

Report No:	RESC12-04-07
File No:	
Date:	11 April 2012
<b><i>Information Only – no decision required</i></b>	

## REPORT SUMMARY

**Report to:** Engineering Services Committee  
**Meeting Date:** 26 April 2012  
**Report Author:** Kim Arnold, Utilities Asset Engineer  
**Subject:** Richmond Water Treatment Plant – Update

### EXECUTIVE SUMMARY

This report provides an update on the status of the Richmond Water Treatment Plant (WTP) project.

### RECOMMENDATION/S

That the report be received.

### DRAFT RESOLUTION

**THAT the Engineering Services Committee receives the Richmond Water Treatment Plant Update report, RESC12-04-07.**

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## 1. Introduction

1.1 This report provides an update on the status of the Richmond Water Treatment Plant (WTP) project.

## 2. Project Overview

2.1 Currently the Richmond water reticulation is divided into two supply zones. One zone is fed from the Waimea bores via the Waimea water treatment plant and the other zone is fed from the Richmond bores. This is illustrated on Map 1 included in Appendix A.

2.2 Nitrate levels in the Richmond bore source water are consistently above the maximum acceptable value stated in the New Zealand Drinking Water Standards (NZDWS). However, the Waimea bore source water has relatively low nitrate levels. Blending of the two source waters is therefore proposed at a new WTP to reduce nitrate to acceptable levels. The blending ratios will generally be 60% from Waimea and 40% from Richmond.

2.3 Other than nitrate, the bore source water is generally of good quality. The new WTP will therefore only need to include chemical dosing for pH adjustment (similar to what is currently done at the Waimea WTP) and UV treatment. A chlorine dosing system will also be provided, but will only be used as a back-up during emergency conditions.

2.4 At present Council has two resource consents to extract water which will be treated at the Richmond Water Treatment Plant:

- Consent 960213 to extract 7,273 m<sup>3</sup>/day from the lower confined aquifer;
- Consent 110192 to extract 15,400 m<sup>3</sup>/day from the Appleby Gravel unconfined aquifer.

2.5 The water treatment plant will enable Council to utilise all 22,673 m<sup>3</sup>/day throughout the entire Richmond Water Supply area.

2.6 The Richmond Water Treatment Plant project consists of the following primary components of work:

- New WTP with balance tank, to be located on the corner of McShane Road and Lower Queen Street.
- New trunk pipelines on Lower Queen Street and Headingly Lane.
- Upgrades to the Richmond and Waimea bore fields.

2.7 The WTP will include two sets of high lift pumps. One set will pump to the Champion Road Main Reservoir and the other will pump to the Queen Street Reservoir. The two supply zones will be maintained, but the water that is pumped into each zone will be the same. This is illustrated on Map 4 in Appendix A.

2.8 Widening to Borck Creek in the vicinity of the WTP will also be required under this project because:

- Material from Borck Creek is required to lift the WTP site and thus protect the WTP from flood waters.
- It ensures that the treated water trunk pipelines from the WTP across Borck Creek can be installed as Borck Creek is widened.

### **3. Supply to Mapua**

3.1 The project is proceeding on the basis that Mapua will be supplied with water from Motueka via the Coastal Tasman Area pipeline.

3.2 The design of the Richmond Water Treatment Plant is flexible enough to accommodate extra pumping for the Mapua supply if required. However, if Mapua was to continue to be supplied water from the Waimea Pans it would most probably be via the existing Lower Queen Street Water Treatment Plant.

### **4. Treatment Standard Required**

4.1 The selection of the required treatment processes to ensure that the output meets the Drinking Water Standards for New Zealand 2005 (revised 2008) (DWSNZ 2005/08) is based on a catchment risk category approach. Since the initial design statement was produced we have reviewed the Protozoa Log Credit requirements at both Richmond and Waimea bores. This has required significant liaison with the Ministry of Health (MoH) in relation to the interpretation of the DWSNZ and to ensure that Council has obtained formal acceptance of Log Credits required before proceeding with the design.

4.2 A 12 month Cryptosporidium sampling and testing programme of the Waimea bores was undertaken to determine the treatment standard required. The MoH

formally confirmed in November 2011 that the required standard of treatment is three log credits in accordance with the Drinking Water Standards.

4.3 For the Richmond Bores the MOH have confirmed that a 12 month programme of Cryptosporidium testing is not required as the bores are between 10 and 30 metres deep. These bores will be assigned a three log credit rating as long as the bores meet Security Criteria 2 of the DWSNZ 2005/08. To achieve this, the bore headworks will need to be improved and these improvements will be undertaken this financial year.

4.4 The conclusion is that Council have obtained confirmation from the MoH for both sources only three log credits are required. This means that UV treatment will suffice without the need for additional filtration.

## 5. Long Term Programme

5.1 Table 5-1 summarises the allocated budget and key activities by financial year.

**Table 5-1: Budget (non-inflated) and Key Activities by Financial Year**

Financial Year	Budget	Key Activities
2011/12	\$887,000	<ul style="list-style-type: none"> <li>• Preliminary Design (in progress)</li> <li>• Land purchase of WTP site(conditional)</li> <li>• Improvements at the Richmond and Waimea wells(in progress)</li> <li>• Consultation with stakeholders(in progress)</li> <li>• Arbitration with Industrial Users(in progress)</li> </ul>
2012/13	\$2,162,500	<ul style="list-style-type: none"> <li>• Detailed Design</li> <li>• Prepare consents and lodge</li> <li>• Procure long lead items (if any)</li> <li>• Tendering</li> <li>• Tender assessment / Council approval</li> </ul>
2013/14	\$3,892,500	<ul style="list-style-type: none"> <li>• Contract award</li> <li>• Construction</li> </ul>
2014/15	\$2,595,000	<ul style="list-style-type: none"> <li>• Complete construction</li> <li>• Testing and Commissioning</li> </ul>
<b>Total budget</b>	<b>\$9,537,000</b>	(Note: \$8,650,000 from 2012/13 onward)

5.2 The budget for 2012/13 assumes that components of the pipe design and construction will need to be brought forward to align with proposed resurfacing work on Lower Queen Street. At this time it is unlikely that resurfacing work will require this work to be brought forward.

## 6. Design Horizons and Design Flow

- 6.1 Design horizons and design flows for the WTP design have been developed based on the historic water records, a top down water demand management assessment and using the hydraulic network model for Richmond.
- 6.2 The final recommended demand projections are detailed in Table 6-1 below. A complete copy of the technical memorandum, which provides further details and the basis of this recommendation, is included in Appendix B.

**Table 6-1: Recommended Richmond Water Treatment Plant Demands (excludes Mapua)**

Planning Horizon	Demands m <sup>3</sup> /day (Average Day Peak Week)	Comment
2010 Demand	12,000	
2020 Demand	14,880	
2030 Demand	15,400	Design Horizon for Plant.
2060 Demand	19,900	Future design horizon

- 6.3 The 2010 design statement for the treatment plant identified the first design horizon to be 2026 with a design flow rate of 16,997m<sup>3</sup>/day. The design horizon has been amended to 2030 to tie in with the growth projections and hydraulic model.
- 6.4 The 2060 demand is based on the 2008 (medium-high) growth model and is significantly different to the initial projection, being approximately 25% above the demand assessed using the 2010 (low) growth model. It is likely that the 2060 demands identified in the study will be used to assess the additional capacity required at the treatment plant building which also allows for one additional large industry.

## 7. Progress to Date

- 7.1 Significant progress has been made over the last year on the detailed investigations and preliminary design required to progress the project. As well as the construction of the new treatment plant the project involves significant amount of improvements to both the Richmond and Waimea bores. The following is a list of key items of work completed in this phase:
- Land purchased for the WTP and the Borck Creek expansion (yet to go unconditional).
  - Geotechnical investigations and survey conducted at the WTP site.
  - Potholes and survey of the pipe route.

- Pilot plant constructed and operated.
- Horizontal alignment of the pipe alignment defined.
- Bore water blending requirements defined.
- UV reactor and pH adjustment requirements defined.
- Design horizons and design flows developed.
- Formal 3-log certification received from the Ministry of Health for the Waimea Wells.
- First round of stakeholder consultation complete.

## 8. Work In Progress

8. The following items of work are in progress

- Arbitration with Industrial Water Users - this is expected to conclude in July 2012.
- Preliminary Mechanical Design – includes surge analysis, process and instrumentation diagrams, process control narrative, balance tank sizing, bore pumping requirements and WTP high lift pump analysis.
- Improvements at the Waimea wells – required to maintain an “approved” status for the PHRMP
- Improvements at the Richmond wells – required to obtain 3-log certification
- Procurement strategy for the project
- Material requirements for the WTP site - the site will need to be raised above the level of Lower Queen Street for flooding purposes.
- Options assessment of future Mapua supply
- Conduct preliminary HAZOPS
- Update preliminary Commissioning Plan
- Site layout plan for the treatment plant
- Prepare Final Design Report

## 9. RECOMMENDATION

That the report is received.

## 6. DRAFT RESOLUTION

**THAT the Engineering Services Committee receives the Richmond Water Treatment Plant Update report, RESC12-04-07.**

### Appendices:

Appendix A: Schematic Diagrams of Richmond Water Reticulation Network

Appendix B: Correspondence from Ministry of Health regarding Treatment Standards