CARTERTON
DISTRICT COUNCIL

Water Race

Committee Meeting

Wednesday

21 February 2018

9.30am

Committee Members: Mayor J Booth, Councillor B Deller, D Ellison, G Smith, J McFadzean, and N Wadham.

CARTERTON
DISTRICT COUNCIL

AGENDA

The Agenda of the Water Race Committee Meeting of the Carterton District Council to be held in the Hurunui o Rangi Room at the Carterton Events Centre, 50 Holloway Street, Carterton on Wednesday 21 February 2018 at 9.30am.

1. **Apologies**
2. **Conflict of Interest Declaration**
3. **Public Forum**
4. **Notification of General Business / Late Items**
5. **Code of Practice Status update** Presented by Dave Gittings page 1 - 14
6. **Water Race Quality Test Results** Presented by Garry Baker page 15 - 58
7. **Water Race Elections Process Report** Presented by Marty Sebire page 59 - 60
8. **Water Race Operations Report** Presented by Garry Baker page 61 - 64
9. **Water Race Financial Report** Presented by Marty Sebire page 65 - 68
10. **Setting Date for Water Race Committee Visit** **Please bring a diary for the next month to confirm visit date.**
11. **General Business/Late Items**
12. **Confirmation of the Minutes** page 69 - 74

    12.1 Minutes of the Water Race Committee meeting held on the 20 November 2017.
13. **Matters Arising from Minutes**
14. **Exclusion of the Public** page 75 - 76

    14.1 Application to close section of race page 77 - 86

    14.2 Public Excluded Minutes of the Water Race Committee meeting held on the 20 November 2017.

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Marty Sebire
Corporate Services Manager

15th February 2018

Code of Practice/Strategy

1. PURPOSE OF THE REPORT

The purpose of this report is to seek the Water Race committees agreement to provide the final document to the Greater Wellington Regional Council as per condition 2 & 3 of the Taratahi Water Race consent WAR010227 and Condition 2 & 3 of the Carrington Water Race Consent WAR010202 .

2. SIGNIFICANCE

The matters for decision in this report do not trigger the significance policy of Council or otherwise trigger Section 76(3)(b) of the Local Government Act 2002.

3. BACKGROUND

On the 28th of June 2013 Council received the granted resource consent for both the Taratahi Water Race WAR010227 and the Carrington Water Race WAR010202.

Condition 2 and 3 of both of these consent require the following:

2. The consent holder shall operate the Taratahi/Carrington Water Race in accordance with a Code of Practice, which shall be developed and adopted within one year of the commencement of this consent.

   The Code of Practice will aim to work towards improving water quality and water efficiency within the water race system and as a minimum shall include:

- Best practice measures for minimising stock access to water including fencing stock out of water races;
- Initiatives for progressing riparian planting within the water race network;
- Identify best practice procedures for cleaning out water races;
- A strategy that identifies localised areas, water race sections, and/or properties where water quality and water efficiency within the Taratahi Water Race network could be improved. The strategy shall set out a timetabled programme to be implemented during the term of the consent which investigates opportunities to proactively work with landowners in any identified localised areas, water race sections, and/or properties. This shall include (but is not limited to) investigating closing section of water races where

alternative sources of supply exist, and actively promoting best practice of land and stock management to minimise water quality impacts.

3. Prior to adoption of the Code of Practice, the consent holder shall supply a copy of the draft Code of Practice to the Manager, Environmental Regulation, Wellington Regional Council, and interested parties for comment (these include but are not limited to: Wairarapa Public Health, Masterton District Council, Kahungunu ki Wairarapa, Federated Farmers of New Zealand, Wellington Fish and Game Council and Ted Taylor).

   The consent holder shall consider all comments received from interested parties on the draft Code of Practice and amend accordingly.

4. FEEDBACK

Council received feedback from Federated Farmers of New Zealand, Masterton District Council and Greater Wellington Regional Council.

A summary of the feedback received is contained in the following table and where applicable or appropriate has been included in the final document, which is attached as appendix 1.

Submitter	Points raised
Federated Farmers of New Zealand (via telephone)	• A good working document • The need to recognise that dairy farmers have done much to improve their own effluent disposal and keeping stock out of the water race.
Masterton District Council	• A number of common issues between MDC and CDC in relation to water races. • Natural Resource Plan (NRP), Resource Consents and Code of Practice (COP) need to ensure they are still allowed to function as stock water races, while meeting environmental objectives. • Sees the COP as an alternative method to the NRP to help users manage and maintain the network, noting that method 13 in the NRP anticipates this. • Believes the document could provide more clarity as to specific measures that landowner need to take. • Water Race planting strategy has clear objectives and steps to be taken, but is at odds with the NRP which as drafted requires extensive riparian planting. • Renaming the planting strategy to water race planting code of practice and a similar section drafted for each of the

	land owner checklists would help ensure the environmental outcomes would be achieved.
Greater Wellington Regional Council	• Clarification as to why the statement "the fact remains that the best option for the community as a whole is to keep the races" • Ensure that under the status also references the bylaw and the resource consent and the connection between these documents. • Concerns with sediment release into the water races from stock eroding the banks. • Would like the drain clearing expanded ie, what is the most appropriate way to clean and minimize environmental impact • In the planning strategy, requiring permission to plant trees and shrubs may discourage this as it is a bit old fashioned, perhaps this needs to be a permitted activity with guidance and onsite advice. • Planting on one side of the water race which has the most shade provides best benefits, but recognising that in some instances the race can only be accessed from one side.

5. RECOMMENDATIONS

That the Committee:

1. **Receives** the report.
2. **Adopts** the Code Of Practice/Strategy.
3. **Agrees** to send the final Code of Practice/Strategy for the Carrington & Taratahi water races to the Greater Wellington Regional Council in compliance with WAR10202 and WAR14020227.

Prepared by:

Solitaire Robertson

Planner/Policy Adviser

Approved by:

Dave Gittings

Manager Planning & Regulatory

ATTACHMENT 1 – Code of Practice/Strategy – Taratahi and Carrington Water Races

Code of Practice/Strategy – Taratahi and Carrington Water Races

Background

The Carterton District contains two water race systems that total some 306km in length. The Taratahi race (270km long) takes 800 litres per second (l/s) from the Waingawa River when the river exceeds 3500 l/s at the gauging site, 480 l/s when the flow is between 1900-3500 l/s, 410 l/s when the flow is between 1700-1900l/s, and 337 l/s when the level at the gauging site is less than 1700 l/s. The Carrington race (36km) takes 250l/s from the Mangatārere Stream when the flow exceeds 1200 l/s at the gauging site, 113 l/s when the flow is greater than 330l/s, and 65l/s when the low is less than 240 l/s.

The Taratahi and Carrington races have resource consents, which allow them to take water for the race (for stock watering purposes), and discharge contaminants to waterways at the end of the race branches. Although some rural land owners have expressed a negative view of having the races passing through their land, surveys of users have shown that the majority of land owners want them. The races were created decades ago to allow dry land to be farmed. For some users their existence is still vital and without them many farmers could not sustain their current or in some cases even economically viable farming practices.

In addition, the water races have developed their own individual ecosystems and are an established part of the environment.

For those with alternative water sources or who do not farm their land intensively, costs for upkeep of the race systems can seem a burden. However, the fact remains that the best option for the community as a whole, is to keep the races, and the races cannot continue to function within their consented conditions unless all people whose land the race passes through understand and adopt this voluntary code of practice. The intent from both Greater Wellington Regional Council and the councils is to look at a more long term strategy, common sense good practise guidelines.

Purpose

This code of practice/strategy is designed to minimise:

- the wastage of water from the Taratahi and Carrington water races
- the input of contaminants from various farming and land activities to these races
- other adverse environmental impacts from the race systems and their associated operation.
- Maintain effective management of the water race and reduce constraints on their operation

Status

This code of practice/strategy is a voluntary document and compliance with it is not enforceable. The users of these races, however, recognise that whilst highly beneficial to many, the taking of water, and discharging of contaminants to water, which are activities associated with the races, must comply with laws such as the Resource Management Act 1991, the Carterton District Council Race Bylaws, and the granted Resource Consents.

By adopting this code of practice/strategy, the race users intend that negative effects and practices associated with the races can be minimised, allowing users and the environment to continue to receive the benefits of access to the race waters while ensuring overall compliance with the condition of the resource consent. This may also lead to a reduction in both management costs and maintenance costs.

Best Practical Means

This document is based on encouraging users to adopt a "best practical means" of meeting the main purposes of reducing wastage and minimising pollution. What this means is that there may be several ways of addressing a particular problem, and each property owner may select the way which best suits their particular situation. Stopping stock wading in the race, for example, could be met by:

- fencing off the race and pumping water from the race to stock troughs
- locating an electric wire along the centre of the race, allowing stock to access the edge for drinking but not into the race for wading and wallowing
- stocking the paddocks which the race passes through with stock which do not stand in the race, (sheep instead of cattle, for example).

To assist with determining the best practical means, the Water Race Committee will provide an advisory service, either through their members or with assistance from the Carterton District Council, depending on the needs of individual race users.

Minimising Water Wastage

The resource consent to take water from the Waingawa River for the Taratahi Water Race allows for a maximum take of 800 l/s when there is normal flow in the river, reducing to 337 l/s during low flow conditions.

Similarly there are reducing water volumes allowed to be taken from the Mangatārere for the Carrington Water Race as the river flow drops.

Even with the maximum allowable takes the flows at the ends of the races are minimal and stock can be deprived of water.

It is therefore important to make the best use of the water and not to waste any, particularly during low flow conditions in summer.

Water is wasted by the following practices:

- **Allowing** the race to become wider and shallower than is necessary to handle the flow and provide stock access. A wider race has a larger surface for evaporation. For every 100km of race length, a doubling of the race width from say 1m to 2m, would provide an extra 500m^3 of water loss by evaporation per day on a dry windy day. A shallow race

with low freeboard, (the height between the top of the race bank and the water level), can also allow water to escape onto surrounding land, and may create rather than remove flooding during high rainfall events.

- **Allowing** the base and sides of the race to become more permeable to water flow into the surrounding ground. This could be by cracking, having a gravelly base with permeable soils below, or could be occurring at a moderate rate through the existing soils. Such losses could be reduced by appropriate maintenance and repairs, potentially including lining the race with low permeability soils such as clay or synthetic lining materials in the high risk portions of the network. It has been estimated for the Taratahi race system that over 50% of the water taken into the race may be lost through seepage into the ground. Such estimates have not been made for the Carrington race, but it may be that the levels are similar or even higher.

  Advice on cleaning, maintenance and repair of the race to make best use of the water is available from farmers on the Water Race Committee, and the Carterton District Council.

- **Using** water from the races for any purpose other than stock watering, especially if such use involves taking the water, by gravity or pumping, out of the races. The exception to this is water taken from the very end of the race branches, especially where the water quality at that point is significantly degraded and creates an impact on the receiving waters.

Minimising Race Water Contamination

The Taratahi Race water starts at the Waingawa River, and the Carrington race at the Mangatārere Stream. Where these waters leave their source rivers, they are of very high quality. As the water flows along the races, however, it is progressively degraded to a lower quality.

This is from such causes as:

- **Stock wading** along the races instead of just accessing them from the edge for drinking, and or causing bank erosion.
- **Drainage ditches**, which may be directed to the races, adding to the contaminant load the race waters carry,
- **Stock driving races** which pass over the water race and the runoff from these when it rains flowing into the water race,
- **Vehicle and stock crossings** passing through the water race, stirring up sediment and washing debris from tires and vehicle undercarriages into the races
- **General land drainage**, putting contaminants such as; sediment, microbes, and nutrients from fertilisers into the water race,
- **Sediment, weed or herbicides** from race clearing activities,
- **Fertiliser application,** being undertaken too close to the race or to steep banks to the race.
- **Urban pollution** where the races interact with waterways and flow form urban areas
- **Road runoff**

While some of these activities are hard to avoid, it is possible to minimise their effect to a much greater degree than is currently occurring.

The poor water quality which currently occurs in the lower reaches of many branches of the race can create stock health problems for the users in these areas, and can have a

significant impact on the water quality of the rivers and streams that the race branches eventually flow into.

Where the quality of these receiving waters is currently not high, the intention is to gradually improve this quality. This improvement will not occur straight away, but will happen over a matter of years or even decades if the individual discharges of effluent and contaminated waters to the waterways are reduced. Such district wide improvements are already starting to happen with the Carterton District Council obtaining new consents to upgrade the community wastewater treatment facilities for Carterton and improvements in dairy shed effluent treatment and disposal.

Minimising Environmental Impacts

The race systems have been in existence for so long that although man made, they have now become an important part of the natural ecosystem. In particular they are home to various fish life including eels, kokopu, and brown mudfish. During drain cleaning activities, all eels and other fish should be returned to the race up stream of the cleaning activity. It is recommended that landowner discuss the best method of drain cleaning with either the Carterton District Council or the Greater Wellington Regional Council to ensure environmental impacts are minimised in the process.

Landowner Checklist

- Take a fresh look at your races and fill in the Landowner checklist.
- Listed are the most common causes of excessive water wastage and entry of contaminants.
- Consider how you could make improvements to reduce wastage and contamination of the water in the race as it passes through your property.

This Code of Practice/Strategy provides an opportunity for the farming industry, and other bodies to demonstrate their ability to voluntarily adopt common sense and workable solutions to a common problem, and ensure the continuance of the races for the benefit of the community as a whole.

Compliance with the code of practice/strategy will also significantly contribute to improving and sustaining the quality of water in the waterways of the Carterton District, whilst ensuring that Carterton District Council is meeting the terms and conditions of its Resource Consents thus further ensuring the longevity of the water race network.

Landowner Checklist:

Property: **Owner:**
Date: **Number of Race Branches:** **Total Length of Race:**

Problem	Current State on Property	Preferred Fix of Problem	Date Fixed
Stock wandering in races			
Drainage feeding into race			
Stock races draining into race			
Vehicle crossing in race			
Race cleaning – (herbicide spraying only by approved contractors, return of eels and fish)			
Fertiliser application (application to be kept away from race and steep banks leading to race)			
Race Width (should be as narrow as possible).			
Race Freeboard (should be as high as possible)			
Water Loss Through Race (assistance can be provided to measure this)			
Water Used for Other Purposes.			

Water Race Planting Strategy

1 Introduction

1.1 The Planting alongside Stock Water Races Guideline specifies the rules and conditions for a private land-owner wanting to plant adjacent to stock water races. It should be read in conjunction with the Carterton District Council Water Race Bylaw.

2 Context

2.1 This guideline has been formulated in the context of ensuring races are kept free from vegetation and debris that could impede a races function in delivering water to stock while also allowing for improvements in the water quality and amenity values of races, and the retention of their ecological values.

2.2 Compliance with this guideline and the Water Race Bylaw does not necessarily imply compliance with the rules of the Greater Wellington Regional Council's Proposed Natural Resources Plan and resource consent may be required.

3 Guideline Objective

3.1 The objective of this guideline is to provide a standard approach for approving and recording applications for permission to plant trees or shrubs alongside water races.

3.2 This guideline will encourage riparian planting where it is done so in a manner which enhances the water quality.

3.3 A landowner applying for a permit to plant alongside a water race must comply with the provisions under Section 4 of this guideline and with the table of acceptable plants.

4 Guideline Statement

4.1 Trees and shrubs may be planted within 10 metres of a water race only after written permission has been received from the Council's Water race overseer. Permission to plant trees and shrubs applies only to those outlined in the application and not for any subsequent planting not mentioned except for the replacement of dead plants.

4.2 The applicant and subsequent owners are responsible for ensuring that all applicable Acts, Regional and District Plans and Bylaws are followed when planting trees and shrubs (for example if planting near power wires).

4.3 All applications to plant trees or shrubs alongside stock water races must be made in writing on the appropriate form Application Form to the Carterton District Council's Water Race overseer. This can be downloaded from the Council's website or obtained from any of the Council's Service Centre in Holloway Street.

a. A written response will be made by the Council to the application within 10 working days setting out the conditions to be met if the application is granted.

b. A copy of the application and Council reply will be put on the applicant's property file for future reference. The appropriate manager will also be advised of the application and decision reached.

c. The particular species of trees or shrubs shall be stated on the application.

d. Species such as pinus radiata, poplar and willow will not be permitted. The Council reserves the right to prohibit other tree species if they are determined to be an issue if planted alongside water races.

e. Trees and shrubs can only be planted on the opposite side of the race from which it is maintained, where practicable.

f. The lateral (side) growth is to be maintained in the shape of a trimmed hedge so as not to encroach on the water race. The purpose of this requirement is to allow for race maintenance.

g. All tree trimmings in the vicinity of the race are to be moved sufficient distance away to avoid wind-blown material entering the race. Any loose tree material in the race is to be removed. This is to be done immediately following trimming.

h. Any dead or loose material entering the race from the trees as a result of adverse weather such as north-west gales is also to be removed.

i. Carterton District Council shall be advised before any planting or tree maintenance work is carried out so as to avoid any conflict with water race operations.

j. Please note that the Carterton District Council reserves the right to request the removal of the trees or shrubs if they are found at any time to be a problem with the operation of the water race system.

k. The Council reserves the right to withdraw permission for the planting of trees and shrubs if it is found that any of the clauses in Section 4 of this guideline have not been complied with.

5 Links to other documents and community outcomes

5.1 This guideline links to the Carterton Water Race Bylaw, the Code of Practice/Strategy and the Community Outcome that there is sufficient water to meet the needs of communities and ecosystems.

6 Review

6.1 The review of this planting strategy will be aligned with the Water Race Bylaw review programme.

ACCEPTABLE TREES AND SHRUBS ALONGSIDE STOCKWATER RACES

Akiraho (*Olearia paniculata*)
Two years old, 1.6 metres. From the daisy family, this very hardy shrub to small tree grows up to six metres tall, can stand light soils and is found along forest margins and in scrub. Akiraho is mostly a coastal and lowland plant that likes open sunlight and is frost hardy when mature

Harakeke, swamp flax *(Phormium tenax)*
Two and a half year old, 2 metres. Flax is tough, likes open sunlight, and grows best in alluvial soils although it grows well in lowland swamps and dry hillsides.

Karamu *(Coprosma robusta)*
Two and a half years old, 2 metres. This shrub or small tree with leathery leaves grows up to six metres tall and is found throughout NZ in lowland forests.

Kohuhu *(Pittosporum tenuifolium)*
Two and a half years old, 1.5m. A coastal to lower mountain forest tree up to eight metres tall. Found all over the country except in the west of the South Island.

Makomako, wineberry *(Aristotelia serrata)*
Five years old, 2 metres. A very common, fast growing semi-deciduous small tree up to ten metres tall found throughout NZ in forests and scrubland, along forest margins and roadsides.

Manatu, lowland ribbonwood *(Plagianthus regius)*
Five years old, 3 metres. A common lowland forest tree up to 15 metres tall that, unusually, is regularly lea fl ess in winter.

Manuka *(Leptospermum scoparium)*
Five years old, 2.5 metres. Manuka is found mostly in open habitats throughout NZ. It is a fast growing reasonably frost hardy shrub, up to 4 metres tall, that establishes well in disturbed land.

Ngaio *(Myoporum laetum)*
Five years old, 2 metres. A leafy tree up to ten metres high whose spreading branches shade out understorey vegetation. Ngaio likes open sunlight, and is frost hardy when mature but can recover from light frosts when young.

Toetoe – spring flowering *(Cortaderia fulvida)*
Five years old, 2 metres. This native grass, which is actually a type of sedge, is tough and likes open sunlight.

Ti kouka, cabbage tree *(Cordyline australis)*
18 months old, 1.6 metres. An icon NZ tree that reaches up to 20 metres tall, ti kouka grows along edges of forests and swamps and along river banks.

Horoeka, lancewood *(Pseudopanax crassifolius)*
Five years old, > 5 metres. Round headed tree up to 15 metres tall, found in forest and shrubland throughout NZ from sea level to 760m.

Kawakawa, pepper tree *(Macropiper excelsum)*
Three years old, 1 metre. A small densely- branched aromatic tree or shrub up to six metres high that grows in shady sheltered areas throughout NZ.

Koromiko *(Hebe stricta)*
Five years old, 2 metres. There are over 100 species in the hebe genus in NZ. Most grow in open habitats, but some, like the koromiko, are common in shrubland and forest margins, making them a good riparian plant.

Kowhai *(Sophora microphylla)*
Ten years old, > 3 metres. An elegant spreading tree up to 10 metres tall that grows throughout NZ mostly at lower altitudes.

Mahoe, whiteywood *(Melicytus ramiflorus)*
Two years old, 1.5 metres. One of the commonest trees in NZ, small usually spreading tree up to 10 m high. Flowers late spring and summer with berries in summer and autumn.

Pukio, sedge *(Carex secta)*
Six months old, 400 mm. One of the best known caricies, pukio forms a thick trunk (made up from old roots and stems) that can grow up to 1 m tall. The leaves and fl ower heads are very droopy giving it a tussock-like appearance and allowing it to hang over the water providing shelter for stream life.

Tarata, lemonwood *(Pittosporum eugenioides)*
Five years old, 2 metres. A lowland to lower mountain forest tree up to 12 metres tall found all over the country. Tarata is frost hardy, likes partial shade, and fl owers from late spring to early summer.

PROHIBITED TREES AND SHRUBS ALONGSIDE STOCKWATER RACES

Pinus radiata
Poplar
Willow

12 February 2018

Water Race Committee

Water Quality Report of Taratahi and Carrington Water Races.

1. PURPOSE

The purpose of this paper is to present findings of the Water Quality Audit of the Taratahi and Carrington Water Races, carried out by Cardno NZ Ltd in January 2018.

2. SIGNIFICANCE

The matters for decision in this report are not considered to be of significance under the Significance and Engagement Policy.

3. SUMMARY OF WATER QUALITY AUDIT REPORT

Surface water monitoring and reporting is required to assess the impact of the Taratahi and Carrington water races on the receiving environment to satisfy conditions of our Resource Consents. Water quality data collected bi-monthly from 2015 to 2017 has been analysed and discussed in the attached reports (**Attachment 1**). The following is a summary of the results.

- Temperature difference exceeding 3°C between the upstream and downstream monitoring locations was noted on a number of occasions.
- Levels of total phosphorus and total nitrogen are generally higher in the downstream sites compared to the upstream sites, with the majority of results above threshold limits at the downstream locations.
- E.coli readings are higher at the downstream sites in comparison to the upstream monitoring locations. The majority of the E.coli results fall below the 1000 E.coli per 100 mL threshold value.
- All laboratory pH values are within the pH 6-9 general water use ANZECC guidelines values.
- The result for field pH show greater variance than the laboratory pH values with both the upstream and downstream sites showing records out with the upper and lower limits for lowland ecosystems from pH 7.2-7.8. Only two records are out with the general use range of pH 6-9.

- The dissolved oxygen values recorded at the downstream sites vary from upstream sites. Generally, but not always, the downstream dissolved oxygen values are lower than those from upstream. In a number of cases dissolved oxygen was outside the threshold trigger value of <80% dissolved oxygen.
- There are only two occurrences of suspended solids readings exceeding the threshold value, all other results were below the threshold.

The elevated levels in nutrients may be due to variety of source/land use practices such as fertiliser application, animal waste/stock access to streams and waste water management. Dissolved oxygen can be linked to nutrient input, flow rate, temperature, water depth and macrophyte growth.

4. NEXT STEPS

Continued monitoring of water quality in both water races is recommended by the reviewer to be able to understand, flag and control any potential future degradation to the water races. The reviewer also commented that appropriate land use practices and management strategies should be implemented such as minimum flows and river levels and ensuring the operations are in accordance with the Code of Practice. This will help to reduce the impact of the discharges on Mangatarere Stream and Ruamāhanga River.

The report (in Section 3) also discusses the work of the Whaitua and the importance of aligning measures that mitigate the impacts of the water races with the wider projects under the Whaitua and Natural Resources Plan work. As recommended by the author, we will be preparing a water quality strategy that identifies parts of the water race network that could be improved, and sets out a programme of actions to improve water quality.

5. RECOMMENDATIONS

That the Water Race Committee:

1. **Receives** the report
2. **Notes** the report findings
3. **Notes** more monitoring will be undertaken and measures considered to mitigate impacts on receiving waters.
4. **Notes** a Water Quality Strategy will be prepared and will be presented to the next Water Race Committee meeting.

Garry Baker
Infrastructure & Services Manager

Attachment 1: Water Quality Audit Reports

Carrington Water Race

Water Quality Audit for Resource Consent No. WAR 010202

NZ0117158

Prepared for
Carterton District Council

8th January 2018

Cardno
Shaping the Future

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Executive Summary

This report has been prepared to address Condition 30 of resource consent WAR 010202 (21596), to assess the impact of the Carrington Water Race Scheme (CWRS) on the receiving environment. The CWRS was constructed over 90 years ago to distribute stock water over the Mangatarere Valley. The water race provides water for stock, dairy farming, non-potable domestic use, firefighting and irrigation. The water quality discharged from the race is reflective of the land use practises which occur within the race catchment, affecting water quality of the receiving environment.

Monitoring has occurred to assess the affects the water race is having on the receiving environment. Monitoring has been undertaken on a bi-monthly basis from July 2015 – November 2017 by Carterton District Council. The following constituents were analysed as per consent requirements: Escherichia coli, ammoniacal nitrogen, nitrate-nitrite nitrogen, total nitrogen, soluble inorganic nitrogen, dissolved reactive phosphorus, total phosphorus, dissolved oxygen (absolute and percentage saturation), water temperature, suspended solids, pH and conductivity. The results have been assessed against threshold values. These threshold values are based on the ANZECC 2000 trigger values, Regional Freshwater Plan guidelines and National Policy Statement for Freshwater Management 2014 National Bottom Line values.

The total nitrogen, total phosphorus, *E. coli*, and dissolved oxygen from the upstream and downstream sites did not largely differ. All E.coli values and suspended solid values were below the guideline threshold values. At both sites there were records of elevated total phosphorous and total nitrogen that exceed the guideline values; however, the majority of samples are below the trigger threshold values. There were more exceedances in total phosphorous and total nitrogen in the downstream site. Both upstream and downstream locations experienced a variance in dissolved oxygen including some low dissolved oxygen levels that may partly be attributed to land use surrounding the water race.

Continued monitoring of water quality in the CWRS is recommended to be able to understand, flag and control any potential degradation to the water race. Appropriate land use practises and management strategies should be implemented such as upholding the minimum flow and river levels values and ensuring operation in accordance with the Code of Practice. This will help to reduce the impact of the discharge on Mangatarere Stream. As a minimum this shall include:

- Best practice measures for minimising stock access to water including fencing stock out of water races;
- Initiatives for processing riparian planting within the water race network;
- Identify best practice procedures for cleaning out water races; and
- A strategy that identifies localised areas, water race sections, and/or properties where water quality and water efficiency within the CWRS network could be improved. The strategy shall set out a timetabled programme to implemented during the term of consent which investigates opportunities to proactively work with landowners in any identified localised areas, water race sections, and/or properties. This shall include (but is no limited to) investigating closing sections of water races where alternative sources of supply exist, and actively promoting best practice of land and stock management to minimise water quality impacts.

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1 Introduction

1.1 Background

The Carrington Water Race Scheme (CWRS) was constructed over 90 years ago to distribute water to stock over the Mangatarere Valley. The CWRS services an area of over 1600 hectares (ha) of land via a series of approximately 36km of open channel water race branches. The area is characterised by pastoral land use and the water races provides water for dry stock and dairying purposes as well as non-potable domestic use, firefighting and irrigation purposes.

The CWRS is located to the north of Carterton and takes water from the Mangatarere Stream as well as from an unnamed stream (near Cobden Road). The Mangatarere Stream is a small gravel bed river approximately 31km in length with a catchment area of approximately 157km^2. There are 9 discharge locations identified within the water race.

The Mangatarere Stream is one of the most allocated watercourses in the region based on the proportion of flow taken. There are significant water quality stresses in the Mangatarere catchment arising from intensive agricultural activities and the discharge of Carterton's wastewater.

The Mangatarere Stream is identified in Appendix 7 of the Regional Freshwater Plan as a body of water in need of enhancement. It is also listed in Appendix 4 as a water body with important Trout Habitat (including spawning areas) – Water quality to be managed for fishery and fish spawning purposes.

Previous water quality monitoring between December 2011 and April 2012 was completed at the following sites:

- Intake near Mangatarere Stream (upper reach);
- Haringa Rd (middle reach);
- Brooklyn/ Mannings Rd (lower reach);and
- Mangatarere Stream at end of Andersons Line.

The results indicated that the water quality in the upper reaches of the CWRS is much better than the middle and lower reaches. The Haringa Rd (middle reach) had the poorest water quality with values of total nitrogen and total phosphorus breaching ANZECC guidelines for recreational contact and consumption by farm animals and E.coli values exceeding the Public Health Red Alert level (550 cfu/100 mL). Further investigation into the water quality of the Mangatarere Stream catchment was undertaken in 2008 which showed similar trends. The results have identified concerns with the state of the water quality in the CWRS.

1.2 Resource Consent

There are six consents for the operation of the Carrington water race scheme held by Carterton District Council (CDC). These consents for the scheme are:

- WAR 010202 (21376) – Water permit to take and use surface water;
- WAR 010202 (31464) – Water permit to take and use surface water;
- WAR 010202 (31477) – Water permit to take/divert water;
- WAR 010202 (21597) – Land use consent for work in the river bed;
- WAR 010202 (31414) – Land use consent for work in the river bed; and
- WAR 010202 (21596) – Discharge permit to discharge residual water various watercourses.

This water quality audit is for compliance of WAR 010202 (21596) Condition 30. As nine discharge locations have been identified in the application, one 'global' consent for discharging contaminants was considered the most pragmatic way to consider the authorisation of this activity. Under this consent water quality has been monitored at two locations (shown in Figure 1-1). These sites are:

- Carrington water race at intake (CM01); and

- Discharge to Mangatarere Stream near Belvedere Road (CM02).

A map of the Carrington Water Race Scheme including the monitoring point locations CM01 and CM02 can be seen in Figure 1-1. Monitoring location CM01 is the upstream site and location CM02 is the downstream site.

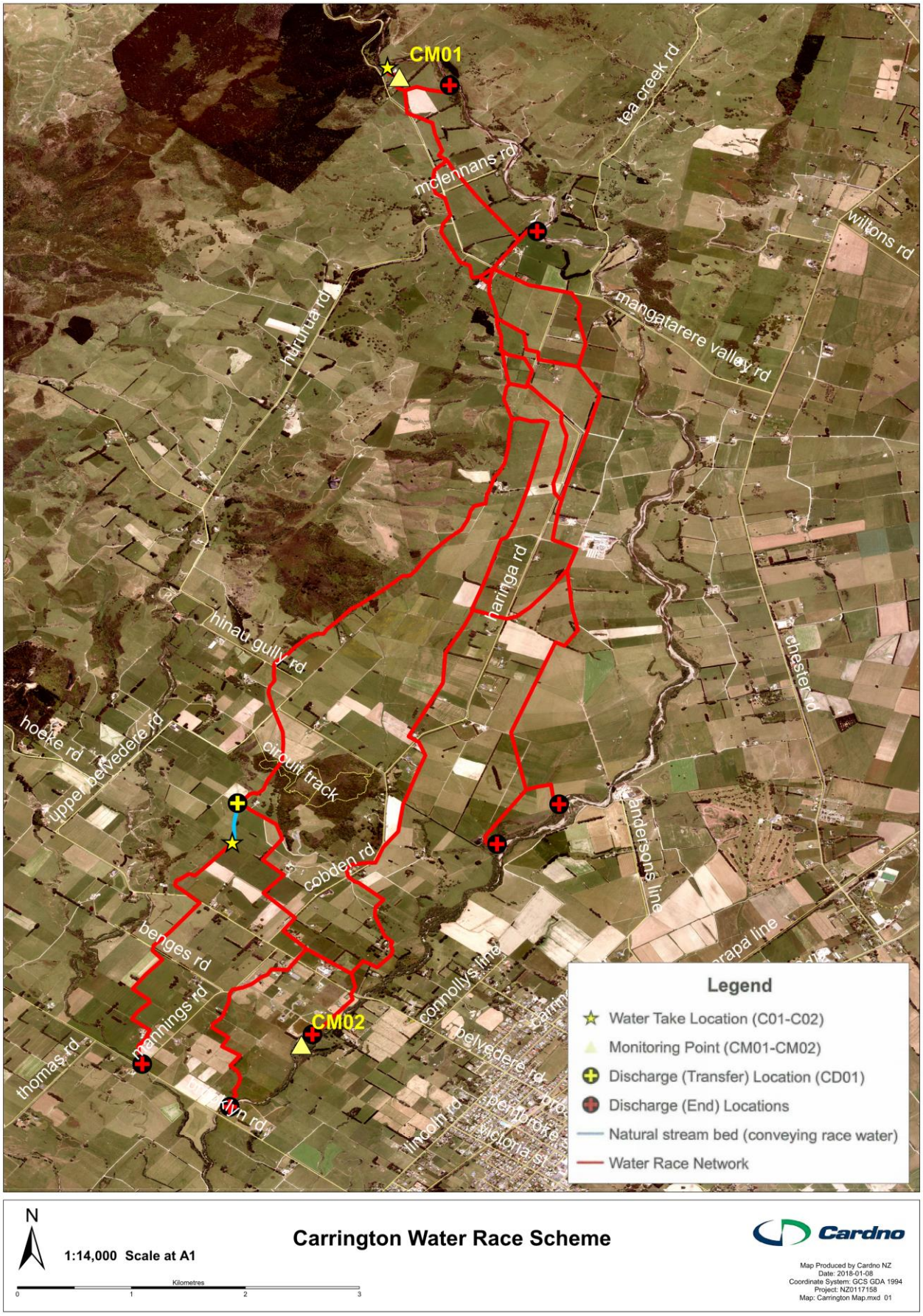

Figure 1-1 Map of Carrington Water Race Scheme (source GWRC)

This Water Quality Audit has been conducted in accordance with Condition 30 of WAR 010202-21596 and uses the water quality monitoring results from 2015-2017 to assess the impact of the discharge on the Mangatarere Stream. The water quality parameters that have been monitored are listed in Table 1-1. The assessment criteria used to assist in understanding the impact the water race discharges are having on the receiving environment are detailed in Table 1-2. The highlighted values are those used in the water quality audit in Section 2.

Criteria from four difference sources have been compared as no single document provides thresholds for all parameters measured in this consent. The four sources are:

- Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000);
- Regional Freshwater Plan, Greater Wellington Regional Council (GWRC, 2014);
- National Policy Statement for Freshwater Management 2014, updated 2017 (NPS-FW, 2017); and
- Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas, Ministry for the Environment (MfE, 2003).

Table 1-1 Water quality parameters monitored for the Carrington Water Race

Field Observations and Assessment	
After reasonable mixing the discharge of water from the Carrington water race into natural watercourses shall not cause any of the following effects: • The production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials; • Any conspicuous change in the colour or visual clarity; • The rendering of freshwater unsuitable for consumption by farm animals; • Any significant adverse effects on aquatic life; • Undesirable biological growths; and • The temperature to be changed by more than 3°C or to exceed 25°C.	
Physical Measures (sampled every two months)	**Measurement unit and detection limit**
Escherichia coli	1 cfu/100mL
Ammoniacal nitrogen	0.001 g/m^3
Nitrate-nitrite nitrogen	0.002 g/m^3
Total nitrogen	0.1 g/m^3
Soluble inorganic nitrogen	0.1 g/m^3
Dissolved reactive phosphorus	0.004 g/m^3
Total phosphorus	0.004 g/m^3
Dissolved Oxygen (absolute and percentage saturation)	0.001 g/m^3 and 1% saturation (using a field meter)
Water temperature	0.01^{0}C (field meter)
Suspended solids	<3 g/m^3
pH	0.01 units (field meter)
Conductivity	0.1 uS/cm (field meter)

Table 1-2 Water quality assessment criteria for the receiving environment

Physical Measures (sampled fortnightly between November and April)	ANZECC trigger value, 2000	Regional Freshwater Plan, 2014	NPS-FW, 2017 National Bottom Line	MfE, 2003	Commentary
Field Observations		Presences			
Physical Measures					
E. coli			1000 cfu/100 mL (annual median)	550 cfu/100 mL	The *E. coli* assessment criteria in MfE guidelines is for recreational water (bathing, water sports, domestic shellfish collection etc.). The trigger is 550 cfu/100 mL. This threshold provides a much greater level of protection than is necessary for stock drinking water based on the likelihood of contact with humans and consequence of risk.
Total nitrogen	614 ug/L				ANZECC default ecological trigger value of slightly disturbed lowland river ecosystems. Livestock drinking water quality standard is for nitrate and nitrite concentrations, not total nitrogen.
Total phosphorus	33 ug/L				ANZECC default ecological trigger value of slightly disturbed lowland river ecosystems.
pH	7.2-7.8 pH lowland ecosystems 6-9 pH general water use	Any pH change (waters managed for aquatic ecosystems)			ANZECC default trigger value of slightly disturbed lowland river ecosystems is for a pH range of 7.2-7.8. It is noted that the trigger values may not be very useful because of diurnal and seasonal variation. ANZECC guideline for general water use for surface water systems is 6-9 pH. Soil and animal health will not generally be affected by water with pH 4-9.
Conductivity					There is no trigger value for conductivity
Dissolved oxygen	98-105 % saturation (daytime sampling)	<80% after reasonable mixing (waters managed for aquatic ecosystems)	4.0 mg/L (1-day summer minimum)		It is noted in the ANZECC guidelines that the trigger values may not be very useful because of diurnal and seasonal variation.
Suspended solids	<40 g/m^3	<50 g/m^3			ANZECC guideline is for the protection of aquaculture species. GWRC guideline is a permitted activity for the discharge of contaminants into water.

2 Water Quality Monitoring Results

The water quality results collected from 2015-2017 (bi-monthly) have been assessed against assessment criteria to assist in understanding the impact the race discharge is having on the receiving environment. This is shown as the trigger value in the below graphs, which are outlined in more detail in Table 1-2 above.

2.1 Temperature

Wide variations in temperature can be harmful to stream life, and are generally influenced by low stream flows (NIWA, 2016). As shown in Figure 2-1 below all samples fall under the trigger temperature of 25ºC.

There were only a couple of instances in which the recorded difference between the upstream and downstream sites had a temperature difference exceeding 3ºC. Details of these occurrences are listed below.

- On the 2/12/2015 the temperature was 3.6 degrees higher in the downstream environment comparative to the upstream environment.
- On the 16/01/2017 the temperature was 3.5 degrees higher in the downstream environment comparative to the upstream environment.
- On the 6/03/2017 the temperature was 3.0 degrees higher in the downstream environment comparative to the upstream environment.

Given that the downstream site falls under the threshold value, and temperature does not appear to be significantly different between sites, temperature does not look to be a particularly sensitive parameter in the receiving environment.

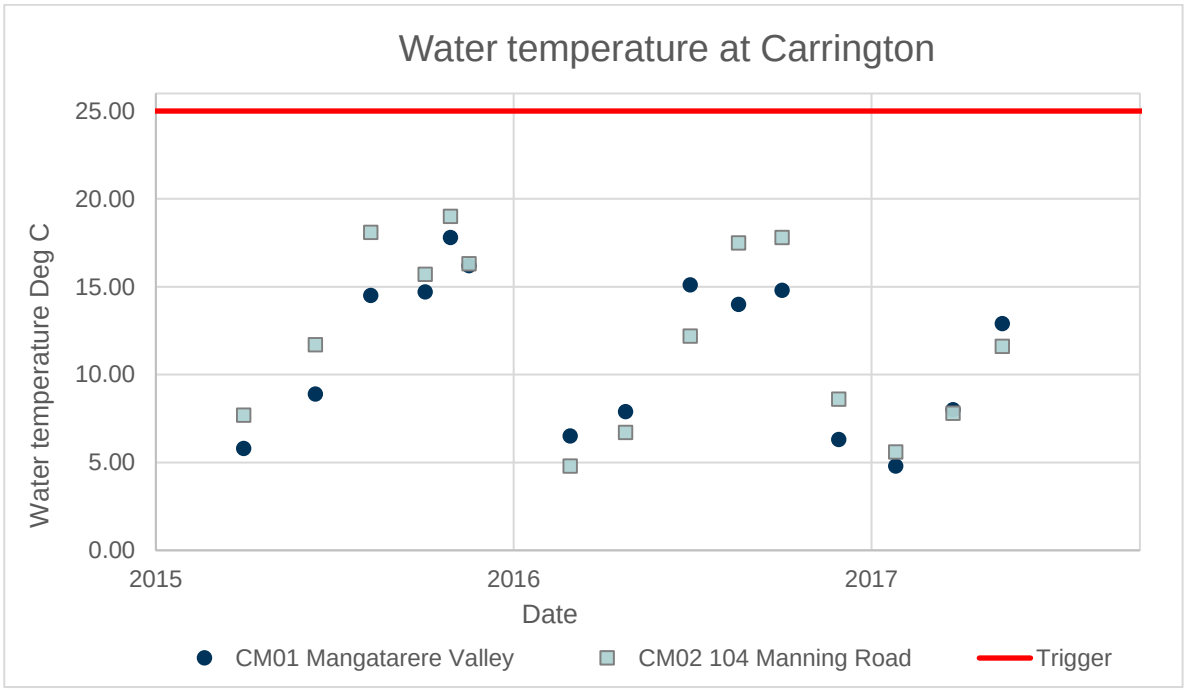

Figure 2-1 Temperature (ºC) in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.2 Total phosphorus and total nitrogen

Elevated levels of total phosphorous and total nitrogen in agricultural streams are largely reflective of land use practises in the catchment (e.g. fertiliser application, animal waste/stock access to streams and waste water management).

Levels of total phosphorus are shown in Figure 2-2 and levels of total nitrogen are shown in Figure 2-3. While the majority of samples are below the trigger guideline threshold values, both the upstream and downstream sites have records of elevated total phosphorous and total nitrogen that exceed the guideline values. The number of samples exceeding the guideline values for total phosphorus at the upstream CM01 site was at 13% of samples and at the downstream CM02 site 40% of samples recorded were in exceedance. The number of samples exceeding the guideline values for total nitrogen at the upstream CM01 site was at 13% of samples and at the downstream CM02 site 33% of samples recorded were in exceedance. There are a greater number of exceedances for both total phosphorus and total nitrogen in the downstream CM02 monitoring site.

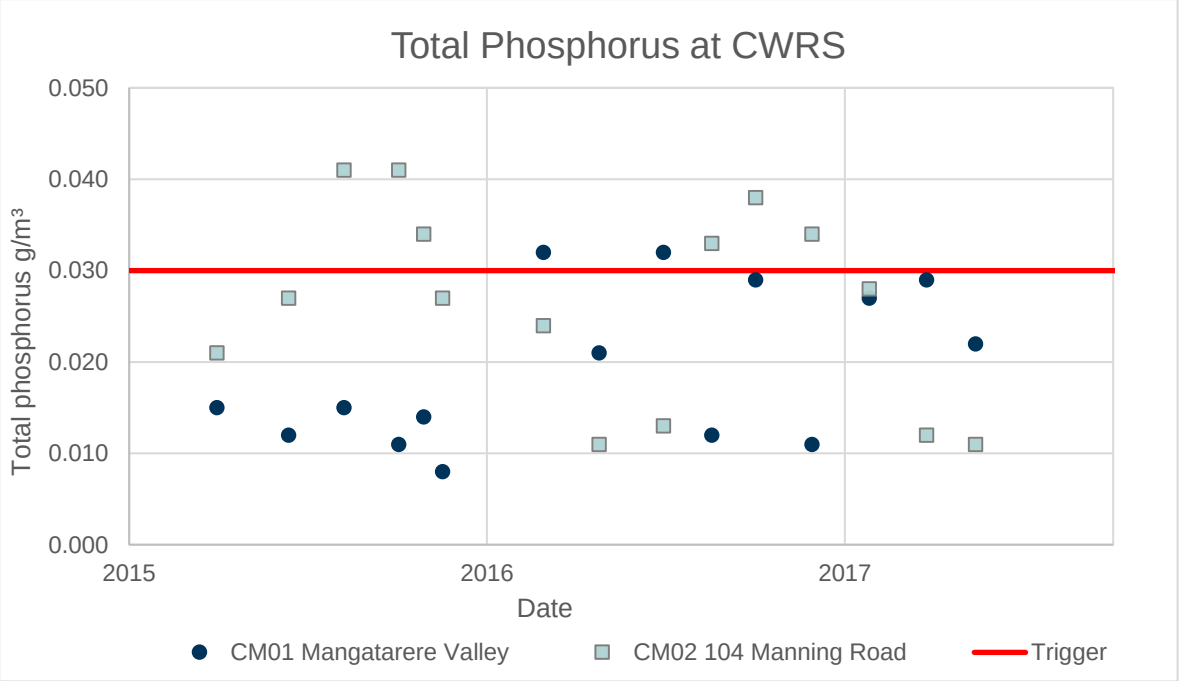

Figure 2-2 Total Phosphorus (g/m³) in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

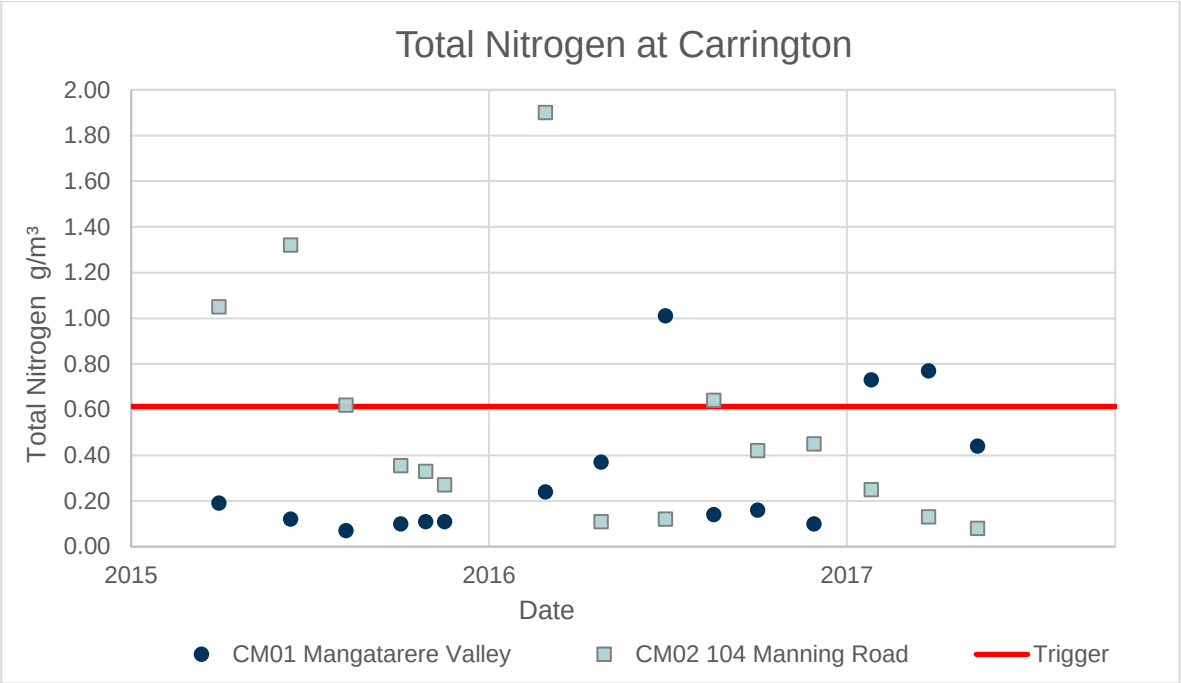

Figure 2-3 Total Nitrogen (g/m³) in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.3 *E. coli*

As shown in Figure 2-4 E.coli levels at both the upstream CM01 and downstream CM02 monitoring sites on the Mangatarere Stream were consistently below the trigger level of the 1000 *E. coli* per 100 mL threshold value. Therefore, over the period sampling, there were no values of concern for E.coli.

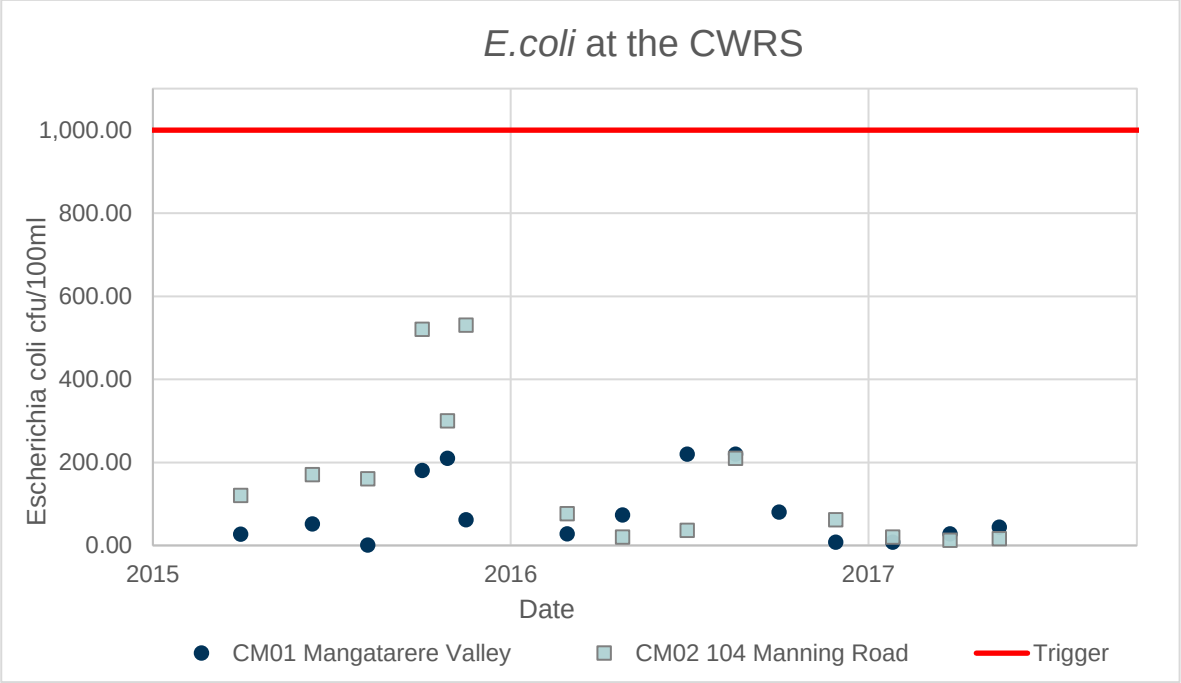

Figure 2-4 Total *E. coli* (cfu/100 mL) in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.4 pH

Variations in pH can be harmful to aquatic invertebrate and are influenced by waters draining swamps or pollution discharge/seepage (which generally leads to acidic waters), and photosynthetic activity by periphyton

and macrophytes (generally leads to more alkaline waters) (NIWA, 2016). With increasingly acid waters the numbers of species and aquatic organisms generally decreases (NIWA, 2016).

The results for laboratory pH, shown in Figure 2-5, are generally within the upper and lower limits for lowland ecosystems set by ANZECC guidelines. Two samples at site CM01 and three samples at site CM02 over the sample period were below the lower trigger limit of pH 7.2. The laboratory pH values are within the 6-9 pH general water use ANZECC guideline values. There is a low degree of variance between the laboratory pH values from the upstream and downstream locations.

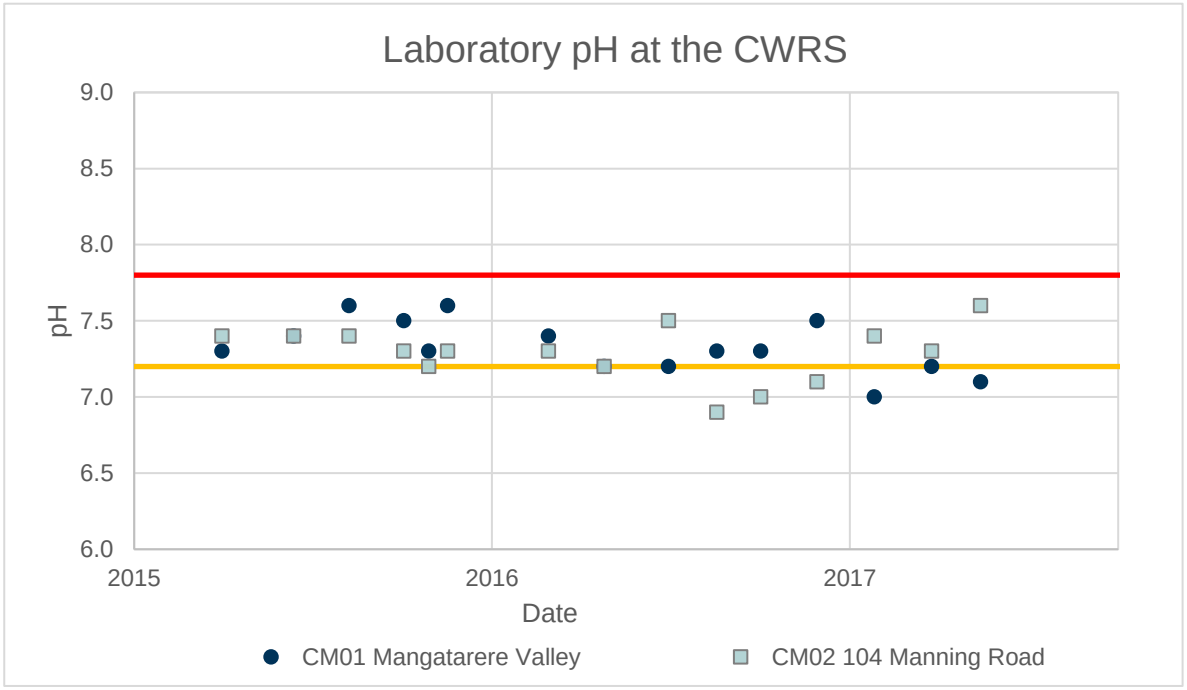

Figure 2-5 Laboratory pH downstream in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

The results for field measured pH show greater variance than the laboratory pH values. For field measured pH 79% of samples at CM01 and 53% of samples at CM02 were below the lower trigger value of pH 7.2 for lowland ecosystems and 29% for CM01 and 27% for CM02 were below the general use lower trigger value of pH 6. Animal health will generally not be affected by water with pH 4-9 according to ANZECC guideline (which all recordings are within). There is a moderate degree of variance between the field pH values from the upstream and downstream locations. However, this switches between the upstream and downstream site having the lower pH value, and so the change in pH between sites is not indicative to the effects of the discharge.

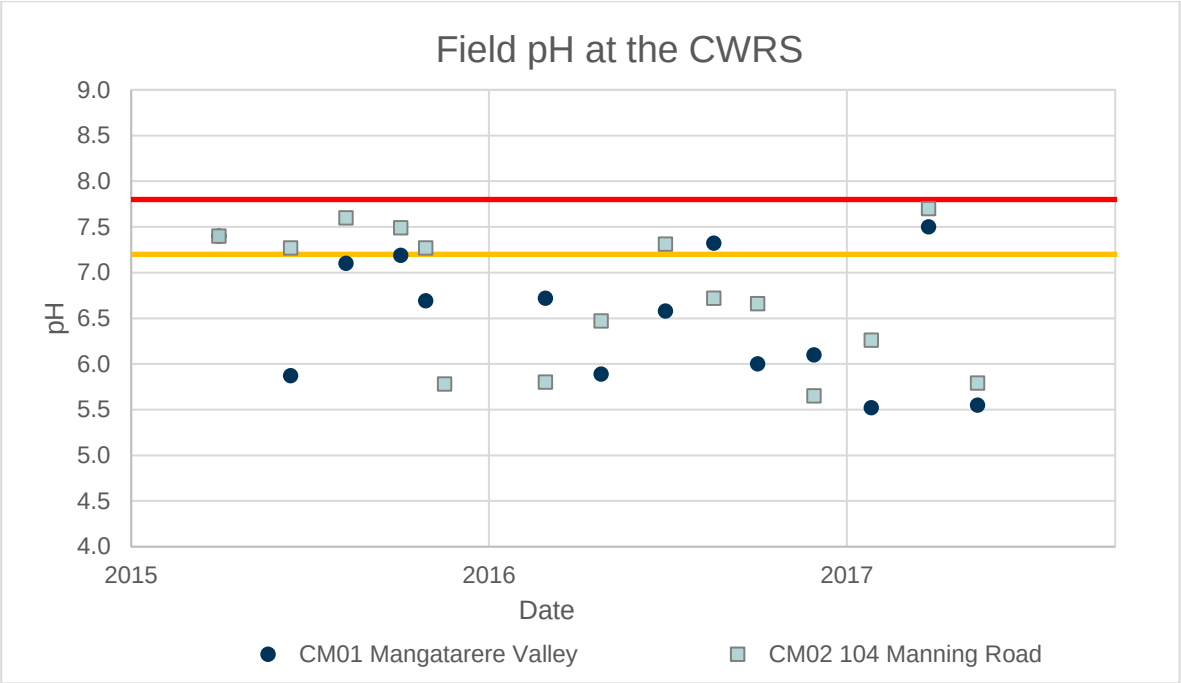

Figure 2-6 Field pH in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.5 Dissolved oxygen

Dissolved oxygen varies due to flow rate, temperature, water depth, macrophyte growth, (high macrophyte growth contributes to low dissolved oxygen concentrations), nutrient inputs, and features that provide oxygenation such as water falls. Excessive plant and algae growth and decay in response to increasing nutrients in waterways can significantly affect the amount of dissolved oxygen available (NIWA, 2016). The oxygen content of water decreases when there is an increase in nutrients and organic materials from runoff from the land. Reduced levels of dissolved oxygen can limit the available habitat where species can live and grow as fish generally avoid areas with low oxygen (NIWA, 2016).

It is also noted that dissolved oxygen varies due to diurnal and seasonal variation. At night dissolved oxygen is consumed by plant and animal respiration and decomposition, and by day animal respiration and decomposition continues, but photosynthesis by plants produces oxygen. Seasonal variation is also caused by changes in the temperature of the water, flow, and macrophyte growth.

Low levels of dissolved oxygen, below the 80% trigger, were experienced in both the upstream CM01 and downstream CM02 monitoring sites as shown in Figure 2-7. These low dissolved oxygen records generally occurred during the summer months when temperatures are higher and flow rates are lower.

Both upstream and downstream locations experience low dissolved oxygen levels and it varies between either the upstream or downstream sites having the lower reading, therefore it is not indicative to the effects of the discharge. Low levels of dissolved oxygen may partly be attributed to intensive land use/farming practises surrounding the water race.

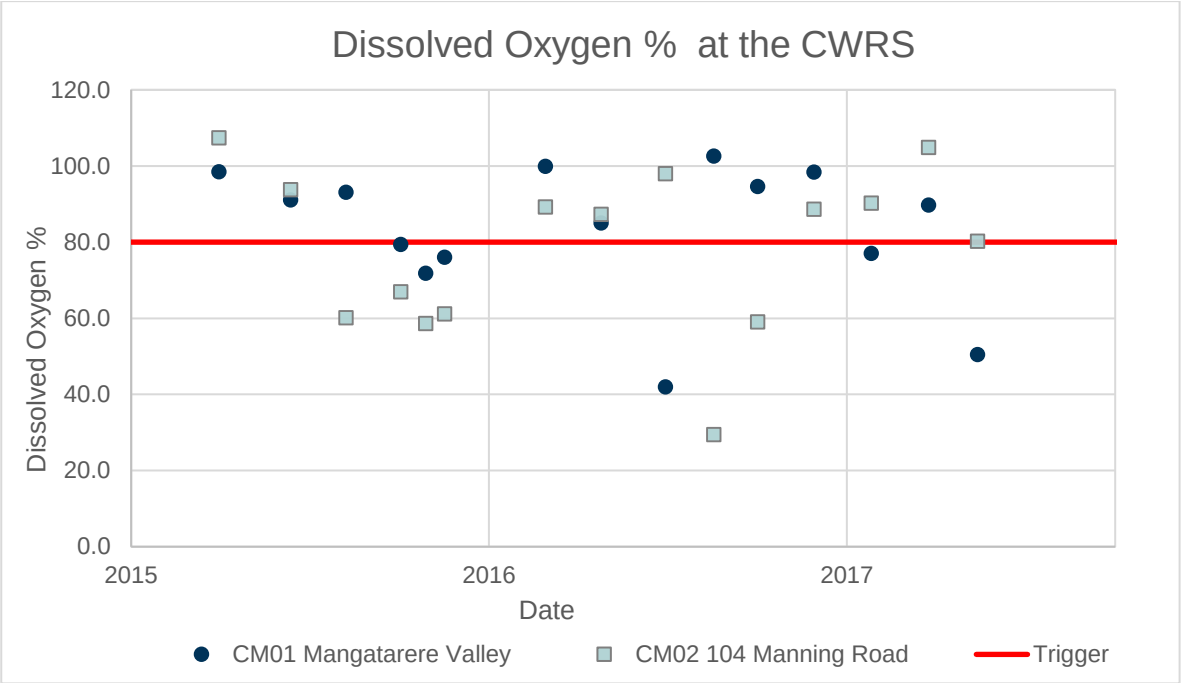

Figure 2-7 Dissolved oxygen % in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.6 Suspended solids

Suspended solids are a measure of the silt or suspended sediment particles in the stream and give an indication on the clarity of the water. The particles can either be washed in directly from the banks, from runoff from bare land and/or eroding slopes, and from stock trampling. As shown in Figure 2-12 all samples are below the threshold value of 50 g/m³ (GWRC guideline for the discharge of contaminants into water) for suspended solids. The majority of samples for both CM01 and CM02 are below detection level of <3 g/m³. Only one sample from the upstream CM01 site on the 6/03/2017 was above the 40 g/m³ ANZECC guideline for the protection of aquaculture species. Given the low readings at both sites suspended solids does not look to be a particularly sensitive parameter in the receiving environment.

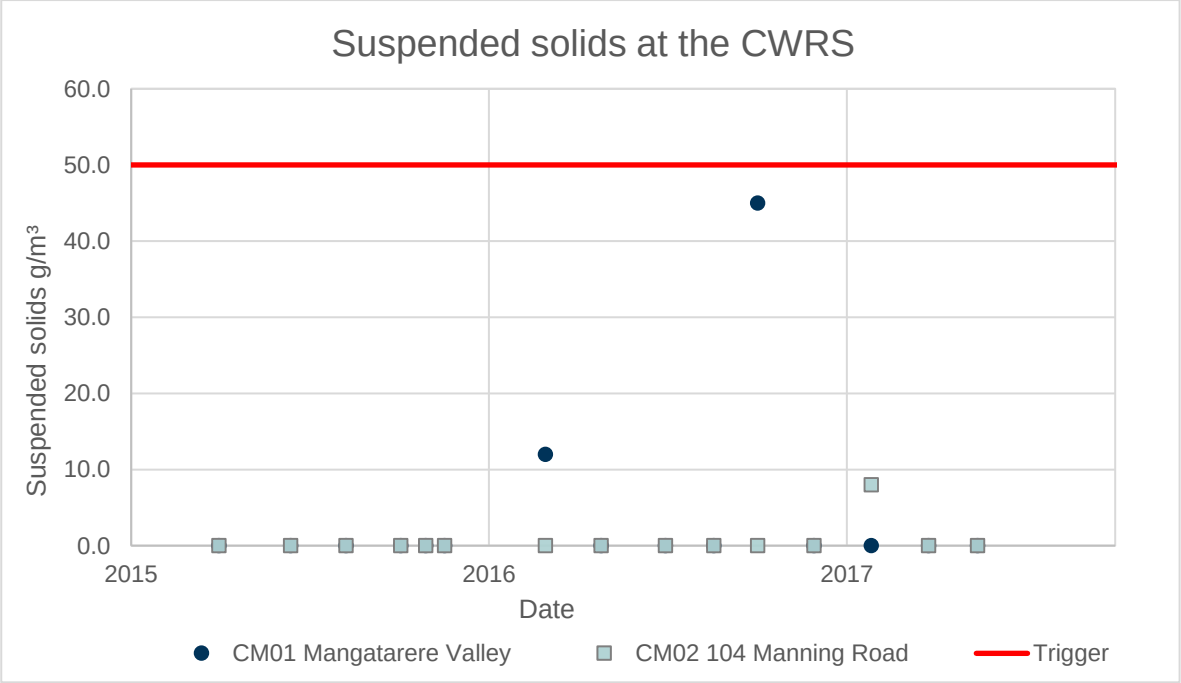

Figure 2-8 Suspended solids (g/m³) in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.7 Conductivity

Conductivity is a measure of the total ionic strength of the water and gives an indication of the level of enrichment (i.e. nutrient content) of the water. There is no threshold value for conductivity; however, the results upstream and downstream of the discharge to Mangatarere Stream are compared in Figure 2-9 below. Conductivity readings at both sites are low. Conductivity levels are more commonly higher at the downstream CM02 site; however, this is not always the case. The values do not vary considerably between the upstream and downstream sites.

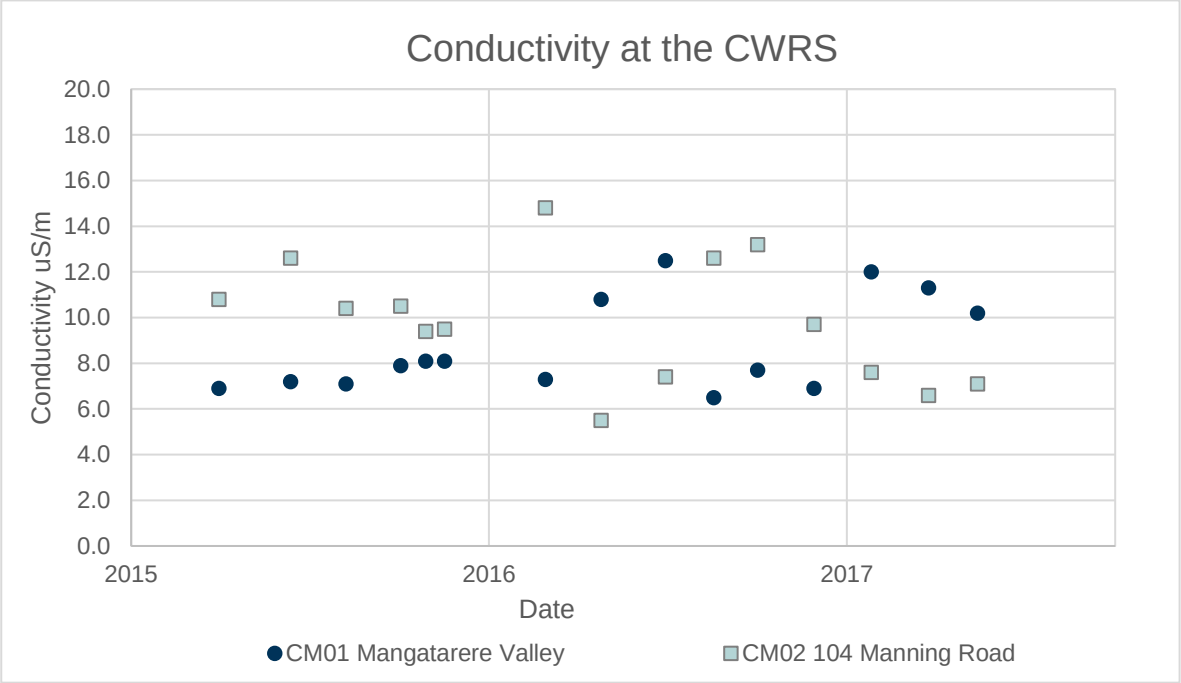

Figure 2-9 Suspended solids (g/m³) in the Mangatarere Stream at CM01 (upstream) and CM02 (downstream)

2.8 Field Observations

Field observations have not been provided. It is assumed that the lack of information provided on any change in the colour or visual clarity or the noting of conspicuous oil or grease films, scums or foams, or floatable materials was because none where observable in the field when samples were taken.

3 Mitigation of Adverse Effects

This water quality audit is to identify and decide on appropriate mitigation measures to minimise adverse effects of land use practices on the quality of the water in the races as per Condition 30 of Resource Consent WAR 010202 (21596).

Discharge from the Carrington Water Race Scheme (CWRS) will impact on the quality of the receiving waters, and consequently may have an impact on the attribute state assigned to the downstream tributaries. As a result, land use management practices will form part of a management plan to improve the water quality of the overall catchment.

The CWRS is currently part of a larger project required under the National Policy Statement for Freshwater. This involves stakeholder engagement to understand the values different uses place on waterbodies, and how those values relate to the quantity and quality of water. This will help to inform the attribute state assigned to the waterbody. If necessary, a management plan will be developed to map out a pathway to achieve that attribute state.

Rather than developing land use practices specifically for the CWRS, land use practices should tie into the work existing committees and governing bodies are developing for the region, and how the water race water quality may influence the attribute state and the desired water quality for the receiving environment.

Within the proposed Natural Resources Plan for the Wellington Region the Mangatarere Stream, from which the CWRS takes/discharges to, is listed as a river with minimum flows within the Ruamahanga Whaitua catchment. By having a minimum flow and minimum water level requirement the Mangatarere Stream is sustainably managed by minimising water use when river flows are low. Ensuring the flow does not reach below these minimum flows will help allow the flushing and mixing of discharge to the stream, which will help prevent a decrease in water quality.

The CWRS also comes under Method M13: Wairarapa water races within the proposed Natural Resources Plan for the Wellington Region. This states that the Wellington Regional Council will work with Wairarapa district councils and landowners to characterise hydrology, water quality, ecology, and the social, heritage and cultural values in the Wairarapa water races to develop management options which, among others, will include options for improving water quality.

The Mangatarere Stream is however, not listed as one of the priority areas under Method 10: Water quality investigation and remediation actions in the proposed Natural Resources Plan for the Wellington Region, as its water quality is not as bad as other rivers within the Ruamahanga Whaitua catchment.

Mitigation measures which have been identified, either through the whaitua process or the ‘Code of Practice should be applied to mitigate adverse effects of the discharges of the CWRS. Within the consents it is stated that the CWRS will operate in accordance with the Code of Practice. As a minimum this shall include:

- Best practice measures for minimising stock access to water including fencing stock out of water races;
- Initiatives for processing riparian planting within the water race network;
- Identify best practice procedures for cleaning out water races; and
- A strategy that identifies localised areas, water race sections, and/or properties where water quality and water efficiency within the CWRS network could be improved. The strategy shall set out a timetabled programme to implemented during the term of consent which investigates opportunities to proactively work with landowners in any identified localised areas, water race sections, and/or properties. This shall include (but is no limited to) investigating closing sections of water races where alternative sources of supply exist, and actively promoting best practice of land and stock management to minimise water quality impacts.

Given the limited water quality data recorded for the CWRS it is recommended that water quality monitoring continues to build a better understanding on the effects of the discharges and to be able to pick up on any water quality degradation that may occur.

4 Summary

Surface water monitoring and reporting is required to assess the impact of the CWRS on the receiving environment to satisfy Condition 30 of Resource Consent WAR 010202 (21596). Water quality data collected bi-monthly from July 2015 to November 2017 by Carterton District Council has been analysed and discussed in this report. The following is a summary of the results.

The total nitrogen, total phosphorus, *E. coli*, and dissolved oxygen from the upstream and downstream sites did not largely differ from one another. All E.coli values and suspended solid values were below the guideline threshold values. At both sites there were records of elevated total phosphorous and total nitrogen that exceed the guideline values; however, the majority of samples are below the trigger guideline threshold values. There were more exceedances in total phosphorous and total nitrogen in the downstream site. The laboratory pH values are within the pH 6-9 for general water use ANZECC guideline values and the field measurements were within the animal health guidelines, which will generally not be affected by water with pH 4-9. Both upstream and downstream locations experienced a variance in dissolved oxygen levels including some low dissolved oxygen levels. There was switching between the upstream or downstream sites having the lower dissolved oxygen reading and therefore was not indicative to the effects of the discharge.

The elevated levels in nutrients may be due to a variety of sources/land use practises such as fertiliser application, animal waste/stock access to streams, and waste water management. Dissolved oxygen can be linked to nutrient input, flow rate, temperature, water depth and macrophyte growth.

Continued monitoring of water quality in the CWRS is recommended to be able to understand, flag and control any potential future degradation to the water race. Appropriate land use practises and management strategies should be implemented such as upholding the minimum flow and river levels values and ensuring the operation in accordance with the Code of Practice. This will help to reduce the impact of the discharge on Mangatarere Stream.

5 References

ANZECC, 2000, *Australia and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council; and Agriculture and Resource Management Council of Australia and New Zealand.

GWRC, 2013, *Officer report WAR010202: Carterton District Council Carrington Water Race Scheme*, Greater Wellington Regional Council.

MfE, 2003, *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas.* Ministry for the Environment

MfE, 2017, *National Policy Statement for Freshwater Management 2014, Updated August 2017 to incorporate amendments from the National Policy Statement for Freshwater Amendment Order 2017,* Ministry for the Environment.

NIWA, 2016, https://www.niwa.co.nz/our-science/freshwater/tools/kaitiaki_tools/impacts/dissolved-oxygen

GWRC, 2014, *Regional Freshwater Plan for the Wellington Region*, Greater Wellington Regional Council.

GWRC, 2015. *Proposed Natural Resources Plan for the Wellington Region,* Greater Wellington Regional Council.

Taratahi Water Race

Water Quality Audit for Resource Consent No. WAR 010227

NZ0117158

Prepared for
Carterton District Council

8th January 2018

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Executive Summary

This report has been prepared to address consent Condition 39 of WAR 010227 (21599) to assess the impact of the Taratahi Water Race Scheme (TWRS) on the receiving environment. The TWRS was constructed over 100 years ago to distribute water to stock over the Taratahi Plains. The TWRS water course supplies water for stock watering, non-potable domestic use, firefighting and other uses. The water quality discharged from the race is reflective of the land use practises which occur within the race, and affects the water quality of the receiving environment.

Monitoring has occurred to assess the affects the water race is having on the receiving environment. Monitoring has been undertaken on a bi-monthly basis from July 2015 – November 2017 by Carterton District Council. The following constituents were analysed as per consent requirements: Escherichia coli, ammoniacal nitrogen, nitrate-nitrite nitrogen, total nitrogen, soluble inorganic nitrogen, dissolved reactive phosphorus, total phosphorus, dissolved oxygen (absolute and percentage saturation), water temperature, suspended solids, pH and conductivity. The results have been assessed against threshold values. These threshold values are based on the ANZECC 2000 trigger values, Regional Freshwater Plan guidelines and National Policy Statement for Freshwater Management 2014 National Bottom Line values.

Water quality results of note were:

- **Total nitrogen and total phosphorus**- The site downstream of the water race discharge are elevated in total nitrogen and total phosphorus. This is most likely due to a variety of sources/land use practises such as fertiliser application, animal waste/stock access to streams and waste water management;
- **Dissolved oxygen-** In a number of cases dissolved oxygen falls below the threshold trigger value of <80% dissolved oxygen. Generally, but not always, the downstream dissolved oxygen values are lower than those from upstream. This was likely to be linked to nutrient input, flow rate, temperature, water depth and macrophyte growth; and
- **Temperature-** while below the threshold value, temperature differences exceeding 3ºC between the upstream and downstream monitoring locations were noted on a number of occasions.

Continued monitoring of water quality in the TWRS is recommended to be able to understand, flag and control any potential future degradation to the water race. Appropriate land use practises and management strategies should be implemented such as upholding the minimum flow and river levels values and ensuring the operation in accordance with the Code of Practice. This will help to reduce the impact of the discharge on Mangatarere Stream. As a minimum this should include:

- Best practice measures for minimising stock access to water including fencing stock out of water races;
- Initiatives for processing riparian planting within the water race network;
- Identification of best practice procedures for cleaning out water races; and
- A strategy that identifies localised areas, water race sections, and/or properties where water quality and water efficiency within the TWRS network could be improved. The strategy shall set out a timetabled programme to implemented during the term of consent which investigates opportunities to proactively work with landowners in any identified localised areas, water race sections, and/or properties. This shall include (but is no limited to) investigating closing sections of water races where alternative sources of supply exist, and actively promoting best practice of land and stock management to minimise water quality impacts.

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1 Introduction

1.1 Background

The Taratahi Water Race Scheme (TWRS) was constructed over 100 years ago to distribute water to stock over the Taratahi Plains and is now an established and integral part of the Carterton district. The TWRS covers an area of approximately 90km^2 and services an area of over 12,500 hectares (ha) of land via a series of approximately 270km of open channel water race branches.

The Taratahi Plains are characterised by pastoral land for dry stock, dairying and arable cropping with a small amount of viticulture and orchards. There has also been an increase in number of rural lifestyle sub-divisions being developed. The TWRS water source supplies water for stock watering, non-potable domestic use, firefighting and other uses. It is important for the social and wellbeing of the area as well as providing ecological and amenity value to the plains.

The TWRS is located to the north of Carterton and takes water from the Waingawa River, Parkvale Stream and Booths Creek. There are 33 discharge locations identified within the water race. The unused water is discharged back into various rivers and streams including the Ruamahanga River, Waiohine River, Parkvale Stream, Booths Creek and Waingawa Wetland.

Previous water quality monitoring by between December 2011 and April 2012 was completed at the flowing sites:

- Intake near Waingawa River (upper reach);
- Cornwall Road (middle reach);
- Hughes Line (middle reach);
- Carteron Golf Club (middle reach);
- Gladstone Road (lower reach); and
- Nix road (lower reach).

The results indicated that the water quality in the upper reaches of the TWRS is much better than the middle and lower reaches. Total nitrogen and total phosphorus were significantly elevated in the lower reaches and breached ANZECC guidelines for recreational contact and consumption by farm animals. Total phosphorus was highest at Nix Road. *E. coli* was elevated at the middle and lower reaches with values exceeding the Public Health Red Alert level (550 cfu/100 mL). Gladstone Road had highest levels of *E. coli*. The results have identified concerns with the state of the water quality in the TWRS.

The Regional Freshwater Plan for the Wellington Region (RFP) has identified TWRS within the following appendices of the RFP:

- Appendix 2: Wetlands, lakes and rivers and their margins, with a High Degree of Natural Character – *Carters Bush / Waikoukou Stream*
- Appendix 3: Water Bodies with Nationally Threatened Indigenous Fish Recorded in the catchment – *Waingawa River*
- Appendix 4: Water Bodies with important Trout Habitat (including spawning areas) – Water quality to be managed for fishery and fish spawning purposes – *Waiohine River and Waingawa River*
- Appendix 5: Water Bodies with Regional Important Amenity and recreational Values – Water Quality to be Managed for Contact Recreation Purposes - *Waiohine River and Waingawa River*
- Appendix 6: Water Bodies with Water Quality to be Managed for Water Supply Purposes - *Waingawa River*
- Appendix 7: Water Bodies with Water Quality Needing Enhancement – *Ruamahanga River and Waiohine River*

1.2 Resource Consent

There are six consents for the operation of the Taratahi water race scheme held by Carterton District Council (CDC). These consents for the scheme are:

- WAR 010227 (21598) – Water permit to take and use surface water;
- WAR 010227 (31463) – Water permit to take and use surface water;
- WAR 010227 (31417) – Water permit to take/divert water;
- WAR 010227 (31418) – Water permit to take/divert water;
- WAR 010227 (31419) – Water permit to take/divert water;
- WAR 010227 (31420) – Water permit to take/divert water;
- WAR 010227 (31422) – Water permit to take/divert water;
- WAR 010227 (31423) – Water permit to take/divert water;
- WAR 010227 (21599) – Discharge permit to discharge residual water various watercourses;
- WAR 010227 (21600) – Land use consent for work in the river bed; and
- WAR 010227 (31416) – Land use consent for work in the river bed.

This water quality audit is for compliance of WAR 010227 (21599) Condition 39. As thirty-three discharge locations have been identified in the application, one 'global' consent for discharging contaminants was considered the most pragmatic way to consider the authorisation of this activity. Under this consent water quality has been monitored at three locations (shown in Figure 1-1). These sites are:

- TWRS at intake (M01);
- Discharge to tributary of Parkvale Stream near Somerset Road (M02), tributary of Parkvale Stream upstream of M02 discharge, and tributary of Parkvale Stream 30m downstream of M02; and
- Discharge to tributary of Para Stream at Waihakeke Road (James' property).

A map of the TWRS including the monitoring point locations can be seen in Figure1-1. Monitoring location TM01 is the upstream site and location TM02 A,B,C and TM03 are the downstream sites.

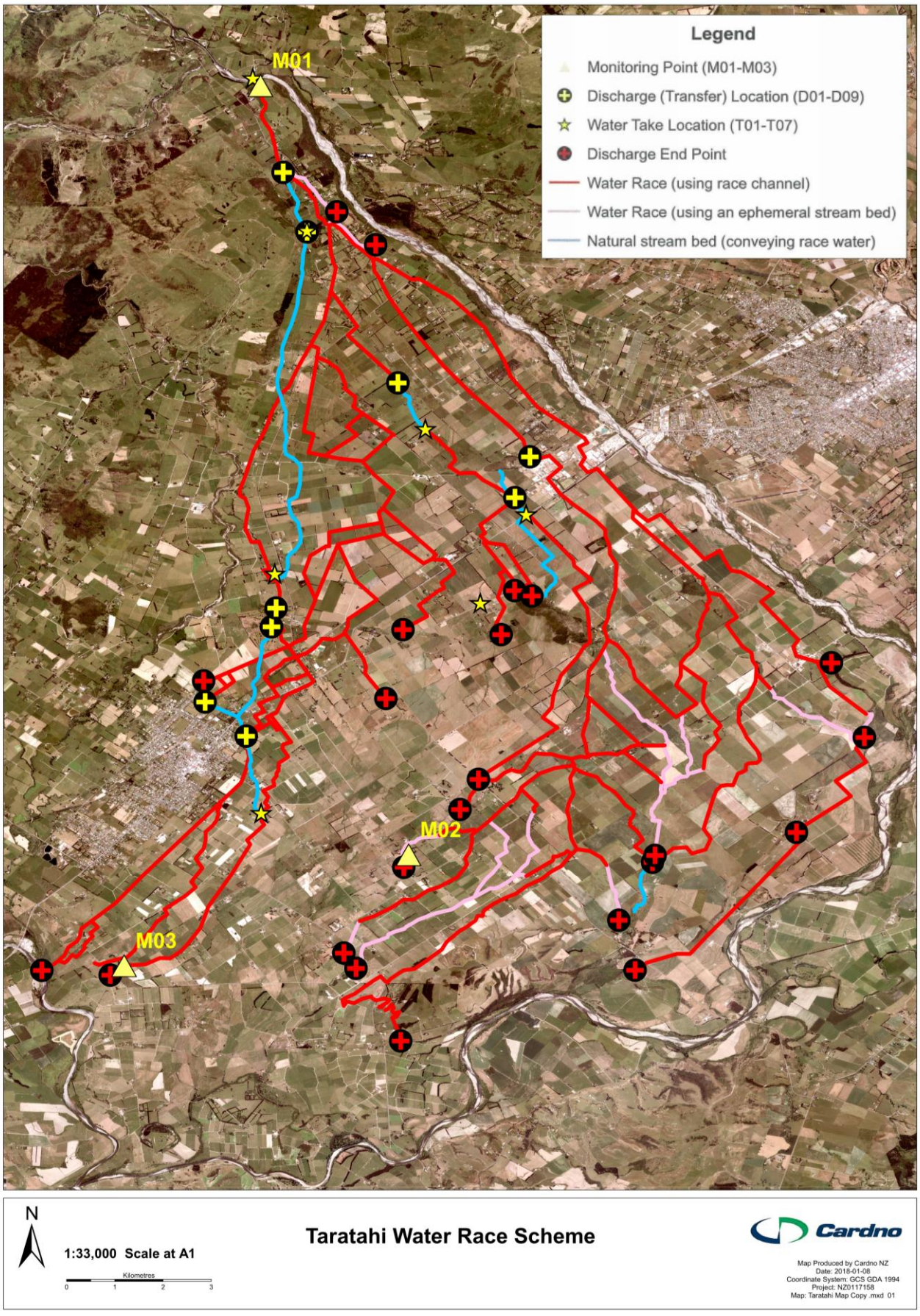


Figure 1-1 Map of Taratahi Water Race Scheme (source GWRC)

This water quality audit has been conducted in accordance with Condition 39 of WAR 010227-21599 and uses the water quality monitoring results from 2015-2017 to assess the impact of the discharge on the receiving environment. The water quality parameters that have been monitored are listed in Table 1-1. The assessment criteria used to assist in understanding the impact the water race discharges are having on the receiving environment are detailed in Table 1-2. The highlighted values are those used in the water quality discussion in Section 2.

Criteria from four difference sources have been compared as no single document provides thresholds for all parameters measured in this consent. The four sources are:

- Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000);
- Regional Freshwater Plan, Greater Wellington Regional Council (GWRC, 2014);
- National Policy Statement for Freshwater Management 2014, updated 2017 (NPS-FW, 2017); and
- Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas, Ministry for the Environment (MfE, 2003).

Table 1-1 Water quality parameters monitored for the Taratahi Water Race Scheme

Field Observations and Assessment	
After reasonable mixing the discharge of water from the TWRS into natural watercourses shall not cause any of the following effects: • The production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials; • Any conspicuous change in the colour or visual clarity; • The rendering of freshwater unsuitable for consumption by farm animals; • Any significant adverse effects on aquatic life; • Undesirable biological growths; and • The temperature to be changed by more than 3°C or to exceed 25°C.	
Physical Measures (sampled every two months)	**Measurement unit and detection limit**
Escherichia coli	1 cfu/100mL
Ammoniacal nitrogen	0.001 g/m^3
Nitrate-nitrite nitrogen	0.002 g/m^3
Total nitrogen	0.1 g/m^3
Soluble inorganic nitrogen	0.1 g/m^3
Dissolved reactive phosphorus	0.004 g/m^3
Total phosphorus	0.004 g/m^3
Dissolved Oxygen (absolute and percentage saturation)	0.001 g/m^3 and 1% saturation (using a field meter)
Water temperature	0.01^0C (field meter)
Suspended solids	<3 g/m^3
pH	0.01 units (field meter)
Conductivity	0.1 uS/cm (field meter)

Table 1-2 Water quality assessment criteria for the receiving environment

Physical Measures (sampled fortnightly between November and April)	ANZECC trigger value, 2000	Regional Freshwater Plan, 2014	NPS-FW, 2017 National Bottom Line	MfE, 2003	Commentary
Field Observations		Presences			
Physical Measures					
E. coli			1000 cfu/100 mL (annual median)	550 cfu/100 mL	The *E. coli* assessment criteria in MfE guidelines is for recreational water (bathing, water sports, domestic shellfish collection etc.). The trigger is 550 cfu/100 mL. This threshold provides a much greater level of protection than is necessary for stock drinking water based on the likelihood of contact with humans and consequence of risk.
Total nitrogen	614 ug/L				ANZECC default ecological trigger value of slightly disturbed lowland river ecosystems. Livestock drinking water quality standard is for nitrate and nitrite concentrations, not total nitrogen.
Total phosphorus	33 ug/L				ANZECC default ecological trigger value of slightly disturbed lowland river ecosystems.
pH	7.2-7.8 pH lowland ecosystems 6-9 pH general water use	Any pH change (waters managed for aquatic ecosystems)			ANZECC default trigger value of slightly disturbed lowland river ecosystems is for a pH range of 7.2-7.8. It is noted that the trigger values may not be very useful because of diurnal and seasonal variation. ANZECC guideline for general water use for surface water systems is 6-9 pH. Soil and animal health will not generally be affected by water with pH 4-9.
Conductivity					There is no trigger value for conductivity
Dissolved oxygen	98-105 % saturation (daytime sampling)	<80% after reasonable mixing (waters managed for aquatic ecosystems)	4.0 mg/L (1-day summer minimum)		It is noted in the ANZECC guidelines that the trigger values may not be very useful because of diurnal and seasonal variation.
Suspended solids	<40 g/m^3	<50 g/m^3			ANZECC guideline is for the protection of aquaculture species. GWRC guideline is a permitted activity for the discharge of contaminants into water.

2 Water Quality Monitoring Results

The water quality monitoring was undertaken by CDC bimonthly between 2015 and 2017. The results from the monitoring have been assessed against trigger thresholds to assist in understanding the impact the race discharge is having on the receiving environment. These have been plotted with the trigger value in this section.

2.1 Temperature

Wide variations in temperature can be harmful to stream life, and are generally influenced by low stream flows (NIWA, 2016). As shown in Figure 2-1 all samples fall under the trigger temperature of 25ºC. However, temperature differences exceeding 3ºC between the upstream and downstream monitoring locations was noted on a number of occasions. Details of these occurrences are listed below.

- On the 1/10/2015 the temperature difference between the upstream TM01 and the downstream TM02A was 3.1 degrees, to TM02B was 3.4 degrees, to TM02C was 3.3 degrees, and to TM03 was 3.1 degrees.
- On the 2/12/2015 the temperature difference between the upstream TM01 and the downstream TM02A was 5.2 degrees, to TM02B was 5.4 degrees, to TM02C was 5.3 degrees, and to TM03 was 5.1 degrees.
- On the 1/02/2016 the temperature difference between the upstream TM01 and the downstream TM02C was 5.3 degrees.
- On the 12/09/2016 the temperature difference between the upstream TM01 and the downstream TM02B was 3.4 degrees, to TM02C was 4.3 degrees, and to TM03 was 3.0 degrees.
- On the 23/11/2016 the temperature difference between the upstream TM01 and the downstream TM02A was 4.7 degrees, to TM02B was 5.2 degrees, to TM02C was 5.1 degrees, and to TM03 was 5.3 degrees.
- On the 16/01/2017 the temperature difference between the upstream TM01 and the downstream TM02B was 3.6 degrees, to TM02C was 4.8 degrees, and to TM03 was 4.0 degrees.
- On the 13/09/2017 the temperature difference between the upstream TM01 and the downstream TM02B was 3.9 degrees and to TM02C was 4.1 degrees.
- On the 7/11/2017 the temperature difference between the upstream TM01 and the downstream TM02B was 5.0 degrees, to TM02C was 5.3 degrees, and to TM03 was 3.2 degrees.

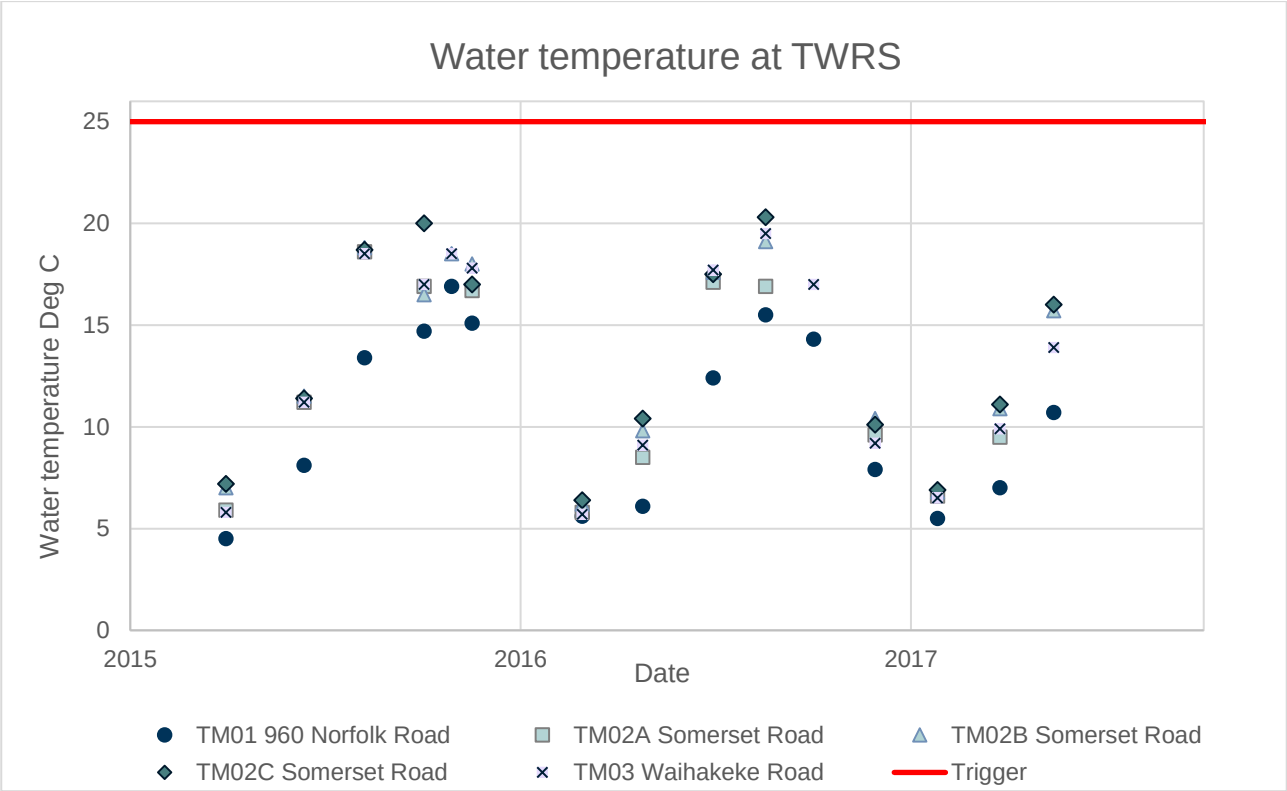


Figure 2-1 Temperature (ºC) monitored at the Taratahi Water Race Scheme

2.2 Total phosphorus and total nitrogen

Elevated levels of total phosphorous and total nitrogen in agricultural streams are largely reflective of land use practises in the catchment (e.g. fertiliser application, animal waste/stock access to streams and waste water management).

There are exceedances in both total phosphorus and total nitrogen at the downstream monitoring sites. All samples measured at the upstream TM01 site are below the threshold for both total phosphorus and total nitrogen.

For total phosphorus 92% of samples at TM02A, 57% of samples at TM02B, 58% of samples at TM02C, and 93% of samples at TM03 are in exceedance of the threshold value, as shown in Figure 2-2.

For total nitrogen 33% of samples at TM02A, 57% of samples at TM02B, 83% of samples at TM02C, and 53% of samples at TM03 are in exceedance of the threshold value, as shown in Figure 2-3.

Between the upstream TM01 site and the downstream monitoring locations total phosphorus and total nitrogen has increased.

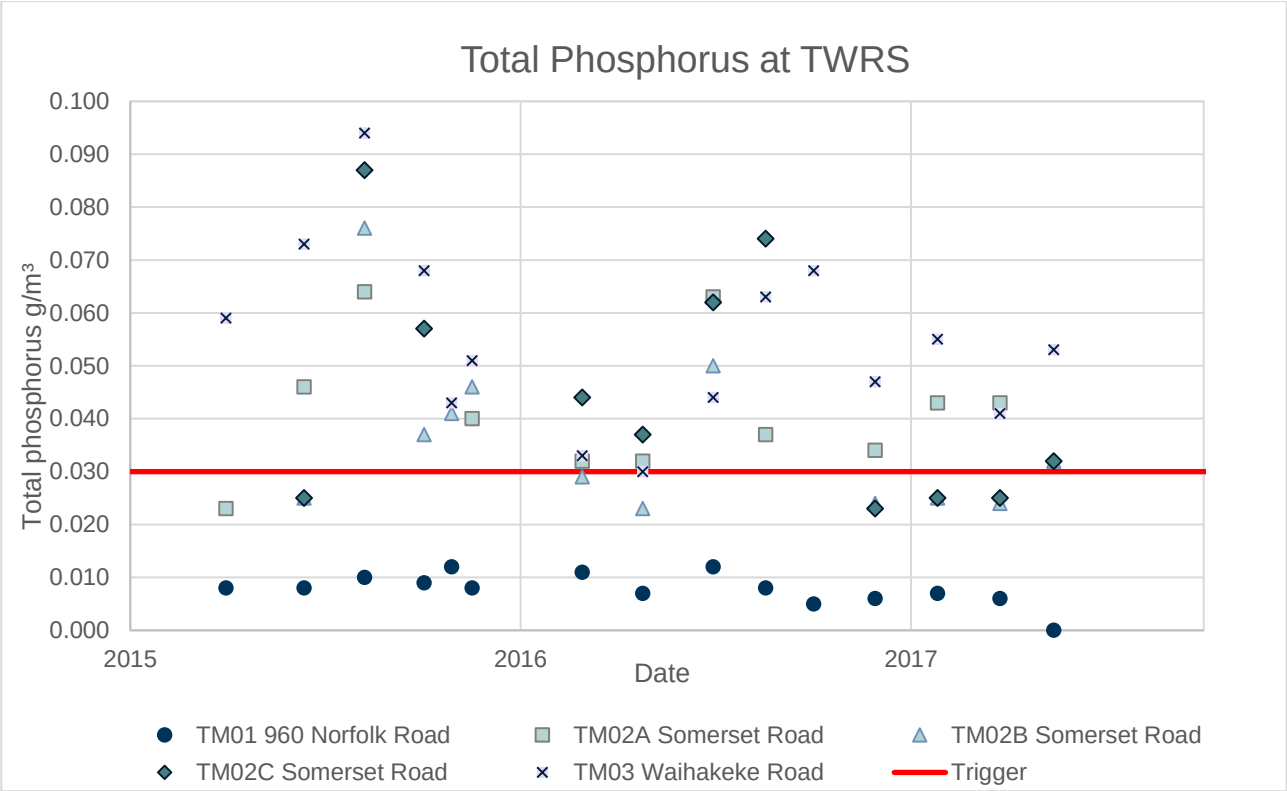


Figure 2-2 Total phosphorous (g/m³) monitored at the Taratahi Water Race Scheme

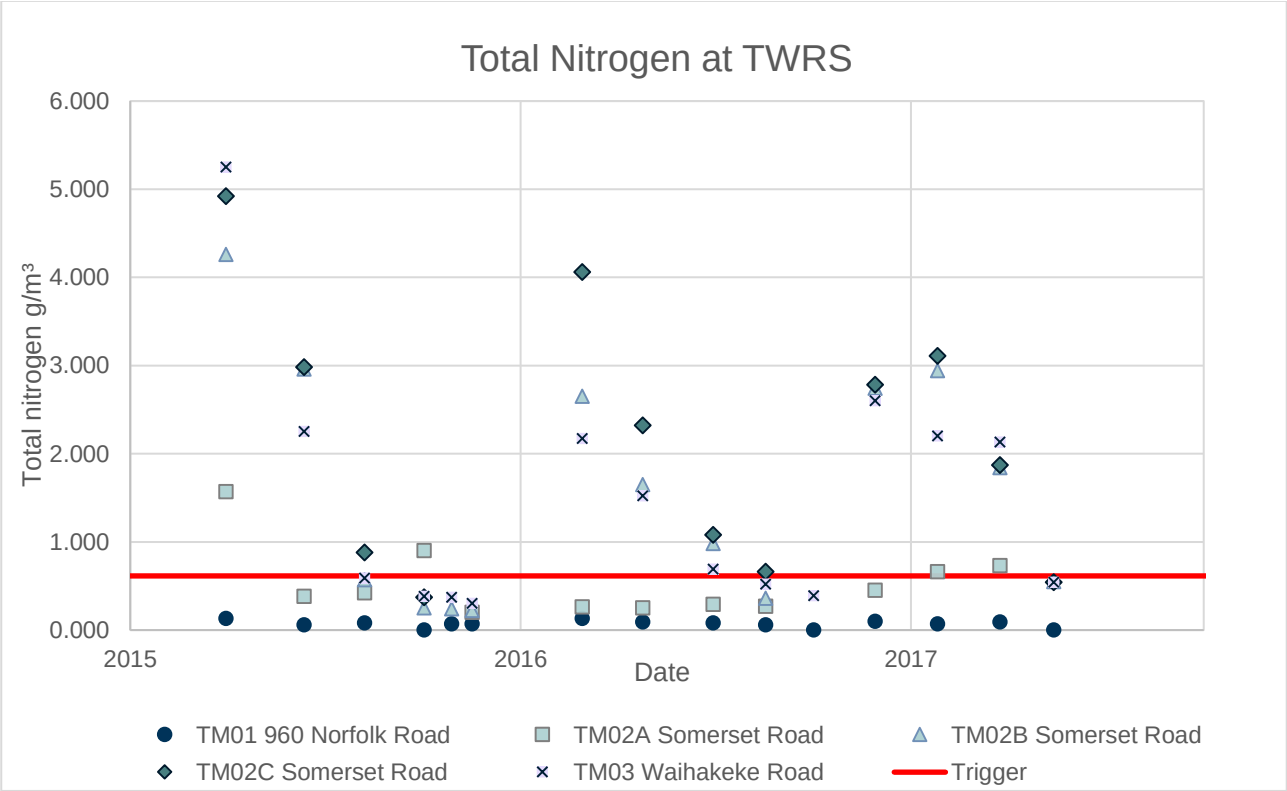


Figure 2-3 Total nitrogen (g/m³) monitored at the Taratahi Water Race Scheme

2.3 *E. coli*

Elevated *E. coli* levels in streams can come from a variety of sources such as agricultural runoff, wastewater treatment plants, on-site septic tank systems, and wildlife that use water as their natural habitat. As shown in Figure 2-4 the majority of the *E. coli* results fall below the 1000 *E. coli* per 100 mL threshold value. This is with

the exception of two samples one at 2000 cfu/100ml taken from TM03 on the 1/10/2015 and one at 11,000 cfu/100ml taken from TM02B on the 2/12/2015 (due to scale issues this value has been excluded from the graph).

E.coli readings are higher at the downstream sites in comparison to the upstream monitoring location.

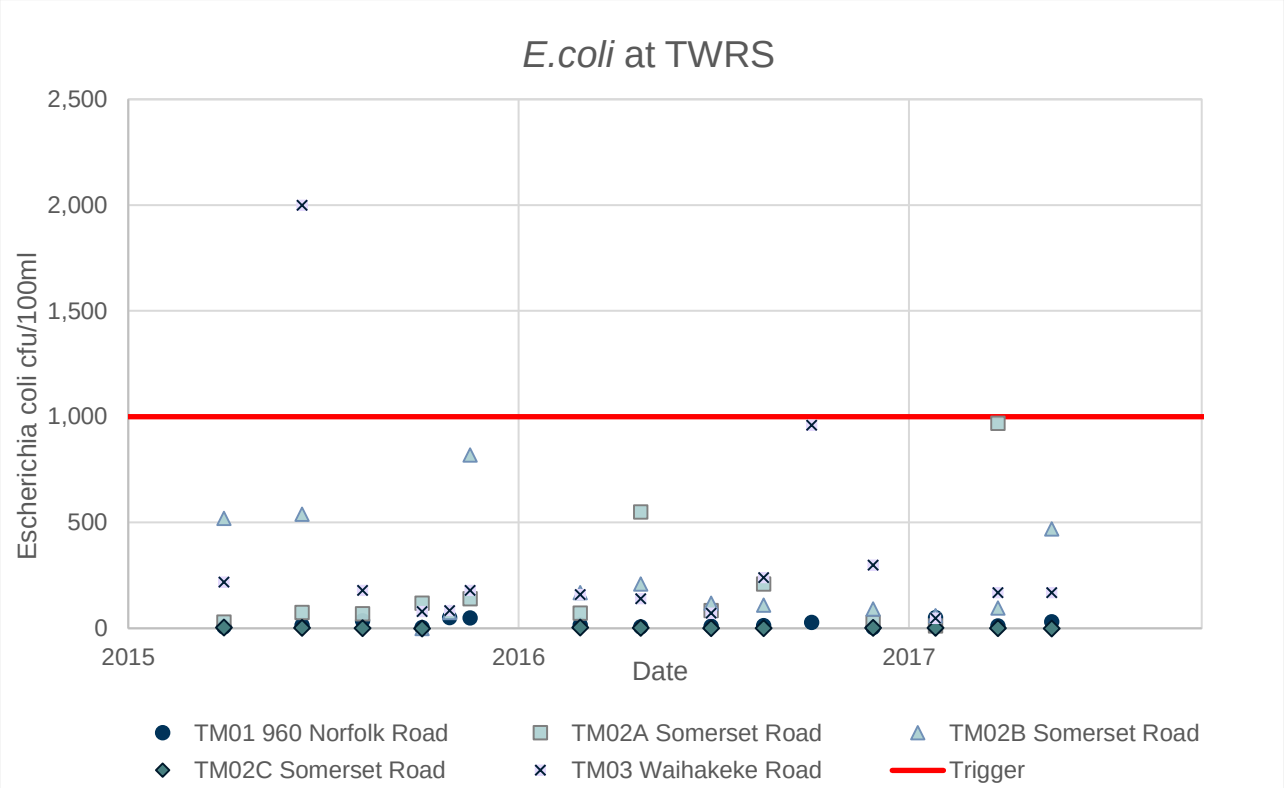


Figure 2-4 Total *E. coli* (cfu/100 mL) monitored at the Taratahi Water Race Scheme

2.4 pH

Variations in pH can be harmful to aquatic invertebrate and are influenced by waters draining swamps or pollution discharge/seepage (which generally leads to acidic waters) and photosynthetic activity by periphyton and macrophytes (generally leads to more alkaline waters) (NIWA, 2016). With increasingly acid waters the numbers of species and aquatic organisms generally decreases (NIWA, 2016).

Figure 2-5 shows the results for laboratory pH in the upstream TM01 site are all within the upper and lower limits for lowland ecosystems set by ANZECC guidelines. However, there are a number of readings from the downstream sites that are just below the lower limit of pH 7.2, with one value from TM02A above the upper limit of pH 7.8. All laboratory pH values are within the pH 6-9 general water use ANZECC guideline values. Animal health will generally not be affected by water with pH 4-9 according to ANZECC guideline (which all recordings are within).

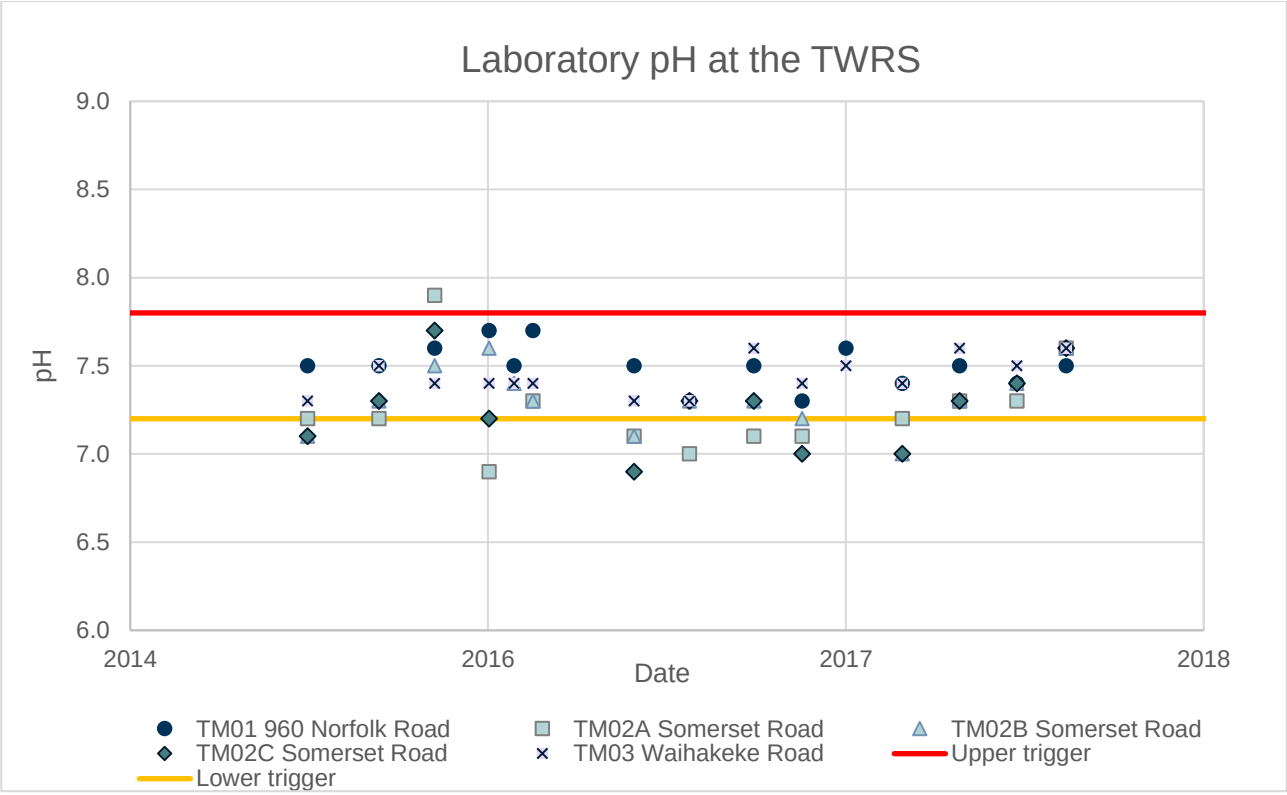


Figure 2-5 Laboratory pH downstream monitored at the Taratahi Water Race Scheme (TWRS)

The pH results for the field measurements show greater variance than the laboratory pH values with both the upstream and downstream sites showing records out of the upper and lower limits for lowland ecosystems of pH7.2 -7.8. As shown in Figure 2-6, only two records are outside the general use range of pH 6-9. One of which, is from the upstream TM01 on the 7/11/17 with a pH of 5.8 and the other from site TM02B on the 11/07/17 with a pH of 9.9. It is possible that the field readings are inaccurate as they do not correspond with the laboratory pH.

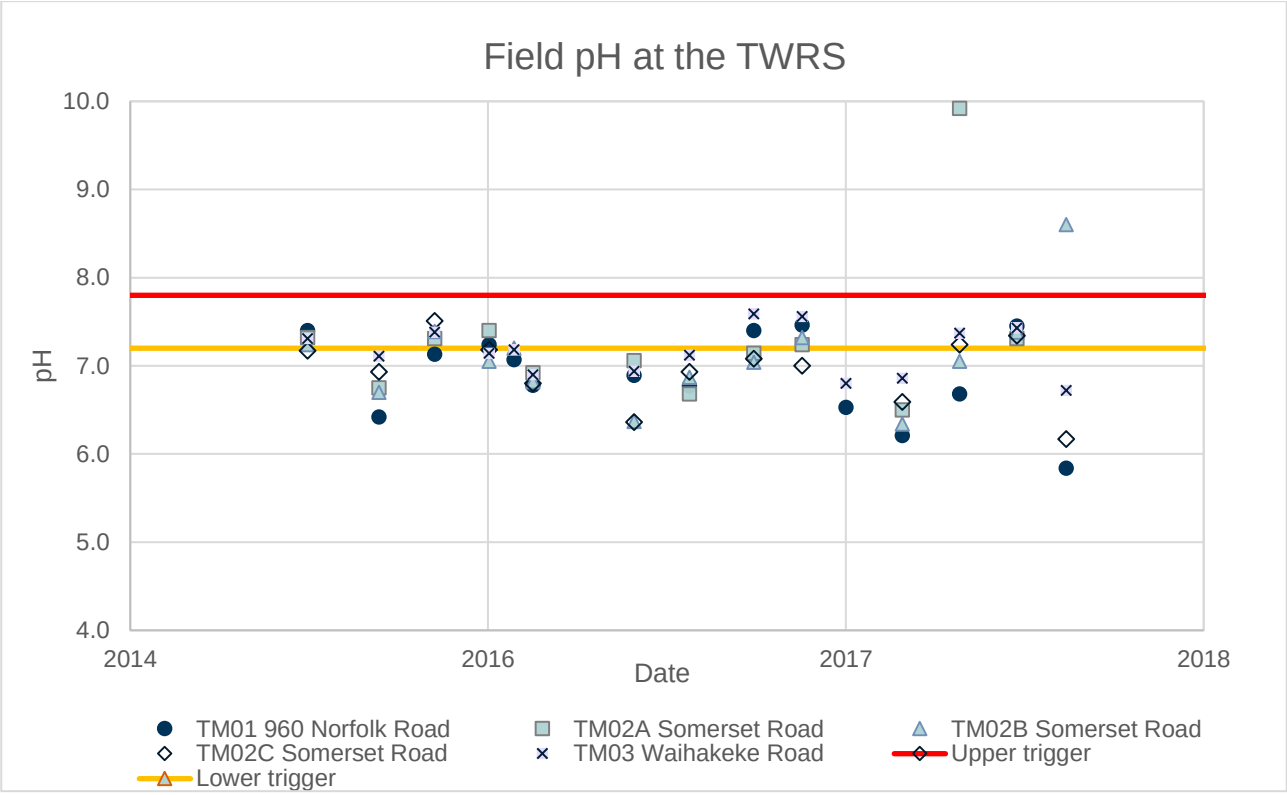


Figure 2-6 Field pH downstream monitored at the Taratahi Water Race Scheme (TWRS)

2.5 Dissolved oxygen

Dissolved oxygen varies due to flow rate, temperature, water depth, macrophyte growth, (high macrophyte growth contributes to low dissolved oxygen concentrations), nutrient inputs and features that provide oxygenation such as water falls. Excessive plant and algae growth and decay in response to increasing nutrients in waterways can significantly affect the amount of dissolved oxygen available (NIWA, 2016). The oxygen content of water decreases when there is an increase in nutrients and organic materials from runoff from the land. Reduced levels of dissolved oxygen can limit the available habitat where species can live and grow as fish generally avoid areas with low oxygen (NIWA, 2016).

It is also noted that dissolved oxygen varies due to diurnal and seasonal variation. At night dissolved oxygen is consumed by plant and animal respiration and decomposition, and by day animal respiration and decomposition continues, but photosynthesis by plants produces oxygen. Seasonal variation is also caused by changes in the temperature of the water, flow and macrophyte growth.

Dissolved oxygen values are shown in Figure 2-7. Upstream values recorded at TM01 are all above the 80% dissolved oxygen threshold with the exception of the samples taken on the 29/02/2016 which has a particularly low value of 7.8%. On this date only three out of five sites were sampled due to the water course being dry with no flow. It is possible that the limited flow has resulted in low dissolved oxygen recorded on this day, however given that the values are drastically different to those recorded over the rest of the sampling period it is possible that this may have been an inaccurate reading.

The dissolved oxygen recorded at the downstream sites has a varies from the upstream values. Generally, but not always, the downstream dissolved oxygen values are lower than those from upstream. In a number of cases dissolved oxygen falls below the threshold trigger value of <80% dissolved oxygen. The percentage of samples that fell below the threshold value was 42% of samples at TM02A, 36% of samples at TM02B, 38% of samples at TM02C, and 33% of samples at TM03 in exceedance of the threshold value.

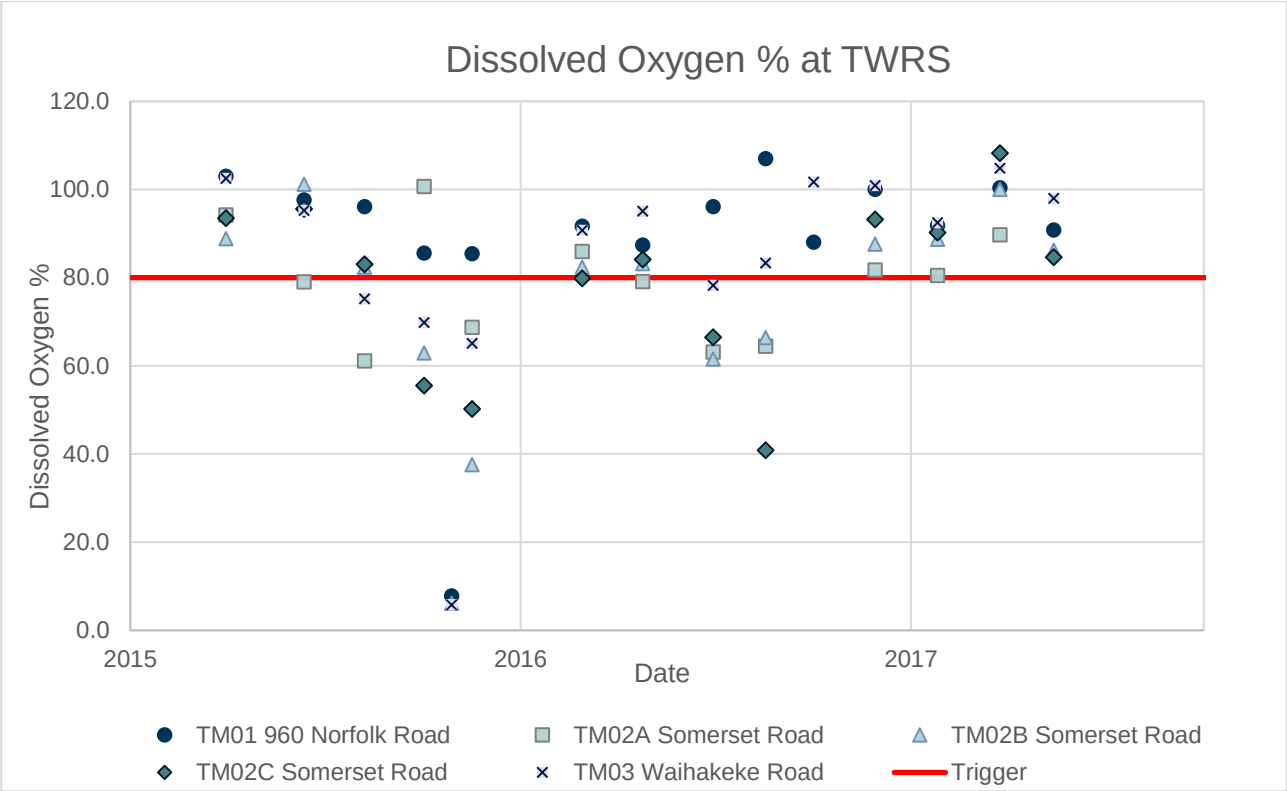


Figure 2-7 Dissolved oxygen % monitored at the Taratahi Water Race Scheme (TWRS)

2.6 Suspended solids

Suspended solids are a measure of the silt or suspended sediment particles in the stream and give an indication on the clarity of the water. The particles can either be washed in directly from the banks, from runoff from bare land and/or eroding slopes, and from stock trampling. As shown in Figure 2-8 there are only two occurrences of suspended solids readings exceeding the threshold value of 50 g/m³ (GWRC guideline for the discharge of contaminants into water) for suspended solids, all other are below the threshold.

As shown in Figure 2-8, while values recorded at the downstream monitoring sites are generally higher than those from the upstream site all values, with the exception of the two outliers, are also below the 40 g/m³ ANZECC guideline for the protection of aquaculture species.

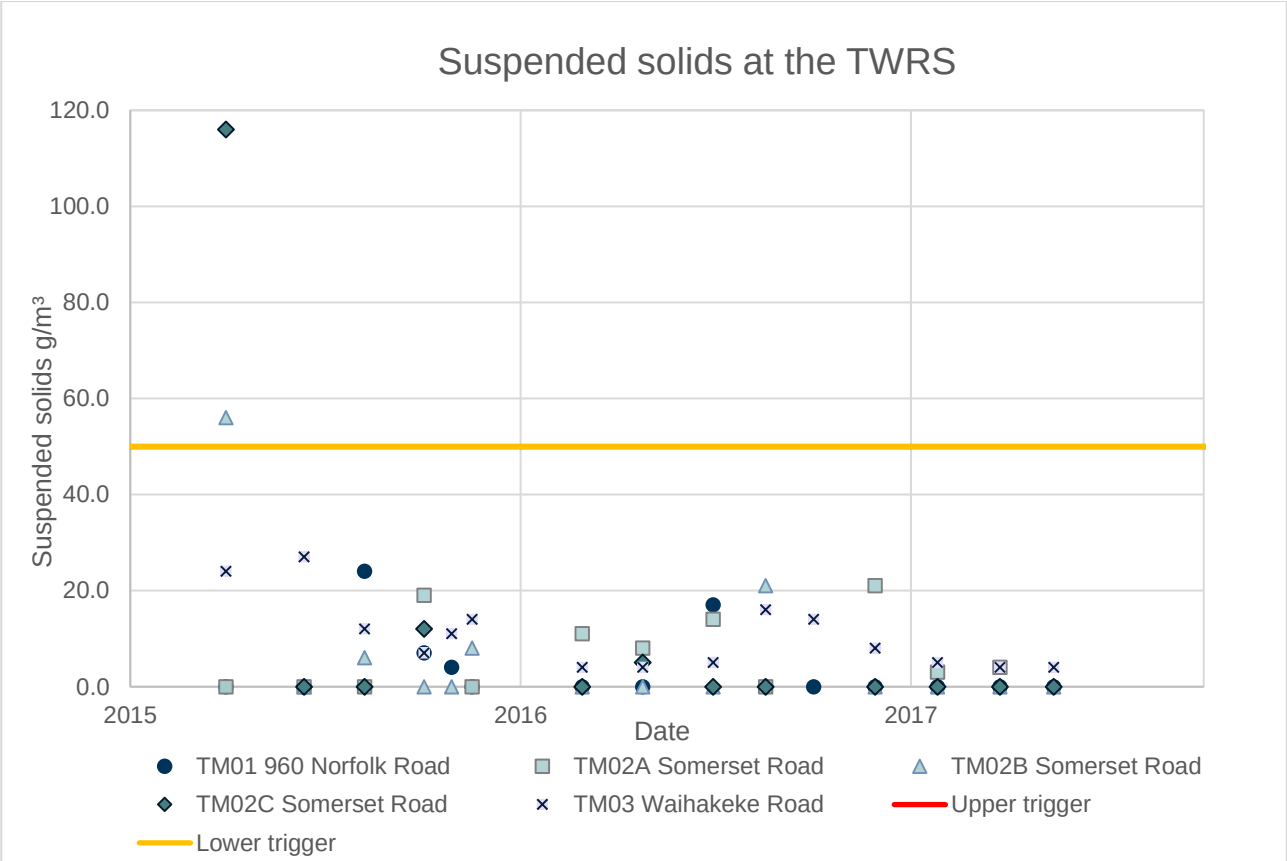


Figure 2-8 Suspended solids (g/m³) monitored at the Taratahi Water Race Scheme (TWRS)

2.7 Conductivity

Conductivity is a measure of the total ionic strength of the water and gives an indication of the level of enrichment (i.e. nutrient content) of the water. There is no threshold value for conductivity; however, the results are compared in Figure 2-9 below. Conductivity readings across all sites are low. Conductivity levels are lowest at the upstream monitoring location.

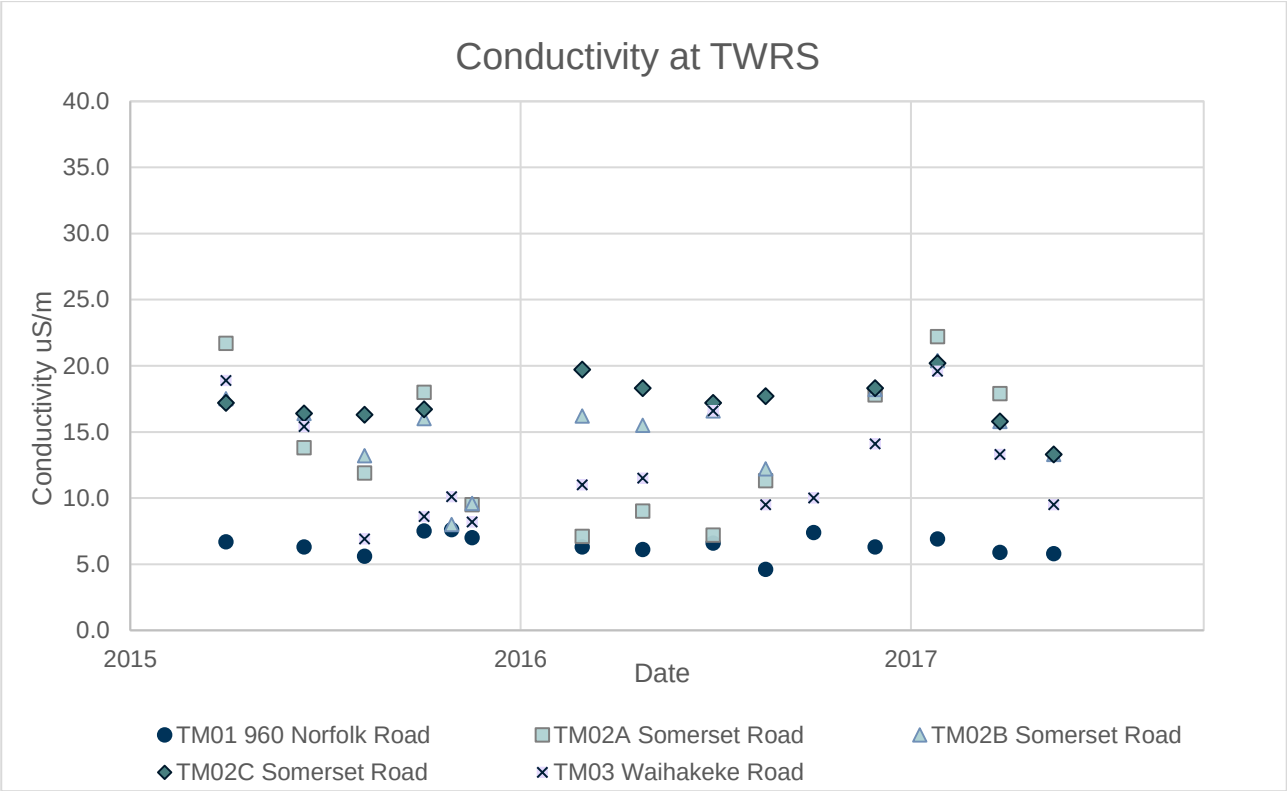


Figure 2-9 Suspended solids (g/m³) monitored at the Taratahi Water Race Scheme (TWRS)

2.8 Field Observations

Field observations have not been provided. It is assumed that the lack of information provided on any change in the colour or visual clarity or the noting of conspicuous oil or grease films, scums or foams, or floatable materials was because none where observable in the field when samples were taken.

3 Mitigation of Adverse Effects

This water quality audit is to identify and decide on appropriate mitigation measures to minimise adverse effects of land use practices on the quality of the water in the races as per Condition 39 of Resource Consent WAR 010227 (21599).

Discharge from the TWRS will impact on the quality of the receiving waters, and consequently may have an impact on the attribute state assigned to the downstream tributaries. As a result, land use management practices will form part of a management plan to improve the water quality of the overall catchment.

The TWRS is currently part of a larger project required under the National Policy Statement for Freshwater. This involves stakeholder engagement to understand the values different uses place on waterbodies, and how those values relate to the quantity and quality of water. This will help to inform the attribute state assigned to the waterbody. If necessary, a management plan will be developed to map out a pathway to achieve that attribute state.

Within the proposed Natural Resources Plan for the Wellington Region the Waingawa River and Parkvale Stream (from which the TWRS takes/discharges to) are listed as rivers with minimum flows within the Ruamahanga Whaitua catchment. By having a minimum flow and minimum water level requirement the Mangatarere Stream is sustainably managed by minimising water use when river flows are low. Ensuring the flow does not reach below these minimum flows will help allow the flushing and mixing of discharge to the stream, which will help prevent a decrease in water quality.

Within the proposed Natural Resources Plan for the Wellington Region the Parkvale Stream has been listed as being a priority area under Method 10: Water quality investigation and remediation actions. The reason for which being elevated nitrate and periphyton levels. Wellington Regional Council will further investigate effects, establish or confirm causality, and develop appropriate remediation and/or containment programmes to address water quality issues in the catchment.

The TWRS also comes under Method M13: Wairarapa water races within the proposed Natural Resources Plan for the Wellington Region. This states that the Wellington Regional Council will work with Wairarapa district councils and landowner to characterise hydrology, water quality, ecology, and the social, heritage and cultural values in the Wairarapa water races to develop management options which, among others, will include options for improving water quality.

Mitigation measures, which have been identified either through the whaitua process or the ‘Code of Practice should be applied to mitigate adverse effects of the discharges of the TWRS. Within the consents it is stated that the Taratahi Water Race will operate in accordance with the Code of Practice. As a minimum this shall include:

- Best practice measures for minimising stock access to water including fencing stock out of water races;
- Initiatives for processing riparian planting within the water race network;
- Identify best practice procedures for cleaning out water races;
- A strategy that identifies localised areas, water race sections, and/or properties where water quality and water efficiency within the TWRS network could be improved. The strategy shall set out a timetabled programme to implemented during the term of consent which investigates opportunities to proactively work with landowners in any identified localised areas, water race sections, and/or properties. This shall include (but is no limited to) investigating closing sections of water races where alternative sources of supply exist, and actively promoting best practice of land and stock management to minimise water quality impacts.

Given the limited water quality data recorded for the TWRS it is recommended that water quality monitoring continues to build a better understanding on the effects of the discharges and to be able to pick up on any water quality degradation that may occur.

4 Summary

Surface water monitoring and reporting is required to assess the impact of the TWRS on the receiving environment to satisfy Condition 39 of Resource Consent WAR 010227 (21599). Water quality data collected by Carterton District Council bi-monthly from 2015 to 2017 has been analysed and discussed in this report. The following is a summary of the results.

Temperature differences exceeding 3ºC between the upstream and downstream monitoring locations were noted on a number of occasions. Levels of total phosphorus and total nitrogen are generally higher in the downstream sites compared to the upstream sites, with the majority of results above threshold limits at the downstream locations. *E.coli* readings are higher at the downstream sites in comparison to the upstream monitoring location. The majority of the *E. coli* results fall below the 1000 *E. coli* per 100 mL threshold value. All laboratory pH values are within the pH 6-9 general water use ANZECC guideline values. The results for field pH show greater variance than the laboratory pH values with both the upstream and downstream sites showing records out with the upper and lower limits for lowland ecosystems from pH 7.2- 7.8. Only two records are out with the general use range of pH 6-9. The dissolved oxygen values recorded at the downstream sites vary from the upstream sites. Generally, but not always, the downstream dissolved oxygen values are lower than those from upstream. In a number of cases dissolved oxygen was outside the threshold trigger value of <80% dissolved oxygen. there are only two occurrences of suspended solids readings exceeding the threshold value, all other results were below the threshold.

The elevated levels in nutrients may be due to a variety of sources/land use practises such as fertiliser application, animal waste/stock access to streams and waste water management. Dissolved oxygen can be linked to nutrient input, flow rate, temperature, water depth and macrophyte growth.

Continued monitoring of water quality in the TWRS is recommended to be able to understand, flag and control any potential future degradation to the water race. Appropriate land use practises and management strategies should be implemented such as upholding the minimum flow and river levels values and ensuring the operation is in accordance with the Code of Practice. This will help to reduce the impact of the discharge on Mangatarere Stream.

5 References

ANZECC, 2000, *Australia and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council; and Agriculture and Resource Management Council of Australia and New Zealand.

GWRC, 2013, *Officer report WAR010227: Carterton District Council Taratahi Water Race Scheme*, Greater Wellington Regional Council.

MfE, 2003, *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas.* Ministry for the Environment

MfE, 2017, *National Policy Statement for Freshwater Management 2014, Updated August 2017 to incorporate amendments from the National Policy Statement for Freshwater Amendment Order 2017,* Ministry for the Environment.

NIWA, 2016, https://www.niwa.co.nz/our-science/freshwater/tools/kaitiaki_tools/impacts/dissolved-oxygen

GWRC, 2014, *Regional Freshwater Plan for the Wellington Region*, Greater Wellington Regional Council.

GWRC, 2015. *Proposed Natural Resources Plan for the Wellington Region,* Greater Wellington Regional Council.

21 February 2018

Water Race Committee

Election of Water Race Committee community representatives

1. PURPOSE

The purpose of this paper is to inform the Water Race Committee of the process for electing community representatives in 2018.

2. SIGNIFICANCE

The matters for decision in this report are not considered to be of significance under the Significance and Engagement Policy.

3. COMMITTEE MEMBERSHIP

Under its terms of reference agreed by Council in November 2016, membership of the Water Race Committee comprises three elected members, four community members elected by water race users, and additional co-opted members if required.

There should be at least one representative from each of Taratahi and Carrington races. The term of the appointment is for three years.

4. EXISTING REPRESENTATIVES

Neal Wadham and David Ellison were elected at the last election in 2014. John McFadzean and Grant Smith were subsequently co-opted to fill the vacant positions.

The next election was due in 2017. Council agreed to defer the 2017 election of replacement community representatives until the outcome of the current Local Government Commission process on amalgamation of Wairarapa district councils was clear. The current ratepayer representatives were co-opted to continue until 30 June 2018.

5. ELECTION PROCESS

The process for the 2018 election will be as follows:

early April	Call for nominations from water race ratepayers
late April	Nominations close
early May	Voting papers distributed
early June	Voting closes
	Election Day
mid-June	Advise candidates and ratepayers of result

The Electoral Officer will be the Corporate Services Manager.

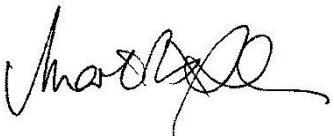
It is proposed that the term will be for three years, with the next election in 2021.

6. RECOMMENDATIONS

That the Water Race Committee:

1. **Receives** the report.

2. **Recommends** that Council commence the process to elect community representatives to the Water Race Committee as outlined above.



Marty Sebire
Corporate Services Manager

Friday, 16 February 2018

Water Race Committee

Water Race Operations Report: NOVEMBER 2017 – JANUARY 2018

1. PURPOSE OF THE REPORT

The purpose of this report is to provide an update on the management of the water races for the period 1st November to 31st January 2018.

2. SIGNIFICANCE

The matters for decision in this report are not considered to be of significance under the Significance and Engagement Policy.

3. CLEANING PROGRESS

Water races on the following properties were cleaned during the three months to January 2018.

Taratahi Water Race Scheme

Small Digger

- R Dick
- B Booth
- A Smith
- J Cameron
- H Eagen
- N Wilton
- C Wins
- Ravensdown
- P Reid
- W Stole
- M Wilton
- G Todd
- B Allen

- West Taratahi School
- R Lowes
- D Lange
- J Snow
- I Jones

Spraying with Bike

- J Leighton
- R Skely
- N Wadham

Rural Works

- Park Road – Campbell's through to Booth Creek
- TSM farms – Somerset Road
- Neville Taylor
- Taratahi Pub – Gasoline Heaven
- Hughes Line downstream to Goodwins to Bush
- Swanson's old place – road to intake
- Reids
- Carterton Golf Course and neighbouring properties
- Smith's Laneway through to Clareville Cemetery
- Lowe's
- Lifestyle Properties upstream from Carterton Golf Course to Smith's
- Taratahi Training Farm
- Tullochs – Cornwall Road
- Alistair Smith's – SH2
- Snows – Lowes - Buzby
- Didsbury – Preston
- Osbornes
- Sage and upstream neighbour
- Wiltons Road from Railway line to Vineyard
- Van Barneveld
- Campbell's – Francis Line
- Bev Duffy
- Peter Burgess
- Wiltons – Wiltons Road back line
- Smiths

- Nieches Lane
- Searle/Tulloch across to Fisher block to bakery
- Kokotau Hill roadside culvert blockage
- Stolts – Quinns – Allen's to Wiltons Road
- Hoopers – Wiltons old block
- Smiths – Anderson's line block
- Daryl Burgess
- Riddell's
- Campbell's Hillside job
- Withers
- JNL paddock
- Urlar Vineyard
- Ryan
- Wells
- John Booth
- Middle Run
- Johner Vineyard
- Bevan Booth
- Middleton – Gallon

Carrington Water Race Scheme

Small Digger

- J Dash
- J Rotman
- N Terry
- A Beken
- G Dashy
- T Brown
- J McFadzean
- Fensham

Rural Works

- Auto gate Area
- Carrington Hill from Hodder to McFadzeans
- Intake and River work
- Intake jetting
- Belvedere Road – Scotts place

- Bill Carters – front line
- Cobden Road – Aidan's
- McFadzeans
- Smith's - Daysh through to Reids Piggery

4. STANDARD OPERATING PROCEDURE

Work has paused on preparing standard operating procedures while staff have been doing other priority work. The project will commence again when workload pressure reduces.

5. RECOMMENDATIONS

That the Committee:

1. **Receives** the report.

Garry Baker

Operations Manager

21 February 2018

Water Race Committee

Financial performance to December 2017

1. PURPOSE OF THE REPORT

The purpose of this paper is to provide financial information on the water races for the 2017/18 financial year to 31 December 2017.

2. SIGNIFICANCE

The matters for decision in this report are not considered to be of significance under the Significance and Engagement Policy.

3. COMMENT ON VARIANCES

Financial statements are attached.

In the six months to date, the water races have returned an operating surplus of $13,877, compared with a budgeted deficit of $342. Overall, there are no significant financial issues.

Revenue to-date has been $15,000 under budget, due to industrial water race fees not been billed yet.

Expenditure to-date was $29,219 under budget. Overall it is forecast to be a favourable variance at year-end.

The major variances are timing which will correct before year end, particularly maintenance work. Significant cleaning has begun and this will show in subsequent reports. There may be some favourable permanent differences, though, for vehicles and personnel. These are likely to be offset somewhat by full-year unfavourable variances for depreciation ($13,000) and for resource consents ($1,700).

Capital works have now started. The silt trap at Waingawa is complete, and work has started on the box culvert under the railway at Chester Road. General culvert headwalls have not started yet.

4. RESERVES

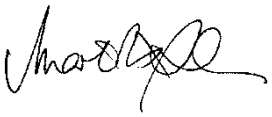
The Water Race Contingency Reserve stands at $59,380. This is an accumulation of small contributions from surpluses in previous years, and is available for emergency purposes.

The balance in the Water Race Targeted Rates Reserve is $116,081. This is an accumulation of the net surpluses and deficits in the Water Race activity after transferring to the contingency reserve and the general depreciation reserve. This can only be used for Water Races expenditure, capital and operating.

5. RECOMMENDATIONS

That the Committee:

1. **Receives** the report.



Marty Sebire
Corporate Services Manager

WATER RACES

STATEMENT OF FINANCIAL PERFORMANCE

FOR THE FINANCIAL YEAR TO 31 DECEMBER 2017

Annual Plan Full year $		TARATAHI Year to date Actual $	CARRINGTON Year to date Actual $	Year to date Actual $	Year to date Budget $	Year to date Variance $
	Income					
40,164	Rates - General	14,346	5,736	20,082	20,082	-
361,480	Rates - Water Races	129,114	51,630	180,744	180,744	-
30,000	Fees - industrial water races	-	-	-	15,000	*15,000 U*
-	Miscellaneous revenue	-	-	-	-	-
431,644	**Total income**	143,460	57,366	200,826	215,826	*15,000 U*
	Expenditure					
63,185	Internal charges	22,128	10,506	32,634	31,584	*1,050 U*
11,000	Consultancy	-	-	-	5,500	*5,500 F*
24,000	Maintenance - intake	-	-	-	12,000	*12,000 F*
139,000	Maintenance - water races	39,350	20,110	59,460	69,500	*10,040 F*
32,000	Materials	5,474	11,477	16,951	15,000	*1,951 U*
9,000	Monitoring	1,919	211	2,130	4,400	*2,270 F*
18,000	Resource consents	13,768	9,223	22,991	18,000	*4,991 U*
16,000	Vehicles	3,323	-	3,323	8,000	*4,677 F*
84,825	Personnel	23,584	14,694	38,278	42,362	*4,084 F*
9,176	Depreciation	9,486	1,586	11,072	4,590	*6,482 U*
8,458	Other	110	-	110	5,232	*5,122 F*
414,644	**Total expenditure**	119,142	67,807	186,949	216,168	*29,219 F*
17,000	**Surplus/(deficit)**	**24,318**	**(10,441)**	13,877	**(342)**	*14,219 F*
	CAPITAL EXPENDITURE					
15,000	Water race culvert headwalls			-	15,000	15,000
6,400	Extend silt trap Waingawa			6,762	6,400	362
60,000	Box culvert under railway line - Chester Road			11,284	60,000	48,716
81,400	**Total capital expenditure**			**18,046**	**81,400**	**63,354**

The minutes of the Water Race Committee Meeting of the Carterton District Council held in the Hurunui o Rangi Room at the Carterton Events Centre, 50 Holloway Street, Carterton on Monday 20 November 2017 at 9.30am.

Present: Mayor John Booth (presiding)
Cr B Deller, G Smith, J McFadzean, N Wadham, D Ellison.

Attendance: M Sebire (Corporate Services Manager)
J Davis (Chief Executive)
G Baker (Infrastructure and Services Manager)
H Burgess (Executive Assistant)
T Pritchard (Asset Engineer)
S Robertson (Senior Planner)
M Pike (Water Race Overseer)
Cr R Carter
M Hewison
Greater Wellington Regional Council staff, Shaun Andrewartha, Lucy Harper and Steven Thawley.

1. Apologies

Moved

There were no apologies.

2. Conflict of Interest

There was no conflict of interest declared.

3. Public Forum

There were no speakers in the Public Forum.

4. Notification of General Business / Late Items

There was two items of General Business notified.

5. Greater Wellington Regional Council

The Legislation covering the operations of water races includes:
Section 13 of RMA, Restriction on certain works in beds of Lakes and rivers.
Section 14 of RMA, Restrictions on taking /damming / diverting water.
Section 15 of RMA, Controls discharges of contaminates into the environment.

Works in the bed of a river – the definition of a river is a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include an artificial watercourse (including an irrigation canal, water supply race and farm drainage canal).

There are three types of watercourse – natural, artificial, and highly modified.

The classification can be difficult to determine without further information, for example old maps. This classification is necessary to work out if a consent is needed to clean the water way.

An artificial doesn't need a consent but a highly modified will need a consent.

Greater Wellington offers a free one hour pre-app service, help with forms, information requirements and technical advice.

A global consent, which is what the council holds for water race cleaning requires intake monitoring, discharge monitoring, following a code of practice, intake maintenance and network maintenance.

Cost of consents are based on staff time. Greater Wellington Regional Council suggest bringing along all the information you can find to the pre-app service, making the most of the free hour. It was noted to Greater Wellington Regional Council that landowners are concerned that the cost of consent is likely to be more than the cost of having the job done.

Carterton District Council's existing water race consent already allows quite a lot of 'pre-approved' works of network maintenance.

Proposed Natural Resources Plan.

1. Highly Valued sites
2. Following the lowland water bodies

Stock access is following national proposed standards, whereby stock is to be excluded from standing and walking in waterways . The draft report on discharges shows the clear impact of stock access on water quality. Water is still available for use for stock, directly or piped.

Values of water races. It has been noticed water is disappearing in the water races going down into the ground then re-appears further down the race. The value of the water race recharging the aquifer is now recognised. The Whaitua work includes trying to balance the competing interests and values.

Carterton District Council's consent allowed a temporary increase in the minimum water take for the water races to 367 l/sec. The take has now reverted back to 337 l/sec.

6. Water Race Operations Report: August 2017 to October 2017

Purpose

To provide the Committee with an update on the management of the water races for the period 1 August to 31 October 2017.

A draft copy of the Carrington Water Race procedures was tabled.

Moved

That the Committee receives the report.

Smith / Cr Deller
CARRIED

Moved

11.20am

That the public be excluded from the following parts of the proceedings of this meeting, namely, -

Water Race Intake access

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

General subject of each matter to be considered	Reason for passing this resolution in relation to each matter	Ground(s) under section 48(1) for the passing of this resolution
1. Water Race Intake access	Good reason to withhold exists under Section 7.	That the public conduct of the whole or the relevant part of the proceedings of the meeting would be likely to result in the disclosure of information for which good reason for withholding would exist. Section 48(1)(a)

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

Item no.	Interest
1.	Protect the privacy of natural persons, including that of deceased natural persons (Schedule 7(2)(a))

Ellison / McFadzean
CARRIED

Moved

11.40am That the committee go out of Public Excluded

Wadham / Smith
CARRIED

7. Water Race Financial Reports

Purpose

To provide the Committee with 2017/18 financial information on the water races to the 30 September 2017.

Mr McFadzean asked that information on the reserves be included in the next financial report.

Moved

That the Committee receives the report

Wadham / Ellison
CARRIED

8. General Business / Late Items

Financials, McFadzean had noticed there had been about a 10% increase in the administration charges. He would like to know what makes up administration and what the charges are for.

Marty Sebire will bring more details of internal charges and cost will be bought back to our next Water Race meeting on the 21st February 2018.

Quality of Race Cleaning.
It was bought to the attention of Mayor Booth the mess left after cleaning out a water race where trees needed to be trimmed back to do the work and where they have taken more materials out of the water race than expected. The property in question belongs to Cr R Carter who was aware the work was to be done. She did not expect that the trees that needed trimming would be cut down. Nor did she expect more than normal would be taken out of the water race. In doing this work they also damaged a culvert on the property and have left a huge mess. It has since been arranged for the green waste to be cleaned up and burnt and the culvert to be repaired. Cr Carter feels we need to look at contractors and check the work being done is still up to our normal standard.

Some of the committee members noted they have also noticed more stones in the sludge coming out of water races.

Garry Baker to visit the Carter residence to look into their concerns.

9. Confirmation of the minutes

Moved

That the minutes of the Water Race Committee Meeting held on Monday 20 November 2017 be confirmed.

McFadzean / Cr Deller
CARRIED

10. Matters Arising from Minutes

There were no matters arising from the minutes from the 20 November 2017.

The meeting concluded at 12.10pm

Minutes confirmed……..

Date……

Exclusion of the Public

The following is the recommended resolution for exclusion of the public so that the appropriate resolution complies with legislative requirements.

That the public be excluded from the following parts of the proceedings of this meeting, namely, -

1. Application to alteration to Taratahi Water Race.
2. Minutes for the Public Excluded Portion of the Water Race Committee Meeting held on the 20 November 2017.

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

General subject of each matter to be considered	**Reason for passing this resolution in relation to each matter**	**Ground(s) under section 48(1) for the passing of this resolution**
1. Application to alter Taratahi Water Race	Good reason to withhold exists under Section 7.	That the public conduct of the whole or the relevant part of the proceedings of the meeting would be likely to result in the disclosure of information for which good reason for withholding would exist. Section 48(1)(a)
2. Minutes for the Public Excluded Portion of the Water Race Committee Meeting held on the 20 November 2017	Good reason to withhold exists under Section 7.	That the public conduct of the whole or the relevant part of the proceedings of the meeting would be likely to result in the disclosure of information for which good reason for withholding would exist. Section 48(1)(a)

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

Item no.	**Interest**
1.	Protect the privacy of natural persons, including that of deceased natural persons (Schedule 7(2)(a))
2.	Protect the privacy of natural persons, including that of deceased natural persons (Schedule 7(2)(a))