

APPENDIX 2

Central Plains Water Enhancement Scheme

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Canterbury Regional Council Consents

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, or deeper than the highest groundwater level at that site; and
 - (b) The deposition of material into excavated land
for the purposes of constructing and 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.
3. Works shall be confined to the areas shown on the accompanying 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 condition (2)
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 groundwater.
9. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Environment Canterbury, 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 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 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.
11. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Environment Canterbury Erosion and Sediment Control Guidelines (2007).
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 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 (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) The date, time, location and estimated volume of the spill;
 - (ii) The cause of the spill;

- (iii) The 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.
14. 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 consent holder may excavate and disturb land, deposit material, and remove and plant vegetation associated with any operational or maintenance activity relating to the Headrace, Inlet Canal, and Water Distribution Race Network, 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) The removal of vegetation within 7.5 metres of the watercourses;
 - (b) The excavation of land within 7.5 metres of the watercourses;
 - (c) The deposition of material within 7.5 metres of the watercourses;
 - (d) The installation of structures and operational or maintenance activities related to the Headrace, Inlet Canal and Water Distribution Network.
 - (e) The stabilisation and revegetation of disturbed areas
4. At least one month prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, 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. 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 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 Environment Canterbury, 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 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 Environment Canterbury Erosion and Sediment Control Guidelines (2007).
11. Erosion and sediment control measures shall be installed prior to the commencement of works as required by the ESCP.
12. Works shall not cause erosion of the banks and bed of drains and waterways.

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 consent holder may excavate and disturb land, deposit material, and remove and plant vegetation associated with any operational or maintenance activity relating to the Headrace, Inlet Canal, and Water Distribution Network, 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) The removal of vegetation within 7.5 metres of the watercourses;
 - (b) The excavation of land within 7.5 metres of the watercourses;
 - (c) The deposition of material within 7.5 metres of the watercourses;

- (d) The installation of structures and operational or maintenance activities related to the Headrace, Inlet Canal and Water Distribution Network.
 - (e) The stabilisation and revegetation of disturbed areas
4. At least one month prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, 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. 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 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 Environment Canterbury, 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 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 Environment Canterbury Erosion and Sediment Control Guidelines (2007).
 11. Erosion and sediment control measures shall be installed prior to the commencement of works as required by the ESCP.
 12. Works shall not cause erosion of the banks and bed of drains and waterways.

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 place, operate, maintain and repair Inlet Canal, Headrace Canal, and Water Distribution Network Structures, 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 and B.2. 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 CRC102328.
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) The installation of erosion and sediment control measures
 - (b) The removal of vegetation
 - (c) The excavation of the bed and riparian margins
 - (d) The installation of siphons, pipes and erosion protection structures;
 - (e) The 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 one month prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, 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. 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 one month of completion of construction of each structure.
8. All practicable steps shall be undertaken to ensure that the works do not deflect floodwaters into the berm.
9. 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.
10. Works shall not occur in flowing water.

11. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Environment Canterbury, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
12. 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 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.
13. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Environment Canterbury Erosion and Sediment Control Guidelines (2007).
14. Erosion and sediment control measures shall be installed prior to the commencement of works as required by the ESCP.
15. Works shall not cause erosion of the banks and bed of the watercourses.
16. 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. Vehicles and machinery shall not enter river channels containing flowing water except where required for access and to do works in the riverbed.
18. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
19. Apart from structures constructed under this consent, on completion of works work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed.

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 erect, and maintain discharge structures and erosion protection structures and carry out associated bed excavation and disturbance, in, on, under, and over the bed of the surface waterbodies listed in Schedules C.1 - C.4. The structures and works will be

associated with the construction 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) The installation of erosion and sediment control measures
 - (b) The removal of vegetation
 - (c) The excavation of the bed and riparian margins
 - (d) The maintenance of siphons, pipes and erosions protection structures;
 - (e) The 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 one month prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, 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. 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 one month of completion of construction of each structure.
8. All practicable steps shall be undertaken to ensure that the works do not deflect floodwaters into the berm.
9. 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.
10. Works shall not occur in flowing water.
11. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Environment Canterbury, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
12. 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 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.
13. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Environment Canterbury Erosion and Sediment Control Guidelines (2007).
 14. Erosion and sediment control measures shall be installed prior to the commencement of works.
 15. Works shall not cause erosion of the banks and bed of the waterways.
 16. 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. Vehicles shall not enter river channels containing flowing water except where required for access and to do works in the riverbed.
 18. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
 19. On completion of works work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed.

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:

This consent is subject to the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative 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) The placement of structures in the bed of the rivers
 - (b) excavating, disturbing and depositing material in the bed of the rivers
 - (c) the 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 without 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 at Browns Rock and the Waimakariri District Council stockwater scheme intake at the same site.
 8. At least one month prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, 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. 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 Environment Canterbury, 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 River;
 - (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 Environment Canterbury Erosion and Sediment Control Guidelines (2007).
 15. Erosion and sediment control measures shall be installed prior to the commencement of works as required by the ESCP.
 16. Works shall not cause erosion of the banks and bed of the Rakaia River or the Waimakariri River or increase the potential for flooding on surrounding land
 17. 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.
 18. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
 19. Apart from structures constructed under this consent, on completion of works work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed.
 20.
 - (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) 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.
 21. 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.
 22. 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.
23. 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.
24. The consent holder shall, after consultation with Canterbury Regional Council's regional engineer, commission an appropriately 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. The Rivers Engineer shall, no less than 24 months post commissioning, undertake a further investigation 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.
25. The works shall not prevent access to and along the Rakaia and Waimakariri Rivers.
26. 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.
27. Plants in riverbeds
- (a) The consent holder shall not introduce any plants listed in Schedule BLR1: Pest Species (attached to this consent).
- (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 condition (2) shall not spread beyond the landscaping zones defined in the Landscape and Rehabilitation Plan.
- (c) The consent holder shall commission a suitably qualified terrestrial ecologist with experience in plant species to certify that the plants identified in the Landscape Plan are not listed in Schedule BLR1, and will not spread beyond the landscaping zone defined in the Landscape and Rehabilitation Plan.
- (d) The consent holder shall submit the certificate, 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.
- (e) The consent holder shall commission a suitably qualified terrestrial ecologist with experience in plant species to undertake a survey by 31 August each year until all plants planted in accordance with the Landscape and Rehabilitation Plan have reached seeding age, and thereafter at (x) yearly intervals to identify any plants that may have spread beyond the landscaping zone.
- (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, submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, a report detailing the results of the survey and the

work undertaken by the consent holder to remove any vegetation as a result of the survey.

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 facilitate the taking of water authorised by resource consents CRC061940 and CRC021091, including:
 - (a) The placement 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.
4. The activities authorised by this consent are subject the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, attached to this consent.
5. The works shall not disturb existing river protection works in the Kimberley Cliff to Redmonds Road reach without 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 at Browns Rock or the Waimakariri District Council to train water towards its stockwater intake.
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 Environment Canterbury, 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 Waimakariri River;
 - (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 Environment Canterbury Erosion and Sediment Control Guidelines (2007).
11. Erosion and sediment control measures shall be installed prior to the commencement of works as required by the ESCP.
12. Works shall not cause erosion of the banks and bed of the Waimakariri River.
13. 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. Vehicles shall not enter river channels containing flowing water.
15. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
16. Apart from structures constructed under this consent, on completion of works work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed.
17. Works shall not increase the potential for flooding on surrounding land
18. Works and any planting undertaken shall not decrease the flood carrying capacity of the Wamakariri River or encroach into any active channel.
19. 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.
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 CRC061868.

Note: This consent does not grant access to the extraction area. 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 by 10 working days after the date of completion of the operation or maintenance activity.
22. The consent holder shall, after consultation with Canterbury Regional Council's regional engineer, commission an appropriately 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. The Rivers Engineer shall, no less than 24 months post commissioning, undertake a further investigation 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.
23. The works shall not impede existing access to and along the Rakaia River and the Waimakariri River.
24. 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.
25. Plants in riverbeds
 - (a) The consent holder shall not introduce any plants listed in Schedule BLR1: Pest Species (attached to this consent).
 - (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 condition (2) shall not spread beyond the landscaping zones defined in the Landscape and Rehabilitation Plan.
 - (c) The consent holder shall commission a suitably qualified terrestrial ecologist with experience in plant species to certify that the plants identified in the Landscape Plan are not listed in Schedule BLR1, and will not spread beyond the landscaping zone defined in the Landscape and Rehabilitation Plan.
 - (d) The consent holder shall submit the certificate, 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.
 - (e) The consent holder shall commission a suitably qualified terrestrial ecologist with experience in plant species to undertake a survey by 31 August each year until all plants planted in accordance with the Landscape and Rehabilitation Plan have reached seeding age, and thereafter at (x) yearly intervals to identify any plants that may have spread beyond the landscaping zone.

- (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, submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, a report detailing the results of the survey and the work undertaken by the consent holder to remove any vegetation as a result of the survey.

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, 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:
 - (h) Any increase in the risk or potential for flooding of surrounding lands;
 - (i) Any destabilising of lawfully established flood control structures or any other lawfully established structures within the beds of rivers;
 - (j) Any increase in erosion of river beds or banks
5. The diversion 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" on attached Plan CRC061940.
2. Water may be diverted at a rate not exceeding 80 cubic metres per second.
3. The diversion shall not prevent the passage of fish, or cause the stranding of fish in pools or channels
4. The diversion shall not obstruct or alter the passage of water in a manner that causes:
 - a. Any increase in the risk or potential for flooding of surrounding lands;
 - b. Any destabilising of lawfully established structures within the beds of rivers;
 - c. Any increase in erosion of river beds or banks;
5. The diversion of water shall be undertaken in accordance with the conditions in Schedule 2: Administrative Conditions attached to this consent.

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:

1. The diversion of water shall only be located in the Waimakariri River at about map reference NZMS 260 L35: 328-603, labelled "diversion" on attached Plan CRC061943.
2. Water may be diverted at a rate not exceeding 40 cubic metres per second.
3. The diversion shall not prevent the passage of fish, or cause the stranding of fish in pools or channels
4. The diversion shall not obstruct or alter the passage of water in a manner that causes:
 - (a) Any increase in the risk or potential for flooding of surrounding lands;
 - (b) Any destabilising of lawfully established structures within the beds of rivers;
 - (c) Any increase in erosion of river beds or banks.
5. The diversion of water shall be undertaken in accordance with the conditions in Schedule 2: Administrative Conditions attached to this consent

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. 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 to be lowered by more than 20% of the available drawdown in that bore.
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 to ensure the adverse effects of the dewatering activities are minimised to the greatest extent practicable. The plan shall include, but not necessarily be 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 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 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.
8. The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be 8 years from first commencement of consent.

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 40 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 near the upstream edge of the designated band shown in Plan CRC061792.
2. The rate at which water is taken from the Waimakariri River shall not exceed 24 cubic metres per second.
3. 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 may 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 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.
 - (v) At or below 76.1 cubic metres per second between 9am and 9pm on Saturdays and Sundays, each weekend between November and March inclusive, and on all public holidays, and on every day during the period commencing the Friday before Christmas each year through to the end of February, no water shall be taken.
4. No water shall be taken during the Coast to Coast event.
5. Water shall only be taken for irrigation including on-farm storage to be used under consent CRC061973. The total volume of water taken for storage from 1 May to 31 August each year under this consent and consent CRC021091 shall not exceed 45,000,000 cubic metres.
6. Fish screens
- (a) The consent holder shall install, operate and maintain a fish screen in accordance with the NIWA publication "Fish Screening: Good Practice Guidelines for Canterbury, October 2007", NIWA Client Report CHC2007-092 at the entrance to the irrigation canal. Water shall be diverted through the fish screen into the canal only when the fish screen is operated in accordance with 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 no greater than 3 millimetres for a mesh screen or 2 millimetres wide for a slotted screen. For the purpose of this clause, the measurement for a mesh shall be the side of a square;
 - (iii) the screens shall have an approach velocity perpendicular to the face of the screen of no greater than 0.12 metres per second;
 - (iv) the 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;
 - (b) each fish screen shall be inspected at a frequency no greater than 48 hours, or 24 hours when the Waimakariri River flows exceed 200 cubic metres per second as estimated by Environment Canterbury from measurements taken at the Old Highway Bridge (at or about map reference NZMS 260 M35: 818-547. Details of the inspections shall be recorded and made available to the Canterbury Regional Council upon their request

- (c) in the event that a screen is damaged so as to be rendered less effective at excluding fish from the canal, the consent holder shall repair or replace the screen immediately, or shall shut down the screen such that water ceases to pass through it. In the event that a screen is shut down, it shall not be reopened until such time as it complies in full with the provisions of condition 5(a) of this consent;
- (d) All incidence of screen shut down shall be recorded by the consent holder and reported to Fish and Game New Zealand within four hours. These records of screen failure shall be forwarded to the Canterbury Regional Council to the attention of the Compliance and Enforcement Manager, at the end of each irrigation season, or upon request.
- (e) The design plans for the fish screen shall be certified by a suitably qualified and experienced chartered engineer with experience in the design and operation of fish screens and / or a fisheries biologist with recognised experience in fisheries research to confirm that the design, function and operation of the screen is in accordance with the guidelines detailed in condition 5(a).
- (f) Prior to commencement of construction:
 - (i) the consent holder shall provide to the Canterbury Regional Council:
 - (a) the certified design plans showing the screen slot or mesh size, sweep velocity, approach velocity, and a by-pass which returns fish to an actively flowing braid of the Rakaia River;
 - (b) a report from the certifying engineer or fisheries biologist which certifies and explains how the certified design and operation of the screen demonstrates compliance with the guidelines detailed in condition 5(a).
 - (ii) the Canterbury Regional Council shall certify the design plans within 20 working days of receipt of those plans. The Certifier's report shall not be unreasonably withheld, and shall be forwarded to the consent holder and copied to the North Canterbury Fish and Game Council.

7. Safety at intakes

- (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 the intake on the Waimakairiri River, and 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 and away from the river, at the choice of the user. 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.

- (b) The safety features of the intake structure shall be designed in consultation with the White Water New Zealand.
 - (c) 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.
 - (d) 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 6(a);
 - (e) 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 6(d)(ii) and such approval shall not be unreasonably withheld.
 - (f) 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 6(e).
 - (g) 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 6(d).
8. 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. The signs shall be visible on the banks and by in-river users and shall be located in consultation with White Water New Zealand and to the approval of the Canterbury Regional Council.
9. All commercial users and recreational boat clubs shall, as far as is practicable, be informed in writing 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.

10. 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.

11. Within six months of the installation of the water measuring or recording device(s), specified in condition (12), 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 9(d) above.

12. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.

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) Limit 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 such that on average not more than 20% of water taken is lost by leakage from the total reticulation system between 1 September and the following 30 April; and
 - (b) Ensure implementation and auditing of the Farm Management Plans as described in Schedule 2 of the Administrative Conditions, and
 - (c) Keep a copy of each Farm Management Plan, and supply any such Plan 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. The maximum application rate shall not exceed 0.6 litres per second per hectare on a scheme-wide basis. 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. 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 10°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) To ensure that all irrigation systems on the property are capable of operating to meet industry and scheme standards for best practice irrigation
 - (b) To maximise water application effectiveness while minimising excess drainage and runoff
 - (c) To minimise the incidence of wind and/or water erosion caused as a result of farming practices
 - (d) To minimise nutrient losses to surface and ground water through the use of nutrient budgeting

- (e) To minimise nitrate leaching and/or run-off losses to surface and ground water through careful fertiliser management
- (f) To minimise phosphate run-off losses to surface water through careful fertiliser management
- (g) To apply nutrients where needed to maximise effectiveness and minimise losses to non target areas
- (h) To exclude all cattle, pigs and deer from waterways and wetlands (including drains and races)
- (i) To minimise soil loss and contamination of waterways
- (j) To protect moderate and high value biodiversity sites

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.
- (e) **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. Consumptive abstraction
 - (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 (3) and (4), 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)	198	182	179	171	169	170	165	166	164	180	203	213

(i)

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 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 (2)(b) 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 Order.

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
CRC991102.1	450
CRC940486.1	450
CRC941177.5	450
CRC941161.2	450
CRC072619	450
CRC941219	450
CRC952433.2	450

6. Water shall only be taken for irrigation including on-farm storage to be used under consent CRC061973. The total volume of water taken for storage from 1 May to 31 August each year under this consent and consent CRC061972 shall not exceed 45,000,000 cubic metres.

7. Fish screens

- (a) The consent holder shall install, operate and maintain a fish screen in accordance with the NIWA publication Fish Screening: Good Practice Guidelines for Canterbury, October 2007”, NIWA Client Report CHC2007-092 at the entrance to the irrigation canal. Water shall be diverted through the fish screen into the canal only when the fish screen is operated in accordance with 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 no greater than 3 millimetres for a mesh screen or 2 millimetres wide for a slotted screen. For the purpose of this clause, the measurement for a mesh shall be the side of a square;
 - (iii) the screens shall have an approach velocity perpendicular to the face of the screen of no greater than 0.12metres per second;
 - (iv) the 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;
- (b) each fish screen shall be inspected at a frequency no greater than 48 hours, or 24 hours when the Rakaia River flows exceed 300 cubic metres per second second as estimated by Environment Canterbury at the Rakaia Gorge recorder site (at or about map reference NZMS 260 K:35: 015-424) or the recorder site at Fighting Hill (at or about map reference NZMS 260 K35:997-437).. Details of the inspections shall be recorded and made available to the Canterbury Regional Council upon their request
- (c) in the event that a screen is damaged so as to be rendered less effective at excluding fish from the canal, the consent holder shall repair or replace the screen immediately, or shall shut down the screen such that water ceases to pass through it. In the event that a screen is shut down, it shall not be reopened until such time as it complies in full with the provisions of condition (7)(a) of this consent;
- (d) All incidence of screen shut down shall be recorded by the consent holder and reported to Fish and Game New Zealand within four hours. These records of screen failure shall be forwarded to the Canterbury Regional Council to the attention of the Compliance and Enforcement Manager, at the end of each irrigation season, or upon request.
- (e) The design plans for the fish screen shall be certified by a suitably qualified and experienced chartered engineer with experience in the design and operation of fish screens and / or a fisheries biologist with recognised experience in fisheries research to confirm that the design, function and operation of the screen is in accordance with the guidelines detailed in condition 7(a).
- (f) Prior to commencement of construction:
 - (i) the consent holder shall provide to the Canterbury Regional Council:
 - (a) the certified design plans showing the screen slot or mesh size, sweep velocity, approach velocity, and a by-pass which returns fish to an actively flowing braid of the Rakaia River;
 - (b) a report from the certifying engineer or fisheries biologist which certifies and explains how the certified design and operation of the screen demonstrates compliance with the guidelines detailed in condition 7(a).
 - (ii) the Canterbury Regional Council shall certify the design plans within 20 working days of receipt of those plans. The Certifier's report shall not be unreasonably withheld, and shall be forwarded to the consent holder and copied to the North Canterbury Fish and Game Council.

8. Safety at intakes

- (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 the intake on the Rakaia River, and 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 m/s 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 m/s,
 - (v) Provide and maintain adjacent to the intake gate a kayak bypass of International Grade 2, suitable for racing kayaks.
- (b) The safety features of the intake structure shall be designed in consultation with the New Zealand Recreational Canoeing Association.
- (c) 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.
- (d) 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 8(a);
- (e) 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(d)(ii) and such approval shall not be unreasonably withheld.
- (f) 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 8(e).
- (g) 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 8(d).
- (h) 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. The signs shall be visible on the banks and by in-river users and shall be located in consultation with White Water New Zealand and to the approval of the Canterbury Regional Council.
- (i) All commercial users and recreational boat clubs shall, as far as is practicable, be informed in writing 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.

9. 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.

10. Within six months of the installation of the water measuring or recording device(s), specified in condition (12), 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 9(d) above.

11. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.

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. Discharges of sediment laden water shall flow across vegetated land prior to discharging into a surface water body.
5. This consent is subject to the general conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions

Pre-construction

6. 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.
7. The consent holder shall inform Environment Canterbury in writing, Attention: RMA Compliance and Enforcement Manager, at least ten days prior to the commencement of work on each new stage of development.
8. 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)

9. 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 (24). 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.
10. The ESCP shall be prepared in accordance with the Environment Canterbury, 2007 "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRC R06/23.
11. Erosion and sediment control measures during the construction of the site shall consist of but not be limited to the following:
 - (a) Silt fences;
 - (b) Diversion channels;
 - (c) Earth bunds;
 - (d) Directing sediment laden water to grassed areas.

Certification

12. 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 (24); and
 - (b) consistent with the conditions of this consent;prior to any discharge authorised by this consent occurring.
13. The ESCP, 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 construction commencing.
14. 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

15. During construction, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff off site.
16. Construction shall be staged such that progressive stabilisation works can be carried out.
17. Discharges from bulk earthworks greater than 5,000 square metres in area shall be via either decanting earth bund or sediment detention pond designed in accord with Environment Canterbury, 2007 "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRC R06/23, but decanting earth bunds shall have the following exceptions:
 - (a) the length to width ratio shall be three to one; and
 - (b) the device shall have a floating decant instead of a snorkel upstand.
18. 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.
19. All exposed surfaces 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.
20. Erosion and sediment control measures implemented under the ESCP shall be constructed and maintained in accordance with the Environment Canterbury, "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRCR06/23, February 2007 (ESCG).
21. 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

22. 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.

23. 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

24. The discharge associated with this consent shall not cause a change in turbidity of more than 20 percent in the receiving water body beyond the zone of non-compliance. The zone of non-compliance shall be calculated as: length of the zone (in metres) is equal to the square root of the width of the flow of the receiving waterway at the point of discharge (measured in metres).

Monitoring

25. 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.

26. If any storm event results in water discharging from the sediment pond(s) or decanting earth bund(s), the consent holder shall, within two hours, undertake water turbidity measurements upstream and downstream of the zone of non-compliance to determine whether there has been a conspicuous increase in turbidity.

- (a) Water turbidity shall be measured using a calibrated turbidity meter.
- (b) Water turbidity measurements shall be undertaken by a suitably qualified person.
- (c) A conspicuous increase shall be defined as an increase in turbidity of twenty percent or higher at the downstream monitoring site.

27. In the event that there is a conspicuous increase in water turbidity measured in accordance with Condition (26) 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.

28. 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

29. There shall be no refuelling of vehicles and machinery within 50 metres of any surface water body.

30. 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

31. Erosion and sediment control measures shall not be decommissioned until the site is stabilised.
32. Decommissioning shall be only undertaken when dry weather is forecast for a period suitable to allow decommissioning to be carried out without rainfall occurring.
33. The following decommissioning measures shall be undertaken in the following order:
- (a) All disturbed areas shall be stabilised and/or re-vegetated as soon as practicable following completion of the works;
 - (b) Any visible debris, litter, sediment and hydrocarbons shall be removed from all sediment control measures; and
 - (c) Erosion and sediment control measures in accordance with the ESCP shall be removed.

Administration

34. The Canterbury Regional Council may, once per year, on any of the last five days of April or October, serve notice of its intention to review the conditions of this consent for the purposes of:
- (a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or
 - (b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
 - (c) Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.

35. The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be 8 years from granting of consent.

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 construction 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. Discharges of sediment laden water shall flow across vegetated land prior to discharging into a surface water body.
5. This consent is subject to the general conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.

Pre-construction

6. 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.
7. The consent holder shall inform Environment Canterbury in writing, Attention: RMA Compliance and Enforcement Manager, at least ten days prior to the commencement of work on each new stage of development.
8. 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

9. 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 (24). 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.
10. The ESCP shall be prepared in accordance with the Environment Canterbury, 2007 "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRC R06/23.
11. Erosion and sediment control measures during the operation and maintenance of the site shall consist of but not be limited to the following:
 - (a) Silt fences;
 - (b) Diversion channels;
 - (c) Earth bunds;
 - (d) Directing sediment laden water to grassed areas;
12. 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 (24); and
 - (b) consistent with the conditions of this consent;prior to any discharge authorised by this consent occurring.

13. The ESCP, 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.
14. 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

15. During operation and maintenance, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff off site.
16. Discharges from bulk earthworks greater than 5,000 square metres in area shall be via either decanting earth bund or sediment detention pond designed in accord with Environment Canterbury, 2007 "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRC R06/23, but decanting earth bunds shall have the following exceptions:
 - (a) the length to width ratio shall be three to one; and
 - (b) the device shall have a floating decant instead of a snorkel upstand.
17. Maintenance shall be staged such that progressive stabilisation works can be carried out.
18. 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.
19. All exposed surfaces 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.
20. Erosion and sediment control measures implemented under the ESCP shall be constructed and maintained in accordance with the Environment Canterbury, "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRCR06/23, February 2007 (ESCG).
21. 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

22. 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.
23. 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

24. The discharge associated with this consent shall not cause an increase in turbidity of more than 20 percent in the receiving water body beyond the zone of non-compliance. The zone of non-compliance shall be calculated as: length of the zone of non-compliance (in metres) is equal to the square root of the width of the flow of the receiving waterway at the point of discharge (measured in metres).

Monitoring

25. The consent holder shall ensure that all erosion and sediment control measures are inspected each working day while any earth remains disturbed or otherwise un stabilised.
26. If any storm event results in water discharging from the sediment pond(s) or decanting earth bund(s), the consent holder shall, within two hours, undertake water turbidity measurements upstream and downstream of the zone of non-compliance to determine whether there has been a conspicuous increase in turbidity.
- (d) Water turbidity shall be measured using a calibrated turbidity meter.
 - (e) Water turbidity measurements shall be undertaken by a suitably qualified person.
 - (f) A conspicuous increase shall be defined as an increase in turbidity of twenty percent or higher at the downstream monitoring site.
27. In the event that there is a conspicuous increase in water turbidity measured in accordance with Condition (24) 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.
28. 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

29. There shall be no refuelling of vehicles and machinery within 50 metres of any surface water body.
30. 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

31. Erosion and sediment control measures shall not be decommissioned until the site is stabilised.
32. Decommissioning shall be only undertaken when dry weather is forecast for a period suitable to allow decommissioning to be carried out without rainfall occurring.
33. The following decommissioning measures shall be undertaken in the following order:
- (a) All disturbed areas shall be stabilised and/or re-vegetated as soon as practicable following completion of the works;
 - (b) Any visible debris, litter, sediment and hydrocarbons shall be removed from all sediment control measures; and
 - (c) Erosion and sediment control measures in accordance with the ESCP shall be removed.

Administration

34. The Canterbury Regional Council may, once per year, on any of the last five days of April or October, serve notice of its intention to review the conditions of this consent for the purposes of:

- (a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or
- (b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
- (c) Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.

35. The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be 8 years from granting of consent.

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 a sealed bund with a capacity of at least 110 percent of the volume of fuel stored.

Stormwater system

- (4) All stormwater discharges shall be treated as follows:
 - (a) Stormwater from access tracks shall be discharged across vegetated land.

- (b) Stormwater from temporary buildings shall discharge directly onto land via adjacent vegetated areas.
 - (c) Roof stormwater from permanent buildings shall discharge into land via soak pits via a sealed system that excludes all other stormwater
 - (d) Any stormwater from temporary hardstand areas shall be discharged across vegetated land.
 - (e) Stormwater from permanent hardstand areas shall discharge into land via vegetated infiltration basins.
 - (f) Stormwater collected from within fuel storage bunds shall be trucked from the site and disposed of at a facility authorised to receive such materials.
- (5) Each soak pit shall:
- (a) Be designed in accordance with the New Zealand Building Code method E1/VM1;
 - (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) Any land which receives a discharge of stormwater shall be uniformly vegetated with grass or groundcover vegetation.
- (7) All infiltration basins shall:
- (a) Be designed and constructed to have sufficient capacity to contain and infiltrate stormwater runoff 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) Stormwater shall not pond in the stormwater system for longer than three days after the cessation of any storm event.
- (9) The discharge shall not cause scour, erosion and/or instability to the bed or banks of any surface waterway.
- (10) 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 (6) and (7) of this consent. This

CPEng shall also sign a statement confirming that they are competent to certify the engineering work

Inspections and Maintenance

- (11) 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 [five/ten] working days of the inspection.
- (12) The infiltration basins and any vegetated land that receives stormwater discharge shall be:
 - (a) Maintained so that vegetation or grass is in a healthy and uniform state.
 - (b) Replanted where erosion or die-off has resulted in bare or patchy soil cover.
- (13) 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.

Performance Standards

- (14) 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 beyond the zone of non-compliance. A significant increase shall be defined as a change greater than 20 percent as measured using a calibrated turbidity meter. The zone of non-compliance shall be calculated as: length of the zone of non-compliance (in metres) is equal to the square root of the width of the flow of the receiving waterway at the point of discharge (measured in metres).

Spills

- (15) 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.

Administration

- (16) This consent is subject to the general conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.
- (17) The Canterbury Regional Council may, once per year, on any of the last five days of April or October, serve notice of its intention to review the conditions of this consent for the purposes of:
 - (a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or
 - (b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
 - (c) Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.
- (18) The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be 8 years from granting of consent.

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 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.
3. The consent holder may 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.
4. The discharge of dewatering water shall not cause any adverse effects to surrounding property or infrastructure.
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 the effects of the dewatering activities are minimised to the greatest extent practicable. The plan shall include, but not necessarily be 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 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 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

NOTE: In the event that the consent holder considers that any of the restrictions contained in the Dewatering Management Plan are unnecessary or too stringent, then the consent holder may apply for a change of conditions in accordance with section 127 of the RMA.

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.

8. The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be [8 years from first commencement of consent].

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 and wetlands, as listed in Schedules A1 to A.4 and C3 to C4.
2. The Inlet Canal, Headrace Canal and Water Distribution Network shall be designed and constructed to limit the loss of water to ground to not more than 20% of the water taken for irrigation from the Rakaia and Waimakariri Rivers combined.
 - (a) 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 all structures and wetlands to be constructed in association with the Central Plains Water Enhancement Scheme.
 - (b) The final design plans shall be reviewed and signed by a chartered professional engineer, certifying that the structures comply with condition (2) of this consent.
 - (c) The review and certification of the plans shall not be undertaken by the person responsible for the design plans.
3. The wetlands and structures shall be constructed in accordance with the reviewed and certified final design plans.
4. A certificate signed by a chartered professional engineer certifying that the wetlands and 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.
5. The discharge of water shall be undertaken in accordance with Schedule 2: Administrative Conditions.
6. 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.
7. The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be 8 years from first commencement of consent.

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 from the Headrace and Water Distribution Network.
2. The discharge shall only be:
 - (a) into water at the locations listed in Table 1; or
 - (b) into land at the locations listed in Table 2.
 - (c) may be into water or land 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 2: Administrative Conditions

Discharges into water

4. 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			

5. The discharge shall not result in erosion of the bed or banks of any watercourse.

6. The discharges into the Waimakariri River shall comply with the following water quality standards as a result of the exercise of this consent:
 - (a) There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.
 - (b) There shall be no conspicuous change in the colour or visual clarity. A conspicuous change in colour shall be defined as a change greater than 10 points on the Munsell scale. A conspicuous change in visual clarity shall be defined as a change greater than 33%, as measured by black disc.
 - (c) There shall be no emission of objectionable odour.
 - (d) The maximum cover of stream or river beds by periphyton as filamentous growths or mats greater than 3 millimetres thick, shall not exceed 25%.
 - (e) Bacterial or fungal slime growths (also known as heterotrophic growths or sewage fungus) shall not be visible to the naked eye as plumose growths or mats
 - (f) The BOD₅ of GF/C filtered water shall not exceed 2 grams per cubic metre.
 - (g) The concentration of dissolved oxygen shall exceed 80% of saturation concentration.
 - (h) Fish and other aquatic organisms shall not be rendered unsuitable for human consumption.
 - (i) There shall be no 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) The natural temperature of the water shall not be changed by more than 3° Celsius, and shall not exceed 25° Celsius at any time, and the temperature of the water 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.
7. 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 no longer than the square root of the lowest river flow over a continuous seven day period with an Annual Exceedence Propability of 10%, multiplied by a factor of 80.

8. All practicable measures shall be undertaken to ensure that the discharged water is not deflected into the berm.

Discharges into land

9. 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			

10. The inlet(s) to the wetland shall be designed and constructed with appropriate protection to prevent erosion and scour.
11. Each wetland shall be designed and constructed to retain and infiltrate water discharged from the headrace and water distribution network.
12. 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.
13. 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 Condition (13). The information submitted shall include, but not be limited to, the following:
 - (a) Evidence of infiltration testing carried out at wetland location, and the results of that testing;
 - (b) The infiltration area of the wetland;
 - (c) A minimum infiltration rate and
 - (d) The volume of the wetland.
14. There shall be no ponding or flooding on surrounding land as a result of the discharge to the wetlands.
15. 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 (11) to (13) of this consent.

Maintenance

16. The wetlands and discharge points into rivers shall be inspected at least once every 6 months.
17. The wetlands shall be maintained such that the infiltration rate is equal to or greater than the minimum rate required to absorb the water into the wetland without surface runoff.
18. 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
19. The consent holder shall keep records of all inspections and maintenance undertaken in accordance with condition 11. 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.

20. 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 to the Rakaia River, at about map reference NZMS 260 K36: 083-379 as shown on the attached plan CRC061980
2. The discharge of water shall not cause significant erosion of the bed or banks of any watercourse.
3. The rate at which water is discharged to the Rakaia River from the fish pass shall be at least 2 cubic metres per second.
4. The discharge shall only be water that has been diverted in accordance with resource consent CRC061940.
5. 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
6. The discharge of water shall be into an active channel of the Rakaia River.
7. Sediment sluicing shall only occur when the flow in the Rakaia River as measured at Fighting Hill exceeds 300 cubic metres per second.
8. Sediment sluicing shall only occur during the mornings of weekdays that are not public holidays.
9. Warning signs shall be erected in the riverbed downstream of the intakes as directed by the Canterbury Regional Council.
10. Sediment sluicing shall be undertaken at a time of day determined in consultation with the Canterbury Regional Council.
11. 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
 - (i) For the purpose of this consent, reasonable mixing is confined to a mixing-zone no longer than the square root of the lowest river flow over a continuous seven day period with an Annual Exceedence Probability of 10%, multiplied by a factor of 80.

12. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.

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:

1. The discharge of water and sediment laden water shall only be to the Waimakariri River, at about map references NZMS 260 L35:336-583 as shown on the attached plan CRC061982.
2. The rate at which water is discharged to the Waimakariri River from the fish pass shall be at least 2 cubic metres per second.
3. The discharge shall only be water diverted in accordance with resource consent CRC061943.
4. 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
5. The discharge of water shall be into an active channel of the Waimakariri River.
6. The discharge shall not cause erosion of the bed or banks of any watercourse.
7. The discharge shall comply with the following water quality standards:
 - (a) There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.
 - (b) There shall be no conspicuous change in the colour or visual clarity. A conspicuous change in colour shall be defined as a change greater than 10 points on the Munsell scale. A conspicuous change in visual clarity shall be defined as a change greater than 33%, as measured by black disc.
 - (c) There shall be no emission of objectionable odour.

- (d) The maximum cover of stream or river beds by periphyton as filamentous growths or mats greater than 3 millimetres thick, shall not exceed 25%.
 - (e) Bacterial or fungal slime growths (also known as heterotrophic growths or sewage fungus) shall not be visible to the naked eye as plumose growths or mats
 - (f) The BOD₅ of GF/C filtered water shall not exceed 2 grams per cubic metre.
 - (g) The concentration of dissolved oxygen shall exceed 80% of saturation concentration.
 - (h) Fish and other aquatic organisms shall not be rendered unsuitable for human consumption.
 - (i) There shall be no 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) The natural temperature of the water shall not be changed by more than 3° Celsius, and shall not exceed 25° Celsius at any time, and the temperature of the water 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.
8. Sediment sluicing shall only be undertaken when the unmodified flow in the Waimakariri River exceeds 100 cubic metres per second.
 9. Sediment sluicing shall only occur during the mornings of weekdays that are not public holidays.
 10. Warning signs shall be erected in the riverbed downstream of the intakes as directed by the Canterbury Regional Council.
 11. Sediment sluicing shall be undertaken at a time of day determined in consultation with the Canterbury Regional Council.
 12. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.

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 attached to 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.
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).
 - (e) 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 meteorological 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 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.
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 attached to this consent and the water intake systems on the Rakaia River and Waimakariri River, located as shown on the attached plans 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.
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.
 - (c) 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 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.
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 this of consent.

Schedule 1: General Conditions

General Conditions

1. All works shall be undertaken in general accordance with the application documents presented except as modified by specific conditions.
1. All practicable measures shall be undertaken to minimise and mitigate adverse effects on property, amenity values, wildlife, vegetation and ecological values.
2. The consent holder shall submit to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, 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 order that compliance with the conditions of this consent can be achieved and the effects of construction activities are minimised and mitigated to the greatest extent practicable.
3. The ECMP will be the over-arching document for environmental compliance. Within the ECMP there will be the following sub-plans to ensure compliance with specific conditions on each consent.
 - (a) Stormwater and wastewater management plan
 - (b) Dewatering management plan
 - (c) Hazardous substances management plan
 - (d) Noise and vibration management plan
 - (e) Dust management plan
 - (f) Traffic management plan
 - (g) Landscape and rehabilitation management plan
 - (h) Remediation action plan
 - (i) Pest management plan
 - (j) Weed management plan
 - (k) Erosion management plan
 - (l) Archaeological management plan
 - (m) Health and safety management plan
 - (n) Waste management plan
4. The consent holder may, at any time, submit to the consent authority, an amended Environmental Construction Management Plan provided it is for the purpose of improving the efficiency and/or quality of the construction works, and better avoiding, mitigating or remedying adverse effects.
5. The consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, in writing of the proposed date of commencement of the construction works, at least one month prior to the start date of the works.

6. 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 shall be notified of the intention to carry out works, and their intended type and scope that are likely to cause significant disturbance of fish and bird life, not less than 48 hours prior to their commencement.
 - (b) All practicable steps shall be undertaken to:
 - (i) keep to established tracks and stream crossings; and
 - (ii) prevent debris, soil, vegetation getting into the watercourse.
 - (c) The activity shall not restrict the access to flood control structures or flood control vegetation for the purposes of their repair or maintenance.
 - (d)
 - (i)
 - A 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, or alternatively offset mitigation of equivalent value to avifauna as recommended by the expert
 - B For the purposes of this condition birds are defined as those bird species listed in Appendix A.
 - (ii) 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 inspects the proposed area of works, no earlier than eight working days prior to any works being carried out, and locates any bird breeding sites of birds 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;
 - 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.
 - (iii) Instream works shall not be undertaken during the period 1 October to 30 March unless the Canterbury Regional Council has notified the consent holder that it is satisfied from a report by a suitably qualified person engaged

by the consent holder that the effects of the proposed works on fish spawning and spawning habitat will be no more than minor.

- (e) The activities and any associated equipment, materials, or debris shall not obstruct or alter the passage of water in a manner that causes:
 - (i) Any increase in the risk or potential for flooding of surrounding lands;
 - (ii) Any destabilising of lawfully established flood control structures or flood control structures or any other lawfully established structures within the beds of rivers;
 - (iii) Any increase in erosion of river beds or banks;
- (f) The works shall not prevent the passage of fish, or cause the stranding of fish in pools or channels.
- (g) Machinery shall be free of plants and plant seeds prior to use in the riverbed.
- (h) 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.
- (i) 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 Environment Canterbury Customer Services.
- (j) Within two months 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.
- (k) The consent holder shall within two months of completion of the construction works, issue a notice to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager,, certifying that all construction debris or other materials from the construction works, that may pose a hazard to public safety, fishing or recreational activities, has been removed.
- (l) 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.
- (m) All disturbed areas shall be stabilised and/or revegetated following completion of the works.
- (n) No structure and/or site works shall be located to preclude existing access to the riverbed

Accidental Discovery

7. .

- (a) In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the consent holder shall immediately:

- (i) cease earthmoving operations in the affected area; and
 - (ii) mark off the affected area until earthmoving operations recommence; and
 - (iii) advise the Canterbury Regional Council of the disturbance; and
 - (iv) advise the Upoko Runanga of Taumutu, or their representative and the New Zealand Historic Places Trust of the disturbance.
- (b) Earthmoving operations shall not recommence until either
- (i) The consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu or their representative(s) and dated within 5 days of the ceasing of the works and stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or
 - (ii) If a certificate is not able to be obtained within 5 working days after advising both Upoko, then a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's professional opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

Note: This condition is in addition to any agreements that are in place between the consent holder and the Upoko Runanga (Cultural Site Accidental Discovery Protocol) or the New Zealand Historic Places Trust. This condition does not replace other legal responsibilities, such as those under the Historic Places Act.

8. Where appropriate, all contractors, project managers and stakeholders shall be made aware of their individual responsibilities under the protocol.

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 ten years from the date of grant of this consent.

Environmental Management Fund

2. Prior to the exercise of this consent, the consent holder must establish and administer an Environmental Management Fund to be used by the consent holder to fund:
 - (a) environmental mitigation required as a result 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,
3. 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 \$2 per hectare of irrigated land 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).
 - (e) The criteria for increasing the levy over time.
9. Priority, for the distribution and use by the consent holder of the scheme Environmental Management Fund, shall be provided to the following environmental mitigation which is not otherwise required by the individual Farm Management Plans or specific consent conditions:
 - (a) Physical protection of, stock exclusion from, weed management and indigenous vegetation planting along riparian margins and wetlands;
 - (b) Physical protection of, stock exclusion from, and indigenous vegetation planting along riparian margins of rivers and streams;
 - (c) Wetland enhancement and wetland creation, including the development of wetlands along intermittent streams;
 - (d) Permanent protection of wetland areas that could contain mudfish.

Sustainability Protocol

10. 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 water take and delivery of water to the Scheme area.
11. The Sustainability Protocol shall be used to develop the Farm Management Plans as prescribed in accordance with resource consent CRC061973.

Community Liaison

12. The consent holder shall, prior to the exercise of these consents, 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 be offered the opportunity to meet every 6 months, or less frequently as determined by the Community Liaison Group, an annual inspection of the Scheme area, and the provision of any information to which Canterbury Regional Council is entitled by virtue of this consent, at the consent holder's expense.
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;
 - (b) Be presented by, and discuss with, the consent holder the results of monitoring and reporting as required by the conditions of these consents, 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. In particular, the members of the Community Liaison Group shall be offered the opportunity to review and comment on the initial Scheme Environmental Management Plan and the initial Farm Management Plan templates, the reviews of and any amendments to the Scheme Environmental Management Plan and Farm Management Plan templates, the consent holder's Annual Environmental Report including the annual overall audit report on compliance with the Farm Management Plans. The Community Liaison Group will be provided with the opportunity to submit information to the Canterbury Regional Council annually in relation to the review of the Scheme Environmental Management Plan and the template for the Farm Management Plans.

Groundwater and Lowland Drainage

19. The consent holder shall avoid, remedy or mitigate adverse effects on groundwater and lowland drainage which occur as a result of the exercise of this consent.
20. Prior to the commencement of any activities authorised by these consents (including the finalisation of the Groundwater and Drainage Plan listed in condition 10), the consent holder shall appoint a Groundwater Technical Review Panel (GTRP).
21. 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:
- (a) The operation of the Central Plains Water Enhancement Scheme
 - (b) Lowland drainage network operations in Canterbury
 - (c) Hydrogeology
 - (d) Land drainage
 - (e) Groundwater quality monitoring
 - (f) Surface water monitoring
22. The GTRP shall comprise at a minimum the following:
- (a) A technical representative appointed by Central Plains Water Enhancement Scheme management,
 - (b) A technical representative of drainage schemes management from the lower plains,
 - (c) An engineer with expertise and experience in both large scale and localised solutions to land drainage needs,
 - (d) An engineer or scientist with expertise and experience in Canterbury groundwater systems
 - (e) A technical representative from the Canterbury Regional Council
23. The role of the GTRP shall be to :
- (a) To review the Groundwater and Drainage Plan described in condition 25, and recommend its adoption with amendments as it considers appropriate;
 - (b) To 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;

- (c) To review reports submitted by the consent holder and complaints referred to it in accordance with condition 28, 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;
- (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);
- (e) To 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;
- (f) To address other matters that may arise from the exercise of consent CRC061973.

24. The GTRP shall

- (a) Meet no less frequently than once a year
- (b) Be funded by the consent holder.
- (c) Operate on a majority basis.
- (d) 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.

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
- (b) The key objectives of the Groundwater and Drainage Plan shall be to outline the groundwater monitoring and reporting programme and to describe how the consent holder will avoid, remedy or mitigate adverse effects on groundwater and lowland drainage which occur as a result of the exercise of this consent.
- (c) 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 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 ECan.
- B There shall be at least four monitoring sites in Lake Ellesmere/ Te Waihora.
- C The consent holder may use data collected by the Canterbury Regional Council or any other body in lieu of establishing new monitoring sites. In the event that other authorities reduce their monitoring of Lake Ellesmere/ Te Waihora or lowland streams, 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.
- 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 screen no longer than 3 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 will be 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 25(i)(iii).
- 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.
 - (iv) 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;
 - (v) A description of the specific triggers that will initiate the implementation of the mitigation measures in response to the monitoring outcomes for any effects that may arise related to groundwater levels, groundwater quality, surface water flows and surface water quality;
 - (vi) 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.
- (d) Surface water quality monitoring
- (i) Using the existing recent surface water quality data and data collected from the surface water monitoring prior to commencement of irrigation activity, the consent holder shall 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.
 - (ii) Trigger levels shall be identified as a percentage increase or an absolute concentration increase in nutrient (Nitrate-N) concentration from the agreed mean baseline level 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.
 - (iii) Specific trigger levels identified in the Groundwater and Drainage Plan shall be submitted to the GTRP for their review and agreement.
 - (iv) Final agreed trigger levels shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.
 - (v) 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 exceedance of any surface water quality trigger level specified in the Groundwater and Drainage Plan, which is due to the exercise of this consent.
- (e) Groundwater level monitoring
- (i) Groundwater levels in the monitoring bores identified in the Groundwater and Drainage Plan shall be measured at least once per month or any subsequent frequency agreed upon by the GRTP.
 - (ii) Groundwater level measurements shall commence at least one year prior to the use of water under resource consent CRC061973.
 - (iii) The frequency of the water level measurements may only be reviewed by the GRTP two years after the commencement of the use of water under resource consent CRC061973.
- (f) No later than six months prior to the use of water under resource consent CRC061973, the consent holder shall undertake a baseline survey of the lowland

drainage systems of the Central Plains taking into consideration historical data, and submit a report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. The report 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.
- (g) Using the existing groundwater level data and data collected from the groundwater level monitoring, the consent holder shall 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.
- (i) Specific trigger levels shall be submitted to the GTRP for their review and agreement.
 - (ii) Final agreed trigger levels shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.
- (h) In the event that the trigger levels specified in accordance with condition (25)(g)(ii) 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.
- (i) Groundwater quality monitoring
- (i) 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.

- (ii) 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.
 - (iii) 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.
 - (iv) 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.
 - (v) 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 exceedance, then the consent holder shall 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 in accordance with condition 28(f) that the use of water by the consent holder was not the likely cause of the exceedance.
- (j) The consent holder shall submit 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.
26. 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. 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. The consent holder shall also submit the report to the Canterbury Regional Council, Attention: Compliance and Enforcement Manager, by 1 September each year.
27. Prior to 1 October each year, the GTRP shall review the report described in condition (11) 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.

28. 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 complainant, 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 and options to mitigate or remedy the effects;
 - (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 (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 otherwise reach agreement with the complainant in respect of any damage. Any agreement for the consent holder to pay costs directly to the landowner shall be registered on the title of the subject property/ies.
- (e) 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
- (f) 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

Review

29. The Canterbury Regional Council may in the last five working days in June and December during the first five years from the date of issue of 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 Waimakairiri River to protect the recharge into the Christchurch-West Melton and Kaiapoi aquifer systems.
30. 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 NZMS 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 State 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

1.1 Bonding

The Consent Holder shall provide and maintain in favour of the Canterbury Regional Council and the Selwyn District Council (jointly for their respective interests) a bond to secure compliance by the Consent Holder with the conditions of the following resource consents and designations:

- (a) Resource Consent Numbered XX to XX, granted by Environment Canterbury;
- (b) Resource Consent Numbered XX to XX, granted by Selwyn District Council;
- (c) Designations Numbered XX to XX, granted by Selwyn District Council;

including the completion of all rehabilitation works required by these consents and designations and all monitoring obligations of the Consent Holder and all works to avoid, remedy, or mitigate any significant adverse effects on the environment arising as the result of the exercise of the consents or rights pursuant to the designations.

1.2 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, Environment Canterbury and the Selwyn District Council (“the Councils”), or, in the event of the Councils not agreeing, approved by an independent firm of solicitors nominated by the Councils jointly.

1.3 Content of Bond

The bond shall provide that the Consent Holder shall be liable and remain liable for meeting:

- (a) The cost of completing the works required to operate the Scheme in accordance with the consents; or alternatively
- (b) The cost of remedying or mitigating any breach of the conditions of the consents as detailed in condition 1.1 above; and
- (c) The cost of avoiding, remedying or mitigating and/or monitoring any significant adverse effect on the environment, and caused by the Scheme,

which became apparent during or after the expiry of the consents set out above.

1.4 Payment

The payment of the bond quantum by the Consent Holder shall be guaranteed by a guarantor acceptable to the Councils.

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.

1.5 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 consents referred to in condition 1.1.

1.6 Amount

The amount of the bond shall be set initially by agreement between the Consent Holder and the Councils, taking into account the estimated cost of meeting the obligations for which the bond is given as set out in condition 1.3 above.

- (a) The amount of the bond will then be reviewed and reassessed by the Consent Holder and the Councils every 12 months from the date the initial bond amount was lodged until a date two years after the date on which all consents listed in condition 1.1 have been given effect to. After that, it will be reviewed and reassessed by the Consent Holder and the Councils at five yearly intervals for the duration of the consents to which this condition relates.
- (b) 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 Councils, 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 1.6(a) above.
- (c) In the event of the Consent Holder and the Councils not reaching agreement on a bond amount within thirty working days (30) days of the date the review and reassessment falls due, it will be assessed by an independent bond assessor appointed by the Councils jointly, and the decision of that person shall be final and binding

- (d) If at any time the amount of the bond is varied pursuant to this condition then the Consent Holder and guarantor approved by the Councils, shall within thirty (30) working days of notification to the Consent Holder of the varied bond amount, execute and lodge with the Councils a new bond for the varied amount or the additional amount required in excess of the existing bond.
- (e) The Consent Holder will not exercise, or shall cease to exercise, these consents:
1. Until the bond referred to in condition 1.5(a) above is executed by the Consent Holder and guarantor and deposited with the Councils; and
 2. In respect of any varied bond referred to in conditions 1.5 (b) and (d) above, after thirty (30) working days has expired from the date the Consent Holder was notified of the terms of the varied bond by either Council, unless the varied bond has been executed by the Consent Holder and guarantor, and has been deposited with the Councils, or the varied bond decreases the bond amount required to be provided by the Consent Holder.

1.7 Section 109

The provisions of Section 109 of the Act shall apply to any bond required pursuant to this condition.

1.8 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.

New Zealand Dam Safety Guidelines 2000, New Zealand Society on Large Dams

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*/ Civil Defence	<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
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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 stat-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.