Canterbury
District Health Board
Te Poari Hauora ō Waitaha

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23 September 2019

9(2)(a) [redacted]

[redacted]

[redacted]

RE Official Information Act request CDHB 10161

I refer to your email dated 31 July 2019 requesting the following information under the Official Information Act from Canterbury DHB.

1. **All reports, memorandums, papers , documents, advice, correspondence, notes, emails, text messages, and other official information, written, reviewed or considered by Environment Canterbury in relation to Schullehner, Jörg & Hansen, Birgitte & Thygesen, Malene & B. Pedersen, Carsten & Sigsgaard, Torben. (2018). Nitrate in drinking water and colorectal cancer risk: A nationwide population-based cohort study: Nitrate in drinking water and CRC. International Journal of Cancer. 143. 10.1002/ijc.31306.**
2. **All reports, memorandums, papers, documents, advice, correspondence, notes, emails, text messages, and other official information considered by Environment Canterbury since 1 January 2019, regarding nitrates in drinking water.**

I note we transferred Questions 1 and 2 to Environment Canterbury to respond to on 13 August 2019.

3. **All reports, memorandums, papers, documents, advice, correspondence, notes, emails, text messages, and other official information between Environment Canterbury and Canterbury District Health Board, since 1 January 2019 regarding nitrates in drinking water.**

Please find attached as **Appendix 1** (below) correspondence and documents held between Environment Canterbury and Canterbury DHB since 1 January 2019 regarding nitrates in drinking water.

4. **All reports, memorandums, papers, documents, advice, correspondence, notes, emails, text messages, and other official information between Canterbury District Health Board and the Ministry of Health, since 1 January 2019 regarding nitrates in drinking water.**

Please find attached as **Appendix 2** correspondence between Canterbury DHB and the Ministry of Health since 1 January 2019 regarding nitrates in drinking water.

Please note: we have redacted information under section 9(2)(a) of the Official Information Act i.e. *"…to protect the privacy of natural persons, including those deceased".*

We have also redacted information we consider to be “out of scope” of your request.

Please note information can also be found on the Environment Canterbury website https://ecan.govt.nz/get-involved/council-and-committee-meetings/

You may, under section 28(3) of the Official Information Act, seek a review of our decision to withhold information by the Ombudsman. Information about how to make a complaint is available at www.ombudsman.parliament.nz; or Freephone 0800 802 602

I trust that this satisfies your interest in this matter.

Please note that this response, or an edited version of this response, may be published on the Canterbury DHB website after your receipt of this response.

Yours sincerely

Carolyn Gullery
Executive Director
Planning, Funding & Decision Support

APPENDIX 1

Out of Scope

[redacted]

-----Original Message-----
From: 9(2)(a) [redacted] @ecan.govt.nz>
Sent: Tuesday, 5 February 2019 4:26 PM
To: Alistair Humphrey <alistair.humphrey@cdhb.health.nz>; 9(2)(a) [redacted] @rdrml.co.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @xtra.co.nz>; 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @xtra.co.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] 9(2)(a) [redacted] @landandwater.org.nz>; 9(2)(a) [redacted] @mpi.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] @hurunui.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @mpi.govt.nz>; 9(2)(a) [redacted] @mfe.govt.nz>; 9(2)(a) [redacted] @selwyn.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ngaitahu.iwi.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @vodafone.co.nz>; 9(2)(a) [redacted] @ecan.govt.nz> 9(2)(a) [redacted] 9(2)(a) [redacted] @ccc.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted]
Cc: 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ecan.govt.nz>; 9(2)(a) [redacted] 9(2)(a) [redacted] @ecan.govt.nz>
Subject: Agenda Papers CWMS Regional Committee meeting 12 Feb 2019
Importance: High

Please find attached agenda for the CWMS Regional Committee meeting to be held on 12 February 2019. Hard copies will be couriered to you this Thursday.
Kind regards

Your message is ready to be sent with the following file or link attachments:

Agenda Papers CWMS Regional Committee meeting 12 Feb 2019

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

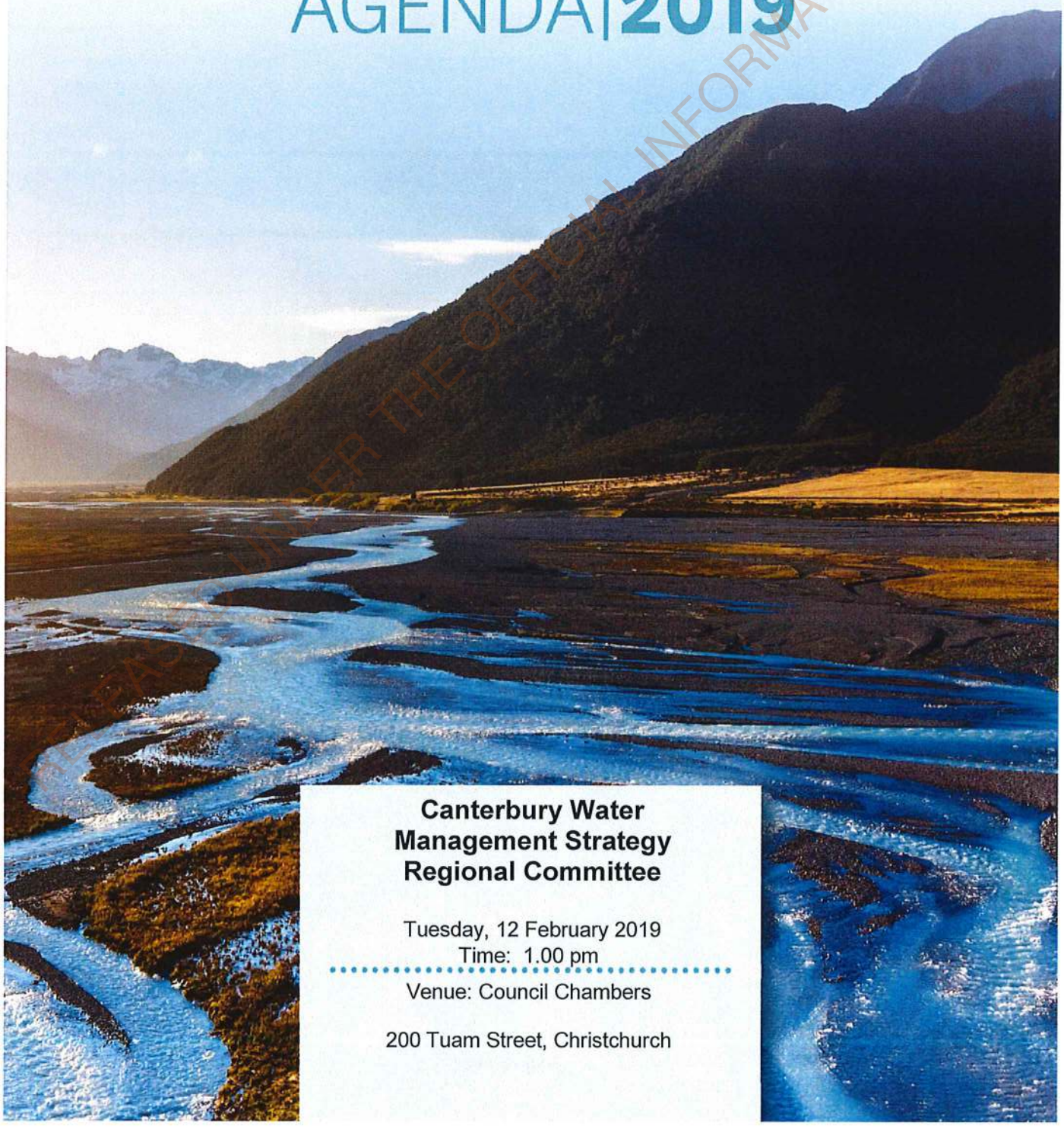
9(2)(a) [redacted]
Business and Customer Services

9(2)(a) [redacted]

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CANTERBURY REGIONAL COUNCIL
Kaunihera Taiao ki Waitaha

AGENDA|2019



Canterbury Water Management Strategy Regional Committee

Tuesday, 12 February 2019
Time: 1.00 pm

Venue: Council Chambers

200 Tuam Street, Christchurch

Canterbury Water Management Strategy
Regional Committee
Membership

Chair	Hugh Logan
Community Representatives	Hugh Canard Jane Demeter Cole Groves Nicky Hyslop Ross Millichamp Vicky Southworth
Zone Representatives	Ted Howard (Kaikoura) Michele Hawke (Hurunui-Waiau) Carolyne Latham (Waimakariri) Karaitiana Taiuru (Selwyn-Waihora) Les Wanhalla (Christchurch-West Melton) Fiona Nicol (Banks Peninsula) Ben Curry (Ashburton) Hamish McFarlane (Orari-Temuka-Opihi-Pareora) Sandra Hampstead-Tipene (Upper/Lower Waitaki)
Christchurch City Council	Sarah Templeton
District Council Representatives	Mayor Winton Dalley (North Canterbury) Councillor Nicole Reid (Mid Canterbury) Peter McIlriath (South Canterbury)
Te Rūnanga o Ngāi Tahu	Rebecca Clements
Ngā Rūnanga	Riki Lewis David Higgins
Environment Canterbury	Councillor Claire McKay Councillor Peter Scott
Central Government Observer	Murray Doak and Jo Buckner (MPI) Nick Vincent (MFE)
Canterbury District Health Board Observer	Dr Alistair Humphrey

Members please note that lunch will be available at 12.30pm

Canterbury Water Management Strategy
Regional Committee

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Opening Karakia

Items for discussion

Closing Karakia

Minutes of the Canterbury Water Management Strategy Regional Committee held in the Council Chamber, Canterbury Regional Council, 200 Tuam Street, Christchurch on Tuesday 11 December 2018 at 1.06 pm

Contents

Present

Community Representatives	
Jane Demeter	Ross Millichamp
Vicky Southworth	Hugh Canard
Zone Representatives	
Ted Howard	Kaikoura
Michele Hawke	Hurunui-Waiau
Carolyne Latham	Waimakariri
Karaitiana Taiuru	Selwyn-Waihora
Les Wanhalla	Christchurch West-Melton
Fiona Nicol	Banks Peninsula
District Council Representative	
Peter McIlraith	South Canterbury
Christchurch City Council	Cr Sara Templeton
Te Rūnanga o Ngai Tahu	Rebecca Clements
Environment Canterbury	Cr Claire McKay
Canterbury District Health Board Observer	Dr Alistair Humphrey

In attendance

John Benn (Department of Conservation)

Environment Canterbury: Lesley Woudberg (Team Leader Zone Facilitator), Stefanie Rixecker (Director of Science), Dann Olykan (Team Leader CWMS), Dennis Jamieson (Project Leader – Water Infrastructure), Mel Renganathan (Principal Strategy Advisor – Land), Anita Fulton (Senior Strategy Advisor), Barbara Nicholas (Contractor), and Louise McDonald (Senior Committee Advisor)

Welcome

Chair Hugh Logan welcomed everyone to chair the meeting.

1. Apologies

Apologies were received and accepted from Mayor Winton Dalley, Riki Lewis, Cr Nicole Reid, Cr Peter Scott, Murray Doak, Jo Buckner

For lateness- Karaitana Taiuru

2 Conflicts of interest

Hugh Logan reminded members of the register of interests held for the committee for members to check and update if necessary.

Although not a conflict of interest he advised of a role that he had just taken with Ministry of Primary Industries chairing a small reference group that is reviewing the legislation on walking access.

3 Minutes of the previous meeting 9 October 2018

Refer pages 1 to 6 of agenda

The general consensus of the Canterbury Water Management Strategy Regional Committee:

Confirmed the minutes of the Regional Water Management Committee meeting held on 9 October 2018, as a true and correct record.

4 Matters arising

There were no matters arising from the minutes.

ITEMS FOR DISCUSSION

5 Water Usage Compliance Monitoring

Refer pages 7 to 8 of the agenda

Carly Waddleton presented this report of the results of the 2017/2018 water use monitoring programme with a PowerPoint presentation. She explained that the data was also used for environmental monitoring.

The system of using four grades A to D to rate water use compliance enables staff to concentrate on working with those consent holders that need to improve. Workshops had been held with the Territorial Authorities to explain the monitoring programme and how to improve compliance.

A leaflet (tabled) has been circulated to all consent holders explaining responsibilities of water consent holders.

Rebecca Clements joined the meeting at 1.20pm.
Nick Vincent joined the meeting at 1.30pm.

Carly provided the following replies to questions about the water usage compliance monitoring:

- all meters need to be calibrated and verified every 5 years.
- the process of enforcement starts with working with the consent holder followed by; warnings; abatement notices; and then enforcement.
- if a well or pump is not functioning a consent holder can apply for a temporary waiver.
- most consent holders use providers for their metering and depending on the system that they have may be able to get real time data of their water take.
- individual circumstances are taken into consideration for any problems encountered with water metering, for example earthquake damage, power outages etc but consent holders still need to get the problem fixed.

It was observed that this exercise is measuring compliance, but not efficiency. It can't be linked to good farming practice. In Christchurch the council are still fixing earthquake damaged pipes and a lot of water taken does not reaching the taps.

The issue of the cost of monitoring and enforcement was raised. It was acknowledged that the community's expectations for data, monitoring and enforcement were growing. In addition to getting an idea of the cost the committee was also interested in:

- the volume of water taken for each of the four compliance grades;
- how the regionally significant takes fit into the four grades;
- the percentage of the takes that are telemetered;
- the cost of not monitoring;
- trend information would be useful to share with the zone committees

Carly was thanked for an interesting presentation and it was requested that the PowerPoint presentation be made available on the Environment Canterbury website.

Karaitiana Taiuru joined the meeting at 2.15pm

6 Canterbury Water Management Strategy Fit for Future Project

Refer pages 9 to 21 of the agenda

Dann Olykan presented this report with a PowerPoint presentation. This is part of the process of the Strategy moving from targets to action. He provided an update on the project and sought feedback on the 2025 and 2030 goals and a set of strategic matters.

The following points were made:

- Is there a mechanism to enable a focus on those targets that are more difficult to achieve, e.g. mahinga kai and can resource be shifted to those areas?
- To identify where the money should come from, firstly identify where does the responsibility and passion lie.
- Is there a process for prioritising funding and should this be linked to the CWMS first priorities? Focus on the big things that can make difference.
- The effect of the National Policy Statement for Freshwater and it's amendments on the CWMS goals and deadlines.
- With the target for better water use, it was suggested that older more generous consents be looked at as environmental concerns appear to be transferred to new users.
- More information on who was consulted and the feedback provided was requested.
- The need to think strategically and be ready for expanded changes in technology.
- When better water use is achieved will there be more water available for the environment to improve reliability?
- Consent reviews are expensive – are there non-regulatory ways to utilise in the interim? (the Government are looking at this).
- The zone committee structure works well but the speed of work is related to Environment Canterbury resources, how do we leverage more funds?
- Need to check that the resourcing and capability to enable iwi representatives to contribute to the zone committee process are satisfactory.
- There is concern because of the time required for consultation the government may intervene.
- More modelling is needed to get a better understanding of the lag time between putting plan processes in place, consent implementation and the science, for meeting the 2040 targets.
- identify what success looks like.

Cr Sara Templeton left the meeting at 3.30pm

Hugh Logan summarised the main points of the discussion: the aspirations goals are important and the challenge for management agencies is to be able to report on these goals. Monitoring needs to be done in many places and this will be expensive. Standards need to be set and if they cannot be meant this should be made clear.

Hugh reported that he has provided an update on the Fit for Future project to the Mayoral Forum at its meeting on 7 December. The Forum are interested in social capital and the degree of public support for the CWMS; the direction of travel towards improvement; and the 3 waters responsibilities for urban and small communities. The feel from the Forum is that the CWMS is going well but that there is room for improvement and increasing support for its implementation.

The 2025, 2030 and 2040 goals are important, and they condition the Zone Implementation Programmes (ZIPs) and provide input into Territorial Authorities and the regional council's plans.

Item 8 was then taken

8. Update from Central Government

Refer pages 25 to 27 of the agenda

Ministry for the Environment

Nick Vincent, Ministry for the Environment, advised that the Fresh Water programme is back with the task force and is wider than just the Ministry. There are three advisory groups are meeting monthly to provide comment on policy. The Minister has requested a list of catchments in danger, so they can be used a trial catchment.

Amendments to the National Policy Statement on Freshwater Management are expected by 2020. There is also work being undertaken on amendments to the Resource Management Act.

The Ministry are also busy with 3 Waters work and are keen to engage with groups like the zone committees.

Department of Conservation

John Benn tabled and spoke to notes on the Departments activities around the CWMS zone over the last two months.

7 Regional Committee Working Group Updates

Refer pages 22 to 24 of the agenda

Ross Millichamp reported from the Infrastructure Working Group that they were working with NIWA to get better information on native fish so that better standards can be established for fish screens.

Hugh Canard advised that the Recreation and Amenity Working Group are working through the report prepared by Visitor Solutions Ltd. Work is also being done to identify what sites are used for, when they are used and how this translates into recreational needs for the CWMS.

Carolyne Latham left the meeting at 4.15pm.

9. Zone Committee Updates

Banks Peninsula

Fiona Nicol reported that the zone committee has formalised the process of information sharing with Christchurch City Council and Environment Canterbury. Flood protection at Little River is being looked at. Fiona noted the benefit of the restoration justice process as shown by a recent Akaroa (Graham Steam Restoration) case that money went to the community for environmental work.

Kaikōura

Ted Howard explained that the Kaikōura focus continues to be on earthquake recovery. Science investigations are being undertaken for Lyell Creek and the Clarence River.

Hurunui Waiau

Michele Hawke reported that the Hurunui Waiau Zone Committee have delivered ther recommendations to Environment Canterbury to fix the 10% rule (in the Land and Water Regional Plan) that had unintended consequences for dryland farming. Other work being done included looking at swimming sites, and the BRIDGE (braided rivers) project.

Selwyn Waihora
Karaitiana Taiuru reported that the Selwyn Waihora zone committee is continuing its work on developing relationships particularly with schools in the zone and with the Te Waihora Co-Governance Group . They have held a field trip and hosted a visit from school students.

Christchurch West Melton
Les Wanhalla reported that the Christchurch West Melton were working to engage with their urban community. An information stall featuring the stormwater superhero project will be at Westfield Riccarton on 18 & 19 January 2019.

10. Draft Regional Committee Annual Report

Refer pages 22 to 27 of the agenda

Hugh Logan invited the Committee to provide any feedback on the draft Regional Committee Annual Report to Lesley Woudberg.

Ross Millichamp suggested that the reference to the fish screen work advise that the problem has been identified but not yet achieved, this was a priority for Environment Canterbury.

An update on the Te Waihora willow control was a project to be highlighted.

Resolved

That the Canterbury Water Management Strategy Regional Committee:

1. **Delegate to the chair to sign off the final annual report on behalf of the Regional Committee**

Peter McIlraith / Ted Howard
CARRIED

11. Facilitators Update

Refer pages 28 to 52 of the agenda

Lesley Woudberg presented this report that included the 2019 meeting and working group dates.

12. General Business

Cr Claire McKay reported that the regional council at its meeting of 13 December would be considering a recommendation to make Plan Change 5 (Nutrient Management and Waitaki) to the Land and Water Regional Plan operative from 1 February 2019.

Lesley Woudberg acknowledged the work of the Waimakariri and the Orari-Temuka-Opihi-Pareora Zone Committees in preparing their Zone Implementation Programme Addenda (ZIPA). These will also be presented to the regional council meeting on 13 December 2018.

11. **Next Meeting**

Tuesday 12 February 2018

The meeting closed at 4.48 pm with a karakia by Karaitiana Taiuru

Confirmed

Date _____ **Chairperson** _____

Agenda Item No: 5	Subject Matter: Canterbury Regional Planning Story May 2010-December 2018 and Beyond
Report to: Canterbury Water Management Strategy Regional Committee	CWMS - Target/s Areas All
Report by: Cr Skelton and Lesley Woudberg (ECan)	Date of Meeting: 12 February 2019

Purpose

To provide an opportunity for the Regional Committee to ask questions of Cr Peter Skelton about his paper *"The Canterbury Regional Planning Story from May 2010 to December 2018 and beyond".*

To provide an opportunity for discussion on:

- The lessons learnt to date
- What still needs fixing?
- What does it mean for the future?

Recommendation

That the Canterbury Water Management Strategy Regional Committee:

1. **Receives the paper by Cr Skelton on *Canterbury's Planning Story from May 2010 to December 2018 and Beyond.***

2. **Acknowledges the contribution Cr Skelton has made to the regional planning framework now in place in Canterbury.**

Report

The Canterbury Regional Planning Story from May 2010 to December 2018 and Beyond.

Cr Peter Skelton December 2018

Seven Commissioners were appointed under the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 (**ECan Act 2010**) to govern Environment Canterbury for a period of three years, ending with the local body elections in October 2013. Their term of office was subsequently extended to the local body elections in October 2016. In October 2016 a Transitional Council comprising seven elected and six appointed Councillors came into office for the three year period ending with the next local body elections in October 2019 under the Environment Canterbury (Transitional Governance Arrangements) Act 2016 (**ECan Act 2016**).

The seven Commissioners took office officially from 1 May 2010.
A description of the Canterbury regional planning scene at that date now follows.

The Canterbury Water Management Strategy (CWMS) (a non- statutory Canterbury Mayoral Forum initiative) had been signed off in 2009.

A review of the operative **Canterbury Regional Policy Statement (RPS)** was underway.

The Natural Resources Regional Plan (NRRP) (a region wide instrument) first notified in 2002 with additional chapters notified in 2004 was in the last stages of decision- making following extensive hearing of submissions by two hearing panels comprising an Independent Chair (Dr Brent Cowie) and elected or past Councillors Bill Woods, Bob Kirk, Mark Oldfield, Robert Johnston and Anne Carroll.

Three sub-region planning instruments were operative. These were the **Waimakariri River Regional Plan**; **the Opihi River Regional Plan;** and **the Waitaki Catchment Water Allocation Regional Plan** (promulgated under special legislation in 2004 and made operative in 2006).

There was and still is an operative **Canterbury Regional Coastal Environment Plan.** This plan is due for review**.** Some changes have been made to it in the meantime either through small private plan change procedures that were largely uncontested or through the Canterbury Earthquake Recovery Act 2011 procedures including the Lyttelton Port Recovery Plan.

There were also a number of catchment-based flow and allocation regimes being developed. Some had been notified as variations to the NRRP including, the Selwyn River, Hurunui River, Waihao River and, Conway River, while others were prepared as separate flow and allocation regional plans including the Waipara Catchment Flow and Water Allocation Regional Plan, and the Pareora Catchment Environmental Flow and Water Allocation Regional Plan. Development had also started on flow and allocation regimes for the Waiau River and the Orari River.

In the Hurunui River Catchment there were also two major pieces of litigation underway. One was an application by the Fish and Game Council for a Water Conservation Order to protect Lake Sumner and the South Branch of the Hurunui River from water takes for irrigation. The other was an application by the Hurunui Water Project (HWP) to dam Lake Sumner and the South Branch of the Hurunui River for irrigation water.

The ECan Act 2010 gave the Council (comprising the seven Commissioners) certain powers relating to Water Conservation Order applications and the imposition of moratoria on the taking of water and discharging to water. It also abolished rights of appeal on **planning** matters to the Environment Court. The only right of appeal was to the High Court on questions of law.

The ECan Act 2010 also required the Council, in its decision- making, to have particular regard to the Vision and Principles of the CWMS which, importantly, were written into a Schedule to the Act. The Act did not require the Council to implement the Strategy as a whole.

Immediately upon appointment, the Commissioners resolved to adopt the CWMS and take all necessary steps to implement it. Two Commissioners, David Caygill and Peter Skelton, were appointed to the then CWMS Steering Committee to represent the Regional Council and later became the Council's first regional representatives on the Regional Committee set up under the Strategy.

The Commissioners also set about establishing the 10 Zone Committees contemplated by the Strategy.

The Hurunui Waiau Zone Committee was the first committee to be established and one of the leading members was the late David Bedford (an ECan Commissioner and later first Chair of the Transitional Regional Council). The first task of this Committee was to develop a Zone Implementation Programme (ZIP) that would inform the development of a sub-regional plan for the Hurunui and Waiau River Catchments. This Zone also included the Waipara River Catchment, but that catchment was dealt with separately from the other two catchments.

To facilitate the preparation of the ZIP the Council used its moratorium powers and applied them to the Hurunui and Waiau rivers and their tributaries. With the concurrence of the Minister for the Environment, these moratoria lasted until 1 October 2011 on which date the proposed Hurunui Waiau River Regional Plan was publicly notified for submission.

In the meantime, the Council received the decisions of the two hearing panels on the NRRP in October 2010 and notified them accordingly. There were 11 appeals to the High Court.

Also, by the end of 2010, the Fish and Game Council had withdrawn its application for a Water Conservation Order, preferring to take its case through the sub-regional planning process, and HWP had agreed not to pursue its application for irrigation water from Lake Sumner and the South Branch of the Hurunui River. It was then considering the use of the Waitohi Catchment as a water source and the Hurunui Waiau River Regional Plan made explicit provision for this as a first preference source of irrigation water in the Hurunui Catchment. The appeals on the NRRP were resolved in early 2011 and on 11 June 2011 the NRRP was made operative. Work was already underway to review this plan so far as water management was concerned to provide for catchment planning across the region and later, work also began on reviewing the NRRP chapter on air.

In the meantime, the Commissioners picked up the work already done for the review of the RPS and completed that work, including incorporating important references to the CWMS in the objectives and policies. The reviewed RPS was publicly notified for submissions on 18 June 2011.

An Independent Hearing Panel was appointed by the Commissioners to hear the submissions comprising a retired Principal Environment Court Judge, an experienced expert resource management consultant and a Ngāi Tahu appointee. The Panel reported back to Commissioners on 12 July 2012. The Commissioners accepted the Panel's recommendations and there were four subsequent appeals to the High Court. These were resolved without the need for a contested hearing and the RPS was made operative (excluding the Recovery and Rebuilding of Greater Christchurch chapter) on 15 January 2013.

Thus, the all-important overarching objectives and policies for the future planning of the region for the next 10 years as a minimum were established. The Recovery and Rebuilding of Greater Christchurch chapter was completed under the Canterbury Earthquake Recovery Act 2011 through the Land Use Recovery Plan and became operative in December 2013.

The Hurunui Waiau River Regional Plan submissions were heard by another Independent Hearing Panel in October 2012. The Council accepted the Panel's recommendations on 18 April 2013. There were 3 appeals to the High Court which were resolved without a hearing and this Plan became operative on 20 December 2013.

The review of the NRRP resulted first in the development of the Canterbury Land and Water Regional Plan (**LWRP**). This plan was written in two parts: a region wide section, and a series of sub-region sections to be populated by sub-regional plans as they were developed through the CWMS Zone Committee processes across the region.

The LWRP itself (which built on the NRRP and included, for the first time in the region, new rules setting limits for nitrogen losses) went through an extensive public hearings process before an Independent Hearing Panel. There were nine appeals to the High Court (one of which went to a formal hearing on a question of law about controlled activities) and the plan was finally made partially operative on 1 September 2015, and fully operative on 1 February 2017.

The review of the NRRP lead secondly to a stand-alone Canterbury Air Regional Plan that was made operative in October 2017.

To date sub-regional plans have been developed for the Selwyn Waihora Zone (Plan Change 1); the Hinds Catchment in the Ashburton Zone (Plan Change 2); the Southern Streams area in the Lower Waitaki Zone (Plan Change 3); the Wairewa Catchment in the Banks Peninsula Zone (Plan Change 6) and the Waitaki Catchment in the Upper and Lower Waitaki Zones (Part B of Plan Change 5).

Plan Change 4 was an omnibus plan change that clarified certain provisions in the LWRP concerned with protecting drinking water sources; strengthened rules about stock in water ways; better identified and protected inanga spawning sites; and made some changes around urban stormwater rules.

Plan Changes 1, 2, 3, 4 and 6 are all operative and Plan Change 5 (both the region-wide and Waitaki Catchment provisions) will become operative on 1 February 2019.

All of the plan changes except Plan Change 6 (the Wairewa Catchment) have been the subject of appeals to the High Court but no hearings have been required.

In addition, over a period of two years, the Commissioners initiated some targeted changes to the Waitaki Catchment Water Allocation Regional Plan to provide for emergency water shortage situations relating to hydro generation from Lake Pukaki; to give effect to an agreed change in the water take regime for the Maerewhenua Catchment; and to resolve some potential future problems relating to priorities on re-consenting in the Lower Waitaki catchment. These changes have all been made operative without any appeals.

Mention was made earlier of the flow and allocation plans that were in preparation when the Commissioners took office.

The Conway River and Waihao River variations were integrated into the relevant sections of the LWRP as was a flow and allocation regime for the Orari River.

The Hurunui flow and allocation variation was withdrawn when the Hurunui Waiau River Regional Plan was developed.

The Waipara Catchment Environmental Flow and Water Allocation Regional Plan went through an independent hearing process and was made operative on 16 June 2012. It is also a stand-alone plan that will eventually find its way into the Hurunui Waiau section of the LWRP.

The Pareora Catchment Environmental Flow and Water Allocation Regional Plan also went through an independent hearing process and was made operative on 21 July 2012. It will be incorporated in the OTOP section of the LWRP.

The Selwyn Variation was incorporated into Plan Change 1 (Te Waihora/Lake Ellesmere).

The Waihao variation was subsequently reviewed by the Lower Waitaki Zone Committee who recommended a revised flow and allocation regime which provided improved water quality

outcomes for the Wainono Lagoon. This was incorporated in Plan Change 3 (the Southern Streams section of the Lower Waitaki Zone).

Currently a change to the Hurunui Waiau River Regional Plan is being prepared for notification and two further sub-regional plans will be prepared for notification before the local body elections in 2019, following the receipt of ZIP Addenda from the OTOP and Waimakariri Zones. In the meantime, Plan Change 5 will apply in these zones. In addition, a second omnibus plan change is also being prepared for notification in 2019.

This will leave the Kaikoura Zone, the Christchurch West Melton Zone, part of the Hurunui Waiau Zone, part of the Banks Peninsula Zone and part of the Ashburton Zone to be dealt with in the future if that is seen to be necessary in the light of Plan Change 5 which will apply from 1 February 2019.

AGENDA ITEM NO: 6	**SUBJECT MATTER:** CWMS Fit for the Future Project
REPORT: Regional Water Management Committee	**DATE OF MEETING**: 12 February 2019
REPORT BY: Alastair Patrick	

Purpose

1. The purpose of this paper is to:

   - update the Regional Water Management Committee on the progress of the Canterbury Water Management Strategy (CWMS) Fit for the Future project
   - seek the Committee's agreement to the draft CWMS 2025 and 2030 goals developed by the Goals Working Group (**Appendix 1**)
   - seek the Committee's feedback on the draft work programme that will support delivery of the 2025 and 2030 goals (**Appendix 2**)
   - seek the Committee's feedback on the structure of the final advice that will go to the Canterbury Mayoral Forum in May (**Appendix 3**), including on how concerns over some of the 2040 goals might be addressed.

2. Appendices 1 and 2 incorporate the outcomes of the engagement process and the detailed work carried out by the Goals Working Group (most recently at a meeting of 30 January). To support your discussion, we have also provided feedback from the Canterbury Mayoral Forum (**paragraph 6** of this document).

3. This paper also notes the future process for the Fit for the Future project.

Update on project progress

4. The last meeting of the Regional Committee received some feedback from a meeting of the Canterbury Mayoral Forum and discussed a set of strategic implementation issues that might inform its advice to the Mayoral Forum. This set of issues were better water use, social capital and CWMS outcomes, governance and accountability, capacity and resourcing, and monitoring, knowledge, reporting and communication.

5. Since then, the engagement process on the Fit for the Future project has been completed and the Goals Working Group has:

   - reviewed the draft 2025 and 2030 goals, with a particular focus on urban water and the goals for the Regional and National Economies target
   - carried out a detailed assessment of the proposed draft work programme
   - discussed how a set of strategic implementation issues might be addressed in advice to the Mayoral Forum

- provided some advice on how some 2040 goals might be addressed in the future.

6. On 1 February the Mayoral Forum was updated on the Fit for the Future project. Feedback from the Mayoral Forum:

   - noted the Mayoral Forum were comfortable with the draft advice developed to date, recognising that there is increasing community expectation for timely delivery of outcomes

   - recognised the importance of telling the CWMS water story using scientific data and commissioned a communications strategy to support the Mayoral Forum announcement of Fit for the Future decisions in May 2019.

Draft Goals for 2025 and 2030

7. The draft goals for 2025 and 2030 are attached as **Appendix 1**. The draft goals have been considered on a number of occasions by the Goals Working Group and are close to final. Some minor refinement of wording is needed to ensure all draft goals are clearly defined and can be measured.

8. A summary of the draft goals is included in a recent paper provided to the Mayoral Forum, **Appendix 4**, **pages 9-11 of that paper**. It highlights notable changes in emphasis as a result of the Fit for the Future project.

9. At this meeting the Regional Committee is asked to focus on whether there are any **major issues** with any of the draft goals? Any minor issues, or drafting matters, should be provided to Environment Canterbury (cwmstargets@ecan.govt.nz) before the meeting, or handed to staff at the meeting.

10. The Goals Working Group in particular focussed on urban water and the draft goals for the Regional and National Economies target. On urban water, a number of suggestions were made by the Goals Working Group that in particular focussed on providing clarity around roles and responsibilities. These have been incorporated into **Appendix 1**. The Goals Working Group also discussed a draft goal for addressing externalities in the Regional and National Economies target. The results of their discussion on this are set out in **Appendix 1, Goals A208-A209.1.** The Working Group also requested that the draft goals be reviewed to ensure more positive language (for example, use 'maintain' rather than 'no further loss').

Draft Work Programme

11. The Draft Work Programme is provided in **Appendix 2.** It sets out an emerging regional work programme to support implementation of each draft goal with a focus on 2025 timeframes. Further work is required to:

   - check alignment with the National Policy Statement on Freshwater Management (NPS-FM)

   - ensure the draft work programme aligns with Zone Implementation Programmes (ZIP), ZIP Addenda and existing work programmes with key agencies

- firm up proposed actions, responsible agencies, timing and resource implications.

There is a lot of detail, so a summary of this can be found within a paper to the Mayoral Forum, **Appendix 2, pages 12-16**.

12. Not all actions and activities in the draft work programme will be able to be done in the short term. The Canterbury Mayoral Forum will be asked to endorse the high-level work programme in May 2019 as a starting point for discussion. Further conversations with individual organisations will then be required to confirm responsibilities, fully scope and cost each area of work, and secure the necessary resources and funding (for example, through Long-Term Plan processes). The work programme will continue to evolve over time as this work is carried out, and in response to further legislative and policy developments at the national level (such as changes to the NPS-FM).

13. The areas that the Regional Committee might cover in its meeting are:

- is the draft work programme complete – does it cover all of the draft goals?
- are the proposed actions capable of being delivered?
- will the suggested actions contribute to the goals being achieved?

14. Again, the Committee should focus on the major issues with the draft work programme. Any minor issues, or drafting matters, should be provided to Environment Canterbury (cwmstargets@ecan.govt.nz) before the meeting, or handed to staff at the meeting.

Strategic Implementation Issues

15. During the course of the work of the Task Groups and Goals Working Group a number of strategic implementation issues were raised. These are:

- leadership and accountability for the CWMS, in particular, ensuring Mayors are well supported in their leadership role, strengthening Ngāi Tahu involvement in the CWMS, supporting Zone Committees to shift their focus from planning to implementation, and ensure coordinated action among the many organisations and sectors that contribute to delivery of the CWMS
- resourcing and funding of the ambitious work programme
- monitoring, reporting and review of Strategy implementation and progress
- understanding and support for the CWMS, including increasing social capital.

16. These are discussed more fully in the Paper to the Mayoral Forum in **Appendix 4: paragraphs 18-25**. The Goals Working Group made the following points:
    - Leadership and accountability – they agreed that it was important that Mayors be supported so that there is consistent and firm joint leadership of the CWMS. Zone Committees' workloads should adapt to reflect changing demands, especially in the post-planning phase. Specific implementation

work programmes could be developed to assist the Committees focus to delivery on the ground.

- Resourcing and funding - there may be a need to develop more formal arrangements between the Mayoral Forum and key industry and NGO groups to get buy-in to the work programme.

- Understanding and support for the CWMS - rūnanga and community groups have struggled to maintain commitment and enthusiasm during the course of the CWMS, in particular in Zone Committees. A number of factors contribute to this – daytime meetings are often not convenient; a plethora of technical papers without sufficient 'plain English' explanations; not enough concrete progress on improving water quality outcomes. Each of these can be addressed.

17. As indicated above and in the paper to the Mayoral Forum, there seems to be a developing set of advice about what should be done for three of the four strategic implementation matters. There is less clarity about how the range of matters around leadership and accountability should be addressed. A focus of this part of the Regional Committee's meeting might discuss what concrete steps might be taken to address these matters, including ensuring consistent leadership of the CWMS, the role and structure of Zone Committees in implementation, how to strengthen Ngāi Tahu involvement, and steps to ensure coordinated action.

2040 Goals

18. The review of the 2040 CWMS goals are beyond the scope of this project but the engagement process (including Task Groups and the Goals Working Group) have signalled that some of the goals may need adjustment given the changes that have occurred since 2010, and shifts in emphasis coming through in the draft 2025 and 2030 goals.

19. The following table sets out which of the 2040 goals have been identified during the engagement process as possibly requiring further thought or adjustment.

2040 Goal	Reason for possible change
100% of lowland areas and spring-fed streams with at least good aquatic ecosystem health, or showing an upward trend.	This may not be possible due to contaminant lag times.
Restored at least one major fresh water recreational opportunity in each zone that is not currently available in 2010.	Some people thought this was unambitious.
Restored fishing opportunities in most lowland streams in each water management zone.	This may not be possible due to contaminant lag times in some waterbodies.
A substantial increase in the reliability of supply and the area of land irrigated in Canterbury all of which has demonstrated high standards of riparian, nutrient and water use management, and has been shown to be consistent with the principles off the strategy. An indicative target is	Doubts whether commercial realities and the impact of limits will see the 850,000 hectares of irrigated land achieved.

2040 Goal	Reason for possible change
850,000 hectares of irrigated land with at least 95% reliability. Improved reliability of supply for all irrigated land.	
Increased Canterbury's contribution to national GDP from 15% to 20%, of which 2% is attributable to increased production and better water management. A demonstrable increase in economic wealth due to biodiversity protection and improvement, and increased recreational use of water resulting from implementation of the CWMS.	Doubts about whether the measures are right, especially the relationship between water management and Canterbury's contribution to national GDP.

20. As the Committee noted in its previous meeting, there are potential inconsistencies between the 2025/2030 and 2040 goals. The Goals Working Group has considered what advice might be provided to the Mayoral Forum on how this issue might be addressed in the future. A full review of the CWMS should be carried out in the medium term that would, among other things, consider the 2040 goals. This review could also ensure that all of the target areas and goals reflected the improved knowledge since the CWMS was first developed, take into account differences between zones, and ensure that there were not mutually irreconcilable goals (for example, between salmonid and native fish species).

Structure of draft advice

21. Attached as **Appendix 3** is a paper that sets out a possible structure for the Regional Committee's advice to the Mayoral Forum. The Committee might wish to discuss what are the key messages and content that it wishes to include in that advice.

Future Steps

22. There will then be further meetings of the Goals Working Group and Regional Committee in mid-March and 9 April respectively before final meetings of the Canterbury Chief Executives Forum and Mayoral Forum in May.

Appendices

1. Draft 2025 and 2030 CWMS goals
2. Draft Work Programmes for the CWMS goals
3. Outline of final May report to the Canterbury Mayoral Forum

Apprendix 1: Draft Goals as at 18 January 2019

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A96		**Environmental Limits**							
A104	ENV	Environmental flows and catchment load limits	Set and Meet Environmental Flows	No Target set in 2010	Set environmental flows for surface streams, rivers and groundwater that are consistent with the fundamental principles of the CWMS and that: - are consistent with ecosystem health and biodiversity targets - for all braided rivers include flood peaks, flow variability, flood periodicity, and channel forming flows to maintain their braided character and ecosystems - afford protection to instream values identified in Ngāi Tahu policies - are consistent with the recreational uses of the water body; and - consider all the target areas of this strategy. Set catchment load limits for nutrients for each water management zone that are consistent with the fundamental principles of the CWMS and that: - are consistent with ecosystem health, drinking water and biodiversity targets - afford protection to instream values identified in Ngāi Tahu policies - are consistent with the recreational uses of the water body; and - consider all the target areas of this strategy.	156) Review of environmental flows and catchment load limits in response to changing monitoring information, new understanding and technologies, and if requested by regional and zone committees	All catchments have planning frameworks that include both environmental flow and load limits. [in place that are consistent with the fundamental principles of the CWMS.]	Review environmental flows and catchment load limits in response to changing monitoring information, new understanding and technologies, and if requested by regional and zone committees	158) Review of environmental flows and catchment load limits in response to changing monitoring information, new understanding and technologies, and if requested by regional and zone committees.
A106	ENV	Environmental flows and catchment load limits	Set and Meet Environmental Flows and Load Limits	No Target set in 2010	Established and begun to implement a programme to apply environmental flows to existing consents.	157) Established and begun to implement a programme to review existing consents where such review is necessary in order to achieve catchment load limits	All planning processes include consideration of how flows and limits will be achieved by a mix of regulatory and non-regulatory means that may include consent reviews 20% of catchments have undertaken consent reviews to achieve flows and catchment load limits	50% of catchments have undertaken consent reviews to achieve flows and catchment load limits	159) Environmental flow and catchment load limits achieved in all waterbodies.
A53		**Ecosystem Health and Indigenous Biodiversity**							
A63	ECO	Freshwater species and their habitat	Freshwater species and habitat	Implement actions to correct the decline in freshwater species, habitat quality or ecosystems.	No Target set for 2015	No Target Set for 2020			No Target Set for 2040
A63.2	ECO		Improve Native Fish Populations	No Target set in 2010	No Target set for 2015	19) An upward trend in diversity and abundance of native fish populations.	Reduction in threatened/at-risk status of indigenous fish species compared to 2020.	Reduction in threatened/at-risk status of indigenous fish species compared to 2025.	No Target Set for 2040

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A64	ECO	Lowland streams	Increase Riparian Planting	No Target set in 2010	No Target set for 2015	22) Increased the length of waterway with riparian management appropriate to aquatic ecosystem protection by 50% from 2010 figures.		Increase in area of riparian management to protect aquatic ecosystems along prioritised waterways from 2020 figures.	No Target Set for 2040
A66	ECO	Wetlands	Protect Wetlands	Prevent further loss of area of naturally occurring wetlands.	Protected all and restored at least two significant wetlands in each zone.	20) Protected all existing wetlands.	All existing 2020 wetlands are physically protected through active management.	All prioritised wetlands are under active management where required and are in the process of being restored to a self-sustaining system.	27) Protected all wetlands.
A69	ECO	Hapua, lagoons, estuaries	Lagoons and Hapua Health	Implement actions to prevent further loss of ecosystem health in river mouths and coastal lagoons.	Accelerate the current riparian restoration and management programme for Te Waihora/Lake Ellesmere and tributary streams.	21) A significant protection and restoration programme is in place on the most ecologically significant river mouth or coastal lagoon in each management zone.		Coastal lagoons, hapua and estuaries show improvement in key ecosystem health indicators compared to 2025.	26) Examples of thriving coastal lagoons, and lowland or spring-fed ecosystems in each water management zone.
A70	ECO	Lowland streams	Improve Lowland Stream Health	Identify and prioritise protection for lowland streams ecosystems in each zone.	Protect and enhance the ecological health of the best examples of lowland streams ecosystems in each zone. Improve ecosystem condition in at least another 10% of lowland streams in each zone.	17) Improved condition and water quality in at least 60% of lowland streams and 60% of lowland lakes in each zone.	70% of lowland and spring-fed streams with at least good aquatic ecosystem health or showing an upward trend.	80% of lowland and spring-fed streams with at least good aquatic ecosystem health or showing an upward trend.	28) 100% of lowland and spring-fed streams with at least good aquatic ecosystem health or showing an upward trend.
A73	ECO	High country and foothill streams	Improve Foothill River Health	No Target set in 2010	Highlighted any high country spring-fed or foothill streams where ecosystem health is declining, and identified the cause with an action plan in place.	18) All foothill rivers and high country rivers and/or lakes either in good ecological health or better, or showing upward trend.	Maintain or improve aquatic ecosystem health of all foothill and high country rivers and high country lakes.	Maintain or improve aquatic ecosystem health of all foothill and high country rivers and high country lakes..	30) Maintained upland spring-fed streams and lakes in very good aquatic ecosystem health (no decline from 2010). 29) 80% of other rivers/streams and lakes with very good aquatic ecosystem health.
A76	ECO	Drylands	Protect Dryland Ecosystems	Maintain existing high quality indigenous aquatic and dryland ecosystems in intermontane basins and on the plains	No Target set for 2015	No Target Set for 2020	Water use (irrigation and changing hydrology as a result of water use) shall result in no further loss of indigenous ecosystems in Canterbury	Water use (irrigation and changing hydrology as a result of water use) shall result in no further loss of indigenous ecosystems in Canterbury	No Target Set for 2040
A80	ECO	Catchment nutrient loads (Ecosystem Health/Biodiversity)	Set and Meet Good Management Practice	No Target set in 2010	Achieved nutrient efficiency targets for the zone on all new irrigated land and 50% of other rural properies (and of properties within urban boundaries that apply nutrients over significant areas)	23) Achieved nutrient efficiency targets for the zone on all new irrigated land and 80% of other land in major rural uses (pasture, major arable and major horticulture crops) and have 100% of rural properties working towards those targets (and of properties within urban boundaries that apply nutrients over significant areas).	Achieved nutrient efficiency targets for the zone on all new irrigated land and 80% of other land in major rural uses (pasture, major arable and major horticulture crops) and have 100% of rural properties working towards those targets (and of properties within urban boundaries that apply nutrients over significant areas).		31) Achieved nutrient efficiency targets for the zone on all new irrigated land and 100% of other rural properties (and of properties within urban boundaries that apply nutrients over significant areas).

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A81	ECO	Environmental flows (Ecosystem Health/Biodiversity)	Set and Meet Good Management Practice	No Target set in 2010	Identified where environmental flows are not met or require change to meet ecosystem health and biodiversity outcomes and implemented actions to rectify. Identified areas where catchment load limits for nutrients are not met, prioritised areas and implemented actions to ensure there is no further enrichment. Demonstrated and included in implementation programmes, how land within the zone will be managed to achieve catchment load limits. Made progress towards achieving environmental flows and catchment load limits.	24) Made progress towards achieving environmental flow and catchment load limits.	Environmental flow regimes and catchment load limits are in place for catchments and significant rivers affected by abstration	Environmental flow regimes and catchment load limits are in place for all catchments and significant rivers affected by abstration	25) Achieved all environmental flow and catchment load limits.
A82	ECO	Emerging contaminant risks	Understand Emerging Contaminant Risks	No Target set in 2010	Understood any emerging contaminant risks and identified any at-risk areas for targeted management.	No Target Set for 2020	Emerging contaminant risks are understood and limits are set where appropriate; at risk areas are managed with targeted remedial programme in place	Emerging contaminant risks are understood and limits are set where appropriate; at risk areas are managed with targeted remedial programme in place	32) Understood any emerging contaminant risks and identified any at-risk areas for targeted management.
A84		**Natural Character of Braided Rivers**							
A85	BRA	Ecosystems, habitats and species	Manage Braided River Bird Habitats	Implement actions to correct the decline in usable braided river bird habitat.	Enhance and protect breeding populations of indigenous braided river birds.		Five rivers are under active management to increase habitat area usable by all species of braided river indigenous birds.	Nine rivers are under active management to increase habitat area usable by all species of braided river indigenous birds.	48) Increase habitat area usable by all species of braided river indigenous birds.
A86	BRA	Riparian wetlands, springs and lagoons	Protect Braided River Habitats		Protect the indigenous habitats in riparian wetlands, springs and the lagoons associated with braided rivers.	42) Protected significant habitat for a full range of indigenous braided river flora and fauna. 43) Protected and enhanced the habitats in riparian wetlands, springs and the lagoons associated with braided rivers.	An increase in area of significant habitat for a full range of indigenous braided river flora and fauna. Increase in actively managed riparian wetlands, springs and the lagoons associated with braided rivers from 2020.	More than 50% of indigenous braided river dependent species are showing positive trends in abundance and health.	47) All indigenous braided river-dependent species are showing positive trends in abundance and health.
A87	BRA	Environmental flows (Braided River)	Set and Meet Ecological Flows		Identified where environmental flows do not include flood peaks, flow variability, flood periodicity, and channel forming flows and implemented actions to rectify.	44) Made progress towards achieving environmental flows.	Made progress towards achieving environmental flows that achieve braided river characteristics on X braided rivers	Made progress towards achieving environmental flows that achieve braided river needs on X+n braided rivers	45) Achieved all environmental flows.

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A91	BRA	Braided River Character	Maintain Braided River Character	Maintain the braided character of all Canterbury's braided rivers by maintaining upper catchments of Canterbury's alpine braided rivers as largely natural ecosystems and landscapes; no new dams on the mainstem of major alpine braided rivers; maintaining the extent of active floodplains, flow variability and sediment flow processes [...]; supporting the dynamics of river mouths and coastal processes.	No Target set for 2015	No Target set for 2020	Maintain the braided character of all Canterbury's braided rivers by maintaining upper catchments of Canterbury's alpine braided rivers as largely natural ecosystems and landscapes; no new dams on the mainstem of major alpine braided rivers; maintaining the extent of active floodplains, flow variability and sediment flow processes [...]; supporting the dynamics of river mouths and coastal processes. Increased community knowledge, awareness and guardianship of the importance of mauri within braided river systems.	Maintain the braided character of all Canterbury's braided rivers by maintaining upper catchments of Canterbury's alpine braided rivers as largely natural ecosystems and landscapes; no new dams on the mainstem of major alpine braided rivers; maintaining the extent of active floodplains, flow variability and sediment flow processes [...]; supporting the dynamics of river mouths and coastal processes. Increased community knowledge, awareness and guardianship of the importance of mauri within braided river systems.	46) Canterbury's braided rivers show the dynamic, braided nature typical of such rivers.
A119		**Kaitiakitanga**							
A128		**Marae Water supply**							
A129	KAI	Marae water supply	Assure Marae Drinking Water Supply	Prevent further decline in the quality or quantity of water bodies used as a drinking water supply to marae and associated papakāinga.	No Target Set for 2015	71) All marae and associated papakāinga have access to high quality drinking water	No decline, compared to 2020 levels, in the quality or quantity of water bodies used as a drinking water supply to marae and associated papakāinga	All marae and associated papakāinga have access to high quality drinking water that meets Drinking Water Standards	No Target Set for 2040
A132		**Working together in partnership**							
A133	KAI	Working together in partnership	Integrate kaitiakitanga	Formally recognise Te Rūnanga o Ngāi Tahu Freshwater Policy and, in each zone, work towards resolving issues related to Ngāi Tahu policies.	Protocols for the recognition and exercise of mana, including kaitiakitanga within the Ngāi Tahu rohe, are implemented.	No Target Set for 2020	Develop an integrated Te Rūnanga O Ngai Tahu/papatipu rūnanga reporting mechanism.		75) Kaitiakitanga is a normalised and an integrated practice of water management
A140	KAI	Working together in partnership	Establish Mātauranga Maori Reporting	No Target set in 2010	A report on the health of all Ngāi Tahu nominated water-bodies using the Ngāi Tahu Cultural Health Monitoring Tool.		An annual mātauranga informed report is provided for rūnanga on the health of all waterways to inform water management decision-making (by councils and Ngāi Tahu)	Outcomes reporting is being informed by Mātauranga Maori Report	No Target Set for 2040
A134	KAI	Working together in partnership	Iwi management plans	No Target set in 2010	Iwi Management Plans in place for all zonal areas.		All Iwi Management Plans more than 5 years old are refreshed	All Iwi Management Plans are refreshed in relation to the integrated ki uta ki tai action plan and responded to.	No Target Set for 2040
A134.1	KAI	Working together in partnership	Planning Regime Reflects Ki uta ki tai			70) Integrated KI Uta KI Tai environmental management philosophies into zonal and regional management planning	An integrated ki uta ki tai strategic plan is completed for all catchments that sets out the agreed actions for all participants		
A135	KAI	Working together in partnership	Increase institutional capability	No Target set in 2010	Institutional capability within local government to adequately recognise and provide for the principle of kaitiakitanga in water management.	No Target Set for 2020	Institutional capability within local government to adequately recognise and provide for the principle of kaitiakitanga in water management.	Institutional capability within local government to adequately recognise and provide for the principle of kaitiakitanga in water management.	No Target Set for 2040

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A135.1	KAI	Working together in partnership	Improve Succession Planning	No Target set in 2010	No Target set in 2010	No Target Set for 2020	Succession plans and rangatahi forums are in place to enable the next generation to participate in zone committees and other water management processes	Intergenerational representation is evident and supported, and ongoing development occurs in the CWMS process	
A136	KAI	Working together in partnership	Establish New co-Governance Arrangements	No Target set in 2010	A formal co-governance arrangement for the active management of Te Waihora (Lake Ellesmere) and its catchment.	69) Further co-governance arrangements (developed in partnership by Ngāi Tahu, the Crown and Canterbury local government) for the active management of nominated waterbodies in North and South Canterbury	Co-governance arrangements developed and being implemented for at least one nominated waterbody in North Canterbury and one in South Canterbury	Co-governance arrangements implemented for at least one nominated waterbody in North Canterbury and one in South Canterbury	No Target Set for 2040
A137	KAI	Working together in partnership	Establish Tangata Tiakiwai	No Target set in 2010	A system for appointing Ngāi Tahu tangata tiakiwai (water guardians) who have formal recognition and support from local government is established.	72) At least one Ngāi Tahu tangata tiakiwai is appointed in each zone	At least one Ngāi Tahu tangata tiakiwai is appointed in each zone	All zones are sufficiently resourced by Tangata tiakiwai	No Target Set for 2040
A138		**Wāhi Taonga and mahinga kai**							
A141	KAI	Wāhi taonga and mahinga kai	Understanding Customary Use	Increase understanding in each zone of the customary values and uses associated with specific waterbodies or parts of waterbodies.	Identified customary uses (current and potentially restored) for all waterways.	No Target Set for 2020	Identified customary uses are mapped for all catchments in Canterbury	No Target Set for 2030 (once values and uses are identified and understood, protection of those values is implemented through other goal lines, such as A139)	No Target Set for 2040
A139	KAI	Wāhi taonga and mahinga kai	Protect wāhi taonga	Prevent further loss or degradation of Ngāi Tahu nominated wāhi taonga.	All degraded wāhi taonga and mahinga kai waterways nominated by Ngāi Tahu have an active restoration programme in place that responds to cultural priorities.	No Target Set for 2020	5 sites in each papatipu runanga area (including freshwater mataitai and Fenton Reserves) are being restored or protected in recognition of them as wāhi taonga and/or to support and be accessible to papatipu runanga for mahinga kai and resource gathering purposes	10 sites in each papatipu runanga areas (including freshwater mataitai and Fenton Reserves) are being restored or protected in recognition of them as wāhi taonga and/or to support and be accessible to papatipu runanga for mahinga kai and resource gathering purposes	74) Protection, in accordance with Ngāi Tahu values and practices, of wāhi taonga and mahinga kai waterways
A145	KAI	Wāhi taonga and mahinga kai	Protect Mahinga Kai	No Target set in 2010	Work and research has commenced on establishing a mahinga kai food gathering standard.	73) A mahinga kai food gathering standard is confirmed and implemented as a water quality monitoring tool		Mahinga kai is available that is of high quality	No Target Set for 2040
A141.1	KAI	Wāhi taonga and mahinga kai	Protection of Taonga Species				At risk freshwater taonga species (e.g. kekewai, kakahi, long finned and short finned tuna) are identified and protection zones are identified and put in place	Number of at risk species is declining	
A142	KAI	Wāhi taonga and mahinga kai	Identify Cultural Flow	No Target set in 2010	A programme for identifying cultural preferences for river and stream flow agreed in each zone.	No Target Set for 2020	Cultural flows are provided for through regional planning processes and documents	Papatipu Rūnanga are decision makers for allocations of Ngai Tahu water in each catchment	No Target Set for 2040
A149	KAI	Wāhi taonga and mahinga kai	Stop the Loss of Intergenerational Knowledge	No Target set in 2010	No Target Set for 2015	No Target Set for 2020	No loss of intergenerational cultural knowledge and practice	No loss of intergenerational cultural knowledge and practice	No Target Set for 2040

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A1		**Drinking Water**							
A17	DRI	Source water quality targets	Protect Existing Untreated Supplies	For those communities that currently have access to untreated and safe drinking water, implement actions to ensure the source water quality remains high enough to meet the current Drinking Water Standards for New Zealand without treatment	No Target set for 2015	No Target Set for 2020	Compliant untreated community supplies (as at 2010) continue to have access to source water that does not require treatment because of catchment protection measures.	Compliant untreated community supplies (as at 2025) continue to have access to source water that does not require treatment because of catchment protection measures.	No Target Set for 2040
A21	DRI	Source water quality targets	Reduce the Need for Additional Treatment	Prevent further decline in source water quality for those communities that currently have to treat drinking-water, such that this requires increased level of treatment or monitoring requirements	No Target set for 2015	No Target Set for 2020	Source water quality remains compliant with Drinking Water Standards resulting in no community drinking water supplies requiring new treatment or increased monitoring requirements. Priority is given to drinking water (including stockwater) over other uses in LWRP.		No Target Set for 2040
A10.3	DRI	Source quantity	Protect Water Volumes	No new activities in a drinking water catchment that reduce access to sufficient quantities of drinking water supplies	No Target set for 2015	No Target Set for 2020	No new activities in a drinking water catchment/ groundwater zone that reduce access to sufficient quantities of drinking water supplies including stockwater Drinking water has priority over other uses in the Land and Water Regional Plan and territorial authorities' district plans.	Drinking water supplies (community use and stockwater) are maintained as a first order priority when reviewing regional policies and planning.	No Target Set for 2040
A11	DRI	Source water quality -Nitrates	Reduce Nitrates Levels in Groundwater	No Target set in 2010	No Target set for 2015	83) A demonstrable decrease in nitrate concentrations in shallow groundwater in priority areas is achieved.	Decrease in the number of wells with increasing trends in nitrate level concentrations from 2020.	Decrease in the number of wells with increasing trends in nitrate level concentrations from 2025.	86) Average annual nitrate levels in all groundwater wells in Canterbury are below 50% of the maximum allowable value for drinking water 87) Nitrate levels in community drinking water wells are below the maximum allowable values of drinking water.
A13	DRI	Source water quality targets	Improve Drinking Water Supplies	No Target set in 2010	No Target set for 2015	84) There is an increase in the percentage of the population supplied with water that meets the New Zealand Drinking Water Standards for health-based determinants.	All community drinking water supplies and self-supplied bores meet the New Zealand Drinking Water Standards for health-based determinants.	All drinking water supplies and self-supplied bores meet the New Zealand Drinking Water Standards for health-based determinants.	
A18	DRI	New*	Improve Groundwater Modelling	No Target set in 2010	No Target set for 2015	No Target Set for 2020	Detailed dynamic groundwater modelling provides data that ensures policy recognises impact of contaminants, land use and climate change.	Refine, define and utilise detailed dynamic groundwater modelling to provide data that informs regional and district policies and rules that recognise impact of contaminants, land use and climate change.	No Target Set for 2040

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A19	DRI	Catchment nutrient loads (Drinking Water)	Set Catchment Nutrient Loads	No Target set in 2010	Demonstrated, and included in implementation programmes, how land within the zone will be managed to achieve catchment load limits	No Target Set for 2020	Implementation programmes in place for each zone to achieve catchment load limits	Catchment load limits are met (timeframes set in implementation programmes)	No Target Set for 2040
A20	DRI	Catchment nutrient loads (Drinking Water)	Set and Meet Good Management Practice	No Target set in 2010	Set catchment load limits for nitrate consistent with drinking water quality targets for each zone, identified priority areas where targets are not met and implemented actions to ensure there is no further enrichment	82) Achieved nutrient efficiency targets for the zone on all new irrigated land and 80% of other land in major rural land uses (pasture, major arable and major horticulture crops), and have 100% of rural properties working towards those targets (and of properties within urban boundaries that apply nutrients over significant areas).	Achieved nutrient efficiency targets for the zone on all new irrigated land and 80% of other land in major rural land uses (pasture, major arable and major horticulture crops), and have 100% of rural properties working towards those targets (and of properties within urban boundaries that apply nutrients over significant areas).	Achieved nutrient efficiency targets for all zones as set out in plans.	88) Achieved nutrient efficiency targets for the zone on all new irrigated land and 100% of other rural properties (and of properties within urban boundaries that apply nutrients over significant areas).
A16	DRI	Emerging contaminant risks	Understand Emerging Contaminant Risks	No Target set in 2010	Emerging contaminant risks are understood and any at risk areas identified for targeted management, and a remedial programme underway	85) Understood any emerging contaminant risks and identified any at risk areas for targeted management and a remedial programme underway.	Emerging contaminant risks are ongoingly identified with targeted remedial programmes in place and evaluated	Emerging contaminant risks are ongoingly identified with targeted remedial programmes in place and evaluated	89) Understood any emerging contaminant risks and identified any at risk areas for targeted management and a remedial programme underway.
A23		**Recreation and Amenity**							
A32	REC	Water based recreational opportunities	Improve Recreational Opportunities	Maintain 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 each zone.	96) A positive trend in the availability and/or quality of recreational opportunities in each zone.	A continuing and measurable positive trend, against baseline information, in the diversity, availability and quality of recreational opportunities in each zone.	A continuing and measurable positive trend, against baseline information, in the diversity, availability and quality of recreational opportunities in each zone. Plans in place that recognise the values and provide protection for recreation and amenity opportunities.	No Target Set for 2040
A32.1			Increase Salmonid Spawning Sites	No Target set in 2010	No further reduction in the number and areas of existing salmon spawning sites. Increasing annual trout spawning counts in identified important areas (based on a 5-year average) as an indicator of habitat availability for salmonid and indigenous fish species.	No Target Set for 2020	20% increase in the number and area of protected salmon spawning sites from 2009 baseline in identified important areas.	40% increase in the number and area of protected salmon spawning sites from 2009 baseline in identified important areas.	No Target Set for 2040
A33	REC	Water based recreational opportunities	Restore Recreational Opportunities	No Target set in 2010	No Target set for 2015	No Target Set for 2020	Identify the restoration of priority freshwater recreational opportunities in each zone, developing plans to achieve and show measurable progress.	Priority freshwater recreational opportunities in each zone (identified by 2025) show progress towards restoration and protection.	100) Restored at least one major fresh water recreational opportunity in each zone that was not currently available in 2010.
A34	REC	Water based recreational opportunities	Understand Emerging Contaminant Risks	No Target set in 2010	No Target set for 2015	No Target Set for 2020	Understand threats and act to reduce risk to freshwater recreational opportunities.	Potential threats to freshwater recreational opportunities are understood and plans in place to reduce risk.	No Target Set for 2040

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A35	REC	Freshwater Angling	Protect Fishing Opportunities	No Target set in 2010	A positive trend in the availability and/or quality of freshwater angling opportunities. An increase in freshwater angler numbers (or catch rate) assessed over a five year average.	No Target Set for 2020	Advocate for and support measures to effectively restore and protect fishing opportunities in each water management zone.	Freshwater fishing opportunities in each zone are restored and protected.	99) Restored fishing opportunities in most lowland streams in each water management zone
A36	REC	Freshwater Angling	Improve Lowland Stream Health	No Target set in 2010	No Target set for 2015	No Target Set for 2020	Health of lowland streams, rivers and lakes in Canterbury show improving habitat and an increase in fishing opportunities.	Sustained improvement in health of lowland streams, rivers and lakes in Canterbury.	No Target Set for 2040
A39	REC	Recreational water flows	Set and Meet Recreational Flows	No Target set in 2010	Identify where environmental flows are not met or require change to meet recreational outcomes and implemented actions to rectify.	97) Made progress toward achieving environmental flows	Environmental flows, which support recreational flow requirements, are set as part of the rule setting process in new plans and included in existing plans when up for review.	Environmental flows, which support recreational flow requirements, are set as part of the rule setting process in new plans and included in existing plans when up for review. All new and existing consents in review are linked to environmental flows.	98) Achieved all environmental flows
A41	REC	Recreational water quality	Improve Recreational Quality	No Target set in 2010	At least 80% of river bathing sites graded as suitable for contact recreation.	95) Of the lake and river sites used for contact recreation, an increase in the percentage that meet recreational water quality guidelines.	Improve on percentage of rivers and lakes being swimmable since 2020 due to consistent water quality monitoring and real-time results.	Achieve the National Policy Statement for Freshwater Management target of 92 percent of rivers and 81 percent of lakes in Canterbury being swimmable by 2030.	No Target Set for 2040
A42	REC	New: Cyanobacteria	Reduce Cyanobacteria	No Target set in 2010	No Target set for 2015	No Target Set for 2020	Cyanobacteria risk for priority contact recreation sites in Canterbury rivers and lakes is understood and managed for public health LWRP rules set mat coverage at 20% for water bodies	Progress is made towards achieving identified reduction targets for cyanobacteria.	No Target Set for 2040
A178		**Water Use Efficiency**							
A179	WUE	Benchmarks	Establish Benchmarks for Water Use	Initiate the development of models/benchmarks of reasonable and efficient use of water in irrigation.	"Established and reported against a benchmark of current water use efficiency for irrigation" (from target A184 below)	No Target Set for 2020	90% of water users meeting or exceeding the agreed water use benchmarks	100% of water users meeting or exceeding the agreed water use benchmarks	No Target Set for 2040
A182	WUE	General (Water Use Efficiency)	Establish Best Practice Standards for Water Use	No decline in the efficiency of water use	60% of water used for irrigation is operating according to best practice water use	106) 80% of water used for irrigation and stockwater is operating according to best practice water use	100% of water used for irrigation and stockwater is operating according to best practice water use	100% of water used for irrigation and stockwater is operating according to water use Good Management Practices.	109) Implemented best practice water use on all irrigation, stockwater and industrial/commercial use in Canterbury
A184	WUE	General (Water Use Efficiency)	Implement Demand Management in Urban Water Use	No Target set in 2010	Established and reported against a benchmark of current water use efficiency for irrigation, community (potable, industrial and commercial) and stockwater	107) Reduced water used for community water supply by 10% (measured in litres per person for day) compared to that used in 2010	Drinking water suppliers have demand management programmes in place as part of good infrastructure practices.	Drinking water suppliers implementing demand management programmes as part of good infrastructure practices.	112) Reduced water used for community water supply by 20% (measured in litres per person per day) compared to that used in 2010.

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A184.1	WUE	General (Water Use Efficiency)	Increase EnvironmentalBenefits from Water Use Efficiency	No Target set in 2010	No Target Set for 2015	No Target Set for 2020	Policy mechanisms are in place to ensure that efficiency gains are returned to the environment where there is overallocation of the water resource	A percentage of the water saved through water use efficiency is returned back to the environment or is allocated to other uses.	No Target Set for 2040
A185	WUE	General (Water Use Efficiency)	Increase Value Benefits from Water Use	No Target set in 2010	No Target Set for 2015	108) Increased the benefits gained per unit of water so that the volume of water beneficially used (used in production of crops, electricity, or commercial uses) in each zone as a proportion of the volume of water take is, on average, 5% greater than that achieved in 2010.		Increased the benefits gained per unit of water so that the volume of water beneficially used (used in production of crops, electricity, or commercial uses) in each zone as a proportion of the volume of water take is, on average, 10% greater than that achieved in 2020.	110) Increased the benefits gained per unit of water so that the volume of water beneficially used (used in production of crops, electricity, or commercial uses) in each zone as a proportion of the volume of water take is, on average, 25% greater than that achieved in 2010.
A152		**Irrigated Land Area**							
A162		**Infrastructure**							
A168	IRR	Infrastructure	Build Agreed Integrated Infrastructure	No Target set in 2010	A system of regionally distributed rural water infrastructure for the storage and distribution of water that provides reliable water to all irrigated land has been designed, timetabled, costed and staged. The system has been demonstrated to align with the principles and targets of this strategy	119) Started construction of regional storage and [improved reliability of supply for at least 50% of irrigated land]			No Target Set for 2040
A166	IRR	Funding Challenges	Funding Integrated Infrastructure Solutions	No Target set in 2010	Decided mechanisms for funding infrastructure and the ongoing operation of the strategy	No Target Set for 2020			No Target Set for 2040
A169	IRR	Consent Reconfiguration	Undertake Consents Reconfiguration	No Target set in 2010	Started on the infrastructure (or reconfiguration of existing consents) that facilitates efficiency improvements and is linked into the regional storage plan	No Target Set for 2020			No Target Set for 2040
A170	IRR	Zone Infrastructure Plans	Build Agreed Integrated Infrastructure	No Target set in 2010	Specified, for each zone, their infrastructure requirements consistent with the regional storage plan, and the principles and targets of the strategy	120) Started construction of infrastructure identified in zonal implementation programmes.	Progress in construction of integrated infrastructure identified in zone implementation programmes (Integrated - both irrigation and environmental)	Progress in construction of integrated infrastructure identified in zone implementation programmes (Integrated - both irrigation and environmental)	No Target Set for 2040
A171		**Reliability**							

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A172	IRR	Irrigated Land Area	Improve Reliability	No reduction in irrigated land area in Canterbury or in overall reliability with each zone.	Increased the area of irrigated land and/or reliability of irrigation.	Improved reliability of supply for at least 50% of irrigated land (Part of A168 and A164 above)	(Integrated Infrastructure system provides) 95% reliability for 25% of irrigated land while also ensuring all target area water uses (environmental (incl. MAR, drinking water, kaitiakitanga) are met as per CWMS priorities. OR reword to All integrated infrastructure systems also ensure all CWMS target area water uses are met.	(Integrated Infrastructure system provides) 95% reliability to 75% of irrigated land while also ensuring all target area water uses (environmental (incl. MAR, drinking water, kaitiakitanga) are met as per CWMS priorities. OR reword to All integrated infrastructure systems also ensure all CWMS target area water uses are met.	121) A substantial increase in the reliability of supply and the area of land irrigated in Canterbury all of which has demonstrated high standards of riparian, nutrient and water use management, and has been shown to be consistent with the principles of the strategy. An indicative target is 850,000 hectares of irrigated land with at least 95% reliability 122) Improved reliability of supply for all irrigated land.
A188		**Energy Security and Efficiency**							
A196	ENE	Efficiency	Optimise Energy Use via Improved Scheduling	No Target set in 2010	No Target Set for 2015	127) Increased the productivity per unit of electricity – per hectare consumption for irrigation sector and equivalent measures in other sectors.		Increased the productivity per unit of energy by X from 2025 (downward trend in energy use per hectare).	No Target Set for 2040
A199	ENE	Multi-Use Infrastructure	Ensure Efficient Energy Use in irrigation	Seek opportunities, as part of design and planning for new infrastructure, to reduce electricity used in the use of water, to provide for multiple use, and to factor generation into existing irrigation infrastructure.	Started projects to generate electricity from existing irrigation infrastructure.	130) Generate at least 40-45% of the power used by irrigation in Canterbury from irrigation infrastructure (including multi-use hydro and irrigation systems) within Canterbury and other renewable on-farm sources	128) Factored efficient use of electricity in all irrigation infrastructure	128) Factored efficient use of electricity in all irrigation infrastructure	128) Factored efficient use of electricity in all irrigation infrastructure
A201	ENE	Maintain Canterbury's Contribution to Energy Supply	Maintain Contribution to National Energy Objectives	Maintain Canterbury's existing contribution to New Zealand's security of electricity supply	No Target Set for 2015	131) Maintain or increase Canterbury's contribution to New Zealand's security of electricity supply.	Continue to maintain or increase Canterbury's contribution to New Zealand's security of electricity supply.	Continue to maintain or increase Canterbury's contribution to New Zealand's security of electricity supply.	No Target Set for 2040
A202		**Indicators of Regional and National Economies**							
A203		**General (Indicators)**							
A204	ENC	Added-value from water	Added-value from water	No decline in the contribution water makes to the Canterbury economy as measured through 'value added' (economic impact)	Increase the value and employment added per unit of water	No Target Set for 2020	Increase the value-add per unit of water	Carry through from 2025	Increased Canterbury's contribution to national GDP from 15% to 20% of which 2% is attributable to increased production and better water management
A205	ENC	Added-value from water	Added-value from water	No Target set in 2010	No Target Set for 2015	Increased production through the direct application of water to agriculture contributes an additional $0.4 billion per annum value added to the Canterbury economy	That the productivity of water use grows by 3% per annum	Carry through from 2025	Increased production through the direct application of water to agriculture contributes an additional $1.7 billion per annumn value-added to the Canterbury economy
A206.1	ENC	Added-value from water	Revitalising Communities	No Target set in 2010	No Target Set for 2015	No Target Set for 2020	No decline in rural economic and social vitality from that measured at 2010		

Counter	TA	TT (Themes from 2017 & 2015 Targets Reports)	Intent (The Objective in 4-5 words)	2010	2015	2020	2025	2030	2040
A206.2	ENC	Employment benefits	Increased Household Income	No Target set in 2010	No Target Set for 2015	No Target Set for 2020	Canterbury household income is maintained or expanded relative to national household income		Recognised and reported on the employment benefits (direct and indirect) that arose from the CWMS
A207		**Externalities and Opportunity Costs**							
A208	ENC	Externalities	Assessing the Cost of Externalities	Any assessments of regional economic value factor in externalities (e.g. water quality treatment costs, climate change emissions, changed recreational values) as well as the costs of environmental repair and restorations	No Target Set for 2015	No Target Set for 2020	All assessments of regional economic value factor in externalities (e.g. water quality treatment costs, climate change emissions, changed recreational values) as well as the costs of environmental repair and restorations	All assessments of regional economic value factor in externalities (e.g. water quality treatment costs, climate change emissions, changed recreational values) as well as the costs of environmental repair and restorations	No Target Set for 2040
A209	ENC	Economic wealth benefits from biodiversity and recreational use	Wealth from Biodiversity and Recreational Use	No Target set in 2010	No Target Set for 2015	Measures in place to assess the economic wealth benefits of freshwater biodiversity (and other ecosystem services) and recreational use of water			A demonstrable increase in economic wealth due to biodiversity protection and improvement, and increased recreational use of water resulting from implementation of the CWMS
A209.1		Natural Capital	Revinvestment in Natural Capital	No Target set in 2010	No Target Set for 2015				
A175	ENC	New* High Value Production (from IRR)	Ensure Water Use for High Value Output	No Target set in 2010	No Target Set for 2020			Metrics give objective information on diversified land use using irrigation enabled innovative, high value, sustainable primary production.	No Target Set for 2040
A177	ENC	New: Promote Sustainable Land Use Options (From IRR)		No Target set in 2010	No Target Set for 2020	No Target Set for 2020	That the value of food and fibre exports transported through the Lyttelton Port of Christchurch, through Timaru Port and through the Christchurch International Airport grows on average at 2% per annum	2030 Target inserted: Diversified Land Use: Land use change with smaller environmental footprint may need to be considered in the future. alternative high value land uses are required. may sit better as an economics target.	No Target Set for 2040

Appendix 2: Draft Work Programmes as at 18 January 2019

Key Target Area	target ID	Work Programme
Environmental Limits	A104, A106, A87, A19, A39	Environmental flow and catchment load limits in regional plans will remain appropriate through: a) reviews scheduled through ECan's Long Term Plans and Annual Plans; b) incorporating climate change knowledge and predicted impacts into reviews; c) ensuring that urban water quality limits are incorporated into reviews according to the timeframes that need to be met under the NPSFM; d) prioritising CWMS first order priorities when setting environmental flows and catchment load limits through reviews; e) ensuring planning processes to review environmental flow and catchment load limits will consider how to implement these flows and limits, including consideration of regulatory and non-regulatory methods.
Environmental Limits	A104, A87, A19	Achieving catchment load limits will be prioritised in over-allocated catchments and will be achieved through: a) industry groups and irrigation schemes promoting GMP and management practices to progess the achievement of catchment load limits; and b) establishing, implementing and monitoring a rural focused technology uptake programme.
Environmental Limits	A104, A19	Develop and implement methods for annual reporting on progress toward achieving environmental flow and catchment load limits and report annually on progress.
Environmental Limits	A106, A169	Develop and implement a programme to ensure that environmental flow regimes and catchment load limits are met in a timely manner.
Environmental Limits	A106	Undertake compliance monitoring and enforcement to ensure that consent holders are complying with flow requirements and nutrient load limits on resource consents.
Ecosystem Health & Indigenous Biodiversity	A63.2	Develop a monitoring programme for native fish species. This will: a) identify the species to report on, including developing a list of Canterbury's at-risk/threatened species; b) monitor and report on at-risk/threatened fish species populations and related measures to track species abundance and health; and c) determine roles and responsibilities and obtain funding to undertake the above.
Ecosystem Health & Indigenous Biodiversity	A63.2	Review the effectiveness of currently used fish screen and fish exclusion devices and identify appropriate fish exclusion devices for Canterbury waterways.
Ecosystem Health & Indigenous Biodiversity	A63.2, A64, A36	Develop an integrated programme of action to protect and manage native fish habitats. This will: a) prioritise waterways and areas to be managed to improve species health and abundance, b) identify methods and undertake actions to restore habitats, including riparian management; c) monitor and report on improvements to aquatic ecosystems and habitats; and d) obtain funding for waterway restoration projects.
Ecosystem Health & Indigenous Biodiversity	A64	a) Determine an appropriate method to measure waterways with riparian management in place; b) measure and report on waterways with riparian management in place; and c) estimate a baseline for 2020.
Ecosystem Health & Indigenous Biodiversity	A66	Develop an integrated programme of action to protect and restore wetlands. This will: a) identify the number and area of existing wetlands; b) identify and evaluate tools to protect wetlands, including regulatory and non-regulatory; c) obtain ongoing funding for wetland protection and restoration; d) restore and protect prioritised wetlands; and e) monitor and report on the number, area and ecosystem health of wetlands.
Ecosystem Health & Indigenous Biodiversity	A69	Develop an integrated programme of action to prevent further loss of ecosystem health in river mouths and coastal lagoons. This will: a) identify and prioritise coastal lagoons, hapua and estuaries requiring management action, considering the effects of climate change (including sedimentation and natural morphological tendancies); b) establish protection and restoration programmes for prioritised areas; d) obtain funding for protection and restoration programmes; e) monitor and report on the number and effectiveness of protection and restoration programmes.
Ecosystem Health & Indigenous Biodiversity	A70, A36	Develop and implement a programme of action to improve the health of lowland streams (including drains). This will: a) identify and prioritise lowland streams for protection and enhancement; b) assign responsibility for each stream prioritised for protection and enhancement; c) obtain funding for protection and enhancement projects; d) develop and undertake actions to improve lowland stream health; e) monitor and report on protection and enhancement projects and stream health, incorporating citizen science.

Ecosystem Health & Indigenous Biodiversity	A73	Develop an integrated high country waterway programme that a) monitors and reports on the water quality and ecosystem health of high country spring fed and foothill streams and high country lakes; b) determines the cause(s) of any decline in water quality and ecosystem health; c) prioritises streams and lakes based on ecosystem health and water quality; and d) develops and implements a work programme to maintain or improve high country stream and lake health.
Ecosystem Health & Indigenous Biodiversity	A76	Develop a programme of action to protect and manage dryland ecosystems. This should: a) clarify agency roles and responsibilities; b) identify dryland ecosystems/areas that require protection, maintenance and restoration; c) develop a monitoring and reporting programme to report on dryland ecosystem health; d) develop an education programme focussing on the effects of water use on dryland ecosystems; e) seek funding for dryland ecosystem protection, maintenance and restoration projects; f) identify opportunities to include mechanisms for dryland protection in regional and local planning documents.
Ecosystem Health & Indigenous Biodiversity	A80, A20	Determine the extent of farmland encroachment into dune ecosystems; identify options for regulatory and non-regulatory responses, taking into account climate change and coastal erosion; and undertake appropriate responses.
Ecosystem Health & Indigenous Biodiversity	A80, A20	Review the effects of forestry operations on waterway health; investigate regulatory and non-regulatory measures for reducing these effects (including setbacks for erosion control, Good Management Practice for Forestry); and undertake agreed measures.
Ecosystem Health & Indigenous Biodiversity	A82	Develop a programme of action to identify and report on emerging contaminants which will include: a) reporting to the community on risks associated with identified contaminants; b) developing contaminant limits in waterways, where required; c) developing a contaminants watchlist programme to feed into national and international work programmes; d) developing a future thinking groundwater modelling and monitoring programme to better understand contaminants and their effects on drinking water.
Natural Character of Braided Rivers	A85, A86	Develop a braided river work programme to guide indigenous flora and fauna habitat and species protection. This should: a) identify and map key habitat for indigenous braided river flora and fauna; b) identify key species in these habitats requiring protection and management; c) develop criteria for defining measures for bird species status; d) monitor and report on status of ecosystems and species; e) include pest plant and animal species control; f) align work programmes for all agencies/organisations involved in braided river protection and management.
Natural Character of Braided Rivers	A85	Ensure that landowners adjacent to braided rivers understand how their land uses affect the braided river. Continue to encourage and support community and irrigation scheme initiatives to manage braided river margins, including incorporating management of braided rivers in Farm Environment Plans for landowners adjacent to river margins.
Natural Character of Braided Rivers	A85, A86	Investigate whether Farm Environment Plans can require properties located adjacent to braided rivers to address effects of farming activities on braided river ecosystems; and, if not, review FEP provisions in regional planning documents to require this.
Natural Character of Braided Rivers	A86	Review statutory and non-statutory regional / district planning documents, strategies and bylaws to ensure that river bed braid plains are defined and to determine if braided river ecosystems are appropriately managed and protected.
Natural Character of Braided Rivers	A91	Ensure that appropriate management tools are in place for braided rivers to monitor and manage gravel extraction so that; a) braided river character is maintained; b) flood risk is minimised; and c) aggregate supply is maintained.
Natural Character of Braided Rivers	A91	Ensure that provisions are in place in regional and district planning documents that maintain the landscape values of the upper reaches of braided rivers and manage the effects of the taking and use of water and land use change.
Natural Character of Braided Rivers	A91	Review all relevant statutory and non-statutory regional and district planning documents and strategies to ensure all provisions relating to braided river systems recognise and provide for ki uta ki tai.
Natural Character of Braided Rivers	A91	Ensure that appropriate management plans are in place for the river mouths of major braided rivers to ensure the dynamic, braided nature typical of such rivers is maintained.
Kaitiakitanga	A129, A131	Develop and implement a comprehensive programme to manage Marae drinking water sources where a marae or households on a marae have requested assistance. This will include: a) baseline monitoring and reporting on the current state of existing drinking water sources, as well as establishing a long term water quality monitoring programme; b) identification of water sources that need to be improved; c) identification of causes of degraded water quality; d) development of a work programme to address degraded water quality.

Kaitiakitanga	A133	Develop and implement an agreed comprehensive reporting programme with Te Runanaga and papatipu runanga to ..... . The Reporting programme will include: a) an agreed schedule for reporting; b) an agreed format for reporting.
Kaitiakitanga	A134	Undertake a full review of the extent to which iwi management plans have been taken into account in council activities, and the extent to which iwi are implementing them; and develop funding mechanism to support continued development of iwi management plans
Kaitiakitanga	A134, A134.1	Develop and implement an agreed ki uta ki tai strategic framework, including: a) identifying and seeking funding for the development of an iwi management plan for each catchment; b) ensuring plans are integrated with other statutory and non-statutory documents being prepared by zone committees; c) implementing iwi management plans
Kaitiakitanga	A135	Ongoing implementation of a Tuia work programme that includes institutional capability building and the delivery of specific CWMS targets; and integrate all territorial authorities into full joint (Tuia) work programmes
Kaitiakitanga	A140	An annual mātauranga informed report is provided for rūnanga on the health of waterways to inform water management decision-making (by councils and Ngāi Tahu)
Kaitiakitanga	A141	Develop and implement a programme focussing on freshwater taonga species, with the purpose of: a) improving understanding of key taonga species, and their habitats; b) identifying and implementing tools to protect species; c) monitoring and reporting on the effectiveness of management tools; d) establishing a regular monitoring and reporting programme for all taonga species.
Kaitiakitanga	A142	Review statutory and non-statutory regional/city planning documents, strategies and bylaws to: a) determine if they appropriately manage Fenton Reserves and b) identify appropriate tools for managing Fenton Reserves
Kaitiakitanga	A143	Ensure that cultural values are recognised when developing, reviewing and implementing environmental flow and allocation regimes
Kaitiakitanga	A144, A145	Develop and implement a region-wide mahinga kai framework that: a) identifies key species for each zone; b) includes monitoring and reporting against mahinga kai priorities and iwi mahinga kai plans; c) identifies opportunities for restoration; d) informs and influences statutory and non-statutory plan development and planning processes
Kaitiakitanga	A147, A149	Develop a programme to support cultural values to ensure that there is no loss of intergenerational cultural knowledge and practice in the region. This will include: a) working together to ensure that cultural values are agreed and defined within each zone; b) development of education tools and methods to retain knowledge and practices; c) implementation of tools and methods; d) sharing of knowledge, tools and methods throughout the region.
Drinking Water	A17	Develop a region-wide drinking water programme to ensure that all drinking water supplies are protected and that there is no decline in the quality of drinking water. This will include: a) ensuring that Territorial Authorities have programmes in place to check security of and maintain boreheads; b) identifying and mapping protection zones; c) monitoring and reporting progress to DWNZ Standards for all sources; d) managing compliance in high priority areas; e) enforcing management of activities in protection zones; f) communicating obligations to private bore owners and owners of public supplies; g) adjusting programme approach in response to monitoring information.
Drinking Water	A10.3	Review all regional and district statutory and non-statutory planning documents, strategies and bylaws to ensure that they are aligned with and support the CWMS targets for drinking water.
Drinking Water	A10.3	Develop communications tools, where required, to educate communities about drinking water sources, risks and protection measures in their local areas.
Drinking Water	A11	Continue to develop and implement a work programme addressing nitrate levels in groundwater. This will include: a) continuing research and monitoring of groundwater wells to recognise trends and zone variation to inform risk factors; b) managing compliance in high priority areas; c) continuing to develop and implement communication and education tools with the community to report on nitrate trends and monitoring results, as well as the effects of different land use activities on groundwater quality.
Drinking Water	A11	Continue to develop and implement a work programme addressing the effects of nitrates on human health. This will include: a) monitoring and reporting of nitrate concentrations; b) analysis of effects on human health; c) communication of results with the community.

Drinking Water	A13	Develop and implement a work programme to ensure that all people in Canterbury are connected to a water supply that meets the New Zealand Drinking Water Standards for health-based determinands. This will include: a) encouraging monitoring of private water supplies and if necessary upgrading or seeking another source; b) continuing to monitor and report progress towards achieving New Zealand Drinking Water standards for all sources; c) investigating whether reviewing consents will contribute to the outcomes sought by the community; d) actively undertaking compliance, monitoring and enforcement of activities within all protection zones; e) adjusting the work programme in response to monitoring and reporting information.
Drinking Water	A18	Continue to update groundwater modelling and monitoring programmes to better understand drinking water issues, as well as options to address these in response to both international studies on emerging contaminants and climate change and local and national research and monitoring. Use this information to develop communications tools to share this information will the community.
Drinking Water	A16	Develop a contaminants watchlist programme that pulls together relevant information from national and international research and monitoring, ensuring that information is readily available to regulators and researchers.
Recreational and Amenity Opportunities	A32, A33	Establish and implement a work programme to diversify and enhance water-based recreational opportunities in each zone, including: a) undertaking surveys and gathering information to establish baseline data on activities; b) preparing work plans for each zone to implement identified improvements; c) ensuring that regional and district plans provide for recreation and amenity opportunities; d) obtaining funding to undertake work programmes in each zone.
Recreational and Amenity Opportunities	A32.1	Identify and implement actions to prioritise and protect salmon spawning sites, supported by: a) establishing a programme to monitor the number and area of spawning sites; b) identifying species to report on; c) ensuring that the prioritised spawning sites are included in planning frameworks.
Recreational and Amenity Opportunities	A34	Manage and reduce the risks to freshwater recreational opportunities by: a) clarifying agency roles and responsibilities for managing risks to freshwater recreational opportunities b) using international studies to understand the impact of threats; c) implement a programme to be alert to threats; d) ensure that the community are aware of potential threats and how risks can be managed.
Recreational and Amenity Opportunities	A35, A36	Develop an integrated programme of action to restore and protect fishing opportunities, which will: a) prioritise the restoration of fishing opportunities in each zone; b) establish catchment groups to take action to improve prioritised areas; c) obtain funding to support actions; d) monitor and report on the water quality and ecosystem health of prioritised areas.
Recreational and Amenity Opportunities	A41	Implement a system that reports water quality monitoring data in real-time and makes this available to the public.
Recreational and Amenity Opportunities	A42	Review monitoring protocols for cyanobacteria and develop an education and communication programme to ensure the public are aware of the health risks of cyanobacteria contamination.
Water-use Efficiency	A179, A185	Establish a regional working group to establish benchmarks for water use. This will a) develop agreed industry and sector water use benchmarks; and b) monitor and report annually on water use against agreed benchmarks
Water-use Efficiency	A182	Establish a regional working group to develop best practice standards for water use. This will include: a) developing agreed water use best practice standards for irrigation and stockwater; b) developing agreed best practice metrics to measure and report progress; c) establishing a monitoring framework to monitor best practice across primary sector water users and report against the CWMS targets.
Water-use Efficiency	A184	Develop and implement an urban water use programme. This will include: a) territorial authorities including demand management measures in Activity Management Plans; b) developing communication and education tools to improve awareness about water use efficiency in urban areas; c) developing and implementing a monitoring and reporting framework
Water-use Efficiency	A184.1	Developing a programme to address over allocation and water use efficiency. This will include: a) identification of catchments where there is existing overallocation; b) identifying trends in water use (through water use data) to establish where efficiency gains are being made; c) identifying options to address overallocation (regulatory and non-regulatory).
Water-use Efficiency	A185	Develop and implement a system to monitor and report on the benefits gained per unit of water; and identify and implement measures to improve the benefits gained per unit of water.

Irrigated Land Area	A168	Revise the CWMS regional infrastructure plan to include: a) an updated Canterbury supply demand/distribution model for water for all needs (environmental and economic); b) greater regard for the flows required to meet environmental, recreational and cultural flows and needs; c) updated information on water supply and demand by node; d) consideration of reductions in demand due to higher water use efficiency and the impacts of climate change; e) options for integrated water storage across each node; f) options for optimising the planning framework to facilitate collaboration between scheme operators. Undertake a case study once the update is completed.
Irrigated Land Area	A166	Investigate options for funding of infrastructure.
Irrigated Land Area	A169	Prepare an issues and options report on regulatory and non-regulatory mechanisms to facilitate infrastructure efficiency improvements, considering the revised infrastructure plan.
Irrigated Land Area	A170	Review zone implementation (infrastructure) programmes to ensure that they: a) demonstrate a balance between environmental and economic water demands; b) are aligned with the regional supply and demand modelling.
Irrigated Land Area	A172	Develop and implement a water reliability programme, including: a) establishing appropriate regional, scheme and individual metrics for reliability of supply; b) completing a scheme by scheme assessment of water reliability, identifying methods to improve reliability and measures of reliability; c) complete a groundwater assessment of impact of climate change on groundwater reliability; d) identify where more aggregated water user options would increase water users' ability to better manage water use and its effects; e) assess the need for further regional storage to support reliability goals.
Energy Security and Efficiency	A196, A199	Prepare an issues and options report to determine potential electricity savings in the irrigation sector, including: a) investigating the electricity demand of irrigation, including the productivity per unit of energy; b) determining options to reduce both energy and water usage; c) analysing power savings within schemes that have undertaken piping, using case studies.
Energy Security and Efficiency	A201	Electricity distribution companies work with water users to increase understanding and coordination of opportunities for mutual benefit (load management, capacity availability, generation options).
Indicators of Regional and National Economies	A204	Gather information on metrics developed in relation to 2025 goals.
Indicators of Regional and National Economies	A209	Identify preferred option for funding policy for reinvestment in natural capital and a method for implementing it.
Indicators of Regional and National Economies	A175	Establish a regional task force to investigate and provide recommendations on innovative, high-value and sustainable primary production options.

Appendix 3

Outline of final May report to the Canterbury Mayoral Forum

Purpose

- Short purpose statement (e.g. to propose 2025 and 2030 goals for the CWMS, and provide advice on a work programme to progress the goals and support implementation).

Recommendations

- Likely to include recommendations that the Canterbury Mayoral Forum:
  - Approve the proposed goals
  - Endorse the draft work programme, subject to further discussion with contributing organisations
  - Agree to next steps / further work proposed on implementation
  - Approve the plan for communicating Mayoral Forum decisions.

Key points

- Short summary of key points (to act as an Executive Summary).

Background

- Reminder about the purpose of the project, the role of the Regional Committee and the process for developing advice.
- Brief update on work undertaken since the interim report of 1 February.

Proposed CWMS goals for 2025 and 2030

- Reference to the proposed set of goals (to be attached), noting any substantive changes since the interim report of 1 February.
- Proposal that the Canterbury Mayoral Forum now approve these goals

2040 Goals

- Any advice on the areas where adjustment to 2040 goals may be required (in light of 2025 and 2030 goals, and changes since they were adopted in 2010).
- Any advice on how and when the 2040 goals might be reviewed.

Agenda Item No: 7	Subject Matter: Regional Committee 2018 Annual Report
Report to: Canterbury Water Management Strategy Regional Committee	CWMS - Target/s Areas All
Report by: Lesley Woudberg, Team Leader, CWMS Facilitators	Date of Meeting: 12 February 2019

Purpose

To provide an opportunity for feedback on the draft Regional Committee 2018 Annual Report.

To seek the agreement of the Committee to endorse the 2018 Annual report, subject to the agreed changes being made.

Recommendation

That the Canterbury Water Management Strategy Regional Committee:

1. **Adopt the 2018 Regional Committee Annual Report.**

Report

The Regional Committee is required to report annually on its activities to the Canterbury Regional Council.

The draft word document of the 2018 Regional Committee Annual Report is set out below.

The Regional Committee is scheduled to present its 2018 Annual Report to the Regional Council on Thursday 11 April at approximately 11:30am.

The 2017 Annual Report can be found at https://www.ecan.govt.nz/your-region/your-environment/water/whats-happening-in-my-water-zone/canterbury-water-regional-committee/ (bottom of the page)

- CWMS Targets
- Monitoring and reporting
- Integration and efficiency of irrigation infrastructure

CWMS Target: Recreation and amenity

It is difficult to measure whether there has been a 'positive trend in the availability and quality of recreational opportunities in each zone" given the diversity of options available and numerous ways people chose to enjoy our rivers and lakes.

Around the region new recreational opportunities are being improved or developed by councils (upgraded toilet facilities at Chamberlains and Coes Ford, new swimming holes in the Hurunui River, and the Te Ara Ōtākaro Avon River Trail) but more needs to be done to understand the region's recreational resources so the committee has set up a working group to achieve this.

A report has been commissioned that provides a theoretical basis for the identification of individual and clusters of opportunities. Further work will be undertaken in 2019 to map existing recreational and amenity opportunities locations which should make it easier to measure progress.

CWMS Target – Ecosystem health and biodiversity

Under the Ecosystem Health and Biodiversity target there is a group of sub-targets that seek to improve native species populations and habitats.

As part of this, a Working Group has begun looking at the effectiveness of fish screens. Environment Canterbury has found that almost 1000 water take consents required fish screens, there has been limited testing of the effectiveness of various fish screen designs.

This work has prompted Environment Canterbury to include fish screens as a priority for compliance checks in 2018/19.

The Working Group has also been facilitating discussions with NIWA, industry, central government agencies (DOC, MPI and MFE) and other regional councils. This has resulted in an application to the Sustainable Food and Fibre Fund to improve the effectiveness of fish screens around New Zealand.

CWMS Targets - Fit for Future Project

Last year the Regional Committee reported to the Canterbury Mayoral Forum on the progress to meet the CWMS targets.

The Forum subsequently asked the Regional Committee to lead a process to develop interim targets for 2025 and 2030. This piece of work was later called the "CWMS Fit for the Future" project.

This project has been a large part of the Regional Committee's 2018 work programme. The project is not yet complete but good progress is being made with the help and input of many individuals and stakeholders.

The committee is due to provide their final advice to the Mayoral Forum in May 2019.

CWMS Monitoring and Reporting – Water Meters and Farm Environment Plan Audits

One of the functions of the Regional Committee is to monitor the progress of the CWMS. It does this by leading the development of a targets report every two years. The committee also receives regular reports on specific work being undertaken to deliver the CWMS. Two programmes reported to the committee this year focused on water meters and the data they generate and Farm Environment Plan Audits.

Water Meters and Water Take Data

Regulations now require water meters on water takes of 5 l/s and greater. In the case of Canterbury this means more than 6,000 takes require water meters; 5,000 are telemetered and provide real time data and data from 1,000 are uploaded annually. Work has focused

The Regional Committee

The purpose of the Regional committee is to;

1. Monitor the progress of the Canterbury Water Management Strategy across the region; and
2. Provide advice to Environment Canterbury on regional issues.

The membership reflects these functions and includes community, rūnanga, Te Rūnanga o Ngāi Tahu and council representatives. Each of the ten zone committees are also represented. The Canterbury District Health Board, Ministry for the Environment, Ministry of Primary Industries and the Department of Conservation have observer status.

Membership

Independent Chair - Hugh Logan
Community - Hugh Canard
Community - Jane Demeter
Community - Cole Groves
Community - Nicky Hyslop
Community - Ross Millichamp
Community - Vicky Southward
Rūnanga Rep North Canterbury - vacant
Rūnanga Rep Mid Canterbury - Riki Lewis
Rūnanga Rep South Canterbury – David Higgins
Te Rūnanga o Ngai Tahu – Rebecca Clements
Environment Canterbury – Cr Peter Scott
Environment Canterbury – Cr Claire McKay
TA Rep North Canterbury – Mayor Winton Dalley
TA Rep Christchurch City Council – Cr Sara Templeton
TA Rep Mid Canterbury – Cr Nicole Reid
TA Rep South Canterbury – Peter McIlraith
ZC Rep Ashburton – Ben Curry
ZC Rep Banks Peninsula – Fiona Nicol
ZC Rep Kaikoura – Ted Howard
ZC Rep Orari-Temuka-Opihi-Pareora – Hamish McFarlane
ZC Rep Selwyn-Waihora – Karaitiana Taiuru
ZC Rep Christchurch West Melton – Les Wanhalla
ZC Rep Hurunui Waiau – Michele Hawke
ZC Rep Upper and Lower Waitaki-South Coastal – Sandra Hampstead-Tipene
ZC Rep Waimakariri – Carolyne Latham
Observer - Dr Alistair Humphrey, Canterbury District Health Board
Observers - Murray Doak and Jo Buckner, Ministry of Primary Industries
Observer - Nick Vincent, Ministry for the Environment
Observer – John Benn, Department of Conservation

Reflections from Dr Andy Pearce – Regional Water Committee Chair

In June 2018 independent chair Dr Andy Pearce stood down from the Regional Committee. Andy has been involved in the Canterbury Water Management Strategy (CWMS) since 2006 when he designed and trialled a community-led decision-making process as part of the Canterbury Strategic Water Study, the precursor to the CWMS. Read his reflections below.

Initially the CWMS was about water storage, having enough water during the summer period to maintain river flows, supply irrigation schemes and further irrigation development.

Twenty-two years on and the CWMS is so much more. It is about making progress on all ten targets not just irrigation development. Some of the biggest changes I've seen have been

Agenda Item No: 8	Subject Matter: Facilitator's Report
Report to: Canterbury Water Management Strategy Regional Committee	**CWMS - Target/s Areas** All
Report by: Lesley Woudberg, Team Leader, Environment Canterbury	**Date of Meeting:** 12 February 2019

Purpose

Provide the Regional Committee with information on:

- Dates for meetings and events
- Progress - Issues raised in previous meetings
- Recent media stories from across the region.

Recommendation

That the Canterbury Water Management Regional Committee:

1. **Notes the Facilitator's report.**

Report

1. Dates, Meeting and Events

Dates 2019	Meetings and Events
12 March	Regional Cmtt Working Groups
9 April	Regional Cmtt meeting Expect final sign off – Fit for Future Project
14 May	Farm visit – FEPs and Audit *What is really happening – what is the real effect of FEP and audits?*
11 June	Regional Cmtt meeting
9 July	Regional Cmtt Working Groups
13 August	Regional Cmtt meeting
10 September	Regional Cmtt meeting
8 October	Regional Cmtt Working Groups (TBC)
12 October	Local Govt Elections
12 November	Regional Cmtt meeting (TBC)
10 December	Regional Cmtt Working Groups (TBC)

2. Progress - Issues Raised During Previous Meetings

ACTIONS FROM PREVIOUS MEETINGS		Who	Status
12 Dec 2017	**Weed Strike Force** Weed control Te Waihora	Interested in progress and also alternatives to the use of chemical sprays	January 2019 summary report on progress (below) Ongoing discussion with DOC and research institutions on alternatives to chemical sprays
13 March 2018	**Urban Water** **3 Waters (drinking water, storm water and waste water)**	Govt –3 Waters Review https://www.dia.govt.nz/Three-waters-review Comment from Selwyn Waihora Zone Committee 31 Jan 2019 Cr Murray Lemon – Selwyn District Council *"...Nationally we are having debate on how to treat 3 Waters, but in relation to Selwyn we have responsibility for 5. In addition to potable, stormwater and wastewater we also have an extensive network of water races dating back to the early development of pastoral farming in the district and an extensive network of land drainage predominantely (but not exclusively) in the lower coastal reaches of the Selwyn."*	Eta detailed proposals for 3 Waters June 2019

Te Waihora Weed Strikeforce Work Update January 2019.

Figure 1: one of a number of mature grey willow stands at Rennies Bay.

January 2019 overview

Work commenced after the Christmas/New year break on Thursday 3rd of January. This month has seen the return of the more typical Caterbury summer, with mostly hot and dry days. The lake remained open during January and water levels were low.

Initial focus was on Purple Loosestrife in Tai Tapu and Prices Culvert. Those plants that had begun flowering were cut and bagged.
Most of the willow control took place at Rennies Bay, with some on-going work taking place at William's Block and Wards Block. The Rennies Bay block occupied privately owned land that has had no previous grey willow control. Mature grey willow occupied freshwater springs and is rapidly colonizing any area excluded from grazing or of high disturbance such as drains and bogs.

With the completion of willow work at Rennies Bay, the northern shore of Te Waihora has now had full surveillance and grey willow control completed. During February and March, the focus can shift to highly valued biodiversity sites on the western shore i.e. Lakeside and raupo areas of Harts Creek.

economic, environmental, recreational and cultural – in a way that works for farmers and is practical. The project will also address the knowledge gaps that currently exist, and work to fit in with the economic reality of farming.

Janet Gregory, Canterbury Regional Coordinator for NZ Landcare Trust, is managing the project. She says: "While most farmers want to farm sustainably, many remain concerned about the implications of having areas identified as wetlands and are uncertain about how to best manage them. This includes addressing matters that go beyond regulatory compliance, such as weed control when stock is excluded or what species to plant in different areas. This project will showcase how farmers can lead and undertake such projects, with support from others when required."

Cultural values

Shaun Burkett (Regional Leader – Biodiversity) and Mananui Ramsden (Cultural Land Management Advisor – Kaitohutohu Tikanga Whenua) represent Environment Canterbury on the project team. A key component of the project is to incorporate mātauranga Māori alongside farming and scientific knowledge.

Wetlands are considered taonga for Ngāi Tahu and with protection of Mahinga Kai now included in Farm Environment Plans for some Canterbury districts, it is a good opportunity to share this knowledge and develop management options that include this. Ramsden adds: "Mātauranga Māori Monitoring is a highly effective way of measuring outcomes and will be essential for future reference."

Wetland protection

There has been huge wetland loss over many years with more than 90 per cent of wetlands lost throughout the country through drainage, land development and land use change. In Canterbury natural wetlands on the plains are now very rare; most of the remaining wetlands are coastal or in the foothills, high country or margins of rivers.

Jason Butt, Environment Canterbury's Principal Biodiversity Advisor – Wetlands, comments: "This project aims to help land managers to appreciate and understand the value wetlands add, not only to their productive systems but to all sectors of society, and this is key to halting the loss of natural wetlands. This in turn will help preserve the biodiversity values, cultural values and ecosystem services that wetlands provide for future generations."

31 January 2019
Ashburton Guardian

Scientist busy tracking harmful nitrates source

It's challenging work trying to track the source of potentially-harmful nitrates in the Tinwald area, says senior Environment Canterbury scientist Philippa Aitchison-Earl. Aitchison-Earl used nitrate isotopes to try to identify the source of high nitrate levels in an area of Tinwald stretching from Timaru Track Road to below Lake Hood. Her work was commissioned by the Ashburton Water Zone Committee and she reported back to them this week. High levels were recorded at the site of the former Tinwald sale yards, while other elevated readings were attributed to septic tanks, animal effluent and fertiliser applied by farmers.

She said high nitrate levels had also been recorded there in the 1980s and was the result of both past and current land use. In flat Canterbury, it could take decades for new practices to

"Excellent progress has been made with our planning work in the last few years," Peter Skelton concluded. "In partnership with the community, we are well on the way towards completing catchment-focused rules for the whole region, with sub-region plans for the Orari-Temuka-Opihi-Pareora zones and the Waimakariri zone due to be notified in mid-2019."

Background

The Nutrient Management and Waitaki Plan Change was notified for public submissions in February 2016. Council accepted the recommendations of independent hearing commissioners in January 2017. Eight appeals to the High Court on questions of law were received, three of which were withdrawn. In late 2018, Council resolved to make the plan change operative on 1 February 2019.

The Land & Water Regional Plan became largely operative in September 2015. It sets the framework to implement community aspirations for water through the Canterbury Water Management Strategy, a community led, collaborative approach to improve water outcomes throughout the region.

The Land & Water Regional Plan operates at two levels – a region-wide section and 10 sub-region sections. The policies and rules in the sub-region sections can apply instead of, or in addition to, policies and rules in the region-wide section. The sub-region sections implement the region-wide objectives in the plan in the most appropriate way for the catchment.

Sub-region sections that are now legally effective cover the Selwyn Te Waihora, Wairewa/Lake Forsyth, Hinds Plains and Waitaki - South Coastal Canterbury zones.

Radio NZ

3 February 2019 Insight:
Running Dry – Can New Zealand thrive without irrigation?"
https://www.radionz.co.nz/national/programmes/insight/audio/2018680689/insight-running-dry-can-nz-thrive-without-irrigation

Kathleen Smitheram

From: Matt Willoughby
Sent: Monday, 11 February 2019 1:11 p.m.
To: 9(2)(a) [redacted]
Cc: Helen Graham
Subject: Re: Tentative: FW: Follow up meeting re Burnham
Attachments: ATT89705 1.jpg

Thanks 9(2)(a) [redacted]

9(2)(a) [redacted]

See you soon.

Cheers,

Matt

-------- Original Message --------
Subject: Re: Tentative: FW: Follow up meeting re Burnham
From: 9(2)(a) [redacted]
To: Matt Willoughby ; 9(2)(a) [redacted]
CC: Helen Graham

Thank you Matt

It has been difficult for 9(2)(a) [redacted] to get everyone together so we are going with Monday.

Looking forward to seeing you there if you can make it.

Regards
9(2)(a) [redacted]

Get Outlook for iOS

From: Matt Willoughby <matt.willoughby@cdhb.health.nz>
Sent: Friday, February 8, 2019 4:32 PM
To: 9(2)(a) [redacted]
Cc: Helen Graham
Subject: Tentative: FW: Follow up meeting re Burnham
Hi 9(2)(a) [redacted]
Thanks for the invite to this meeting.
Monday is my rostered day off so it's unlikely I'll be able to attend as I am with my daughter on Mondays. I will try and arrange for her to be looked after for this time, but if another time is available on either Tuesday, Wednesday (PM), Thursday or Friday, that would suit better and I would be able to attend.

REGARDS
MATT WILLOUGHBY
Health Protection Officer
Environment Team
Protection Team
Community and Public Health

9(2)(a) [redacted]

From: 9(2)(a) [redacted]@ecan.govt.nz>
Sent: Tuesday, 12 February 2019 3:23 p.m.
To: 9(2)(a) [redacted]@foodandhealth.co.nz; 9(2)(a) [redacted] Alistair Humphrey; Helen Graham; Matt Willoughby; 9(2)(a) [redacted] 9(2)(a) [redacted]
Subject: Summary notes from meeting 11 February 2019 re Burnham area

Good afternoon,

Thank you all for your attendance at the meeting yesterday, particularly given the short notice and cramped conditions!

Below is my recollection of the meeting. Please let me know if I have missed anything and/or you disagree with my recollection and would like to see an amendment.

Notes re meeting on 11 February 2019 – Burnham drinking water

Attending: 9(2)(a) [redacted] (SDC); Dr Alistair Humphrey, Helen Graham, Matt Willoughby (CDHB); 9(2)(a) [redacted] (ECan),

Brief summary of meeting

Groundwater science reiterated that there are two separate issues to be considered; Regional groundwater trends and localised effects on GW due to adjacent land-use activities.

Regional groundwater trends showing elevated nitrate levels.

- Burnham area in 'Moderate' risk area, meaning nitrate levels can exceed the MAV at times, but they are not consistently above the MAV.
- GW looked at 7 monitoring bores in the area, these bores show an increasing trend consistent with the regional trend, and at times exceed 11.3mg/L for nitrate, but not consistently.
- All agreed, there are risks associated with using private wells for drinking water, and ideally these wells should be regularly tested and fitted with treatment devices for pathogens, particularly if shallow.
- Current advice is to test once a year. Concern raised regarding the fact a test is a snap shot in time and may not accurately capture the risk.
- Midwives and doctors are trained to share risk map info and other relevant information with those who have young children to alert them to potential risks.
- Acknowledged further work could be done to improve messaging.
- CDHB reiterated *e.coli* poses a more immediate risk than nitrates, and thus must also be focused on.

Localised effects/risks.

- Land-use activities in the Burnham area are raising down-gradient contaminant concentrations, sometimes to above the MAV. These activities include but are not limited to the NZDF wastewater discharge.
- Residents immediately down-gradient of NZDF were verbally notified of risks by SDC Environmental Health Officers and ECan officers following a high contaminant reading in downgradient monitoring bores in August 2018.
- A reticulated supply is available for the properties down-gradient of the NZDF, but private bore owners do not wish to connect. It was agreed connection is the best option, however there are complications associated with formally requiring these residents to connect.
- Following a request from EHO's Selwyn District Council is willing to extend the reticulated supply to cover more of the Burnham area.

Out of Scope

[redacted]

From: 9(2)(a) [redacted]
Sent: Tuesday, 19 February 2019 4:30 PM
To: Helen Graham <Helen.Graham@cdhb.health.nz>
Subject: Summary of info - Marae drinking water

Hi

Good to catch up today.
Had trouble finding this doc, so sorry for delay, here it is.

Cheers
9(2)(a) [redacted]

Mārae Drinking Water Supplies - Summary of information

	Tūtehuarewa Mārae Koukourarata	Ngāti Moki Mārae Taumutu	Tuahiwi Mārae Tūāhuriri	Karaweko Mārae Ōnuku	Mangamaunu Mārae Kaikōura
Source of water	**Rainwater** collected from roof of mārae and surrounding buildings	24m deep **well** situated on the grounds, well head is closed and has no concrete apron	16.7m deep **well** situated on the grounds, diameter of 150mm	**Surface water** from Te Awaiti stream, intake on Lighthouse Road, pipe openings covered by grate, storage tanks feed into tanks at mārae	**Rainwater** collected from roof
Storage	3 large tanks underneath buildings; 1 tank beside shed	Pressure tank built onto pump	2 drinking water tanks,1 sprinkler system tank	Holding tanks, sprinker system holding tanks and drinking water tanks	2 large holding tanks
Water quality	Clear, no smell, tastes good	'The best', ice cold, good flow, never had a problem	Clear, great taste, no discernible smell	Often determined by weather, mostly clean, clear, smells good No incidence of contamination to date	'Tastes like rainwater', guttering needs regular cleaning, needles and pollen from nearby trees can contaminate source, still used but not for drinking
Reliability all year /needs met	Storage meets needs (if supply ever low can truck in)	Supply consistent and reliable, meets needs	Supply consistent and reliable, meets needs	Supply consistent and reliable	At times rainwater supply is low, local whānau have brought in water, not always a consistent and reliable supply
Used in emergency events	Yes	Yes, has own generator to run water supply	Yes, has own generator to run water supply	Yes, has own generator, current supply is adequate to meet needs	Yes, has own generator
Treatment	Filter systems and UV treatment	Filter system then reticulated via pressure tank built onto the pump	Pumps, filter system, UV treatment, water conditioning systems, well secured.	Pumps, filter system, UV treatment, maintenance and testing well recorded	Filter units, pump reliant on a generator. No treatment

Out of Scope [redacted]

From: 9(2)(a) [redacted]
Sent: Tuesday, 12 March 2019 4:16 PM
To: Kathryn Russell <Kathryn.Russell@cdhb.health.nz>
Subject: Te Paiherenga hui - marae drinking water - draft notes

Hi Kathryn

I now have access to the DRAFT notes from the Te Paiherenga hui, as follows.
Also, as of this week 9(2)(a) [redacted] is back with ECan and may get involved in this project again. I will talk to her about future direction when we get a chance. Will let you know.

Regards
9(2)(a) [redacted]

Te Paiherenga Minutes 22 February 2019 10am – 3pm
Present: 9(2)(a) [redacted]
9(2)(a) [redacted]

1. *Marae Drinking Water – joined by Community and Public Health representatives*

Approval is sought from five rūnanga who are still to receive the report. Marae based at Ōnuku, Koukourārata, Tuahiwi, Taumutu, Mangamaunu are not on mains.
Recognition of role of marae for hosting large numbers of people and also community emergency response
Focus on not only the needs of today for providing potable and safe drinking water but also for the future
CWMS kaitiakitanga target – Every marae in the ECan takiwā has access to water quality and quantity
The intent is to understand where work can be done and who might do this. There could be an opportunity for ECan and Crown Public Health to work with each rūnanga to develop a programme of work
Advice is therefore sought from the rōpu today
Discussion:

- Query where data re nutrients/pollutants etc is accessed
- Knowledge content could be better
- Testing is important – if you don't look you don't find. It's important to have a person regularly taking samples for testing
- Link between nitrate levels in drinking water and cancer has been identified in research studies
- Every marae is different with regard to nutrient and nitrate levels
- Substance behind how the issues identified pertaining to potential health risks throughout the testing processes are addressed, required – support for a person to be trained for the role. The work involving this work requires careful planning
- Public Health acknowledgment that the work would need to be driven by the marae

- Recommendation of linking to the zone committee and discussing kaupapa with rūnanga reps and potential for advocacy through district councils
- Ideally a Plan for each marae to identify and mitigate risks
- Taumutu is right at the threshold of intensive dairy farming within catchment which increases risk of high nitrates in drinking water on a regular basis
- Funding is required to support programmes of work
- Query raised whether the existing planning regimes adequate for water supply and how can this be addressed in the future
- Land use has changed. Our water is not what it should be so therefore water has to be treated accordingly
- Query whether Ngāti Moki water at Taumutu could be tested, given that the water protection zone is by the lake – not where dairy farming encroaches on land close to Ngāti Moki
- There is potential scope to drive the kaupapa through existing work programmes including work related to FEPS

Actions:

A. Whether 9(2)(a) report addresses local service water to marae and if ground water, is suitable, to be follow up by ECan

B. Further planning and discussion to develop strategies at next Te Paiherenga hui on 22nd May.

9(2)(a) [redacted]

From: 9(2)(a) [redacted]@ecan.govt.nz>
Sent: Thursday, 4 April 2019 12:07 p.m.
To: Denise Tully
Subject: RE: info for targets
Attachments: CanterburyWaterManagementStrategy2017TargetsProgressReport.PDF

Hi Denise

I think on supplies. Hope that's not too much work for you guys. We won't be including too much detail, it more about the story we tell around the detail.

Ngā mihi
9(2)(a) [redacted]

From: Denise Tully <Denise.Tully@cdhb.health.nz>
Sent: Thursday, 4 April 2019 10:58 AM
To: 9(2)(a) [redacted]@ecan.govt.nz>
Subject: info for targets

Hi 9(2)(a) [redacted]

Can you tell me how you want the info presented regarding compliance of water supplies? Do you want to know on a population basis or how many supplies etc?

Ngā mihi,

Denise Tully
Technical Manager/Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch 8140
Tel 03 364 1777

9(2)(a) [redacted]

From: 9(2)(a) [redacted]@ecan.govt.nz>
Sent: Friday, 12 April 2019 10:55 a.m.
To: Denise Tully
Subject: RE: forfiling_GEN_2_1_CWMS targets

Hi Denise

The target is … There is an increase in the % of the population supplied with water that meets the NZDWS for health based determinants.

My first draft text is ….

Target 5: Community and Public Health assesses water suppliers' compliance with the Drinking Water Standards for New Zealand across all registered Canterbury community water supplies. Each supply serves a different population size. The results from the 2017-2018 annual drinking water quality survey showed an improvement in compliance in Hurunui, Waimakariri and Selwyn districts. Mackenzie district showed no change, while Christchurch, Timaru, Waimate, Kaikōura and Ashburton districts all showed a decrease in compliance, primarily due to infrastructure issues relating to loss of bore head security. Territorial Authorities have spent significant capital and operating budget on short to medium term work programmes to maintain and improve their community drinking water supplies in order to regain compliance and secure status.

Comments welcome.

Cheers
9(2)(a) [redacted]

From: Denise Tully <Denise.Tully@cdhb.health.nz>
Sent: Friday, 12 April 2019 10:30 AM
To: 9(2)(a) [redacted]@ecan.govt.nz>
Subject: RE: forfiling_GEN_2_1_CWMS targets

Hi Anita

Just trying to get a bit of a comment from public Health South. Just a reminder that this is unpublished data so your comments will need to be very non recognisable (ie high level trending which could have to some extent come from the info the councils provide at the CDWRG meeting)

Ngā mihi,

Denise Tully
Technical Manager/Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch 8140
Tel 03 364 1777

From: 9(2)(a) [redacted]@ecan.govt.nz]
Sent: Friday, 12 April 2019 9:42 a.m.
To: Denise Tully <Denise.Tully@cdhb.health.nz>

Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: RE: forfiling_GEN_2_1_CWMS targets

Challenging to tell the story, will share with you once I have the draft ready.

Is there data for Waitaki?

From: Denise Tully <Denise.Tully@cdhb.health.nz>
Sent: Friday, 12 April 2019 9:40 AM
To: 9(2)(a) [redacted]@ecan.govt.nz>
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: forfiling_GEN_2_1_CWMS targets

Hi 9(2)(a) [redacted]

Yes but remember a decrease over 2 years. Interestingly the year in-between had a much higher compliance rate for that particular district. (so things can look different in between)

Ngā mihi,

Denise Tully
Technical Manager/Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch 8140
Tel 03 364 1777

From: 9(2)(a) [redacted]@ecan.govt.nz]
Sent: Friday, 12 April 2019 9:22 a.m.
To: Denise Tully <Denise.Tully@cdhb.health.nz>
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: RE: forfiling_GEN_2_1_CWMS targets

This is great stuff, thank you Denise. Can I check that I interpret it right.

Compliance for 2017/18: 4,750/43,040 = 11.03% A decrease of 0.04%
Compliance for 2015/16: 4,615/41,684 = 11.07%

4750 Timaru population out of 43040 Timaru population (or 11.03% of the Timaru population) received compliant water that met the DWSNZ, a decrease of 0.04% on last year. Right?

Thanks again.
9(2)(a) [redacted]

From: Denise Tully <Denise.Tully@cdhb.health.nz>
Sent: Friday, 12 April 2019 8:48 AM
To: 9(2)(a) [redacted]@ecan.govt.nz>
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: forfiling_GEN_2_1_CWMS targets

Hi Anita

A few qualifiers; if these figures look different from what you are getting from councils it is because we have included non council schemes in each district. These are TA districts, which may not align completely with CWMS districts.

Also please note that comparing the 2015-2016 to the 2017-2018 annual survey has some difficulties because in the 2015-2016 survey compliance was reported on a zone basis, whereas it is now reported on a supply basis. For some councils, eg HDC it should have looked like they had more improvement than is shown in the stats...because in 2015-2016 Leithfield Beach zone was fully compliant (and still is) but because it is now reported as part of a supply (Ashley Rural) that is not fully compliant, then the population served as part of the compliant zone are lost.

Hope you can see some trends here there is some loss of compliance and increased monitoring due to catchment activities but overall it is due to infrastructure issues.

Timaru District Council
Compliance for 2017/18: 4,750/43,040 = 11.03% A decrease of 0.04%
Compliance for 2015/16: 4,615/41,684 = 11.07%

Mackenzie District Council
Compliance for 2017/18: 0/3,075 = 10% No change
Compliance for 2015/16: 0/2,950 = 10%

Waimate District Council
Compliance for 2017/18: = 0% Decrease of 57.16%
Compliance for 2015/16: = 57.16%

Loss in compliance due to loss in security

Kaikoura
2017/2018- 0% comply with DWS
2015/2016- 65% COMPLY DWS

Loss in compliance is due to Kaikoura Urban losing bore water security post EQ 2016 (infrastructure).

No changes to catchment so no increased monitoring.

Ashburton district:
(2017-18) : 8% receiving compliant water.
(2015/16 year) 83%

Loss in compliance is due to loss of security due to infrastructure issues.

One supply increased monitoring for nitrate due to catchment activities (since last annual survey).

Selwyn district

Selwyn 17/18 year 73% access to compliant water.

Selwyn: 15/16 year 65% access to compliant water

Note one supply of 1700 people lost security due to E coli transgressions. (so no longer compliant without treatment)so yes to catchment activities.

Another bore is now being monitored regularly due to increased nitrate. (just under half MAV so hasn't been applied as a P2 but need to keep an eye on it)

Christchurch CC

(17/18 year) 0% have compliant water – loss of bore water security was infrastructure issues only

(15/16 year) 76% had compliant water

No additional P2s applied. No supplies lost security because of E coli transgressions.

Waimakariri
2017/18 – 88.2% comply
2015/16 – 87.3 comply

No supplies have lost security and no additional monitoring due to catchment activities during this period.

Hurunui
In the 2017-2018 annual survey Hurunui DC had 20.6% of population served by fully compliant supplies
In the 2015-2016 annual survey Hurunui DC had 19.4% of population served by fully compliant supplies
No supplies have lost security during this period and I there aren't any in the category that had to treat more due to catchment issues.

Ngā mihi,

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Community & Public Health
PO Box 1475
Christchurch 8140
Tel 03 364 1777

9(2)(a) [redacted]

From: 9(2)(a) [redacted]@ecan.govt.nz>
Sent: Monday, 15 April 2019 3:00 p.m.
To: Denise Tully; 9(2)(a) [redacted]
Subject: Draft text for CWMS Targets Progress Report

Hi

As you both know we are currently writing the text for the 2019 CWMS Targets Progress report. The following DRAFT text is for the Source Water Quality goal under the Drinking Water target. Would welcome any comment/feedback.

Thanks
9(2)(a) [redacted]

Progress to 2020

Target 1: Protecting sources of human drinking water is one of the key priorities in the CWMS and is addressed via the rules and Schedule 1 of the Land and Water Regional Plan (LWRP). It is also subject to the Resource Management (National Environmental Standards (NES) for Sources of Human Drinking Water) Regulations 2007.

The LWRP defines Community Drinking Water supplies as a supply listed on the Ministry of Health Register, and which supplies drinking water to no fewer than 25 persons for 60 or more days per calendar year. Existing community drinking water supplies have mapped protection zones around the source to manage land-use activities that could pose potential risk of contamination. Some activities within the protection zones require resource consent.

Target 2: Canterbury's Territorial Authorities operate 151 drinking water supplies. There are also non-council owned drinking water supplies that operate within each district. Recommendations from the Government's Havelock North Drinking Water Inquiry have seen Canterbury's Territorial Authorities review and implement a risk-based approach to determining the need for, and level of, treatment.

Target 3: Territorial Authorities are undertaking actions to ensure source water quality remains high and distribution systems supply water that meets Drinking Water Standards for New Zealand (DWSNZ). As a key partner to the CWMS, Territorial Authorities are prioritising their work to updating or upgrading infrastructure to ensure water quality remains of the highest standard through activity and assessment management planning. The Christchurch City Council has been undertaking an extensive programme to upgrade and improve the well head security on its drinking water supplies across the city.

The Canterbury Drinking Water Reference Group (CDWRG) was established following the contamination incident in Havelock North. The CDWRG includes representatives from all councils, Environment Canterbury and the Canterbury District Health Board. The CDWRG was directed by the Mayoral Forum to report on the state of community drinking water supplies in Canterbury, co-ordinate contingency planning and implement amendments to current practices.

Target 4: Risk maps are produced and updated as part a joint communication plan between Community & Public Health and Environment Canterbury to provide information to show risk of nitrate contamination in groundwater. The risk maps were last reviewed in 2017. For more information see https://www.cph.co.nz/your-health/drinking-water/

Environment Canterbury monitors nitrate levels across groundwater in Canterbury annually. See fig.11 for the long-term trends in nitrate concentrations on data collected each spring from 2008 to 2017. From the 230 wells sampled in 2017, analysis shows that nitrate concentrations have been increasing in 43 (about 19%) of those wells over the past ten years. The overall figure shows an improvement on the 25% for the period 2006-2015. The Selwyn-Waihora and Ashburton CWMS zones have the highest proportions of wells with increasing nitrate nitrogen trends. Overall, 17 wells (7%) show decreasing nitrate concentration trends, while 170 wells (74%) have no decreasing or increasing trend in nitrate concentrations. Over the years, increasing trends in nitrate concentrations have also caused an increase in the number of wells measuring over the maximum allowable value (MAV). These have risen from around 3% of samples from monitoring

Target 5: Community and Public Health assesses water suppliers' compliance with the Drinking Water Standards for New Zealand across all registered Canterbury community water supplies. Each supply serves a different population size. The results from the 2017-2018 annual drinking water quality survey showed an improvement in compliance in Hurunui, Waimakariri and Selwyn districts. Mackenzie district showed no change, while Christchurch, Timaru, Waimate, Kaikōura and Ashburton districts all showed a decrease in compliance, primarily due to infrastructure issues relating to loss of bore head security. Territorial Authorities have spent significant capital and operating budget on short to medium term work programmes to maintain and improve their community drinking water supplies in order to regain compliance and secure status.

9(2)(a)

Environment Canterbury

9(2)(a)

9(2)(a)@ecan.govt.nz

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
24 Hours: 0800 76 55 88

9(2)(a) [redacted]

From: 9(2)(a) [redacted]@ecan.govt.nz>
Sent: Monday, 15 April 2019 3:47 p.m.
To: Denise Tully; 9(2)(a) [redacted]
Subject: RE: Draft text for CWMS Targets Progress Report

Good question Denise, sorry …

From 2010:
Target 1: For those communities that currently have access to untreated and safe drinking water, implement actions to ensure the source water quality remains high enough to meet the current Drinking Water Standards for New Zealand without treatment.
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By 2020:
Target 4: A demonstrable decrease in nitrate concentrations in shallow groundwater in priority areas is achieved.
Target 5: There is an increase in the percentage of the population supplied with water that meets the New Zealand Drinking Water Standards for health-based determinants.

From: Denise Tully <Denise.Tully@cdhb.health.nz>
Sent: Monday, 15 April 2019 3:44 PM
To: 9(2)(a) [redacted]@ecan.govt.nz>; 9(2)(a) [redacted]@ecan.govt.nz>
Subject: RE: Draft text for CWMS Targets Progress Report

Hi 9(2)(a) [redacted]

Sorry to sound dense but can you confirm what target one is, is it one of the 2010 targets? I see you have 5 targets listed so just want to know what dot points in the CWMS document each of those targets are you are referring to below.

When I look at the targets, the first one is …from 2010 *"For those community that currently have access to untreated and safe drinking water……" etc*

thanks

Ngā mihi,

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Tel 03 364 1777

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Sent: Monday, 15 April 2019 3:00 p.m.
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Target 2: Canterbury's Territorial Authorities operate 151 drinking water supplies. There are also non-council owned drinking water supplies that operate within each district. Recommendations from the Government's Havelock North Drinking Water Inquiry have seen Canterbury's Territorial Authorities review and implement a risk-based approach to determining the need for, and level of, treatment.

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9(2)(a) [redacted]
Environment Canterbury

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
24 Hours: 0800 76 55 88

9(2)(a) [redacted]
9(2)(a) [redacted]@ecan.govt.nz

Kathleen Smitheram

From: 9(2)(a)@ecan.govt.nz>
Sent: Monday, 15 April 2019 3:57 p.m.
To: 9(2)(a) Denise Tully
Subject: RE: Draft text for CWMS Targets Progress Report
Attachments: Progress to 2020.docx

Hi 9(2)(a)

This looks fine to me. I just made a few edits, copying it into the attached document so I could use Track Changes.

9(2)(a)

From: 9(2)(a)
Sent: Monday, 15 April 2019 3:00 p.m.
To: Denise Tully <Denise.Tully@cdhb.health.nz>; 9(2)(a)@ecan.govt.nz>
Subject: Draft text for CWMS Targets Progress Report

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9(2)(a)

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Kathleen Smitheram

From: Denise Tully
Sent: Monday, 15 April 2019 4:15 p.m.
To: 9(2)(a) [redacted]
Cc: CPH Drinking Water Unit
Subject: forfiling_GEN_2_1_Draft text for CWMS Targets Progress Report

Thanks, have made some comments below in red, trying to comment in relation to how we discussed answering these in past years. Unfortunately other issues interfere with getting a consistent picture, such as the issues with bore heads across the district which has been the main driver for loss of compliance which makes it harder to see what is actually going on.

Ngā mihi,

Denise Tully
Technical Manager/Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch 8140
Tel 03 364 1777

From: 9(2)(a) [redacted]@ecan.govt.nz]
Sent: Monday, 15 April 2019 3:47 p.m.
To: Denise Tully <Denise.Tully@cdhb.health.nz>; Carl Hanson <carl.hanson@ecan.govt.nz>
Subject: RE: Draft text for CWMS Targets Progress Report

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From: Denise Tully <Denise.Tully@cdhb.health.nz>
Sent: Monday, 15 April 2019 3:44 PM
To: 9(2)(a) [redacted]@ecan.govt.nz>; 9(2)(a) [redacted]@ecan.govt.nz>
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We have looked at this in the past in relation to loss of ground water security due to catchment issues. Most supplies have lost security due to infrastructure issues with the exception of one which is now transgressing (raw water, bores around 40 to 55m deep) similar to what happened to Dunsandel some years back. So you could make a comment that those supplies that could comply with the DWS without treatment generally can no longer due to infrastructure issues with the exception of one supply.

Target 2: Canterbury's Territorial Authorities operate 151 drinking water supplies. There are also non-council owned drinking water supplies that operate within each district. Recommendations from the Government's Havelock North Drinking Water Inquiry have seen Canterbury's Territorial Authorities review and implement a risk-based approach to determining the need for, and level of, treatment. Yes this is happening. The past approach (when we didnt have Havelock in the picture) was that we looked at whether water suppliers had to monitor more or treat more because of what was happening in the catchment. Generally we quoted more supplies that had to monitor nitrate because of catchment activities. In the past two years there is one supply which now has to do more frequent nitrate monitoring and one bore which contributes to a scheme with a number of bores, which has increased the nitrate monitoring.

Target 3: Territorial Authorities are undertaking actions to ensure source water quality remains high and distribution systems supply water that meets Drinking Water Standards for New Zealand (DWSNZ). As a key partner to the CWMS, Territorial Authorities are prioritising their work to updating or upgrading infrastructure to ensure water quality remains of the highest

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So with this one there was concern some years back that abstraction for agricultural activities could have been impacting on ground water quantity for community drinking water supplies. Carl's group may have more comment here about whether it is climatic rather than abstraction that has caused issues?

Target 4: Risk maps are produced and updated as part a joint communication plan between Community & Public Health and Environment Canterbury to provide information to show risk of nitrate contamination in groundwater. The risk maps were last reviewed in 2017. For more information see https://www.cph.co.nz/your-health/drinking-water/

Environment Canterbury monitors nitrate levels across groundwater in Canterbury annually. See fig.11 for the long-term trends in nitrate concentrations on data collected each spring from 2008 to 2017. From the 230 wells sampled in 2017, analysis shows that nitrate concentrations have been increasing in 43 (about 19%) of those wells over the past ten years. The overall figure shows an improvement on the 25% for the period 2006-2015. Carl can comment on this one!! The Selwyn-Waihora and Ashburton CWMS zones have the highest proportions of wells with increasing nitrate nitrogen trends. Overall, 17 wells (7%) show decreasing nitrate concentration trends, while 170 wells (74%) have no decreasing or increasing trend in nitrate concentrations. Over the years, increasing trends in nitrate concentrations have also caused an increase in the number of wells measuring over the maximum allowable value (MAV). These have risen from around 3% of samples from monitoring

Target 5: Community and Public Health assesses water suppliers' compliance with the Drinking Water Standards for New Zealand across all registered Canterbury community water supplies. Each supply serves a different population size. The results from the 2017-2018 annual drinking water quality survey showed an improvement in compliance in Hurunui, Waimakariri and Selwyn districts. Mackenzie district showed no change, while Christchurch, Timaru, Waimate, Kaikōura and Ashburton districts all showed a decrease in compliance, primarily due to infrastructure issues relating to loss of bore head security. Territorial Authorities have spent significant capital and operating budget on short to medium term work programmes to maintain and improve their community drinking water supplies in order to regain compliance and secure status. I think this is a fair comment, these issues are generally not related to the water management in the wider catchment. I am still waiting for comment about Waitaki (compliance gone down but why is what I am trying to find out)

9(2)(a) [redacted]
Environment Canterbury

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
24 Hours: 0800 76 55 88

9(2)(a) [redacted]

9(2)(a) [redacted]

From: Denise Tully
Sent: Wednesday, 17 April 2019 4:31 p.m.
To: 9(2)(a) [redacted]
Subject: RE: Letter to Minister of Health re nitrate and cancer research

Thanks for letting us know 9(2)(a) [redacted]

Ngā mihi,

Denise Tully
Technical Manager/Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch 8140
Tel 03 364 1777

From: 9(2)(a) [redacted] @ecan.govt.nz]
Sent: Wednesday, 17 April 2019 4:19 p.m.
To: Denise Tully <Denise.Tully@cdhb.health.nz>; Judy Williamson <Judy.Williamson@cdhb.health.nz>; Helen Graham <Helen.Graham@cdhb.health.nz>
Subject: FW: Letter to Minister of Health re nitrate and cancer research

Hi there

See attached letter FYI asking MoH to consider researching any correlation between low nitrate levels in drinking water and the occurrence of colorectal cancer.

Regards
9(2)(a) [redacted]

From: 9(2)(a) [redacted]
Sent: Wednesday, 17 April 2019 3:51 PM
To: 9(2)(a) [redacted] @ecan.govt.nz>
Subject: Letter to Minister of Health re nitrate and cancer research

FYI- letter the CHWM ZC have sent to the Minister of Health. 9(2)(a) [redacted] are all aware of it.

Could be worth letting your CPH contacts know that they have done this- if you think appropriate ☺

From: 9(2)(a) [redacted] @parliament.govt.nz>
Sent: Wednesday, 17 April 2019 3:13 PM
To: 9(2)(a) [redacted] @ecan.govt.nz>
Subject: Acknowledgement from the Office of Hon Dr David Clark (DR19163)

Kia ora

On behalf of Hon Dr David Clark, Minister of Health, thank you for your correspondence.

The Minister has noted your comments and has asked the Ministry of Health to respond to you directly about the issues you have raised.

Ngā mihi

9(2)(a)

9(2)(a)

Office of Hon Dr David Clark
Minister of Health | Associate Minister of Finance

From: 9(2)(a) @ecan.govt.nz]
Sent: Tuesday, 16 April 2019 5:00 PM
To: D Clark (MIN) 9(2)(a)
Subject: Letter from the Christchurch West Melton Water Management Zone Committee re nitrate research.

Tēnā koe Hon Dr Clark,

Please find attached a letter from the Christchurch West Melton Water Management Zone Committee regarding research on nitrates.

Kind regards,
9(2)(a)
On behalf of the 9(2)(a) Christchurch West Melton Water Management Zone Committee)

9(2)(a)

Environment Canterbury

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
24 Hours: 0800 76 55 88

9(2)(a)

Facilitating sustainable development in the Canterbury region ecan.govt.nz

---

9(2)(a)

Canterbury Water Management Strategy
9(2)(a)

9(2)(a)

From: 9(2)(a)@ecan.govt.nz>
Sent: Wednesday, 17 April 2019 4:19 p.m.
To: Denise Tully; Judy Williamson; Helen Graham
Subject: FW: Letter to Minister of Health re nitrate and cancer research
Attachments: CHWM Zone Committee Letter to Minister of Health.pdf

Hi there

See attached letter FYI asking MoH to consider researching any correlation between low nitrate levels in drinking water and the occurrence of colorectal cancer.

Regards
9(2)(a)

From 9(2)(a)
Sent: Wednesday, 17 April 2019 3:51 PM
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Subject: Letter to Minister of Health re nitrate and cancer research

FYI- letter the CHWM ZC have sent to the Minister of Health 9(2)(a) are all aware of it.

Could be worth letting your CPH contacts know that they have done this- if you think appropriate 😊

From: 9(2)(a)@parliament.govt.nz>
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Kia ora

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Ngā mihi
9(2)(a)

9(2)(a)
Office of Hon Dr David Clark
Minister of Health |Associate Minister of Finance

From 9(2)(a)@ecan.govt.nz]
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To: D Clark (MIN) 9(2)(a)
Subject: Letter from the Christchurch West Melton Water Management Zone Committee re nitrate research.

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Kind regards,

9(2)(a)
On behalf of the 9(2)(a) Christchurch West Melton Water Management Zone Committee)

9(2)(a)

Environment Canterbury

9(2)(a)

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
24 Hours: 0800 76 55 88

Facilitating sustainable development in the Canterbury region ecan.govt.nz

9(2)(a)

Canterbury Water Management Strategy
9(2)(a)

Christchurch West Melton Water Zone Committee

15 April 2019

The Hon Dr David Clark
Minister of Health

Tēnā koe Hon Dr Clark

Re: Research on nitrate in drinking water and colorectal cancer risk.

The Christchurch West Melton Zone Committee is a joint committee established by Environment Canterbury, Christchurch City Council, and Selwyn District Council. The committee includes community members, and rūnanga and council representatives. Its role is to help deliver the Canterbury Water Management Strategy and make recommendations to councils about the management of freshwater.

Recently the zone committee discussed research on the correlation between low nitrate levels in drinking water and the occurrence of colorectal cancer. The discussion focused on the findings of several studies, including one led by Aarhus University, Denmark:

Schullehner, J., Hansen, B., Thygesen, M., Pedersen, C.B. and Sigsgaard, T. (2018). Nitrate in drinking water and colorectal cancer risk: a nationwide population-based cohort study. *International Journal of Cancer, 143: 73-79.*

The committee were concerned about the findings of the research given the current nitrate concentrations in many of Canterbury's public and private drinking water supplies. The study identified a statistically significant cancer correlation with nitrate concentrations as low as 3.9 mg/L compared to the WHO (and NZ) drinking water guideline of 50 mg/L.

We acknowledge that further conclusive research is needed to determine the correlation between nitrate levels and colorectal cancer, and therefore the appropriateness of the current 'Maximum Acceptable Value' (MAV) for nitrate in drinking water.

We recognise that New Zealand's bowel cancer rates are among the highest in the world. The committee would like to know if the Ministry of Health have a programme of work focused on this research, and if so, how this research will be used to determine the appropriateness of MAV for nitrate. If not, the committee would like to see the Ministry of Health work with research institutes to prioritise studies on the relationship between nitrate levels and colorectal cancer in New Zealand.

This research is of national interest and it is critical that we understand the risks that nitrate levels pose to our communities in New Zealand.

Nāku noa, nā

9(2)(a) [redacted]
9(2)(a) [redacted] the Christchurch West Melton Zone Committee
Email: 9(2)(a) [redacted]

Kathleen Smitheram

From: 9(2)(a) @ecan.govt.nz>
Sent: Friday, 19 July 2019 3:42 p.m.
To: 9(2)(a)
Cc: 9(2)(a) Denise Tully
Subject: RE: Selwyn Ground Water Quality - Nitrates

Hi 9(2)(a)

Thanks for your email. I was wondering how your meeting went. Yes, I'd be happy to meet, and if you're happy to come in to our office, that would suit me fine. I could do Monday afternoon, Tuesday morning before 11, or most any time on Wednesday (except 2 - 3 pm).

9(2)(a)

9(2)(a)
Environment Canterbury

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
Pollution Hotline: 0800 76 55 88

9(2)(a)

Facilitating sustainable development in the Canterbury region ecan.govt.nz

From: 9(2)(a) @foodandhealth.co.nz>
Sent: Friday, 19 July 2019 3:30 p.m.
To: 9(2)(a) @ecan.govt.nz>
Cc: 9(2)(a) @foodandhealth.co.nz>; 9(2)(a) @foodandhealth.co.nz>; Denise.Tully@cdhb.health.nz
Subject: Selwyn Ground Water Quality - Nitrates

Dear 9(2)(a)

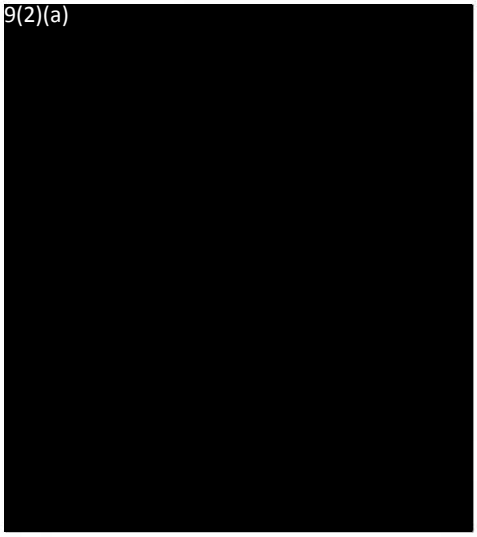
I wonder if we could meet sometime early next week to follow on form our recent telephone discussion. Since our conversation I have met with senior management at SDC. The outcome of that meeting was for me to meet with you.

I am available next week and can meet at your office if that suits you better.

Thank you and regards
9(2)(a)

9(2)(a)

Selwyn District Council
Email: 9(2)(a) @foodandhealth.co.nz I Phone: 9(2)(a)



APPENDIX 2

9(2)(a) [redacted]

From: Judy Williamson
Sent: Wednesday, 19 June 2019 1:03 p.m.
To: 9(2)(a) [redacted]@health.govt.nz'
Subject: RE: Nitrate monitoring in Christchurch - another question...

Have just gone to CCC direct to ask – hopefully will hear back quickly....

From: 9(2)(a) [redacted]@health.govt.nz]
Sent: Wednesday, 19 June 2019 12:08 p.m.
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: Nitrate monitoring in Christchurch - another question...

Hi Judy

We see that this information came from the 2017 WSP but do you know the date the samples were taklen and when the next sampling will take place (noting it is five yearly)?

Thanks very much - 9(2)(a) [redacted]

----- Forwarded by 9(2)(a) [redacted] MOH on 19/06/2019 12:06 p.m. -----

From: 9(2)(a) [redacted] MOH
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>,
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Date: 19/06/2019 11:59 a.m.
Subject: Re: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

---

Thanks so much Judy

That's exactly what we need.

Kind regards 9(2)(a) [redacted]

9(2)(a) [redacted]
Ministry of Health
9(2)(a) [redacted]

http://www.health.govt.nz

From: Judy Williamson <Judy.Williamson@cdhb.health.nz>
To: 9(2)(a) [redacted]@health.govt.nz"9(2)(a) [redacted]@health.govt.nz>,
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Date: 19/06/2019 11:56 a.m.
Subject: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

---

Hi 9(2)(a) [redacted]

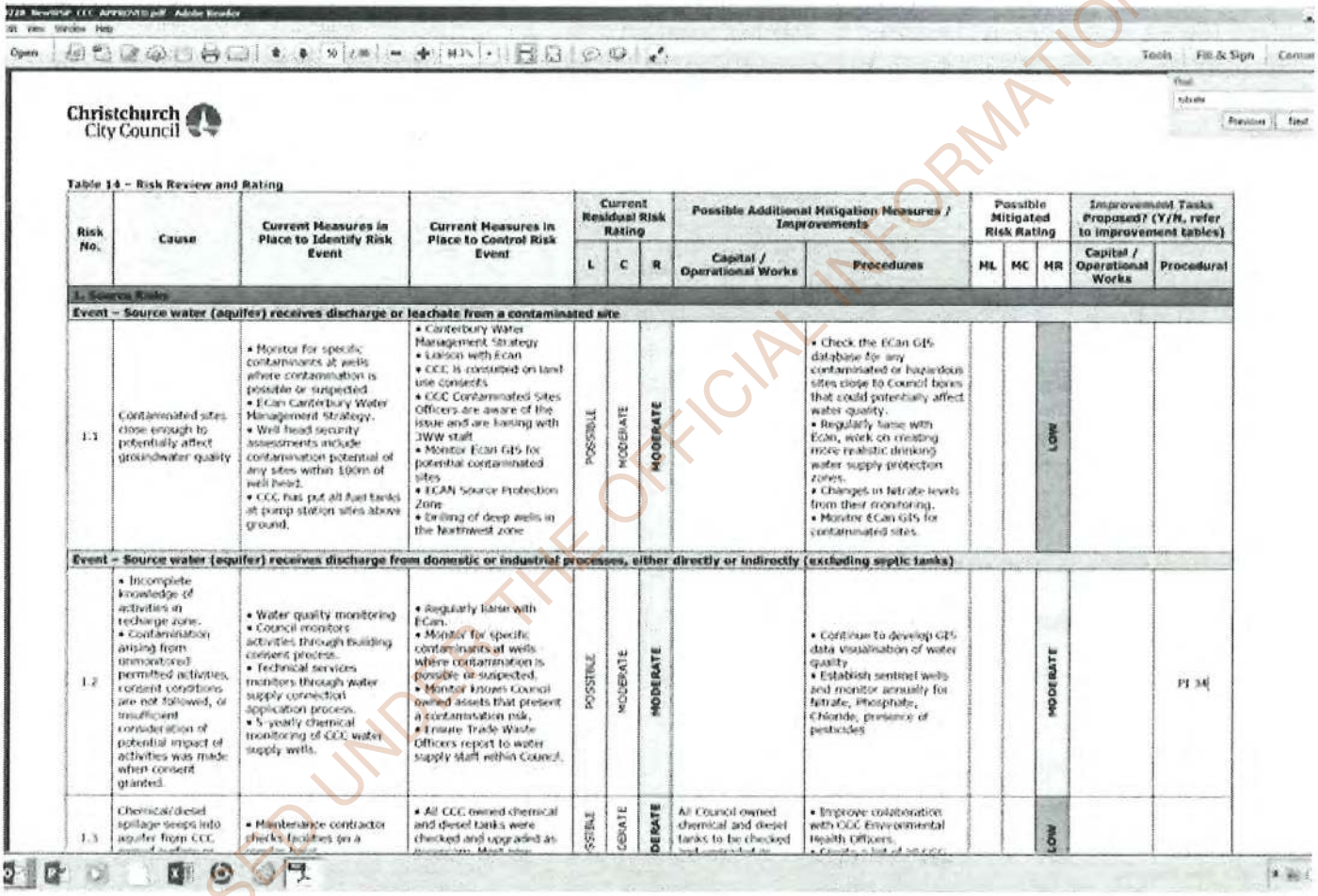
From WSP (approved Feb 2017)

Typical characteristics of the source water for Christchurch are given in Table 8.

Table 8: Typical chemical analysis of water delivered from the Christchurch aquifers
Parameter Average DWSNZ 2005

pH: 7.7 7.0 – 8.5
pH after aeration: 7.7 7.0 – 8.5
Turbidity (NTU): 0.7 2.5 NTU
Nitrate Nitrogen: 0.4 50 g/m3
Sulphate: 4.2 250 g/m3
Chloride: 4.0 250 g/m3
Fluoride: 0.06 1.5 g/m3
Sodium: 7.0 200 g/m3
Total Hardness (as CaCO3): 43.5 200 mg/L

Risk 1.2 below – so five yearly monitoring and are doing the suggested improvement which involves using the 2012 P2 Guide



Christchurch City Council

Table 14 – Risk Review and Rating

Risk No.	Cause	Current Measures in Place to Identify Risk Event	Current Measures in Place to Control Risk Event	Current Residual Risk Rating L	C	R	Possible Additional Mitigation Measures / Improvements: Capital / Operational Works	Procedures	Possible Mitigated Risk Rating ML	MC	MR	Improvement Tasks Proposed? (Y/N, refer to improvement tables): Capital / Operational Works	Procedural
1. Source Risks													
Event – Source water (aquifer) receives discharge or leachate from a contaminated site													
1.1	Contaminated sites close enough to potentially affect groundwater quality	• Monitor for specific contaminants at wells where contamination is possible or suspected • ECan Canterbury Water Management Strategy. • Well head security assessments include contamination potential of any sites within 100m of well head. • CCC has put all fuel tanks at pump station sites above ground.	• Canterbury Water Management Strategy • Liaison with ECan • CCC is consulted on land use consents • CCC Contaminated Sites Officers are aware of the issue and are liaising with 3WW staff • Monitor ECan GIS for potential contaminated sites • ECAN Source Protection Zone • Drilling of deep wells in the Northwest zone	POSSIBLE	MODERATE	MODERATE		• Check the ECan GIS database for any contaminated or hazardous sites close to Council bores that could potentially affect water quality. • Regularly liaise with ECan, work on creating more realistic drinking water supply protection zones. • Changes in Nitrate levels from their monitoring. • Monitor ECan GIS for contaminated sites.			LOW		
Event – Source water (aquifer) receives discharge from domestic or industrial processes, either directly or indirectly (excluding septic tanks)													
1.2	• Incomplete knowledge of activities in recharge zone. • Contamination arising from unmonitored permitted activities, consent conditions are not followed, or insufficient consideration of potential impact of activities was made when consent granted.	• Water quality monitoring • Council monitors activities through Building consent process. • Technical services monitors through water supply connection application process. • 5 yearly chemical monitoring of CCC water supply wells.	• Regularly liaise with ECan. • Monitor for specific contaminants at wells where contamination is possible or suspected. • Monitor known Council owned assets that present a contamination risk. • Ensure Trade Waste Officers report to water supply staff within Council.	POSSIBLE	MODERATE	MODERATE		• Continue to develop GIS data visualisation of water quality • Establish sentinel wells and monitor annually for Nitrate, Phosphate, Chloride, presence of pesticides			MODERATE		PI 34
1.3	Chemical/diesel spillage seeps into aquifer from CCC	• Maintenance contractor checks facilities on a	• All CCC owned chemical and diesel tanks were checked and upgraded as	POSSIBLE	MODERATE	MODERATE	All Council owned chemical and diesel tanks to be checked	• Improve collaboration with CCC Environmental Health Officers.			LOW		

Regards
Judy

Judy Williamson
Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch
Ph (03) 3786782 Mobile 9(2)(a) [redacted]

****

9(2)(a) [redacted]

From: Judy Williamson
Sent: Wednesday, 19 June 2019 1:09 p.m.
To: 9(2)(a) [redacted]@health.govt.nz'
Subject: FW: Nitrate monitoring in Christchurch - another question...

Hi 9(2)(a) [redacted]
See below – July/August this year – are going to take 76 samples for aging (as the modelling work for criteria 1 is not going as well as hoped) and will also include chemical sampling – which will include nitrate.
Regards
Judy

From: 9(2)(a) [redacted]@ccc.govt.nz]
Sent: Wednesday, 19 June 2019 1:07 p.m.
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Subject: Re: Nitrate monitoring in Christchurch - another question...

Hi Judy,

Nitrate is on the list of determinands that we will sample for when we take our age dating samples in July / August.

All 76 wells that will be age dated will also be sampled for a comprehensive chemistry suite.

I can provide the historic results easily but I am working from home today so won't be able to do it today.

Regards,

9(2)(a) [redacted]

From: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Sent: Wednesday, June 19, 2019 1:02:28 PM
To: 9(2)(a) [redacted]
Subject: FW: Nitrate monitoring in Christchurch - another question...

Hi 9(2)(a) [redacted]
Quick question re nitrates (qns in parliament re water this afternoon anticipated)….when will you next sample Chch sources for nitrate?
Have you easily to hand the latest results for nitrate?
Thanks
Regards
Judy

From: 9(2)(a) [redacted]@health.govt.nz]
Sent: Wednesday, 19 June 2019 12:08 p.m.
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: Nitrate monitoring in Christchurch - another question...

Hi Judy

We see that this information came from the 2017 WSP but do you know the date the samples were taklen and when the next sampling will take place (noting it is five yearly)?

Thanks very much - 9(2)(a)

----- Forwarded by 9(2)(a) /MOH on 19/06/2019 12:06 p.m. -----

From: 9(2)(a) /MOH
To: Judy Williamson <Judy.Williamson@cdhb.health.nz<mailto:Judy.Williamson@cdhb.health.nz>>,
Cc: CPH Drinking Water Unit
<DrinkingWaterUnit@cdhb.health.nz<mailto:DrinkingWaterUnit@cdhb.health.nz>>
Date: 19/06/2019 11:59 a.m.
Subject: Re: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

---

Thanks so much Judy

That's exactly what we need.

Kind regards - 9(2)(a)

9(2)(a)
Ministry of Health
9(2)(a)

http://www.health.govt.nz<http://www.health.govt.nz/>

From: Judy Williamson <Judy.Williamson@cdhb.health.nz<mailto:Judy.Williamson@cdhb.health.nz>>
To: 9(2)(a) @health.govt.nz>>,
Cc: CPH Drinking Water Unit
<DrinkingWaterUnit@cdhb.health.nz<mailto:DrinkingWaterUnit@cdhb.health.nz>>
Date: 19/06/2019 11:56 a.m.
Subject: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

---

Hi 9(2)(a)

From WSP (approved Feb 2017)
Typical characteristics of the source water for Christchurch are given in Table 8.
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Parameter Average DWSNZ 2005
pH: 7.7 7.0 – 8.5
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Fluoride: 0.06 1.5 g/m3
Sodium: 7.0 200 g/m3
Total Hardness (as CaCO3): 43.5 200 mg/L

Risk 1.2 below – so five yearly monitoring and are doing the suggested improvement which involves using the 2012 P2 Guide

[cid:_2_131824E0131822740000B01DCC25841E]

Regards
Judy

Judy Williamson
Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch
Ph (03) 3786782 Mobile 9(2)(a) [redacted]

9(2)(a) [redacted]

From: Judy Williamson
Sent: Wednesday, 19 June 2019 11:57 a.m.
To: 9(2)(a) [redacted]@health.govt.nz'
Cc: CPH Drinking Water Unit
Subject: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

Hi 9(2)(a) [redacted]

From WSP (approved Feb 2017)
Typical characteristics of the source water for Christchurch are given in Table 8.

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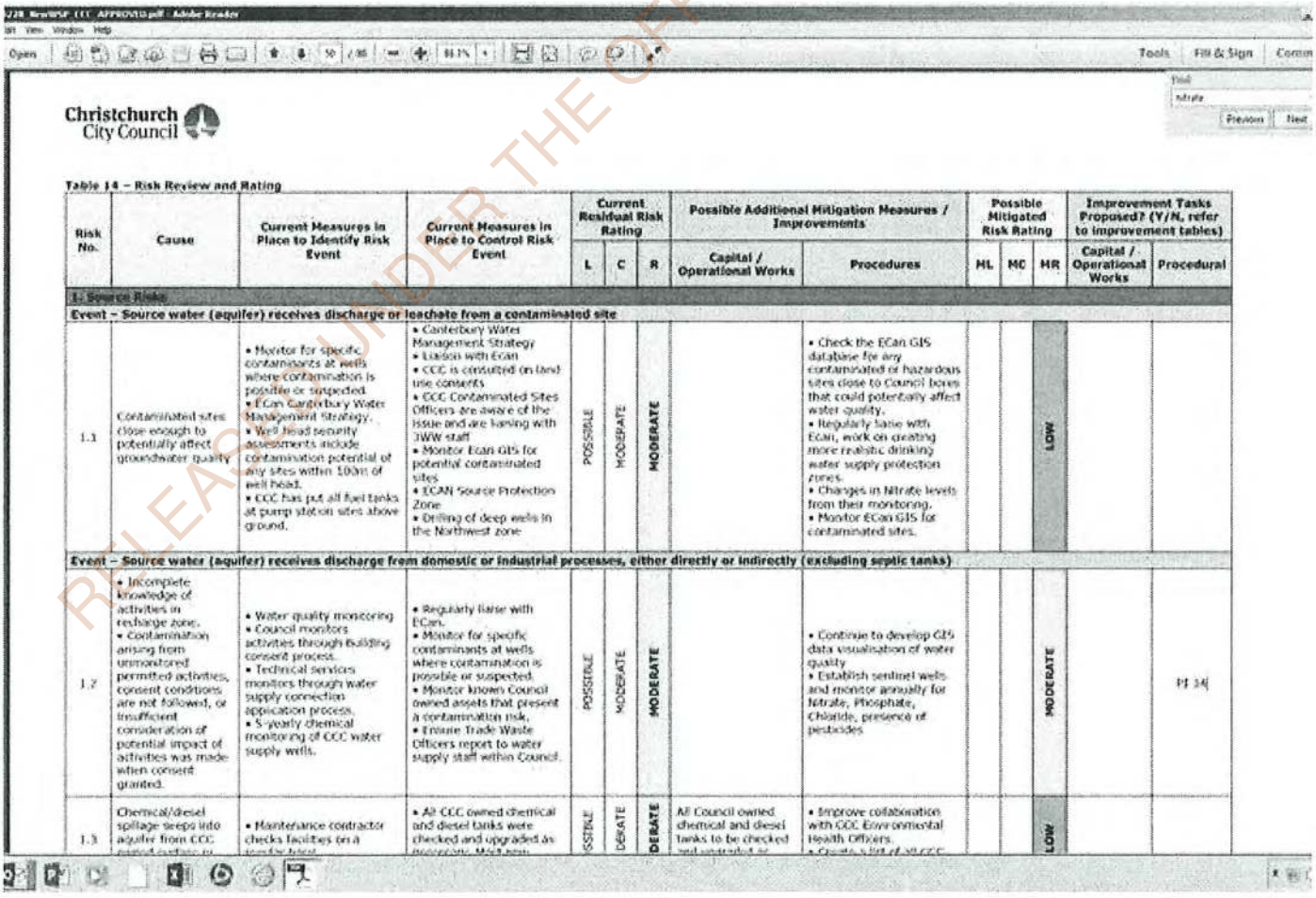

Christchurch City Council

Table 14 – Risk Review and Rating

Risk No.	Cause	Current Measures in Place to Identify Risk Event	Current Measures in Place to Control Risk Event	Current Residual Risk Rating			Possible Additional Mitigation Measures / Improvements		Possible Mitigated Risk Rating			Improvement Tasks Proposed? (Y/N, refer to improvement tables)	
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Event – Source water (aquifer) receives discharge from domestic or industrial processes, either directly or indirectly (excluding septic tanks)													
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1.3	Chemical/diesel spillage seeps into aquifer from CCC owned carbon or	• Maintenance contractor checks facilities on a [illegible]	• All CCC owned chemical and diesel tanks were checked and upgraded as [illegible] Most non-	SSIBLE	DERATE	DERATE	All Council owned chemical and diesel tanks to be checked	• Improve collaboration with CCC Environmental Health Officers.			LOW		

Regards
Judy

Judy Williamson
Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch
Ph (03) 3786782 Mobile 9(2)(a) [redacted]

9(2)(a) [redacted]

From: Judy Williamson
Sent: Thursday, 20 June 2019 7:48 a.m.
To: 9(2)(a) [redacted]@health.govt.nz'
Cc: 9(2)(a) [redacted]@health.govt.nz'; CPH Drinking Water Unit
Subject: forfiling-CWS_1_CHR001_ Nitrate monitoring in Christchurch - another question...
Attachments: Nitrate in urban CCC wells 2008 - 2019.xlsx; 2019 Chemistry Suite.xlsx

Hi
Probably not useful now – but passing on out of interest.
Regards
Judy

From: 9(2)(a) [redacted]@ccc.govt.nz]
Sent: Wednesday, 19 June 2019 8:04 p.m.
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Cc: 9(2)(a) [redacted]@ccc.govt.nz>; 9(2)(a) [redacted]@ccc.govt.nz>
Subject: RE: Nitrate monitoring in Christchurch - another question...

Hi Judy,
Please find attached the groundwater Nitrate sampling results from 2008 to 2019. We have older data available upon request.
As indicated in my earlier email we will be sampling 76 wells this year for groundwater age parameters (tritium, SF6, CFCs) and a chemistry suite which includes Nitrate (see attached).

Regards,
9(2)(a) [redacted]

From: Judy Williamson [mailto:Judy.Williamson@cdhb.health.nz]
Sent: Wednesday, 19 June 2019 1:10 p.m.
To: 9(2)(a) [redacted]@ccc.govt.nz>
Subject: RE: Nitrate monitoring in Christchurch - another question...

Thanks 9(2)(a) [redacted] no problem – am sure you are getting lots done with little interuptions!
Regards
Judy

From: 9(2)(a) [redacted]@ccc.govt.nz]
Sent: Wednesday, 19 June 2019 1:07 p.m.
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Subject: Re: Nitrate monitoring in Christchurch - another question...

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I can provide the historic results easily but I am working from home today so won't be able to do it today.

Regards,

9(2)(a) [redacted]

From: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Sent: Wednesday, June 19, 2019 1:02:28 PM
To: 9(2)(a) [redacted]
Subject: FW: Nitrate monitoring in Christchurch - another question...

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Quick question re nitrates (qns in parliament re water this afternoon anticipated)….when will you next sample Chch sources for nitrate?
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Thanks
Regards
Judy

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Sent: Wednesday, 19 June 2019 12:08 p.m.
To: Judy Williamson <Judy.Williamson@cdhb.health.nz>
Cc: CPH Drinking Water Unit <DrinkingWaterUnit@cdhb.health.nz>
Subject: Nitrate monitoring in Christchurch - another question...

Hi Judy

We see that this information came from the 2017 WSP but do you know the date the samples were taklen and when the next sampling will take place (noting it is five yearly)?

Thanks very much - 9(2)(a) [redacted]

----- Forwarded by 9(2)(a) [redacted] /MOH on 19/06/2019 12:06 p.m. -----

From: 9(2)(a) [redacted] /MOH
To: Judy Williamson <Judy.Williamson@cdhb.health.nz<mailto:Judy.Williamson@cdhb.health.nz>>,
Cc: CPH Drinking Water Unit
<DrinkingWaterUnit@cdhb.health.nz<mailto:DrinkingWaterUnit@cdhb.health.nz>>
Date: 19/06/2019 11:59 a.m.
Subject: Re: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

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Thanks so much Judy

That's exactly what we need.

Kind regards - 9(2)(a) [redacted]

9(2)(a) [redacted]

Ministry of Health
9(2)(a) [redacted]

http://www.health.govt.nz<http://www.health.govt.nz/>

From: Judy Williamson <Judy.Williamson@cdhb.health.nz<mailto:Judy.Williamson@cdhb.health.nz>>
To: 9(2)(a) [redacted] @health.govt.nz>>,
Cc: CPH Drinking Water Unit
<DrinkingWaterUnit@cdhb.health.nz<mailto:DrinkingWaterUnit@cdhb.health.nz>>
Date: 19/06/2019 11:56 a.m.
Subject: forfiling_CWS_1_CHR001_Nitrate monitoring in Christchurch

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Hi 9(2)(a) [redacted]

From WSP (approved Feb 2017)
Typical characteristics of the source water for Christchurch are given in Table 8.
Table 8: Typical chemical analysis of water delivered from the Christchurch aquifers
Parameter Average DWSNZ 2005
pH: 7.7 7.0 – 8.5
pH after aeration: 7.7 7.0 – 8.5
Turbidity (NTU): 0.7 2.5 NTU
Nitrate Nitrogen: 0.4 50 g/m3
Sulphate: 4.2 250 g/m3
Chloride: 4.0 250 g/m3
Fluoride: 0.06 1.5 g/m3
Sodium: 7.0 200 g/m3
Total Hardness (as CaCO3): 43.5 200 mg/L

Risk 1.2 below – so five yearly monitoring and are doing the suggested improvement which involves using the 2012 P2 Guide

[cid:_2_131824E0131822740000B01DCC25841E]

Regards
Judy

Judy Williamson
Drinking Water Assessor
Community & Public Health
PO Box 1475
Christchurch
Ph (03) 3786782 Mobile 9(2)(a) [redacted]

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http://www.ccc.govt.nz
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Determinand	Unit	DWSNZ maximum acceptable value	DWSNZ guideline value	Comment
Microbiology				
E. coli	MPN/100ml	<1		
Total Coliforms	MPN/100ml			
Chemistry				
Acidity to pH8.3	mg/l $CaCO_3$			
Alkalinity to pH4.5	mg/l $CaCO_3$			Total Alkalinity
Aluminium	mg/l		0.1	
Ammonia	mg/l		1.5	
Antimony	mg/l	0.02		
Arsenic	mg/l	0.01		
Barium	mg/l	0.4		
Bicarbonate				calculated
Boron	mg/l	1.4		
Bromide	mg/l			
Cadmium	mg/l	0.004		
Calcium	mg/l			
Chloride	mg/l		250	
Chromium	mg/l	0.05		
Colour	Hazen Units or TCU		10	
Conductivity	µS/cm			
Copper	mg/l	2	1	
Cyanide	mg/l	0.6		
Fluoride	mg/l	1.5		
Iron	mg/l		0.2	
Langelier Saturation Index			no GV but ideally: -0.3 to 0.3	negative = corrosive positive = scale-forming
Lead	mg/l	0.01		
Magnesium	mg/l			
Manganese	mg/l	0.4	0.04	
Mercury	mg/l	0.007		

Molybdenum	mg/l	0.07		
Nickel	mg/l	0.08		
Nitrate	mg/l as NO_3	short-term: 50		
Nitrite	mg/l as NO_2	short-term: 3 long-term: 0.2		
Organic Carbon, Dissolved	mg/l			
Organic Carbon, Total	mg/l			
pH			7.0 - 8.5	
pH, aerated				
Phosphate dissolved reactive	mg/l			
Phosphorous	mg/l			
Potassium	mg/l			
Reactive Silica	mg/l as SiO_2			
Selenium	mg/l	0.01		
Solids, Total Suspended	mg/l			
Solids, Total Dissolved	mg/l		1000	
Sodium	mg/l		200	
Sulphate	mg/l		250	
Temperature				
Total Hardness	mg/l $CaCO_3$		200	
Turbidity	NTU		2.5	
Uranium	mg/l	0.02		
Zinc	mg/l		1.5	
UV Absorbance @ 254nm				
SUVA, specific UV absorbance				(calculated from UV absorbance 254nm and DOC)

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1132454	Brooklands Kainga	TP00964	CCC	Brooklands Pump Stn	Nitrate-Nitrogen	0.16	mg/L	25/08/2011	09.45	RMcC	Well 1
1205600	Brooklands Kainga	TP00964	CCC	Brooklands Pump Stn	Nitrate-Nitrogen	0.22	mg/L	19/04/2012	13.25	Rodger Jackson	Well 1
1707334	Brooklands Kainga	TP00964	CCC	Brooklands Pump Stn	Nitrate-Nitrogen	0.84	mg/L	23/05/2017	13.35	Ian Baker	Well 2
1132453	Brooklands Kainga	TP00964	CCC	Kainga Pump Stn	Nitrate-Nitrogen	0.82	mg/L	25/08/2011	09.15	RMcC	Well 1
1307253	Brooklands Kainga	TP00964	CCC	Kainga Pump Stn	Nitrate-Nitrogen	0.91	mg/L	10/05/2013	10.22	Lisa de Haan	Well 1
1603227	Brooklands Kainga	TP00964	CCC	Kainga Pump Stn	Nitrate-Nitrogen	1.8	mg/L	22/03/2016	11.05	Ian Baker	Well 1
1106106	Central	TP00179	CCC	Addington Pump Stn	Nitrate-Nitrogen	0.35	mg/L	16/03/2011	10.50	TD	
1131845	Central	TP00179	CCC	Addington Pump Stn	Nitrate-Nitrogen	0.36	mg/L	18/08/2011	08.40	R McC	Well 1
1205605	Central	TP00179	CCC	Addington Pump Stn	Nitrate-Nitrogen	0.50	mg/L	29/05/2012	11.50	SM	Composite Aquifer 4
1006268	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.21	mg/L	18/05/2010	11.20	TD	Well 1
1006269	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.06	mg/L	18/05/2010	11.10	TD	Well 3
1018751	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.13	mg/L	05/10/2010	11.00	RJ & CW	Well 3
1018752	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.20	mg/L	05/10/2010	11.15	RJ & CW	Well 1
1106043	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.05	mg/L	10/03/2011	09.25	RJ	Well 3
1132460	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.27	mg/L	25/08/2011	14.00	RMcC	Well 3
1132461	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.18	mg/L	25/08/2011	14.30	RMcC	Well 1
1408436	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	<0.060	mg/L	28/05/2014	13.47	Lisa de Haan	Well 2
1505495	Central	TP00179	CCC	Aldwins Pump Stn	Nitrate-Nitrogen	0.39	mg/L	14/04/2015	11.40	JK	Well 3
1106030	Central	TP00179	CCC	Aston Dr Pump Stn	Nitrate-Nitrogen	0.36	mg/L	17/03/2011	10.05	CW	Well 1
1131864	Central	TP00179	CCC	Aston Dr Pump Stn	Nitrate-Nitrogen	0.37	mg/L	19/08/2011	9.50	RMcC	Well 1
1131865	Central	TP00179	CCC	Aston Dr Pump Stn	Nitrate-Nitrogen	0.33	mg/L	19/08/2011	10.10	RMcC	Well 2
1205608	Central	TP00179	CCC	Aston Dr Pump Stn	Nitrate-Nitrogen	0.32	mg/L	19/04/2012	12.27	Rodger Jackson	Well 1
1205609	Central	TP00179	CCC	Aston Dr Pump Stn	Nitrate-Nitrogen	0.43	mg/L	19/04/2012	12.15	Rodger Jackson	Well 2
1006273	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	0.17	mg/L	19/05/2010	13.00	TD	Well 1
1006274	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	0.03	mg/L	19/05/2010	13.10	TD	Well 2
1006275	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	0.15	mg/L	19/05/2010	13.35	TD	Well 3
1018756	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	0.12	mg/L	05/10/2010	13.40	RJ & CW	Well 4
1018757	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	0.08	mg/L	05/10/2010	13.20	RJ & CW	Well 3
1018754	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	0.03	mg/L	06/10/2010	09.45	RJ & CW	Well 2
1132457	Central	TP00179	CCC	Averill Pump Stn	Nitrate-Nitrogen	<0.020	mg/L	25/08/2011	11.10	RMcC	Well 2
1006272	Central	TP00179	CCC	Bexley Pump Stn	Nitrate-Nitrogen	0.17	mg/L	19/05/2010	14.00	TD	Well 2
1106068	Central	TP00179	CCC	Bexley Pump Stn	Nitrate-Nitrogen	0.15	mg/L	16/03/2011	09.55	RJ	No well access/point
1131873	Central	TP00179	CCC	Bexley Pump Stn	Nitrate-Nitrogen	0.13	mg/L	19/08/2011	14.35	RMcC	Well 1
1505496	Central	TP00179	CCC	Bexley Pump Stn	Nitrate-Nitrogen	0.36	mg/L	14/04/2015	12.15	JK	Well 1
1106047	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.31	mg/L	16/03/2011	10.15	SM	No well access
1132445	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.50	mg/L	24/08/2011	12.30	RMcC	Well 1
1132446	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.18	mg/L	24/08/2011	12.50	RMcC	Well 2
1205610	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.36	mg/L	19/04/2012	14.49	Rodger Jackson	Well 1
1205611	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.31	mg/L	19/04/2012	14.58	Rodger Jackson	Well 2
1707340	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.53	mg/L	24/05/2017	13.20	Ian Baker	Well 4
1707339	Central	TP00179	CCC	Blighs Pump Stn	Nitrate-Nitrogen	0.52	mg/L	30/05/2017	12.30	Ian Baker	Well 2
1106033	Central	TP00179	CCC	Carters Pump Stn	Nitrate-Nitrogen	0.15	mg/L	16/03/2011	09.05	RJ	All wells turned off
1131874	Central	TP00179	CCC	Carters Pump Stn	Nitrate-Nitrogen	0.14	mg/L	19/08/2011	14.50	RMcC	Well 5
1131875	Central	TP00179	CCC	Carters Pump Stn	Nitrate-Nitrogen	0.095	mg/L	22/08/2011	8.15	RMcC	Well 2
1131876	Central	TP00179	CCC	Carters Pump Stn	Nitrate-Nitrogen	0.061	mg/L	22/08/2011	8.40	RMcC	Well 3
1205612	Central	TP00179	CCC	Carters Pump Stn	Nitrate-Nitrogen	0.17	mg/L	19/04/2012	11.07	Rodger Jackson	Well 1
1205613	Central	TP00179	CCC	Carters Pump Stn	Nitrate-Nitrogen	0.13	mg/L	19/04/2012	11.27	Rodger Jackson	Well 2
1106020	Central	TP00179	CCC	Effingham Pump Stn	Nitrate-Nitrogen	0.25	mg/L	17/03/2011	9.45	CW	Well 3

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1106028	Central	TP00179	CCC	Effingham Pump Stn	Nitrate-Nitrogen	0.26	mg/L	17/03/2011	9.25	CW	CC fitted key well 1
1131862	Central	TP00179	CCC	Effingham Pump Stn	Nitrate-Nitrogen	0.25	mg/L	19/08/2011	9.20	RMcC	Well 2
1131863	Central	TP00179	CCC	Effingham Pump Stn	Nitrate-Nitrogen	0.24	mg/L	19/08/2011	9.35	RMcC	Well 1
1603233	Central	TP00179	CCC	Effingham Pump Stn	Nitrate-Nitrogen	1.4	mg/L	22/03/2016	13.50	Lisa de Haan	Well 2
1603249	Central	TP00179	CCC	Effingham Pump Stn	Nitrate-Nitrogen	1.4	mg/L	22/03/2016	14.00	Lisa de Haan	Well 1
1814571	Central	TP00179	Hill	Effingham Pump Stn	Nitrate-Nitrogen	0.28	mg/L	17/10/2018	09.45	Lisa de Haan	Well 3, M35/2609
1131860	Central	TP00179	CCC	Estuary Rd Pump Stn	Nitrate-Nitrogen	0.15	mg/L	19/08/2011	8.35	RMcC	Well 1
1131861	Central	TP00179	CCC	Estuary Rd Pump Stn	Nitrate-Nitrogen	0.079	mg/L	19/08/2011	8.55	RMcC	Well 3
1307257	Central	TP00179	CCC	Estuary Rd Pump Stn	Nitrate-Nitrogen	0.090	mg/L	01/06/2013	12.59	Lisa de Haan	Well 3
1307258	Central	TP00179	CCC	Estuary Rd Pump Stn	Nitrate-Nitrogen	0.30	mg/L	01/06/2013	12.55	Lisa de Haan	Well 2
1106045	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.11	mg/L	16/03/2011	12.25	SM	Well 2
1106115	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.15	mg/L	16/03/2011	12.35	SM	Well 3
1132443	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.14	mg/L	24/08/2011	11.30	RMcC	Well 3
1132444	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.92	mg/L	24/08/2011	11.45	RMcC	Well 1
1307259	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.14	mg/L	16/05/2013	14.35	Lisa de Haan	Well 1
1307260	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.19	mg/L	16/05/2013	14.22	Lisa de Haan	Well 2
1603250	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	1.3	mg/L	22/03/2016	11.25	Lisa de Haan	Well 3
1707338	Central	TP00179	CCC	Grassmere St Pump Stn	Nitrate-Nitrogen	0.84	mg/L	15/06/2017	11.35	Ian Baker	Well 1
1106104	Central	TP00179	CCC	Hillmorton Pump Stn	Nitrate-Nitrogen	0.15	mg/L	16/03/2011	9.10	TD	Well 1
1131888	Central	TP00179	CCC	Hillmorton Pump Stn	Nitrate-Nitrogen	0.13	mg/L	23/08/2011	9.55	RMcC	Well 1
1131889	Central	TP00179	CCC	Hillmorton Pump Stn	Nitrate-Nitrogen	0.33	mg/L	23/08/2011	10.15	RMcC	Well 2
1106073	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.19	mg/L	16/03/2011	14.00	SM	Well 1 no flow
1106078	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.11	mg/L	16/03/2011	14.15	SM	Well 5
1106083	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.14	mg/L	16/03/2011	14.05	SM	Well 4
1132438	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.21	mg/L	24/08/2011	08.00	RMcC	Well 2
1132439	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.14	mg/L	24/08/2011	08.15	RMcC	Well 4
1132440	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.11	mg/L	24/08/2011	08.30	RMcC	Well 5
1505492	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.19	mg/L	14/04/2015	13.30	JK	Well 6
1505493	Central	TP00179	CCC	Hills Pump Stn	Nitrate-Nitrogen	0.40	mg/L	14/04/2015	13.45	JK	Well 7
1006271	Central	TP00179	CCC	Kerrs Pump Stn	Nitrate-Nitrogen	0.14	mg/L	18/05/2010	14.25	TD	Pump 2
1018753	Central	TP00179	CCC	Kerrs Pump Stn	Nitrate-Nitrogen	0.15	mg/L	05/10/2010	10.05	RJ & CW	Well 1
1131877	Central	TP00179	CCC	Kerrs Pump Stn	Nitrate-Nitrogen	0.14	mg/L	22/08/2011	9.00	RMcc	Well 2
1307263	Central	TP00179	CCC	Kerrs Pump Stn	Nitrate-Nitrogen	0.15	mg/L	10/05/2013	13.22	Lisa de Haan	Well 2
1603251	Central	TP00179	CCC	Keyes Pump Stn	Nitrate-Nitrogen	1.3	mg/L	23/03/2016	11.20	Lisa de Haan	Well 1
1707336	Central	TP00179	CCC	Keyes Pump Stn	Nitrate-Nitrogen	0.55	mg/L	24/05/2017	15.21	Ian Baker	Well 1
1707337	Central	TP00179	CCC	Keyes Pump Stn	Nitrate-Nitrogen	0.52	mg/L	25/05/2017	13.35	Ian Baker	Well 2
1131871	Central	TP00179	CCC	Lake Tce Pump Stn	Nitrate-Nitrogen	0.11	mg/L	19/08/2011	14.00	RMcC	Well 2
1131872	Central	TP00179	CCC	Lake Tce Pump Stn	Nitrate-Nitrogen	0.16	mg/L	19/08/2011	14.15	RMcC	Well 3
1307261	Central	TP00179	CCC	Lake Tce Pump Stn	Nitrate-Nitrogen	0.23	mg/L	18/05/2013	12.21	Lisa de Haan	Well 3
1307262	Central	TP00179	CCC	Lake Tce Pump Stn	Nitrate-Nitrogen	0.17	mg/L	18/05/2013	12.25	Lisa de Haan	Well 2
1814568	Central	TP00179	Hill	Lake Tce Pump Stn	Nitrate-Nitrogen	<0.0010	mg/L	18/10/2018	10.40	Lisa de Haan	Well 3, M35/2260
1814569	Central	TP00179	Hill	Lake Tce Pump Stn	Nitrate-Nitrogen	0.15	mg/L	18/10/2018	10.30	Lisa de Haan	Well 4, M35/18398
1814570	Central	TP00179	Hill	Lake Tce Pump Stn	Nitrate-Nitrogen	0.12	mg/L	18/10/2018	10.50	Lisa de Haan	Well 5, BX/240993
290407050	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	1.85	mg/L	07/04/2009	11.15	RM	Well2
1106112	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	1.13	mg/L	16/03/2011	14.20	CW	Well 3
1106066	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	1.97	mg/L	17/03/2011	14.00	CW	Well 2 temp sp
1131885	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	1.3	mg/L	23/08/2011	8.30	RMcC	Well 3
1408449	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	1.8	mg/L	27/05/2014	10.35	Lisa de Haan	Well 1

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1505974	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	2.1	mg/L	28/04/2015	10.19	Lisa de Haan	Well 2
1603231	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	3.8	mg/L	22/03/2016	12.40	Lisa de Haan	Well 5
1609264	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	2.2	mg/L	21/07/2016	11.38	Ian Baker	Well 1
1609265	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	2.8	mg/L	21/07/2016	11.04	Ian Baker	Well 2
1609266	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	1.8	mg/L	21/07/2016	10.57	Ian Baker	Well 3
1609267	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	3.7	mg/L	21/07/2016	11.58	Ian Baker	Well 4
1609269	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	2.7	mg/L	21/07/2016	11.44	Ian Baker	Well 6
1609594	Central	TP00179	CCC	Main Pump Stn	Nitrate-Nitrogen	3.9	mg/L	27/07/2016	12.33	Ian Baker	Well 5
1018777	Central	TP00179	CCC	Mays Pump Stn	Nitrate-Nitrogen	0.39	mg/L	05/10/2010	13.20	RJ & CW	Well 3
1106038	Central	TP00179	CCC	Mays Pump Stn	Nitrate-Nitrogen	0.21	mg/L	16/03/2011	13.35	SM	No well access/point
1106032	Central	TP00179	CCC	Mays Pump Stn	Nitrate-Nitrogen	0.12	mg/L	21/03/2011	14.40	CW	Well 5
1132441	Central	TP00179	CCC	Mays Pump Stn	Nitrate-Nitrogen	0.12	mg/L	24/08/2011	08.45	RMcC	Well 5
1505491	Central	TP00179	CCC	Mays Pump Stn	Nitrate-Nitrogen	0.20	mg/L	14/04/2015	14.10	JK	Well 4
1707346	Central	TP00179	CCC	Mays Pump Stn	Nitrate-Nitrogen	0.77	mg/L	16/06/2017	11.50	Ian Baker	Well 3
1006266	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.17	mg/L	19/05/2010	9.40	TD	Well 1
1006267	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.51	mg/L	19/05/2010	9.50	TD	Well 2
1018747	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.17	mg/L	05/10/2010	11.44	RJ & CW	Well 1
1018749	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.49	mg/L	05/10/2010	11.50	RJ & CW	Well 2
1106093	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.17	mg/L	16/03/2011	15.00	CW	Well 1
1106094	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.44	mg/L	16/03/2011	15.10	CW	Well 2
1131890	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.38	mg/L	23/08/2011	10.45	RMcC	Well 2
1131891	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.15	mg/L	23/08/2011	11.00	RMcC	Well 1
1307255	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.21	mg/L	16/05/2013	10.25	Lisa de Haan	Well 1
1307256	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.55	mg/L	16/05/2013	10.20	Lisa de Haan	Well 2
1505497	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.34	mg/L	15/04/2015	10.29	Lisa de Haan	Well 1
1609270	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.8	mg/L	21/07/2016	12.23	Ian Baker	Well 2
1813715	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.17	mg/L	16/10/2018	10.05	Lisa de Haan	Well 1, M35/2243
1813727	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.32	mg/L	16/10/2018	11.12	Lisa de Haan	Well 2, M35/2325
1815254	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.22	mg/L	19/11/2018	11.27	Lisa de Haan	Well 1
1815255	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.22	mg/L	19/11/2018	11.34	Lisa de Haan	Well 2
1816071	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.19	mg/L	03/12/2018	10.18	Lisa de Haan	Well 1
1816072	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.35	mg/L	03/12/2018	10.16	Lisa de Haan	Well 2
1900823	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.22	mg/L	22/01/2019	09.36	Lisa de Haan	Well 1 M35/2243
1900824	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.19	mg/L	22/01/2019	09.34	Lisa de Haan	Well 2 M35/2325
1902562	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.18	mg/L	19/02/2019	10.03	Lisa de Haan	Well 1
1902563	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.33	mg/L	19/02/2019	10.03	Lisa de Haan	Well 2
1904143	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.18	mg/L	19/03/2019	09.41	Lisa de Haan	Well 1
1904144	Central	TP00179	CCC	Montreal Pump Stn	Nitrate-Nitrogen	0.35	mg/L	19/03/2019	09.43	Lisa de Haan	Well 2
290424079	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.40	mg/L	24/04/2009	09.00	RM	Well 1
1408439	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.68	mg/L	22/05/2014	10.18	Lisa de Haan	
1609271	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	1.0	mg/L	21/07/2016	10.15	Ian Baker	Well 1
1813823	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.49	mg/L	17/10/2018	12.00	Lisa de Haan	Well 1, M36/1197
1814557	Central	TP00179	Hill	Palatine Pump Stn	Nitrate-Nitrogen	0.51	mg/L	17/10/2018	12.00	Lisa de Haan	Well 1, M36/1197
1815252	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.48	mg/L	19/11/2018	09.38	Lisa de Haan	Well 1
1816070	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.50	mg/L	03/12/2018	11.48	Lisa de Haan	Well 1
1900826	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.49	mg/L	22/01/2019	09.12	Lisa de Haan	Well 1 M36/1197
1902561	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.55	mg/L	19/02/2019	13.20	Lisa de Haan	Well 1
1904142	Central	TP00179	CCC	Palatine Pump Stn	Nitrate-Nitrogen	0.48	mg/L	19/03/2019	09.22	Lisa de Haan	Well 1

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
290423127	Central	TP00179	CCC	Palmers Rd Pump Stn	Nitrate-Nitrogen	0.22	mg/L	23/04/2009	14.50	RM	Well 3
290424078	Central	TP00179	CCC	Palmers Rd Pump Stn	Nitrate-Nitrogen	0.14	mg/L	24/04/2009	08.20	RM	Well 1
290407051	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	3.12	mg/L	07/04/2009	11.55	RM	Well 2
290407052	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.20	mg/L	07/04/2009	11.45	RM	Well 4
290424080	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.22	mg/L	24/04/2009	09.30	RM	Well 3
1106090	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	3.57	mg/L	16/03/2011	10.00	TD	Well 2
1106095	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.53	mg/L	16/03/2011	10.30	TD	Well 6
1106099	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.04	mg/L	16/03/2011	10.20	TD	Well 4
1106109	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.03	mg/L	16/03/2011	10.10	TD	Well 5
1106014	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.02	mg/L	17/03/2011	14.50	CW	Well 3 temp fitting
1131882	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	4.0	mg/L	22/08/2011	10.50	RMcC	Well 2
1131883	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	<0.020	mg/L	22/08/2011	11.00	RMcC	Well 6
1131884	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.56	mg/L	22/08/2011	11.15	RM	Well 6
1408437	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	<0.060	mg/L	22/05/2014	11.03	Lisa de Haan	Well 3
1408438	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	3.3	mg/L	22/05/2014	10.49	Lisa de Haan	Well 2
1408444	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	<0.060	mg/L	22/05/2014	10.53	Lisa de Haan	Well 4
1609207	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	4.2	mg/L	19/07/2016	0910	Matthew Thomas	Well 2
1609208	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.5	mg/L	19/07/2016	0855	Matthew Thomas	Well 4
1609209	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	1.0	mg/L	19/07/2016	0905	Matthew Thomas	Well 6
1707341	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.42	mg/L	24/05/2017	11.10	Ian Baker	Well 3
1707342	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	4.1	mg/L	24/05/2017	10.55	Ian Baker	Well 2
1707343	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.42	mg/L	24/05/2017	11.05	Ian Baker	Well 5
1707344	Central	TP00179	CCC	Spreydon Pump Stn	Nitrate-Nitrogen	0.93	mg/L	24/05/2017	11.02	Ian Baker	Well 6
1106072	Central	TP00179	CCC	St Johns Pump Stn	Nitrate-Nitrogen	0.13	mg/L	16/03/2011	11.10	RJ	Confined space wells
1106024	Central	TP00179	CCC	St Johns Pump Stn	Nitrate-Nitrogen	0.13	mg/L	17/03/2011	11.40	CW	Well 2
1131878	Central	TP00179	CCC	St Johns Pump Stn	Nitrate-Nitrogen	0.14	mg/L	22/08/2011	9.30	RMcC	Well 2
1131859	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	0.24	mg/L	18/08/2011	14.30	RMcC	Well 4
1205607	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	0.27	mg/L	03/05/2012	13.20	Lisa de Haan	Well 4
1307254	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	0.32	mg/L	16/05/2013	12.24	Lisa de Haan	Well 5
1411316	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	<0.060	mg/L	17/07/2014	11.22	Lisa de Haan	Well 8
1505500	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	0.40	mg/L	21/04/2015	13.20	JK	Well 7
1506014	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	0.34	mg/L	23/04/2015	10.10	JK	Well 8
1707335	Central	TP00179	CCC	Sydenham Pump Stn	Nitrate-Nitrogen	0.59	mg/L	24/05/2017	09.18	Ian Baker	Well 5
1106098	Central	TP00179	CCC	Thorrington Pump Stn	Nitrate-Nitrogen	1.48	mg/L	16/03/2011	14.30	CW	Well 1
1131886	Central	TP00179	CCC	Thorrington Pump Stn	Nitrate-Nitrogen	1.2	mg/L	23/08/2011	9.00	RMcC	Well 1
1205614	Central	TP00179	CCC	Thorrington Pump Stn	Nitrate-Nitrogen	1.4	mg/L	10/05/2012	09.50	SM	Well
1609272	Central	TP00179	CCC	Thorrington Pump Stn	Nitrate-Nitrogen	1.9	mg/L	21/07/2016	10.30	Ian Baker	Well 1
290423108	Central	TP00179	CCC	Trafalgar Pump Stn	Nitrate-Nitrogen	3.77	mg/L	23/04/2009	09.30	RM	Well 6
1106100	Central	TP00179	CCC	Trafalgar Pump Stn	Nitrate-Nitrogen	0.11	mg/L	16/03/2011	13.45	SM	Well 6
1131892	Central	TP00179	CCC	Trafalgar Pump Stn	Nitrate-Nitrogen	0.12	mg/L	23/08/2011	11.30	RMcC	Well 1
1131893	Central	TP00179	CCC	Trafalgar Pump Stn	Nitrate-Nitrogen	0.11	mg/L	23/08/2011	11.50	RMcC	Well 6
1505494	Central	TP00179	CCC	Trafalgar Pump Stn	Nitrate-Nitrogen	0.41	mg/L	21/04/2015	12.20	JK	Pump 1
290408097	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	2.18	mg/L	08/04/2009	10.00	RM	Well 3
290408098	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	0.17	mg/L	08/04/2009	10.30	RM	Well 4
1106069	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	1.03	mg/L	16/03/2011	10.30	RJ	No well points
1131879	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	0.16	mg/L	22/08/2011	9.50	RMcC	Well 4
1131880	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	<0.020	mg/L	22/08/2011	10.10	RMcC	Well 3
1131881	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	0.22	mg/L	22/08/2011	10.30	RMcC	Well 5

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1408440	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	1.0	mg/L	22/05/2014	09.30	Lisa de Haan	Well 3
1408441	Central	TP00179	CCC	Woolston Pump Stn	Nitrate-Nitrogen	0.19	mg/L	22/05/2014	09.13	Lisa de Haan	Well 4
1018779	Central	TP00179	CCC	Worcester Pump Stn	Nitrate-Nitrogen	0.40	mg/L	05/10/2010	11.20	RJ & CW	Well
1106061	Central	TP00179	CCC	Worcester Pump Stn	Nitrate-Nitrogen	0.16	mg/L	16/03/2011	15.20	CW	Well 1/2no sp on wel
1131894	Central	TP00179	CCC	Worcester Pump Stn	Nitrate-Nitrogen	0.15	mg/L	23/08/2011	13.15	RMcC	Well 2
290424086	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.15	mg/L	24/04/2009	11.10	RM	
1006285	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.14	mg/L	18/05/2010	14.30	TD	
1018776	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.14	mg/L	05/10/2010	15.45	SM	Well
1205624	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.13	mg/L	18/04/2012	15.40	SM	Well
1408445	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.10	mg/L	23/05/2014	10.42	Lisa de Haan	
1505509	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.30	mg/L	14/04/2015	11.55	JK	
1603283	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	1.3	mg/L	23/03/2016	09.53	Lisa de Haan	
1707372	Heathcote	TP00188	CCC	Dyers Rd Well	Nitrate-Nitrogen	0.51	mg/L	25/05/2017	10.29	Ian Baker	
1006278	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.29	mg/L	18/05/2010	12.25	TD	Well 4
1006279	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.08	mg/L	20/05/2010	10.30	TD	Well 5
1018764	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.03	mg/L	06/10/2010	12.20	RJ & CW	Well 2 -off pump
1018765	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	1.64	mg/L	06/10/2010	11.50	RJ & CW	Well 5
1106107	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.92	mg/L	16/03/2011	11.50	TD	Big Pump
1106058	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.79	mg/L	21/03/2011	12.20	CW	Well 4
1307265	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.18	mg/L	16/05/2013	11.59	Lisa de Haan	Well 5
1408450	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.14	mg/L	27/05/2014	11.59	Lisa de Haan	Well 3
1609210	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.6	mg/L	19/07/2016	1027	Matthew Thomas	Well 5
1609211	Northwest	TP00181	CCC	Auburn Pump Stn	Nitrate-Nitrogen	0.6	mg/L	19/07/2016	1054	Matthew Thomas	Surface Pump 1
1106052	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	0.26	mg/L	16/03/2011	10.00	CW	Well 4
1106054	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	2.08	mg/L	16/03/2011	10.10	CW	Well 2
1106059	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	2.08	mg/L	16/03/2011	10.25	CW	Well 3
1131850	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	0.27	mg/L	18/08/2011	10.50	RMcC	Well 4
1131851	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	1.7	mg/L	18/08/2011	11.10	RMcC	Well 3
1205615	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	1.7	mg/L	19/04/2012	14.20	Rodger Jackson	Well 2
1205616	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	0.28	mg/L	19/04/2012	14.20	Rodger Jackson	Well 4
1707348	Northwest	TP00181	CCC	Avonhead Pump Stn	Nitrate-Nitrogen	0.67	mg/L	24/05/2017	14.22	Ian Baker	Well 4
1106044	Northwest	TP00181	CCC	Belfast Pump Station	Nitrate-Nitrogen	1.97	mg/L	16/03/2011	11.55	SM	Well 2
1006276	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	2.16	mg/L	18/05/2010	13.10	TD	Well 2
1006277	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	0.29	mg/L	18/05/2010	13.20	TD	Well 1
1018759	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	1.46	mg/L	07/10/2010	10.45	RJ & CW	Well 1
1018762	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	1.78	mg/L	07/10/2010	11.25	RJ & CW	Well 2
1106082	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	1.37	mg/L	16/03/2011	12.05	SM	Well 1
1132451	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	2.1	mg/L	25/08/2011	08.45	RMcC	Well 2
1132452	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	1.4	mg/L	25/08/2011	09.00	RMcC	Well 1
1505501	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	1.8	mg/L	17/04/2015	10.19	Lisa de Haan	Well 2
1505502	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	1.9	mg/L	17/04/2015	10.17	Lisa de Haan	Well 1
1603268	Northwest	TP00181	CCC	Belfast Pump Stn	Nitrate-Nitrogen	2.9	mg/L	18/03/2016	12.10		Well 2
290407047	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	1.39	mg/L	07/04/2009	09.45	RM	Well 1
290407048	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.15	mg/L	07/04/2009	09.30	RM	Well 5
1106055	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.97	mg/L	16/03/2011	11.30	CW	Well 1
1106056	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.16	mg/L	16/03/2011	11.20	CW	Well 5
1106086	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.96	mg/L	16/03/2011	11.00	CW	Well 2
1106087	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.16	mg/L	16/03/2011	11.10	CW	Well 3

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1131848	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.16	mg/L	18/08/2011	10.00	R McC	Well 5
1131849	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	0.63	mg/L	18/08/2011	10.15	RMcC	Well 1
1408454	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	1.3	mg/L	29/05/2014	10.26	Lisa de Haan	Well 3
1408455	Northwest	TP00181	CCC	Burnside Pump Stn	Nitrate-Nitrogen	1.4	mg/L	29/05/2014	10.31	Lisa de Haan	Well 2
1018780	Northwest	TP00181	CCC	Crosbie Pump Stn	Nitrate-Nitrogen	3.98	mg/L	06/10/2010	10.55	RJ & CW	Well 1
1018781	Northwest	TP00181	CCC	Crosbie Pump Stn	Nitrate-Nitrogen	0.26	mg/L	06/10/2010	11.20	RJ & CW	Well 2
1106085	Northwest	TP00181	CCC	Crosbie Pump Stn	Nitrate-Nitrogen	0.23	mg/L	16/03/2011	10.45	CW	taken from PS
1131852	Northwest	TP00181	CCC	Crosbie Pump Stn	Nitrate-Nitrogen	0.24	mg/L	18/08/2011	11.25	RMcC	Well 2
1131853	Northwest	TP00181	CCC	Crosbie Pump Stn	Nitrate-Nitrogen	1.6	mg/L	18/08/2011	11.45	RMcC	Well 3
1603266	Northwest	TP00181	CCC	Crosbie Pump Stn	Nitrate-Nitrogen	1.4	mg/L	18/03/2016	10.47		Well 2
1106049	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.58	mg/L	16/03/2011	10.30	SM	Well 1
1106088	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.12	mg/L	16/03/2011	10.40	SM	Well 4
1106105	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.56	mg/L	16/03/2011	10.35	SM	Well 3
1106075	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.78	mg/L	21/03/2011	13.00	CW	Well 2
1132447	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.13	mg/L	24/08/2011	13.10	RMcC	Well 4
1132448	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.64	mg/L	24/08/2011	13.30	RMcC	Well 3
1205606	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.43	mg/L	24/05/2012	11.30	SM	Well 3
1205618	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.65	mg/L	29/05/2012	11.25	SM	Well 4
1707350	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.50	mg/L	25/05/2017	08.45	Ian Baker	Well 4
1707351	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.49	mg/L	14/06/2017	12.50	Ian Baker	Well 5
1707361	Northwest	TP00181	CCC	Farrington Pump Stn	Nitrate-Nitrogen	0.50	mg/L	14/06/2017	11.05	Ian Baker	Well 8
1814559	Northwest	TP00181	Hill	Gardiners Pump Stn	Nitrate-Nitrogen	0.18	mg/L	22/10/2018	11.00	Lisa de Haan	Well 1, BX24/1311
1814560	Northwest	TP00181	Hill	Gardiners Pump Stn	Nitrate-Nitrogen	1.1	mg/L	22/10/2018	11.40	Lisa de Haan	Well 2, BX24/1312
290424087	Northwest	TP00181	CCC	Grampian Pump Stn	Nitrate-Nitrogen	0.40	mg/L	24/04/2009	11.50	RM	Well 3
1106081	Northwest	TP00181	CCC	Grampian Pump Stn	Nitrate-Nitrogen	0.35	mg/L	16/03/2011	11.00	SM	No consistent flow
1132455	Northwest	TP00181	CCC	Grampian Pump Stn	Nitrate-Nitrogen	0.33	mg/L	25/08/2011	10.15	RMcC	well 5
1132456	Northwest	TP00181	CCC	Grampian Pump Stn	Nitrate-Nitrogen	0.37	mg/L	25/08/2011	10.15	RMcC	well 3
1307264	Northwest	TP00181	CCC	Grampian Pump Stn	Nitrate-Nitrogen	0.37	mg/L	18/05/2013	11.31	Lisa de Haan	Well 3
1707364	Northwest	TP00181	CCC	Grampian Pump Stn	Nitrate-Nitrogen	0.69	mg/L	28/06/2017	13.02	Ian Baker	Well 5
1106089	Northwest	TP00181	CCC	Harewood Pump Stn	Nitrate-Nitrogen	0.32	mg/L	16/03/2011	12.00	CW	Well 1
1132449	Northwest	TP00181	CCC	Harewood Pump Stn	Nitrate-Nitrogen	0.32	mg/L	24/08/2011	13.50	RMcC	Well 1
1205619	Northwest	TP00181	CCC	Harewood Pump Stn	Nitrate-Nitrogen	0.19	mg/L	03/05/2012	12.29	Lisa de Haan	Well 1
1505503	Northwest	TP00181	CCC	Harewood Pump Stn	Nitrate-Nitrogen	0.49	mg/L	20/04/2015	12.14	Ian Baker	
1603265	Northwest	TP00181	CCC	Harewood Pump Stn	Nitrate-Nitrogen	1.4	mg/L	18/03/2016	12.38		Well 1
1707362	Northwest	TP00181	CCC	Harewood Pump Stn	Nitrate-Nitrogen	0.62	mg/L	14/06/2017	11.30	Ian Baker	
1006280	Northwest	TP00181	CCC	Jeffreys Pump Stn	Nitrate-Nitrogen	0.21	mg/L	18/05/2010	12.45	TD	Well 6
1018767	Northwest	TP00181	CCC	Jeffreys Pump Stn	Nitrate-Nitrogen	0.25	mg/L	06/10/2010	13.40	RJ & CW	Pump sample tap
1106050	Northwest	TP00181	CCC	Jeffreys Pump Stn	Nitrate-Nitrogen	0.07	mg/L	16/03/2011	12.30	CW	Well 6
1106057	Northwest	TP00181	CCC	Jeffreys Pump Stn	Nitrate-Nitrogen	0.31	mg/L	16/03/2011	12.40	CW	taken off p2 in PS
1505504	Northwest	TP00181	CCC	Jeffreys Pump Stn	Nitrate-Nitrogen	1.3	mg/L	15/04/2015	13.00	JK	Well 6
290408099	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.33	mg/L	08/04/2009	11.10	RM	Well 2
1106076	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.30	mg/L	16/03/2011	11.15	SM	Well 2
1106079	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.30	mg/L	16/03/2011	11.25	SM	Well 1
1132442	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.33	mg/L	24/08/2011	11.00	RMcC	Well 1
1307266	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.30	mg/L	10/05/2013	11.26	Lisa de Haan	Well 2
1408456	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.22	mg/L	30/05/2014	12.15	Lisa de Haan	
1707349	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.63	mg/L	23/05/2017	14.18	Ian Baker	Well 2
1813822	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.31	mg/L	17/10/2018	10.30	Lisa de Haan	Well 1, M35/5251

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1814556	Northwest	TP00181	Hill	Redwood Pump Stn	Nitrate-Nitrogen	0.33	mg/L	17/10/2018	10.30	Lisa de Haan	Well 1, M35/5251
1815251	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.35	mg/L	19/11/2018	12.47	Lisa de Haan	Well 1
1816069	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.32	mg/L	03/12/2018	10.48	Lisa de Haan	Well 1
1900825	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.35	mg/L	22/01/2019	10.03	Lisa de Haan	Well 1 M35/5251
1902564	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.37	mg/L	19/02/2019	10.26	Lisa de Haan	Well 1
1904145	Northwest	TP00181	CCC	Redwood Pump Stn	Nitrate-Nitrogen	0.35	mg/L	19/03/2019	10.09	Lisa de Haan	Well 1
1106037	Northwest	TP00181	CCC	Thompsons Pump Stn	Nitrate-Nitrogen	0.25	mg/L	16/03/2011	11.40	SM	No well sample point
1132450	Northwest	TP00181	CCC	Thompsons Pump Stn	Nitrate-Nitrogen	2.2	mg/L	25/08/2011	08.15	RMcC	Well 2
1307267	Northwest	TP00181	CCC	Thompsons Pump Stn	Nitrate-Nitrogen	<0.020	mg/L	10/05/2013	11.03	Lisa de Haan	Well 1
1603263	Northwest	TP00181	CCC	Thompsons Pump Stn	Nitrate-Nitrogen	2.9	mg/L	18/03/2016	11.32		Well 2
1106048	Northwest	TP00181	CCC	Wrights Pump Stn	Nitrate-Nitrogen	0.93	mg/L	16/03/2011	9.40	TD	no well tested
1131887	Northwest	TP00181	CCC	Wrights Pump Stn	Nitrate-Nitrogen	6.5	mg/L	23/08/2011	9.35	RMcC	Well 1
1609200	Northwest	TP00181	CCC	Wrights Pump Stn	Nitrate-Nitrogen	7.1	mg/L	19/07/2016	0948	Matthew Thomas	Well 1
1609202	Northwest	TP00181	CCC	Wrights Pump Stn	Nitrate-Nitrogen	7.0	mg/L	19/07/2016	0930	Matthew Thomas	Well 2
1609203	Northwest	TP00181	CCC	Wrights Pump Stn	Nitrate-Nitrogen	7.0	mg/L	19/07/2016	1001	Matthew Thomas	Well 3
1609205	Northwest	TP00181	CCC	Wrights Pump Stn	Nitrate-Nitrogen	6.6	mg/L	19/07/2016	0942	Mathew Thomas	Well 4
290407049	Parklands	TP00182	CCC	Burwood Pump Stn	Nitrate-Nitrogen	0.26	mg/L	07/04/2009	08.45	RM	Well 1
1131869	Parklands	TP00182	CCC	Burwood Pump Stn	Nitrate-Nitrogen	0.27	mg/L	19/08/2011	11.45	RMcC	Well 1
1307268	Parklands	TP00182	CCC	Burwood Pump Stn	Nitrate-Nitrogen	0.34	mg/L	10/05/2013	12.00	Lisa de Haan	Well 2
1408442	Parklands	TP00182	CCC	Burwood Pump Stn	Nitrate-Nitrogen	<0.060	mg/L	22/05/2014	12.08	Lisa de Haan	Well 1
1006282	Parklands	TP00182	CCC	Mairehau Pump Stn	Nitrate-Nitrogen	0.23	mg/L	18/05/2010	13.40	TD	Well 1
1018770	Parklands	TP00182	CCC	Mairehau Pump Stn	Nitrate-Nitrogen	0.04	mg/L	05/10/2010	14.20	RJ & CW	Well
1707366	Parklands	TP00182	CCC	Mairehau Pump Stn	Nitrate-Nitrogen	0.77	mg/L	01/06/2017	13.43	Lisa de Haan	
1131870	Parklands	TP00182	CCC	Marshlands Pump Stn	Nitrate-Nitrogen	0.29	mg/L	19/08/2011	13.40	RMcC	Well 2
1603271	Parklands	TP00182	CCC	Marshlands Pump Stn	Nitrate-Nitrogen	1.4	mg/L	22/03/2016	11.00	Lisa de Haan	Well 2
1006281	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.49	mg/L	19/05/2010	10.15	TD	Well 1
1018769	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.37	mg/L	07/10/2010	10.00	RJ & CW	Well 2
1106023	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.32	mg/L	17/03/2011	10.40	Cw	Well 2
1131866	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.33	mg/L	19/08/2011	10.40	RMcC	Well 2
1131867	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.48	mg/L	19/08/2011	11.00	RMcC	Well 1
1131868	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.46	mg/L	19/08/2011	11.20	RMcC	Wel 1
1205620	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.37	mg/L	19/04/2012	12.56	Rodger Jackson	Well 2
1505507	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.58	mg/L	14/04/2015	12.40	JK	Well 3
1505506	Parklands	TP00182	CCC	Parklands Pump Stn	Nitrate-Nitrogen	0.72	mg/L	15/04/2015	13.43	Lisa de Haan	Well 1
1707365	Parklands	TP00182	CCC	Prestons Pump Stn	Nitrate-Nitrogen	0.93	mg/L	23/05/2017	13.10	Ian Baker	Well 1
1707367	Parklands	TP00182	CCC	Prestons Pump Stn	Nitrate-Nitrogen	0.99	mg/L	23/05/2017	12.38	Ian Baker	Well 3
1609154	Riccarton	TP00185	CCC	Lyndon St 30	Nitrate-Nitrogen	0.6	mg/L	18/07/2016	2139	Ian Baker	
290423130	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	0.22	mg/L	23/04/2009	13.30	RM	Well 2
1006283	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	0.48	mg/L	18/05/2010	11.40	TD	Well 3
1018774	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	0.24	mg/L	07/10/2010	12.15	CW	Pump Station
1106110	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	0.24	mg/L	16/03/2011	11.10	TD	Well 1
1106114	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	<0.02	mg/L	16/03/2011	11.00	TD	Well 3
1131846	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	0.22	mg/L	18/08/2011	09.15	RMcC	Well 1
1131847	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	0.16	mg/L	18/08/2011	09.35	RMcC	Well 3
1307269	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	<0.020	mg/L	16/05/2013	11.30	Lisa de Haan	Well 3
1408451	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	<0.060	mg/L	28/05/2014	09.55	Lisa de Haan	Well 1
1603272	Riccarton	TP00185	CCC	Picton Pump Stn	Nitrate-Nitrogen	1.3	mg/L	24/03/2016	09.30	Lisa de Haan	Well 3
1006284	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	0.19	mg/L	18/05/2010	12.00	TD	Well 4

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1018773	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	0.19	mg/L	06/10/2010	12.55	RJ & CW	Well 4
1106111	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	0.18	mg/L	16/03/2011	11.35	TD	Well 1
1131856	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	0.18	mg/L	18/08/2011	13.25	RMcC	Well 4
1205621	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	0.20	mg/L	19/04/2012	11.45		Well 4
1505508	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	<0.10	mg/L	15/04/2015	10.58	Lisa de Haan	Well 4
1707368	Riccarton	TP00185	CCC	Tara Pump Stn	Nitrate-Nitrogen	0.55	mg/L	24/05/2017	12.20	Ian Baker	Well 4
290423128	Rocky Point	TP00184	CCC	Chapmans Pump Stn	Nitrate-Nitrogen	0.38	mg/L	23/04/2009	14.00	RM	Well 1
1106019	Rocky Point	TP00184	CCC	Chapmans Pump Stn	Nitrate-Nitrogen	0.71	mg/L	16/03/2011	12.40	RJ	Well 1
1106025	Rocky Point	TP00184	CCC	Chapmans Pump Stn	Nitrate-Nitrogen	0.80	mg/L	16/03/2011	12.10	RJ	Well 2
1132458	Rocky Point	TP00184	CCC	Chapmans Pump Stn	Nitrate-Nitrogen	0.84	mg/L	25/08/2011	13.25	RMcC	Well 2
1408443	Rocky Point	TP00184	CCC	Chapmans Pump Stn	Nitrate-Nitrogen	1.5	mg/L	22/05/2014	09.48	Lisa de Haan	
1106026	Rocky Point	TP00184	CCC	Tanner Pump Stn	Nitrate-Nitrogen	0.10	mg/L	16/03/2011	11.40	RJ	Well 1
1106077	Rocky Point	TP00184	CCC	Tanner Pump Stn	Nitrate-Nitrogen	0.19	mg/L	17/03/2011	12.15	CW	
1132459	Rocky Point	TP00184	CCC	Tanner Pump Stn	Nitrate-Nitrogen	0.16	mg/L	25/08/2011	13.40	RMcC	Well 2
1205622	Rocky Point	TP00184	CCC	Tanner Pump Stn	Nitrate-Nitrogen	0.15	mg/L	03/05/2012	13.42	Lisa de Haan	Well 2
1603275	Rocky Point	TP00184	CCC	Tanner Pump Stn	Nitrate-Nitrogen	1.4	mg/L	24/03/2016	08.50	Lisa de Haan	Well 2
1707369	Rocky Point	TP00184	CCC	Tanner Pump Stn	Nitrate-Nitrogen	0.53	mg/L	25/05/2017	09.50	Ian Baker	Well 2
1814558	Rocky Point	TP00184	Hill	Tanner Pump Stn	Nitrate-Nitrogen	0.21	mg/L	18/10/2018	08.50	Lisa de Haan	Well 2, M36/1915
290423107	West	TP00183	CCC	Denton Pump Stn	Nitrate-Nitrogen	0.84	mg/L	23/04/2009	09.00	RM	Well 4
1106053	West	TP00183	CCC	Denton Pump Stn	Nitrate-Nitrogen	0.70	mg/L	16/03/2011	9.40	CW	Well 3
1131854	West	TP00183	CCC	Denton Pump Stn	Nitrate-Nitrogen	0.98	mg/L	18/08/2011	12.10	RMcC	Well 6
1307270	West	TP00183	CCC	Denton Pump Stn	Nitrate-Nitrogen	0.98	mg/L	16/05/2013	13.21	Lisa de Haan	Well 1
1603280	West	TP00183	CCC	Denton Pump Stn	Nitrate-Nitrogen	1.7	mg/L	18/03/2016	13.44		Well 1
1814567	West	TP00183	Hill	Denton Pump Stn	Nitrate-Nitrogen	0.96	mg/L	26/10/2018	11.30	Lisa de Haan	Well 2, M35/1866
1106101	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.49	mg/L	16/03/2011	7.40	TD	Well 4
1106102	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.60	mg/L	16/03/2011	8.20	TD	Well 3
1106103	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	1.78	mg/L	16/03/2011	8.40	TD	Well 2
1106029	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.85	mg/L	21/03/2011	10.55	CW	Well 1
1106060	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	1.51	mg/L	21/03/2011	10.40	CW	Well 2
1106062	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.51	mg/L	21/03/2011	10.15	CW	Well 4
1106070	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.41	mg/L	21/03/2011	11.00	CW	Well 5
1106097	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.49	mg/L	21/03/2011	10.30	CW	Well 3
1131857	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.47	mg/L	18/08/2011	13.50	RMcC	Well 3
1131858	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.41	mg/L	18/08/2011	14.15	RMcC	Well 5
1205623	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.51	mg/L	03/05/2012	12.51	Lisa de Haan	Well 2
1308469	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.54	mg/L	01/06/2013	10.55	Lisa de Haan	Well 3
1308470	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.47	mg/L	01/06/2013	11.15	Lisa de Haan	Well 5
1609213	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	1.0	mg/L	19/07/2016	1440	Matthew Thomas	Well 1
1609215	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	2.3	mg/L	19/07/2016	1420	Matthew Thomas	Well 2
1609216	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	1.0	mg/L	19/07/2016	1401	Matthew Thomas	Well 3
1609217	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.9	mg/L	19/07/2016	1345	Matthew Thomas	Well 4
1707370	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.89	mg/L	25/05/2017	11.45	Ian Baker	Well 1
1707371	West	TP00183	CCC	Dunbars Pump Stn	Nitrate-Nitrogen	0.78	mg/L	25/05/2017	11.50	Ian Baker	Well 5
1106051	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.44	mg/L	16/03/2011	8.50	CW	Well 1
1106084	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.35	mg/L	16/03/2011	8.30	CW	Well 2
1131855	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.38	mg/L	18/08/2011	13.00	RMcC	Well 2
1408453	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.54	mg/L	28/05/2014	10.19	Lisa de Haan	
1603278	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	1.5	mg/L	24/03/2016	10.07	Lisa de Haan	Well 2

SampleID	PressureZone	LocationID	LabRef	Address	Determinand	Result	Units	Date	Sample Time	Name	Comments
1609227	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.7	mg/L	19/07/2016	1130	Matthew Thomas	Well 1
1609228	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.8	mg/L	19/07/2016	1142	Matthew Thomas	Well 2
1609229	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.8	mg/L	19/07/2016	1308	Matthew Thomas	Well 1
1609230	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.7	mg/L	19/07/2016	1255	Matthew Thomas	Well 2
1609231	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.8	mg/L	19/07/2016	1209	Matthew Thomas	Well 5
1609232	West	TP00183	CCC	Sockburn Pump Stn	Nitrate-Nitrogen	0.9	mg/L	19/07/2016	1155	Matthew Thomas	Well 6
1814566	West	TP00183	Hill	Sockburn Pump Stn	Nitrate-Nitrogen	0.56	mg/L	25/10/2018	11.00	Lisa de Haan	Well 2, M35/1860
1308471	West	TP00183	CCC	Wilmers Pump Stn	Nitrate-Nitrogen	0.24	mg/L	13/06/2013	08.51	LdH	Well 2
1603282	West	TP00183	CCC	Wilmers Pump Stn	Nitrate-Nitrogen	1.4	mg/L	24/03/2016	10.45	Lisa de Haan	Well 2

9(2)(a) [redacted]

From: 9(2)(a) [redacted]@health.govt.nz
Sent: Monday, 22 July 2019 1:26 p.m.
To: Helen Graham
Subject: Re: Nitrate in drinking water

Thanks Helen,

We have had a number of enquiries about this and have just responded again to West Melton

9(2)(a) [redacted]
Ministry of Health
9(2)(a) [redacted]

http://www.health.govt.nz
9(2)(a) [redacted]

From: "Helen Graham" <Helen.Graham@cdhb.health.nz>
To: "9(2)(a) [redacted]@health.govt.nz>,
Date: 22/07/2019 01:11 p.m.
Subject: Nitrate in drinking water

Hi 9(2)(a) [redacted]

See email below re nitrate in drinking water. Just a heads up.

Kind Regards

Helen

Helen Graham
Team Leader | Protection Team

Community and Public Health
Canterbury District Health Board
310 Manchester Street | Christchurch
PO Box 1475 | Christchurch | 8013
Ext: 82795| **DDI:** 9(2)(a) **Mobile:** 9(2)(a)
Email: Helen.Graham@cdhb.health.nz | **Website**: www.cph.co.nz

Canterbury
District Health Board
Te Poari Hauora o Waitaha

From: Alizon Paterson
Sent: Monday, 22 July 2019 1:05 p.m.
To: CPH Risk Management Committee (Identification) <RISKMANAGEMENTCOMMITTEE@cdhb.health.nz>
Subject: CWMS Stuff

Interesting comments from the recent Christchurch West Melton Zonal Meeting for your information:

Nitrate in Drinking Water Research
At the Local Government NZ AGM they have recommended that the Government fund additional research into the effects of nitrates in drinking water on human health, and/or partner with international public health organisations to promote such research, in order to determine whether the current drinking water standard for nitrate is still appropriate for the protection of human health.

At its Council meeting on 11 July 2019 Environment Canterbury also resolved to send a letter to the Minister of Health asking that research be prioritised into health issues from nitrate concentrations.
(ChChWestMelton Zonal Group has already written to Government along these same lines – they plan to approach Government again about this)

Plan Change 7 to Land and Water Regional Plan
Environment Canterbury will publicly notify proposed Plan Change 7 to the Land and Water Regional Plan on 20 July 2019 for public submissions. The Plan Change has three parts. Part A is an 'Omnibus' plan change that proposes amendments to region-wide provisions in the LWRP and makes minor changes to a number of subregion sections. Parts B and C relate to the Orari-Temuka-Opihi-Pareora (OTOP) and Waimakariri sub-region sections of the Plan respectively.

Alizon

Alizon Paterson | Health Protection Officer| HSNO Officer
Community and Public Health | Canterbury District Health Board
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