Utilities and Roading Committee

Agenda

Tuesday 19 November 2019

4.00pm

Waimakariri District Council Chambers
215 High Street
Rangiora

Members:
Cr Wendy Doody (Chairperson)
Cr Al Blackie
Cr Robbie Brine
Mayor Dan Gordon (ex officio)
Cr Sandra Stewart
Cr Paul Williams
The Chairperson and Members
WAIMAKARIRI DISTRICT COUNCIL

A Meeting of the UTILITIES AND ROADING COMMITTEE will be held in the COUNCIL CHAMBERS, 215 HIGH STREET, RANGIORA on TUESDAY 19 NOVEMBER 2019 to commence at 4.00pm.

Adrienne Smith
Governance Coordinator

Recommendations in reports are not to be construed as Council policy until adopted by the Council

BUSINESS

1 APOLOGIES

2 CONFLICTS OF INTEREST

Conflicts of interest (if any) to be reported for minuting.

3 RECEIPT OF MINUTES

3.1 Minutes of a meeting of the Utilities and Roading Committee held on Tuesday 24 September 2019

RECOMMENDATION

THAT the Utilities and Roading Committee:

(a) Receives for information the minutes of a meeting of the Utilities and Roading Committee held on 24 September 2019.

4 MATTERS ARISING

5 DEPUTATION

6 REPORTS

6.1 Drinking-water Quality and Compliance Annual Report 2018-19 – Colin Roxburgh (Water Asset Manager)

RECOMMENDATION

THAT the Utilities and Roading Committee:
(a) **Receives** report No. 181002113999.

(b) **Notes** that as a drinking-water supplier, Council has met its monitoring and management obligations under the Health Act for all of its public supplies during the 2018/19 compliance period.

(c) **Notes** that at the treatment plants, all 13 of the Council's drinking-water supplies met the bacterial requirements of the Drinking-water Standards for New Zealand (DWSNZ).

(d) **Notes** that 11 of Council's 13 drinking-water supplies met the bacterial requirements of the DWSNZ for their distribution zones.

(e) **Notes** that 8 out of Council's 13 drinking-water supplies met the protozoal requirements of the DWSNZ for the full compliance period, two met the requirements part way through the compliance period (Mandeville-Fernside and Oxford Rural No.1), one requires some further reporting (Waikuku Beach), and two require full capital upgrades (Poyntzs Road and Garrymere).

(f) **Notes** that all 13 of Council's drinking-water supplies met the chemical requirements of the DWSNZ for the 2018/19 compliance period.

(g) **Notes** that no E. coli was detected on any of Council's 13 drinking-water supplies during the 2018/19 compliance period.

(h) **Notes** that the rate of total coliforms being detected in the 2018/19 period was 1.3% which is lower than the long term average rate of 5.1%.

(i) **Notes** that five Water Safety Plans were submitted and approved during the 2018/19 period, and that implementation visits were completed on eight water supplies to confirm that the Water Safety Plans are being implemented correctly.

(j) **Circulates** this report to Council and all Community Boards for their information.

6.2 **Cust Headwork's Renewal Project – Colin Roxburgh (Water Asset Manager)**

**RECOMMENDATION** 50-58

THAT the Utilities and Roading Committee:

(a) **Receives** report No. 191031151907.

(b) **Notes** that there is an immediate need to renew the Cust water headworks and increase the storage provision at the site, but that the UV treatment project is proposed to be deferred until there is greater certainty about future requirements.

(c) **Recommends** that the Council, for consideration as part of the Draft 2020/21 Annual Plan, retain the Cust Headworks Renewal ($400,000) and Cust Storage Upgrade ($80,000) budgets currently set for the 2020/21 financial years, but defer the majority ($330,000) of the UV upgrade budget until the 2021/22 financial year, leaving $220,000 in 2020/21.

(d) **Endorses** the engagement strategy outlined in Section 5 of this report as the means of informing and gaining feedback from the relevant stakeholders to this project.

(e) **Circulates** this report to the Rangiora-Ashley Community Board for their information.
6.3 **Ohoka, Central and Coastal Drainage Maintenance Budgets – Owen Davies (Drainage Asset Manager)**

*RECOMMENDATION 59-84*

**THAT** the Utilities and Roading Committee:

(a) **Receives** report No. 191104153585.

(b) **Notes** that there has been a significant increase in the annual drain maintenance expenditure in the Ohoka Rural, Central Rural and Coastal Rural drainage schemes, over the previous two financial years.

(c) **Notes** drainage staff will continue to monitor drainage maintenance expenditure over the current financial year and will implement cost saving measures where possible.

(d) **Notes** that even with some cost savings being realised, it is still expected that an increase in the Ohoka Rural, Central Rural and Coastal Rural drainage schemes’ drain maintenance budgets in the 2020/21 will be required.

(e) **Circulates** this report to the Council, Oxford-Ohoka, Kaiapoi-Tuahiwi, Rangiora-Ashley and Woodend-Seton Community Boards for their information.


*RECOMMENDATION 85-91*

**THAT** the Utilities and Roading Committee

(a) **Receives** report No. 191105154393.

(b) **Establishes** a Solid and Hazardous Waste Working Party.

(c) ** Approves** the Terms of Reference for the Solid and Hazardous Waste Working Party as contained in document 191105154039.

(d) **Appoints** Councillors Brine, ............, ............... and ............... as members of the Solid and Hazardous Waste Working Party.

(e) **Notes** that Mayor Gordon is an ex-officio member of the Solid and Hazardous Waste Working Party.

(f) **Circulates** report No. 191105154393 to the Community Boards.
6.5 **Update on Solid Waste Services and Waste Quantities to 31 October 2019**

– Kitty Waghorn (Solid Waste Asset Manager)

**RECOMMENDATION**

THAT the Utilities and Roading Committee:

(a) Receives report No. 191107155980.

(b) Notes that staff will continue to monitor the weight of waste collected at kerbside over the spring and summer periods, and will regularly report back to the Utilities & Roading Committee on these figures.

(c) Circulates report No 191107155980 to the Council.

(d) Circulates report No 191107155980 to Community Boards.

6.6 **Water Race Management Contract – Renegotiation of Base Payment**

– Kalley Simpson (3 Waters Manager)

**RECOMMENDATION**

THAT the Utilities and Roading Committee

(a) Receives report No. 191107155981.

(b) Approves the increase of $38,236 as detailed in the WIL letter dated 18 October 2019.

(c) Notes that there is adequate budget available for this increase as the budgets were revised as part of the Drainage & Stockwater – Staff Submission to the Draft 2019-20 Annual Plan, May 2019 (TRIM 190418057971) in anticipation of the increase.

(d) Circulates this report to the Council and community board for their information.

6.7 **Urban Stormwater quality baseline results and issues identified**

– Sophie Allen (Water Environment Advisor)

**RECOMMENDATION**

THAT the Utilities and Roading Committee:

(a) Receives report No. 190618085491.

(b) Notes the issues raised in stormwater quality baseline monitoring reports, summarised in this report, for;

   i. Rangiora (TRIM 140728079529);

   ii. Woodend (TRIM 180822095021);

   iii. Kaiapoi (TRIM 190709096637); and

   iv. Oxford (report to be completed).
(c) **Notes** that WDC staff are investigating some issues raised by the stormwater quality baseline monitoring results, in conjunction with Environment Canterbury staff where appropriate.

(d) **Notes** that a report on the progress on the stormwater network discharge consent applications, associated monitoring programmes, and proposal for data management will be presented to the Utilities and Roading Committee in early 2020.

(e) **Notes** that budget allocation for urban stormwater quality improvements is included in the current budgets from 2025/26 onwards.

(f) **Circulates** this report to the Waimakariri Water Zone Committee, Land and Water Committee, and Community Boards.

6.8 **Cam River floodgate automation for saline intrusion prevention – Sophie Allen (Water Environment Advisor)**

**RECOMMENDATION**  
283-299

**THAT** the Utilities and Roading Committee

(a) **Receives** report No. 191017145159.

(b) **Considers** inclusion of a budget of $15,000 in the Draft Annual Plan from the general rate for 2020-21 to scope feasibility of automating the Cam River Floodgate, to be used as a tidegate against saline incursions.

(c) **Notes** that a report summarising findings from the feasibility study will be presented to the Utilities and Roading Committee and Environment Canterbury in early 2021, for a decision whether to proceed, and costings in order to obtain required consents / permissions and construct the design.

(d) **Notes** that any modifications to the Cam River floodgate would require the approval of Environment Canterbury as the asset owner.

(e) **Circulates** this report to the Kaiapoi-Tuahiwi Community Board and Waimakariri Water Zone Committee.

6.9 **Approval of the Roading and Transportation Procurement Strategy – Joanne McBride (Roading and Transport Manager)**

**RECOMMENDATION**  
300-372

**THAT** the Utilities and Roading Committee

(a) **Receives** report No. 191105154423;

(b) **Approves** the Roading and Transportation Procurement Strategy (TRIM No. 190417057789);

(c) **Circulates** this report to Council and the Community Boards for information;

(d) **Notes** that shared services are considered and implemented with neighbouring local authorities where applicable.
7 PORTFOLIO UPDATES

7.1 Roading – Councillor Paul Williams
7.2 Drainage and Stockwater – Councillor Sandra Stewart
7.3 Utilities (Water Supplies and Sewer) – Councillor Paul Williams
7.4 Solid Waste – Councillor Robbie Brine
7.5 Transport – Mayor Dan Gordon

8 QUESTIONS

9 URGENT GENERAL BUSINESS

NEXT MEETING

The next meeting of the Utilities and Roading Committee is scheduled for 9:30am, Thursday 19 December 2019 in the Council Chambers.
WAIMAKARIRI DISTRICT COUNCIL

MINUTES OF THE MEETING OF THE UTILITIES AND ROADING COMMITTEE HELD IN THE COUNCIL CHAMBERS, 215 HIGH STREET, RANGIORA ON TUESDAY 24 SEPTEMBER 2019 COMMENCING AT 4.00PM

PRESENT

Councillor P Williams (Chair), Councillors R Brine, J Meyer, S Stewart, Deputy Mayor K Felstead and Mayor Ayers

IN ATTENDANCE

K LaValley (PDU Manager), Colin Roxburgh (Water Asset Manager), K Waghorn (Solid Waste Asset Manager), S Collin (Infrastructure Strategy Manager), K Straw (Civil Projects Team Leader), J McBride (Roading and Transport Manager), D Young (Senior Engineering Advisor), K Graham (Road Safety Co-ordinator/Journey Planner), S Allen (Water Environment Advisor), G Hutchison (Wastewater Asset Manager), J Pascoe (minutes)

1 APOLOGIES

No apologies were received.

2 CONFLICTS OF INTEREST

No conflicts of interest were recorded.

3 CONFIRMATION OF MINUTES

3.1 Minutes of a meeting of the Utilities and Roading Committee held on Tuesday 20 August 2019

Moved: Councillor Brine  Seconded: Councillor Meyer

THAT the Utilities and Roading Committee:

(a) Confirms, as a true and correct record, the minutes of a meeting of the Utilities and Roading Committee held on Tuesday 20 August 2019.

CARRIED

4 MATTERS ARISING

There were no matters arising

5 DEPUTATION

There were no deputations.
6 REPORTS

6.1 Update on Solid Waste Activities in 2018/2019 – K Waghorn (Solid Waste Asset Manager)

S Collin reported on the 2018/19 Solid Waste Activities and noted the focus on recycling that is aimed at removing recyclable items prior to reaching the landfill resulting in less contamination of these recyclables. Education services have continued as for past years and the demand for these remains high.

Moved: Councillor Brine   Seconded: Councillor Felstead

THAT the Utilities and Roading Committee:

(a) **Receives** report No. 190904124164.

(b) **Notes** that the Council has achieved a number of milestones during the 2018/19 financial year, including:

   I. Adoption of the Waste Management & Minimisation Plan.
   
   II. Tender and award of solid waste services for kerbside collections and facilities operations.
   
   III. Completion of the kerbside recycling shed and use of shed for consolidating kerbside recycling prior to the end of June 2019.
   
   IV. Delivery of over 19,000 rubbish and organics bins by end June 2019.
   
   V. Replacement of the rubbish compactor at Southbrook resource recovery park at the end of June 2019.
   
(c) **Notes** that school and community education and community engagement continues to be a significant focus for staff in order to raise awareness about appropriate waste disposal practices and waste minimisation.

(d) **Circulates** report No 190904124164 to the Council.

(e) **Circulates** report No 190904124164 to the Community Boards.

CARRIED

Councillor Brine congratulated staff on a busy year.

Councillor Doody noted the presence of inappropriate rubbish in Oxford bins.
6.2 **Update on new Solid Waste Services and Waste Quantities – K Waghorn (Solid Waste Asset Manager)**

S Collin provided an update on Solid Waste Services and the quantities being dealt with over the first two months of the financial year. Currently these quantities are aligning with the estimates used for the 2019/20 budget. Six months information will be needed for greater accuracy. Good amounts of organic waste are being collected from the kerbside but this could represent less on-site composting being done. A Waste Analysis Protocols Audit is due to be done in March/April 2020 and will give information for the provision of better services.

Mayor Ayers commented that there is a possibility of collecting timber from the pit for use by organisations such as the Men’s Shed and asked if there should be a collection area at the pit for this. S Collin agreed to pass this suggestion to the appropriate staff.

Moved: Councillor Brine  Seconded: Mayor Ayers

**THAT** the Utilities and Roading Committee

(a) **Receives** report No. 190905124856.

(b) **Notes** that staff will continue to monitor the weight of waste collected at kerbside over the spring and summer periods, and will regularly report back to the Utilities & Roading Committee on these figures.

(c) **Notes** that there are early indications that the new organics collection service is reducing the weight of waste sent to landfill in the 2019/20 year.

(d) **Circulates** report No 190905124856 to the Council.

(e) **Circulates** report No 190905124856 to Community Boards.

CARRIED

6.3 **Rangiora Woodend Road Safety Improvements at Boys Road Intersection – K Straw (Civil Projects Team Leader) and J McBride (Roading and Transport Manager)**

K Straw reported on the need to bring forward funding for the Rangiora Woodend Road Safety improvements and for the scheme plan to be approved.

Mayor Ayers asked if traffic could be slowed at the intersection by making the corner tighter for left hand turns or made easier to be seen from Tuahiwi or Woodend Roads. J McBride replied that tree trimming could be done but that visibility gains from this would be small and that there is more risk of rear-end collisions by making the corner tighter. She noted that there is a need to move to more long-term solutions and that a right-turning bay could be a good interim measure.

J McBride advised that removing the dip on the Rangiora-Woodend Road has not yet been looked at. Community consultation took place two years ago and Council is now relying on technical expertise for the issues at this intersection however public feedback could be asked for.

Councillor Brine noted the difficulty of turning right out of Boys Road and asked if more traffic control was needed. J McBride replied that this would need further discussion as more land would be needed for this and taking land through the Public Works Act is difficult and that all options would be looked at.
Cr Williams asked how many how many accidents had occurred since the speed limit was reduced to 80km/hr. J McBride replied that accidents were still occurring with 2-3 in the last few months and that the speed reduction had not helped.

Cr Williams asked if the intersection was not lit would the lights of oncoming vehicles be more obvious and how many accidents have been caused by the power poles that are being removed. J McBride noted that lights provide a clear indication of an intersection and make motorists more aware. The power poles are being moved because of the change in the location of traffic lanes.

Councillor Meyer noted the speed of traffic travelling towards Rangiora on the Rangiora-Woodend Road and asked if there is room for a left-hand turn lane noting that the adjoining land has reserve status. J McBride advised that this could cause safety issues because of one car shadowing another.

Moved: Councillor Brine Seconded: Councillor Meyer

THAT the Utilities and Roading Committee:

(a) Receives report No. 190909125545;

(b) Approves the scheme design that is inclusive of removal of existing overhead services, installation of a new right turn lane, and installation of complying intersection lighting, as per section 4.3 of this report.

AND

RECOMMENDS THAT the Council:

(c) Approves bringing forward funding of $400,000 from the 2020/2021 and 2021/22 years into the 2019/20 budget (PJ 101034.000.5133), to allow this work to be undertaken;

(d) Notes that the current 2019 / 2020 budget is $200,000, meaning the overall project budget for this financial year will increase to $600,000 (based on recommendation c being approved);

(e) Notes that if $40,000 savings in other Low Cost/Low Risk projects can be found, then this will be used for engaging a consultant for the purposes of investigating the alternative long term solutions, and that if savings cannot be found by December 2019, that a request for an additional $40,000 will be requested in the draft Annual Plan;

(f) Notes that the project has an NZTA subsidy of 51%;

(g) Circulates this report to all Community Boards for their information

CARRIED

Councillor Brine welcomed the improvements as a positive step and noted that residents in the area would like to see the intersection problems fixed.

Mayor Ayers noted difficulties in taking reserve land for roading works and with public expectations through consultation.

Councillor Barnett did not think that the new design would rectify the intersection and with the volume of traffic on the Rangiora-Woodend Road it is impossible to turn right and people take risks. A wider road was recommended with a separation of traffic flows and conversations with affected communities.
Mayor Ayers did not support bringing the funding forward and stated that the problem needs to be sorted properly and that the recommended alterations do not go far enough.

Councillor Stewart supported the bringing forward of funding and said that this is an interim proposal to address serious safety concerns. Doing nothing is not an option.

Councillor Brine also supported earlier funding and noted that the reduction in the speed limit to 80kmh has reduced the severity of crashes and the consequences of these.

6.4 Park and Ride Strategy – D Young (Senior Engineering Advisor)

D Young advised that the object of this report is to give staff the mandate to progress the planning of a park and ride area and that most key decisions are yet to be made. The report will give a mandate to find suitable sites and that a proposal will be presented to community board meetings in December.

D Young noted that the location of the park and ride is immaterial as public transport will move to the location. More park and share locations are also being planned.

Moved: Councillor Brine  
Seconded: Councillor Felstead

THAT the Utilities and Roading Committee:

(a) Receives report No. 190820116067.

(b) Adopts the Park and Ride general locations, and timed staging as per the Park and Ride – Phased Implementation Plan (Trim 190812112165)

(c) Notes that the Community Boards have been briefed on the Park and Ride – Phased Implementation Plan in September 2019.

(d) Notes that a further report recommending sites for the phase 1 sites and appropriate levels of Service will be presented to a future U&R Committee meeting, after consultation with the affected Community Boards. This will occur in the new Council term.

(e) Circulates this report to all Community Boards.

CARRIED

Councillor Brine noted that traffic congestion and providing alternative transport into Christchurch are important topics.

6.5 Cycle Skills Education Programme “Cycle Sense” – K Graham (Road Safety Co-ordinator/Journey Planner)

K Graham provided an update on the Cycle Skills Education Programme. Funding for this programme was approved in 2017 and North Canterbury Vehicle Trust are delivering the Grade 1 school based programme in schools. Currently the Trust is undertaking training that will enable them to deliver the Grade 2 programme which is road based. By the end of 2019 400 students will have taken part in the Grade 1 programme and feedback has been very positive.

Councillor Brine asked if the bicycles used are in good condition or is help needed with this. K Graham replied that 10 bicycles were gifted by Christchurch
City Council and updating is a continual process. Bicycles can be gifted however 10 is the maximum number that can be carried on the trailer.

Moved: Councillor Williams Seconded: Councillor Meyer

THAT the Utilities and Roading Committee

(a) Receives report No. 190911127503

(b) Notes that Cycle Sense is now an established cycle skills education programme being delivered in schools in the Waimakariri District.

(c) Circulates this report to Council and Community Boards for their information.

CARRIED

Councillor Meyer congratulated K Graham on the success of the programme and Councillors Brine and Doody also added their congratulations.

6.6 Avian botulism occurrence, costs and management of avian botulism during the 2018-19 season – S Allen (Water Environment Advisor)

S Allen gave the annual update of bird death counts noting 950 to date this year as against 2,500 to date last year, however deaths have increased at the Rangiora Wastewater Treatment Plant. A management document has been put together and a separate report will come to this Committee with options to reduce the wastewater treatment wetland area at Rangiora to address the number of bird deaths. Reducing the water retention time in the wetland area will result in less algal growth.

Cr Stewart asked if the depth of water in the wetland area is a mitigating factor and if aeration of the wetland would be a mitigating factor. S Allen advised that altering the depth is not a management option as there is no way of topping up the water level if it becomes too low and that aeration would be a challenge as the area is large and flat.

Cr Williams noted that the cost of picking up and disposing by cremation of dead birds is around $50,000 per year and asked if there is a better method available. S Allen noted that the work takes place over nine months and an external contractor could be more efficient and there is scope to put this in place for the next season. An offal pit could be used for disposal but there are bio-waste regulations to consider.

Councillor Meyer asked if a study had been done on how many birds are on the pond today as compared to previous years and have the numbers increased. S Allen advised that numbers of birds on the pond depends on the weather and that less birds this year could be due to migration.

Councillor Meyer asked if other species present such as swallows, bitterns, kingfishers etc. are monitored. S Allen replied that this was not done at the wastewater plant but was done in the wider area but that specific monitoring was not done on all of the species.
THAT the Utilities and Roading Committee:

(a) Receives report No. 190905124322.

(b) Notes the update on bird death numbers and species for 2018-19, as collected by contractors to contain avian botulism.

(c) Notes the production of a WDC Avian Botulism Management Plan, which outlines current management practices, and documents communication, collaboration, monitoring, reporting and other requirements.

(d) Circulates this report to Council, the Waimakariri Water Zone Committee, and Community Boards for information.

CARRIED

6.7 Oxford Wastewater Scheme – Request for Information – G Hutchison (Wastewater Asset Manager)

G Hutchison provided a summary of work done towards the removal of filtration effluent and information on nitrogen levels at the wastewater scheme plus a strategy for going forward. He advised that a large amount of work has been done to research nitrate loadings caused by discharge from the wastewater scheme in order to obtain an irrigation consent. Graphs provided showed a potential leaching of nitrates into the groundwater of around 23kg/ha/year and this is only 6% of the permitted level. Currently 200kg/ha/year is the allowed limit.

Councillor Stewart commented that these figures are similar to a reasonably performing dairy farm and asked if any allowances are made for the type of soil. G Hutchinson replied that three types of soil are considered in the modelling done by the consultants.

Councillor Stewart asked if inundation and filtration information has been benchmarked. G Hutchinson advised that it work will be done on filtration hotspots in the network and has already been done in Oxford. Infiltration depends on rain events and ground saturation and areas will be benchmarked for iron levels to gain a better understanding of the process going forward. G Hutchinson undertook to provide further information to this committee and noted that iron will always be present in the system.

Councillor Stewart asked what work has been done on the wastewater system in Oxford. G Hutchinson advised that manholes and pipework have been inspected and house to house inspections for illegal connections are carried out. He noted that manhole repairs are costly and that it is difficult to retrospectively address some issues and that Oxford infiltration is above expectations and that around 50% of this infiltration is coming from the private network on properties.

Councillor Felstead enquired why only a small portion of the Racecourse Reserve is used for irrigation of treated effluent. G Hutchinson explained that 16 hectares is available for irrigation but that the consent only allow a coverage of 22mm per day and no ponding is allowed. A holding pond is available for excess effluent. Additional land is also available for population growth.
THAT the Utilities and Roading Committee

(a) **Receives** report No. 190906125260.

(b) **Notes** that Infiltration & Inflow reduction works will focus on investigations over the 2019/20 and 2020/21 financial years.

(c) **Notes** that the nitrogen loading applied to the soils from irrigation of treated effluent from the Oxford WWTP are at 60% of that allowed under the discharge consent conditions.

(d) **Notes** that the nitrogen levels discharged from the WWTP have reduced following the recent upgrade of the aeration system.

(e) **Circulates** this report to the Oxford-Ohoka Community Board.

CARRIED

Councillor Felstead thanked staff for the update.

6.8 **Ocean Outfall 2018 to 2019 Compliance review – G Hutchison**

(Wastewater Asset Manager)

G Hutchison reported that all consent conditions had been achieved in 2018/19 with a reduction in nitrogen levels due to the use of the irrigation basin. More internal auditing is being done.

Councillor Stewart noted some public criticism about the functioning of the plant and the quality of the effluent and asked how the effluent from this plant rated against other plants in New Zealand. G Hutchison advised that the quality of the effluent is good and that the plant operates as well as any plant in New Zealand and Australia. A state of art plant would perform better but there would be an effect on rates.

Councillor Meyer commented that he is looking forward to the upgrades of the Rangiora wastewater plant and suggested that media should be given information on this. G Hutchinson agreed that Council should be proactive with this information.

Councillor Meyer asked about international trends and will new ways of disposal of wastewater need to be found. G Hutchison replied that additional information will be available in the future and that improvements can be done to the existing plants such as the installation of algal membrane. There is a movement overseas to more biological treatment of effluent.

Kalley Simpson advised that wastewater recovery systems are used overseas to recover both energy and nutrients. Both the biological and cultural treatment of wastewater in this country will need to be improved in the future. Overseas the discharge of wastewater to water must be of drinking water standard.

G Hutchison explained that over the next few years there will be a need to look at long-term treatment options and to consult with the Iwi long before consent expiry date of 2039.
THAT the Utilities and Roading Committee

(a) Receives report No. 190827119588.

(b) Notes that the Ocean Outfall discharge consent was compliant with all consent conditions for the year 2018-2019.

(c) Circulates this report to Council for their information.

(d) Circulates this report to all Community Boards for information.

CARRIED

Councillor Stewart agreed that there is a need to evaluate where to go with sewerage treatment well in advance of the expiry date and commented that the Iwi do not favour disposal into the ocean and that she did not favour disposal on land or into freshwater. A community discussion will be needed in the next five years including capital implications, resource recovery. The public have a negative perception of wastewater disposal and need to be informed on the performance of wastewater plants.

7 MATTERS REFERRED FROM THE OXFORD-OHOKA COMMUNITY BOARD MEETING OF 5 SEPTEMBER 2019

7.1 Request for Approval to Proceed with Consultation on Poyntzs Road Joining with West Eyreton and Summerhill Water Supplies

C Roxburgh provided information on the Poyntzs Road upgrade to comply with the Drinking Water Standards and joining with the West Eyreton scheme. Staff have worked with the advisory groups and presented information to the two relevant community boards and recommend consultation with the affected communities in the new year.

Moved: Councillor Williams Seconded: Councillor Felstead

THAT the Utilities and Roading Committee recommends:

THAT the incoming Council:

(a) Receives report No. 190820116633.

(b) Notes that an upgrade to the Poyntzs Road scheme is required to achieve compliance with the Drinking-water Standards for New Zealand.

(c) Notes that the optimum way to achieve this upgrade is by installation of a pipeline from West Eyreton the Poyntzs Road, and that the optimum pipe route has been determined to be the Main Race Road alignment, following previous consultation with residents on two potential pipe routes.

(d) Notes that three funding options have been identified for consideration by the communities for the upgrade, following consultation with the West Eyreton and Summerhill Water Supply Advisory Groups.
(e) **Approves** staff to consult with the affected communities on the proposal and funding options identified, based on the draft consultation material attached, noting that the consultation material is currently in draft format and will be refined prior to distribution to residents.

(f) **Notes** that an identical report is to be presented to the Rangiora-Ashley Community Board prior to progressing with consultation.

CARRIED

Cr Williams thanked staff for a very good report.

8 **PORTFOLIO UPDATES**

8.1 **Roading – Councillor John Meyer**
Line marking is underway using reflective paint for better visibility.

8.2 **Drainage and Stockwater – Councillor Sandra Stewart**
Attending drainage meetings. Noted that both the reporting time to the drainage committee and dealing with problems in a timely manner should improve with an increase in staff.

8.3 **Utilities (Water Supplies and Sewer) – Councillor Paul Williams**
Poyntz Road issues noted.

8.4 **Solid Waste – Councillor Robbie Brine**
Noted the retirement of Mr Dick Davison and the appointment of another independent director. Funding of $130,000 available for regional waste minimisation.

9 **QUESTIONS**

There were no questions.

10 **URGENT GENERAL BUSINESS**

There was no general business.

THERE BEING NO FURTHER BUSINESS, THE MEETING WAS CLOSED AT 5.44PM.

CONFIRMED

_____________________________  ____________________________
Chairperson  Chief Executive

_____________________________  ____________________________
Date  Date
1. **SUMMARY**

1.1. This report is to update the Utilities and Roading Committee on the compliance of the Council’s public drinking-water supplies for the 2018-19 period, and of water quality trends over this period.

**Compliance with Drinking-water Standards and Health Act**

1.2. Each year Council is required to demonstrate compliance for each of its public drinking-water supplies. This has historically been reported annually to the Utilities and Roading Committee. The following key points can be made:

1.2.1. The monitoring and management obligations under the Health Act were met by Council for all its public supplies.

1.2.2. Bacterial compliance was achieved at all treatment plants.

1.2.3. Bacterial compliance was achieved within the distribution zones for all supplies, with the exception of Cust and West Eyreton - Summerhill. This was due to the correct number of samples not being taken. The samples were programmed correctly, but three samples were not taken on one day due to human error. Steps have been put in place to prevent a repeat occurrence of this.

1.2.4. Protozoal compliance was achieved on eight out of Council’s thirteen schemes. Specifically:

- Protozoal compliance was achieved on all eight schemes with secure sources.
- The Mandeville-Fernside and Oxford Rural No.1 schemes achieved compliance part way through the year. Mandeville’s UV plant was able to be operated correctly from January onwards, and Oxford Rural No.1 had a source upgrade in December 2018.
- Further work is required to demonstrate compliance of the Waikuku Beach UV system.
- Capital upgrades are required on the Garrymere and Poyntzs Road schemes to achieve protozoal compliance.

**Water Safety Plan Submissions and Implementation Assessments**
1.3. Water Safety Plans are used on each scheme to manage the safety and identify and plan for upgrades, as required by the Health Act. These are required to be resubmitted every five years, or when a significant upgrade is completed. Implementation visits are carried out by the Drinking-water Assessor (DWA) on each supply every three years to ensure that the Water Safety Plans are being implemented correctly. During the 2018/19 compliance period, the following key achievements were made:

1.3.1. Five Water Safety Plans were submitted and approved (Pegasus, Oxford Urban-Rural No.2, Mandeville-Fernside, Oxford Rural No.1, West Eyreton-Summerhill).

1.3.2. Implementation visits were carried out on eight supplies. There were no non-compliances, 2 non-conformances, and 26 recommendations identified. The non-conformances were to do with improvements required to documentation of reservoir inspections.

Water Quality Trends

1.4. This report includes information on water quality trends, which has not been analysed at this level or reported previously. As part of the 2019 Handbook for Preparing a Water Safety Plan a need for long term evaluation of results is identified, which this report sets out to achieve. Key points noted with respect to recent results are:

1.4.1. No E. coli was detected on any of the schemes out of the 1,664 samples taken in 2018/19.

1.4.2. Historically total coliforms were present in 5.1% of samples taken from 2002 to 2018. For the 2018/19 compliance period, 1.3% of samples had total coliforms present.

Attachments:

i. Annual Compliance Report (190930136459).

2. RECOMMENDATION

THAT the Utilities and Roading Committee:

(a) Receives report No. 181002113999.

(b) Notes that as a drinking-water supplier, Council has met its monitoring and management obligations under the Health Act for all of its public supplies during the 2018/19 compliance period.

(c) Notes that at the treatment plants, all 13 of the Council’s drinking-water supplies met the bacterial requirements of the Drinking-water Standards for New Zealand (DWSNZ).

(d) Notes that 11 of Council’s 13 drinking-water supplies met the bacterial requirements of the DWSNZ for their distribution zones.

(e) Notes that 8 out of Council’s 13 drinking-water supplies met the protozoal requirements of the DWSNZ for the full compliance period, two met the requirements part way through the compliance period (Mandeville-Fernside and Oxford Rural No.1), one requires some further reporting (Waikuku Beach), and two require full capital upgrades (Poyntzs Road and Garrymere).

(f) Notes that all 13 of Council’s drinking-water supplies met the chemical requirements of the DWSNZ for the 2018/19 compliance period.

(g) Notes that no E. coli was detected on any of Council’s 13 drinking-water supplies during the 2018/19 compliance period.
Notes that the rate of total coliforms being detected in the 2018/19 period was 1.3% which is lower than the long term average rate of 5.1%.

Notes that five Water Safety Plans were submitted and approved during the 2018/19 period, and that implementation visits were completed on eight water supplies to confirm that the Water Safety Plans are being implemented correctly.

Circulates this report to Council and all Community Boards for their information.

3. BACKGROUND

3.1 The Health Act (1956) requires that Council comply with the Drinking-water Standards for New Zealand 2005 (Revised 2018) (DWSNZ).

3.2 The key ways in which compliance is measured and reported on are summarised below:

3.1.1. Bacterial Compliance with the DWSNZ: Bacterial compliance is covered under Section 4 of the DWSNZ. Compliance is achieved through E. coli monitoring which is reported both at each treatment plant, and within each distribution zone (reticulation network).

3.1.2. Protozoal Compliance with the DWSNZ: Protozoal compliance is covered under Section 5 of the DWSNZ. Protozoal compliance is assessed at each treatment plant, and can be achieved either by treatment for protozoa with an approved treatment system operated within its required parameters, or by gaining secure groundwater classification in which requirements are met to negate the need for protozoal treatment.

3.1.3. Chemical Compliance with the DWSNZ: This is the assessment as to whether the chemical properties of the source water complies with the Maximum Acceptable Values (MAVs) in the DWSNZ. In general chemical tests are required to be undertaken every 5 years. If a result from one of these tests is greater than 50% of the MAV, that parameter is assigned as a Priority 2 (P2) determinand and more frequent sampling required. In the case of the Council’s supplies the only P2 determinand is nitrate on the Poyntzs Road scheme. In addition, Council is required to issue notices about the potential for plumbosolvent water twice per year for all its supplies.

3.1.4. Compliance with the Health Act: Council has duties under the Health Act which are assessed as part of the annual compliance report. The key duties noted in the 2018/19 compliance report are Council’s duties to:

- Take all practicable steps to ensure an adequate supply of drinking water (Section 69S).
- Take reasonable steps to contribute to protection of source drinking water (Section 69U).
- To keep records and make them available (Section 69ZD).
- To investigate complaints (Section 69ZE).

3.1.5. In terms of Section 69S and Council’s duty to comply with the DWSNZ, this came into effect in a staged manner depending on the size of the supply, as required under the Health (Drinking-water) Amendment Act 2007. These timeframes are:

- For large supplies (Kaiapoi and Rangiora) it became mandatory to comply from 1 July 2012.
- For minor supplies (Mandeville, Oxford Rural No.1, Oxford Rural No.2, Oxford Urban, Pegasus, West Eyreton, Woodend and Waikuku) it became mandatory to comply from 1 July 2014.
- For small supplies (Cust, Garrymere, Ohoka, Poyntzs Road) it became mandatory to comply from 1 July 2015.
3.1.6. As is implicit from above, from 1 July 2015 it has been mandatory and a legislative requirement that all Council supplies fully comply with the DWNSZ from this date.

4. ISSUES AND OPTIONS

This section of the report is split into four sub-sections:

- Compliance with DWSNZ and Health Act
- Water Safety Plans
- Water Quality Data Trends
- Water Quality Complaints Trends

Compliance with DWSNZ and Health Act

4.1. The key results of the 2018/19 compliance report are summarised below:
### Table 1: Summary of Results

<table>
<thead>
<tr>
<th>Supply</th>
<th>Compliance Achieved</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plant (Bacterial)</td>
<td>Plant (Protozoal)</td>
</tr>
<tr>
<td>Cust</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Garrymere</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Kaiapoi</td>
<td>Yes (Peraki)</td>
<td>Yes (Peraki)</td>
</tr>
<tr>
<td></td>
<td>Yes (Darnley)</td>
<td>Yes (Darnley)</td>
</tr>
<tr>
<td>Mandeville-Fenside</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Ohoka</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Oxford Rural No.1</td>
<td>Yes (Rockford Intake)</td>
<td>No (Rockford Intake)</td>
</tr>
<tr>
<td></td>
<td>Yes (Rockford well)</td>
<td>Yes (Rockford well)</td>
</tr>
<tr>
<td></td>
<td>Yes (McPhedrons)</td>
<td>Yes (McPhedrons)</td>
</tr>
<tr>
<td>Oxford Urban Rural No.2</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pegasus</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Poyntzs Road</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rangiora</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Waikuku Beach</td>
<td>Yes (Kings Ave)</td>
<td>No (Kings Ave)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Eyreton Summerhill</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodend</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Total</td>
<td>13/13</td>
<td>8/13</td>
</tr>
</tbody>
</table>

1. Some supplies have multiple plants or distribution zones for a single supply.
2. Backup sources are also included in the annual report, but have not been included in the table above if they were offline for the entire compliance period.

4.2. The following key conclusions can be drawn from above:
Bacterial Compliance of Plants:

4.2.1. Bacterial compliance was achieved at all WDC plants within the district that operated during the compliance period.

Protozoal Compliance of Plants:

4.2.2. The schemes with secure sources continued to achieve protozoal compliance (Rangiora, Kaiapoi, Woodend, Pegasus, Cust, West Eyreton, Oxford Urban-Rural No.2, Ohoka). This was at risk part way through the compliance year, with a number of schemes being required to demonstrate security again in August 2018 given it was 5 years since security was last granted. Secure status was renewed successfully for the West Eyreton, Oxford Urban, Kaiapoi and Woodend schemes following upgrade works at these sites.

4.2.3. The key improvement on protozoal compliance was the new source coming online for Oxford Rural No.1 to replace the old Waimakariri River intake. While protozoal compliance was not achieved for the scheme for the entire period (as the source online came online in November 2018) this represents a significant improvement to the safety of this supply.

4.2.4. There have still been challenges in operating the Mandeville plant within the strict parameters required for 100% of the time, which meant that protozoal compliance was not achieved for this plant for the entire period. Since taking one of the wells offline in January 2019, the plant has been fully compliant therefore it is anticipated that full compliance will be able to be achieved for the 2019/20 period.

4.2.5. While the UV upgrade has been completed at Waikuku Beach, there is work underway currently to confirm the protozoal removal requirement by demonstrating that the source water and catchment matches the treatment system. This has been complicated by the release of the 2018 DWSNZ, however this is expected to be confirmed later in 2019. Compliance is expected to be able to be demonstrated once reporting has been accepted.

4.2.6. Upgrade works are required at both Garrymere and Poyntzs Road in order to gain protozoal compliance of these schemes. Garrymere is planned to be constructed this financial year, and Poyntzs Road is budgeted to join with West Eyreton next financial year, subject to Council approval following consultation with the affected scheme members.

Distribution Zones

4.2.7. Compliance of the distribution zones (or reticulation), is demonstrated by taking the required number of E. coli samples in accordance with a set of parameters defined in the DWSNZ.

4.2.8. In total approximately 1,700 E. coli samples were taken across the district’s supplies over the compliance period. Three programmed samples for the Cust, West Eyreton and Summerhill distribution zones were not taken when they were programmed to be taken. This meant that these schemes exceeded the maximum allowable days between samples, and therefore compliance was not granted for these schemes.

4.2.9. Additional internal checks are now in place to reduce the risk of samples being missed in the future. These checks include daily emails from the Water Unit to the 3 Waters Team to confirm that all samples programmed have been taken. In addition to this an automated checking process is currently being developed and trialled.

Health Act
4.2.10. The Report on Compliance with the Drinking-water Standards for New Zealand 2005 (Revised 2018) and Duties under Health Act 1956 for the period 1st July 2018 to 30 June 2019 was received on 30 September 2019, from the South Island Drinking Water Assessment Unit of Community and Public Health (refer 190930136459).

4.2.11. In this report it was noted that the Council is meeting its duties under Sections 69S, 69U, 69ZD and 69ZE of the Health Act.

**Water Safety Plans**

4.3. All large and medium water supplies are required to have a Water Safety Plan (WSP) in place to document what the risks are on a given water supply, and how they are managed. Council also operates a number of small drinking-water supplies, which while not required to have a WSP, have operated with WSPs as a tool to manage their safety.

4.4. Each WSP is required to be renewed every five years, and each supply with a WSP in place is assessed with a Water Safety Plan implementation visit every three years.

4.5. The table below shows the WSPs that were renewed during the 2018/19 compliance period:

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Status</th>
<th>WSP Renewal Date</th>
<th>Adequacy Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pegasus</td>
<td>Approved</td>
<td>August 2018</td>
<td>181219150463</td>
</tr>
<tr>
<td>Oxford Urban / Rural No.2</td>
<td>Approved</td>
<td>October 2018</td>
<td>181015120428</td>
</tr>
<tr>
<td>Mandeville-Fernside</td>
<td>Approved</td>
<td>December 2018</td>
<td>190123007162</td>
</tr>
<tr>
<td>Oxford Rural No.1</td>
<td>Approved</td>
<td>March 2019</td>
<td>190313033114</td>
</tr>
<tr>
<td>West Eyreton / Summerhill</td>
<td>Approved</td>
<td>April 2019</td>
<td>190424059120</td>
</tr>
</tbody>
</table>

4.6. The table below shows the implementation visits and subsequent reports completed during 2018/19. Within each report the drinking-water assessor notes either non-compliances, non-conformances or recommendations. These are defined as:

- Non-compliances relate to findings where a water supplier fails to comply with the Act and/or DWSNZ.

- Non-conformances relate to the Drinking-water Assessor (DWA) findings where requirements of the approved WSP were not met or where the on-site visit has identified critical inadequacies in the approved WSP.

- Recommendations are suggestions where the DWA believes improvement could be made relating to good practice.
Table 3: Summary of Water Safety Plans Implementation Visits during 2018-19 Period

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Date</th>
<th>Non-compliance</th>
<th>Non-conformances</th>
<th>Recommendations</th>
<th>Implementation Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodend</td>
<td>November 2018</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>181121136518</td>
</tr>
<tr>
<td>Waikuku Beach</td>
<td>November 2018</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>181121136520</td>
</tr>
<tr>
<td>Cust</td>
<td>April 2019</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>190424059350</td>
</tr>
<tr>
<td>Mandeville-Fernside</td>
<td>May 2019</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>190530077285</td>
</tr>
<tr>
<td>Rangiora</td>
<td>March 2019</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>190530077286</td>
</tr>
<tr>
<td>Kaiapoi</td>
<td>March 2019</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>190530077288</td>
</tr>
<tr>
<td>Oxford Rural No.1</td>
<td>June 2018</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>190701092198</td>
</tr>
<tr>
<td>Oxford Urban – Rural No.2</td>
<td>June 2018</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>190701092199</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>0</td>
<td>2</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

4.7. Non-conformances are detailed below. The only two non-conformances were identical to each other on the Rangiora and Kaiapoi schemes.

*Table 4: Rangiora and Kaiapoi Water Supply WSP Implementation Report Non-Conformances*

**Non-conformance 1:** WDC should ensure that reservoir inspections are recorded in the Operational Log. Agreement – WDC have agreed to use their new electronic record keeping system to record reservoir checks and reiterate with their operators the importance of recording these checks. The new system will be implemented within the next few months.

4.8. The issue identified resulting in the non-conformance is that critical checks on the scheme such as reservoir inspections were not being adequately documented. As was noted in the implementation report, the agreed resolution is to ensure that mobile inspection forms are developed to capture this inspection data. These are being developed as part of the Asset Management Information System (AMIS) project which is to go live early in 2020. In the interim notes are being made on paper log books on site.

**Water Quality Data Trends**

4.9. Previously, only overall compliance has been reported on. There is however other data that is gathered that can be reported on to help understand a more complete picture of the overall quality of water being supplied.

4.10. As part of the 2019 Handbook for Preparing a Water Safety Plan a need for long term evaluation of results is identified, which this section of the report sets out to achieve.

**E. coli**

4.11. The most critical water quality indicator is E. coli. While E. coli itself will not necessarily cause illness, it is an indicator that faecal contamination is present in the water supply, and hence that it is not safe for human consumption. The following table summarises the history of E. coli contamination events within the district from 2002 to the present.
Table 5: Summary of E. coli sampling for 2018/19

<table>
<thead>
<tr>
<th></th>
<th>2018/19</th>
<th></th>
<th>2002 - 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Samples</td>
<td>Positive</td>
<td>Samples</td>
</tr>
<tr>
<td></td>
<td>Taken</td>
<td>Results</td>
<td>Taken</td>
</tr>
<tr>
<td>Plant</td>
<td>459</td>
<td>0</td>
<td>6,729</td>
</tr>
<tr>
<td>Reticulation</td>
<td>808</td>
<td>0</td>
<td>11,041</td>
</tr>
<tr>
<td>Source</td>
<td>407</td>
<td>0</td>
<td>1,786</td>
</tr>
<tr>
<td>Total</td>
<td>1,674</td>
<td>0</td>
<td>19,556</td>
</tr>
</tbody>
</table>

*22 of 25 source samples with E. coli were the Mandeville Two Chain Road bore, as part of repeated testing in 2012.

4.12. Over the last compliance year, there has been no E. coli detected in any of the 1,674 samples taken.

4.13. Historic data has been analysed to assess the most recent year against past years. This analysis has been split into distribution zones and plants.

![Figure 1: Summary of instances of E. coli being found in the distribution zone](image-url)
Figure 2: Summary of instances of E. coli being detected at treatment plants

4.14. The following reports have been produced in response to past E. coli events over the last 10 year period.
### Table 6: Summary of Historic E. coli Transgressions

<table>
<thead>
<tr>
<th>Event</th>
<th>Transgression Detail</th>
<th>Report</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangiora reticulation 2017/18</td>
<td>Positive sample in reticulation as part of routine sampling</td>
<td>180530060130</td>
<td>Sampling error due to inappropriate sample point location. New sample point installed.</td>
</tr>
<tr>
<td>Oxford Rural No.1 January 2018</td>
<td>Positive sample in reticulation as part of routine sampling</td>
<td>180312026010 180327032656 180327032657</td>
<td>High turbidity in source water from river intake. Intake replaced with new deep well.</td>
</tr>
<tr>
<td>Waikuku Beach December 2016</td>
<td>Positive e. coli sample returned from private property following complaints of illness.</td>
<td>191024148658</td>
<td>Determined to be private issue. Substantial testing on scheme did not return any evidence of contamination.</td>
</tr>
<tr>
<td>Woodend 2012, 2013 and 2014</td>
<td>2012 positive samples in reticulation found. Late 2013 positive samples in reticulation were found Early 2014 positive sample in reticulation, and from one reservoir.</td>
<td>140403034173 140228019442 130311017524</td>
<td>After the 2012 event it was concluded that the likely cause was either a contaminated sample tap (as there was no official sample point, and a tap at the Woodend Gateway Hotel was used to take the sample) or that the filter may have been the source of contamination. Following the 2013 / 14 event it was concluded that the northern reservoir may have been the cause. Contamination was found directly downstream of the reservoir, some gaps sealed, and the reservoir cleaned.</td>
</tr>
<tr>
<td>Mandeville 2012</td>
<td>Positive sample in reticulation as part of routine sampling. Subsequent sampling showed the chlorine equipment had not been working, and that the source was contaminated.</td>
<td>121005069107</td>
<td>Source concluded as not secure, UV treatment installed. Chlorination equipment alarmed.</td>
</tr>
<tr>
<td>Kaiapoi 2010</td>
<td>Positive sample in reticulation as part of routine sampling.</td>
<td>100210003955</td>
<td>Transgression concluded to be due to damage to water and sewer mains concurrently by a contractor.</td>
</tr>
</tbody>
</table>

**Total Coliforms**

4.15. A key indicator of water quality is total coliforms. There is no maximum acceptable value (MAV) for total coliforms in the DWSNZ, however they are now required to be monitored and analysed to give suppliers a better understanding of the overall water quality picture. Total coliforms represent living organisms in the water supply, with E. coli being a subset of the total coliforms group. E. coli is living organisms that originated in the stomach of a mammal, and are therefore an indicator of faecal contamination.

4.16. A summary of the rate of total coliforms being present for the last compliance period relative to the long term average is given below. The following figures present this data annually.
### Table 7: Comparison of 2018/19 Total Coliforms Detection Rate with Long Term Average

<table>
<thead>
<tr>
<th></th>
<th>2018/19</th>
<th></th>
<th>2002 - 2018</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Samples Taken</td>
<td>Positive Results</td>
<td>Samples Taken</td>
<td>Positive Results</td>
</tr>
<tr>
<td><strong>Plant</strong></td>
<td>452</td>
<td>1</td>
<td>6,744</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>0.2%</td>
<td></td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td><strong>Reticulation</strong></td>
<td>808</td>
<td>17</td>
<td>11,180</td>
<td>461</td>
</tr>
<tr>
<td></td>
<td>2.1%</td>
<td></td>
<td>4.1%</td>
<td></td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>407</td>
<td>4</td>
<td>1,682</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>1.0%</td>
<td></td>
<td>4.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,674</td>
<td>22</td>
<td>12,682</td>
<td>660</td>
</tr>
<tr>
<td></td>
<td>1.3%</td>
<td></td>
<td>5.1%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Percentage of Samples with Total Coliforms within Reticulation

Figure 4: Percentage of Samples with Total Coliforms at Plants

4.17. The following key conclusions can be drawn from the above figures:

- At treatment plants, the long term average rate of total coliforms being present is in the order of 2%. 

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Utilities and Roading Committee  
19 November 2019
Within the reticulation, the long term average rate of total coliforms being present is in the order of 4%.

A key contributor to the overall rate of total coliforms being present is the Woodend water supply which has had higher rates than other schemes historically. This is analysed further below.

4.18. Woodend is the only unchlorinated scheme with elevated manganese levels which can lead to biofilm. To determine whether there is a correlation between manganese levels and total coliforms incidence rates, the following graph was produced.

![Graph: Total Coliforms Trend and Manganese Levels](image)

**Figure 5: Comparison of Total Coliforms within the Woodend water supply with manganese levels**

4.19. The following conclusions can be drawn from the above:

- Over time the incidence rate of total coliforms is similar at the plant and within the reticulation for Woodend. This suggests that the source of the total coliforms is either the source water, or the plant, rather than the reticulation network.

- There have been sporadic incidences of total coliforms in the raw source water. This should not occur for secure groundwater, although it is noted that this has not occurred since well head upgrades were completed in August 2018, following security assessments.

- There is no obvious correlation between the manganese levels and the total coliforms levels.

- There had been issues with the performance of the Woodend filter over recent years, as evidenced by the higher manganese levels since approximately 2013. This has been resolved by the joining of the Woodend scheme to Pegasus, and abandoning the Woodend filter. This occurred at the end of the 2018/19 financial year, with very low manganese levels since this time.

4.20. While the previous figures provide an idea of the long term trend over the last 17 years, the latest annual set of results has been assessed relative to the previous year to get a better idea of the performance over the last completed compliance period relative to the previous one.
Based on the above two figures, it can be concluded that the total coliforms have significantly reduced at treatment plants over the latest compliance year relative to the previous one.
4.21.1. As with the plant samples, the rate of incidences of total coliforms in the reticulation has reduced in 2018/19 relative to 2017/18. Key changes made are:

- Flushing has been carried out of the Kaiapoi reticulation system after repeated total coliforms results in north Kaiapoi.
- The Waikuku Beach UV unit has been functioning, with no total coliforms detected in either the plant or reticulation since this time.
- The Woodend manganese removal filter has been more actively managed, reducing the rate of biofilm growth within the scheme.

4.21.2. To eliminate the total coliforms incidences further, the focus for the following year will be on steps to address the sporadic incidences on Cust and Kaiapoi, and to continue to closely monitor Woodend.
Complaints

4.22. The rate of complaints is tracked, and can be used to determine trends or identify issues with water quality. Easily accessible data for comparison on complaints has been available from the 2016/17 year onwards, through the Council’s Service Request system which is managed in TechOne.

4.23. The figure below shows the number of complaints received each year on the primary vertical axis, and this data converted to complaints per 1,000 properties on the secondary vertical axis.

4.24. The Council’s performance measure for complaints is to be less than 5 per 1,000 connections per year. As can be seen for the last three compliance years, this target has not been met with the rate of complaints being from 6.6 to 8.4 per 1,000 connections.

![Figure 10: Water Supply Complaints by Type and Year](image)

4.25. The following key points can be made about the data above:

- The total number of complaints has reduced in 2018/19 relative to 2017/18.
- In both 2017/18 and 2018/19 the scheme with the most complaints was Woodend-Tuahiwi.

4.26. The following figure provides some further explanation to the Woodend data for 2018/19:

![Figure 11: Water Supply Complaints for Woodend for 2018/19 by Complaint Type](image)

4.27. The key source of complaint on the Woodend scheme was clarity. In particular, this has been related to manganese build up during times when the manganese removal filter has not been performing well. The old filter at Woodend is no longer used, with the recently converted filter in Pegasus now treating all water for both Woodend and Pegasus.
4.28. To date, the Pegasus filter has been performing very well. At the time this report was written, there had been 1 complaint registered for Woodend, versus the 35 registered during the last compliance year.

4.29. It is also noted for Woodend there was a spike in continuity of supply complaints in the fourth quarter. This was due to an outage on the scheme as a result of the 1 June storm event. The circumstances that lead to this outage have since been resolved.

4.30. The Management Team have reviewed this report and support the recommendations.

5. **COMMUNITY VIEWS**

5.1. **Groups and Organisations**

5.2. No groups or organisations have been consulted regarding the annual compliance report or quality data analysis. Consultation is carried out with individual community boards and advisory groups for specific capital projects as required.

5.3. **Wider Community**

5.4. As above, specific community consultation has not been carried out regarding the compliance report as a whole, but targeted consultation exercises are carried out on specific schemes for specific projects.

5.5. To keep the public informed on the overall performance and compliance of the district's water supplies 3 Waters staff will work with the Communications and Engagement Team to put together a media release or news story on the contents of this report.

6. **IMPLICATIONS AND RISKS**

6.1. **Financial Implications**

6.2. There are capital budgets in place for the remaining work on the source upgrade projects for Poyntzs Road and Garrymere. The annual sampling is carried out from specific sampling budgets for each scheme, and Water Safety Plans are prepared within existing Asset Management budgets.

6.3. **Community Implications**

6.4. Compliance with the DWSNZ is required in order to ensure that all residents receiving water from a Council owned supply receive water that is demonstrably safe.

6.5. The complaints which are tracked and included in this report are used as a key tool for assessing the implications to the community on the quality and reliability of water being received.

6.6. **Risk Management**

6.7. There are inherent risks with public drinking water supplies. If a supply does not comply with the DWSNZ, it can be inferred that the level of risk is at an unacceptable level for that supply and that further steps must be taken in order to address the risk and achieve compliance. To address these risks on schemes that did not achieve compliance, steps and/or capital projects are in place to achieve full compliance.

6.8. In November 2019, a total coliforms reading was reported from the Cust water headworks that was higher than other intermittent results that are reported from time to time. This led
to the temporary chlorination of the supply, until the issues identified with the reservoirs could be remedied, as a precautionary measure. This was the first instance of one of Council’s emergency chlorination systems being utilised. This demonstrates the ability Council has through its current systems of identifying issues and managing them, while maintaining safe supplies.

6.9. **Health and Safety**

6.10. As above, compliant drinking-water is essential in ensuring the health and safety of the district’s communities from water borne disease.

7. **CONTEXT**

7.1. **Policy**

This matter is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

7.2. **Legislation**

The Health (Drinking-water) Amendment Act is relevant in this matter.

7.3. **Community Outcomes**

The provision of safe drinking water relates to the following community outcomes:

*Core utility services are provided in a timely and sustainable manner:*

- Council sewerage and water supply schemes, and drainage and waste collection services are provided to a high standard.

7.4. **Delegations**

No delegation is required to receive this report. The topic of the report is within the general delegation of the Utilities and Roading Committee.
Report on Compliance with the Drinking-water Standards for New Zealand 2005 (Revised 2018) and Duties under Health Act 1956

For Period: 1st July 2018 – 30th June 2019

Drinking Water Supplies:
Cust (CUS001)
Garrymere (GAR001)
Kaiapoi (KAI003)
Mandeville (MAN009)
Ohoka (OHO001)
Oxford Rural No 1 (OXF101)
Oxford Urban – Rural No 2 (OXF103)
Pegasus (PEG001)
Poyntz Road, Eyrewell (POY001)
Rangiora (RAN001)
Waikuku (WAI011)
West Eyreton (WES004)
Woodend (WOO002)

Water Supplier:
Waimakariri District Council

Drinking Water Unit:
South Island Drinking Water Assessment Unit
PO Box 1475, Christchurch 8140

Report Identifier:
WaimakaririDistrictCouncil_DWSNZ2005/18Compliance_300919_v1
Terminology

The Act – Part 2A, Health Act 1956  
CPH – Community and Public Health  
CRA – Catchment Risk Assessment  
DWA – Drinking Water Assessor  
DWO – Drinking Water Online  
DWSNZ – Drinking Water Standards New Zealand 2005 (Revised 2018)  
GW – Ground water  
MAV – Maximum acceptable level  
MoH – Ministry of Health  
P2 – Priority 2 determinand  
UV – Ultra-violet  
WDC – Waimakariri District Council  
WSP – Water Safety Plan

Non-Compliance - areas where the drinking water supply does not comply with the DWSNZ.

Bacterial compliance is under Section 4 of the DWSNZ  
Protozoal compliance is under Section 5 of the DWSNZ  
Cyanotoxin compliance is under Section 7 of the DWSNZ  
Chemical compliance is under Section 8 of the DWSNZ  
Radiological compliance is under Section 9 of the DWSNZ
## Treatment Plant: Bacterial Compliance

### Summary of *E.coli* Sampling Results

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Samples required</th>
<th>Samples collected</th>
<th>Number of transgressions</th>
<th>Compliance</th>
<th>Total coliform monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campground Waikuku Beach (TP02540)</td>
<td>104</td>
<td>11</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Cust (TP00741)</td>
<td>4</td>
<td>50</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Darnley Square (TP00209)</td>
<td>4</td>
<td>13</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Domain Road (TP02973)</td>
<td>4</td>
<td>9</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Garrymere (TP00593)</td>
<td>52</td>
<td>54</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Kings Avenue (TP00214)</td>
<td>104</td>
<td>108</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Mandeville 1 (TP02442)</td>
<td>104</td>
<td>106</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>McPhedrons Road (TP04030)</td>
<td>104</td>
<td>67</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Ohoka (TP00594)</td>
<td>4</td>
<td>10</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Pegasus (TP02780)</td>
<td>4</td>
<td>13</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Peraki Street (TP02443)</td>
<td>4</td>
<td>12</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Poyntz Road (TP00884)</td>
<td>52</td>
<td>54</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Rockford Road Deep Well (TP04029)</td>
<td>4</td>
<td>105</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Rockford Road Pump Station (TP00806)</td>
<td>104</td>
<td>45</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>South Belt (TP03053)</td>
<td>4</td>
<td>12</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>West Eyreton (TP00742)</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
<tr>
<td>Woodend Chinnerys Road (TP00211)</td>
<td>4</td>
<td>12</td>
<td>0</td>
<td>Compliant Y</td>
<td></td>
</tr>
</tbody>
</table>
Summary of Compliance with Sampling/Analytical/Remedial/Operational Requirements

Campground Waikuku Beach, Waikuku, Garrymere, Kings Avenue, Mandeville 1, Poyntz Road, Rockford Road Pump Station and South Belt were assessed under Criteria 1 E.coli monitoring.

Cust, Dornley Square, Domain Road, Ohoka, Pegasus, Peraki Street, Rockford Road Deep Well, West Eyreton and Woodend Chinnerys Road were assessed under SecureGW (reduced monitoring).

McPhedrons Road was assessed under SecureGW (interim security).

Campground, Waikuku, McPhedrons Road and Rockford Road Pump Station did not operate for the entire compliance period. The appropriate number of samples were taken for the period they were operational.

Ayres Street, Coopers Creek, Dudley Park, Fernside, Gammans Creek, Mandeville 2 and Rinaldi Ave were not operational during the compliance period and have therefore been excluded from reporting.

Mandeville 1 exceeded the maximum interval between samples by one day.

For all other plants sampling compliance was achieved for maximum days between samples, and minimum days of the week used for sampling. A MoH recognised laboratory was used for the sample analyses and appropriate sampling methods and sites were used. All of the treatment plants that were in operation during the compliance period met all of the requirements to comply with the bacterial requirements of the DWSNZ.

**Treatment Plant: Protozoa Compliance**

No log credit is required for secure GW supplies with no recycle.

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Log credit required pre March 1st</th>
<th>Log credit required post March 1st</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campground, Waikuku Beach (TP02540)</td>
<td>Not assigned</td>
<td>Not yet assigned</td>
</tr>
<tr>
<td>Garrymere (TP00593)</td>
<td>Not assigned</td>
<td>Not yet assigned</td>
</tr>
<tr>
<td>Kings Avenue (TP00214)</td>
<td>Not assigned</td>
<td>Not yet assigned</td>
</tr>
<tr>
<td>Mandeville 1 (TP02442)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Poyntz Road (TP00884)</td>
<td>Not assigned</td>
<td>Not yet assigned</td>
</tr>
<tr>
<td>Rockford Road Pump Station (TP00806)</td>
<td>Not assigned</td>
<td>Not yet assigned</td>
</tr>
</tbody>
</table>

Summary of Compliance with Risk Categorisation Process

CRAs and log credit assignation have not been completed for Garrymere, Campground Waikuku, Poyntz Road and Rockford Road Pump Station.

Kings Avenue is currently in the process of cryptosporidium monitoring which will feed into their CRA for this supply.
### Summary of Treatment Processes and Associated Log Credits

<table>
<thead>
<tr>
<th>Plant</th>
<th>Treatment process¹</th>
<th>Potential log credit Available</th>
<th>Compliance with all other requirements of criterion²</th>
<th>Log credit achieved pre March 1st</th>
<th>Log credit achieved post March 1st</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cust (TP00741)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Darnley Square (TP00209)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Domain Road (TP02973)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Mandeville 1 (TP02442)</td>
<td>UV</td>
<td>3</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>McPhedrons Road Well (TP04030)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Ohoka (TP00594)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Pegasus (TP02780)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Peraki Street (TP02443)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Rockford Road Deep Well (TP04029)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>South Belt (TP03053)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>West Eyreton (TP00742)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Woodend Chinnerys Road (TP00211)</td>
<td>GW security</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>All other plants</td>
<td>No treatment that meets the protozoa removal/inactivation requirement of the DWSNZ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Treatment Process meeting DWSNZ definition of available combination of treatment technology
² Further detail provided below under log credit assessment

### Summary of Log Credit Assessment

*Cust, Darnley Square, Domain Road, McPhedrons Road Well, Ohoka, Pegasus, Peraki Street, Rockford Road Deep Well, South Belt, West Eyreton and Woodend Chinnerys Road* achieved compliance due to GW security.

*Mandeville 1* did not achieve protozoal compliance due to turbidity transgressions.

*Campground Waikuku, Garrymere, Kings Avenue, Poyntz Road and Rockford Road Pump Station* did not achieve compliance because they did not have treatment that meets the protozoa removal/inactivation requirement of the DWSNZ.
Kings Avenue currently has UV treatment but is undertaking cryptosporidium monitoring which will feed into their CRA. Log credits will then be determined.

Treatment Plant: Cyanotoxin Compliance

None of the aforementioned plants have cyanobacteria management plans in place. For the surface supplies we are not aware of any cyanobacteria blooms that have affected drinking water quality. Waikuku and Garrymere source waters could potentially be affected by the Ashley River and the WSPs have indicated that periodic sampling will occur when algal mats reach a level that requires the issue of public notices which exclude people from the river. During the compliance period a Public Notice was issued in January. WDC followed their WSP and sampled for anatoxins. Results were negative.

Treatment Plant: Chemical Compliance

For all plants, plumbosolvent public notices were provided to consumers at the specified frequency during the compliance period. There are no P2 determinands assigned to any WDC treatment plants.

Treatment Plant: Radiological Compliance

Results Summary

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Number of samples taken</th>
<th>Exceedances of MAVs</th>
<th>One in ten year test completed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waikuku Beach (TP02540)</td>
<td>1</td>
<td>0</td>
<td>2018</td>
</tr>
<tr>
<td>Cust (TP00741)</td>
<td>1</td>
<td>0</td>
<td>2012</td>
</tr>
<tr>
<td>Darnley Square (TP00209)</td>
<td>1</td>
<td>0</td>
<td>2017</td>
</tr>
<tr>
<td>Domain Road (TP02973)</td>
<td>2</td>
<td>0</td>
<td>2017</td>
</tr>
<tr>
<td>Garrymere (TP00593)</td>
<td>1</td>
<td>0</td>
<td>2018</td>
</tr>
<tr>
<td>Kings Avenue (TP00214)</td>
<td>1</td>
<td>0</td>
<td>2018</td>
</tr>
<tr>
<td>Mandeville 1 (TP02442)</td>
<td>1</td>
<td>0</td>
<td>2018</td>
</tr>
<tr>
<td>McPhedrons Road (TP04030)</td>
<td>1</td>
<td>0</td>
<td>2018</td>
</tr>
<tr>
<td>Ohoka (TP00594)</td>
<td>1</td>
<td>0</td>
<td>2016</td>
</tr>
<tr>
<td>Pegasus (TP02780)</td>
<td>1</td>
<td>0</td>
<td>2014</td>
</tr>
<tr>
<td>Peraki St (TP02443)</td>
<td>1</td>
<td>0</td>
<td>2017</td>
</tr>
</tbody>
</table>
This is only applicable to GW supplies which are not considered equivalent to surface water. The DWSNZ requires new wells to be tested before connecting them to the reticulation. Section 9.4 of the DWSNZ states that the monitoring frequency for established sources is ten years. Radiological testing was completed on bores indicated above between 2011 and 2018. Therefore these comply with radiological compliance requirements.

*Pegasus* did not comply as this plant is fed by four bores, three of which have not been tested for radiological determinands (G01946, G01947 and G01759).

*Kings Ave* did not comply as this plant is fed by two bores, one of which has not been tested for radiological determinands (G03069).
Distribution Zones

Distribution Zone: Bacterial Compliance

Summary of *E. coli* Sampling Results

<table>
<thead>
<tr>
<th>Distribution zone name</th>
<th>Samples required</th>
<th>Samples collected</th>
<th>Transgressions</th>
<th>Compliance</th>
<th>Total coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cust (CUS001CU)</td>
<td>12</td>
<td>22</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Garrymere (GAR001GA)</td>
<td>12</td>
<td>12</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Kaiapoi (KAI003KA)</td>
<td>76</td>
<td>81</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Mandeville (MAN009MA)</td>
<td>52</td>
<td>64</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Ohoka (OHO001OH)</td>
<td>12</td>
<td>12</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Oxford Rural 2 (OXF103OR)</td>
<td>52</td>
<td>200</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Oxford Rural 1 (OXF101OX)</td>
<td>52</td>
<td>63</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Oxford Urban (OXF103OX)</td>
<td>52</td>
<td>52</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Pegasus (PEG001PE)</td>
<td>52</td>
<td>52</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Poyntz Road (POY001PO)</td>
<td>12</td>
<td>12</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Rangiora (RAN001RA)</td>
<td>88</td>
<td>112</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Summerhill (WES004SU)</td>
<td>12</td>
<td>11</td>
<td>0</td>
<td>Non-compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Waikuku Beach (WAI011KI)</td>
<td>52</td>
<td>52</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
<tr>
<td>West Eyreton (WES004WE)</td>
<td>12</td>
<td>11</td>
<td>0</td>
<td>Non-compliant</td>
<td>Y</td>
</tr>
<tr>
<td>Woodend Town (WOO002WO)</td>
<td>52</td>
<td>52</td>
<td>0</td>
<td>Compliant</td>
<td>Y</td>
</tr>
</tbody>
</table>

Summary of Compliance with general sampling/analytical/remedial action requirements
*Rangiora, Pegasus, Waikuku Beach and Woodend Town* did not comply with the maximum interval between samples by one day. Leniency has been applied because the non-compliance was caused by a sampling scheduling error which has now been resolved.

*Cust, Summerhill* and *West Eyreton* did not comply with the maximum interval between samples.

*Summerhill* and *West Eyreton* did not comply with the number of samples required.
For all other zones, sampling compliance was achieved for maximum days between samples, and minimum days of the week used for sampling. A MoH recognised laboratory was used for the sample analyses and appropriate sampling methods and sites were used.

**Distribution Zone: Cyanotoxin Compliance**

Cyanotoxin has not been assigned as a P2 for any WDC zones.

**Distribution Zone: Chemical Compliance**

**Priority 2 Determinands: Monitoring Results**

<table>
<thead>
<tr>
<th>Distribution</th>
<th>P2 determinands</th>
<th>Samples required</th>
<th>Samples taken</th>
<th>Transgressions</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poyntz Road (POY001PO)</td>
<td>Nitrate (NO³)</td>
<td>12</td>
<td>12</td>
<td>0</td>
<td>Compliant</td>
</tr>
</tbody>
</table>

**Summary of Compliance with general sampling/analytical/remedial action requirements**

*Poyntz Rd* complied with the number of samples taken during the compliance period. Sampling has been carried out monthly with a maximum of 42 days between samples. Analysis was provided by a MoH approved laboratory. All 12 samples exceeded 50% of the MAV but did not exceed the MAV. The WSP for Poyntz Rd includes a contingency plan for exceedances of the MAV.
Summary of Audit Activities to Verify DWSNZ Monitoring Data

A selection of laboratory results were audited for Poyntz Road, West Eyreton and Kaiapoi

Poyntz Rd – nitrate results were sighted for July to December 2018 and the data was found to correlate with the information entered on DWO.

West Eyreton – treatment plant E.coli results were sighted for July to September 2018 and the data was found to correlate with the information entered on DWO.

Kaiapoi – treatment plant E.coli results were sighted for November 2018 and the data was found to correlate with the information entered on DWO.

Summary of DWSNZ Compliance

Treatment Plants
Full compliance with the DWSNZ WAS ACHIEVED for Cust (TP00741), Darnley Square (TP00209), Domain Road (TP02973), McPhedrons Road (TP04030), Ohoka (TP00594), Pegasus (TP02780), Peraki Street (TP02443), Rockford Road Deep Well (TP04029), South Belt (TP03053), West Eyreton (TP00742) and Woodend Chinnerys Road (TP00211) treatment plants.

Full compliance with the DWSNZ WAS NOT ACHIEVED for Campground Waikuku (TP02540), Garrymere (TP00593), Kings Avenue (TP00214), Mandeville 1 (TP02442), Poyntz Road (TP00884) and Rockford Road Pump Station (TP00806) treatment plants.

Distribution Zones
Full compliance with the DWSNZ WAS ACHIEVED for Garrymere (GAR001GA), Kaiapoi (KAI003KA), Mandeville (MAN009MA), Ohoka (OHO001OH), Oxford Rural 2 (OXF103OR), Oxford Rural 1 (OXF101OX), Oxford Urban (OXF103OX), Pegasus (PEG001PE), Poyntz Road (POY001PE), Rangiora (RAN001RA), Waikuku Beach (WAI011KI) and Woodend Town (WOO002WO) zones.

Full compliance with the DWSNZ WAS NOT ACHIEVED for Cust (CUS001CU), Summerhill (WES004SU) and West Eyreton (WES004WE) zones.
Assessment of Compliance with Duties of Drinking-water Suppliers under the Act

The duties of the water supplier under the Health Act have all been met.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Met for All Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>69S</td>
<td>Duty of suppliers in relation to the provision of drinking water</td>
<td>MET FOR ALL SUPPLIES</td>
</tr>
</tbody>
</table>

WDC appear to have taken all practicable steps to ensure an adequate supply of drinking water was provided to all points to which it supplies drinking water. Additionally, WDC reports that there were no restrictions/interruptions in the water supply to the consumer of greater than 8 hours on any one occasion.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Met for All Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>69U</td>
<td>Duty to take reasonable steps to contribute to protection of source of drinking water</td>
<td>MET FOR ALL SUPPLIES</td>
</tr>
</tbody>
</table>

WDC is involved (and has the opportunity to make submissions) on the resource consent process. All WSPs cover catchment protection and acknowledge activities in the catchment.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Met for All Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>69ZD</td>
<td>Duty to keep records and make them available</td>
<td>MET FOR ALL SUPPLIES</td>
</tr>
</tbody>
</table>

WDC uses and maintains DWO. General correspondence with WDC in addition to visits for implementations of WSPs have always resulted in appropriate records/documentation being provided when requested.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Met for All Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>69ZE</td>
<td>Duty to investigate complaints</td>
<td>MET FOR ALL SUPPLIES</td>
</tr>
</tbody>
</table>

Customer complaints relating to WDC’s water supplies were examined during implementation visits. WDC has demonstrated that if the complaint relates to the wholesomeness of the water, then all reasonable steps are taken to improve the quality. If the complaint relates to a failure to meet the DWSNZ then steps are taken to carry out the appropriate remedial action set out in the DWSNZ.

The results in this report relate only to the compliance of the above listed treatment plants and distribution zones.

Kaiapoi, Rangiora: Under the Health (Drinking Water) Amendment Act 2007, these supplies fall into the category of a large drinking water supply. Therefore the legal requirement to comply with the DWSNZ applied from 1st July 2012.

Mandeville, Oxford Rural No. 1, Oxford Urban – Rural No. 2, Pegasus, West Eyreton, Woodend and Waikuku: Under the Health (Drinking Water) Amendment Act 2007, these supplies fall into the category of a minor drinking water supply. Therefore the legal requirement to comply with the DWSNZ applied from 1st July 2014.

Cust, Garrymere, Ohoka and Poyntz Road: Under the Health (Drinking Water) Amendment Act 2007, these supplies fall into the category of a small drinking water supply. Therefore the legal requirement to comply with the DWSNZ applied from 1st July 2015.
Information in this report may be provided to the MoH at their request. With the exception of the MoH, this report shall not be reproduced without the approval of the Drinking Water Assessment Unit and WDC.

Completed 30th September 2019

Laura Bruce
IANZ Accredited Drinking Water Assessor
South Island Drinking Water Assessment Unit
Assessment Report Information

<table>
<thead>
<tr>
<th>Report identifier</th>
<th>WaimakaririDistrictCouncil_DWSNZ2005/18Compliance_300919_v1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking Water</td>
<td>South Island Drinking Water Assessment Unit</td>
</tr>
<tr>
<td>Assessment Unit</td>
<td>PO Box 1475, Christchurch</td>
</tr>
<tr>
<td>(Inspection Body)</td>
<td>03 364 1777</td>
</tr>
<tr>
<td>DWA</td>
<td>Laura Bruce</td>
</tr>
<tr>
<td>Assessment Date</td>
<td>27th September 2019</td>
</tr>
</tbody>
</table>

Description of assessment work

Assessment of Compliance with Drinking Water Standards for New Zealand 2005 for Cust (CUS001), Garrymere (GAR001), Kaiapoi (KAI003), Mandeville (MAN009), Ohoka (OHO001), Oxford Rural No 1 (OXF101), Oxford Urban – Rural No 2 (OXF103), Pegasus (PEG001), Poyntz Road, Eyrewell (POY001), Rangiora (RAN001), Waikuku (WAI011), West Ereyton (WES004), Woodend (WOO002) supplies Campground Waikuku (TP02540), Cust (TP00741), Darnley Square (TP00209), Domain Road (TP02973), Garrymere (TP00593), Kings Avenue (TP00214), Mandeville 1 (TP02442), McPhedrons Road (TP04030), Ohoka (TP00594), Pegasus (TP02780), Peraki Street (TP02443), Poyntz Road (TP00884), Rockford Road Pump Station (TP00806), Rockford Road Deep Well (TP04029), South Belt (TP03053), West Ereyton (TP00742), Woodend Chinnerys Road (TP00211) plants Cust (CUS001CU), Garrymere (GAR001GA), Kaiapoi (KAI003KA), Mandeville (MAN009MA), Ohoka (OHO001OH), Oxford Rural 2 (OXF103OR), Oxford Rural 1 (OXF101OX), Oxford Urban (OXF103OX), Pegasus (PEG001PE), Poyntz Road (POY001PO), Rangiora (RAN001RA), Summerhill (WES004SU), Waikuku Beach (WAI011KI), West Ereyton (WES004WE), Woodend Town (WOO002WO) distribution zones

Equipment Used

DWO

Water Supply Owner / Person Responsible

Colin Roxburgh
Waimakariri District Council

Assessment method

Standard assessment as per Scope 1A Procedure
Drinking Water Standards for New Zealand 2005(revised 2018)

Documents and Information

Drinking Water Standards for New Zealand 2005 (Revised 2018)
Part 2A Health Act 1956
Poyntz Rd nitrate results, July to December 2018
West Ereyton treatment plant E.coli results, July to September 2018
Kaiapoi treatment plant E.coli results November 2018

Site of Assessment

CPH
310 Manchester Street, Christchurch

Omissions from assessment

Nil

Sub-contracted work

Nil

Document checked by:

Judy Williamson
IANZ Accredited Drinking Water Assessor
27th September 2019

Release of report authorised by:

Laura Bruce
IANZ Accredited Drinking Water Assessor
30th September 2019
If you do not agree with the findings of this report a written appeal must be lodged with the Technical Manager, South Island Drinking Water Assessment Unit within two months of receipt of this report. The Technical Manager will arrange for a review to be undertaken using the MoH appeals procedure.
1. SUMMARY

1.1. This report is to request the Utilities and Roading Committee’s endorsement of the proposed strategy for the Cust headworks renewal, storage upgrade, and UV treatment implementation projects. This report also seeks a recommendation from the Utilities and Roading Committee regarding budget redistribution.

1.2. All three projects above are budgeted to be completed within the 2020/21 financial year, and design work has been progressing on them throughout the current year.

1.3. The headworks renewal project is considered to be overdue, given the condition of the current site, and the storage upgrade is required to address an existing deficiency. The UV project however is subject to confirmation of what level of treatment the revised drinking-water standards will entail, which have not been as forthcoming as initially expected.

1.4. Given the uncertainty with the speed at which the drinking-water standards will change, but the immediate need to renew the headworks and increase the storage, the following strategy is recommended:

- Renew the headworks and construct the additional storage as planned in 2020/21, and;
- Make provision in the renewed headworks design for the UV treatment equipment to be installed at a later date. This would involve deferring the majority of the budget until 2021/22, but utilising some of it such that the renewed headworks can make provision for UV treatment to be retrofitted at a later date.

1.5. There are a number of individuals and groups that are stakeholders in this project to some level. The engagement strategy to address this is outlined within the body of this report.

Attachments:

i. Nil

2. RECOMMENDATION

THAT the Utilities and Roading Committee:
(a) **Receives** report No. 191031151907.

(b) **Notes** that there is an immediate need to renew the Cust water headworks and increase the storage provision at the site, but that the UV treatment project is proposed to be deferred until there is greater certainty about future requirements.

(c) **Recommends** that the Council, for consideration as part of the Draft 2020/21 Annual Plan, retain the Cust Headworks Renewal ($400,000) and Cust Storage Upgrade ($80,000) budgets currently set for the 2020/21 financial years, but defer the majority ($330,000) of the UV upgrade budget until the 2021/22 financial year, leaving $220,000 in 2020/21.

(d) **Endorses** the engagement strategy outlined in Section 5 of this report as the means of informing and gaining feedback from the relevant stakeholders to this project.

(e) **Circulates** this report to the Rangiora-Ashley Community Board for their information.

3. **BACKGROUND**

3.1 There are three projects planned at the Cust water headworks in the 2020/21 financial year, each with differing drivers. These are:

<table>
<thead>
<tr>
<th>Budget Name</th>
<th>Cost Centre</th>
<th>Amount</th>
<th>Year</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cust UV</td>
<td>District Water</td>
<td>$550,000</td>
<td>2020/21</td>
<td>To provide treatment for bacteria and protozoa to improve the safety of the currently untreated water supply, and in anticipation of removal of secure section of current drinking-water standards.</td>
</tr>
<tr>
<td>Cust Headworks Renewal</td>
<td>Cust Water</td>
<td>$400,000</td>
<td>2020/21</td>
<td>To renew the existing Cust water supply headworks which is in poor condition, and has reached the end of its useful life.</td>
</tr>
<tr>
<td>Storage Upgrade</td>
<td>Cust Water</td>
<td>$80,000</td>
<td>2020/21</td>
<td>In order to meet minimum storage requirements for the scheme, to provide adequate resilience and redundancy, and reduce risk of an outage during either a high demand period, or as a result of a fire event.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>$1,030,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2. The UV works are currently being designed in anticipation of new requirements, however the Council resolved to defer their construction until the new Drinking-water Standards for New Zealand (DWSNZ) have been released. This will allow it to be confirmed that the proposed treatment system will meet the future standards, before this expenditure is committed to.

3.3. As these anticipated changes to standards have not yet eventuated, it is being proposed as part of the Draft 2020/21 Annual Plan that construction budgets for UV works on untreated schemes be deferred until the following financial year.

3.4. At Cust, this is complicated by the need to carry out other works at the headworks site, irrespective of the timing of the UV works.

3.5. Neither the UV works nor storage upgrade can be completed in isolation. This is because there is no available land surrounding the existing headworks building to install additional treatment equipment or storage tanks. In order to complete either of these projects, the headworks will need to be re-built at the rear of the site, where there is sufficient land.
3.6. It is also noted that regardless of the storage upgrade or UV project, the headworks is due for renewal due to issues identified with the existing building and tanks.

3.7. The current site layout, and proposed new headworks location is shown below:

Figure 1: Cust Headworks Layout
3.8. It is however possible to construct the headworks renewal and storage upgrade, without yet committing to the UV works. This would however require some of the UV funding to be utilised to ensure that the renewed headworks is designed to accommodate UV treatment equipment and/or chlorine treatment equipment in the future. This is discussed in the following section.

4. **ISSUES AND OPTIONS**

4.1. The following strategy is proposed for works at the Cust water headworks:

- Renew the headworks and construct the additional storage as planned in 2020/21, and;

- Make provision in the renewed headworks design for the UV treatment equipment to be installed at a later date.

4.2. This proposal will require some of the UV treatment budget to be spent in 2020/21 (as part of the larger project), but the majority of it to be deferred until the following year. The new headworks design will also incorporate provision in its layout for chlorination equipment to be permanently installed, should this be a future requirement either instead of, or as well as UV disinfection. This will ensure that the renewed headworks is sufficiently flexible in its design to accommodate a range of potential future requirements.

4.3. A total estimate for the relocated headworks, upgraded storage and provision for UV installation in the future is approximately $700,000. The total cost estimate including the UV treatment equipment is approximately $900,000 (see 191010141935 for estimates).

4.4. The following table shows the budgets which are currently allowed for through the 2018-28 Long Term Plan (following amendments through the 2019/20 Annual Plan), and proposed further amendments as covered in this report:
### Table 2: Proposed Changes to Budgets

<table>
<thead>
<tr>
<th>Budget Name</th>
<th>Cost Centre</th>
<th>As per 19/20 Annual Plan</th>
<th>Proposed Revised Figure as Part of 20/21 Annual Plan</th>
<th>Description of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cust UV</td>
<td>District Water</td>
<td>$550,000</td>
<td>$220,000</td>
<td>Defer majority of budget ($330,000) until final decision made on UV treatment of untreated supplies, but utilise $220,000 of this budget in 2020/21 to facilitate provision for UV treatment as part of renewal.</td>
</tr>
<tr>
<td>Cust Headworks</td>
<td>Cust Water</td>
<td>$400,000</td>
<td>$400,000</td>
<td>Complete this project in 2020/21 as planned.</td>
</tr>
<tr>
<td>Storage Upgrade</td>
<td>Cust Water</td>
<td>$80,000</td>
<td>$80,000</td>
<td>Complete this project in 2020/21 as planned.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$1,030,000</strong></td>
<td><strong>$700,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

4.6. As can be seen above, the proposed changes will reduce the expenditure for the next financial year by not yet committing to investment in the UV treatment infrastructure, while still allowing the essential projects at the site of renewing the headworks, and increasing the storage to proceed.

4.7. If the headworks renewal and/or storage upgrade did not proceed, this would mean continuing to operate the headworks in its current state, until such time that the standards change. The issues with the current site which would remain if not addressed are the quality of the building, the lack of storage, and the vulnerability of the tanks and associated pipework to leaks.

4.8. Regardless of the speed at which the Drinking-water Standards are formally updated, the expectations of requirements to maintain compliance with the current standards are increasing significantly. This means that it is important that issues such as those identified at the Cust headworks are addressed in a timely manner, rather than continuing to defer these works.

4.9. The Management Team have reviewed this report and support the recommendations.

### 5. COMMUNITY VIEWS

5.1. **Groups and Organisations**

5.2. A number of groups are proposed to be engaged with regarding this project. These are detailed below:
### Table 3: Groups to be Engaged with

<table>
<thead>
<tr>
<th>Group</th>
<th>Proposed Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cust Water Supply Advisory Group Members (WSAG)</td>
<td>While the Cust WSAG is not currently active, a letter will be written to the group members to inform them of the project and invite any questions or comments.</td>
</tr>
<tr>
<td>Cust Fire Brigade</td>
<td>As the section of land proposed for the new headworks is leased by the Cust Fire Brigade, the lease will be amended to swap the Fire Brigade’s right to use the land at the rear of the site with the land at the front of the site (this has already been agreed in principle verbally with the Fire Brigade Chief)</td>
</tr>
<tr>
<td>Cust Community Network</td>
<td>Present information to the group and answer any questions the group may have. Staff will request feedback on the proposed site layout and aesthetics.</td>
</tr>
<tr>
<td>Rangiora-Ashley Community Board</td>
<td>Present information to the group and answer any questions the group may have. Staff will request feedback on the proposed site layout and aesthetics.</td>
</tr>
</tbody>
</table>

### 5.3. Wider Community

### 5.4.

There are a number of landowners who are neighbours to the site, and will be engaged with through a personalised letter informing them of the upcoming project and providing contact details if they want further information or discussion on any implications to them. These groups / residents who will be contacted, and the expected impact of the project on them is detailed below:

- **Cust School**: The school is accessed off Earlys Road, however there is a small section of shared boundary with the Cust headworks site. Aerial photos indicate that the school may have used the rear of the Cust headworks site in the past for access to the rear of the school ground. This issue will be raised with the school, and access retained if required.

- **1691 Cust Road**: This property shares a boundary with the site. There are unlikely to be any impacts to this property as a result of the project, however the letter will invite the property owners to raise any points that they believe require consideration.

- **1681 Cust Road**: This property is located to the east of the site. There are unlikely to be any impacts to this property as a result of the project, however the letter will invite the property owners to raise any points that they believe require consideration.

- **Cust Plunket**: This project will result in the water headworks getting further away from the Plunket. Therefore, if anything there will be positive implications as a result of this project. However, the letter will invite the property owners to raise any points that they believe require consideration.

- **Cust Garage**: The Cust garage is currently located in close proximity to the existing water headworks. The relocation of the Cust water headworks to the rear of the site will provide greater separation between the garage and the headworks. Therefore, if anything, the project may have some positive implications to the Cust garage.

- **1689B Cust Road**: This property is located to the west of the Cust water headworks site. The proposed relocation of the headworks will mean that the new headworks will be closer to their property than the existing building is. There are not expected to be any negative impacts to the property owners as a result of this
however. The new headworks building, which is proposed to be constructed of concrete blocks, will perform better acoustically than the current ‘tin shed’ building so there are not expected to be any negative impacts in this regard. However, the proposed letter will invite the property owners to raise any points that they believe require consideration.

5.5. There are some rating implications to the wider Cust community, as a result of this project (see Section 6.1). It is proposed that a letter be prepared to each property owner on the Cust scheme to inform them of the project, explain the need and the benefits to the community of the project, and explain the impact on their rates. Each resident will then have contact details provided of a staff member to contact if they require further information.

5.6. The alternative to a process of informing the Cust water scheme members, would be to consult with them. As there is no change in level of service proposed, no options assessment which feedback is required on, and the project at this stage is purely to renew an aged asset, a process of informing the public is recommended rather than consultation.

6. **IMPLICATIONS AND RISKS**

6.1. **Financial Implications**

6.2. As noted in Table 2, it is proposed that the headworks renewal and storage upgrade be completed within 2020/21 (as per the previous approved Annual Plan), but that the UV project be deferred by 1 year. This means that the projected expenditure for 2020/21 is $700,000, rather than $1,030,000.

6.3. The portion of project proposed to be completed in 2020/21 is predominantly to be renewal funded from the Cust Water cost centre, with some additional funding from the District Water UV account to ensure that provision is made in the future for treatment of the water.

6.4. The rating implication to the Cust water account is summarised below. Rate changes were signalled as part of the 2019/20 Annual Plan. As part of the draft 2020/21 Annual Plan which is being prepare currently, efforts have been made to smooth the change.

<table>
<thead>
<tr>
<th>Table 4: Projected Changes to Cust Water Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signalled in</strong> 2019/20 Annual Plan</td>
</tr>
<tr>
<td>Rate ($/conn.)</td>
</tr>
<tr>
<td>% Change (incremental)</td>
</tr>
<tr>
<td><strong>Recommended in</strong> 2020/21 Annual Plan*</td>
</tr>
<tr>
<td>Rate ($/conn.)</td>
</tr>
<tr>
<td>% Change (incremental)</td>
</tr>
</tbody>
</table>

*indicative as updated Annual Plan budgets in preliminary stages currently

6.5. **Community Implications**

6.6. This project will result in the following positive community outcomes:

- Improve the safety of the Cust water supply, by addressing the risk presented by the deteriorated concrete tanks at the current headworks.
- Reduce the likelihood of a loss of supply on the scheme, by increasing the emergency storage to a level more consistent with other on-demand schemes.
• Reduce the risk of the scheme running out of water during a potential future fire event.

• Address the negative amenity value provided by the current headworks which is in a generally unattractive state in a reasonably public location close to the Cust garage. The budget allows for demolition of the existing headworks, and specific details of the nature of reinstatement will be determined following engagement with the stakeholders identified in Section 5.

• Improve the site security by allowing the site to be fenced to reduce the risk of damage or sabotage.

6.7. Risk Management

6.8. The risks that the project will address (loss of supply, water safety, site security, firefighting ability) are outlined in the previous section.

6.9. The risks of any negative feedback from the public or surrounding landowners will be managed through the engagement process outlined in the earlier sections of this report.

6.10. With any project, there is a risk that costs may escalate beyond the budgetary allowance. In the case of this project, this risk is deemed to be low as the design is reasonably well developed, and a detailed cost estimate has been produced to check the budget against.

6.11. Health and Safety

6.12. The normal construction risks will apply, which will be managed through the Council’s Health and Safety systems.

7. CONTEXT

7.1. Policy

This is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

7.2. Legislation

7.3. The following pieces of legislation are relevant in this matter:

• *The Health (Drinking-water) Amendment Act*

• *The Local Government Act*

7.4. Community Outcomes

The following Community Outcomes are relevant in this matter:

• *There are wide ranging opportunities for people to contribute to the decision making that affects our District.*

• *Core utility services are provided in a timely and sustainable manner.*

7.5. Delegations

The Council has allocated the budget for this project as part of the 2018-28 Long Term Plan, and reviewed it as part of the 2019-20 Annual Plan. The Utilities and Roading Committee has the
delegation to approve strategies relating to how projects are delivered, which is covered within this report.
1. **SUMMARY**

1.1 This report is to inform the Utilities and Roading Committee of increased maintenance expenditure within the Ohoka Rural, Central Rural and Coastal Rural Drainage Rating Areas.

1.2 The maintenance expenditure has been increasing over the previous 2 financial years in the Ohoka Rural, Central Rural and Coastal Rural Drainage Schemes, primarily due to:
   
   a. Reduction of spraying drains and increase in mechanical cleaning.
   
   b. Removal of all roadside drain cleanings.
   
   c. Higher levels of service due to increased rural residential development.
   
   d. Warmer winter conditions, causing rapid weed growth in drains.

1.3 The approved budget has been exceeded in Ohoka by approximately, 190% in the 2017/18 FY and 180% in the 2018/19 FY, in Central Rural by approximately 140% in the 2017/18 FY and 180% in the 2018/19 FY and the Coastal Rural budget was exceeded by approximately 113% in the 2017/18 FY and 140% in the 2018/19 FY.

**Attachments:**

i. Glyphosate Review of Council Practices (Trim 190702093110)

2. **RECOMMENDATION**

THAT the Utilities and Roading Committee:

(a) Receives report No. 191104153585.

(b) Notes that there has been a significant increase in the annual drain maintenance expenditure in the Ohoka Rural, Central Rural and Coastal Rural drainage schemes, over the previous two financial years.

(c) Notes drainage staff will continue to monitor drainage maintenance expenditure over the current financial year and will implement cost saving measures where possible.
(d) Notes that even with some cost savings being realised, it is still expected that an increase in the Ohoka Rural, Central Rural and Coastal Rural drainage schemes’ drain maintenance budgets in the 2020/21 will be required.

(e) Circulates this report to the Council, Oxford-Ohoka, Kaiapoi-Tuahiwi, Rangiora-Ashley and Woodend-Sefton Community Boards for their information.

3. BACKGROUND

3.1. The approved drainage maintenance budgets have been exceeded in the Ohoka Rural, Central Rural and Coastal Rural drainage schemes in the 17/18 and 18/19 financial years (refer table 1 below).

Table 1 - Ohoka Rural and Central Rural and Coastal Rural Drainage Maintenance Budgets v’s Actual Expenditure

<table>
<thead>
<tr>
<th>Scheme</th>
<th>17/18 Approved Maintenance Budget</th>
<th>17/18 Actual Maintenance Expenditure</th>
<th>% Increase</th>
<th>18/19 Approved Maintenance Budget</th>
<th>18/19 Actual Maintenance Expenditure</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohoka Rural</td>
<td>$133,930</td>
<td>$260,164</td>
<td>194</td>
<td>$136,470</td>
<td>$253,356</td>
<td>185</td>
</tr>
<tr>
<td>Central Rural</td>
<td>$57,660</td>
<td>$81,335</td>
<td>141</td>
<td>$58,760</td>
<td>$105,845</td>
<td>180</td>
</tr>
<tr>
<td>Coastal Rural</td>
<td>$79,200</td>
<td>$89,836</td>
<td>113</td>
<td>$80,700</td>
<td>$112,239</td>
<td>139</td>
</tr>
</tbody>
</table>

3.2. The expenditure on these schemes has been higher than budgeted since the June 2014 flood event. The budgets have been progressively increased between 25-55% over the last five years, however, staff have attempted to ‘smooth’ the drainage rates by taking a long term view of drainage budgets, in order to avoid large fluctuations, due to seasonal variations and flood events etc.

3.3. The drainage maintenance budgets have been exceeded in two consecutive years which indicates a trend towards greater maintenance costs in these schemes. Drainage staff and the relevant Drainage Advisory Groups have been monitoring maintenance expenditure to determine if the recent high spend was due to unusual seasonal variations or a permanent change in the maintenance spend. Staff believe the trend is likely to continue into the future and will require a significant adjustment in the 19/20 annual plan drainage budgets.

3.4. Maintenance spending in the Ohoka Rural, Central Rural and Coastal Rural Drainage Rating Areas has increased primarily due to the following changes in operating procedures and weather conditions:

- Reduction of spraying drains and increase in mechanical cleaning.
- Removal of all roadside drain cleanings.
- Higher levels of service due to increased rural residential development.
- Warm winter conditions, causing rapid weed growth in drains.

4. ISSUES AND OPTIONS

4.1. Spraying
4.1.1. Drainage and Greenspace staff reported to Council on 30 January 2018 and 6 August 2019 on the use of Glyphosate based weed sprays by Council (refer attachment i)

4.1.2. The following notes and recommendations were approved by Council.

1. **Notes** that the budgets in the LTP have been based on continuing to use herbicides, including glyphosate, for weed control where deemed necessary by Council staff and contractors.

2. **It is recommended** that use of glyphosate by Council Staff and contractors continues to be carefully considered for reduction of use, as a precautionary principle. Good management practises and good design principles, such as shading or mulch to minimise weeds should continue to be considered.

4.1.3. Drainage staff reduced the amount of glyphosate herbicide spraying in the 18/19 FY. The practice of spraying emergent weeds in spring fed drains over this period was replaced by mechanical removal of the weeds.

4.2. **Table 2 - 18/19 Actual drain cleaning cost v’s cost of spraying**

<table>
<thead>
<tr>
<th>Scheme</th>
<th>18/19 Drain cleaning contract claim</th>
<th>Drain cleaning cost if sprayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohoka</td>
<td>$46,741</td>
<td>$7,188</td>
</tr>
<tr>
<td>Central</td>
<td>$46,000</td>
<td>$7,735</td>
</tr>
<tr>
<td>Coastal</td>
<td>$13,494</td>
<td>$1,074</td>
</tr>
</tbody>
</table>

4.3. **Removal of Roadside Drain Cleanings**

4.3.1. The drainage maintenance contractor is now required to remove all drain cleanings from roadside drains. Removal of drain cleanings from the road shoulder is usually done at a later date, which involves extra mobilisation costs. In the past some cleanings were left on the roadside however this is no longer acceptable.

4.3.2. The Drainage Maintenance Contractor has trailed various methods of silt removal, including direct transfer of the cleanings onto a truck. This method results in spillage onto the road. Additionally it has been observed that an unacceptable number of aquatic species are removed from the drain. Leaving the cleanings on the side of the drain allows eels etc to return to the water course prior to removal of the cleanings, at a later date. This is the preferred method however it is more expensive than direct transfer to the waiting truck. The current tendered rates for drain cleaning and spraying using mechanical methods are approximately 4 times higher than spraying. Additionally if removal of drain cleanings is required this increases the rate by a further 3 times, giving a total rate in the order of $10/m compared to approximately $0.6/m for spraying.

4.4. **Level of Service**

4.4.1. Rural residential development within the Waimakariri District has resulted in many new residents mowing their own property frontages. In most cases, the standard of the frontages have been raised to a level well above the agreed level of service provided by Council, in rural areas of the district. This has raised the expectations of residents in regards to maintenance of roadside drains and the standards of removal of cleanings. The contractor is often required to manually tidy frontages.
after the excavator has completed removal of the cleanings. Flood works carried out in the Mandeville area, after the 2014 floods has required Council to take over mowing of some berms, where this was carried out previously by the residents. Subsequent remedial works has been undertaken in some cases which will allow the residents' to mow the berms again.

4.4.2. Rural residential development has also increased the number of properties traversed by the contractor during drain cleaning operations. This has resulted additional access issues between adjacent properties where no gates exist. Additionally management time has increased due to difficulties in contacting property owners to arrange access.

4.5. **Climate Conditions**

4.5.1. Temperatures in the district have been unseasonably warm with relatively few winter frosts in 2017 and 2018. Warm wet conditions has resulted in weed growth above what would normally be expected resulting in some drains requiring additional cleaning. Winter frosts would normally kill macrophyte weeds in the water ways.

4.5.2. The Management Team have reviewed this report and support the recommendations.

5. **COMMUNITY VIEWS**

5.1. **Groups and Organisations**

5.1.1. The Ohoka Rural, Central Rural and Coastal Rural Drainage Advisory Groups requested that the maintenance budgets be increased to allow funds to build up over a ten year period to roughly equal to one year’s maintenance budget allowance. This funding ‘buffer’ would cover the eventuality of additional expenditure due unforeseen flood events.

5.1.2. The Kaiapoi Community Board at its meeting on the 20th of June 2016 recommended the following:

1. **Recommends** that Council approves the use of mechanical means, rather than spraying, to control weeds in the Council Stormwater and roadside drains and waterways. Notes that mechanical means, rather than spraying Council drains, is estimated to cost an additional $80,000 per year.

2. **Recommends** that Council declines support for a return to the use of spraying to control weeds in Council drains.

5.1.3. This recommendation was not adopted by Council, rather a precautionary approach of only using glyphosate where deemed necessary was adopted (refer TRIM 160805077062 and 180111001840).

5.2. **Wider Community**

5.2.1. The wider community has not been consulted regarding the Ohoka and Central Rural drainage maintenance budgets.

6. **IMPLICATIONS AND RISKS**

6.1. **Financial Implications**

6.1.1. Based on current increases over the past 3 years and assuming the current practice of not spraying drains is continued, the Ohoka Rural, Central Rural and
Coastal Rural drainage schemes may need to increase the annual drainage budget by approximately 50% in Ohoka Rural and Central Rural and 30% in Coastal Rural.

6.2. **Community Implications**

6.2.1. The rural communities serviced by the three schemes have a strong expectation that all of the Councils drainage assets are managed and maintained in a timely manner. Failure to carry out maintenance may result in an increased risk of flooding in these areas.

6.3. **Risk Management**

6.3.1. There is a risk that without an increase in the Ohoka Rural, Central Rural and Coastal Rural drainage maintenance budgets drainage maintenance staff will not be able to meet Councils level of service and ratepayer expectations in these schemes.

6.4. **Health and Safety**

6.4.1. There are no health and safety implications related to this report.

7. **CONTEXT**

7.1. **Policy**

7.1.1. This matter is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

7.2. **Legislation**

7.2.1. The Local Government Act, Section 101 (Financial Management)

7.3. **Community Outcomes**

7.3.1. Harm to the environment from the impacts of land use, use of water resources and air emissions is minimised

7.3.2. Council sewerage and water supply schemes, and drainage and waste collection services are provided to a high standard.

7.4. **Delegations**

7.4.1. The Utilities and Roading Committee has the authority to accept the recommendations of this report and copy it to the Council for its information.
1. SUMMARY

1.1. This report provides an update on previous reports regarding the use of the herbicide glyphosate by the Council, and presents recommendations on where further improvements to current glyphosate practices could be made, taking into consideration feedback from the community.

1.2. Glyphosate is used by the Greenspace, 3 Waters, Roading, Water Unit, and Property teams for Council work, primarily by contractors. The Council has worked to reduce glyphosate usage in recent years, based on the precautionary principle and on-going debate to what degree glyphosate could cause health issues. There are other users of glyphosate in public spaces in the District, such as the New Zealand Transport Agency.

1.3. It is recommended that an online herbicide usage map is scoped by Council staff for feasibility. The map would be made accessible on the Council website, to show public areas that have been recently sprayed, or shortly scheduled to be sprayed with herbicide.

1.4. Signage requirements for spraying are recommended to continue to follow manufacturer’s instructions, based on the withholding period.

1.5. A ‘No Spray’ register is recommended to be kept across all Council Departments, where landowners may register their property to not have glyphosate sprayed by Council contractors within the close vicinity (e.g. 5m) of their property.

1.6. It is recommended for Council to alter conditions in Service Contracts to require Health and Safety and signage audits specifically for spraying herbicide. The audit will check that manufacturer’s instructions are followed, and that there is correct usage of Personal Protective Equipment (PPE).

1.7. Service Contracts are recommended to be updated when renewed, to include conditions detailed in this report, such as a requirement to update the online herbicide usage map, if progressed.

1.8. It is recommended that use of glyphosate by Council staff and contractors continues to be carefully considered for reduction of use, as a precautionary principle. Good management
practices and good design principles, such as use of shading or mulch to minimise weeds, should also continue to be considered.

1.9. Alternatives to glyphosate include; smart design and shading; mechanical and manual clearing; and the use of organic sprays, such as fatty acid sprays. These alternatives have been examined for feasibility and cost, and are also used by the Council. A three-yearly review of alternative options is recommended, and/or if there are any new products that come to market.

Attachments:

i. Report to Council – Herbicide Glyphosate use for weed control. GOV-01-11 (Trim 180111001840[v1])

2. RECOMMENDATION

THAT the Council:

(a) Receives report No. 190702093110.

(b) Notes that WDC staff will scope the creation of an online herbicide usage map for the general public to view information of where, and when, herbicide is used in public areas.

(c) Notes that the online herbicide map creation, if progressed, will be prioritised by the Geospatial Team.

(d) Notes that signage requirements are based on the manufacturer's instructions regarding the withholding period.

(e) Notes that all Council departments will use a joint ‘No Spray’ register, where private landowners who sign up do not receive spray in the close vicinity of their property.

(f) Notes that specific Health and Safety spray audits are to be carried out by contractors, with external auditing by Council staff, for signage and Personal Protective Equipment usage with glyphosate and other herbicide spraying.

(g) Notes that WDC staff intend to include conditions in Service Contracts for required use by contractors of the online herbicide usage map (if progressed), and the ‘No Spray’ register.

(h) Notes that WDC staff will continue to carefully consider options for reduction of the use of glyphosate, as a precautionary principle.

(i) Notes the update on glyphosate alternatives and feasibility of their use.

(j) Circulates this report to the Community Boards, Drainage Advisory Groups and the Waimakariri Water Zone Committee for their information.

3. BACKGROUND

3.1. Community concerns regarding the use of glyphosate by Council in public places has been brought to the Council’s attention. Specifically, a resident of Pines Beach has raised concerns regarding signage of spraying in parks. The resident created a petition asking for Council to stop the use of glyphosate in public places. Another community member has recently raised questions of what is correct Personal Protective Equipment to be worn when spraying glyphosate. A resident of Kaiapoi also expressed concerns in 2015 that the dieback of submerged weeds in the Kaiapoi River was caused by glyphosate.

3.2. Glyphosate was re-classified as a ‘probable carcinogen’ by the International Agency for Research on Cancer (IARC), a unit of the World Health Organisation, in 2015. However
the US Environmental Protection Agency and European agencies have concluded that glyphosate has “low toxicity to humans”. Guidance on the use of glyphosate within New Zealand is provided by the Environmental Protection Agency (EPA). A report entitled “Review of the Evidence Relating to Glyphosate and Carcinogenicity” was published in August 2016 by the toxicologist Dr Wayne Temple. The report found that, “based on a weight of evidence approach, taking into account the quality and reliability of the available data – glyphosate is unlikely to be genotoxic or carcinogenic to humans and does not require classification under HSNO as a carcinogen or mutagen”.

3.3. In January 2018, WDC staff presented to Council (Trim 180111001840[v1]) on the continued use of the herbicide glyphosate and potential alternatives. It was noted that, based on information available, it was unlikely that the use of glyphosate by the Council would pose a risk to public health and the environment. It was noted, however, that there is on-going scientific debate. The Council approved the decision that, provided glyphosate is used appropriately, for it to continue to be used by Waimakariri District Council.

3.4. In order for the Council to take a precautionary approach to glyphosate usage, the January 2018 report outlined options that limit the use of glyphosate in certain circumstances. The use of glyphosate and other herbicides has been limited to essential areas and is recognised as one of a range of options, including the use of mechanical weeding, mowing, organic sprays and shading for example.

4. ISSUES AND OPTIONS

Online herbicide usage map

4.1. The production of an online herbicide usage map is recommended to be scoped for feasibility by Council Departments that use herbicide, and prioritised for creation by the Geospatial Team. A condition for contractors to update the map would be included when a new Service Contract becomes operative.

4.2. WDC staff are recommended to review if there are exemptions of Council-owned or Council-managed public spaces, where spray usage would not be feasible or practicable to show on the online map. These exemptions should be clearly stated to users of the online map. Pensioner flats and other housing owned by Council are not considered public, and therefore would not have herbicide usage reported on an online map. Restricted access areas owned by the Council, such as wastewater treatment plants, are not also recommended for visualisation and listing on the online map.

4.3. The map is recommended to show a one-month window of when spraying will, or has, occurred. An advantage of an online map, as opposed to a static published notice, i.e. in a newspaper, is that it can be regularly updated. For example, reactive (unscheduled) spraying could be added to the online map as required.

4.4. It is recommended that each contractor has an appointed staff member with Citrix access, as the primary agents to upload and edit herbicide usage data, possibly with a secondary approval or check by WDC staff before finalising edits. This is to minimise double-handling of data and potential data errors.

Signage

4.5. The Council is recommended to continue with current signage requirements as set out in existing Service Contracts. In the Service Contract with the contractor Delta, who carry out maintenance in urban areas, and rural parks and reserves, it is stated:

‘Signs indicating that spraying operations are in progress shall be positioned so that persons entering the area receive adequate warning that spraying is being undertaken.’
The signs shall remain in place at the conclusion of spraying until the withholding period recommended by the manufacturer in order to avoid direct contact with spray material has been met.’

For most glyphosate formulations, the withholding period is generally very short, with a mobile spraying unit able to comply with signage instructions with signage on the mobile unit, with no fixed signage left on site. Compliance of signage requirements is recommended to be checked during spray audits.

In the Resource Consent CRC120402 that WDC holds for spraying over waterways, there is a condition stating:

‘If persons are encountered in a spraying location, the spraying personnel shall approach the people, explain their activity and request they leave the area before continuing spraying.’

The Service Contract with Sicon Ltd, who maintain district-wide roading and rural drainage and assets on behalf of the Council, states in Part D 12.4 that the contractor must supply the methodology and equipment for chemical application.

Sicon Ltd. requires appropriate signage to be clearly displayed to warn public of chemical usage in public areas, under their Work Instruction 360. Such signage is generally displayed via a mobile unit, i.e. a vehicle or person conducting the spraying, rather than stationary signage.

**No Spray register**

4.6. Currently a ‘No Spray’ register is only maintained by the Roading Team, however is recommended for extension of use to all departments within Council. The spray register is recommended to be owned and maintained by the AIMS Team, on behalf of the Council. This will enable private landowners to specify if they do not desire glyphosate usage in the vicinity (e.g. 5m) of their property, for example due to organic certification requirements, or sensitivity to glyphosate. The size of the buffer area that is not sprayed by Council could be based on a ‘case by case’ basis depending on factors such as what is requested by landowner and whether an anti-drift additive is used, or set at a standard distance.

4.7. Physical markers, such as blue triangles used by Nelson City Council, could be provided to ‘No Spray’ landowners for their installation at the property boundaries. These would demarcate the ‘No Spray’ area visually for contractors.

4.8. Additional cost for maintenance, could potentially be sought by Council from property owners on the ‘No Spray’ register to undertake other options than glyphosate. Any cost recovery policy, however, would need discussion and/or consultation with the community, and is not explored in this report. Properties on the ‘No Spray’ register could be shown as a GIS layer to WDC staff and contractors, on the online herbicide usage map.

**Health and Safety – spray audits**

4.9. It is recommended for Council staff to ensure that Health and Safety audits specifically for spraying herbicide are carried out by contractors. Currently, generic Health and Safety audits are carried out, however an audit may not be when a contractor is undertaking herbicide spraying work.

**Changes to Service Contracts**
4.10. Service Contracts are recommended to include conditions for contractors to update the online herbicide usage map (if progressed), use the ‘No Spray’ register, and undertake specific Health and Safety audits for herbicide spraying when new contracts are negotiated. The current roading and rural drainage contract ends in October 2020, and the green space contract in 2021. It is anticipated that this would result in an increase in cost for the contractor, which would be passed to the Council.

Use of alternatives

4.11. It is recommended for staff to maintain on-going awareness of glyphosate alternatives, with a specific review every three years, for any technological advances made, changes in costs, and information on trials of alternative options carried out by others.

Greenspace

4.12. In Greenspace areas, the current practice is to reduce the need to spray by carrying out the following:

4.12.1. Application of mulch on shrub beds to reduce weed growth and therefore reduce the need to spray.

4.12.2. Tree pits created around trees which are covered in mulch reducing the need to spray around the base of the tree where mowers cannot always get to.

4.12.3. Vegetation around all bollards, wire, chain and post and rail fencing is manually controlled which is a specification in the parks contract.

4.12.4. Infill planting is undertaken annually to suppress weed growth and therefore reduce the need to use spray.

4.12.5. Combi guards or equivalent weed matting and plant protection is used when planting new native regeneration areas in natural reserves. The weed matting supresses weed growth around the plants.

Drainage

4.13. The Council holds a resource consent from Environment Canterbury to spray emergent aquatic macrophytes. However, due to taking a precautionary approach to glyphosate usage, no spraying was undertaken by Council contractors in 2018-19, with a preference for mechanical cleaning methods instead. Historically, approximately 8 - 10% of spring-fed drains have been sprayed every year.

4.14. Glyphosate gel is used to control willow and other woody weeds along open drains and streams. The plant is either ‘drilled and injected’ with the gel, or cut with the stump pasted. These methods ensure no product enters the water.

4.15. Glyphosate is used for managing riparian areas which have been planted with natives. The practice is to target problem weeds that could compete with the natives. A backpack sprayer is used.

Community Water Supply

4.16. At water supply wells for the Garrymere and Poyntzs Road schemes, due to the shallow source of the groundwater, weed control is manual, with mowers or weedeaters used to control any weed / grass growth at these sites.

Wastewater
4.17. The Wastewater team use contractors to apply glyphosate in publically-excluded areas only, such as at Wastewater Treatment Plants. Publicly accessible wastewater assets, such as pump station buildings, have weeds maintained with organic spray options, such as fatty-acid sprays.

**Clean fill and closed landfills**

4.18. Clean fill and closed landfill sites are minimally sprayed with herbicide, i.e. spot spraying for woody weeds and thistles.

**Christchurch City Council experience**

4.19. In 2016, the Christchurch City Council (CCC) stopped using glyphosate products in public places due to concerns that glyphosate might be a carcinogen. Contractors use organic alternatives such as the Kiwicare product ‘Weedfree Rapid’, which contains fatty acids.

4.20. The use of glyphosate alternatives by Delta, the former CCC Parks contractor, and current WDC contractor, created significant additional costs and contract renegotiations between contractor and CCC.

4.21. The product, as with some organic sprays, is highly acidic which can cause burns to skin and eyes. Extra protective clothing must be worn by applicators.

4.22. The product is a contact herbicide i.e. the part of the plant must be treated to be effective. Therefore the roots of the plant often remain alive and the plant can re-sprout after treatment. This means more product is required and must be applied more often. This can require an increased Level of Service, (more treatments at the site per year), at an increased cost. Glyphosate is a systemic herbicide, which is transported to the roots.

4.23. The product has a strong odour which received complaints from the public. Especially from dog owners because their dogs like to roll in it. An altered formulation was created in response by Kiwicare, which aimed to reduce smell complaints.

4.24. It is more of a challenge to maintain parks with a tidy appearance which also increases complaints from the public. For example the product appears to be totally ineffective on the common weed mallow.

4.25. Success has been noted with the trial use of foam or steam technology by CCC recently. The technology is new, with the ongoing evaluation. The ability to cost-effectively introduce this alternative will be reviewed by WDC when this information is available.

4.26. The Management Team has reviewed this report and support the recommendations.

5. **COMMUNITY VIEWS**

5.1. **Groups and Organisations**

5.1.1. Organisations such as the Soil and Health Association and the Green Party are advocating that glyphosate should be reassessed and eventually phased out of use. Former Green MP Steffan Browning produced a critique of the EPA review (2016) of the evidence relating to glyphosate and carcinogenicity.

5.2. **Wider Community**

5.2.1. The community views on this issue are varied. The drainage advisory groups generally are supportive of the use of herbicides, including glyphosate. However
there are opinions over the whole spectrum including people who consider that there should be no use of glyphosate in public areas.

6. **IMPLICATIONS AND RISKS**

   6.1. **Financial Implications**
   
   6.1.1. It is anticipated that there would be a cost in Service Contracts for contractor staff time to upload spray data to the online herbicide usage map, and use of the ‘No Spray’ register. It has not been scoped how much this cost would be.
   
   6.1.2. A significant risk of using glyphosate alternatives is an increase in cost and/or a reduction in level of service provided, due to the limitation of other methods. Contractors have indicated that there is an expected cost increase for alternative methods. While they could not specifically identify a percentage increase in cost, it could be anticipated from information from another Council that a 50% increase could be the minimum expectation.

   6.2. **Community Implications**
   
   6.2.1. The community will be more informed about where and when glyphosate is used by Council and its contractors in public areas. This enables greater options and satisfaction for community members.

   6.3. **Risk Management**
   
   6.3.1. The Council has chosen to take a precautionary approach to reduce glyphosate usage, due to on-going scientific debate, and conflicting decisions by the World Health Organisation and Environmental Protection Agency on the cancer-causing nature of glyphosate.

   6.4. **Health and Safety**
   
   6.4.1. Applicators of glyphosate will be specifically audited to ensure correct PPE is provided and is being used. There will be less unknown exposure of the general public to glyphosate, which allows an individual to take a precautionary approach, to allow for any future research results on glyphosate health effects.

7. **CONTEXT**

   7.1. **Policy**
   
   7.1.1. This matter is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

   7.2. **Legislation**
   
   7.2.1. Hazardous Substances and New Organisms Act (1996, amended 2015) – Classifies chemicals based on risk, for example as a carcinogen or mutagen, and can restrict their use with New Zealand.

   7.3. **Community Outcomes**
   
   7.3.1. There is a safe environment for all
   
   7.3.1.1. Harm to people from natural and man-made hazards is minimised.
   
   7.3.2. There is a healthy and sustainable environment for all
7.3.2.1. Harm to the environment from the impacts of land use, use of water resources and air emissions is minimised.

7.3.2.2. Cultural values relating to water are acknowledged and respected.

7.3.2.3. Harm to the environment from the spread of contaminants into ground water and surface water is minimised.

7.4. Delegations

7.4.1. No delegations apply to this matter, as this report is for information only.
WAIMAKARIRI DISTRICT COUNCIL

REPORT

FILE NO and TRIM NO: GOV–01-11 / 180111001840

REPORT TO: Council

DATE OF MEETING: 30 January 2018

FROM: Greg Bennett, Land Drainage Engineer
       Gerard Cleary, Manager Utilities and Roading

SUBJECT: Herbicide, Glyphosate use for Waimakariri District Council weed control operations.

SIGNED BY: (for Reports to Council or Committees)

Department Manager                                       Chief Executive

1. SUMMARY

1.1. The purpose of this report is give an update on the Council use of herbicides for weed control operations in the district.

1.2. The use of weed spray is covered in detail for each of the relevant Council functions including costs and the cost of alternative options.

1.3. The advice received to date is that provided glyphosate is used appropriately it can continue to be used.

1.4. If the Council would like to take a precautionary approach there are options presented in this report to limit the use of glyphosate in certain circumstances. Cost estimates for the various options are included so that these can be included in budgets for the draft Long Term Plan (LTP).

Attachments:
   i. 160805077062, Interim Update on eth use of Herbicides including Glyphosate, for Council Weed control operations, September 2016.
   ii. 171012110892, CAREX report on Glyphosate, report to Council October 2017.
   iii. 171011110252, Persistence and ecological consequences of glyphosate to control aquatic weeds in Waimakariri lowland waterways, CAREX, September 2017.

2. RECOMMENDATION

THAT the Council:

(a) Receives report No. 180111001840.

(b) Notes that based on information to date, it is unlikely that the use of glyphosate by the Council would pose a risk to public health and the environment.
3. **ISSUES AND OPTIONS**

### 3.1. **Background**

3.1.1. Community concerns regarding the use of glyphosate in Council drains have been brought to the Council’s attention. Specifically a resident of Kaiapoi in 2015 blamed the Council’s use of glyphosate for the dieback of submerged weed in the Kaiapoi River.

3.1.2. This report provides a summary of previous reports to Council, activities where the Council’s contractors use glyphosate and suggested options on actions the Council could take to the 2018 Long Term Plan consultation process.

### 3.2. **Kaiapoi River Sediment Testing**

3.2.1. The Council had Kaiapoi river sediment sampled and tested for the presence of glyphosate. Water and sediment monitoring undertaken in April 2016 found no detectable concentrations in the water, and concentrations between 0.11 to 0.26 mg/kg in three sediment samples.

3.2.2. Ecan have undertaken monitoring in the Kaiapoi River and noted salt water intrusions up the river when there are spring tides coupled with low flows in the Waimakariri River. This phenomenon is likely to cause dieback of freshwater aquatic plants.

### 3.3. **Advice from Government Ministries and Statutory Authorities**

3.3.1. The Council previously sought advice from the Ministry of Health (MOH), Ministry for the Environment (MfE), Parliamentary Commissioner for the Environment (PCE) and the Environmental Protection Authority (EPA), on the impact of use of glyphosate and other sprays on public health and on the environment. Their responses are summarised below.

3.3.2. The EPA response referred Council to a recent report it had commissioned, titled “Review of the Evidence Relating to Glyphosate and Carcinogenicity”, published in August 2016. This report was prepared by toxicologists Dr Wayne Temple with
contributions from Michael Beasley of the New Zealand National Poisons Centre. The report found that, “based on a weight of evidence approach, taking into account the quality and reliability of the available data – glyphosate is unlikely to be genotoxic or carcinogenic to humans and does not require classification under HSNO as a carcinogen or mutagen”.

3.3.3. The letter from the MOH referred the Council to the EPA as the most appropriate authority in New Zealand on assessing and regulating glyphosate use. Therefore the report prepared by Dr Wayne Temple is considered the most comprehensive and recent resource provided by the Government for New Zealand organisations to assess public health impacts of the use of glyphosate.

3.3.4. The MfE also concurred with the findings of the EPA report. It noted that the EPA has approved the use of glyphosate in New Zealand following consideration of the likely effects of glyphosate on both human health and on the environment. It concluded that “both could be safeguarded by placing appropriate controls on the use of products containing glyphosate”. It went on to state that “the level of glyphosate in Kaiapoi, according to your own testing on 4 April 2016, is not at a level that would cause significant adverse effects for either humans or the environment.”

3.3.5. Apart from a letter received to acknowledge the request for information no further correspondence has been received from the PCE.

3.3.6. The Council was presented these reports at its meeting on the 6th of September 2016, refer TRIM 160929100894 (complete report with attachments; TRIM 160805077062[v2]).

3.3.7. Representatives from the Environmental Protection Authority visited Council in September 2016. They had no issues with the use of glyphosate by Council but cautioned against using more toxic alternatives available in New Zealand.

3.4. Other Herbicides

3.4.1. Included in the report to Council on the 6th of September 2016 was a review of the Council’s use of herbicides across all departments and activities. There are a number of products used for the control of weeds, some of which are specialist herbicides usually employed to control such weeds as gorse and broadleaf weeds and these include active ingredients such as triclopyr, clopyralid, metsulfuron-methyl, haloxyfop-P-methyl ester, sodium hypochlorite, picloram and others. These chemicals are very hazardous and require qualified applicators and none of them are approved to be used over water. As they are specialist herbicides, very little is used by Council contractors. This report does not cover these chemicals in any detail.

3.5. CAREX Partnership

3.5.1. In the summer of 2016 – 2017 The Waimakariri District Council partnered with (CAREX) in a trial to understand the persistence of glyphosate in stream water and sediment and its short-term effects on freshwater invertebrates and fish following spraying of waterways. The results of the trial are summarised as follows:
3.5.1.1. Glyphosate was present in the sediment before spraying had even started.

3.5.1.2. Glyphosate was present in the water column for 1-2 days following spraying, but quickly bound to sediment and broke down.

3.5.1.3. Freshwater invertebrates and fish were not affected by the use of glyphosate to control emergent macrophytes although it was concluded that as these drains are highly modified environments, invertebrates and fish that continue to occupy them may be already tolerant of existing water quality in these systems.

3.5.2. The CAREX trial report was presented to the Council on the 24th of October 2017, refer TRIM 171012110892 (complete report; TRIM 171011110252).

3.6. **Formulations Containing Glyphosate**

3.6.1. Glyphosate formulations are available at the local hardware and farm supply stores. They can be purchased and used with no restrictions. Home gardeners and commercial cropping farmers are using glyphosate. A drive around the district reveals the landowners who are spraying their roadside drains, most likely with glyphosate. It is the most widely used herbicide in the world.

3.6.2. There are many herbicide products on the market containing glyphosate. A common misconception is using the term “Roundup” to describe all formulations, but Roundup is just another formulation produced and marketed by the company Monsanto. The Council’s contractors do not use this particular product.

3.6.3. Each manufacturer adds other ingredients to glyphosate to create herbicide formulations usually to target certain weeds. An example of this is the product Weed Weapon manufactured by Kiwicare for the home gardener market. This also contains saflufenacil, which is effective on broad leaf species. Other added ingredients are surfactants and adjuvants (see below).

3.6.4. The Council’s contractors use two formulations of glyphosate: Greenspace contractors use Glyphosate 360, and Drainage and Roading contractors use Glyphosate 510. The label information for the two formulations are compared in Table 1.

3.6.5. The added ingredients distinguish the main difference between the two formulations; Glyphosate 360 cannot be used in the aquatic environment and is classed as toxic, while Glyphosate 510 is approved to be used in the aquatic environment and not classed as toxic. It is not glyphosate itself that sets the hazard class but the added ingredients. Glyphosate alone does not even rate a class 6 toxic label.

3.6.6. It is also worth noting that the hazard warnings apply to the concentrated product before it is diluted for use. This is for the personal protection of the handlers and care that the concentrated product does not enter the natural environment.

<table>
<thead>
<tr>
<th>Table 1. Comparisons of Glyphosate 360 and Glyphosate 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Classes</td>
</tr>
<tr>
<td>6.1D Substances that are acutely toxic - Harmful</td>
</tr>
<tr>
<td>6.4A Substances that are irritating to the eye</td>
</tr>
</tbody>
</table>
### 9.1B Substances that are ecotoxic in the aquatic environment

<table>
<thead>
<tr>
<th>Composition</th>
<th>Glyphosate isopropylammonium 360g/L</th>
<th>Tallow amine ethoxylate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Glyphosate isopropylammonium 510g/L</td>
<td>Alkyl polyoxyethylene phosphate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicological Information</th>
<th>ACUTE ORAL: LD50 (rats) &gt;5000 mg/kg.</th>
<th>ACUTE ORAL: LD50 (rats) &gt;10000 mg/kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACUTE DERMAL: LC50 (rabbit) inhalation &gt;5000 mg/Kg. ACUTE INHALATION: LC50 (rats) &gt;10 mg/L for 4 hour aerosol exposure.</td>
<td>ACUTE DERMAL: LC50 (rabbit) inhalation &gt;5000 mg/Kg. ACUTE INHALATION: LC50 (rats) &gt;10 mg/L for 4 hour aerosol exposure.</td>
</tr>
<tr>
<td></td>
<td>OTHER TOXICITY INFORMATION: Warning - May cause skin irritation, avoid skin contact. Warning - May cause eye irritation, avoid contact with eyes.</td>
<td>OTHER TOXICITY INFORMATION: Warning - May cause skin irritation, avoid skin contact. Warning - May cause eye irritation, avoid contact with eyes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ecological Information</th>
<th>AQUATIC TOXICITY: Toxic to aquatic life. LC50 Fish (Trout) 72hr: 9mg/L</th>
<th>AQUATIC TOXICITY: Slightly toxic to fish.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SOIL TOXICITY: Not toxic to worms.</td>
<td>SOIL TOXICITY: Not toxic to worms.</td>
</tr>
<tr>
<td></td>
<td>TERRESTRIAL VERTEBRATES - BIRDS: Not toxic to birds. TERRESTRIAL INVERTEBRATES - BEES: Not toxic to bees.</td>
<td>TERRESTRIAL VERTEBRATES - BIRDS: Not toxic to birds. TERRESTRIAL INVERTEBRATES - BEES: Not toxic to bees.</td>
</tr>
</tbody>
</table>

| Recommended Use | A non-selective herbicide for the control of most annual and perennial grass and broadleaf weed | A non-selective herbicide used before planting for the control of most annual and perennial grass and broadleaf weeds. Will control emerged weeds only, and provides no residual control. |

3.6.7. *What are surfactants?* The term surfactant is a blend of surface active agent. They help to break the barrier between unlike chemicals or surfaces, like the waxy surface of a leaf. Surfactants work because they're able to break the surface tension of the herbicide and leaf surface. This allows the spray to evenly coat leaf surfaces in an even sheen with no beading up or rolling off.

3.6.8. *What are adjuvants?* Adjuvants reduce the surface tension, improve the wetting action, and increase the penetration of the herbicide.

### 3.7 Council's Use of Herbicide

3.7.1. **Greenspace, Roading, Property, Transfer Stations, Closed Landfills, Water, Wastewater & Forestry assets**

3.7.2. Glyphosate formulations are used around the Council's Greenspace, Roading, Property, Wastewater & forestry assets. It is used for:
• Keeping neat tidy edges around gardens and grass areas.
• Keeping footpaths and other traffic areas weed free.
• Keeping the area around marker posts and power poles clear of grass and weeds.
• General control of unwanted problem weeds.

3.7.3. Other sprays and herbicides are used by Council contractors where necessary. These are listed in detail on the table below.

Table 2. Council Use of Herbicide Products

<table>
<thead>
<tr>
<th>Activity</th>
<th>Contractor</th>
<th>Method/ Product</th>
<th>Undiluted Application Rates (if provided/ per annum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roading</td>
<td>Sicon</td>
<td>Zeal (Metsulfuron – methyl)</td>
<td>6 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td>22 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glyphosate 510</td>
<td>220 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Versatile</td>
<td>20 litres</td>
</tr>
<tr>
<td>Drainage</td>
<td>Hide Spraying Ltd</td>
<td>Glyphosate 510</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td>Water Supplies</td>
<td>Graeme Ford</td>
<td>Glyphosate 510</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td>Wastewater</td>
<td>Hide Spraying Ltd</td>
<td>Agpro Green (Glyphosate 510)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Escort</td>
<td></td>
</tr>
<tr>
<td>Properties</td>
<td>National Decorators (roof spraying)</td>
<td>Hypostat (sodium hypochlorite) (roof moss &amp; mould)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gallant</td>
<td>0.04 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wet &amp; Forget / Surrender</td>
<td>0.3 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td>0.6 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Versatile</td>
<td>1.7 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glyphosate</td>
<td>5.3 litres</td>
</tr>
<tr>
<td>Parks and Recreation</td>
<td>Delta</td>
<td>Glyphosate</td>
<td>116 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brushkiller</td>
<td>34 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximiser</td>
<td>30 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lime Sulphur</td>
<td>46 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moss &amp; Mould killer</td>
<td>24 litres</td>
</tr>
<tr>
<td>Rural Forestry</td>
<td></td>
<td>Glyphosate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Terbuthylazine (Gardoprim)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Picloram</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aminopyralids (Tordon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wetting agents (pulse etc.)</td>
<td></td>
</tr>
<tr>
<td>Transfer Stations</td>
<td>Graeme Ford</td>
<td>Glyphosate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td>Closed Landfills</td>
<td>Hide Spraying Ltd</td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td></td>
</tr>
<tr>
<td>Cleanfill Site</td>
<td>Hide Spraying Ltd</td>
<td>Grazon (Triclopyr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td></td>
</tr>
</tbody>
</table>
3.7.4. In recent years staff and contractors have been very aware of the concerns around the use of herbicides and in particular glyphosate. The use of glyphosate and other herbicides is limited to essential areas and is one of the range of options, including the use of mechanical weeding.

3.7.5. In Greenspace areas, the current practice is to reduce the need to spray by carrying out the following:

- Application of mulch on shrub beds to reduce weed growth and therefore reduce the need to spray.
- Tree pits created around trees which are covered in mulch reducing the need to spray around the base of the tree where mowers cannot always get to.
- Vegetation around all bollards, wire, chain and post and rail fencing is manually controlled which is a specification in the parks contract.
- Infill planting is undertaken annually to suppress weed growth and therefore reduce the need to use spray.
- Combi guards or equivalent weed matting and plant protection is used when planting new native regeneration areas in natural reserves. The weed matting suppresses weed growth around the plants.

3.7.6. At water supply headworks the use of herbicides has been limited and weed control is undertaken with mowers and weed eaters. The key herbicide used at water headworks sites is glyphosate, however Grazon is also used in specific circumstances. If the Council wanted to minimise the use of chemical sprays at water headworks sites this could be achieved by ceasing use of chemical sprays from water supply well sites, but continuing to use sprays as required at headworks or reservoir sites. Given the limited size and number of the well sites and the sensitivity public have to drinking water quality this is a pragmatic approach that could be managed at a modest cost.

3.7.7. One area that could be of concern to the public is children’s playgrounds. While it would be difficult to manage reserves in general without glyphosate it would be manageable to cease using glyphosate and other herbicides in the immediate area of children’s playgrounds if Council wanted to take a precautionary approach.

3.7.8. Excluding drainage there are no other areas where staff would recommend ceasing the use of glyphosate and herbicides.

3.7.9. Drainage

3.7.10. The initial concerns regarding spraying and the use of glyphosate relates to the maintenance of the drainage network therefore this section will focus on the issues in more detail.

3.7.11. The Council’s contractors spray dry drains to control rank grass. They have strict instructions to spray only the invert of the drain and to leave the banks untouched. Usually one spray per year is enough to keep the drains manageable.

3.7.12. The coastal zone of the Waimakariri district has a network of open drains that have a permanent base flow of spring water. There are a number of introduced aquatic weeds (macrophytes) both emergent (growing above the water) and submergent (growing under the water) that infest these drains. During the summer warm temperatures and longer sunlight hours cause prolific growth of these weeds. The most common emergent macrophytes are:
• Watercress (Nasturtium officinale) native to Europe and Asia.
• Monkey musk (Erythranthe guttata, formerly Mimulus guttatus) native to North America.
• Veronica or water speedwell (Veronica anagallis-aquatica) country of origin unknown.
• Floating sweet grass (Glyceria fluitans) native to Europe.

3.7.13. The prolific growth of these macrophytes cause the following problems:
• Water levels increase along some of the drainage networks causing flooding of surrounding land.
• Decrease of drain capacity which can cause flooding issues during heavy rain.
• During heavy rain events clumps of weed, especially watercress, can become unrooted, float downstream and build up to cause blockages at culverts.
• Macrophytes trap sediment that reduces drain capacity, clog stream beds, reduce habitat for aquatic biota and, like a self-perpetuating system, enable more prolific weed growth.
• Excess weed will hinder the migration of both introduced and native fish populations.
• Detract from the aesthetic appeal of a body of water.

3.7.14. The Council have a resource consent from Environment Canterbury to spray emergent aquatic macrophytes. Historically approximately 8 - 10% of spring fed drains are sprayed every year.

3.7.15. The product authorized for use is Glyphosate 510. The contractor uses a vehicle mounted spray unit and the practice is to spray the middle of the drain only and not spray the banks. Glyphosate is only effective on emergent weeds as sprays are diluted beyond effectiveness when mixed with stream water.

3.7.16. Glyphosate gel is used to control willow and other woody weeds along open drains and streams. The plant is either drilled and injected with the gel or the plant is cut and the stump pasted. These methods ensure no product enters the water.

3.7.17. Glyphosate is used for managing riparian areas which have been planted with natives. The practice is to target problem weeds that could compete with the natives. A backpack sprayer is used.

3.7.18. There are no other herbicides that are approved to be sprayed over water. Most of the organic products on the market contain fatty acids, pine and other oils that are toxic to stream fauna and flora and as such are not appropriate or approved to control in-stream macrophytes.

3.7.19. If the Council wished to take a precautionary approach it could opt to cease spraying glyphosate on emergent aquatic macrophytes in water.

3.8. Alternatives to using Herbicide

3.8.1. Excavation. A digger fitted with a rake attachment is employed to mechanically remove excess weed. A good operator can do this with minimal disturbance to the stream banks and stream base. The major impact is removal of a large proportion of in-stream biomass is removed from the stream. Ideally the removed macrophytes are placed along the side of the stream which will allow fauna to migrate back into the stream. In recent years the development of lifestyle property
has introduced land owners wanting a tidy groomed road frontage and garden, they do not want stream cleanings spoiling their lawns and expect the Council’s contractor to immediately remove the cleanings. The impact is that any fauna is totally removed from the stream.

3.8.2. Shade. The establishment of native plants to introduce shade along stream banks is proven method to reduce macrophyte growth. In many cases, especially with an east – west aligned stream, the use of glyphosate and excavation is completely eliminated.

3.8.3. Grass Cutting. Weed eating dry drains and other areas is an alternative to using herbicide.

3.8.4. Other alternatives were considered in the previous report to Council in September 2016 (refer TRIM 160805077062).

3.9. Hollistic Management of Waterways

3.9.1. In 2013 the Parliamentary Commissioner for the Environment issued a warning that our long finned eel population is in dramatic decline and heading for extinction. Where there is sufficient data; nearly 3 quarters of our freshwater fish species and one third of freshwater invertebrates are classified at risk or threatened with extinction. This report focusses on the use of glyphosate however there are other factors to consider when looking at the health of our lowland waterways. Our freshwater ecosystems are impacted by changes in the water cycle, drainage, pollution and sedimentation, nutrient enrichment, deforestation and invasion by pests. The CAREX report highlights the issue that the health of our lowland waterways is not good. The use of glyphosate can be discontinued by the Council but we cannot expect an improvement in the health of our freshwater systems without looking at the broader picture.

3.9.2. There are opportunities here to look at our waterways holistically and focus on enhancing water quality and water ecology by managing catchments, more riparian planting to introduce shade and habitat.

3.10. Christchurch City Council experience

3.10.1. In 2016 the Christchurch City Council stopped using glyphosate products in public places due to concerns that glyphosate might be a carcinogen. Their contractors use “organic” alternatives such as Kiwicare product Weedfree Rapid which contains fatty acids.

3.10.2. Discussions with Christchurch City Council staff and the City’s parks contractors Delta and Recreational Services highlights the following issues when using these organic alternatives.

3.10.2.1. The product is highly acidic which can cause burns to skin and eyes. Extra protective clothing must be worn by applicators.

3.10.2.2. As the product is a contact herbicide (glyphosate is a systemic herbicide) every part of the plant must be treated to be effective however the roots
of the plant remain alive and the plant can re-sprout after treatment. This means more product is required and must be applied more often.

3.10.2.3. The product has a strong odour which has increased the number of complaints from the public. Especially from dog owners because their dogs like to roll in it.

3.10.2.4. It is more of a challenge to maintain parks with a tidy appearance which also increases complaints from the public. For example the product appears to be totally ineffective on the common weed mallow.

3.11. Other Views

3.11.1. Organisations such as the Soil & Health Association and the Green Party are advocating that glyphosate should be reassessed and eventually phased out of use. Green MP Steffan Browning produced a critique of the EPA’s review of the evidence relating to glyphosate and carcinogenicity.

3.12. Options

3.12.1. It is recommended that the Council take the glyphosate issue to the 2018 Long Term Plan process for consultation. This would involve discussion of the issue in the Consultation Document. Members of the public will have an opportunity to express their opinions as a submission to the LTP:

- **Option 1: No change to current practice and use** (Staff recommendation). This option has been allowed for in the draft LTP budgets. There is no cost impact if this option is chosen by Council for consultation.

- **Option 2: Cease use of glyphosate directly into waterways*, water well headworks and in children’s playground areas.** Continue current use for all other Council activities. This option would have a cost of approximately $130,000 to $150,000 per annum. If Council wanted to take a precautionary approach staff would support this as it would eliminate the highest risk activities from an environmental and human health perspective. Staff and contractors would be able to manage most of the level of service issues associated with this. *Note refers to ceasing spraying glyphosate on emergent aquatic macrophytes in water.

- **Option 3: Cease use of glyphosate across all Drainage and public areas (footpaths, parks, playgrounds etc).** Continue to use glyphosate for rural roads and forestry areas. This option would cost an additional $1.0 million to $1.5 million above the current budgets in the draft LTP. It would also have a significant impact on levels of service. This option is not recommended by staff.

- **Option 4: Cease use of glyphosate across all Council activities.** Not recommended. This would cost in the order of $1.1 million to $2.0 million above the current budgets in the draft LTP. Staff advise against this option as it would have significant level of service impacts and in particular road safety implications.

3.13. The Management Team has reviewed this report and supports the recommendations.

4. COMMUNITY VIEWS

4.1. The community views on this issue are varied. The drainage advisory groups generally are supportive of the use of herbicides including glyphosate. However there are opinions over the whole spectrum including people who consider that there should be no use of glyphosate.
4.2. The Kaiapoi Community Board at its meeting on the 20th of June 2016 (TRIM 160620057958) recommended the following:

4.2.1. **Recommends** that Council approves the use of mechanical means, rather than spraying, to control weeds in the Council stormwater and roadside drains, and waterways. Notes that mechanical means, rather than spraying Council drains, is estimated to cost an additional $80,000 per year.

4.2.2. **Recommends** that Council declines support for a return to the use of spraying to control weeds in Council drains.

5. **FINANCIAL IMPLICATIONS AND RISKS**

5.1. The costs that have been built into the draft LTP are based on the Council continuing with its current approach of using glyphosate for weed control where deemed appropriate by Council staff and contractors. If the Council chooses another option for consultation, other than the staff recommendation, the draft budgets will need to be amended to align with this decision.

5.2. The following table compares current weed control costs for each Council activity with a rough order estimated cost range for replacing sprays with mechanical weed control methods. This is not based on a site specific assessment as the exact cost of the most suitable alternative weed control method for each site has not been identified. The cost estimates are instead based on extrapolations based on the actual costs reported by the drainage activity during the recent mechanical weed control trials.

5.3. The results of the trials have been interpolated across all Council activities to provide a starting point for cost comparisons between glyphosate and mechanical weed removal options. To complete a more comprehensive options assessment would require an individual assessment at each site, including, for instance, the most appropriate weed removal option for each drain, reserve margin, garden, road verge etc. This level of in-depth investigation would require significant further resourcing.

5.4. Any Council reduction in its use of glyphosate is unlikely to have a significant impact on the concentrations found in the environment, due to the extent of private usage of the product.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Current Average Annual Cost of Weed Control</th>
<th>Estimated Total Cost of Mechanical Weed Control for all Council weed control (range)</th>
<th>Estimated Additional Cost for Mechanical Weed Control (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roading</td>
<td>$35,000</td>
<td>$210,000 to $350,000</td>
<td>$175,000 to $315,000</td>
</tr>
<tr>
<td>Drainage</td>
<td>$105,000</td>
<td>$630,000 to $1.05 million</td>
<td>$525,000 to $945,000</td>
</tr>
<tr>
<td>Water Supplies</td>
<td>$10,000</td>
<td>$20,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Wastewater</td>
<td>$25,000</td>
<td>$154,000 to $257,000</td>
<td>$128,300 to $231,300</td>
</tr>
<tr>
<td>Properties</td>
<td>$3,500</td>
<td>$25,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>-------------</td>
<td>--------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>(incl. pensioner housing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parks &amp; Recreation</td>
<td>$35,000</td>
<td>$210,000 to $350,000</td>
<td>$175,000 to $315,000</td>
</tr>
<tr>
<td>(excludes natural reserves &amp; Mainpower Oval)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural Forestry</td>
<td>$20,000</td>
<td>$120,000 to $200,000</td>
<td>$100,000 to $180,000</td>
</tr>
<tr>
<td>Transfer Stations*</td>
<td>Not available</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Closed Landfills</td>
<td>$2,000</td>
<td>$12,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Cleanfill Site</td>
<td>$500</td>
<td>$3,000</td>
<td>$2,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$236,000</td>
<td><strong>$1.38 million - $2.27 million</strong></td>
<td><strong>$1.14 million - $2.02 million</strong></td>
</tr>
</tbody>
</table>

*Weed control is part of transfer station maintenance and not separately scheduled.

5.5. This report presents a number of options for Council to consider the cost of each option is totalled in the options section of this report. The breakdown of the costs to cease use of glyphosate under Option 2 is approximately $100,000-$120,000 in waterways, $10,000 at water well headworks and $20,000 in children’s playground areas.

5.6. A significant risk of ceasing the use of glyphosate or other herbicides is the reduction in level of service. Despite the increase in cost, due to the limitation of other methods there would be a reduction in the level of service. This reduction in level of service would be activity dependant. Anecdotal evidence from Christchurch has shown there has been a reduction in the level of service from their approach. We would expect the same for this district.

6. CONTEXT

6.1. Policy

6.1.1. This matter is not a matter of significance in terms of the Council’s Significance Policy. However if there was a significant change, such as an outright council wide cessation in the use of herbicide, then this would trigger the significance policy in terms of cost and level of service.

6.2. Legislation

**Resource Management Act 1991**

Section 31

(1) Every territorial authority shall have the following functions for the purpose of giving effect to this Act in its district:

(e) the control of any actual or potential effects of activities in relation to the surface of water in rivers and lakes:

Section 35
i. Every local authority shall gather such information, and undertake or commission such research, as is necessary to carry out effectively its functions under this Act or regulations under this Act.

ii. Every local authority shall monitor (a) the state of the whole or any part of the environment in its region or district;

Hazardous Substances and New Organisms Act 1996 (HSNO Act)

The use of glyphosate in New Zealand is regulated through the Hazardous Substances and New Organisms Act 1996 (HSNO Act). The Environmental Protection Authority administers the HSNO Act and has the role of assessing and approving the use of hazardous substances for use or continued use in New Zealand. The use of glyphosate is currently approved for use in New Zealand under the provisions of this Act.

6.3. Community Outcomes

6.3.1. The air and land is healthy

6.3.2. Core utility services are provided in a timely, sustainable and affordable manner.

6.3.3. There is sufficient clean water to meet the needs of communities and ecosystems
1. SUMMARY

1.1 This report requests the re-establishment of the Solid and Hazardous Waste Working Party, as a working party to this Committee.

1.2 The Working Party has previously been established to deal with those solid and hazardous waste issues that often benefit from being discussed in a less formal forum than can be provide in a Council Committee. This included the consultation around the Waste Assessment and Waste Management & Minimisation Plan, and retendering the solid waste contracts.

1.3 The Waste Management & Minimisation Plan was adopted in 2018 and the new contracts began on 1 July 2019. Staff consider that it is still necessary to re-establish the Solid and Hazardous Waste Working Party to have an overview of the new services, provide input into the planned facility upgrades and Annual Plan/Long Term Plan budgets, and give strategic guidance for the next Waste Management & Minimisation Plan review.

1.4 The members of this Working Party in the last Term were Cr R Brine (as chair), Crs J Meyer, W Doody, D Gordon, S Stewart, P Williams, and the late P. Allen, plus Mayor Ayers (ex-officio). Only four of the Councillors were members of Utilities and Roading Committee.

1.5 The draft Terms of Reference give the Working Party recommending authority and delegated authority to decide on all matters relating to Solid and Hazardous Waste that do not have an effect on the Annual Plan and Budget. The working party is mainly involved in giving guidance to staff as they go about their delegated responsibilities.

1.6 It is proposed that the membership of the Working Party be reduced from 7 members to 5 members, plus the Mayor ex-officio, given that the workload over the next three years will be much reduced from the previous Council term.

Attachments:

i. Draft 2019 Solid and Hazardous Waste Working Party Terms of Reference (191105154039)
2. RECOMMENDATION

THAT the Council:

(a) Receives report No. 191105154393.
(b) Establishes a Solid and Hazardous Waste Working Party.
(c) Approves the Terms of Reference for the Solid and Hazardous Waste Working Party as contained in document 191105154039.
(d) Appoints Councillors Brine, ................., ................. and ................. as members of the Solid and Hazardous Waste Working Party.
(e) Notes that Mayor Gordon is an ex-officio member of the Solid and Hazardous Waste Working Party.
(f) Circulates report No. 191105154393 to the Community Boards.

3. BACKGROUND

3.1 The Utilities and Roading Committee has previously established a Solid and Hazardous Waste Working Party (Working Party), and delegated recommending authority to the Working Party to consider matters relating to solid and hazardous waste.

3.2 The previous committees have found that this was a useful forum for discussing the above matters, as it fits well with the relatively time-consuming and detailed discussions necessary in this portfolio.

3.3 The previous Term’s Working Party numbered seven (7) members owing to the planned consultation around the Waste Assessment and Waste Management & Minimisation Plan, which included the potential implementation of a 3 bin collection service, and retendering of the solid waste collection and facilities operations contracts.

3.4 The members of the Working Party in the last Term were Cr R Brine (as chair), Crs J Meyer, W Doody, D Gordon, S Stewart, P Williams and the late P. Allen, plus Mayor Ayers (ex-officio). It should be noted that only Crs Brine, Meyer, Stewart and Williams were members of Utilities and Roading Committee during that Term and the remaining three Councillors were members of other Committees.

3.5 The Waste Management & Minimisation Plan was adopted in 2018 and the new contracts began on 1 July 2019, however staff consider that it is still necessary to re-establish the Solid and Hazardous Waste Working Party. The Working Party will have an overview of the new services, provide input into the planned facility upgrades and Annual Plan/Long Term Plan budgets, and give strategic guidance in the lead-up to the next Waste Management & Minimisation Plan review.

4. ISSUES AND OPTIONS

4.1. The Committee can choose to either re-establish or not re-establish a Working Party, and also to adopt or amend the Terms of Reference. The Committee can appoint any members to the Working Party that it chooses, including other Councillors not sitting on the Utilities and Roading Committee.

4.2. The Committee could establish a subcommittee instead of a Working Party. This has some advantages in terms of formalising an on-going task, but some disadvantages in terms of the higher level of formality required.
4.3. The Committee may choose to amend the draft Terms of Reference. For example they may choose not to reduce the membership of the Working Party from 7 members to 5 members. The workload over the next three years will be much reduced from the previous Council term, and the Working Party membership has been set at a lower number for the two terms prior to that time: a membership of 5 is considered to be a reasonable number for the projected level of activity.

4.4. Cr Brine is the Council’s Solid Waste Portfolio Holder, and there would be significant advantages in appointing him as chair of this committee. This would provide continuity with the process given he has been the chair of the Solid and Hazardous Waste Working Party since its establishment in November 2004.

4.5. The Management Team have reviewed this report and support the recommendations.

5. **COMMUNITY VIEWS**

5.1. **Groups and Organisations**

5.1.1. Groups and organisations have not been consulted on this decision as it is a matter of internal Council process

5.2. **Wider Community**

5.2.1. The wider public, including Maori and stakeholders, have not been consulted on this decision as it is a matter of internal Council process

6. **IMPLICATIONS AND RISKS**

6.1. **Financial Implications**

6.1.1. There are no financial implications of re-establishing the Working Party. Other implications of waste decisions will be reported to the Committee at the appropriate time for consideration.

6.1.2. The Working Party will review the proposed draft fees and charges to ratepayers and transfer station customers prior to Council’s consideration of the draft Annual Plan and Long Term Plan budgets. This review will likely involve discussions around organic bin weights and rates, bin delivery fees, kerbside recycling processing costs, and disposal charges at our facilities.

6.2. **Community Implication**

6.2.1. The Working Party will have overview of the draft Annual Plan and Long Term plan budgets, and the development plan for Southbrook resource recovery park upgrades. They will consider what implications these, and any proposed new services, will have to the community.

6.3. **Risk management**

6.3.1. The risk of re-establishing the Working Party with the proposed Terms of Reference are relatively small, as they only have recommending authority, and binding decisions will be referred to the Committee and to Council.

6.4. **Health and Safety**

6.4.1. There are significant H&S risks to the Council, contractor and public during the provision of solid waste services. These risks need to be carefully managed to minimise their impacts.
7. **CONTEXT**

7.1. **Policy**

7.1.1. This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

**Legislation**

7.1.2. Local Government Act 2002

7.1.2.1. S78 requires local authorities to give due consideration to the views and preferences of persons likely to be affected by, or to have an interest in, the matter.

7.1.2.2. S79 outlines the responsibility of local authorities to achieve compliance with (S77 and) S78 that is largely in proportion to the significance of the matters affected by the decision.

7.1.3. Waste Minimisation Act 2008

7.1.3.1. S42 requires territorial authorities to promote effective and efficient waste management and minimisation within their districts.

7.2. **Community Outcomes**

7.2.1. The re-establishment of a Working Party will assist with the following community outcomes:

**ENVIRONMENT**

c. **There is a safe environment for all**

- Harm to people from natural and man-made hazards is minimised.

d. **There is a healthy and sustainable environment for all**

- Harm to the environment from the spread of contaminants into ground water and surface water is minimised.

**SERVICES**

k. **Core utility services are provided in a timely and sustainable manner**

- Waste recycling and re-use of solid waste is encouraged and residues are managed so that they minimise harm to the environment.

7.3. **Delegations**

7.3.1. The Utilities & Roading has the delegated authority to re-establish this Working Party, and appoint Councillors to sit on the Working Party.

Kitty Waghorn
Solid Waste Asset Manager
1. **Purpose**

   To:
   - Ensure the effective implementation of the Waste Management & Minimisation Plan;
   - Maintain an overview of Council’s solid waste services; and
   - Monitor industry trends, risks and opportunities in relation to waste management and minimisation initiatives.

2. **Membership**

   - Cr. Robbie Brine, Solid Waste Portfolio Holder (chair)
   - Cr. _________________
   - Cr. _________________
   - Cr. _________________
   - Cr. _________________
   - Mayor Dan Gordon (ex officio)

3. **Staff and Executive Support**

   - Kitty Waghorn, Solid Waste Asset Manager
   - Gerard Cleary, Manager: Utilities & Roading

4. **Administrative Support**

   - Monese Ball, Solid Waste Officer

5. **Quorum**

   Any 3 members

6. **Objectives**

   - Monitor and review industry trends, risks and opportunities, and plan for future directions and initiatives in waste management and minimisation;
   - Evaluate the delivery of Council’s solid waste services, including refuse, recycling and organics collections, transfer station and cleanfill site operations;
   - Provide strategic input into the Annual Plan and Long Term Plan budgets, fees and charges;
   - Manage the liaison with the Canterbury Waste Joint Committee and the Canterbury Regional Landfill Joint Committee; and
SOLID & HAZARDOUS WASTE WORKING PARTY

- Provide strategic input into the 6-yearly review of the Waste Management & Minimisation Plan, due to be reviewed in 2022/23.

7. Outcomes
- Update the Utilities & Roading Committee after each meeting.
- Advise the Utilities & Roading Committee on issues that affect the Solid Waste Budget.
- Review the proposed draft fees and charges to ratepayers and transfer station customers prior to Council’s consideration of the draft Annual Plan and Long Term Plan budgets.

8. Delegation
- Delegated authority is given to the Working Party to decide on all matters relating to Solid and Hazardous Waste that do not have an effect on the Annual Plan and Budget.

9. Decision Making
- The Working Party will be responsible for considering issues relating to Solid and Hazardous Waste.
- Decisions will, in so far as it is possible, be reached by consensus. Where this is not achievable, decisions will be made by voting with a simple majority being required.
- The Working Party will have the option of referring any matter to the Utilities & Roading Committee for a decision.

10. Financial Management
- The Working Party can decide on all matters relating to Solid and Hazardous Waste that do not have an effect on the Annual Plan and Budget.

11. Legal Responsibilities
In working together to achieve the objectives of the Waste Management & Minimisation Plan, the Council and the Solid & Hazardous Waste Working Party are required to comply with all relevant legislation and regulations.

These include, but are not limited to:
- The Health and Safety at Work Act 2015
- Local Government Act 2002
- The Waste Minimisation Act 2008
12. Administration

The agenda and minutes for the Solid & Hazardous Waste Working Party meeting will be prepared by the Administrator Assistant. The agenda and minutes will be filed in TRIM and distributed to all members.

The outline agenda for the meeting shall generally be as follows:

1. Apologies
2. Previous Minutes
3. Matters Arising
4. Staff Reports (milestones, programme, issues, budget, risk, health and safety)
5. Risks, Issues or Concerns
6. Community Engagement and Media
7. Reports to Council, Committee or Community Board
8. General Business

13. Meeting Frequency

The Solid & Hazardous Waste Working Party shall meet two-monthly, or when requested to do so for urgent matters or matters relating to the purpose of the Solid & Hazardous Waste Working Party.

14. Duration

The Solid & Hazardous Waste Working Party is intended to function until the 2022 elections, whereupon it will be reviewed and a decision made on whether to re-establish the group.
WAIMAKARIRI DISTRICT COUNCIL

REPORT FOR INFORMATION

FILE NO and TRIM NO: SHW-02-01 / 191107155980

REPORT TO: Utilities & Roading Committee

DATE OF MEETING: 19 November 2019

FROM: Kitty Waghorn, Solid Waste Asset Manager

SUBJECT: Update on Solid Waste Services and Waste Quantities to 31 October 2019

1. SUMMARY

1.1 This report is to provide the Utilities & Roading Committee information with an update on the new services, waste quantities and waste trends.

1.2 The number of bins in service at the start of the year was higher than the numbers projected for the 2019/20 year’s budgets, and the number of bins as at the end of October is higher than those projected for the start of the 2020/21 year.

1.3 As a result of this, the overall recycling, rubbish and organics collection and bin delivery costs, and the weight of materials collected and their disposal costs, will be higher than was budgeted. This will be offset by a higher than budgeted income from rates and part-year charges.

1.4 The weight of materials collected from kerbside bins from 1 July through to 31 October 2019 indicates that the initial bin weight estimates for recycling and rubbish in the budgets are realistic, however in October weights of the organics bins were considerably higher than the assumed average bin weight. When the weights are averaged over the past four months, organics bins are 5.4% higher than budgeted for.

1.5 Staff will continue to monitor bin weights throughout the year and will report back to the Committee on these figures.

1.6 Continuing changes in international recycling markets have resulted in an increase in recycling processing costs. The processing charge has increased from $95 to $124/tonne as from 1 November 2019, and a further increase to $140/tonne is forecast for 1 July 2020.

1.7 There is sufficient funding in the Collection Account to cover the projected increased costs in the current financial year, however staff will be using the measured bin weights to update fees and charges accordingly for the draft 2020/21 annual plan budgets.

1.8 Sorting activities are continuing at the Southbrook resource recovery park rubbish pit, and almost 21 tonnes of materials have been diverted from landfill. Landfill tonnages are 406.41 tonnes lower than the same period last year, a decrease of 7.4%. Greenwaste disposed of at Southbrook has dropped by 269.29 tonnes, or a decrease of 28%. This indicates that the new collection services are reducing landfill quantities and also impacting the amount of greenwaste coming into the facility.
2. **RECOMMENDATION**

**THAT** the Utilities & Roading Committee:

(a) **Receives** report No. 191107155980.

(b) **Notes** that staff will continue to monitor the weight of waste collected at kerbside over the spring and summer periods, and will regularly report back to the Utilities & Roading Committee on these figures.

(c) **Circulates** report No 191107155980 to the Council.

(d) **Circulates** report No 191107155980 to Community Boards.

3. **BACKGROUND**

**Kerbside Collections**

3.1 The new collection services began on 1 July 2019. The statistics around bin numbers and weight of waste collected have been collated for the period between 1 July and 30 October, and are tabulated below.

<table>
<thead>
<tr>
<th>Bin Type</th>
<th>Recycling</th>
<th>Rubbish</th>
<th>Organics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Budgeted bin numbers</strong></td>
<td>18,420</td>
<td>9,960</td>
<td>7,776</td>
</tr>
<tr>
<td>Bins in service at 1 July</td>
<td>18,972</td>
<td>10,101</td>
<td>7,933</td>
</tr>
<tr>
<td>Bins in service at 30 October</td>
<td>19,149</td>
<td>11,397</td>
<td>8,995</td>
</tr>
<tr>
<td>Tonnes collected 1 July to 30 October</td>
<td>1,347.24</td>
<td>1,139.44</td>
<td>1,241.54</td>
</tr>
<tr>
<td>Total number rubbish bags (estimated)</td>
<td>29,644</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated weight of rubbish from bags (t)</td>
<td>222.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Budgeted estimated weight/bin/collection (kg)</strong></td>
<td>9.4</td>
<td>10.4</td>
<td>7.4</td>
</tr>
<tr>
<td><strong>Average weight/bin/collection (kg)</strong></td>
<td>7.9</td>
<td>-16.0%</td>
<td>9.3</td>
</tr>
</tbody>
</table>

**Bin Numbers**

3.2 The number of bins in service at the start of the new collection were higher than was anticipated for this year’s budget, and the uptake of bins to date is higher than projected. There are now more bins in service than were projected at the end of the current financial year.

3.3 As a result of this higher uptake the overall recycling, rubbish and organics collection and bin delivery costs, and the weight of materials collected and their disposal costs will be higher than was budgeted this year. However this will be offset by a higher than budgeted income from rates and part-year charges.

**Bin Weights**

3.4 The average weekly weight of bins has been calculated based on the weight collected during each month divided by the total number of bins in service (on properties) and by the number of collections scheduled in that month, not the number of bins actually presented (placed out) for collection. This is the same method that was used to estimate tonnages for the budgets.

3.5 Bag numbers are based on the total number of bags delivered to Council service centres and supermarkets during this period, less the number of bags disposed of at Southbrook.
resource recovery park. Bag weights are based on audited weights of 6kg/bag plus a 25% increase, as the change to a fortnightly collection is expected to have resulted in a proportion of the bags being packed fuller than was measured in the last audit.

3.6 This gives an approximate tonnage weight of rubbish collected from bags, which is subtracted from the total weight of rubbish before calculating the average weekly bin weight.

3.7 It is expected that the Organics bins will be heavier than the average weight during spring and autumn, and lighter in summer and winter. Rubbish and recycling bins are both likely to be heaviest over the summer period, although some residents may choose to put excess garden waste into their rubbish bins and bags during high-growth periods if they don’t have an organics bin or run out of space in their organics bin.

3.8 The monthly weight of kerbside rubbish has increased by about 12% to 319.9 tonnes in October from an average monthly weight of 285.8 tonnes over August and September. This increase in weight could be attributed to people putting lawn clippings in their rubbish bins. The average weekly rubbish bin weight remains lower than the 10.4 kg figure used for budgeting purposes.

3.9 The monthly weight of kerbside organics has more than doubled to 559.4 tonnes in October, from an average monthly weight of 251 tonnes per month over August and September. This will have been caused by the growth in grass and other vegetation as a result of the warm, wet weather during this month. We have had a few instances where an organics bin has not been collected because it was above the 70kg bin weight limit, because of the amount of wet grass clippings placed in the bins.

3.10 This jump in weights has increased weekly bin weights from 7.0 kg in August to 12.5 kg in October, an increase of 79%. When the total tonnes of organic waste collected over the four month period is averaged out, the weekly bin weights are calculated to be 7.8 kg, or around 5% higher than the budgeted weekly weight of 7.4 kg. If the weight of organics bins continue at this higher level, it will impact on total disposal costs this year, however we expect a drop in the weight of organics when the growing season ends and summer heat dries vegetation out.

3.11 Staff will continue to monitor the weight of waste collected and calculate the average bin weights over the rest of spring and during the summer periods, and will report on these figures to the Utilities & Roading Committee on a regular basis.

Recycling Processing Costs

3.12 Toward the end of October the Council was formally advised by EcoCentral that changes in international recycling markets has resulted in an increase in their processing charges. These charges were increased from $95 to $124/tonne as from 1 November 2019.

Facilities Operations

3.13 The new contract for the operation and maintenance of Southbrook resource recovery park (RRP) and Oxford transfer station commenced on 1 July 2019. So far there have only been minor changes made to site operations at both facilities, mainly around staffing and improvements to site safety.

Southbrook RRP

3.14 Waste Management continue to remove materials from the pit at Southbrook using a specialised excavator with a sorting-arm. The table on the following page shows the tonnage of materials diverted from the pit over the past four months. This is expected to increase over time, although space limitations in the pit and finding appropriate and sustainable end-uses for the materials will be a constraint.
### Utilities & Roading Committee

#### 19 November 2019

<table>
<thead>
<tr>
<th>Tonnes of Material diverted from July to October</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling</td>
<td>0.28</td>
</tr>
<tr>
<td>Reuse</td>
<td>3.73</td>
</tr>
<tr>
<td>Steel Recycling</td>
<td>13.61</td>
</tr>
<tr>
<td>Timber for Reuse</td>
<td>3.22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20.84</strong></td>
</tr>
</tbody>
</table>

3.15 In-site waste flows at Southbrook RRP have been measured as from 1 July 2019. This enables staff to measure the weight of unacceptable materials received at the recycling and reuse area, the weight and type of material being diverted from the pit, and weight of contamination that is removed from the kerbside recycling as these materials are loaded into the consolidator.

3.16 Waste coming from the reuse and recycling area totalled 17.62 tonnes from July to October, and 6.22 tonnes from the recycling shed, or a total of 23.84 tonnes. Solid Waste and Communications staff will work with the contractor and our educator to develop a plan on how to deal with educating users about what can and can’t be diverted at our facilities.

**Cust Rural Recycling Drop-Off**

3.17 The Cust Rural Recycling Drop-off Facility was opened to the public on 28 July 2019. The quality of the materials placed in the bins continues to have a very low level of contamination. CNN have been very proactive in reminding users about what can and can’t be put in the containers, and about the fact that rubbish cannot be dropped off at this facility.

3.18 The total weight of recycling removed from Cust is 10.27 tonnes (an average of 3.4 tonnes per month), indicating that there is a good level of use at this facility.

3.19 At this stage it is difficult to attribute any changes from the Cust facility to Oxford transfer station and Southbrook resource recovery park recycling tonnages.

**Waste Tonnages**

3.20 Oxford transfer station rubbish tonnages have dropped from 132.88 tonnes to 115.95 tonnes: a 16.3 tonne, or 12.7% decrease. Overall landfill tonnages are have dropped from 5,479.57 to 5,073.16 tonnes, as at the same period last year, a decrease of 406.41 tonnes (7.4%).

3.21 Greenwaste disposed of at Southbrook resource recovery park has dropped from 955.83 to 686.54 tonnes, a decrease of 269.29 tonnes or 28%.

3.22 This indicates that the new collection services are reducing landfill quantities and also impacting the amount of greenwaste coming into the facility.

4. **ISSUES AND OPTIONS**

4.1 The increase in the number of bins in service, and the weight of organics collected from kerbside in October, has resulted in an increase in overall disposal costs.

4.2 The changes in international recycling markets has resulted in an increase in processing costs in the current year, from $95 to $124/tonne as from 1 November 2019, and a further increase to $140/tonne is forecast for 1 July 2020. The increased costs are driven by a substantial decrease in income from the sale of paper and cardboard on top of the reduced income from sale of plastics.

4.3 The financial implication of these increases are discussed in Section 6 below.
4.4. The Management Team have reviewed this report and support the recommendations.

5. **COMMUNITY VIEWS**

5.1. **Groups and Organisations**

5.1.1. Groups and organisations have been consulted about the collection services when the Waste Management & Minimisation Plan was reviewed and during the last Long Term Plan, as part of the SCP’s for both of those documents.

5.1.2. The potential impact on private collection businesses was a consideration when the Council was making their decision on the opt-in nature of the new service.

5.2. **Wider Community**

5.2.1. The wider community has been consulted about the collection services when the Waste Management & Minimisation Plan was reviewed and during the last Long Term Plan, as part of the SCP’s for both of those documents.

5.2.2. Two letters were sent to all owners of properties within the kerbside collection areas: we asked them to make their bin choices in August 2018, and to confirm or change their choices in February 2019.

6. **IMPLICATIONS AND RISKS**

6.1. **Financial Implications**

6.1.1. The changes in international recycling markets has resulted in an increase in processing costs in the current year, from $95 to $124/tonne, and a further increase to $140/tonne is forecast for 1 July 2020.

6.1.2. The increase in recycling processing costs is estimated to result in an increased cost to Council of around $80,000. There is also a risk that, if the summer weather is wetter than usual, the organics bin weights will continue to be higher than the projected average weights.

6.1.3. There is sufficient funding in the Collection Account in the current financial year to cover the increased recycling processing costs and possible higher organics disposal costs.

6.1.4. Staff will use the measured bin weight figures to update the draft 2020/21 annual plan budgets, and fees and charges may have to be adjusted accordingly.

6.2. **Community Implications**

6.2.1. If the actual weight of organics bins prove to be higher than was projected for budgeting purposes, the costs for disposing of the additional materials will be passed on to users of organics bins by an appropriate change in rates. Any increased charges would be signalled in the upcoming draft Annual Plan consultation, and are unlikely to be significant.

**Risk Management**

6.2.2. The uncertainty about the weight of rubbish and organics bins, and the number of properties continuing to use rubbish bags, was signalled as a risk to the Council when they considered the current year’s budgets.

6.2.3. The contract, which is based on NZS 3917, clearly shares risk between the Council (as Principal) and the Contractor, and the risk share is based on standard industry practice.
6.2.4. There is a risk that private collection companies may seek alternative disposal facilities to take their waste to (rubbish, green waste or recycling), which would affect tonnages coming into our facilities.

6.2.5. There is a risk that the changes in international recycling markets may further impact the Council’s solid waste services, and this is a risk that the Council will continue to bear.

Health and Safety

6.2.6. The contractor has an extensive H&S plan, which has been reviewed by staff. Staff will continue to monitor the contractor’s H&S performance and standards over the term of the contract.

7. CONTEXT

7.1. Policy

This matter is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

7.2. Legislation

Local Government Act 2002
S78: Requires local authorities to give due consideration to the views and preferences of persons likely to be affected by, or to have an interest in, the matter.
S79: outlines the responsibility of local authorities to achieve compliance with (S77 and) S78 that is largely in proportion to the significance of the matters affected by the decision.

Waste Minimisation Act 2008
S42: Requires territorial authorities to promote effective and efficient waste management and minimisation within their districts.

7.3. Community Outcomes

k. Core utility services are provided in a timely and sustainable manner
   • Council sewerage and water supply schemes, and drainage and waste collection services are provided to a high standard. 1.4
   • Waste recycling and re-use of solid waste is encouraged and residues are managed so that they minimise harm to the environment. 1.3.4

7.4. Delegations

The Utilities & Roading has the delegated authority to consider the matters raised in this report.

Kitty Waghorn
Solid Waste Asset Manager
WAIMAKARIRI DISTRICT COUNCIL

REPORT

FILE NO: CON199862 / 191107155981

REPORT TO: Utilities & Roading Committee

DATE OF MEETING: 19 November 2019

FROM: Kalley Simpson, 3 Waters Manager

SUBJECT: Water Race Management Contract – Renegotiation of Base Payment

SIGNED BY: (for Reports to Council or Committees)

1. SUMMARY

1.1. The purpose of this report is to seek Utilities & Roading Committee approval for the increase in the base payment from $206,437 to $244,673, for maintenance of the stock water race system under the Water Race Management Contract 98/62.

1.2. Waimakariri Irrigation Limited (WIL) applied for an increase in the base rate to cover increase maintenance cost associated with the increase in number of water race ratepayers, additional maintenance requirements and increase in insurance costs.

1.3. Council staff consider that the $38,236 increase (or approximately 18.5% increase) is justified as the rate has not been revised since 2011 and also based on the changes to the network since the last base payment adjustment in 2005.

Attachments:

i. WIL letter dated 2 May 2019 (TRIM 191113158724)

ii. WIL letter dated 18 October 2019 (TRIM 191113158722)

2. RECOMMENDATION

THAT the Utilities & Roading Committee:

(a) Receives report No. 191107155981.

(b) Approves the increase of $38,236 as detailed in the WIL letter dated 18 October 2019.

(c) Notes that there is adequate budget available for this increase as the budgets were revised as part of the Drainage & Stockwater – Staff Submission to the Draft 2019-20 Annual Plan, May 2019 (TRIM 190418057971) in anticipation of the increase.

(d) Circulates this report to the Council and community board for their information.

3. BACKGROUND

3.1. In May 2019, WIL wrote to the Council seeking to "enter into negotiations" on the base payment to be made under the Water Race Management Contract.
3.2. Provision for negotiating the payments is covered by Clause 2.3 of the Agreement in Relation to Management of the Water Race System, which states:

“... the parties will enter into negotiations with the intention of reaching agreement as to payments to be made by the WDC to WIL under this agreement for the following three years.”

3.3. WIL previously negotiated an increase to the base payment in 2005 and 2011 when increases of $7,300 and $12,336 were approved respectively. Note that these increases are independent of the percentage increase in the Consumer Price Index (CPI) applied in accordance with Clause 5.2 of the Agreement.

3.4. In their October 2019 letter, WIL provided a breakdown of the stock water costs based on the original approach used to calculate the base payment (refer Schedule 1 of the Agreement), which covered Raceman Contract, Monitoring, Riverworks, Repairs and Maintenance, Professional Services, Directors Fees and Insurance.

3.5. The original proposed adjustment as document in the WIL letter dated 2 May 2019 was $256,926 (or approximately a 24% increase).

3.6. Council staff have met with WIL seeking further information and clarification of the breakdown, particularly around the change in the percentage split between stock water and irrigation costs.

3.7. WIL revised the breakdown and provided additional information, indicating that the increased number of water race ratepayers, increased salaries and director fees and increased insurance costs were the main reasons for the increase.

3.8. The revised proposed adjustment as document in the WIL letter dated 18 October 2018 was $244,673 (or approximately an 18.5% increase).

4. ISSUES AND OPTIONS

4.1. A review by Council staff of the changes to the water race network identified the following information to justify the increase requested by WIL.

4.1.1. Water race ratepayers – While the total rated area has decreased since 2011, the total number of properties paying water race rates has increased. This increase has occurred due to the conversion of larger farmers to smaller lifestyle blocks (refer Table 1 below).

Table 1 – Properties Paying Water Race Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Area Rated (ha)</th>
<th>Properties &lt;10 Ha</th>
<th>Properties &gt; 10 Ha</th>
<th>Total Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>44,076</td>
<td>634</td>
<td>592</td>
<td>1,226</td>
</tr>
<tr>
<td>2005</td>
<td>43,653</td>
<td>841</td>
<td>553</td>
<td>1,394</td>
</tr>
<tr>
<td>2008</td>
<td>42,225</td>
<td>1,057</td>
<td>504</td>
<td>1,561</td>
</tr>
<tr>
<td>2011</td>
<td>42,197</td>
<td>1,153</td>
<td>476</td>
<td>1,629</td>
</tr>
<tr>
<td>2015</td>
<td>42,756</td>
<td>1,289</td>
<td>421</td>
<td>1,710</td>
</tr>
<tr>
<td>2018</td>
<td>40,350</td>
<td>1,311</td>
<td>336</td>
<td>1,647</td>
</tr>
</tbody>
</table>

4.1.1. The additional properties have increased the time WIL spends addressing customer service requests and following up on individual property owner's
maintenance requirements. This is one of the main reasons that the salaries costs have increased by 10% more than CPI since 2011.

4.1.2. WIL have also stated that race maintenance to ensure reliability of the supply has been unfunded in recent years. In addition there have been several large floods (e.g.: June 2014, July 2017, February 2018) and the undercurrents have been flowing for two extended periods of time, which have both added to the increase in race maintenance costs. As indicated in the letter dated 18 October 2019, the race repairs and maintenance costs have double since 2011.

4.1.3. River Works – The main braid of the Waimakariri River currently deflects away from the intake to the south bank rather than continues along the north bank (refer Figure 1 below). This has substantially increased the maintenance works required to maintain good flow past the intake screens and into the water race system. This is the main reason that the river works costs have increased by more than 2.5 times since 2011.

4.1.4. Increased Insurance Costs – WIL insurance has increased by approximately 65% since 2011. They indicated back then that they have been advised that insurance premiums were likely to increase a further 50% in the future.

4.1.5. Length of Stock Water Races – The current length of water races in the District is approximately 760 kilometres. This has reduced from about 830 kilometres in 2011, predominantly due to the closure of water races in the Eyrewell Forrest due to converting the land to dairy farming and also through north Rangiora due to urbanisation. The irrigation system has also been extended in some locations and several stock water races have been realigned predominantly due to the installation of centre pivot irrigators.

4.2. On the whole it is considered by staff that the $38,236 increase (or approximately 18.5% increase), while substantial, is justified based on the changes to the network, increase in maintenance requirements and increase in insurance costs, since the last base payment adjustment.

4.3. WIL have indicated that they would like to commence a process to revisit the method of calculating the base payment to better reflect the actual cost of maintenance. This is likely to be an extensive process that will require some time to work through. Council staff agree that there is a need for this work given the amount of time and changes to the system since the original agreement was put in place in 1999.

4.4. The Management Team has reviewed this report and supports the recommendations.
5. COMMUNITY VIEWS

5.1. Groups and Organisations

5.1.1. No community groups have been sought on this matter.

5.2. Wider Community

5.2.1. The community have not been consulted on this matter.

6. IMPLICATIONS AND RISKS

6.1. Financial Implications

6.1.1. The $38,236 increase in the base payment under the Water Race Management Contract has already been allowed for in the 2018/19 budgets.

6.1.2. The budgets were revised as part of the Drainage & Stockwater – Staff Submission to the Draft 2019-20 Annual Plan, May 2019 (TRIM 190418057971) in anticipation of the increase.

6.1.3. The net increase in rates was approximately 6% as the increase in maintenance costs increase was offset against a reduction in budget for non-standard maintenance work (e.g.: flood mitigation works), which has not been required in recent years.

6.2. Community Implication

6.2.1. The additional work covered by this increase in payment will improve the actual physical maintenance of the races and improve the reliability of the supply.

6.3. Risk Management

6.3.1. The risks associated with this additional operational work are low and can be managed through standard practices.

6.4. Health and Safety

6.4.1. The works will be undertaken by the stockwater race maintenance contractor. A separate project is underway that considers the health and safety and traffic management aspects of requiring private landowners to maintain stockwater races in the road reserve in front of their properties.

7. CONTEXT

7.1. Policy

7.1.1. This matter is not a matter of significance in terms of the Council’s Significance Policy.

7.2. Legislation

7.2.1. The Local Government Act 2002 sets out the power and responsibility of local authorities, including the Council’s role in providing water race services.
7.3. Community Outcomes

7.3.1. Core utility services are provided in a timely and sustainable manner.

7.4. Delegations

7.4.1. Utilities and Roading Committee have the delegation to approve work that is within the budgetary constraints.
Attachment ii - WIL letter dated 18 October 2019
2 May 2019

Kalley Simpson  
3 Waters Manager  
Waimakariri District Council  
Private Bag 1005  
Rangiora 7440

Dear Kalley

**Water Race Management Contract Base Payment Reset Discussion**

As per our discussion this morning, the stock water contract is due for renewal in the 2020 financial year which commences 1 July 2019. In accordance with the ‘Agreement in Relation to Management of Water Race System’ (Agreement), the base payment is reset every three years with two CPI adjustments in between.

A spreadsheet is attached showing the base payment summary for the year ending 30 June for each year back to 2014. There is also a small summary table at the bottom of the spreadsheet which shows the stockwater contract payments back to 2011. The rows that have been highlighted represent those years where a reset has or should have been applied. You indicated you have a similar table going back to the beginning of the Agreement.

Schedule 1 of the Agreement outlines the basis for the contract payment, and while the Agreement was prepared in 1999 the payment structure remains largely the same. Though, at some stage between 2002 and 2011 the parties must have agreed on the current percentage splits.

Clause 2.3 of the Agreement states;

“….. the parties will enter negotiations with the intention of reaching agreement as to payments to be made by WDC to WIL under this Agreement for the following three year term. If the parties cannot reach agreement in relation to payments due for the following three year term by the relevant three year anniversary, the payment basis in this Agreement will continue to apply.”

Looking at the base payment calculations back to 2014, it would appear that condition 2.3 of the Agreement has not been met or applied, with the contract payment for each reset period not matching WIL’s actual costs.

Over the entire term of the Agreement, and certainly for the past six years operating costs have remained largely static with the exception of salaries and race maintenance.

Salaries are independently evaluated and adjusted annually to reflect market movement within the sector. In 2008 the irrigation network was upgraded, and as a result very little maintenance was required for the
following five to six years until it got to the stage where the annual maintenance budget of circa $70k was inadequate. In 2015 the annual maintenance budget was increased to $160k. This spend is spread across the entire network benefiting the delivery of stock water. In relation to race maintenance spend, it should be noted that this does not include the cost to maintain the Ngai Tahu water race network as they currently meet these costs.

WIL is generally satisfied with the current base payment method as the splits fairly represent actual effort and costs, so long as the base payment matches WIL’s actual costs. Unfortunately, this has not been the case for a number of years meaning that in order to meet the ‘intent’ of the Agreement, the catch-up payment will be quite significant. For example, the stock water calculation for the 2020 operating budget is $256,926 verses a current payment level of $208,263.

An alternative method for calculating the payment would be to link it to actual water usage. This is the same method currently used to calculate the proportion of rates WIL pays to WDC according to a variation to the licence that exists between the parties. Attached is the most recent report from PDP, you will see that the stockwater usage based on a rolling average was 30% for the period.

For the purposes of this discussion, the 30% split has then been applied to the base payment calculation (the right-hand table). Not surprisingly this method produces a similar total.

If this alternative method for calculating the annual payment was adopted, then on 1 August this year we would present to the Council a calculation showing the actual stockwater usage through Browns Rock for the period 1 July 2018 to 30 June 2019, along with the actual costs for the corresponding period with the percentage applied. This would become the contract payment for the financial year 2020. On 1 August 2020 the exercise would be repeated. While it is essentially a retrospective payment, you would have an ‘actual cost’ to present for budgeting purposes.

When we met last week, I mentioned a 16% gap which is correct for the financial year ending 2018. In giving you an indication of what the payment might look like for the YE 2020, the 2020 budget figures have been used (this is being presented to the Board for approval on 6 May) noting the only material increase is wages.

As discussed, we have also presented the ‘alternative’ method for a comparison. Both methods produce a similar outcome, and this is the order of increase we will be applying to the Council for which we believe is fair and consistent with the current Agreement. Please note, there has been no provision included in the calculation to meet an increase in service levels should this be the direction the Council is heading.

I am happy to discuss this with you and I hope it provides you with enough detail for your report this afternoon.

Regards

Brent Walton
Chief Executive Officer

Attached:
- PDP annual water usage calculation
- Base payment calculation spreadsheet
18 October 2019

Kalley Simpson
3 Waters Manager
Waimakariri District Council
Private Bag 1005
Rangiora 7440

Dear Kalley

Water Race Management Contract Base Payment Reset Discussion

Thank you for your email of 10 October 2019 and our meeting of 15 October 2019. I have spent some time working back through our correspondence and agree that there is documentation missing from the 2015/2016 and 2016/2017 years, with the exception of the WIL letter of 29 April 2015 and your reply of 11 May 2015.

The table below is the income that WIL has received for the respective year-ending periods of 30 June. Prior to June 2013, the income received does not quite align with the amounts discussed in the correspondence, but given the time lapse, the differences are of little significance.

In mid-2015 discussions were held regarding the ‘2015 reset’, but it would appear WIL overlooked your request for information on 11 May 2015. There are no records to show the increase from $189,338 to $199,008 or the reason behind it. We can only assume both parties were happy with the arrangement.

<table>
<thead>
<tr>
<th>Year</th>
<th>Actuals</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>30/06/2011</td>
<td>$164,544</td>
<td></td>
</tr>
<tr>
<td>30/06/2012</td>
<td>$178,303</td>
<td></td>
</tr>
<tr>
<td>30/06/2013</td>
<td>$184,876</td>
<td>letter 3 July 2013</td>
</tr>
<tr>
<td>30/06/2014</td>
<td>$186,540</td>
<td></td>
</tr>
<tr>
<td>30/06/2015</td>
<td>$189,338</td>
<td>letter 4 July 2014</td>
</tr>
<tr>
<td>30/06/2016</td>
<td>$189,338</td>
<td></td>
</tr>
<tr>
<td>30/06/2017</td>
<td>$199,008</td>
<td></td>
</tr>
<tr>
<td>30/06/2018</td>
<td>$203,386</td>
<td>letter 23 June 2017</td>
</tr>
<tr>
<td>30/06/2019</td>
<td>$206,437</td>
<td>letter 29 August 2018</td>
</tr>
</tbody>
</table>

Reset Discussion

On 2 May 2019 we presented you with a discussion paper and spreadsheet showing a revised base payment calculation based on WIL’s 2020 budget. Following our recent discussions and your email of 10 October 2019, I have revisited the base payment calculation, but instead of using 2020 forecast figures I have used the actual
figures from WIL’s management accounts for the year ending 30 June 2019 which have been recently signed off by the auditors. It is the 30 June 2019 actuals that we propose to use as the basis for the reset calculation.

I have also gone through each item to ensure the costs are ‘like for like’ as agreed to in 2011. Where an item shows a material increase from 2011 an explanation is provided.

Vehicles

WIL runs a fleet of five vehicles, but only four are directly related to the stockwater contract. An adjustment has been made to reflect this (Total cost divided by 5 times 4 or 80% of the total cost)

Depreciation

Each vehicle is itemised on the depreciation schedule, and the amount shown is the total of the four vehicles.

Racemen Salaries

Salaries are reviewed annually and independently by nationwide remuneration specialists Strategic Pay. Salaries are market evaluated against 500+ roles within the private sector of the Canterbury region. The salaries paid to WIL employees are consistent with those paid by other irrigation schemes.

Weekend, callout and overtime payments are deducted from the total including an adjustment for holiday pay.

River Works

The cost of river works does vary from year to year and is largely dependent on where the main braid sits in relation to Browns Rock.

Race Maintenance

This cost relates directly to race maintenance (it does not include, gates, turnouts and structures). In 2016 the Company recognised race maintenance had been severely underfunded. The doubling of the R&M budget from $70k to $160k +/- has significantly increased delivery reliability. It is difficult to ‘un-couple’ stockwater from this equation.

Professional Services

There is an increase in compliance requirements from ECan and this is reflected in the PDP costs. Only the costs directly related to managing the Water Take and Use Consent (CRC166677) have been included.

Directors Fees

Fees are independently reviewed, and market evaluated. A formal review is carried out every three years with a CPI adjustment in the interim years.

Insurance

The insurance policies have not changed since 2011. The costs reflect general market increases.

Regards

Brent Walton
Chief Executive Officer
1. SUMMARY

1.1 This report summarises baseline water quality data for urban stormwater areas of Rangiora, Woodend, Kaiapoi, and Oxford, and raises issues identified. Comparison was made to exceedance levels in Schedule 5 of the Canterbury Land and Water Regional Plan, (LWRP), or the ANZECC Water Quality Guidelines for Fresh and Marine Water Quality, (2000).

1.2 Waimakariri District Council undertook baseline water quality sampling in 2014 (Rangiora) and 2016 (Woodend, Kaiapoi, Oxford) to inform network stormwater discharge consent applications.

1.3 It should be noted that water quality sampling carried out by Waimakariri District Council was for a limited time period (either 2014 or 2016), therefore results should be noted with caution that they may not be representative of the current state. WDC stormwater monitoring programmes, which are a condition of the comprehensive network discharge consents, will provide more information on general water quality and the source of contaminants.

1.4 In general, a number of the contaminants are sourced rurally and the guidelines are exceeded prior to entering an urban area. However for some contaminants there was an increase in concentration through the urban area, indicating that the urban discharges also contain these contaminants.

1.5 It is recommended that contaminants such as E. coli, and phosphorus should be investigated further by Environment Canterbury within the rural part of each catchment. It is also recommended that Environment Canterbury consider investigating nitrogen contamination sources in the rural areas as rural catchments consistently exceed the ANZECC guidelines for Total Nitrogen.

1.6 As expected, moderate rain events (such as a ‘first flush’ event) were when exceedances of contaminants were often measured.

1.7 The draft National Policy Statement for Freshwater Management (NPS-FM, 2019) proposes a more stringent National Bottom Line for Dissolved Inorganic Nitrogen (1.0 mg/l) than the exceedance levels for receiving environments that are ‘spring-fed – plains – urban’ currently in the Canterbury Land and Water Regional Plan (1.50 mg/l). Water quality...
standards in Stormwater Network Discharge Consents may be updated, when the Land and Water Regional Plan incorporates changes from a finalised NPS-FM.

1.8 Environment Canterbury also undertakes regular water quality sampling in some of the downstream receiving environments, which has also been summarised in this report where applicable, with data sourced from the Land and Water Aotearoa website. In general, Environment Canterbury data shows that Total Nitrogen levels and trends are of concern in monitored waterways downstream of urban areas. Environment Canterbury does not sample for contaminants commonly from urban environments, such as copper and zinc.

1.9 Specific issues identified from the WDC baseline water quality results include:

**Rangiora**

1.1.1. Most exceedances of contaminants occurred during a moderate wet weather event (in May), which was much larger than a first flush rainfall event.

1.1.2. The Middle Brook catchment, in particular, was identified by WDC staff to require further investigation into sources of zinc.

**Woodend**

1.1.3. Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Most exceedances of contaminants levels (as per the LWRP) occurred in a first flush rainfall event (December 2016), which was the largest rainfall event captured during the sampling period. Phosphorus and *E. coli* were found to be urban and rural-sourced in Woodend.

**Kaiapoi**

1.1.4. Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Most exceedances occurred from a first flush rainfall event, (December 2016 sampling round), which was the largest rainfall event captured during the sampling period.

**Oxford**

1.1.5. Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Most exceedances occurred from a first flush rainfall event, (December 2016 sampling round), which was the largest rainfall event captured during the sampling period. Some exceedances were also during a minor wet weather event in August 2016.

1.1.6. Exceedances of zinc and copper, possibly from a rural overland flow that enters the Findleys Drain, has been identified by WDC staff as a ‘hot spot’ for follow-up investigations in conjunction with Environment Canterbury staff.

Attachments:

i.  Rangiora Stormwater Quality Monitoring Baseline Programme (Trim 140728079529)
ii. Woodend Stormwater Quality Monitoring Baseline Report (Trim 180822095021)

Note: the Oxford Stormwater Network Quality Baseline Monitoring Report is yet to be completed

2. **RECOMMENDATION**

**THAT** the Utilities and Roading Committee:
(a) **Receives** report No. 190618085491.

(b) **Notes** the issues raised in stormwater quality baseline monitoring reports, summarised in this report, for:

   i. Rangiora (TRIM 140728079529);

   ii. Woodend (TRIM 180822095021);

   iii. Kaiapoi (TRIM 190709096637); and

   iv. Oxford (report to be completed).

(c) **Notes** that WDC staff are investigating some issues raised by the stormwater quality baseline monitoring results, in conjunction with Environment Canterbury staff where appropriate.

(d) **Notes** that a report on the progress on the stormwater network discharge consent applications, associated monitoring programmes, and proposal for data management will be presented to the Utilities and Roading Committee in early 2020.

(e) **Notes** that budget allocation for urban stormwater quality improvements is included in the current budgets from 2025/26 onwards.

(f) **Circulates** this report to the Waimakariri Water Zone Committee, Land and Water Committee, and Community Boards.

3. **BACKGROUND**

3.1. Environment Canterbury requires each of the Territorial Authorities within the Canterbury region to submit comprehensive urban stormwater network discharge consents for all major towns in each district. The Rangiora urban stormwater discharge consent application, was the first to be lodged in the Waimakariri District in May 2018. Woodend was lodged in June 2019, with Kaiapoi and Oxford soon to follow by the end of 2019. Consent application requires the Waimakariri District Council (WDC) to propose a stormwater monitoring programmes for each urban area. The monitoring programmes focus on the urban stormwater discharge impact on the waterway, however also includes stream health water sampling and stream ecological surveys to characterise the receiving environment.

3.2. As a condition of the stormwater network discharge consents, more comprehensive stormwater quality will be carried out from 2020-2025. The results of this monitoring will be the basis for allocation of $20 million that has been budgeted for stormwater improvements in 2025-2035 (see Figure 1).
WDC has undertaken baseline sampling programme, with the purpose of identifying the source of the waterway contaminants (see Table 1) and the current health of the waterways. Four sample rounds were completed, in both wet (including first flush) and dry conditions for each urban area.

3.3.1. In Rangiora, eight sites were sampled for Rangiora in the North Drain, North Brook, Middle Brook and South Brook.

3.3.2. In Kaiapoi, twelve sites were sampled for the baseline sampling programme in following waterways, Silverstream, Kaiapoi River, Kaikanui Stream, Cam River, Courtenay Stream and the McIntosh Drain.

3.3.3. In Woodend, seven sites were sampled in the Taranaki Stream, Waiora Stream, McIntosh Drain, Box Drain and a channel adjacent to the state highway at the south of Woodend

3.3.4. In Oxford, seven sites were sampled in the Findleys Drain, Main Drain, Pearsons Drain and Flannigans Drain.

3.4. Oxford differ from the other town centres (Rangiora, Woodend and Kaiapoi), in that it has some drains with hill-fed runoff, as well as some plains runoff and spring-fed flows. The drains in Rangiora, Woodend and Kaiapoi primarily receive plains runoff with a spring-fed baseflow. Hill-fed waterways have different exceedance values to plains-fed in Schedule 5 of the LWRP.

3.5. From 2009-2014, WDC undertook water quality sampling in the Taranaki Stream and Greigs Drain. These results have not been presented in this report.

Sources of contaminants

Table 1: Sources of common urban contaminants.

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Major Contributing Activities (within Urban Limits)</th>
</tr>
</thead>
</table>

Figure 1: Stages for stormwater quality monitoring and improvements
| **Total Suspended Solids (TSS)** | Sediment distributed via roads  
Earthworks and construction  
Residential gardening/soil disturbance  
Break down of organic material (e.g. leaf litter) in the kerb and channel  
Airborne particulates  
Sewage overflows |
|---|---|
| **Dissolved zinc** | Commercial and residential roofs (unpainted/ deteriorating galvanised)  
Vehicle use on roads – including vehicle tyre wear |
| **Dissolved copper** | Vehicle brake pads  
Industrial machinery operations and construction  
Exterior building surfaces (facades, down pipes, spouting) |
| **E.coli** | Wastewater overflows – human urban source  
Avian (bird droppings into open drains or urban properties) – natural urban/rural source  
Canine or feline (dog or cat faecal matter) – largely urban source  
Ruminant (cattle/sheep/deer droppings) – rural source |
| **Hazardous substances** | Industrial activities – various chemicals, risk of spills and leaks  
Residential activities (disposal of oil and paint residues, fuel leaks etc.)  
Hydrocarbons from vehicle use on roads and driveways |
| **Dissolved lead** | Dissolved lead primary sources include but are not limited to road runoff (auto parts) and construction wastes (paints). |
| **Nitrogen (i.e. nitrate, nitrite, ammonical – N, and Total Kjeldahl Nitrogen)** | Nitrogen primary sources include but are not limited to fertilizers and sewerage.  
Note: Total Nitrogen is the sum of TKN + Nitrate-N + Nitrite-N and DIN is the sum of Total Ammoniacal-N + Nitrate-N + Nitrite-N. |
| **Phosphorus** | Phosphorus primary sources include but are not limited to fertilisers and sewage. Phosphorus tends to attach to soil particles and moves into surface-water bodies from runoff. |
4. **ISSUES AND OPTIONS**

4.1. WDC staff have assessed what will be addressed as a rural and/or urban contaminant for each of the network stormwater discharge consent applications (Table 2). WDC could be challenged to meet guideline levels of phosphorus and *E. coli*, if the guideline values are used as a consent condition, due to the significant rural contributions of phosphorus and *E. coli*.

Table 2: Definition by WDC staff of rural and/or urban primary contaminant sources for WDC network stormwater discharge consent applications. (Note: this classification is based on limited sampling, and includes assumptions made by WDC staff).

<table>
<thead>
<tr>
<th></th>
<th>TSS</th>
<th>Dissolved zinc</th>
<th>Dissolved copper</th>
<th><em>E. coli</em></th>
<th>Dissolved Reactive Phosphorous</th>
<th>DIN</th>
<th>Total Ammoniacal Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangiora</td>
<td>Urban/Rural</td>
<td>Urban</td>
<td>Urban</td>
<td>(Urban) / Rural</td>
<td>(Urban) / Rural</td>
<td>Rural</td>
<td>Rural</td>
</tr>
<tr>
<td>Kaiapoi</td>
<td>Urban/Rural</td>
<td>Urban</td>
<td>Urban</td>
<td>(Urban) / Rural</td>
<td>(Urban) / Rural</td>
<td>Rural</td>
<td>Rural</td>
</tr>
<tr>
<td>Woodend</td>
<td>Urban/Rural</td>
<td>Urban</td>
<td>Urban</td>
<td>(Urban) / Rural</td>
<td>(Urban) / Rural</td>
<td>Rural</td>
<td>Rural</td>
</tr>
<tr>
<td>Oxford</td>
<td>Rural</td>
<td>Urban</td>
<td>Urban</td>
<td>(Urban) / Rural</td>
<td>(Urban) / Rural</td>
<td>Rural</td>
<td>Rural</td>
</tr>
</tbody>
</table>

4.2. Lead and Total Hydrocarbon levels were far below guideline values in surface water samples. Therefore they are not considered priority contaminants for future surface water sampling, but will be sampled in stream bed sediments and stormwater basins where they may potentially accumulate.

4.3. Management of WDC water quality data is recommended to be improved with automation of data management processes, and an examination of what database will be fit for purpose with increased water quality monitoring for urban stormwater network consent compliance.

4.4. **Rangiora**

4.4.1. It was found that the bulk of the contaminants are sourced rurally and the guidelines are exceeded prior to the township. However for some contaminants there was an increase in concentration through the township, indicating that the urban area discharges these contaminants also, but in smaller quantities.

4.4.2. The concentrations of contaminants discharging from springs sometimes exceeded the guidelines, particularly for nutrients in the Middle Brook. These springs source groundwater from rural recharge areas.

4.4.3. The baseline monitoring has shown that the rural areas have a significant impact on the health of the Rangiora waterways, and possibly others in the district. It is recommended that Environment Canterbury undertakes monitoring upstream of the townships to identify the source of these contaminates as many contaminant concentrations are exceeded prior to the urban limits.

4.4.4. Generally the TSS concentrations were below the LWRP guideline value, though they are increasing through the township, indicating that the township is contributing suspended solids to the waterways. The North Brook is the exception, where higher TSS concentrations seemed to be discharging from a water race.
This water race has now been closed. As TSS concentrations were not elevated, TSS is not predicted to be adversely affecting aquatic life.

4.4.5. Generally the dissolved copper concentrations increased within the township; although it is also noted that the rural runoff appears to have copper concentrations higher than the guideline values. Dissolved copper is a proven urban contaminant and the 2014 WDC baseline programme has shown that the concentrations can exceed the guidelines in high runoff events.

4.4.6. The LWRP guideline for zinc (0.015mg/L) was exceeded in many of the wet weather sample rounds. In the dry weather sample round the dissolved zinc concentrations did not exceed the guideline value. Generally the dissolved zinc concentrations in the township, although is also noted that the rural runoff appears to have zinc concentrations higher than the guideline values. The Middle Brook catchment, in particular, was identified by WDC staff to require further investigation into sources of zinc. Conclusions are that the zinc is likely to be discharging from older housing and unfiltered road runoff from busy roads.

4.4.7. The ANZECC guideline for Total Nitrogen (0.614mg/L) was exceeded generally in both the dry and wet weather samples. For Dissolved Inorganic Nitrogen the LWRP guideline (1.5mg/L) was generally exceeded in both the dry weather sample (June) and the wet weather sample (May). Results indicated that nitrogen is not an urban contaminant. The nitrogen levels in the North Brook and South Brook are higher in the dry weather flow sample round than the wet weather samples. This indicates that spring heads are potentially contributing nitrogen to the Brooks.

4.4.8. The ANZECC guideline for Total Phosphorus (0.033mg/L) and the LWRP guideline for Dissolved Reactive Phosphorus (0.016mg/L), were exceeded generally in the wet weather samples. Results indicated that phosphorus can be an urban contaminant. An increase in concentrations of phosphorus through the township are thought to be caused by spring inflow and mobilising of the bed sediments in high runoff conditions.

4.4.9. Results suggest that rural runoff is a main contributor of *E. coli*, but also urban runoff to some degree, with concentrations of *E. coli* increasing through the urban area. During dry weather days there are generally very low levels of *E. coli* in the waterways, indicating that the springs do not contribute *E. coli* to the waterways. It is recommended that Environment Canterbury undertakes further monitoring of the rural catchments to locate the sources of *E. coli*.

4.4.10. Downstream of the Rangiora urban area, Environment Canterbury regularly monitors water quality of the South Brook, North Brook, and Cam River at Marshes Road, and the Cam River at Bramleys Road. Total Nitrogen is generally at levels that place the Cam River and its tributaries in the worst 50% compared to similar waterways in Canterbury, and showing a likely trend of degrading (except the South Brook with no trend found). Total Phosphorus and Dissolved Reactive Phosphorus have generally been showing significant trends of improving, except at the Cam River at Bramleys Road where there is no significant trend. Turbidity and *E. coli* are also very likely to be degrading, however the waterway is placed in the top 50% of similar waterways. There is no trend for Total Phosphorus.
4.5. **Woodend**

4.5.1. It is recommended that contaminants such as *E. coli*, and phosphorus should be investigated further by Environment Canterbury within the rural catchment. Both of these contaminants exceed the LWRP guidelines in the rural zones, upstream of the urban limits.

4.5.2. Phosphorus was found to be more of an issue in Woodend’s waterways than nitrogen. In contrast to the distribution of nitrogen, it is the urban-fed waterways that demonstrate higher levels of phosphorus than the rural waterways, which may indicate wastewater overflows or wastewater to stormwater cross connection. The majority of phosphorus in the samples is in the form of Dissolved Reactive Phosphorus (DRP), the more readily bioavailable form, rather than particulate or organic forms. This indicates the majority of phosphorus entering the stream is in a form which could readily contribute to eutrophication. TSS levels have a strong linear correlation with DRP and a noticeably weaker correlation with Total Phosphorus suggesting entrainment of sediment is not the main contributor to elevated levels of phosphorus.

4.5.3. There was a spike in zinc concentration in a minor rain event (August 2016), west of Rangiora Woodend Road (Box Drain). This is thought by WDC staff that it could be related to the low base flow (i.e. stagnant water) in this drain.

4.5.4. A ‘hot spot’ area for Total Phosphorus, Dissolved Reactive Phosphorus, and Dissolved Zinc was found during a moderate rainfall event (December 2016) at the corner of Woodend Beach and Main North Road. This is thought by WDC staff to possibly be due to vehicle traffic on State Highway 1, including potential disbursement of soil by truck wheels moving on and off nearby major roads. However, test results to-date cannot definitively confirm the cause.

4.5.5. The concentrations of *E. coli* in the 2016 samples exceed the guideline values in 24% of the samples captured. Exceedances were particularly prevalent in the first flush event seen in December. Aside from the December event, the smaller October rain event was the only other event to result in an exceedance of the guideline value. The sites sampled during the minor wet weather event in August and dry weather event in September both demonstrated levels of *E. coli* comfortably below the guideline value.

4.5.6. Although less than half the guideline value, it is worth noting that the two sites in the Taranaki Stream demonstrated the highest and most consistent base levels of *E. coli* levels observed during dry events. This is likely to be the result of consistent contamination upstream from rural areas. The urban areas generally exhibited low to no *E. coli* during dry weather events with extremely high levels after the first flush event in December.

4.5.7. Downstream of the Woodend urban area, Environment Canterbury monitors water quality in the Taranaki Stream at Preecees Road. Total Nitrogen is showing a degrading trend and the stream is in the worst 50% when compared to similar waterways. *E. coli*, Ammoniacal- Nitrogen and Turbidity trends are significantly improving, however the stream is also in the worst 50% when compared to similar waterways for these attributes. Total Phosphorus and Dissolved Reactive Phosphorus trends are significantly improving.

4.6. **Kaiapoi**

4.6.1. Total suspended solids tended to be relatively low in Kaiapoi waterways, except for sites that are possibly influenced by tidal and/or tailwater from the Waimakariri River during high flows. Results showed that TSS is mainly an urban contaminant.
4.6.2. Copper was only detected almost exclusively in the first flush (December 2016) event. The results suggest inflows from Woodend (via McIntoshs Drain) and runoff from the State Highway One are contributing copper to Kaiapoi waterways. The Oaks Reserve site, the only sample site to show detectable levels outside of the first flush (December 2016) event, is directly downstream of a Kaiapoi industrial area and is downstream of State Highway 1 roadside drainage. The results show that copper is mainly an urban contaminant.

4.6.3. Dissolved Zinc is present in the majority of the urban-fed waterways however at relatively low concentrations at most of these sites. The notable exception to this is at the Oaks Reserve site on the Kaikanui Stream which significantly exceeded the guideline during both the wet weather events (August and December 2016). The results show that zinc is mainly an urban contaminant.

4.6.4. Dissolved Inorganic Nitrogen and Total Nitrogen shows elevated levels in the rural-sourced waterways such as Silverstream, Kaiapoi River and Courtenay Stream.

4.6.5. Phosphorus levels were highest in the first flush event (December 2016). Urban-fed waterways demonstrated higher levels of phosphorus (Total Phosphorus and Dissolved Reactive Phosphorus) than the rural waterways. Sample sites in Silverstream and upper site on the Cam River returned TP and DRP levels below the guideline levels whereas the urban fed waterways all demonstrated phosphorus levels in exceedance of the guidelines.

4.6.6. Environment Canterbury monitors water quality in the Silverstream (Kaiapoi River) at Island Road, which passes through the suburb of Silverstream, but is upstream of the majority of the Kaiapoi township. *E. coli* and Total Nitrogen are both of concern, with levels that place the waterway in the worst 25% of similar waterways, and degrading trends. Turbidity and Total Phosphorus trends are significantly improving. There is limited water quality monitoring in the Kaiapoi River downstream of Kaiapoi, due to the tidal nature of the waterway (only recreational monitoring of *E. coli* each summer).

4.7. Oxford

4.7.1. Oxford had a higher level of exceedances for particular contaminants than for the other town centres, particularly for Total Suspended Solids, Total Phosphorus, zinc and copper. This is thought to possibly be due to issues such as point source contamination from private land uses and / or wastewater entering the stormwater network, such as through a cross-connection.

4.7.2. Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds (for example Total Nitrogen, Ammoniacal-Nitrogen, *E. coli*, Total Phosphorus, Zinc and Total Suspended Solids). Most exceedances occurred from a first flush rainfall event, (December 2016 sampling round), which was the largest rainfall event captured during the sampling period. Some exceedances were also during a minor wet weather event in August 2016.

4.7.3. There is no Environment Canterbury water quality monitoring downstream of the Oxford urban area. There is an aquatic ecology health site that monitors macroinvertebrates on the Cust River at Tippings Road. This monitoring shows that the health of the waterway is fair, however there is trend that this health is likely degrading.

4.8. Pegasus

4.8. A comprehensive stormwater network discharge consent is already in place for the Pegasus urban area, therefore baseline water quality sampling has not been not carried
out. Due to the design standards used for Pegasus, it is not anticipated that there would be any significant stormwater discharge issues. Potentially fertiliser application could be contaminating stormwater. However, this has not been investigated.

Next Steps

4.9. Next steps for WDC staff is to complete lodgement of the Kaiapoi and Oxford stormwater network discharge consents, and continue working on any point source issues identified from the sampling. A future report to the Utilities and Roading Committee, to be drafted early in 2020, will examine budget allocation in the Long Term Plan for stormwater improvements. These improvements are anticipated to be implemented from 2025-2035.

4.10. Reallocation of staff time, or additional staff resourcing is anticipated at this early stage to be able to lead the stormwater monitoring programmes, and implement stormwater improvement work for issues identified. As a recognition of the increasing resourcing needed for stormwater resourcing, the Stormwater Engineer position was created within the 3 Waters team in 2019.

4.11. The Management Team have reviewed this report and support the recommendations.

5. COMMUNITY VIEWS

5.1. Groups and Organisations

5.1.1. This report will be circulated to the Waimakariri Water Zone Committee and Community Boards for their information and feedback.

5.2. Wider Community

5.2.1. There has been no consultation to-date for the wider community regarding the results and implications of baseline stormwater quality monitoring results. WDC has contacted one landowner of a property that has been identified as potential point sources of contaminants, with a few other individual potential point sources to be followed-up.

5.2.2. Contaminant reductions will require future widespread community behaviour change and public support. The stormwater network discharge consent applications propose that modelling is undertaken of sources of diffuse contaminant discharges prior to 2025. This will inform future actions needed to reduce the diffuse contaminant discharges.

5.2.3. A further role for widespread community response is in reduction of urban sources of sediment and other common household or business contaminants such as litter, detergents or other waste substances discharging into waterways. Proposals are being developed to address these various discharges with reductions implemented via consent conditions and education programmes. Many of these required changes can be most effectively led at a national level.

6. IMPLICATIONS AND RISKS

6.1. Financial Implications

6.1.1. There will be significant costs in order to meet water quality standards in Network Stormwater Discharge Consents, therefore $20 million has been allocated in the Long Term Plan for 2025-2035. These costs could increase, for example if National Bottom Lines in the National Policy Statement for Freshwater Management set more stringent levels, such as proposed for Dissolved Inorganic
Nitrogen. The actual cost implications of the NPS-FM will become more apparent over time.

6.1.2. The financial implications of the Network Stormwater Discharge Consent monitoring programmes, investigations and stormwater improvements will be presented to the Utilities and Roading Committee in a report in early 2020. This report is for information only.

6.2. **Community Implications**

6.2.1. The baseline stormwater water quality monitoring programme has highlighted that there are exceedances of guideline values. This will have an impact for the community; both for ratepayers to fund stormwater improvements to meet consent conditions, and also through behaviour changes/ changes to private land use that can improve stormwater quality.

6.3. **Risk Management**

6.3.1. The baseline network stormwater consent monitoring has successfully informed monitoring programmes proposed in the consent applications, by providing a basis to assess contaminants that are an likely to exceed guideline values, and assess whether contaminants have rural and/or urban contaminant sources.

6.4. **Health and Safety**

6.4.1. There are no health and safety considerations arising from this report.

7. **CONTEXT**

7.1. **Policy**

7.1.1. This matter is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

7.2. **Legislation**

7.2.1. (Resource Management Act 1991) – WDC has applied for comprehensive network stormwater discharge consents to meet Section 15 of the RMA, and rules in the Canterbury Land and Water Regional Plan.

7.3. **Community Outcomes**

7.3.1. There is a healthy and sustainable environment for all

7.3.2. Harm to the environment from the impacts of land use, use of water resources and air emissions is minimised.

7.3.3. Cultural values relating to water are acknowledged and respected.

7.3.4. Harm to the environment from the spread of contaminants into ground water and surface water is minimised.

7.4. **Delegations**

7.4.1. This report is for information only.
Rangiora Comprehensive Stormwater Consent:

Stormwater Quality Monitoring Baseline Programme

Prepared by the Project Delivery Unit
September 2014
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1. **SUMMARY**

1.1. **INTRODUCTION**

The Rangiora Stormwater Consent, the first of such in the Waimakariri District, will be prepared in conjunction with a stormwater management plan (SMP). This requires the Waimakariri District Council (WDC) to produce a stormwater monitoring programme. This monitoring programme focuses on the urban stormwater discharge impact on the waterways, as opposed to general stream health.

Ecan requested that the WDC undertakes a baseline sampling programme before defining the parameters of the monitoring programme to demonstrate to all parties the source of the waterway contaminants and to gauge the current health of the Rangiora waterways. The purpose of this report is to present the findings from this baseline sampling programme and recommend the parameters that should be carried forward to the ongoing stormwater monitoring programme.

Four sample rounds have been completed, in both wet and dry conditions, at 8 sites in the North Drain, North Brook, Middle Brook and South Brook. The results from each of these rounds has been summarised along with suggested potential sources of each contaminant.

1.2. **BACKGROUND**

The stormwater monitoring programme has been designed to identify potential areas of urban stormwater impact on the Rangiora receiving waters. The trends formed from the monitoring programme analysis can be used to direct stormwater treatment activities, within the Rangiora urban limits.

The current stormwater monitoring programme has four sections: visual inspections, urban stormwater impact, stormwater basin monitoring and stream health monitoring.

Visual inspections, urban stormwater impact and stormwater basin monitoring will all form part of the Rangiora comprehensive stormwater discharge consent, with consent management objectives seeking to address any exceeded values.

The stream health monitoring will be included within the comprehensive stormwater discharge consent, however the parameters will not have consent management objectives associated with them, i.e. this information will be utilised for other Council projects, such as stream enhancement programmes, as these additional parameters are not considered to be primarily contributed by urban stormwater discharge.

This investigation looks at water quality samples, which will only affect the urban impact and stream health sections of this monitoring programme.

1.3. **METHODOLOGY**

Four water sampling rounds were undertaken by the WDC Water Unit and analysed by the WDC Project Delivery Unit. The sampling occurred approximately monthly from February to June 2014.

The samples were collected using best practice methods and delivered directly to the laboratory after collection. The sample testing was undertaken by Hill Laboratories in Hamilton.

The Rangiora waterways were sampled at the following sites:

RRND012: North Drain, Coldstream Road (capturing solely urban contaminants).
RRNB017: North Brook, on the Northern side of Boys Road
RRNB036: North Brook, Lilybrook Park
RRNB055: North Brook, at Aspen Street Park
RRMB019: Middle Brook, on the Northern side of Denchs Road
RRMB029: Middle Brook, on the Western side of Bush Street
RRSB030: South Brook, on the West side of Railway Road
RRSB048: South Brook, on the East side of Townsend Road

The laboratory test included Total suspended solids, Dissolved copper, Dissolved lead, Dissolved zinc, Total Ammoniacal-N, Nitrate-N + Nitrite, Total Kjeldahl Nitrogen (TKN), Dissolved Reactive Phosphorus, Total phosphorous, E. coli and Total petroleum hydrocarbons. The portable probe measurements included Dissolved Oxygen, pH, Temperature and Conductivity.

1.4. RESULTS SUMMARY

The results concluded that the some of the contaminants can be removed from the monitoring programme, and some added. Table 1 summarises the recommended changes to the monitoring programme.

Table 1: Summary of contaminants recommended to be changed in the monitoring programme

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Source</th>
<th>Current Monitoring Programme Section</th>
<th>Recommended Monitoring Programme Section</th>
<th>Reason Section for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Copper</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Lead</td>
<td>-</td>
<td>Urban Impact</td>
<td>-</td>
<td>Very Low Concentrations, therefore recommended to remove it from the programme</td>
</tr>
<tr>
<td>Dissolved Zinc</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>-</td>
<td>DIN is in the LWRP, therefore it is recommended that we replace TN with DIN</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen</td>
<td>Rural</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Mainly Rural</td>
<td>Stream Health</td>
<td>-</td>
<td>DRP is in the LWRP, therefore it is recommended that we replace TP with DRP</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus</td>
<td>Mainly Rural</td>
<td>-</td>
<td>Stream Health</td>
<td>This was proven to be mainly a rural contaminant and be a contaminant that is monitored as part of the Wastewater Management plan.</td>
</tr>
<tr>
<td>E.Coli</td>
<td>Mainly Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td>Very Low Concentrations therefore recommended removing it from the programme. Total Hydrocarbons will remain in the basin sediment monitoring.</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>-</td>
<td>Urban Impact</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>-</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td>Initial one off sample recommended as overall indicator of contaminants.</td>
</tr>
<tr>
<td>Hardness</td>
<td>Rural or Urban</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
</tbody>
</table>
All of the contaminants were found to be in the appropriate monitoring programme category. Dissolved Lead and Total Hydrocarbons are recommended to be removed from the programme as they were consistently measured to be well below the guideline values.

It is recommended that Total Nitrogen and Total Phosphorus should be replaced with Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen as these are specified in the LWRP.

It was recommended by Ecan water quality specialists that the waterway hardness is measured once or twice to characterise the waterway. This will enable the WDC to get site specific trigger values for metals.

It was found that the bulk of the contaminants are sourced rurally and the guidelines are exceeded prior to the township. However for some contaminants there was an increase in concentration through the township, indicating that the urban area discharges these contaminants also, but in smaller quantities.

The concentrations of contaminants discharging from the springs exceed the guidelines, particularly in the Middlebrook. These springs source water from rurally sourced undercurrent and resurgence.

This study has shown that the rural areas have a significant impact on the health of the Rangiora waterways, and possibly others in the district. It is recommended that Ecan undertakes monitoring upstream of the townships to identify the source of these containments as many contaminant concentrations are exceeded prior to the urban limits.

1.5. CONCLUSION

The following conclusions were made in this investigation:

- Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. However most exceedances occurred in the May, a moderate wet weather event, which was much larger than a first flush rainfall event.

- It was found that generally the contaminants were present in both rural and urban environments, however the rural area was found to have a larger impact than the urban area and the guidelines were often exceeded prior to reaching the urban discharge points.

The following changes are recommended to the Stormwater Monitoring Programme:

- It is recommended that the contaminants are left in their proposed monitoring programme section. All of the contaminants were found to be in the appropriate monitoring programme section.

- It is recommended that Lead and Total Hydrocarbons are removed from the ‘urban impact’ section of the Stormwater Monitoring Programme, as the results indicated that the concentrations were consistently far below the guidelines.

- It is recommended that Total Nitrogen and Total Phosphorus should be replaced with Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen as these are specified in the LWRP.

- It is recommended that many contaminants such as E.Coli, Nitrogen and Phosphorus should be investigated further by Ecan within the rural catchment. These were significantly exceeding the LWRP guidelines in the rural zones, upstream of the urban limits.

After discussions with Ecan and MKT the Stormwater Monitoring Programme will be updated.
2. **INTRODUCTION**

Environment Canterbury (Ecan) has requested each of the Territorial authorities within the Canterbury region submit Global Stormwater Consents for all major towns in each district. The Rangiora Stormwater Consent, the first of such in the Waimakariri District, will be prepared in conjunction with a stormwater management plan (SMP). This requires the Waimakariri District Council (WDC) to produce a stormwater monitoring programme. This monitoring programme focuses on the urban stormwater discharge impact on the waterway, as opposed to general stream health.

During the steering group meeting with Mahaaunui Kurataiao Limited (MKT) and Ecan, in November 2013, a recommendation was suggested for the WDC to undertake a baseline sampling programme. The purpose of this was to demonstrate to all parties, the source of the waterway contaminants and the current health of the waterways.

Four sample rounds have been completed, in both wet and dry conditions, at 8 sites in the North Drain, North Brook, Middle Brook and South Brook. This report summarises the results from the study and suggests potential sources of the contaminants.

3. **BACKGROUND**

The stormwater monitoring programme has been designed to identify potential areas of urban stormwater impact on the Rangiora receiving waters. The trends formed from the monitoring programme analysis can be used to direct stormwater treatment activities, within the Rangiora urban limits.

Ecan has recommended that the WDC includes faecal coliform and portable probe measurements (such as dissolved oxygen, pH, temperature, specific conductance) to the urban stormwater impact monitoring, proposed to be sampled biannually.

If the WDC agrees to include these parameters, this would potentially raise the following issues:

1. Some of the sample parameters would be outside of the stormwater discharge consent scope, as they enter the network primarily from rural sources.
2. The cost of increased sampling; including collection, laboratory tests and results analysis.
3. Responsibility and resources for treating rural source contaminants are transferred to urban ratepayers, reducing the pressure from regulators applied to rural properties to mitigate their own adverse effects, and reducing available funding from urban ratepayers for proven urban contaminants such as copper or zinc.
4. The subsequent implications for other future urban consents within the Waimakariri District.

Therefore it was recommended that a 6 month baseline investigation be undertaken, and results used to assist determine the source of the contaminants and associated consent conditions.

3.1. **MKT AND ECAN INVOLVEMENT WITH THE COMPREHENSIVE CONSENT**

The WDC is working with MKT and Ecan to produce a comprehensive stormwater consent for discharge from the Rangiora urban stormwater network into the receiving waters. The WDC will be applying to Ecan for the consent, however currently MKT and Ecan are playing an advisory role recommending improvements on initiatives relating to the consent.

3.2. **RANGIORA AREA**

Rural land surrounds Rangiora Township. There is a high potential for the waterways within the urban limit to be impacted by rural activities.

Within the Rangiora urban limits there are three main receiving waters which receive urban stormwater; North Brook, Middle Brook and South Brook. These waterways have annual baseflow sourced from
springs and irrigation channels. These springs and irrigation channels source water from the upstream rural catchment.

The springs in Rangiora are a product of undercurrent and resurgence from the west of Rangiora. This is apparent through observations of the prevalent southeast direction of groundwater flow. These undercurrents are sourced from the upstream rural catchments, which can discharge rural contaminants within the urban area.

Figure 1 presents the WDC land zones surrounding Rangiora.

![Figure 1: WDC Zonings surrounding Rangiora](image)

The North Drain collects stormwater from the north Rangiora urban catchment. This waterway is ephemeral and therefore was only in flow in the wet weather baseline sampling rounds.

The North Brook originates from a rural irrigation channel and further is supplemented by several springs along the course.

The Middle Brook is sourced from springs originating within the Rangiora Township. The waterway flow is augmented by a pump, pumping spring water into the upstream end, so that there is always baseflow in this waterway. The Middle Brook is further supplemented by several other springs along the course.

The South Brook originates from three spring heads within the rural area. The waterway is also fed by several spring fed roadside drains and an irrigation channel.

Figure 2 is a map showing the known spring locations within the Rangiora urban limits, sourced from the Ecan database.
Figure 2: Known spring locations, sourced from the Ecan data base.

Figure 1 and Figure 2 show that all of the Brooks are sourced mainly from springs and urban runoff. It is noted that there are many springs that are not detailed in the Ecan data base, however these are difficult to locate as they emerge from many locations within the Brooks.

3.3. CURRENT PROPOSED STORMWATER MONITORING PROGRAMME

The stormwater monitoring programme has been designed to identify potential areas of urban stormwater impact on the Rangiora receiving waters. The trends formed from the analysis can be used to direct stormwater treatment activities, within the Rangiora urban limits.

Stormwater monitoring programme updates are recommended in this report.

This stormwater monitoring programme report specifies the following:
- Sample Locations
- Sample Parameters
- Sample Frequency

Based on the Canterbury Land and Water Regional Plan (LWRP), the WDC had proposed, prior to undertaking its baseline water quality survey, that the Rangiora stormwater monitoring programme include the following water quality monitoring parameters and frequency:
Visual inspections, urban stormwater impact and stormwater basin monitoring will all form part of the Rangiora comprehensive stormwater discharge consent, with consent management objectives applied to seek to address any exceeded values.

The stream health monitoring will be included within the comprehensive stormwater discharge consent, however the parameters will not have consent management objectives associated with them, i.e. this information will be utilised for other Council projects, such as stream enhancement programmes outside the scope of the consent, as these parameters are not considered to be primarily contributed by stormwater discharge.

This investigation looks at water quality samples, which will only affect the urban impact and stream health sections of this monitoring programme.

### 3.4. GUIDELINE VALUES

Water quality guidelines are used to identify if the WDC waterways are in a healthy condition. The guidelines have defined Trigger Levels for many different waterway contaminants.

The guidelines that are used to analyse the data are sourced from the following resources:

1. Canterbury Land and Water Regional Plan (2012) *(LWRP, Section 16, Schedule 5)*
2. ANZECC Water Quality Guidelines for Fresh and Marine Water Quality *(ANZECC, 2000)*

The LWRP gives a guideline to the level to which a ‘spring fed – plains urban’ Catchment should be striving to meet. However this guideline is quite brief, there are several contaminants that were sampled that are not in the LWRP. Therefore, although the LWRP will be the main guideline source the ANZECC guidelines will be used if LWRP does not provide a guideline value for any parameter considered essential to the consent.
The guidelines that are being compared to the contaminant concentration are specified.

4. METHODOLOGY

The proposed baseline study aimed to confirm whether the parameters outlined in the proposed monitoring programme are from primarily rural or urban sources.

Four water sampling rounds were undertaken by the WDC Water Unit and analysed by the WDC Project Delivery Unit. The sampling occurred approximately monthly from February to June 2014.

The samples were collected using best practice methods and delivered directly to the laboratory after collection. The sample testing was undertaken by Hill Laboratories in Hamilton.

4.1. SAMPLE LOCATIONS

To assess baseflow (DWF) contaminant concentrations and runoff contaminant concentrations (WWF), sample sites have been selected to be within the receiving waters.

To make this baseline sample programme more efficient and affordable for the WDC, 8 sites were sampled; 3 in the North Brook, 2 in the Middle Brook, 2 in the South Brook and 1 on the North Drain. These sites were selected from the urban stormwater impact sites, so that the data is comparable in the future.

The proposed sample points were situated at either the upstream edge of the urban limits (or at the stream source), and the downstream edge of the urban limits. The change in concentration of contaminants in the receiving waters will enable the WDC to assess the contaminants contributed by the urban area.

The sample locations are as follows; the site number relates to Figure 3:

RRND012: North Drain, Coldstream Road (capturing solely urban contaminants).
RRNB017: North Brook, on the Northern side of Boys Road
RRNB036: North Brook, Lilybrook Park
RRNB055: North Brook, at Aspen Street Park
RRMB019: Middle Brook, on the Northern side of Dench’s Road
RRMB029: Middle Brook, on the Western side of Bush Street
RRSB030: South Brook, on the West side of Railway Road
RRSB048: South Brook, on the East side of Townsend Road

See Appendix A for more information on the sample locations; including descriptions, GPS locations and sampling location photographs.

Figure 3 presents a map of the proposed baseline sample sites.
Figure 3: Sample sites for the Baseline Monitoring Programme.
4.2. SAMPLE PARAMETERS

The water quality parameters that were sampled as part of this baseline study are as follows:

Laboratory tests
- Total suspended solids
- Dissolved copper
- Dissolved lead
- Dissolved zinc
- Total Ammoniacal-N
- Nitrate-N + Nitrite
- Total Kjeldahl Nitrogen (TKN)
- Dissolved Reactive Phosphorus
- Total phosphorous
- E. coli
- Total petroleum hydrocarbons

Portable probe measurements
- Dissolved oxygen
- pH
- Temperature
- Conductivity

Dissolved oxygen, pH, temperature and specific conductance can be sampled using portable water quality devices. The WDC water unit currently has access to an YSI multi-probe used in past stormwater monitoring exercises.

4.3. FREQUENCY

The samples were retrieved approximately every month, so that four sample rounds are undertaken before June 2014. Wet and dry weather days were selected so the source of the contaminants could be separated into spring discharge and/or runoff contaminants.

The following list presents the selected sampling days;

1. February 13th 2014, sampling commenced at 9:00am
2. March 26th 2014, sampling commenced at 9:00am
3. May 14th 2014, sampling commenced at 9:00am
4. June 4th 2014, sampling commenced at 1:00pm
5. RESULTS

5.1. SAMPLING WEATHER CONDITIONS

First flush events give the best measure of runoff contaminants. As first flush events are statistically infrequent, getting a first flush event within the baseline monitoring programme period was predicted to be difficult. Therefore samples were retrieved in dry conditions and wet conditions; although the sample round in February fitted the first flush parameters.

Table 3 presents a summary of the rainfall prior to the water quality sampling; the rainfall data was taken from the Ayres Street, Rangiora WDC rainfall gauge.

Table 3: Presents a description of the conditions on each of the Baseline sampling days

<table>
<thead>
<tr>
<th>Date</th>
<th>Weather Conditions</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 13th</td>
<td>Dry weather when sampling, 22 mm of rain in the 24 hours before the sample, no rainfall 72 hours prior to that rainfall</td>
<td>* First flush event</td>
</tr>
<tr>
<td>March 26th</td>
<td>Dry weather whilst sampling, 13 mm of rain in the 24 hours before the sample, 0.8 mm rainfall 72 hours prior to the sampling</td>
<td>Minor wet weather event</td>
</tr>
<tr>
<td>May 14th</td>
<td>Wet weather whilst sampling, 41 mm of rain in the 24 hours before the sample, 0.2 mm rainfall 72 hours prior to the sampling</td>
<td>Moderate wet weather event, 1 year return period</td>
</tr>
<tr>
<td>June 4th</td>
<td>Dry weather whilst sampling, 0 mm of rain in the 24 hours before the sample, 0 mm rainfall 72 hours prior to the sampling</td>
<td>Dry weather event</td>
</tr>
</tbody>
</table>

* First flush conditions are defined as a rainfall event with rainfall no less than 10 mm and no greater than 25 mm, over 24 hours (CCC, waterways wetlands and drainage guide). Antecedent precipitation conditions should be considered, where a first flush storm needs to have a period of at least 72 hours of no measurable precipitation (Otago Regional Council).

See Appendix B for rainfall hydrographs of the sampled events.

5.2. RESULTS SUMMARY

There were several parameter concentrations that were below detectable limits in the samples given to Hills Laboratory; for simplicity these were recorded as zero in this investigation.

Due to the North Drain being ephemeral there was flow in the May sample round only. February, March and June samples for the North Drain were collected but the results considered invalid as the samples were retrieved from stagnant water.

It is also noted that most guidelines specify that the sampling should be undertaken in a first flush event. The May samples generally produced higher concentrations than the other samples, however this event was much larger than a first flush event.

The following sections of this report look at each of the tested contaminants separately, to discuss the source of the contaminant and proposed changes to the current stormwater monitoring programme.

See Appendix C for a summary of the laboratory results summary for each of the sample rounds.
5.2.1. **Total Suspended Solids**

Total suspended solids (TSS) include all particles suspended in water which will not pass through a filter. Suspended solids are mainly non-point source pollutants such as soil erosion from agricultural and construction sites.

Figure 4 presents the TSS concentration laboratory results from the North Drain, North Brook, Middle Brook and South Brook.

![Figure 4: TSS concentrations in the North Drain, North Brook, Middle Brook and South Brook](image)

Some sites had TSS concentrations below the detectable limit (3mg/L) in all events. The LWRP guideline, 50mg/L, is not exceeded in any of the sampling rounds. This indicates that TSS concentrations are not elevated, and are therefore not predicted to adversely affect aquatic life.

Flow in the north drain only occurred in the May sample, where the TSS concentrations were under the detectable limit and are therefore not shown in the Figure 4.

In the May sample round, the moderate wet weather event, the TSS concentrations were higher than in the other events. This is simply because there was more runoff in a larger rainfall event, therefore higher velocities, and greater particle movement is expected.

Generally the TSS concentrations are increasing through the township, indicating that the township is contributing suspended solids to the waterways. The North Brook is the exception, where higher TSS concentrations seem to be discharging from the irrigation channel.

In most of the sample rounds a trend and the source of the TSS was not clear. Therefore it is recommended that TSS remains in the urban impact monitoring programme, as it is standard practice to report against this parameter.
5.2.2. **Dissolved Copper**

Dissolved copper primary sources include but are not limited to, vehicle brake pad wear and plumbing uses such as copper spouting.

Figure 5 presents the dissolved copper concentration laboratory results from the North Drain, North Brook, Middle Brook and South Brook.

![Dissolved Copper concentrations in the North Drain, North Brook, Middle Brook and South Brook](image)

**Figure 5: Dissolved Copper concentrations in the North Drain, North Brook, Middle Brook and South Brook**

The LWRP guideline, 0.0018mg/L, is exceeded in the May, wet weather sample round. In low runoff or dry weather flow conditions the dissolved copper guideline is not exceeded. There are sites with concentrations below the detectable limit (0.0005 mg/L) particularly in the dry weather sample in June.

- North Drain – flow in the north drain only occurred in the May sample, where the dissolved copper concentrations were below the guideline value.
- North Brook – the copper concentrations are highest in the centre of the township. However it is noted that the copper concentration exceeds the guideline prior to the township also. The copper concentration at the Boys Road site is lower than the others, indicating that it is being diluted and/or the North Brook stormwater pond is operating effectively.
- Middle Brook – the copper concentrations are high near the start of the catchment, and increase in concentration through the township.
- South Brook – the copper concentrations were highest before entering the township, in the May sample. This seems to be an anomaly, as the other events do not follow the same trend.

Generally the dissolved copper concentrations increase within the township; although it is also noted that the rural runoff appears to have copper concentrations higher than the guideline values.

As dissolved copper is a proven urban contaminant and the baseline programme has shown that the concentrations can exceed the guidelines in high runoff events, it is recommended that dissolved copper remains in the ‘urban impact’ section of the monitoring programme.
5.2.3. **Dissolved Lead**

Dissolved lead primary sources include but are not limited to road runoff (auto parts) and construction wastes (paints).

**Error! Reference source not found.** Figure 5 presents the dissolved lead concentration laboratory results from the North Drain, North Brook, Middle Brook and South Brook.

![Figure 5](image)

Figure 6: Dissolved Lead concentrations in the North Drain, North Brook, Middle Brook and South Brook

The LWRP guideline, 0.0056mg/L, is not exceeded in any of the sampling rounds. This indicates that dissolved lead concentrations are not predicted to adversely affect aquatic life in the Rangiora waterways. For many of the samples the concentrations were below the detectable limit (0.0005 mg/L).

Generally concentrations do not change significantly through the township. There are also minor lead concentrations prior to the township sourced from rural runoff.

Therefore it is recommended that dissolved lead is removed from the urban impact monitoring programme as recorded levels are extremely low and do not appear to be approaching the guideline level in any sample.

5.2.4. **Dissolved Zinc**

Dissolved zinc primary sources include but are not limited to, unpainted galvanized roofs and vehicle tyre wear.

Figure 7 presents the dissolved zinc concentration laboratory results from the North Drain, North Brook, Middle Brook and South Brook.
Figure 7: Dissolved zinc concentrations in the North Drain, North Brook, Middle Brook and South Brook

The LWRP guideline, 0.015mg/L, is exceeded in many of the wet weather sample rounds. In the dry weather sample round the dissolved zinc concentrations did not exceed the guideline value.

- **North Drain** – flow in the north drain only occurred in the May sample, where the dissolved zinc concentrations exceeded the guideline values.

- **North Brook** – the zinc concentrations are highest in the centre of the township. However, it is noted that the zinc concentration also exceeds the guideline prior to the township. The zinc concentration at the Boys Road site is lower than the others, indicating that it is being diluted and/or the North Brook stormwater pond is operating effectively.

- **Middle Brook** – the zinc concentrations are generally higher near the start of the catchment. All wet weather samples exceeded the guideline at both Middle Brook sites.

- **South Brook** – the zinc concentrations were highest before entering the township, in the May sample. This seems to be an anomaly, as the other events do not follow the same trend.

Generally the dissolved zinc concentrations increase within the township; although it is also noted that the rural runoff appears to have zinc concentrations higher than the guideline values.

As dissolved zinc is a proven urban contaminant and the baseline programme has shown that the concentrations can exceed the guidelines in high runoff events, it is recommended that dissolved zinc remains in the ‘urban impact’ section of the monitoring programme.

### 5.2.5. Nitrogen

Nitrogen primary sources include but are not limited to fertilizers and sewerage. It is noted that Total Nitrogen is the sum of TKN + Nitrate-N + Nitrite-N and DIN is the sum of Total Ammoniacal-N + Nitrate-N + Nitrite-N.

Figure 8 and Figure 9 present the Total Nitrogen (TN) and Dissolved Inorganic Nitrogen (DIN) concentrations from laboratory results from the North Drain, North Brook, Middle Brook and South Brook.
The ANZECC guideline for Total Nitrogen, 0.614mg/L, is exceeded generally in both the dry and wet weather samples. For DIN the LWRP guideline is 1.5mg/L, this is generally exceeded in both the dry weather sample (June) and the most wet weather sample (May).

The flow in the north drain only occurred in the May sample, where the nitrogen concentrations did not exceeded the guideline values; indicating that nitrogen is not an urban contaminant.
The nitrogen levels in the North and South Brooks are higher in the dry weather flow sample round than the wet weather samples. This indicates that the irrigation channels and spring heads are contributing nitrogen to the Brooks.

The nitrogen concentrations in moderate wet weather event (May) are also quite high, and generally decreasing through town. This indicates that when rural runoff is high, like in the May rainfall event, nitrogen levels are high.

In the February and March events the nitrogen concentrations were lower than the dry weather flow sample. In these events the runoff was low in the rural catchments, and infiltration was high. It appears that the urban discharge diluted the nitrogen concentrations from the springs and irrigation channels.

DIN is stated as an urban indicator in the LWRP. It is recommended that the WDC places this into the stream health section of the monitoring programme instead of the urban impact section as it is clearly demonstrated through these results to be a rural contaminant. DIN generally gives a better indication of highly bioavailable inorganic forms of nitrogen, for example fertilizers.

Therefore it is recommended that TN is replaced with DIN and remains in the stream health monitoring programme, as concentrations clearly correlate with spring flows and rural runoff, rather than urban discharges.

5.2.6. **Phosphorus**

Phosphorus primary sources include but are not limited to fertilizers and sewerage. Phosphorus tends to attach to soil particles and moves into surface-water bodies from runoff.

Figure 10 and Figure 11 present the Total Phosphorus (TP) and Dissolved Reactive Phosphorus (DRP) concentrations from laboratory results from the North Drain, North Brook, Middle Brook and South Brook.

![Figure 10: Total Phosphorus concentrations in the North Drain, North Brook, Middle Brook and South Brook](image-url)
The ANZECC guideline for TP (0.033mg/L) and the LWRP guideline for DRP (0.016mg/L), are exceeded generally in the wet weather samples.

The flow in the north drain only occurred in the May sample, where the phosphorus concentrations exceeded the guideline values; indicating that phosphorus can be an urban contaminant.

The dry weather samples for phosphorus were all below the guideline values. It is noted that the concentrations are generally increasing through the urban area in the dry weather sample, indicating that the springs could be contributing phosphorus along the course of the waterway.

Phosphorus concentrations decrease through the urban area in the February and March events. This indicates that the phosphorus concentrations are being diluted by the urban runoff, and therefore are being sourced rurally.

During the May sample round, the moderate wet weather event, the concentration increases through the township and the concentrations are higher than in the other events. This is simply because there is more runoff in a larger rainfall event, therefore higher velocities, and greater particle movement is expected.

As DRP is stated as the applicable indicator for stormwater quality in the LWRP, it is recommended that it replaces the TP in the current monitoring programme.

It is concluded that the increase in concentrations of phosphorus through the township are caused by the springs and mobilizing of the bed sediments in high runoff conditions. Therefore it is recommended that TP is replaced with DRP and kept in the ‘stream health’ section of the monitoring programme, as it is a rural contaminant.
5.2.7. **E.Coli**

E.Coli is used as an indicator of possible sewage contamination as E.Coli is commonly found in human and animal feces.

Figure 12 presents the E.Coli concentrations from laboratory results for the North Drain, North Brook, Middle Brook and South Brook.

![E. Coli concentrations in the North Drain, North Brook, Middle Brook and South Brook](image)

The concentrations of E.Coli in these samples frequently exceeded the guideline LWRP (550 E.Coli per 100ml) values, particularly in the February and May wet weather samples.

The flow in the north drain only occurred in the May sample, where the E.Coli concentrations exceeded the guideline values; indicating that E.Coli can be an urban contaminant.

The runoff from the rural catchments has high concentrations of E.Coli prior to entering the urban area. This is seen in the upstream sample sites of the waterways.

It appears that the rural runoff is the main contributor of E.Coli, as during the DWF days there are generally very low levels of E.Coli in the waterways, indicating that the springs do not contribute E.Coli to the waterways. The exception being in the June sample at Lilybrook, the dry weather E.Coli concentration exceeds the wet weather samples. This is a clear outlier, and is therefore disregarded.

As the concentrations of E.Coli are increasing through the urban area, in some of the samples, the potential sources were investigated further. The main sources of E.coli include, but are not limited to:

- Urban animal sewerage such as dogs, cats and birds
- Agricultural sewerage
- Human sewerage

To investigate the rural and animal sources of E.Coli, Figure 13 presents the Rangiora stormwater network, rural zones and parks surrounding the three Brooks.
It is feasible that the North Brook stormwater pond dense bird population may be causing a spike in E.Coli concentrations at the RRNB017 sample point. However the urban animal sewerage generally seems an improbable conclusion. It is difficult to believe that dog parks (where most people pick up their dog waste) and bird guano on roofs can cause very elevated levels of E.Coli as observed in the wet weather samples.

As the E.Coli concentrations are elevated prior to entering the urban limits, it is concluded that the majority of the E.Coli is rurally sourced.
The May rainfall event, which caused the highest concentrations of E.Coli was run through the Rangiora Sewer Network Hydraulic Model, to see if this rainfall event caused any sewer overflows. The analysis concluded that the moderate event in May did not cause sewer overflows.

As modelling information is only a representation of the sewer network it is accepted that there may be sewerage overflow sites that are not appearing in the model. However it is also acknowledged that these overflows are being managed separately through the Wastewater Management Plan process. A number of wastewater capacity upgrades are currently programmed to reduce wastewater overflows and further improvements will be identified through the planning process and incorporated in future Long Term Plans.

Therefore it is recommended that Ecan undertakes further monitoring of the rural catchments to locate the source of E.Coli, as it appears to be mainly rurally sourced.

5.2.8. **Total Hydrocarbons**

Total Hydrocarbon primary sources include but are not limited to road asphalts, manufacturing facilities and fuelling depots, as these areas frequently experience oil spillages.

There is no consistency between guidelines for hydrocarbons; Ecan is in the process of investigating and stating a guideline.

For all samples the results indicated that the total hydrocarbon concentrations for C7 - C9, C10 - C14 and C15 - C36 were all below the detectable limits. Therefore it was concluded that the Rangiora urban and rural catchments do not have an issue with hydrocarbons.

It is recommended the hydrocarbons should be removed from the urban impact section of the monitoring programme, however the total hydrocarbon concentration should be kept in the ‘sediment sampling’ section of the monitoring programme, until it has been investigated further.

5.2.9. **Dissolved Oxygen**

Several factors affect the amount of oxygen dissolved in the water in waterways. Colder water usually has more oxygen, because gasses dissolve better in cold temperatures. Water motion also helps mix oxygen into the water. Eutrophication can deplete the oxygen concentration in the waterways.

Figure 14 presents the dissolved oxygen concentration portable probe results for the North Drain, North Brook, Middle Brook and South Brook. It is noted that a dissolved oxygen reading was not retrieved in the February event.
Figure 14: Dissolved Oxygen concentrations in the North Drain, North Brook, Middle Brook and South Brook

The LWRP guideline states that the dissolved oxygen saturation minimum is 70%. Most of the readings were recorded to be below this guideline. More water movement tends to result in more oxygen in the water, the data supports this, where in May the oxygen saturation levels are higher than the other events.

Oxygen saturation percentages are low in the dry weather event (June) and the minor wet weather event (March). This demonstrates that urban runoff does not have any significant effect on the dissolved oxygen saturation.

Therefore it is recommended that dissolved oxygen is kept in the ‘stream health’ section of the monitoring programme, as it is not negatively impacted by urban stormwater discharges.

5.2.10. pH

Low pH (acidic) is caused by high organic acids, such as some wetland waters or where mineral acidity occurs naturally. High pH (basic) is caused by highly eutrophic waters, where eutrophication occurs. pH differences can also occur by water draining certain rock and soil types and industrial wastes.

Figure 15 presents the pH portable probe results from the North Drain, North Brook, Middle Brook and South Brook. It is noted that pH reading was not retrieved in the February event.
Figure 15: pH in the North Drain, North Brook, Middle Brook and South Brook

The LWRP guideline states that the pH should be within a range 6.5 to 8.5. All readings were within this range, maybe slightly on the acidic side of the scale. The pH levels do not change significantly between the wet and dry samples.

Therefore it is recommended that pH is kept in the ‘stream health’ section of the monitoring programme, as it is not proven to be affected by the urban discharges.
5.2.11. **Temperature**

Temperature fluctuations can be caused by the change in runoff temperature off street/field surface temperatures.

Figure 16 presents the temperature portable probe results from the North Drain, North Brook, Middle Brook and South Brook. It is noted that pH reading was not retrieved in the February event.

![Temperature Chart]

**Figure 16: Temperature in the North Drain, North Brook, Middle Brook and South Brook**

The LWRP guideline states that the stream temperatures should not exceed 20 degrees Celsius. All readings were below this guideline. Generally in the warmer months the waterway temperatures were higher than in the winter months. There is no evidence to suggest that stormwater runoff is altering the natural temperature of the stream, as the temperatures of the dry (June) and wet (May) weather events are similar.

Therefore it is recommended that temperature is kept in the ‘stream health’ section of the monitoring programme, as it is not proven to be affected by the urban discharges.

5.2.12. **Conductivity**

Conductivity measurements can be used to estimate ion concentrations in solution. It doesn't identify the specific ions in the water. However, significant increases in conductivity may be an indicator that polluting discharges have entered the water.

A conductivity guideline is not specified in the LWRP or ANZECC guidelines, the WDC has decided to include it in the stream health monitoring programme as it is a portable probe measurement, therefore easily retrieved with the other probe measurements.

Figure 17 presents the conductivity portable probe results from the North Drain, North Brook, Middle Brook and South Brook. It is noted that pH reading was not retrieved in the February event.
Although there are no guidelines for conductivity, it is recommended that conductivity is kept in the ‘stream health’ section of the monitoring programme, as it can be easily retrieved and recorded. Sharp changes in conductivity will indicated a change in discharge pollutant quantity and quality.
6. DISCUSSION

Four sample rounds were completed, in both wet and dry conditions, at 8 sites on the North Drain, North Brook, Middle Brook and South Brook. The results concluded that the some of the contaminants can be removed from the monitoring programme, and some added. Table 4 summarises the changes to the monitoring programme.

Table 4: Summary of contaminants recommended to be changed in the monitoring programme

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Source</th>
<th>Current Monitoring Programme Section</th>
<th>Recommended Monitoring Programme Section</th>
<th>Reason Section for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Copper</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Lead</td>
<td>-</td>
<td>Urban Impact</td>
<td>-</td>
<td>Very Low Concentrations, therefore recommended to remove it from the programme</td>
</tr>
<tr>
<td>Dissolved Zinc</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>-</td>
<td>DIN is in the LWRP, therefore it is recommended that we replace TN with DIN</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen</td>
<td>Rural</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Mainly Rural</td>
<td>Stream Health</td>
<td>-</td>
<td>DRP is in the LWRP, therefore it is recommended that we replace TP with DRP</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus</td>
<td>Mainly Rural</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>E.Coli</td>
<td>Mainly Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td>This was proven to be mainly a rural contaminant and be a contaminant that is monitored as part of the Wastewater Management plan.</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>-</td>
<td>Urban Impact</td>
<td>-</td>
<td>Very Low Concentrations therefore recommended removing it from the programme. Total Hydrocarbons will remain in the basin sediment monitoring.</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>-</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Hardness</td>
<td>Rural or Urban</td>
<td>-</td>
<td>Stream Health</td>
<td>Initial one off sample recommended as overall indicator of contaminants.</td>
</tr>
</tbody>
</table>

All of the contaminants were found to be in the appropriate monitoring programme category. Dissolved Lead and Total Hydrocarbons are recommended to be removed from the programme as they were consistently measured to be well below the guideline values.

Total Nitrogen and Total Phosphorus should be replaced with Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen as these are specified in the LWRP.
It was recommended by Ecan water quality specialists that the waterway hardness is measured once or twice to characterise the waterway. This will enable the WDC to get site specific trigger values for metals.

It was found that the bulk of the contaminants are sourced rurally and the guidelines are exceeded prior to the township. However for some contaminants there was an increase in concentration through the township, indicating that the urban area discharges these contaminants also, but in smaller quantities.

The concentrations of contaminants discharging from the springs exceed the guidelines, particularly in the Middlebrook. These springs source water from rurally sourced undercurrent and resurgence.

This study has shown that the rural areas have a significant impact on the health of the Rangiora waterways, and possibly others in the district. It is recommended that Ecan undertakes monitoring upstream of the townships as many contaminant concentrations are exceeded prior to the urban limits.

Table 5 presents the recommended Stormwater Monitoring Programme overview updated using the results from this baseline investigation.

<table>
<thead>
<tr>
<th>Table 5: Recommended Updated Stormwater Monitoring Programme Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td><strong>Parameters</strong></td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td><strong>Weather Conditions</strong></td>
</tr>
</tbody>
</table>
7. **CONCLUSION**

During the steering group meeting MKT and Ecan, in November 2013, recommended the WDC undertakes a baseline sampling programme. The purpose of this was to demonstrate to all parties, the source of the waterway contaminants and the current health of the waterways.

Four sample rounds have been completed, in both wet and dry conditions, at 8 sites on the North Drain, North Brook, Middle Brook and South Brook. The report summarised the results from the investigation and suggested potential sources of the contaminants.

The following conclusions were made in this investigation:

- Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. However most exceedances occurred in the May, a moderate wet weather event, which was much larger than a first flush rainfall event.

- It was found that generally the contaminants were present in both rural and urban environments, however the rural area was found to have a larger impact than the urban area and the guidelines were often exceeded prior to reaching the urban discharge points.

The following changes are recommended to the Stormwater Monitoring Programme:

- It is recommended that the contaminants are left in their proposed monitoring programme section. All of the contaminants were found to be in the appropriate monitoring programme section.

- It is recommended that Lead and Total Hydrocarbons are removed from the 'urban impact' section of the Stormwater Monitoring Programme, as the results indicated that the concentrations were consistently far below the guidelines.

- It is recommended that Total Nitrogen and Total Phosphorus should be replaced with Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen as these are specified in the LWRP.

- It is recommended that many contaminants such as E.Coli, Nitrogen and Phosphorus should be investigated further by Ecan within the rural catchment. These were significantly exceeding the LWRP guidelines in the rural zones, upstream of the urban limits.

After discussions with Ecan and MKT the Stormwater Monitoring Programme will be updated.
8. **APPENDIX**

**APPENDIX A: EXTRA BASELINE SAMPLING INFORMATION**

Sampling kits should be ordered in advance to prepare for unpredicted sampling times. The kits should contain a STER, UP1L, NWU100 and a TPH250 from Hill Laboratory. The sample kits should be labelled in the following way:

![Sample Kit Image]

**SITE DESCRIPTIONS:**

**Site:** RRND012  
**GPS location:** X-Coordinate: 1567351; Y-Coordinate: 5206731  
**Site Description:** In the North Drain near Coldstream Road. Sample to be retrieved upstream of Coldstream Road, in the deepest section of the stream.  
**Site Photo:**

![Site Photo Image]
Site: RRNB017  
GPS location: X-Coordinate: 1568918; Y-Coordinate: 5204096  
Site Description: In the North Brook, on the Northern side of Boys Road. Sample to be retrieved between culverts under Boys Road, in the deepest section of the stream.  
Site Photo:

Site: RRNB036  
GPS location: X-Coordinate: 1567230; Y-Coordinate: 5204552  
Site Description: In the North Brook, in Lilybrook Park. Sample to be retrieved near the high level overflow rock structure, in the deepest section of the stream.  
Site Photo:
Site: RRNB055  
**GPS location:** X-Coordinate: 1565640; Y-Coordinate: 5204966  
**Site Description:** In the North Brook, at Aspen Street Park. Sample to be retrieved near the large flax in the centre of the park, in the deepest section of the stream.  
**Site Photo:**

Site: RRMB019  
**GPS location:** X-Coordinate: 1567595; Y-Coordinate: 5203538  
**Site Description:** In the Middle Brook, on the Northern side of Denchs Road. Sample to be retrieved between the culverts on the west side of the bridge, in the deepest section of the stream.  
**Site Photo:**
Site: RRMB029
GPS location: X-Coordinate: 1567595; Y-Coordinate: 5204004
Site Description: In the Middle Brook, on the Western side of Bush Street. Sample to be retrieved by the footpath, before the culvert, in the deepest section of the stream.
Site Photo:

Site: RRSB030
GPS location: X-Coordinate: 1567664; Y-Coordinate: 5203074
Site Description: In the South Brook, on the west side of Railway Road. Sample to be retrieved from the stream bank, before the culvert, in the deepest section of the stream.
Site Photo:
Site: RRSB048
GPS location: X-Coordinate: 1567664; Y-Coordinate: 5203074
Site Description: In the South Brook, on the East side of Townsend Road. Sample to be retrieved from the stream bank, under the bridge, in the deepest section of the stream.
Site Photo:
APPENDIX B: RAINFALL EVENT HYDROGRAPHS

Ayres Street, Rangiora Rainfall data; 24 hour period prior to the rainfall event is shown in red.
AYERS St 1, RAINFALL, TODAY'S TOTAL (mm) and 24 hours before sampling.
## APPENDIX C: LABORATORY RESULTS SUMMARY

Red highlighting is exceedance of the guidelines

February sample round results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Guideline Value</th>
<th>RRND012: North Drain, Coldstream Road (capturing solely urban contaminants.)</th>
<th>RRNB055: North Brook, at Aspen Street Park</th>
<th>RRNB036: North Brook, Lilybrook Park</th>
<th>RRNB017: North Brook, on the Northern side of Boys Road</th>
<th>RRMB029: Middle Brook, on the Western side of Bush Street</th>
<th>RRMB019: Middle Brook, on the Northern side of Denchs Road</th>
<th>RRSB048: South Brook, on the East side of Townsend Road</th>
<th>RRSB030: South Brook, on the East side of Railway Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids g/m³</td>
<td>50</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>4</td>
<td>21</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
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<tr>
<td>Dissolved Copper g/m³</td>
<td>0.0018</td>
<td>0.0008</td>
<td>0.0008</td>
<td>&lt;0.0005</td>
<td>0.0008</td>
<td>0.0005</td>
<td>0.0005</td>
<td>0.0005</td>
<td>0.0005</td>
</tr>
<tr>
<td>Dissolved Lead g/m³</td>
<td>0.0056</td>
<td>0.00018</td>
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<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
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<tr>
<td>Dissolved Zinc g/m³</td>
<td>0.015</td>
<td>0.0032</td>
<td>0.0075</td>
<td>0.034</td>
<td>0.025</td>
<td>0.005</td>
<td>0.007</td>
<td>0.005</td>
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<td>Total Nitrogen g/m³</td>
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<td>0.43</td>
<td>0.81</td>
<td>0.71</td>
<td>1.79</td>
<td>1.63</td>
<td>2.3</td>
<td>2.3</td>
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<tr>
<td>Total Ammoniacal-N g/m³</td>
<td>0.021</td>
<td>&lt;0.010</td>
<td>0.019</td>
<td>0.012</td>
<td>0.012</td>
<td>0.014</td>
<td>0.014</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
</tr>
<tr>
<td>Nitrate-N + Nitrite-N g/m³</td>
<td>0.444</td>
<td>0.004</td>
<td>0.09</td>
<td>0.59</td>
<td>1.46</td>
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<td>0.28</td>
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<td>0.17</td>
<td>0.42</td>
<td>0.12</td>
<td>0.19</td>
<td>0.3</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
<td>0.17</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN)</td>
<td>1.5</td>
<td>0.004</td>
<td>0.709</td>
<td>0.532</td>
<td>1.508</td>
<td>1.394</td>
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<td>0.2</td>
<td>0.17</td>
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<tr>
<td>Dissolved Reactive Phosphorus g/m³</td>
<td>0.016</td>
<td>0.054</td>
<td>0.053</td>
<td>0.007</td>
<td>0.062</td>
<td>0.065</td>
<td>0.054</td>
<td>0.054</td>
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<tr>
<td>Total Phosphorus g/m³</td>
<td>0.031</td>
<td>0.087</td>
<td>0.028</td>
<td>0.023</td>
<td>0.062</td>
<td>0.037</td>
<td>0.029</td>
<td>0.029</td>
<td>0.036</td>
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<tr>
<td>Escherichia coli cfu / 100mL</td>
<td>550</td>
<td>1200</td>
<td>2600</td>
<td>3400</td>
<td>800</td>
<td>1300</td>
<td>3200</td>
<td>3200</td>
<td>3200</td>
</tr>
<tr>
<td>C7 - C9 g/m³</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>C10 - C14 g/m³</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>C15 - C36 g/m³</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
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<tr>
<td>Total hydrocarbons (C7 - C36) g/m³</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Dissolved Oxygen (%)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>pH</td>
<td>6.5</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conductivity (mho or µS/cm)</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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## March sample round results

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<thead>
<tr>
<th>March</th>
<th>Guideline Value</th>
</tr>
</thead>
<tbody>
<tr>
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<td>RRND012: North Drain, Coldstream Road (capturing solely urban contaminants).</td>
</tr>
<tr>
<td>Total Suspended Solids g/m³</td>
<td>50</td>
</tr>
<tr>
<td>Dissolved Copper g/m³</td>
<td>0.0018</td>
</tr>
<tr>
<td>Dissolved Lead g/m³</td>
<td>0.0056</td>
</tr>
<tr>
<td>Dissolved Zinc g/m³</td>
<td>0.015</td>
</tr>
<tr>
<td>Total Nitrogen g/m³</td>
<td>0.614</td>
</tr>
<tr>
<td>Total Ammoniacal-N g/m³</td>
<td>0.021</td>
</tr>
<tr>
<td>Nitrate-N + Nitrite-N g/m³</td>
<td>0.444</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (TKN) g/m³</td>
<td>0.17</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN)</td>
<td>1.5</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus g/m³</td>
<td>0.016</td>
</tr>
<tr>
<td>Total Phosphorus g/m³</td>
<td>0.037</td>
</tr>
<tr>
<td>Escherichia coli cfu / 100mL</td>
<td>550</td>
</tr>
<tr>
<td>C7 - C9 g/m³</td>
<td>&lt; 0.10</td>
</tr>
<tr>
<td>C10 - C14 g/m³</td>
<td>&lt; 0.2</td>
</tr>
<tr>
<td>C15 - C36 g/m³</td>
<td>&lt; 0.4</td>
</tr>
<tr>
<td>Total hydrocarbons (C7 - C36) g/m³</td>
<td>0</td>
</tr>
<tr>
<td>Dissolved Oxygen (%)</td>
<td>70</td>
</tr>
<tr>
<td>pH</td>
<td>6.5 - 8.5</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
</tr>
<tr>
<td>Conductivity (mho or µS/cm)</td>
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</table>
### May sample round results

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<tr>
<th>May</th>
<th>Guideline Value</th>
<th>RRND012: North Drain, Coldstream Road (capturing solely urban contaminants)</th>
<th>RRNB017: North Brook, on the Northern side of Boys Road</th>
<th>RRNB036: North Brook, Lilybrook Park</th>
<th>RRNB055: North Brook, at Aspen Street Park</th>
<th>RRM8019: Middle Brook, on the Northern side of Denchs Road</th>
<th>RRM8029: Middle Brook, on the Western side of Bush Street</th>
<th>RRSB030: South Brook, on the East side of Railway Road</th>
<th>RRSB048: South Brook, on the East side of Townsend Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids g/m³</td>
<td>50</td>
<td>&lt; 3</td>
<td>48</td>
<td>10</td>
<td>14</td>
<td>10</td>
<td>14</td>
<td>27</td>
<td>37</td>
</tr>
<tr>
<td>Dissolved Copper g/m³</td>
<td>0.0018</td>
<td>0.0008</td>
<td>0.0031</td>
<td>0.0048</td>
<td>0.0053</td>
<td>0.0053</td>
<td>0.0057</td>
<td>0.008</td>
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<tr>
<td>Dissolved Lead g/m³</td>
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<td>0.0011</td>
<td>&lt; 0.00010</td>
<td>0.00034</td>
<td>0.00076</td>
<td>0.00031</td>
<td>0.00024</td>
<td>0.00025</td>
<td>&lt; 0.00010</td>
</tr>
<tr>
<td>Dissolved Zinc g/m³</td>
<td>0.017</td>
<td>0.033</td>
<td>0.0169</td>
<td>0.065</td>
<td>0.0109</td>
<td>0.094</td>
<td>0.089</td>
<td>0.07</td>
<td>0.006</td>
</tr>
<tr>
<td>Total Nitrogen g/m³</td>
<td>0.614</td>
<td>0.24</td>
<td>1.84</td>
<td>2.5</td>
<td>2.3</td>
<td>2.3</td>
<td>4</td>
<td>3.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Total Ammoniacal-N g/m³</td>
<td>0.21</td>
<td>&lt; 0.010</td>
<td>0.05</td>
<td>0.034</td>
<td>0.023</td>
<td>0.051</td>
<td>0.032</td>
<td>0.107</td>
<td>0.103</td>
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<tr>
<td>Nitrate-N + Nitrite-N g/m³</td>
<td>0.448</td>
<td>0.071</td>
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<td>1.29</td>
<td>1.4</td>
<td>1.2</td>
<td>1.2</td>
<td>1.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (TKN) g/m³</td>
<td>0.17</td>
<td>0.17</td>
<td>0.81</td>
<td>0.76</td>
<td>0.93</td>
<td>0.75</td>
<td>1.19</td>
<td>1.71</td>
<td>1.73</td>
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<tr>
<td>Dissolved Reactive Phosphorus g/m³</td>
<td>0.016</td>
<td>0.072</td>
<td>0.005</td>
<td>0.3</td>
<td>0.21</td>
<td>0.34</td>
<td>0.57</td>
<td>0.21</td>
<td>0.22</td>
</tr>
<tr>
<td>Total Phosphorus g/m³</td>
<td>0.031</td>
<td>0.079</td>
<td>0.17</td>
<td>0.32</td>
<td>0.32</td>
<td>0.36</td>
<td>0.61</td>
<td>0.32</td>
<td>0.37</td>
</tr>
<tr>
<td>Escherichia coli cfu / 100mL</td>
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<td>1600</td>
<td>5000</td>
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<td>14000</td>
<td>14000</td>
<td>15000</td>
<td>18000</td>
<td>3400</td>
</tr>
<tr>
<td>C7 - C9 g/m³</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
</tr>
<tr>
<td>C10 - C14 g/m³</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
</tr>
<tr>
<td>C15 - C36 g/m³</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
</tr>
<tr>
<td>Total hydrocarbons (C7 - C36) g/m³</td>
<td>70</td>
<td>144</td>
<td>110.6</td>
<td>117</td>
<td>113.4</td>
<td>99.9</td>
<td>104.6</td>
<td>103.9</td>
<td>105.6</td>
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<tr>
<td>Dissolved Oxygen (%)</td>
<td>6.5 - 8.5</td>
<td>7.47</td>
<td>6.79</td>
<td>6.76</td>
<td>7.22</td>
<td>6.88</td>
<td>6.77</td>
<td>6.61</td>
<td>6.74</td>
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<td>Temperature (°C)</td>
<td>Change of 2 °C</td>
<td>9.8</td>
<td>13.2</td>
<td>12.4</td>
<td>10.9</td>
<td>13.1</td>
<td>12.9</td>
<td>12.5</td>
<td>12</td>
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<tr>
<td>Conductivity (mho or µS/cm)</td>
<td>2000</td>
<td>43.6</td>
<td>103</td>
<td>107</td>
<td>71.9</td>
<td>110.5</td>
<td>154</td>
<td>104.9</td>
<td>84.4</td>
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### June sample round results

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<tr>
<th>June</th>
<th>Guideline Value</th>
<th>RRND012: North Drain, Coldstream Road (capturing solely urban contaminants.)</th>
<th>RRNB017: North Brook, on the Northern side of Boys Road</th>
<th>RRNB036: North Brook, Lilybrook Park</th>
<th>RRNB055: North Brook, at Aspen Street Park</th>
<th>RRMB019: Middle Brook, on the Northern side of Denchs Road</th>
<th>RRMB029: Middle Brook, on the Western side of Bush Street</th>
<th>RRSB030: South Brook, on the East side of Railway Road</th>
<th>RRSB048: South Brook, on the East side of Townsend Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids g/m³</td>
<td></td>
<td>50</td>
<td>&lt; 3</td>
<td>&lt; 3</td>
<td>&lt; 3</td>
<td>&lt; 3</td>
<td>&lt; 3</td>
<td>&lt; 3</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>Dissolved Copper g/m³</td>
<td></td>
<td>0.0018</td>
<td>&lt; 0.0005</td>
<td>&lt; 0.0005</td>
<td>&lt; 0.0005</td>
<td>&lt; 0.0005</td>
<td>&lt; 0.0005</td>
<td>&lt; 0.0005</td>
<td>&lt; 0.0005</td>
</tr>
<tr>
<td>Dissolved Lead g/m³</td>
<td></td>
<td>0.0056</td>
<td>&lt; 0.00010</td>
<td>&lt; 0.00010</td>
<td>&lt; 0.00010</td>
<td>&lt; 0.00010</td>
<td>&lt; 0.00010</td>
<td>&lt; 0.00010</td>
<td>&lt; 0.00010</td>
</tr>
<tr>
<td>Dissolved Zinc g/m³</td>
<td></td>
<td>0.015</td>
<td>0.0023</td>
<td>0.0056</td>
<td>0.0018</td>
<td>0.0071</td>
<td>0.0086</td>
<td>0.0014</td>
<td>&lt; 0.00010</td>
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<tr>
<td>Total Nitrogen g/m³</td>
<td></td>
<td>0.614</td>
<td>1.78</td>
<td>2.6</td>
<td>3.2</td>
<td>1.31</td>
<td>1.5</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Total Ammoniacal-N g/m³</td>
<td></td>
<td>0.021</td>
<td>0.01</td>
<td>0.013</td>
<td>&lt; 0.010</td>
<td>&lt; 0.010</td>
<td>&lt; 0.010</td>
<td>&lt; 0.010</td>
<td>&lt; 0.010</td>
</tr>
<tr>
<td>Nitrate-N + Nitrite-N g/m³</td>
<td></td>
<td>0.444</td>
<td>0.14</td>
<td>0.14</td>
<td>0.31</td>
<td>0.14</td>
<td>0</td>
<td>0</td>
<td>0.17</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (TKN) g/m³</td>
<td></td>
<td>0.17</td>
<td>0.14</td>
<td>0.14</td>
<td>0.31</td>
<td>0.14</td>
<td>0</td>
<td>0</td>
<td>0.17</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN) g/m³</td>
<td></td>
<td>1.5</td>
<td>1.78</td>
<td>2.65</td>
<td>3.21</td>
<td>1.32</td>
<td>1.51</td>
<td>3.37</td>
<td>3.37</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus g/m³</td>
<td></td>
<td>0.018</td>
<td>0.006</td>
<td>0.01</td>
<td>0.016</td>
<td>0.012</td>
<td>0.016</td>
<td>0.012</td>
<td>0.01</td>
</tr>
<tr>
<td>Total Phosphorus g/m³</td>
<td></td>
<td>0.033</td>
<td>0.008</td>
<td>0.013</td>
<td>0.026</td>
<td>0.019</td>
<td>0.024</td>
<td>0.017</td>
<td>0.017</td>
</tr>
<tr>
<td>Escherichia coli cfu / 100mL</td>
<td></td>
<td>550</td>
<td>70</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>160</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>C7 - C9 g/m³</td>
<td></td>
<td></td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
<td>&lt; 0.10</td>
</tr>
<tr>
<td>C10 - C14 g/m³</td>
<td></td>
<td></td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
</tr>
<tr>
<td>C15 - C36 g/m³</td>
<td></td>
<td></td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
<td>&lt; 0.4</td>
</tr>
<tr>
<td>Total hydrocarbons (C7 - C36) g/m³</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dissolved Oxygen (%)</td>
<td></td>
<td>70</td>
<td>71.2</td>
<td>59.8</td>
<td>103.9</td>
<td>62.2</td>
<td>70</td>
<td>68.4</td>
<td>70</td>
</tr>
<tr>
<td>pH</td>
<td></td>
<td>6.5 - 8.5</td>
<td>6.64</td>
<td>6.67</td>
<td>6.73</td>
<td>6.82</td>
<td>7.07</td>
<td>6.86</td>
<td>6.96</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td></td>
<td>Change of 2 °C</td>
<td>12.8</td>
<td>12.4</td>
<td>5.1</td>
<td>12.4</td>
<td>12.4</td>
<td>11.6</td>
<td>11.8</td>
</tr>
<tr>
<td>Conductivity (mho or µS/cm)</td>
<td></td>
<td>2200</td>
<td>102.9</td>
<td>118.8</td>
<td>90.1</td>
<td>105.7</td>
<td>116.5</td>
<td>125.1</td>
<td>124.4</td>
</tr>
</tbody>
</table>
Woodend Stormwater Network Consent:
Stormwater Quality Monitoring Baseline Programme

Prepared by the Project Delivery Unit
November 2018
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1. EXECUTIVE SUMMARY

1.1. INTRODUCTION

The Woodend Stormwater Discharge Consent, the second of such in the Waimakariri District, will be prepared in conjunction with a stormwater management plan (SMP) and consent application. This requires the Waimakariri District Council (WDC) to produce a stormwater monitoring programme. This monitoring programme focuses on the urban stormwater discharge impact on the waterways, as opposed to general stream health.

The focus of this report is on stormwater quality entering and within the Woodend urban area.

ECan requested that the WDC undertakes a baseline sampling programme before defining the parameters of the monitoring programme to demonstrate to all parties the source of the waterway contaminants and to gauge the current health of Woodend’s waterways. The purpose of this report is to present the findings from this baseline sampling programme and recommend the parameters that should be carried forward to the ongoing stormwater monitoring programme.

Four sample rounds have been completed, in both wet and dry conditions, at seven sites spread over the Taranaki Stream, Waiora Stream, McIntosh Drain, Box Drain and a channel adjacent to the state highway at the south of Woodend. The results from each of these sampling rounds has been summarised along with suggested potential sources of each contaminant.

1.2. BACKGROUND

The stormwater monitoring programme will be designed to identify potential areas of urban stormwater impact on the Woodend receiving waters. The trends formed from the monitoring programme analysis can be used to direct stormwater treatment activities, within the Woodend urban limits.

The Woodend stormwater monitoring programme will be modelled off the Rangiora Stormwater Monitoring Programme, with some modifications for the Woodend contaminants, informed by this investigation. Generally speaking the urban impact would be measured by monitoring urban contaminants through discharge point inspections, receiving surface water testing, stormwater basin testing and stream sediment surveys will all form part of the Woodend stormwater network discharge consent, with consent management objectives seeking to address any exceeded values.

The stream health monitoring will be included within the stormwater network discharge consent, however the parameters will not have consent management objectives associated with them, i.e. this information will be utilised for other Council projects, such as stream enhancement programmes, as these additional parameters are not considered to be primarily contributed by urban stormwater discharge.

This investigation looks at water quality samples, which will only affect the urban impact and stream health sections for the Woodend monitoring programme.

1.3. METHODOLOGY

Four water sampling rounds were undertaken by the WDC Water Unit and analysed by the WDC Project Delivery Unit. The sampling occurred approximately monthly from August to December 2016.

The samples were collected using best practice methods and delivered directly to the laboratory after collection. The sample testing was undertaken by Hill Laboratories in Hamilton.

The Woodend waterways were sampled at the following sites:

- WDSH024: SH1 Drain, Woodend Beach - Main North Road Intersection
- WDBD005: Box Drain, West of Rangiora Woodend Road - School Road Intersection
The laboratory test included:

- Total suspended solids
- Dissolved copper
- Dissolved lead
- Dissolved zinc
- Total Ammoniacal-N
- Nitrate-N + Nitrite
- Total Kjeldahl Nitrogen (TKN)
- Total Nitrogen
- Dissolved Reactive Phosphorus
- Total phosphorus
- *E. coli*
- Petroleum hydrocarbons C7-C9, C10-C14, C15-C34
- Total Petroleum Hydrocarbons.

The portable probe measurements captured were Dissolved Oxygen, pH, Temperature and Conductivity.

### 1.4. RESULTS SUMMARY

The results concluded that some of the contaminants are better suited to the urban impact section of the monitoring programme and others to the stream health section. Table 1 summarises the recommended changes to the monitoring programme.
Table 1: Summary of contaminants recommended to be changed in the monitoring programme

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Source</th>
<th>Rangiora’s Monitoring Programme Section</th>
<th>Woodend’s Recommended Monitoring Programme Section</th>
<th>Reason Section for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Copper</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Lead</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td>Very Low Concentrations, therefore recommended to remove it from the programme</td>
</tr>
<tr>
<td>Dissolved Zinc</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>-</td>
<td>DIN is in the Land and Water Regional Plan (LWRP), therefore it is recommended that we replace TN with DIN</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN)</td>
<td>Rural</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Mainly Urban</td>
<td>Stream Health</td>
<td>-</td>
<td>DRP is in the LWRP therefore it is recommended that TP is replaced with DRP. It appears DRP may be from both rural and urban sources. It is recommended further consideration is given to include DRP in the Urban Impact section of the monitoring programme.</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (DRP)</td>
<td>Mainly Urban</td>
<td>-</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>E. coli</td>
<td>Urban &amp; Rural</td>
<td>Stream Health</td>
<td>Urban Impact</td>
<td>E. coli was found to be from both rural and possibly urban sources. It is a contaminant that is monitored as part of the Wastewater Management plan. It is recommended further consideration is given to including E. coli in the Urban Impact section of the monitoring programme.</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>-</td>
<td>Urban Impact</td>
<td>-</td>
<td>Very Low Concentrations therefore recommended removing it from the programme. Total Hydrocarbons will remain in the basin sediment monitoring.</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>-</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Hardness</td>
<td>Mainly Rural</td>
<td>-</td>
<td>Urban Impact</td>
<td>Initial one off sample recommended as overall indicator of contaminants.</td>
</tr>
</tbody>
</table>

The contaminants that differed from the Rangiora Stormwater Monitoring Programme were Phosphorus and E. coli, these were found to be urban and rural sourced in Woodend and mainly ruraly sources in Rangiora. Total Hydrocarbons are recommended to be removed from the programme as they were consistently measured to be well below the guideline values.
It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP.

It was recommended by ECan water quality specialists that the waterway hardness is measured once or twice to characterise the waterway. This will enable the WDC to get site specific trigger values for metals. This would be undertaken as part of the monitoring programme, as the sample sites would not be the same as in this baseline programme.

It was found that a number of the contaminants are sourced rurally and the guidelines are exceeded prior to the township. However for some contaminants there was an increase in concentration through the township, indicating that the urban area discharges these contaminants also, but in smaller quantities.

This study has demonstrated that the rural areas have a significant impact on the health of the Woodend waterways, and possibly others in the district. It is recommended that ECan undertakes monitoring upstream of the townsships to identify the source of these containments as some contaminant concentrations exceed the guideline values prior to the urban limits.

1.5. CONCLUSION

The following conclusions were made in this investigation:

- Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Most exceedances occurred in the December, a first flush rainfall event, which was the largest rainfall event captured during the sampling period.

- It was found that generally the contaminants were present in both rural and urban environments, however in some cases the rural area was found to have a larger impact than the urban area and the guideline concentrations were at times exceeded prior to reaching the urban discharge points.

The following changes are recommended to the Rangiora Stormwater Monitoring Programme for Woodend:

- It is recommended that further thought is put into placing E. coli and phosphorus to the urban impact section of the monitoring programme, as WDC shouldn’t be trying to meet a guideline level which is near exceedance, due to the significant rural contributions of E. coli and phosphorus.

- It is recommended that Lead and Total Hydrocarbons are removed from the ‘urban impact’ section of the Stormwater Monitoring Programme, as the results indicated that the concentrations were consistently far below the guidelines.

- It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP.

- It is recommended that contaminants such as E. coli, and phosphorus should be investigated further by ECan within the rural catchment. Both of these contaminants exceed the LWRP guidelines in the rural zones, upstream of the urban limits. It is also suggested that ECan consider investigating nitrogen contaminates in the rural areas as rural catchments consistently exceed the ANZECC guidelines for TN however, as it stands they currently fall below the guideline levels provided in the LWRP for DIN.

These conclusions will be used to develop the Woodend Stormwater Monitoring Programme.
2. **INTRODUCTION**

Environment Canterbury (ECan) has requested each of the Territorial authorities within the Canterbury region submit Global Stormwater Consents for all major towns in each district. The Woodend Stormwater Discharge Consent, the second of such in the Waimakariri District, will be prepared in conjunction with a stormwater management plan (SMP) and consent application. This requires the Waimakariri District Council (WDC) to produce a stormwater monitoring programme. This monitoring programme focuses on the urban stormwater discharge impact on the waterways, as opposed to general stream health.

During the steering group meeting with Mahaanui Kurataiao Limited (MKT) and ECan, in November 2013, a recommendation was suggested for the WDC to undertake a baseline sampling programme. The purpose of this was to demonstrate to all parties, the source of the waterway contaminants and the current health of the waterways. Following on from the Waimakariri District’s Urban Stormwater Consent: Baseline Monitoring Report (TRIM 160128006568) a baseline sampling programme has been undertaken for Woodend. The purpose of this sampling programme was to collect data which could then be used to demonstrate to all parties the source of the water contaminants and the current health of the waterways.

Four sample rounds have been completed, in both wet and dry conditions, at seven sites spread over the Taranaki Stream, Waiora Stream, McIntosh Drain, Box Drain and a channel adjacent to the state highway at the south of Woodend. The results from each of these sampling rounds has been summarised along with suggested potential sources of each contaminant.

The purpose of this report is to present the findings from this baseline sampling programme and recommend the parameters that should be carried forward to the ongoing stormwater monitoring programme.

3. **BACKGROUND**

The stormwater monitoring programme has been designed to identify potential areas of urban stormwater impact on the Woodend receiving waters. The trends formed from the monitoring programme analysis can be used to direct stormwater treatment activities within the Woodend urban limits.

The WDC would only agree to sample contaminants which have been proven to be urban sourced. The main consequences of accepting parameters which are rurally sourced are as follows:

1. Some of the sample parameters would be outside of the stormwater discharge consent scope, as they enter the network primarily from rural sources.
2. The cost of increased sampling; including collection, laboratory tests and results analysis.
3. Responsibility and resources for treating rural source contaminants are transferred to urban ratepayers, reducing the pressure from regulators applied to rural properties to mitigate their own adverse effects, and reducing available funding from urban ratepayers for proven urban contaminants such as copper or zinc.
4. The subsequent implications for other future urban consents within the Waimakariri District.

Therefore it was recommended that a 6 month baseline investigation be undertaken, and results used to assist determining the source of the contaminants and associated consent conditions.

3.1. **MKT AND ECAN INVOLVEMENT WITH THE STORMWATER NETWORK CONSENTS**

The WDC worked closely with MKT and ECan to produce the Rangiura stormwater network consent. The WDC will be applying to ECan for the Woodend network discharge consent. WDC will be sending the application and monitoring programme to MKT and ECan to provide advice before formally submitting the consent application.

3.2. **WOODEND AREA**
Rural land surrounds Woodend Township. There is a high potential for the waterways within the urban limit to be impacted by rural activities. Within the Woodend urban limits there are three main receiving waters which receive urban stormwater; the Taranaki Stream, Waiora Stream and the McIntosh Drain (downstream of the East Woodend stormwater management area). The drains to the south ultimately discharge into the Kaiapoi River.

ECan's known spring database does not identify any springs feeding into local waterways in or near Woodend.
Figure 1 represents the WDC land zones surrounding Woodend.
Woodend township is split over three main catchments: the Waimakariri River, Taranaki Stream and Saltwater Creek catchments. Taranaki Stream discharges into the Ashley River and the other two discharge into the Waimakariri River. Figure 2 presents the catchments that the Woodend Township discharges to.

Figure 2: Woodend is split by three main catchments.
Woodend can be subdivided into sub-catchments as illustrated in Figure 3.

Figure 3: Woodend Stormwater Sub Catchments and Sample Points
The Taranaki collects water from the East of Woodend. This waterway is composed of both urban and rural areas. It should be noted that development is occurring to the north of Woodend (the Ravenswood...
development) which will extend the urban limits to the northern boundary shown in Figure 3 and will significantly modify this part of the catchment.

The Waiora Stream Catchment is composed of a combination of urban and rural land.

The McIntosh Drain is fed by the south-eastern urban area of Woodend and rural land to the east of this. It is Woodend's largest urban subcatchment.

Located on the western side of Woodend the Box Drain subcatchment is composed of an approximately 50% split of rural and urban residential land.

The Transit Drain subcatchment is composed of an approximately 50% split of rural and urban residential land. This catchment discharges into the Cam River.

The Panckhurst Drive subcatchment is urban residential.

### 3.3. **RANGIORA STORMWATER MONITORING PROGRAMME**

The Rangiora stormwater monitoring programme was developed in 2014 and has been gradually improved upon since. The Woodend stormwater monitoring programme will be modelled off the Rangiora Stormwater Monitoring Programme, with some modifications for the Woodend contaminants, informed by this investigation.

Generally the Rangiora stormwater monitoring programme report specifies the following:
- Sample Locations
- Sample Parameters
- Sample Frequency

The Rangiora stormwater monitoring programme includes the following water quality monitoring parameters and frequency:

<table>
<thead>
<tr>
<th>Description</th>
<th>Location</th>
<th>Urban Impact Monitoring (part of consent)</th>
<th>Stream Health Monitoring (not part of consent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Point Inspection</td>
<td>Downstream of major discharge points in receiving waterways</td>
<td>Inspection of the major discharge points into the receiving waters</td>
<td>Water quality testing</td>
</tr>
<tr>
<td>Receiving Surface Water</td>
<td>Selected receiving waters sampling points</td>
<td>Water quality testing</td>
<td>Ecological surveys</td>
</tr>
<tr>
<td>Stormwater Basin</td>
<td>Dry and Wet Stormwater Basins</td>
<td>Soil or Sediment sampling of the Stormwater Basins</td>
<td>Sediment sampling of the stream beds</td>
</tr>
<tr>
<td>Stream Sediment</td>
<td>Stream beds (sites to be confirmed)</td>
<td>Stream beds</td>
<td>Selected receiving waters sampling points</td>
</tr>
<tr>
<td>Surface Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecological</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Rangiora Stormwater Monitoring Programme Overview
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Water clarity, visual contaminants and erosion</th>
<th>Dissolved Copper, Dissolved Zinc and Polycyclic Aromatic Hydrocarbons</th>
<th>Total Copper, Total Lead, Total Zinc and Polycyclic Aromatic Hydrocarbons</th>
<th>Sediment Survey; Total Copper, Lead, Zinc and Polycyclic Aromatic Hydrocarbons</th>
<th>Dissolved Oxygen pH Temperature Specific Conductance Total Phosphorous Total Nitrogen, Ammonia, E. coli, TSS</th>
<th>Periphyton Fish species Macrophytes QMCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Quarterly</td>
<td>Biannually</td>
<td>Every 5 years</td>
<td>Every 5 years</td>
<td>Annually</td>
<td>Every 5 years</td>
</tr>
<tr>
<td>Weather Conditions</td>
<td>Wet Weather</td>
<td>Ideally First Flush</td>
<td>Dry Weather</td>
<td>Dry Weather</td>
<td>Dry Weather</td>
<td>Dry Weather</td>
</tr>
</tbody>
</table>

Generally speaking the urban impact would be measured by monitoring urban contaminants through discharge point inspections, receiving surface water testing, stormwater basin testing and stream sediment surveys. These tests would form part of the Woodend stormwater network discharge consent, with consent management objectives applied to seek to address any exceeded values.

Similar to the Rangiora Consent, the stream health monitoring would be included within the Woodend stormwater network discharge consent, however the parameters will not have consent management objectives associated with them, i.e. this information will be utilised for other Council projects, such as stream enhancement programmes outside the scope of the consent, as these parameters are not considered to be primarily contributed by stormwater discharge.

This investigation looks at water quality samples, which would only affect the urban impact and stream health sections of this monitoring programme.

### 3.4. GUIDELINE VALUES

Water quality guidelines are used to identify if the WDC waterways are in a healthy condition. The guidelines have defined Trigger Levels or maximum allowable values (MAVs) for many different waterway contaminants. In some cases such as dissolved oxygen and pH there are also minimum allowable values (denoted Min AV).

The guidelines that are used to analyse our data are sourced from the following resources:

1. Canterbury Land and Water Regional Plan (2012) \((LWRP, \text{ Section 16, Schedule 5})\)
2. ANZECC Water Quality Guidelines for Fresh and Marine Water Quality (ANZECC, 2000)

The LWRP gives a guideline to the level to which a ‘spring fed – plains urban’ catchment should be striving to meet. However this guideline is quite brief, there are several contaminants sampled that are not in the LWRP. Therefore, although the LWRP will be the main guideline source, the ANZECC guidelines will be used if LWRP does not provide a guideline value for any parameter considered essential to the consent. In these cases the 90 % level of protection (LOP) trigger value has been used. For a number of contaminants the LWRP guideline value is equal to the ANZECC guideline value.

The guidelines that are being compared to the contaminant concentration are specified.
4. METHODOLOGY

The proposed baseline study aimed to confirm whether the common water quality parameters are from primarily rural or urban sources.

Four water sampling rounds were undertaken by the WDC Water Unit and analysed by the WDC Project Delivery Unit. The sampling occurred approximately monthly from August to December 2016.

The samples were collected using best practice methods and delivered directly to the laboratory after collection. The sample testing was undertaken by Hill Laboratories in Hamilton.

4.1. SAMPLE LOCATIONS

To assess baseflow (DWF) contaminant concentrations and runoff contaminant concentrations (WWF), sample sites have been selected to be within the receiving waters.

Seven sites were sampled for the baseline sampling programme; three in the Taranaki Stream (WDTS065, WDTS066, WDTS053), one in the Waiora Stream (WDWS005), one in the Box Drain (WDBD005), one downstream of the Transit Drain (WDSH024) and one in the McIntosh Drain (WDMD078). These sites were selected from the urban stormwater impact sites, so that the data is comparable in the future.

The proposed sample points were situated at either the upstream edge of the urban limits (or at the stream source), and the downstream edge of the urban limits. The change in concentration of contaminants in the receiving waters will enable the WDC to assess the contaminants contributed by the urban area.

The sample locations are as follows:

<table>
<thead>
<tr>
<th>Site Code</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WDBD005</td>
<td>Box Drain, West of Rangiora Woodend Road - School Road Intersection</td>
</tr>
<tr>
<td>WDTS075</td>
<td>Taranaki Stream, Gatehouse Lane</td>
</tr>
<tr>
<td>WDTS066</td>
<td>Taranaki Stream, West of Chinnerys Road Opposite Nursery</td>
</tr>
<tr>
<td>WDTS053</td>
<td>Taranaki Stream, East of Main North Road (SH1) – Pegasus Boulevard Roundabout</td>
</tr>
<tr>
<td>WDWS005</td>
<td>Waiora Stream, East of SH1</td>
</tr>
<tr>
<td>WDMD078</td>
<td>McIntosh Drain, before East Woodend Pond, Petries Road</td>
</tr>
<tr>
<td>WDSH024</td>
<td>SH1 Drain, Woodend Beach - Main North Road Intersection</td>
</tr>
</tbody>
</table>

Figure 4 presents a map of the baseline sample sites. See Appendix A for more information on the sample locations; including descriptions, GPS locations and photographs.
Figure 4: Woodend sample sites for the Baseline Monitoring Programme.
4.2. SAMPLE PARAMETERS

The water quality parameters that were sampled as part of this baseline study are as follows:

Laboratory tests
- Total suspended solids
- Dissolved copper
- Dissolved lead
- Dissolved zinc
- Total Ammoniacal-N
- Nitrate-N + Nitrite
- Total Kjeldahl Nitrogen (TKN)
- Dissolved Reactive Phosphorus
- Total phosphorus
- *E. coli*
- Total petroleum hydrocarbons

YSI multi-probe portable probe measurements
- Dissolved oxygen
- pH
- Temperature
- Conductivity

4.3. FREQUENCY

The samples were retrieved approximately every month, so that four sample rounds were undertaken. Wet and dry weather days were selected so the source of the contaminants could be separated into spring discharge and/or runoff contaminants.

The following list presents the selected sampling days:
1. August 4th 2016, sampling commenced at 3:00 pm
2. September 19th 2016, sampling commenced at 3:00 pm
3. October 13th 2016, sampling commenced at 2:00 pm
4. December 12th 2016, sampling commenced at 3:00pm

The plan for sampling was to be in the wet and dry conditions (and ideally across seasons). Weather conditions were not quite right in November, hence this month was missed.
5. RESULTS

5.1. SAMPLING WEATHER CONDITIONS

First flush events give the best measure of runoff contaminants. As first flush events are statistically infrequent, getting a first flush event within the baseline monitoring programme period was predicted to be difficult. Therefore samples were retrieved in dry conditions and wet conditions.

Table 3 presents a summary of the rainfall prior to the water quality sampling; the rainfall data was taken from the Ayres Street, Woodend WDC rainfall gauge.

Table 3: Presents a description of the conditions on each of the baseline sampling days in 2016

<table>
<thead>
<tr>
<th>Date</th>
<th>Weather Conditions</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th August 2016</td>
<td>Dry weather when sampling, 2 mm of rain in the 24 hours before sampling, 4 mm of rainfall 72 hours prior to the sampling</td>
<td>Minor wet weather event.</td>
</tr>
<tr>
<td>19th September 2016</td>
<td>Dry weather while sampling, 0 mm of rain in the 24 hours before sampling, 0 mm rainfall 72 hours prior to the sampling</td>
<td>Dry weather event.</td>
</tr>
<tr>
<td>13th October 2016</td>
<td>Dry weather while sampling, 0 mm of rain in the 24 hours before sampling, 4.4 mm rainfall 72 hours prior to the sampling</td>
<td>Dry weather event.</td>
</tr>
<tr>
<td>12th December 2016</td>
<td>Dry weather while sampling, 12.4 mm of rain in the 24 hours before the sample, 36.4 mm rainfall 72 hours prior to the sampling</td>
<td>Moderate wet weather event, 2.6 year return period for 1 hour interval. *First flush event.</td>
</tr>
</tbody>
</table>

* First flush conditions are defined as a rainfall event with rainfall no less than 10 mm and no greater than 25 mm, over 24 hours (CCC, waterways wetlands and drainage guide). Antecedent precipitation conditions should be considered, where a first flush storm needs to have a period of at least 72 hours of no measurable precipitation (Otago Regional Council).

See Appendix B for rainfall hydrographs of the sampled events.

5.2. RESULTS SUMMARY

There were several parameter concentrations that were below detectable limits in the samples given to Hills Laboratory; for simplicity these were recorded as zero in this investigation.

There was flow in sampling point on the state highway near the State Highway Drain (WDSH024) during only one of the four events. As a result there were no samples taken from this point during the sampling rounds in August, September and October. Similarly the sample obtained from Box Drain (WDBD005) during the September sampling round was noted to be from still stagnant water so the results obtained from this sample are not necessarily representative of stormwater runoff.

It is also noted that most guidelines specify that the sampling should be undertaken in a first flush event. The sampling round completed in the December event was the closest event to a first flush rainfall event, although there was rainfall recorded in the days leading up to this event.

The following sections of this report look at each of the tested contaminants separately, to discuss the source of the contaminant and proposed changes to the current stormwater monitoring programme.

See Appendix C for a summary of the laboratory results summary for each of the sample rounds.
5.2.1. **Total Suspended Solids**

Total suspended solids (TSS) include all particles suspended in water which will not pass through a filter. Suspended solids are mainly non-point source pollutants such as soil erosion from agricultural and construction sites.

TSS as measured coming in and going out of Woodend are shown in Figure 5. The LWRP provides a guideline TSS value of 50 mg/L. It is acknowledged that this is a measure at the discharge point, however it is the only relevant guideline of TSS to compare the results to.

![Figure 5: Total suspended solids as measured in the Taranaki Stream, Waiora Stream, McIntosh Drain and Box Drain and Transit Drain.](image)

Total suspended solids were generally low or below detectable limit. The only significant exception to this was the large December event which resulted in total suspended solids above the guideline levels at two sites, one in the McIntosh Drain (WDMD078) and on the Transit Drain (State Highway 1, WDSH024). Samples taken from waterways entering Woodend from rural areas demonstrated levels just above the detectable limit, even in the December event.

The results show that TSS is mainly an urban contaminant and should be monitored as part of the stormwater network discharge consent.
5.2.2. **Dissolved Copper**

Primary sources for dissolved copper (Cu) include but are not limited to vehicle brake pad wear, plumbing uses such as copper spouting and soil disturbance from historic horticultural sites.

The 90% LOP trigger value for copper provided in both the LWRP and ANZECC guidelines is 0.0018 mg/L. Dissolved copper levels are shown in Figure 6.

![Dissolved Copper](image)

**Figure 6**: Dissolved copper levels in Woodend waterways.

A summary of the results by waterway is presented below.

Taranaki Stream (WDTS075, WDTS066 and WDTS053) – only detected in the sample taken at the site downstream of the highway.

McIntosh Drain (WDMD078) – detected in most samples.

Box Drain (WDBD005) – second highest reading recorded during the sampling, but only detected at this site in the August event.

Waiora Stream (WDWS005) – not detected.

State highway WDSH024) – exceeded allowable levels in the first flush event. Possibly due to surface runoff from the adjacent highway.

Based on the results the main sources of copper are from urban runoff such as state highways. It was detected at four out of the seven sample sites but was generally below the guideline value. Levels exceeded the guideline in only one sample, in the first flush event in December at WDSH024 adjacent to the state highway. Interestingly the McIntosh Drain sampling site (WDMD078) was the only site where copper was observed on more than occasion. Hence the McIntosh Drain catchment appears to be the most heavily influenced by copper - likely from a combination of road (the state highway is immediately upstream) and residential runoff.
The results suggest Woodend and the state highway are contributing dissolved copper to the local waterways. The rural catchments upstream of Woodend do not appear to be leading to increased dissolved copper levels.

The results show that copper is mainly an urban contaminant and it is recommended that dissolved copper is included in the ‘urban impact’ section of the monitoring programme.

5.2.3. **Dissolved Lead**

The recorded levels of dissolved lead are shown in Figure 7.

Primary sources of dissolved lead (Pb) include but are not limited to road runoff (from automobile parts), and degrading construction components such as paint and roof flashings. The 90% trigger level guideline provided by ANZECC for dissolved lead is 5.6 µg/L.

![Dissolved Lead graph]

Figure 7: Dissolved lead levels recorded in Woodend’s waterways.

Dissolved lead was detected in four samples spread over three samples sites. Similar to the dissolved copper results, the highest recorded result was from the state highway site (WDSH024) during the first flush event and the second highest result was recorded in the box drain (WDBD005), following the minor wet weather event in August. Lead was not detected in any of the predominantly rural fed waterways.

There was no lead present in any samples taken during either of the dry weather periods, it was only detected during the wet weather events in August and December 2016.

The results show that lead is predominantly an urban contaminant. Recorded levels of lead are low and do not appear to be approaching the guideline values level in any of Woodend’s samples. This is consistent with findings in Rangiora.
Therefore it is recommended that dissolved lead is removed from the urban impact monitoring programme of the guideline.

5.2.4. **Dissolved Zinc**

Sources of dissolved zinc (Zn) are commonly from anti-corrosion agents used in the galvanisation of iron and steel. It is found in metal roofs, metal fences, lampposts, car bodies, anticorrosion paint used on exterior steel, in rubber vehicle tyres to protect against UV degradation, and some herbicides.

The LWRP and ANZECC provide a 90% guideline value of 15µg/L of dissolved zinc.

The recorded levels of zinc are presented in Figure 8.

![Zinc Concentration Chart](chart.png)

**Figure 8: Dissolved concentrations of zinc in the samples captured at Woodend**

Dissolved zinc is present in the three main urban fed catchments however only exceeds the guideline in the box drain (WDBD005) and adjacent to the state highway (WDSH024). Similar to the other heavy metals lead and copper, the highest dissolved zinc levels are recorded in the box drain (WDBD005) during the minor wet weather event in August and in the first flush event in December in the box drain and state highway drain respectively. The August Box Drain sampling event may have involved sampling in relatively stagnant water (as noted with the September sample). Further sampling at this site is required to determine whether the elevated contaminants observed at the Box Drain in the August sampling round were an anomaly or a result of unusual water retention / drainage occurring at this site.

Interestingly the amount of dissolved zinc is considerably higher in the Box Drain than on the State Highway, which stands in contrast to the levels observed for copper. This could be a reflection of the greater amount of zinc coming from galvanised roofs in the sub-catchment.
The results show that zinc is mainly an urban contaminant and it is recommended that dissolved zinc is included in the ‘urban impact’ section of the monitoring programme.

5.2.5. **Nitrogen**

Nitrogen primary sources include but are not limited to fertilizers and sewerage. It is noted that Total Nitrogen is the sum of TKN + Nitrate-N + Nitrite-N and DIN is the sum of Total Ammoniacal-N + Nitrate-N + Nitrite-N.

Figure 9 and Figure 10 present the Total Nitrogen (TN) and Dissolved Inorganic Nitrogen (DIN) concentrations from laboratory results from waterways in the Woodend area, respectively. The ANZECC guideline for total nitrogen is 0.614 mg/L. The LWRP guideline of 1.5 mg/L has been applied for DIN (the bioavailable portion). It is worth noting that the LWRP does not specify a guideline value for TN so the guideline value applied from the ANZECC guidelines for TN is more stringent as it is actually less than the value for DIN.

![Figure 9: Recorded levels of Total Nitrogen in the Woodend area.](image)

The guideline for TN, 0.614 mg/l, is exceeded in nine of the 24 samples. This is especially noticeable in the predominantly rurally sourced waterways such as the Taranaki (WDTS075 and WDTS053) and Waiora Stream (WDWS005). TN levels are also high in the Box Drain (WDBD005). The highest level recorded was during the December first flush event at site WDSH024 (adjacent to the state highway). It is worth noting this was the only sample taken from this site as it was dry during the other sampling rounds.
All samples had DIN levels below the LWRP guideline. Interestingly the DIN level recorded for the December event at site WDSH024 were far below the guideline value and relatively inconspicuous amongst the other sites (i.e. TN>> DIN at this site). This suggests the forms of TN entering this water way, although in relatively high concentrations, are not readily bioavailable. The main flow of the Taranaki Stream (WDTS075 and WDTS053) demonstrates the highest levels of DIN of all the sites and in all captured events the stream DIN levels exhibit a decrease moving downstream through Woodend. This suggests that the Taranaki Stream is strongly influenced by upstream land use (predominantly agricultural) and the urban areas of Woodend have a dilutive effect on DIN levels.

The sample site WDTS066 (located in the middle stretch of the original Taranaki Stream channel) demonstrates very low TN levels and DIN below the detectable limit of 0.01 mg/l. This reinforces the idea that although the site ID has the prefix WDTS and is in the Taranaki Stream it is not carrying water from the upstream Taranaki Stream catchment. Just below sample site WDTS075 the water is diverted out of the historic channel and now flows along the manmade channel to the north. Elevated levels of urban contaminants such as zinc and copper at WDTS066 that are not picked up at the upstream or downstream sites support this. It is worth noting the sample site always contained flow during sampling so appears to have a reliable source from within this subcatchment to maintain this baseflow.

It is recommended that TN is replaced with DIN, as this is the value provided in the LWRP, in the stream health monitoring programme. It is recommended this contaminant stays in the stream health monitoring section of the programme as the results show that concentrations are more closely linked to rural runoff than urban.

5.2.6. **Phosphorus**

Primary sources of phosphorus include but are not limited to fertilisers (both agricultural and residential), sewerage and some detergents. Phosphorus has a tendency to bind to soil particles and can be transported into waterways with sediment runoff.

Figure 11 and Figure 12 present the recorded levels of Total Phosphorus (TP) and Dissolved Reactive Phosphorus (DRP) respectively. Similar to nitrogen the LWRP does not provide a guideline value for TP.
so the 90% ANZECC guideline value of 0.033 mg/L has been used. The LWRP provides a guideline value of 0.016 mg/L for DRP.

Figure 11: Total Phosphorus levels in Woodend’s waterways.

Figure 12: Dissolved Reactive Phosphorus in Woodend’s waterways
Based on the levels observed it is apparent phosphorus is more of an issue in Woodend’s waterways than nitrogen. In contrast to the distribution of nitrogen, it is the urban fed waterways that demonstrate higher levels of phosphorus than the rural waterways. Both of the sample sites in the main flow of the Taranaki Stream (WDTS075 and WDTS053) returned TP and DRP levels below the guideline levels whereas the urban fed waterways all demonstrated phosphorus levels in exceedance of the guidelines.

The majority of phosphorus in the samples is in the form of DRP (the more readily bioavailable form) rather than particulate or organic forms. This indicates the majority of phosphorus entering the stream is in a form which could readily contribute to eutrophication.

It is noted however that it the phosphorus concentrations are elevated to near or above guideline levels at all sample sited. It would be unfair to say phosphorus is only urban sourced.

At all sample sites phosphorus levels were highest in the first flush event in December. Initially it was suspected this was likely to be a result of greater entrainment of suspended solids due to the higher velocities experienced during the larger rain event. However, as illustrated in Figure 13 TSS levels have a strong linear correlation with DRP and a noticeably weaker correlation with TP suggesting entrainment of sediment is not the main contributor to elevated levels of phosphorus.

As DRP is stated as the applicable indicator for of phosphate in the LWRP, it is recommended that it replaces TP in the monitoring programme. The results show that phosphorus has both urban and rural sources. It is recommended that further thought is put into placing this contaminant into the urban impact section of the monitoring programme. As it stands WDC would face significant challenges to meet a guideline level which is near or above exceedance due to the significant rural contributions of phosphorus.
5.2.7. \textit{E. coli}

\textit{Escherichia coli} (\textit{E. coli}) is used as an indicator of possible sewage contamination as \textit{E. coli} is commonly found in human and animal feces. The LWMP provides a guideline of 550 CFU/100 mL of \textit{E. coli} and requires 95\% of samples to be below this value.

Figure 14 shows the recorded levels of \textit{E. coli} in Woodend’s waterways.

![Figure 14: \textit{E. coli} levels in Woodend's waterways.](image)

The concentrations of \textit{E. coli} in these samples exceed the guideline values in seven instances, or 24\% of the samples captured. Exceedances were particularly prevalent in the first flush event seen in December. Aside from the December event, the smaller October rain event was the only other event to result in an exceedance of the guideline value. The sites sampled during the minor wet weather event in August and dry weather event in September both demonstrated levels of \textit{E. coli} comfortably below the guideline value.

Although less than half the guideline value, it is worth noting that the two sites in the Taranaki stream demonstrated the highest and most consistent base levels of \textit{E. coli} levels observed during dry events. This is likely to be the result of consistent contamination upstream in the rural land areas. The urban areas generally exhibited low to no \textit{E. coli} during dry weather events with extremely high levels after the first flush event in December.

As the concentrations of \textit{E. coli} are increasing in urban areas the potential sources have been investigated further. The main suspected sources of \textit{E. coli} include:

- Fecal matter from urban animals such as dogs, cats, and birds
- Agricultural fecal matter
- Human fecal matter

The locations of Woodend’s public parks, which could be common dog walking areas, are presented in Figure 15. These are areas that have higher concentrations of domestic animal fecal matter. There does not appear to be a strong obvious link between \textit{E. coli} levels and the locations of public parks.
Figure 15: Map of public park areas in Woodend that may be sources of point sources of *E. coli*.

Overflows are managed separately through the Wastewater Management Plan process. There may be sewerage overflows occurring within the wastewater network contributing to the issue. However, modelling
completed for the Woodend Network in 2014 indicated that overflows should not occur during a 1 in 5 year storm event.

The results show that *E. coli* appears to have urban sources and elevated levels in the urban catchments are seen during rainfall events. However the results also show that significant levels of *E. coli* are entering the township from rural areas. Therefore it is recommended that further thought is put into placing this contaminant in the urban impact section of the monitoring programme.

Further investigation is required to identify whether there are any significant urban sources of *E. coli* contributing to the above exceedances, particularly at/into the State Highway 1 Drain. The Drain appears to have a solely urban sub-catchment and the high level of *E. coli* observed is not easily explained.

WDC should not be trying to meet a guideline level which is near exceedance, if there are found to be significant rural contributions of *E. coli* affecting results.

### 5.2.8. Total Hydrocarbons

Total Hydrocarbon primary sources include but are not limited to road asphalts, manufacturing facilities and fuelling depots, as these areas frequently experience oil spillages.

There is no consistency between guidelines for hydrocarbons; ECan is in the process of investigating and stating a guideline.

For all samples the results indicated that the total hydrocarbon concentrations for C7 - C9, C10 - C14 and C15 - C36 were all below the detectable limits. Therefore it was concluded that the Woodend urban and rural catchments do not have an issue with hydrocarbons.

It is recommended the hydrocarbons should be removed from the urban impact section of the monitoring programme, however the total hydrocarbon concentration should be kept in the 'sediment sampling' section of the monitoring programme, until it has been investigated further.

### 5.2.9. Dissolved Oxygen

Several factors affect the amount of oxygen dissolved in the water in waterways. Colder water usually has more oxygen, because gases dissolve more readily in cold water. Water motion also helps mix oxygen into the water. Eutrophication can result in the depletion of oxygen concentration in the waterways as resulting organic matter respires and breakdowns.

Figure 16 and Figure 17 show the DO levels recorded by portable probe during the sampling rounds.

The ANZECC guidelines provide a relatively narrow DO guideline range of between 98% (min) and 105% (max). The absolute levels of DO, can also be used to gauge the general health of a waterway. For optimum fish health the minimum DO level suggested by NIWA is 5 mg/L.
Figure 16: DO levels observed in Woodend's waterways as a percentage of saturation.

Figure 17: DO levels in observed in Woodend's waterways as an absolute value.
It is clear from the recorded DO levels that there is significant variation in Woodend’s waterways. Although some variation is to be expected the DO fluctuates considerably between sites even within the same water body - for instance in the August event the Taranaki Stream goes from a DO level of 64% at site WDTS075 to 140% 2.2 km downstream at site WDTS053. This trend is not consistent between events and could suggest the DO readings are somewhat unreliable. The DO percentage saturation is a combination of two field measurements, the absolute DO level and the temperature. If both meter readings are not well calibrated then it is possible to produce compounding errors.

Figure 26 shows the absolute DO level exceeds the guideline minimum of 5 mg/L in all but one sample, which was captured in the first flush event in December. Interestingly the December event samples generally had the lowest levels of absolute DO at each site. This is appears to be a direct result of the warmer water in summer resulting in lower solubility of oxygen as saturated oxygen percentage (Figure 16) and temperature (Figure 19) are both relatively high.

The results suggests the waterways were not suffering from the low DO effects that can result from eutrophication at the time of sampling. However, it is expected waterways would have higher than usual DO levels after rain events due to raindrops having a large surface area to volume ratio to absorb oxygen while falling and additional mixing in the waterway created by increased turbulence and the resulting aeration. Low flow periods during warm summer periods are a more likely time to observe signs of eutrophication.

It is recommended that DO is monitored as part of the stream health in the monitoring programme, as it is a portable probe measurement and would not cost WDC much to monitor.

5.2.10. pH

Low pH (acidic) is caused by high organic acids, such as some wetland waters or where mineral acidity occurs naturally. High pH (basic) is caused by highly eutrophic waters, where eutrophication occurs. pH differences can also occur by water draining certain rock, soil types and industrial wastes.

Figure 18 represents the pH portable probe results from the sampled waterways in and around Woodend. The LWRP provides a guideline from pH 6.5 to pH 8.5.
Figure 18: pH readings captured by portable probe in Woodend’s waterways.

The recorded results are all within the guideline range. In general the samples tend to be slightly basic. The dry October event is the only event to demonstrate consistently elevated pH levels. There are three samples in the October and December rounds that demonstrate pH levels slightly below neutral.

The pH levels recorded are comfortably within the LWRP guidelines and don’t indicate eutrophication or other problems indicated by pH changes.

It is recommended that pH is monitored as part of the ‘stream health’ section of the monitoring programme, as it is not proven to be affected by the urban discharges. As it is a portable probe measurement it would not cost WDC much to monitor.
5.2.11. **Temperature**

Temperature of waterways can be affected by the air temperature during a rain event, the temperature of surfaces contributing runoff entering waterways and the temperature of the baseflow. Seasonal temperature fluctuations play a major role.

The LWRP provides a guideline of a maximum temperature of 20 °C for lowland rivers.

![Temperature as captured by portable probe over the Woodend area.](attachment:image.png)

The recorded results follow the trend of warmer temperatures in warmer periods of the year. The waterways reached a maximum temperature of 17 °C, observed in the December event. There is no evidence to suggest that stormwater is altering the temperature of Woodend’s waterways. Additional measurements collected at the same time of the year during wet and dry events would be needed to confirm this observation.

It is recommended that temperature is monitored as part of the stream health in the monitoring programme, as it is a portable probe measurement and would not cost WDC much to monitor.

5.2.12. **Conductivity**

Water Conductivity is a measure of the total ionic strength of the water and is widely used as a quick indication of the level of enrichment of the water. The measurement does not distinguish between nutrient and non-nutrient ions so although it can signal a potential issue it requires additional information to
determine what the source of the ions is. There is no specific guideline for water conductivity provided by ANZECC or the LWRP.

Figure 20 presents the conductivity results recorded by portable probe.

![Conductivity graph](image)

**Figure 20: Conductivity results for Woodend.**

Samples captured in the minor wet weather event in August and dry weather event in October events demonstrate the highest conductivity levels at each site. Samples captured during the first flush December event tend to demonstrate the lowest conductivity observed at each site. As the December event tended to demonstrate the highest levels of conducting nutrients such as DRP, and reasonably high levels of DIN, it appears the elevated conductivity observed in the August and October events is not from nutrients but from non-nutrient ions present in the water.

Although there are no guidelines for conductivity, it is recommended that conductivity is kept in the ‘stream health’ section of the monitoring programme, as it can be easily retrieved and recorded. Sharp changes in conductivity indicate a change in anion or ion concentration which is linked to contaminant quantity and quality.
6. DISCUSSION

Four sample rounds were completed, in both wet and dry conditions, at seven sites spread over the Taranaki Stream, Waiora Stream, Box Drain, Transit Drain, and the McIntosh Drain. The results concluded that basing Woodend’s monitoring programme on the programme approved for Rangiora that some of the contaminants can be removed and some added. Table 4 summarises the proposed changes to the Rangiora monitoring programme for Woodend’s programme.

Table 4: Summary of contaminants from Rangiora’s monitoring programme recommended to be changed for application to Woodend.

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Source</th>
<th>Rangiora’s Monitoring Programme Section</th>
<th>Woodend’s Recommended Monitoring Programme Section</th>
<th>Reason Section for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td>Very Low Concentrations, therefore recommended to remove it from the programme</td>
</tr>
<tr>
<td>Dissolved Copper</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Lead</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Zinc</td>
<td>Urban</td>
<td>Urban Impact</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>-</td>
<td>DIN is in the Land and Water Regional Plan (LWRP), therefore it is recommended that we replace TN with DIN</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN)</td>
<td>Rural</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Mainly Urban</td>
<td>Stream Health</td>
<td>-</td>
<td>DRP is in the LWRP therefore it is recommended that TP is replaced with DRP. It appears DRP may be from both rural and urban sources. It is recommended further consideration is given to include DRP in the Urban Impact section of the monitoring programme.</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (DRP)</td>
<td>Mainly Urban</td>
<td>-</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td><strong>E. coli</strong></td>
<td>Urban &amp; Rural</td>
<td>Stream Health</td>
<td>Urban Impact</td>
<td><em>E. coli</em> was found to be from both rural and possibly urban sources. It is a contaminant that is monitored as part of the Wastewater Management plan. It is recommended further consideration is given to including <em>E. coli</em> in the Urban Impact section of the monitoring programme.</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>-</td>
<td>Urban Impact</td>
<td>-</td>
<td>Very Low Concentrations therefore recommended removing it from the programme. Total Hydrocarbons will remain in the basin sediment monitoring.</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Rural</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>-</td>
<td>Stream Health</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Hardness</td>
<td>Mainly Rural</td>
<td>-</td>
<td>Urban Impact</td>
<td>Initial one off sample recommended as overall indicator of contaminants.</td>
</tr>
</tbody>
</table>
The contaminants that differed from the Rangiora Stormwater Monitoring Programme were Phosphorus and *E. coli*, these were found to be urban and rural sourced in Woodend and mainly rurally sources in Rangiora. Total Hydrocarbons are recommended to be removed from the programme as they were consistently measured to be well below the guideline values.

It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP.

It was recommended by ECAn water quality specialists that the waterway hardness is measured once or twice to characterise the waterway. This will enable the WDC to get site specific trigger values for metals. This would be undertaken as part of the monitoring programme, as the sample sites would not be the same as in this baseline programme.

It was found that a number of the contaminants are sourced rurally and the relevant guidelines are exceeded prior to entering the township. For some of these contaminants there was an increase in concentration through the township, indicating that the urban area discharges these contaminants also, but in smaller quantities.

There are no known contaminants discharging from springs.

This study has demonstrated that the rural areas have a significant impact on the health of the Woodend waterways, and possibly others in the district. It is recommended that ECan undertakes monitoring upstream of the townships as contaminant concentrations are exceeded prior to the urban limits.

Table 5 presents the recommended Stormwater Monitoring Programme overview updated using the results from this baseline investigation.

**Table 5: Recommended Updated Stormwater Monitoring Programme Overview**

<table>
<thead>
<tr>
<th>Description</th>
<th>Urban Impact Monitoring (part of consent)</th>
<th>Stream Health Monitoring (not part of consent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Point Inspection</td>
<td>Receiving Surface Water</td>
<td>Stormwater Basin</td>
</tr>
<tr>
<td>Inspection of the major discharge points into the receiving waters</td>
<td>Water quality testing</td>
<td>Soil or Sediment sampling of the Stormwater Basins</td>
</tr>
<tr>
<td>Location</td>
<td>Downstream of major discharge points in receiving waterways</td>
<td>Selected receiving waters sampling points</td>
</tr>
<tr>
<td>Parameters</td>
<td>Water clarity, visual contaminants and erosion</td>
<td>Dissolved Copper, Dissolved Zinc TSS, Dissolved Reactive Phosphorous and <em>E. coli</em></td>
</tr>
</tbody>
</table>

QMCI = 199
<table>
<thead>
<tr>
<th>Frequency</th>
<th>Quarterly</th>
<th>Biannually</th>
<th>Every 5 years</th>
<th>Every 5 years</th>
<th>Annually</th>
<th>Every 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather Conditions</td>
<td>Wet Weather</td>
<td>Ideally First Flush</td>
<td>Dry Weather</td>
<td>Dry Weather</td>
<td>Dry Weather</td>
<td>Dry Weather</td>
</tr>
</tbody>
</table>

It should be noted that although applied here in this report in the absence of LWRP guidelines, the ANZECC (2000) guidelines do not provide water quality standards in the traditional sense (i.e. fixed standards that should not be exceeded). Rather, ANZECC (2000) states that the uncertainty in the derivation and application of such standards led them to develop trigger values that indicate a potential environmental problem if they are exceeded. Hence, ANZECC (2000) trigger values are not intended to be applied in an absolute fashion. If a trigger value is exceeded, further investigation is required.
7. **CONCLUSION**

The following conclusions were made in this investigation:

- Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Most exceedances occurred in the December, a first flush rainfall event, which was the largest rainfall event captured during the sampling period.

- It was found that generally the contaminants were present in both rural and urban environments, however in some cases the rural area was found to have a larger impact than the urban area and the guideline concentrations were at times exceeded prior to reaching the urban discharge points.

The following changes are recommended to the Rangiora Stormwater Monitoring Programme for Woodend:

- It is recommended that further thought is put into placing *E. coli* and phosphorus to the urban impact section of the monitoring programme, as WDC shouldn’t be trying to meet a guideline level which is near exceedance, due to the significant rural contributions of *E. coli* and phosphorus.

- It is recommended that Lead and Total Hydrocarbons are removed from the 'urban impact' section of the Stormwater Monitoring Programme, as the results indicated that the concentrations were consistently far below the guidelines.

- It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP.

- It is recommended that contaminants such as *E. coli*, phosphorus and nitrogen should be investigated further by ECAn within the rural catchment. Both *E. coli* and phosphorus levels exceed the LWRP guidelines in the rural zones, upstream of the urban limits. Nitrogen contaminates in the rural areas as rural catchments consistently exceed the ANZECC guidelines for TN however currently fall below the guideline levels provided in the LWRP for DIN.

These conclusions will be used to develop the Woodend Stormwater Monitoring Programme. After discussions with ECAn and MKT the Stormwater Monitoring Programme will be updated.
8. **APPENDIX**

**APPENDIX A: EXTRA BASELINE SAMPLING INFORMATION**

Sampling kits should be ordered in advance to prepare for unpredicted sampling times. The kits should contain a STER, UP1L, NWU100 and a TPH250 from Hill Laboratory. The sample kits should be labelled in the following way:
SITE DESCRIPTIONS:

Site: WDBD005

GPS location: X-Coordinate: 1572557; Y-Coordinate: 5203147

Site Description: Box Drain, West side of Rangiora Woodend Road.

Site Photo:

Site: WDMD078

GPS location: X-Coordinate: 1573732; Y-Coordinate: 5202953

Site Description: McIntosh Drain, before East Woodend Pond

Site Photo:
Site: WDSH024
GPS location: X-Coordinate: 1572942; Y-Coordinate: 5202558
Site Description: SH 1 Drain, Cr Woodend Beach & Main North Rd.
Site Photo:

Site: WDT5075
GPS location: X-Coordinate: 1571721; Y-Coordinate: 5204507
Site Description: Gatehouse Lane.
Site Photo: nil
Site: WDTS066
GPS location: X-Coordinate: 1572812; Y-Coordinate: 5204321
Site Description: Taranaki Stream, East side of Chinnerys Road
Site Photo: 

Site: WDTS053
GPS location: X-Coordinate: 1573660; Y-Coordinate: 5204832
Site Description: East side of the SH crossing, north of the roundabout.
Site Photo: nil

Site: WDWS005
GPS location: X-Coordinate: 1573371; Y-Coordinate: 5204448
Site Description: Waiora Stream crossing, east of the state highway
Site Photo: nil
APPENDIX B: RAINFALL EVENT HYDROGRAPHS

Chinnerys Road, Woodend Rainfall data; 24 hour period prior to the rainfall event is shown in red.

![Rainfall: Woodend (E1572139, N5203917), 1/8/2016-4/8/2016](image1.png)

![Rainfall: Woodend (E1572139, N5203917), 16/9/2016-19/9/2016](image2.png)

![Rainfall: Woodend (E1572139, N5203917), 10/10/2016-13/10/2016](image3.png)
Rainfall: Woodend (E1572139, N5203917), 9/12/2016-12/12/2016

Rain Intensity (mm/5 min)

Time

9/12/2016 10/12/2016 11/12/2016 12/12/2016 13/12/2016 14/12/2016

Prior to Sampling

Rainfall
APPENDIX C: LABORATORY RESULTS SUMMARY

Green and white highlighting marks acceptable values and red highlighting indicates exceedance of the guidelines

August sample round results

<table>
<thead>
<tr>
<th>August</th>
<th>Guideline Value</th>
<th>WDBD005 - West of Rangiora Woodend Road</th>
<th>WDMDO78 - After East Woodend Pond</th>
<th>WDSH024 - Cnr of Woodend Beach and Main North Roads</th>
<th>WDT5075 - West of Chinnerys Road</th>
<th>WDT5066 - Chinnerys Road</th>
<th>WDT5053 - East of Main North Road</th>
<th>WDWS005 - East of SH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (g/m³)</td>
<td>50</td>
<td>7</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Dissolved Copper (g/m³)</td>
<td>0.0018</td>
<td>0.0018</td>
<td>0.0018</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Dissolved Zinc (g/m³)</td>
<td>0.15</td>
<td>0.133</td>
<td>0.057</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
</tr>
<tr>
<td>Dissolved Lead (g/m³)</td>
<td>0.00056</td>
<td>0.00059</td>
<td>0.00022</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Total Nitrogen (g/m³)</td>
<td>0.614</td>
<td>0.72</td>
<td>0.28</td>
<td>1.21</td>
<td>0.19</td>
<td>1.13</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Total Ammoniacal-N (g/m³)</td>
<td>0.0018</td>
<td>0.27</td>
<td>&lt;0.10</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
</tr>
<tr>
<td>Nitrate-N and Nitrite-N (g/m³)</td>
<td>0.015</td>
<td>0.144</td>
<td>0.022</td>
<td>1.07</td>
<td>0.002</td>
<td>0.98</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (g/m³)</td>
<td>0.17</td>
<td>0.58</td>
<td>0.26</td>
<td>0.14</td>
<td>0.19</td>
<td>0.15</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (g/m³)</td>
<td>1.5</td>
<td>0.414</td>
<td>0.022</td>
<td>1.07</td>
<td>0.98</td>
<td>0.98</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (g/m³)</td>
<td>0.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus (g/m³)</td>
<td>0.033</td>
<td>0.084</td>
<td>0.055</td>
<td>0.014</td>
<td>0.023</td>
<td>0.013</td>
<td>0.026</td>
<td></td>
</tr>
<tr>
<td>E. Coli (cfu/100mL)</td>
<td>550</td>
<td>290</td>
<td>85</td>
<td>260</td>
<td>5</td>
<td>300</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>C7-C9# (g/m³)</td>
<td>-</td>
<td>&lt;0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C10-C14# (g/m³)</td>
<td>-</td>
<td>&lt;0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15-C36# (g/m³)</td>
<td>-</td>
<td>&lt;0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Hydrocarbons (g/m³)</td>
<td>-</td>
<td>&lt;0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DO (mg/L)</td>
<td>5</td>
<td>9.25</td>
<td>11.96</td>
<td>10.4</td>
<td>8.09</td>
<td>12</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>8.5</td>
<td>7.18</td>
<td>7.19</td>
<td>7.45</td>
<td>7.08</td>
<td>7.3</td>
<td>7.17</td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
<td>10.1</td>
<td>8.7</td>
<td>11.6</td>
<td>9.8</td>
<td>10.3</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Conductivity (µS/cm)</td>
<td>500</td>
<td>129.8</td>
<td>179.3</td>
<td>144</td>
<td>154</td>
<td>125.7</td>
<td>136</td>
<td></td>
</tr>
</tbody>
</table>
## September sample round results

<table>
<thead>
<tr>
<th>September</th>
<th>Guideline Value</th>
<th>WDBD005 - West of Rangiora Woodend Road</th>
<th>WDM078 - After East Woodend Pond</th>
<th>WDHS024 - Cnr of Woodend Beach and Main North Roads</th>
<th>WDT075 - West of Chinnerys Road</th>
<th>WDT066 - Chinnerys Road</th>
<th>WDT053 - East of Main North Road</th>
<th>WDD005 - East of SH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (g/m³)</td>
<td>50</td>
<td>&lt;3</td>
<td>3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Dissolved Copper (g/m³)</td>
<td>0.0018</td>
<td>&lt;0.0005</td>
<td>0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Dissolved Zinc (g/m³)</td>
<td>0.015</td>
<td>0.0076</td>
<td>0.001</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
</tr>
<tr>
<td>Dissolve Lead (g/m³)</td>
<td>0.00056</td>
<td>&lt;0.00010</td>
<td>0.0001</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
</tr>
<tr>
<td>Total Nitrogen (g/m³)</td>
<td>0.614</td>
<td>0.25</td>
<td>0.17</td>
<td>0.25</td>
<td>0.14</td>
<td>0.02</td>
<td>0.14</td>
<td>0.25</td>
</tr>
<tr>
<td>Total Ammoniacal-N (g/m³)</td>
<td>0.0018</td>
<td>0.010</td>
<td>0.010</td>
<td>0.010</td>
<td>0.010</td>
<td>0.010</td>
<td>0.010</td>
<td>0.010</td>
</tr>
<tr>
<td>Nitrate-N and Nitrite-N (g/m³)</td>
<td>0.015</td>
<td>&lt;0.002</td>
<td>0.008</td>
<td>&lt;0.002</td>
<td>0.008</td>
<td>0.006</td>
<td>0.008</td>
<td>0.006</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (g/m³)</td>
<td>0.17</td>
<td>0.25</td>
<td>0.41</td>
<td>0.25</td>
<td>0.14</td>
<td>0.17</td>
<td>0.14</td>
<td>0.17</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (g/m³)</td>
<td>1.5</td>
<td>0.25</td>
<td>0.14</td>
<td>0.25</td>
<td>0.14</td>
<td>0.17</td>
<td>0.14</td>
<td>0.17</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (g/m³)</td>
<td>0.016</td>
<td>0.014</td>
<td>0.014</td>
<td>0.014</td>
<td>0.014</td>
<td>0.014</td>
<td>0.014</td>
<td>0.014</td>
</tr>
<tr>
<td>Total Phosphorus (g/m³)</td>
<td>0.033</td>
<td>0.022</td>
<td>0.022</td>
<td>0.022</td>
<td>0.022</td>
<td>0.022</td>
<td>0.022</td>
<td>0.022</td>
</tr>
<tr>
<td>E. Coli (cfu/100mL)</td>
<td>550</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>C7-C9# (g/m³)</td>
<td>-</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>C10-C14# (g/m³)</td>
<td>-</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>C15-C36# (g/m³)</td>
<td>-</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
</tr>
<tr>
<td>Total Hydrocarbons (g/m³)</td>
<td>-</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
</tr>
<tr>
<td>pH</td>
<td>8.5</td>
<td>8.04</td>
<td>8.11</td>
<td>7.29</td>
<td>7.75</td>
<td>8.28</td>
<td>8.28</td>
<td>8.28</td>
</tr>
<tr>
<td>Temperature (ºC)</td>
<td>20</td>
<td>13.9</td>
<td>13.4</td>
<td>11.9</td>
<td>13.6</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Conductivity (µS/cm)</td>
<td>500</td>
<td>158.2</td>
<td>99.9</td>
<td>117.8</td>
<td>92</td>
<td>98.9</td>
<td>98.9</td>
<td>98.9</td>
</tr>
</tbody>
</table>

- NO FLOW - STAGNANT WATER. NOT SAMPLED
- SAMPLE SITE DRY
- LAB TEST RESULTS NOT RETURNED
### October sample round results

<table>
<thead>
<tr>
<th>October</th>
<th>Guideline Value</th>
<th>WDBD005 - West of Rangiora Woodend Road</th>
<th>WDMD078 - After East Woodend Pond</th>
<th>WDWH024 - Cnr of Woodend Beach and Main North Roads</th>
<th>WDT075 - West of Chinnerys Road</th>
<th>WDT066 - Chinnery Road</th>
<th>WDT053 - East of Main North Road</th>
<th>WDWS005 - East of SH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (g/m³)</td>
<td>50</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>4</td>
<td>&lt;3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Dissolved Copper (g/m³)</td>
<td>0.0018</td>
<td>&lt;0.0005</td>
<td>0.0007</td>
<td>&lt;0.0005</td>
<td>0.001</td>
<td>&lt;0.0005</td>
<td>0.00014</td>
<td>9</td>
</tr>
<tr>
<td>Dissolved Zinc (g/m³)</td>
<td>0.015</td>
<td>0.0051</td>
<td>0.0085</td>
<td>0.0011</td>
<td>0.014</td>
<td>&lt;0.0024</td>
<td>&lt;0.0010</td>
<td>&lt;0.00010</td>
</tr>
<tr>
<td>Dissolve Lead (g/m³)</td>
<td>0.00056</td>
<td>&lt;0.00010</td>
<td>&lt;0.0010</td>
<td>0.00010</td>
<td>0.00010</td>
<td>0.00010</td>
<td>0.00010</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen (g/m³)</td>
<td>0.614</td>
<td>0.47</td>
<td>0.22</td>
<td>&lt;0.10</td>
<td>0.323</td>
<td>0.57</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>Total Ammoniacal-N (g/m³)</td>
<td>0.0018</td>
<td>0.33</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>0.010</td>
<td>&lt;0.010</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Nitrate-N and Nitrite-N (g/m³)</td>
<td>0.015</td>
<td>0.08</td>
<td>&lt;0.002</td>
<td>0.002</td>
<td>0.48</td>
<td>0.042</td>
<td>0.042</td>
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<tr>
<td>Total Kjeldahl Nitrogen (g/m³)</td>
<td>0.17</td>
<td>0.39</td>
<td>0.21</td>
<td>&lt;0.10</td>
<td>0.23</td>
<td>&lt;0.10</td>
<td>0.37</td>
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</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (g/m³)</td>
<td>1.5</td>
<td>0.41</td>
<td>&lt;0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (g/m³)</td>
<td>0.016</td>
<td>0.025</td>
<td>0.017</td>
<td>0.009</td>
<td>0.013</td>
<td>0.013</td>
<td>0.034</td>
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<tr>
<td>Total Phosphorus (g/m³)</td>
<td>0.033</td>
<td>0.068</td>
<td>0.023</td>
<td>0.008</td>
<td>0.034</td>
<td>0.014</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>E. Coli (cfu/100mL)</td>
<td>550</td>
<td>6</td>
<td>39</td>
<td>320</td>
<td>900</td>
<td>90</td>
<td>90</td>
<td>200</td>
</tr>
<tr>
<td>C7-C9# (g/m³)</td>
<td>-</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>C10-C14# (g/m³)</td>
<td>-</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>C15-C36# (g/m³)</td>
<td>-</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Total Hydrocarbons (g/m³)</td>
<td>-</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td></td>
</tr>
<tr>
<td>DO (mg/L)</td>
<td>5</td>
<td>8.1</td>
<td>8.11</td>
<td>9.09</td>
<td>6.74</td>
<td>11.48</td>
<td>14.01</td>
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<tr>
<td>pH</td>
<td>8.5</td>
<td>7.25</td>
<td>7.37</td>
<td>7.01</td>
<td>6.82</td>
<td>7.37</td>
<td>7.68</td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
<td>14.2</td>
<td>16</td>
<td>14.9</td>
<td>13.1</td>
<td>14.7</td>
<td>15.2</td>
<td></td>
</tr>
<tr>
<td>Conductivity (µS/cm)</td>
<td>500</td>
<td>199.6</td>
<td>164.8</td>
<td>117.9</td>
<td>155.1</td>
<td>116.3</td>
<td>124.5</td>
<td></td>
</tr>
</tbody>
</table>
## December sample round results

<table>
<thead>
<tr>
<th>December</th>
<th>Guideline Value</th>
<th>WDBD005 - West of Rangiora Woodend Road</th>
<th>WDMD078 - After East Woodend Pond</th>
<th>WDSH024 - Cnr of Woodend Beach and Main North Roads</th>
<th>WDT075 - West of Chinnerys Road</th>
<th>WDT066 - Chinnerys Road</th>
<th>WDT053 - East of Main North Road</th>
<th>WDW005 - East of SH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (g/m³)</td>
<td>50</td>
<td>&lt;3</td>
<td>75</td>
<td>82</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>5</td>
</tr>
<tr>
<td>Dissolved Copper (g/m³)</td>
<td>0.0018</td>
<td>&lt;0.0005</td>
<td>0.0013</td>
<td>0.0035</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Dissolved Zinc (g/m³)</td>
<td>0.015</td>
<td>0.0124</td>
<td>0.0097</td>
<td>0.045</td>
<td>&gt;0.0010</td>
<td>0.0018</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
</tr>
<tr>
<td>Dissolve Lead (g/m³)</td>
<td>0.00056</td>
<td>&lt;0.00010</td>
<td>0.00014</td>
<td>0.00065</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
</tr>
<tr>
<td>Total Nitrogen (g/m³)</td>
<td>0.614</td>
<td>0.52</td>
<td>0.43</td>
<td>2</td>
<td>0.89</td>
<td>0.17</td>
<td>0.64</td>
<td>0.36</td>
</tr>
<tr>
<td>Total Ammoniacal-N (g/m³)</td>
<td>0.0018</td>
<td>0.23</td>
<td>&lt;0.010</td>
<td>0.021</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>0.016</td>
</tr>
<tr>
<td>Nitrate-N and Nitrite-N (g/m³)</td>
<td>0.015</td>
<td>0.16</td>
<td>0.044</td>
<td>0.25</td>
<td>0.7</td>
<td>&lt;0.002</td>
<td>0.49</td>
<td>0.016</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (g/m³)</td>
<td>0.17</td>
<td>0.36</td>
<td>0.38</td>
<td>1.78</td>
<td>0.19</td>
<td>0.17</td>
<td>0.15</td>
<td>0.35</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (g/m³)</td>
<td>1.5</td>
<td>0.39</td>
<td>0.044</td>
<td>0.271</td>
<td>0.7</td>
<td>0.49</td>
<td>0.032</td>
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<tr>
<td>Dissolved Reactive Phosphorus (g/m³)</td>
<td>0.016</td>
<td>0.081</td>
<td>0.148</td>
<td>0.22</td>
<td>0.013</td>
<td>0.038</td>
<td>0.01</td>
<td>0.028</td>
</tr>
<tr>
<td>Total Phosphorus (g/m³)</td>
<td>0.033</td>
<td>0.081</td>
<td>0.148</td>
<td>0.37</td>
<td>0.013</td>
<td>0.052</td>
<td>0.014</td>
<td>0.056</td>
</tr>
<tr>
<td>E. Coli (cfu/100mL)</td>
<td>550</td>
<td>200</td>
<td>2700</td>
<td>12000</td>
<td>2400</td>
<td>2400</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>C7-C9# (g/m³)</td>
<td>-</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>C10-C14# (g/m³)</td>
<td>-</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>C15-C36# (g/m³)</td>
<td>-</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
</tr>
<tr>
<td>Total Hydrocarbons (g/m³)</td>
<td>-</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
</tr>
<tr>
<td>DO (mg/L)</td>
<td>5</td>
<td>7.42</td>
<td>5.44</td>
<td>5.04</td>
<td>6.56</td>
<td>4.42</td>
<td>7.41</td>
<td>6.15</td>
</tr>
<tr>
<td>pH</td>
<td>8.5</td>
<td>7.43</td>
<td>7.19</td>
<td>7.45</td>
<td>7.08</td>
<td>7.3</td>
<td>7.17</td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
<td>10.1</td>
<td>15.9</td>
<td>16.6</td>
<td>14.9</td>
<td>17.2</td>
<td>14.1</td>
<td>15.8</td>
</tr>
<tr>
<td>Conductivity (µS/cm)</td>
<td>500</td>
<td>129.8</td>
<td>26.1</td>
<td>54.1</td>
<td>93.5</td>
<td>109.7</td>
<td>85.3</td>
<td>105.4</td>
</tr>
</tbody>
</table>
Kaiapoi Stormwater Network Consent:

Stormwater Quality Monitoring Baseline Programme

Prepared by the Project Delivery Unit
August 2019
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1. EXECUTIVE SUMMARY

1.1. INTRODUCTION

The Kaiapoi Stormwater Network Discharge Consent, the third of such in the Waimakariri District (following Rangiora and Woodend), will be prepared in conjunction with an Interim stormwater management plan (SMP) and consent application. This requires the Waimakariri District Council (WDC) to produce a stormwater monitoring programme. This monitoring programme focuses on the urban stormwater discharge impact on the waterways, as opposed to general stream health.

The focus of this report is on stormwater quality entering and within the Kaiapoi urban area.

ECan requested that the WDC undertakes a baseline sampling programme for each town before defining the parameters of the monitoring programme. This will demonstrate to all parties the source of the waterway contaminants and to gauge the current health of Kaiapoi’s waterways. The purpose of this baseline report is to present the findings from this baseline sampling programme and recommend parameters that should be carried forward to the ongoing stormwater monitoring programme.

Four sample rounds have been completed, in both wet and dry conditions, at twelve sites spread over the McIntosh Drain, Cam River, Kaiapoi River, Silver Stream, Kaikanui Stream and Courtenay Stream. The results from each of these sampling rounds has been summarised along with suggested potential sources of each contaminant.

1.2. BACKGROUND

The stormwater monitoring programme will be designed to identify potential areas of urban stormwater impact on the Kaiapoi receiving waters. The trends formed from the monitoring programme analysis can be used to direct stormwater treatment activities, within the Kaiapoi urban limits.

The Kaiapoi stormwater monitoring programme will be modelled off the Rangiora Stormwater Monitoring Programme, with some modifications for the Kaiapoi contaminants, informed by this investigation. Generally speaking the urban impact would be measured by monitoring urban contaminants through discharge point inspections and selected discharge point testing, receiving surface water testing, stormwater basin testing and stream sediment surveys. All these components will form part of the Kaiapoi stormwater network discharge consent, with consent management objectives seeking to address any exceeded values.

The stream health monitoring will be included within the stormwater network discharge consent, however the parameters will not have consent management objectives associated with them, i.e. this information will be utilised for other Council projects, such as stream enhancement programmes. These additional parameters are not considered to be primarily influenced by urban stormwater discharge.

This investigation looks at water quality samples, which will only affect the urban impact and stream health sections for the Kaiapoi monitoring programme.

1.3. METHODOLOGY

Four water sampling rounds were undertaken by the WDC Water Unit and analysed by the WDC Project Delivery Unit. The sampling occurred approximately monthly from August to December 2016.

The samples were collected using best practice methods and delivered directly to the laboratory after collection. The sample testing was undertaken by Hill Laboratories in Hamilton.
The Kaiapoi waterways were sampled at the following sites:

<table>
<thead>
<tr>
<th>Site Code</th>
<th>Waterway Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KASS002</td>
<td>Silver Stream, South side of Island Road</td>
</tr>
<tr>
<td>KAKS027</td>
<td>Kaikanui Stream, North side of Neeves Road</td>
</tr>
<tr>
<td>KAKS003</td>
<td>Kaikanui Stream, The Oaks Reserve</td>
</tr>
<tr>
<td>KACS003</td>
<td>Courtenay Stream, Courtenay Drive Reserve</td>
</tr>
<tr>
<td>KASS012</td>
<td>Silver Stream, North side of bridge</td>
</tr>
<tr>
<td>KACR001</td>
<td>Cam River, South of Smith Street</td>
</tr>
<tr>
<td>KACR022</td>
<td>Cam River, SH1 West side of road</td>
</tr>
<tr>
<td>KAMDO10</td>
<td>McIntosh Drain, South side of Beach Road</td>
</tr>
<tr>
<td>KACS012</td>
<td>Courtenay Stream, On walkway in reserve</td>
</tr>
<tr>
<td>KAMDO57</td>
<td>McIntosh Drain, South of Fullers Road</td>
</tr>
<tr>
<td>KAKR037</td>
<td>Kaiapoi River, South of motorway bridge</td>
</tr>
<tr>
<td>KAKR005</td>
<td>Kaiapoi River, Hall Street</td>
</tr>
</tbody>
</table>

The laboratory test included:
- Total suspended solids
- Dissolved copper
- Dissolved lead
- Dissolved zinc
- Total Ammoniacal-N (N\textsubscript{2}O + NO\textsubscript{3} + NO\textsubscript{2})
- Nitrate-N + Nitrite
- Total Kjeldahl Nitrogen (TKN)
- Total Nitrogen
- Dissolved Reactive Phosphorus
- Total phosphorus
- \textit{E. coli}
- Petroleum hydrocarbons C\textsubscript{7}-C\textsubscript{9}, C\textsubscript{10}-C\textsubscript{14}, C\textsubscript{15}-C\textsubscript{34}
- Total Petroleum Hydrocarbons.

The portable probe measurements captured were Dissolved Oxygen, pH, Temperature and Conductivity.

1.4. RESULTS SUMMARY

The results concluded that some of the contaminants are better suited to the urban impact section of the monitoring programme and others to the stream health section. Table 1 summarises the recommended changes to the monitoring programme.

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Source</th>
<th>Baseline Monitoring Programme Inclusion</th>
<th>Recommended Ongoing Monitoring Programme Section</th>
<th>Reason Section for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>Urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Copper</td>
<td>Urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Lead</td>
<td>Urban</td>
<td>Included</td>
<td>-</td>
<td>Very low concentrations, therefore recommended to remove it from the programme.</td>
</tr>
<tr>
<td>Dissolved Zinc</td>
<td>Urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen (TN)</td>
<td>Rural</td>
<td>Included</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Contaminant</td>
<td>Source</td>
<td>Baseline Monitoring Programme Inclusion</td>
<td>Recommended Ongoing Monitoring Programme Section</td>
<td>Reason Section for Change</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------</td>
<td>----------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN)</td>
<td>Rural &amp; Urban</td>
<td>-</td>
<td>Stream Health</td>
<td>DIN is in the Land and Water Regional Plan (LWRP), therefore it is recommended that we replace TN with DIN</td>
</tr>
<tr>
<td>Total Ammoniacal Nitrogen (TAN)</td>
<td>Urban &amp; Rural</td>
<td>Included</td>
<td>Stream Health</td>
<td>DRP is in the LWRP therefore it is recommended that TP is replaced with DRP.</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Mainly Urban</td>
<td>Included</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (DRP)</td>
<td>Mainly urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td>It appears DRP may be from both rural and urban sources. DRP as a component of wastewater overflows is a known issue for Kaiapoi and is being separately addressed via a wastewater capacity upgrade (refer consent application for details). The inclusion of DRP in the urban impact sampling programme will provide ongoing data that will enable any reduction of overflows entering streams over time to be measured and reported.</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>Urban &amp; Rural</td>
<td>Included</td>
<td>Urban Impact</td>
<td><em>E. coli</em> was found to be from both rural and likely urban sources. It is a contaminant that is monitored as part of the Wastewater Management plan. <em>E. coli</em> as a component of wastewater overflows is a known issue for Kaiapoi and is being separately addressed via a wastewater capacity upgrade (refer consent application for details). The inclusion of <em>E. coli</em> in the urban impact sampling programme will provide ongoing data that will enable any reduction of overflows entering streams over time to be measured and reported.</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>Urban</td>
<td>Included</td>
<td></td>
<td>Very low concentrations therefore recommended removing it from the programme. Total Hydrocarbons will remain in the basin sediment monitoring.</td>
</tr>
<tr>
<td>Dissolved Oxygen (DO)</td>
<td>-</td>
<td>Included</td>
<td>Stream Health</td>
<td>Can be used for guideline value adjustment.</td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td>Included</td>
<td>Urban Impact</td>
<td>Lab sample useful for determining salinity of water sample and potential mixing of fresh and salt water.</td>
</tr>
<tr>
<td>Temperature</td>
<td>-</td>
<td>Included</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>-</td>
<td>Included</td>
<td>Stream Health</td>
<td>Initial one off sample to establish value for hardness adjustment and then occasional sampling recommended to monitor the character of the water way.</td>
</tr>
<tr>
<td>Hardness</td>
<td>-</td>
<td>-</td>
<td>Urban Impact -occasional</td>
<td>Initial one off sample to establish value for guideline adjustment and then occasional sampling recommended to monitor the character of the water way.</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>Mainly Rural</td>
<td>-</td>
<td>Urban Impact -occasional</td>
<td>Initial one off sample to establish value for guideline adjustment and then occasional sampling recommended to monitor the character of the water way.</td>
</tr>
</tbody>
</table>
Total hydrocarbons and lead are recommended to be removed from the programme as they consistently demonstrated levels well below their guideline values.

It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP. It is also recommended that electrical conductivity (in the form of specific conductance) is captured by the lab for any samples as a backstop to check if there has been any mixing of the waterway water with tidal saline waters.

It was recommended by ECAn water quality specialists that the waterway hardness, pH and dissolved organic carbon are measured once or twice to characterise the waterway. This will also enable the WDC to get site specific trigger values for metals. This would be undertaken as part of the future monitoring programme, as the sample sites will not be the same as in this baseline programme.

It was found that a number of the contaminants are sourced rurally and the relevant guidelines are exceeded prior to entering the township. For some of these contaminants there was an increase in concentration through the township. This indicates that the urban area discharges these contaminants also, but in smaller quantities.

There are no known contaminants discharging from springs within Kaiapoi.

This study has demonstrated that the rural areas have a significant impact on the health of the Kaiapoi waterways. It is recommended that ECAn undertakes monitoring upstream of the townships as contaminant concentration guidelines are exceeded in some waterways prior to entering the urban limits.

It should be noted that although applied here in this report in the absence of LWRP guidelines, the ANZECC (2000) guidelines do not provide water quality standards in the traditional sense (i.e. fixed standards that should not be exceeded). Rather, ANZECC (2000) states that the uncertainty in the derivation and application of such standards led them to develop trigger values that indicate a potential environmental problem if they are exceeded. Hence, ANZECC (2000) trigger values are not intended to be applied in an absolute fashion. If a trigger value is exceeded, further investigation is required.

### 1.5. CONCLUSION

The following conclusions were made in this investigation:

- Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Many exceedances occurred in the December sampling period which was a first flush rainfall event, and the largest rainfall event captured during the sampling period.

- It was found that generally the majority of contaminants were present in both rural and urban environments, however in some cases the rural area was found to have a larger impact than the urban area and the guideline concentrations were at times exceeded prior to reaching the urban discharge points.

The following factors are recommended for consideration in the ongoing Stormwater Quality Monitoring Programme for Kaiapoi:

- It is recommended that Lead and Total Hydrocarbons are removed from the ‘urban impact’ section of the Stormwater Monitoring Programme, as the results indicate that the concentrations were consistently far below the guidelines.

- It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP.
- It is recommended that *E. coli* and DRP are monitored regularly in the ongoing programme as there is some evidence to suggest the urban area is a contributing source of these contaminants.

- It is recommended that contaminants such as *E. coli*, phosphorus and nitrogen be investigated further by ECan within the rural catchments. Particularly in the largest wet weather event *E. coli* and phosphorus levels exceeded the LWRP guidelines in the rural zones, upstream of the urban limits. Nitrogen contaminants in the rural catchments were a prevalent issue across all four sampling events. The results show the ANZECC guidelines for DIN - at five of the twelve sites were significantly exceeded in all weather events, specifically in the Silverstream, Upper Kaiapoi River and Courtenay Stream.

- It is recommended that electrical conductivity is measured in future lab samples to indicate the salinity of the captured sample. This lab measurement can then be checked against the portable probe measurement to if there was saline stratification of the sampled layer of the waterbody at the time of sampling.

- It is recommended that dissolved copper and dissolved zinc sampling from selected major network discharge outlets (e.g. major pipes and open drains) is undertaken for several years from the main urban sub-catchments, to determine a baseline within the WDC stormwater network. Once a baseline is determined, improvement targets can be identified and progressed over the remaining term of consent. This baseline study shows that the Schedule 5 LWRP standards are not useful in assessing effects of discharges in tidal waterways or in spring fed rural streams. These strong flowing/ tidal streams, such as the Courtenay Stream, Kaiapoi River or lower Cam River, have significant volumes through Kaiapoi, diluting the main urban contaminants. This study showed the effects of the urban contaminants are only measurable in the shallow low volume streams or open drains.

These conclusions will be used to develop the Kaiapoi Stormwater Monitoring Programme. After discussions with ECan and MKT the Stormwater Monitoring Programme will be updated.
2. **INTRODUCTION**

Environment Canterbury (ECan) has requested each of the Territorial authorities within the Canterbury region submit Global Stormwater Consents for all major towns in each district. The Kaiapoi Stormwater Discharge Consent, the third of such in the Waimakariri District, will be prepared in conjunction with a stormwater management plan (SMP) and consent application. This requires the Waimakariri District Council (WDC) to produce a stormwater monitoring programme. This monitoring programme focuses on the urban stormwater discharge impact on the waterways, as opposed to general stream health.

During the steering group meeting with Mahaanui Kurataiao Limited (MKT) and ECan, in November 2013, a recommendation was suggested for the WDC to undertake a baseline sampling programme for each town. The purpose of this was to demonstrate to all parties, the source of the waterway contaminants and the current health of the waterways. Following this recommendation, a baseline sampling programme has been undertaken for Kaiapoi, along with the other main towns in the District.

Four sample rounds have been completed, in both wet and dry conditions, at twelve sites spread over the McIntosh Drain, Cam River, Kaiapoi River, Silver Stream, Kaikanui Stream and Courtenay Stream. The results from each of these sampling rounds has been summarised along with suggested potential sources of each contaminant.

The purpose of this report is to present the findings from this baseline sampling programme and recommend the parameters that should be carried forward to the ongoing stormwater monitoring programme.

3. **BACKGROUND**

The stormwater monitoring programme has been designed to identify potential areas of urban stormwater impact on the Kaiapoi receiving waters. The trends formed from the monitoring programme analysis can be used to direct stormwater treatment activities within the Kaiapoi urban limits.

Following review of the baseline study, the WDC will commit to ongoing sampling of contaminants which are proven to have an urban source, to help develop its water quality mitigations programme which will be implemented from 2025. The main consequences of accepting parameters which are rurally sourced are as follows;

1. Some of the sample parameters would be outside of the stormwater discharge consent scope, as they enter the network primarily from rural sources.
2. The cost of increased sampling; including collection, laboratory tests and results analysis.
3. Responsibility and resources for treating rural source contaminants are transferred to urban ratepayers, reducing the pressure from regulators applied to rural properties to mitigate their own adverse effects, and reducing available funding from urban ratepayers for proven urban contaminants such as copper or zinc.
4. The subsequent implications for other future urban consents within the Waimakariri District.

Therefore it was recommended that a 6 month baseline investigation be undertaken, and results used to assist determining the source of the contaminants and associated consent conditions which will apply to implementing the ongoing monitoring programme.

3.1. **MKT AND ECAN INVOLVEMENT WITH THE STORMWATER NETWORK CONSENTS**

The WDC worked closely with MKT and ECan to produce the Rangiura stormwater network consent, which forms a template for all of the towns in terms of the proposed management approach. The WDC will be shortly applying to ECan for the Kaiapoi network discharge consent. WDC will be sending the application and monitoring programme to MKT and ECan to provide advice before formally submitting the consent application.
3.2. **KAIAPOI AREA**

Rural land surrounds Kaiapoi Township. There is a high potential for the waterways within the urban limit to be impacted by rural activities. Within the Kaiapoi urban limits there are six main receiving waters which receive urban stormwater; the McIntosh Drain, Cam River, Kaiapoi River, Silver Stream, Kaikanui Stream and Courtenay Stream. All discharges from the stormwater network ultimately discharge into the Kaiapoi River, sometimes via one its tributaries.

ECan's spring database (Canterbury maps) does not identify any springs feeding directly into local waterways in Kaiapoi's urban area. There are clusters of seven total known springs outside of the urban area approximately 1 km to the west of Kaiapoi's urban boundary. These springs feed into the Kaiapoi River catchment.

The land use zones in Kaiapoi of the Kaiapoi area are presented in Figure 1.
Figure 1: Land use zones in the greater Kaiapoi area
Kaiapoi township is split over four main catchments: the Cam River, Kaiapoi River, Courtenay Stream, and the Waimakariri River catchments. The Cust River and Ohoka Stream join the Kaiapoi River near to the western urban boundary and are outside the scope of this consent. Figure 2 presents the catchments that the Kaiapoi Township discharges to.

Figure 2: Kaiapoi is split by four main catchments.
Kaiapoi is subdivided into drainage sub-catchments, each having either one major, or multiple separate stormwater discharge points, as illustrated in Figure 3.
All of Kaiapoi’s main catchments (see Figure 2) are composed principally of rural areas. As a result the netflow from Kaiapoi’s contributing urban areas is relatively insignificant when compared to the rural contributions. The greater contributions from rural areas and high spring flows and runoff flowing into the Kaiapoi waterways effectively create a significant dilutive effect for Kaiapoi’s stormwater discharges into these waterways.

The Cam River is fed by the area to the north of Kaiapoi and a portion of Kaiapoi’s northern urban area. So the Cam catchment is mainly rural with a minor urban contribution in the lower reaches. It also receives most of the urban Rangiora stormwater surface discharges.

The Kaiapoi River catchment is fed from the area to the west of Kaiapoi. It includes the Cust and Ohoka catchments. The Kaiapoi River catchment is a significant catchment composed of mainly rural land with reasonably sized but proportionately small contributing area of the west and centre of urban Kaiapoi. The Kaiapoi River catchment includes the Silver Stream which is heavily rurally influenced.

The Courtenay Stream catchment is composed of mostly rural land to the southwest of Kaiapoi and includes the southern portion of Kaiapoi’s urban area.

The Waimakariri catchment, as shown in Figure 2, includes all of Kaiapoi’s urban area to the east of the catchments previously mentioned. The catchment is composed of the McIntosh Drain catchment, which originates in Woodend, and carries a significant proportion of Woodend’s stormwater runoff. Downstream of Woodend the McIntosh Catchment includes a corridor of rural area and eventually enters Kaiapoi picking up the majority of the northern urban area of Kaiapoi’s stormwater runoff via the Sovereign Palms, Sovereign Lakes and Moorecroft Catchments, which feed into the drain from the west. In summary the McIntosh Drain originates in the Woodend urban area, travels through and services a reasonably large rural area before flowing through a proportionately small area of urban Kaiapoi.

### 3.3. RANGIORA STORMWATER MONITORING PROGRAMME

The Rangiora stormwater monitoring programme was developed in 2014 and has been gradually improved upon since. The Kaiapoi stormwater monitoring programme will be modelled off the Rangiora Stormwater Monitoring Programme which was supported by four years of water quality data collection (for Rangiora). Some modifications for the Kaiapoi contaminants have been added, informed by this investigation.

Generally the Rangiora stormwater monitoring programme report specifies the following:

- Sample Locations
- Sample Parameters
- Sample Frequency

Generally speaking the urban impact will be measured by monitoring urban contaminants through visual checks of discharge point inspections, lab testing at selected urban discharge points, receiving surface water testing, stormwater basin testing and stream bed sediment surveys. These tests would form part of the Kaiapoi stormwater network discharge consent, with consent management objectives applied to address any exceeded values.

Other water quality testing and ecological surveys will be undertaken for stream health assessment purposes. Compliance requirements for the consent will not apply. This information will be used to support other Council work programmes.

This investigation looks at water quality samples, which would only affect the urban impact and stream health (surface water testing) sections of this monitoring programme.

### 3.4. GUIDELINE VALUES
Water quality guidelines are used to identify if the WDC waterways are in a healthy condition. The guidelines have defined Trigger Levels or maximum allowable values (MAVs) for many different waterway contaminants. In some cases such as dissolved oxygen and pH there are also minimum allowable values (denoted Min AV).

The guidelines that are used to analyse our data are sourced from the following resources:

1. Canterbury Land and Water Regional Plan (2012) *(LWRP, Section 16, Schedule 5)*
2. ANZECC Water Quality Guidelines for Fresh and Marine Water Quality *(ANZECC, 2000)*

The LWRP gives a guideline to the level to which a ‘spring fed – plains urban’ catchment should be striving to meet. Although the LWRP will be the main guideline source, the ANZECC guidelines will be used if LWRP does not provide a guideline value for any parameter considered essential to the consent. In these cases the 90 % level of protection (LOP) trigger value has been used. For a number of contaminants the LWRP guideline value is equal to the ANZECC guideline value.

The guidelines that are being compared to the contaminant concentration are specified.

4. **METHODOLOGY**

The proposed baseline study aimed to confirm whether the common water quality parameters are from primarily rural or urban sources.

Four water sampling rounds were undertaken by the WDC Water Unit and analysed by the WDC Project Delivery Unit. The sampling occurred approximately monthly from August to December 2016.

The samples were collected using best practice methods and delivered directly to the laboratory after collection. The sample testing was undertaken by Hill Laboratories in Hamilton.

4.1. **SAMPLE LOCATIONS**

To assess both dry weather baseflow (DWF) contaminant concentrations and wet weather flow (WWF) runoff contaminant concentrations, sample sites have been selected to be within the receiving waters.

Twelve sites were sampled for the baseline sampling programme; two in each of the following waterways: Silver Stream (KASS012 and KASS002), Kaiapoi River (KAKR037 and KAKR005), Cam River (KACR022 and KACR001), Courtenay Stream (KACS012 and KACS003) and the McIntosh Drain (KAMD057 and KAMD010). These sites were selected to indicate water quality both upstream and downstream of the urban stormwater discharge locations, and during a range of weather events. It is anticipated that similar sites would be used in the future sampling programme so that the data is comparable in the future.

The proposed sample points were primarily situated at either the upstream edge of the urban limits (or at the stream source location with available road access), and the downstream edge of the urban limits. A couple of sites were positioned within the urban area at or above key confluences to capture quality prior to merging with a separate catchment. The change in concentration of contaminants in the receiving waters as they pass through Kaiapoi will enable the WDC to assess the contaminants contributed by the urban area.

The sample locations are as follows:

<table>
<thead>
<tr>
<th>Site ID</th>
<th>Site Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KASS012</td>
<td>Silver Stream, North side of bridge</td>
</tr>
<tr>
<td>KASS002</td>
<td>Silver Stream, South side of Island Road</td>
</tr>
<tr>
<td>Site ID</td>
<td>Site Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>KAKR037</td>
<td>Kaiapoi River, South of motorway bridge</td>
</tr>
<tr>
<td>KACR022</td>
<td>Cam River, SH1 West side of road</td>
</tr>
<tr>
<td>KACR001</td>
<td>Cam River, South of Smith Street</td>
</tr>
<tr>
<td>KAKS027</td>
<td>Kaikanui Stream, North side of Neeves Road</td>
</tr>
<tr>
<td>KAKS003</td>
<td>Kaikanui Stream, The Oaks Reserve</td>
</tr>
<tr>
<td>KACS012</td>
<td>Courtenay Stream, On walkway in reserve</td>
</tr>
<tr>
<td>KACS003</td>
<td>Courtenay Stream, Courtenay Drive Reserve</td>
</tr>
<tr>
<td>KAMD057</td>
<td>McIntosh Drain, South of Fullers Road</td>
</tr>
<tr>
<td>KAKR005</td>
<td>Kaiapoi River, Hall Street</td>
</tr>
<tr>
<td>KAMD010</td>
<td>McIntosh Drain, South side of Beach Road</td>
</tr>
</tbody>
</table>

Figure 4 presents a map of the baseline sample sites. See Appendix A for more information on the sample locations; including descriptions, GPS locations and photographs.
Figure 4: Kaiapoi sample sites used in the Baseline Monitoring Programme.
4.2. **SAMPLE PARAMETERS**

The water quality parameters that were sampled as part of this baseline study are as follows:

**Laboratory tests**
- Total suspended solids
- Dissolved copper
- Dissolved lead
- Dissolved zinc
- Total Ammoniacal-N
- Nitrate-N + Nitrite
- Total Kjeldahl Nitrogen (TKN)
- Dissolved Reactive Phosphorus
- Total phosphorus
- *E. coli*
- Total petroleum hydrocarbons

**YSI multi-probe portable probe measurements**
- Dissolved oxygen
- pH
- Temperature
- Conductivity

4.3. **FREQUENCY**

The samples were retrieved approximately every month, so that four sample rounds were undertaken. Wet and dry weather days were selected so the source of the contaminants could be separated into spring discharge and/or runoff contaminants.

The following list presents the selected sampling days;
1. August 4\textsuperscript{th} 2016, sampling commenced at 11:00 am
2. September 19\textsuperscript{th} 2016, sampling commenced at 12:00 pm
3. October 13\textsuperscript{th} 2016, sampling commenced at 11:00 am
4. December 12\textsuperscript{th} 2016, sampling commenced at 11:30 am

The plan for sampling was to be in the wet and dry conditions (and ideally across seasons). Weather conditions were not quite right in November, hence this month was missed.
5. RESULTS

5.1. SAMPLING WEATHER CONDITIONS

First flush events give the best measure of runoff contaminants. As first flush events are statistically infrequent, getting a first flush event within the baseline monitoring programme period was predicted to be difficult. Therefore samples were retrieved in dry conditions and wet conditions.

Table 2 presents a summary of the rainfall prior to the water quality sampling; the rainfall data was taken from the WDC Woodend rainfall gauge located at Chinnerys Road 7.2 km to the north of Kaiapoi.

Table 2: The weather conditions on each of the baseline sampling days in 2016

<table>
<thead>
<tr>
<th>Date</th>
<th>Weather Conditions</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th August 2016</td>
<td>Dry weather when sampling, 2 mm of rain in the 24 hours before sampling, 4 mm of rainfall 72 hours prior to the sampling</td>
<td>Minor wet weather event.</td>
</tr>
<tr>
<td>19th September 2016</td>
<td>Dry weather while sampling, 0 mm of rain in the 24 hours before sampling, 0 mm rainfall 72 hours prior to the sampling</td>
<td>Dry weather event.</td>
</tr>
<tr>
<td>13th October 2016</td>
<td>Dry weather while sampling, 0 mm of rain in the 24 hours before sampling, 4.4 mm rainfall 72 hours prior to the sampling</td>
<td>Dry weather event.</td>
</tr>
<tr>
<td>12th December 2016</td>
<td>Dry weather while sampling, 12.4 mm of rain in the 24 hours before the sample, 36.4 mm rainfall 72 hours prior to the sampling</td>
<td>Moderate wet weather event, 2.6 year return period for 1 hour interval. *First flush event.</td>
</tr>
</tbody>
</table>

*First flush conditions are defined as a rainfall event with rainfall no less than 10 mm and no greater than 25 mm, over 24 hours (CCC, waterways wetlands and drainage guide). Antecedent precipitation conditions should be considered, where a first flush storm needs to have a period of at least 72 hours of no measurable precipitation (Otago Regional Council).

See Appendix B for rainfall hydrographs of the sampled events.

5.2. SAMPLING TIDAL CONDITIONS

Kaiapoi is low lying and is positioned immediately adjacent to the coast. As a result the lower reaches of Kaiapoi's waterways are affected by oceanic tidal movements. This likely means Kaiapoi's waterways will behave quite differently to the waterways in the other urban areas in the district. In addition to backflow of freshwater upstream there is potential for mixing of fresh and sea waters, stratification between fresh and brackish waters, and even bidirectional flow between stratified layers during an incoming (or flood) tide. Table 3 presents the tidal state during each of the sampling periods.

Table 3: The tidal state during each of the baseline sampling periods in 2016.

<table>
<thead>
<tr>
<th>Date</th>
<th>Sampling Times</th>
<th>Tidal Conditions</th>
<th>Tidal Flow Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th August 2016</td>
<td>11:00 to 14:30</td>
<td>Low tide when sampling commenced, flood tide during sampling.</td>
<td>Incoming</td>
</tr>
<tr>
<td>19th September 2016</td>
<td>12:00 to 14:30</td>
<td>Dead low when sampling commenced, flood tide during sampling.</td>
<td>Incoming</td>
</tr>
<tr>
<td>13th October 2016</td>
<td>11:00 to 14:00</td>
<td>Half-tide when sampling commenced, sampling occurred over the latter half of the flood tide. Last sample taken shortly before high tide.</td>
<td>Incoming</td>
</tr>
<tr>
<td>12th December 2016</td>
<td>11:30 to 14:30</td>
<td>Shortly before half-tide when sampling commenced last sample taken approx. 1 hour before high tide.</td>
<td>Incoming</td>
</tr>
</tbody>
</table>

The tide was rising during each of the sampling periods which means backflows from downstream contaminant sources, and even backflows from larger downstream waterways must to be considered during the assessment of contaminants at each site, particularly at the downstream most sites.

See Appendix C for tidal charts for the Kaiapoi area during the sampled events.
5.3. RESULTS SUMMARY

There were several parameter concentrations that were below detectable limits in the samples given to Hills Laboratory; for simplicity these were recorded as zero in this investigation.

There was flow at the upper McIntosh drain site south of Fullers Road (KAMD057) at only one of the sample rounds during first flush event in December. As a result there were no samples taken from this point during the sampling rounds in August, September and October.

It is also noted that most guidelines specify that the sampling should be undertaken in a first flush event. The sampling round completed in the December event was the closest event to a first flush rainfall event, although there was rainfall recorded in the days leading up to this event.

The following sections of this report look at each of the tested contaminants separately, to discuss the source of the contaminant and proposed changes to the current stormwater monitoring programme.

See Appendix D for a summary of the laboratory results summary for each of the sample rounds.
5.3.1. **Total Suspended Solids**

Total suspended solids (TSS) include all particles suspended in water which will not pass through a filter. Suspended solids are mainly non-point source pollutants such as soil erosion from agricultural and construction sites.

TSS as measured coming in and going out of Kaiapoi are shown in Figure 5. The LWRP provides a guideline TSS value of 50 mg/L. It is acknowledged that this is a measure at the discharge point, however it is the best known relevant guideline of TSS to compare the results against.
Figure 5: Total suspended solids as measured in the Kaiapoi River.
The results demonstrate total suspended solids tend to be relatively low in Kaiapoi’s waterways except for the lowest sites on the Kaiapoi River (KAKR005) and the McIntosh Drain (KAMD010). Considering their low elevations and proximity to the river mouth these sites are likely to be tidally influenced and the elevated TSS could be from entrained estuarine sediments.

Cross referencing the most downstream sites shows the lower McIntosh Drain sample consistently exhibited elevated conductivity which suggests brackish water was sampled.

Conversely the elevated TSS levels at site KAKR005 do not have corresponding elevated electrical conductivity levels demonstrating that the sampled water was not brackish at this point. It is possible that sediment laden backflow from the Waimakariri River has caused this spike in TSS in the lower Kaiapoi River and lower McIntosh Drain, however further information would be required to confirm this.

Kaiapoi does not have any exceedances for TSS. The vast majority of sites had consistent detectable but low concentrations and both of the monitored sites in the Silver Stream did not contain detectable levels in any of the four events. The results show total suspended solids tend to be relatively low in Kaiapoi’s waterways except for the lower lying reaches of the McIntosh Drain and Kaiapoi River which are known to be tidally influenced.

It is recommended that TSS should continue to be monitored as part of the stormwater network discharge consent as it is a key indicator of the overall quality of a waterway. It is suggested that future monitoring include TSS levels taken from selected major stormwater discharge outlets, as well as a receiving waterway TSS baseline as in 2016.

5.3.2. **Dissolved Copper**

Primary sources for dissolved copper (Cu) include but are not limited to vehicle brake pad wear, plumbing uses such as copper spouting and soil disturbance from historic horticultural sites.

The 90% LOP trigger value for copper provided in both the LWRP and ANZECC guidelines is 0.0018 mg/L. Dissolved copper levels are shown in Figure 6.
Figure 6: Dissolved copper levels in Kaiapoi waterways.
Copper was only detected at six of the twelve sites and almost exclusively in the first flush December event. The only site to demonstrate elevated levels across multiple events was at the Oaks Reserve site in the lower Kaikanui Stream, (KAKS003) which also showed a detectable level in the minor wet weather event in August. The sites exhibiting elevated levels in the December event tend to be located adjacent to or directly downstream of the highway.

The exception to being located near to the highway is both sites in the McIntosh Drain with the upper site exhibiting the highest level recorded and the only exceedance above the guideline value. The upper McIntosh Drain exceedance is likely to come from State Highway road runoff from Woodend. Also seemingly separate from the highway runoff are the sample sites in the Kaikanui Stream, notably the upper site (KAKS027) which is significantly upstream of the highway.

The results suggest inflows into Kaiapoi from the State Highway on the western side of Kaiapoi and through Woodend are contributing copper to Kaiapoi’s waterways. The Silver Stream, upper Cam and Courtenay Stream with their significant spring flows and rural catchments do not have detectable levels of copper. The Oaks Reserve site (KAKS003) in the Kaikanui Stream is the only sample site to show detectable levels outside of the December first flush event. This site is located directly downstream of Kaiapoi’s main industrial area and also conveys flows from State Highway 1 which drains to the head of the Kaikanui Stream, and from an older residential area in south Kaiapoi.

The results show that copper is mainly an urban contaminant and it is recommended that dissolved copper is included in the ‘urban impact’ section of the monitoring programme.

5.3.3. **Dissolved Lead**

The recorded levels of dissolved lead are shown in Figure 7.

Primary sources of dissolved lead (Pb) include but are not limited to road runoff (from automobile parts), and degrading construction components such as paint and roof flashings. The 90% trigger level guideline provided by ANZECC for dissolved lead is 5.6 µg/L.
Figure 7: Dissolved lead levels recorded in Kaiapoi’s waterways.
Dissolved lead was detected in eight samples spread over six samples sites. Similar to the dissolved copper results, the highest recorded results were from the lower McIntosh Drain site (KAMD010) and the Oaks Reserve site on the lower Kaikanui Stream (KAKS003). Lead was not detected in any of the predominantly rural fed waterways.

With one exception there was no lead present in any samples taken during the two sampled dry weather events, it was mainly detected during the wet weather events in August and December 2016. Lead was detected across all of the four events but the majority of the samples showing traces of dissolved lead were in the first flush event in December.

The results show that lead is predominantly an urban contaminant. Recorded levels of lead are barely detectable and hence far below the guideline values level in any of Kaiapoi’s samples. This is consistent with findings in Rangiora and Woodend.

As the sampling result show lead is an insignificant contaminant in Kaiapoi’s urban area it is recommended that dissolved lead is removed from the urban impact monitoring programme of the guideline.

### 5.3.4. Dissolved Zinc

Sources of dissolved zinc (Zn) are commonly from anti-corrosion agents used in the galvanisation of iron and steel. It is found in metal roofs, metal fences, lampposts, car bodies, anticorrosion paint used on exterior steel, in rubber vehicle tyres to protect against UV degradation, and some herbicides.

The LWRP and ANZECC provide a 90% guideline value of 15µg/L of dissolved zinc.

The recorded levels of zinc are presented in Figure 8.
Figure 8: Dissolved concentrations of zinc in the samples captured at Kaiapoi
Dissolved zinc is present in the majority of the urban fed waterways however at low concentrations at the vast majority of sites. The notable exception to this is at the lower Kaikanui Stream Oaks Reserve site (KAKS003) which significantly exceeded the guideline during both the August and December wet weather events and demonstrated a high level in October (note this same site also demonstrated elevated levels of copper and lead).

This site measures discharges from the Kaiapoi Stone Street/Ohoka Road main industrial area, and also from a large older residential catchment in southern Kaiapoi. Either industrial activities or older residential roofing could be the cause of the zinc exceedance recorded at this site. Another possible source is road runoff from State Highway 1 which discharges into the head of the Kaikanui Stream via a roadside drain. Actual zinc sources will need to be further investigated. Additional monitoring sites on the Kaikanui Stream are proposed to be added to the monitoring programme to try to isolate the catchment source of the zinc.

The upper and lower McIntosh drain both show detectable levels of zinc with the upper site (KAMD057) demonstrating the second highest reading after the Oaks reserve site. The zinc in the McIntosh Drain is likely to have a Woodend based source.

The results show that zinc is mainly an urban contaminant and it is recommended that dissolved zinc is included in the ‘urban impact’ section of the monitoring programme.

5.3.5. Nitrogen

Nitrogen primary sources include but are not limited to fertilizers and sewerage. It is noted that Total Nitrogen is the sum of TKN + Nitrate-N + Nitrite-N and DIN is the sum of Total Ammoniacal-N + Nitrate-N + Nitrite-N.

Figure 9 presents the Total Nitrogen (TN) and Dissolved Inorganic Nitrogen (DIN) concentrations from laboratory results from waterways in the Kaiapoi area, respectively. The ANZECC guideline for total nitrogen is 0.614 mg/L. The DIN values presented in Figure 10 have been deduced from the laboratory results. The LWRP guideline of 1.5 mg/L has been applied for DIN (the bioavailable portion). It is worth noting that the LWRP does not specify a guideline value for TN. The guideline value applied from the ANZECC guidelines for TN is more stringent as it is actually less than the LWRP guideline value for DIN.

Figure 11 presents the total ammoniacal nitrogen (TAN), a component of DIN, which includes the forms of nitrogen: ammonia and ammonium. Ammoniacal nitrogen is commonly sourced from animal waste (from farmed animals and human). Total ammoniacal nitrogen provides an indication of relatively ‘fresh’ nitrogen contamination that has not yet been nitrified by microorganisms into nitrates. The ANZECC guideline for total ammoniacal nitrogen is modified based on the pH of the sample. pH values ranged from 6.6 to 8.0 in the collected results, giving a range of 2380 to 900 mg/L as total ammonia-N. In the interests of simplicity the average pH across the entire sample set (pH 7.3) was used in the adjustment method provided in ANZECC Guidelines to give a guideline value of 1.88 mg/L. It is noted this exceeds both the TN and DIN guideline values.
Figure 9: Recorded levels of Total Nitrogen in the Kaiapoi area.
The guideline for TN, 0.614 mg/l, is exceeded at the vast majority of the sites. This is especially noticeable in the predominantly rurally sourced waterways such as the Silver Stream (KASS012, KASS002), the Kaiapoi River (KAKR037) and Courtenay Stream (KACS012 KACS003).
Figure 10: Recorded levels of dissolved organic nitrogen for the Kaiapoi area.
Figure 11: Recorded levels of total ammoniacal nitrogen for the Kaiapoi area.
DIN similarly to TN shows elevated levels in the rural sourced waterways such as Silver Stream, Kaiapoi River and Courtenay Stream. Generally urban sources do not appear to contribute to elevating nitrogen levels and in some waterways (such as the Silver Stream and, excepting the September results, in the Kaikanui Stream) there is a noticeable decrease in nitrogen levels at the downstream urban sample site.

The Cam River is an exception as it demonstrated low levels at the upper sampling point (KACR022) and in two of the four sampling events demonstrated significantly elevated levels at the downstream site (KACR001). However this may be caused by the incoming tide affecting nitrogen levels at the lower Cam site. The nitrogen at this site may represent backflow from another source, such as from the lower Kaiapoi River or from the Courtenay Stream, discharging upstream on the incoming tide.

The increase in TN and DIN levels observed in the Cam River could also be from runoff from the Kaiapoi Golf Course on the east side of the Cam, the neighbouring farm runoff to the west of this stretch of the Cam River, or possibly from avian sources in or around the Kaiapoi Lakes. *E. coli* levels at the two Cam River sites (consistent in October and high in December, similar to other sites) do not follow the same distribution trend suggesting the source of the nitrogen contamination is not derived from avian faecal matter.

The Courtenay River, Silver Stream and Kaiapoi River all demonstrate consistent exceedances of the guideline for TN, with the majority of these samples at these sites demonstrating levels more than double the guideline values. The results suggest the TN in these rivers is rurally sourced.

Kaiapoi has no clear predominantly urban sourced waterways. The upper McIntosh Drain site (KAMD057) is comprised of a combination of urban runoff from Woodend, rural runoff from the east of Woodend, runoff from rural land between Woodend and Kaiapoi, and resurgent groundwater discharging from tile drains from Woodend. The McIntosh Drain sampling demonstrates the overall lowest DIN levels of all sites sampled.

TAN indicates the presence of relatively ‘fresh’ nitrogen contamination. The levels observed show a markedly different distribution to that illustrated in the TN and DIN levels (both of which showed relatively consistent contaminant trends for each site). Generally the concentrations of TAN are well below the guideline values. The upper Kaikanui Stream site (KAKS027) generally demonstrated the highest levels. Further downstream The Oaks Reserve sample site (KAKS003) in the lower Kaikanui Stream demonstrated elevated TAN levels noticeably above background levels seen in other waterways. The Courtenay Stream and lower McIntosh Drain also demonstrated slightly increased levels. The distribution of TAN suggests that there could be localised sources of this nitrogen contaminant seeping into the waterways that are not from the same sources as the TN and DIN. It is unclear if this is from rural or urban sources.

It is recommended that TN is replaced with DIN, as this is the value provided in the LWRP, in the stream health monitoring programme. It is recommended this contaminant stays in the stream health monitoring section of the programme as the results show that concentrations are more closely linked to rural runoff than urban stormwater.

Although TAN levels are well below the guideline concentration it is recommended it is considered for inclusion in the stormwater programme as it provides information on the proximity of any sources of nitrogen contamination near the urban network.

5.3.6. **Phosphorus**

Primary sources of phosphorus include but are not limited to fertilisers (both agricultural and residential), sewerage and some detergents. Phosphorus has a tendency to bind to soil particles and can be transported into waterways with sediment runoff.
Figure 12 and Figure 13 present the recorded levels of Total Phosphorus (TP) and Dissolved Reactive Phosphorus (DRP) respectively. Similar to nitrogen the LWRP does not provide a guideline value for TP so the 90% ANZECC guideline value of 0.033 mg/L has been used. The LWRP provides a guideline value of 0.016 mg/L for DRP.

It should be noted that DRP results were not provided by the lab for the samples captured during the August event. DRP levels were recorded for the other three events.
Figure 12: Total Phosphorus levels in Kaiapoi’s waterways.
Figure 13: Dissolved Reactive Phosphorus in Kaiapoi’s waterways
Based on the levels observed it is apparent phosphorus is less consistently an issue in Kaiapoi’s waterways than nitrogen. In contrast to the distribution of nitrogen, the results demonstrate the shallower or ephemeral Kaiapoi waterways (Kaikanui Stream, McIntosh Drain) with less volume and lower flow rates have more frequent and higher elevated levels of phosphorus. Both of the sample sites in Silverstream (KASS012 and KASS002) and upper site on the Cam River (KACR022) returned TP and DRP levels below the guideline levels. Conversely the lower volume waterways all demonstrated phosphorus levels in exceedance of the guidelines, particularly in the first flush event in December.

At all sample sites phosphorus levels were highest in the first flush event in December with the exception of the lower Kaiapoi River site (KAKR005). The majority of phosphorus in the samples is in the form of DRP (the more readily bioavailable form) rather than particulate or organic forms. This indicates the majority of phosphorus entering the streams is in a form which could readily contribute to eutrophication.

It is noted that phosphorus concentrations are elevated above the guideline value in the December first flush at all sample sites but the two located in the Silver Stream. Rural source waterways with large spring fed catchments such as the Silver Stream do not show any exceedances above the guideline level, despite this waterway consistently demonstrating the highest levels of TN recorded during each event.

As DRP is stated as the applicable indicator of phosphate in the LWRP, it is recommended that it replaces TP in the urban impact section of the monitoring programme. The results show that phosphorus has both urban and rural sources. Wastewater overflows are a known urban cause of high phosphorous in waterways and are also a known issue for Kaiapoi. Wastewater overflows will be separately managed through a major wastewater network capacity upgrade for Kaiapoi programmed from 2023 to 2033.

5.3.7. **E. coli**

*Escherichia coli* (*E. coli*) is used as an indicator of possible sewage contamination as *E. coli* is commonly found in human and animal feces. The LWRP provides a guideline of 550 CFU/100 mL of *E. coli* and requires 95% of samples to be below this value.

Figure 14 shows the recorded levels of *E. coli* in Kaiapoi’s waterways.
Figure 14: E. coli levels in Kaiapoi’s waterways.
The concentrations of *E. coli* in these samples exceed the guideline values in fourteen instances of the 43, (42% total) of the samples captured. Exceedances were ubiquitous in the first flush event in December. The upper Kaikanui, (KAKS027) was the only site to demonstrate exceedances outside of the December event and demonstrated values above the 550 CFU/100 mL for all four samples. The sites sampled during the minor wet weather event in August and dry weather event in September typically both demonstrated levels of *E. coli* comfortably below the guideline value.

The ongoing elevated levels at the site in the upper Kaikanui Stream site (KAKS027) are likely to be the result of consistent contamination in the upstream rural land areas in combination with low flow, and possibly even stagnant, water. As a result of these conditions the *E. coli* result is not particularly meaningful.

The upper McIntosh Drain site (KAMD057) demonstrates the second highest *E. coli* concentrations of any site in December at 6900 CFU/100 mLs. KAMD057 is upstream of Kaiapoi’s urban boundary and above tidal effects – the elevated levels at this site could be due to contamination upstream or possibly the lack of flow through this section of the channel leading to a build-up of bacteria which is being flushed out in the larger first flush event.

KAMD078 (sampled as part of Woodend’s programme at 3:40 pm - approximately an hour after KAMD057) recorded an *E. coli* level of 2700 CFU/100 mLs. This shows that although elevated in Woodend the level of *E. coli* in this waterway increased further between two sites. It is noted that the *E. coli* recorded downstream at KAMD010 is significantly lower at 1100 CFU/100 mLs. However as discussed in section 5.3.12 “Electrical Conductivity”, this site appears to be brackish. This indicates freshwater at this site has been diluted with seawater which is neutralising bacteria in the lower drain.

At just a little below the levels seen at KAMD057 the lower site on the Kaikanui (KAKS003), on the southern side of Kaiapoi, demonstrates the third highest *E. coli* level of all of the sites. KAKS003 is downstream of significant urban areas and is fed by both residential and commercial-industrial land use catchments. Possible explanations for the elevated *E. coli* levels at this site include:

- *E. coli* contamination washed down from further upstream. KAKS027 showed extremely high *E. coli* levels.
- Overflows from the urban wastewater network.
- Runoff from the industrial area to the north (see Figure 1) and possibly seepage from historic and known contaminated areas such as Kaiapoi’s historic freezing works site. It is known that a considerable amount of waste was disposed of in slit trenches to the SE of the freezing works.
- Contaminated runoff from the farming area to the south of the Kaikanui Stream.
- Animal faecal matter runoff from urban greenspaces. The site is downstream of the Hinemoa Park Reserve and the Jim Brydon Reserve - neither are specific dog parks but both allow dog access. A cemetery area is also in this catchment but is unlikely to be a source of animal faecal matter.
- Backflow from avian sources in the downstream pond at the lower Courtenay Stream (unlikely as the Courtenay Stream has tide gates and if they were ineffective and there was backflow elevated *E. coli* levels would be expected at site KACS012 - this was not the case).

The locations of these possible sources is presented in Figure 15. Further investigation is needed to determine the actual sources of the *E. coli* particularly along the McIntosh Drain and Kaikanui Stream. Additional sampling could be undertaken along the Kaikanui to assist with narrowing down the source of this contamination.
Figure 15: Possible sources of elevated E. coli at urban sample site KAKS003.
5.3.8. **Total Hydrocarbons**

Total Hydrocarbon primary sources include but are not limited to road asphalts, manufacturing facilities and fuelling depots, as these areas frequently experience oil spillages.

There is no consistency between guidelines for hydrocarbons; ECan is in the process of investigating and stating a guideline.

For all samples the results indicated that the total hydrocarbon concentrations for C7 - C9, C10 - C14 and C15 - C36 were all below the detectable limits. Therefore it was concluded that the Kaiapoi urban and rural catchments do not have an issue with hydrocarbons.

It is recommended the hydrocarbons should be removed from the urban impact section of the monitoring programme. However the total hydrocarbon concentration should be kept in the ‘sediment sampling’ section of the monitoring programme, until it has been investigated further.

5.3.9. **Dissolved Oxygen**

Several factors affect the amount of oxygen dissolved in the water in waterways. Colder water usually has more oxygen, because gasses dissolve more readily in cold water. Water motion also helps mix oxygen into the water. Eutrophication can result in the depletion of oxygen concentration in the waterways as resulting organic matter respires and breaks down.

Figure 16 and Figure 17 show the DO levels recorded by portable probe during the sampling rounds.

The ANZECC guidelines provide a relatively narrow DO guideline range of between 98% (min) and 105% (max). The absolute levels of DO, can also be used to gauge the general health of a waterway. For optimum fish health the minimum DO level suggested by NIWA is 5 mg/L.
Figure 16: DO levels observed in Kaiapoi's waterways as a percentage of saturation.
Figure 17: DO levels in observed in Kaiapoi's waterways as an absolute value.
It is clear from the recorded DO levels that there is significant variation in Kaiapoi’s waterways. Although some variation is to be expected the DO fluctuates considerably between sites even within the same water body - for instance in the October event the Kaikanui Stream goes from a DO level of 54% at site KAKS027 to 94% 2.4 km downstream at site KAKS003. This trend is not consistent between events and could suggest the DO readings are somewhat unreliable. The DO percentage saturation (Figure 16) is a combination of two field measurements, the absolute DO level and the temperature. If both meter readings are not well calibrated then it is possible to produce compounding errors.

Figure 17 shows the absolute DO level exceeds the guideline minimum of 5 mg/L in all but three samples, which were captured in the first flush event in December. The only measurement taken in the upper McIntosh Drain at sample site KAMD057 showed a low DO reading of 0.78 mg/L, suggesting a near anoxic waterbody (<0.5 mg/L) at the time of sampling. Interestingly the December event samples generally had the lowest levels of absolute DO at each site. This is consistent with the results witnessed in previously assessed urban areas and appears to be a direct result of the warmer water in summer resulting in lower solubility of oxygen as saturated oxygen percentage (Figure 16) and temperature (Figure 19) are both relatively high.

The results suggests the waterways (with the exception of the upper McIntosh Drain) were not suffering from the low DO effects that can result from eutrophication at the time of sampling. However, it is expected waterways would have higher than usual DO levels after rain events due to raindrops having a large surface area to volume ratio to absorb oxygen while falling and additional mixing in the waterway created by increased turbulence and the resulting aeration. Low flow periods during warm summer periods are a more likely time to observe signs of eutrophication.

It is recommended that DO is monitored as part of the stream health in the monitoring programme, as it is a portable probe measurement and would not cost WDC much to monitor.

5.3.10. \( \textit{pH} \)

Low pH (acidic) is caused by high organic acids, such as some wetland waters or where mineral acidity occurs naturally. High pH (basic) is caused by highly eutrophic waters, where eutrophication occurs. pH differences can also occur by water draining certain rock, soil types and industrial wastes.

Figure 18 represents the pH portable probe results from the sampled waterways in and around Kaiapoi. The LWRP provides a guideline from pH 6.5 to pH 8.5.
Figure 18: pH readings captured by portable probe in Kaiapoi's waterways.
The recorded results are all within the guideline range. In general the samples tend to be slightly basic. The dry August event is the only event to demonstrate near acidic pH levels, which occurred across the majority of the sites. There were no sites in the following three sampling periods that demonstrated acidic pH levels on the acidic side of neutral (below a pH of 7.0). September demonstrated the highest pH levels at all of the sites except one.

The pH levels recorded are comfortably within the LWRP guidelines and don't indicate eutrophication or other problems indicated by pH changes. The high pH levels in September could be due to the dry spell prior to this event (the longest of the four events).

It is recommended that pH is monitored as part of the 'stream health' section of the monitoring programme, as it is not proven to be affected by the urban discharges. As it is a portable probe measurement it would not cost WDC much to monitor.
5.3.11. **Temperature**

Temperature of waterways can be affected by the air temperature during a rain event, the temperature of surfaces contributing runoff entering waterways and the temperature of the baseflow. Seasonal temperature fluctuations play a major role.

The LWRP provides a guideline of a maximum temperature of 20 °C for lowland rivers.
Figure 19: Temperature as captured by portable probe over the Kaiapoi area.
The recorded results follow the trend of warmer temperatures in warmer periods of the year. The waterways reached a maximum temperature of 18 °C, observed in the December event. There is no evidence to suggest that stormwater is altering the temperature of Kaiapoi’s waterways. Additional measurements collected at the same time of the year during wet and dry events would be needed to confirm this observation.

It is recommended that temperature is monitored as part of the stream health in the monitoring programme, as it is a portable probe measurement and would not cost WDC much to monitor.

5.3.12. Electrical Conductivity

Water Electrical Conductivity is a measure of the total ionic strength of the water and is widely used as a quick indication of the level of enrichment of the water. The measurement does not distinguish between nutrient and non-nutrient ions so although it can signal a potential issue it requires additional information to determine what the source of the ions is. There is no specific guideline for water conductivity provided by ANZECC or the LWRP. Typical drinking water has a range of between 50-500 µS/cm while sea water is about 54,000 µS/cm.

Figure 20 presents Kaiapoi conductivity results as recorded by portable probe in the waterway.
Figure 20: Conductivity results for Kaiapoi.
Samples captured in the minor wet weather event in August and dry weather event in October demonstrate the highest conductivity levels at each site. Samples captured during the first flush December event tend to demonstrate the lowest conductivity observed at each site. As the December event tended to demonstrate the highest levels of conducting nutrients such as DRP, and reasonably high levels of DIN, it appears the elevated conductivity observed in the August and October events is not from nutrients but from non-nutrient ions present in the water. There is a clear jump in conductivity levels at two of the lowest lying sites KACS003 and KAMD010. Considering both sites have low elevation and close proximity to the river estuary it appears there is some saltwater mixing at these sites.

Although there are no guidelines for conductivity, it is recommended that conductivity is kept in the ‘stream health’ section of the monitoring programme, as it can be easily retrieved and recorded. Sharp changes in conductivity indicate a change in anion or ion concentration which is linked to contaminant quantity and quality and particularly in the lower areas of Kaiapoi’s waterways gives an indication of the salinity of the tested water.

It should be noted that at the low elevation sites the waterways could be stratified with saline sea water positioned deeper down in the waterbody. This potential stratification adds a layer of complexity to both sampling and interpretation. It is possible that the surface probe only measured the electrical conductivity of the very surface which might differ from the bottled sample if the sample container was filled any deeper than the probe was positioned, or the action of filling the sample bottle disturbed an interface between fresh and salty water.

In the future the sample source could be verified by having the electrical conductivity of the sample tested at the laboratory. This could then be checked during the quality analysis to verify it is approximately the same as the EC recorded by the portable probe. Any mismatches would indicate stratification of the waterway and show samples that have measured and captured different layers. The possibility of backflows up the river due to the rising tide should also be considered. By continuing to capture the time the measurement and sample were taken the state of the tide can then be considered and used to check if the sample was captured on an incoming or outgoing tide - this can then be used to inform if there may have been resulting backflow up the waterway.

Further investigation into the effect tidal flow has on the different waterways should be investigated, in the following areas:

- the reach of saltwater upstream in Kaiapoi’s waterways
- the tidal influence on freshwater causing backflow upstream
- presence of stratification (haloclines) of Kaiapoi’s waterways during rising tides
- if stratification is occurring in Kaiapoi’s waterways during a flood tide (rising sea) are there bidirectional flows of distinct layers of freshwater downstream and saline water upstream?
6. **DISCUSSION**

Four sample rounds were completed, in both wet and dry conditions, at 12 sites spread over the Silver Stream, Kaiapoi River, Cam River, Kaiapoi Stream, Courtenay Stream and McIntosh Drain.

Due to its proximity to the sea and exposure to tides Kaiapoi presents a unique set of challenges when sampling and analysing the stormwater quality of its waterways. During the baseline sampling all of the sampling occurred during rising tides meaning that there is likely to have been backflows up the lower elevation waterways. There is clear evidence of brackish water at two of the twelve sites and it is possible there were backflows of freshwater upstream at some of the other sites, such as in the lower Cam River. Further investigation is required to determine the type and full extent of the tidal influence in Kaiapoi.

In addition to an investigation into tidal effects it is suggested that electrical conductivity or Total Dissolved Solids (TDS) is captured in the lab sample to verify the portable probe is measuring the same water as the sample captured for the lab – this would confirm the sample isn’t coming from a sub-surface saline layer if there is stratification in the water body. To minimise potential contamination from backflows samples would ideally be captured during the latter half of an outgoing tide or at low tide, to allow any mixed back flowed water opportunity to be flushed downstream.

The results concluded that for Kaiapoi’s ongoing monitoring programme some contaminants can be removed and some added. Table 4 summarises the suggested changes from the baseline monitoring programme for Kaiapoi’s ongoing monitoring programme.

**Table 4: Summary of contaminants from baseline monitoring programme recommended to be changed for ongoing monitoring programme application to Kaiapoi.**

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Source</th>
<th>Baseline Monitoring Programme Inclusion</th>
<th>Recommended Ongoing Monitoring Programme Section</th>
<th>Reason Section for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>Urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Copper</td>
<td>Urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Dissolved Lead</td>
<td>Urban</td>
<td>Included</td>
<td>-</td>
<td>Very low concentrations, therefore recommended to remove it from the programme.</td>
</tr>
<tr>
<td>Dissolved Zinc</td>
<td>Urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen (TN)</td>
<td>Rural</td>
<td>Included</td>
<td>-</td>
<td>DIN is in the Land and Water Regional Plan (LWRP), therefore it is recommended that we replace TN with DIN</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN)</td>
<td>Rural &amp; Urban</td>
<td>-</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Total Ammoniacal Nitrogen (TAN)</td>
<td>Urban &amp; Rural</td>
<td>Included</td>
<td>Stream Health</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Mainly Urban</td>
<td>Included</td>
<td>-</td>
<td>DRP was found to be from rural and possibly urban sources. DRP is a component of wastewater overflows and it is recommended that it is monitored in Kaiapoi’s water ways on an ongoing basis.</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (DRP)</td>
<td>Mainly urban</td>
<td>Included</td>
<td>Urban Impact</td>
<td></td>
</tr>
<tr>
<td>Contaminant</td>
<td>Source</td>
<td>Baseline Monitoring Programme Inclusion</td>
<td>Recommended Ongoing Monitoring Programme Section</td>
<td>Reason Section for Change</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------</td>
<td>------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>E. coli</td>
<td>Urban &amp; Rural</td>
<td>Included</td>
<td>Urban Impact</td>
<td>The inclusion of DRP in the urban impact sampling programme will provide ongoing data that will enable any reduction of overflows entering streams over time to be measured and reported.</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>Urban</td>
<td>Included</td>
<td>-</td>
<td>Very low concentrations therefore recommended removing it from the programme. Total Hydrocarbons will remain in the basin sediment monitoring.</td>
</tr>
<tr>
<td>Dissolved Oxygen (DO)</td>
<td>-</td>
<td>Included</td>
<td>Stream Health</td>
<td>Can be used for guideline value adjustment.</td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td>Included</td>
<td>Urban Impact</td>
<td>Lab sample useful for determining salinity of water sample and potential mixing of fresh and salt water.</td>
</tr>
<tr>
<td>Temperature</td>
<td>-</td>
<td>Included</td>
<td>Stream Health</td>
<td>Can be used for determining salinity of water sample and potential mixing of fresh and salt water.</td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>-</td>
<td>Included</td>
<td>Stream Health</td>
<td>Lab sample useful for determining salinity of water sample and potential mixing of fresh and salt water.</td>
</tr>
<tr>
<td>Hardness</td>
<td>-</td>
<td>-</td>
<td>Urban Impact</td>
<td>Initial one off sample to establish value for hardness adjustment and then occasional sampling recommended to monitor the character of the water way.</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>Mainly Rural</td>
<td>-</td>
<td>Urban Impact</td>
<td>Initial one off sample to establish value for guideline adjustment and then occasional sampling recommended to monitor the character of the water way.</td>
</tr>
</tbody>
</table>

Total hydrocarbons and lead are recommended to be removed from the programme as they consistently demonstrated levels well below their guideline values.

It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP. It is also recommended that electrical conductivity (in the form of specific conductance) is captured by the lab for any samples as a backstop to check if there has been any mixing of the waterway water with tidal saline waters.

It was recommended by ECan water quality specialists that the waterway hardness and dissolved organic carbon are measured once or twice to characterise the waterway. This will enable the WDC to get site specific trigger values for metals. This would be undertaken as part of the monitoring programme, as the future monitoring programme sample sites would not be the same as in this baseline programme.

It is recommended that the monitoring programme for Kaiapoi be amended to include more sample points at additional locations in the urban stream reaches. This includes additional sample sites downstream of
more of the major urban discharge outlets, particularly in the Kaikanui Stream which has the most significant levels of urban contaminants identified to date.

The Council will also undertake dissolved copper and zinc sampling from selected major network discharge outlets (e.g. major pipes and open drains). It is recommended that sampling of dissolved metals from pipe outlets is undertaken for several years from the main sub-catchment pipes or drains, to determine a baseline. Once a baseline is determined, improvement targets can be identified and progressed over the remaining term of consent. This is a different monitoring approach from that proposed for Woodend or Rangiora. This is because the Schedule 5 standards in the LWRP are not relevant or useful in assessing effects of discharges in tidal waterways or in spring fed rural streams. These strong flowing rural streams, such as the Courtenay Stream or Cam River, flow with significant volumes through Kaiapoi, diluting contaminants which are only readily measurable in the lower volume shallower streams and open drains.

It was found that a number of the contaminants are sourced rurally and the relevant guidelines are exceeded prior to entering the township. For some of these contaminants there was an increase in concentration through the township, indicating that the urban area discharges these contaminants also, but in smaller quantities.

It is possible that nitrogen laden water is discharging into the Silverstream and Courtenay Stream from rural springs or overland flows upgradient of Kaiapoi. There are no mapped springs within urban Kaiapoi and so, no effect on springs from the urban stormwater discharges.

This study has demonstrated that the rural areas have a significant impact on the health of the Kaiapoi waterways. It is recommended that ECAN undertakes monitoring upstream of the townships as contaminant concentration guidelines are exceeded in some waterways prior to entering the urban limits.

It should be noted that although applied here in this report in the absence of LWRP guidelines, the ANZECC (2000) guidelines do not provide water quality standards in the traditional sense (i.e. fixed standards that should not be exceeded). Rather, ANZECC (2000) states that the uncertainty in the derivation and application of such standards led them to develop trigger values that indicate a potential environmental problem if they are exceeded. Hence, ANZECC (2000) trigger values are not intended to be applied in an absolute fashion. If a trigger value is exceeded, further investigation is required.
7. **CONCLUSION**

The following conclusions were made in this investigation:

- Most of the contaminants tested exceeded the guidelines in at least one of the sample rounds. Many exceedances occurred in the December sampling period which was a first flush rainfall event, which was the largest rainfall event captured during the sampling period.

- It was found that generally the majority of contaminants were present in both rural and urban environments, however in some cases the rural area was found to have a larger impact than the urban area and the guideline concentrations were at times exceeded prior to reaching the urban discharge points.

The following factors are recommended for consideration in the ongoing Kaiapoi stormwater quality monitoring programme:

- It is recommended that Lead and Total Hydrocarbons are removed from the ‘urban impact’ section of the Stormwater Monitoring Programme, as the results indicated that the concentrations were consistently far below the guidelines.

- It is recommended that Dissolved Reactive Phosphorus and Dissolved Inorganic Nitrogen should be used in the monitoring programme as these are specified in the LWRP.

- It is recommended that *E. coli* and DRP are monitored regularly in the ongoing programme as there is some evidence to suggest the urban area is a contributing source of these contaminants.

- It is recommended that contaminants such as *E. coli*, phosphorus and nitrogen be investigated further by ECan within the rural catchments. Particularly in the largest wet weather event *E. coli* and phosphorus levels exceeded the LWRP guidelines in the rural zones, upstream of the urban limits. Nitrogen contaminants in the rural areas of rural catchments were a prevalent issue across all four sampling events. The results demonstrate significant exceedances of the guideline levels provided in the LWRP for DIN at five of the twelve sites sampled particularly in the Silverstream and Courtenay Stream.

- It is recommended that electrical conductivity is measured in future lab samples to indicate the salinity of the captured sample. This lab measurement can then be checked against the portable probe measurement and verify if there was saline stratification of the sampled layer of the waterbody at the time of sampling.

- It is recommended that dissolved copper and zinc sampling from selected major network discharge outlets (e.g. major pipes and open drains) is undertaken for several years from the main urban sub-catchments, to determine a baseline. Once a baseline is determined, improvement targets can be identified and progressed over the remaining term of consent. The Schedule 5 LWRP standards are not useful in assessing effects of discharges in tidal waterways or in spring fed rural streams. These strong flowing/ tidal streams, such as the Courtenay Stream, Kaiapoi River or lower Cam River, have significant volumes through Kaiapoi, diluting the main urban contaminants which are only measurable in shallow streams or open drains.

These conclusions will be used to develop the Kaiapoi Stormwater Monitoring Programme. After discussions with ECan and MKT the Stormwater Monitoring Programme will be updated.
8. **APPENDIX**

   **APPENDIX A: EXTRA BASELINE SAMPLING INFORMATION**

Sampling kits should be ordered in advance to prepare for unpredicted sampling times. The kits should contain a STER, UP1L, NWU100 and a TPH250 from Hill Laboratory. The sample kits should be labelled in the following way:

![Labelled sampling kit image]
SITE DESCRIPTIONS:

Site: KASS012  
**GPS location:** X-Coordinate: 1570132; Y-Coordinate: 5196675  
**Site Description:** Silver Stream, North side of bridge.  
**Site Photo:**

Site: KASS002  
**GPS location:** X-Coordinate: 1570316; Y-Coordinate: 5197379  
**Site Description:** Silver Stream, South side of Island Road  
**Site Photo:**
Site: KAKR037
GPS location: X-Coordinate: 1571237; Y-Coordinate: 5197207
Site Description: Kaiapoi River, South of motorway bridge.
Site Photo: nil.

Site: KACR022
GPS location: X-Coordinate: 1572421; Y-Coordinate: 5199128
Site Description: Cam River, SH1 West side of road.
Site Photo: nil.

Site: KACR001
GPS location: X-Coordinate: 1571845; Y-Coordinate: 5197268
Site Description: Taranaki Stream, East side of Chinnerys Road
Site Photo:
Site: KAKS027
GPS location: X-Coordinate: 1570642; Y-Coordinate: 5194664
Site Description: Kaikanui Stream, North side of Neeves Road
Site Photo:

Site: KAKS003
GPS location: X-Coordinate: 1572377; Y-Coordinate: 5195333
Site Description: Kaikanui Stream, The Oaks Reserve
Site Photo:
Site: KACS012
GPS location: X-Coordinate: 1572508; Y-Coordinate: 5195177
Site Description: Courtenay Stream, on walkway in reserve
Site Photo: nil.

Site: KACS003
GPS location: X-Coordinate: 1572960; Y-Coordinate: 5195954
Site Description: Courtenay Stream, Courtenay Drive Reserve
Site Photo: nil.

Site: KAMD057
GPS location: X-Coordinate: 1573844; Y-Coordinate: 5201130
Site Description: McIntosh Drain, South of Fullers Road
Site Photo: nil.

Site: KAKR005
GPS location: X-Coordinate: 1573560; Y-Coordinate: 5195984
Site Description: Kaiapoi River, Hall Street
Site Photo: nil.
Site: KAMD010

GPS location: X-Coordinate: 1573840; Y-Coordinate: 5196834

Site Description: McIntosh Drain, South side of Beach Road

Site Photo:
APPENDIX B: RAINFALL EVENT HYDROGRAPHS

Chinnerys Road, Woodend Rainfall data; 24 hour period prior to the rainfall event is shown in red.


Rainfall: Woodend (E1572139, N5203917), 16/9/2016-19/9/2016

Rainfall: Woodend (E1572139, N5203917), 10/10/2016-13/10/2016
Rainfall: Woodend (E1572139, N5203917), 9/12/2016-12/12/2016

Rain Intensity (mm/5 min) vs Time

24 hrs Prior to Sampling
Rainfall
## APPENDIX C: TIDAL INFORMATION

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Tide Height (m)</th>
<th>Date</th>
<th>Time</th>
<th>Tide Height (m)</th>
<th>Date</th>
<th>Time</th>
<th>Tide Height (m)</th>
<th>Date</th>
<th>Time</th>
<th>Tide Height (m)</th>
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<tbody>
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<td>19/09/2016</td>
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**Source:** NIWA Tide forecaster  
**Latitude:** 43 22 55.7 S  
**Longitude:** 172 42 45.2 E  
[https://www.niwa.co.nz/node/26820/results](https://www.niwa.co.nz/node/26820/results)
**APPENDIX D: LABORATORY RESULTS SUMMARY**

Green and white highlighting marks acceptable values and red highlighting indicates exceedance of the guidelines

August sample round results

<table>
<thead>
<tr>
<th>August</th>
<th>Guideline Value</th>
<th>KASS012 - North side of bridge</th>
<th>KASS002 - South side of Island Road</th>
<th>KAKR037 - South of motorway bridge</th>
<th>KACR022 - SH1 West side of road</th>
<th>KACR001 - South of Smith Street</th>
<th>KAKS027 - North side of Neeves Road</th>
<th>KAKS003 - The Oaks Reserve</th>
<th>KACS012 - On walkway in reserve</th>
<th>KAC003 - Courtenay Drive Reserve</th>
<th>KAMD057 - South of Fullers Road</th>
<th>KAKR005 - Hall Street</th>
<th>KAMD010 - South side of Beach Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (g/m³)</td>
<td>50</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>6</td>
<td>&lt;3</td>
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<td>7</td>
<td>&lt;3</td>
<td>&lt;3</td>
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<td>&lt;0.005</td>
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<tr>
<td>Dissolved Copper (g/m³)</td>
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<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
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<td>&lt;0.0005</td>
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<tr>
<td>Dissolved Zinc (g/m³)</td>
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<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>0.0015</td>
<td>0.0026</td>
<td>&lt;0.0010</td>
<td>0.068</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>0.0012</td>
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<td>Dissolve Lead (g/m³)</td>
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<tr>
<td>Total Nitrogen (g/m³)</td>
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<td>0.67</td>
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<tr>
<td>Total Ammoniacal-N (g/m³)</td>
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<td>&lt;0.010</td>
<td>0.015</td>
<td>&lt;0.010</td>
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<td>0.055</td>
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<td>0.012</td>
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<td>Nitrate-N and Nitrite-N (g/m³)</td>
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<td>4.2</td>
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<td>0.99</td>
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<tr>
<td>Total Kjeldahl Nitrogen (g/m³)</td>
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<td>0.16</td>
<td>0.18</td>
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<td>Dissolved Inorganic Nitrogen (g/m³)</td>
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<tr>
<td>Dissolved Reactive Phosphorus (g/m³)</td>
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<td>0.014</td>
<td>0.009</td>
<td>0.024</td>
<td>0.013</td>
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<td>0.064</td>
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<td>E. Coli (cfu/100mL)</td>
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<td>11.4</td>
<td>10.9</td>
<td>10.8</td>
<td>7.7</td>
<td>9.7</td>
<td>10.2</td>
<td>11.4</td>
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<tr>
<td>C7-C9# (g/m³)</td>
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<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
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<tr>
<td>C10-C14# (g/m³)</td>
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<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
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<td>&lt;0.2</td>
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<tr>
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<td>&lt;0.4</td>
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<td>&lt;0.4</td>
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<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
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<td>&lt;0.7</td>
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<tr>
<td>DO (mg/L)</td>
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<td>11.0</td>
<td>7.7</td>
<td>9.7</td>
<td>10.2</td>
<td>11.4</td>
<td>7.7</td>
<td>9.7</td>
<td>12.9</td>
<td>9.9</td>
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<tr>
<td>pH</td>
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<td>7.9</td>
<td>9.3</td>
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<td>196</td>
<td>121</td>
<td>124</td>
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<td>194</td>
<td>324</td>
<td>177</td>
<td>934</td>
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</table>
### September Sample Results

| September | Guideline Value | KASS012 - North side of bridge | KASS002 - South side of Island Road | KAKR037 - South of motorway bridge | KACR022 - SH1 West side of road | KACR001 - South of Smith Street | KAKS027 - South of Neeves Road | KAKS003 - The Oaks Reserve | KACS012 - On walkway in reserve | KACS003 - Courtenay Drive Reserve | KAMD057 - South of Fullers Road | KAKR005 - Hall Street | KAMD010 - South side of Beach Road |
|-----------|------------------|--------------------------------|-----------------------------------|-----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------|-----------------------------|----------------------------------|
| Total Suspended Solids (g/m³) | 50 | <3 | <3 | 4 | 4 | 4 | 3 | <3 | 3 | 12 | 10 | 10 | 7 |
| Dissolved Copper (g/m³) | 0.0018 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Dissolved Zinc (g/m³) | 0.015 | <0.0010 | <0.0010 | <0.0010 | 0.0014 | 0.0012 | 0.0011 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Dissolve Lead (g/m³) | 0.00056 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Total Nitrogen (g/m³) | 0.614 | 4.6 | 4.6 | 4 | 0.5 | 0.57 | 0.8 | 3.7 | 4.2 | 0.46 | 2.6 | 0.65 |
| Total Ammoniacal-N (g/m³) | 1.88 | <0.010 | <0.010 | 0.016 | 0.012 | 0.011 | 0.21 | 0.065 | 0.012 | 0.036 | 0.027 | 0.028 |
| Nitrate-N and Nitrite-N (g/m³) | 0.444 | 4.5 | 4.4 | 3.8 | 0.35 | 0.35 | 0.33 | 3.5 | 4 | 0.141 | 2.5 | 0.44 |
| Total Kjeldahl Nitrogen (g/m³) | 0.17 | 0.12 | 0.16 | 0.2 | 0.14 | 0.22 | 0.47 | 0.2 | 0.13 | 0.32 | 0.13 | 0.6 |
| Dissolved Inorganic Nitrogen (g/m³) | 1.5 | 4.5 | 4.4 | 3.816 | 0.362 | 0.361 | 0.54 | 3.565 | 4.012 | 0.177 | 2.527 | 0.072 |
| Dissolved Reactive Phosphorus (g/m³) | 0.016 | 0.004 | <0.004 | 0.01 | 0.008 | 0.008 | 0.1 | 0.008 | 0.008 | 0.044 | 0.01 | 0.048 |
| Total Phosphorus (g/m³) | 0.033 | 0.008 | 0.005 | 0.017 | 0.015 | 0.02 | 0.14 | 0.012 | 0.011 | 0.075 | 0.018 | 0.104 |
| E. Coli (cfu/100mL) | 550 | 200 | 140 | 510 | 280 | 290 | 29000 | 40 | 120 | 220 | 210 | 330 |
| C7-C9# (g/m³) | - | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| C10-C14# (g/m³) | - | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| C15-C36# (g/m³) | - | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Hydrocarbons (g/m³) | - | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |
| DO (mg/L) | 5 | 10.0 | 10.9 | 10.5 | 8.7 | 8.4 | 5.1 | 7.2 | 9.2 | 10.8 | 8.8 | 8.4 |
| pH | 8.5 | 7.89 | 7.77 | 7.6 | 7.76 | 7.73 | 7.67 | 7.61 | 7.72 | 7.98 | 7.95 | 7.69 |
| Temperature (°C) | 20 | 12.9 | 12.6 | 12.2 | 12.8 | 12.8 | 12.2 | 13.9 | 13.8 | 13.8 | 13.8 | 13.9 |
| Conductivity (µS/cm) | 500 | 149 | 146 | 149 | 95 | 94 | 154 | 196 | 155 | 217 | 168 | 95 |
## October sample round results

<table>
<thead>
<tr>
<th></th>
<th>Guideline Value</th>
<th>KASS012 - North side of bridge</th>
<th>KASS002 - South side of Island Road</th>
<th>KAKR037 - South of motorway bridge</th>
<th>KACR022 - SH1 West side of road</th>
<th>KACR001 - South of Smith Street</th>
<th>KAKS027 - North side of Neeves Road</th>
<th>KAKS003 - The Oaks Reserve</th>
<th>KACS012 - On walkway in reserve</th>
<th>KACS003 - Courtenay Drive Reserve</th>
<th>KAMD057 - South of Fullers Road</th>
<th>KAKR005 - Hall Street</th>
<th>KAMD010 - South side of Beach Road</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Suspended Solids (g/m³)</strong></td>
<td>50</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>4&lt;3</td>
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<td>12&lt;3</td>
<td>8&lt;3</td>
<td>12&lt;3</td>
<td>3&lt;3</td>
<td>12&lt;3</td>
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<tr>
<td><strong>Dissolved Copper (g/m³)</strong></td>
<td>0.0018</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td><strong>Dissolved Zinc (g/m³)</strong></td>
<td>0.015</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
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<td>0.001</td>
<td>0.0112</td>
<td>0.001</td>
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</tr>
<tr>
<td><strong>Dissolve Lead (g/m³)</strong></td>
<td>0.00056</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
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<td>&lt;0.00010</td>
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<tr>
<td><strong>Total Nitrogen (g/m³)</strong></td>
<td>0.614</td>
<td>4.4</td>
<td>4.4</td>
<td>3.8</td>
<td>0.49</td>
<td>2.1</td>
<td>0.49</td>
<td>0.34</td>
<td>3.6</td>
<td>4.2</td>
<td>0.14</td>
<td>0.6</td>
<td>0.092</td>
</tr>
<tr>
<td><strong>Total Ammoniacal-N (g/m³)</strong></td>
<td>1.88</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>0.01</td>
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<tr>
<td><strong>Nitrate-N and Nitrite-N (g/m³)</strong></td>
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<tr>
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<td>0.008</td>
<td>0.01</td>
<td>0.009</td>
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<td>0.103</td>
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<td>0.01</td>
<td>0.012</td>
<td>0.011</td>
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<td>0.039</td>
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<td>0.092</td>
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<tr>
<td><strong>E. Coli (cfu/100mL)</strong></td>
<td>550</td>
<td>63</td>
<td>70</td>
<td>150</td>
<td>410</td>
<td>700</td>
<td>900</td>
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<tr>
<td><strong>C7-C9# (g/m³)</strong></td>
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<td>&lt;0.10</td>
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<td>&lt;0.10</td>
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<td>&lt;0.10</td>
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<td>&lt;0.10</td>
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<tr>
<td><strong>C10-C14# (g/m³)</strong></td>
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<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
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<tr>
<td><strong>C15-C36# (g/m³)</strong></td>
<td>-</td>
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<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
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<td>&lt;0.4</td>
<td>&lt;0.4</td>
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<td>&lt;0.7</td>
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<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
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<tr>
<td><strong>DO (mg/L)</strong></td>
<td>5</td>
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<td>5.9</td>
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<td>10.1</td>
<td>10.9</td>
</tr>
<tr>
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<td>7.13</td>
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<td>7.12</td>
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<td>20</td>
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<td>13</td>
<td>11</td>
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<td>13.2</td>
<td>13.9</td>
<td>11.5</td>
<td>13.7</td>
<td>11.5</td>
</tr>
<tr>
<td><strong>Conductivity (µS/cm)</strong></td>
<td>500</td>
<td>190</td>
<td>193</td>
<td>189</td>
<td>119</td>
<td>168</td>
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<td>358</td>
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December sample round results

<table>
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<tr>
<th>December</th>
<th>Guideline Value</th>
<th>KASS012 - North side of bridge</th>
<th>KASS002 - South side of Island Road</th>
<th>KAKR037 - South of motorway bridge</th>
<th>KACR022 - SH1 West side of road</th>
<th>KACR001 - South of Smith Street</th>
<th>KAKS027 - North side of Neaves Road</th>
<th>KAKS003 - The Oaks Reserve</th>
<th>KACS012 - On walkway in reserve</th>
<th>KACS003 - Courtenay Drive Reserve</th>
<th>KAMD057 - South of Fullers Road</th>
<th>KAKR005 - Hall Street</th>
<th>KAMD010 - South side of Beach Road</th>
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<tr>
<td>Total Suspended Solids (g/m³)</td>
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<td>&lt;3</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>19</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>12</td>
<td>30</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Dissolved Copper (g/m³)</td>
<td>0.0018</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>0.0008</td>
<td>&lt;0.0005</td>
<td>0.0008</td>
<td>0.0007</td>
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<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
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<tr>
<td>Dissolved Zinc (g/m³)</td>
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<td>&lt;0.0010</td>
<td>&lt;0.0010</td>
<td>0.0026</td>
<td>0.0023</td>
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<tr>
<td>Dissolved Lead (g/m³)</td>
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<td>&lt;0.00010</td>
<td>&lt;0.00010</td>
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<tr>
<td>Total Nitrogen (g/m³)</td>
<td>0.614</td>
<td>4.2</td>
<td>4.1</td>
<td>3</td>
<td>0.55</td>
<td>1.91</td>
<td>0.77</td>
<td>0.41</td>
<td>4.1</td>
<td>3.4</td>
<td>1.44</td>
<td>0.17</td>
<td>0.65</td>
</tr>
<tr>
<td>Total Ammoniacal-N (g/m³)</td>
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<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>&lt;0.010</td>
<td>0.015</td>
<td>&lt;0.010</td>
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<td>&lt;0.010</td>
<td>&lt;0.010</td>
</tr>
<tr>
<td>Nitrate-N and Nitrite-N (g/m³)</td>
<td>0.444</td>
<td>4</td>
<td>3.9</td>
<td>2.5</td>
<td>0.39</td>
<td>1.48</td>
<td>0.134</td>
<td>0.159</td>
<td>3.9</td>
<td>3</td>
<td>0.03</td>
<td>0.105</td>
<td>0.061</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (g/m³)</td>
<td>0.17</td>
<td>0.23</td>
<td>0.19</td>
<td>0.55</td>
<td>0.16</td>
<td>0.43</td>
<td>0.63</td>
<td>0.25</td>
<td>0.19</td>
<td>0.41</td>
<td>1.44</td>
<td>&lt;0.10</td>
<td>0.19</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (g/m³)</td>
<td>1.5</td>
<td>4</td>
<td>3.9</td>
<td>2.5</td>
<td>0.405</td>
<td>1.48</td>
<td>0.309</td>
<td>0.175</td>
<td>3.91</td>
<td>3.075</td>
<td>0.003</td>
<td>0.105</td>
<td>0.061</td>
</tr>
<tr>
<td>Dissolved Reactive Phosphorus (g/m³)</td>
<td>0.016</td>
<td>0.013</td>
<td>0.012</td>
<td>0.032</td>
<td>0.021</td>
<td>0.029</td>
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<td>0.03</td>
<td>0.36</td>
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<tr>
<td>Total Phosphorus (g/m³)</td>
<td>0.033</td>
<td>0.021</td>
<td>0.016</td>
<td>0.059</td>
<td>0.027</td>
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<td>0.054</td>
<td>0.54</td>
<td>0.018</td>
<td>0.138</td>
</tr>
<tr>
<td>E. Coli (cfu/100mL)</td>
<td>550</td>
<td>1500</td>
<td>1100</td>
<td>2800</td>
<td>1000</td>
<td>3800</td>
<td>35000</td>
<td>6300</td>
<td>2100</td>
<td>1100</td>
<td>6900</td>
<td>900</td>
<td>1100</td>
</tr>
<tr>
<td>C7-C9# (g/m³)</td>
<td>-</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
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<tr>
<td>C10-C14# (g/m³)</td>
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<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
<td>&lt;0.2</td>
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<td>&lt;0.2</td>
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<tr>
<td>C15-C36# (g/m³)</td>
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<td>&lt;0.4</td>
<td>&lt;0.4</td>
<td>&lt;0.4</td>
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<td>&lt;0.4</td>
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<tr>
<td>Total Hydrocarbons (g/m³)</td>
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<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
<td>&lt;0.7</td>
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<td>&lt;0.7</td>
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<td>&lt;0.7</td>
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<tr>
<td>DO (mg/L)</td>
<td>5</td>
<td>5.8</td>
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<tr>
<td>pH</td>
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<td>7.15</td>
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<tr>
<td>Temperature (°C)</td>
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<td>149</td>
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WAIMAKARIRI DISTRICT COUNCIL

REPORT FOR DECISION

FILE NO and TRIM NO: DRA-19 / 191017145159

REPORT TO: Utilities and Roading Committee

DATE OF MEETING: 19 November 2019

FROM: Gerard Cleary – Manager Utilities and Roading, on behalf of the Kairapoi River Rehabilitation Working Party

SUBJECT: Cam River floodgate automation for saline intrusion prevention

SIGNED BY:

Department Manager

Chief Executive

1. SUMMARY

1.1 This report details a proposal from the Kaiapoi River Rehabilitation Working Party to investigate the feasibility for automation of the Cam River Floodgate to become a tidegate, for prevention of saline incursions upstream.

1.2 This report seeks consideration of a $15,000 budget in 2020-21 to investigate the feasibility of this proposal, such as producing a concept design, detail of required resource consents and permissions, as well as preliminary consultation with Te Ngāi Tūāhuriri Rūnanga. As this is a generalised expenditure that could benefit a range of users, it is proposed for the budget to come from the general rate.

1.3 The intent of the automated floodgate operation is to avoid or limit saline intrusion into the lower Cam River during times when there is high salinity on the incoming tide. This would retain a freshwater environment in the lower Cam River, with possible complex benefits. However, there are also multiple possible disadvantages for ecological species and the local community.

1.4 The Cam River Floodgate is an Environment Canterbury asset, therefore any modifications would require their approval.

Attachments:

i. Kaiapoi River Rehabilitation Working Party meeting minutes 25 September 2019 (191029150331)

2. RECOMMENDATION

THAT the Utilities and Roading Committee recommends:

THAT the Council:

(a) Receives report No. 191017145159.

(b) Considers inclusion of a budget of $15,000 in the Draft Annual Plan from the general rate for 2020-21 to scope feasibility of automating the Cam River Floodgate, to be used as a tidegate against saline incursions.
Notes that a report summarising findings from the feasibility study will be presented to the Utilities and Roading Committee and Environment Canterbury in early 2021, for a decision whether to proceed, and costings in order to obtain required consents / permissions and construct the design.

Notes that any modifications to the Cam River floodgate would require the approval of Environment Canterbury as the asset owner.

Circulates this report to the Kaiapoi-Tuahiwi Community Board and Waimakariri Water Zone Committee.

3. BACKGROUND

3.1 The Kaiapoi River Rehabilitation Working Party has proposed that the Cam River floodgate could be modified to be used approximately up to four months of the year as a tidegate, for prevention of saline water from progressing upstream during a high tide. Environment Canterbury has conducted preliminary investigations that confirmed that automation of the Cam River Floodgate is possible, however with many required considerations.

3.2 The Kaiapoi River Rehabilitation Working Party has fully allocated a budget of $105,000 for 2019-20, and 2020-21 to projects in the Kaiapoi River (sediment trap construction, planting and river bank realignment), therefore there is no unallocated funding currently at the discretion of the Working party to allocate.

3.3 The Cam River Floodgates were designed and built in 1971/72 to prevent floodwater from the Waimakariri River overtopping the stopbanks upstream of the Floodgates. The Cam River Floodgates are an Environment Canterbury – owned and managed asset. When the water level at the Waimakariri River Gorge gauge reaches 3.5m the floodgates are lowered manually. Once the flood levels have receded the floodgates are raised again. The floodgates were designed for rare, temporary flooding.

3.4 A report into the cause of saline incursion by Adrian Meredith at Environment Canterbury, entitled ‘Assessment of the state of a tidal waterway – the Lower Kaiapoi River’ (March 2018), concluded that observed changes were mostly likely due to increasing episodes of saline water intrusion flowing into the lower Kaiapoi River. This conclusion is supported by salinity measurements taken by Environment Canterbury.

3.5 The saline intrusions are thought to be a result of bed level changes following the 2010-11 Canterbury earthquakes. Saline intrusion episodes in the lower Kaiapoi River are also hypothesised by Meredith (2018) to result from low flows in the Waimakariri River, generally in summer and autumn, allowing saltwater to penetrate further up the mouth of the Kaiapoi and Cam Rivers, with flow data supporting this hypothesis.

3.6 A report on the ecological and wider implications of saline incursions in the Kaiapoi River, including the Cam River catchment was presented to the Utilities and Roading Committee in April 2019 (190115003326[v2]). An agreed response strategy to the increasing saline incursions, such as to protect against (for example with a tidegates), or to accommodate (for example with provisions in the District Plan), has not been decided upon by the Waimakariri District Council. The saline intrusions will likely be exacerbated by sea level rise, and modelled decreasing flows in the Waimakariri River in the summer time.

3.7 Environment Canterbury is continuing to undertake salinity monitoring during summer months in the Kaiapoi River, to assess when saline incursions occur, and further assess the level of relationship of saline incursions in the Kaiapoi and Cam Rivers to the minimum flow levels in the Waimakariri River.
4. **ISSUES AND OPTIONS**

*Options*

4.1. Options that have been discussed by the Kaiapoi River Rehabilitation Working Party include:

(1) Maintaining the status quo, with use of the floodgates only during floods in the Waimakariri River, with manual operation.

(2) Using the flood gate as a tide gate during periods of saline incursion, with manual operation, as and when there are low flows in the Waimakariri River. Manual operation however is labour intensive.

(3) Modifying the flood gate for automated use as a tide gate for periods of saline incursions (i.e. low flow in the Waimakariri River). Automated salinity meters downstream of the floodgate, would transmit information of saline incursions occurrences via telemetry. This is the option recommended by the Kaiapoi River Rehabilitation Working Party, and therefore has been detailed further in this report.

4.2. Other combinations of the options are also possible, as such automated salinity meters downstream, however to retain the manual operation of the floodgate.

4.3. As Environment Canterbury is the asset-owner, any decisions for design and budget allocation for modification of the floodgate would need to be in consultation with Environment Canterbury.

*Issues for automation of the Cam River Floodgate*

4.4. The adaption of the floodgate to be used as a tidegate has many engineering, economic, ecological and cultural considerations.

*Engineering and hydrology*

4.4.1. The floodgate would be required to be modified to enable ease of opening and closing, to withstand corrosion from saline water, and to be submerged for longer periods. Winch motors have been proposed to be installed by Environment Canterbury as an opening and closing mechanism, with a modification to the lifting mechanism.

4.4.2. A power supply to the floodgate would be required to be installed for automation of the gate. Saline telemetry meters could operate off a mains, battery or solar supply.

4.4.3. Back-up power would need to be considered, as well as the increased cost of ongoing maintenance, due to salinity exposure, increased use and more components.

4.4.4. Telemetry would need to be installed for the salinity meters, with a party, such as Environment Canterbury or Waimakariri District Council, who would receive and monitor the information. The telemetry meters would need to be carefully placed to ensure that salinity changes were detected within appropriate timeframes.

4.4.5. Security of the tidegate and salinity meters from vandalism or any activities that could endanger the public would need to be considered.

4.4.6. An assessment of the hydraulic and capacity effects on the Cam River and other waterbodies, such as the Kaiapoi River would need to be carried out. This should specifically examine what the effect of a fresh or flood in the Cam River would
have if the tidegate was closed, whether there would be sufficient flushing flows to clear built-up sediment behind the tidegate when opened, and salinity effects for the Kaiapoi River. Potentially the mechanism for the tidegate could be designed to have an override function to be open if floodwater needed to drain downstream, to not flood properties upstream of the Cam River Tidegate.

4.4.7. Hydrological investigations should consider the potential effect of raised groundwater levels upstream of a Cam River Tidegate. Investigations should also consider the effect of a Cam River tidegate for consequential effects on flood conveyance of the lower Ohoka Stream, lower Cust River and Silverstream and associated flood risk for properties adjoining the lower reaches of these waterways with higher tidal inflow as a consequence of less upstream conveyance into the Cam River system.

**Economic**

4.4.8. There is potential that preventing saline incursions with a tidegate would protect an area of productive land or with infrastructure upstream of the tidegate from saline effects in the medium term, but potentially not in the longer term, due to sea level rise. It had not been investigated in this report how substantial this area could be.

4.4.9. There is an opportunity cost to pursuing a feasibility study for automating the floodgate i.e. the budget could possibly be allocated to other projects to achieve the intended benefits, however a wider scope of potential options has not been carried out.

**Ecology**

4.4.10. Some species, such as the introduced Canadian oxygen weed (*Elodea Canadensis*) do not tolerate prolonged periods of saline water. Therefore these species would benefit from prevention of saline incursions through the operation of the tidegate. However many species, often thought of as freshwater species, such as brown trout, Inanga and eels, also inhabit saline estuarine environments. Freshwater mussels (*Echyridella menziesii*), that are known to be present in the Kaiapoi river above the mouth of the Cam River, and therefore potentially also around the Cam River Floodgate, are saline tolerant to some degree. Saline tolerant weedbed species, such as the native plant *Ruppia megacarpa* would naturally establish from seed source nearby if a tidegate was not in operation.

4.4.11. The tidegate would likely create a fish passage barrier that could prevent migratory fish (both introduced and native species) from completing their lifecycle. However, to what severity the tidegate would be a barrier requires further investigation of the time of year and length of time that the tidegate would be operating. A fish passage facility, such as a ‘window’, as that designed for the Taranaki Floodgate, could be a potential solution to enable fish passage. However, it should be noted that the Taranaki Floodgate ‘window’ is a novel design, yet to be monitored for results.

4.4.12. The tidegate, by changing the location of the saltwater wedge, where freshwater overlays saline water, would likely change the location of Inanga spawning habitat, located in 2019 by Aquatic Ecology Ltd for around the confluence of the Cam River with the Kaiapoi River. It would recommended, and potentially a consent condition, to monitor the new location(s) of the spawning habitat, and ensure that an appropriate vegetation cover of grasses, with low shading is provided at these locations.
4.4.13. One of the hypothetical benefits of a tidegate is reducing inflow of high suspended sediment backwash from the Waimakariri River flowing into the Cam River system, where it removes habitat for invertebrates and fish species that use interstitial spaces on and around rocks.

4.4.14. Potentially the current ecosystem and species present have already adapted to the saline incursions due to the length of time that they have been occurring.

Cultural

4.4.15. There are potential effects to mahinga kai, such as changes in the abundances of species that are available for harvest.

4.4.16. There are potential effects on silent files areas, such as the changes to water levels behind the Floodgate location, upstream of the Cam River.

Social

4.4.17. The social benefits, of maintaining a freshwater environment versus allowing an increasing estuarine environment to establish, have not been assessed with the local community. The preference for a freshwater environment or tidal/estuarine is a subjective question that would likely have a range of views.

4.5. The feasibility studies that are proposed to be carried out with the budget request of $15,000 are:

4.5.1. Assessment/advice on all consents and permissions that would be required to undertake the modification to a tidegate, with status of each proposed activity in each plan (i.e. permitted, restricted discretionary, controlled activity).

4.5.2. A concept design and costing of the works by a suitably-qualified engineer.

4.5.3. Preliminary consultation with Te Rūnanga Ngāi Tūāhuriri (potentially via Mahaanui Kura Taiao Ltd and/or directly).

4.6. The Management Team have reviewed this report and support the recommendations.

5. COMMUNITY VIEWS

5.1. Groups and Organisations

5.1.1. Kaiapoi River Rehabilitation Working Party

The Working Party agreed with a motion at a meeting on the 25 September 2019 that it would request funding for a formal investigation and engineering options and implications report into future floodgate automation, with funding to be sought for this from the WDC annual plan budget.

5.2. Wider Community

5.2.1. The wider community has not been consulted on the proposal to automate the Cam River Floodgate. Individual members of the community have raised the idea with the Kaiapoi River Rehabilitation Working Party and Waimakariri District Council.

6. IMPLICATIONS AND RISKS

6.1. Financial Implications
6.1.1. It should be noted that this report requesting $15,000 is for a feasibility study only. This is recommended to come from the District-wide rate.

6.1.2. Environment Canterbury estimates the cost of full automation of the floodgate, including link to an electronic salinity sensor is approximately $45,000 to $50,000. An additional cost is the resource consents to approve the changed floodgate operation, estimated at $30,000, project management fees, and project contingencies. These estimates include costs of the investigations needed to support the consent processing (see Table 1).

6.1.3. A cost-sharing agreement with Environment Canterbury is recommended to be discussed, particularly if the project proceeded to construction stage.

**Estimate of Costs for Full Automation (provided by Environment Canterbury)**

Note these estimates are a high level first approximation. Costs for investigations and consenting could be quite different, and excludes the on-going increased cost of maintenance.

Investigation/Design – Mechanical/Electronics/Safety/Security $10,000
Downstream Salinity Meters/Data Loggers/Telemetry $5,000
Power to downstream Salinity Meter – 240V/Battery/or potentially solar $3,000
Upstream Salinity Meter/Data Logger/water level recorder/Telemetry $5,000
Power to upstream Salinity Meter and Cam Floodgates $6,000
Power winches (2) $2,000
Fitting and modification – lifting mechanisms $5,000
Fish Passage modifications $3,000
Over-ride systems and back-up power $5,000
Electronics $3,000
Investigations for Consenting $15,000
Consents for converting to a tidegate as well as for Salinity Meters $15,000
Professional fees for project management $30,000
Contingencies (30%) $32,000
Total $139,000

**Table 1**: Estimate of costs to automate the Cam River Floodgate

6.2. **Community Implications**

6.2.1. The implications for community members would be varied, with advantages and disadvantages depending on;

6.2.1.1. The subjective preference for freshwater or estuarine environments;

6.2.1.2. The degree of environmental effects (yet to be established in an Assessment of Environmental Effects), such as the level of saline inundation prevented, and effect on local ecology, flooding and sedimentation for the Cam River and surrounding waterways.

6.3. **Risk Management**

6.3.1. It is recommended to lead a wide community discussion with our coastal communities in the District regarding response strategies for increasingly saline environments from sea level rise, and for any advocacy to change minimum flows set for the Waimakariri River. Otherwise, there is a risk that budget could be allocated to conflicting response strategies, such as to protect the lower Cam River freshwater environment from saline incursions with a tidegate, or
encouraging saline-tolerant weedbeds to establish, which could provide coastal erosion protection in the future.

6.3.2. In the longer term, it cannot be assumed that a tidegate would be sufficient to maintain a freshwater environment, with increasing sea level, and potential saltwater inundation of groundwater along the coast. There is a risk that installation of a tidegate would incorrectly signal to the community that a freshwater environment could be maintained into the future.

6.4. **Health and Safety**

6.4.1. A health and safety risk assessment to the public of more regular opening and closing of the floodgate, as a tidegate, would be included as part of the feasibility study.

6.4.2. Assessment of Environmental Effects of the automated tidegate proposal would require a contractor conducting fieldwork to meet health and safety requirements.

7. **CONTEXT**

7.1. **Policy**

7.1.1. This matter is not a matter of significance in terms of the Council’s Significance and Engagement Policy.

7.2. **Legislation**

7.2.1. Consents would be required under the Canterbury Land and Water Regional Plan, District Plan (under the Resource Management Act 1991). These could potentially be notified or non-notified consent applications.

7.2.2. Permission to obstruct fish passage would be required under the Freshwater Fishery Regulations 1983 (Part 6).

7.2.3. Additional consents and permits would likely be required, such as signalled by the proposed National Policy Statement– Freshwater Management from the Ministry for the Environment regarding fish passage.

7.3. **Community Outcomes**

7.3.1. Our district has the capacity and resilience to quickly recover from natural disasters and adapt to the effects of climate change.

7.3.2. There is a healthy and sustainable environment for all

7.3.3. Harm to the environment from the impacts of land use, use of water resources and air emissions is minimised.

7.3.4. Cultural values relating to water are acknowledged and respected.

7.4. **Delegations**

7.4.1. The Council holds the authority to allocate budget in the Annual Plan.
**MINUTES JOINT WORKING PARTY**  
**KAIAPOI RIVER REHABILITATION PROJECT**  
**ENVIRONMENT CANTERBURY AND WAIMAKARIRI DISTRICT COUNCIL**

**MEETING IN THE KAIAPOI SERVICE CENTRE COUNCIL CHAMBERS**  
176 Williams Street, Kaiapoi  
Wednesday 25 September 2019 at 4:00pm – 5:30pm

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Oversee the work required to scope in-stream proposals for improving water quality, navigability, flood hazard management, amenity and recreation in the Kaiapoi River.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Party Members</td>
<td>Neville Atkinson (apologies for lateness); Claire McKay (Environment Canterbury); Michael Blackwell (Waimakariri Zone Committee); Kevin Felstead (Waimakariri Deputy Mayor – Chair of this Meeting); Sandra Stewart (Kaiapoi-Tuahiwi Community Board).</td>
</tr>
</tbody>
</table>
| Staff Advisors (as required) | Adrian Meredith; Andrew Arps; Brian McIndoe (Environment Canterbury)  
Grant McLeod, Sophie Allen, Duncan Roxborough, Janet Fraser, Gerard Cleary (Waimakariri District Council) |
| Apologies | Position vacant (Mahaanui Kurataiao Ltd); Position vacant (Te Ngāi Tūāhuriri Rūnanga).  
Owen Davies, Chris Brown (Waimakariri District Council) |
| Attachments | Finalised Comprehensive Planting Plan  
Prepared by Tori Stableford  
Notes: Cam River Floodgates to Tidegates  
Prepared by Brian McIndoe |

**Key Objective for the Working Party:**

Oversee preparation of a report, initially for consideration by the Kaiapoi Community Board, and then by Environment Canterbury and Waimakariri District Council, setting out a possible costed programme of work that would be required to meet the water quality objectives, navigability requirements, flood hazard management, amenity and recreation imperatives for the Kaiapoi River.
Business

1. Welcome and Apologies

Cr. Kevin Felstead chaired the meeting. Also present were Michael Blackwell (Waimakariri Water Management Zone Committee), Sandra Stewart (Kaiapoi Tuahiwi Community Board), Neville Atkinson (Kaiapoi Tuahiwi Community Board – apologies for lateness), Claire McKay (Environment Canterbury).

Apologies were received from Jason Eden on behalf of Ngāi Tūāhuriri and Mahaanui Kurataiao Ltd.

Moved: Sandra Stewart Seconded: Kevin Felstead

CARRIED

2. Confirmation of Minutes

Minutes of a meeting of the Kaiapoi River Rehabilitation Working Party held on Wednesday 20 March 2019

RECOMMENDATION

That the Working Party:

(a) Confirms as a true and correct record the minutes of a meeting of the Working Party held on Wednesday 20 March 2019.

Moved: Sandra Stewart Seconded: Kevin Felstead

CARRIED

3. Review of Comprehensive Planting Plan

Janet provided an overview of the plan to the Working Party. During the meeting the plan was workshopped and its provisions were generally agreed among all present.

Brian confirmed that ECan will undertake willow control through the Kaiapoi River between the Coastguard and the Askeaton Reserve in January and February 2020. Dead trees will be removed and damaged trees will be pruned. Stumps will be left in the lower banks to stabilise them.

Brian noted the risk of wave lap erosion destabilising the river stopbanks in the areas where the willows are removed.

It is intended that the WDC terrestrial and wetted edge planting programme will provide infill around the areas where willows have been removed later in 2020, as shown in the plans.

For placement of plantings, Brian notes that flax and other “heavier” plants and shrubs need to be at a distance of 1m from the toe of the stopbank to maintain their stability. Other lighter/smaller plants including grasses can be planted up to the toe of the stopbank. No plants should be placed directly on the side of the stopbanks.

Andrew noted that Riverside Nurseries (Natural Habitat Landscapes) have a large number of low cost wetland plants that will need to be planted out shortly.
Action: Sophie to follow up with Riverside Nurseries regarding the suitability of these plants for the Kaiapoi River planting and for other pending WDC wetland planting projects.

Note: the plant list was subsequently reviewed by Sophie and was not considered suitable for the pending Kaiapoi aquatic or terrestrial plantings.

An updated version of the planting plan will be recirculated to all participants following the meeting.

The plan is a “live” document, intended for ongoing update as a working document.

Note that the programme outlined in Section 7 includes funding to implement much of the comprehensive planting plan in 2019/20 and 2020/21. Note that some decisions on shrub/tree removal will however be referred to the Kaiapoi – Tuahiwi Community Board for decision.

4. Ongoing Plant Maintenance & Weed Control

The Working Party agreed to recommend that an ongoing plant maintenance programme be established which will undertake:

a) Ongoing removal of juvenile exotic trees (including juvenile willows) and weeds, including ivy and yellow flag iris, inside the stopbanks
b) Infill planting as required to fill gaps and replace dead plants
c) Promote viability of existing terrestrial native plantings
d) Remove raupo cages from the previous year aquatic wetland plantings

Note that ongoing willow control is a function of Environment Canterbury and will not be included in the proposed Waimakariri District Council plant maintenance programme, other than for growth of juvenile plants.

It is suggested the Working Party recommend that the Waimakariri District Council include an ongoing budget of approximately $2,000 per annum commencing in 2020/21. The budget will be revised once detailed cost estimates from Delta Parks Contractors are received and an appropriate budget is recommended to be included to cover this work.

This programme would continue for a period of at least 4 years and be used for ongoing maintenance inside the stopbanks. This is intended to protect the viability of the newly establishing native plants, continue infill planting as required and provide ongoing removal of noxious or other problem weeds.

Action: Grant to include budget in 2020/21 Annual Plan.

Note: subsequent to the meeting Delta declined to undertake the proposed plant maintenance works. Therefore Wai-Ora Landscapes (or similar ecological restoration company) will now be approached to undertake the works. The works will be funded from the Greenspace Account and rated district wide as a component of the Parks Maintenance Programme.

5. Option to use Dredged Spoil to Widen Stopbanks

There is an option to utilise some of the dredged river spoil to widen stopbanks. To date the marina basin dredging has excavated material that is approximately half gravelly sand and half fine silts. The gravel/sand material is sitting in stockpiles adjacent to the dewatering basin and is ready for further reuse. The silty material remains within the basin to further dry before it will be extracted and stockpiled.

Brian advises that the area between Hall Street and the Corcoran Basin is suitable and desirable for stopbank widening. The compaction and stopbank design would involve
commencing a bench at 1m below the top of the current stopbank (e.g. the bench highest point at approximately 3mRL), with a 3:1 side batter from the existing stopbank to the newly formed outer bank toe. The bench would be in the form of a wider ramp extending from the landward side of the existing stopbanks.

However there is a stormwater asset traversing the toe of the stopbank for the full distance between Hall Street and the Corcoran Basin.

**Action:** Janet will follow up with the drainage team about potential use of the dredged spoil to widen this area of stopbank.

Other possible uses of the dredged spoil are:

- Build-up of slumped land at the Askeaton Reserve
- Wetland in-fill in the Kaiapoi wastewater treatment plant
- Build up other low lying land in the Regeneration Zone

The reuse of material for any of the above options is subject to pending contamination and salinity testing which will determine suitable future land uses.

A further factor is spoil composition. This will determine whether the material is able to be suitably compacted for reuse in widened stopbanks or other types of land use.

If no particular areas are identified for stopbank widening, then a default option for use of the balance of spoil not required for other purposes is for it to be bulldozed into the side of the stopbanks along Charles Street. Any material incorporated into the stopbanks will be suitably compacted.

6. **Updates**

**Adrian Meredith – Update on salinity monitoring in Kaiapoi River**

Adrian noted the salinity probes are now being put back in the Kaiapoi River to record saline incursions this summer. These will show any effects of the dredging on degree of saline intrusion affecting the river as a result of the deepened river bed contours.

**Sophie Allen – Waimakariri District Council views on salinity report/ pigeon control options**

*Kaiapoi River salinity* - Sophie commented on the discussion among the Utilities and Roading Committee about the considerations raised in Adrian’s report on increasing salinity in the Kaiapoi River. The uncertainties concerning future effects were recognised. The Committee did not take a position on preferred response strategies at this stage. However it acknowledged that the future Council/ community response will likely involve a need for local adaption to the new conditions in the river including adapting to potential effects in the lower tributaries which are also affected by ongoing saline intrusion.

*Pigeon control* – The Roading department is seeking a price from SICON to implement the potential options to prevent pigeons from nesting beneath the Williams Street Bridge. The investigations are in progress but the pigeon removal operation may not be undertaken this financial year.

The options include blocking nesting locations with mesh wiring or with solid inserts. Various design options to block the pigeon access are being considered by the Roading team. The trapping of pigeons is required in advance/ in conjunction with the works so the colony does not immediately relocate to an alternative location. The accumulated faecal matter beneath the bridge will also need to be removed before the barriers are installed.
Andrew Arps – Update on Environment Canterbury terrestrial planting

Andrew is awaiting an update from Park Ranger Greg Stanley who undertook the river terrestrial planting over the previous year. Once provided this update will be circulated to the Working Party. Information on any further terrestrial planting to be undertaken by ECan along the Kaiapoi River will also be provided.

Grant McLeod - War Memorial Redevelopment

Grant described the proposal for the War Memorial area is likely to be in the form of an investigation paper or concept design presented to the Kaiapoi Community Board for consideration.

Specific feedback during the meeting was provided about the existing shrubbery surrounding the War Memorial. This area was noted to be providing current habitat for Tui and other native birdlife. It also provides shelter for people walking along the river during easterly winds. A design proposal or discussion document will be taken by Grant to the Kaiapoi Tuahiwi Community Board in the 2019/20 financial year. This could include the following considerations:

- Protecting currently established bird habitat
- Establishing view shafts over the river if/where appropriate
- Consultation with the Kaiapoi RSA
- Retaining pedestrian shelter from easterly winds
- Opening up the existing walkway through the existing shrubs down to the water’s edge

Brian McIndoe – Willow removal and automating the operation of the Cam Floodgate

Willow Removal – Brian noted the ECan willow control will be undertaken in January and February 2020 between the Coastguard Ramp and the Askeaton Reserve.

Cam Floodgate- ECan staff have identified that it is technically possible to fully automate the Cam floodgate. The gate could be electronically linked to a salinity gauge that could automatically lower the gate into the river during times of saline incursion.

Brian estimates the cost of full automation of the flood gate including link to an electronic salinity sensor is approximately $45,000 to $50,000. An additional cost is the resource consents to approve the changed floodgate operation, estimated at $30,000. These estimates include costs of the investigations needed to support the consent processing. A further update paper was provided by Brian subsequent to the meeting and is attached to these minutes, for information.

The intent of the automated floodgate operation is to avoid or limit saline intrusion into the lower Cam River during times when there is high salinity on the incoming tide. This would retain a freshwater environment in the lower Cam River for longer periods and minimise effects on its freshwater species. The gate automation would improve habitat for freshwater species such as freshwater mussels.

A further benefit is reducing inflow of high suspended sediment backwash from the Waimakariri River flowing into the Cam River system, where it then sloshes back and forth with the tide.

Some implications of the floodgate operation that would need to be assessed through the Environment Canterbury consent process are:

- The requirement to obtain Environment Canterbury (and Department of Conservation) resource consent/approval to block fish passage
- Design of a suitable fish bypass, ensuring fish passage into the Cam River system whilst minimising saline encroachment
- Maintain freshes and outflow/conveyance from the Cam River during wet weather in the foothills catchment, which can assist to flush sediment and weeds from the system
- Consequential effects on salinity in the Kaiapoi River mainstem and upstream tributaries, if saline water is pushed further upstream in the Kaiapoi River
• Consequential effects on flood conveyance of the lower Ohoka Stream, lower Cust River and Silverstream and associated flood risk for properties adjoining the lower reaches of these waterways with higher tidal inflow as a consequence of less upstream conveyance into the Cam River system.

The Working Party agreed that it will request funding for a formal investigation and engineering options and implications report into future floodgate automation. Funding will be sought from the WDC annual plan budget.

Action: Sophie to work with Brian McIndoe to draft a report to the Utilities and Roading Committee, then to Council requesting budget for the 2020/21 annual plan to formally investigate engineering options and implications of automating the Cam River floodgate for saline incursion response.

Duncan Roxborough – Kaiapoi River Dredging

The dredging of the marina basin is near complete, with the Riverview Pontoon installed and a deep berthing pocket established for vessels berthing at the pontoon. The pontoon can be used now, but its full construction will be complete once its services (lights and power) are installed.

A small pocket of dredging adjacent to the wharf was not completed and final dredge depths in the marina basin have not yet been reached.

The dredging will recommence next year in the period from 1 June to 15 August. During this time the Council will complete the balance of the marina basin berthing dredging and will excavate the navigation channel from the Coastguard to the Kaiapoi/Waimakariri confluence.

Navigation dredge channel volumes are less than originally anticipated. The minimal channel dimensions (10m wide flat bottom channel at -2.5mRL) could potentially be widened further from the original channel design plans, within the existing contracted extraction allowance.

Janet Fraser – Alternative Backhoe Dredge Consents

The Council is discussing consent conditions with Environment Canterbury for alternative backhoe dredging consents. These will be needed to dredge small pockets (with a long reach digger on a barge) where larger boulders and gravels in the river cannot be sucked into the suction pump hose and pumped to the dewatering basin. This will enable the Council to complete all of the intended dredging next winter.

7. General Business

7.1 Proposed Forward Work Programme for Waimakariri District Council

It is proposed to continue to implement the previously scoped Kaiapoi River Rehabilitation Projects. The identified projects and updated proposed implementation dates (and indicative budgets) are outlined in the following table.

Combining available Kaiapoi River aquatic planting budgets, the Waimakariri District Council currently has approximately $18,000 budget available in 2019/20 to continue aquatic planting, terrestrial planting and weed control works between the Mafeking Bridge and the Courtenay Confluence.

A further site visit of the planting trial area is proposed with the Working Party in November 2019. This will be held prior to commencing the summer planting and weed control programme and will finalise the 2019/20 aquatic and terrestrial planting locations.
The following locations and activities are currently proposed:

**Table 7.1: Summary Proposed Kaiapoi River Rehabilitation Programme**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Year</th>
<th>2018/19</th>
<th>2019/20</th>
<th>2020/21</th>
<th>2021/22</th>
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<tbody>
<tr>
<td>Kaiapoi River Navigation Dredging</td>
<td>Complete navigation channel safety component of Kaiapoi River dredging</td>
<td>$350,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Gravel Beach/Wetland</td>
<td>On raised shelf at corner of Charles and Smith Street adjacent to fishing hole</td>
<td>-</td>
<td>-</td>
<td>$10,000</td>
<td>-</td>
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<tr>
<td>Sediment trap at Mafeking Bridge</td>
<td>Create a slow flow channel and major sediment trap with central planted island</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Realign River Bend at Smith/Charles St Corner</td>
<td>Requires earthworks and further consultation with Fish &amp; Game and Ngāi Tūāhuriri.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$25,000</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>$368,000</td>
<td>$30,000</td>
<td>$75,000</td>
<td></td>
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</tbody>
</table>

*Includes $10,000 per annum from Waimakariri Water Management Zone biodiversity funds, with the balance from the Kaiapoi urban drainage account.

The proposed funding allocation is indicative. It is likely that funding for some projects may exceed the above estimates and for other projects may be less than estimated.

The Working Party has progressed proposals on the basis that a 50% cost share will be provided by the Waimakariri District Council and Environment Canterbury for each project. The programme above is currently budgeted by Waimakariri District Council, including underwriting the requested 50% Environment Canterbury cost share to enable the works to proceed.

The $10,000 per annum allocated from Waimakariri Water Management Zone biodiversity funds are a Waimakariri District Council contribution to the Zone Committee work programme. These are not Environment Canterbury Immediate Steps funds.

The Working Party may wish to reiterate its previous request to Environment Canterbury to provide a 50% cost share to contribute to the continuation of the river rehabilitation programme (see previous meeting minutes).
8. **Recommendations**

THAT the Working Party:

(a) **Endorses** the continuation of the Kaiapoi River Rehabilitation programme as outlined in Table 7.1.

(b) **Notes** the proposed funding in Table 7.1 is indicative, and final allocations may differ among the recommended projects following more detailed planning with the project contractor/s.

(c) **Recommends** the Waimakariri District Council includes an ongoing inner stopbank maintenance programme **potentially with Wai-Ora Landscapes or other selected contractor**, estimated at $2,000 per annum or other price as agreed with the selected contractor, and be ongoing for at least four years. This programme is to cover weed removal, provide for infill planting as required and protect the viability of existing plants.

(d) **Recommends** that Environment Canterbury consider through its Annual Plan process provision of a $25,000 budget in 2021/22 to contribute to the cost of establishment of the slow flow channel, central-island and major sediment trap formation upstream of the Mafeking footbridge.

(e) **Requests** Waimakariri District Council staff prepare a report that requests Annual Plan 2020/21 budget provision from the Waimakariri District Council to cover investigation of issues and options to automate the Cam River floodgate, electronically connected to a salinity sensor.

(f) **Notes** recommendation (e) would seek in kind support from Environment Canterbury of specialist advice regarding the automation of the floodgate.

(g) **Notes** a Working Party site visit will be arranged in November 2019, to review specific sites for Waimakariri District Council aquatic and terrestrial planting in the 2019/20 year.

Moved: Neville Atkinson  
Seconded: Sandra Stewart  
CARRIED

9. **Other General Business**

Sandra queried how the Waimakariri River minimum flow allocation is currently measured and restrictions applied. For instance, how is the 41 cumecs cut off point for abstractions measured and how are the in-river flow gauge devices calibrated. Environment Canterbury staff have agreed to provide an explanation report on this process to the next meeting of the Waimakariri Water Management Zone Committee.

10. **Closing and Next Meeting Date and Time**

It was raised that this meeting may potentially be the last meeting of the Kaiapoi River Rehabilitation Working Party, with a proposal to incorporate the Party into the WDC Land and Water Working Group – to be discussed by the newly-elected Council. Gerard Cleary thanked the Party for their hard work over many years.
1. **SUMMARY**

1.1 This report is to seek approval of the Roading and Transportation Procurement Strategy.

1.2 The NZ Transport Agency *Procurement manual* is to be used for activities funded through the National Land Transport Programme and contains procurement procedures approved by the NZ Transport Agency for use by approved organisations, when purchasing infrastructure, planning and advice, and public transport services.

1.3 A requirement of the Procurement Manual is that all approved organisations are required to develop a procurement strategy for roading and transportation works and services, and to have this endorsed by NZ Transport Agency.

1.4 The previous Roading and Transportation Procurement Strategy was adopted in July 2011 and therefore a thorough review and adoption of a new strategy is required. NZ Transport Agency require this to be completed by the end of 2019.

1.5 A review of services has also been undertaken as required by Section 17A of the Local Government Act and this is being reported to the Audit & Risk Committee in November 2019.

1.6 The Procurement Strategy does not propose any new procurement practices; it confirms Council’s current practices as providing good value for money and meeting required levels of service.

1.7 NZTA will formally endorse the strategy once it has been approved by the Utilities and Roading Committee.

**Attachments:**

i. Review of Delivery of Road Maintenance and Renewal Services under Section 17A of the Local Government - November 2019 (Trim No. 191009141372)

ii. Draft Roading and Transport Procurement Strategy (Trim No. 190417057789)
2. **RECOMMENDATION**

THAT the Utilities & Roading Committee:

(a) **Receives** report No. 191105154423;

(b) **Approves** the Roading and Transportation Procurement Strategy (TRIM No. 190417057789);

(c) **Circulates** this report to Council and the Community Boards for information;

(d) **Notes** that shared services are considered and implemented with neighbouring local authorities where applicable.

3. **BACKGROUND**

3.1 To meet NZ Transport Agency requirements the Waimakariri District Council must have a NZ Transport Agency endorsed procurement strategy in place.

3.2 The current procurement strategy was adopted in 2011 and as such needs to be reviewed and then adopted. NZ Transport Agency require the updated strategy to be in place by the end of 2019.

3.3 The procurement strategy is a management strategy to ensure community agreed levels of service are efficiently and effectively delivered and so community views have not been specifically sought during its development.

3.4 A draft procurement strategy was submitted to NZTA on 17 May and on 21 May the agency responded with some suggested changes which staff have reviewed and incorporated into the document.

3.5 The previous procurement strategy has been reviewed and minor amendments and clarifications have been made to the previous strategy however there have been no significant changes to the previous strategy.

3.6 Where appropriate Council uses a shared services model in conjunction with other local authorities to achieve value for money. Example of this are the street light maintenance contract and working with Hurunui District Council on boundary maintenance activities.

4. **ISSUES AND OPTIONS**

4.1. As part of the review process staff have also undertaken a Section 17A review of the current road maintenance and renewals activity under the Local Government Act, to ensure the services are being delivered appropriately.

4.2. Feedback has been sought from the construction industry on the draft Roading Procurement Strategy and this has been incorporated in the draft document.

4.3. A meeting of the North Canterbury Roading Collaboration Group has also been held and road maintenance activities have been discussed between the partners.

4.4. The strategy is required to be formally reviewed every three years but this does not preclude other changes to the strategy between the formal reviews to meet changing markets or changing environments. It should be considered a live document.

4.5. The Strategy has not been formally reviewed or updated since 2011 and therefore has been reviewed.
4.6. There are two options available to the Utilities & Roading Committee:

4.7. **Option One – Approve the Procurement Strategy.**

This is the recommended option as it will ensure Council has an approved strategy in place and is an approved agency. As such Council will continue to be eligible for NZ Transport Agency funding for roading and transport activities.

4.8. **Option Two – Decline approval of the Procurement Strategy and instruct staff to undertake a further review of the draft strategy.**

This is not the recommended option as NZTA and Industry have been consulted and provided feedback that supports the draft strategy. Also if Council does not have an approved procurement strategy in place then NZ Transport Agency could review the current funding agreement.

4.9. The Procurement Manager has reviewed this Procurement Strategy and supports the approval of the strategy.

4.10. The Management Team have reviewed this report and support the recommendations.

5. **COMMUNITY VIEWS**

5.1. **Groups and Organisations**

5.2. No specific views have been sought from groups or organisations

5.3. Feedback has been sought from the contracting industry and from Councils within the North Canterbury Roading Collaboration Group on the Draft Roading & Transportation Procurement Strategy.

5.4. **Wider Community**

5.5. No specific community views have been sought for this review however the community expects road maintenance work to be carried out efficiently and effectively to ensure community agreed levels of service are met and the draft procurement strategy takes that into account.

6. **IMPLICATIONS AND RISKS**

6.1. **Financial Implications**

6.2. This strategy is about procuring services to deliver the roading programme so it impacts on all of the roading expenditure. This impact is positive as its purpose is to deliver best value.

6.3. The annual cost of the road maintenance and renewal activities are provided for within the Roading budgets.

6.4. The recommended procurement methods and contract models aligns with current best practice for road maintenance and renewal contracts.

6.5. **Community Implications**

6.6. Road maintenance and renewals are an important issue for the community and a core Council function.

6.7. **Risk Management**

6.8. The review of the Roading & Transportation Procurement Strategy provides an assessment of current practices and considers alignment with best practice.
6.9. **Health and Safety**

6.10. All construction and maintenance contracts involve careful management of Health & Safety risks.

6.11. As part of all physical works contracts, the successful contractor will be required to submit a Health & Safety Plan for approval prior to contract commencement.

7. **CONTEXT**

7.1. **Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

7.2. **Legislation**

7.3. The Land Transport Management Act 2003 and the Local Government Act are relevant legislation on this matter.

7.4. In particular the Land Transport Management Act 2003 requires the NZ Transport Agency to have in place approved procurement procedures and to ensure best value is the main outcome of the procurement.

7.5. The use of NZTA approved procurement procedures is a statutory obligation under s25 of the Land Transport Management Act 2003.

7.6. **Community Outcomes**

This report consider the following outcomes:

*There is a safe environment for all*

- Harm to people from natural and man-made hazards is minimised.
- Our district has the capacity and resilience to quickly recover from natural disasters and adapt to the effects of climate change.
- Crime, injury and harm from road crashes, gambling, and alcohol abuse are minimised.
- Our District is well served by emergency services and volunteers are encouraged.

*Transport is accessible, convenient, reliable and sustainable*

- The standard of our District's roads is keeping pace with increasing traffic numbers.
- Communities in our District are well linked with each other and Christchurch is readily accessible by a range of transport modes.
- Public transport serves our District effectively.
- Opportunities to increase the occupancy of commuter vehicles is actively encouraged.

7.7. **Delegations**

The Utilities & Roading Committee is responsible for Roading (including road safety and traffic controls) and has under its jurisdiction the delegation to develop goals and strategies for activities the committee is responsible for.
Waimakariri District Council

Review of the Delivery of Road Maintenance and Renewal Services under Section 17A of the Local Government Act

November 2019
Quality Record

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Executive Summary

Section 17A of the Local Government Act requires Councils to review service delivery functions within 2 years of the expiry of a contract. The Councils road maintenance contract expires on 31 October 2020 and so the road maintenance service delivery function has been reviewed.

This review excludes street light maintenance and renewal as this function is delivered by a separate contract.

The review notes that the Land Transport Management Act (LTMA) requires road maintenance services to be contracted out to the private sector and so the Council will continue to competitively tender road maintenance services.

The review recommends the Council’s road maintenance service continues to be provided by a single district wide network management contract covering all road maintenance and renewal activities, including some minor capital works projects, in a contract form that encourages innovation in a collaborative working environment, using a quality based contractor selection process.

The Roading Procurement Strategy has the support of the local contracting industry and the other North Canterbury Councils and it is consistent with current best practice for road maintenance contracts.
Introduction

Section 17A of the Local Government Act makes it mandatory for Councils to periodically review the ‘cost effectiveness of current arrangements’ for service delivery including ‘the governance, funding and delivery of any infrastructure, service or regulatory function’.

A review must be undertaken:

a) In conjunction with consideration of any significant change to relevant service levels; and
b) Within 2 years before the expiry of any contract or other binding agreement relating to the delivery of that infrastructure, service, or regulatory function; and
c) At such other times as the local authority considers desirable, but not later than 6 years following the last review under subsection (1).

The current Road Maintenance Contract expires on 31 October 2020 and so the road maintenance service must now be reviewed under Section 17A of the Local Government Act. The last review was undertaken in May 2015.

Scope

This review is of the delivery of the road maintenance physical works service as covered by the current road network maintenance contract and includes routine road maintenance and renewal activities, as well as some minor capital works. It does not include street light maintenance and renewals.

This review does not include the provision of professional services required to manage the road maintenance physical works service delivery.

Funding

Local authority roading is funded from a combination of rates and from central government through the National Land Transport Fund (NLTF). The Land Transport Management Act (LTMA) sets out the framework for how the funds from the NLTF are allocated. In particular NZ Transport Agency is responsible for allocating the NLTF.

The Councils funding for roading is provided for and approved through the Councils Long Term Plan.

The value of work covered by the current road maintenance and renewal contract is approximately $9.5 million per annum and with NZ Transport Agency funding of $4.6 million. NZ Transport Agency funding increasing to $5.2 million in 2020/21 and then to $5.4 million in 2021/22. It is anticipated that the current financial assistance rates (FAR) will remain constant at 51% over future years.

Other funding sources such as tolling, public-private partnerships and regional fuel taxes are either not permitted by law or are not appropriate for funding the road maintenance and renewal activity.

Tolling is only permitted under the LTMA for the construction and ongoing maintenance of new roads while public-private partnerships are only appropriate for new infrastructure where the benefit of that infrastructure can be translated into a revenue stream for the private funders.

Legislation that enables a regional fuel tax was passed on 26 June 2018. The Land Transport Management (Regional Fuel Tax) Amendment Act 2018 provided a process for regional councils to raise revenue to fund transport projects that would otherwise be delayed or not funded. The regional fuel tax has initially only been implemented in the Auckland region.
Development contributions and financial contributions are collected by the Council and are used to fund new capital works to manage growth within the district. These contributions cannot be used to fund maintenance and renewal activities on existing roads.

In Waimakariri District the roading rates are levied in two parts:

1. A fixed annual charge
2. A rate in the dollar on the rateable capital value of each property.

The roading rates fund the cost of managing the district's roading network, including road and bridge repairs and maintenance, rescaling and new sealing, road signs, road safety, planning and design, street lighting, footpaths, kerb and channel.

**Roading Rate (from the Councils Revenue and Financing Policy)**

The Council considers that the roading network is a District-wide activity. The roading network is managed as one asset, and the maintenance and renewal benefits the wider community and properties in the District.

While the Council is eligible for subsidies from NZ Transport Agency that contribute to the maintenance and renewal of the roading network, the balance of the costs must be recovered by way of rates.

When determining the appropriate mechanism to recover the cost, the Council considers that both individuals and properties benefit from the roading activity. Council discounted the option of creating separate rating areas within the district as it felt any separation would be artificial given the open access of the roading network, where any person can drive on any public road.

Under a system of capital value rating, Council considers that the roading infrastructure in relation to a property (including roadways, bridges & culverts, footpaths, lighting etc.) is reflected within the capital value of the property across the district.

Individuals benefit as each has an equal opportunity to use the network and, to an extent, many within the community make similar use of the network. Hence, the Council considers that 20% of the rates requirement should be recovered by way of a fixed amount per rating unit on every property in the district, which reflects the equal opportunity to use the asset.

The Council considers that the balance of the rate requirement (80%) should be recovered by a rate in the dollar based on the capital value of a property. The Council considers that capital value better reflects the supporting infrastructure; and the impact that access has on the value of a property. Also the higher the capital value the property has, the greater the likelihood of increased use of the roading network or damage caused to the network, particularly in respect of large rural, commercial or industrial properties.

The Council considered, but decided against, creating a differential category for high use properties, as to some extent they already contribute through road user charges, which are collected and partially returned via the NZ Transport Agency subsidy.
Governance

The provision of roads is a core function of the Council and so it is currently governed by the Council. The Council sets levels of service, approves Activity Management Plans and approves Long Term Plans.

Possible alternate options for governing the road maintenance and renewal function are:

- a) Option One - Through a Council controlled organisation (CCO)
- b) Option Two - Through an in-house business unit
- c) Option Three - Jointly with a neighbouring authority
- d) Option Four - Through a regional transport authority.

These four options will now be outlined in more detail.

- **Option One - Through a Council Controlled Organisation (CCO):**
  Forming a Council controlled organisation to deliver the road maintenance and renewal services would not guarantee the CCO would actually get the work as the physical work is required to be contracted out under the LTMA, through a procurement process that at the first stage must be an open process. The work could not be 'allocated' to the CCO.

  In any case there are a wide range of contractors with good experience in delivering road maintenance services based in Christchurch and the surrounding area that are available to carry out the work. There would be no advantage in the Council forming a CCO to deliver road maintenance and renewal services as it would be very difficult for it to compete with the existing providers.

- **Option Two – Through an In-house Business Unit:**
  An in-house business unit could not be formed to deliver the physical road maintenance and renewal work as this is not permitted under the LTMA. Currently an in-house business unit assists with the management of the road maintenance and renewal functions including managing the contract.

- **Option Three - Jointly with a Neighbouring Authority:**
  Delivering the road maintenance and renewal function jointly with a neighbouring authority is unlikely to provide benefits to the Waimakariri district because the Waimakariri district is of an efficient and compact size close to Christchurch with a high population base, and so it gets good economies of scale. Roading is not managed in isolation and the interaction with the three waters, parks and reserves and community facilities functions along with the knowledge of the wider community results in a more focussed and responsive approach and a more coordinated service delivery for the Waimakariri community. Combining roading with another authority is likely to dilute that benefit, particularly as neighbouring authorities have different demands and issues.

- **Option Four - Through a Regional Transport Authority:**
  At the Greater Christchurch level and the Canterbury regional level there has in the past been suggestions of a Christchurch or Canterbury ‘transport authority’ however this has not come to fruition.

  The proposed term of the road maintenance contract is a three year contract with two further one year extensions to a maximum term of five years. Should a decision be made to form a Christchurch or Canterbury ‘transport authority’ then this is unlikely to be in place within three years and if this was to progress then the road maintenance contract be taken over by the new organisation.
Land Transport Management Act Requirements

The Waimakariri District Council is an approved organisation under the Land Transport Management Act (LTMA) and approved organisations must comply with the LTMA in order to receive funding from NZ Transport Agency through the NLTF.

The LTMA sets out the requirements for the NZ Transport Agency to approve activities for funding (s20) by the NZ Transport Agency from the NLTF. Approved organisations must account for the funds they receive through a land transport disbursement account (s24) operated by the approved organisation. All expenditure from the land transport disbursement account must be made with an approved procurement procedure (s25), unless exempt (by or under s26). Exempt expenditure includes expenditure on administration activity, in-house professional services, and emergency reinstatement.

Section 25 requires that procurement procedures used by approved organisations be designed to obtain best value for money spent. The following provisions influence procurement from a value for money perspective:

- Procurement procedures must be designed to obtain best value for money spent, having regard for the purpose of the LTMA, which stresses that the land transport system must be affordable, integrated, safe, responsive and sustainable.
- The NZ Transport Agency must approve procurement procedures designed to obtain the best value for money spent.
- When approving a procurement procedure, the NZ Transport Agency must also consider the desirability of enabling fair competition and encouraging competitive and efficient markets for the supply of outputs required for funded activities.
- Procurement procedures approved by the NZ Transport Agency must specify how the procurement is to be carried out.
- Outputs must be purchased from external providers, except for minor and ancillary works, which may be purchased from an internal business unit under certain conditions.
- To reinforce the point that the lowest price proposal received for the provision of any outputs does not always equate to the best value for money spent, s25 ends with a specific provision stating that an approved organisation is not compelled to accept the lowest price proposal. This has important implications when it comes to determining value for money.

Roading and Transport Procurement Strategy

The Councils Roading and Transport Procurement Strategy has been reviewed with the aim to have this approved by the Utilities & Roading Committee in November 2019 before being endorsed by NZ Transport Agency. NZTA have provided comments on the draft revision. The Draft Roading and Transport Procurement Strategy (Doc 190417057789) is attached in Appendix A.

The following extract is from the strategy relating to road maintenance and renewal service delivery.

Road Maintenance and Renewal

Key attributes and value for money strategy

- All road maintenance and renewal work is included in one contract to gain efficiencies in network management
- There is one contract to manage so reducing overhead costs associated with multiple contracts.
- The contract is managed by Council in-house staff to provide a direct one-on-one client/contractor relationship to shorten communication lines in order to improve responsiveness, take advantage of network and community knowledge and to avoid the
extra costs of engaging an external consultant. This approach utilises the skills and knowledge of the experienced in-house staff.

- The contractor selection process utilises short listing to ensure tenderers meet minimum quality standard and then involves contractor input in developing the contract documents to ensure the tenderers understand the contract requirements and the buildability issues are identified at an early stage.

- NEC3 Conditions of Contract are used as this is suitable for term service contracts and has provisions that encourage flexibility and innovation by focussing on the level of service. It also encourages a collaborative working environment.

- The Waimakariri District road network is compact and so it provides an ‘economic’ and manageable package due to its size and proximity to Christchurch. Combining the network with an adjoining authority may diminish this advantage.

- The contractor is responsible for inspections, programming, reporting, design of reseals and rehabilitation and other minor works so this reduces input from external consultants and in-house staff and ensures a whole of network focus thus clarifying responsibilities and avoiding duplication.

- A collaborative working approach is used to ensure the energy of all parties is directed at achieving the specified levels of service and good network outcomes. This approach minimises the risk of contract disputes.

- The contract document encourages innovation and flexibility by specifying outcomes and not specifying prescriptive work methods.

- Includes the requirement for the contractor to directly deal with customer service requests to reduce double handling and to provide a more responsive and proactive approach.

- Requires RAMM Contractor to be used to ensure more efficient management of work flow, claiming, auditing and asset data updating.

- Includes a section of Hurunui District Council road (Okuku Pass Road) as this section is integral with the Waimakariri roading network and is remote from the Hurunui District Nature of Activities

- All routine road maintenance and renewal activities are included with responsibility for managing the network from ‘boundary to boundary’. Excludes street light maintenance as this is a more specialist activity.

- Includes some minor new works where it is cost effective to include this in the contract or where the new work is integral with a maintenance or renewal activity.

- Includes design and build for reseals, rehabilitation and other minor structures and minor works.

- Includes investigating and responding to service requests.

Aggregation, bundling and contract term

- As noted above all road maintenance and renewal work is included in a single district wide contract.

- This approach does not impact on the supply market as Waimakariri is part of the large greater Christchurch market and it’s spend is a relatively small part of that market.

Delivery Model and Supplier Selection Method

- Contract tendered every five years on a 3 year term plus 2 one year extensions subject to performance meeting the required level.

- Contract uses NEC3 Conditions of Contract Option A (Contractor priced price list).

- Delivery model is design and build.

- Supplier selection method involves an Expressions of Interest phase to develop a short list of tenderers of preferably three and a maximum of four. Short list selection is based on relevant experience / track record, technical / management skills and methodology.
• Short listed contractors provide input into final contract document.
• Final tender stage uses standard price quality method generally using 70% weighting on price. Scores from relevant experience / track record, technical / management skills and 50% of methodology score are carried forward from short list stage.
• Tenderers must provide a draft Contractor Plan with their tender and nominate key personnel who will be managing the contract.

**Impact on value for money, fair competition, and competitive and efficient markets**
• Type of contract, contractor responsibilities and size of network maximises value for money as detailed above.
• Expressions of interest phase is advertised openly and widely and so it ensures all contractors have an opportunity to be involved.
• Waimakariri District is part of the larger Christchurch market and so this model and approach does not have any significant impact on the competitiveness or efficiency of the market. It aims to take advantage of that market.

**Risk Identification and Management**
• NEC3 requires a risk register to be maintained and for ‘early warnings’ to be notified by both parties and for these to be entered into the risk register and managed.

**Contract Management Approach**
• A collaborative working approach is used focussing on delivering the required levels of service in a cost effective way and by encouraging innovation.

### Considering the Road Maintenance Environment

There are factors in the road maintenance management environment that impact on the delivery of road maintenance services. These factors include the following:

1. **Road Maintenance Task Force**
   
   In 2011 the government established the Road Maintenance Task Force to identify opportunities to increase the effectiveness of road maintenance. The Task Force identified four general areas for improvement:
   • Adapting the business models used to deliver maintenance, renewals and operations.
   • Improved procurement practices, also in support of new business models.
   • Improved prioritisation and optimisation through level of service differentiation.
   • Consistent introduction of enhanced asset management practices.

2. **The Road Efficiency Group (REG)**
   
   The Road Efficiency Group (REG) was formed in 2012 to carry out the recommendations of the Road Maintenance Task Force as outlined above. REG has continued to be a driving force in road efficiency and supports the New Zealand transport sector to deliver a modern integrated system to align with the objectives of local, regional and central government. REG has a focus on four key work groups:
   • Community outcomes - ensures RCAs are demonstrating value for money in the delivery of road maintenance.
   • Evidence & Insights - to provide Road Controlling Authorities (RCAs) with the tools to understand their data quality baseline.
   • Sector Excellence - works with the sector to provide improved investment decision making for customer outcomes.
   • Strategic Direction - aims to identify and promote procurement and delivery models.
3. North Canterbury Roading Collaboration Group

Collaboration on roading and transportation matters between Hurunui District Council, Selwyn District Council, Kaikoura District Council and Waimakariri District Council was formalised in a Memorandum of Understanding in 2014.

This MOU agreement between the parties was put together to seek opportunities to work together in specific aspects of roading asset management and network operations. In particular the parties aim to improve management and operation of their road networks by working together. In doing this they want to:

- Improve asset management processes, outcomes and consistency in respect of their respective road networks.
- Establish a consistent regional response to land-use and demand changes.
- Improve investment decision-making, while recognising and accepting appropriate risk.
- Develop consistent levels of service standards, in line with the One Network Road Classifications and customer outcomes.
- Enhance customer satisfaction and promote a ‘One Network’ approach.
- Further embed Road Safety in the cultures of the respective organisation.

This MOU is to be reviewed by the partners over the next 12 months and updated so it remains a relevant document.

Service Delivery and Contract Options

The Waimakariri District Council carried out a service delivery options review in 2010 and the Draft Procurement Strategy is consistent with the recommendations from this report. In particular the 2010 review recommended a single district wide network management contract covering all road maintenance and renewal activities, except for street lighting, encouraging innovation in a collaborative working environment and using a quality based contractor selection process. This model is consistent with current best practice for maintenance contracts, has worked well for the district and delivered good value for the community.

Under the Memorandum of Understanding (MOU) on collaboration with other North Canterbury Councils the NEC3 contract model has been adopted and is performing well. The exceptions to this are Kaikoura District Council, who have combined their maintenance work with the NZ Transport Agency road maintenance contract, and Selwyn District Council who have moved to the NZS3917 contract form. Feedback from the contracting industry supports the Roading Procurement Strategy and current procurement processes adopted by Council. It was noted that longer term and alternative contract models are being utilised in some other districts and that in some areas more weighting is being given to quality rather than price.

In June 2019 a meeting was held with the North Canterbury Roading Collaboration Group which was attended by representatives from Selwyn, Waimakariri and Kaikoura District Council. The meeting was called to discuss issues and opportunities for collaboration across the partners.

It is noted that no detailed analysis has been undertaken to assess benefits and costs of combining works and contracts as it was considered that the costs and effort to do so could not be justified. It is noted that because of the Waimakariri districts compact size and location being close to Christchurch and hence its advantageous situation in procuring services, any combining of work or contracts is likely to have a detrimental impact on the district.

The road maintenance contract re-tender timing has been coordinated and agreed between Waimakariri District, Selwyn District and Hurunui District so that the tendering is staggered to ensure the contracting sector can tender for each contract efficiently with the result of better tenders. The timing has been planned so the result of one process is known before the next process starts.
The timing of contracts is as follows:

- Waimakariri District Council – 1 November 2020 start date
- Selwyn District Council – 1 June 2021 start date
- Hurunui District Council – 1 July 2022 contract start date

**Conclusions and Recommendations**

The LTMA requires all roading physical works to be contracted out to the private sector.

The LTMA requires the Council to have a procurement strategy for roading that has been approved by NZ Transport Agency.

The Council’s Roading and Transportation Strategy has been reviewed and is to be taken to the Utilities & Roading Committee for endorsement in November 2019. NZ Transport Agency has provided feedback on the draft strategy. Once endorsed by the Utilities & Roading Committee this will be sent to NZ Transport Agency for approval.

This strategy outlines the contract model for road maintenance services and this model provides for a single district wide network management contract covering all road maintenance and renewal activities (except for street lighting), encouraging innovation in a collaborative working environment and using a quality based contractor selection process.

This model was selected following an analysis of various options for the service delivery and contract models for the road maintenance and renewal activity in 2010. A further review of this model taking into account changes in the road maintenance management environment since 2010 has confirmed it is still the most appropriate model and meets current best practice.

It is **recommended** that the Council’s road maintenance service continues to be provided by a single district wide network management contract covering all road maintenance and renewal activities, including some minor capital works projects, in a contract form that encourages innovation in a collaborative working environment, using a quality based contractor selection process.
Waimakariri District Council

Roading and Transportation Procurement Strategy

November 2019
**Internal Quality Record**

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<tr>
<th>Reviewed By</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Joanne McBride – Roading and Transportation Manager</td>
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<tr>
<th>Approved For Issue By</th>
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<tr>
<td>Gerard Cleary – Manager, Utilities and Roading</td>
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<tr>
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<tr>
<td>Utilities and Roading Committee</td>
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**Revision Record**

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<th>Rev No</th>
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<th>Description</th>
<th>Prepared By</th>
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<td>Final draft for NZTA Interim approval.</td>
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Appendix A - Delegations & Policies
S-DM 1046 – Contractual Authorities – Staff Schedule - Issue 57 Delegations Manual (TRIM 190708095887)
S-CP 4160 – Procurement and Contract Management Policy - Adopted 5 February 2019 (TRIM 190121005949)

Appendix B - Industry Feedback
Civil Contractors NZ
Isaac Construction
City Care Ltd
HEB Construction
Sicon Ltd
1.0 Executive Summary

Procurement plays a vital role in the delivery of Council outcomes, with a significant variety of goods, services and works being purchased from third party suppliers.

The Council recognises that rigorous procurement and contract management practices:

(a) ensure the Council delivers value for money and quality outcomes for the community
(b) underpin the performance and delivery of the Council’s strategic and business objectives
(c) provides opportunities for business sustainability, strategic growth and improvement

The strategy has been developed as a guidance document for Waimakariri District Council staff to allow the effective implementation of best practise procurement and also to inform the supplier community.

1.1 The purpose of this strategy is to ensure that procurement planning reflects the Waimakariri District Council’s corporate aims and priorities and is consistent with Council strategies and policies and NZTA funding and procurement rules.

1.2 This strategy is unique to the Waimakariri District Council and it recognises the experience of Council staff and the economic and geographic environment in which the Council operates.

1.3 This strategy must be read in conjunction with the NZTA Procurement Manual. The NZTA Procurement Manual sets out the rules for the procurement activity funded through the National Land Transport Fund.

1.4 The use of NZTA approved procurement procedures is a statutory obligation under s25 of the Land Transport Management Act 2003.

1.5 The objectives of this strategy are:

   a) To support the achievement of the Council’s Community Outcomes and the Waimakariri Long Term Plan through efficient procurement processes
   b) To deliver services to the community that represent best value for money
   c) To encourage appropriate levels of competition across supplier markets
   d) To ensure procurement is fair and transparent with effective accountability measures
   e) To allow for opportunities for local business to participate
   f) To identify opportunities for working with others in order to maximise purchasing power and identifying opportunities for innovation and to add value.
   g) To ensure that current and future procurement activities are planned, implemented, monitored and reviewed effectively
   h) To ensure that good practice examples are identified and applied consistently.

1.6 Procurement Environment

Waimakariri District is part of the greater Christchurch area and is approximately 20 to 30 minutes’ drive from the centre of Christchurch City and so this gives ready access to a large pool of suppliers. Many of the large national/international organisations have bases in Christchurch City and there is also a range of small to medium companies based in the District.
The Waimakariri District Council has very experienced in-house roading and technical services teams with good network management, asset management, project management and contract management capability and skills, along with a good knowledge of the local community and its expectations and needs. This experience is utilised in combination with the large external supplier market to achieve the objectives of this strategy.

1.7 Procurement Approach

In its approach to procurement the Waimakariri District Council will utilise guidance provided by the NZTA Procurement Manual Procurement Procedure 1 – Infrastructure for Physical Works and Procurement Procedure 2 – Planning and Advice for Professional Services.

The Council has recently carried out a review of its previous overarching purchasing (including tendering) Policy and has carried out work to review and update the Policy. A new “Procurement and Contract Management Policy” was subsequently developed and was adopted by Council on 5 February 2019. This policy has included a number of changes including additional principles to provide further underlying guidance to the policy, clarification around organisational scope, consideration of sustainability and risk.

The Council has also recently adopted a Procurement Strategy which seeks to provide the strategic direction for procurement activities for the organisation. It sets forth the framework to achieve public value and quality outcomes through best procurement practices.

Following the adoption of the new policy and strategy, Council is in the process of considering further options for procurement, such as the establishment of panels where appropriate. At this stage a Trades Panel and Minor Civil Works Panel are proposed to be developed, with a Professional services Panel also planned.

The approach adopted by the Waimakariri District Council for the various aspects of its road work is as follows:

- Road maintenance and renewal work is managed on a network management basis under one term service contract using a design and build delivery model and using NEC3 conditions of contract with a maximum five year term. It is managed in a collaborative working environment by Council in-house staff. Supplier selection is by the price quality method.

- Street light maintenance and renewal work is managed on a network management basis under one term maintenance contract combined with NZTA street lighting on its North Canterbury Network and with Hurunui District Council using a design and build delivery model with a maximum five year term. It is managed in a collaborative working environment by Council in-house staff. Supplier selection is by the price quality method.

- Street light maintenance and renewal work is managed through a maintenance contract with NZTA and Hurunui District Council. A design and build delivery model is utilised with a maximum five year term. The contract is managed in a collaborative working environment by Council in-house staff. Supplier selection is by the price quality method.

- Routine new works are delivered by small to medium low risk contracts using a traditional design followed by construction staged delivery model to provide opportunities for local small and medium sized contractors. It utilises standard documentation and construction details to reduce risk and cost. Associated professional services are usually provided by in house staff. Supplier selection is generally procured by the lowest price conforming method with flexibility to assess depending on risk.

- Major projects are delivered by one off contracts using a staged delivery model with associated professional services provided by external consultants overseen by
experienced in-house project managers. Design and build delivery models may be considered for complex projects, or projects where it is felt value can be gained by industry input. Supplier selection is usually by the price quality method.

- Professional services for routine network management, programme management, routine investigations and reporting, asset management and for delivering community road safety programmes is provided in-house.
- Specialist professional services such as bridge inspections and structural advice, road safety audits and advice, transport planning and traffic assessments, traffic counting, road condition rating and surveys are provided by external consultants. A staged delivery model is used for external consultants under a quality based supplier selection process or by direct appointment for lower value appointments.

1.8 Review and Monitoring

This strategy will be assessed regularly to test the appropriateness of the approaches used and it will be formally reviewed every three years in line with NZTA requirements.

1.9 Recommendations

- That the Waimakariri District Council Utilities and Roading Committee approves the Roading and Transportation Procurement Strategy for the period 31 October 2019 until 30 October 2022.
- That WDC submits the Roading and Transportation Strategy to NZTA for endorsement for the period 31 October 2019 until 30 October 2022.
- That NZ Transport Agency note the continued use of in-house professional services under s.26 of the Land Transport Management Act 2003, as previously approved.
- That NZ Transport Agency approve the use of supplier panels for professional services and minor physical works.
2.0 Introduction

This document sets out the Waimakariri District Council’s strategic approach to road and transport related procurement of works and services within the district.

NZTA requires all territorial roading authorities to have in place an approved Procurement Strategy that remains fit for purpose, with ongoing revisions/replacements to be reviewed and endorsed by the Agency.

Effective procurement is crucial in securing high quality, best value works and services for all roading and transport stakeholders. Developing a clear procurement strategy is a key step towards achieving best value, efficiency and competition. It also assist contractors by providing a clear overarching strategy with the key objectives for procurement.

This Procurement Strategy recognises the importance of social responsibility, whole of life cost, environmental and economic impacts.

Best value and efficiency goals require a positive approach to competition, taking advantage of opportunities for innovation and partnerships with the public, contractors, other Councils and organisations. This strategy seeks to strike a balance between several priorities:

- Ensuring quality of works on the assets
- Ensuring efficiency in procuring, and delivering
- Providing social responsibility, by engaging with local and regional suppliers to promote the local economy.
- Ensuring good value to the ratepayer
- Ensuring fairness to the industry

The Procurement Strategy takes a balanced approach to risk management. It is accepted that the Council, as the purchasing organisation, must establish the level of risk it is prepared to shoulder in relation to its dealings with suppliers. Understanding risk and appropriate apportionment, between supplier and Council, is a key consideration when it comes to delivering value for money. Equally, it is important that product is affordable and meets the desired performance levels.

In preparing this Procurement Strategy, Waimakariri District Council (WDC) has considered its planning framework, principles and attitude to procurement.
3.0 Procurement in the Waimakariri District Council Context

3.1 District Overview

The Waimakariri District is one of the two districts that make up North Canterbury. The District (225,000 hectares) extends from Pegasus Bay in the east to the Puketeraki Range in the west. It is bounded in the south by the Waimakariri River and Christchurch City, and in the north by the Hurunui District.

Kaiapoi and Rangiora are the major urban areas in the Waimakariri District. These towns are 20 and 30 minutes respectively from Christchurch City centre. The District’s other main urban areas are Woodend/Pegasus and Oxford and there are also a number of villages and beach settlements. Sixty-two\(^1\) percent of the District’s population resides in the four main urban areas.

A large portion of the District is fertile flat land, or highly productive rolling downs. The north-western portion of the District is hill and high country.

There has been a marked increase in the number of people living in the District’s rural areas as new smaller properties are created. Some of these are used for horticultural enterprises. Others are occupied by people who have been attracted to the District to enjoy living in a rural environment close to Christchurch.

Council expenditure on roading and transport includes a combination of:

- Operations and maintenance of assets
- Renewal of assets
- Construction of new infrastructure to improve the level of service
- Construction of new infrastructure to meet changing demands and a growing population
- Contribution towards private construction (development) when there is a public benefit
- Professional services to support Council functions

3.2 Purpose of Local Government

The purpose of local government is —

(a) to enable democratic local decision-making and action by, and on behalf of, communities; and

(b) to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.

(LGA 2002 S.10 reprint April 2019)

3.3 Government Led Construction Accord

In April 2019 the Government, Government Agencies and Accord Development Partners signed the Construction Sector Accord which has the following vision:

“The wellbeing of New Zealanders is supported by safe and durable homes, buildings and infrastructure, built by a productive, capable, resilient and proud sector.”

The accord has four shared goals:

- To increase productivity

\(^1\) Department of Statistics estimate 2018
• To raise capability
• To improve resilience
• To restore confidence, pride and reputation

This would help deliver benefits across the sector and for all New Zealanders in the areas of homes, buildings and infrastructure.

One of the government led priorities was to ensure better procurement practices and improved pipeline management. This included creating a more certain, visible and better coordinated pipeline of government construction work, and improving government and industry procurement practices so they are more consistent, focus on good value, and enable the industry to succeed.

3.4 **Waimakariri District Council Outcomes and Goals**

Since the establishment of the Waimakariri District, the Council’s emphasis has been on managing change in a way that would ensure the maintenance of environmental standards and the quality of the District’s community life. In the 2018-28 Long Term Plan (LTP), the Council adopted the following purpose and outcomes:

**Purpose:** To make Waimakariri a great place to be, in partnership with our Communities guided by our outcomes:

- A high quality natural environment
- A high quality living environment
- A high quality productive environment
- And a strong sense of community

3.5 **Waimakariri District Community Outcomes**

Following consultation with the community, the Council through the Long Term Plan (LTP) adopted the following broad outcomes in relation to transportation and business within the district:

- There is a safe environment for all
- Public spaces and facilities are plentiful, accessible and high quality
- Transport is accessible, convenient, reliable, affordable and sustainable
- Businesses in the District are diverse, adaptable, and growing

3.6 **Roading and Transportation Goal**

The following goal for the provision of roading infrastructure in the Waimakariri District Council has been developed from the Community Outcomes. Our road and transport goal is:

“To plan, provide, maintain, develop and improve the road and transport network so that it is affordable, integrated, safe, responsive and sustainable and it contributes to the attainment of high quality natural, living and productive environments within the District and assists development of a strong sense of community.”

The Council Procurement and Contract Management policy contains the following:

**Principles**

Council procurement and contract management practices shall ensure that the Council plans for, enters into and manages its procurement and contract management activities in a manner that maximises value for money and quality service delivery, as well as realises business, strategic and community expectations.

The following ten principles shall be reflected in all procurement and contract management practices:

1. Procurement and contract management processes will comply with all applicable statutory obligations, recognise Council's business, strategic and community expectations, and reflect relevant sector, central and local government good practice standards and guidelines. Such processes shall at all times foster a safe working environment for staff, contractors and the general public and support the intent laid down within the Health and Safety at Work Act 2015.

2. The purchasing power of the Council will be harnessed for the realisation of its strategic and business objectives, as well as the benefit of the local community.

3. Planning and managing for great results. All purchasing decisions will consider what the most appropriate procurement options are, and select from a range of delivery processes to achieve the best outcome for Council and the community.

   This provides the flexibility for Council to identify the most appropriate procurement option for obtaining goods and services. The decision about what option to be used will be based on the type of expenditure being incurred as well as other appropriate procurement objectives. Available tools for procurement include:

   - Full external service delivery;
   - Collaboration between Council and external organisations;
   - Public/private partnerships;
   - Fully resourced from internal sources.

4. The Council shall be fair to all suppliers. Where Open tendering applies, procurement practice will demonstrate integrity by all parties and enable all potential suppliers to have equal access through the use of open and contestable processes.

5. All Council procurement for goods and services shall be open and competitive. However, there are circumstances when Council may decide to restrict or limit supplier involvement in a procurement process, based on matters of scale or relevance, such as in an emergency and/or by allocating work directly to its own operating departments. When this principle of open and competitive purchasing is subject to deviation, Council will document the justification for such actions. Suppliers will be disqualified from tendering for Council goods and services for a period of not less than 12 months if they lobby or contact Councillors or staff (other than contacting staff named in the tender documents) regarding a tender while the tendering process is in progress.
6. The Council shall ensure full probity in its procurement practices and decision-making processes. All procurement decisions will be appropriate and transparent, fair and equitable, and free from any real or perceived bias or conflict of interest.

7. The Council shall take into consideration the whole of life costs and/or benefits associated with procurement – spanning design, manufacture, delivery, operation and disposal.

8. Consideration will be given to sustainable procurement principles whenever possible, i.e. assessing the whole of life social, economic and environmental impact of the procurement.

9. All contracts shall clearly identify the functional, performance and/or technical deliverables and key performance indicators that reflect Council’s expectations and quality standards, and establish effective means to measure, monitor and manage their delivery.

10. All contracts will be actively managed in a manner that fosters collaboration with suppliers and contractors, maximises value for money, supports the Ta Matou Mauri principles as well as supporting continuous innovation and improvement; including the use of ‘All of Government Contracts’ and N3-GSB where appropriate.

11. All procurement and contract management risks will be identified and managed effectively throughout the life cycle of the goods or service.

3.8 Council Procurement Strategy (Adopted 3 September 2019)

The Procurement Strategy is a framework that supports Council in achieving its mission “To pursue with the community a high quality physical and social environment, safe communities, and a healthy economy.” Procurement supports this mission through its object of “sustainable value through smart buying”.

The Strategy has been developed to support the upcoming work reflected in the Council’s key planning documents and guides the organisation down a path from a traditional approach to procurement and towards an approach which is more strategic with a focus on planning. This will be supported by robust and objective analysis that informs the best methodology to approach the market to give optimal outcomes and public value.

3.9 NZ Transport Agency’s Procurement Requirements

The Land Transport Management Act S25 requires that procurement procedures used by approved organisations (AO) be designed to obtain best value for money spent. S25 also notes:

- Regard must be given to the desirability of enabling fair competition that encourages competitive and efficient markets

- For other than minor or ancillary works undertaken by an internal business unit, outputs must be purchased from external providers.

- To reinforce the value for money concept, an Approved Organisation is not compelled to accept the lowest price proposal.

Professional services procured in-house require the specific approval of NZTA. This has previously been obtained.
3.10 **Office of the Auditor General**

The Office of the Auditor General provides comprehensive guidance through its publication *Procurement Guidance for Public Entities*, which replaces the previous *Guidance document Procurement: a Statement of Good Practice*.

Basic principles that the office of the Auditor General states should govern all public spending:

- **Accountability** – Public entities should be accountable for their performance and be able to give complete and accurate accounts of the use they have put public funds to, including funds passed on to others for particular purposes. They should also have suitable governance and management arrangements in place to oversee funding arrangements.
- **Openness** – Public entities should be transparent in their administration of funds, both to support accountability and to promote clarity and shared understanding of respective roles and obligations between entities and any external parties entering into funding arrangements.
- **Value for money** – Public entities should use resources effectively, economically, and without waste, with due regard for the total costs and benefits of an arrangement, and its contribution to the outcomes the entity is trying to achieve. In addition, the principle of value for money for procuring goods or services does not necessarily mean selecting the lowest price but rather the best possible outcome for the total cost of ownership (or whole-of-life cost).
- **Lawfulness** – Public entities must act within the law, and meet their legal obligations.
- **Fairness** – Public entities have a general public law obligation to act fairly and reasonably. Public entities must be, and must be seen to be, impartial in their decision-making. Public entities may also at times need to consider the imbalance of power in some funding arrangements, and whether it is significant enough to require a different approach to the way they conduct the relationship.
- **Integrity** – Anyone who is managing public resources must do so with the utmost integrity. The standards applicable to public servants and other public employees are clear, and public entities need to make clear when funding other organisations that they expect similar standards from them.

3.11 **Local Government Act 2002**

The LGA 2002 S.14 Principles relating to Local Authorities notes:

- S.14 (1) (f) a local authority should undertake any commercial transactions in accordance with sound business practices …
- S.14 (1) (g) a local authority should ensure prudent stewardship and the efficient use of resources in the district or region

3.12 **Objectives and Outcomes**

This procurement strategy undertakes to achieve the following **objectives**:

1. To support the achievement of the Council’s Community Outcomes and the Waimakariri Long Term Plan through efficient procurement processes
2. To deliver services to the community that represent best value for money
3. To encourage appropriate levels of competition across supplier markets
4. To ensure procurement is fair and transparent with effective accountability measures
5. To allow for opportunities for local business to participate
6. To identify opportunities for working with others in order to maximise purchasing power and identifying opportunities for innovation and to add value.
7. To ensure that current and future procurement activities are planned, implemented, monitored and reviewed effectively
8. To ensure that good practice examples are identified and applied consistently.

The procurement strategy aims to provide the following outcomes to benefit the Council and the community:

- Improved value for money.
- More efficient procurement procedures.
- Effective partnerships with suppliers.
- Benefits for the local economy.
- Effective collaboration with other Local authorities and private sector.
- Best practice risk management.
- Best practice project planning.
- Integration with the Council's overall aims and priorities.
4.0 Current Procurement Profile

The scale of the activities covered by this strategy are as detailed below. These amounts are based on the Council's 2018/19 programme. Future years are expected to be similar except that the value of new works can vary from year to year depending on the major projects which are planned.

**Physical Works (subsidised) - NZTA co-funded**

<table>
<thead>
<tr>
<th>Service</th>
<th>Amount</th>
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<tr>
<td>Maintenance and operations</td>
<td>$4,200,000</td>
</tr>
<tr>
<td>Renewal</td>
<td>$6,100,000</td>
</tr>
<tr>
<td>New Works</td>
<td>$4,000,000</td>
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</table>

**Physical Works (Unsubsidised) – includes Development Driven Projects**

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<th>Service</th>
<th>Amount</th>
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</thead>
<tbody>
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<td>Maintenance and operations</td>
<td>$500,000</td>
</tr>
<tr>
<td>New Works</td>
<td>$3,720,000</td>
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**Professional Services**

Note – project and renewal related professional services are included in the sums above.

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<tr>
<th>Service</th>
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<tbody>
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<td>Road Network Management</td>
<td>$1,147,000</td>
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<tr>
<td>Community Road Safety Projects</td>
<td>$247,300</td>
</tr>
</tbody>
</table>

The total value is in the order of $19m per annum.

Most of the activity in the past has been low risk road operations and maintenance, renewals and routine new works. However there is scope for innovation in the way the road operations and maintenance is procured and managed and balanced with how the professional services are procured and managed. For example the use of design build for routine renewal work can produce good value for money and encourage innovation.

New works are mainly routine projects such as intersection improvements, new footpaths and cycle ways and seal extension work. These are normally low risk projects costing less than $1 million.

Major and more complex projects of value greater than $1 million are only occasionally procured.

Included below are details of the current roading and transport activities and their current procurement methods.
## Physical Works

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Procurement Method/Contract Approach</th>
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| District Road Maintenance     | Inspections, programming, all routine maintenance and renewal work, resealing, rehabilitation, road marking, some minor improvements. Approximate value - $9.5m per year. Expiry date – 31 October 2020. | • EOI to select short list,  
• Input to document from short listed contractors  
• RFT using Price Quality Method  
• Collaborative working approach using NEC3 Conditions of Contract  
• 3 + 1 + 1 contract term |
| District Street Light         | Inspections, programming, all maintenance work, renewals and minor improvements. Joint contract with NZTA and Hurunui District Council. Approximate value - $335,000 per year. Expiry date – 31 November 2019. | • Open tender using Price Quality Method  
• NZS3917  
• 3 + 1 + 1 contract term |
| Routine new and renewal       | Kerb and channel replacements, minor improvements, seal extensions etc. Approximate total value – $1m per year. Typical contract value – $100,000 to $600,000 per contract | • Open tender  
• Lowest price conforming or Price Quality dependent on complexity  
• NZS3910  
• Small to medium parcels of work |
| Major construction projects   | Major intersection upgrades, bridge renewals, road reconstruction. Annual value varies.                                                                                                                                 | • Either open tender or EOI followed by short listing depending on size and complexity  
• Price Quality Method  
• NZS3910 |
| Power Supply for Street       | Electricity Supply for street lighting, water and sewer pumping stations and other Council services. Approximate value for street lighting - $400,000 per year.                                                                 | • Included in All of Government Agreement. |
| Traffic Signal Maintenance    | Managed by CTOC through signals maintenance contract. MOU with CTOC being developed.                                                                                                                                 |                                                                                                   |

## Professional Services

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Procurement Method/Contract Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge and Structures</td>
<td>Routine bridge inspections and specialist structural advice. Approximate value - $60,000 per year.</td>
<td>Negotiated agreement with preferred consultant based predominately on quality. Based on ACENZ Short form agreement. Reviewed annually.</td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>Procurement Method/Contract Approach</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Road safety</td>
<td>Routine road safety inspections and crash reporting and specialist advice. Approximate value - $15,000 - $30,000 per year.</td>
<td>Negotiated agreement with preferred consultant based predominately on quality. Based on ACENZ Short form agreement. Somewhat dependent on number of serious/fatal crashes per year. Reviewed annually.</td>
</tr>
<tr>
<td>Transportation planning and traffic engineering advice</td>
<td>Specialist transport planning and traffic engineering advice for transport studies and investigations, feasibility studies not able to be provided in-house. Approximate total value - $80,000 - $160,000 per year dependent on projects. Typical value of each commission – less than $50,000.</td>
<td>Negotiated agreement, either closed contest or direct negotiation, with most appropriate consultant(s) to carry out the particular task and normally using on a Quality Based assessment. One off project based. Based on ACENZ CCCS Short form agreement.</td>
</tr>
<tr>
<td>RAMM condition Surveys</td>
<td>Routine road rating and roughness surveys. Approximate value $50,000 for a two year period.</td>
<td>Negotiated agreement, either closed contest or direct negotiation, with most appropriate consultant(s) to carry out the particular task. Uses ACENZ CCCS Short form agreement. Note that this procurement method is in place until REG complete the review of this work.</td>
</tr>
<tr>
<td>Traffic Counting</td>
<td>Delivering the Council’s traffic counting programme. Approximate value - $170,000 for a three year period.</td>
<td>● EOI to select short list, ● Lowest price conforming method ● NZS3910 ● 3 + 1 + 1 + 1 contract term</td>
</tr>
<tr>
<td>Network Management</td>
<td>Managing the road and transport network including contract management, RAMM management, AMP’s, financial management, investigating customer enquiries. Approximate value - $1.15m per year</td>
<td>Services provided in-house under In-house Output Agreements. Annual review.</td>
</tr>
<tr>
<td>Professional services for routine new and renewal projects</td>
<td>Detailed investigation and reporting, detailed design, contract documentation and contract management for routine projects. Annual value – approx. $170,000 (from 17/18). Approx. value per project - $10,000 to $50,000.</td>
<td>Services provided in-house under In-house output agreements. Annual review.</td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>Procurement Method/Contract Approach</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Professional Services for major construction projects</td>
<td>Detailed investigation and reporting, detailed design, contract documentation and contract management for specific projects. Annual value varies.</td>
<td>Open or closed tender process, depending on value, using both Quality based and Price Quality supplier selection methods. Procurement method designed to suit the specific project.</td>
</tr>
</tbody>
</table>
5.0 Procurement Programme

The Council’s programme for Roading and transport activities is outlined in the Council’s Ten Year Plan.

The activities consist of normal road operations and maintenance, renewal, and new works along with supporting professional services.

The professional services and physical works for the earthquake recovery and rebuilding have been procured and contracts are in place.

5.1 Term Maintenance Contracts


5.2 Projects

Routine Construction projects (kerb and channel replacement, minor improvements, routine seal extensions)

Two to three contracts each year of value $100,000 to $600,000. Timed for construction in the normal construction season.

5.3 More Significant Projects

There are a number of key projects which are planned around the district. These projects have a focus on both safety and growth:

- Skew Bridge Improvements
- West Rangiora to Kaiapoi Roading Improvements
- Flaxton Road Upgrade
- Kaiapoi to Belfast Cycleway
- Coldstream Road Improvements

Further information on each of these projects is included below.

a) Skew Bridge Improvements

Skew Bridge is located on the route between west Rangiora and Kaiapoi (and the northern motorway link to Christchurch). This is a key route which is anticipated to provide an attractive alternative to SH71 as growth continues within the area. The existing bridge is narrow, the road geometry leading to the bridge is challenging and there is a crash history at the bridge.

Initial funding to undertake a single stage business case has been approved by NZTA. Funding for detailed design and construction has not yet been approved. Construction is dependent on funding approval and is unlikely to proceed until the 2021-24 period.

b) West Rangiora Roading Improvements – Townsend to Fernside

Western Rangiora has experienced significant growth over the past 10 years. This growth is expected to continue, with new developments planned or already underway. This route review is likely to result in a number of specific projects being planned and could include intersection improvements, seal widening and / or roadside hazard minimisation. Investigation is currently underway.
It is likely this project will be broken down into smaller projects however this will be confirmed once the investigation is complete and the scope determined. Construction is proposed for the 2019/20 and 2020/21 years and will be open tendered.

c) South Rangiora to West Kaiapoi Route Improvements – Flaxton to Skewbridge:
This section of road has an attractiveness as a route between west Rangiora and Kaiapoi (and the northern motorway link to Christchurch). The southern access to Rangiora is seen as an alternative to alleviate pressure on the Southbrook area.

This route review is likely to result in a number of specific projects being planned and could include intersection improvements, seal widening and/or roadside hazard minimisation. It is likely this project will be broken down into smaller projects however this is yet to be confirmed. Construction is proposed for the 2019/20 and 2020/21 years and will be open tendered.

d) Flaxton Road Upgrade
The scope of this project is the upgrade of Flaxton Road, from Lineside Road to approximately Kingsford Smith Drive. As a result of the recent growth in Rangiora and development in Southbrook, the use of Flaxton Road has changed significantly.

This project will ensure that the use of the road corridor is in alignment with the change in adjacent land uses, and will consider provision of footpath and cycle links in the area as well as linkages to other cycleways. Construction is proposed for the 2019/20 and 2020/21 years and will be open tendered.

e) Kaiapoi to Belfast Cycleway
This project is part of a wider cycle strategy to provide a network of cycle facilities linking the main towns in the District, and linking the District with the northern part of Christchurch City. It will also improve safety for vehicles accessing businesses on Main North Road and improve access to public transport along Main North Road. Construction is proposed for the 2019/20 and 2020/21 years and will be open tendered.

f) Coldstream Road Improvements
This project involves making improvements to turning into the multi-use sport facility and intersection improvements at East Belt/Coldstream Road intersection. Pedestrian and cycle facilities will also be constructed to provide access to the multi-use sports facility. Construction is proposed for the 2020/21 year and will be open tendered.

5.4 Professional Services

The Council’s position is that it prefers the use of in-house staff over the use of consultants to provide professional services. However, it acknowledges external consultants will be required for certain types of work and in certain circumstances. As such it adopted the following criteria when the engagement of consultants is contemplated:

- Where the level of expertise required to carry out a particular task is beyond that of staff employed, and the Council does not have sufficient ongoing work to justify recruiting a full-time specialist.
- Where existing resources are fully utilised for an identified period and the priority associated with a project(s) means that it cannot be delayed until internal resources are available.
- Where the Council does not hold specialised tools, software or equipment to undertake the work (e.g. specialised design software/monitoring equipment).
- Where best-practice standards or legislation requires an independent peer review or audit.
6.0 Procurement Environment

6.1 Analysis of Supplier Market
The Waimakariri District is part of the greater Christchurch area and is close to Christchurch City and so it has ready access to a large pool of suppliers. Many of the large national/international organisations have bases in Christchurch City and there is also a range of small to medium companies based in the District. There are too many to list in this document.

There is a high level of interest in tenders for work in the district and there is good competition between suppliers. Feedback from the various suppliers suggests Waimakariri District is an attractive place to do business and Waimakariri District Council wishes to retain this reputation.

6.2 WDC’s Current Procurement Spend and Profile
The current spend (2018/19 year) on roading and transport activities is shown in the tables above.

6.3 Analysis of the impact of the procurement programmes on other approved organisations and other entities
Waimakariri District Council is actively involved with neighbouring authorities and other agencies such as NZTA, Christchurch City Council, Selwyn District Council and Environment Canterbury through the implementation of the Greater Christchurch Urban Development Strategy and the Regional Land Transport Programme, and with Hurunui District Council on cross boundary issues.

In developing this strategy Council Roading staff have met with staff from neighbouring authorities to discuss proposed approaches and likely impacts.

A key impact is the timing of the tendering of major maintenance contracts. If major contracts from neighbouring authorities are tendered at the same time this can affect the ability of the tenderers to put together quality tenders and so may have an adverse impact on the contract outcomes. As such the timing of tenders is discussed and agreed to by the neighbouring authorities and with suppliers to ensure they are planned and programmed to avoid clashes.

As all road controlling organisations in close proximity to Christchurch are essentially using the same supply pool, some consistency in approach is desirable and has been requested by the supply industry. Waimakariri District Council uses the same construction standards wherever possible as Christchurch City Council and this lowers costs, minimises risks and ensures a consistent standard.

Waimakariri District is using NEC3 for its term maintenance contract as is Hurunui District Council. Selwyn District Council utilises NZS3917 contract form. Where approaches are coordinated this can lead to efficiencies over time as contractors have a consistent platform and the ability to learn and improve on a number for contracts.

While the Waimakariri District Council is a large buyer of goods and services, the proportion is small when compared to the private and public sector within Christchurch City and so its impact or influence on the greater Christchurch market from decisions it makes is likely to be minimal. Being in this market should benefit the Council through a greater range of suppliers and increased competition. The Council can further benefit from this by being a client of choice.

Further benefits can be obtained by combining work such as street light maintenance and road rating with our neighbours, as is done with Hurunui District Council.

The collaboration within the Regional Transport Committee and UDS provide an opportunity for integrated programming across the agencies.
7.0 Procurement Approach to delivering the Programme

7.1 Confirmation of Specific Strategic Objectives
This procurement strategy has the following objectives:
1. To support the achievement of the Council’s Community Outcomes and the Waimakariri Long Term Plan through efficient procurement processes,
2. To deliver services to the community that represent best value for money,
3. To encourage appropriate levels of competition across supplier markets,
4. To ensure procurement is fair and transparent with effective accountability measures,
5. To allow for opportunities for local business to participate,
6. To identify opportunities for working with others in order to maximise purchasing power and identifying opportunities for innovation and to add value,
7. To ensure that current and future procurement activities are planned, implemented, monitored and reviewed effectively,
8. To ensure that good practice examples are identified and applied consistently.

7.2 Procurement Approach
In summary the approach adopted by the Waimakariri District Council for its roading work is as follows:
- Road maintenance and renewal managed on a network management basis under one term maintenance contract using NEC3 conditions of contract.
- Street light maintenance and renewal managed on a network management basis under a one term maintenance contract combined with NZTA street lighting on its North Canterbury Network and with Hurunui District Council.
- Routine new works by small to medium low risk contracts with associated professional services provided in-house.
- Major projects by one-off contracts with associated professional services provided by external consultants and in-house services as appropriate.
- Professional services for routine network management, programme management, routine investigations and reporting, asset management and for delivering community road safety programmes provided in-house.
- Specialist professional services provided by external consultants.
- Opportunities for delivering services through a shared service approach with neighbouring authorities will be investigated on an ongoing basis and implemented where best value can be demonstrated.
- Council is considering the introduction of a Minor Works Panel for small value physical works (less than $100,000) as well as a Professional Service Panel in the future.

The approach for each aspect is detailed on the following pages.
Road Maintenance and Renewal

Key attributes and value for money strategy

- All road maintenance and renewal work is included in one contract to gain efficiencies in network management.
- There is one contract to manage so reducing overhead costs associated with multiple contracts.
- The contract is managed by Council in-house staff to provide a direct one-on-one client/contractor relationship to shorten communication lines in order to improve responsiveness, take advantage of network and community knowledge and to avoid the extra costs of engaging an external consultant. This approach utilises the skills and knowledge of the experienced in-house staff.
- The contractor selection process utilises short listing to ensure tenderers meet minimum quality standard and then involves contractor input in developing the contract documents to ensure the tenderers understand the contract requirements and the buildability issues are identified at an early stage.
- NEC3 Conditions of Contract are used as this is suitable for term service contracts and has provisions that encourage flexibility and innovation by focussing on the level of service. It also encourages a collaborative working environment.
- The Waimakariri District road network is compact and so it provides an ‘economic’ and manageable package due to its size and proximity to Christchurch. Combining the network with an adjoining authority may diminish this advantage.
- The contractor is responsible for inspections, programming, reporting, design of reseals and rehabilitation and other minor works so this reduces input from external consultants and in-house staff and ensures a whole of network focus thus clarifying responsibilities and avoiding duplication.
- A collaborative working approach is used to ensure the energy of all parties is directed at achieving the specified levels of service and good network outcomes. This approach minimises the risk of contract disputes.
- The contract document encourages innovation and flexibility by specifying outcomes and not specifying prescriptive work methods.
- Includes the requirement for the contractor to directly deal with customer service requests to reduce double handling and to provide a more responsive and proactive approach.
- Requires RAMM Contractor to be used to ensure more efficient management of work flow, claiming, auditing and asset data updating.
- Includes a section of Hurunui District Council road (Okuku Pass Road) as this section is integral with the Waimakariri roading network and is remote from the Hurunui District

Nature of Activities

- All routine road maintenance and renewal activities are included with responsibility for managing the network from ‘boundary to boundary’. Excludes street light maintenance as this is a more specialist activity.
- Includes some minor new works where it is cost effective to include this in the contract or where the new work is integral with a maintenance or renewal activity.
- Includes design and build for reseals, rehabilitation and other minor structures and minor works.
- Includes investigating and responding to service requests.
Aggregation, bundling and contract term

- As noted above all road maintenance and renewal work is included in a single district wide contract.
- This approach does not impact on the supply market as Waimakariri is part of the large greater Christchurch market and its spend is a relatively small part of that market.

Delivery Model and Supplier Selection Method

- Contract tendered every five years on a 3 year term plus 2 one year extensions subject to performance meeting the required level.
- Contract uses NEC3 Conditions of Contract Option A (Contractor priced price list).
- Delivery model is design and build.
- Supplier selection method involves an Expressions of Interest phase to develop a short list of tenderers of preferably three and a maximum of four. Short list selection is based on relevant experience / track record, technical / management skills and methodology.
- Short listed contractors provide input into final contract document.
- Final tender stage uses standard price quality method generally using 70% weighting on price. Scores from relevant experience / track record, technical / management skills and 50% of methodology score are carried forward from short list stage.
- Tenderers must provide a draft Contractor Plan with their tender and nominate key personnel who will be managing the contract.

Impact on value for money, fair competition, and competitive and efficient markets

- Type of contract, contractor responsibilities and size of network maximises value for money as detailed above.
- Expressions of interest phase is advertised openly and widely and so it ensures all contractors have an opportunity to be involved.
- Waimakariri District is part of the larger Christchurch market and so this model and approach does not have any significant impact on the competitiveness or efficiency of the market. It aims to take advantage of that market.

Risk Identification and Management

- NEC3 requires a risk register to be maintained and for ‘early warnings’ to be notified by both parties and for these to be entered into the risk register and managed.

Contract Management Approach

- A collaborative working approach is used focussing on delivering the required levels of service in a cost effective way and by encouraging innovation.
**Street light Maintenance and Renewal**

**Key attributes and value for money strategy**

- All street light operations, maintenance, renewal and minor improvements work is included in the contract to gain efficiencies in network management. This includes amenity and parks and reserves lighting and is not restricted to NZTA subsidised lighting only.

- Includes the NZTA North Canterbury street light network and the Hurunui District Council street light network to obtain efficiencies of scale. Working towards including Kaikoura District Council in the next maintenance contract.

- As there is one contract to manage this results in reducing overhead costs associated with multiple contracts.

- The contract is managed by Council in-house staff to provide a direct one-on-one client / contractor relationship to shorten communication lines to improve responsiveness and to avoid extra costs of engaging an external consultant.

- There is an open tender process used to minimise tender costs as the supplier market is specialised and relatively small so the extra costs of a short listing process cannot be justified.

- Network size including NZTA, Hurunui and Kaikoura District networks provides an ‘economic’ and manageable package.

- The contractor is responsible for inspections, programming, reporting, and design so this reduces input from external consultants and in-house staff and clarifies responsibilities.

- Collaborative working approach used to ensure energy of all parties is directed at achieving good network outcomes. This approach minimises the risk of contract disputes.

- The contract document encourages innovation and flexibility by specifying outcomes and not specifying prescriptive work methods.

- Includes directly dealing with customer service requests to reduce double handling.

- Utilises RAMM to ensure more efficient management of work flow, claiming, auditing and asset data updating.

**Nature of Activities**

- The contract includes all routine street light operations, maintenance and renewal activities with responsibility for managing the total network. This includes amenity lighting and lighting in parks and reserves.

- Includes minor new works where it is cost effective to include them in the contract or where the new work is integral with a maintenance or renewal activity.

- Includes investigating service requests.

**Aggregation, bundling and contract term**

- As noted above all street light maintenance and renewal work is included in a single contract covering the Waimakariri District, NZTA North Canterbury and Hurunui District Council street lighting networks.

- Current contract term is 2 years plus 3 one year rights of renewal based on performance meeting the required level.

**Delivery Model and Supplier Selection Method**

- Contract tendered every five years on a 3 year term plus 2 one year extensions subject to performance meeting the required level.
• Contract uses NZS 3910 with contractor priced schedule with combination of unit rates and lump sum.
• Delivery model is design and build.
• Supplier selection method involves an open tender process using price quality method generally using 70% weighting on price.
• Impact on value for money, fair competition, and competitive and efficient markets.
• Type of contract, contractor responsibilities and size of network maximises value for money as detailed above.
• Open tender phase is advertised openly and widely which ensures all contractors have an opportunity to be involved.
• Waimakariri District is part of the greater Christchurch market and so this model and approach does not have any significant impact on the competitiveness or efficiency of the market. It aims to take advantage of the market.

Risk Identification and Management

• Risk is managed through regular asset inspections and regular contract management meetings.

Contract Management Approach

• A collaborative working approach is used focussing on delivering the required levels of service in a cost effective way and by encouraging innovation.
Routine Small and Medium Sized Construction Projects.

Key attributes and value for money strategy

- Like work packaged into small to medium sized contracts of $100,000 to $600,000 to suit the local small to medium supplier market.
- Low risk and low technically complex contracts.
- Standard documentation and construction details consistent with Christchurch City are utilised which reduces documentation and tender and construction management costs and risks.
- Standard open tender approach with lowest price conforming tender evaluation process utilised.
- NZS 3910 Conditions of Contract used as these are well understood by the construction sector.
- When timing is not critical flexibility is allowed in contract start dates to ensure best tender prices and better utilisation of resources.
- Contracts are managed by Council in-house staff to provide a direct one-on-one client/contractor relationship to shorten communication lines to improve responsiveness, to take advantage of local and community knowledge and to avoid extra costs, such as travel from Christchurch, or engaging an external consultant.
- In-house staff are familiar with local conditions and local community needs.
- Collaborative working approach to ensure the energy of all parties is directed at achieving good project outcomes. This approach minimises the risk of contract disputes.

Nature of Activities

- Work in this category includes kerb and channel replacement projects, minor improvements projects, seal extension projects, and new footpaths and cycleways.

Aggregation, bundling and contract term

- Like works are included in contract packages on a one off contract basis.

Delivery Model and Supplier Selection Method

- Standard NZS 3910 open tender contracts evaluated by the lowest conforming tender method.
- Delivery model is a staged model.
- On some occasions a selected tender (closed) process or direct negotiation may be used if the particular circumstances require it and project costs are within the permitted limits.

Impact on value for money, fair competition, and competitive and efficient markets

- Type of contract, contractor responsibilities and size of contracts maximises value for money as detailed above.
- These contracts utilise the small to medium contractor market and provide valuable work to keep that market competitive.
- Waimakariri District is part of the greater Christchurch market and so this model and approach does not have any significant impact on the competitiveness or efficiency of the market. It aims to take advantage of the market.

Risk Identification and Management

- These are low risk contracts with risks identified, apportioned and managed at all stages in accordance with industry best practice.

Contract Management Approach

- A collaborative working approach is utilised to ensure the energy of all parties is directed at achieving good project outcomes.
**Major and Complex Projects.**

Key attributes and value for money strategy

- The procurement and contract approach is determined on a case by case basis depending on the size and complexity of the project.

- Opportunities for combining the road component with other adjoining or associated work is considered and utilised when efficiencies of scale can be obtained.

- Standard documentation and construction details are utilised which reduces documentation and tender and construction management costs.

- NZS 3910 Conditions of Contract are used which are well understood by the construction sector. Consideration may be given to using NEC3 in specific cases if the project may benefit, for example a major design and build project.

- The Council will appoint an experienced in-house project manager to manage the project including procuring and managing the professional services. This ensures the Council remains a ‘smart’ buyer and ensures efficient and good decision making.

- Collaborative working approach is used to ensure the energy of all parties is directed at achieving good project outcomes. This approach minimises the risk of contract disputes.

**Nature of Activities**

- Work in this category includes major road reconstruction, major intersection improvements, and bridge and structural component renewal.

**Aggregation, bundling and contract term**

- All direct and associated work is included in the contract. For example a recent major intersection improvement was combined with a stormwater pond construction project which resulted in efficiencies in both physical works and professional services involvement.

**Delivery Model and Supplier Selection Method**

- Standard NZS 3910 Conditions of Contract. Consideration may be given to using NEC3 in specific cases if the project may benefit.

- Delivery model is a staged model.

- Selection method by either an open tender or by an EOI and short listing process. Evaluation will be normally by the price quality method.

- On some occasions a selected (closed) tender process may be used for projects less than $100,000 if the particular circumstances require it.

**Impact on value for money, fair competition, and competitive and efficient markets**

- Type of contract, contractor responsibilities and size of contract maximises value for money as detailed above.

- These contracts utilise the range of contractors that are available in the greater Christchurch area market.

- Waimakariri District is part of the greater Christchurch market and so this model and approach does not have any significant impact on the competitiveness or efficiency of the market. It aims to take advantage of the market.

**Risk Identification and Management**

- Best practice risk management will occur at all stages of the project lifecycle.
Contract Management Approach

- A collaborative working approach is utilised to ensure the energy of all parties is directed at achieving good project outcomes.
**Professional Services**

**Key attributes and value for money strategy**

- Routine and non-specialist professional services are carried out by in-house staff to avoid duplication and to provide a more responsive service and to utilise the high level of knowledge, capability and skills that is available in the in-house teams.

- Specialist services are provided by the best consultant for the particular job based on experience and capability; their ability to work with the Council; the consultant’s knowledge of the Waimakariri District network and by utilising the large Christchurch market.

- Design of routine renewal works is included in physical works contract.

- Programming of maintenance and renewal work is included in physical works contract and not carried out by separate consultants.

- External consultants are managed by experienced in-house project managers to ensure ‘smart’ buyer approach and to ensure responsive decision making.

- A Professional Service Panel is planned to be established in the future to assist with better buying.

- Consultant selection weighted more on quality evaluation with cost being assessed on a whole of life or total project cost approach.

- For specialist work direct negotiation with preferred consultant is used based on network knowledge, performance, specific personal, compatibility with Waimakariri District approach and values. This provides value for money as the cost is usually in the $5,000-$50,000 range and for other forms of procurement the extra cost would outweigh any benefits.

- ACENZ short form agreement used.

- Proximity to Christchurch market provides for a range of consultants at competitive rates.

- Work combined with neighbouring authorities where economies of scale can produce better results.

- Collaborative working approach to ensure energy of all parties is directed at achieving good project outcomes.

- Ensure Waimakariri District Council is considered a client of choice and a preferred organisation to do work.

**Nature of activities**

- Network management, asset management and planning, traffic and transport assessments, feasibility studies, road condition surveys, traffic counting, work programming, bridge and structural advice, road safety inspections and road safety advice, road safety community programme management, project management, investigation and reporting, design and tender documentation, and construction and contract management.

**Aggregation, bundling and contract term**

- Network management including managing the term maintenance contracts and managing consultants for specialist activities, asset management and planning, road safety community programme management, and work programming is carried out by the in-house Roading Unit of the Waimakariri District Council.

- Feasibility studies, investigation and reporting, design and tender documentation, and construction and contract management, is procured by agreements on a preferred consultant basis with the in-house Project Delivery Unit of the Waimakariri District Council.
• Traffic and transport assessments and feasibility studies not carried out in-house are procured by negotiated agreements with specialist consultants on a one off best for project approach.

• Road condition surveys, condition rating and roughness, had previously been carried out by a negotiated annual agreement with an approved contractor and combined with Hurunui District Council, however in recent years these contracts have been let for different periods by both Councils and are therefore out of alignment. This has not had an impact on the cost.

• Traffic counting is carried out by a competitively tendered contract on a 2 year term plus 3 one year extensions. This contract has recently been re-tendered and awarded to the same contractor who provided both better terms and price than the only other tenderer.

• Bridge inspections and structural advice is provided on a negotiated agreement basis by an external consultant with an annual review based on performance and specific personnel being available.

• Safety inspections and specialist advice is provided on a negotiated agreement basis by an external consultant with an annual review based on performance and suitably qualified staff being available.

• Major project professional services are procured on a project by project approach through a negotiated, selected (closed) or open tender method.

**Delivery Model and Supplier Selection Method**

• In-house services are provided by Output Agreements which are updated and signed annually.

• Transport and traffic assessment and project feasibility consultants are selected on a best consultant for commission basis by direct negotiation or by a selected (closed) selection process. This takes into account the consultant's expertise and personnel in relation to the type of work being done.

• Road condition surveys are currently being carried out by direct negotiation annually (inflation based) following a competitive process in 2002, to allow for consistency in data collection. However, with new technology and a review of the requirements being carried out by NZTA and REG (Road Efficiency Group) it is proposed to carry out a review of potential alternatives before committing to the next renewal.

• Bridge inspections and structural advice, and road safety inspections and specialist road safety advice is provided on a negotiated agreement basis with a preferred consultant subject to good performance and specific personnel being available. This agreement has been recently approved through until 31 September 2019. It is proposed to seek expressions of interest for this work from the market during the early part of 2021.

• Major project professional services, such as investigations and reporting, design and contract documentation and construction and contract management is procured on a project by project basis through direct negotiation, selected (closed) or open tender depending on the size and complexity of the project.

**Impact on value for money, fair competition, and competitive and efficient markets.**

• Waimakariri District is part of the greater Christchurch market and so this model and approach does not have any significant impact on the competitiveness or efficiency of the market. The Council can, however, take advantage of the competitive market that is available.

• The model and approach outlined above provides value for money by utilising in-house staff for routine and non-specialist activities, and for key activities where asset knowledge and ownership is important, as it avoids duplication of effort of
engaging and managing an external consultant. It also provides value for money through utilising a strong local market for specialist services by selecting the most appropriate consultant for the project and using experienced in-house project managers to ensure there is a 'smart' buyer capability.

- A key consideration is whole of life costs and so while the cost of the professional services and a competitive market is important this cost needs to be compared with the quality of output and its influence on the whole of life or total project cost.

Risk Identification and Management

- Best practice risk management is carried out at all stages of the projects.

Contract Management Approach

- A collaborative working approach focusing on delivering the required levels of service in a cost effective way and by encouraging innovation is used in all professional services contracts.
8.0 Risk Identification and Management

8.1 Strategy Philosophy
This strategy is underpinned by a philosophy of risk management which identifies and categorises the types of goods and services purchased by the Council. The Council’s risk management strategy has been developed to make sure that risks are properly identified and managed. By understanding and apportioning risk appropriately we can minimise the cost of procurement and also make savings on supply costs.

A balanced approach to risk management is appropriate for the Council (i.e. neither risk averse nor risk seeking – identify who is the most appropriate party to carry the risk). Some projects can be categorised as low risk whilst other more complex in nature require greater level of Council input and control.

8.2 Collaborative Working Approach
The WDC endeavours to uphold the principles of collaborative working in all contracts. This philosophy encourages non-confrontational relationships with suppliers and promotes the WDC as a ‘Client of choice’ amongst contractors and suppliers.

8.3 Shared Services
The WDC will investigate and consider opportunities for delivering services through a shared services approach with neighbouring authorities where this will deliver best value. The current examples of street lighting and road condition rating being combined with neighbouring authorities, and the road maintenance of Hurunui District Council’s Okuku Pass Road, demonstrate what can be achieved. Future opportunities will be reported to the Council for consideration and approval.

8.4 Community Strategy, Regeneration and Diversity
The WDC is committed to encouraging growth and sustainability in the local economy. Our procurement practices will encourage direct relationships with local contractors and service providers and will not discriminate against any suppliers. The Council will assist local businesses (small and medium sized enterprises in particular) by providing high quality information and advice (including information on the Council’s website) to encourage them to compete for public contracts. Aggregation of small contracts can reduce the individual contract administration overheads but may force local contractors out of the market. This strategy seeks to strike a balance between minimising administration costs and encouraging diversity in the local contracting industry.

8.5 Quality
The WDC seeks to procure goods and services that are fit for purpose, durable and affordable. A project may not require a high specification to achieve a satisfactory outcome. It is recognised, however, that decisions regarding quality and standards should be made by experienced and qualified staff in consultation with stakeholders. This is an appropriate and pragmatic approach to service delivery i.e. state highway standards aren’t necessarily required on small local roads. Conversely, whilst some flexibility in standards can bring about overall savings it may be better to spend more money in the short term to achieve long term savings i.e. full reconstruction may give greater ‘whole of life’ cost benefits than a maintenance intervention strategy.

8.6 Health and Safety
The Health & Safety at Work Act 2015 requires that an organisation must ensure the health and safety of workers (including contractors), and that organisations must consult, co-operate and co-ordinate activities with all other organisations who have health and safety duties in relation to the same matter (overlapping duties), so far as is reasonably practicable. WDC maintains contract health and safety management systems in order to achieve compliance with these requirements.
Suppliers for all contracts shall be required to meet a range of health and safety requirements throughout the life-cycle of the contract, which, depending on the nature of the contract, may include (but are not limited to):

- Health and safety pre-qualification
- Site specific safety plans
- Site inductions
- Incident reporting
- Site safety audits
- Contract close outs

In particular, all suppliers for contracts involving physical works shall be health and safety pre-qualified. This will mean that they are assessed at >50% via the SiteWise health and safety pre-qualification system as a minimum, or meet the requirements of another externally-audited pre-qualification system of equivalent or superior standard (this will be assessed on a case-by-case basis by the WDC Health & Safety Team).

Suppliers can achieve health and safety prequalification before or during the tender period, but pre-qualification must be achieved prior to work commencing.

Where a decision is made to select a supplier who is not health and safety prequalified as the preferred tenderer (or who has a SiteWise score lower than any minimum score indicated in the tender documents), approval must be gained and the reasons for the decision shall be reported (such as emergency works, or a sole supplier situation).

All further health and safety requirements for the duration of the contract shall be clearly defined within the contract documentation

8.7 **Code of Conduct**

All procurement activity must be undertaken to the highest ethical standards. The WDC insists on the highest ethical standards from its suppliers and contractors and in turn must demonstrate the highest ethical standards itself. Staff must not only be fair and ‘above board’ in all business dealings, but should also avoid any conduct that is capable of adverse interpretation.

Staff must adhere to the code of conduct and the protocol for gifts and hospitality.
9.0 Implementation

9.1 Council Organisation Structure

The current management structure of the Council has a Utilities and Roading group that is responsible for managing the assets and the delivery of the programmes for roading, water supply, sewerage, solid waste and drainage. It is headed by a Utilities and Roading Manager with a Roading and Transport Manager, 3 Waters Manager, Project Delivery Manager, and Solid Waste Manager reporting to them.

The Roading and Transport Manager is responsible for managing the Council’s roading and transport function and for managing the Roading Team. This position is a senior position requiring widespread experience in all aspects of road asset management, road maintenance management, traffic engineering, transport planning, financial management, consultant management, project management and contract management.

The Roading Team is responsible for managing the roading network and carries out asset management and planning, developing and approving programmes, customer liaison, and project, maintenance and contract management.

The current Roading Team has wide and extensive experience in road maintenance and project management as well as in road asset management activities. This experience is fully utilised in the current structure where in-house staff take a lead role in managing the roading function and it develops relationships with external suppliers for those activities that require specialist input.

The structure and the procurement approach outlined above works well with the current skill set within the current organisational structure. However, the structure and procurement approach will need to be reviewed when current key staff move on or retire. Steps are being taken to ensure the transition does not compromise current standards of delivery and management.
The Project Delivery Unit is included in the Utilities and Roading group. This Unit provides engineering services to Council departments. It has a range of engineers from graduate engineers through to senior engineers and includes a “Special Projects Team” which manage multi-disciplinary or specialist projects.

The Civil Projects Team work with the Roading Team to deliver kerb and channel renewals and minor improvement projects. The Civil Projects Team Leader has extensive roading and contract management experience.

The Project Delivery Unit has the capability and capacity to provide investigation and reporting, design and contract documentation and construction and contract management services for a range of routine roading projects, and is also closely supported by the Roading unit with external consultant expertise uses where required.

9.3 Internal Procurement Processes

The Waimakariri District Council’s financial delegations and purchasing policy are contained in documents S-DM 1046 – Contractual Authorities – Staff Schedule and S-CP 4160 – Procurement and Contract Management Policy. This is attached in Appendix A.

9.4 Performance Measurement and Monitoring

The appropriateness and effectiveness of this strategy will be evaluated on an ongoing basis as works and services are procured; and reviewed every three years leading into the Council’s Long Term Plan and National Land Transport Programme development.

The future direction of the road maintenance contract and street light maintenance contract will be reviewed in the year prior to them being retendered. These reviews will consider current trends and best practice as well as the current Council direction and feedback from contractors and contractor organisations.

Information as required by the NZTA Procurement Manual will be collected and documented to enable NZTA to monitor procurement performance.

Transparency and accountability checks occur through the Council’s normal business practices including audits by Audit NZ and procedural and technical audits by NZTA.

9.5 Communication and Consultation

Feedback on the draft Roading and Transportation Procurement Strategy was sought from both industry and members of the North Canterbury Roading Collaboration Group which includes, Selwyn District Council and Hurunui District Council.

Feedback on the draft strategy from the industry was generally positive with support for the overarching strategy and the key objectives which were outlined. It was noted that the proposed procurement strategy gave a full range of contractor’s access to Council work stream while managing risk.

Civil Contractors New Zealand noted that seeing the objectives cover the needs of the Council, the Community, and the Contractors, was great and that from an industry perspective, knowing that the Council values and that Council is trying to foster a competitive but sustainable supplier market was encouraging.

Feedback has been provided around the use of panels and also tender processes for future contracts. Council is considering the introduction of a Minor Works Panel for small value physical works (less than $100,000).

It was also noted that some Councils are moving to longer contact periods and higher attribute weightings (lower price weighting). Given the districts proximity to Christchurch and the supply market it not considered necessary to move to these alternative contract forms. The written feedback received has been included in Appendix B.
A copy of the endorsed Procurement Strategy will be made available on Council’s website.

9.6 **Implementation Responsibility**

The Waimakariri District Council Roading Manager will be responsible for implementing this strategy and for reviewing and updating the strategy.

9.7 **Corporate Ownership and Internal Endorsement**

This strategy will be approved by the Council’s Utilities and Roading Committee.
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Appendix A – Delegations & Policies

S-DM 1046 – Contractual Authorities – Staff Schedule – TRIM No. 190708095887

S-CP 4160 – Procurement and Contract Management Policy
### Contractual Authorities – Staff Schedule

<table>
<thead>
<tr>
<th>Title</th>
<th>Contractual Authority</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Executive</td>
<td>$1,000,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Manager Finance and Business Support</td>
<td>$250,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Manager Regulation</td>
<td>$250,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Manager Utilities and Roading</td>
<td>$250,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Manager Community and Recreation</td>
<td>$250,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Manager Strategy and Engagement</td>
<td>$250,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Manager Organisational Development and Human Resources</td>
<td>$250,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Manager Special Projects</td>
<td>$150,000</td>
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</tr>
<tr>
<td>Executive Assistant (to Mayor and Chief Executive)</td>
<td>$15,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>Executive Assistant (to Senior Managers)</td>
<td>$15,000</td>
<td>$2,000</td>
</tr>
<tr>
<td><strong>Community Team</strong></td>
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<td></td>
</tr>
<tr>
<td>Community Team Manager</td>
<td>$10,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>Community Development Facilitator – Safe Communities (x2 positions)</td>
<td>$2,000</td>
<td>--</td>
</tr>
<tr>
<td>Community Development Advisor</td>
<td>$2,000</td>
<td>--</td>
</tr>
<tr>
<td>Community Development Facilitator (x2 positions)</td>
<td>$2,000</td>
<td>--</td>
</tr>
<tr>
<td>Youth Development Coordinator</td>
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<tr>
<td><strong>Finance</strong></td>
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<td>Finance Manager</td>
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<tr>
<td>Management Accountant</td>
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<tr>
<td>Assistant Accountant</td>
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<tr>
<td>Asset Information Management Team Leader</td>
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<tr>
<td><strong>Governance and Administrative Services</strong></td>
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<td>Governance Manager</td>
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<tr>
<td>Administration Team Leader</td>
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<td>Governance Coordinator</td>
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<td>Governance Team Leader</td>
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<tr>
<td>Governance Support Officer</td>
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<tr>
<td><strong>Aquatic Centres</strong></td>
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<tr>
<td>Aquatic Facilities Manager</td>
<td>$20,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Dudley Park Aquatic Centre Manager</td>
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</tr>
<tr>
<td>Kaiapoi Aquatic Centre and Facilities Asset Manager</td>
<td>$5,000</td>
<td></td>
</tr>
<tr>
<td>Dudley Aquatic Centre Coordinator</td>
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<td></td>
</tr>
<tr>
<td>Kaiapoi Aquatic Centre Coordinator</td>
<td>$1,000</td>
<td></td>
</tr>
</tbody>
</table>
## Contractual Authorities – Staff Schedule

### Building Unit
- Building Unit Manager: $10,000, $2,000
- Team Leader Processing x 2 positions: $2,000, --
- Team Leader Inspections: $2,000, --
- Team Leader Administration: *$5,000
- Administration Officer: $2,000, --
- Building Officer – Building WOF and EQ Prone Buildings: ¹$10,000, ²$1,000

### Council Property
- Property Manager: $10,000, $2,000
- Property Officer: $5,000, $500
- Property Assets Advisor: $5,000

### Organisational Development and HR
- Health, Safety and Quality Manager: $10,000, $2,000

### Information Services
- Chief Information Officer: $20,000, $10,000
- Information and Communications Technology Team Leader: $10,000, $2,000
- Systems Administrator: $5,000
- Help Desk Administrator: $2,500
- GIS Team Leader: $5,000, $5,000
- Information Management Team Leader: $2,000
- Information Management Technical Administrator: $2,000
- Information Management Assistants: $2,000

### Library Services
- District Libraries Manager: $10,000, $2,000
- People and Places Coordinator: $5,000, $2,000
- Administration Officer Kaiapoi: $5,000
- Collection Services Coordinator: $5,000
- Acquisitions Librarian (Asst Librarian Support Services): $1,000

### Customer Services
- Customer Services Manager: $10,000, $2,000
- Customer Services Coordinator Oxford: $10,000, $2,000, *$3,000
- Customer Services Contact Team Leader: $500
- Customer Services Officer: $500
- Customer Services Officer (with responsibility for Pensioner housing): $3,000
- Rates Supervisor: $3,000
- Rates Officer: $1,500

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190708095887
Executive management/Delegations Manual Update: 26/7/10, 16/09/10, 21/1/11, 7/3/11, 21/8/11, 5/07/11, 13/01/12, 2/05/12, 13/12/2011/2012, 25/02/13, 18/03/13, 20/6/13, 26/09/13, 9/12/13, 4/2/14, 10/3/14, 2/9/14, 17/6/15, 22/10/15, 20/5/16, 10/3/17, 17/5/17, 22/9/17, 19/1/18, 29/1/18, 12/2/18, 27/6/18, 6/7/18, 8/8/18, 31/8/18, 3/10/18, 17/10/18, 5/11/18, 6/11/18, 13/12/18, 30/1/19, 26/4/19, 8/7/19

190417057789
Roading & Transportation Procurement Strategy
November 2019
## Contractual Authorities – Staff Schedule

**Communications and Engagement**
- Communications and Engagement Manager: $25,000
- Communications Coordinator: $1,000
- Media & Visual Communications Coordinator: $1,000
- Communications & Engagement Coordinator: $1,000
- Online & Social Media Coordinator: $1,000

**Emergency Management and Civil Defence**
- Emergency Management Advisor: $10,000, $2,000
- Disaster Recovery Manager: $100,000
- Deputy Disaster Recovery Manager: $100,000
- Emergency Management Officer: $1,000

**Environmental Services**
- Environmental Services Manager: $10,000, $2,000
- Animal Control Officer: $1,000
- Environmental Health Officers: $1,000
- General Inspector: $1,000

**Strategy and Engagement**
- Business and Centres Manager: $25,000, $10,000
- Development Planning Manager: $25,000, $10,000
- Policy Manager: $25,000, $5,000
- Policy Analyst: $1,000
- Corporate Planner: $1,000

**Planning Unit**
- Planning Manager: $10,000, $2,000

**Greenspace**
- Community Greenspace Manager: $25,000, $5,000
- Parks and Recreation Operations Team Leader: $20,000, $5,000
- Greenspace Community Assets Officer: $5,000, $5,000
- Greenspace and Community Facilities Planner: $5,000, $5,000
- Parks Community Assets Officer: $5,000, $5,000
- Community Facilities Coordinator: $5,000, $5,000
- Greenspace Community Engagement Officer: $5,000
- Greenspace Asset Information Officer: $5,000

**District Regeneration**
- Implementation Project Manager District Regeneration: $100,000
- Landscape Planner – District Regeneration: $5,000
- Landscape Architect – District Regeneration: $5,000
- Project Administrator – District Regeneration: $3,000

**Roading Asset Management**
- Roading and Transport Manager: $50,000, $25,000
- Road Maintenance Engineer: $15,000, $15,000
- Roads Projects Engineer: $15,000, $15,000
- Roading Asset Planning Engineer: $10,000, $5,000
### Utilities Asset Management

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<tr>
<th>Title</th>
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<th>Activity</th>
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<tbody>
<tr>
<td>3 Waters Manager</td>
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</tr>
<tr>
<td>Drainage Asset Manager</td>
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<tr>
<td>Water Asset Manager</td>
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</tr>
<tr>
<td>Wastewater Asset Manager</td>
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<tr>
<td>Solid Waste Asset Manager</td>
<td>$15,000</td>
<td></td>
</tr>
<tr>
<td>Infrastructure Strategy Manager</td>
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<tr>
<td>Utilities Officer</td>
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<td></td>
</tr>
<tr>
<td>Land Drainage Engineer</td>
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<td></td>
</tr>
<tr>
<td>Water Operations Team Leader</td>
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<tr>
<td>Control Systems Engineer</td>
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<tr>
<td>Solid Waste Officer</td>
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### Utilities and Roading

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<tr>
<th>Title</th>
<th>Contractual Authority</th>
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</thead>
<tbody>
<tr>
<td>Senior Engineering Advisor</td>
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### Project Delivery Unit
(Note: PDU amounts are also applicable to progress payments, although this excludes where PDU acts as "Engineer to a Contract").

<table>
<thead>
<tr>
<th>Title</th>
<th>Contractual Authority</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Delivery Manager</td>
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<tr>
<td>Special Projects Manager</td>
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<tr>
<td>Utilities Projects Team Leader</td>
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<tr>
<td>Civil Projects Team Leader</td>
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<td></td>
</tr>
<tr>
<td>Development Manager</td>
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<tr>
<td>Network Planning Team Leader</td>
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</table>

### Water Unit

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>Water Unit Manager</td>
<td>$10,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Projects and Unit Support Team Leader</td>
<td>$5,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Water Unit Supervisor (Reticulation)</td>
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</tr>
<tr>
<td>Reticulation Supervisor</td>
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<td>$5,000</td>
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<tr>
<td>Technician Team Leader</td>
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<td>$5,000</td>
</tr>
<tr>
<td>Administration Officer x2</td>
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<tr>
<td>Laboratory Technician</td>
<td>$500</td>
<td></td>
</tr>
</tbody>
</table>
Part 4

Delegation to Staff

Contractual Authorities – Staff Schedule

Delegation Building Unit Team Leader Administration

*For refund or part refund of cancelled or amended:

- PIM applications
- Building consent applications
- Inspection processes
- Certificate of acceptance
- Certificate of public use

Key: 
- **Contractual Authority No 1** = Expenditure provided for and approved in the Annual Plan and Budget (per item)
- **Contractual Authority No 2** = Emergency expenditure not provided for in the Annual Plan and Budget
- **Contractual Authority No 3** = Expenditure provided for and approved in Unit Budgets and Project Delivery
- **Contractual Authority No 4** = Emergency expenditure not provided for in unit budgets and Project Delivery
- **Contractual Authority No 5** = Expenditure on management-quoted work projects approved by activity manager
  where involving sub-contractors for materials, labour and plant hire

**Activity** = Area of responsibility unless otherwise stated
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1. Introduction
The Waimakariri District Council (the “Council”) is a territorial local authority with obligations to its rate payers and the public, defined under the *Local Government Act 2002* as: "to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses". ¹

Delivering good public service to the community starts with good procurement. How well money is spent has a direct impact on the quality of services the community experience, and reflects Council’s efficiency and effectiveness. Waimakariri District Council is committed to open and transparent procurement that delivers the best value for money (which isn’t always the cheapest price), ensures impartiality in decision-making, and meets international standards of public scrutiny and accountability.

2. Policy Context
Procurement plays a vital role in the delivery of Council outcomes, with a significant variety of goods, services and works being purchased from third party suppliers.

The Council recognises that rigorous procurement and contract management practices:

- (d) ensure the Council delivers value for money and quality outcomes for the community
- (e) underpin the performance and delivery of the Council’s strategic and business objectives
- (f) provide opportunities for business sustainability, strategic growth and improvement.

1.1 Definitions

**Approved Contractor:** prior to undertaking any work for the Council, all contractors must apply for and be approved against a set of eligibility requirements, including insurance cover, Health and Safety (H&S) and relevant codes of practice.

**Bribe or inducement:** the giving or receiving, whether directly or indirectly, of something of value to influence a (procurement or contract management) transaction.

**Contract:** a formal, documented agreement between the Council and a supplier or contractor that commits Council in legal or financial terms to the acquisition of goods and services.

**Contract management:** the process of systematically and efficiently managing contract creation, execution and analysis for maximising operational and financial performance and minimising risk.

**Contract Owner:** a designated Council staff member who is responsible for the ongoing management and delivery of contracted goods or services, and who has the authority to contract on the Council’s behalf.

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This Policy identifies the authority, responsibilities and operational parameters for prudent procurement decision-making, and the effective management of contracts and associated legally binding agreements.
Contract variation: an addition or alteration to the terms of contract that is mutually agreed to by both parties to the contract. A contract variation can be documented by letter or a deed of variation.

Contracted staff: non-permanent employees of the Council, including consultants and contractors employed on fixed or short-term contracts who are undertaking business activities on behalf of the Council.

Direct purchase: means the procurement of goods and/or services by placing an order with the supplier of choice, without seeking other bids.

Emergency situation: a situation that threatens life, property or equipment, or has a significant impact on services or the public.

Invited Tenders: Invited or Restricted tenders, restricted calls for tenders, or invited tenders are only open to selected prequalified vendors or contractors. Invited or Restricted tenders can come about because essentially only one suitable supplier of the services or product exists, or confidentiality issues are involved in the awarding of the contract, or are awarded on the basis of prequalification.

Market: all potential providers of a good or service that may be available to the Council.

Open tender: the process of publicly inviting offers to supply goods or provide services involving specifications and detailed documentation.

Price: the total price of a procurement for the total period of the contract, including extensions.

Procurement: the process of securing goods and services, including but not limited to purchase planning, standards or specifications determination, supplier and sector research, review and selection, pricing negotiation, making the purchase, supply contract administration, disposals and other related functions.

Services: the whole of the services, tasks, work and requisites to be supplied, rendered, provided or performed by a contractor under a contract and any variations provided for by the contract, and includes all and any goods, materials, plant, machinery or equipment supplied, provided or used by the contractor in performance of the contract.

Sustainable Procurement: procurement principles that allow the Council to secure goods and services in a way that recognises the whole of life costs and/or benefits of the goods or service, as well as delivers benefits for the local Waimakariri community, economy and environment.

Tender: a document in the form of an offer to supply goods and/or services, usually submitted in response to a public or selective invitation such as a RFQ, RFT or RFP.

Tendering - Tendering is the process of making an offer, bid or proposal, or expressing interest in response to an invitation or request to supply goods or services. As a contestable process other businesses are invited to respond to a particular need, such as the supply of goods and services, and will select an offer or tender that meets the needs and provides the best value for money.

Tender request documents - Also referred to as invitations to tender, Requests for Tender (RTF), and Requests for Proposal (RFP) which outline what is required and set out the Council’s requirements. These documents also outline the particular needs, criteria, and instructions that are to be followed.

Total contract value: the estimated total value of the contract for the entire life of the contract, including extensions.

Verbal quotation: a verbal process of inviting offers to supply goods and/or services involving a limited number of potential suppliers.

Quotations – Quotations are a formal statement setting out the cost of particular goods or services.

Whole of Life: an assessment of the total costs and/or benefits of purchasing goods or services – from concept to disposal. This includes purchase outcomes, operating costs spanning the useful life of the good or service, as well as any impacts associated with (product) manufacture, transport, delivery and disposal. Consideration may also be given to sustainable procurement, i.e. assessing the local social, economic and environmental costs and/or benefits associated with the procurement.

Written quotation: a written process of inviting tenderers to supply goods and/or services involving simple documentation and a limited number of potential suppliers.
3. Principles

Council procurement and contract management practices shall ensure that the Council plans for, enters into and manages its procurement and contract management activities in a manner that maximises value for money and quality service delivery, as well as realises business, strategic and community expectations.

The following ten principles shall be reflected in all procurement and contract management practices:

1. Procurement and contract management processes will comply with all applicable statutory obligations, recognise Council's business, strategic and community expectations, and reflect relevant sector, central and local government good practice standards and guidelines.

Such processes shall at all times foster a safe working environment for staff, contractors and the general public and support the intent laid down within the Health and Safety at Work Act 2015.

2. The purchasing power of the Council will be harnessed for the realisation of its strategic and business objectives, as well as the benefit of the local community.

3. Planning and managing for great results. All purchasing decisions will consider what the most appropriate procurement options are, and select from a range of delivery processes to achieve the best outcome for Council and the community.

This provides the flexibility for Council to identify the most appropriate procurement option for obtaining goods and services. The decision about what option to be used will be based on the type of expenditure being incurred as well as other appropriate procurement objectives. Available tools for procurement include:

- Full external service delivery;
- Collaboration between Council and external organisations;
- Public/private partnerships;
- Fully resourced from internal sources.

4. The Council shall be fair to all suppliers. Where Open tendering applies, procurement practice will demonstrate integrity by all parties and enable all potential suppliers to have equal access through the use of open and contestable processes.

All Council procurement for goods and services shall be open and competitive. However, there are circumstances when Council may decide to restrict or limit supplier involvement in a procurement process, based on matters of scale or relevance, such as in an emergency and/or by allocating work directly to its own operating departments. When this principle of open and competitive purchasing is subject to deviation, Council will document the justification for such actions. Suppliers may be disqualified from tendering for Council goods and services for a period of not less than 12 months if they lobby or contact Councillors or staff (other than contacting staff named in the tender documents) regarding a tender while the tendering process is in progress.

5. The Council shall ensure full probity in its procurement practices and decision-making processes. All procurement decisions will be appropriate and transparent, fair and equitable, and free from any real or undisclosed bias or conflict of interest.

6. The Council shall take into consideration the whole of life costs and/or benefits associated with procurement – spanning design, manufacture, delivery, operation and disposal.

7. Consideration will be given to sustainable procurement principles whenever possible, i.e. assessing the whole of life social, economic and environmental impact of the procurement.

8. All contracts shall clearly identify the functional, performance and/or technical deliverables and key performance indicators that reflect Council’s expectations and quality standards, and establish effective means to measure, monitor and manage their delivery.

9. All contracts will be actively managed in a manner that fosters collaboration with suppliers and contractors, maximises value for money, supports the Ta Matou Mauri principles as well as supporting continuous innovation and improvement; including the use of ‘All of Government Contracts’ and N^3-GSB where appropriate.
10. All procurement and contract management risks will be identified and managed effectively throughout the life cycle of the goods or service.

These principles are designed to ensure that the procurement of goods and services are an open, selective and transparent process that achieves value for money by delivering the desired outcome at the best possible quality and price. These principles also promote a procurement and contract management process that is impartial, open and ethical, ensuring that all Council procurement and contract management is undertaken in a fair and unbiased way.

Procurement processes should be designed to ensure that purchasing and contract management practice is proportionate to the value, risk and complexity of the purchase. This policy provides a context for sound commercial judgement to achieve the best value for money, which isn’t always the cheapest price, to drive innovation and high performance without compromising health and safety.

4. Policy Objective
The purpose of the Council Procurement Policy (the 'Policy') is to articulate Council's commitment to the responsible, effective and fit-for-purpose procurement of goods and services.

The Policy establishes the guiding principles for Council’s procurement and contract management practices, and seeks to ensure that:

(a) a robust framework is adopted across the Council for procurement, and the subsequent management and reporting of goods and services contracts;
(b) the Council plans for, enters into and manages all contracts in a manner which facilitates Council strategic and business objectives, and optimises risk transfer;
(c) staff understand their roles and responsibilities with regards procurement and contract management, and are appropriately skilled and trained to do so;
(d) the Council achieves quality performance and cost-effective service delivery.

Procurement should involve proactively managing supplier and other key stakeholder relationships throughout the sourcing process and for the duration of the contract. This embraces the development of relationships with suppliers, and driving value for money through ongoing efficiency gains.

All suppliers must meet Council’s minimum standards to ensure health and safety is maintained.

5. Organisational Scope
This policy applies to:

All Council employees, including temporary employees and contracted staff.

(a) Any person who is involved in the operation of the Council, including elected members, volunteers and those people with honorary or unpaid staff status.
(b) Every business, service or activity of the Council – with the exception of employment contracts.

6. Contract approval
All staff involved in the procurement of goods and services must have appropriate knowledge of, and comply with all relevant Council policies, procedures and guidelines, as well as applicable legislation and professional standards of practice with regards the procurement and contract management process.

All procurement results must be approved by the relevant reporting authority) Delegated Staff, Management Team, Committee or Council) and then signed by the relevant Delegated Authority. No external parties are authorised to sign contracts on behalf of Council.

The Contract Administrator shall maintain a full (physical and/or electronic) record of all procurement preparation, negotiation and award activities, in accordance with this Policy and all (Council records management practices).

All contracts entered into by the Council must be in writing, signed by all relevant parties, and held securely on file in accordance with Council document management practices.

All contracts prepared by the Council shall utilise approved and standardised contract templates whenever possible. If no applicable template exists, the Contract Administrator shall seek assistance from the PDU Manager or their delegate to prepare a contract.
No contractual arrangement entered into by the Council shall be greater than 10 years in its entirety, including rights of renewal. Council shall not enter into contracts that include more than two rights of renewal or that are “evergreen” (i.e. of indefinite length).

Market scoping and the evaluation of potential goods or service suppliers shall be in accordance with the Purchase Authority requirements stated at 6.1 below.

6.1 Contract approval thresholds

Quotations and tenders are not required when contracting through the all-of-government supplier network (N³-GSB) since the processes of procurement for a preferred supplier have already been undertaken.

For amounts under $20,000, the necessity for obtaining three quotations is at the Contract Owner’s discretion. Verbal contracts cannot be made for any value of purchase. All purchases should be confirmed with supply of a purchase order.

Where a decision is made not to put out to tender a contract for goods and services to an amount greater than $100,000 approval must be gained from the Management Team, and the reasons for the decision shall be reported to the relevant Standing Committee.

Purchasing directly from a supplier without an open and competitive process is acceptable for goods and services below an expected value of $5,000 based on the following principles:

(a) the value of the goods or services is relatively low;
(b) the purchase of these goods or services is on an as-required basis;
(c) it is not practical to aggregate separate orders for the goods or services;

The cost of seeking quotations or tenders would be out of proportion to the value of the benefits likely to be obtained, or impractical in the circumstances.

For goods and services with an expected cumulative annual price of more than $100,000 a public contestable tender process is required. Contracts/tenders with an expected annual expenditure of greater than $1,000,000 and total project cost of greater than $2,000,000 may only be authorised by the relevant standing committee or the Council.

The following table sets out Council’s procurement thresholds.

Note: Guidelines to be used in conjunction with N³ and All of Government pricing.

<table>
<thead>
<tr>
<th>Dollar value</th>
<th>Procedure</th>
<th>Purchase Authority</th>
<th>Value Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $5,000</td>
<td>Direct from supplier</td>
<td>Per delegations</td>
<td>One up</td>
</tr>
<tr>
<td>$5,000 to $20,000</td>
<td>3 quotations or direct from supplier</td>
<td>Per delegations</td>
<td>One up</td>
</tr>
<tr>
<td>$20,000-$100,000</td>
<td>3 quotations or direct from supplier</td>
<td>Per delegations</td>
<td>One up</td>
</tr>
<tr>
<td>&gt;$100,000</td>
<td>Public tender</td>
<td>Per delegations</td>
<td>Tender criteria</td>
</tr>
<tr>
<td>&gt;$1,000,000 pa</td>
<td>Public tender</td>
<td>Committee/Council</td>
<td>Tender criteria</td>
</tr>
<tr>
<td>&gt;$2,000,000 total</td>
<td>Public tender</td>
<td>Committee/Council</td>
<td>Tender criteria</td>
</tr>
</tbody>
</table>

One up approval must be used for all purchases. This means that there needs to be more than one person involved in the purchasing decision and approval. That is, an Initiator and an Approver with the appropriate delegation to approve a purchase.

The Chief Executive shall appoint a tender secretary who shall be responsible for the management and security of electronic tenders as well as the tender box and the tenders deposited therein. The tender secretary has responsibility for opening the tenders received, either electronically or hard copy and recording the tender prices at the conclusion of the tender process.

All tenders shall close at a time nominated in the tender documents and must be received either electronically or in the tender box by the closing time. The tender box shall be fixed in one place in the foyer of the Rangiora Service Centre and shall remain locked until the closing time for tenders. Electronic tenders will only be received via tenderlink.com/waimakariri. or GETS - Government Electronic Tenders Service [www.gets.govt.nz](http://www.gets.govt.nz)

Tenders will be opened in public. All tenders with an expected price of $100,000 (GST exclusive) or less shall be opened in the presence of the tender secretary and at least one member of the management team. Tenders with an expected price over $100,000 shall be opened in the presence of the tender secretary and two others from the management team or Council. An elected representative should be present for tenders expected to exceed $500,000.
Council is accountable to the community through the Long term Plan and Annual Plan. All purchases (including tenders) of any goods and services which commits expenditure from the current year’s Annual Plan shall be accepted by an officer with sufficient contractual authority as described in the delegations manual S-DM 1044. Monitoring of the procurement process will be undertaken by the Audit Committee and management team.

Variations within existing contracts, and committing council to an increase in the scope of works, may be authorised in accordance with the delegations manual S-DM 1044.

7. Sustainable Procurement
The Council recognises that procurement and contract management practices provide a key opportunity to maximise value for money and quality service delivery, as well as deliver tangible benefits for the local community, economy and environment – as articulated in the Council's Strategic Framework.

As such, the principles of sustainable procurement shall be recognised whenever possible in the assessment of the costs and benefits of procurement on a whole of life basis, as follows:

(a) **Think Local**: The Council shall preference those suppliers that can evidence a positive economic footprint in the region. This includes contributing to the vibrancy and sustainability of the local economy, supporting job or market growth, as well as fostering opportunities for small and medium sized enterprises (SMEs).

(b) **Think Environmental**: The Council shall encourage procurement decisions that have a positive impact on the natural environment and biodiversity, including the prudent use of natural resources, the minimisation of waste or hazardous substances, and efforts to reduce carbon or Greenhouse Gas (GHG) emissions.

(c) **Think Social**: The Council shall encourage procurement decisions that maximise community benefits in terms of personal wellbeing, social cohesion, capital and inclusion, equal opportunities and participation.

Whenever practicable, the Council shall give conscious consideration to sustainable procurement principles, including when undertaking cost-benefit analyses or weighted attributes assessments of potential goods and service suppliers.

8. Conflict of Interest
The Council shall ensure that procurement and contract management processes cannot be justifiably challenged on the basis of any real or undisclosed bias or conflict of interest.

All procurement and contract management decision-making processes shall include careful consideration of any actual, potential or undisclosed conflicts of interest.

Under no circumstances shall a staff member influence, advise or participate in a procurement or contract management activity where that employee has an actual, or undisclosed conflict of interest.

Every person on the Tender Evaluation Team (TET) must complete a declaration in writing that they have no actual or undisclosed conflict of interest. This includes those involved directly in procurement and contract management activities, as well as anyone who has the ability to influence key decisions (e.g. those holding delegated financial authority or monitoring performance).

Where there is uncertainty about whether there is a conflict, employees should discuss the potential conflict with the Contract Owner, Line or Group Manager or Chief Executive Officer. If in doubt, employees should at all times fully disclose a potential conflict or bias. Refer also to the Council Conflict of Interest Policy for further details.

Where the CEO is involved with procurement and/or contract management and identifies a potential conflict of interest, escalation shall be to elected members.

It is never acceptable for a Council staff member to accept a bribe or inducement. Any such instances will be dealt with in strict accordance with the (Staff Code of Conduct Policy) and other applicable guidelines - see also the Council (Fraud Prevention Policy).

As part of the procurement process the Council (Gifts and Hospitality Register) shall be reviewed to identify gifts and/or hospitality received by any person involved in a procurement process. Should these exceed a cumulative value of $500 in the preceding 12 months the person will be precluded from taking any part in the procurement process.
9. **Contract Management**

The Council shall maintain a central database of all approved and/or active contractors, and ensure comprehensive records are held, including all third-party vetting; H&S approval; insurance coverage; contract review, renewal or expiration dates; deviations and variations.

All Council contracts shall have a delegated Contract Owner, who acts as the dedicated single point of contact and is responsible for the effective management and delivery of the contract in line with this Policy and all associated processes or guidelines. Duties include, but are not limited to:

### 9.1 Contract Negotiation

(a) All contracts shall include measurable, relevant and robust key deliverables, measures and performance indicators (i.e. 'SMART' key performance indicators that are Specific, Measurable, Achievable, Relevant and Time-bound).

(b) All contracts shall establish effective and robust monitoring and reporting activities that ensure delivery of pre-determined deliverables and levels of performance.

(c) All contracts shall comply with Council, professional regulatory body and statutory obligations, as required.

(d) Contract Owners shall be alert to, and address any provisions in contracts that expose the Council to unsuitable or unacceptable risk. This includes a review of prior service delivery or performance by potential third party suppliers.

### 9.2 Contract Delivery

(a) Contract Owners shall regularly monitor, audit and review contractor delivery against agreed milestones, deliverables or performance expectations over the life of the contract, including maintaining a regular audit programme, as required.

(b) All contractor payments, performance bonds and other financial transactions shall be made in accordance with the terms of the contract and appropriate assurance of agreed performance delivery, in accordance with relevant Council financial delegations and authority.

(c) Contract Owners shall engage relevant parties and establish variations or re-negotiate contract terms where appropriate.

(d) Full records of all contract evaluations and performance monitoring activities (including any variations, renewals and cancellations) shall be held in accordance with the {Council document management guidelines and practices.}

### 9.3 Escalation and Exit

(a) The Council shall ensure appropriate and effective processes and mechanisms are in place for the reporting, escalation and resolution of performance issues or contract delivery failure.

(b) Contract Owners shall monitor contract schedules for renewal or expiry, and effectively manage the business impacts arising from exiting the agreement, including ensuring all relevant Intellectual Property, data or property is returned to Council.

### 10. Risk Management

The Council shall ensure that the costs, benefits and risk presented by procurement are identified, and appropriately reflected in the procurement and contract management methodology utilised.

Contract Owners shall work collaboratively with engaged providers to identify, assess and manage all risks associated with the goods or service procured, throughout the length of the contracted period.

All critical issues must be escalated and resolved appropriately to ensure the continued quality delivery of service expectations.

All risk management and mitigation strategies must be clearly documented as part of the procurement and contract management process.

### 11. Deviations

Deviation from the Council's procurement and contract management processes may be necessary due to circumstances beyond the control of Council. Such instances include:

(a) A limited number of suppliers available in the market.
1. (b) A different procurement methodology or process is stipulated by legislation or a professional/ regulatory body.

(c) An exceptional, urgent or emergency situation where immediate Council decision-making is required and is in the best interests of ratepayers.

In such instances, two members of the Management Team shall authorise the deviation prior to adoption, and if appropriate the decision ratified retrospectively by the CEO.

In such instances where a staff member has a conflict of interest, but also possesses specific expertise that is deemed essential to the procurement decision-making process and which is not available from any other sources, including those external to the Council, two members of the Management Team may sanction that person's involvement in writing, provided they:

   (a) ensure the staff member's involvement is limited as much as possible; and;

   (b) closely supervise the staff member's role and takes personal responsibility for the fairness and equity in the decision-making.

12. Record Keeping

All procurement and contract document management processes shall adhere to relevant statutory and regulatory obligations, including the Public Records Act 2005.

Clear and comprehensive written records of all procurement and contract management activity shall be retained in accordance with Council document management policies and protocols. This includes market, tender and evaluation material, contracts and variations, performance reporting, correspondence and associated service delivery records.

Procurement and contract management records shall provide a clear, transparent and accessible audit trail so that Council staff, auditors and/or legal advisors may readily establish the process and rationale for any procurement decisions made and actions taken.

At a minimum, records shall be retained that demonstrate:

   (a) Council procurement and contract management processes have been followed, as outlined in this Policy and all associated procedures and practice guidelines.

   (b) Procurement adheres to appropriate budget allocations through the Long Term Plan, the Annual Plan, or an approved Business Case.

   (c) Approval for procurement has been obtained from the relevant holder of delegated financial authority.

   (d) The Council has identified key contract performance expectations and deliverables, and undertaken appropriate measures and audit/monitoring activities that provide assurance of performance.

   (e) All risks are identified, assessed and effectively managed in collaboration with the contractor, including Health and Safety assessments, site planning and maintaining appropriate insurance cover.

   (f) All members of the tender evaluation team involved in decision-making have affirmed that they are free from any real or undisclosed conflicts of interest.

13. Confidentiality

Employees involved in procurement and contract management activities shall take all due precautions when handling commercially sensitive information. This includes ensuring information is not passed between parties entering into a tender or other competitive procurement process, as well as maintaining the rights of Council and third-party intellectual property.

Confidentiality obligations continue throughout the procurement and contract management process, as well as after the contract has terminated or expired.

14. Health and Safety

The Health & Safety at Work Act 2015 requires that an organisation must ensure the health and safety of workers (including contractors), and that organisations must consult, co-operate and co-ordinate activities with all other organisations who have health and safety duties in relation to the same matter (overlapping duties); so far as is reasonably practicable. WDC maintains contract health and safety management systems in order to achieve compliance with these requirements.
Suppliers for all contracts shall be required to meet a range of health and safety requirements throughout the life-cycle of the contract, which, depending on the nature of the contract, may include (but are not limited to):

- Health and safety pre-qualification
- Site specific safety plans
- Site inductions
- Incident reporting
- Site safety audits
- Contract close outs

In particular, all suppliers for contracts involving physical works shall be health and safety pre-qualified. This will mean that they are assessed at >50% via the SiteWise health and safety pre-qualification system as a minimum, or meet the requirements of another externally-audited pre-qualification system of equivalent or superior standard (this will be approved on a case-by-case basis by the WDC Health & Safety Team).

Suppliers can achieve health and safety prequalification before or during the tender period, but pre-qualification must be achieved prior to work commencing.

Where a decision is made to select a supplier who is not health and safety prequalified as the preferred tenderer (or who has a SiteWise score lower than any minimum score indicated in the tender documents), approval must be gained from the Management team. The reasons for the decision shall be reported (such as emergency works, or a sole supplier situation).

All further health and safety requirements for the duration of the contract shall be clearly defined within the contract documentation.

15. Links to legislation, other policies and community outcomes

WDC Ta Matou Mauri – Our Principles

Controller and Auditor-General Procurement Guidance for Public Entities June 2008


Local Government Act 2002 S3(c) promotes the accountability of local authorities to their communities, and S10 (b) has the purpose of local government as meeting the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses

All tenders which are subject to a New Zealand Transport Agency (NZTA) subsidy must comply with the requirements of NZTA. If there is any conflict between this policy and the NZTA requirements, then the NZTA requirements will take precedence to the extent of the inconsistency

Health and Safety at Work Act 2015

WDC Contract Admin Guidelines

QP-C1030 – Physical Works – Preparation of Request for Tenders
QP-C1031 – Physical Works – Inviting Tenders
QP-C1032 – Physical Works – Tender Evaluation
QP-C1042 – General Purchase – Inviting Tenders
QP-C1043 – General Purchase – Tender Evaluation

WDC Quality Policy

QP-C387 – Purchasing Procedures – Selection of Suppliers
16. **Adopted**
   
   Adopted by Council on 5 February 2019.

17. **Review**
   
   Reviewed every three years or earlier on request.
Appendix B – Industry Feedback
Civil Contractors New Zealand (CCNZ):

Having read your email, and also read the Draft Roading and Transportation Procurement Strategy, I have the following comment from an industry perspective through CCNZ;

- It is pleasing to see the overarching strategy and the key objectives so clearly outlined around what WDC wish to achieve with their procurement strategy.
- Seeing the objectives cover the needs of the Council, the Community, and the Contractors, is great – from an industry perspective, knowing that the Council values and is trying to foster a competitive but sustainable supplier market is very encouraging. So many principals do not seem to understand or value this. There is a perception that Contractors make a lot of money and really understand how to manage risk. I can tell you, that both perceptions are generally very wrong and that risk and financial outcomes go hand in hand. WDC understands this relatively well and as a result generally achieve what they need when procuring their projects from the market.
- Managing risk appropriately, while catering to all levels of the supply chain and giving them ability to access the WDC Capital works program at the appropriate risk level, for both the contractor and the council, is also great to see. Helping contractors manage their risk profile through good procurement is key to helping build a strong industry.
- The makeup of the average spend each year, and how it is likely to be procured to the market, makes sense. Again, it manages risk well, while giving the full range of contractor's access to the Council work stream.
- Need to be wary of extremely low prices and outliers in lowest price conforming smaller tenders, as this is a sign of unsustainable pricing. Low risk tenders usually mean there is little opportunity for "smarts" or unique methodology, therefore, a large variation in price should be interrogated more thoroughly as it is likely a result of poor, and unsustainable, tendering.
- Has the Government led Construction Accord been taken into account into the Procurement Strategy – it is not referenced anywhere? It is aimed at Vertical Construction mostly but is relevant to both vertical and horizontal construction.

ISAAC Construction:

From an Isaac perspective;

- Only additions to above (CCNZ feedback) is that once an EOI is done, the respondents are scored and chosen, only ask for attributes from the chosen contractors / panel that will directly be relevant to the job at hand and don’t replicate the EOI.
- These documents take a huge amount of time and effort. Targeted and non-repetitive questions are the key to getting the best outcomes.
- A very low price that is received for a tender, no matter what the size, should be closely considered by WDC as to whether it is "sustainable" for the contractor. In tough markets some contractors / suppliers will look to “buy” work. This does nobody any favours in the long term. It drives prices down to unsustainable levels, quality often suffers as the price cannot cover it, and even more importantly, safety often suffers as corners are cut. WDC has a responsibility to ensure they are comfortable that the price is sustainable, in that it can deliver on all of the WDC requirements – not just financially. Asking the question “are you happy with the price” (not something I have seen from WDC, but could very easily happen as the market gets tougher) does not adequately cover this requirement.
CityCare Limited:

Thank you for considering Citycare for feedback on your Procurement Strategy.

Capital Works

We understand that Capital works are straight forward in regards to its procurement strategy. On the basis that tender award is generally down to the complexity, programme or profile of the respective works and this will be weighted accordingly through a submission considering programme, price, personnel and methodology (I understand that Sustainability will play a large part of our futures).

Whilst we respect that capital works submissions are important to provide the client with our track records, plant & personnel, these are often regurgitated on multiple submissions. For ease of selection of small to mid-sized contracts, the Council may consider building panels for contractors who carry out these respective work disciplines (Playgrounds, waterways, minor hard stand works etc.). This would not limit the size of the contractor, as several panels can be created to assist sustainability for the region. This could really streamline the selection process and save Council both time and cost during selection, as the initial selection would identify all non-priced attributes up front. Rates could also be supplied up front if requested as an indicatives.

Road Maintenance

I can confirm that we as a business take the Waimakariri Road Maintenance contract, as one of importance for our future. We currently hold the Christchurch Northern Road Maintenance Contract, which is directly adjacent to yours, of which we see great efficiencies which can be passed to our clients, should both be operated concurrently by our energetic and committed team.

On our current RMC, we carry out large portions of our works in-house and also maintain our model of sustainability for the local market, using medium to smaller sized contracting businesses to assist in the programme of works. We also hold strong relationships with our neighbouring maintenance contractors, which allows collaboration and cross utilization of resources.

As you will know, I personally believe that a good relationship with the client is paramount to the success of any contract, and we hold this vision throughout our wider business. We believe innovation and efficiency of resource should be considered through the selection process.

HEB Construction:

In short, it is concise, well laid out and in line with our understanding. We believe the current procurement processes are good and in line with your objectives.

In regards to the Roading Maintenance contract, the tender process with the current contract was a good process (same as in this document), I think that the added EOI phase makes it fair to all and then with shortlisting to three contractors is good. Good as far as the effort is put into the EOI to get a well sought position in the top 3. And if unsuccessful at the first gate, tender costs are reduced for the unsuccessful tenderers.

One correction note being Selwyn utilise NZS3917.

In regards to minor and more complex projects, again we understand and agree. It is a good balance.

A couple of other things to note or consider:
- Some local authorities are looking at longer term, some up to 10 years.
- The attribute weightings are increasing generally on some contracts.
- KPI framework across maintenance contracts can be considered.
- There have also been instances in the past with term maintenance contracts where tenure is linked to KPI performance.

SICON Limited:

Thank you for the opportunity to provide feedback on the strategy.

Some generic feedback is listed below:

- Consider extending the term of the contract to a 3 + 2 + 2 year contract. There is significant resources allocated to this type of contract. Not only large investment in plant but also significant staff resources who are local people in the area. With a minimum of 3 years and maximum 5 years, it can be difficult to attract the right people to the area or encourage local people to switch to work for this contract due to its term. This can be particularly difficult if someone leaves part way through the contract and the timeframe for employment is potentially shorter. Extending this contract to a longer term will potentially improve the talent pool for key positions.

- The weighting of the contract is currently 70% price and 30% attributes. This lends itself to a price drive tender and reduces the recognition of the attributes each contractor brings. Whilst in the short term a price gain might seem the best outcome, it can jeopardise the quality of the product and services in the contract. Value for money is a balance between price and quality. Too much emphasis on price will result in less investment in quality improvement and more focus on lower value outcomes. Corners are cut and methodology is compromised. Working collaboratively with trust and transparency will save far more in the longer term than a lower price.

- We would endorse a supplier panel for some of the larger infrastructure works in the area. This will ensure consistency in the district and will reduce Council time managing contractors who are not tried and tested. As the incumbent to the road maintenance contract our local staff are sometimes frustrated with quality of work in a network they feel very responsible for and take pride in.