

# Water and Waste

1.10pm - 1.40pm

## Optimising Value Across Infrastructure Assets Main Trunk Sewer Upgrade - Timaru - Ashley Harper & Robert Crosbie

### Abstract

In 1998 Timaru District Council (TDC) embarked on a project to renew the existing main trunk sewer (MTS) system. It commenced at a strategic level including options to eliminate a major pump station at Taitarakihi Creek which is at the end of its economic life. Flow monitoring and modelling resulted in a renewal strategy spread over 25 years.

An integrated approach to infrastructure renewals and WWTP upgrades has also resulted in separation of industrial and domestic wastewater flows, significantly reducing costs for planned WWTP upgrades. Separation of flows permits a significant improvement to treatment of domestic flows at much lower overall cost. Industrial discharges are 60% of total flow and approximately 90% of WWTP load (as BOD5) which would have resulted in very high costs for a combined treatment strategy. TDC is now moving forward on its overall strategy for wastewater conveyance and treatment/disposal.

Following extensive geotechnical investigations along the proposed MTS gravity pipeline route, the first four stages of renewal have been completed. Stages I, II and IV involved innovative use of profile walled HDPE pipe laid using conventional techniques in parks, streets and the environmentally sensitive Washdyke Lagoon. Stage III involved construction of tunnels through each of three low ridges which are remnants of lava flows from a nearby volcano in what were once valleys.

A collaborative approach to the tunnelling contract commencing with an interactive tendering process resulted in smooth and expeditious contract execution.

**Ashley Harper**, District Services Manager, Timaru District Council. Ashley is a Chartered Professional Engineer, a Fellow of IPENZ and immediate Past President of Ingenium. He has been the District Services Manager for the Timaru District Council since 1989. In this role he has focused on the determination of levels of service for community infrastructure, comprehensive renewal strategies, and the delivery of capital expenditure projects in an integrated manner.

**Robert Crosbie**, Technical Director - Civil Engineering, Beca Infrastructure Ltd. Rob Crosbie is a Member of IPENZ and IEAust and is a Technical Director, Civil Engineering at Beca Infrastructure Ltd and manages the Beca office in Dunedin. Rob has experience across a range of disciplines within civil engineering including tunnelling, heavy civil design and construction, structural design and waste to energy projects. He also has extensive experience as Engineer to the Contract and is a strong advocate of a collaborative approach to expediting construction contracts.

1.50pm - 2.20pm

## Turning Wine into Water - Reusing Existing Assets to Upgrade of the Blenheim Industrial Wastewater Treatment Plant - Murray Kerr

### Abstract

The Blenheim industrial wastewater treatment plant serves a variety of trade waste customers throughout the year, but during the wine industry vintage period, must also treat a three month peak of high strength wastewater. Continued rapid growth in the wine industry required another increase to treatment plant capacity. The requirement was to develop a treatment plant that provides flexibility to meet fluctuations and growth in wine production, while minimising the capital investment.

This paper will outline how more treatment capacity was created using less money, land and new construction, by converting the former "single pass" aerated lagoons into an activated sludge treatment plant. Treatment capacity was increased by recycling biomass using a new Dissolved Air Flotation (DAF) system, and increasing aerator power. Investment was minimised by using the existing facultative oxidation ponds for treatment of excess

solids. Reuse of the existing earthen aeration basins allowed the aerators and other works from previous upgrades to be reused.

It is noteworthy that the existing earthen basins were constructed in 1981 to serve a major meat processing plant. Both the meat works site and treatment plant were converted to wine industry uses when the meat works closed in 2002. The combined winery wastewaters during vintage exceed the loading from the former meat processing and now equate to a population equivalent of 300,000 persons.

This project demonstrates how Councils can work with their key industrial customers to derive mutual benefits from their wastewater assets and meet environmental and business goals for their region.

**Murray Kerr** is a Senior Environmental Engineer with particular expertise in the design of wastewater treatment plants and sewers and is also skilled in the field of sewer condition surveys and rehabilitation. Since joining Beca's Christchurch office in 2008, Murray has been involved in projects at the Christchurch Wastewater Treatment Plant and Clifton Wastewater Treatment Plant in Invercargill and was the Design Engineer in the upgrade of the Blenheim Industrial Wastewater Plant.

2.30pm - 3.00pm

## **The Energy and Carbon Footprint Benefits of Wastewater Solids - Jim Bradley & Rainer Hoffmann**

### **Abstract**

The management of wastewater treatment plant (WWTP) solids, be they sludges and / or biosolids, continues to be both expensive and in many cases difficult to find sustainable solutions to. In a national context, our progress has been limited and in some cases would appear to have gone backwards in finding sustainable solutions particularly those involving beneficial reuse.

In New Zealand, our RMA planning instruments provide both direction, and in some cases, confusion on how to go forward. These include Regional Plans, Waste Management Plans, the NZ Waste Strategy - and our *Guidelines To The Safe Application Of Biosolids To Land In NZ*.

The solids produced at wastewater treatment plants (WWTP) are rich in energy which can be converted to methane gas during controlled degradation and used beneficially as a power source. As part of a long term biosolids management plan (BMP) there is a global focus within solid stream treatment processes to maximise both volatile suspended solids (VSS) destruction and energy recovery, minimise carbon footprint, and produce a biosolid product that is suitable for beneficial reuse.

The presentation will traversethese issues and highlight the outcomes from the Australian and New Zealand Biosolids Partnership Review of the standards in NZ and Australia for biosolids reuse onto land.

**Jim Bradley**, BE Hons (Civil); Dip SE (Delft), DEE; Member CIWEM, Fellow - IPENZ; CPEng, International Engineer): Jim is one of New Zealand's leading practising professional engineers and communicators in the fields of sustainable wastewater and biosolids management. In recent times Jim has focused on sustainable wastewater management and development of approaches to this that encompass regulatory social, cultural, environmental, economic considerations in addition to technical and management needs. Jim is highly experienced in the areas of regulatory requirements, scheme assessment, consultation, public relations, facilitation and communication of environmental and technical principles and concepts.

Jim is regularly invited to give key note addresses at National and International Conferences. He has been a speaker at a number of AWA Federal Conferences and in 2007 was an invited plenary speaker at the IWA's International Biosolids Conference in Canada. In 2004 Jim was the inaugural winner of the Institute of Professional Engineers.(IPENZ) Supreme Technical Achievers Award for the "Sustainable and Cleaner Technology" and in 2005 at the Engineering Excellence awards he was the inaugural winner of the William Pickering Award for Engineering Leadership.

**Rainer Hoffmann, BSc, MSc (Eng):** Rainer Hoffmann is the MWH NZ Wastewater Discipline Leader and National Wastewater Specialist with over 32 years post-graduate experience in the field of water and wastewater treatment. Rainer also provides a high level link to the MWH global Wastewater Knowledge Community through his role as Asia Pacific Knowledge leader.

Rainer's experience covers a wide range of wastewater related projects and skills and has been involved personally in the process design and optimisation of numerous wastewater treatment plants, treating both municipal and industrial wastewater. He has specific expertise in the design of solid stream treatment processes with emphasis on energy efficiency and recovery and in the design of biological nutrient removal plants (P & N removal) with emphasis on optimizing aeration control to reduce power consumption.