ENVIRONMENT AND INFRASTRUCTURE COMMITTEE AGENDA

THURSDAY 7 FEBRUARY 2012

AT 9AM

IN COMMITTEE ROOM 1, SECOND FLOOR, CIVIC OFFICES, 53 HEREFORD STREET

Committee: Councillor Claudia Reid (Chair)
Councillors Sally Buck, Jimmy Chen, Barry Corbett, Aaron Keown, and Sue Wells

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PART A - MATTERS REQUIRING A COUNCIL DECISION
PART B - REPORTS FOR INFORMATION
PART C - DELEGATED DECISIONS

INDEX

ENVIRONMENT AND INFRASTRUCTURE COMMITTEE 7. 2. 20132

1. APOLOGIES

2. BRIEFING ON WATER MANAGEMENT ZONE IMPLEMENTATION PROGRAMMES

Refer **Attachment 1** and **Attachment 2**.

3. DEPUTATIONS BY APPOINTMENT

3.1 Glen Koorey, Spokes Canterbury Inc, in relation to clause 4, Key Cycleway Projects.

Canterbury Water

Banks Peninsula
Zone Implementation Programme

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Christchurch City Council

The Banks Peninsula Zone Committee:

The Banks Peninsula Zone Committee is one of ten under the Canterbury Water Management Strategy (CWMS).

Banks Peninsula Zone Committee Members:

Richard Simpson..... Chair (community member)

Yvette Couch-Lewis..... Deputy Chair (community member)

Iaean Cranwell ..... (Te Rūnanga o Wairewa)

Steve Lowndes .....(Community member)

Pam Richardson..... (Community member)

June Swindells ..... (Te Hapu ō Ngāti Wheke/Rapaki)

Kevin Simcock ..... (Community member)

Claudia Reid ..... (Christchurch City Councillor)

Wade Wereta-Osborn..... (Te Rūnanga o Koukourarata)

Pere Tainui..... (Te Rūnanga o Ōnuku)

Donald Couch ..... (Environment Canterbury Commissioner)

(see http://ecan.govt.nz/get-involved/canterburywater/committees/bankspeninsula/Pages/membership.aspx
for background information on committee members)

With support from

Shelley Washington.....Environment Canterbury (Launch Jan - Dec 2012)

Peter Kingsbury .....Christchurch City Council

Fiona Grace Nicol.....Environment Canterbury

Tracey Hobson.....Christchurch City Council

Anna Veltman.....Environment Canterbury

For more information contact fiona.nicol@ecan.govt.nz

Nā te Pō, Ko te Ao
Tana ko te Ao Mārama
Tana ko te Ao Tūroa,
Tana ko te Kore te Whiwhia
Tana ko te Kore te Rawea
Tana ko te Kore te Tāmaua
Tana ko te Kore Mātua
Tana ko Mākū
Te Punawai o Te Ao

Ko te pū, Ko te more, Te Weu Aka
Ko te rea, Ko te wao, Kukune whe
Ko te kore ko te pō ko Rakinui, Papatūānuku Ūkaipō
Ka tau te parawhenua, Hua parawhenua!

Ka tau anō kā mauka, Ko Te Poho o Tamatea, Te Pōhue
Ōteauheke, Te Ūpoko o Tahumatā
Ka titiro ki kā puna, kā awa, kā whaka, te roto o Wairewa,
ki Te Pātaka Te toka tapu ko Te Ahu Pātiki, Ō tū kai taua Tūmataueka

Ko Waitaha
Ko Māmoe
Ko Tahu
Tīhei Mauri Ora!

Chairmans Comments

Volcanic activity millions of years ago formed Banks Peninsula. The landscape it left has a long and rugged coastline, two harbours and a lake all surrounded by moderate to steep hill country with short steep streams. Original Maori settlement was scattered all over Banks Peninsula where food was abundant on the land, in fresh water and in the sea. European settlement has followed suit with numerous communities widely dotted onto the Banks Peninsula landscape. Settlements are more concentrated around the two harbours of Lyttelton [Whakaraupo] and Akaroa and there are four marae that are the cultural centres for Maori. Sheep, cattle farming and tourism are the main industries on Banks Peninsula upon which thelocal economy is based.

The nature of Banks Peninsula with large areas of quite steep contour means that land use is not intensive although there are a small number of dairy farms and some horticulture. Therefore water use is largely for domestic consumption and stock water usage. Biodiversity on Banks Peninsula is relatively plentiful and numerous community efforts are centred toward further protection and restoration. About 15% of groundcover is currently in original or regenerating native vegetation.

This Draft ZIP has been developed after consultation with a wide group of stakeholders and members of our community. The Zone Committee is now asking for your input to help us form the final ZIP. When you give us your feedback could you please be as specific and concise as possible as to what you would like to see changed and/or added including reference to recommendation numbers where applicable. We would really appreciate your thoughts.

The representatives on the zone committee reflect this diverse area by contributing their extensive knowledge of the Banks Peninsula water issues as well as their wide areas of interest and expertise. The representatives and employees of Environment Canterbury, the Christchurch City Council, local Rūnanga and the community have worked conscientiously and collaboratively with extensive community input to produce this Draft Zone Implementation Programme. It has been a pleasure to Chair such a diverse, dedicated and capable group of people.

Richard Simpson (Chair)

Invitation for feedback

The Zone Committee welcomes written feedback on this draft Zone Implementation Programme (ZIP) – see feedback form at the end of this document.

Please send your feedback to mailroom@ecan.govt.nz by **16 November, 2012.**

The Zone Committee will present and discuss this draft ZIP at public community meetings as follows:

Lyttelton Top Club, 23 Dublin St, Lyttelton
Monday 29th October, 6pm-8pm.

Akaroa Sports Complex, Akaroa
Tuesday 30th October, 6pm-8pm.

Little River Rugby Clubroom, Little River
Wednesday 31st October, 6pm-8pm

Diamond Harbour Community Hall, Diamond Harbour
Thursday 1st November, 5:30pm-7:30pm

The Zone Committee welcomes the opportunity to meet with organisations to discuss this draft ZIP.

Please contact admin@canterburywater.org.nz if your organisation wishes to meet with the Zone Committee or if you want more information on the community public meetings.

Mā te mahi ngātahi i te ao kōwhai, ka eke tātou
The work will be successful through unity

Contents

1. Introduction

This Zone Implementation Programme (ZIP) is the output from the Banks Peninsula Zone Committee (BPZC), as part of the wider Canterbury Water Management Strategy (CWMS).

The CWMS was initiated in 2005 by the Canterbury Mayoral Forum to manage water in the region in a collaborative manner.

The desired outcome of the CWMS is

"To enable present and future generations to gain the greatest social, economic, recreational and cultural benefits from our water resources within an environmentally sustainable framework."

Banks Peninsula is one of ten zones in the Canterbury region under the CWMS.

The Committee is tasked to give effect to make recommendations to the principles, priorities and targets it the CWMS:

- **Primary principles** - sustainable management, regional approach and kaitiakitanga.
- **Supporting principles** - natural character, indigenous biodiversity, access, quality drinking water, recreational and amenity opportunities, and community and commercial use.
- **First order priorities** - environment, customary use, community supplies and stock water.
- **Second order priorities** - irrigation, renewable electricity generation, recreation and amenity.

A set of ten targets provides the strategy with a sense of direction and balance, and ensure that all aspects of the solution are advanced in parallel. The targets are:

- Ecosystem health and biodiversity.
- Natural character, processes and ecological health of braided rivers.
- Kaitiakitanga.
- Drinking water.
- Recreational and amenity opportunities.
- Water use efficiency.
- Irrigated land area.
- Energy security and efficiency.
- Indicators of regional and national economies.
- Environmental limits.

Draft ZIP

The recommendations from the committee make up this draft ZIP which is then is circulated for Public Feedback. The ZIP will contain recommendations principally for actions in the next three years, but with a long-term horizon also in view. The ZIP is a living document and the Zone committee will review progress against it and update it as required.

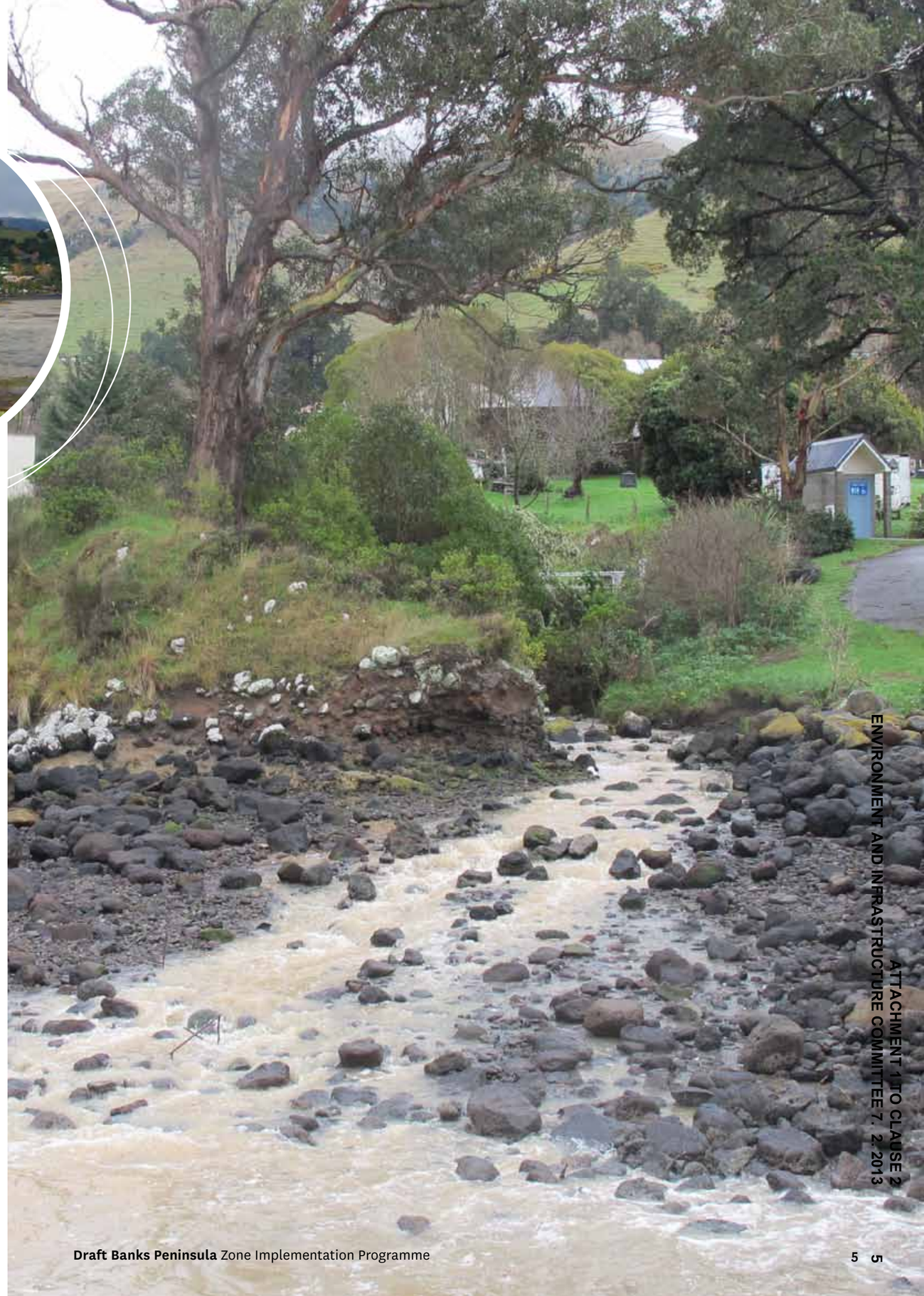
The ZIP is not a statutory plan under the Resource Management Act and the Zone Committee does not have the power to commit any Council to any path or expenditure. However the ZIP carries the weight of the wide commitment to the CWMS, of Councils, Rūnanga, and the community and a wide range of agencies and interest- and industry-groups.

The ZIP recommendations are intended to be integrated into the planning process in relevant agencies and councils and lend weight to future projects and spending in the zones.

Immediate Steps Protection and Restoration Programme

Immediate Steps funding is money set aside through CWMS to implement recommendations in the ZIP around Biodiversity projects. The Immediate Steps programme aims to protect and restore freshwater biodiversity and water-use affected terrestrial biodiversity in Canterbury.

The programme has two main streams of work – restoration actions and planning matters (each of these is summarised in Annex I of the CWMS). As part of the restoration actions work stream, the Immediate Steps Fund provides the Banks Peninsula Zone Committee with $100,000 per year, for five years, to allocate to on-the-ground actions which contribute to achieving the ecosystem health and biodiversity goals and objectives of the CWMS. The Zone Committee is tasked with prioritising how these funds are best allocated within the Banks Peninsula Zone.



The Banks Peninsula Zone Committee

The Banks Peninsula Zone Committee is an experienced, committed, knowledgable and collaborative group of people including Rūnanga, farming, small block holders and council members representing the broad mix of the Peninsula population.

Specifically the Zone Committee is formed with Canterbury Regional Council, Christchurch City Council, Wairewa Rūnanga, Te Hapu o Ngāti Wheke/Rapaki, Ōnuku Rūnanga, Te Rūnanga o Koukourarata and community members.

The Banks Peninsula Zone Committee was launched in September 2011 and since then has met at least once a month to work through various chapters of its ZIP to meet the targets of the CWMS. Formal meetings, site visits, presentations and stakeholder feedback meetings were followed by more informal workshop sessions to pull together a consensus of recommendations.

The Committee acknowledges the support it has received from Christchurch City Council and Environment Canterbury staff, and many of the smaller groups on the Peninsula who have given presentations and engaged in discussion with the Zone Committee to come up with the recommendations in this ZIP.

Many members of the public have come along to the open meetings and presented their specific cases, educating and influencing the Zone Committee in their recommendations for Water Management in the Zone.

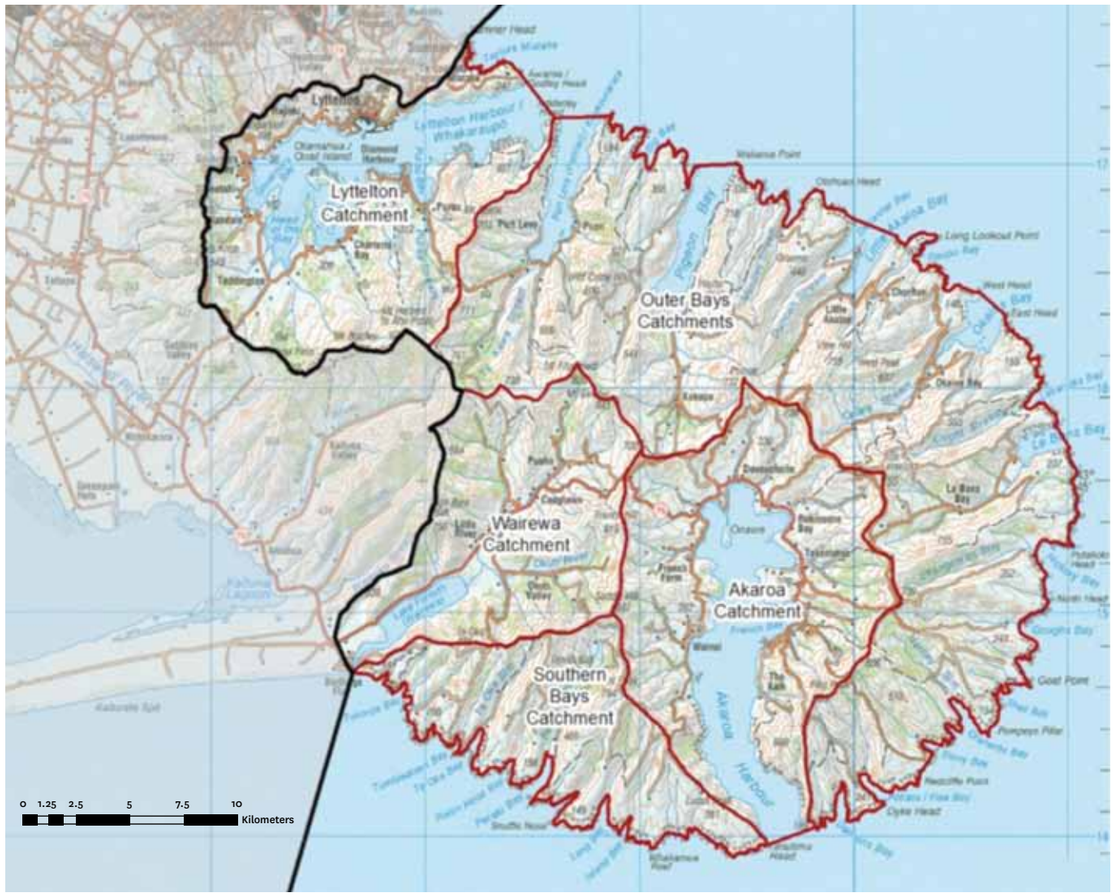
The Zone Committee has set priorities for how Immediate Steps funding is to be spent.

The Zone Committee looks forward to continuing work in the Zone, building on existing established relationships and the ones formed through the process, to implement the recommendations in this ZIP.

The Banks Peninsula ZIP enable the CWMS targets through its chapters as follows:

CWMS Target	Chapter in Banks Peninsula ZIP
Ecosystem health and biodiversity	Biodiversity, Erosion and Sediment Control, Waste Water and Education
Natural character of braided rivers	Not included - No braided rivers in Zone
Kaitiakitanga	Kaitiakitanga
Drinking water	Water Quality
Recreational and amenity opportunities	Biodiversity, Costal and Te Roto o Wairewa
Water use efficiency	Water Quantity and Climate Change
Irrigated land area	Not included - Little irrigated land on the Peninsula
Energy securtiy and efficiency	Water Quantity
Regional and national economics	Water Quantity
Environmental limits	Water Quality and Water Quantity

Unique Banks Peninsula



Banks Peninsula Water Management Zone

Features

Banks Peninsula/Te Pataka o Rakaihautu is a unique part of Canterbury. The Peninsula is approximately 1000 sq km in area and its highest point is Mt Herbert at 920 m above sea level. Almost surrounded by the Pacific Ocean, the Peninsula has a geologically and ecologically distinctive volcanic and coastal landscape. The extinct volcanic cones have created a steep landscape with many deep valleys. With so many bays, harbours and valleys, the peninsula contains over 100 streams. Due to the nature of the landscape, the catchments are all short(less than 10 km long) and very steep, with lowland stream reaches generally measuring only a few kilometres long. In pre-European times (pre 1840s), upper headwaters would have flowed from New Zealand coniferous forests. Lowland streams would have run through tall tōtara, mātai, rimu and kahikatea podocarp (native pine) forests. The once vast areas of podocarp forest have mostly all gone now. Over the last 100yrs the Peninsula has experienced a complete ecological transformation from dense forest to farmland.

The Peninsula's steep sided valleys and limited flat land means there are few wetlands. The small amounts of flat land have generally been drained and farmed. The largest wetland areas on the Peninsula are around the edges of Te Waihora/ Lake Ellesmere in the adjacent Selwyn Waihora zone.

The soils on Banks Peninsula comprise two different types, volcanic tephra and loess soil (including clays). The volcanic soils are high in iron, phosphorus and other minerals, giving them a strong reddish-brown colour. In the past, , loess was blown by strong nor'west winds from the plains and settled on top of the volcanic soil. Strong winds, rain and the removal of native forest from Banks Peninsula have caused erosion of both soil types. Loess is particularly prone to erosion when native forest cover is removed. Movement of sediment is typical in many Banks Peninsula streams due to highly erodible soils and steep catchments. Mud and soil transported downstream is most often referred to as suspended sediment. Even streams such as Narbey Stream, which has thick streamside vegetation for almost its entire length, often has a milky appearance due to small amounts of sediment being held in suspension. Many native freshwater fish species have adapted to, and will tolerate, a certain level of suspended sediment for short periods. However, few species will withstand prolonged high sediment loadings. Banded kōkopu, for example, actively avoid streams with high sediment loadings and may in time disappear from such streams.

Strong community support for conservation projects has developed to reverse some of these effects, retain natural and historic features and to restore habitat. Increasingly land is being purchased for conservation by private individuals and at the same time long established farming families are protecting areas of high conservation value on their land.

Tourism has become one of the Peninsula's primary industries, with holidaymakers visiting Akaroa and other Peninsula settlements over weekends and holidays.During peak periods tourism, just like more traditional Peninsula industries, can put pressure on freshwater resources both in terms of water supply and effluent disposal.

The Committee has broken up the Zone into five sub-areas for ease through the ZIP process. The five areas are shown on the map as follows:

- Lyttelton catchment.
- Outer bays catchment.
- Akaroa catchment.
- Wairewa catchment.
- Southern Bays catchment.

Christchurch City Council

The Banks Peninsula Zone falls under the Christchurch City Council area. Since amalgamation with the Banks Peninsula District Council in 2006 there has been more money and resources for the Peninsula to upgrade water related infrastructure such as water and wastewater treatment plants.

The Christchurch City Council has been a large part of creating this ZIP and the work they are doing is recognised and supported by the Zone Committee. The Zone Committee look forward to a united, strong and integrated relationship with the City Council as it moves into implemetation.

Shared Boundaries With Other Zones

The Banks Peninsula Zone is adjacent to the Selwyn Waihora Zone and the Christchurch - West Melton zones

The Selwyn Waihora Zone's main water body is Te Waihora/ Lake Ellesmere with Banks Peninsula being Te Roto o Wairewa. The Zone Committee acknowledges the cross boundary issues and the need to work together. This is detailed further in the recommendations.

History

The history of the Waitaha people in New Zealand goes back many generations to about 850 AD, when Rākaihautū (a Waitaha ancestor) came to Te Wai Pounamu (the South Island) from Hawaiki as the captain of the Uruao waka. The waka was beached at Whakatū/Nelson.

While his son Rakihouia took some of the party to explore the East Coast, Rākaihautū led the remainder on an inland route over the Southern Alps or Kā Tiritiri o te Moana. With his famous kō (digging stick) Tūwhakaroria, Rākaihautū dug the southern lakes (Kā puna karikari o Rākaihautū). Te Rakihouia then proceeded south down the Canterbury Coast in the Uruao waka and met up with his father in the vicinity of Waihao.

The final two lakes that Rākaihautū carved out were Te Waihora (Lake Ellesmere) and Te Roto o Wairewa (Lake Forsyth), these are guarded by a taniwha kaitiaki (guardian monster), named Tūterakihuanoa.

Te Waihora was originally named Te Kete Ika o Rākaihautū - the fish basket of Rākaihautū, acknowledging the abundant resources in the lake.

Waitaha then settled in Akaroa Harbour. Overwhelmed by the magnificence of his artistic endeavours Rākaihautū decided to stay driving his kō, Tūwhakaroria deep into the ground above Wainui where it became Tuhiraki (Mt Bossu). As a testament to his work and in recognition of the abundance and variety of food and other resources found on the Peninsula up until quite recently, the people named the area Te Pātaka o Rākaihautū or the great food storage house of Rākaihautū.

Generations later, the Kāti Māmoe people arrived from the North Island (Te Ika a Maui) and settled among the Waitaha people. A prominent man of this tribe was Tūtekawa, who in establishing his home at Waikākahi, declared Te Waihora as his own and the lake became known as Te Kete Ika a Tūtekawa. Until the late seventeenth century, Kāti Māmoe was the main tribe in the South Island. When Tūtekawa killed two senior Ngāi Tahu women, Ngāi Tahu warriors came from the north in pursuit of Tūtekawa and his people. They ransacked the major Kāti Māmoe pā Parakākāriki (at Ōtanerito) and Waikākahi. The Ngāi Tahu chiefs took control of key locations on the Peninsula.

By 1750, prior to European settlement, Ngāi Tahu occupied most of the South Island. Ngāi Tahu had settlements in every bay on the peninsula and on many of the headlands. They settled these areas in either hapū (sub-tribe) or whānau (family) groups. Ngāi Tahu settlement differed from the earlier more nomadic tribes in that permanent gardens were established. The gardening expertise of peninsula Ngāi Tahu must have been well honed; kūmara were grown successfully on Te Pātaka o Rākaihautū despite it being 1,000 kilometres further south than kūmara grown in their native Chile. In the early 1800s, there are records of trading between Ngāi Tahu and European sealers. However, as well as muskets, clothing, tobacco and alcohol, the Europeans brought with them a number of diseases. These diseases, combined with a ferocious civil war and raids led by Te Rauparaha from Kapiti, all took a huge toll on Peninsula Ngāi Tahu. A census conducted in 1848-49 estimated a population of only 300 Ngāi Tahu on the peninsula, whereas before the war and spread of disease there had been thousands.

Papatipu Rūnanga

Papatipu Rūnanga are the modern day administrative councils and representatives of Ngāi Tahu hapū and whānau on traditional marae-based communities. Each Rūnanga has its own takiwā (area) determined by natural boundaries such as mountain ranges and rivers.

- Te Hapū o Ngāti Wheke, (Rapaki).
- Te Rūnanga o Koukourārata, (Port Levy).
- Ōnuku Rūnanga, (Akaroa).
- Wairewa Rūnanga, (Little River).

Each Rūnanga is represented on the Zone Committee.

2. Chapters and Recommendations

The Committee's intial workshop held in March 2012 set Initial Priority Outcomes for the Zone. The output from this workshop is outlined as follows:

Key Principles

- A Ki Uta Ki Tai (From the mountains to the sea) approach is taken to waterway management in the Zone.
- Collaboration and Community Partnerships are used to achieve outcomes.
- Innovation and integration are used in implementation.
- Success is demonstrated and shared.
- Kaitiakitanga underpins water management in the Zone.

Priority Outcomes

Priority outcomes for the Zone to be achieved under the CWMS have been identified. These are all considered to be outcomes of equal importance and they are not listed in any priority order.

- Thriving communities and industries, including tourism and agriculture.
- All communities have a high quality and reliable water supplySafe drinking water is available for private supplies.
- Adequate water is available for stock water and fire fighting.
- Improved efficiency in the use of water in the Zone.
- Waste water management is improved in Little River, andLyttelton and Akaroa harbours.
- The coastal margins in harbours and bays are healthy ecosystems.
- Selected streams are protected and enhanced in each sub-zone using a Ki Uta Ki Tai approach.
- Remaining areas of salt marsh and raupo in Whakaraupō / Lyttelton Harbour are protected and enhanced.
- Te Roto o Wairewa has the water quality improved to be suitable for contact recreation, mahinga kai, and fish passage.
- Improved community understanding of water quality and quantity through effective monitoring and education.

Process from Initial Workshop to Recommendations

Each of the following chapters was the focus of a Zone Committee meeting where presentations and feedback were sought from council experts, community and conservation groups.

1. Water Quality

Maintaining and enhancing surface and groundwater water quality in the Banks Peninsula Zone is important as water is used for drinking, enhancing biodiversity and helping to sustain economic viability. High quality drinking water is important for both the health of the community, ecosystems and to sustain the tourist industry. Much of the Peninsula's drinking water is supplied via council-run community water supplies which are currently being upgraded. There are also many private small group supplies which are operated independently. The council mandate for upgrading systems not already council owned comes from national policy and public health risks. The Zone Committee feels it is important that private small group supplies are prioritised for support and the local communities are fully briefed on the options for upgrading such systems in their areas. Water quality monitoring programmes are in place which regularly tests many of the streams on the Peninsula, but there is a need to review the programmes and update as necessary. Contaminants entering waterways are an important issue for the Zone Committee and are dealt with in specific recommendations.

Priority Outcomes

People in the Banks Peninsula Zone have access to safe drinking water, as defined by the New Zealand Drinking Water Standards (NZDWS). Water quality in Banks Peninsula waterways is regularly monitored. Policies and rules are developed to maintain natural water quality and improve it where appropriate.

Recommendations

	Recommendations	Responsibility/Time Period
1.1	CCC WATER SUPPLIES to be upgraded to at least Bb (see appendix 1) by 2015 in the following areas: Akaroa, Duvauchelle, Little River, Pigeon Bay, Takamatua.	Christchurch City Council in 5yrs.
1.2	Small group private water supplies that are not currently under CCC management are to be prioritised for funding support upgrades.	Zone Committee in 1 year.
1.3	The users of small group private water supplies are fully informed on the options for improving water quality in their catchments.	Zone Committee and Christchurch City Council in 5yrs.
1.4	Water supply catchments are prioritised for biodiversity enhancements and protection upstream of the takes.	Christchurch City Council and Community.
1.5	All stormwater from hazardous sites is treated with oil interceptors or similar technology.	Environment Canterbury in 5yrs.
1.6	The upgrading of areas that are contributing to poor stormwater quality are prioritised based on the adverse effects of water quality and quantity on the environment.	Christchurch City Council.
1.7	Planning rules around stock exclusion are enforced.	Environment Canterbury ongoing.
1.8	Fertiliser usage is managed to minimise discharge of nutrients to waterways. The Overseer programme (or an equivalent method) and GPS are used for fertiliser management on farms.	All land users.
1.9	Passive discharge from contaminated land is investigated to determine its affect on the environment. Rules to require sufficient distance from waterways are enforced.	Environment Canterbury in 5yrs.
1.10	Identify birds that in large numbers have significant adverse effects on water quality in the Zone. Where required improve the effective management of birds in these locations.	Environment Canterbury, DOC, Fish and Game ongoing.
1.11	Water trough and yard placement are away from streams and runoff is managed.	Community education.
1.12	Regulations are established and enforced for runoff water from such activities as boat and car washing, excavations, roadways and car parks and similar to improve the quality of water being discharged to the ocean.	Environment Canterbury 5yrs.
1.13	On-going water quality testing of waterways is continued and a plan for expansion developed.	Environment Canterbury and Christchurch City Council ongoing.

2. Water Quantity

Water availability for out-of-stream use, particularly for domestic and stock water requirements, is one of the key issues in the Zone. Most of the water sources are the numerous small streams, with only a small proportion of water being sourced from groundwater. In the summer months, in some communities, there is not enough water to service all household and gardening needs. If the Peninsula is to grow, this issue will need to be addressed. It is recommended that all the existing minimum flows set for streams and rivers in the zone (Appendix 3) are reviewed, including in flow-sensitive catchments already listed in Environment Canterbury plans (Appendix 4). An action also identified is to explore water efficiency and re-use options. Adoption of measures to improve water use efficiency, including re-use is recommended before sourcing additional water supplies.

Priority Outcomes

There is enough water available in the Banks Peninsula Zone to meet the needs of domestic use, stock water and fire fighting storage. Allocation of water above that required to meet these needs is subject to flow and allocation limits.

Recommendations

	Recommendations	Responsibility/Time Period
2.1	A research project into how much Permitted Activity water take and essential domestic and stock water supplies influence the flows in the Peninsula stream flows is undertaken.	Environment Canterbury in 1yr.
2.2	Existing minimum flows set for streams (including flow sensitive catchments) are reviewed and, if needed, new minimum flows and allocation limits are set. Recognise the significance of the minimum flow sensitive catchments when assessing the future land usage for those areas.	Zone Committee and Christchurch City Council in 2 yrs.
2.3	The interaction between groundwater and surface water is taken into account when setting minimum flows for streams.	Environment Canterbury in 2yrs.
2.4	The focus for Banks Peninsula is on the efficient use and re-use of water rather than an increase in supply.	Christchurch City Council in 20yrs.
2.5	Water use efficiencies on Banks Peninsula are investigated, and once decided, recommended as changes to the Christchurch City Council Water Services Bylaw.	Zone Committee and Christchurch City Council in 2 yrs.
2.6	CCC carry out a cost-benefit study to investigate a system where water rates are reduced for people who adopt the water use efficiencies in the Christchurch City Council Bylaw.	Christchurch City Council in 10yrs.
2.7	At the next District Plan Review, regulation be included requiring rain-water recovery systems for all new homes and major building alterations.	Christchurch City Council in 2yrs.
2.8	Water use is measured and recorded and water metering is promoted. Where this measurement identifies high water use, strategies are developed and implemented to reduce use.	Christchurch City Council and Community in 5yrs.
2.9	CCC work through programmed works to fix leaky pipes in infrastructure as per Water Supply Strategy 2009-2039 and feed back to Zone Committee on 6 monthly basis.	Christchurch City Council in 10yrs.
2.10	Storage Options are identified, discussed and implemented for fire fighting water. All property owners are encouraged to develop a fire-fighting plan.	Zone Committee 1 yr.
2.11	The effects of high seasonal numbers of tourists are taken into account when planning for water usage in Banks Peninsula.	Christchurch City Council ongoing.
2.12	Establish water supply strategies for small group private water supplies, encouraging the usage of composting toilets, reclaimed water roof supply water and similar systems.	Christchurch City Council ongoing.

3. Biodiversity

The Banks Peninsula Zone Committee considers the protection and restoration of biodiversity to be a priority within the zone. This is reflected in the large number of recommendations within this chapter. The whole of Banks Peninsula is a regionally outstanding landscape (Daley 2004) and the topography, geology and climate that results from such a uniquely formed landscape is also reflected in the unique biodiversity values found in the zone. The often short and steep stream catchments of Banks Peninsula have high native fish and invertebrate diversity and provide rare 'source to sea' habitats for the flora and fauna that live in them. This is especially important for our migratory native fish which spend at least part of their lifecycle at sea but return to the freshwater streams to spawn. The wetlands and salt marshes found within the Banks Peninsula zone together with the estuaries and oxidation ponds found north of the Port Hills within the Christchurch zone, support nationally and internationally significant concentrations of a variety of bird species. The main lake present within the zone, Lake Forsyth (Te Roto o Wairewa), is extremely important in both a national and regional context due to the biodiversity values that the lake and surrounding catchment support. Additionally, the Okana River delta that feeds into Lake Forsyth is a 'nationally significant landform', being the best example of a cuspate delta in the South Island. It is important that these unique biodiversity values are protected to ensure that they are still around for future generations to enjoy. The Banks Peninsula community already show a high level of interest in biodiversity and subsequently have an impressive array of existing programmes, projects, groups and initiatives that help protect and restore the precious biodiversity values within the area. The committee wishes to ensure that these efforts are further supported and promoted while encouraging better co-ordination between all groups and agencies working to protect biodiversity, so that 'the whole is greater than the sum of its parts'

Priority Outcomes

Banks Peninsula is recognised in the region for showcasing flourishing biodiversity. Protection and enhancement of biodiversity is promoted, supported and celebrated. 'Flagship Projects' are showcased as examples of excellent Biodiversity achievement.

Recommendations

	Recommendations	Responsibility/Time Period
3.1	Agencies take a co-ordinated approach to Biodiversity across the Zone.	All Agencies general philosophy.
3.2	Key biodiversity indicators are selected and agreed on. These indicators are used to measure Biodiversity improvement in (i) Water Quality (ii) Flora and fauna regeneration and (iii) Water Quantity (iv) Mauri.	Christchurch City Council, Environment Canterbury, DOC , BPCT QEII Trust, All Rūnunga in 1yr.
3.3	All agencies use the key biodiversity indicators to measure and communicate biodiversity on the Peninsula.	Christchurch City Council, Environment Canterbury, DOC , BPCT QEII Trust, All Rūnunga in 1yr.
3.4	One agency agrees to take the responsibility for co-ordinating all of the monitoring information from agencies and community groups, and creating a computerised system of documentation including mapping.	Christchurch City Council, Environment Canterbury, DOC , BPCT QEII Trust decide in 1yr.
3.5	2-3 Flag Ship projects are selected including one in the farming sector.	Zone Committee in 6 months.
3.6	Two wetlands are chosen to protect and restore.	Zone Committee in 6 months.
3.7	The Banks Peninsula Ecological Study and implementation programme is supported.	Christchurch City Council 5yrs.
3.8	The Banks Peninsula Conservation Forum is supported. At least 1 Zone Committee member is nominated to attend the forum and report back to the Zone Committee.	Banks Peninsula Conservation Forum and Zone Committee 6 months.
3.9	The Banks Peninsula Conservation Trust is supported.	Zone Committee, Community and Councils.
3.10	Improved co-ordination to rationalise equitable access to available funding for smaller groups.	Christchurch City Council, Environment Canterbury, DOC Ongoing.
3.11	Barriers to native fish passage are investigated. Establish a work programme to remove these barriers to promote native fish passage.	Christchurch City Council and Environment Canterbury in 5yrs.
3.12	Biodiversity is highly valued and promoted in all infrastructure upgrades.	Christchurch City Council On-going.
3.13	Environment Canterbury and CCC plans are reviewed to ensure rules specifically support Biodiversity	Zone Committee in 1 yr.

Recommendations continued...

	Recommendations	Responsibility/Time Period
3.14	Compliance with the Regional Pest Management Strategy is supported. Identify pests that are significant risks to Biodiversity that are not covered by RPMS and develop strategies to address these.	Environment Canterbury in 5 yrs.
3.15	Alternative ways to prevent stock entering waterways other than fencing are investigated.	Zone Committee and Community.
3.16	The remaining Immediate Steps Funding, for enhancing biodiversity and maximising ecological health is spread out over the four regions of the peninsula.	Environment Canterbury.
3.17	The following project criteria be a priority for funding.	
	Projects which protect areas which are vulnerable to threats (development, weeds, animal pests etc).	
	Projects have good links back into the community.	
	Projects which have good connectivity and create habitat corridors throughout the peninsula.	
	Projects which protect and achieve Ki Uta Ki Tai – mountains to the sea protection and restoration of waterways.	
	Projects which have the ability to provide educational opportunities and visibility for the general public to become engaged with biodiversity (a 'working laboratory'); and,	
	Projects which support landowners who go above and beyond the current requirements under the stock exclusion rule in the NRRP.	
	Projects where funding provides leverage to further funding from other organisations.	
	Projects where "buy in" and enthusiasm of land owner is high.	
3.18	Scientific experts in salt marsh and estuary research are engaged to provide expert advice and information regarding regeneration.	Environment Canterbury in 1 yr.
3.19	Protection of whitebait spawning habitats is a priority in biodiversity projects.	Environment Canterbury and Christchurch City Council.
3.20	Priority areas for willow tree removal are set taking into account the crested grebe habitat.	Environment Canterbury, Christchurch City Council and Rūnunga in 5yrs.

4. Kaitiakitanga

Kaitiakitanga is one of the three fundamental principles of the Canterbury Water Management Strategy (CWMS) which also notes (Annex G no.3) that ".. Exercise of Kaitiakitanga requires both a role in decision making and the achievement of environmental outcomes.." The Resource Management Act (RMA) (Part 1 section 2(1)) states that ".. 'Kaitiakitanga' means the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources: and includes the ethic of stewardship.."

The Zone Committee notes that the issue of indigenous rights to fresh water lies beyond the purview of the CWMS and is not a matter that the Committee can resolve. Indeed, indigenous rights to fresh water in Canterbury can only be resolved by Ngāi Tahu and Crown representatives as it relates to agreements reached by their predecessors under the Treaty of Waitangi (1840) and the Sale & Purchase Agreement for Port Cooper & Port Levy Blocks (1849) and the Akaroa Block (1856). That said, the Committee recognises the following:

a) That the relationship between tangata whenua and freshwater is longstanding.

b) That relationship of mana whenua with water is fundamental to their culture.

c) That water per se is valued as a taonga of paramount importance; and

d) That the obligations to protect and enhance the mauri of water are inter-generational and must apply to all those who benefit from the use of water.

It is worth noting that, notwithstanding the unresolved nature of their rights to freshwater, Ngāi Tahu have made it very clear that economic development is vital for the region and for the nation, and that in their role as kaitiaki, they need to be involved in all aspects of water management, including economic development. Tangata Whenua have been very clear that sustainable economic development is fundamentally dependent on sustaining healthy waterways. Poor water, poor economy! No water, no economy! Tangata Whenua consider that water quality is the paramount determinant governing all land and water use and development, ensuring that land and water users share relative responsibility to protect, maintain or enhance environmental values as a matter of first order priority so that the water can continue to uphold economic, social and cultural endeavour for generations to come.

Ultimately, Ngāi Tahu seek outcomes from water that:

a) Sustain the physical and metaphysical health and wellbeing of waterways as a matter of first principle.

b) Ensure the continuation of customary in-stream values and uses; and

c) Satisfy development aspirations.

Mahinga Kai Water plays a unique role in the traditional economy and culture of Ngāi Tahu. The most direct physical relationship that Ngāi Tahu have with water involves the protection, harvesting, and management of mahinga kai. The term 'mahinga kai' refers to natural resources and the area in which they are found, Ki Uta Ki Tai (from the mountains to the sea). Mahinga kai has always been, and continues to be, at the heart of Ngāi Tahu culture and identity. It encompasses social and educational elements as well as the process of food gathering. This includes the way resources are gathered, the places they are gathered from, and the resources themselves. In the past, mahinga kai would have included seals, tītī (mutton birds), kererū, kaimoana (shellfish), tuna (eels) inaka (whitebait), trees for carving and waka, materials such as harakeke, and paru (mud), which are used for dyes. These resources are considered taonga (particular treasures for food and cultural identity) because they sustained life and an industry for the area and those who resided there. Thus cultural use, traditionally and today, continues within a sustainable use framework. For Ngāi Tahu today, participation in mahinga kai activities is an important expression of cultural identity. This participation is reliant on Ngāi Tahu people having sufficient access to mahinga kai sites, resources and a healthy environment.

Toitū te marae o Tangaroa
Toitū te marae o Tāne
Toitū te iwi

Healthy Water, Healthy Land, Healthy People

Priority Outcomes

All streams, freshwater wetlands, Te Roto o Wairewa, salt marsh/estuaries, springs and harbours in the Banks Peninsula Zone have Kaitiakitanga as an overarching value and reflect Ki Uta Ki Tai, Mauri, Mahinga Kai to tangata whenua, Wahi Tapu and Wahi Taonga.

Recommendations

	Recommendations	Responsibility/Time Period
4.1	Restoration and maintenance of Mauri in all waterways be of the highest priority.	All agencies and councils and community.
4.2	Ki Uta Ki Tai (catchment based planning from the mountains to the sea) is integrated into all planning documents on the Peninsula.	All agencies and councils and community.
4.3	The coastal environment and harbours are not separated from the waterways leading to them.	All agencies and councils and community.
4.4	All Papatipū Rūnanga are consulted and involved in the freshwater projects in their Takiwā.	All agencies and councils and community.
4.5	Tuia projects are spread between the four Papatipū Rūnanga within the zone.	Environment Canterbury.
4.6	Investigate ways to measure Kaitiakitanga values and include one measure in key biodiversity indicators for improvement.	Zone Committee and Rūnunga 6 months.
4.7	Three main projects are chosen which focus on Mahinga Kai as the priority.	Zone Committee in 1 year.
4.8	Access to key mahinga kai sites is to be discussed by tangata whenua and land owners and where possible provided for.	Rūnunga and Community 4 yrs.
4.9	Wahi Tapu and Wahi Taonga sites are identified for protection through the Ngāi Tahu cultural mapping project. Rūnanga are consulted and are involved in the environmental projects in the vincinity of the sites in their area.	Community ongoing.

5. Erosion and Sediment Control

Sediment contamination into streams and harbours from unrestricted earthworks and other land use practices is identified as another major issue for the zone. Sediment building up in the streams and harbours negatively effects water quality, Mahinga Kai and Kai Moana. Of all sources of contaminants, sediment coming from roading is considered to have the highest impact and in most in need of priority attention. Areas of high risk for erosion and sediment runoff on Banks Peninsula have been identified in the regional plan, (Appendix 5). The community has previously undertaken a lot of work on this issue and want to see this work continued and improved. As a starting point, it is recommended that sediment budgets are developed as a means to quantify the issue, beginning in Whakaraupō. A sediment budget will provide an estimate of how much sediment enters the harbour and how much sediment is washed out, thus indicating whether sediment is accumulating in the harbour at this time, and if so, at what rate.

Priority Outcomes

Sediment discharge into waterways is minimised. Sediment build-up in the harbours is managed sustainably to prevent damage to Mahinga Kai and Kai Moana from erosion and sedimentation.

Recommendations

	Recommendations	Responsibility/Time Period
5.1	Collate all existing research material on sediment in the harbour and devise a harbour sediment budget, starting with Whakaraupō, to monitor changing sediment levels in the harbour.	Christchurch City Council and Environment Canterbury in 2yrs.
5.2	Roading planners and contractors are educated and enforced to engineer new roading cuts to eliminate sediment discharge during, and after, construction in rain events.	Christchurch City Council in 2yrs.
5.3	Enforcement is prioritised for erosion and sediment control from roads on the peninsula.	Environment Canterbury for 5yrs.
5.4	Subdivisions and new housing earthworks are managed in accordance with strict erosion and sediment control guidelines to eliminate sediment discharge during, and after, rain events.	Environment Canterbury and Christchurch City Council ongoing.
5.5	Christchurch City Council prioritises Whakaraupō for an integrated stormwater management plan.	Christchurch City Council in 2yrs.
5.6	Quarries are targeted for management of sediment and erosion control.	Environment Canterbury and Christchurch City Council ongoing.
5.7	Stabilising vegetation is established as a priority after any earthworks.	Environment Canterbury and Christchurch City Council and community.
5.8	Resource Consents are required for all forestry clearance to protect waterways from sediment.	Environment Canterbury.
5.9	Previously identified areas of erosion risk are clearly advised to the community to encourage sustainable land use, development and roading (Appendix 5).	Environment Canterbury.
5.10	The effects of potential extreme events as a result of climate change are included in the evaluation of erosion and sediment control guidelines.	Environment Canterbury.

6. Te Roto O Wairewa

Te Roto o Wairewa is a shallow coastal lake and is a tribal taonga. The lake is also one of only two customary lakes in Aotearoa (the other being Horowhenua). Te Roto o Wairewa supports a customary fishery; tuna (eel), pātiki (flounder), aua (yellow eyed mullet), kanakana (lamprey) and inaka (whitebait) are the primary species caught. Extensive forests in the catchment provided timber, fibre for building and weaving, as well as food and traditional medicines. Te Roto o Wairewa is Statutory Acknowledgement site, recognizing the mana of Ngāi Tahu with regard to the lake and guaranteeing tribal involvement in management. Schedule 71 of the NTCSA 1998 is a statement of Ngāi Tahu cultural, spiritual, historic, and traditional association to the lake. Thousands of years ago Te Roto o Wairewa was a hāpua or estuary and in the late 1800's, alluvial drift caused the lake to close by the growth of a large shingle bar, known as Kaitōrete Spit. Over the last 160 years, the catchment has been dramatically modified and mahinga kai values severely degraded. The majority of native forest cover was removed between 1860 and 1890 to open up the land for agricultural and pastoral land use, resulting in massive reductions in native bird and plant species. Sedimentation in the Lake has increased due to forest clearance, wetland drainage, pest and weed incursion, and the intensification of land use, and this has had major effects on both terrestrial and aquatic environments. The land cover and land use within the catchment has changed dramatically over the past 160 years. This has increased the nutrient content in the sediment, namely nitrogen and phosphates. The increase in nutrients, along with a shallower lake has made the lake highly eutrophic with extreme water quality problems. The most severe problem is the summer blooming of Nodularia Spumigena (blue green algae). The cyanotoxin, Nodularia R that is produced when this algae blooms is highly toxic to humans, livestock and pets. The level of Te Roto o Wairewa has been controlled for flood protection since the 19th century. The lake is currently fresh to brackish, depending on freshwater inflows and on whether the lake canal is open to the sea. The lake is highly turbid due to high algal production and wind-driven sediment resuspension. The mechanical opening regime was a stop gap measure initiated after the government considered that costs for the preferred option of creating some form of permanent opening were prohibitive. The Waitangi Tribunal recommended in respect of Te Roto o Wairewa that a management plan be prepared, involving Ngāi Tahu as part of the decision making process along with the Department of Conservation, Regional Authority, Ministry of Agriculture and Fisheries, for the improvement of the water quality, with the Crown providing the same resources as recommended in respect of Te Waihora.

Appendix 7 explains the meaning of TLI (Priority Outcome)
Appendix 8 shows the full Te Roto O Wairewa background

Priority Outcomes

(i) Te Roto O Wairewa is a nationally and regionally significant 'Flagship Project' showcasing outstanding environmental restoration. The Lake has a TLI of 4 within 20 yrs and supporting Mahinga Kai and contact recreation within 15 years.

(ii) All streams that flow into Te Roto O Wairewa are flourishing ecosystems reflecting Mauri, Kaitiakitanga and Mahinga Kai values

Recommendations

	Recommendations	Responsibility/Time Period
6.1	Wairewa Rūnanga is recognised as the leader in the restoration and management of Te Roto O Wairewa, resolving issues in partnership with agencies and community.	Wairewa Rūnunga.
6.2	A nutrient, flow and allocation regime is investigated and modelled for the Wairewa catchment.	Environment Canterbury and Community through sub-regional process in 2yrs.
6.3	A permanent opening for the lake is investigated and modelled.	Wairewa Rūnunga, Christchurch City Council, Environment Canterbury and Research Organisations in 2yrs.
6.4	The existing mechanical opening regime is supported by technology and information to provide for more effective lake level control. Openings take into account weather patterns, waves, fish recruitment and predicative flood control.	Wairewa Rūnunga and Christchurch City Council.
6.5	Different methods of sediment removal from the lake are investigated.	Wairewa Rūnanga, Christchurch City Council, Environment Canterbury and Research Organisations in 2yrs.
6.6	A monitoring programme is established that gives the community confidence that changes in lake health can be detected.	Wairewa Rūnunga, Christchurch City Council, Environment Canterbury and Research Organisations in 2yrs.
6.7	The lake and surrounding streams are managed in such a way that flooding is minimised to a 1 in 100year flood to Little River and SH1.	Christchurch City Council.
6.8	Covenanting and fencing is prioritised in the catchment.	Environment Canterbury, BPCT and QEII Trust.
6.9	Prioritisation is given to Geese and swan population management.	Environment Canterbury, Rūnanga, Federated Farmers, DOC and Fish and Game .
6.10	Banks Peninsula and Selwyn/Waihora ZC meet annually to discuss to inter-zone issues.	Environment Canterbury and ZCs ongoing.
6.11	Community briefings to give updates on the progress of Te Roto o Wairewa are held annually.	Wairewa Rūnunga.
6.12	Sea level rise due to climate change is included in all modelling of Te Roto o Wairewa.	Environment Canterbury.
6.13	All steps are taken to reduce the incidence of the cyano bacteria Nodularia Spumigena (blue green algae) in the Te Roto o Wairewa.	Environment Canterbury.

7. Wastewater

Wastewater disposal in the Banks Peninsula Zone is generally via either Christchurch City Council reticulated systems or individual septic tanks systems. Since the amalgamation of the Christchurch City Council with Banks Peninsula District Council many more upgrades have been possible for the council reticulated systems, and more are planned. For the council reticulated systems, the Zone Committee has a preference for no discharge of treated wastewater to harbours in the long term, in order to further improve the water quality of the harbours. The new Land and Water Regional Plan is requiring a resource consent be obtained for the installation of new septic tanks on Banks Peninsula due to the soil types and properties of these in the Zone. The Zone Committee has concerns with this proposed change, and hence some recommendations are included around investigating alternative types of Septic tanks that may work more efficiently on Banks Peninsula soils. Due to the relative scarcity of water on the peninsula at times of low rainfall, there is a significant focus being promoted to innovatively re-use reclaimed wastewater.

Appendix 2 show planned upgrades the Christchurch City Council water and wastewater systems.

Priority Outcomes

Wastewater is not discharged to the harbours but reclaimed to land. Wastewater is treated to a high quality and promoted as an innovative water and irrigation source for the Peninsula.

Recommendations

	Recommendations	Responsibility/Time Period
7.1	The CCC wastewater programme (Appendix 2) is supported and implemented.	Christchurch City Council LTP process ongoing.
7.2	Land based application and irrigation trials for Akaroa wastewater are vigorously supported.	Christchurch City Council LTP process in 3yrs.
7.3	The new Wainui land based reticulated system is used as a trial for irrigation to land in other areas.	Christchurch City Council LTP process in 3yrs.
7.4	Un-reticulated areas are to be prioritised for reticulation as follows: (i) Charteris Bay (ii) Wainui (iii) Little River (iv) Birdlings Flat (v) Takamatua (vi) Robinsons Bay (vii) Purau (viii) Okains Bay.	Christchurch City Council and Public Health to feedback to ZC in 1yr.
7.5	Alternative processes for reclaiming wastewater are investigated. Reclamation and re-use of wastewater is encouraged.	Christchurch City Council.
7.6	Wastewater capacity is a priority for the future CCC Small Settlement Studies.	Christchurch City Council.
7.7	Septic tanks are managed up to current standards and plan rules.	Community ongoing.
7.8	Investigations are undertaken into new technologies for septic tanks specifically suited to Peninsula soils.	Christchurch City Council and Environment Canterbury in 5 years.
7.9	Freedom camping and visitor impacts are managed so they do not pose unacceptable risk to community drinking water or to waterways.	Christchurch City Council ongoing.
7.10	Maintain the Lyttelton wastewater plant in a near ready to operate state to provide backup if the tunnel pipeline should fail.	Christchurch City Council 10yrs.

8. Climate Change and Flooding

The Zone Committee's thinking on climate change has been primarily influenced by NIWA's publication "Coastal Adaptation to Climate Change - Pathways to Change" (Nov 2011) and Christchurch City Council's "Climate Smart Strategy" 2010 - 2025. The "Pathways to Change" laid out in NIWA's publication involve four steps to guide planners toward the creation of communities which are resilient to climate change. The first step is awareness and acceptance and the committee is firmly of the mind that climate change will have a significant impact on coastal communities on the peninsula while higher temperatures and less rainfall will impact on fresh water. Step two is assessment and that is what we have set out to address in this document. The final steps are planning a way forward and implementation, monitoring and review which will evolve as the risks and threats are better understood. The following recommendations are the Committees outline for this process.

Priority Outcomes

Climate Change effects are taken into account in all infrastructure upgrades and planning on Banks Peninsula. As the climate changes ensure there is adequate water available and that flooding is minimised.

Recommendations

	Recommendations	Responsibility/Time Period
8.1	Planning processes take into account the prediction of less rain, warmer temperatures and stronger winds from the West increasing fire risk.	Christchurch City Council and Environment Canterbury.
8.2	Planning processes take into account the prediction of 10% higher intense rainfall events resulting in flooding of low lying areas and increased risk of landslides and road closures.	Christchurch City Council and Environment Canterbury.
8.3	Planning processes take into account the prediction of sea level rise leading to possible 50-80cm rise by 2090.	Christchurch City Council and Environment Canterbury.
8.4	Planning processes take into account that low lying areas will be affected by erosion and inundation at times of high tides and storm surges.	Christchurch City Council and Environment Canterbury.
8.5	Climate change effects are taken into account when culverts are investigated, maintained or changed.	Environment Canterbury and Christchurch City Council and Community.
8.6	A database it set up for recording Floods. Community members can add flooding information to the database easily.	Environment Canterbury and Christchurch City Council and Community.
8.7	The impact of climate change on the land is considered when vegetation clearance is planned and undertaken.	Environment Canterbury and Christchurch City Council.
8.8	The pest types and populations will alter as the climate changes. Strategies for the zone need to consider the potential effects of these new pests and diseases.	Environment Canterbury and Christchurch City Council.

9. Education and Communication

Education is the key to achieving "buy in" from the community to the principles and detail of the ZIP. The committee is especially committed to achieving the long term goals by educating the young and has included recommendations with this focus. The importance of working with and using the contacts and experience of existing organisations is also recognised. Such organisations are highlighted for support and where appropriate, funding. Research and Development will be a vital part of resolving the existing and future issues. The Committee has proposed a pathway to encourage R&D. Education and Communication was of high importance to the Zone Committee. It was agreed that an empowered community is one that is going to be engaged in positive environmental management. Many of the population of the peninsula are motivated in conservation and biodiversity but not be fully informed on all the water issues. The main recommendation centres around priority funding. At the moment, most of the council funding is focused on youth (which is recommended and supported to continue) but general funding would be spread across the Priority areas listed in 9.4

Priority Outcomes

The Banks Peninsula community are empowered by education in environmental management. Environmental successes in the Zone are widely celebrated and shared.

Recommendations

	Recommendations	Responsibility/Time Period
9.1	Education is supported in parallel with enforcement.	Christchurch City Council and Environment Canterbury.
9.2	Enviroschools are adequately funded so youth are empowered.	Christchurch City Council and Environment Canterbury.
9.3	A Youth Hui is held toward in 2013.	Environment Canterbury.
9.4	Education is prioritised in the following areas(in order of importance).	Relevant Agencies and Councils.
	Water quality and quantity limits.	
	Erosion and Sediment Control.	
	Water quality and quantity results/nutrient levels in waterways.	
	Biodiversity knowledge and monitoring.	
	Banks Peninsula Ecological Study.	
	Planning Rules - consents etc.	
	Research and Development.	
	Promotion of 'Flagship' Projects.	
	Flood management.	
	Community involvement in monitoring.	
	Septic Tank Maintenance.	
	Salt Marsh Protection.	
	Regional Pest Strategy.	
9.5	Existing Peninsula groups and organisations are encouraged and funded to educate and promote environmental issues.	All Agencies.
9.6	Research and Development is an important aspect of the long term improvement of freshwater in the Zone. Submissions will be sought from the community for R&D projects with a view to enabling funding and implementation of two major projects in 2014.	Zone Committee.

10. Coastal

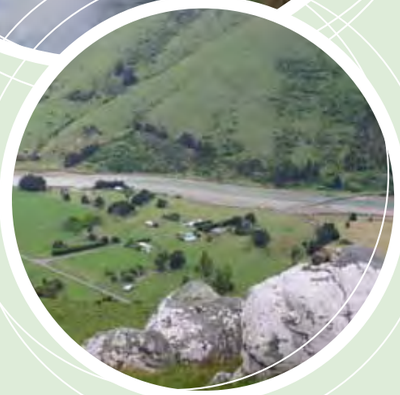
The Coastal chapter in the Banks Peninsula ZIP is slightly more difficult to include as the CWMS has a focus on fresh water. The planning framework for coastal issues is covered under a separate regional plan which is due to be reviewed in 2013. The Zone Committee considers it important to include a coastal chapter in the ZIP to provide a holistic, integrated approach to water management in the Zone as there are many Ngāi Tahu philosophies of connectedness between mountains, rivers and the sea. This chapter mainly focuses on work beginning in 2013 when the regional coastal plan will be reviewed.

Priority Outcomes

The harbours are a natural extension of the rivers and streams. The marine biodiversity and the water quality of the harbours is protected and enhanced.

Recommendations

	Recommendations	Responsibility/Time Period
10.1	Environment Canterbury collaborate with the community through the Coastal Plan process beginning 2013.	Environment Canterbury in 2013.
10.2	A list of interested parties that are involved in Coastal Management is set up. Ways of working with these groups to enhance land to coastal management is developed.	Environment Canterbury in 2013.
10.3	Investigate and monitor the water quality of the water in flows to the harbours for their impact on sustaining coastal harbours.	Environment Canterbury in 2013.
10.4	A cross organisation ecological monitoring programme is developed for the Peninsula along the lines of the healthy estuary/rivers of the city monitoring programme.	CCC, Environment Canterbury, Rūnanga, Lyttelton Port Company.
10.5	The Okains Bay estuary is suitable for contact recreation.	Environment Canterburyand Christchurch City Council in 10 yrs.



APPENDICES

1. Drinking Water Grading Information - Christchurch City Council
2. Planned upgrades to water and wasterwater plants - Christchurch City Council
3. Minimum flows for streams on the peninsula - Environment Canterbury
4. Flow sensitive catchments - Environment Canterbury
5. Explanation of surface and groundwater interactions - Environment Canterbury
6. Soil Erosion Map - Environment Canterbury
7. Te Roto o Wairewa TLI explanation and full history - Environment Canterbury
8. Full Ngai Tāhu history
9. Climate Change
10. Stakeholder list

APPENDIX 1

1. Drinking Water Grading Information - (Source Ccc)

1. Water Supply Systems

1.1 Public Drinking Water Supply Systems

Christchurch City Council provides reticulated public drinking water supply systems to several communities in Banks Peninsula:

- Akaroa.
- Birdlings Flat.
- Duvauchelle.
- Little River.
- Pigeon Bay.
- Takamatua.
- Wainui.
- Lyttelton Harbour Basin (extending from Lyttelton to Diamond Harbour and Governors Bay).

These systems include seven main pumping stations, six water treatment plants and over 130 kilometres of network infrastructure.

The City Council has consents to abstract from surface water sources and ground water sources to deliver this service. The sources for each of the public drinking water supply systems is summarised in Table 1 below.

Some of the public drinking water supply systems are on-demand (unrestricted) and others are restricted supplies. Table 1 indicates the status of each system.

Table 1. Public drinking water systems in Banks Peninsula

Water supply system	Drinking water source(s)	Type
	Aylmers Stream	On-demand
	Aylmers bore	
	Balguerei Stream	
	Grehan Stream	
	Settlers Hill Rd bore	
Birdlings Flat	Birdlings Flat bore	Restricted (1 m3/d)
Duvauchelle	Pipers Stream	Restricted (1 m3/d)
Little River	Police Creek	Restricted (1 m3/d)
Pigeon Bay	Dick Stream	Restricted (1 m3/d)
Takamatua	Takamatua Stream	On-demand
Wainui	Wainui bore	Restricted (1 m3/d)
Lyttelton Harbour Basin	Groundwater ()	On-demand

The City Council operates water treatment plants, where needed, so that the public drinking water supply systems meet Ministry of Health standards. Table 2 lists the public drinking water supply systems and the treatment used, where applicable.

Table 2. Treatment of public water drinking systems

Water supply system	Treatment used
Akaroa	L'Aube Hill plant (majority of water supplied): filtration plus chlorine disinfection
Birdlings Flat	Filtration plus UV disinfection
Duvauchelle	Settlement plus filtration plus chlorine disinfection
Little River	Filtration plus chlorine disinfection
Pigeon Bay	Settlement plus filtration plus UV disinfection
Takamatua	Settlement plus filtration plus chlorine disinfection
Wainui	Filtration
Lyttelton Harbour Basin	Not applicable

Appendix A shows the areas served by the public drinking water supply systems.

1.2 Private Community Supplies

In addition to the Council-operated public drinking water systems, there are nine privately operated community drinking water supplies in Banks Peninsula:

- French Farm Winery
- Governors Bay Preschool
- Koukourarata Marae
- Le Bons Bay Domain
- Little River School
- Living Springs
- Okains Bay
- Onuku Marae
- Takamatua Valley Vineyard

1.3 Rest Of The Peninsula

Human drinking water needs in the rest of Banks Peninsula are met by small individual privately owned and operated supplies. These include systems serving a single household as well as very small private communal systems serving less than 50 people per year.

2. Regulatory Framework

Under the Health (Drinking Water) Amendment Act 2007, community drinking water supply systems must meet certain standards by specified dates based on the population served by these supplies.

2.1 Public Health Risk Grading

Community drinking water supplies, which include both public drinking water systems such as Akaroa and privately operated systems such as French Farm Winery, are graded against Ministry of Health (MoH) standards. The MoH grading is intended to indicate level of confidence that a drinking-water supply system will not become contaminated, rather than being an absolute indication of quality at a specific time.

There are two grades applied to community drinking water supplies:

Treatment Plant: A zone receives water from one or more treatment plants. If there is no physical treatment, for example the "urban" Christchurch public drinking water supplies, a nominal treatment plant is still defined. The grading ranges from A1 to U and is based primarily on the likely health risks to the community arising from bacteria, protozoa and chemical substances in the source water, and how effectively the treatment plant can act as a barrier to such contaminants.

A1 - Completely satisfactory, negligible level of risk, demonstrably high quality

A - Completely satisfactory, extremely low level of risk

B - Satisfactory, very low level of risk when the water leaves the treatment plant.

C - Marginally satisfactory, low level of microbiological risk but may not be satisfactory chemically.

D - Unsatisfactory level of risk

E - Unacceptable level of risk

U – Ungraded

Note that for an untreated system such urban Christchurch, the highest grading possible is a B, because the water is not treated.

Distribution Zone: A zone comprises all or part of a town or community that receives similar quality water from its taps. If different parts of town have different water sources or conditions, then the community will be divided into two or more zones. Zone grading ranges from a1 to u, and is based upon the microbiological and chemical quality of the water, along with the condition of the reticulation system and the quality of its care, and related factors.

a1 - Completely satisfactory, negligible level of risk, demonstrably high quality

a - Completely satisfactory, extremely low level of risk

b - Satisfactory, very low level of risk

c - Marginally satisfactory, moderately low level of risk.

d - Unsatisfactory level of risk

e - Unacceptable level of risk

u - Not yet graded. (Not yet required if less than 500 people)

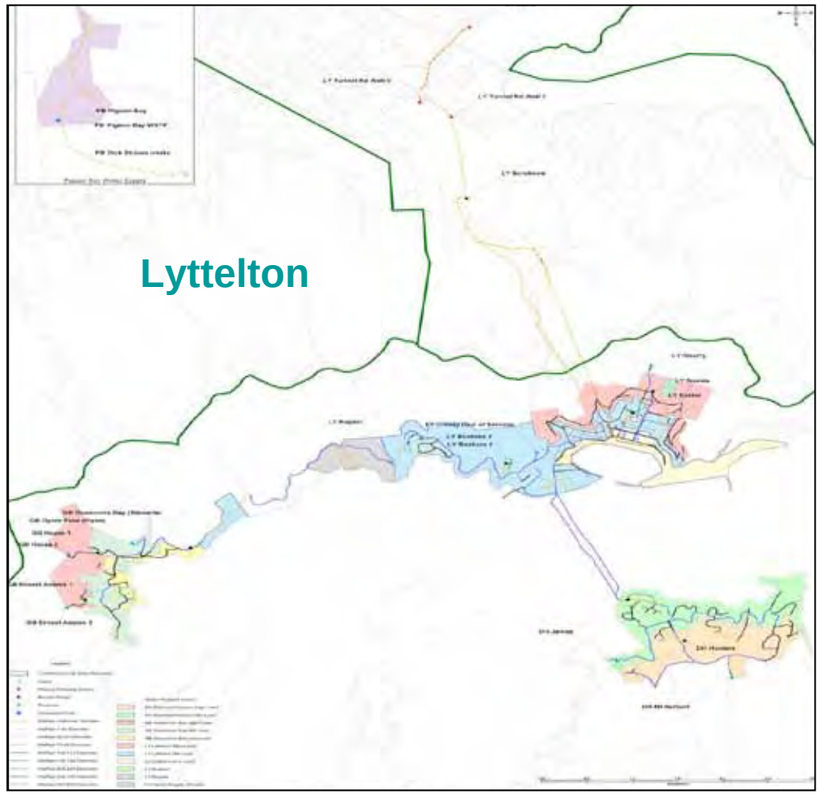
There is a minimum grade for a community water supply system, based on the size of the community served by the system. Table 3 lists the most recent grading for each system as well as the minimum grading required based on the population served. Note that many of the Banks Peninsula public drinking water supply systems have not been graded.

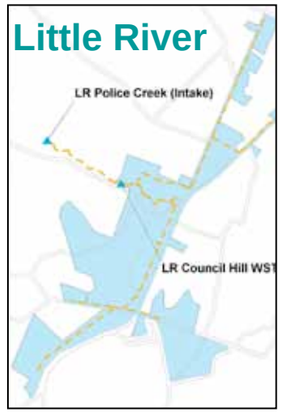
**State calculated using regression with Jollies*

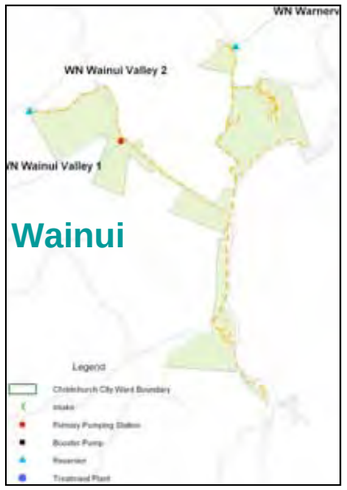
Table 3. MoH gradings - Public drinking water systems

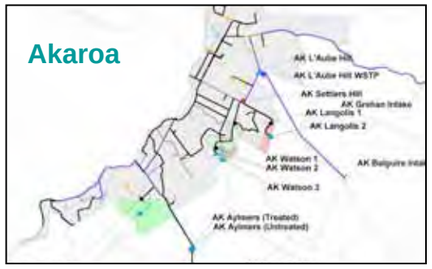
Water supply system	MoH Grading	Minimum Grading
Akaroa	Aylmers Zone: Ue	Cc
	L'Aube Hill Zone: Uc	Cc
Birdlings Flat	Birdlings Flat Zone: Uu	Cc
Duvauchelle	Duvauchelle Zone: Uu	Cc
Little River	Little River Zone: Uu	Cc
Pigeon Bay	Pigeon Bay Zone: Uu	Cc
Takamatua	Takamatua Zone: Uu	Cc
Wainui	Wainui Zone: Uu	Cc
Lyttelton Harbour Basin	Diamond Harbour Zone: Bb	Bb
	Governors Bay Zone: Ba	Bb
	Lyttelton Zone: Bb	Bb

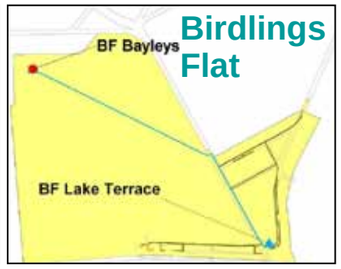
Appendix A. Areas served by City Council drinking water supply systems

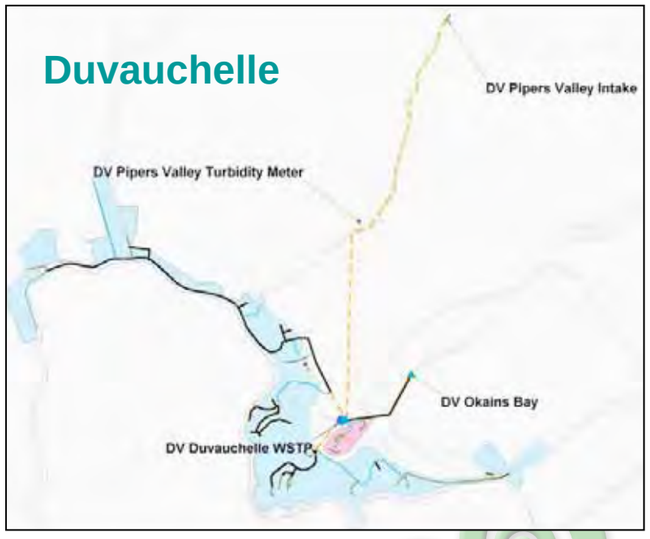






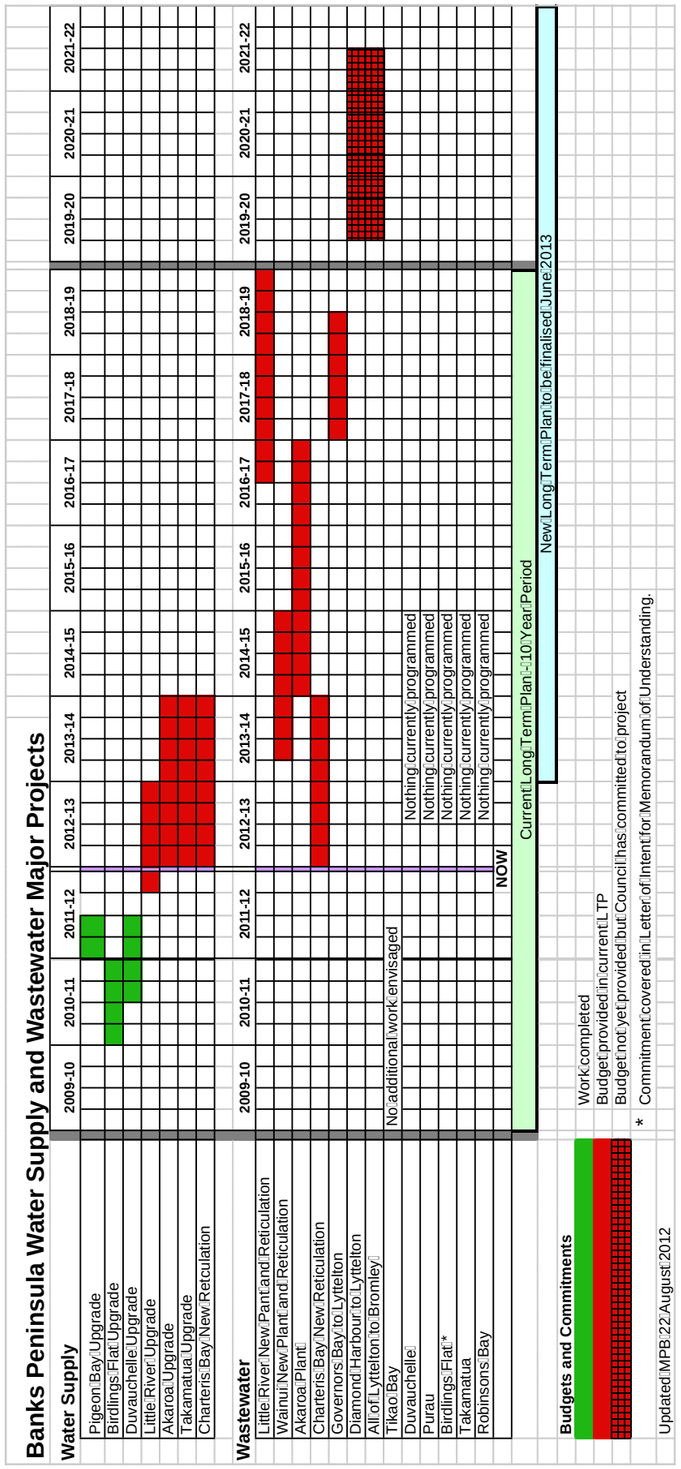






APPENDIX 2

Supply And Wastewater Upgrade Projects



APPENDIX 3

Peninsula Streams Low Flows (Source Environment Canterbury)

Site	Catchment	Min flow or residual	Min l/s	Allocation	No of consents in allocation	MALF 7d l/s	Mean Flow l/s
Barrys Bay Stream at Lower Rd Bridge- Cheese Factory	Akaroa	Min flow	38	18.84	3	19	138
Pawson Valley Stream at SH75 Bridge	Akaroa	Min flow	15	11.3	2	9	67
Pipers Valley Stream at d/s of BPDC Take-Craw Property	Akaroa	Residual	3	5.5	1		
French Farm Stream at French Farm Valley Rd	Akaroa	Min Flow	18	10.7	5	15	111
Pipers Creek at Chirstchurch- Akaroa Rd Bridge	Akaroa	Min Flow	11	5	1	9	47
Aylmers Stream at d/s BPDC Intake	Akaroa	Residual	0.5	19.2	1	7	41
Balguerie Stream at d/s BPDC intake	Akaroa	Residual	0.5	13.2	1	7	38
Grehan stream at d/s BPDC Intake	Akaroa	Residual	0.5	14.5	1	6	43
Smarts Rd Drain at d/s of dam-Flatman property	Lyttelton	Residual	0.2	0	1		
Charteris Bay Stream at Teddington/Purau Rd	Lyttelton	Min flow	22	10	1	21	177
Pigeon Bay Stream at Port Levy /Pigeon Bay Rd	Outer Bays	Min flow	32	15	1	37	342
Dick Creek Stream at BPDC Intake	Outer Bays	Residual	0.08	0.35	1		
Waterfall Creek at Little Akaloa Rd Bdg	Outer Bays	Min flow	6	3	1	5	17
Little Akaloa Stream at Little Akaloa Rd Bridge	Outer Bays	Min flow	16	8.3	1	42	176
Holmes Stream at Port Levy Pigeon Bay Rd	Outer Bays	Min flow	30	0.5	1	28	145
Okuti River at Kinloch Rd Bridge	Wairewa	Min Flow	45	10	1	66	342

SWAZ with no min flow	Catchment	Min flow or residual	Min l/s	Allocation	No of consents in allocation	MALF 7d l/s	Mean Flow l/s
Takamatua Bay	Akaroa	-	-	26.2	4	21	89
Wainui Valley Stream	Akaroa	-	-	3	1	44	202
Purau Bay	Lyttelton	-	-	5	1	14	230
Lebons Bay	Outer Bays	-	-	0.32	1	-	-
Okains Bay	Outer Bays	-	-	5	1	42	249
Menzies Bay Stream	Outer Bays	-	-	0.5	1	0	46
Police Creek	Wairewa	-	-	2.5	1	-	-

Low Flows

Southern Bays catchment	Mean Flow	MALF (7day)
Peraki Creek at Peraki Bay	288	41.7
Peraki Creek at Wrights Rd	16	3.3
Tumbledown Bay Strm at Te Oka bay Rd	61	5.2

Lyttelton catchment	Mean Flow	MALF (7day)
Allandale Strm at Allandale	16.5	0.7
Cass Peak Strm at Allandale	6.6	0.3
Charteris Bay Stream at Teddington/Purau Road	177.2	20.8
Charteris Bay Strm at Upper	174.2	20.3
Purau Bay Stream at Blakey Ford	300.7	7.8
Purau Bay Stream at Camp Ground	230	14.4
Waiake Strm at Teddington-Purau Rd	81.7	5.4

Low Flows

Outer Bays catchment	Mean Flow	MALF (7day)
Damons Bay Strm at Walking Track	24	3.4
Flea Bay No 1 at Flea Bay	108	19.8
Holmes Stream at Upstream Port Levy Pigeon Bay Road	144.6	27.9
Little Akaloa Stream at Little Akaloa Rd Bge	175.7	42.4
Menzies Stream at Menzies Bay	45.8	0.0
Opara Stream at Friesan Stud Farm (Recorder)	249	42
Opara Stream at Okains Bay Rd	137	15.4
Pigeon Bay Stream at Pigeon Bay Road	341.9	37.5
Pigeon Bay Strm at Kukupa	105	12.5
Stoney Beach Strm at Chorlton Okains Rd	84	14.5
Waterfall Creek (Little Akaloa) at Little Akaloa Chorlton Road	17.4	4.6

Akaroa Catchment	Mean Flow	MALF (7day)
Aylmers at Beach Rd Bge	67	17.9
Aylmers Stream at Upstream Council Intake (Recorder)	41	7.1
Balgueri Stream at Akaroa	91	21.6
Balguerie Stream at u/s Council Intake	37.8	6.5
Barrys Bay Stream at Cheese Factory	137.8	19.4
French Farm at French Farm Valley Rd (Recorder)	111	15
French Farm at Upper Bge Site	103	15.3
Grehan Stream at u/s Council Intake	43.3	6.2
Jubilee Stream at Jubilee Rd Bge	81	17
Jubilee Stream at Wainui	85	26.7
Kaik Stream at Top Crossing	8	2
Kaik Stream at Pa	55	9.9
Pawsons Valley Stream at Chch Akaroa Road	66.9	8.9
Pipers Stream at Chch Akaroa Road	46.7	9.0
Pipers Vlly Strm at Upper Bridge	11	4.2
Robinsons Bay Stream at CHCH/Akaora Road	113	24.7
Takamatua Ck at CHCH/Akaroa Rd	133	21.3
Takamatua Ck at Takamatua Vly Rd	89	20.6
Wainui Stream at 2nd Bridge	20	8
Wainui Stream at Wainui	202	43.5

Wairewa catchment	Mean Flow	MALF (7day)
Hikuika Strm at Opuahou Strm confl	150	17.8
Huka Huka at Lathams Br (Recorder)	217	34.3
Hukahuka Strm at Bachelors Rd Ford	68	11.6
Okana River at SH 75	763	108
Okuti River at Kinloch	399	66.3
Opuahou Stream at Hikuika Strm confl	212	36.9
Reynolds Strm at Brankins Bge	76	18.1

APPENDIX 4

Flow Sensitive Catchments (For Proposed Land And Water Plan)

Flow Sensitive Catchments (source enveronment canterbury proposed land and water plan)

Catchment (see Planning Maps)	Sensitive part of catchment	Monitoring site - lower boundary of catchment
Opara Stream	Whole catchment	Opara recorder site
Dick Stream	Whole catchment	Confluence with Pigeon Bay Stream
Pawson Valley Stream	Whole catchment	Christchurch/Akaroa Road (State Highway 75)
Pipers Valley Stream (Duvauchelle)	Whole catchment	Governors Bay/Teddington Road and Allandale
Allandale Stream (Smarts Road Drain)	Whole catchment	Christchurch /Akaroa Road (State Highway 75)
French Farm Stream	Whole catchment	French Farm Valley Road recorder above Christchurch/Akaroa Road (State Highway 75)
Te Wharau Stream	Whole catchment	Teddington/Purau Road
Takamatua Stream	Whole catchment	Christchurch /Akaroa Road (State Highway 75)
Okuti River	Whole catchment	Kinloch Road Bridge
Okana River	Whole catchment	Christchurch /Akaroa Road (State Highway 75)
Pigeon Bay Stream	Whole catchment	Pigeon Bay Road
Police Stream	Whole catchment	Christchurch /Akaroa Road (State Highway 75)

APPENDIX 5

Groundwater-Surface Water Interaction On Banks Peninsula

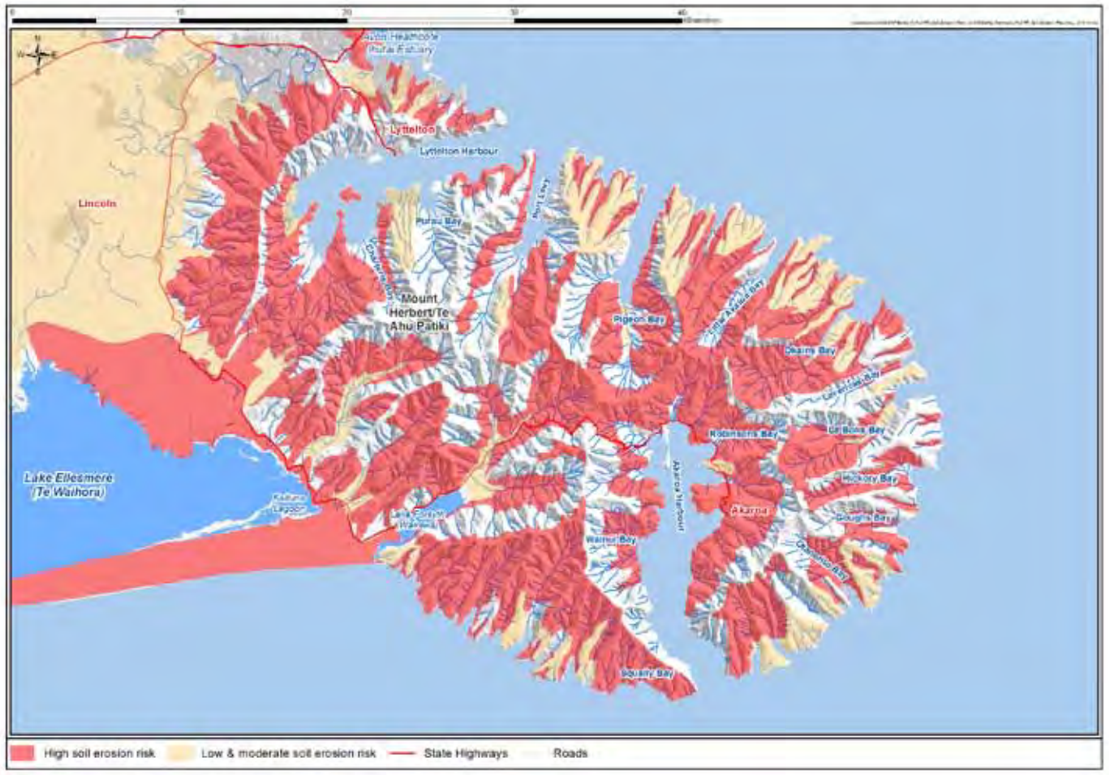
The geology of Banks Peninsula is predominantly basalt and other volcanic rocks which contain deep fractures. These fractures are capable of storing groundwater derived from infiltrating rainfall above them. Although the volumes can be large they are nowhere near as large as the aquifers under the Canterbury Plains and they have no direct connection to the aquifers under the plains. There are two ways that the Banks Peninsula groundwater interacts with surface water.

It is common to have springs and seeps on hillsides; these often become small streams or are used for stock water sources. The springs and seeps are where the groundwater has moved downslope and reached either an easy discharge point (e.g. a large crack that reaches to the surface) or a point where flow is very difficult (e.g. an area with very few fractures). In the latter case the groundwater goes from flowing easily to a constriction and can therefore be pushed towards the surface.

The fact that many Banks Peninsula streams continue flowing during the summer after long periods without rain is because the stream flow is being fed by groundwater. The groundwater reaches the streams via springs on hillsides (e.g. as described above) or a multiple of small springs in the streambed. On the valley floor the water table is often close to the surface and groundwater can easily reach the surface in these springs.

APPENDIX 6

Banks Peninsula Soil Erosion Risk



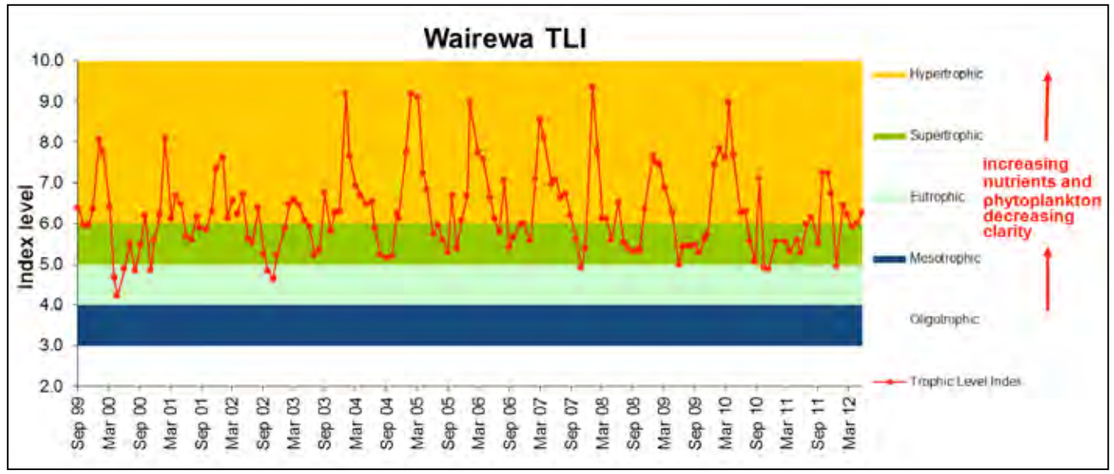
APPENDIX 7

Trophic Level Index (Tli)

Trophic level index (TLI) is a way of combining water quality information for lakes into a single number which describes the water quality in a simple way. In most Canterbury lakes1 the TLI is a combination of total nitrogen, total phosphorus and chlorophyll-a, as measured in water samples.

The TLI number is then used in a classification of a lake's "trophic state". The trophic state of a lake indicates its biological productivity, i.e. the amount of living material supported within the lake, primarily as algae. The least productive lakes are called "microtrophic". These are typically cool and clear, and have relatively low nutrient contents. The most productive lakes are called "hypertrophic" and are characterized by high nutrient concentrations which result in algal growth, cloudy water, and low dissolved oxygen levels. In between these microtrophic and hypertrophic levels are the "oligotrophic", "mesotrophic", "eutrophic" and "supertrophic" levels.

The diagram below shows the TLI calculated from monthly measurements of water quality in Lake Forsyth (Te Roto o Wairewa); N.B. each red dot represents a separate monthly sample of water quality in the lake. The most notable thing about the TLI in Wairewa is the variability, with the lake moving between eutrophic and extremely hypertrophic levels. The nearby Te Waihora (Lake Ellesmere) shows a much steadier TLI of about 7 (hypertrophic) during a similar period of measurement. The extreme hypertrophic peaks are in the summer when large algal and cyanobacterial blooms are known to occur. During the winter the lake is generally in a supertrophic state (between 5 and 6).



1 In other parts of New Zealand water clarity may also be included in the TLI calculation. Water clarity is not used in many Canterbury lakes because of the affects of glacial flour suspended in the water column (e.g. Lakes Tekapo, Pukaki, Benmore and Ohau) and resuspended sediment (e.g. shallow coastal lakes like Wairewa), both of which are not linked to biological productivity.

Te Roto O Wairewa (Lake Forsyth)

Te Roto o Wairewa is a shallow coastal lake and is a tribal taonga. The lake is also one of only two customary lakes in Aotearoa (the other being Horowhenua). This means that only persons belonging to the Ngāi Tahu iwi can take eels from the lake. It has been home to a permanent settlement for many generations and was the last lake named by Rākaihautū. The lake has been also known as Te Pātaka Kai a Makō (the food basket of Makō) because it provided abundant mahinga kai all year round. It is central to Ngāi Tahu values, culture, and social order. This includes all the traditional systems, processes, rules, and regulations used to manage and protect the valuable indigenous resources. Te Roto o Wairewa supports a customary fishery; tuna (eel), pātiki (flounder), aua (yellow eyed mullet), kanakana (lamprey) and inaka (whitebait) are the primary species caught. Extensive forests in the catchment provided timber, fibre for building and weaving, as well as food and traditional medicines. Te Roto o Wairewa is Statutory Acknowledgement site, recognizing the mana of Ngāi Tahu with regard to the lake and guaranteeing tribal involvement in management. Schedule 71 of the NTCSA 1998 is a statement of Ngāi Tahu cultural, spiritual, historic, and traditional association to the lake.

Thousands of years ago Te Roto o Wairewa was a hāpua or estuary and in the late 1800's, alluvial drift caused the lake to close by the growth of a large shingle bar, known as Kaitōrete Spit. Over the last 160 years, the catchment has been dramatically modified and mahinga kai values severely degraded. The majority of native forest cover was removed between 1860 and 1890 to open up the land for agricultural and pastoral land use, resulting in massive reductions in native bird and plant species. Sedimentation in the Lake has increased due to forest clearance, wetland drainage, pest and weed incursion, and the intensification of land use, and this has had major effects on both terrestrial and aquatic environments. The land cover and land use within the catchment has changed dramatically over the past 160 years. This has increased the nutrient content in the sediment, namely nitrogen and phosphates. The increase in nutrients, along with a shallower lake has made the lake highly eutrophic with extreme water quality problems. The most severe problem is the summer blooming of Nodularia Spumigena (blue green algae). The cyanotoxin, Nodularia R that is produced when this algae blooms is highly toxic to humans, livestock and pets.

The level of Te Roto o Wairewa has been controlled for flood protection since the 19th century. The lake is currently fresh to brackish, depending on freshwater inflows and on whether the lake canal is open to the sea. The lake is highly turbid due to high algal production and wind-driven sediment resuspension. The mechanical opening regime was a stop gap measure initiated after the government considered that costs for the preferred option of creating some form of permanent opening were prohibitive. Since then this regime has been in place without recourse to cultural, social or environmental considerations.

Based solely on arbitrary trigger levels the lake is currently opened mechanically by diggers. This regime is unacceptable to Wairewa Rūnanga and Ngāi Tahu. The Waitangi Tribunal recommended in respect of Te Roto o Wairewa that a management plan be prepared, involving Ngāi Tahu as part of the decision making process along with the Department of Conservation, Regional Authority, Ministry of Agriculture and Fisheries, for the improvement of the water quality, with the Crown providing the same resources as recommended in respect of Te Waihora.

APPENDIX 8

Ngāi Tahu Whānui History

Te Waka o Aoraki

In the beginning all was darkness (Te Pō). Out of the first glimmer of light (Te Ao), long standing light (Te Aotūroa) emerged until it stood in all quarters. Encompassing everything was a womb of emptiness, an intangible void (Te Kore). This void was intense in its search for procreation. Finally it reached its ultimate boundaries and became a parentless void (Te Koremātua) but with the potential for life. And so Te Makū, moisture, emerged and coupled with Mahoranuiatea, a cloud that grew from the dawn. From this union came Raki, the heavens, who coupled with Pokohārua Te Pō the breath of life found in the womb of darkness. The first child in this chain of creation was Aoraki who stands as the supreme mountain of Ngāi Tahu.

In the beginning there was no Te Wai Pounamu or Aotearoa. The waters of Kiwa rolled over the place now occupied by the South Island, the North Island and Stewart Island. No sign of land existed. Before Raki (the Sky Father) wedded Papatūānuku (the Earth Mother), each of them already had children by other unions. After the marriage, some of the Sky Children came down to greet their father's new wife.

Among the celestial visitors were four sons of Raki who were named Aoraki (Cloud in the Sky), Rakiroa (Long Raki), Rakirua (Raki the Second), and Rārakiroa (Long Unbroken Line). They came down in a canoe which was known as Te Waka o Aoraki. They travelled around Papatūānuku who lay as one body in a huge continent known as Hawaiki.

Then, keen to explore, the voyagers set out to sea, but no matter how far they travelled, they could not find land. They decided to return to their celestial home but the karakia (incantation) which should have lifted the waka (canoe) back to the heavens failed and their craft ran aground on a hidden reef, turning to stone and earth in the process.

The waka listed and settled with the west side much higher out of the water than the east. Thus the whole waka formed the South Island, hence the name: Te Waka o Aoraki. Aoraki and his brothers clambered on to the high side and were turned to stone. They are still there today. Aoraki is the highest peak (Mount Cook, and his brothers are the next highest peaks near him).

The form of the island as it now owes much to the subsequent deeds of Tū Te Rakiwhānoa, the grandson of Aoraki, and his companions Marokura and Kahukura. Tū Te Rakiwhānoa raked up the best bits of Kā Pākihi Whakatekateka o Waitaha (Canterbury Plains) and formed Te Pātaka o Rākaihautū (Banks Peninsula).

Tū Te Rakiwhānoa called upon his companion, Marokura to do the work related to the sea. He scooped out inlets, bays, and estuaries. He then put all kinds of kaimoana in these places. Now it was the turn of Kahukura to cover Te Pātaka o Rākaihautū with native grasses, native trees, flax and raupō. In the hollows in Te Pātaka o Rākaihautū he made little lakes and swamps. It soon rained and these filled up making little streams and rivers flowing down the valleys to the sea. Kahukura is held responsible for filling the bush with birds and the swamps with ducks, eels, and inaka.

Present day Ngāi Tahu Whānui are of Rapuwai, Hāwea, Waitaha, Kāti Māmoe and Ngāi Tahu ancestry. Three waves of Māori settlement are recognised on Te Pātaka o Rākaihautū / Banks Peninsula.

Waitaha

The history of the Waitaha people in New Zealand goes back many generations to about 850 AD, when Rākaihautū (a Waitaha ancestor) came to Te Wai Pounamu (the South Island) from Hawaiki as the captain of the Uruao waka. The waka was beached at Whakatū/Nelson. While his son Rakihouia took some of the party to explore the East Coast, Rākaihautū led the remainder on an inland route over the Southern Alps or Kā Tiritiri o te Moana. With his famous kō (digging stick) Tūwhakaroria, Rākaihautū dug the southern lakes (Kā puna karikari o Rākaihautū). Te Rakihouia then proceeded south down the Canterbury Coast in the Uruao waka and met up with his father in the vicinity of Waihao.

The final two lakes that Rākaihautū carved out were Te Waihora (Lake Ellesmere) and Te Roto o Wairewa (Lake Forsyth), these are guarded by a taniwha kaitiaki (guardian monster), named Tūterakihuanoa. Te Waihora was originally named Te Kete Ika o Rākaihautū - the fish basket of Rākaihautū, acknowledging the abundant resources in the lake.

Waitaha then settled in Akaroa Harbour. Overwhelmed by the magnificence of his artistic endeavours Rākaihautū decided to stay driving his kō, Tūwhakaroria deep into the ground above Wainui where it became Tuhiraki (Mt Bossu). As a testament to his work and in recognition of the abundance and variety of food and other resources found on the Peninsula up until quite recently, the people named the area Te Pātaka o Rākaihautū or the great food storage house of Rākaihautū.

Kāti Māmoe

Generations later, the Kāti Māmoe people arrived from the North Island (Te Ika a Maui) and settled among the Waitaha people. A prominent man of this tribe was Tūtekawa, who in establishing his home at Waikākahi, declared Te Waihora as his own and the lake became known as Te Kete Ika a Tūtekawa. Until the late seventeenth century, Kāti Māmoe was the main tribe in the South Island. When Tūtekawa killed two senior Ngāi Tahu women, Ngāi Tahu warriors came from the north in pursuit of Tūtekawa and his people. They ransacked the major Kāti Māmoe pā Parakākāriki (at Ōtanerito) and Waikākahi, and from there Ngāi Tahu chiefs took control of key locations on the peninsula.

Ngāi Tahu

By 1750, prior to European settlement, Ngāi Tahu occupied most of the South Island. Ngāi Tahu had settlements in every bay on the peninsula and on many of the headlands. They settled these areas in either hapū (sub-tribe) or whānau (family) groups. Ngāi Tahu settlement differed from the earlier more nomadic tribes in that permanent gardens were established. The gardening expertise of peninsula Ngāi Tahu must have been well honed; kūmara were grown successfully on Te Pātaka o Rākaihautū despite it being 1,000 kilometres further south than kūmara grown in their native Chile. In the early 1800s, there are records of trading between Ngāi Tahu and European sealers. However, as well as muskets, clothing, tobacco and alcohol, the Europeans brought with them a number of diseases. These diseases, combined with a ferocious civil war and raids led by Te Rauparaha from Kapiti, all took a huge toll on Peninsula Ngāi Tahu. A census conducted in 1848-49 estimated a population of only 300 Ngāi Tahu on the peninsula, whereas before the war and spread of disease there had been thousands.

Papatipu Rūnanga

Papatipu Rūnanga are the modern day administrative councils and representatives of Ngāi Tahu hapū and whānau traditional marae-based communities. Each Rūnanga has its own takiwā (area) determined by natural boundaries such as mountain ranges and rivers. The four Rūnanga on the Peninsula are Te Hapū o Ngāti Wheke, Te Rūnanga o Koukourārata, Ōnuku Rūnanga and Wairewa Rūnanga.

Mahinga Kai

Water plays a unique role in the traditional economy and culture of Ngāi Tahu. The most direct physical relationship that Ngāi Tahu have with water involves the protection, harvesting, and management of mahinga kai. The term ‘mahinga kai’ refers to natural resources and the area in which they are found, Ki Uta Ki Tai (from the mountains to the sea). Mahinga kai has always been, and continues to be, at the heart of Ngāi Tahu culture and identity.

It encompasses social and educational elements as well as the process of food gathering. This includes the way resources are gathered, the places they are gathered from, and the resources themselves. In the past, mahinga kai would have included seals, tītī (mutton birds), kererū, kaimoana (shellfish), tuna (eels) inaka (whitebait), trees for carving and waka, materials such as harakeke, and paru (mud), which are used for dyes. These resources are considered taonga (particular treasures for food and cultural identity) because they sustained life and an industry for the area and those who resided there. Thus cultural use, traditionally and today, continues within a sustainable use framework. For Ngāi Tahu today, participation in mahinga kai activities is an important expression of cultural identity. This participation is reliant on Ngāi Tahu people having sufficient access to mahinga kai sites, resources and a healthy environment.

Toitū te marae o Tangaroa
Toitū te marae o Tāne
Toitū te iwi
Healthy Water, Healthy Land, Healthy People.

APPENDIX 9

Climate Change Supplement

Climate change models for the East coast of New Zealand predict less rain and warmer temperatures in the decades to come.

The rate of sea level rise, currently running at .2mm per annum, is projected to increase significantly due to thermal expansion and polar ice melt.

These incremental changes to our weather and to the marine environment will be magnified by periodic, extreme events.

The Banks Peninsula Zone with its extensive coastline and dependence on surface water will be significantly affected by climate change during the life of this strategy.

“Surface water sources of public water supplies in Banks Peninsula would be expected to be adversely affected by drier climate conditions, placing further stress on the sources when the demand tends to be highest”

CCC Water Supply Strategy 2009-2030

Whilst overall rainfall will decrease by about 10% there will be a higher occurrence of intense rainfall events resulting in the flooding of low lying areas and an increased risk of landslides and road closures.

At the other end of the extreme events scale there will be a doubling of the likelihood of drought.. This will impact on water supply, primary industry and increase the risk of fire. Strong winds, predominantly from the West, combined with higher temperatures and low humidity will further exacerbate the fire risk.

Sea level rise will impact negatively on the coastal margins of the zone. Estimates of the rise in mean sea levels vary between 50cm and 80cm by 2090. Low lying areas will be most affected by erosion and inundation at times of high tides and storm surges.

The world’s output of Co2 (plus methane, nitrous oxide and CFC’s) has resulted in over 400ppm of greenhouse gases in the atmosphere. These levels have not been experienced for 650,000 years. If we continue this high emission path we can expect a warming of between 4 and 6 degrees and a 1 to 2 meter rise in sea levels within 90 years.

APPENDIX 10

Stakeholders List

Name	Address	City	Email
Te Rūnanga o Koukourarata	P O Box 3187	Christchurch 8140	koukourarata@Ngāitahu.iwi.nz
Christchurch City Council	P O Box 73013	Christchurch 8154	peter.kingsbury@ccc.govt.nz
Environment Canterbury	P O Box 345	Christchurch 8140	fiona.nicol@ecan.govt.nz
Te Rūnanga o Wairewa	P O Box 2845	Christchurch 8140	liz.maaka@Ngāitahu.iwi.nz
Akaroa District Promotions	P O Box 166	Akaroa 7542	hollie@akaroa.com
QEII Trust	80 Colombo Street	Christchurch 8023	alice@caverock.net.nz
Community and Public Health	310 Manchester Street	Christchurch 8140	judy.williamson@cdhb.health.nz
Banks Peninsula Conservation Trust	P O Box 146	Tai Tapu 7645	rgmenzies@farmside.co.nz
Lyttelton Harbour/Whakaraupo Issues Group			findlayc@xtra.co.nz
Akaroa Harbour Issues Working Party			iprichardson@xtra.co.nz
Robin Wybrow			robin.wybrow@farmside.co.nz
Ken Sitarz			gemview@clear.net.nz
Te Hapu o Ngati Wheke	P O Box 107	Lyttelton 8841	rapaki@xtra.co.nz
Te Rūnanga o Onuku	P O Box 3189	Christchurch 8140	onuku@Ngāitahu.iwi.nz
Mahaanui Kurataiao	P O Box 3246	Christchurch 8140	
Lyttelton Mt Herbert Community Board	P O Box 73027	Christchurch 8154	pfamvenbeynen@snap.net.nz
Akaroa Wairewa Community Board	28 Rue Jolie	Akaroa 7520	claudia.reid@ccc.govt.nz
John Benn, Dept of Conservation			jbenn@doc.govt.nz
Helen Chambers			helen.trevor@clear.net.nz
Okains Bay School	Okains Bay Road, Okains Bay	Christchurch 7853	okainsbay.school.nz
Lyttelton Main School	Oxford Street	Lyttelton 8082	office@lytteltonmain.school.nz
Little River School	Western Valley Road, Little River	Canterbury 7591	office@littleriver.school.nz
Akaroa Area School	141 Rue Jolie	Akaroa 7520	
Lyttelton West School	41 Voelas Rd, Lyttelton West	Lyttelton	principal@lytteltonwest.school.nz
Duvauchelle School	School Lane R D 1	Akaroa, Christchurch 7581	
Le Bons Bay School	Le Bons Bay Road, R D 3	Akaroa 7583	lebons.bay@xtra.co.nz
Governors Bay School	1 Jetty Road, Governors Bay, RD1,	Lyttelton 8971	secretary@governorsbay.school.nz
Rod Donald Conservation Trust			suky@roddonald.co.nz
Fish and Game			

REFERENCES

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- *Targets Canterbury Water publication*
- *'Proposed Land and Water Regional Plan' August 2012 Environment Canterbury publication*
- *'Waitaha wai' Booklet for Banks Peninsula Environment Canterbury publication*
- *Erosion and Sediment Control Guidelines 2007 Environment Canterbury publication*
- *Water Supply Strategy 2009-2039 Christchurch City Council*
- *Surface Water Strategy 2009-2039 Christchurch City Council*
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- *Te Taumutu Rūnanga, 2003. Natural Resource Management Plan. (180pp).*
- *Canterbury Regional Pest Management Strategy 2005-2015 Environment Canterbury*
- *Ngāi Tahu Claims Settlement Act (1998)*
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GLOSSARY

Adaptive management	A structured process of decision making using system monitoring in order to respond to change or uncertainty.
Allocation	The volume of water that may be taken from a fresh water resource by resource consent holders.
Audited self-management	ASM is a process where collective groups manage their resource use and activities to verify their adherence to good practice to achieve set outcomes.
Biodiversity	Is short for biological diversity. It describes the variety of all biological life – the different species, from micro-organisms to trees, animals and fungi; the genes they comprise; and the ecosystems they collectively form. This includes diversity within species, between species, and of ecosystems[1]. 1 International Convention on Biological Diversity
Customary Lake	A lake where only people of a certain iwi (in this case Ngāi Tahu) have a customary fishing entitlement for lawful fishing and gathering of natural resources (in this case tuna/eel).
Earthworks	Means the excavation of, and/or filling with topsoil, subsoil, sediments, rock and/or other underlying materials on which the soil is formed. Earthworks include, but are not limited to, the construction of roads, tracks, firebreaks and landings, and ground shaping (recontouring), root raking and blading. Earthworks excludes cultivation of the soil for the establishment of crops or pasture.
Ecosystem	Plants, animals, their physical environment and the dynamic processes that link them.
Groundwater	Water located underground in rock crevices and pores/layers of geological material, groundwater supplies wells and springs.
Hapū	Sub-tribe; section of a larger tribe.
Hazardous site	The Resource Management Act (RMA) defines contaminated land as land of one of the following kinds: (a) if there is an applicable national environmental standard on contaminants in soil, the land is more contaminated than the standard allows; or (b) if there is no applicable national environmental standard on contaminants in soil, the land has a hazardous substance in or on it that - (i) has significant adverse effects on the environment; or (ii) is reasonably likely to have a significant adverse effect on the environment.
Intensity of land use	The concentration of the use of the land through activity or productivity.
Iwi	Tribe. The Iwi with Mana Whenua status in Canterbury and the South Island, excluding the northern part of the island.
Kaitiaki	Guardians, custodians.
Kaitiakitanga	The exercise of guardianship by the Tangata Whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; and includes the ethic of stewardship.
Ki uta ki tai	From the mountains to the sea.
Limit	To define the capacity for use of a resource, e.g. maximum water take, minimum discharge quality or receiving water quality standards.
Mahinga Kai	Food and places for obtaining natural foods and resources. The work (mahi), methods and cultural activities involved in obtaining foods and resources.
Mana Whenua	Those with traditional status, rights and responsibilities in an area, based on their traditional takiwā.
Mauri	Life supporting capacity; spiritual essence; life, health and vitality; Mauri is the traditional measure of physical, spiritual and/or emotional wellbeing of people and places.
Mātauranga Māori	Māori traditional knowledge and systems. Mātauranga takes many forms, including language (te reo), traditional environmental knowledge (tāonga tuku iho, mātauranga o te taiao), traditional knowledge of cultural practice, such as healing and medicines (rongoā), fishing (kai moana) and cultivation (mahinga kai).

GLOSSARY CONTINUED...

Natural character	The natural flow regimes, dynamic processes and biodiversity of rivers are still in place, and the interdependence of waterways, land and coastal systems are intact.
Ngāi Tahu	Iwi with Tangata Whenua status in Canterbury and the South Island, excluding the northern part of the island.
Riparian planting	Planting usually of indigenous plants on the banks of rivers or streams to reduce erosion, stock access and pollution run off into a waterway.
Papatipu Rūnanga	The modern day administrative councils and representatives of Ngāi Tahu hapū and whānau. Each Rūnanga has its own area (rohe /takiwā) determined by natural boundaries such as mountain ranges and rivers.
Rangatiratanga	Promotion of self-determination and is the domain or autonomous authority of the rangatira, sometimes sovereignty; chiefly qualities of a rangatira. Chieftainship.
Seven Day Mean Annual Flow (7MALF)	Is determined by adding the lowest seven day low flow for every year of record and dividing by the number of years of record (in any year the seven day low flow is the lowest average flow sustained over seven consecutive days).
Surface water or surface water body	Means water above the ground surface and within a lake, river, artificial watercourse or wetland, but does not include water in the sea, snow or rain or water vapour in the air.
Takiwā	Area.
Tangata Whenua	Those with traditional status, rights and responsibilities in an area, based on their traditional takiwā.
Taonga	Treasured possessions, both tangible and intangible.
Taonga raranga	Plants which produce material highly prized for use in weaving.
Te Rūnanga O Ngāi Tahu	Te Rūnanga o Ngāi Tahu is the organisation that services the tribe's statutory rights and ensures that the benefits of the Settlement grow for the future generations. It was established by the Te Rūnanga o Ngāi Tahu Act 1996.
Tikanga	Rights, customs, accepted protocol, rule, Māori traditions, lore or law, the correct Māori way.
TLI	Trophic level index (TLI) is a way of combining water quality information for lakes into a single number which describes the water quality in a simple way. In most Canterbury lakes the TLI is a combination of total nitrogen, total phosphorus and chlorophyll-a, as measured in water samples.
Tuia Project	The Ngāi Tahu and Environment Canterbury joint work programme.
Wāhi taonga	Places and resources of historical and traditional significance often linked to significant mahinga kai values.
Wāhi tapu	A place sacred to Māori in a traditional, spiritual, religious, ritual or mythological sense (section 2, Historic Places Act 1993).
Wetlands	Wetlands are areas that are intermittently or permanently wet, shallow water and land water margins that support plants and animals that are adapted to the wet conditions.
Whānau	Extended family.
Whenua	Land, country, soil.

October 2012

Banks Peninsula Zone Committee

DRAFT ZONE IMPLEMENTATION PROGRAMME (ZIP)

FEEDBACK FORM

This form is for you to provide feedback on the Draft ZIP.

The Banks Peninsula Zone Committee will take all views into account as it works to reach consensus on the final Zone Implementation Programme.

Keeping your comments brief and to the point will help ensure your views count.

Please complete the form and return by 16 November, 2012 to:

Email: mailroom@ecan.govt.nz
Subject: Banks Peninsula ZIP feedback

Post: Environment Canterbury ZIP Feedback, PO Box 345, Christchurch

Fax: 03 365 3194

To fill this feedback form out online visit: ecan.govt.nz/canterburywater

CONTACT DETAILS

Name/Organisation: _____

Address: _____

Postcode: _____

City/Town: _____

Phone: _____

Email: _____

Signature: _____

Date: _____

CONTEXT FOR YOUR FEEDBACK AND COMMENTS

The draft ZIP has been produced by the Banks Peninsula Zone Committee in conjunction with stakeholders and the local community. It is a collection of integrated actions and recommendations to give effect to the CWMS in the Banks Peninsula Zone.

Main Features of the Draft Banks Peninsula Zone Implementation Programme:

Water quality - Maintaining and enhancing surface and groundwater water quality in the Banks Peninsula Zone is important as water is used for drinking, enhancing biodiversity and helping to sustain economic viability.

Water quantity - Water availability for out-of-stream use, particularly for domestic and stock water requirements, is one of the key issues in the Zone.

Biodiversity - The Banks Peninsula Zone Committee considers the protection and restoration of biodiversity to be a priority within the zone. This is reflected in the large number of recommendations within the chapter.

Kaitiakitanga - Kaitiakitanga is one of the three fundamental principles of the Canterbury Water Management Strategy (CWMS) which also notes (Annex G no.3) that ".. Exercise of Kaitiakitanga requires both a role in decision making and the achievement of environmental outcomes.."

Erosion and sediment control: Sediment contamination into streams and harbours from unrestricted earthworks and other land use practices is identified as another major issue for the zone.

Te Roto O Wairewa - Te Roto o Wairewa is a shallow coastal lake and is a tribal taonga. The increase in nutrients, along with a shallower lake has made the lake highly eutrophic with extreme water quality problems.

Wastewater - The Zone Committee has a preference for no discharge of treated wastewater to harbours in the long term, in order to further improve the water quality of the harbours.

Climate change and flooding - The committee is firmly of the mind that climate change will have a significant impact on coastal communities on the peninsula while higher temperatures and less rainfall will impact on fresh water.

Education and Communication - Education and Communication was of high importance to the Zone Committee. It was agreed that an empowered community is one that is going to be engaged in positive environmental management.

Coastal - The Zone Committee considers it important to include a coastal chapter in the ZIP to provide a holistic, integrated approach to water management in the Zone as there are many Ngāi Tahu philosophies of connectedness between mountains, rivers and the sea, even though the CWMS does not cover coastal planning.

Canterbury Water

FEEDBACK SECTION

Please refer to the draft Banks Peninsula ZIP to provide the aspect number for each area you want to comment on.

We want to know what you agree or don't agree with. We also want to know what you think is missing. If you don't agree or think something is missing please give us a solution in the right-hand column. We are looking for realistic and positive solutions. We have provided a brief laid-out example below to show you how get you started.

Aspect #	ZIP recommendation	What I agree with/What I don't agree with/What is missing?	Solutions			
1.12	Regulations are established and enforced for runoff water from such activities as car and boat washing, excavations, roadways and carparks and similar to improve the quality of water being discharged into the ocean.	The quality of ocean water is one of the most important issues facing water management in Banks Peninsula. We need to work towards ensuring locals and visitors are aware of the issue and behaviours required to reduce/stop contaminated discharges. This is a priority and we should be working to fixing the problem faster.	Can we run a community awareness campaign with posters and flyers at key sites such as boating and car washing facilities. Perhaps school kids could be involved in design the collateral.			

FEEDBACK SECTION

Please refer to the draft Ashburton ZIP to provide the aspect number for each area you want to comment on.

We want to know what you agree or don't agree with. We also want to know what you think is missing. If you don't agree or think something is missing please give us a solution in the right-hand column. We are looking for realistic and positive solutions. We have provided a brief laid-out example below to show you how get you started.

Aspect #	ZIP recommendation	What I agree with/What I don't agree with/What is missing?	Solutions

FEEDBACK SECTION

Please refer to the draft Ashburton ZIP to provide the aspect number for each area you want to comment on.

We want to know what you agree or don't agree with. We also want to know what you think is missing. If you don't agree or think something is missing please give us a solution in the right-hand column. We are looking for realistic and positive solutions. We have provided a brief laid-out example below to show you how get you started.

Aspect #	ZIP recommendation	What I agree with/What I don't agree with/What is missing?	Solutions

FEEDBACK SECTION
General feedback - draft Banks Peninsula ZIP
Canterbury Water

Ki uta ki tai

From the mountains to the sea

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Facilitating sustainable development in the Canterbury region

www.ecan.govt.nz

Report: E12/97

Environment Canterbury offices

Christchurch
PO Box 345
Christchurch 8140
P: 03 365 3828
F: 03 365 3194

Kaikoura
73 Beach Road
PO Box 73
Kaikoura 7300
P: 03 319 5781
F: 03 319 5809

Canterbury Water

Draft Christchurch West Melton Zone Implementation Programme

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Selwyn District Council

Christchurch City Council

Zone Committee Membership:

Christchurch West Melton Zone Committee (the Committee) is a joint committee of Christchurch City Council, Selwyn District Council and Environment Canterbury Regional Council.

The members of the Committee as of the 28 November 2012 public meeting are:

Ian Fox Chair/Community member

Deidre Francis ..... Deputy Chair/Community member

Ann Winstanley..... Community member

Hugh Thorpe ..... Community member

Jon Harding ..... Community member

Robert Wynn-Williams..... Community member

Arapata Reuben..... Ngāi Tūāhuriri Rūnunga

Yvette Couch-Lewis..... Te Hapū ō Ngāti Wheke/Rapaki

Vacant ..... *Te Rūnunga o Ngāi Taumutu*

Councillor Debra Hasson ..... Selwyn District Council

Commissioner Rex Williams ..... Environment Canterbury

Councillor Sally Buck ..... Christchurch City Council

See http://ecan.govt.nz/get-involved/canterburywater/committees/chch-west-melton/Pages/membership.aspx for background information on committee members.

Previous members of the Committee are:

Herena Stone ..... Te Hapū ō Ngāti Wheke/Rapaki

Craig Pauling ..... Te Rūnunga o Ngāi Taumutu

With support from

Matthew Ross..... Environment Canterbury

Elizabeth Blayney..... Christchurch City Council

Diane Shelander ..... Christchurch City Council

For more information contact matthew.ross@ecan.govt.nz

Whakataukī

Ko o mātou whakaaro ki te whenua, ngā roto, ngā awa, te moana hei here ia tātou.
O ngā tuputupunga o Te Aka o Tū Whenua
Hei whakatō whakatipu I ngā mahinga kai

Our thoughts are to the land, to the lakes, the rivers and the sea that bind us together.

To preserve the well-being of the vines of Tū Whenua (land and water)

That gave rise to the people's food gathering places

Invitation for feedback:

The Committee welcomes written feedback on this draft Zone Implementation Programme (ZIP) – see feedback form at the end of this document.

Please send your feedback to mailroom@ecan.govt.nz, by 03 February 2012.
The Committee will present and discuss this draft ZIP at public meetings as follows:

18 December 2012, 7-9pm, at Wigram Manor, 14 Henry Wigram Drive, Christchurch 8042
24 January 2012, 7-9pm, at Wigram Manor, 14 Henry Wigram Drive, Christchurch 8042

We welcome the opportunity to meet with organisations to discuss this draft ZIP.
Please contact admin@canterburywater.org.nz if your organisation wishes to meet with us.

Chairman's Comments

"A consensus decision is one with which the majority agree, and the minority can at least live with" said a friend of mine a couple of years ago. With that definition firmly in mind, as the Canterbury Water Management Strategy (CWMS) requires our decisions be arrived at by consensus, the Christchurch West Melton Zone Committee (the Committee) embarked on our journey a little over a year ago.

The destination, as far one goes, is a holistic management of water as embodied in the CWMS and specified in the targets, although the people around this committee table probably won't be the ones who get there, as it's some distance away. Rather, our aim has been to provide the foundations upon which successive iterations of the Zone Implementation Programme (ZIP) can be laid in a way that can include prior learning and allow for new information as it comes to light, and to give us something with which we can start to do things better than we have done before - right now.

Some thanks are due before I continue. Firstly, I have to say I'm proud to have been working with the people on and involved with this Committee. The Committee members are great and the effort they've put in to our deliberations has been eclipsed only by their forbearance for my (deliberately) bad jokes. Water management can, after all, be a somewhat dry subject at times. There have been many others who've helped us along the way, including several staff from Environment Canterbury (ECan) and Christchurch City Council (CCC) who've been vital in supplying information and advice that's been essential to the Committee's deliberations. Thanks to you all.

During our drafting stages there was, under the heading "Chairman's Comment", a note that read "[INSERT TEXT HERE]." Jon Harding, one of my fellow Committee members, said at our November 2012 meeting that he felt it was a quite pithy comment and really got to the nub of what we'd been doing. While his tongue was firmly in his cheek at the time he was, I think, quite right. While we had plenty of guidance and a torrent of information flowing our way it was, ultimately, up to us to insert the text here where you are now reading it.

We think we've done OK, well, better than OK but we know we've a long way to go so that'll do for self-congratulations for now. It wasn't easy. Frequently it was quite challenging. We have not taken account of everything we think we ought to; as we've had to focus on particular aspects of water management (those that Earthquake Recovery Programmes could affect or effect) in order to fit with external timelines. That hasn't necessarily been a bad thing and we hope it provides the benefits we are expecting it to.

This draft ZIP contains a large number of recommendations to Councils, and we've thought about them a lot over the last year. Considerable time, effort, and information gathering has gone into their drafting, along with significant debate; although very little of what could be called arguing as generally this Committee has been harmoniously and unanimously focussed on the task at hand.

Unlike other parts of Canterbury this Zone is blessed, so far as a Zone Committee's harmony of deliberations is concerned, with having no looming infrastructure projects or agricultural expansion. This has made it comparatively easy to focus on issues such as the protection of our groundwater (that provides New Zealand's second largest city's domestic and industrial water supply, and has an estimated economic value approaching $3b per annum), the arrest and preferably reversal of the decline of our waterways, the potential to provide increased opportunities for people to enjoy our waterways in a variety of manners, and, very importantly, the chances we have to utilise the knowledge of Tangata Whenua in managing our waterways and the life they hold in a manner that enhances them for all and ensures those coming after us will still be able to do so.

We definitely do have our challenges here as we have some of the most polluted streams in the region thanks to 160 years of urban growth. Everything we do on land affects our waterways – from the simplest casual disposal of a cigarette butt into a gutter, to washing our cars on the street, to blasting off our newly laid stamped concrete driveways, to a huge industrial spillage or a sewage overflow - all that filthy waste ends up in our steams. One of the biggest challenges we face is continuing suburban development around our waterways and trying to find ways of at least arresting degradation of them while that growth continues. This will be a huge topic for this Committee to continue considering in the future. It won't be easy, but anything of real value seldom is, and we're up for it.

This isn't our draft ZIP. It's our work, but it's you – those of you reading it – who need to own it. It's been written by the Committee as a set of recommendations to manage your water (bearing in mind that neither the fish, birds, insects, plants, nor any future generations of people can speak for themselves so I'm including all of them in "your" too). As I said, we think we've done an OK job thus far. What we need now though is your input, your considered feedback, your "what were you thinking?" or "I like that, it's cool!", and vitally your reasons why you say those things. It simply isn't enough to say you do or don't like something; we need the reasons for that so we know why we are or aren't, in your opinion, on the right track. Particularly, if you don't like something we've said or recommended we'd like you to suggest an alternative. We've spent a lot of time on what is written here, but that doesn't mean we haven't missed something. So thanks for taking the time to read and consider this draft ZIP. We look forward to hearing from you about it.

A thought to close on: Kiwis are justifiably proud of our High Country and our ability to drink freely from the streams within it. But would you drink from the Avon River/Ōtākaro or the Heathcote River/Ōpāwaho? Could you do so safely one day? It may not be possible, but I think it's worth aiming for if for no other reason than to challenge ourselves to see how far we can get towards cleaning up the mess our forebears and ourselves have made so those after us can continue toward that aim from somewhere closer to it than we are.

Ian Fox.
Chair, Christchurch West Melton Zone Committee

Executive Summary

This is the first draft Zone Implementation Programme (ZIP) for the Christchurch West Melton Zone (the Zone) to be produced under the Canterbury Water Management Strategy (CWMS). The draft ZIP has been developed as a package of recommendations that complement and support each other. To successfully implement the CWMS in this zone, the entire package of recommendations will need to be adopted.

The draft ZIP has been prepared by Christchurch West Melton Zone Committee (the Committee) through a collaborative process and is a non-statutory document. The Committee is a committee of Christchurch City Council, Environment Canterbury, and Selwyn District Council. Once completed, the ZIP will be formally submitted to the councils for consideration.

This first draft ZIP takes a deliberately high level view of water management. There are a number of well-developed local government strategies and plans and a variety of different organisations and community groups already actively involved in water management in the Zone. The key goal of this draft ZIP is to ensure that these strategies, plans, and programmes align with the CWMS and with local priorities. Alignment will lead to more catchment specific recommendations in future ZIPs.

The Committee has identified five issues that are a priority to address in the Zone and that must be tackled in parallel, and in an integrated way, to give effect to the CWMS. The "Priority Issues" are:

- Enhancing and managing waterways for recreation, relaxation and amenity
- Improving surface water quality and safeguarding surface water flows
- Enhancing healthy ecosystems, indigenous biodiversity, and valued introduced species and landscapes
- Safeguarding groundwater quality and flows for multiple uses
- Making efficient use of water and managing demand

Furthermore, there are five "Key Principles" woven throughout the draft ZIP, which must be taken into account when recommendations are being implemented. These Key Principles are:

- Kaitiakitanga
- Better integration of plans and collaboration between agencies and groups
- Earthquake recovery programmes help to implement the CWMS in the Zone
- Local people are involved in improving water management
- The effects of improving flood management are beneficial to a spectrum of waterway values

It is important to note that the CWMS does not address flooding or the management of floods. As such, the provision of flood defences and stop banks are beyond the scope of the ZIP. Similarly, as the Committee is focussed only on the Christchurch West Melton Zone, implementation of the CWMS in other parts of Canterbury is also out of scope.

With the rapid rebuild in post-earthquake Christchurch, the Committee anticipates the need to produce an updated version of the ZIP within approximately 12 months.

Contents

1. Introduction

1.1 Scope Of The Zone Implementation Programme

This Zone Implementation Programme (ZIP) is intended to guide the implementation of the Canterbury Water Management Strategy (CWMS) in the Christchurch West Melton Zone (the Zone). It aims to address all the CWMS targets, in so far as they are applicable to the Zone and contains 86 recommendations for Environment Canterbury, Christchurch City Council, Selwyn District Council, and other agencies.

1.2 Geographical Scope

The geographic area covered by the ZIP includes:

- The lower parts of the Waimakariri River
- Aquifers that are part of the Canterbury Plains groundwater system
- The Ōtūkaikino Creek
- The Styx River/Pūrākaunui
- The Avon River/Ōtākaro
- The Heathcote River/Ōpāwaho
- The Avon-Heathcote Estuary/Ihutai
- The upper part of the Halswell River/Hurutini

The Zone includes a large part of Christchurch City Council's territorial area including all of urban Christchurch and parts of the Port Hills. The western part of the Zone is within Selwyn District.

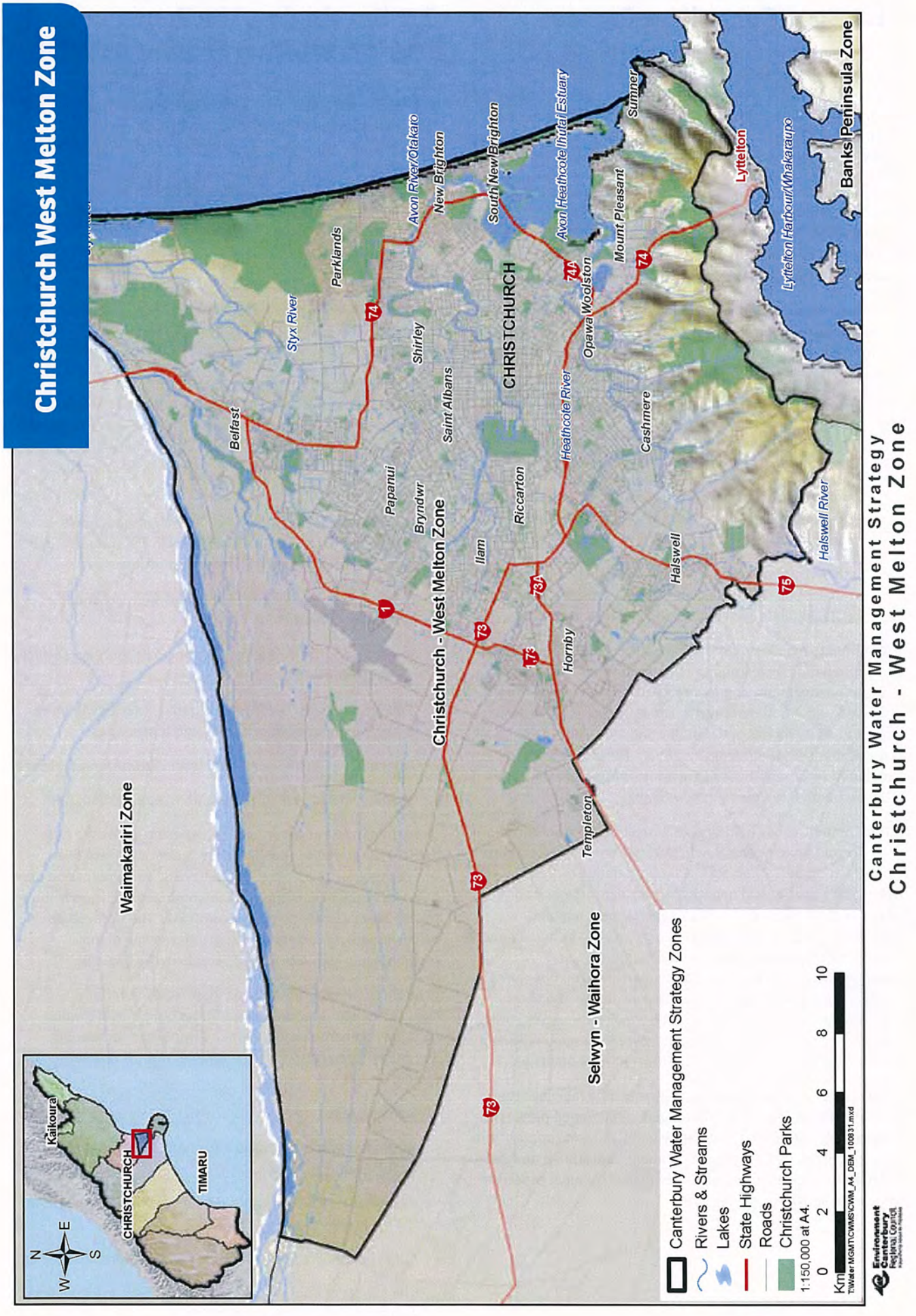
1.3 Boundaries With Other Water Management Zones

The Zone shares boundaries with Banks Peninsula, Selwyn-Waihora, and Waimakairiri Zones, with water moving into and out of the Zone:

- The Waimakariri River flows through the Christchurch West Melton, Selwyn-Waihora, and Waimakariri Zones
  - The Waimakariri upper catchment is in the Selwyn-Waihora Zone
  - Christchurch West Melton shares a boundary with the Waimakariri Zone along the lower parts of the catchment
- The aquifers in the Zone are part of a larger groundwater system on the Canterbury Plains, with water moving both into and out of the Zone
- The Halswell River/Hurutini catchment flows from the Zone into Selwyn-Waihora Zone (towards Te Waihora/Lake Ellesmere)
- The reticulated public water supply to Lyttelton Harbour/Whakaraupo is supplied from groundwater in the Zone

In addition, there is a Regional Committee for the Canterbury Water Management Strategy (CWMS) that considers cross-boundary matters from a regional perspective.

The Zone Committee will seek to ensure that an integrated approach to water management is taken that reflects catchments rather than administrative boundaries.



Draft Christchurch West Melton Zone Implementation Programme

1.4 Zone Committee Process

The Committee was established under the auspices of the Local Government Act 2002 in accordance with the Canterbury Water Management Strategy (2009). This is a joint Committee of Environment Canterbury (the Regional Council), Christchurch City Council and Selwyn District Council (the Territorial Authorities).

The Committee was set up in November 2011 to prepare and periodically review a Zone Implementation Programme (ZIP) giving effect to the CWMS in the Christchurch West Melton Zone. The collaborative CWMS approach and consensual decision making has been sought on all decisions.

The membership reflects the need for the group to work collaboratively, considering the implementation of the Principles, Priorities, and Targets of the CWMS in the Zone and includes:

- 1 member appointed by the Regional Council
- 1 member appointed by each Territorial Authority (Christchurch City Council & Selwyn District Council)
- 1 member appointed by each Rūnanga (Ngāi Tūāhuriri Rūnanga, Te Hapū ō Ngāti Wheke/Rapaki, Te Rūnunga o Ngāi Taumutu)
- Between 4-7 members from the community, chosen from a range of backgrounds and interests, jointly appointed by the Regional Council and Territorial Authorities

Community members were selected (both as individuals and in combination as a group of people) for their knowledge of water management, connections with the Zone, and their ability to work collaboratively. The selection process was open to all members of the public and included written applications and workshop sessions. The selection panel included representatives of Environment Canterbury, Christchurch City Council, and Rūnanga.

The Committee has held 13 public meetings and 10 informal workshops since orientation in October 2011. The Committee has been briefed about surface and groundwater resources (including quality and quantity/flows); ecosystems and biodiversity; cultural values and aspirations; regional planning; wastewater management; stormwater management; water supply; water use; pollution incidents; flood management activities; recreation; earthquake impacts; public communications and awareness raising initiatives. The Committee met, and discussed zone water issues with a number of community groups and government agencies. In addition the Committee has undertaken three fieldtrips.

Environment Canterbury provides the staff to facilitate the committee process with Christchurch City Council providing the secretarial support, with access to technical support from Christchurch City Council, Environment Canterbury, and Selwyn District Council as necessary. Additional technical expertise has been sought where required.

1.5 Developing The Zone Implementation Programme (Zip)

This ZIP has been developed in the context of the Principles, Priorities, and Targets of the CWMS as relevant to the Christchurch West Melton Zone. It has been developed as a package of priority outcomes and recommendations that complement and support each other. Because of this interconnectedness, to successfully implement the CWMS in this zone, the entire package of recommendations will need to be adopted.

The CWMS established the importance of involving local people in the integrated management of water at a local level. The Committee acknowledges the significant contribution in time and effort that is already being made on water related issues by community groups and other organisations in the Zone.

The challenges and opportunities related to water management at a local level reflect the aspirations and concerns of local people. These include how water is used or not used, and the need to take the specific nature of the local environment and waterways (e.g. size of rivers, number of wetlands) into account.

The Committee has identified five Priority Issues that it believes need to be addressed urgently in the zone in order to implement the CWMS (not in order of priority):

- Enhancing and managing waterways for recreation, relaxation and amenity
- Improving surface water quality and safeguarding surface water flows
- Enhancing healthy ecosystems, indigenous biodiversity, and valued introduced species and landscapes
- Safeguarding groundwater quality and flows for multiple uses
- Making efficient use of water and managing demand.

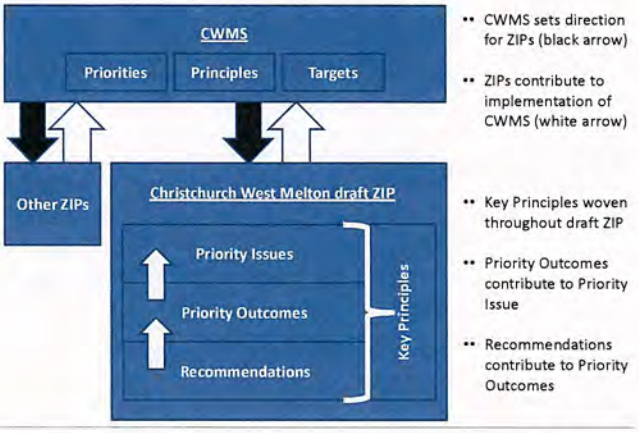
The Committee has recommended specific actions to help achieve outcomes for each priority. Note that these five Priority Issues are a subset of the CWMS. An explanation of how the Priority Outcomes and Recommendations contribute to the CWMS is included in this draft ZIP. The Committee will include a more detailed cross-referencing of our recommendations with CWMS Targets in the final ZIP.

In addition, the Committee has identified a number of "Key Principles" that are woven throughout the ZIP, which must be taken into account when Priority Outcomes and Recommendations are being implemented. These Key Principles are:

- Kaitiakitanga
- Better integration of plans and collaboration between agencies and groups
- Earthquake recovery programmes help to implement the CWMS in the Zone
- Local people are involved in improving water management
- The effects of improving flood management are beneficial to a spectrum of waterway values.

A diagram illustrating the relationship between the CWMS and Key Principles, Priority Issues, Priority Outcomes, and Recommendations in the draft ZIP is included shown below.

Relationship between CWMS and draft ZIP



This draft ZIP is written to advise decision makers about the actions that the Committee believes are needed to meet the CWMS Targets within the Zone. The CWMS Targets were agreed through the initial CWMS process and signed off by the Regional Council and Canterbury's territorial authorities. We have focused on what needs to be done to achieve the CWMS targets within their stated time frames. The Committee did not consider the level of resourcing available for achieving the Recommendations. This is because the CWMS has a 30-year vision and it is inevitable that budgets and resources will vary over this period.

This first draft ZIP takes a deliberately high level view of water management. There are a number of well-developed local government strategies and plans and a variety of different organisations and community groups already actively involved in water management in the Zone. The key goal of this first ZIP is to ensure that these strategies, plans, and programmes align with the CWMS and with local priorities. Alignment will lead to more catchment specific recommendations in future ZIPs and in many instances the Committee have recommended, as a priority, that a collaborative approach be established at a catchment level to facilitate this. Considering issues from a catchment level will encourage a flexible and focused approach to improving water management. Furthermore, with the rapid rebuild in post-earthquake Christchurch, the Committee anticipates the need to produce an updated version of this first ZIP within approximately 12 months.

For clarity, timeframes have been identified for individual recommendations. This is based on the;

- timeframes for the relevant CWMS Target,
- type of action requested,
- a reasonable period of time to achieve the outcomes,
- the urgency with which the Committee thinks the recommendation needs to be carried to a conclusion.

The Committee acknowledges that it has ***not*** considered whether this timeframe is achievable for the organisations named against recommendations.

The Committee anticipates that it will receive comments and feedback on the timeframes, affordability, resource availability etc. as part of the public and stakeholder engagement process. This will be used to help inform the development of the final ZIP. Once the final ZIP is formally presented to Councils, the Committee hopes to receive a response as to how the councils will give effect to the ZIP. The Committee recognises that this response will clearly be dictated by resource availability etc. and may require the Committee to prioritise.

The Committee cannot commit the organisations or groups named in the ZIP to specific courses of spending, policy or operations. It can however hope that those identified as being able to help implement the CWMS in the Zone will contribute where possible, towards achieving the priority outcomes and recommendations in the ZIP.

Finally, it is important to note that the sequence in which the Key Principles, Priority Issues, Priority Outcomes, and Recommendations are included in this document does not imply any order of relative importance or urgency.

2. Christchurch West Melton Zone Overview

2.1 State Of Water Resources

2.1.1 Waimakariri River

The Waimakariri River is one of the largest rivers in North Canterbury and originates in the main divide of the Southern Alps. The catchment is about 2600 square kilometres and flows are snow and rain fed with floods and freshes occurring mostly in north-west weather. The catchment provides water for multiple uses in the CWMS zones of Selwyn Waihora, Christchurch West Melton and the Waimakariri.

The extensive upper headwaters of the Waimakariri are little modified by human activity. The river leaves the gorge at Kowai Bush north of Springfield, crossing the Canterbury plains for the last 60 km of its course. At the river mouth there is an extensive estuary of high value native plant, animal and bird life.

The lower part of the Waimakariri River forms the northern boundary of the Zone. The western boundary is Intake Road. These lower reaches have been highly modified by stop banks, groynes, in-stream tracks, artificial channels and willow covered margins to manage flooding. The river berms and associated riparian wetlands also support high numbers of endemic, specialised river-bird species, invertebrates, fish and native plants. These areas are among the largest remaining in the Canterbury region.

Water leaks through the bed and banks of the Waimakariri River from Halkett downstream, recharging the riparian aquifers, contributing to a huge groundwater resource stored in the gravels beneath the plains. This groundwater flows towards Christchurch and is abstracted for multiple uses. Much of this groundwater re-surfaces in springs feeding the streams on the lower plains, including the Ōtūkaikino Creek (South Branch of Waimakariri), Styx River/Pūrākaunui, Avon River/Ōtākaro, Heathcote River/Ōpāwaho and Halswell River/Hurutini.

The Waimakariri is one of the most heavily used rivers for recreation in New Zealand because of its proximity to Christchurch.

The Waimakariri River catchment had and still has today an important role in the wellbeing of the local Ngāi Tahu. When the first European settlers looked out over the Waimakariri River catchment from the top of the Bridle Path they saw a swamp land that they planned to drain.

Ngāi Tahu saw the same swamp land and enormous expanse of waterways as being a place full of mahinga kai. The catchment provided freshwater and saltwater fish species and shellfish. There was an abundance of bird life for kai and raranga (weaving) material, numerous plant and natural materials for building whare, waka, and rongoā species. The estuaries and swamps provided raupō, harakeke and pingao, mud, soils, tree bark and berries for dyes, and plant seeds for oils. It was a place of significance. The abundance of natural resources ensured the welfare and future of the people. Those with resources flourished while those without perished. Therefore, the management and maintenance of resources was and is the foremost concern. This inter-dependent relationship with the environment is central to Māori creation stories, religious belief, and resource management techniques within the Waimakariri River catchment.

2.1.2 Groundwater

The Christchurch West Melton aquifer system is a segment of the extensive groundwater system of the Canterbury Plains. Groundwater occupies the pore spaces of the unconsolidated gravels, sands and silts that make up the plains. The aquifers of the Christchurch West Melton system are recharged by relatively constant leakage from the Waimakariri River, supplemented by seasonably variable rainfall on the land between the River and the City which filters down through the soil to the water table.

Groundwater flow is generally from west to east, from the mountains towards the sea. Some groundwater flows out underneath Christchurch at depth into the ocean, but a large proportion of the flow resurfaces as springs feeding groundwater-dependent streams. The volcanic rocks of the Port Hills form a barrier to groundwater flow, diverting the groundwater either side of Banks Peninsula i.e. eastwards underneath Christchurch towards the sea, or southwards towards Te Waihora/Lake Ellesmere. The southern boundary of the Christchurch West Melton Zone approximates a 'groundwater divide' between these two components of groundwater flow.

Changes in sea level over past cycles of glaciation have resulted in alternating layers of coarse river gravels and fine marine or estuarine silty deposits near the coast creating a sequence of five or more distinct gravel aquifers beneath the city, sandwiched between finer-grained confining layers. In this coastal confined aquifer system, pressures are higher in the deep aquifers and there is a slow upward movement of water from any one aquifer into the aquifer immediately above it. When this water eventually reaches the top (Riccarton gravel) aquifer it flows coastwards and emerges at some point offshore. The deeper aquifers are presumed to be "blind". The confining layers are not impermeable to flow and it is this upward flow as much as the fine-grained sediments that protect the deeper aquifers from contamination entering via the land surface near the coast. The confining layers thin towards the west. The margin of the top confining layer is highly irregular but broadly speaking it does not extend beyond Johns/Russley Roads. Still further west there is no confining layer and groundwater is vulnerable because contaminated water can move relatively easily down from the surface to the water table.

The Christchurch West Melton groundwater system has had a long history of abstraction for public water supply, industry and agriculture. It needs no treatment and provides almost all of the area's drinking water, valued by both the people and industries of Christchurch.

Water is a taonga. It represents the lifeblood of the environment and is embodied in the traditional values,

controls and spiritual beliefs and practices. The maintenance of water quality and quantity is of absolute importance for the historical religious practices that were carried out and for mahinga kai. Both surface and ground water play an equal part in the well-being of the people.

Before drainage there was an extensive network of waterways and wetlands between the Waimakariri River, Lake Ellesmere/Te Waihora, and the Avon-Heathcote Esturary/Ihutai. Ngāi Tahu followed these waterways in its maintenance of the food-rich wetlands. Today the great wetlands are no longer evident. The people of the land had appreciation for the importance of the interconnection between both sources and the need to manage them collectively. A culturally holistic approach considers that all waterways above and below ground are significant. Ki uta ki tai, flowing from the mountains connecting the rivers, streams, estuaries, and wetlands, all leading out to the coast; all is one.

2.1.3 Ōtukaikino Creek

The Ōtūkaikino Creek arises from a system of spring-fed streams and wetlands between the Airport and McLeans Island. Prior to river control works that have confined the braided river to its current course it was known as the "South Branch" of the Waimakariri River. The catchment is primarily rural grazing land with some areas designated for residential development, such as Clearwater, and other areas used for recreation, such as the Groynes, and some used for gravel extraction.

The values within the Ōtukaikino Creek catchment of Ngā taonga tūku iho (Mauri, Mahinga kai, Wāhi Taonga, Wāhi Raranga, Hāpua, Waiora, Waipuna) are to uphold the water quality and quantity, protect the waterway margins and wetlands, and prevent destruction of wāhi tapu sites. In this catchment, Ngāi Tūāhuriri Rūnunga has significant unresolved concerns about the mixing of waters that resulted from the construction of the Northern Motorway.

The Ōtūkaikino Creek retains high aquatic ecological values, with native fish populations as well as a high value trout sports fishery. The invertebrate communities in the Ōtūkaikino Creek represent the healthiest aquatic ecosystem in the Christchurch area. Water quality is generally good due to the close connection with the Waimakariri River, but faecal contamination has been a problem for many years related to livestock access to waterways and large populations of waterfowl at the Groynes. The river and its associated wetland areas have high value for native birdlife, both wetland and forest species, and contain good remnants of native plants.

2.1.4 Styx/Pūrākaunui River

The Styx River/Pūrākaunui channel can be traced back as far as Nunweek Park where it is usually dry. It has a small flow at Sawyers Arms road but is boosted strongly by large springs before reaching Gardiners Road, with more downstream, notably Redwood Spring. Below Nunweek Park the Styx flows through a mix of residential, conservation, rural and lifestyle land uses before exiting into Brooklands Lagoon adjacent to the mouth of the Waimakariri River. Tide gates at Brooklands minimise the impact of high tides on water levels in the lower river, which is in an area of low lying land subject to flooding. Earthquake induced land subsidence around Brooklands suggests that flooding in this area will worsen.

The Styx River/Pūrākaunui has two main tributaries, Smacks and Kaputone Creek, with additional inflow from a series of land drainage channels that historically enabled the conversion of boggy peat land into market gardens and grazing land in the south and east of the catchment. There is a history of industrial land use along Johns Road and in the Belfast area, with discharges from the latter into Kaputone Creek that affected the water quality and ecology of this waterway. Further large residential development in the catchment is imminent but stormwater treatment systems have been mandated to minimise the impacts of stormwater on flooding, water quality and ecology of the river.

The Styx River/Pūrākaunui has relatively high ecological values for an urban waterway, with a diverse fish community and healthy invertebrate populations in the upper wadeable reaches of the river. Remnant saltmarsh ecosystems can be found downstream of the tide gates. Water quality is generally good, although existing stormwater runoff increases sediment and contaminant loads in the river and livestock access to waterways are also a source of sediment and faecal contamination in some areas. Extensive macrophyte (aquatic weed) growth is periodically removed from the river to mitigate flood risk. Land subsidence in the middle and lower reaches of the river is indicated by higher water levels (relative to land) even in normal conditions. This will affect flood management.

2.1.5 Avon/Ōtākaro River

The Avon River/Ōtākaro is spring-fed and flows slowly from the northwest of Christchurch, through the central city and the eastern suburbs to the northern apex of the Avon-Heathcote Estuary/Ihutai. A dry channel crosses Russley Road, and the Ilam stream at Crosbie Park carries a small flow sourced from the Paparua stockwater race, but the first point on the Avon River/Ōtākaro proper at which water is usually present is at Balrudry Street. There are a number of tributaries, both natural streams and drains. The catchment is very flat and almost completely urbanised, with a mix of residential, commercial and agricultural land use. A small part of the catchment in the Cranford Street basin and north of QE II Drive remains in market gardens and grazing land. Some of the latter area drains to the Styx River/Pūrākaunui catchment.

The Avon River/Ōtākaro has high heritage, cultural, amenity and recreational values. Water quality is affected by the quality of groundwater in the shallow aquifers feeding the springs, which is very good at source but subsequently degraded by stormwater inputs, occasional wastewater overflows, and large populations of waterfowl. The catchment has been urbanised for many years and most of the stormwater discharged to the river is untreated. Water quality in some tributaries such as Addington and Riccarton Drains is poor and unexplained fish kills (primarily eels) are occasionally reported.

Aquatic ecology values in the Avon River/Ōtākaro have declined in the last few decades, primarily as a result of fine sediment deposition and other contaminants (such as heavy metals) on the river bed and reduction in habitat diversity. Sediment deposition has been greatly affected by liquefaction processes. The lower river has a diverse fish community and good examples of inanga spawning habitats. The river and

tributary streams in the upper catchment have good riparian plant cover but this reduces downstream as the river widens and becomes tidal in the lower reaches. Extensive macrophyte (aquatic weed) growth is periodically removed from the river to mitigate flood risk.

2.1.6 Heathcote/Ōpāwaho River

The Heathcote River/Ōpāwaho and its tributaries are in the south of Christchurch and approximately one-third of the catchment is on the Port Hills. The Cashmere Stream is a significant spring-fed tributary including both hill and flat land in its sub-catchment. The upper river is also spring-fed but receives flow from the Sockburn industrial sub-catchment of Haytons Stream before joining with the Cashmere Stream. Hendersons Basin in the upper catchment is very low-lying and is designated as a flood management area to mitigate flooding in the lower catchment. Flood risk is also managed by gates in the lower river at the Woolston Cut, which open to ease flood flows and reduce water levels upstream. Under normal conditions the gates are closed and flows follow the old channel. This prevents salt water flowing further upstream and damaging freshwater ecosystems.

The Port Hills land is covered by highly erodible loess soils. Development on the hills, combined with a reduction in vegetation, has resulted in considerable fine sediment input to the Cashmere Stream and the Heathcote River/Ōpāwaho over the years. Many of the streams draining the Port Hills are ephemeral. Apart from the upper Cashmere Stream water quality in the river system is poor. As with the other urban rivers it is affected by the quality of shallow groundwater feeding the springs, occasional industrial discharges (accidental and/or illegal), sediment-laden runoff from the Port Hills, stormwater from rural, industrial, commercial and residential land use, occasional wastewater overflows and large populations of wildfowl. Water quality in the Cashmere Stream is relatively good, while it is very poor in the industrial catchment of Sockburn/Wigram draining into Haytons Stream.

From early European settlement until the 1960s the lower Heathcote River/Ōpāwaho was used for discharging waste from a range of industries in the Woolston area. Despite the heavy historical human impacts the lower river in the vicinity of the Avon-Heathcote Estuary/Ihutai retains significant ecological values even though it is still greatly impacted. Further upstream, the Cashmere Stream has high aquatic ecological values indicated by the presence of freshwater mussel and crayfish (koura) populations. The ecological values of the mainstem have also been impacted by fine sediment deposition resulting in reduced habitat diversity. Extensive macrophyte (aquatic weed) growth is periodically removed from the river to mitigate flood risk.

2.1.7 Avon-Heathcote Estuary/Ihutai

Ihutai and its catchment are of immense cultural and historical importance to Tangata Whenua, being a place of significant settlement and food gathering by Waitaha, Ngati Mamoe and Ngāi Tahu for over 600 years. Sites along both the Avon River/Ōtākaro and Heathcote River/Ōpāwaho, in and around the estuary, and on the coastline near the mouth of the estuary were known and used due to the availability and abundance of mahinga kai resources. Freshwater fish and shellfish, as well as numerous native plant resources, waterfowl and forest birds could be gathered from the network of springs, waterways, swamps, grasslands and lowland podocarp forests that made up the estuary catchment, much of which was still present at the time of European settlement (Tau, Goodall, Palmer & Tau 1990; Christchurch City Libraries 2006; Christchurch City Council 2007).

The Heathcote River/Ōpāwaho has seen four centuries of fishing. The awa is susceptible to flooding within its catchment. With sufficient time and intensity the Heathcote River/Ōpāwaho will ultimately overflow its banks and flood the adjacent land. However, the floodplains were a good place to settle as they were flat and fertile and adjacent to a water supply, and means of transportation.

Tangata Whenua had a close relationship with the estuaries and their tributaries for protection, transport and food, including shellfish, inanga, flounder and tuna. In the lower reaches, the inanga would come and spawn along the awa on the river grasses. The swamp forest around small streams such as Stream Wharf provided gathering grounds for water fowl and forest birds including pukeko, weka and tui.

2.1.8 Halswell/Hurutini River

The upper Halswell River/Hurutini lies within the Christchurch West Melton Zone while the remainder of the catchment is in the Selwyn Waihora Zone. It follows a meandering path through farmland from its spring-fed origins west of Oaklands and Halswell to the northern shore of Te Waihora/Lake Ellesmere. The upper tributaries of Knights Stream, Nottingham Stream and the Quaifes Road drain system are spring-fed and converge just south of Halswell to form the mainstem. Ephemeral streams draining the Port Hills also flow into the upper river. The Nottingham Stream sub-catchment is almost completely urbanised, while the remainder of the catchment comprises largely rural and lifestyle land use. Very large residential development in the Wigram/Halswell area is underway and much more is planned over the next few decades. Best practice stormwater management and treatment systems designed to minimise the impacts of stormwater on flooding, water quality and ecology of the river have been mandated.

Water quality in the upper Halswell River/Hurutini is generally poor. The quality of groundwater in the springs is very good but urban stormwater, runoff from rural land and rural land management practices combine to degrade river water quality. The aquatic ecological values of the river are variable. Some areas have high value, such as the Quaifes Road spring-fed drain system where freshwater crayfish and diverse invertebrate populations are found, while other areas have been affected by a reduction in habitat quality which has reduced ecological values. A diverse fish assemblage is found in the lower river, with some species likely to use the upper reaches as a spawning, rearing and/or refuge area. Extensive macrophyte (aquatic weed) growth is periodically removed from the river to mitigate flood risk.

2.2 Context

2.2.1 Mana Whenua

Manawhenua

Traditional Māori rights to resources were founded on the manawhenua of a particular tribe which was based on the lands, waterways and all resources controlled by the tribe.

Manawhenua is described as the political and occupational authority over a particular area, usually defined by natural boundaries. The verbal expression of a tribe's manawhenua typically refers to dominant physical features such as mountains, rivers and lakes.

Rangatiratanga

Rangatiratanga was traditionally embodied in the concepts of turangawaewae and manawhenua which centered on the status, role and authority of the rangatira (chief) of the group. He or she was the embodiment of the tribe and carried the practical, moral and spiritual focus of the community.

The rangatira obtained their tapu (spiritual protection) and mana (authority, influence) from a combination of their whakapapa, personality and ability. While the rangatira exercised their mana on behalf of the tribal group, that mana was dependent on the continued recognition and support of the tribal members both as individuals and as a group.

In this way land areas were, in practice, controlled by local hapū (sub-tribe) for their own benefit and the benefit of those other tribal members who had usage rights there. This also reinforced the philosophy that the welfare of the group as a whole was paramount to the welfare of any sub-group or individual within that group.

It is intended that the final version of the ZIP will include zone-specific references to whakapapa.

Ngāi Tahu Freshwater Policy

The Ngāi Tahu Freshwater Policy, Te Whakatau Kauapapa (Ngāi Tahu Resource Management Strategy for Canterbury 1990) and soon to be released iwi management plan for the area contain information, objectives and policies of relevance to the Committee's work.

2.2.2 National Policy Statement On Freshwater

The National Policy Statement on Freshwater sets out the objectives and policies that direct local government to manage water in an integrated and sustainable way, whilst providing for economic growth within set water quality and quantity limits that reflect both local and national values.

The CWMS, through the establishment of Zone Committees and the development of Zone Implementation Programmes, provides an opportunity for local communities to contribute to the identification of shared values at a local and regional level.

2.2.3 Recovery Strategy For Greater Christchurch/Mahere Haumanutanga O Waitaha

The Recovery Strategy for Greater Christchurch/Mahere Haumanutanga o Waitaha is the key reference document that guides and co-ordinates the programmes of work including Recovery Plans, under the Canterbury Earthquake Recovery Act. The six components of recovery are:

- Leadership and integration
- Economic recovery
- Social recovery
- Cultural recovery
- Built environment recovery
- Natural environment recovery.

The Committee notes that there are synergies at a high level between the Greater Christchurch Recovery Strategy and the Canterbury Water Management Strategy. There may be opportunities for the Programmes being developed to implement the Recovery Strategy to also assist with the implementation of the CWMS (and Christchurch West Melton ZIP). Recovery Programmes such as the Natural Environment Recovery Programme, the Infrastructure Programme and the Residential Red Zone Programme have particular opportunities to progress the ZIP's recommendations. The Committee, however, acknowledges that the scope of the Recovery Programmes is wider than water management alone, and that this may constrain the degree to which alignment is possible.

More information on the Recovery Strategy can be found at http://cera.govt.nz/recovery-strategy/overview

2.2.4 Regional And District Planning

The regulatory framework for managing water resources is through the Resource Management Act 1991 and the associated statutory plans at a district and regional level.

Environment Canterbury notified the proposed Land and Water Regional Plan (pLWRP) in August 2012. The pLWRP includes regional level objectives, policies and rules that relate to the management of water in Christchurch West Melton Zone. In addition, the pLWRP includes a sub-regional chapter on the Zone. As the draft ZIP was still being developed at the point that the pLWRP was notified, the Committee has had limited involvement with the development of the pLWRP to date. In due course, it is anticipated that this ZIP will help to inform the relevant sub-regional chapter of the pLWRP.

The sub-regional chapter of the pLWRP for Selwyn-Waihora is currently being developed. A small area of the Christchurch West Melton Zone is included in the scope of the Selwyn-Waihora sub-regional chapter to better reflect groundwater boundaries and surface water catchments. The Committee will work with Environment Canterbury and other relevant CWMS committees to highlight cross-zone matters where appropriate and necessary as identified in the Christchurch West Melton ZIP.

The Christchurch City Plan is a document prepared under the Resource Management Act 1991. Its purpose is to provide a framework for managing the effects of land use and subdivision within the City. The geographical area to which the City Plan applies is those areas of Christchurch that pre-date the amalgamation with the former Banks Peninsula District Council in 2006. The Banks Peninsula District Plan applies to the geographic area of the former Banks Peninsula District Council. The City Plan consists of three volumes: Volume 1 - Statement of Issues, Volume 2 - Statement of Objectives, Policies and Methods, and Volume 3 - Statement of Rules. The City Plan was publicly notified on 24 June 1995 and made operative on 21 November 2005.

The Selwyn District Plan is also a document prepared under the Resource Management Act 1991 with the purpose of providing a framework for managing the effects of land use and subdivision within the District. The District Plan consists of three volumes: Townships, Rural, and Maps. The District Plan was publicly notified on 2 November 2000 and made partially operative on 10 June 2008.

2.2.5 Plans And Non-Statutory Strategies

There are a number of relevant local government and non-governmental organisations (NGOs) strategies and plans in the Zone that are relevant to the implementation of the CWMS and the ZIP. The Committee intends to include a list of the most relevant strategies and plans in the finalised ZIP. To illustrate, some relevant non-statutory plans would include (not an exhaustive list):

- Ngāi Tahu Freshwater Policy Statement
- Christchurch City Council's Surface Water Strategy 2009 – 2039
- Christchurch City Council's Water Supply Strategy 2009 – 2039
- Christchurch City Council's Draft Wastewater Management Strategy.

There are community groups that have well established and developed strategies and plans for the management of water. The Committee hopes that the ZIP will help to facilitate strong connections and support for these where activities will help to implement the CWMS.

3. Key Principles

3.1 Overview

In developing the Zone Implementation Programme (ZIP), the Committee identified that there were some general principles to be considered when tackling many of the water management issues in the Zone. These principles are applied throughout the ZIP and have been woven into the Priority Outcomes and Recommendations as part of an integrated approach to water management. The Key Principles (not in order of priority) are:

- Kaitiakitanga
- Better integration of plans and collaboration between agencies and groups
- Earthquake recovery programmes help to implement the CWMS in the Zone
- Local people are involved in improving water management
- The effects of improving flood management are beneficial to a spectrum of waterway values.

3.2 Kaitiakitanga

Whakapapa o te Wai

Na te po, ko tea o,

Tana ko tu Ao Marama,

Tana ko tea Ao turoa,

Tan ko te kore te Whiwhia,

Tana ko te kore te Rawea,

Tana ko te kore te Tamaua,

Tana ko te kore Matua,

Tana ko Maku,

Te Puna Wai o Te Ao.

From eternity came the universe,

From the universe the bright clear light,

From the bright light the enduring light,

From the enduring light the void unattainable,

From the void unattainable, the void intangible, the void unstable,

From the void unstable, the void endowed with paternity,

From which came the moisture, the spring of eternal life.

Whakapapa is an integral part of Māori society. It is used both extra and intra-tribally to establish and maintain relationships between people, their speaking rights and leadership rights, and their environment. These relationships determine access to resources and the philosophies for their use, and also the responsibilities of people to others.

Whakapapa and turangawaewae (traditional land rights) establish a person's right to participate in tribal life, and constitutes a statement of identity, both genealogically and geographically.

As well as reciting their genealogical relationship with each other and with other tribal groups. Ngāi Tahu also recite the whakapapa which links humankind to the atua (deities) and to the earth, to the waters, forests, animals and birds.

Like other Māori tribes, Ngāi Tahu claim the same whakapapa through Rakinui (sky father) and Papatuanuku (earth mother) and see themselves as connected to the other descendants of Raki and his wives. Whakapapa, then, binds Ngāi Tahu to the mountains, forests, and waters, and the life supported by them. In this way, all things are considered to have mauri (life force) and to be living and to have a genealogical relationship with each other. People are therefore related to the natural world.

As all living creatures are born from Papatuanuku and all return to her on their death, Māori consider that they belong to the land and vice versa.

Wakawaka

Hapū and Iwi rights to fishing areas were based on the same criteria as those to land and its resources. These rights were not general and open to all, any more than land was. This right to control water-based, and particularly sea-based, resources is called manamoana and incorporates all of those principles included in manawhenua.

To Ngāi Tahu, fish were of great cultural, social and economic significance. Their collection was a communal task involving cooperation at a community level and they were traded for the delicacies of other areas, for example, potted birds from inland groups.

As well as developing extensive knowledge about each species' life cycle, Ngāi Tahu developed the technologies to store excess catches for long periods of time.

Mauri

Life, health and vitality – Mauri is the traditional measure of physical, spiritual and emotional wellbeing of people and places: Healthy waterways, healthy kai, healthy people.

As kaitiaki, particular issues of concern within the Zone that manawhenua would like to see addressed are:

- Remediation of inappropriate mixing of waters
- Restoration of our waterways to enable culturally sustainable harvesting of our kai roto, kai awa and kai moana

- Discharges of raw sewage and contaminants to all waterways desist
- Wāhi tapu and wāhi taonga sites are recognized, respected and protected.

These concerns are primarily about ensuring healthy ecosystems for the community and future generations: and that the mauri of rivers, streams, springs, the groundwater, wetlands and lagoons are restored and protected. They recognise the need for sustainable regional economic development and believe this is fundamentally dependent on sustaining healthy waterways.

Manawhenua goals for water management in the Zone are that the above four concerns are addressed with the utmost urgency.

3.3 Better Integration Of Plans And Collaboration Between Agencies And Groups

The Committee believes that implementing the CWMS in the Zone requires better integration of plans and collaboration between agencies and groups in the way that water is managed. The CWMS established the importance of having an integrated approach to water management that delivers multiple benefits in combination. In the Christchurch West Melton Zone there are already a number of plans and strategies in place (or being developed) in addition to the ZIP. Furthermore, there are organisations already involved in water management, including Ngāi Tahu, statutory organisations, businesses, and community groups. Ensuring that all of these different groups, plans, and strategies are working together in a way that helps to implement the CWMS is a key principle of the ZIP. Successfully applying this principle means that:

- The way water is managed and used enhances cultural, social, economic, and environmental well-being in the Zone
- There is a joined-up and collaborative approach to managing water issues in the Zone:
  - From mountains (source) to the sea/"Ki uta ki tai"
  - Across and between rural and urban areas
  - Across and between Central Government, Regional Council, Territorial Authorities and with manawhenua
  - Understanding where our zone receives water from, or transfers water to other zones
  - Involving local community groups in implementation.

Earthquake Recovery Programmes may provide a unique opportunity to proactively rehabilitate and protect waterways sites of cultural significance[1] and be consistent with Ngāi Tahu values.

3.4 Earthquake Recovery Programmes Help To Implement The Canterbury Water Management Strategy

The Committee believes that it is important that earthquake recovery programmes help to implement the CWMS (where possible and appropriate). Successfully applying this principle means that:

- Opportunities created by the earthquakes to do things differently are taken, and;
- Efforts to tackle and address the water related impacts of earthquakes, are targeted in implementing the CWMS.

In the context of implementing the CWMS, the Committee recognises that recovering from the earthquakes presents additional water related challenges and opportunities, whether as a direct effect of the earthquakes themselves, or as a consequence of the decisions taken, in recovering and rebuilding. Some of the water-related earthquake impacts have already been addressed (e.g. restoring water supplies to homes) but other impacts may be longer term or permanent (e.g. bed level of the Avon-Heathcote Estuary/ Ihutai). Earthquake recovery is inevitably a key component of integrated water management that will need to be considered in tackling the water management issues and the priority outcomes identified.

3.5 Local People Are Involved In Improving Water Management

The involvement of local communities in identifying the priorities for water management at a local (zone) level is fundamental to the Canterbury Water Management Strategy. The Committee believes that this is a very important principle for the successful implementation of the CWMS in the Christchurch West Melton Zone. The large urban area in the Zone means that water management challenges have a different emphasis compared to more rural Zones. Stormwater is a more significant water quality challenge in urban waterways, whilst rivers and streams provide access to green space and "blue corridors" that are important for quality of life in an urban environment. Whilst some people are closely involved and interested in water management (e.g. participants in water sports), others have a less direct connection with individual waterways and a strong focus on home use of water. Successfully accommodating this spectrum of interests means that:

- Local people have a sense of ownership and pride in the way water is managed in the Zone
- Local people are well informed about the steps that they can take as individuals to help improve the way we manage water
- Local community groups have opportunities to be involved in implementation of recommendations.

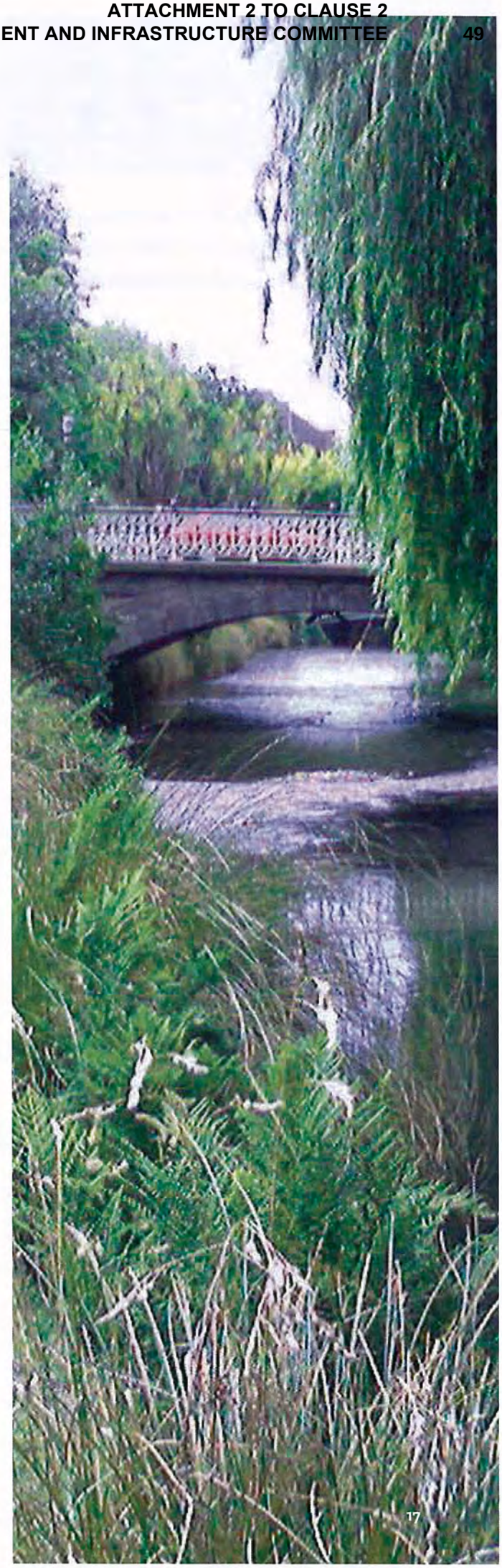
[1] Sites of cultural significance include Ngāi Tahu and European cultural sites.

3.6 The Effects Of Improving Flood Management Are Beneficial To A Spectrum Of Waterway Values

The CWMS does not address flooding or the management of floods. As such, the provision of flood defences and stop banks are beyond the scope of the ZIP. The Committee recognises however that some activities related to flood management may impact our ability to implement the CWMS. For example, dredging silt from waterways to maintain their flood-carrying capacity may adversely impact on native biodiversity at least temporarily. The committee acknowledges that providing appropriate standards of flood protection will be the main priority for flood management activities.

There are significant flood management defences and activities in the Zone along the Waimakariri River and in urban areas. The Committee believes that improving the effects of flood management activities on waterways is an important principle for the ZIP. Successfully applying this principle means that:

- Flood management strategies, plans, and activities (including urban and rural drainage systems) are aligned with the CWMS where possible, without compromising the overall level of flood protection provided.



4. Priority Issues

4.1 Enhancing And Managing Waterways For Recreation, Relaxation And Amenity

Background

Christchurch is known as the "Garden City" due to the quality and extent of its green spaces, which in part is linked to the European heritage of riverside parks and walkways that are valued and enjoyed by both residents and tourists. Perhaps generally less well known are the wāhi taonga and wāhi tapu that are important to manawhenua, as are the associated spiritual, relaxation, therapeutic and passive recreation opportunities.

Recreation, relaxation and amenity opportunities in the waterways of this zone are of social, cultural and economic benefit. Recreation, relaxation and amenity can vary from active pursuits such as kayaking, kite surfing or jetboating to more leisurely activities such as gathering mahinga kai, fishing, walking, or picnicking. Waterways provide "blue corridors" that are valued and enjoyed by people in the Christchurch West Melton Zone for the recreation, relaxation and amenity opportunities they provide. The Waimakariri River is one of the most heavily used waterways in New Zealand. In addition, the braided character of the river has intrinsic value. In the urban setting riverside parks and reserves, provide access to open landscapes, water scenes, wooded areas and the more natural world that are used by walkers, cyclists, and people taking some time out for quiet contemplation. Recreation and relaxation in this context have both direct and indirect benefits to local people and those from outside the Zone.

More people taking part in more activities will increase exercise levels, reduce stress, support local businesses, encourage the provision of better attractions for both local people and visitors, and help earthquake recovery. In some instances, the social and economic benefits will be more tangible and demonstrably connected to waterways (e.g. increased visitor numbers to an improved riverside park), whilst more indirect in others (e.g. a person feels happier because they walked beside the river at lunchtime).

Each of the major catchments in the Zone offers a different range of recreation, relaxation and amenity opportunities. Inevitably, there are sometimes conflicts between the different ways that people want to use and enjoy the same space. For example, a jet boat is not conducive to quiet contemplation. As such, the Committee believes it is important to manage our waterway corridors to provide for multiple recreation, relaxation and amenity uses. We believe that this will be most effectively achieved by involving local groups in identifying priorities for improving recreational and relaxation opportunities with easy access, i.e. close to their communities.

The Committee believes increasing access to waterways is a priority if we are to enhance recreation, relaxation and amenity opportunities. More space beside the waterways means more space to provide for a variety of activities. In some instances, development has encroached on riparian strips and there may be opportunities to reinstate these as part of the post-earthquake rebuild. It is also important to encourage developers to go beyond the statutory minima for set-back provisions to help expand or enhance riparian strips. Connecting recreational opportunities along waterway corridors is also important in improving access and encouraging people to use riparian areas. The Committee supports the concept of a large multiple-use park along the Avon/Ōtākaro River in a corridor from the central business district to the estuary.

The Committee also believes that culture and heritage education parks along waterways would improve recreation, relaxation and amenity opportunities by helping people to better understand the multi-values of their waterways. Interpretation stations are important components of an overall approach to making waterway corridors more accessible. In the same vein, ensuring that there are venues for events (e.g. meeting places, concerts) alongside waterways is an important element of designing waterway corridors that are used by a broad-cross section of the community.

In some locations, where space is available and it is appropriate, moving stop banks further away from the river to reinstate flood plains may help to increase the diversity of landscapes and associated scope for recreation, relaxation and amenity. Ensuring that there is a variety of wet areas is an important design feature as ponds, wetlands, streams, and rivers all provide different experiences.

Ensuring that water is clean and safe for contact is essential for enhancing water based recreation, relaxation and amenity opportunities. Contact water recreation standards are the benchmark. This topic is addressed by the Priority Outcomes and Recommendations related to the Priority Issue of "Improving surface water quality and safeguarding surface water flows."

For some water-based sports, enhancing opportunities includes identifying ways to upgrade existing facilities or provide new venues within the Zone. This is particularly the case for white-water and flat-water sports in the Zone. The committee recognises that larger scale venues would be costly, with limited locations to establish new waterways for these sports (e.g. new artificial lakes). Furthermore, modification of existing waterways would potentially conflict with other priorities (i.e. straightening or widening rivers would have impacts on biodiversity and change flow characteristics). As such the Committee believes that it is appropriate to investigate how enhanced facilities could be developed in the Zone, taking into account the following points:

- Preference for new artificial lakes over modification of existing waterways
- Accessibility of potential locations to encourage participation by younger age groups
- Supporting a variety of different recreation, relaxation and amenity activities (e.g. kayaking, rowing, swimming, sailing)

- Providing multiple benefits for enhanced water management (e.g. native biodiversity and habitat areas, stormwater retention basins, flood management).

Our Priority Outcomes

The Canterbury Water Management Strategy (CWMS) has set specific targets for recreation and amenity opportunities. These targets particularly focus on availability and/or quality of recreational opportunities in each zone, increasing angler numbers or catch rates, addressing environmental flows to meet recreational outcomes and, in areas used for water based recreation, improving water quality if appropriate guidelines are not already met. The water quality aspects of the recreational targets are addressed in our water quality recommendations. Our Committee has specifically highlighted relaxation and passive recreation to clarify that recreation is not limited to more energetic activities.

In order to address CWMS recreation and amenity targets, the Committee have identified priority outcomes that need to be achieved. These are:

- Waterway corridors provide for multiple recreation, relaxation and amenity uses.
- Riparian strips are created, reinstated or expanded (in length and breadth) to improve accessibility for, and encourage recreation, relaxation and amenity
- Wāhi taonga and wāhi tapu are acknowledged
- The effects of flood management activities on the safety of water based recreation are reduced and eliminated where possible
- Earthquake Recovery Programmes help enhance and manage waterways for recreation, relaxation and amenity.

Links to CWMS

The Committee believes that achieving our priority outcomes will directly contribute to the implementation of the following CWMS recreation and amenity opportunities Target areas:

- Maintaining the existing diversity and quality of water-based recreation sites, opportunities and experiences
- A positive trend in the availability and/or quality of recreational opportunities in our zone
- Restoring at least one major fresh water recreational opportunity in our zone that is not currently available in 2010
- Improving water quality in river bathing sites so at least 80% of these sites are graded as suitable for contact recreation.

The Committee also believes that achieving our priority outcomes will contribute to achieving CWMS targets in other sections of the CWMS such as:

- Ecosystem health/biodiversity, through riparian management to improve habitat quality alongside and within waterways
- Kaitiakitanga through acknowledgement and better understanding of wāhi taonga and wāhi tapu as well as improved quality of mahinga kai through riparian management improvements
- Indicators of regional and national economies through increased recreational and tourism opportunities.

Our Recommendations

The Committee has identified the actions that we recommend are implemented to achieve our priority outcomes (see table below). The 'priority outcome' column signifies the subject of the recommendation and the 'Who' column suggests the most appropriate lead organisation(s) for delivering the result. The Committee acknowledges that there may be individuals and agencies who will be involved but who are not listed.

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
RR1 **Waterway corridors provide for multiple recreation, relaxation and amenity uses.**	1.1	a) Implement a collaborative process at a catchment level to involve local community groups in identifying priorities for improving recreational and relaxation opportunities. b) Review and update statutory plans and enforcement activities to give effect to these priorities. c) Develop and progress a co-ordinated programme of actions that are integrated into a catchment plan.	CCC, ECan, Manawhenua, SDC	3 yrs
	1.2	Develop and enhance collaboration between community groups and waterway users for the Waimakariri River, Brooklands Lagoon, and the Avon-Heathcote Estuary/Ihutai, as waterways with multiple uses that are sometimes in conflict (e.g. boating, fishing, significant native biodiversity).	CCC, ECan, Manawhenua, Regional Committee	1-5 yrs
	1.3	Develop and progress a co-ordinated programme of actions to: a) Increase inter-connection and accessibility of relaxation and recreation opportunities in urban and rural waterway corridors b) Increase the number of safe, inviting areas for quiet contemplation c) Establish environmental, cultural and heritage parks, with appropriate signage, along waterways.	CCC, ECan, Manawhenua, SDC	5 yrs
	1.4	Investigate a co-ordinated programme of actions to move flood banks further back from urban waterways to facilitate improved recreation, relaxation and amenity	CCC, Manawhenua, SDC	3 yrs
	1.5	In consultation with community groups develop a co-ordinated programme to establish a large multiple-use park along the Avon/Ōtākaro River in a corridor from the central business district to the estuary	To be identified	3 yrs

	1.6	(a) Investigate; (b) develop a co-ordinated programme to develop international standard flat-water and white-water courses, taking into account:
		· Potential for these facilities to benefit:
		  · native biodiversity
		  · stormwater management
		  · flood management
		  · other recreation and relaxation activities
		· Preference for new artificial lakes over modification of existing waterways
		· Accessibility of potential locations to encourage participation by younger age groups
			To be identified	3 yrs

RR2 **Riparian strips are created, reinstated or expanded (in length and breadth) to improve accessibility, to encourage recreation, relaxation and amenity**	2.1	a) Review the effectiveness of current set-back provisions to ensure that opportunities are taken as part of earthquake recovery to encourage recreation, relaxation and amenity in riparian areas. b) Review and update statutory plans and enforcement activities where required	CCC, ECan, SDC	6 months
	2.2	Where land is redeveloped or sub-divided, work with developers and landowners to implement actions that create, enhance and/or expand riparian strips	CCC, ECan, Manawhenua, SDC	Ongoing
	2.3	Work with interested land owners, to improve access for recreation, including mahinga kai harvesting, relaxation and amenity.	CCC, ECan, Mana Whenua, SDC	Ongoing
RR3 **Wāhi taonga and wāhi tapu are acknowledged**	3.1	Work with manawhenua to develop and progress a co-ordinated programme of actions to raise awareness, understanding, and engender a sense of shared pride in wāhi taonga and wāhi tapu	CCC, ECan, Manawhenua SDC	3 yrs
R4 **The effects of flood management activities on the safety of water based recreation are reduced and eliminated where possible**	4.1	a) Review statutory plans and flood management programmes to ensure that flood management infrastructure and activities do not adversely impact on the safety of water based recreation b) Update where required	ECan	Within 1 year
RR5 **Earthquake Recovery Programmes help enhance and manage waterways for recreation, relaxation and amenity**	5.1	Work with CERA to identify opportunities for Earthquake Recovery Programmes to assist with the implementation of the following recommendations, where appropriate: RR1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3, 3.1	CCC, ECan, Manawhenua, SDC	6 months
	5.2	Seek guidance and advice from the Zone Committee on the implementation of Earthquake Recovery Programmes in the context of the CWMS	CCC, ECan, SDC	Ongoing to 2016

4.2 Improving Surface Water Quality And Safeguarding Surface Water Flows

Background

Good quality surface water and adequate flows are essential for the protection of natural ecosystems and the health of those people gathering mahinga kai and using waterways for recreation. High levels of harmful bacteria or other water-borne illnesses can affect people using waterways for gathering mahinga kai or recreation, and may affect animals. Bacteria found in water bodies are largely derived from water fowl, sewage, stormwater or farm run-off.

"Ngāi Tahu considers that its relationships with the waters of its rohe have been eroded over the last 150 years. Evidence produced by Ngāi Tahu to the Waitangi Tribunal documented numerous examples of the waterways within the Ngāi Tahu rohe:

- That are now severely polluted by discharges &
- Where reworking of the hydrological regime of waterways has resulted in unnatural patterns of erosion, sedimentation, drying up of flows and damage to rich mahinga kai habitats on the riparian margins.

The degraded state of many of the waterways is confirmed by the State of the Environment Report (1997). These adverse effects impact on the health and wellbeing of the waterways and the ability of Ngāi Tahu to access the life sustaining resources of the waterways."[2] Environment Canterbury's State of the Environment Report (2009) for fresh water confirms that generally urban lowland streams are of poor water quality. However, there are some exceptions such as spring zones.

In this Zone, water is not generally abstracted from rivers and streams for human drinking water but it is taken from the lower Waimakariri for stock water schemes.

Each of the major catchments in the Zone has a different combination of issues and opportunities related to surface water quality and flows. These issues and opportunities reflect the type and intensity of land-use in the catchment (i.e. urban or rural), land drainage systems, historical modification of naturally occurring waterways, and the various inputs into, and abstraction from waterways (e.g. stormwater input, agricultural abstraction). The ecosystem health, biodiversity, recreation, relaxation and amenity, cultural and heritage outcomes that local communities want for individual waterways will vary. The feasibility of achieving those outcomes and the resource implications for doing so will also vary between catchments. The Committee believes it is important to establish specific water quality limits at a catchment level that reflect these factors in an integrated and planned way. It is crucial that local communities are involved in the process of identifying water quality outcomes (and associated environmental flows and limits).

The Waimakairiri River is the only braided river in the Zone and retains significant and diverse values as a consequence of current water quality and flows. The Committee believes that safeguarding these values in the way the river is managed is a very high priority. It is however important to recognise that the Waimakairiri River has been modified and constrained to its current channel by stop banks and gravel extraction, to provide flood protection to Christchurch and surrounding areas. The committee believes that these flood management activities should, where possible, be undertaken in a way that benefits the Waimakariri's braided character and associated ecosystems.

Water quality in our urban waterways is degraded by storm-water run-off from our streets, car parks, drives, and buildings. Making sure that stormwater does not flood our streets and houses is obviously important. Management of stormwater can be improved to minimise or eliminate the discharge of polluted water through either reducing the amount of contamination and/or reducing the volume or rate at which water is discharged. For example:

- Buildings can be built or retrofitted so that rainwater can be collected and used for flushing toilets or watering the garden. Green roofs and rain gardens can absorb more water to be released later more slowly.
- Materials that increase levels of contaminants (e.g. copper cladding, CCA treated wood) in new or renovated buildings should be avoided.
- Hard standing areas like car parks and drives should be surfaced with permeable materials (e.g. gravel, permeable concrete) that allow water to soak into the ground instead of running into drains.
- Street design should incorporate green areas or swales to absorb and hold storm-water.
- New developments and subdivisions should be required to minimise, detain or retain stormwater in the most appropriate way.
- Riparian strips should be created, reinstated or widened to improve the buffering of stormwater before it enters a stream.
- Roads should be swept more frequently to reduce the build-up of pollutants and rubbish which would otherwise wash off into the drains and rivers.
- Councils should work with community groups and media to raise awareness and understanding of stormwater management, so that individuals minimise their personal impacts, including, for example:
  - Picking up dog droppings when walking dog(s) to prevent them being washed into the river
  - Washing paint brushes on the grass rather than pouring paint water down the drain, which is connected to the local stream
  - Cleaning cars on a porous surface (e.g. lawn, loose brick) to prevent detergents washing into streams.

The Committee believes that the post-earthquake rebuild of Christchurch provides a unique opportunity to retrofit and

[2] Te Rūnanga o Ngāi Tahu Freshwater Policy Statement pg 5

redesign the stormwater infrastructure of our city. This should be showcased in the design and construction of the new central city. If excellent standards of stormwater management are achieved, this will be to the long term benefit of our waterways and future generations.

Our aspiration is that the discharge of waste water into our waterways never happens. The Committee recognises, however, that this may sometimes be necessary in emergency situations to protect human health, as was the case in the immediate aftermath of the recent earthquakes. Christchurch is built on swamp and marshlands. Cracks or breakages in the sewerage system allow shallow groundwater to infiltrate the pipes, especially during heavy rainfall, worsening overflows to waterways. The Committee recognises that this restricts the ability to eliminate the discharge of waste water in extreme weather conditions, but strongly feel that this should be the goal in reasonably foreseeable circumstances. To this end, there is an opportunity to improve the performance and resilience of our waste-water systems as they are rebuilt.

The Committee acknowledges the significant improvements that have been made in recent years to public waste-water infrastructure (e.g. stopping discharge to the Avon-Heathcote Estuary/Ihutai) and the management of storm-water at a catchment level. Surface water quality and flows however remain an issue that needs to be further addressed if the long-term vision of the CWMS is to be achieved in this zone.

The Committee also thinks that it is important to address industrial discharge in the Zone. Proactively working with industry and business will help them to exceed environmental standards specified in their consents, which will further benefit waterways.

Increasing surface flows and improving water quality is a fundamental issue in successfully implementing the CWMS in this zone. Unless the water in our waterways is of a suitable quality and flows at the appropriate rates when needed, kaitiakitanga cannot be demonstrated nor can the social, economic, and environmental aspirations of local communities be met.

Water quality and flows are important so that:

- Healthy ecosystems and biodiversity can be maintained for their intrinsic value and our shared enjoyment
- Crops and pasture can be grown and drinking water can be provided for livestock
- Coming into contact with the water in our streams and rivers, or gathering food from waterways, will not result in illness
- The Mauri of waterways is safeguarded.

There are a number of different benchmarks for what constitutes "good" water quality depending on the desired outcome(s):

- Drinking water attains excellent water quality by meeting the New Zealand Drinking water standards[3]
- Water that is used for contact recreation can be graded as very good[4]
- The level of toxic contaminants in our waterways meet ANZECC 2000 Water Quality Guidelines[5]
- Health of waterways will be recognised when mahinga kai species are harvestable
- Food safety for species gathered from waterways can be measured according to NZ food safety guidelines and recreation water quality guidelines.[6]

In our zone, the quality and flows in the upper reaches of our spring-fed waterways are closely related to the groundwater quality and water table levels. Groundwater and surface water are intimately connected. Surface water flows depend upon the levels in aquifers which should be monitored at multiple locations and maintained according to an agreed management regime. The flows required to maintain desired amenity and ecosystems values of a waterway (e.g. the number of braided channels in a braided river, or to maintain fish passage) should be established and used as a benchmark. All non-domestic water takes, whether groundwater or surface water, should be monitored, reported and analysed for trends.

Our Priority Outcomes

The Canterbury Water Management Strategy (CWMS) has set specific targets for improving surface water quality for river bathing sites and lakes and rivers used for contact recreation under the "recreation and amenity opportunities" targets. Water quality and flows are implicit in the "ecosystem health and biodiversity" targets that focus on habitat quality, ecosystem health and improvement of lowland stream ecosystems. "Kaitiakitanga" targets refer specifically to direct discharges of contaminants into water and to addressing non-point source pollution. The "natural character of braided rivers" targets encompass the importance of flows, flooding, bird habitat and other indigenous habitats. "Environmental limits" that include setting environmental flows for surface streams and rivers plus setting load limits for nutrients are also CWMS Targets. At this stage our committee has insufficient information to be able to make specific recommendations for the environmental limits targets.

In order to meet the CWMS Targets, the Committee has identified priority outcomes which are:

- Surface water quality and flows are improved
- Mahinga kai are safeguarded from declining water quality and flows
- The Waimakariri River is safeguarded from declining water quality and flows

[3] *http://www.mfe.govt.nz/publications/water/nz-drinking-water-standards-00.html*
[4] *http://www.mfe.govt.nz/publications/water/microbiological-quality-jun03/html/part-two.html*
[5] *http://www.mfe.govt.nz/publications/water/anzecc-water-quality-guide-02/index.html*
[6] *http://www.foodsmart.govt.nz/food-safety/hunting-collecting-fishing/* and *http://www.foodsmart.govt.nz/food-safety/hunting-collecting-fishing/* and *http://www.mfe.govt.nz/publications/water/microbiological-quality-jun03/html/part-two.html*

- Stormwater impacts on surface water quality are reduced
- Riparian strips are created, reinstated or expanded, and enhanced to reduce stormwater pollution
- Waste water impacts on surface water quality are reduced
- Industrial impacts on surface water quality are reduced
- Earthquake Recovery Programmes help improve surface water quality and safeguard surface water flows.

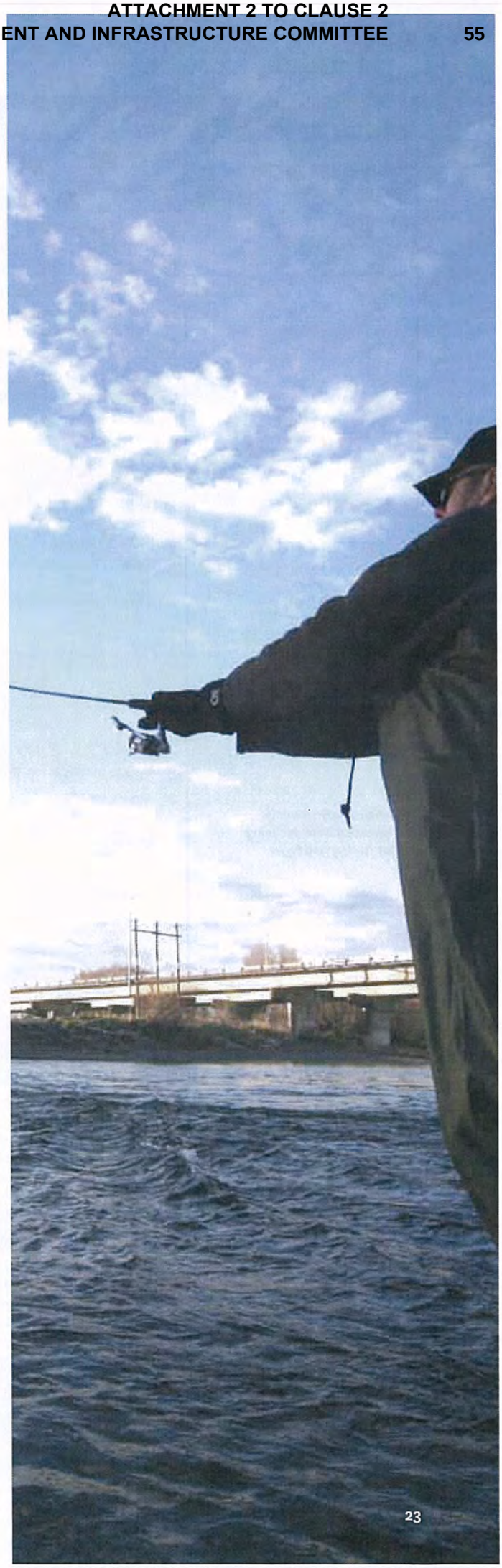
Links to CWMS

We believe that achieving our priority outcomes will contribute to achieving the following CWMS targets:

- Correcting decline in freshwater species, habitat quality or ecosystems
- Preventing further loss of ecosystem health in river mouths and coastal lagoons (hāpua)
- Improving lowland stream ecosystems
- Maintaining the natural braided character of the lower Waimakariri River
- Kaitiakitanga targets are met for point source discharges, non-point source pollution, mahinga kai, customary uses, wāhi taonga, and Waimakariri river environmental flows
- Water quality targets for river bathing sites and rivers used for contact recreation are achieved
- Indicators of regional and national economies regarding the contribution water makes to the Canterbury economy through value added economic impact.

Our Recommendations

The Committee has identified the actions that we recommend be implemented to achieve our priority outcomes (see table below). The 'priority outcome' column signifies the subject of the recommendation and the 'Who' column suggests the most appropriate lead organisation(s) for delivering the outcomes. The Committee acknowledges that there may be individuals and agencies who will be involved but who are not listed.



Priority Outcomes	Ref. #	Recommendations	Who	Implement within
SW1 **Surface water quality and flows are improved**	1.1	a) Support manawhenua and community groups to identify outcomes for each major surface water catchment b) Review and update statutory plans and enforcement activities to give effect to these outcomes c) Develop and advance a co-ordinated programme of actions that are integrated into a catchment plan for each catchment including: · public communications and awareness raising · initiatives to involve students at schools and education institutions	CCC, ECan, Manawhenua, SDC	3-5 yrs
	1.2	a) Work with the Committee to agree a preferred approach for managing rural land-use in the Zone b) Update the proposed Land and Water Regional Plan where required	ECan	3-5 yrs
	1.3	Review the use and management of stockwater races taking into account flows into naturally occurring waterways, and update as required	CCC SDC	Every 3 years
	1.4	Review and monitor effectiveness of the 'Pollution Hotline' service and update where required	ECan	Annually
	1.5	Develop and initiate a prioritised programme of projects to artificially rehabilitate flows in spring-fed waterways	CCC, ECan, Manawhenua, SDC	3-5 yrs
	1.6	Work with the landowners to: a) Assess the impact of abandoned historical infrastructure (e.g. abandoned wells, dumps) b) Develop and progress projects to address significant issues as quickly as possible	CCC, ECan, SDC	Ongoing
SW2 **Mahinga Kai are safeguarded from declining water quality and flows**	2.1	a) Review Plans and Strategies to assess the effectiveness of provisions to safeguard mahinga kai values in all waterways, taking into account: a. water quality b. flows c. habitat for all life stages of mahinga kai[7] b) Update the Plans and Strategies where required	ECan	3-5 yrs
SW3 **The Waimakariri River is safeguarded from declining water quality and flows**	3.1	a) Review the effectiveness of the Waimakariri River Regional Plan, taking into account: · water quality · flows · braided river character · gravel extraction · flood management · endangered birds b) Update the plan where required	ECan	3-5 yrs
SW4 **Stormwater impacts on surface water quality are reduced**	4.1	a) Review statutory plans and enforcement activities to ensure that : · Stormwater infrastructure is upgraded or retrofitted where possible when building density is changed · Stormwater from all new developments and subdivisions is treated at/or near to source and not discharged directly into waterways b) Update where required	CCC, ECan, SDC	6 months
	4.2	a) Review planned improvements to public stormwater infrastructure, taking into account: · Opportunities to speed up implementation · Minimising the direct discharge of stormwater to waterways (eliminating where possible) as quickly as possible b) Update where required and progress	CCC, ECan, SDC	Annually
	4.3	Identify and implement performance standards for the permeability of new and resurfaced car-parks/footpaths/drives to reduce run-off rates	CCC, SDC	6 months
	4.4	Identify and implement performance standards for the design of new or redeveloped buildings, taking into account: · Best practice treatment at/or near source · Avoiding materials that increase levels of contaminants (e.g. copper cladding)	CCC, SDC	6 months
	4.5	Develop and progress a programme of actions to ensure that new and retrofitted infrastructure in the new central city meets international best practice standards, with a view to Christchurch becoming an international exemplar of excellent urban stormwater management	To be identified	6 months

[7] All species utilised by people for food &/or other purposes need habitats for each of their life stages to be protected, if they are to thrive.

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
	4.6	Review and update road sweeping operations to reduce contamination from polluted stormwater	CCC, SDC	2 yrs
	4.7	Publicise and enforce existing sediment control and erosion regulations from new subdivisions	CCC, ECan, SDC	Ongoing
SW5 Riparian strips are created, reinstated or expanded, and enhanced to reduce stormwater pollution	5.1	a) Review the effectiveness of current set-back provisions to ensure that opportunities are taken as part of earthquake recovery b) Update statutory plans and enforcement activities where required	CCC, ECan, SDC	6 months
	5.2	Where land is redeveloped or sub-divided, work with developers and landowners to further enhance and/or expand riparian strips	CCC, ECan, SDC	Ongoing
SW6 Waste water impacts on surface water quality are reduced	6.1	Review and update public waste water strategies and plans to ensure that : · there is no direct discharge to waterways in non-emergency situations (in as far as this is possible) · infrastructure is more resilient to natural hazards	CCC, SDC	3 yrs
	6.2	a) Review the standards for private waste water treatment systems in the Groundwater Protection Zone, taking into account the risk of contamination in emergency situations b) Update where required	ECan	3 yrs
SW7 Industrial impacts on surface water quality are reduced	7.1	Work with industries to develop and progress projects to phase out direct discharge to waterways as quickly as possible	CCC, ECan, SDC	Ongoing
	7.2	Prohibit new industrial discharges direct to waterways in the Proposed Land and Water Regional Plan	ECan	1 yr
	7.3	Develop and advance an enhanced programme of co-ordinated initiatives to encourage industry to go beyond the minimum required for compliance, prioritising areas with poor water quality (e.g. developing best practice guidelines)	CCC, ECan, SDC	1 yr
SW8 Earthquake Recovery Programmes help improve surface water quality and safeguard surface water flows	8.1	Work with CERA to identify opportunities for Earthquake Recovery Programmes to assist with the implementation of the following recommendations, where appropriate: SW1.1, 1.5, 1.6, 2.1, 3.1, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1, 6.2	CCC, ECan, Manawhenua, SDC	6 months
	8.2	Seek guidance and advice from the Zone Committee on the implementation of Earthquake Recovery Programmes in the context of the CWMS	CCC, ECan, SDC	Ongoing to 2016

4.3 Enhancing Healthy Ecosystems, Indigenous Biodiversity, And Valued Introduced Species And Landscapes

Background

The waterways in our zone have been significantly modified since European settlement of Christchurch in the 1800s. The extensive network of swamps, marshes, and wetlands have been drained and built upon as Christchurch City expanded. The streams and rivers have been modified through:

- Constraining by stop banks
- Deepening and/or widening
- Introduction of new barriers (e.g. culverts, weirs)
- Changes in land-use (both rural and urban) reducing water quality
- Changed flow patterns
- Replacing indigenous riparian vegetation with non-native species
- Creating exotic landscapes (e.g. parklands, pastureland).

These changes have profoundly altered the nature of the ecosystems and species in our zone, with a particular impact upon wāhi taonga and mahinga kai. Realistically, we need to recognise that waterway ecosystem restoration is not possible and aim for rehabilitation to the maximum extent practicable.

The Committee believes that we must protect and increase indigenous biodiversity in our zone. There has been a general decline in the health and abundance of native ecosystems and indigenous biodiversity especially since European settlement. For example, according to Environment Canterbury, more than 98% of wetlands in the Zone have been lost. In some places, spring-fed waterways have dried up or disappeared in their higher reaches as the water table has been affected by abstraction and land use changes. Many populations of native species have been lost from our waterways as a consequence of declining water quality, changed river morphology, and competition from non-native species. Some of the change has been recent. For example, we know that 30 years ago koura (the freshwater crayfish) was found in a number of streams throughout the central city. Today, it is very rare and only found in a few waterways on the city boundary. On the flip-side, there are still small high quality native habitats and indigenous biodiversity that are worth protecting. For example, Travis Wetland is a natural wetland being rehabilitated; there is a population of Bluegill Bullies at Horseshoe Lake, and inanga spawning habitats on the tidal reaches of all the urban rivers.

The Committee has not located all the natural wetlands in our zone. It is important to identify these wetlands so that they are protected for their intrinsic and biodiversity values. In addition, many of these wetlands provide a natural environmental service by removing nutrients and sediment and providing storage to reduce flooding. While the Committee does not advocate for naturally occurring wetlands to be managed solely for these extra benefits, we think these additional benefits increase the importance of wetlands. Similarly, wetlands that are specifically constructed for these latter purposes should be designed to enhance biodiversity and other values wherever possible (e.g. native plantings, amenity & recreation).

Some non-native species and landscapes related to waterways are valued by local communities. For example, salmon and trout are valued as game fish by anglers and make good eating. Specimen trees in parks are key features of the landscapes, valued by many people as part of our European heritage. It is important that these valued introduced species and landscapes are safeguarded where appropriate as part of a healthy ecosystem. The Committee however acknowledges that in some circumstances, introduced species are "pests" which affect our ability to protect and enhance indigenous biodiversity. For example, removing barriers to fish migration may help the populations of migratory native fish species, but also increase predation of native fish by introduced species.

The Committee considers a pest to be an organism which causes damage to native ecosystems, or that preys on, or competes with, indigenous species. In some situations, we may wish to manage our waterways to support non-native species that are valued by people. For example, salmon and trout prey on native fish species, but are valued as a game fish. For this reason, we believe that it is important to identify what constitutes a pest species at a local level (i.e. individual waterways or catchments) in pest management plans. This approach will ensure that pest management activities are targeted to managing the species that conflict with the desired biodiversity outcomes for a particular waterway.

Pest management has the potential to become a significant issue in red zone land if pest populations are uncontrolled where people move out. The Committee believe that a co-ordinated approach is required in these areas to avoid significant negative impacts on the indigenous biodiversity and valued species in our waterway corridors.

The Waimakariri River is unique in the Zone for its braided river ecosystem and the native species that it supports. The Committee is keen to ensure that the important indigenous biodiversity (e.g. fish species, braided river birds) and valued introduced species (i.e. salmon and trout) are protected by enhancing the health of the whole ecosystem. Similarly, the Avon-Heathcote Estuary/Ihutai has highly significant indigenous biodiversity and valued introduced species that the Committee believe need to be appropriately protected.

The extensive flood management activities in our zone have the potential to impact adversely on indigenous biodiversity and valued introduced species. For example, dredging, weed cutting, gravel extraction, need to be undertaken in a way that is sensitive to the organisms of our waterway corridors wherever possible. Flood protection activities need to be reviewed regularly and continuously improved. Where ecosystem damage by such activities is unavoidable remediation should be the norm.

The Committee thinks that enhancing waterway corridors by reinstating, rehabilitating, or expanding riparian strips is a priority outcome and making more space for a greater variety of habitats will provide greater scope for this.

There were extensive dryland ecosystems on the Canterbury Plains prior to the intensification of agriculture. In this zone, fragments of native dryland ecosystems remain. The Committee believes that these need to be protected from further loss or degradation, and opportunities to improve the overall health of this ecosystem taken.

Each of the major catchments in the Zone will have different issues and opportunities related to enhancing ecosystem health, indigenous biodiversity, valued introduced species and landscapes. Managing these sometimes competing priorities will be most effectively achieved by involving local community groups, ideally at a catchment level, in conjunction with providing suitable water quality and flows, and providing for recreation, relaxation and amenity.

Our Priority Outcomes

The Canterbury Water Management Strategy (CWMS) has set a number of targets for ecosystem health and biodiversity. These targets concern freshwater species, habitat quality and ecosystems, in general. There are also targets focused on particular ecosystem types and on native fish, trout and salmon. Not all ecosystem types are found in our zone. The Committee also acknowledge that there are introduced plant and animal species that are valued by the community, associated with our waterways. We have recognised the importance of valued introduced species in our recommendations.

In order to address ecosystem health and biodiversity targets, the Committee has identified priority outcomes to be achieved. They are:

- Ecological health of all waterways is protected and rehabilitated
- Naturally occurring wetlands are identified and rehabilitated
- Effects of flood management activities on waterway biodiversity are minimised
- Riparian strips are created, expanded and/or enhanced
- Mahinga kai is enhanced
- Indigenous species diversity and abundance is increased
- The impact of pest species on waterways is reduced
- Dryland ecosystems are protected and rehabilitated
- The Avon-Heathcote Estuary/Ihutai ecosystems are more effectively protected
- Earthquake Recovery Programmes help enhance healthy ecosystems, indigenous biodiversity and valued introduced species.

Links to CWMS

The Committee believes that achieving our priority outcomes will directly contribute to the implementation of the following CWMS Targets:

- Ecosystem health and biodiversity (Freshwater species, habitat quality, ecosystems; river mouth & coastal lagoons; dryland ecosystems; lowland streams; spring-fed streams; General including wetlands & riparian management; and native fish targets).

The Committee also believes that achieving our priority outcomes will contribute to achieving CWMS targets in other sections of the CWMS, such as:

- Natural character of braided rivers (braided river birds, indigenous habitat)
- Kaitiakitanga (wāhi taonga, mahinga kai, customary uses)
- Recreation and amenity opportunities (improved catch rates for anglers)
- Indicators of regional and national economies (Increased wealth due to biodiversity protection and improvement).

Our Recommendations

The Committee has identified the actions that we recommend be implemented to achieve our priority outcomes (see table below). The 'priority outcome' column signifies the subject of the recommendation and the 'Who' column suggests the most appropriate lead organisation(s) for delivering on the recommendation. The Committee acknowledges that there may be individuals and agencies who will be involved but who are not listed.

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
EB1 **Ecological health of all waterways is protected and rehabilitated**	1.1	a) Ensure statutory plans and enforcement activities: · Appropriately manage human activities which negatively impact on the ecological health of waterways · Protect/rehabilitate all remaining naturally occurring wetlands · Avoid or mitigate barriers to the movement of native stream fauna Safeguard braided river bird habitats on the Waimakariri River from human activities	CCC, DOC, ECan, Manawhenua, SDC	2 yrs
	1.2	Develop a co-ordinated programme of actions to improve the ecological health of waterways and ensure that it is integrated into a plan for each major surface water catchment	CCC, DOC, ECan, Manawhenua, SDC	3 yrs
	1.3	Continue to remove earthquake silt from waterways as planned	CCC	Ongoing
	1.4	a) Continue existing public communications and education initiatives to improve understanding of the many values of our waterways. b) Develop and advance a co-ordinated programme of initiatives to engender a greater understanding of the value of set-back provisions, indigenous biodiversity and introduced species.	CCC, ECan, Manawhenua, SDC	3-5 yrs
EB2 **Naturally occurring wetlands are identified and rehabilitated**	2.1	Identify all naturally occurring wetlands	CCC, DOC, ECan, SDC	3 yrs
	2.2	Develop and implement a management plan for two significant wetlands, so that they are rehabilitated by 2015	CCC, DOC, ECan, Manawhenua, SDC, ZC	3 yrs
EB3 **Effects of flood management activities on waterway biodiversity are minimised**	3.1	a) Continuously improve work programmes and operations to: · Minimise the direct impacts of flood management operations on biodiversity · Rehabilitate waterways after modification to increase the diversity of in-stream habitats.	CCC, ECan, SDC	Every 3 years
	3.2	Ensure the Canterbury Regional River Gravel Management Strategy is implemented to minimise loss of diversity and abundance of indigenous and valued introduced species	ECan	1 yrs
EB4 **Riparian strips are created, expanded and/or enhanced**	4.1	Review the effectiveness of current set-back provisions to ensure that opportunities are taken as part of earthquake recovery to enhance waterway biodiversity and amenity. [This recommendations correlates with RR2.1(b)]	CCC, ECan, SDC	6 months
	4.2	Where land is redeveloped or sub-divided, work with developers and landowners to implement actions to create or further enhance and/or expand riparian strips	CCC, ECan, SDC	Ongoing
EB5 **Mahinga kai is enhanced**	5.1	Working with interested land owners, identify where culturally acceptable mahinga kai could be readily rehabilitated and accessed	CCC, DOC, ECan, Manawhenua, SDC	1 yrs
	5.2	Initiate and implement management plans to rehabilitate mahinga kai (e.g. contribute staff time/project funding)	CCC, DOC, Manawhenua, ECan, SDC	3 yrs
EB6 **Indigenous species diversity and abundance is increased**	6.1	Immediate Steps funding is allocated to projects in the following priority areas and ecosystems: · Springheads of spring fed waterways · Wetlands · Waimakariri River mouth · Brooklands Lagoon · Avon-Heathcote Estuary/Ihutai[8] · Other projects that score highly on cultural and ecological assessment · As a first preference, support projects that are led by or involve community groups	ECan, ZC	Commencing Immediately

[8] This includes species that move between salt and freshwater environments and the up-stream habitat areas that are important in their lifecycle

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
	6.2	a) Identify and assess the impact of barriers that restrict the movement of native in-stream and stream associated fauna for all waterways b) Except for barriers that protect native fish from introduced fish species, prioritise and progress a programme of work to remove barriers identified	CCC, DOC, ECan, Manawhenua, SDC	3-5 yrs
EB7 The impact of pest species on waterways is reduced	7.1	Implement a pest management plan for the residential red zone	To be identified	6 months
	7.2	Develop and implement a co-ordinated pest control programme for all waterways in the Zone	CCC, DOC, ECan, Manawhenua SDC	3-5 yrs
EB8 Dryland ecosystems are protected and rehabilitated	8.1	a) Assess the effectiveness of current statutory plans and enforcement activities in protecting remnant dryland ecosystems from changes of land use and/or new irrigation b) Update plans where required	CCC, DOC, ECan, SDC	3 yrs
	8.2	Develop and progress a co-ordinated programme of actions as part of an integrated management approach to: · Identify all remnant dryland ecosystems · Improve the ecological health of drylands and; · Increase the total area of dryland ecosystems	CCC, DOC, ECan, Manawhenua SDC	5 yrs
	8.3	Work with landowners to develop and progress management plans to improve dryland ecosystems	CCC, DOC, ECan, SDC	3 yrs
EB9 The Avon-Heathcote Estuary/Ihutai ecosystems are more effectively protected	9.1	Review the effectiveness of the current statutory and non-statutory protection measures for indigenous biodiversity and valued introduced species	CCC, Local community groups DOC, ECan, Manawhenua	3 yrs
	9.2	Agree and implement a package of protection measures	CCC, ECan, DOC, Manawhenua, Local community groups	3-5 yrs
EB10 Earthquake Recovery Programmes help enhance healthy ecosystems, indigenous biodiversity and valued introduced species	10.1	Work with CERA to identify opportunities for Earthquake Recovery Programmes to assist with the implementation of the following recommendations, where appropriate: EB1.1, 1.2, 1.3, 4.1, 4.2, 5.1, 5.2, 6.2, 7.1, 8.1	CCC, ECan, Manawhenua, SDC	6 months
	10.2	Seek guidance and advice from the Zone Committee on the implementation of Earthquake Recovery Programmes in the context of the CWMS	CCC, ECan, SDC	Ongoing to 2016

4.4 Safeguarding Groundwater Quality And Flows For Multiple Uses

Background

In the Christchurch West Melton Zone, groundwater underpins the cultural, social, economic, environmental well-being and health of local communities:

- Our major urban streams and rivers are all spring-fed by groundwater, which is linked to the ecosystem health of surface waterways and associated cultural values
- Our untreated potable drinking water supply comes from the aquifers (public community supplies and private takes)
- Industry in our zone has an economic advantage because of the ready availability of groundwater of suitable quality and quantity
- Groundwater is abstracted to support agricultural production, including market gardening that supplies fresh produce to shops in Christchurch
- The high pressure of water in the aquifers minimises the cost of pumping water around the Zone

The Committee notes that abstraction of groundwater for human use reduces the amount of water in the system that is available for the environment. This means that we will have to accept that supplying water for the needs of our society will inevitably impact on the environment. This is why the Committee believes it is important to review the future water needs of our communities in the context of meeting water demands from the aquifers. This will enable us to make informed decisions about the consequences of our demands and to identify the best integrated approach for the future management of water.

The management of groundwater is further complicated as the aquifers we rely upon are part of a wider system under the Canterbury Plains. This means that we both receive groundwater from, and export groundwater to other zones. In order to realise our aspirations about groundwater, we will need to work with other Zone Committees in adjacent areas.

The Committee recognises that maintaining an untreated potable water supply in our zone is a fundamental expectation of local people. In our zone, we strongly support the ongoing enforcement of "Groundwater Protection Zones" and the restrictive management of land-use activities over unconfined aquifers where the risk of groundwater contamination is greatest. The Committee also notes the significant work that has been done in recent years to conclude that there is no/or little risk posed to water quality in our aquifers by new irrigation schemes and land-use intensification outside of our zone (i.e. Central Plains Water). This is the basis of the current planning approach being taken by Environment Canterbury in the Proposed Land and Water Regional Plan and the development of sub-regional chapters.

The Committee acknowledges that for many people in our zone, there is an ongoing anxiety about the risk that land-use intensification poses to the water quality in our aquifers. As such, we believe that the CWMS process necessitates a general review of the currently available information by a panel of experts to jointly advise on:

- The spatial extent of groundwater flows and recharge areas that feed water into the zone, and;
- The degree of risk posed by current land use, and likely scenarios of future land use, over un-confined aquifers
- A long term research programme to gain a better understanding of the three-dimensional nature of the Zone aquifers and the movement of groundwater through them.

In the context of implementing the CWMS in our zone, this approach will provide reassurance for the Committee (and the wider public) that groundwater quality is being safeguarded and flows in the most effective way for the future. Once a joint position is agreed, statutory plans and enforcement activities (including Groundwater Protection Areas) can be amended if necessary.

The Committee has heard that the rate at which water seeps from the Waimakariri River into the aquifers in our zone is considered to be relatively consistent across a range of flows. The Committee is however concerned that any deterioration in water quality in the Waimakariri River could introduce additional contamination into the aquifers. We believe a precautionary approach to managing water quality in the Waimakariri should be adopted.

In addition, the groundwater systems in the Zone support populations of invertebrates that are endemic to New Zealand (possibly to Canterbury). The role of groundwater invertebrates in maintaining water quality in the aquifers, or their sensitivity to pollution, is not yet fully understood. The Committee thinks that avoiding significant changes to groundwater quality and quantity would seem prudent until the invertebrate ecology is better understood, as a precautionary approach to maintaining water quality in our aquifers.

The Committee is particularly concerned about activities in the Zone that could potentially affect water quality or flows in the vicinity of springs that feed our waterways. This is because structures that penetrate into the water table (pumped wells or drained pits) have the potential to divert groundwater flows away from springs and reduce stream flows. In addition, some activities have the potential to degrade water quality by introducing new contamination (e.g. CCA timber) or to disturb sediments. The Committee are keen to ensure that all of these impacts are closely controlled as part of the post-earthquake rebuild, and in general to safeguard the future of spring-heads.

There have been two obvious groundwater-related effects of the earthquakes: liquefaction and new springs. The Committee acknowledges the effects of these impacts on people in the Zone however, considers that they are outside the scope of the ZIP as follows:

- Other than where silt has impacted directly on waterways, the Committee considers the effects of liquefaction to be outside of the scope of the CWMS
- Where new springs arise outside of existing water corridors and/or are affecting buildings or private land,

the Committee considers that these springs are best addressed in the context of earthquake recovery.

It is important to note that the reticulated public water supply in the Lyttelton Harbour/Whakaraupo area of the Banks Peninsula Zone is supplied from groundwater that is abstracted in the Heathcote Valley, part of the Christchurch West Melton Zone. This Committee will work with the Banks Peninsula Zone Committee to ensure appropriate alignment of CWMS implementation on this matter.

Our Priority Outcomes

The Canterbury Water Management Strategy (CWMS) has set a number of Targets that are relevant to groundwater management. Of particular significance are the targets concerning "Drinking Water" as most drinking water in the Christchurch West Melton Zone is sourced from groundwater. "Water-use efficiency" targets are also relevant for groundwater management. In this zone water takes for urban parks and sports-field irrigation are sourced from groundwater, as are takes for industrial/commercial and community use. "Indicators of regional and national economies" are also relevant because of the value of access to an untreated water supply for both commercial and domestic use. Lower Waimakariri limits for environmental flows are relevant because of the contribution that groundwater makes to rivers and streams flows, especially during summer. Catchment load limits for nutrients are also relevant to groundwater because of the contribution that groundwater makes to stream flows and, in particular because of the risks of nitrate contamination in drinking water supplies.

The Committee therefore believes that safeguarding groundwater quality and flows for multiple uses is possibly the most important issue to be tackled to successfully implement the CWMS in the Christchurch West Melton Zone. In order to address this issue, the Committee has identified priority outcomes. These are:

- Groundwater quality is safeguarded for multiple uses
- The quality of untreated drinking water from aquifers is safeguarded
- Groundwater resources are actively managed for multiple uses
- Water levels, quality and flows at spring-heads of spring-fed waterways are safeguarded
- Earthquake Recovery Programmes help safeguard groundwater quality and flows for multiple uses.

Links to CWMS

The Committee believes that achieving our priority outcomes will contribute directly to the implementation of the following CWMS Targets:

- General contaminant risks and nitrate loads in relation to drinking water targets:
- Indicators of regional and national economies.

The Committee also believes that achieving our priority outcomes will contribute to achieving CWMS targets in other sections of the CWMS such as:

- Ecosystem health and biodiversity for riparian and in-stream ecosystems especially at the spring heads
- Achieving kaitiakitanga (instream flows, non-point source pollution, drinking water quality, wāhi taonga and mahinga kai)
- Improving water use efficiency (irrigation, community use, industrial/commercial use)
- Establishing environmental limits.

Our Recommendations

The Committee has identified the actions that we recommend be implemented to achieve our priority outcomes (see table below). The 'priority outcome' column signifies the subject of the recommendation and the 'Who' column suggests the most appropriate lead organisation(s) for delivering on the recommendation. The Committee acknowledges that there may be individuals and agencies who will be involved but who are not listed.

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
GW1 **Groundwater quality is safeguarded for multiple uses**	1.1	a) Review the effectiveness of statutory plans and enforcement activities to: · Manage land-use activities over un-confined aquifers on a precautionary basis · Maintain special provisions in relation to the Groundwater Protection Zones · Prevent new development and/or intensification/change of land use in the Groundwater Protection Zone unless it can be undertaken without risk to groundwater quality · Ensure that private bore casings are installed to appropriate standards to protect groundwater quality b) Update plans where required	CCC, ECan, SDC	1.5 yrs
	1.2	Continue to implement a co-ordinated groundwater quality monitoring programme to keep nitrate levels and other contaminants under surveillance against World Health Standards	CCC, CDHB, ECan, SDC	Ongoing
GW2 **The quality of untreated drinking water from aquifers is safeguarded**	2.1	a) Establish and facilitate an expert panel to review and jointly advise on the following points (using currently available information): · The spatial extent of groundwater flows and recharge areas that feed water into the Zone, and; · The degree of risk posed by current land use, and likely scenarios of future land use, over un-confined aquifers b) Where required, update statutory plans and enforcement activities	CCC, CDHB, ECan, SDC	6 months
	2.2	Develop and initiate a programme of actions to improve the security of drinking water supplied via the public reticulation system in north west Christchurch (to at least a Ba NZ Drinking Water Standards)	CCC	2 yrs
	2.3	Develop and initiate a programme of actions to improve the security of drinking water supplied via the public reticulation systems in Selwyn District	SDC	2 yrs
GW3 **Groundwater resources are actively managed for multiple uses**	3.1	Update future demand projections for the community water supply, to ensure alignment with the following: · Earthquake Recovery Strategy · Greater Christchurch Urban Development Strategy · Christchurch West Melton Zone Implementation Programme	CCC, ECan	2 yrs
	3.2	Develop future demand projections for all other takes from groundwater, to ensure alignment with the following: · Earthquake Recovery Strategy · Greater Christchurch Urban Development Strategy · The Zone Implementation Programme	ECan	2 yrs
	3.3	a) Assess the extent to which the management of groundwater resources can give effect to the following outcomes in combination (not in order of priority): · Maintain and enhance flows at springheads of spring-fed waterways to sustain ecosystem health and cultural values, and; · Where possible reinstate flows from historical springs and; · Safeguard recharge and water quality of the deeper aquifers so that the resource is not depleted or degraded in quality and; · Meet projected future demand for community water supply and; · Meet projected demand of all other takes and; · Remain resilient in reasonably foreseeable climate variation scenarios b) Work with the Committee to identify a preferred approach to managing and allocating groundwater resources c) Where required, update the Land and Water Regional Plan to give effect to the preferred approach	CCC, ECan, SDC	3 yrs
GW4 **Water levels, quality and flows at spring-heads of spring-fed waterways are safeguarded**	4.1	a) Identify "sensitive" areas around the heads of spring fed waterways where activities could alter or vary groundwater quality, levels, and flows (this may require a detailed survey of springs) b) Review the effectiveness of statutory plans and enforcement activities taking into account: · A precautionary approach in sensitive areas · The design and construction of foundations for new and redeveloped buildings · Design and installation of new and replacement buried infrastructure (e.g. pipes, cables) c) Update plans where required	CCC, ECan, SDC	6 months

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
	4.2	a) Identify shallow groundwater takes in sensitive areas that are having a negative impact on spring-fed waterways b) Working with consent holders, develop and implement a co-ordinated programme of actions to retire or modify takes which are identified as causing harm to ecosystems.	ECan, Consent holders	5 yrs
GW5 Earthquake Recovery Programmes help safeguard groundwater quality and flows for multiple uses	5.1	Work with CERA to identify opportunities for Earthquake Recovery Programmes to assist with the implementation of the following recommendations, where appropriate: GW1.1, 2.1, 3.1, 3.2, 3.3, 4.1	CCC, ECan, Manawhenua, SDC	6 months
	5.2	Seek guidance and advice from the Zone Committee on the implementation of Earthquake Recovery Programmes in the context of the CWMS	CCC, ECan, SDC	Ongoing to 2016

4.5 Making Efficient Use Of Water And Managing Demand

Background

In the Christchurch West Melton Zone, we are very fortunate to have large aquifers (essentially natural reservoirs under the ground) containing vast amounts of good quality water for people to use. Whilst the total volume of groundwater is large, the rate at which water is replaced (or recharged) into the aquifers is dependent on two key factors; how much rain falls on the plains to the west of the city and; how much water flows out of the Waimakariri River into the ground.

The Committee is concerned that if water is taken from the aquifers at a rate which is faster than they are recharged, our underground reservoirs will be depleted. Over time, there may be less water available in the aquifers for us to use. In addition, possible variations in climate may affect the amount and timing of rainfall on the plains or flows in the Waimakariri River. In turn this may affect the availability of water in the aquifers.

The total amount of water taken by people from the aquifers in the Zone has increased over time. The aquifers providing for domestic, commercial, and industrial use also feed springs which create the urban rivers (e.g. Avon/Ōtākaro River) so valued by local communities. Taking water for people to drink, water gardens, flush toilets, clean cars, irrigate crops, and manufacture products, means that there is already less available for the environment.

The Committee believes that it is important to plan today for multiple uses and benefits. Everybody using water whether in urban or rural areas, for industrial, commercial, or domestic uses, must use water more wisely. This means reducing domestic use (e.g. re-using grey water, collecting and using rainwater), irrigating parks, sports fields, golf courses, farms and gardens more efficiently, economising in commercial and industrial processes, and reducing leakage from pipes. The Committee notes that minimising water use may not always be appropriate in emergency situations e.g. water used for fire fighting, but this usage is infrequent and the volumes used minuscule compared to irrigation and for other purposes

We believe that allocating domestic users an "equitable amount" of water is an important principle to encourage urban residents to use water more wisely. Domestic users who take less than this equitable amount should then be rewarded for using less water, while those taking more should contribute more to the costs of water supply. The Committee notes that the cost of delivering water to the Christchurch public is low compared with similar systems in other parts of New Zealand, and that the ability of Councils to recover costs is constrained by legislation. The Committee also notes that the per capita use of water in Christchurch is one of the highest in New Zealand. The two facts may be related.

The Committee accepts that not everybody in the Zone will agree about the best way to encourage domestic users to use water more efficiently. We recognise that for the people of Christchurch, discussions about charging domestic users for the amount of water they use have historically been emotive. We emphasise strongly that any charge will not be for water as such but to cover the costs of constructing and maintaining the wells, pumps and pipes plus paying for the power. The charge would be for access to the water which in any case is paid for now as part of our general rates.

In developing the ZIP the Committee notes and highlights the following points:

- The CWMS sets targets for the efficient use of water for irrigation, stock water, industrial use, electricity generation, and community water use [e.g. By 2020, 10% reduction in community water use (litres per day per person) compared with 2010]
- Whilst there is some agricultural irrigation and dairying in this zone, the vast bulk is outside of this zone and thus beyond the remit of this Committee. The vast majority of Canterbury's domestic water users are within this Zone
- The Committee's recommendations are inclusive of agricultural, commercial, industrial, and domestic uses of water, in both rural and urban areas of the Zone
- As noted above, domestic water consumption in litres per head of population for Christchurch is amongst the highest in New Zealand.[10]

Ultimately, the Committee believes that if we are to realise the vision of the CWMS by 2040, we need to work out the best way for people in the Christchurch-West Melton Zone to use water more efficiently and manage demand both individually and collectively. It is essential that water continues to be available for community water supplies, industrial, commercial, and environmental uses. Agreeing a clear way forward on how to manage water demand is the first urgent step to take.

[10] http://www.qualityoflifeproject.govt.nz/pdfs/2007/Quality_of_Life_2007.pdf
http://www.waternz.org.nz/Folder?Action=View%20File&Folder_id=89&File=110318_nationalperformancereview_finalreport.pdf

Our Priority Outcomes

The Canterbury Water Management Strategy (CWMS) has set specific targets for water efficiency. These targets particularly focus on irrigation, community, stockwater, industrial/commercial use and electricity generation in Canterbury. While electricity generation from hydro sources occurs in other zones, it does not occur in the Christchurch West Melton Zone.

The Committee believes that managing demand for water in this zone, through encouraging, incentivising and improving efficient use of water is an important part of reducing pressure on the resource. Greater efficiencies and less demand will help to ensure that water is available where it is most needed. In order to address this issue, the Committee has identified priority outcomes.

These are:

- Leakage from reticulated public water supplies is reduced
- Domestic water is used more efficiently
- Commercial and industrial use of water is more efficient
- Use of irrigation in both rural and urban areas is targeted and efficient
- Earthquake Recovery Programmes help to achieve efficient use of water and manage water demand.

Links to CWMS

The Committee believes that achieving our priority outcomes will directly contribute to the implementation of the following CWMS Targets:

- Improving water use efficiency by encouraging best practice for irrigation; industrial/commercial and stockwater users.
- Reducing the litres per person per day used for community water supply and increasing benefits per unit of water used.

The Committee believes that achieving these priority outcomes will also contribute to achieving CWMS targets in other sections of the CWMS such as Ecosystem health/biodiversity and Kaitiakitanga, because more water will be retained for in-stream values.

Our Recommendations

The Committee has identified the actions that we recommend are implemented to achieve our priority outcomes (see table below). The 'priority outcome' column signifies the subject of the recommendation and the 'Who' column suggests the most appropriate lead organisation(s) for delivering on the recommendation. The Committee acknowledges that there may be individuals and agencies who will be involved but who are not listed.

Priority Outcomes	Ref. #	Recommendations	Who	Implement within
EU1 **Leakage from reticulated public water supplies is reduced**	1.1	a) Continue and strengthen existing work programmes b) Ensure work programmes take into account: · The effects of earthquake damage · More resilient standards for water supply infrastructure c) Update programmes where required	CCC, SDC	1 yr
EU2 **Domestic water is used more efficiently**	2.1	a) Continue existing public communications and awareness raising initiatives b) Evaluate existing public communications c) Where required, update work programmes and implement these in a coordinated way.	CCC, ECan, SDC	1 yr
	2.2	Recommend the best mechanism(s) for encouraging more efficient use of water taken from Christchurch's community water supply	CCC	2 yrs
	2.3	Recommend the best mechanism(s) for encouraging more efficient use of water taken from Selwyn District's community water supplies	SDC	2 yrs
	2.4	Develop and implement a programme of action to give effect to the recommendations in 2.2 and 2.3	CCC, SDC	3-5 yrs
	2.5	Investigate and apply mechanism(s) to improve efficiency of water use from private domestic supplies	ECan	3-5 yrs
EU3 **Commercial and industrial use of water is more efficient**	3.1	Require commercial and industrial users of water to demonstrate how they have implemented water efficiency plans	CCC, SDC	Every 3 yrs
	3.2	Continue to charge commercial and industrial users for access to the water they use	CCC, SDC	Ongoing
	3.3	a) Assess whether current statutory plans and enforcement activities require water efficiency plans to be established and implemented b) Where required, update statutory plans to achieve this	ECan	2 yrs
	3.4	Investigate and apply mechanisms to improve industrial and commercial water-use efficiency	ECan	3-5 yrs
EU4 **Use of irrigation in both rural and urban areas is targeted and efficient**	4.1	a) Assess whether current statutory plans and enforcement activities require managers of irrigation systems to implement water efficiency plans b) Where required, update plans and enforcement activities to ensure this happens	ECan	2 yrs
	4.2	Identify and action best practice water use of publicly managed irrigation systems (e.g. sprinklers in parks)	CCC, ECan, SDC	Every 3 yrs
EU5 **Earthquake Recovery Programmes help to achieve efficient use of water and manage water demand**	5.1	Work with CERA to identify opportunities for Earthquake Recovery Programmes to assist with the implementation of the following recommendations, where appropriate: EU1.1	CCC, ECan, Manawhenua, SDC	6 months
	5.2	Seek guidance and advice from the Zone Committee on the implementation of Earthquake Recovery Programmes in the context of the CWMS	CCC, ECan, SDC	Ongoing to 2016

Appendix

Summary Information On The Canterbury Water Management Strategy

The strategy (CWMS 2010) provides a way forward towards the improved management and use of Canterbury's water resources. The CWMS (2010) Framework Document (Mayoral Forum 2009) sets out the key challenges, visions, principles and targets for the integrated management of Canterbury's water.

The expressed outcome of the strategy is:

"To enable present and future generations to gain the greatest social, economic, recreational and cultural benefits from our water resources within an environmentally sustainable framework."

The principles that underpin the CWMS (2010) will help to ensure that our water resource is managed sustainably:

- Primary principles - sustainable management, regional approach and tangata whenua
- Supporting principles - natural character, indigenous biodiversity, access, quality drinking water, recreational opportunities, and community and commercial use.

Within the regional approach is a set of priorities for planning of natural water use. These are:

- First order priorities - environment, customary use, community supplies and stock water
- Second order priorities - irrigation, renewable electricity generation, recreation and amenity.

The strategy focuses on delivering a set of quantified and time constrained targets the following areas:

- Ecosystem health and biodiversity
- Natural character, processes and ecological health of braided rivers
- Kaitiakitanga
- Drinking water
- Recreational and amenity opportunities
- Water use efficiency
- Irrigated land area
- Energy security and efficiency
- Indicators of regional and national economies
- Environmental limits.

The CWMS identified the need to establish Zone Committees to develop Zone Implementation Programmes that will implement the CWMS at a local level.

For more information on the Canterbury Water Management Strategy please refer to:

http://ecan.govt.nz/get-involved/canterburywater/key-documents/Pages/CWMS (2010).aspx

Zone Committee Progress To Date

For a record of the Committee's discussions in developing the draft ZIP, please refer to http://ecan.govt.nz/get-involved/canterburywater/committees/chch-west-melton/Pages/default.aspx

http://www.ccc.govt.nz/thecouncil/meetingsminutes/agendas/index.aspx

Glossary and Acronyms

Abstraction	The taking of water from a water body or the diverting of water outside of the bed of a river, lake or artificial watercourse.
ANZECC	Australian and New Zealand Environment Conservation Council.
Awa	River.
Biodiversity	Biodiversity is short for biological diversity. It describes the variety of all biological life – the different species, from micro-organisms to trees, animals and fungi; the genes they comprise; and the ecosystems they collectively form. This includes diversity within species, between species, and of ecosystems. (International Convention on Biological Diversity).
Blue corridors	Waterways and the associated riparian zone.
Braided River	Any river with multiple successively divergent and re-joining channels separated by gravel islands.
CCC	Christchurch City Council.
CDHB	Christchurch District Health Board.
Confined aquifer	An aquifer overlain by a low permeability or impermeable layer where the water in the aquifer is under pressure.
Contact Recreation	Recreational activities that bring people physically in contact with water, involving a risk of involuntary ingestion or inhalation of water.
CWMS	Canterbury Water Management Strategy.
DOC	Department of Conservation.
ECan	An abbreviation of Environment Canterbury, the Canterbury Regional Council.
Ecosystem	A system of interacting terrestrial or aquatic living organisms within their natural and physical environment.
Endemic species	An indigenous species which breeds only within a specified region or locality and is unique to that area.
Freshes	A short duration flow event that raises river levels slightly.
Grey water	Domestic waters from a bath, shower, basin, laundry and kitchen but excluding toilet and urinal wastes.
Groundwater	Water beneath the surface of the earth contained within the saturated zone, but excludes the water chemically combined in minerals.
Hāpua	A shallow lake at the termination of a river, separated from the sea by a bank of sand or shingle and includes coastal lakes which may be in the coastal marine area.
Harakeke	Flax.
Hapū	Sub-tribe; section of a larger tribe.
Inanga	Whitebait species.
Indigenous species	A plant or animal species which occurs naturally in New Zealand. A synonym is "native".

Glossary and Acronyms Cont...

Interpretation Stations	Often associated with signs that provide information about what people are seeing at a particular place, its history, and other facts/stories that may enhance the experience/appreciation of a site.
Iwi	Tribe.
Kai	Food.
Kaitiaki	Guardians, custodians.
Kaitiakitanga	The exercise of guardianship by the tangata whenua of an area in accordance with tikanga māori in relation to natural and physical resources; and includes the ethic of stewardship.
Mahinga Kai	Food and places for obtaining natural foods and resources. The work (mahi), methods and cultural activities involved in obtaining foods and resources.
Mana	Integrity, respect, prestige, authority.
Manawhenua	Customary authority exercised by an iwi or hapū in an identified area.
Mauri	Means essential life force or principle; a metaphysical quality inherent in all things, both animate and inanimate.
Non-point source discharge	Run-off or leachate from land onto or into land, a water body or the sea.
Papatuanuku	Mother Earth.
Pingao	Golden sand sedge; a coastal grass.
Point source discharge	A discharge from a specific and identifiable outlet onto or into land, a water body or the sea.
Raranga	Weaving.
Raupō	Bullrush.
Reticulated water supply	Water made available through a network (reticulation) of pipes, as in most urban areas.
Riparian planting	Planting on the banks of a waterway to reduce erosion, and pollution to improve habitat and amenity.
Riparian zone	In relation to a river or lake the riparian zone is the area of land within their beds and adjacent to the beds where direct interaction occurs between aquatic and terrestrial ecosystems. The riparian zone includes the banks of a river, the margin of a lake and the relevant parts of any wetlands or islands contained within their beds, and all aquatic areas with the beds. Riparian zones typically contain vegetated areas adjacent to and within the beds.
Rongoā	Medicine, antidote, drug (medicinal).
Rūnanga	Assembly; Council.
Set-back provisions	The minimum prescribed distance between a building or structure and the boundaries of its site in relation to any nearby waterways.
SDC	Selwyn District Council.
Spring fed waterways	Waterways that are fed by groundwater from springs.

Spring head	Source of a spring fed waterway.
Stormwater	Runoff that has been channelled, diverted, intensified or accelerated by human modification of the land surface or run-off from the external surface of any structure as a result of precipitation and includes entrained contaminants and sediment including that generated during construction or earthworks.
Surface water	Surface water or surface water body means water above the ground surface and within a lake, river artificial watercourse or wetland, but does not include water in the sea, snow, or rain or water vapour in the air.
Takiwā	Area. District or region within which a particular hapū or iwi is recognised as holding manawhenua/manamoana.
Tangata Whenua	In relation to a particular area, Tangata Whenua refers to the iwi, or hapu that holds manawhenua over that area. Taonga; Treasured possession, material or abstract (e.g. language); Māori interest in these is protected by the treaty of Waitangi and New Zealand statute and common law/lore.
The Committee	The Christchurch West Melton Zone Committee.
Tuna	Eel.
Turangawaewae	A person's right to stand in a particular place and speak on matters affecting them or their whānau. Home, sense of place, belonging, connection.
Unconfined aquifer	An aquifer that lacks an overlying layer of fine sediment, and is not under pressure.
Urupā	Burial place, cemetery, places where Māori bury their dead, often enclosed.
Waiora	Waters used for healing by tohunga (expert). These waters were pure and fresh running.
Waipuna	Important springs.
Wāhi raranga	Sources of weaving material.
Wāhi taonga	Sacred places.
Wāhi tapu	Places of sacred or extreme importance.
Waka	Canoe.
Wastewater	Liquid waste (and liquids containing waste solids) from domestic, industrial or commercial premises including, but not limited to, toilet wastes, grey water, waste from household sinks, showers, and baths, and trade wastes and excludes stormwater
Waterway	A river, channel or other surface route that allows a flow of water.
Whānau	Extended family units. The essential building block of traditional Māori society.
Whakataukī	Proverbial saying.
Whanaungatanga	Relationship, kinship.
Whare	House.
Whakataukī	Proverbial saying.
Wetlands	Includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.

December 2012

Canterbury Water

Christchurch-West Melton Zone Committee

DRAFT ZONE IMPLEMENTATION PROGRAMME (ZIP)

FEEDBACK FORM

This form is for you to provide feedback on the Draft ZIP.

The Christchurch-West Melton Zone Committee will take all views into account as it works to reach consensus on the final Zone Implementation Programme.

Keeping your comments brief and to the point will help ensure your views count. Please complete the form and return by 3 February, 2012 to:

Email: mailroom@ecan.govt.nz
Subject: Christchurch-West Melton ZIP feedback

Post: Environment Canterbury ZIP Feedback, PO Box 345, Christchurch

Fax: 03 365 3194

To fill this feedback form out online visit: ecan.govt.nz/canterburywater

Your feedback will be made available on the Christchurch-West Melton ZIP webpage unless you have a specific reason for it not to be made public.

CONTACT DETAILS

Name/Organisation: .....

Address: .....

Postcode: .....

City/Town: .....

Phone: .....

Email: .....

Signature: .....

Date: .....

CONTEXT FOR YOUR FEEDBACK AND COMMENTS

The draft Christchurch – West Melton ZIP has been produced by the zone committee following numerous meetings, workshops, field-trips and engagement with local community groups and stakeholder organisations.

It is a collection of integrated actions and recommendations to give effect to the Canterbury Water Management Strategy (CWMS) in the Christchurch – West Melton zone.

The Committee has identified five issues that are a priority to address in the zone and that must be addressed in parallel, and in an integrated way, to give effect to the CWMS.

The Priority Issues are:

- Enhancing and managing waterways for recreation, relaxation and amenity
- Improving surface water quality and safeguarding surface water flows
- Enhancing healthy ecosystems, indigenous biodiversity, and valued introduced species and landscapes
- Safeguarding groundwater quality and flows for multiple uses
- Making efficient use of water and managing demand

Furthermore, there are five key principles woven throughout the draft ZIP, which must be taken into account when recommendations are being implemented.

The key principles are:

- Kaitiakitanga
- Better integration of plans and collaboration between agencies and groups
- Earthquake recovery programmes help to implement the CWMS in the Zone
- Local people are involved in improving water management
- The effects of improving flood management are beneficial to a spectrum of waterway values

FEEDBACK SECTION

Please refer to the draft Christchurch-West Melton ZIP to provide the aspect number for each area you want to comment on.

Canterbury Water

We want to know what you agree or don't agree with. We also want to know what you think is missing. If you don't agree or think something is missing please give us a solution in the right-hand column. We are looking for realistic and positive solutions. We have provided a brief laid-out example below to show you how get you started.

Priority Outcome	ZIP recommendation	What I agree with/What I don't agree with/What is missing?	Solutions
1.2 EXAMPLE	Develop a co-ordinated programme of actions to improve the ecological health of waterways and ensure that it is integrated into a plan for each major surface water catchment.	The quality of our local waterways is one of the most important issues facing Christchurch. We need to get locals involved to help ensure water quality is not only maintained, but also enhanced so it is in a worthy state for future generations.	Can we run a community awareness campaign with signage, posters and flyers at key waterways to educate people on how to ensure water quality is protected. Practices such as washing leftover paint down storm water drains need to be discouraged. Perhaps we could involve school children to help design some of the material.

FEEDBACK SECTION

Please refer to the draft Christchurch-West Melton ZIP to provide the aspect number for each area you want to comment on.

Canterbury Water

We want to know what you agree or don't agree with. We also want to know what you think is missing. If you don't agree or think something is missing please give us a solution in the right-hand column. We are looking for realistic and positive solutions. We have provided a brief laid-out example below to show you how get you started.

Priority Outcome	ZIP recommendation	What I agree with/What I don't agree with/What is missing?	Solutions

FEEDBACK SECTION

General feedback - draft Christchurch-West Melton ZIP

Canterbury Water

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Facilitating sustainable development in the Canterbury region

www.ecan.govt.nz

Report: E12/115

Environment Canterbury offices

Christchurch
PO Box 345
Christchurch 8140
P: 03 365 3828
F: 03 365 3194

Kaikoura
73 Beach Road
PO Box 73
Kaikoura 7300
P: 03 319 5781
F: 03 319 5809

4. KEY CYCLEWAY PROJECTS

General Manager responsible:	General Manager City Environment Group DDI 941-8608
Officer responsible:	Unit Manager Asset and Network Planning
Author:	Michael Ferigo Transport Planner – Cycling and Pedestrians

PURPOSE OF REPORT

1. The report represents follow up information to the committee on open actions arising from the council meeting of 22 November 2012. It was resolved that Council ask the Environment and Infrastructure Committee to identify four to five key cycling projects.

EXECUTIVE SUMMARY

2. Identifying key cycleway projects

3. Thirteen cycleway projects are identified in the map (refer **Attachment 1**). These projects reflect the major cycle network in the Christchurch Transport Strategic Plan and complement the cycling initiatives in the Christchurch Central Recovery Plan. The proposed cycle route alignments and the type of cycle infrastructure to be provided at this stage are indicative and will be developed further through planning and consultation on the alignments and detailed designs.

4. Staff have identified 13 significant cycleway projects for consideration by the Environment and Infrastructure Committee. Staff recommend to the committee that the top six of these projects are key priorities for consideration by the Council for the 2013 – 2022 draft Long Term Plan (LTP). The six routes are potential wins because they build on existing cycle infrastructure, connect areas of high cycle demand and link into other Council priorities such as the Avon river, southern motorway and delivering the recovery master plans. At present there is limited provision for cycle projects in the draft LTP. The following six projects would make a significant contribution to making Christchurch a cycle city:

   (a) University route: Canterbury University (and Teachers College) to the central city **(currently funded in the draft LTP)**

   (b) Grassmere route: connecting Papanui (Key Activity Centre) to the City connecting the existing northern railway pathway, through Sawyers Arms Road to Grassmere Road Rutland Reserve to Rutland Street and Edgeware Village to Colombo Street and into the central city **(currently funded in the draft LTP)**

   (c) Little River route: an off-road route following the southern motorway corridor from Prebbleton over the Wigram / Magdala Bridge (to be constructed) into Collins Street and Grove Road with a connection into southern Hagley Park and the central city **(currently funded in the draft LTP)**

   (d) Northern Rail route: extend the northern and southern sections of the off-road rail pathway from Factory Road in Belfast to Lester Street with a link into South Hagley Park to the central city **(currently unfunded in the draft LTP)**

   (e) Avon River route: connecting New Brighton to the central city primarily via the Avon River corridor **(currently unfunded in the draft LTP)**

   (f) Sumner to City route: connects up to the coastal edge pathway project at the Ferrymead Bridge and provides cycle provision linking into the central city **(currently unfunded in the draft LTP**).

FINANCIAL IMPLICATIONS

5. There are direct financial implications for the implementation of cycleway projects.

4 Cont'd

Do the Recommendations of this Report Align with 20013-19 LTP budgets?

6. At the time of this report, the draft version of the LTP contained a limited number of cycleway projects. There may be implications to the LTP 2013 - 2022 if additions are made to the cycling programme by the Council.

7. The Environment and Infrastructure Committee has been asked to identify four to five key cycleway projects. Once agreed, depending on the implementation time frame, these may impact on the 2013-2022 Long Term Plan.

LEGAL CONSIDERATIONS

8. None.

Have you considered the legal implications of the issue under consideration?

9. There are no legal implications.

ALIGNMENT WITH LTP AND ACTIVITY MANAGEMENT PLANS

10. The issues discussed in this update report align with the activities within the Street and Transport Activity Management Plans, particularly the delivery of Active Travel activities.

Do the recommendations of this report support a level of service or project in the 20013-19 LTP?

11. At the time of this report, the draft version of the Long Term Community Plan contained a limited number of cycleway projects.

ALIGNMENT WITH STRATEGIES

12. The drive for the early implementation of cycleway projects in the city has come about as a result of public consultation and adoption of the Christchurch Transport Strategic Plan which sets out an action to make Christchurch a cycling city.

Do the recommendations align with the Council's strategies?

13. The recommendations support the Christchurch Transport Strategic Plan.

CONSULTATION FULFILMENT

14. Not applicable. Any major cycle projects progression will be subject to consultation during its planning stage.

STAFF RECOMMENDATION

It is recommended that the Committee recommend that the Council:

(a) Note the key (6) projects which staff consider will most effectively begin to deliver on the Council's Cycle Vision

(b) Note the three projects (University to City, Grassmere (Papanui) to City, and Little River Route) which have been recommended for inclusion and funded capital projects in the Draft 2013-22 Long Term Plan.

(c) Note that the prioritisation and timing of these and other cycle projects can be considered as part of the upcoming Long Term Plan.

4 Cont'd

BACKGROUND

15. Staff have identified thirteen significant major or recreational cycle routes that collectively provide a level of geographical coverage of Christchurch similar to that illustrated in the Christchurch Transport Strategy Plan. Each route is selected on a mix of factors from strategic fit through to practical implementation with the top six achieving the best mix. The factors considered include:

    (a) Potential to attract new cyclists and maintain existing cyclists. Attractiveness to encourage new cyclists via levels of safety, comfort and convenience and the overall likely level of cycle usage. Some modelling work has been undertaken using conservative factors to predict projected cycle trips based on a similar cycle provision programme as outlined below, out to the year 2026 as illustrated later in this report.

    (b) Connecting strategic cycle destinations and generators – including Key Activity Centres, educational facilities, business centres, high density employment and residential areas.

    (c) Alignment with the Council's strategic recovery plans and projects (transport and others) for the city - in response to expressed community aspirations.

    (d) Level of impact (positive and negative) on other road users, residents, businesses or routes.

    (e) Practicalities of implementation (land ownership, widths of corridors, detours, etc) and how it fits in with other existing and new infrastructure.

    (f) Wider benefits of congestion relief, improved travel times, improved health and increased economic and sustainability benefits.

16. The 13 cycle routes identified in this report are described in more detail – the first six are proposed as key routes and the first three of these are included within the current draft LTP programme.

    (1) *University route:* Canterbury University (and Teachers College) to the central city. This route is partially complete. There needs to be a number of extensions and upgrades to provide a consistent level of service including: increasing safety with the introduction of signalisation at major intersections at Kahu Road and Deans Avenue, providing a more direct and attractive route. The route is expected to attract many new cyclists to commute to work or education and for recreational purposes. The route passes near a number of major high schools and several intermediate schools in addition to the tertiary locations. The route has been subject to a scoping report as part of the Council's resolution in response to Christchurch City Council's A City for People Action Plan 2010 - (action number 14) 'a trial for separated cycleways between key destinations such as the Central City and the University of Canterbury'. The Rough Order Costs (ROC) for this route totals $ 1.9 million.

    (2) *Grassmere route:* Connecting Northlands shopping area (Key Activity Centre) and the northern railway pathway to the central city. This route will provide a direct alternative to the arterial roads for cyclists to travel into the city centre from the northern suburbs. It is expected to attract many new commuters, shoppers and recreational cyclists alongside existing cyclists being attracted to it for its level of service. Sections of the route are planned to be physically separated from motor vehicles where it is busy whilst quieter residential sections of the route may have traffic calming / neighbourhood greenways treatments. This route will provide many local residents an attractive opportunity to use active transport to reach popular destinations especially as it provides a new direct and attractive direct route to the existing convoluted routes through local roads or on busy arterial roads. The proposed new bridge and Rutland Reserve pathway extension has

4 Cont'd

historically had strong local support. The whole route will also provide immediate connections to Papanui High School, Graham Condon Leisure Centre, Paparoa School, Rutland Reserve, St Albans School, and Edgeware Village. The route will be linked to and coordinated alongside the Edgeware Village Master Plan. The ROC for the route totals $3.0 million.

(3) *Little River route:* This project is named Little River route as it forms a major connection from the city to the 'Christchurch to Little River Rail Trail', an attractive route for local and national tourists, however the expected main usage will be in the form of people commuting from the new and existing local residential areas to the city and various businesses along the shared pathway. Long sections of it will also be popular with recreational and leisure cyclists as a longitudinal 'park' experience. The project also includes plans to complete the Little River township end of the trail with provision of an off road shared pathway through to the centre of the town and a crossing refuge near the shops. The Akaroa Wairewa Community Board are very interested in completing this section of the project as are the Christchurch to Little River Trust. Prior to the earthquakes the Council had resolved that the costs be established for inclusion into the draft Long Term Plan. The project will also extend the shared pathway from Barrington Street to Collins Street and then develop better provision for cycling along Collins Street and Grove Road to connect into the south eastern end of South Hagley Park. The ROC for the route totals $2.7 million.

(4) *Northern Rail route:* extend the northern and southern sections of the off-road rail pathway from Factory Road in Belfast to Lester Street with a link into South Hagley Park to the central city. This project includes upgrades to existing older sections of the railway pathway and signalisation of arterial intersections. This route will provide a consistent level of service to users providing an attractive and comfortable safe off-road route. This already very popular shared pathway will be extended along the rail corridor to link to the main north road pathway from Northwood residential and retail areas and further north into the Belfast Super Centre, Public Transport 'Core Facilities', existing and new schools, local Belfast pool and the centre of the existing and developing Belfast residential areas. Its northern progress and alignment will be assessed in relation to other local developments and the proposed northern arterial motorway and its associated shared pathways. It will also extend south from the current Kilmarnock Street termination through to Tower Junction and the south western end of South Hagley Park allowing continual off road safe cycle trips to many local destinations. This will provide a northern cycle entrance to the city attracting a level of tourism to the route. The extensions of the route will need lease extensions to be granted from the New Zealand Railways Corporation with the associated limited tenure and conditions. The ROC for the route totals $6.7 million.

(5) *Avon River route:* connecting New Brighton (Key Activity Centre) to the central city via the Avon river corridor. This route fits well with the redevelopment of the red zones and river banks alongside the Avon River. It is a natural extension of the central city river pathway and strongly requested within the 'Share an Idea' and feedback that eventually resulted in the Christchurch Central Recovery Plan. There are other riverside projects developing alongside the water management projects which may dictate the progress of this route. The pathway will primarily provide a high amenity pathway for recreation and tourists and in sections, commuting cycling. It is expected to be very popular for leisurely cycling and may need to be separated from pedestrians to reduce conflicts. The route will provide connections to the potential new sporting, recreational and cultural developments being considered alongside the river redevelopment areas as well as the many schools and parks alongside the river. The ROC totals $4.2 million.

(6) *Sumner to City route:* coastal edge pathway and cycle provision connecting into the central city. This route is divided into two distinct sections. The first is the coastal edge pathway running from Sumner to Ferrymead Bridge and is being progressed outside of many intersection crossings, occasionally crossing over busy streets. It will commence near Princess Margaret Hospital and continue winding east following the Heathcote River

4 Cont'd

the cycleways capital programme. The second section that this report is covering starts at the Ferrymead Bridge and tracks into the city centre. This section is primarily aimed at attracting more commuter cyclists but will also attract utility cyclists to local destinations along the route and into the city centre along with weekend recreational cyclists accessing Sumner. The actual preferred corridor is still to be firmed as more exploration is needed including more political and community discussion as to whether the primary route uses Ferry Road or Linwood Avenue and Linwood drain corridors. The preliminary staff preferred route initially proposed uses the Ferry Road corridor and is planned to be coordinated alongside the Ferry Road master plan. It is proposed that strong levels of separation from motor traffic are used along the length of the route to encourage new cyclists to use this popular route due to its convenient and directness by making it more comfortable and safe for cycling. The ROC for the route from Ferrymead Bridge to the City Centre totals $6.7 million.

17. The following seven cycle routes make up the thirteen routes that collectively could provide a strong base cycle network to project Christchurch into the future as an attractive cycling city:

(7) *Western Orbital route:* This route tracks around the suburbs from Hoon Hay through Middleton, Upper Riccarton, Bryndwr, and Papanui. It will help provide for the post earthquake travel patterns that have followed development and employment re-locations, resulting in increased congestion on many western roads. This route connects to a number of existing and proposed key radial cycle routes thus providing many possible feeder routes. Additionally it tracks past the Canterbury University. It is expected to attract commuters and students primarily. The route travels through many different environments from quiet streets with little infrastructure required, through to busy roads suggesting the introduction of physical separation measures at busy intersections where signals will be introduced. Potential land purchases have been allowed for in the costings endeavouring to keep a level of provision consistent with major cycleways. The ROC for the route totals $8.6 million.

(8) *Hornby Rail route:* This route connects the edge of the cities western boundary in Templeton and links through the suburbs of Hornby (also a Key Activity Centre), Sockburn, Middleton to Riccarton and Addington finishing by connecting to the Northern Railway route and the shared paths in South Hagley Park. This route will appeal to commuters with many employment and business areas concentrated alongside the rail corridor. It will also appeal to tourist and leisure cyclists, providing the primary cycling entrance to the city from the south – it is complementary to the current plans for the Southern Motorway Extension and Main South Road four laning. Local sections of it will be used recreationally and for utility purposes. It will also help service the demand from the south western residential development areas. Some property purchase may be needed where it links away from the rail corridor or where the rail corridor is too narrow to accommodate the shared pathway. The majority of the route would need a lease to be granted from the New Zealand Railways Corporation with the associated limited tenure and conditions. The ROC for the route totals $12.6 million.

(9) *Halswell to City route:* This route connects the Halswell suburb (Key Activity Centre) and follows Halswell and Lincoln Road all the way to the existing shared pathways in South Hagley Park. It is proposed that strong levels of separation from motor traffic are used along the length of the route to encourage many new cyclists to use this existing direct and convenient route by making it obviously more comfortable, safe and attractive. The New Zealand Transport Agency is responsible for the Halswell Road section of this route and its agreement to any eventual plans will be needed. The route will help support the residential growth areas around the southwest of the city by offering another attractive transport option for commuters and for utility cyclists to access the many local road side shops and businesses. The ROC for the route total $4.2 million.

(10) *Heathcote River / Heritage Trail route:* This route follows the river in various formats from using pathways along the river bank reserve to using quiet riverside streets and

4 Cont'd

to Ferrymead. Much of the route has existing provision for cycling but will need upgrading. It will primarily attract recreational usage but may also provide some useful links for local commuter cyclists. The ROC for the route totals $3.0 million.

(11) *South to City route:* This route connects to the cycle facilities along the foot of the Port Hills and the proposed Heathcote River route and uses the existing Tennyson Street pathway facilities to then develop strong separation from motor vehicles in Strickland and Antigua Streets all the way through to the Antigua Bridge cycle crossing. This route is currently popular as a commuter route providing direct and convenient access to the city and beyond from the southern suburbs into the city, linking to the shared paths through North Hagley Park to the west. The proposal will attract many more people to cycle the route for commuting and utility purposes as well as recreational cyclist because of the increased comfort and separation levels from motor vehicles. The ROC for the route totals $2.9 million.

(12) *Heathcote Rail route:* This route commences in Heathcote and primarily uses the rail corridor to travel through Woolston, Opawa, Waltham and Sydenham suburbs on the way into the city centre at the Christchurch Polytechnic Institute of Technology on Moorhouse Avenue. It will be developed to a similar level as the newer sections of the Northern Rail shared pathway route with cycle signalised crossings at busy intersections, lighting and fencing. It is expected to attract many new users from across the range of cyclist purposes as it connects through the residential, business and industrial areas. The majority of the route would need a lease to be granted from the New Zealand Railways Corporation with the associated limited tenure and conditions. The ROC for the route totals $7.8 million.

(13) *Airport route:* This route provides a route to the airport and its wider employment and business areas. The route connects from the existing section of the Northern Rail route at Harewood Road intersection and follows Harewood Road to the proposed underpass at Russley Road and then continues into the start of both Orchard and Mcleans Island Road. The majority of the route will require strong separation measures from the motor vehicle traffic. Whilst mainly residential there are several schools on or near the route and it is predicted to attract school students along with shoppers to the Bishopdale Mall and Papanui Key Activity Centre. Primarily the usage is predicted to be commuting to the employment areas nearing the airport and Papanui. The ROC for the route totals $4.3 million.

18. The six key cycle projects have rough order costs totalling $25.2 million. The seven next major cycleway projects described in this report have rough order costs totalling $43.4 million. Collectively the rough order costs for the thirteen major cycleways that establish the city wide major cycleways network from the Christchurch Transport Strategic Plan total $68.6 million.

	Project Title	Rough Order Cost
6 Key Projects	University Route	$1.9 M
	Grassmere Route	$3.0 M
	Avon River Route	$4.2M
	Northern Rail Route	$6.7 M
	Little River Route	$2.7 M
	Sumner to City Route	$6.7 M
		Sub Total: $25.2 M
	Western Orbital Route	$8.6 M
	Hornby Rail	$12.6 M
	Halswell to City Route	$4.2 M
	Heathcote River / Heritage Trail Route	$3.0 M
	South to City Route	$2.9 M
	Heathcote Rail Route	$7.8 M
	Airport Route	$4.3 M
		Sub Total: $43.4 M
		Overall Total: $68.6 M

4 Cont'd

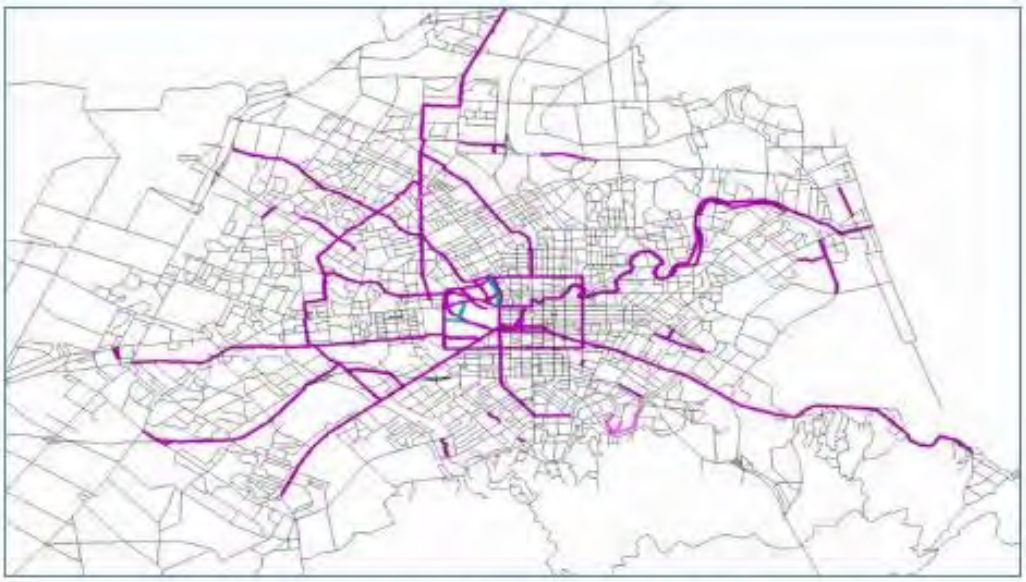
19. The first three of the six key cycle projects listed above are funded in the draft LTP. In addition to this there are two other significant cycleways capital projects shown within the draft LTP. The first is for targeted improvements – this is aimed to improve a number of strategic 'problem' or potential high benefit locations such as where cyclists need better separation through the trialled 'flexi posts' or shoulder or pathway widening. The project is aimed at making an early positive impact in the city for cycling and totals $0.5 million over the first two years of the LTP. The second project is an upgrade of the existing Prestons Road cycle route – this is to substantially upgrade the pathway that is very narrow and not up to current standards with driveway crossings and markings/signage and needs better connections. However in comparing it to the key cycle project outcomes the Council may want to consider this project as a potential substitution to begin partial funding of a key project. The funding for Prestons Road is in the year 2018, and totals $1.0 million.

20. As part of the exercise in estimating the predicted cycle usage rates that correspond to the programme indicated in the Christchurch Transport Strategic Plan a Christchurch 'Strategic Cycle Model' (SCM) was developed. The model uses a refined version of the Christchurch Assignment and Simulation Traffic (CAST) model. Cycle trip generation has been estimated for four principal purposes (home based work, home-based education, other home-based trips and non home-based trips). One of the key assumptions relating to potential future cycle demand is how many car users (drivers or passengers) would choose cycling as a viable alternative given significant improvements. Existing research varies from 80 per cent to 9 per cent. For the purposes of the SCM a reasonably conservative 30 per cent was selected as the 'trader factor' from car use.

Continued over…

4 Cont'd

21. The following extracts from the SCM report provide an indication of predicted cycling levels forecast at 2026:

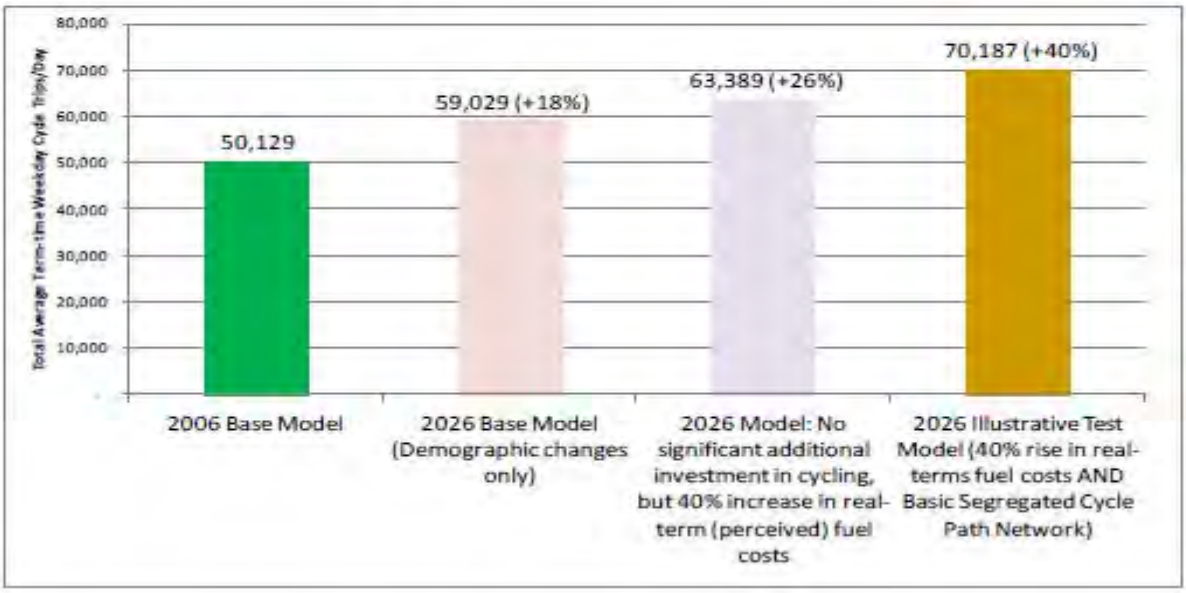


Illustrative Segregated Cycle Path Additions for a 2026 Test model
(Note Blenheim Road is a proxy for a Southern Railway cycleway and Main North Rd is a proxy for extension of the Northern Railway Cycleway)

2026 Illustrative Test Model: Estimated resulting total daily cycling demand

4 Cont'd

The resulting total cycle demand forecast at the various stages of model projection can be summarised by the following figure:



22. The figure above shows predictions based on daily trips which extrapolated to yearly figures equates to over 25 million trips by cycle per year of which an additional 2.5 million trips per year attributable to the implementation of the 2026 basic separated cycle path network illustrated above. The expectation is that more people will cycle and all cyclists will be attracted to use the path network routes as they provide a good level of service and safety. As such the levels of usage on the network routes newly developed are expected to rise even higher than the overall average increases.

Priority Cycleway Projects

Key
- Completed
- 6 Key projects
- Significant projects
- Key Activity Areas

To Factory Road

Airport Route
ROC $4.3m

Northern Rail Route
ROC $6.7m

Western Orbital
ROC $8.6m

Grassmere/Papanui to City
ROC $3.0m

Avon River
ROC $4.2m

Northern Rail Route

University to City
ROC $1.9m

Hornby Rail Route - Templeton to City
ROC $12.6m

Magdala Bridge Connection

Little River Route
ROC $2.7m

South to City
ROC $2.9m

Heathcote River
ROC $3.0m

Sumner to City
ROC $6.7m

Coastal Route budget non cycleways

Southern Motorway
ROC $9.2m

Halswell to City
ROC $4.2m

Heathcote Rail Route to City
ROC $7.8m

To Templeton
(via rail corridor)

Little River Rail Trail
(incl. part of Little River Route)

to Governors Bay & Diamond Harbour

5. VICTORIA CLOCK TOWER

General Manager responsible:	General Manager City Environment, DDI 941-8608
Officer responsible:	Unit Manager Transport and Greenspace
Author:	Maria Adamski Parks Heritage Contract Manager

PURPOSE OF REPORT

1. To provide further information in regards to the option to maintain one face of the clock permanently set at 12.51pm.

EXECUTIVE SUMMARY

2. Victoria Clock Tower is of considerable national and regional significance making an important contribution to the identity, sense of place and history of the Canterbury region. It is listed as a Group Two (national or regional importance) heritage item in the Christchurch City Plan and is registered as a Category I (special or outstanding historical or cultural heritage significance or value) Historic Place by the New Zealand Historic Places Trust(refer **Attachment 1**).

3. Several options have been proposed for the future display of the time on the Victoria Clock Tower:

   (a) Fix the clock completely: This will ensure the clock maintains its original purpose as a dedicated memorial to Queen Victoria's Jubilee and of telling the time for the citizens of Christchurch.

   (b) One face remains at 12.51pm: This would alter the purpose of the clock as a memorial to the Jubilee of Queen Victoria to encompass an unrelated memorial, that of the earthquake. Also the clock will not be fulfilling its purpose as a timepiece and there will be complaints that the time is not correct. Overseas/out of town visitors may not comprehend this.

4. The clock faces are driven from one central mechanism, while it is possible to stop one face they cannot be run independently.

5. To stop one face and assign another value to the clock would be in conflict with the principles of the ICOMOS New Zealand Charter (2010) for the Conservation of Places of Cultural Heritage Value. The Council subscribes to the principles of the ICOMOS (NZ) Charter through the City Plan assessment matters with regard to alterations of listed heritage items (Vol 3, Part 10, 1.4.1 (i). This proposed alteration to the clock would not align with the conservation principles and polices of minimum intervention.[1] The ICOMOS (NZ) charter states that *"Any **intervention** which would reduce or compromise **cultural heritage value** is undesirable and should not occur."*[2]

6. Restoring the clock completely to working order follows good practice heritage conservation principles whereas mixing memorial subjects is considered inappropriate. Any alteration in the meaning and purpose of this 1897 memorial clock tower would significantly and adversely affect the social historical and intangible heritage values of this nationally recognised heritage item.

Heritage Summary

7. The Victoria Clock Tower is of architectural significance for the original design of the clock case of the upper portion of the tower by B W Mountfort and the later design of the stone section to house it as a Jubilee memorial by Strouts and Ballantyne.

8. It is of cultural significance for its brief association with Canterbury Provincial Government), but principally as a Jubilee memorial for Queen Victoria's 'Diamond Jubilee 1837-1897' as is inscribed in a stone tablet on the east side of the base.

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[1] **Policy 6:** ***Intervention Policy 17*** *should be the minimum necessary to ensure the retention of **tangible** and **intangible values** and the continuation of **uses** integral to those values. The removal of **fabric** or the alteration of features and spaces that have **cultural heritage value** should be avoided.*

[2] **Policy 17 ICOMOS (NZ) Charter**

5 Cont'd

9. The upper part of the clock tower was constructed by Midland Counties Iron Works in Coventry or Skidmore and Sons in Coventry, England and sent out to New Zealand in 1860 in 142 packages. It proved too heavy for the Provincial Buidlings timber tower and was placed in storage until its incorporation in the Jubilee memorial. The base employs Mount Somers, Port Chalmers and Timaru stone, and a high level of stonemasonry skill for the period (1890s) is evident in the work.

FINANCIAL IMPLICATIONS

10. There would be no additional cost to maintain the Victoria Clock in working order as this is currently covered under the Garden and Heritage activity.

11. There would be a cost to disconnect one face of $180.00 and to fabricate a support for the hands of $350.00.

Do the Recommendations of this Report Align with 2009-19 LTCCP budgets?

12. Not applicable.

LEGAL CONSIDERATIONS

13. Not applicable.

Have you considered the legal implications of the issue under consideration?

14. Not applicable.

ALIGNMENT WITH LTCCP AND ACTIVITY MANAGEMENT PLANS

15. Yes. Maintaining the city clocks in working order aligns with p126 of the LTCCP 2009-2019 and 6.2.12 of the proposed 2013-22 Activity Management Plan LOS: "*this includes ensuring open heritage buildings and structures are safe, appropriately maintained, and serviced to ensure their heritage values are protected, and that they can be appropriately enjoyed by the community."*

Do the recommendations of this report support a level of service or project in the 2009-19 LTCCP?

16. As above.

ALIGNMENT WITH STRATEGIES

17. The retention of the correct time on all faces of the Victoria Clock Tower is aligned with the LTCCP Community Outcome "An Attractive and Well-designed City". In particular protecting our heritage for future generations.

Do the recommendations align with the Council's strategies?

18. Yes, refer above.

CONSULTATION FULFILMENT

19. Not applicable.

STAFF RECOMMENDATION

It is recommended that the Environment and Infrastructure Committee recommend to the Council that it restore the Victoria Clock completely to working order.

Attachment 1: Jubilee Clock Tower Heritage Assessment

STATEMENT OF SIGNIFICANCE
VICTORIA STREET CLOCK TOWER/JUBILEE CLOCK TOWER

INTRODUCTION:

The Victoria Clock Tower is of considerable regional significance making an important contribution to the identity, sense of place and history of the Canterbury region. The clock section was originally made for the Canterbury Provincial Council Buildings. However it never served that purpose and was constructed as a Jubilee memorial to Queen Victoria. The Clock Tower is of architectural significance for its unique design by Mountfort and the later base designed by Strouts and Ballantyne. The Clock Tower is of technological and craftsmanship significance for its ornate Victorian detailing and use of stone, glass and wrought iron. It is a Christchurch landmark that is recognised and identified with regionally.

HISTORICAL AND SOCIAL SIGNIFICANCE

The upper part of the Victoria Street Clock Tower was constructed in 1859 in England and was intended to have been incorporated into the Canterbury Provincial Council buildings complex, however it was too heavy for its intended site. Subsequently the structure was temporarily stored in the courtyard at the Provincial Council Buildings until 1864, then in the Christchurch City Council yards. In 1897, the 60th Jubilee of Queen Victoria's Reign was celebrated in the city, and the structure was incorporated into a memorial clock tower, with a stone base. The cost of the Clock Tower was shared between the Council and the public. In 1897 a competition held for the design of the stone base, on which the tower was eventually erected, was won by Strouts and Ballantyne. This was erected at the corner of High, Lichfield and Manchester Streets. The increasing volume of traffic at this intersection resulted in the decision to relocate the tower, and it was erected on its present site in Victoria Street in 1930. After refurbishment work in 1976, the clock was renamed the Provincial Government Clock as a mark of its original intent (*The Star,* 31.5.2000), however this name does not appear to have entered into popular use.

CULTURAL AND SPIRITUAL SIGNIFICANCE

The Victoria Clock Tower is of cultural significance for its association with Canterbury Provincial government (1853-76), and as a Jubilee memorial to Queen Victoria. 'Diamond Jubilee 1837-1897' is inscribed in a stone tablet on the east side of the stone base. Another stone tablet is inscribed "Erected by Citizens of Christchurch NZ in commemoration of the Diamond Jubilee of HJM Victoria R et J". Public clocks and drinking fountains played a more integral part of the community's day to day life when the Clock Tower was designed for the Provincial Council Buildings in 1859 and erected as a stand alone clock tower in 1897. The public clock assisted citizens to reset their time to a standard time for the City, and therefore played a vital role in the early development of the City.

ARCHITECTURAL AND AESTHETIC SIGNIFICANCE

The Victoria Clock Tower is of architectural and aesthetic significance for its design in two stages by two local architects. Benjamin Woolfield Mountfort, architect of the Canterbury Provincial Buildings, designed the upper portions of the tower in 1859. Mountfort's original design was somewhat modified due to the cost. His design becomes increasingly delicate as it ascends and originally the wrought iron railing and scroll work were covered in gold leaf (NZHPT Website). Benjamin Woolfield Mountfort (1825-98) trained as an architect in England, and arrived in Canterbury in 1850. He became New Zealand's pre-eminent Gothic Revival architect. He was involved in many important commissions including a number of churches, the Canterbury Museum (1869-82) and the Clock-tower Block on the Canterbury College campus (1876-77).

Frederick Strouts (1834-1919) was born in England, and trained as an architect there. . He became noted for his houses, and in 1871 he was appointed supervising architect for the Church of St Michael and All Angels. He formed a practice partnership with his former pupil Robert Ballantyne. The clock tower was restored in 1978, and chimes were added to the clock mechanism. The clock tower was also restored in c2002, including the painting of some of the wrought iron work in gold leaf. A decorative cast iron drinking fountain is located within the tower.

TECHNOLOGICAL AND CRAFTSMANSHIP SIGNIFICANCE

The upper part of the clock tower was constructed by Midland Counties Iron Works in Coventry or Skidmore and Sons in Coventry, England and sent out to New Zealand in 1860 in 142 packages. The base employs Mount Somers, Port Chalmers and Timaru stone, and a high level of stonemasonry skill for the period (1890s) is evident in the work. The ornate wrought iron also shows the high degree of skill in this medium which was practised in England at the time (1850s). The clock mechanism was replaced in 1930 with new telechron gearing, new hands, and plate glass dials on each face (The Press 9.7.1929, p.10).

CONTEXTUAL SIGNIFICANCE

The setting of the clock tower consists of a triangular area of land on the corner of Victoria, Salisbury and Montreal Streets. Low height rose plantings are located in formal garden beds immediately at its base. The clock tower is located directly in front of Victoria Mansions, an art deco apartment block, and together the buildings form a group of heritage structures, along with the former dwelling on the corner of Salisbury and Montreal Street. The setting of the clock tower provides for its landmark visual presence in the streetscape, on a significant intersection in the city. The clock tower is also associated with the Canterbury Provincial Council Buildings, which is located a few blocks away, but which shares the materials and detailing of the Mountfort designed portions of the clock tower.

ARCHAEOLOGICAL SIGNIFICANCE

The clock tower and setting are of archaeological significance because they have potential to provide archaeological evidence relating to past building construction methods and materials, and other human activity. The setting in Victoria Street has potential to provide evidence of human activity prior to 1900, as the Street was a main thoroughfare centre of commercial and other activity for the early European settlers.

Statement of significance report by Jenny May based on the CCC Heritage Building assessment criteria and file information
May 2012

6. COUNCIL BUILDING / INFRASTRUCTURE IMPROVEMENT ALLOWANCE REQUEST FOR INFRASTRUCTURE REBUILD PROGRAMME

General Manager responsible:	General Manager City Environment, DDI 941-8608
Officer responsible:	Unit Manager Asset and Network Planning
Author:	Mike Bourke, Senior Technician Water and Waste Planning

PURPOSE OF REPORT

1. To seek the Committee's recommendation to the Council to fund the betterment portion of a number of projects that the Stronger Christchurch Infrastructure Rebuild Team (SCIRT) are undertaking to design and build. The requests are based on costs estimated at the time of concept design and these projects have now moved into the detailed design stage.

EXECUTIVE SUMMARY

2. The SCIRT mandate for the rebuild is to return the assets to their pre-earthquake condition, however there are a few situations where it is sensible and practical to carry out additional work over and above the earthquake repair. These situations arise where:

   (a) the asset only has a short remaining life

   (b) to avoid digging up the new road again in the short term

   (c) to repair non-earthquake damage as part of the rebuild to extend the asset life, or

   (d) to provide future flexibility to the rebuild or flexibility and resilience to future operation.

3. Reports on all of the betterment projects described in this report have been presented to the Scope and Standards Committee, and approval given for funding to be sought from the Council.

BACKGROUND

4. This report includes seven projects where betterment has been identified and the additional cost of the betterment needs to be funded separately from the rebuild costs.

   (a) Charleston Area Water Supply (refer **Attachment 1**).

   (b) Pump Station 8 Area Stormwater pipe upsize (refer **Attachment 2**).

   (c) Beachville Catchment Stormwater upgrade (refer **Attachment 3**)

   (d) Maces Road Water Main Upgrade (refer **Attachment 4**)

   (e) Worsleys Reservoir Repair (refer **Attachment 5**)

   (f) Main Road Causeway Seawall and associated works (refer **Attachment 6**)

   (g) Beachville Road Eastern Seawall rebuild and associated works (refer **Attachment 3**).

Charleston Area Water Supply Improvements

5. The old cast iron water supply pipes in Grafton Street require replacement due to earthquake damage as part of the rebuild and road reconstruction in the Charleston area of Waltham. Additional funding of $315,000 is sought to increase the size of two sections of this pipe line (283 metres out of a total of 392 metres – sections B and C on **Attachment 1** to meet City Plan zone fire fighting capacity requirements where the zoning has changed from Living to Business since the pipes were first laid in 1925. The total cost of the Rebuild project for this area just for water supply, roading and stormwater is estimated at $8.4 million.

6 Cont'd

Pump Station 8 Area Stormwater Pipe Upsize

6. CCTV condition assessment indicates that in the pump station 8 catchment area of Avonside the majority of stormwater pipes require replacement. Additional funding of $54,410 is sought to upsize 404 metres of stormwater pipe to meet the Council design service levels of an Annual Exceedence Probability of 20 percent (meets a one in five year storm). It is proposed to increase a total of 224 metres of stormwater pipes from 375 millimetres diameter to 450 millimetres diameter in North Avon Road, and 180 metres of stormwater pipes from 225 millimetre diameter to 300 millimetres diameter in North Avon Road and Flesher Avenue. The total stormwater upgrade cost of these pipes is estimated at concept design stage to be $278,000.

Beachville Catchment Stormwater Upgrade

7. CCTV inspection of the 1500 metres of stormwater pipes in this Beachville Road/Celia Street area shows that the majority require replacement due to earthquake damage. There is a section of 101 metres that is below capacity to achieve the Infrastructure Design Standards required 20 percent Annual Exceedence Probability (one in five year storm) and should be increased in size to meet current levels of service as there is no alternative overland flow path for the stormwater to get into the estuary. The additional cost of this increase in size is $12,400 in a total cost $97,800 for this stormwater pipe section. The total catchment project cost is $6 million for construction.

Maces Road Water Main Upgrade

8. The 800 million of asbestos concrete and 2 metres of cast iron 150 millimetres of diameter water main in Maces Road is to be renewed due to earthquake damage and the carriageway renewal is to follow. The capacity of the water main is inadequate to meet full fire flow requirements in the Maces Road industrial area and renewal of the main in a larger size will rectify this. A larger main will also provide for improved resilience between zones and allow future rezoning and pressure management to proceed, further improving resilience and reduced water loss. The additional betterment portion of the cost of increasing the size of the water main to 300mm diameter is $158,000 in a total water main renewal cost of $945,000. The construction rebuild cost estimate for roading, water supply and stormwater for this catchment is $16.9 million.

Worsleys Reservoir Repair

9. The Worsleys Road reservoirs (two tanks) are now the largest in the City Water Supply system and due to earthquake damage require repair to meet the required strength of the New Building Standard (NBS). These tanks are considered importance level four in terms of essential infrastructure (need to be operational after a major event) and therefore are required to meet 67 percent of the NBS. (Both tanks are currently at 28 percent of the NBS). The residual life of these tanks is estimated at 50 years. Upgrading them to the equivalent of 100 percent of the NBS for 50 years is actually 83 percent of NBS (assumes new tanks have a 50 year life). The estimated total cost of repair of these tanks to reach 83 percent of NBS (equivalent to 100 percent NBS for a 50 year life) is $1.28 million, compared to the estimated cost of repair to reach the required 67 percent of NBS of $1.2 million. Additional funding of $80,000 is therefore sought to bring these tanks up to equivalent 100 percent of NBS.

Main Road Causeway Seawall and Associated Works

10. The 980 metres of seawall on the estuary side of the causeway has been damaged and requires replacement for the full length to provide long term erosion protection for the causeway. .In order to provide for the future four metres wide coastal walkway for the full length of the causeway rebuild including pedestrian access to the estuary (consistent with the concept design and feasibility report for the Christchurch Coastal Pathway), and space to accommodate future sea level rise additional betterment funding of $603,000 is sought. The total cost of the seawall replacement at concept design stage is $1.3 million which includes the allowance for the betterment.

6 Cont'd

Beachville Road Eastern Seawall and Associated Works

11. This package of work covers the Celia Street and Beachville Road area and this package includes total replacement of the damaged seawall, together with road reconstruction, wastewater and road realignment at a total estimated cost of $5.9 million. In order to provide for a future four metre wide coastal walkway for the full length of the wall rebuild and space to increase seawall height to counter sea level rise in the future some additional road realignment is proposed. This betterment portion is estimated at $129,000.

FINANCIAL IMPLICATIONS

12. Funding of these betterment initiatives will draw down the Council Building / Infrastructure Improvement Allowance which currently stands at $72,846,116. Where there are renewal aspects of these projects the renewal aspect would normally be funded from renewal funds but renewal funds have been reduced in line with the strategy of lesser renewals being required once the rebuild is complete.

Summary of betterment funds sought	
Project	**Betterment Cost**
Charleston Area Water Supply Improvements	$315,000
PS 8 Area Stormwater Pipe Upsize	$54,410
Beachville Catchment Stormwater upgrade	$12,400
Maces Road Water Main Upgrade	$158,000
Worsleys Reservoir Repair	$80,000
Main Road Causeway Sea Wall	$603,000
Beachville Road Eastern Sea Wall	$129,000
TOTAL	**$1,351,810**

Do the Recommendations of this Report Align with 2009-19 LTCCP budgets?

13. This work represents a marginal increase in scope (betterment) over work being conducted as part of the infrastructure rebuild being undertaken by SCIRT. SCIRT will perform these betterment elements as part of the infrastructure packages of work. Work to be funded from the Council Building/Infrastructure Improvement Allowance.

LEGAL CONSIDERATIONS

14. The projects are all on Council land and there are no legal implications of these works.

Have you considered the legal implications of the issue under consideration?

15. Not applicable.

ALIGNMENT WITH LTCCP AND ACTIVITY MANAGEMENT PLANS

16. These works are associated with Waterways and Land Drainage Activity (6.5) the Wastewater Collection Activity (11.0) and the Christchurch Strategy Transport Plan.

Do the recommendations of this report support a level of service or project in the 2009-19 LTCCP?

17. Works additional to work programmed by SCIRT as part of the infrastructure rebuild. Budget provision made for the base scope of work in FY 12/13 Annual Plan (Infrastructure Rebuild Budget).

6 Cont'd

ALIGNMENT WITH STRATEGIES

18. Aligns with the Surface Water Strategy; draft Wastewater Strategy and the Christchurch Strategy Transport Plan.

Do the recommendations align with the Council's strategies?

19. As above.

CONSULTATION FULFILMENT

20. Not applicable.

STAFF RECOMMENDATION

It is recommended that the Environment and Infrastructure Committee recommend that the Council:

(a) Approve the allocation of the betterment funds from the Council Infrastructure / Building Improvement Allowance as detailed above for:

  (i) Charleston Area Water Supply Improvements ($315,000 to increase pipe size)

  (ii) PS 8 Area Stormwater Pipe ($54,410 to increase pipe size)

  (iii) Beachville Catchment Stormwater Upgrade ($12,400 to increase pipe size)

  (iv) Maces Road Water Main Upgrade ($158,000 for larger water main)

  (v) Worsleys Reservoir Repair ($80,000 to bring up to 100% of NBS)

  (vi) Main Road Causeway Sea Wall and Associated Works ($603,000 to future proof for possible four metre wide walkway)

  (vii) Beachville Road Eastern Sea Wall and Associated Works ($129,000 to future proof for possible four metre wide walkway)

(b) Authorise the City Environment General Manager to instruct the Stronger Christchurch Infrastructure Rebuild Team to complete betterment elements as part of the infrastructure rebuild works being progressed in each of the respective areas.

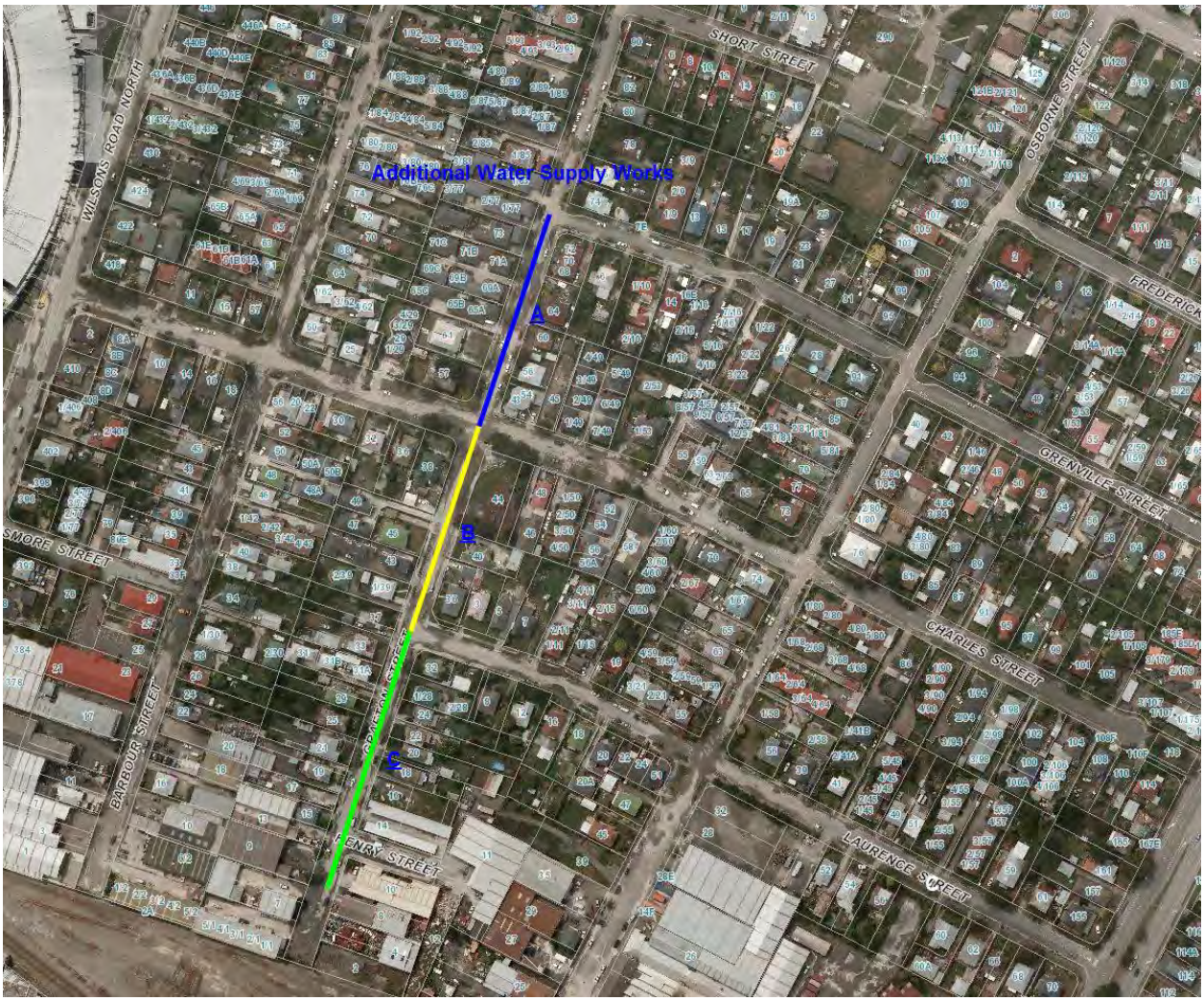
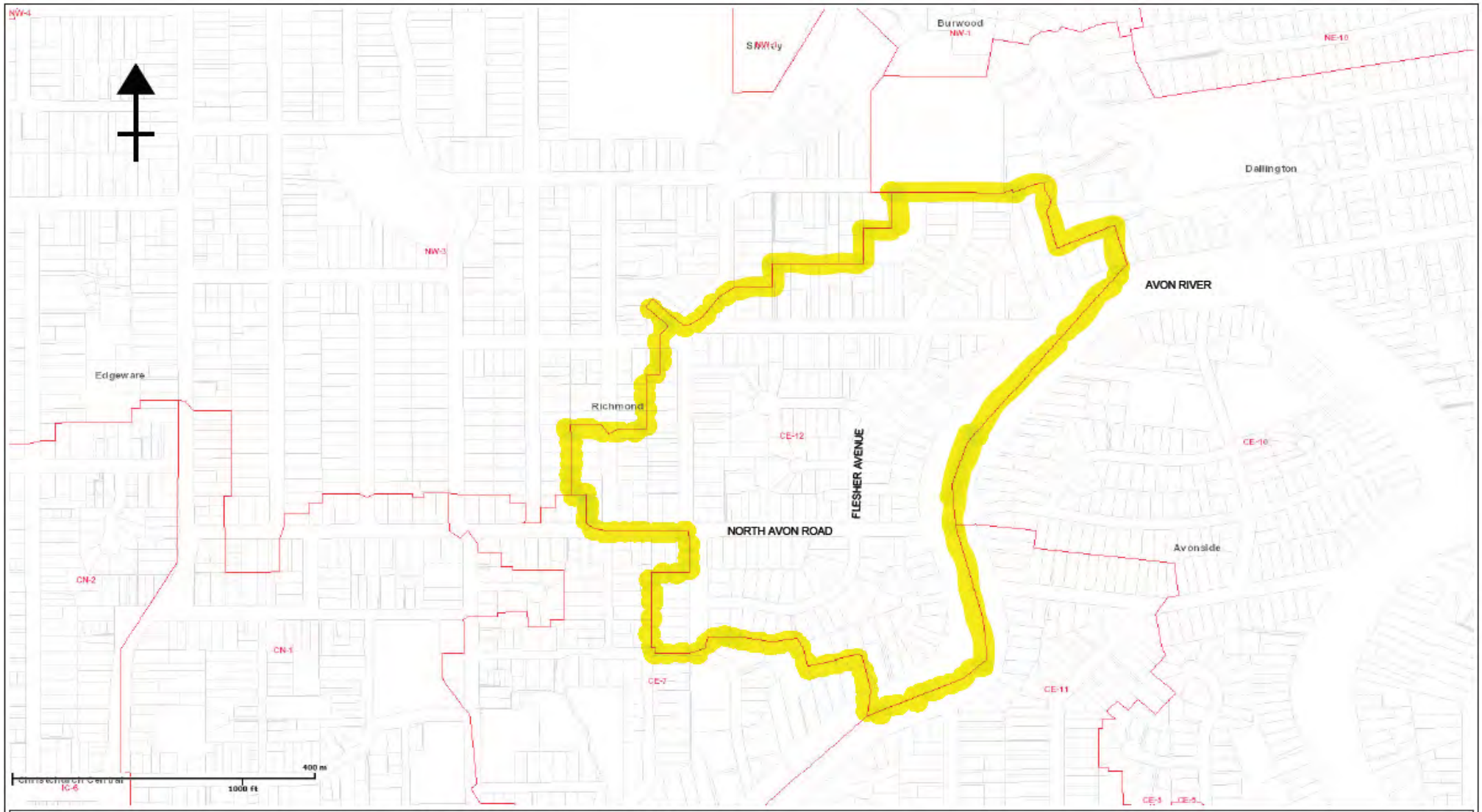


Figure1: Extent of additional water supply works.



PS8 CATCHMENT

Locality Map

New Zealand Government

Christchurch City Council

SCIRT Rebuilding Infrastructure

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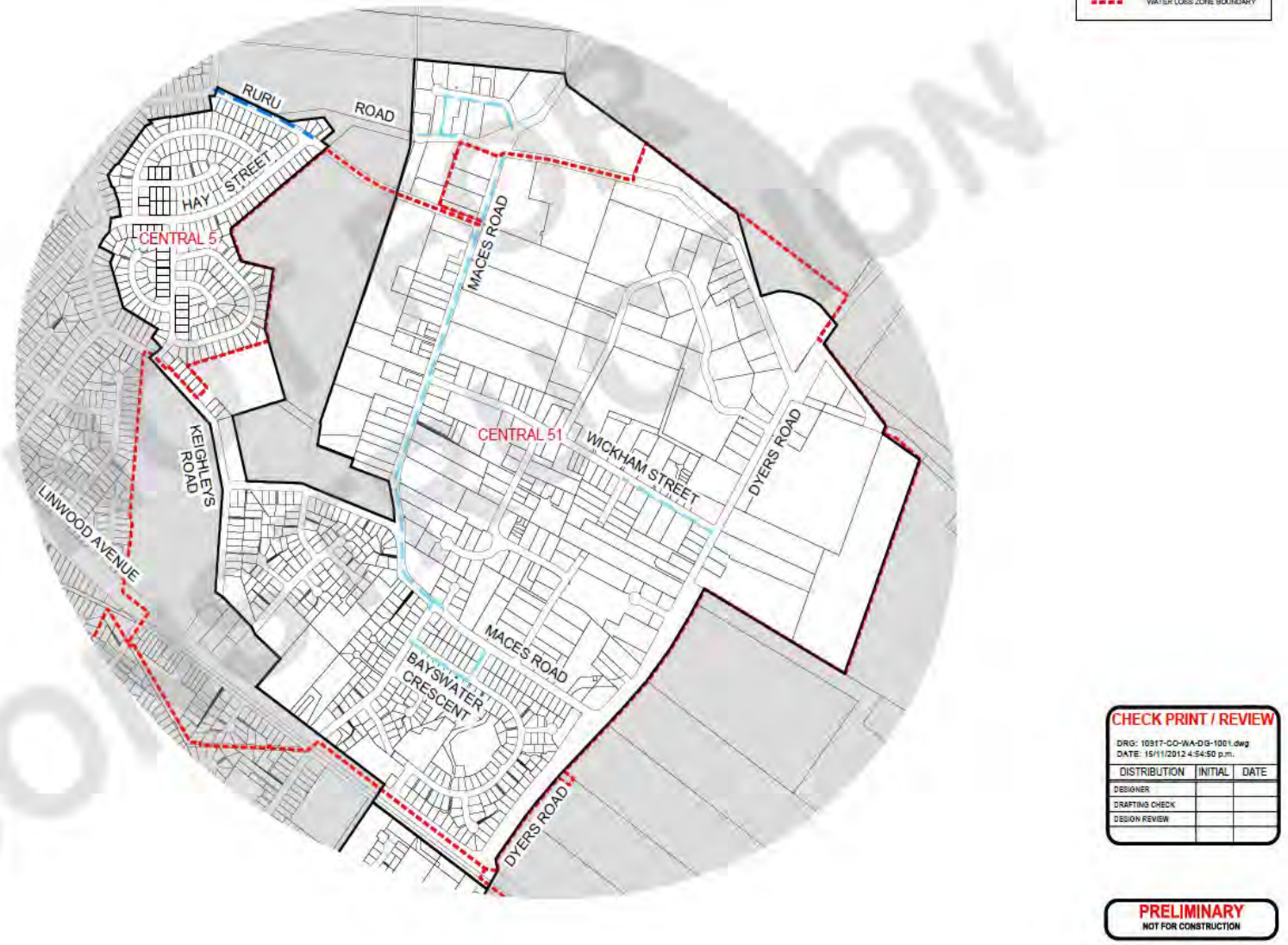
Figure 1-1 Beachville Road and Celia Street Project Areas

Figure 5 – Mains renewal if Road Reconstruction above



LOCATION PLAN

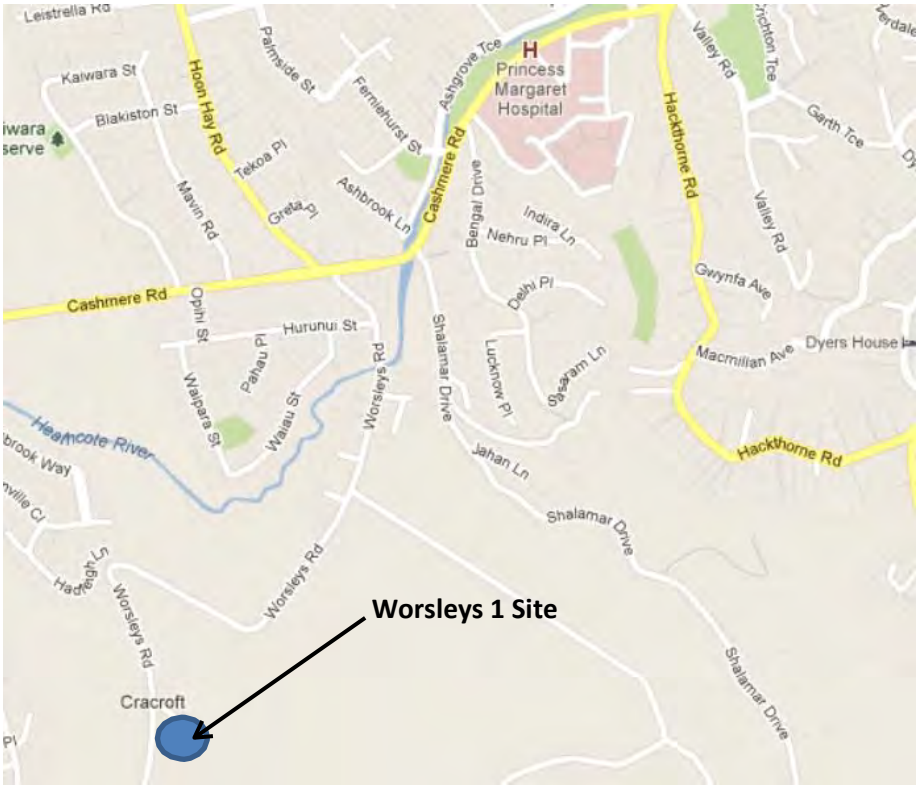


Figure 1 Location Plan

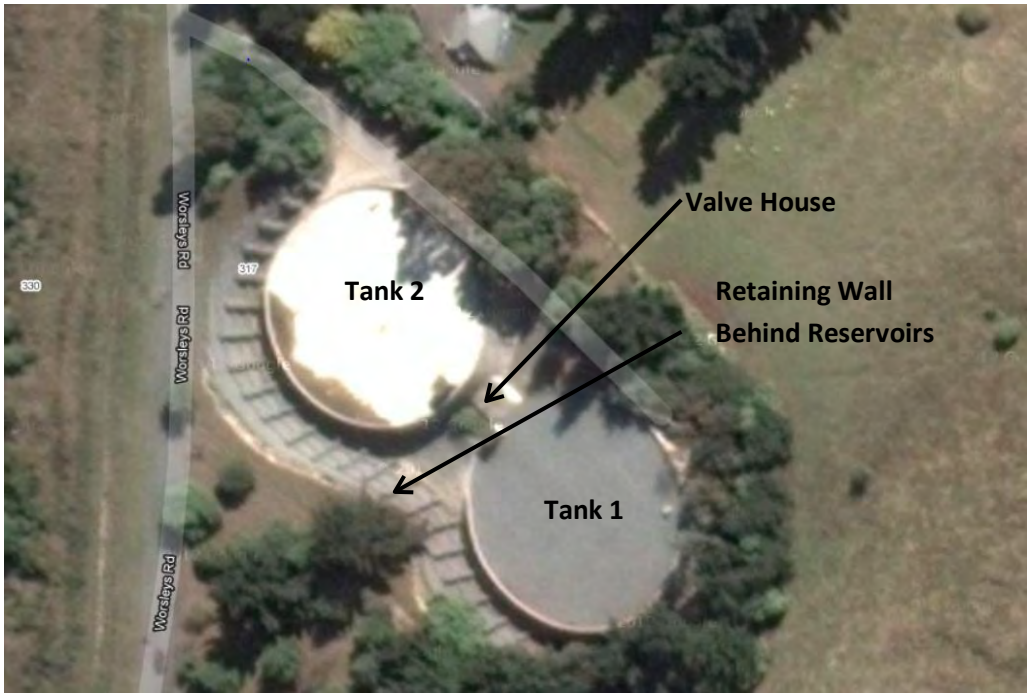
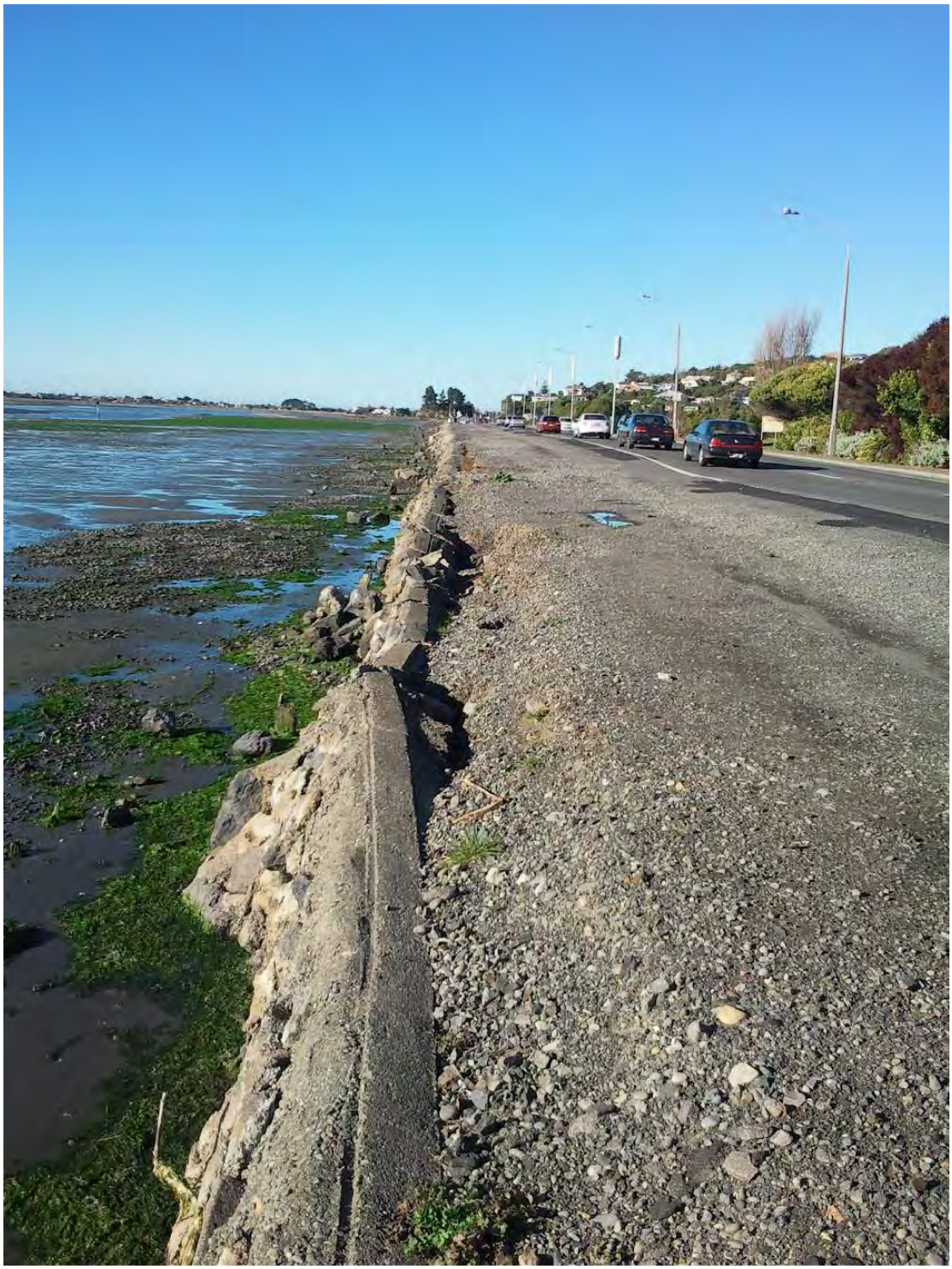


Figure 2 Aerial View

SS95 Main Road Causeway Seawall



7. INFRASTRUCTURE REBUILD MONTHLY REPORT

General Manager responsible:	General Manager Capital Programme DDI: 941 8235
Officer responsible:	Infrastructure Rebuild Client Manager
Author:	Will Doughty, Infrastructure Rebuild Leader

PURPOSE OF REPORT

1. To provide the Environment and Infrastructure Committee with a monthly update on the infrastructure rebuild.

EXECUTIVE SUMMARY

2. At its April 2011 meeting, Council gave approval for an alliance to be formed to deliver the reinstatement of the City's damaged infrastructure. It was also agreed that the Chief Executive would report regularly to the Council on progress with regard to the reinstatement work.

3. The report (**Attachment 1**) is the 13th of what will be a regular monthly report that is provided to the Environment and Infrastructure Committee, Council and the Canterbury Earthquake Recovery Authority (CERA).

STAFF RECOMMENDATION

It is recommended that the Committee recommend that the Council receive the Infrastructure Rebuild Monthly Report for December 2012, noting that the next report will cover the two month period around the Christmas break.

Christchurch City Council

New Zealand Government

INFRASTRUCTURE REBUILD PROGRESS REPORT

DECEMBER 2012

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1. INTRODUCTION

The purpose of this report is to provide Council, CERA and NZTA an update on the horizontal infrastructure rebuild. For this month, and going forward, progress on all horizontal infrastructure rebuild work is reported. This includes the work activity being delivered by SCIRT (section 4.1) and work being delivered under business as usual (BAU) mechanisms (section 4.2).

2. ACTIVITIES FOR THE MONTH

November has seen another productive month in the field for SCIRT, with a continued increase in delivery of work in construction. Now that SCIRT has ramped up delivery the focus over the next few months is to demonstrate that we are successfully achieving good value for money through the rebuild. A number of reporting metrics are being established to help with visibility in this area which are anticipated to be in use in the first quarter of next calendar year.

The SCIRT training and recruitment programme has been in full swing in November with the "Train, Work, Earn, For Real" bus travelling around the South Island. To date over 1350 people have registered expressions of interest and over 330 of those have been identified for interview to go into training and/or employment. The challenge will be to translate those suitable candidates into employment opportunities.

SCIRT are currently undertaking their quarterly prioritisation of the five year work programme by adding in further information from the ongoing asset investigation work. It is anticipated that an updated rebuild schedule will be available early in the new year. The rebuild team will be scheduling further Community Board visits once the updated schedule is available.

Work is ongoing with regard to the updated Infrastructure Rebuild Estimate, including investigating opportunities for reducing costs where appropriate. This updated estimate will be used to inform the LTP and the Programme Business Case required by Treasury to secure funding for the Rebuild Programme going ahead.

Overall it has been a challenging but productive year for the Infrastructure Rebuild Programme with numerous successes that can be attributed to the hard work of all those involved.

3. FINANCIALS

3.1 2012/13 Annual Plan – Actual year to date cost against budget

Below is a summary of the financials for the horizontal infrastructure rebuild. These have been separated into rebuild activities being carried out by SCIRT (including NZTA State Highway rebuild work) and Council infrastructure rebuild activities being undertaken through Council business as usual mechanisms.

This report includes a breakdown for the current financial year to date as per the agreed SCIRT annual target budget and the Council Annual Plan in section 3.1 and actual life to date costs against the overall infrastructure rebuild estimate (plus additional projects) in section 3.2. For the purpose of this report all indirect costs have been allocated based on portion of the programme estimate per activity.

The table below summarises the year to date and life to date of the horizontal infrastructure rebuild activities performed by SCIRT, rebuild activities performed by others and other CCC renewal projects performed by SCIRT.

This month rebuild activities performed by others includes $2.4m for repair works to park assets paid for by Christchurch Earthquake Appeal Trust. Also this month saw Pressure Main 11 and Keyes Pumping Station project costs move from “Other activities performed by SCIRT” to “Rebuild activities performed by SCIRT” to correctly reflect the nature of the repair.

Table 3.1 Summary Cost Table.

FINANCE AS AT 30 NOVEMBER 2012

Activity	Year to date 2012/2013		Life to date	
	Budget	Actual	Estimate	Actual
Rebuild activities performed by SCIRT	$ 440,000,000	$ 186,922,781	$ 1,751,095,238	459,005,670
Rebuild activities performed by others	$ 103,486,521	$ 14,747,048	$ 305,546,857	76,087,003
Other activites performed by SCIRT	$ 29,699,092	$ 9,999,786	$ 29,699,092	8,805,608
GRAND TOTAL	**$ 573,185,613**	**$ 211,669,615**	**$ 2,086,341,187**	**$ 543,898,282**

3.1.2 SCIRT actual year to date costs

The approved annual target budget for SCIRT is $440m. This includes NZTA State Highway rebuild activities of $10.9m. Table 3.2 below presents the actual costs for each activity for the year to date reported against the agreed annual target budget for SCIRT. As mentioned above, this month saw Pressure Main 11 and Keyes Pumping Station projects moved into the Rebuild works performed by SCIRT. All costs are up to the end of November 2012.

Table 3.2 Actual costs for year to date of rebuild works by SCIRT

FINANCE AS AT 30 NOVEMBER 2012

SCIRT

Activity	Description	2012/13 SCIRT Target Budget	Actual Cost YTD	Forecast Total Spend This Year	Year End Variance
Road Network	Roading	$ 105,410,459	$ 53,018,366	$ 119,661,933	-$ 14,251,474
Wastewater Collection		$ 272,979,267	$ 114,687,659	$ 266,012,598	$ 6,966,670
Water Supply	Water Supply	$ 26,872,162	$ 14,547,347	$ 26,325,687	$ 546,475
Waterways & Land Drainage	Stormwater	$ 23,824,220	$ 3,524,744	$ 23,378,282	$ 445,938
NZTA Highways		$ 10,913,892	$ 1,144,664	$ 11,121,502	-$ 207,610
TOTAL SCIRT INFRASTRUCTURE REBUILD PROGRAMME		**$ 440,000,000**	**$ 186,922,781**	**$ 446,500,001**	**-$ 6,500,001**

3.1.3 Non-SCIRT actual year to date costs

The balance of the annual plan budget for the infrastructure rebuild ($103.5m) is being delivered by Council business as usual mechanisms. Table 3.3 below presents the actual costs for the year to date of the infrastructure rebuild performed by Council for each activity against the 2012/13 Annual Plan budget. These costs are up to the end of November 2012.

Parks and Open Spaces includes the $2.4m repairs paid for by Christchurch Earthquake Appeal Trust.

Table 3.3 Actual costs for year to date of non-SCIRT rebuild works

FINANCE AS AT 30 NOVEMBER 2012

Non SCIRT

Activity	Description	Approved Budget	Actual Cost YTD	Year End Forecast	Year End Variance
Road Network	Roading	$ 31,367,190	$ 50,820	$ 8,187,821	23,179,369
Wastewater Collection		-$ 42,779,266	-$ 12,456	-$ 12,456	- 42,766,810
Parks & Open Spaces	Greenspace	$ 13,554,101	$ 3,324,883	$ 9,754,101	3,800,000
Refuse Minimisation & Disposal	Solid Waste	$ 5,105,263	$ 2,112,247	$ 5,105,263	- 0
Wastewater Treatment & Disposal	WW Treatment Plant	$ 29,020,147	$ 6,094,384	$ 29,020,146	1
Water Supply	Water Supply	$ 62,553,010	$ 1,508,080	$ 34,265,041	28,287,969
Waterways & Land Drainage	Stormwater	$ 4,666,077	$ 1,669,090	$ 6,755,465	- 2,089,388
TOTAL NON-SCIRT INFRASTRUCTURE REBUILD PROGRAMME		**$ 103,486,521**	**$ 14,747,048**	**$ 93,075,382**	**$ 10,411,140**

3.2 Overall Infrastructure Rebuild estimate - actual life to date costs against current infrastructure rebuild estimate.

The current estimate for the overall rebuild of the City's horizontal infrastructure is $2.015 billion (including contingency and excluding escalation), plus $16.4m project budget not included in the horizontal infrastructure cost estimate. In addition to the above there is an estimate of $25m for NZTA State Highways rebuild. For the purpose of this monthly progress report the current overall estimate reported against is therefore $2.057 billion.

The revised programme estimate is anticipated to be completed by the end of calendar year 2012 to help inform the long term planning process.

3.2.1 SCIRT actual life to date against estimate

Table 3.4 includes the overall life to date costs against the current estimate for the SCIRT performed rebuild of the City's infrastructure. SCIRT is performing $1.7b of Council infrastructure rebuild, plus $25m NZTA Highways rebuild.

Table 3.4 SCIRT Actual life to date costs against estimate

SCIRT

Activity	Description	Current Estimate of Cost	Actual Cost 2010/11	Actual Cost 2011/12	Actual Cost 2012/13	Total Actual Cost	Forecast Total Spend	Programme Variance
Road Network	Roading	$ 814,857,143	$ 11,812,105	$ 72,567,577	$ 53,018,366	$ 137,398,049	$ 814,857,143	$ -
Wastewater Collection		$ 714,095,238	$ 10,376,296	$ 130,232,206	$ 114,687,659	$ 255,296,161	$ 714,095,238	$ -
Water Supply	Water Supply	$ 128,142,857	$ 1,857,860	$ 35,483,416	$ 14,547,347	$ 51,888,623	$ 128,142,857	$ -
Waterways & Land Drainage	Stormwater	$ 69,000,000	$ 999,542	$ 6,558,723	$ 3,524,744	$ 11,083,009	$ 69,000,000	$ -
NZTA Highways Rebuild		$ 25,000,000		$ 2,195,164	$ 1,144,664	$ 3,339,829	$ 25,000,000	
TOTAL		**$ 1,751,095,238**	**$ 25,045,803**	**$ 247,037,086**	**$ 186,922,781**	**$ 459,005,670**	**$ 1,751,095,238**	**$ -**

3.2.2 Non-SCIRT actual life to date against estimate

Table 3.5 includes the overall life to date costs against the current estimate for infrastructure rebuild activities being delivered by Council business as usual mechanisms. This table also includes $16.4m budget from Earthquake Building/Infrastructure Shortfall Allowance for the Waste Water Treatment Plant.

Table 3.5 Non-SCIRT actual life to date costs against estimate

NON-SCIRT

Activity	Description	Current Estimate of Cost	Actual Cost 2010/11	Actual Cost 2011/12	Actual Cost 2012/13	Total Actual Cost	Forecast Total Spend	Programme Variance
Road Network	Roading	$ 77,761,905	$ 848,201	$ 692,114	$ 50,820	$ 1,591,135	$ 77,761,905	$ -
Wastewater Collection		$ -	$ 1,634,066	$ 13,757,590	-$ 12,456	$ 15,379,201	$ -	$ -
Parks & Open Spaces	Greenspace	$ 56,952,381	$ 611,310	$ 1,835,060	$ 3,324,883	$ 5,771,252	$ 56,952,381	$ -
Refuse Minimisation & Disposal	Solid Waste	$ 8,761,905	$ 2,076,017	$ 3,091,587	$ 2,112,247	$ 7,279,851	$ 8,761,905	$ -
Wastewater Treatment & Disposal	WW Treatment Plant	$ 96,356,381	$ 4,488,038	$ 13,249,043	$ 6,094,384	$ 23,831,465	$ 96,356,381	$ -
Water Supply	Water Supply	$ 24,095,238	$ 4,266,124	$ 830,545	$ 1,508,080	$ 6,604,749	$ 24,095,238	$ -
Waterways & Land Drainage	Stormwater	$ 41,619,048	$ -	$ 13,960,259	$ 1,669,090	$ 15,629,349	$ 41,619,048	$ -
TOTAL		**$ 305,546,857**	**$ 13,923,757**	**$ 47,416,198**	**$ 14,747,048**	**$ 76,087,003**	**$ 305,546,857**	**$ -**

4. COMMUNICATIONS

4.1 Strategic Communications

Positive media coverage and community feedback on the rebuild continued during November. Promotion of key progress milestones was placed in existing Council and CERA publications. The Communications Working Group is considering issues for wider messaging in the coming month and awaiting final approval of spending for proposed media campaign, which would begin in the new year.

4.2 Operational Communications (SCIRT)

4.2.1 Key Outcomes

SCIRT held a community day to explain planned work on the Avondale Bridge to residents and this was well-received. The infrastructure rebuild presence at the A&P Show in November helped hundreds of visitors learn more about the work underway and was also well-received.

During November SCIRT delivered 106 start work notices to more than 30,000 properties. SCIRT communications staff carried out 743 direct interactions with residents through door knocking, responded to 357 hotline calls and 346 resident emails. The web was updated 97 times, four e-newsletters were sent and 82 tweets were made.

4.2.2 Upcoming Priorities

Communication of retaining wall ownership to affected residents is a key focus for SCIRT and the Council over the coming months as ownership is determined.

4.3 Summary of Media Coverage

Media coverage was once again positive for the month of November. More than 50 items were aired on local and national media. The launch of the For Real recruitment campaign received significant attention.

5. ENVIRONMENT

5.1 Key Outcomes

- Environmental initiatives are increasing, will 11 initiatives identified and shared between teams this month.
- A global contaminated land consent has been granted for the programme.
- ECan confirmed a non-enforcement decision for the Beachville sea wall reconstruction, i.e. no resource consent requirement. This is another example of ECan's continued pragmatic approach to SCIRT's programme of work.
- High profile consent applications have been lodged for:
    - Main Road (to Sumner) causeway sea wall; and
    - Triumphal Arch on the Bridge of Remembrance

5.2 Upcoming Priorities

- The development of a SCIRT environmental training programme in conjunction with Environment Canterbury.
- Develop an information sharing platform to assist with viewing of consent compliance information between Delivery Teams, the IST and regulators.

5.3 Environmental Statistics

Description	October 2012	November 2012	October Life To Date	November Life To Date
Environmental Hazards	96	98	775	873
Environmental Opportunities	127	188	299	487
Environmental Team Initiatives	6	9	59	68
Community Organised Events	3	3	21	24
Number of Environmental Incidents	24	53	244	297
Infringement Notices	0	0	0	0
Abatement Notices	0	0	0	0
% of waste reduced, re-used, recycled	24	25	91	116

Data from SCIRT Operational Report – December 2012

6. PROGRAMME

6.1 SCIRT Work Activity

6.1.1 Achievement Report

The progress report for this month includes an achievement report which outlines progress made by the construction projects against key metrics for each asset type.

Asset Type	Asset Sub-Type	Unit	October	November	Life To Date
Storm Water Reticulation	Drainage	m	764	969	5,833
Storm Water Pump Stations	Pump Station	%	0	50	50
Transport - Roading	Bridge Repairs	%	56	5	76
	Kerb & Channel	m	1,631	1,612	9,617
	Pavement	m2	13,939	15,190	126,348
	Footpath	m2	2,221	1,304	11,670
	Retaining Walls	m2	152	296	1,028
Waste Water Reticulation	Reticulation	m	13,430	13,761	90,864
Waste Water Pump Stations	Pump Station	%	311	361	1863
Water Supply Pump & Reservoir	Pump Station	%	94	48	596
	Reservoir	%	0	0	283
Water Supply Reticulation	Reticulation	m	657	162	19,482
	House connections	#	0	8	167

6.1.2 Number of Ongoing SCIRT Projects

The following table is a summary of the programme pipeline as at November 31st 2012. It shows how many projects and the total value at each stage of the project lifecycle.

Project Lifecycle Stage	October Estimate	November Estimate	October Estimated Construction Cost	November Estimated Construction Cost
Investigation (Asset Assessment)	31	11	$43.5m	$1.1m
Concept Design	115	126	$636.1m	$700.8
Detailed Design	63	104	$430.4m	$577.2
Construction	131	95	$401.4m	$265.5
Handover	223	231	$91.2m	$102.6
Grand Total	**563**	**567**	**$1,602.6M**	**$1,647.2**

In the table above, the previous monthly report totals have also been included to show the change in activity.

6.1.3 Ongoing Projects by Ward

6.1.3.1 Introduction

The progress report this month includes a summary of all SCIRT projects that are currently either in detailed design or construction separated on a Ward basis. A separate table has been included specifically for projects either in detailed design or construction within the central city (within the four avenues). This has been created to assist in the coordination with the Central City Recovery Plan and vertical infrastructure rebuild going forward.

For projects in construction – estimated construction cost (Target Outturn Cost) has been included together with actual Life to Date Costs as at the end of November 2012.

6.1.3.2 Burwood / Pegasus

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10415	PS 128 (formerly PS 63)	New replacement PS63 at Beach Road. This project is linked to 10926 for the approximately 4km long 700mm pressure main.
10620	Pages Rd Bridge	Repair to Pages Rd Bridge, including road network connecting to roundabout on North end of bridge.
10796	NZTA Anzac Bridge Repairs	Ground improvements, removal of landward bridge spans, demolish and rebuild abutments, repair piers, approaches and underpasses.
10809	PS28 Catchment RD SW and WS Repairs	Design for repair (some full reconstruction) of minor to severe earthquake damage to carriageways, kerbs and channels, and footpaths with some associated stormwater and water supply works in streets situated in the area from Woodham Rd/Pages Rd north to Wainoni Rd/Breezes Rd. This work will follow construction of wastewater repairs/replacement.
10840	PS37 Catchment RD SW WS	Linked to Project 10318 WW for the RD WS and SW elements.
10900	New Brighton NE6&NE7 Catchment Rebuild (WW)	Full, one pass rebuild of the New Brighton Catchment Area (Waste Water Element).
10932	PM136 New Pressure Main for PS36 (WW)	Construction of an additional Pressure Main from Pump Station 36 to provide resilience in the system. The existing asset will remain as PM 36 and the new pressure main will be known as PM 136.
10959	Aranui Catchment NE4 Vacuum Pump Station, Pages Road (WW)	Construction of a vacuum pump station to service the Aranui catchment including an above ground, architecturally designed pump station building, biological filter bed, shared generator building with PS36 and an access road. This pump station is located at the same site as PS36 and has some shared facilities.
10960	Aranui Catchment NE4 Vacuum Arm 1: Rowses Road Subcatchment (WW)	Construction of vacuum sewerage pipes, pits, and laterals (in road reserve only) and connecting up to the new vacuum pump station in Bexley Reserve.
10961	Aranui Catchment NE4 Vacuum Arm 2: Pages Rd West Subcatchment (WW)	Construction of vacuum sewerage pipes, pits, and laterals (in road reserve only) and connecting up to the new vacuum pump station in Bexley Reserve.

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10962	Aranui Catchment NE4 Vacuum Arm 3: Shortland Street Subcatchment (WW)	Construction of vacuum sewerage pipes, pits, and laterals (in road reserve only) and connecting up to the new vacuum pump station in Bexley Reserve.
10963	Aranui Catchment NE4 Vacuum Arm 4: Marlow Road Subcatchment (WW)	Construction of vacuum sewerage pipes, pits, and laterals (in road reserve only) and connecting up to the new vacuum pump station in Bexley Reserve.
10964	Aranui Catchment NE4 Vacuum Arm 5: Portchester Street Subcatchment (WW)	Construction of vacuum sewerage pipes, pits, and laterals (in road reserve only) and connecting up to the new vacuum pump station in Bexley Reserve.
10975	NE12 - North New Brighton Wastewater Catchment Repairs (WW)	Repair of the Wastewater network within the North New Brighton area.
10976	NE13 - Beach Road & Bower Ave Wastewater Catchment Repairs (WW)	Wastewater replacement in the Beach and Bower Ave Catchment within Parklands East.
10977	NE13 - Parklands East Wastewater Catchment Repairs (WW)	Replacement of the Wastewater system in the Parklands East area.
10978	NE13 - Parklands West Wastewater Catchment Repairs (WW)	Wastewater repairs to the Parklands West catchment area.
11020	Keyes Road Catchment - New Brighton and Frosts Road - Roading Stormwater and Water Supply (WS,SW,RD)	Repair of Earthwork damage to Stormwater, Roading and Water Supply for the Areas including Frosts Road, Travis Drive, Bower Avenue, Palmers Road and Baker Street. Stormwater issues may be affected by the adjacent New Brighton Road Project.
11035	North New Brighton and North Shore (RD, WS,SW)	Repairs to roading, stormwater and water supply assets.
11045	South New Brighton - Gravity Repairs (WW)	South New Brighton gravity repairs. This has been split out of the original projects 10861 and 10318 scopes.
11040	PS 56 - Burwood North Wastewater (WW)	Wastewater Repair/Renewal within the Burwood North Area.
11041	Burwood East Wastewater (WW)	Replacement of the Wastewater System in the Burwood East Area.
11042	Burwood West Wastewater & Trunk Sewers (WW)	Replacement of Wastewater system within the Burwood West Area.

DETAILED DESIGN		
Reference	**Project**	**Project Description**
11043	Burwood Pressure Main 54 (WW)	Replacement of Pressure Main 54 within the Burwood Area.
11032	Parklands East (RD, SW, WS)	Repairs to roading, stormwater and water supply assets.
11033	Parklands West (RD, SW, WS)	Repairs to roading, stormwater and water supply assets.
11034	Parklands South (RD, WS, SW)	Repairs to roading, stormwater and water supply assets.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10314	Keyes Road Catchment (WW, WS)	Repair and/or reinstatement of wastewater system.	05/03/12	14/01/13	$5,465,563	$8,036,933
10318	PS37 North Catchment (WW)	Wastewater repairs and renewal for northern half of PS37 catchment. Includes one new pump station and approximately 100 pressure sewer pumps.	27/04/12	02/05/13	$4,361,942	$4,150,382
10363	PS 108 Catchment (old PS39 Catchment)	A large waste water catchment of approx 12 streets which all drain to Pump Station 54 in Avondale.	11/11/11	09/11/12	$5,306,865	$5,175,942
10416	PS37 (PS)	Repairs to existing PS37, including new pump intakes and repairs to yards.	24/01/13	05/06/13	$247,891	$716,412
10429	Estuary Rd Carriageway, PS37 to Bridge Street Catchment (WS,SW,RD)	Repairs to roads, stormwater and water in Estuary Road between Bridge Street and Beatty Street.	28/09/12	28/02/13	$1,351,722	$881,694
10430	PS28 - Catchment	PS 28 catchment services residential and industrial land loosely bounded by Pages Rd, Cuffs Rd, Wainoni Rd and Shortland St in the suburb of Wainoni. Other pockets of land are also serviced including 650 m of Wainoni Rd north of Shortland St and 240 m of Breezes Rd, an area west of Wainoni Rd including a	24/07/12	18/12/13	$15,841,952	$2,148,347

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
		portion of Avonside Dr, Newport St, Tenby Pl and Emlyn Pl, 350 m of Wainoni Rd south of Cuffs Rd and an area south of Pages Rd including Price Pl, 180 m of Kearneys Rd and Mecca Pl. The seismic events caused liquefaction and land settlement throughout the catchment. The pump station is still operational and in a serviceable state. The majority of the network suffered either loss of grade, cracks and breakages or a combination of the two. Therefore a significant proportion, if not all, of the network will need to be replaced.				
10557	Gayhurst Road Roading (RD)	Design for road reconstruction to repair moderate to severe earthquake damage to carriageway, kerb and channel, and footpaths from Dallington Bridge northwards to Mundys Road. This project will become part of PS108 Catchment Phase 1 Roading, Storm Water and Water Supply. This work follows wastewater repairs/replacement.	16/07/12	07/02/13	$2,869,439	$1,473,358
10705	Owles Tce (WW)	Project released from hold March 2012.	06/11/12	19/06/13	$7,359,572	$976,593
10765	PS 108 New Pump Station	Minor new pump station.	15/10/12	25/02/13	$1,056,159	$456,848
10769	Keyes Pumping Station (WS)	CCC capital works programme rebuilding project for the Keyes Water Pumping Station. Initial design was carried out by CPG, and URS are also involved with the geotechnical investigation and report.	25/06/12	23/11/12	$2,915,195	$2,845,815
10786	PS 108 Catchment Stormwater, Water Supply and Roading Renewals (SW,WS,RD)	Design for repair (some full reconstruction) of minor to severe earthquake damage to carriageways, kerbs and channels, and footpaths with associated storm water and water supply works in 11 streets situated immediately to the east and west of Gayhurst Rd from	03/10/12	22/04/13	$1,915,623	$657,922

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
		McBratneys Rd northwards to Mundys Rd. This work will follow construction of wastewater repairs/replacement.				
10800	PS 108 Phase 2 Waste Water	Detailed Design of remediation works for wastewater catchment 108.	14/08/12	24/04/13	$4,541,913	$2,580,818
10801	PS108 Phase 2 Roading and Storm Water Renewals (RD,SW,WS)	Design for repair (some full reconstruction) of minor to severe earthquake damage to carriageways, kerbs and channels, and footpaths with associated storm water and water supply works in 10 streets situated immediately to the east and west of Gayhurst Rd - generally south of Strathfield Ave in the west and McBratneys Rd in the east. This work will follow construction of wastewater repairs/replacement.	15/02/13	06/06/13	$2,693,015	$348,377
10802	PS54 Stage 1 - Northern Roading Renewals incl Breezes Road	Road design for 8 roads in Avondale. New pipe sytems are needed in multiple roads requiring asset managers understanding and buy-in. Includes stormwater full dynamic modelling with probable need to restore capacity by optioneering new components (new basin and/or pump upgrading).	10/09/12	03/10/13	$3,782,598	$1,122,396
10803	PS54 Stage 1 Southern Roading Renewals (South of Breezes Road)	Road design for Pembroke St and Horton Place in Avondale. A new pipe sytem is needed on Horton St requiring asset managers understanding and buy-in.	02/07/12	15/03/13	$900,394	$1,038,395
10846	Water Main Replacement Projects Vivian St, Admirals Way, Pine Ave (WS)	Water Main replacement projects for: Vivian St, Admirals Way, Pine Ave. Other streets have been moved to other projects: Port Hills Rd and Flavell St to 10681. Keyes Road to 10314. All others removed.	25/05/12	26/11/12	$883,245	$845,303
10896	Minor Works - Demolition of Porrit Park and Snells	Demolition and make safe work for Porrit Park Footbridge, Snells Footbridge, PS26 and PS27. Rebuild of the bridges to be undertaken in separate	23/10/12	27/11/12	$223,083	$83,028

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	Footbridges, PS26 and PS27 Pump Stations	standard projects.				
10898	Minor Works - Medway Footbridge Removal	Removal and make safe of the footbridge. Store off site until a decision is made regarding the structure.	01/11/12	14/11/12	$82,348	$14,027

6.1.3.3 Fendalton / Waimairi

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10994	North West Trunk Sewers (WW)	Rehabilitation of North West Trunk Sewers.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10425	Glandovey/Bryndwr Cluster	Design for repair to severe earthquake damage to wastewater and minor damage to carriageways, kerbs and channels, and footpaths (severity yet to be confirmed) storm water and water supply. This cluster incorporates the 9 streets immediately adjacent to and including Glandovey Road between the Wairarapa Stream and Strowan Road.	12/11/12	19/06/13	$2,855,572	$405,840
10485	Merivale WW	Approximately 9km of WW gravity system, one new pump station.	14/05/12	26/04/13	$14,270,192	$7,815,260
10575	Papanui Rd - Knowles to May (WW)	The area has been broken into wastewater sub-catchments in order to determine the best catchment wide solution. 10575 therefore includes Browns Rd north of Mansfield Ave, McDougal Ave east of Murray Pl, Murray Pl, Innes Rd between Papanui Rd and Browns Rd, Heaton St east of Circuit St, Papanui Rd between Innes Rd and Mays Rd, approximately 230 m of the eastern end of Knowles St, Weston Rd and Chapter St, Approximately 280 m of the western end of Normans Rd and 150 m of the eastern end of Mays Rd. The seismic events caused some liquefaction and land settlement in parts of the sub- catchment. Much of the network is made up of Earthenware pipe laid during the 1920s and 1930s. Much of the network suffered either loss of grade, cracks and breakages or a combination of the two. Therefore a significant	17/05/12	05/06/13	$4,795,898	$3,875,629

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
		proportion, if not all, of the network will need to be repaired or replaced.				
10595	Wairakei Road (WW)	Replacement of the deep 225 mm sewer main and the construction of new 150 mm sewer rider mains over the deep main. The wastewater works are from Aorangi Street to Idris Road.	02/08/12	05/06/13	$1,004,981	$334,506
10852	Minor Works - Casebrook Block	Minor footpath, K&C and pavement repairs	31/05/12	15/03/13	$226,107	$89,604
10857	Minor Works - Bridge Minor Works Project Package 02	Minor repair works to 55 bridges that suffered low levels of damage during the EQ events. Delivery team led with input from SCIRT Design teams where required.	01/08/12	09/11/12	$29,231	$157,512
10884	Merivale Pumping Station (PS)	New Pumping station for the Merivale Catchment Project. Linked to Project #10485	21/01/13	16/05/13	$895,481	$138,818

6.1.3.4 Central City

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10464	F106 Antigua Street Footbridge	Replacement of existing structure, or incorporate historical elements into major repair works.
10467	R114 Colombo St (North) Bridge	Major structural repair works Northern Colombo St, over the Avon, heritage bridge near intersection of Oxford Tce & Colombo St.
10468	R115 Armagh St Bridge	Major structural repair works.
10934	Wairakei Diversion - Local Reticulation & Roading repairs (WW,SW,WS,RD)	Repair of any other damaged infrastructure along the route of the new Wairakei Diversion.
10986	Central City Kilmore Street Catchment Area (WW)	Repair/replacement of wastewater system in the north west of the CBD. Excludes WW Brick barrel which is considered under Project 10845.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10401	Moorhouse Brick Barrel 01 (SW)	Repair of a failed stormwater Brick Barrel pipe on Moorehouse Ave under the Colombo St over bridge.	14/01/13	11/03/13	$486,192	$102,556
10445	Fitzgerald Ave Wall and Roading	The works include the replacement of a failed retaining wall and carriageway. Ground stabilization is also being installed with stone columns 12 meters deep.	15/06/11	30/01/13	$3,130,000	$4,819,212
10845	Central City - Brick Barrel Assessment, Relining and Repairs	Full assessment, relining and repair works for the Brick Barrel Trunk network within the CBD Catchment. Includes all WW and SW Brick Barrels. A separate Project has been created for the Kilmore St Brick Barrel and concept / detailed design should be undertaken in conjunction with this work.	21/05/12	24/04/13	$18,687,281	$11,281,772
10893	Minor Works- Bridge Minor Works Project Package	Minor repairs to bridges requiring little design input. Project to be led by SCIRT Project Manager and Delivery teams.	23/07/12	13/12/12	$221,900	$128,117

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	01 Bridging					

6.1.3.5 Hagley / Ferrymead (*excludes central city)

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10347	Gayhurst Rd Bridge Works EW (RD)	Retrofit repair to bridge involving new abutments, piles, wingwalls and associated road approaches and services.
10462	Site 228 Rangatira Tce Retaining Wall (RW)	
10655	CCC - Main Road 3 Laning Sea Wall - Capital Works Project (RD)	
10795	PS57 McCormacks Bay Rd Pump Station Repairs (PS)	Repairs to building at existing pump station.
10823	St Johns (SW,WS,RD)	Catchment study for a full one pass rebuild of remaining services within the catchment area. Refer to Project 10449 for WW assets in this area.
10824	Beachville Catchment Area including Beachville Road & Celia Street (WW,WS,SW,RD)	Full one pass rebuild of the catchment area. Project Includes PS30, WW, SW, RD and Sea Wall assets. Projects already existing in this area which this catchment study will relate to are: 10600 - PS30, 10619 - Beachville Road Eastern Seawall, 10677 - Beachville Watermain WS.
10832	PS15 - Alport Place Pump Station Replacement (PS)	Construct a new Pump Station, tie in works, odour control system and demolition of existing PS15.
10868	PS 18 Rebuild SE11 North (WS,SW,RD)	Full area rebuild of the northern area of the PS18 catchment - RD,SW & WS elements. Linked to 10860. Construction projecta in the region of $10M expected from this concept report.
10897	Woolston Ferrymead PS15 Central (WW)	Repair and rebuild of wastewater reticulation and trunk main assets. This includes for approximately 130 residential properties to be replaced with a pressure wastewater system in St Lukes. PS15 Pump Station rebuild under Project #10832 (Yellow Team).
10907	Site 226 Soleares Ave	Stabilisation of rock face and re instatement of the access road damaged in Feb 2011 earthquake.
10908	CCC - The Causeway, Main Road Sumner, Culvert Replacement (SW)	Renewal of the culvert structure, linked to the Causeway project #10634. CCC BAU Project.
10916	Bromley & Woolston PS15 North (WW)	Repair and rebuild of wastewater reticulation and trunk main assets.
10927	Retaining Wall - 1 to 3 Maffeys Road (RW)	Repair of the retaining wall at 1-3 Maffeys Road. Linked to 10307.
10979	CCC - Main Road 3 Laning - Capital Project (RD)	CCC Capital project for the 3 laning of Main Road. To be completed in conjunction with the SCIRT earthquake repair job of 10634, and the culvert replacement CCC project 10908.

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10980	NZTA - Dyers Road Repairs (Metro Pl to Bridge St) (RD)	Repairs to the State Highway between Metro Place and Bridge Street (through the treatment ponds area).
10995	Avonside Linwood Stage 1 (WW,SW,WS,RD)	One pass approach renewing wastewater, roading and stormwater assets within stage one of the Avonside Linwood Catchment. Standard project resulting from Catchment Studies 10875 and 10876.
10996	Avonside Linwood Stage 2 (WW,SW,RD)	One pass approach renewing wastewater, roading and stormwater assets within stage two of the Avonside Linwood Catchment. Standard project resulting from Catchment Studies 10875 and 10876.
10997	Avonside Linwood Stage 3 (WW,WS,SW,RD)	One pass approach renewing wastewater, roading and stormwater assets within stage three of the Avonside Linwood Catchment. Standard project resulting from Catchment Studies 10875 and 10876.
11027	Main Road Causeway Stage 2 - Seawall Renewal (RW)	Renewal of seawall along causeway.
11048	Woolston SE-13 (WW)	Repair and rebuild of wastewater reticulation and trunk main assets.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10303	Site 229 Mt Pleasant Rd Retaining Wall (RW)	60m replacement retaining wall and road reinstatement, in Mt Pleasant.	04/02/13	28/05/13	$458,381	$73,071
10306	PM11 Randolph (WW)	3.6km, 1.2m dia WW pressure main.	05/03/12	14/05/13	$13,086,719	$11,601,740
10307	173 Maffeys Road Retaining Wall (RW)	Repair of retaining wall in Maffeys Rd, along with associated buried services.	08/10/12	15/02/13	$1,505,280	$865,568
10317	Heberden Ave Permanent Solution (WW)	New gravity sewer diversion to replace broken sewer down Scarborough Cliffs.	09/11/12	18/12/12	$256,733	$481,117
10356	Woodham Rd (PS5	The project scope requires replacement of 960m of	14/11/11	19/11/12	$3,095,185	$3,145,016

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	east of river)	damaged waste water from Linwood Ave to Ngarimu St. Road refurbishment will follow sewer works. Traffic diversion are required for this work to be completed safely.				
10403	Barbour St Water (WS)	Replacement of water mains in two streets to the south and east of AMI Stadium, Waltham.	08/10/12	10/12/12	$174,742	$132,052
10459	Lower Richmond-Stanmore to Fitzgerald (WW)	Approximately 5km of WW, gravity system; requiring 2 new pump stations.	20/03/12	23/04/13	$11,833,107	$8,665,626
10472	Charleston	Approx 2.9km WW enhanced gravity system, 1 new pump station; 0.3km SW; 8600m2 carriageway reconstruction, and 1830m2 localised repairs.	07/05/12	21/12/12	$3,737,683	$3,182,939
10483	Lower Richmond (Southern Section) WS,SW,RD	Full reconstruction of intersection (80m), and localised repairs on remaining streets; 86m of SW replacement.	07/01/13	02/04/13	$316,261	$116,238
10541	PS 11 - Randolf		11/06/12	22/03/13	$475,000	$753,107
10548	Gloucester Street	Design for Wastewater, Stormwater, Water & Roading along Gloucester Street between Woodham Road and Avonside Drive. Close to complete replacement of all WW and Roading assets. Stormwater is reasonably intact.	26/06/12	16/11/12	$1,083,590	$1,323,401
10578	PS 107	Minor new pump station.	29/10/12	04/03/13	$563,749	$266,821
10579	PS5 - Catchment (West of river)	Pump Station 5 catchment originally serviced an area either side of the Avon River at the northern end of Linwood Avenue and south eastern edge of lower Richmond. Pump Station 5 was badly affected in the series of earthquakes. A proposal to split the PS5	15/10/12	29/05/13	$2,422,349	$358,964

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
		catchment either side of the river to enable removal of pump station from close proximity of the river has received informal agreement among CCC Asset and technical representatives. This project relates to the reinstatement of sewer services to the portion of the original PS5 catchment to the west of the Avon River. Initial assessment of condition suggests that the entire sewer network requires replacement, due to gross and differential land settlement and consequential adverse impact on sewer grades, in addition to physical damage to the predominantly earthernware piping. Reinstatement options will consider the range of options allowed under the technical standards and will likely require a new pump station or siphon crossing beneath the Avon river.				
10582	PS8 - Catchment	Design for repair to severe earthquake damage to wastewaster within Pump Station 8 catchment green zone. The green zone is located to the north-west of the Avon River and generally bounded by Flesher Ave to the east and south, Chrystal St to the west and Medway St to the north.	19/11/12	26/07/13	$2,974,474	$82,484
10634	Main Road (Mt Pleasant - Beachville) Sumner Causeway (RD)	Repairs to main road causeway including replacement of estuary seawall and minor cross culverts and carriageway repairs.	11/01/13	26/09/13	$1,189,803	$212,671
10680	Clifton No. 4 Reservoir	Repair and retrofit of reservoir.	21/03/12	11/12/12	$437,673	$348,045
10799	NZTA Horotane Overpass Bridges (RD)	Propping system between piers, subject to ground investigation results.	07/12/12	13/06/13	$1,614,301	$130,920
10820	McCormacks Bay	Tank 1 and 2 and access reinstatement.	01/06/12	29/08/13	$1,106,431	$928,988

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	Reservoir Stages 3,4 and 5					
10822	McCormacks Bay Reservoir Stage 2 Walls	Retaining walls and rock fall protection works at reservoir site.	30/01/12	17/09/13	$1,549,159	$1,166,362
10841	Charleston Catchment Area (RD,SW,WS)	Linked to Project 10472 WW for the RD SW and WS elements.	26/10/12	24/06/13	$1,399,044	$157,303
10843	Lower Richmond Catchment RD SW WS	Linked to #10459 for the RD SW and WS elements of the project.	21/01/13	02/09/13	$1,573,629	$168,040
10853	McCormacks Bay Reservoirs - Rock Face Protection Work	Rock protection work to facilitate the repairs to the reservoir tanks.	07/05/12	21/12/12	$1,231,910	$1,165,334
10862	Lower Richmond Pump Stations - Avalon and Haywood	Pump station construction in conjunction with the Richmond project.	16/07/12	21/01/13	$1,322,356	$600,661
10863	Charleston Waste Water Pump Station	Pumps Station Construction.	10/12/12	12/04/13	$503,092	$78,136
10864	Woodham Road (SW,RD,WS)	Storm water and water supply elements linked to project 10356 WW & RD.	29/03/12	09/11/12	$441,840	$517,209
10895	PM11 Randolph Phase 5 (WW)	All remaining design works for the design and delivery of the 3.6km, 1.2m waste water pressure main. This is a CCC business as usual project and is the fifth phase. Phases one to four are included under project number 10306.	01/02/13	26/04/13	$905,557	$222,233
11022	Emergency Repair - Southern Relief Sewer - Worcester	Emergency Repair for the 1525mm Dia Trunk Sewer. Currently reported by Operational Team as high risk of imminent failure. Depressions forming at road level	31/05/13	31/07/13	$500,000	$80,579

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	Street (WW)	around manhole. Falls within existing Project Area #10995.				

6.1.3.6 Lyttelton / Mt Herbert

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10981	Retaining Wall Area 1 - Lyttelton 1A Brittan Terrace (RW)	Design and construction of multiple soil retaining walls from Lyttelton town centre west towards Diamond Harbour Blvd.
11005	Retaining Wall Area 1 - Simeon Quay Emergency Work (RW)	Stabilise face or provide new retaining wall at Simeon Key, Lyttelton.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10394	RW Package 05 - Canterbury Stone Walls (RW)	Project to design three replacement retaining walls on Canterbury Street and one wall on Ripon Street, Lyttelton. The walls are up to 4.5m high and are of high heritage value.	21/05/12	30/11/12	$1,482,372	$1,632,869
10475	Site 079 Coleridge/Dublin St Ret. Walls	200m replacement retaining wall and road reinstatement in Lyttelton.	01/02/13	13/11/13	$1,607,135	$115,175
10905	Sumner Rd Retaining Wall L - Stage 2 Wall and Stage 1 and 2 Roads (RW, RD)	Stage two of new 450m long modular block retaining wall.	25/10/12	04/06/13	$2,054,487	$43,447
10400	RW Package 08 - Lyttelton on-stone (RW)	Design five replacement retaining walls on London Street, Canterbury Street, Hawkhurst Road and Ticehurst Road. Sections of these walls are of high heritage value.	12/06/12	14/02/13	$589,801	$890,509
10424	Sumner Rd Retaining Wall L (RW)	Stage one of new 450m long modular block retaining wall.	25/11/11	11/02/13	$1,658,595	$1,716,849
10427	035 Cunningham	Repair of retaining wall in Cunningham Tce, along with	04/05/12	28/03/13	$1,785,393	$1,293,354

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	Tce Retaining Wall (RW)	associated buried services.				
10511	RW Package 06 - Selwyn and Ross	Five retaining walls on Selwyn Street and Ross Terrace, Lyttelton. The walls range in height from 1.5m to 3m, and are of high heritage value.	24/01/13	28/03/13	$188,044	$116,680
10818	NZTA Norwich & Gladstone Quay State Highway Repair (RD, WW, SW, WS)	Repairs to state highway adjacent to the Port of Lyttelton.	14/01/13	31/05/13	$1,101,973	$123,188

6.1.3.7 Riccarton / Wigram

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10831	CCC - PS60 (PS)	Upgrade of pump station 60 and pressure main 60 to ensure increased flows can be managed in the short term.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10409	Halswell WW Package 03	Repair wastewater along a section of Halswell Rd, O"Halloran Dr, & within private properties behind Muir Ave.	09/07/12	30/01/13	$1,516,362	$1,724,521
10768	CCC - Wilmers Road Water Pumping Station (WS, PS)	New water source and pumping station to cater for projected growth in the western area of Christchurch.	30/04/12	25/03/13	$4,524,196	$2,751,830
10909	Minor Works - Port Hills Package 01	Minor road repairs within the Port Hills.	03/07/12	09/11/12	$178,770	$209,042
10912	Sparks Road Pavement Repairs	Minor roading repairs to Sparks Road.	13/09/12	16/11/12	$115,749	$226,425

6.1.3.8 Shirley / Papanui

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10858	Minor Works - Pump Station Demolition and Repairs (WW)	Minor repair works to slightly damaged Pump Stations that require no major works during the rebuild programme. Demolition of 3 PS buildings to make safe in Red Zones. Project led by the delivery team with a SCIRT Design input and coordination. Close liaison with CCC Operations team (Graeme Black) required throughout the project.
10883	Emergency Repair - Northern Relief Sewer Hills & Dudley	Emergency repair to the Northern Relief Sewer.
11051	Shirley NW-2 Pressure and Vacuum Sewer (WW)	Design and construction of two pressure sewer sub catchments and one vacuum sub catchment. Concept design and Gravity elements included within project 10914.
10943	PS 124 Replacement Pump Station for PS5 (PS)	Pump Station 5 catchment originally serviced an area either side of the Avon River at the northern end of Linwood Avenue and south eastern edge of lower Richmond. Pump Station 5 was badly affected in the series of earthquakes. The wastewater portion of this area is covered by project 10579. This project is for the required replacement pump station works only.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10344	Edgeware Road - Emergency Works	A large complex repair to a sewer trunk main in Edgeware Rd.	22/09/11	09/11/12	$1,734,794	$2,479,061
10457	Purchas & Madras (Bealey - Edgeware)	WW, SW and roading repairs. Includes traffic calming on Purchas St to conform with IDS and City Plan requirements for Local Road widths.	08/11/11	30/01/13	$3,974,790	$4,774,880
10534	Innes & Knowles - subcatchment	The local wastewater reticulation on Innes Rd and Knowles St between Philpotts Rd and Bretts Rd suffered earthquake induced damage during the recent seismic events. Some liquefaction and land settlement was recorded in the area. Investigations continue however much of the network is made up of	10/08/12	03/07/13	$9,217,618	$1,805,237

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
		Earthenware pipe laid during the 1920s and 1930s. This material has not performed well in other areas therefore it is anticipated some form of repair or replacement will be required for the majority of the network.				
10535	Rutland Rd – sub catchment	Wastewater repair along a single street east of Papanui. This project area is lightly to be revised.	20/04/12	21/02/13	$1,561,775	$1,434,527
10810	PS7 Catchment Phase 1 Waste Water Renewal	Wastewater network remediation in the Pump Station 7 catchment which is situated in Shirley, centred upon Stapleton's Road and Shirley Road which bisect the catchment. (Area 1 of 4, south of catchment).	28/05/12	05/04/13	$4,631,305	$3,015,379
10812	PS7 Catchment Phase 2 Waste Water Renewal	Wastewater network remediation in the Pump Station 7 catchment which is situated in Shirley, centred upon Stapletons Road and Shirley Road which bisect the catchment. (Area 2 of 4, eastern quarter of catchment).	30/05/12	24/07/13	$5,460,231	$3,443,874
10814	PS7 Catchment Phase 3 Waste Water Renewal	Wastewater network remediation in the Pump Station 7 catchment which is situated in Shirley, centred upon Stapletons Road and Shirley Road which bisect the catchment. (Area 3 of 4, north western quarter of catchment).	23/07/12	15/08/13	$6,154,487	$2,101,935
10816	PS7 Catchment Phase 4 Waste Water Renewals	Wastewater network remediation in the Pump Station 7 catchment which is situated in Shirley, centred upon Stapletons Road and Shirley Road which bisect the catchment. (Area 4 of 4, central/western quarter of catchment).	28/09/12	06/12/13	$3,188,229	$186,384
10886	Innes & Knowles Pump Station 118 and 119 (PS)	New pump station for the waste water reticulation system in the region of Innes Rd and Knowles St. This projects covers the pump station only, with the waste water system being undertaken under the SCIRT project number 10534.	26/11/12	01/05/13	$801,569	$169,449
10899	Minor Works - Lower Styx Road &	Pavement repairs.	08/10/12	26/11/12	$150,763	$76,468

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	Turners Road					
10930	PS7 Phase 3 Pump Station Shirley Road (PS)	New wastewater Pump Station in the PS7 catchment which is situated in Shirley, centred upon Stapletons Road and Shirley Road which bisect the catchment (area 3 of 4, north western quarter of catchment).	31/07/12	25/01/13	$985,228	$410,093

6.1.3.9 Spreydon / Heathcote

DETAILED DESIGN		
Reference	**Project**	**Project Description**
10872	Opawa, Hillsborough Catchment SE11 (South) (RD,WS,SW)	Full one pass rebuild of the catchment area - RD, WS & SW elements.
10879	Durham Street Over bridge Repairs	Repairs to the Over bridge.
10888	Hillmorton & Hoonhay S-7 (WW)	Full one pass rebuild of this catchment area - Waste Water Element.
10889	Hillmorton & Hoonhay S-7 (WS,SW & RD)	
10892	Antigua Burke Stormwater (SW)	Repair of storm water assets along Antigua St (between Moorehouse & Brougham) and Burke St (between Selwyn & Montreal). Related to project 10311 which has completed Detailed Design.
10913	Retaining Wall - Site 349 Major Aitken Road (RW,WW,SW,WS,RD)	Repair of the gabion basket retaining wall, WW,SW,WS and RD.
10922	Rossmore Terrace Retaining Walls (RW, WW,SW,WS,RD)	Repair of 5 retaining structures on Rossmore Terrace including associated infrastructure adjacent to the wall.

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
10311	Antigua St / Burke St Arterial Roads (WW,WS,SW,RD)	Repair of road and all buried services along Antigua St (between Moorehouse & Brougham) and Burke St (between Selwyn & Montreal).	18/04/12	11/06/13	$3,151,988	$2,105,852
10379	Fisher Ave & Eastern Tce Syphon (WW)	Repair of Syphon near Fisher Ave.	04/05/12	31/01/13	$455,870	$1,165,185
10385	Bewdley Evesham and Dellow	Repair of road and all buried services along Bewdley St, Eversham Cres & Dellow Pl.	20/04/12	21/12/12	$1,552,670	$2,077,067
10398	Somerfield Package 01 (WW,SW,RD,WS)	Repair and reconstruction of all assets within a small catchment block.	19/11/12	21/08/13	$4,130,180	$367,311
10407	St Martins Package	Repair of road and all buried services within the St	20/08/12	16/12/13	$8,385,354	$2,927,165

CONSTRUCTION						
Reference	**Project**	**Project Description**	**Estimated Start**	**Estimated Finish**	**Estimated Cost**	**Life To Date**
	02 (WW,WS,SW,RD)	Martins loop, north of Centaurus Rd.				
10520	Hoon Hay Package 01	Repair of road and all buried services along a section of Hoon Hay Rd (between Halswell & Sparks), including Penny ln, Weir Pl, McBeath Ave, Muirson Ave & Greenpark St.	23/07/12	18/07/13	$6,767,934	$2,591,661
10785	Holliss Ave / Glamis Place - All Services (WW,WS,SW,RD)	Repair of water & roading along a section of Holliss Ave (between Gunns & Centaurus) and all services within Glamis Pl.	08/10/12	21/12/12	$287,051	$158,169
10797	NZTA Heathcote/Opawa Bridge Repairs	Ground improvements, and underpinning and lifting (jacking) of the abutments.	19/11/12	30/09/13	$2,291,591	$333,613
10821	Huntsbury Reservoir Tank No 2 & demolition	New reservoir tank (no.2) constructed in NE corner of old reservoir.	02/02/12	21/12/12	$3,458,765	$4,492,450
10829	CCC - Victoria Reservoir Replacement (WS)	Victoria reservoir is being replaced by SCIRT and funded by CCC.	13/08/12	25/01/13	$968,840	$1,216,281

6.1.4 Projects Complete by Ward

The following section outlines the projects within each ward that have been completed since SCIRT was established on 1st September 2011. It includes both a summary of numbers of projects as well as a list of specific projects. It is anticipated that the completed projects for the last quarter will be reported on a monthly basis.

Ward	October Number of Projects	November Number of Projects	October Projects Life To Date Cost	November Projects Life To Date Cost
Burwood-Pegasus	92	96	$33,519,203	$37,479,068
Fendalton-Waimari	3	3	$210,796	$210,796
Central City	9	9	$1,728,272	$1,734,789
Hagley-Ferrymead	70	70	$21,257,394	$21,751,063
Lyttelton-Mt Herbert	5	5	$464,597	$464,597
Riccarton-Wigram	7	7	$4,924,554	$4,929,676
Shirley-Papanui	22	23	$6,926,175	$7,084,133
Spreydon-Heathcote	18	18	$7,479,383	$7,475,940
Total	**226**	**231**	**$76,510,375**	**$81,130,063**

In the table above, the previous monthly report totals have also been included to show the change in activity.

6.1.4.1 List of Projects Complete by Ward

Ward	Reference	Project	Project Life to Date Cost
Burwood-Pegasus	**10312**	Rowes/Tomrich Street Watermain	$264,247
	10321	PM 51 Emergency Repair	$1,510
	10325	Cresswell Avenue - Watermains	$148,731
	10327	Pembroke Street	$146,277
	10328	De Ville Place	$107,535
	10331	PM 39 - Gayhurst Road	$1,594,161
	10332	PM54 - Niven-Avonside	$375,476
	10335	PS54 - Catchment	$6,640,762
	10338	Wainoni Road (WW EW - Ottawa to Avonside)	$908,330
	10339	Woodham Road (Temp Repairs)	$4,149,374
	10340	Ottawa Road Sewer Emergency Repair	$517,444
	10342	Avondale Road (Bridge Emergency Works)	$0
	10343	PM16 - Oakmont Green	$4,287
	10346	Fleete Street - Emergency Repair	$9,328
	10349	PS39 - Birchfield Avenue WW EW	$218,674
	10351	Ardrossan Street - Temp. Solution	$347,571
	10355	Landy Street	$18,738
	10359	PS54 - Niven Street (WW)	$62,282
	10364	Shortland Street	$343,883
	10366	McBratneys Road - WM	$348
	10376	PM 28	$1,499,119
	10384	Pacific Tedder Watermain Replacement	$528,152
	10421	Estuary Rd Carriageway, PS37 to Bridge Street Catchment (WW)	$2,412,079
	10440	PS 25C	$702,670
	10443	PM 38 Beach Rd	$596,770
	10484	Pump Station 25 connection repair	$8,977
	10532	Cnr Pages & Cuff - Emergency Repair	$2,845,126
	10547	New Brighton Road	$24,036
	10551	Avondale Rd (Temp Repair)	$0
	10576	PM 106 - Woolley	$1,466
	10577	PS 106 - Woolley	$670,945
	10604	PM 45 (WW)	$324,122

Ward	Reference	Project	Project Life to Date Cost
	10605	Sylvia Street watermain (WS)	$134,293
	10606	Chadlington Street Water Mains	$35,376
	10607	PM 37 (WW)	$1,908,949
	10608	PM 35	$1,087,648
	10614	Aldershot Street watermain (WS)	$255,436
	10615	Willryan Avenue Watermain	$237,336
	10616	Flemington and Ascot Ave Watermains	$525,630
	10617	PM 46	$55,828
	10621	Chartwell Street Water Mains	$384,531
	10638	630 Pages Road 450mm (WW)	$25,397
	10639	23 Leaver Tce WW	$62,858
	10641	Kirner St WW	$21,497
	10645	Inwoods Close 450mm WW	$128,404
	10647	Travis Rd watermains and submains	$215,845
	10649	Corhampton Street watermains and submains	$261,190
	10650	Water Main on Bridge Street Bridge (WS)	$161,781
	10651	Keyes Road Watermain (WS)	$195,318
	10664	Saltaire (Bower to Marriots Rd) (WS)	$69,096
	10665	Sinclair (Keyes to Rawson) - WS	$250,841
	10669	Palmers Road PS Stabilisation	$16,065
	10670	Major flooding Pratt St.	$295,425
	10671	Owles Tce Temp. (WW)	$113,618
	10676	Marine Parade Watermain	$153,358
	10681	Bower Avenue Watermain and Submains (WS)	$468,915
	10682	Briarmont Street watermain (WS)	$87,815
	10683	Cowes St Watermain and Submains (WS)	$107,789
	10684	Gresham Terrace Watermain and Submains (WS)	$161,116
	10685	Inverell Pl Watermain and Submains (WS)	$63,517
	10686	Orrick St Watermain and Submains (WS)	$83,284
	10688	Blake St Watermain (WS)	$343,340
	10689	Pegasus Ave Watermain	$168,650
	10690	Bassett St Watermain (WS)	$225,196
	10691	Falcon St Watermain	$180,732
	10692	Beach Rd Watermain	$138,143

Ward	Reference	Project	Project Life to Date Cost
	10695	Allstone Watermain	$90,800
	10696	Marriotts Road Watermain	$36,116
	10700	Hulverstone Drive Emergency Repair	$22,188
	10702	Rawhiti Water Well Stormwater Outfall	$147,524
	10706	Bowhill Watermain (WS)	$149,728
	10708	Rookwood Ave Watermain (WS)	$174,380
	10711	Waitaki St Temp. Sewer	$0
	10714	Kate Sheppard Emergency Repair (Barkers Lane Temp Works) (WW)	$187,534
	10723	Merrington Cres Watermain	$183,621
	10728	Rowan Ave Emergency Work WW	$447,340
	10744	PS 36 Gravity Main (Pages Rd)	$649
	10749	Beach Rd Gravity Sewer (WW)	$67,291
	10752	Desal plant long term storage (WS)	$79,908
	10756	PM39 Temp Overland Pipe (PM)	$7,828
	10760	Pages Road	$69,173
	10789	Woodham Road Water Supply Pumping Line Renewal	$83,862
	10794	Pratt Street (Keyes Road) Water Main from Pumping Station	$217,767
	10806	Pages & Cuffs Emergency Repair Roading (RD)	$390,097
	10833	Fast Track - PS36 Sewerage Overflow Repairs Pages/Waitaki (WW)	$21,546
	10834	Minor Works - Stage 1 Schools	$7,185
	10838	Minor Works - Banks Avenue	$121,504
	10859	CCC - Private Laterals Keyes Road (WW)	$49,616
	10865	Catchment Study - Burwood Rebuild NE8 (WW) - 11040, 11041, 11042, 11043	$0
	10315	Ferner Street - Emergency Works	$223,901
	10336	Kingsford & Liggins Streets (Projects 10336 & 10885)	$204,574
	10873	Catchment Study - PS36 Catchment, Area NE4 split into 10959-65 (WW)	$36,398
	10882	Emergency Work - Beatty Street	$236,824
	10903	Catchment Study - Parklands & North New Brighton split into	$0

Ward	Reference	Project	Project Life to Date Cost
		10975-78 NE12, NE13 (WW)	
	10904	Catchment Study - Parklands & North New Brighton (RD,WS,SW) spilt to 11032, 11033, 11034, 11035	$28,515
	10928	Emergency Works - Merrington Crescent (WW)	$96,564
Fendalton-Waimari	**10354**	Papanui Road - Emergency Work	$53,511
	10480	R126 Monavale Footbridge	$31,654
	10590	Thornycroft Street - Pri4 (WS)	$125,632
Central City	**10447**	Fitzgerald Ave Temp Sewer Replacement (WW)	$22,117
	10455	Fitzgerald Ave Twin Bridges Temp Repairs	$0
	10506	Hagley Syphon	$601,348
	10726	Stormwater Pump Station 203	$44,715
	10764	PM 3 Temporary Repair (Complex Emergency)	$52,786
	10790	Liverpool Street Water Main (CBD)	$107,959
	10867	Fitzgerald Ave Retaining Wall Footpath	$677,831
	10880	Kilmore St Brick Barrel Repair - Emergency Work (WW)	$190,110
	10941	Minor Works - 789 Colombo Street (WS)	$37,922
Hagley-Ferrymead	**10301**	CCC - Tanner Street Replacement Well (WS)	$15,792
	10319	St Martins Package 01 (WW) Wilsons Rd South, St Martins Rd and Gamblins Rd	$1,337,159
	10326	Retreat Road	$678,774
	10333	PM 57 - Replacement (Stage 2 March)	$2,075,207
	10337	Avonside - WW Trunk Sewer	$204,090
	10341	River Road - Siphon (WW)	$669,189
	10350	Avonside Drive/Retreat - Gravity Sewer Repair	$93,588
	10352	Avonside Drive/Morris Bowie - Gravity Sewer Temp. Solution	$86,006
	10353	294 Avonside Drive - Temp. Solution	$241,562
	10358	PS57 - McCormacks Bay Rd Sewer Overflow Renewal	$170,231
	10361	PS54 Catchment Temp. Solutions	$878,147

Ward	Reference	Project	Project Life to Date Cost
	10362	PS5 - Glade	$0
	10372	Dacre Street	$125,100
	10386	St Andrews Hill Rd Sewer (Major Hornbrook)	$67,715
	10391	Stevens St Watermain	$164,811
	10402	Moorhouse SW BB 02	$72,744
	10406	226 Main Road SW	$4,627
	10411	Clifton Reservoir 3	$360,172
	10417	Upper Balmoral Reservoir	$406,969
	10422	PM 31 Renewal Works (WW)	$1,591,347
	10428	RW Mt Pleasant Rd Wall 156 (RW)	$181,134
	10431	PS15 Alport	$1,282,063
	10434	PS 12 Smith	$546,105
	10441	Ferry Road 873	$366,749
	10442	PS15 Gould Cres Overflow Structure	$210,522
	10448	PM 12	$710
	10451	Manning-Ferry	$17,158
	10452	WW No Service Grafton	$134,202
	10454	225 Linwood Ave	$74,062
	10458	31 Stanmore Road	$49,606
	10463	Hamner Street - waste water relay	$72,948
	10471	33 River Terrace	$38,939
	10473	Wickham St Watermain Replacement	$307,303
	10478	F805 McCormacks Bay 1 Footbridge	$8,795
	10479	F806 McCormacks Bay 2 Footbridge	$7,959
	10481	R223 Heathcote Barrage	$5,703
	10496	PS13 Tilford	$10,207
	10497	PS 10 Linwood WW	$13,921
	10499	Saxon Street Waste Water	$15,687
	10505	Stanmore Road Lateral	$0
	10537	Patten Street	$633,749
	10539	Brittan Street	$564,468
	10586	PM 107	$261,816
	10609	PM 47	$24,815
	10612	McCormacks Bay Reservoir No 2-2	$693,102
	10613	Mt Pleasant Reservoir 2/2	$95,660
	10618	Beachville Road Pressure + Gravity Main	$476,693

Ward	Reference	Project	Project Life to Date Cost
	10629	McCormacks Bay Rd WR mains and submains (WS)	$2,188,133
	10644	55 Clark St WW	$759
	10666	Head Street - Esplanade to Nayland (WS)	$78,803
	10677	Beachville Watermain (WS)	$248,043
	10679	Moncks Spur No. 3	$215,102
	10687	Wakefield Ave Watermain (WS)	$156,900
	10716	PM 34 Sumner - Replacement	$1,609,254
	10729	WW, Gravity Bridal Path and Cannon	$250,799
	10739	Heberden Ave Temporary Solution (WW)	$102,792
	10743	281 River Rd Siphon (WW)	$0
	10746	Ruru Ave Repair PM 11	$42,191
	10747	Bromley Waste Water Treatment	$23,860
	10753	WW No Service Glendevere (WW)	$2,081
	10763	Moncks Bay Walkway - Temp Repairs	$45,416
	10770	Linwood Ave / Humphrys Dr Retaining Wall Emergency Permanent Repairs (RW)	$429,902
	10779	CCC - Linwood Avenue Water Main	$456,000
	10782	15 Dunoon Place Emergency Stabilisation / Sewer Repair	$179,641
	10792	Truro Street Emergency Waste Water Sewer Renewal (Van Asch School)	$180,850
	10830	Minor Works - Bridge Minor Works Project Package 01 Roading	$13,135
	10835	Minor Works - Avonside Girls High School	$78,494
	10875	Catchment Study - Avonside & Linwood Area CE-5,6,7,9,10,11,12 (WW)	$0
	10876	Catchment Study - Avonside & Linwood Area CE5,6,7,9,10,11,12 (RD, SW & WS)	$96,101
	10772	Monks Bay Main Road Emergency Repair (WW)	$15,503
Lyttelton-Mt Herbert	**10382**	Lyttelton Treatment Plant Access	$0
	10636	Priority Roads - Governors Bay	$389,090

Ward	Reference	Project	Project Life to Date Cost
		Road Rebuild	
	10672	Sutton Quay Retaining wall 441 (RW)	$39,384
	10878	Minor Works - Cunningham Terrace & Sumner Rd Temp Access Works	$35,211
	10418	Lyttelton Dyers Road Pump Station (WS, PS)	$912
Riccarton-Wigram	**10309**	Halswell Minor Roading Works - All Areas	$322,784
	10380	Halswell WW Package 02	$2,031,265
	10383	PS73 Kennedys Bush	$101,031
	10387	Townshend Crescent Wastewater	$46,679
	10389	Sparks Rd Watermain	$175,935
	10392	Halswell WW Package 1 (WW)	$2,109,992
	10408	Glovers Street water (WS)	$141,990
Shirley-Papanui	**10308**	Riselaw Street	$91,424
	10313	PM 6 - Harrison St	$207,579
	10322	Ranfurly Street	$118,626
	10323	Chrystal Street	$83,927
	10329	Hope Street	$145,208
	10330	Orontes Street - WS	$90,022
	10334	PM 7 - Stapletons Road	$242,909
	10345	Nancy Ave / Weston Road	$16,297
	10348	Shirley Road - Wastewater (Emergency Repair)	$696
	10369	Orion Street	$41,881
	10435	Temporary Gravity Sewer Lower Styx Road	$1,074,738
	10437	PM 40 Marshlands	$585,684
	10439	Heyders 29-65 (WW)	$320,151
	10446	Brooklands Roading - Temporary Repairs	$364,289
	10453	PS78 Heyders (PS)	$50,098
	10460	449 Durham Street North	$304,376
	10536	Edgeware Rd - WW	$1,828,863
	10555	Madras Street / Forfar Wastewater	$588,121
	10805	Madras Street Road, Storm Water & Water Supply Repairs	$376,626
	10837	Minor Works - Shirley Boys High School	$112,202
	10851	Minor Works - Marshland Road & Belfast Road	$332,048

Ward	Reference	Project	Project Life to Date Cost
	10856	Minor Works - Northwood Block	$107,269
	10581	Catchment Study - PS7 (10810, 10811, 10812, 10813, 10814, 10815, 10816, 10817)	$1,098
Spreydon-Heathcote	**10320**	Murray Aynsley Reservoir 2	$148,161
	10381	Rydal St (WW)	$921,784
	10390	Centaurus Rd Watermain	$143,772
	10393	Smartlea WW Emergency Repair	$109,989
	10396	75 Wilsons Emergency Repair	$825
	10397	Glenelg Spur 01	$142,696
	10404	Hollis Ave Water (WS)	$175,384
	10410	Hollis Ave WW	$967,783
	10432	PS19 Beckford	$3,201
	10433	PS20 Locarno	$19,394
	10476	F207 Aynsley Tce Footbridge	$8,319
	10477	F212 Sloan Tce Footbridge	$593
	10545	PS19 - Syphon	$0
	10597	Huntsbury Reservoir (WS)	$4,071,178
	10717		$2,207
	10745	CCC - Sydenham Stn Replace Wells (WS)	$236,486
	10755	PS19 Fifield - 171 Fifield - Sheetpiling protection of riverbank	$114,715
	10787	Rydal Street Water Supply, Storm Water and Roading Renewals (SW,WS, RD)	$409,453
Grand Total			**$81,130,063**

6.2 NON-SCIRT Work Activity

6.2.1 Introduction

The following section of the report included a progress report against infrastructure and other associated rebuild projects that are not being delivered by SCIRT. It includes a report on progress on Greenspace projects, Christchurch Wastewater Treatment Plant and Organics Processing Plant, Burwood Landfill and Water Supply Wells.

6.2.2 Greenspace

No change in Greenspace reporting this month. Status of all projects is currently under review, in particular those on hold, due to the Central City Plan and red zone areas.

Ward	Work Package Number	Project	Description	Number of projects in package	Phase	Estimated Construction Start	Estimated Construction Finish	Estimated Cost
Banks Peninsula Wards	WP0000537	PARKS Marine Structures Repairs	Marine Structures Repairs	13	CONSTRUCTION	01/08/2011	30/06/2013	$412,000
	WP0000551	PARKS Marine Structures Assessments	Marine Structures Assessments	10	COMPLETE	01/08/2011	30/11/2011	$50,000
	WP0000783	B/P Retaining Walls	Retaining wall repairs in parks and cemeteries on Banks Peninsula	4	INVESTIGATION	01/07/2012	30/06/2013	$241,000
Burwood Pegasus	WP0000251	PARKS CEAF 1.1 Sth New Brighton CAPEX	Hard surface and playground undersurfacing renewals	4	CONSTRUCTION	01/10/2011	30/06/2013	$227,000
	WP0000257	PARKS CEAF 1.2 B/P CAPEX	Bexley, Avondale and Burwood Parks hard surfacing renewals	3	COMPLETE	01/09/2011	31/10/2011	$100,400
	WP0000258	PARKS CEAF 1.2 B/P OPEX	Hard surface repairs	11	COMPLETE	01/10/2011	29/02/2012	$148,500
	WP0000284	PARKS CEAF 2.6 TRAVIS CAPEX	Hard surface renewals	5	COMPLETE	01/12/2011	29/02/2012	$340,500
	WP0000285	PARKS CEAF 2.7 AVON PARK CAPEX	Hard surface renewals	3	INVESTIGATION	01/03/2012	30/06/2013	$63,850
	WP0000286	PARKS CEAF 2.8 ESTUARY CAPEX	Hard surface renewals	1	INVESTIGATION	01/03/2012	30/06/2013	$300,000
City wide	WP0000177	PARKS Playground Softfall - CAPEX	Replacement of contaminated softfall to playgrounds	24	COMPLETE	01/08/2011	30/11/2011	$335,755

Ward	Work Package Number	Project	Description	Number of projects in package	Phase	Estimated Construction Start	Estimated Construction Finish	Estimated Cost
	WP0000206	PARKS Playground Softfall - OPEX	Repairs to playground undersurfacing	8	COMPLETE	01/08/2011	20/12/2011	$54,200
	WP0000269	PARKS CEAF 2.2 S/P,F/W,R/W,L/M OPEX	Hard surface and minor structural repairs	11	COMPLETE	01/03/2012	31/05/2012	$90,500
	WP0000312	PARKS Hard Surface Nthn & Sthn - OPEX	Hard surface repairs	58	CONSTRUCTION	01/03/2012	30/04/2013	$450,000
	WP0000313	PARKS Hard Surfaces Nthn & Sthn CAPEX	Hard surface renewals	14	CONSTRUCTION	01/03/2012	30/04/2013	$550,000
	WP0000318	PARKS Hard Surfaces Eastern CAPEX	Hard surface renewals	23	CONSTRUCTION	01/03/2012	30/04/2013	$755,000
	WP0000321	PARKS Hard Surface Eastern - OPEX	Hard surface repairs	76	CONSTRUCTION	01/03/2012	30/04/2013	$700,000
	WP0000323	PARKS City Wide Turf Repairs - OPEX	Repairs to non sports turf surfaces	110	COMPLETE	01/11/2011	31/05/2012	$390,550
	WP0000357	PARKS Retaining Walls CAPEX	Minor retaining wall renewals	5	CONSTRUCTION	01/08/2011	30/06/2013	$393,000
	WP0000358	PARKS Retaining Wall Repairs	Minor retaining wall repairs	24	CONSTRUCTION	01/08/2011	30/06/2013	$336,000
	WP0000376	PARKS Minor Structures CAPEX	Minor structures renewals	8	INVESTIGATION	01/08/2011	30/06/2013	$439,000
	WP0000377	PARKS Minor Structures Repairs	Minor structures repairs	60	CONSTRUCTION	01/08/2011	30/06/2013	$471,000
	WP0000571	PARKS 2012 Sports Fields Repairs	Repairs to sports turf 2011/12	45	COMPLETE	01/09/2011	31/03/2012	$691,000
	WP0000768	PARKS Mature Tree Replacements	Tree renewals at Hagley Park and Sth Brighton Domain	2	COMPLETE	01/03/2012	30/06/2013	$100,000
	WP0000769	PARKS Port Hills Restoration	Port Hills rock fencing and planting	2	INVESTIGATION	01/07/2012	TBC	$200,000
	WP0000205	PARKS Sports Fields Repair - Moderate	Repairs to sports turf	19	COMPLETE	01/05/2011	31/07/2011	$244,000

Ward	Work Package Number	Project	Description	Number of projects in package	Phase	Estimated Construction Start	Estimated Construction Finish	Estimated Cost
	WP0000207	PARKS Sports Fields Repair - Minor	Repairs to sports turf	23	COMPLETE	01/05/2011	31/07/2011	$122,550
	WP0000779	Structural	Bridge repairs on Parks City wide	14	INVESTIGATION	01/07/2012	30/06/2014	$919,000
	WP0000780	Regional Parks	Repairs to structures and hard surfaces	6	INVESTIGATION	01/07/2012	30/06/2013	$465,000
	WP0000781	Trees	City wide tree renewals	1	CONSTRUCTION	01/07/2012	30/06/2013	$500,000
	WP0000782	Ponds	Repairs to small ponds and outflows in parks	2	COMPLETE			$50,000
	WP0000784	Cemeteries - Operational	Repairs and make safe work to headstones in Operational cemeteries	18	COMPLETE	01/12/2011	30/06/2013	$250,000
	WP0000785	Cemeteries - Heritage	Repairs and make safe work to headstones in Heritage cemeteries	3	INVESTIGATION	01/07/2012	30/06/2015	$250,000
	N/A	On Hold	Projects on hold due to them being in Red Zoned areas, cordons, rock fall risk etc. Depending on land decisions some of these repairs/renewals may become redundant	141	ON HOLD	XXXX	XXXX	$6,347,200
	N/A	Port Hill Parks/Tracks Reopening Project	Port Hill Parks/Tracks Reopening	21	INVESTIGATION	TBC	TBC	$2,196,020
Hagley Ferrymead	WP0000252	PARKS Victoria Lake CAPEX	Relining Victoria lake	1	COMPLETE	01/07/2011	29/02/2012	$500,000
	WP0000253	PARKS CEAF 1.3 Hagley Pk/Bot.Gdns CAPEX	Hard surface and playground undersurfacing renewals	5	COMPLETE	01/09/2011	29/02/2012	$228,000
	WP0000254	PARKS CEAF 1.4	Irrigation and Turf renewals	2	COMPLETE	01/07/2011	31/07/2011	$30,000

Ward	Work Package Number	Project	Description	Number of projects in package	Phase	Estimated Construction Start	Estimated Construction Finish	Estimated Cost
		Hagley Pk North CAPEX						
	WP0000263	PARKS CEAF 1.6 H/F CAPEX	Hard surface renewals	5	COMPLETE	01/10/2011	29/02/2012	$230,500
	WP0000264	PARKS CEAF 1.6 H/F OPEX	Hard surface, track and minor structure repairs	20	COMPLETE	01/10/2011	29/02/2012	$142,000
	WP0000265	PARKS CEAF 1.8 BOT. GARDENS CAPEX	Playground undersurfacing repairs	1	COMPLETE	01/10/2011	29/02/2012	$50,000
	WP0000287	PARKS CEAF 2.9 VICTORIA SQUARE CAPEX	Hard surface, track and minor structure renewals	4	CONSTRUCTION	01/12/2012	30/06/2013	$277,000
	WP0000288	PARKS CEAF 2.10 CENTRAL CITY PARKS CAPEX	Hard surface renewals	3	ON HOLD	XXXX	XXXX	$15,000
	WP0000289	PARKS CEAF 2.10 CENTRAL CITY PARKS OPEX	Hard surface, track and minor structure repairs	10	ON HOLD	XXXX	XXXX	$19,100
	WP0000767	PARKS Sumner/Scarborough Restoration	Hard surface renewals	9	CONSTRUCTION	01/12/2011	30/04/2013	$187,000
Riccarton Wigram	WP0000280	PARKS CEAF 2.5 MONA VALE CAPEX	Hard surface, bridge and wall renewals	5	INVESTIGATION	01/07/2012	30/06/2013	$322,000
Shirley Papanui	WP0000255	PARKS CEAF 1.5 Groynes CAPEX	Car Park, Driveway, Turf, Track and Jetty renewals	6	COMPLETE	01/08/2011	30/09/2011	$96,000
	WP0000256	PARKS CEAF 1.7 Temp Changing Rooms CAPEX	Portable changing facilities for sports parks	2	CONSTRUCTION	01/02/2012	31/12/2012	$300,000
	WP0000268	PARKS CEAF 2.1 English Park CAPEX	Car Park renewal	1	COMPLETE	01/08/2011	30/10/2011	$247,500
	WP0000277	PARKS CEAF 2.3 S/P OPEX	Hard surface and track repairs	5	COMPLETE	01/03/2012	31/05/2012	$20,500

Ward	Work Package Number	Project	Description	Number of projects in package	Phase	Estimated Construction Start	Estimated Construction Finish	Estimated Cost
	WP0000278	PARKS CEAF 2.3 S/P CAPEX	Hard surface renewals	3	COMPLETE	01/03/2012	31/05/2012	$100,000
	WP0000778	Roto Kohatu	Repairs to bank works at Roto Kohatu Reserve	1	COMPLETE	01/02/2011	30/04/2011	$200,000
Spreydon Heathcote	WP0000279	PARKS CEAF 2.4 S/H OPEX	Hard surface and minor structural repairs	11	COMPLETE	01/11/2011	31/03/2012	$153,615
		ACC: Auckland City Council grant						
		CEAF: Canterbury Earthquake Appeal fund						
		NOTE: Canterbury Earthquake Appeal Fund projects are billed directly to Dept. Internal Affairs.						
		CCC labour costs to design, project manage and supervise these projects are charged to 721/120 codes depending on the asset type						
		Status Summary						
				67	Investigation	$5,395,870		
				293	Construction	$5,558,000		
				352	Complete	$4,966,070		
				154	On Hold	$6,381,300		
					Total	$22,301,240		

6.2.3 Wastewater Treatment Plant and Organics Processing Plant

Project	Description	Phase	Estimated Construction Start	Estimated Construction End	Estimated Cost
Clarifiers	C4 - New structural bottom - CIPP repair to influent pipe - Modify Arms to suit new structure. C3 - New structural bottom - CIPP repairs to influent pipe. - Modify Arms to suit new structure C1 - New structural bottom - CIPP repair to influent pipe - Modify Arms to suit new Structure	Complete Complete Construction	Nov 11 24 Jan 12 July 12	3 Feb 12 30 June 12 15 Feb 13	$9,432,768
Civil & Structural	• Paving • C2 water • Crack repairs to structures. • Reclad Digester 2 • PST/SCT & Grit Tank Repairs	**Complete** Complete **Complete** Complete Construction	Oct 11 Oct 11 April 11 Sept 11 Aug 12	Sept 12 Feb 12 Nov 12 Dec 11 Feb 13	$4,514,760
Contaminated Sand Disposal Point	• Repair after hours access road & improve for increased traffic movements. • Repair and strengthen septic waste dump point into Lagoon 2.	Construction Construction	Oct 12 Oct 12	Dec 12 Dec 12	$1,500,000
Oxidation Ponds	• Transfer structures 1-4 • Transfer Structure 4-5. • Pond banks strengthen and reinstate to design levels. • Estuary outfall structure • Dyers Road transfer structure	Complete Complete Construction Construction **Construction**	Oct 11 Dec 11 Jan 12 July 12 **Oct 12**	Feb 12 Mar 12 **Feb 13** Sept 12 **April 13**	$16,250,000
Galleries	• South Gallery – drainage and structural *Proposed repair strategy unsuccessful, redesign underway* • North Gallery – drainage & joints	Design Construction	**TBA** June 12	**TBA** Jan 13	

Project	Description	Phase	Estimated Construction Start	Estimated Construction End	Estimated Cost
	• Diagonal Gallery – drainage & joints • Pump Stn A – drainage & joints • Sludge Rm A – drainage & joints	Design Design Design	**Jan 13** Dec 12 Jan 13	**Mar 13** **Mar 13** Mar 13	$1,353,550
Trickling Filters Stage 1 **Trickling Filters Stage 2**	• External repairs to Trickling Filter 1 • External repairs to Trickling Filter 2 Investigate and repair any damage to Trickling Filter internal structure	**Design** **Design** Loss Adjusters	**Feb 13** **May 13** 2020	**April 13** **Aug 13**	$3,500,000
Mechanical & General Repairs	• Digesters 2 • Digesters 1 • Digester 4 • Digester 3 • Digesters 5 • Digester 6 • Buffer Tank • Primary Sedimentation Tanks • Bio- Solids Holding Tank	Construction **Construction** Investigation Investigation Investigation Investigation Complete **Complete** **Loss Adjusters**	Oct 11 **Nov 12** **Feb 13** **Mar 13** Jan 14 Jun 14 Nov 11 Jun 11 **Mar 13**	**Feb 13** **Mar 13** **Aug 13** **Sept 13** **Jun 14** **Nov 14** Jan 12 July 12 **Aug 13**	$5,450,250
Organics Processing Plant	• Demolish & Reconstruct Tunnels • Repair & Strengthen Process Hall • Repair Hard Standing	Construction	Mar 12	July 13	$9,518,133
Facilities	• Laboratory • Control room • Workshops • Offices/ Cafeteria/ Mtg room	**Loss Adjusters** **Loss Adjusters** Investigation **Loss Adjusters**	Feb 13 Feb 13 Feb 13 Feb 13	Jun 13 Jun 13 Jun 13 Jun 13	$2,741,000
Outlet Structure	• Replace Broken Outlet Pipes • New Outlet Structure • Decommission Broken Pipes	**Tender**	**Jan 13**	**Jun 13**	$2,300,000

Project	Description	Phase	Estimated Construction Start	Estimated Construction End	Estimated Cost
	TOTAL				**$56,560,461**

In the table above, the bolded text identifies a change in activity since the previous monthly report.

6.2.4 Burwood Landfill

Project	Description	Material Received (tonnes)	Material Processed (tonnes)	Phase	Estimated Construction Start	Estimated Construction End	Estimated Cost
Burwood Landfill Liquefaction and Infrastructure Rebuild Waste Disposal	• Prepare areas for disposal • Operate and maintain disposal site • Restoration and landscaping • Resource consent application • Consultation documents to affected parties • Consultation Feedback documents to affected parties • Consents granted	**376,013**	**376,013**	Completed Operation **Operation Completed** Completed Completed Completed	Feb 11 Feb 11 Jan 12 Jan 12 Apr 12 Jun 12 Jul 12	Jan 12 Dec 13 Dec 13 Aug 12 Jul 12 Jul 12 Sept 12	Self Funded
Burwood Landfill Residual Demolition Waste Disposal	• Design of new cell for residual waste • Cell construction • Operate and maintain disposal site • Restoration and landscaping • Resource consent application • Consultation documents to affected parties • Consultation Feedback documents to affected parties • Consents granted	0	0	**Completed Construction** **Construction** Design **Completed** Completed Completed Completed	Oct 11 Mar 12 **Jan 13** Jul 17 Oct 11 Apr 12 Jul 12 Jul 12	Jun 12 **Jan 13** Dec 17 Dec 17 Aug 12 Jul 12 Aug 12 Sep 12	To be funded by Transwaste Canterbury
Burwood Resource Recovery Park Demolition Sorting and Processing Facility	• Construct areas for storage of material and associated roading • Design of sorting plant • Construction of sorting plant • Sorting operation • Rehabilitation and landscaping • Resource consent application	**370,000**	0	Complete Completed **Commenced** **To commence Jan 13** Design **Completed** Completed	Feb 11 Mar 11 Jul 12 **Jan 13** Jul 17 Oct 11	Jun 11 Jun 12 Dec 12 Dec 17 Dec 17 Aug 12	To be funded by Transwaste Canterbury

Project	Description	Material Received (tonnes)	Material Processed (tonnes)	Phase	Estimated Construction Start	Estimated Construction End	Estimated Cost
	• Consultation documents to affected parties • Consultation Feedback documents to affected parties • Consents granted			Completed Completed	Apr 12 Jun 12 Jul 12	Jul 12 Jul 12 Sep 12	
	TOTAL	**746,013**	**376,013**				

In the table above, the bolded text identifies a change in activity since the previous monthly report.

6.2.5 Wells

The damage to wells has been reported separately from the remainder of the non-SCIRT infrastructure rebuild because much of the wells repair work is reactionary due to the ongoing aftershocks.

Forward programming is limited by the reactionary work and the operational requirements of the water supply network, meaning that each package of work is programmed "on the fly" on a prioritised basis before it is issued.

The programme of work must be kept flexible in order to keep as many damaged wells operational as possible while at the same time moving forward with the repair and replacement programme. Only a limited number of wells can be taken out of service at one time to avoid affecting the demand on water supply network, and to minimise water restrictions.

	October At Ground Level	November At Ground Level	October Below Ground Level	November Below Ground Level	October Totals	November Totals
Total number of active wells					154	154
Wells yet to be repaired[+*]	34	32	37	34	71	66
Cost Estimate all repairs[+]	$4,692,000	$4,692,000	$18,584,000	$18,603,000	$23,276,000	$23,295,000
Wells repaired to date[+*]	68	69	100	104	168	173
Cost to date[+]	$2,830,173	$2,958,439	$6,575,652	$6,479,604	$9,405,825	$9,438,043

+ includes replacement wells

- some wells are damaged both at and below ground level

8. RESOLUTION TO EXCLUDE THE PUBLIC

Attached.

7. 2. 2013

ENVIRONMENT AND INFRASTRUCTURE COMMITTEE

RESOLUTION TO EXCLUDE THE PUBLIC

Section 48, Local Government Official Information and Meetings Act 1987.

I move that the public be excluded from the following parts of the proceedings of this meeting, namely item 9.

The general subject of each matter to be considered while the public is excluded, the reason for passing this resolution in relation to each matter and the specific grounds under Section 48(1) of the Local Government Official Information and Meetings Act 1987 for the passing of this resolution are as follows:

		GENERAL SUBJECT OF EACH MATTER TO BE CONSIDERED	REASON FOR PASSING THIS RESOLUTION IN RELATION TO EACH MATTER	GROUND(S) UNDER SECTION 48(1) FOR THE PASSING OF THIS RESOLUTION
PART A	9.	**CHARTERIS BAY WATER AND WASTEWATER SCHEME: CONTRACT 12/13-59**	) GOOD REASON TO) WITHHOLD EXISTS) UNDER SECTION 7	SECTION 48(1)(a)

This resolution is made in reliance on Section 48(1)(a) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act which would be prejudiced by the holding of the whole or relevant part of the proceedings of the meeting in public are as follows:

ITEM NO.	REASON UNDER ACT	SECTION	PLAIN ENGLISH REASON	WHEN REPORT CAN BE RELEASED
9.	Prejudice commercial position	7(2)(b)(ii)	Commercial negotiations yet to be completed with preferred tenderer.	When the tender process has been completed and tenderers have been advised of the outcome.

Chairperson's Recommendation: That the foregoing motion be adopted.

Note

Section 48(4) of the Local Government Official Information and Meetings Act 1987 provides as follows:

"(4) Every resolution to exclude the public shall be put at a time when the meeting is open to the public, and the text of that resolution (or copies thereof):

(a) Shall be available to any member of the public who is present; and
(b) Shall form part of the minutes of the local authority."