# INGENIUM TECHNICAL PRESENTATIONS - ABSTRACTS

## FRIDAY 17 JUNE - 10.45 am

**STREAM: WATER AND WASTEWATER** **10.45 am**

*Sponsored by CPG*

### The ins and outs of pipeline deterioration

*Jonathan Morris, Senior Asset Management Consultant, Opus International Consultants Ltd*
*Co-Presenter: Sue Freitag, Principal Scientist, Opus International Consultants*

Two recent concrete sewer assessment jobs revealed sharp contrasts between internal and external condition. A review of how condition information is used for pipeline asset management revealed an opportunity to add value to existing approaches.

CCTV is a proven and effective way of checking on gravity wastewater and stormwater pipes. However, it is limited to internal inspection and can't provide information on the external condition of the pipeline.

This paper will briefly describe the two concrete pipeline case studies, then describe the combined materials and asset management approach developed to help asset managers better understand the external state of their pipelines. It will then show how this complements existing internal CCTV inspection programmes.

The combined approach requires little additional effort but can substantially improve understanding of the state of the pipeline system, offering improved reliability in valuations, renewals and rehabilitation activities, operational maintenance, prioritisation and system risk management.

**Jonathan Morris** is a Chartered Materials Engineer with over 25 years experience of infrastructure assets, and a doctorate on non-destructive testing. Jonathan is a Senior Asset Management Consultant with a special interest in understanding how asset management is affected by the way that materials change in service.

**Sue Freitag** is a Principal Concrete Scientist at Opus's Central Laboratories, and is one of two Opus Technical Principals for concrete. She has over 25 years experience as a concrete materials technologist, involved in research, testing and consultancy services relating to several major concrete durability issues in New Zealand infrastructure.

**STREAM: STORMWATER** **10.45 am**

*Sponsored by Aurecon*

### Protecting Great Lake Taupo - Stormwater Management for Future

*Roger Stokes, Manager – Development Engineering, Taupo District Council*

Lake Taupo is a national icon and is one of the clearest lakes in the world. Stormwater management for new residential developments is an important issue. The days of new direct discharges to the lake are gone.

Over the last decade residential development in Taupo has boomed. An array of different stormwater management options have been utilised by different developers, many seeking to take advantage of the good natural soakage conditions available in pumice country.

Each solution has it's own advantages and drawbacks.

The merits of these different solutions have been continually assessed by Taupo District Council and new best practice guidelines have been adopted.

The presentation will look in a non-technical manner at a selection of the stormwater methods used, the lessons learnt and Taupo's approach for the future.
**Roger Stokes** has been employed by Taupo District Council for ten years and currently holds the position of Manager - Development Engineering. Roger is responsible for the infrastructure aspects of

subdivision and landuse consents in Taupo District, and has overseen the completion of about 3500 new subdivision lots in this time. Roger has an NZCE (Civil) and a BE (Civil) (1st Class Hons) from the University of Auckland in 1989.

Roger first worked for three years with Papatoetoe City Council in Auckland, before moving to Lower Hutt for eleven years, and working as a design engineer for the Hutt Valley Drainage Board, Hutt City Council and then Civil Design Services (now part of the GHD Group).

## STREAM: ROADING 10.45 am

*Sponsored by Beca*

### The Ruby Bay Bypass - The project that pushed the boundaries - the smart way

*Joanna Orr, Environmental Manager, Downer*

The Ruby Bay Bypass is a 10.7km long bypass between Nelson and Motueka which was opened on the 22nd October 2010. During construction a number of initiatives were put in place to not just complete the project to design, but to push the boundaries and deliver beyond everyone's expectations.

Smart Planning – A partnering group was established by the project team which included all interest groups including local Iwi, DOC etc. Regular meetings informed the group on progress, as well as allowing any potential issues to be raised and resolved in a timely fashion.

Smart Performance –

- GPS control on excavators, dozers and graders which increased productivity and Accuracy;
- First in the Tasman region to implement new Sediment and Erosion Control standards based on Auckland's standards which were rigorously enforced;
- First NZTA project to produce a carbon footprint report;
- Project extremely focused on Iwi relations and environmental outcomes due to working in a very sensitive estuarine area.

Smart Outcomes – The project was completed ahead of time and below budget. The new bypass has reduced travel time between Nelson and Motueka and vastly improved safety. It has also reduced traffic volume along the old route which is a big positive for the local communities. St John Manager, Karyn Bell, said "the bypass meant a smoother trip for patients, quicker access to the hospital and quicker response times".

**Joanna Orr** has been working for Downer NZ for the past two years as the Environmental Manager on the Ruby Bay Bypass Project in Nelson. She was central to helping the local council in the rolling out of the new sediment and erosion control guidelines. Joanna has now moved to Wellington to work on a fuel tank farm construction for BP. She also oversees the environmental management for the Downer Major Projects division in the South Island. In July this year she was awarded the Downer Environmental Graduate of the Year 2010. Joanna has previously worked for URS in Australia and White Young Green in Belfast to gain experience during her studies. Joanna studied Civil and Environmental engineering at the University of Edinburgh, gaining a 1st class Masters Degree with honours. Joanna is an extensive and keen traveller having previously spent time in the USA, Australia and throughout Asia.

## STREAM: SMART MIX 10.45 am

*Sponsored by NZ Contractors Federation*

### NEC – New Engineering Contract. The case for its use in NZ – and some warnings

*Andrew Brickell, Director of Project Management, Asia-Pacific, MWH New Zealand Ltd*

This paper discusses the potential place in the NZ construction industry for the NEC suite of 16 engineering contracts, developed in the UK during the period 1985-2005 and now in their 3rd published edition (NEC3).

NEC was developed from a realisation by the UK industry that efficiency in their construction was not well served by traditional contracts, written in archaic language and with little emphasis on co-operative working relationships. Using a similar approach to our earlier development of the NZS 3910 Conditions of Contract, the drafting team sought to redefine contractual relationships between an Employer and a

Contractor, and the roles of those who administer such contracts.

NEC claims to be a stimulus to good management of projects, but much has to be learned before projects can be procured and administered under its rules. NEC has new terminology and some surprising new business processes. Some potentially serious areas of misalignment with NZ legislation and industry practice need to be resolved before NEC3 gains widespread acceptance in New Zealand.

The paper discusses where NEC might deliver better results on NZ projects than procurement using existing contracts like NZS 3910. Sources of further information on NEC, including local training programmes, are included.

**Andrew Brickell** is a consulting engineer who has worked in 16 countries, specialising in construction contracts and project management. In the late 1970s he worked with an industry team on the drafts of what later became NZS 3910 and for more than 30 years he has administered contracts and taught many seminars and professional training courses on the use of 3910, 3915, the NEC suite, ICE and FIDIC contracts, AS 2124 and World Bank conditions of contract. His current role is as Director of Project Management at MWH Asia-Pacific, based in Auckland, in addition to consulting roles advising contractors and principals on contract procurement.

# FRIDAY 17 JUNE - 11.25 am

## STREAM: WATER AND WASTEWATER 11.25 am

*Sponsored by CPG*

### Innovative Deep Shaft Wastewater Solutions

*David Ward, NZ Water Development Manager, Aurecon New Zealand Limited*

The Rosedale Wastewater Treatment Plant (WWTP) is the second largest treatment works in the Auckland region and one of the largest in New Zealand. The plant services a population of approximately 185,000, treating 19.7 million m³ of wastewater annually. Recent upgrades to the plant have included the construction of a new ocean outfall connection to convey tertiary treated effluent to a discharge diffuser structure in the Rangitoto Channel. The outfall consists of 3km long, 3.7m diameter, segmentally-lined bored tunnel from the WWPT UP Plant to the ocean, and a further 2k of 1600mm diameter PE pipeline buried under the ocean floor. The system is designed to carry a peak flow of up to 6m³/s in 2110.

The WWPT is approximately 34m above sea level and the inlet dropshaft is over 40m deep. Control of air entering the tunnel and marine pipeline was a critical element of the design.

Through the use of sophisticated modeling techniques (numerical and physical) a New Zealand first form of drop-shaft was constructed which met all the design requirements and was easy for the contractor (McConnell Dowell) to construct. This paper will look at the various forms of drop shaft which have been employed globally and how a unique approach provided the best outcome.

**David Ward** is a Chartered Civil Engineer with over 30 years experience in civil engineering, particularly in the delivery of complex wastewater conveyance, treatment and disposal infrastructure projects. He has lead multi-disciplinary teams of up to thirty and has considerable experience in developing high performance teams delivering complex projects.

David has gained valuable experience throughout his career as a hydraulic and structural designer of wastewater conveyance and treatment projects, preparing contract documents and delivering contracts through conventional or more contemporary arrangements. David has experience of ICE, IChemE, FIDIC and NZS3910 contract forms. David is also an experienced Project Manager who can identify client's needs and deliver projects on time, to budget and with a recognised high level of quality.

David has worked for clients, consultants and managed contractors which gives him invaluable, balanced insight of the parties to construction contracts. His experience includes traditional design-bid-build contracts as well as design and construct and framework contracts.

## STREAM: STORMWATER 11.25 am

*Sponsored by Aurecon*

### A Smart Solution to Managing Auckland Transport's Stormwater Assets

*John Tetteroo, Project Manager, GHD*

GHD is assisting Auckland Transport through a three year Drainage and Structures Asset Management contract to deliver council's renewal programme, and to achieve its stormwater strategy and sustainability goals.

The challenge for GHD has been to create more innovative ways to overcome stormwater issues within the road reserve, implement best practice asset management techniques, develop actions that are linked to strategies, and collaborate with stakeholders to achieve integrated solutions.

Outcomes to-date include:

- Innovative management and techniques for stormwater quality,
- Robust forward works programming (1, 3, and 10 year),
- Advanced condition and performance assessments,
- Development of workable policies, standards and engineering details,
- Actions that deliver the Asset Management strategies
- A low-cost, scientifically tested stormwater treatment device, which can be managed as part of the regular catchpit cleaning cycle.

Together with Auckland Transport, GHD is striving for excellence in the management and performance of road stormwater drainage assets, particularly with respect to the impact of stormwater on the receiving environment.

**John Tetteroo** is Project Manager for GHD's stormwater assets contract with Auckland Transport. He also chairs meetings between Auckland Transport and its stakeholders, with the objective of coordinating works across the city, setting transport policy and standards and integrating GHD's work with the wider city reticulation and aquifer systems.

## STREAM: ROADING 11.25 am

*Sponsored by Beca*

### September 4 Earthquake / Smart Planning, Resilient Organisations and response to Earthquake in Christchurch

*Michael Fulton, Operations Manager, Fulton Hogan*

Fulton Hogan was involved in immediate response and clean-up on numerous fronts for the Christchurch Earthquake. This paper will focus on the initial response and impact on the infrastructure from the earthquake. The paper will also discuss:

- Gathering information in field and communication to the affected organisations
- Impact on safety and contractual issues in managing an increased workforce and large number of sub-contract suppliers
- Ability to resource, adapt and preparedness
- Factors that make a resilient organisation in a time of upheaval or crisis
- Lessons learnt from other local authorities

**Michael Hogan** is the Christchurch Operations Manager of Fulton Hogan Canterbury. He has valuable experience and knowledge within road asset systems and has managed contracting divisions, including surfacing, construction, road maintenance, facilities management, quarries, industries and distribution & retail. Michael is a Chartered Professional Engineer, and holds a Diploma in Managing Excellence in Engineering and Construction.

## STREAM: SMART MIX 11.25 am

*Sponsored by NZ Contractors Federation*

### The sky's the limit. How far can PPP's spread?

*Duncan Halliwell, Senior Associate, Kensington Swan*

PPP's are now underway in New Zealand, with the first PPP prison and schools now in procurement. They have also been considered for new roads and for defence projects. But elsewhere in the world PPP has developed into a common procurement tool for a wide variety of different projects not currently under discussion in New Zealand. This paper will briefly examine the use of PPP's overseas for project types not currently considered in New Zealand, including leisure facilities, street lighting, council accommodation, joined up services centres and local roads, and will explain whether these are suited to New Zealand.

**Duncan Halliwell** is a senior lawyer in Kensington Swan's Infrastructure team. Previously, Duncan worked for seven years in the UK as legal adviser on major construction and PPP projects, including many of the areas discussed, for both central and local government and the private sector.

# FRIDAY 17 JUNE - 2.05 pm

**STREAM: WATER AND WASTEWATER** **2.05 pm**

*Sponsored by CPG*

### Smart Water Planning for a Smarter Super City

*Christine McCormack, Water Systems Specialist, MWH New Zealand Ltd*
*Co-Presenter: Deborah Corneby, Water Resources Manager, Watercare Services Ltd*

The Auckland region represents one third of New Zealand's population (over 1.4 million people) and is an important commercial driver of the national economy. Smart infrastructure planning and delivery is vital to ensure the continued prosperity of our nation.

Watercare Services, Auckland's water and wastewater supplier, has employed smart planning by investigating international best-practice and applying a cutting-edge water supply planning approach from the UK. The methodology identifies the risks and uncertainty in the supply-demand balance and applies headRoom Bnd outage allowances to better inform infrastructure investment decisions. Typical planning uncertainties include climate change impacts, gradual source pollution and unplanned outage events.

Significant project management challenges were faced by Watercare and MWH teams working across three cities and opposite sides of the planet. Smart performance ideas adopted on the project included innovative communication and technological approaches. Smart outcomes were delivered by successfully articulating a complex business case to the Watercare Board for an investment to increase the capacity of the Waikato Water Treatment Plant from 75,000m3/day to 125,000m3/day.

This paper will outline the approach, challenges and outcomes of applying international best practice and the potential for New Zealand local government to apply new thinking in water infrastructure planning.

**Christine McCormack**
Christine is a Water Systems Specialist at MWH in Christchurch, focusing on water demand management, water loss reduction and asset management. She has over 14 years of local government consulting experience in both Canada and New Zealand working on sustainable water, wastewater and stormwater infrastructure.

**Deborah Corneby** is the Water Resources Manager for the Auckland region's water supply. She has 15 years experience of water resources planning and management, water efficiency planning, water loss management, asset management planning and operational water supply management gained through positions held at Watercare and in the UK working for a major water utility and a water management consultancy.

**STREAM: STORMWATER** **2.05 pm**

*Sponsored by Aurecon*

### Napier's Cross Country Drain – Smart Design and Procurement delivers a significant stormwater asset.

*Garry Macdonald, Business Development Manager, Beca Infrastructure*

The Napier Cross Country Drain is designed to provide drainage capacity for the future development of Napier and reduce flood risk.

The scheme consists of a 4.3km drain connected to a 10 cumec pump station. Three 230m long rising mains discharge the stormwater onto Awatoto Beach via a unique dispersion system, which minimises beach erosion. The dispersal system comprises three architecturally designed "pods" within a 30m wide shallow excavated basin that extends over 200m along the beachfront with Stormwater dispersing over a long horizontal concrete weir.

Power is provided to the main pumps by means of three dedicated diesel generators with a total capacity of 2.46 MVA. This innovation has resulted in lower operational costs by avoiding high "fixed charges" of a mains connection, and has also removed the risk of mains power outage during severe storms.

Procurement methods for each major component of the scheme were chosen on a best-for-project basis, with a range of contract types being employed.

This paper will provide background on the Stormwater Scheme and describe the innovations and unique features which could benefit other local authorities as they seek to protect their communities from flood risk under more extreme climate events.

**Garry Macdonald** is Business Development Manager and Technical Director with Beca Infrastructure, based in Auckland. Since graduating from Canterbury University in 1976, he has worked on most of New Zealand's major wastewater plants and schemes, as well as in Australia, UK and the Middle East. He specialises in strategic planning of wastewater schemes and has written over 35 technical papers for a variety of national and international conferences. He is currently (2010/11) President of IPENZ, and has been on the IPENZ Board for 3 years and is a Fellow of IPENZ. Before that he was on the Board of Water NZ for many years and was President in 2000/01. Garry was elected a Life Member of Water NZ in 2010. He is the NZ delegate on the House of Delegates for the Water Environment Federation based in Washington – a position he has held for over 10 years in which time he served for two years on the WEFBoard of Directors.

## STREAM: ROADING 2.05 pm

*Sponsored by Beca*

### Intelligent Street Lighting

*Andy Collins, Senior Lighting Consultant, Opus International Consultants*

A state of the art street lighting system for the Eden Park area has recently been commissioned, designed to increase light levels during times of high pedestrian activity, and provide subdued residential lighting at other times.

Luminaires utilising the latest LED technology are controlled by an intelligent wireless Remote Management System. Both technologies are a first in New Zealand for large scale road lighting installations.

The Luminaires are easily dimmed, producing a "white" light, creating better definition, greater public safety and security. Additionally, light distribution can be tightly controlled, significantly reducing intrusive/spill light onto residential properties.

Utilising an open communication protocol, a wireless mesh networking technology (similar to a mobile phone network), allows the central management system to "talk" with each street light to switch it off/on or be dimmed at any time. The system also monitors energy use and reports faults, and additionally dynamically adjusts for light level depreciation over the life of the installation, assisting council staff to assure the appropriate lighting level on the road, but offer reduced operating costs and carbon emissions. The system is currently being extended to neighbouring areas utilising Cosmopolis lamps. In this session, costs are presented, and practical applications for this technology are discussed.

**Andy Collins:** Before moving to New Zealand in 2002, Andy worked for Lancashire County Council (UK) for 12 years in the Street Lighting Department. Starting off as a road lighting designer, he moved through into Maintenance Contract Management and was finally promoted to Principal Street Lighting Engineer responsible for the design, maintenance and energy management of a network in access of 160,000 street lights, illuminated road signs and bollards.

Andy has written a number of articles for technical journals on street lighting, dimming and energy management and energy strategy. The county council's leading role in lighting innovation and energy management was recognised when it became the first Highway Authority in the UK to achieve Energy Efficiency Accreditation Status, conferred by the Institute of Energy and recognised as the national benchmark in energy management. The Street Lighting Department subsequently won the Major Energy Users Council's 'Best Energy Strategy' Award at the Energy Awards in 2000.

Since 2003 the Andy has worked as a lighting designer on projects from sports stadiums to offices. Now working for Opus International Consultants his primary role is the street lighting field.

**STREAM: SMART MIX** **2.05 pm**

*Sponsored by NZ Contractors Federation*

## Systems Thinking Approach to Roading

*Patrick Keenan, Maintenance Division Manager, Fulton Hogan Ltd*

In March 2008 Central Otago District Council engaged Fulton Hogan Ltd to be involved in a process to examine the "what and why of current performance" of the Roading system.

A systems thinking approach was to be taken, and a consultant from Vanguard UK pulled in to provide direction and expertise. This assisted in looking at Roading as a System outside-in and to examine the key current beliefs that were governing organisational performance.

The process has been subsidised by 51% by NZTA as a pilot project. In addition to the consultant cost, in excess of 3000 hours of council and Fulton Hogan staff time was committed to the project.

The outcomes have been an improved flow of work from the demands placed on the system by customers, and the physical network encompassing change in the way we inspect, programme, achieve and disburse the work.

The changes are emergent and are delivering significant improvements in ratepayer satisfaction, substantial cost savings from streamlining of work, and improvements in staff morale, with particular reference to decreases in paperwork and more time for "value" work .

The CODC Roading Physical Works Contract was tendered in October 2009 and awarded to Fulton Hogan in December 2009. The Partnership is now operating under NZTA's Shared Risk Delivery Model.

**Patrick Keenan** has worked with Fulton Hogan in Central Otago for 9 years and his role is Maintenance Division Manager. He has been involved with the management of Central Otago District Council's roading assets for 8 years, and has been directly involved in the evolution of the contract model from traditional measure and value to the innovative Partnership Model being utilized today.

# SATURDAY 18 JUNE - 1.10 pm

## STREAM: WATER & WASTEWATER 1.10 pm

*Sponsored by CPG*

### Using Asset Criticality to Develop Smarter Maintenance Strategies for Water and Wastewater Assets in the Rodney District

*Rob Green, Senior Consultant, GHD*

Following a review of critical asset identification processes within Rodney district, GHD recommended a number of maintenance strategies aimed at improving overall maintenance effectiveness at lower cost.

Critical water and wastewater assets, and critical water customers, were identified across six water and ten wastewater schemes, based on a range of criteria. Risk based renewal triggers had previously been established which effectively required renewal of super critical assets prior to failure. Once super critical assets were identified, maintenance strategies were developed to assist in projecting remaining useful life in order to plan for renewal of critical assets prior to failure.

As a result of this study, recommendations were made to introduce smarter, more targeted asset performance assessment requirements, in the council's maintenance contract to enable remaining useful life projections of critical assets for renewal planning purposes. A number of routine maintenance activities were recommended for elimination, and replaced with less frequent asset performance assessment activities.

This paper describes the processes used for identification and categorisation of critical assets, a procedure for engaging with critical customers, and finally, the development of smarter maintenance approaches to develop asset performance curves based on location specific data as a means of projecting critical asset renewal dates.

**Rob Green** is a senior consultant with GHD's Infrastructure Strategy Group based in Palmerston North. A civil engineer, Rob has been involved in design, construction and management of municipal engineering assets and facilities management for projects in New Zealand, the USA and Canada.

## STREAM: URBAN DESIGN 1.10 pm

*Sponsored by Aurecon*

### A Role for Land Development Engineers

*Peter Clark, Development Engineering Manager, Western Bay of Plenty District Council*

This paper explores the role of the Land Development Engineer as it relates to a particular sub-divisional development in the Western Bay of Plenty area of Omokoroa.

Omokoroa is a Smartgrowth area within Western Bay of Plenty District Council area. An integrated consent for the subdivision of three properties owned by three separate developers was granted in 2007. One of Council's structure plan roads was included in the consent.

By the end of 2007, physical works had started on the site, but by early 2008, the developers had fallen out. All works had stopped.

In December 2009, Council Development Engineers were advised of the situation, when one of the developers approached Council seeking ways to vary the consent, and to complete their own development.

At that stage Council could have either allowed the private developers to resolve their own difficulties in a legal manner, or step in and facilitate the development in its most important growth zones.

The latter option was taken, and Council's Land Development Engineers have driven this project ever since. This paper explores the options and processes that were taken to progress the works, and deliver a smart outcome.

**Peter Clark**, NZCE, BE Civil (Hons), MIPENZ, CPEng. Chairman of the Land Development Engineering Group. Peter's present role is Development Engineering Manager at Western Bay of Plenty District Council. He started a career for life with the Ministry of Works and Development in 1975. Peter has worked in many offices around the North Island with MWD, Works Consultancy, and Opus Consultants. He left Opus Consultants in 2002 to join Western Bay of Plenty District Council as Divisional Engineer, then moved into the Development Engineering Manager's role.

## STREAM: ASSET MANAGEMENT 1.10 pm

*Sponsored by Beca*

### Smart Performance for Hamilton City

*Emily Botje, City Waters Asset Manager, Hamilton City Council*
*Co-Presenter: Cushla Anich, Associate Director, AECOM*

Promises of delivery to customers made by infrastructure managers are so important. Yet levels of service are probably the most neglected part of asset management and are often disconnected, misunderstood, historical or just a bunch of customer satisfaction ratings that don't readily relate back to the service provided, and hold no relevance to staff.

Hamilton City Council (HCC) wished to lift their game for levels of service for the three waters, refuse and transport activities in the lead up to the 2012 Long Term Plan process. Many of their current levels of service were historical and because of this staff felt that they were no longer relevant to their daily business or works programme and generally difficult to understand.

The review compared 'best practice' organisations in New Zealand with Hamilton's current practice. It took into account recent central government guidelines from Treasury along with recent Audit New Zealand recommendations. The review found that HCC's current levels of service for the transport activity were mainly customer satisfaction related which did not provide a complete view of the service's performance.

Key staff members were also interviewed as part of the review process for suggested internal KPIs and technical indicators. This canvassing provided good team focused and business process KPIs, but also technical LOS that were previously absent. This was particularly true for the treatment plants.

The recommended LOS was developed into a framework for easy inclusion into the LTCP and AMPs so that they represent best practice, staff engagement and better reflection of the complete activity. The recommended LOS helped Hamilton City set their direction for the next 10 years providing a key input into their respective Asset Management Plans. They also helped refocus their daily business such as their operations and maintenance contracts, internal monitoring and daily asset management processes such as project settlement and updating as-builts. Overall, this review provided a good foundation for smarter performance to their customers.

**Emily Botje** is the City Waters Asset Manager for Hamilton City Council. She is responsible for the asset management planning for all three waters and refuse for Hamilton City including the networks and treatment plants. Before joining HCC, Emily worked for MWH as key client manager to HCC for the three waters asset planning. Emily also worked for Scottish Water for five years so understands the water industry well as an asset owner and consultant.

**Cushla Anich** is an Associate Director with AECOM in Auckland. She has significant experience in asset planning and asset management for all three waters, and brings unique skills and knowledge of the water industry with her blend of industry and consultancy experience. Before joining AECOM in 2007, Cushla worked for Metrowater for five years in an asset planning leadership role and prior to that, she led the water supply team at North Shore City Council for eight years.

## STREAM: SMART MIX 1.10 pm

*Sponsored by NZ Contractors Federation*

### Palmerston North City Council Recycling Service – A Smart Operation

*Chris Pepper, Water and Waste Services Manager, Palmerston North City Council*
*Co-Presenter: Katherine Stannard, Projects Programmer, Palmerston North City Council*

In July 2010 Palmerston North City Council introduced a new Recycling Service for its residential ratepayers. This recycling service stands out from the crowd as a "smart" service in a number of areas. Unlike the majority of councils, PNCC own and operate the service and the recyclables "from cradle to grave" – PNCC procured the bins, collection vehicles and processing equipment, PNCC staff manage, collect and process the recycling and PNCC deals directly with the recycling industry to on-sell the recycled product. This paper describes the service provided by PNCC, highlighting areas of "smart" operation, such as;

- separation of glass at the kerbside and throughout collection and processing to reduce wear and tear on processing machinery and improve the quality of all recycled products;
- encouraging domestic recycling by retaining a "user pays" council rubbish bag system for general waste;
- design and installation of the Materials Recycling Facility (MRF) to maximise flexibility in recovering a variety of products;
- determination of the scale of operations (MRF processing capacity) by considering economies of scale and market prices for recycled materials;
- use of industry providers and expertise directly through alternative contract arrangements;
- ensuring the best possible deal was delivered to the ratepayer by undertaking market comparable costing of in-house services.

**Chris Pepper** has been the Water and Waste Services Manager at the Palmerston North City Council since 2002. Chris is a Civil Engineer and has an MBA. Under his leadership, the Palmerston North City Council has adopted a Waste Management and Minimisation Plan, which includes a long term target to reduce waste to landfill from Palmerston North by 75%. An improved recycling system was identified as a key strategy to achieve this target. Chris has acted as the project sponsor for the project to introduce Wheelie Bins for Recycling.

**Katherine Stannard** has worked for Palmerston North City Council in their Technical Services Unit since 2004. She is a Civil Engineer. She was Project Manager for the delivery of Palmerston North City Council's new recycling wheelie bin system. Katherine was responsible for tendering and administering contracts for the supply of trucks, bins and the sortline upgrade, as well as coordinating the public information campaign associated with the implementation of the new scheme and assisting the PNCC Operations Team to upskill and prepare themselves for the new system.

# SATURDAY 18 JUNE - 1.50 pm

**STREAM: WATER & WASTEWATER** **1.50 pm**

*Sponsored by CPG*

### Smart Procurement through a 'Design Build Operate' Contract

*Alan Bannatyne, Acting Water and Waste Operations Manager, MWH NZ*

Hutt City Council is now ten years into an innovative $150m twenty year 'design build operate' contract with Hutt Valley Water Services for its secondary wastewater treatment plant and trunk wastewater network.

This procurement solution was chosen ahead of more traditional approaches to ensure best value for money and optimum long term performance of the assets. Smart contract provisions included the requirement for the contractor to fully fund construction until acceptance tests were successfully completed, and the assets had to be maintained so the Council protected itself against receiving back dilapidated assets at the conclusion of the operating period.

This paper will describe the outcomes achieved by this smart innovative contract structure at its halfway stage. The presentation will address the original procurement option selected, how it has been delivered, issues encountered and resolved, and how the smart outcomes achieved for this Council would be applicable for other infrastructure projects around New Zealand.

**Alan Bannatyne** played the lead role on the Hutt Valley wastewater scheme, from its inception through to successful commissioning. The project was awarded the Institution of Professional Engineers in New Zealand Innovation Award in 2003. He also presented papers on the earlier stages of the scheme at various conferences. Alan has more than 40 years experience as a civil engineer and has specialised in strategy development and in project management of all phases of major wastewater scheme development

**STREAM: URBAN DESIGN** **1.50 pm**

*Sponsored by Aurecon*

### Sandringham Road Upgrade & Wairepo Swamp Walk

*John Sia, Graduate Engineer, Opus International Consultants Ltd*

Auckland Council has applied a partnering approach to project management in order to transform the increasingly congested Sandringham Road corridor into a world class gateway to Eden Park for RWC 2011, leaving a positive legacy for future events.

With a combined construction footprint of 800m in length, the council projects encompassed seven integrated projects ranging from $500k to $240 million in value. Of the seven projects, two were partnerships between Auckland City Council, Fulton Hogan and Opus International Consultants to a combined value of $7.5 million.

The unique aspects of the two council led projects include:

- The world's first automated dimmable LED street lighting system
- New Zealand's first shared space zone
- A shared service trench for all utilities
- Restoration and preservation of historical houses
- Integrated site team from Client to Contractor for expediting informed decision making, typically within hours versus days
- Combination of Urban design philosophies with local artist involvement
- Use of green storm water management practices

As a result of the close partnering on Wairepo Swamp Walk and the Sandringham Road Upgrade projects, both projects were completed eight months ahead of kick-off and $3.5M under budget.

**John Sia** is a 2009 graduate from the University of Auckland, who has previously worked on the SH20 Mt Roskill extension for 9 months; followed by a 9 month secondment at the Auckland Motorway alliance as the vehicle detection systems coordinator. More recently, John has been involved in the

Sandringham Road Upgrade projects in a mixed role as Engineer's representative and design support to Auckland City Council.

Having successfully presented previously at the 2009 ATRF Conference on a research paper entitled "Travel Time Study of Auckland Arterial Road Network Using GPS Data", John should be well placed to present on the unique aspects of these two council projects.

## STREAM: ASSET MANAGEMENT 1.50 pm

*Sponsored by Beca*

### Improving infrastructure efficiency through behavioural change

*Jonathan Reed, Associate – Civil Engineering, Beca Infrastructure*

Engineering projects have a social context. They respond to issues or problems by developing new infrastructure; this is what we have always done and it has worked successfully in the past. But is there a better way?

Society demands new or improved infrastructure based on a standard of living. Quite rightly, these standards should be high – we should be seeking a high quality of life coupled with environmental protection. But is the only way of providing this by an extension to "business as usual", or can we influence society to make different choices, changing behaviour to use infrastructure more efficiently?

We are not the first industry to want to influence people. What can we learn from those which successfully infiltrate and mobilise communities formed around common values? We cannot dictate to or persuade people to act in a certain way based on purely rational logic. Instead, we need to respect group dynamics and put our message into a social context.

This paper explores different approaches to behavioural change techniques from the health, transport and water industries. It considers whether the conversations we have within the communities we serve can make the greatest impact on how efficiently our infrastructure is used.

**Jonathan Reed** is a Chartered Civil and Environmental Engineer with over 15 years' experience. He specialises in sustainable solutions which integrate the different parts of the water cycle, particularly water resources, water efficiency, flood risk, stormwater and Low Impact Design. He has worked on a range of international projects such as the London 2012 Olympics and Masdar eco-city. In parallel to his engineering career, he set up and ran a charity that promotes sustainable development in the construction industry.

## STREAM: SMART MIX 1.50 pm

*Sponsored by NZ Contractors Federation*

### Canterbury Earthquake

*Gerard Cleary, Manager Utilities and Roading, Waimakariri District Council*
*Co-Presenter: Gary Boot, Utilities Manager, Waimakariri District Council*

The 4 September Darfield earthquake had a devastating impact on the towns of Kaiapoi, Pines Beach and Kairaki. Liquefaction and lateral spread in these areas caused severe damage to roads and utilities. Initially 12,000 residents were without water and it took nine days to restore water service to every single property. The sewers were more severely damaged and it took 49 days to restore a functioning service to the boundary of all of the houses that were still occupied. Raw sewage was spilled into rivers for two months after the quake.

Getting these services up and running was a difficult logistical task for Waimakariri District Council, involving a large number of staff and contractors. This presentation is a summary of the damage, repair work, organisation, logistics and communication with the residents that was carried out in getting the services back on track and ceasing untreated sewage discharges.

**Gerard Cleary** is Manager Utilities and Roading at Waimakariri District Council, a role he has held since October 2008. Prior to this he managed the Council's in-house consultancy and has had experience working for several local authorities in New Zealand in design, project and contract

management, development and asset management. Gerard is a Chartered Professional Engineer and MIPENZ.

**Gary Boot** is the Utilities Manager at the Waimakariri District Council, responsible for Water, Sewer, and Solid Waste services. Gary has 18 years experience, 10 of which were spent in consulting work in the environmental and infrastructure engineering field, and the last 8 years have been in his current role with the WDC. Gary is a Chartered Professional Engineer. Gary played a key role in the Council's response to the Magnitude 7.1 Earthquake, including coordinating the teams of staff, contractors, and volunteers to restore water and wastewater services to around 3,000 properties in Kaiapoi, Pines Beach, and Kairaki.

# SATURDAY 18 JUNE - 2.30 pm

**STREAM: WATER & WASTEWATER** **2.30 pm**

*Sponsored by CPG*

### Porirua City Council Marches Forward – Smart Development of Renewals Programmes

*Des Scrimgeour, Senior Waters Engineer, Porirua City Council*
*Co-Presenter: Ben Davies, Water & Waste Project Engineer, MWH New Zealand*

Porirua City Council (PCC) is under substantial pressure to keeps rates down, yet the community has a strong expectation that the council will continue to provide high levels of service in its core assets. This presentation looks at PCC's smart solution to gain a better understanding of its water, wastewater and stormwater networks, to ultimately ensure that it can measure the impact and payback it gets from each dollar spent.

The presentation will include details of some of the successes to date, including a new sewer renewals programme, based on an auditable methodology and incorporating outputs from different partner consultants into a cohesive whole. The risk-based renewals programme was built around a long-term partnership between council (led by Des Scrimgeour) and consultants (primarily MWH and AWT Water).

The smart approach also includes how the project has been presented to councillors; the programme is able to be presented in Google Earth, a format which is easily accessible to technical and non-technical audiences alike. This has helped increase understanding about an asset that is often out of sight and mind until it is too late.

Factors brought into the risk analysis were as diverse as age and diameter of the mains, results of CCTV surveying and modelling, and consequences of a failure on aspects such as lifestyle, economy, environment and culture. Source information for the analysis was derived from modelling of the sewer network carried out by AWT Water, and MWHSoft's CapPlan software was used to carry out the majority of the risk analysis.

In future, tweaking of factors in the analysis will be required to incorporate additional data and reflect a greater understanding of the network. The transparent and auditable nature of the analysis and the communication paths already forged between the partnership consultants will allow this to be carried out with little difficulty. This process has also provided a model for other local authorities and consultants to follows as they seek to find smarter, cost-effective ways to manage sewer assets.

**Des Scrimgeour** has been with Porirua City Council for approximately four years and spear-headed the development of the Asset Analysis Programme. He has worked for local authorities for approximately 15 years and has spent most of that time in asset management and development of underground services.

**Ben Davies** has been involved in renewals planning for the last four years, firstly in water supply with Thames Water (UK) as Lead Design Engineer in the Trunk Mains Leakage team, and lately in MWH with local authorities in both water supply and wastewater. He recently presented a paper at the Water NZ conference on water meter renewals planning, and has been involved in high-level assessments in Hutt City Council and Tauranga City Council, in addition to his work with Porirua City Council.

**STREAM: URBAN DESIGN** **2.30 pm**

*Sponsored by Aurecon*

### Keeping it Simple: Delivering on the Concept of Placemaking

*Melissa Clark, Team Leader, GHD*

The concept of "placemaking" in the context of urban design is gaining momentum. Its appeal lies in its relative simplicity. Whereas urban design has traditionally been seen as a generator of grand schemes and large budgets, placemaking generally refers to a number of small urban design improvements that bring about big social benefits, without breaking the bank. It's not scary.

However these kinds of projects require skilled planning, both in terms of strategy and delivery before

funding is allocated. You need to be clear from the outset about how they are going to work spatially, and community engagement is fundamental.

In this paper, Melissa provides examples of how the concept of placemaking is helping provincial towns around New Zealand achieve some of those "hard to define" community outcomes that have been set within town spatial plans. She will also take you through a planning process that shows how integration across different disciplines, and robust community consultation, can impact the bottom line.

**Melissa Clark** is Team Leader for GHD's urban design and landscape architecture group. She is experienced in providing urban design advice, particularly for transportation projects, and is a trustee of Placemaking New Zealand.

## STREAM: ASSET MANAGEMENT 2.30 pm

*Sponsored by Beca*

### The Impending Demise of Risk Management?

*Fendall Hill, Senior Consultant, GHD Infrastructure Group*
*Co-Presenter: Dr Theuns Henning, Senior Lecturer, University of Auckland*

Risk management could be in danger of being overlooked as another fruitless fad because of a combination of issues: The over-complication of process, excessive servitude to software, failure to integrate risk with asset management, failure to follow through, and the international risk standard's "less-than-suitable" approach for councils.

Nine councils were evaluated for an NZTA / RIMS research paper on risk management practices in New Zealand's council roading authorities. Fendall and Theuns will reflect on the results of this research and other experiences with asset and risk management at all levels of various councils.

The authors believe in the results of risk management 'done well', but see trends that, if continued, could reduce it to a box ticking exercise with no useful output or gain.

**Fendall Hill** is a senior consultant with GHD's Infrastructure Strategy Group based in Auckland City. He is a Professional Civil Engineer with 23 years experience in local authority engineering and management processes.

**Dr Theuns Henning** is a senior lecturer at the University of Auckland and the Business Manager of IDS Ltd, specialising in asset management.

## STREAM: SMART MIX 2.30 pm

*Sponsored by NZ Contractors Federation*

### From Good Graduates to Engaged Engineers: How Young Professionals are Getting Smarter About Professional Development and Social Responsibility.

*Chris Maguire, Graduate Engineer, MWH New Zealand*

The journey from graduate to professional engineer is not just about passing exams. Engineers today look beyond the present and into the future and are motivated by how we, as engineers, can make a difference to both current and future generations.

As socially conscious engineers become more centre stage, new breeds of young professionals are emerging from within our communities. Using engineering institutions, young professional groups and company outreach initiatives, they are enhancing not only their own knowledge but also that of their peers and of the next generation of engineers.

Education outreach is also evolving with smarter planning and social networking, enabling better outcomes in sustainable engineering. The future professional engineer will be at the forefront of sustainable development and the knowledge they gain will benefit our generation for years to come.

As young professionals are expanding their skill set through social engagement, they are helping drive the local government sector forward into a new era of sustainable, economic and social development.

Voluntarism benefits the graduates in their personal development and by interacting with the community, the public are becoming more aware of the value of professional engineers to maintain and improve the infrastructure on which they rely.

**Chris Mcguire** has just over three years experience in water resources engineering, but has already worked for Skanska Poland, MWH UK and now MWH NZ. He has been engaged in graduate development for more than five years through the Institution of Civil Engineers and has worked on multiple education outreach programmes. Chris is a firm believer in the need for engineers to engage with the public. Since moving to NZ only seven months ago, he has already presented sustainability and water resources education to over 200 students in the Waikato, through MWH's Climate Change Commitment Education Outreach Programme, and through IPENZ's Neighbourhood Engineers Programme.

Chris was the Winner of the 2009 Chartered Institute of Water & Environmental Management (CIWEM) Young Members Paper competition with his paper entitled "Assessing the ecological footprint of modern wastewater treatment methods".