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Stormwater 2017 Conference

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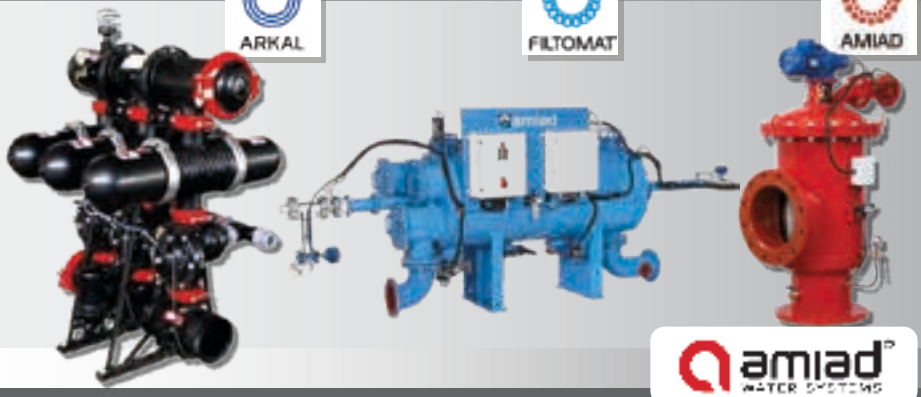

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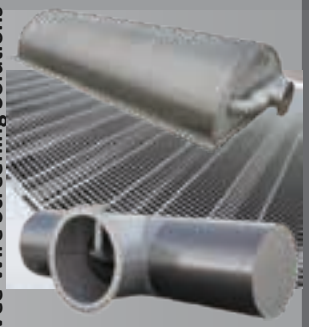

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Issue 199 MAY / JUNE 2017

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FEATURES

REGULARS

The official journal of Water New Zealand – New Zealand's only water environment periodical.
Established in 1958, Water New Zealand is a non-profit organisation.

Future ready stormwater systems

Dukessa Blackburn-Huettner,
President, Water New Zealand

The theme of this year's Stormwater Conference, 'Innovative, Resilient and Future-ready', has been particularly pertinent.

In Auckland, the deluge and resulting flooding and wastewater overflows was, understandably, the focus of strong public interest on stormwater management. The flooding certainly underscored the importance of ensuring our stormwater systems continue to be resilient and future-ready.

Increasingly, we will need to focus on innovation and a multi-stakeholder approach in order to rise to the many challenges we face – an approach that has been resonating strongly with me in these past few months.

March and April were particularly intense months. The Auckland region received up to 740mm of rain across a 37 day period. We were certainly under the spotlight as we faced nearly every consequence of flooding – from roads scoured away to evacuations and buildings red-stickered through to major stock losses and services cut. We had significant wastewater overflows and our water treatment plant became so blocked by sediment that we had to ask Aucklanders to conserve water.

While this was a challenging time, it has provided an opportunity to show us that we are on the right track in identifying issues, and steps we need to have in place to build resilience and reduce the impact of flood events in the future.

Future-ready stormwater systems will need to not only fulfil their traditional role of removing flooding, but also develop to deliver improved freshwater quality for our urban waterways. These will be driven by expectations from the community and stricter regulations expected from the implementation of the National Policy Statement on Freshwater Management.

One fundamental shift needed in the management of flooding is not related to pipes and culverts, but in ensuring better understanding of human activity and urban planning in stormwater management.

There is a perception that the stormwater pipe network reduces the chances of flooding. Yet this is rarely true. Very often, flooding occurs because of inadequate provision of space to allow ground surface flooding when land is developed, particularly in inappropriate areas.

In the urban environment many streams are buried. The pipes that replace the streams are a far less resilient system than the streams they replaced. It is important to recognise that the stormwater pipe network serves primary drainage and is of limited capacity. It is the secondary stormwater network of streams and overland flow paths which accommodates and alleviates flood flows.

Blockage of these systems and inadvertent diversion of overland flow paths causes as much flooding as streams and rivers bursting their banks. That's why ensuring these are kept clear of debris and are well maintained is vital to reduce the risk of flooding. Ensuring no contaminants enter through this network and enhancing and maintaining natural systems will also lead to better water quality outcomes.

Councils need to work in partnership with the community to educate on the vital role these systems play in both flood

management and water quality. We need to take collective ownership of these systems and the outcomes.

Flooding is also caused by building in the wrong location or at the wrong elevation. It is a concern, that as we see more and more infill housing, the space left for overland flow reduces.

We can also see infill housing being developed in more marginal locations such as steep sections or in low lying areas. Design features such as concrete slabs, cut-in building platforms and building floor levels the same as the ground level outside, along with poor landscaping choices, all conspire to invite water into our homes.

In order to achieve an integrated system and outcome, it is critical that both regional and district plans align.

Stormwater quality and flooding considerations must be taken into account when land is zoned for development. Clear objectives and rules within the plans are needed to ensure that future development does not create additional burden on organisations responsible for the management of stormwater – both in terms of quality and quantity.

Choosing a more water-sensitive approach to flood management can also achieve better water quality outcomes. These include a range of stormwater treatment or water sensitive design mechanisms.

Urban streams can become highly valued areas for recreation as well as enabling more biodiversity. Other measures can include gross pollutant traps, vegetative filters, rain gardens, wetlands and water quality ponds. This is in marked contrast to the piped, channelled and sterile environments created when we focus simply on conveying flood water away as quickly as possible.

The site visits of our stormwater conference reflected this trend. Participants visited a range of innovative water-sensitive design sites that included a residential development incorporating water sensitive design features, and the Kopupaka reserve stormwater ponds which won the 2016 Landscape of the Year at the World Architecture Festival. They also had the opportunity to visit 'the cloak' – an award winning green roof at Auckland airport – along with the rehabilitated Te Auanga creek which incorporates stormwater management with ecological restoration.

Such projects of course do not come without a price tag and stormwater systems have always been the poor cousin to wastewater and drinking water in terms of funding. The 2015-16 National Performance Review (NPR) shows total expenditure for water supply systems is double that of stormwater systems, and for wastewater systems, more than three times higher ($690,000,000, $1,118,000,000 and $313,000,000 were spent on drinking water, wastewater, and stormwater systems respectively by the NPR's 50 council and CCO participants).

These are certainly interesting times and I am heartened by the enthusiasm and innovative thinking that has been happening in our sector.

Our big challenge now is to ensure that our communities and decision makers understand just how critical resilient and sustainable stormwater planning is in future urban development. **WNZ**

Bay of Plenty flooding a 'medium-scale event'

The Government classified the flooding from Cyclone Debbie in the Bay of Plenty as a "medium-scale adverse event".

"The classification of a medium-scale event makes extra recovery assistance measures available including recovery coordination, increased support through Enhanced Task Force Green teams and Bay of Plenty Rural Support Trust, as well as tax flexibility," says Social Development Minister Anne Tolley.

This may come as a surprise to the likes of the victims of the Rangitaiki River stop bank failure that drowned most of the town of Edgecumbe.

The river and flood mitigation will be a major focus of the Bay of Plenty Regional Council for some time as it answers questions as to why the stop bank failed, resulting in the devastating flooding.

The township lies on a flood plain (with many parts below sea level) and the surrounding area has an unenviable history of floods that dates back to news records in 1925.

Back in April, the Rangitaiki River didn't flood over the bank, but collapsed it. Construction of flood defences began in the catchment in 1971 and this was completed by the early 1980s. Since that period, components of the flood defence system have been reviewed and upgraded. Renewal work has been necessary following natural disasters such as the 1987 Edgecumbe earthquake and the July 1998 and 2004 floods.

Investigations will cover local materials used in the contruction of the stopbank, structural stability, any recent changes, possible erosion by the river, slope instability, and even rabbit warren weaknesses, which are difficult to backfill.

Navigation planning starts soon

A new hydrographic plan is expected to deliver benefits to our shipping and fishing industries, tourist operators, and marine scientists.

Land Information New Zealand (LINZ) has released Hyplan, which sets out areas around the country where it will carry out surveys of the sea floor over the next five to 10 years.

The plan prioritises areas where the latest navigation information will be most beneficial.

"One of the biggest priority areas is from Kaikoura to Port Underwood. Last year's earthquake had a big impact both above and below water, so it's important we assess the local sea floor," says Land Information Minister Mark Mitchell.

"Fiordland, Eastern Bay of Plenty, and the East Cape are also high on the priority list due in part to the increasing flow of cruise ships in those areas."

For these priority areas, work is planned to start later this year, and LINZ will soon go out to the market to find a survey company to carry this out.

Other priority areas include Bluff and Stewart Island, approaches to Port Taranaki, Banks Peninsula, and Coromandel Peninsula, with LINZ set to continually review these areas so it can adjust if the needs of a region change.

More on Hyplan priorities for surveys at: www.linz.govt.nz/sea/charts/annual-work-programme.

New staff welcomed at Water New Zealand

Charlotte Cudby

Pip Donnelly

Water New Zealand has recently welcomed two new team members, Charlotte Cudby and Pip Donnelly.

Charlotte is a Senior Policy Advisor with a background in resource economics, who specialises in water issues. She has worked in a variety of public and private sector roles. Her role prior to joining Water New Zealand was supporting the work of the Land and Water Forum.

Charlotte will be working on contract to develop submissions on central government policy proposals of interest to members, as well as progressing policy related projects such as work to improve resource consent consistency for wastewater treatment plants.

Pip joins Water New Zealand as an Administration Officer. Pip has a strong administration background, with her most recent role being for a children's charity. She will be mainly focused on database and memberships, ensuring all member information is accurate and up-to-date.

While the "three waters" space is totally new to Pip, she is learning fast and says she looks forward to meeting some of the members at the annual conference in September.

Water treatment partnership

Hynds Pipe Systems and Eloy Water have a new partnership in New Zealand and South West Pacific Islands.

Eloy Water NZ is part of the Belgian-owned Eloy Group, which has built a strong global reputation supplying wastewater treatment plants to 26 countries around the world. The company specialises in modular treatment solutions for single house to mid-size communities that includes three technologies: Submerged Aerated Fixed Film (SAFF); Sequencing Batch Reactor (SBR); and Passive Treatment Filter (Zero Power Treatment Process).

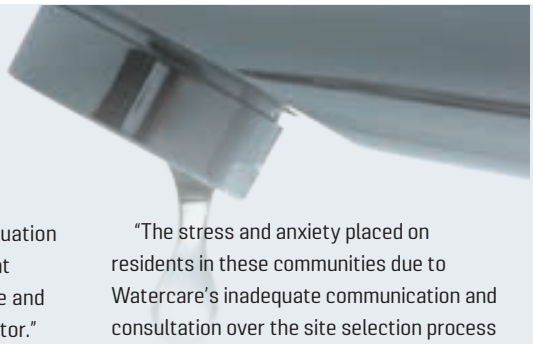
This strategic alliance between the two family-owned companies shares a common vision and combines more than 110 years of experience in construction and wastewater treatment and provides Eloy Water Global Technology and R&D, supported by the manufacturing strength of Hynds Pipe Systems.

In the coming months, Hynds and Eloy Water will introduce a suite of products focused primarily on the treatment of domestic grade wastewater, for single dwellings up to medium size communities.

The primary focus on this new business partnership is to be the market leader in development and distribution of wastewater treatment solutions, say the pair.

The new venture is under the leadership of Mike Dawson, the previous general manager of Eloy Water NZ.

Tapping in to water news



New membership class for retired members

Water New Zealand is launching a new 'retired' membership class aimed at helping retain expertise and knowledge in the sector.

From 1 July, retired members will get a discounted membership fee of $50 (inclusive) per year.

In order to qualify for the new 'Individual – Retired' class, members must no longer be in paid employment and must have previously held full financial membership either as an individual or corporate additional member.

Chief Executive John Pfahlert says there is a lot of experience and skills amongst retired water sector members and he hopes to build on and enhance the important role these members have in the organisation.

As part of this, Water New Zealand is hoping to establish a new mentoring programme between older and more experienced members, and new and younger members.

"We think this could be a win-win situation for both groups of members and a great way to ensure that valuable knowledge and experience is not lost to the water sector."

For more information, or if you wish to apply for this membership, please contact enquiries@waternz.org.nz.

Handling community rage

Watercare Services is having a hard time finding a site for its proposed new Huia Water Treatment Plant.

Out of three optional short-listed sites, the Parker Road location in Oratia has created a storm of protest from community groups claiming that more than 100 people with be made homeless if the project goes ahead.

The other two sites in Titirangi will require significant vegetation cleared in an environmentally sensitive area, they say.

"The stress and anxiety placed on residents in these communities due to Watercare's inadequate communication and consultation over the site selection process is unfair and unnecessary," says Waitakere Ranges Combined Residents and Ratepayers Group Chair Kubi Witten-Hannah.

The group, which represents the Waitakere Ranges heritage area from Titirangi to Piha and Swanson, says all local communities are threatened by the lack of accountability of Council Controlled Organisations when planning new infrastructure.

Local residents are also calling for proper and thorough community consultation to take place. Section 59 of the Local Government Act requires Watercare to "exhibit a sense of social and environmental responsibility", they claim.

Clean Water Consultation submission

Water New Zealand has made a submission to the Ministry for the Environment's Clean Water Consultation 2017.

The association supports, in principle, the overall intent of the Clean Water proposals, which cover the swimmability targets, proposed amendments to the National Policy Statement for Freshwater Management (NPS-FM 2014), the freshwater improvement fund and the stock exclusion proposal.

Water New Zealand does, however, want to see some specific clarifications made to the swimmability targets and the proposed changes to the NPS-FM. It also says the proposed macroinvertebrate monitoring requirement could go further.

The association also supports in principal the proposed additional Objective and Policy in relation to Te Mana o te Wai.

"The interconnectedness of water and the broader environment is of fundamental importance when we are considering the provision of safe drinking water and the management of point source discharges. Including a framework for TMOTW in the NPS-FM is therefore welcome but it needs more work.

"It is unclear how councils and communities are expected to interpret the relationship between the new Objective and Policy and the values expressed in Appendix 1. The changes imply there is intended to be a values hierarchy under which water supply, along with other important values listed under the heading "extractive uses", would be outside the TMOTW framework, and therefore given lower priority in freshwater objective and limit-setting.

"This is inconsistent with the more integrated and holistic approach to assessing community values that has been promoted by LAWF, and supported by Water New Zealand.

"Water New Zealand would like to see water supply explicitly connected to the TMOTW framework under the heading "Hauora o te Tangata" (health of the people). Water New Zealand would also like the text of the new Objective and Policy to be clarified to support consistent implementation. The relationship to, and treatment of, the national values listed in Appendix 1 need to be explicit in the wording of the Objective and Policy itself."

In terms of a future work programme the associstion says meeting community aspirations for freshwater in the most economically sustainable way will require new management approaches.

"Water New Zealand wants to see (for example) national direction on water metering extended, greater use made of economic instruments to encourage more efficient water use, more attention given to urban good management practices, as well as support for standardising consent conditions to help streamline implementation.

"Water New Zealand is keen to see the planned work completed in time to support 'first generation plans' and in turn support more effective infrastructure planning.

"Three waters infrastructure will likely face increased environmental standards once the NPS-FM is implemented and this will cost communities.

"It is also vital that future work on allocation and good management practices involve stakeholders in an open and transparent way from an early stage and on an ongoing basis."

To read the full submission, visit www.waternz.org.nz.

Water conference calls

Don't miss out on the 59th New Zealand Water Conference and Expo being held at Claudelands in Hamilton, September 20-22.

This year it's going to be bigger than ever. In 2016 the association hosted nearly 1300 delegates and expo attendees, almost a record attendance, and association Chief John Pfahlert says this year will be no different.

"In addition to our normal annual conference and expo, there will be an opportunity to register for an additional one-day pre-conference symposium on Tuesday 19 September, where we will be discussing the learnings from the Havelock North campylobacter outbreak," he says.

"Five international speakers will be talking about the lessons learnt, similarities to events overseas, the history and current state of water safety plans, and water sanitation planning.

"We hope to confirm a panel member from the Government Inquiry to talk about the outcomes and the implications for water management in our country.

"Last year, for the first time, we introduced a very successful Thought Leadership stream at the conference. It will be run again this year and

will complement the more than 100 technical papers to be selected by our newly appointed Technical Committee.

"Once again, this conference will bring together like-minded professionals to share experiences and knowledge and build new relationships.

"I invite you participate as delegates and enjoy what Hamilton and its region has to offer. It is the highlight of the three waters events calendar in this country and an occasion that is not to be missed."

Picton and Waikawa sewerage upgrade

Stages two and three of a major upgrade to Picton's 85-year-old sewage system start this month. Contractors will replace main sewerage pipes and pump stations between Dublin and Ranui Streets, and build a new bypass treatment facility to treat excess sewage that can't be processed at Picton's Sewage Treatment Plant. The two stages, worth $19.45 million, will service nearly 2500 properties in Picton and Waikawa, says Council Projects Engineer, Bruce Oliver. Work is expected to take 12 months and follows a major upgrade to Picton and Waikawa's new water treatment plant at Speeds Road, which has now been commissioned.

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Beca's new chairman

David Carter is now Beca's Executive Chairman, succeeding Richard Aitken, ONZM, who has stepped down after eight years in the role.

This appointment is the culmination of David's long and distinguished career with Beca, having held a number of executive roles including: regional director, Asia; managing director of Beca Australia; and managing director, Corporate Operations. He holds numerous board roles with Beca, has nearly 30 years of experience in strategy and management, and has an extensive track record in leading and delivering major infrastructure projects.

Outgoing chairman, Richard Aitken, said, "We welcome David to the role of executive chairman during a time of growth and innovation across Beca.

"David has a deep understanding of our business – most recently as our current chief technical officer, he has driven our focus on professional excellence and the enhancement of leading-edge technical capability. As chairman, he will play a vital role focusing on long-term strategic direction as the company enters another era of expansion and diversification."

David will also continue in his current roles as chief technical officer (CTO) and as regional director for Beca Asia. He is also active in the wider community as a trustee of The University of Auckland Foundation; chairman, Hutt Valley Water Services; and non-executive board member, Leadership Development Centre.

Richard Aitken has been an executive at Beca for more than 40 years.


David Carter


Rupert Hodson

Before becoming executive chairman in 2009, he held numerous leadership roles, including that of Group CEO for 10 years.

He will continue to hold a number of roles for Beca, including chair of the Project Alliance Board on the hallmark Waterview Connection project, and the $1.4 billion Auckland motorway project soon to be open to the public.

In other company news, Beca has appointed **Rupert Hodson** as regional manager for New Zealand's northern region, based in its Auckland office.

Rupert has 17 years of experience in planning and environmental consulting here and in the UK.

Alongside his regional manager role, he continues as business director of Environment Business Line, which has nearly 50 planning and environmental practitioners based in Auckland.

BOP regional waterways investment

Bay of Plenty Regional Council says its decision to invest $24 million each year into protecting and improving rivers, lakes, streams and aquifers in its region is paying off.

Our Fresh Water 2017, the first dedicated report on fresh water in the Environmental Reporting Series released by the Ministry for the Environment, (which will become a baseline for tracking change over time) reflects the council's work, it says.

"We're pleased to see that it shows that our lakes' monitoring is on track and we're seeing improvements in our lakes' water quality.

"This is largely due to proactive interventions being delivered by the Rotorua Te Arawa Lakes Programme."

Strategy and Science Manager Ian Morton says the report highlighted some worrying trends nationally for fish species, but adds there's plenty of work taking place across the Bay of Plenty, which is showing promising results for native fish species.

Fish surveys showed results in the region with two endangered native fish (dwarf galaxias and koaro) found in a number of upper catchment streams. It was the first time koaro have been found in the Rangitaiki catchment.

In addition, a joint project with the Department of Conservation, Te Arawa Lakes Trust and Ngati Rangiwewehi to help native fish has had positive results. This includes the installation of a weir in Hamurana Stream near Rotorua, providing a barrier to prevent trout moving into the upper reaches of the stream, leaving the habitat safe for native fish, especially koaro, which are capable of climbing steep waterfalls and rocks.

"The outcome is also a win for downstream users as there are still trout in the lower reaches of the stream for recreational fishermen."

More information: www.boprc.govt.nz/freshwaterfutures.

Record fine for Thames Water

In the UK, Thames Water has been hit with a record fine of £20.3 million following huge leaks of untreated sewage into the Thames River and its tributaries and onto land, including the popular Thames path. The prolonged leaks led to serious impacts on residents, farmers, and wildlife, killing birds and fish. The fine imposed was for numerous offences in 2013 and 2014 at sewage treatment works at Aylesbury, Didcot, Henley and Little Marlow, and a large sewage pumping station at Littlemore.

The Environment Agency (EA), which brought the prosecution, said the enormous volume of untreated sewage discharged was unprecedented – 1.4 billion litres – as was the length of time over which the discharges occurred.

The sewage caused long-term pollution in the Thames and some tributaries, revolting riverside users and wiped out the season for a commercial cray fisherman. The EA said it was the biggest freshwater pollution case it had ever undertaken.

"This is a shocking and disgraceful state of affairs," said Judge Francis Sheridan, who delivered the sentence at Aylesbury crown court. "It should not be cheaper to offend than to take appropriate precautions.

"I have to make the fine sufficiently large that [Thames Water] get the message," he said. Describing the breaches as "wicked" and noting the company's "continual failure to report incidents" and "history of non-compliance", he said, "One has to get the message across to the shareholders that the environment is to be treasured and protected, and not poisoned."

Anne Brosnan, the EA's chief prosecutor, said: "Thames Water was completely negligent to the environmental dangers created by the parlous state of its works. Our investigation revealed that we were dealing with a pattern of unprecedented pollution incidents which could have been avoided if Thames Water had been open and frank with the EA as required."

Thames Water, which is the UK's biggest water company, serves about a quarter of the population.

Havelock North inquiry stage one damning

Hawke's Bay Regional Council and Hastings District Council were criticised in the first stage of the panel report on the Havelock North water supply contaimination last year.

The report identified failings by the Hastings District Council, Hawke's Bay Regional Council and drinking water assessors, and raised "serious questions" of the safety and security of our drinking water in general.

While it did not say the councils directly caused the outbreak, their "dysfunctional relationship" as "guardians" of the aquifers in the Heretaunga Plains is said to have caused missed opportunities that could have prevented it from occurring and their actions fell below "required standards".

Hastings District Council "did not embrace or implement the high standard of care required of a public drinking-water supplier". The council was also found to be lacking in its maintenance of plant equipment.

Attorney-General Chris Finlayson says all councils should take note of the findings and immediately check their water processes, and not wait until the Stage 2 report.

"There is nothing more fundamental to the citizens of this country than clean water," he says.

Stage 2 will address systemic issues and provide recommendations about managing water supply across the country. It will examine the existing statutory and regulatory regimes involved in delivering drinking-water to see if improvements can be made. This is due to be reported back to the Attorney-General by December 8.

Meantime, regional council chairman Rex Graham reportedly disagreed with the findings and says he felt the council performed its duty to protect public health.

"The aquifer is the lifeblood of my family and all the other families on the Heretaunga Plains and we would do nothing to fail to protect it or the people that live on it, so I would dispute that," he says.

Hastings Mayor Lawrence Yule says the findings were fair and acknowledges multiple agencies, including the district council, had fallen short.

"I think the findings are fair, balanced and reflect what actually happened, so I think they've done a good job and we accept the findings."

Soliciting public views on water

Water New Zealand has launched a major customer survey to help local authorities and the water sector grapple with the growing challenges around planning and managing the country's water resources. By **Debra Harrington.**

It is the first national comprehensive survey of its type, and aims to gauge attitudes and concerns about water issues – from sustainability and quality issues, to how to manage ageing infrastructure and increasing urbanisation.

Water New Zealand Chief Executive John Pfahlert says that the survey aims to help inform future policy making around water issues.

"Understanding community attitudes, priorities and perceptions is critical to developing a comprehensive, robust and sustainable water policy.

"We want to know what people from all over the country think about water use efficiency, sources of water, price, infrastructure, customer service, and what is important for the future of water."

The survey began on May 1 and is expected to run until mid-June.

"We hope to gather a wide cross section of community views," he says. "That's why we've been asking all our members and councils to use their communications channels to get the survey out to ratepayers and customers."

Local authorities have been asked to share the survey by sending banners with links to the survey in emails to ratepayers and customers as well as through social media and other channels.

Water New Zealand intends to share this information at its Annual Conference and Expo in September and make the findings available for all water utilities.

"Ultimately, the exercise will aim to encourage more conversations around water and raise awareness of the importance of water to all New Zealanders," he says.

"It will also provide insights into people's attitudes to different water sources, price sensitivity, water saving drivers and customer interaction – information that can help us deliver services in a way that best meets the needs of our customers."

The customer satisfaction survey is the first project of Water New Zealand's new Special Interest Group focusing on customers. The group brings together members with an interest in customer focus to discuss and share solutions, as well as develop and maintain industry standards and policies.

"We want to share and build on the really good work that has been done by members aimed at becoming more customer focused."

You can participate in the water survey by going to www.nzwatersurvey.co.nz. **WNZ**

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Stormwater 2017
Innovative, Resilient & Future Ready

Alan Titchall reports from Stormwater 2017

The theme of this year's stormwater conference was, 'Innovative, Resilient & Future Ready'. As conference Chair Bronwyn Rhynd and other speakers pointed out, after the downpours and flooding of March this year, on top of unprecedented population growth, stormwater infrastructure is suddenly back in the limelight and even made 'sexy' again.

The conference comprised two and half days of sessions, four keynote speakers, a welcome function sponsored by Abergeldie Harker, and a conference dinner sponsored by Stormwater360 featuring two inaugural awards – Professional Paper and Professional of the Year.

The increasing challenges of managing urban stormwater was the key focus in Auckland for around 300 delegates and specialists from local and regional authorities, as well as scientists, planners and engineers. They are looking at the growing pressure on our water management systems caused by intensified flooding, urban population growth and ageing infrastructure around the country.

The Chair of Water New Zealand's Stormwater Special Interest Group, Michael Hannah, says Auckland is a prime example of what can happen when massive population growth places too much pressure on infrastructure.

"The Auckland region received up to 740mm of rain across a 37 day period in March and April this year and, as we know, that placed an enormous pressure on existing stormwater systems."

He says the big question is how to fund the new infrastructure and urban design needed to ensure communities remain resilient.

"One thing is certain, there are no quick fix, or cheap, solutions. It's going to require a lot of time, collaboration and innovative solutions.

"That's why the theme of this year's conference, Innovative, Resilient and Future-ready, is particularly pertinent."

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1. Each conference is opened with an emotive welcome. The powhiri in Auckland, by host Ngati Whatua and Kaumatua 'Uncle Bob', was sensitive and very moving.
2. Exceptional catering by the Pullman F&B team kept delegates well fed.
3. Auckland councillor Penny Hulse thanked delegates for "repairing God's work. "Stormwater may be unsexy and unloved, but it is impossible to ignore, and we need to change," she said. "Thank you for your work redesigning our cities."

Among the 'operational management' presentations was an excellent focus on WSD-related stormwater facilities by Dr Frank Tian, which was complemented by keynote speaker Jack Mullaly who presented examples of poor and well-maintained bio-retention ponds and facilities in urban Queensland.

The 1.5 hour Auckland Unitary Plan discussion forum was one of the 'sleepers' of the conference, but those that attended were rewarded with an insight from Healthy Waters management on how the city and intensified housing development and infill will cope with stormwater mitigation, particularly after the flooding in March.

It has been five years since eight water-focused authorities were merged to provide scale of water asset management and development in Auckland. This is basically divided between Healthy Waters, which looks after Auckland City's stormwater asset and Watercare Services, which looks after wastewater and water supply. In the area where the storm and waste water systems are still combined, they work together.

Of great interest was how the older infrastructure in the city will cope with the council's Unitary Plan and new infill developments that will place pressure on water systems.

At the Unitary Plan discussion were five senior officials from Healthy Waters, including the head of agency Craig McElroy, and Andrew Chin, its Waters Strategy & Resilience Manager. They talked of 'network approach' to flood management.

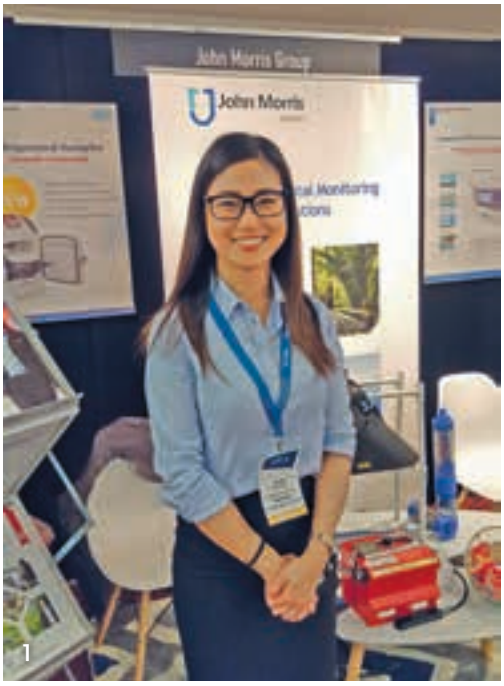
Long-term strategies to reduce flooding risk involves the large, 13-kilometre Central Interceptor tunnel and link sewers (costing $920 million) that will convey wastewater from western and central suburbs to the upgraded Mangere Wastewater Treatment Plant. It will free up capacity in the Orakei Interceptor and duplicate critical ageing sections of the Western Interceptor. Up to 4.5 metres in diameter, this large pipe is expected to reduce the frequency and volume of overflows in its catchment area by 80 percent. Construction begins in 2019 and finishes in 2026.

Other projects involve upgrading existing infrastructure, as it's not feasible to replace the entire network.

As flooding in Auckland, in many cases, can be attributed to restrictions in the overland flow path network, the idea is to map out poorly thought out modifications to flow paths – such as landscaping that obstructs or diverts flow paths, which can create significant issues. There are over 2000 kilometres of urban watercourses in Auckland, from concrete lined channels, to streams and watercourses on private land. Healthy Waters is proposing to categorise these 'assets' from one to five, with five being vital to management. This means where private landowners are currently being relied on to maintain these water courses, the council will take charge.

Another approach is the use of water pumps. Generally, Auckland's stormwater system is gravity fed, but Chin says pumping could be a future option.

TRADE



1. Juliet Browning, Environmental Division Manager, John Morris Group.
2. James Logan, Product Manager, Hynds, with the WaStop check value system that stops backflow in drains.
3. Oggie Kralj from Calibre Consulting and Vijesh Chandra from GHD.
4. Sam Burgess, Staff Engineer, and Charles Sweeny, Project Engineer, McMillen Jacobs Associates.
5. Andrew Olsen, Managing Director, Aquacomb with the new on-site detention pod. This is the first in-slab stormwater system to come in a pre-packaged kit form, for cost effective and quick installation that can be designed into any type of slab construction.
6. Adrian Moran, Key Account Manager, Humes, standing next to a model of the Artillery Drive stormwater project in Auckland, which is being built by McConnell Dowell. Using concrete pipes, this is the biggest job tonnage-wise for Humes in its 95-year history.
7. Chris Blair, Business Development Manager, A2K Technologies, with a restored arcade gaming machine – water themed of course.
8. Nicci Flynn from Healthy Waters, Auckland Council.
9. Steve McIntosh, General Manager and Ivo Van Dael, Northern Area Manager, Stormwater360.

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AWARDS

1. Allan Leahy (MWH) was awarded with 2017 Water New Zealand Stormwater Group Professional of the Year.
2. Conference chair Bronwyn Rhynd from CKL Surveys and Benoit Midol, tender manager for Downer.
3. Jack Mullay (right) was a keynote speaker at the conference. He spoke about bio-retention systems in the southern Brisbane region and best urban environment management.

Alfie Whattam had them laughing at the conference awards night in the Maritime Room on Princes Wharf. Alfie is a British magician, illusionist, and entrepreneur, best known as the star of the TV Show 'The Illusionist'.

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3

AWARDS

The 2017 Water New Zealand Stormwater Group Paper of the Year was won by Graham Levy for his paper, 'Hydrology of Urban Development: What Measures, What Outcomes', co-written with Dr Cameron Oliver. Graham is a Technical Director at Beca, with 42 years of experience in water resources engineering, including significant involvement in urban stormwater engineering, stormwater management concept development, and consenting for urban growth areas, and preparation of stormwater management strategies and guidelines.

The Paper of the Year

HYDROLOGY OF URBAN DEVELOPMENT: WHAT MEASURES, WHAT OUTCOMES?

C. J. Oliver and G. J. Levy, Beca, Christchurch.

ABSTRACT

There is increasing awareness in the stormwater industry of the more subtle long-term effects of urban development on urban stream morphology and ecology. Historically we have moved from a flood management approach, through stormwater quality improvement to water sensitive design (WSD) and sustainable management of urban streams. The recent Auckland Unitary Plan included measures targeted at protecting higher value streams.

Despite increased awareness, the practicality of implementing effective measures through statutory and design processes remains a challenge, with outcomes still uncertain. In part this is due to two factors: the difficulty of fully addressing the principle of hydrological neutrality; and the complexity of assessing the effectiveness of those measures on diverse stream environments in terms of base flow, erosion and ecology.

The underlying mechanisms typically used within WSD are retention, extended detention and peak flow attenuation, with treatment design contributing to the mix. While there are guidelines in place for such devices, rules vary across the country, and are typically borrowed and reinterpreted from elsewhere, rather than being validated for a region or site. There appears to be little hydrological simulation to support the design guides.

This paper has drawn on the earlier work investigating urban hydrology and stream erosion that lies behind the current TP10 extended detention requirements. It explores the relative effects of retention and extended detention on stream response to frequent rainfall events, and uses simplified continuous simulation to explore the relative effects of sizing parameters and configuration on the frequency of runoff events and the long-term flow duration curve. It is not a comprehensive study, but rather is intended to inform regulators on potential outcomes of their decisions, and spark further analytical investigation into this important subject.

The full paper can be read at: www.waternz.org.nz.

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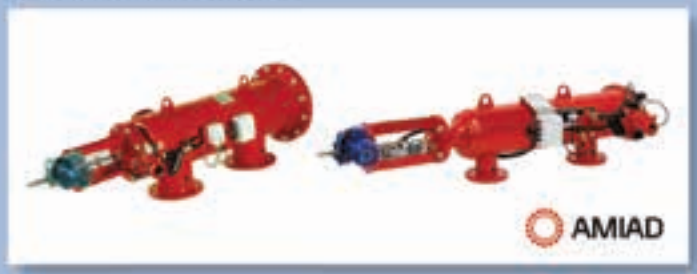

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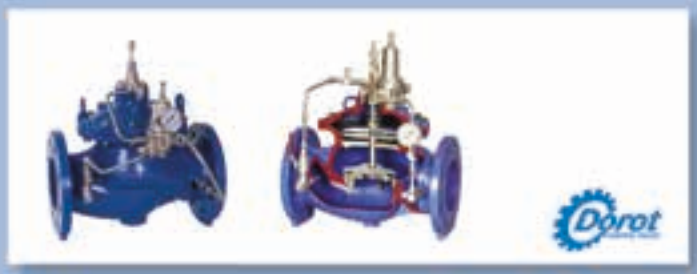

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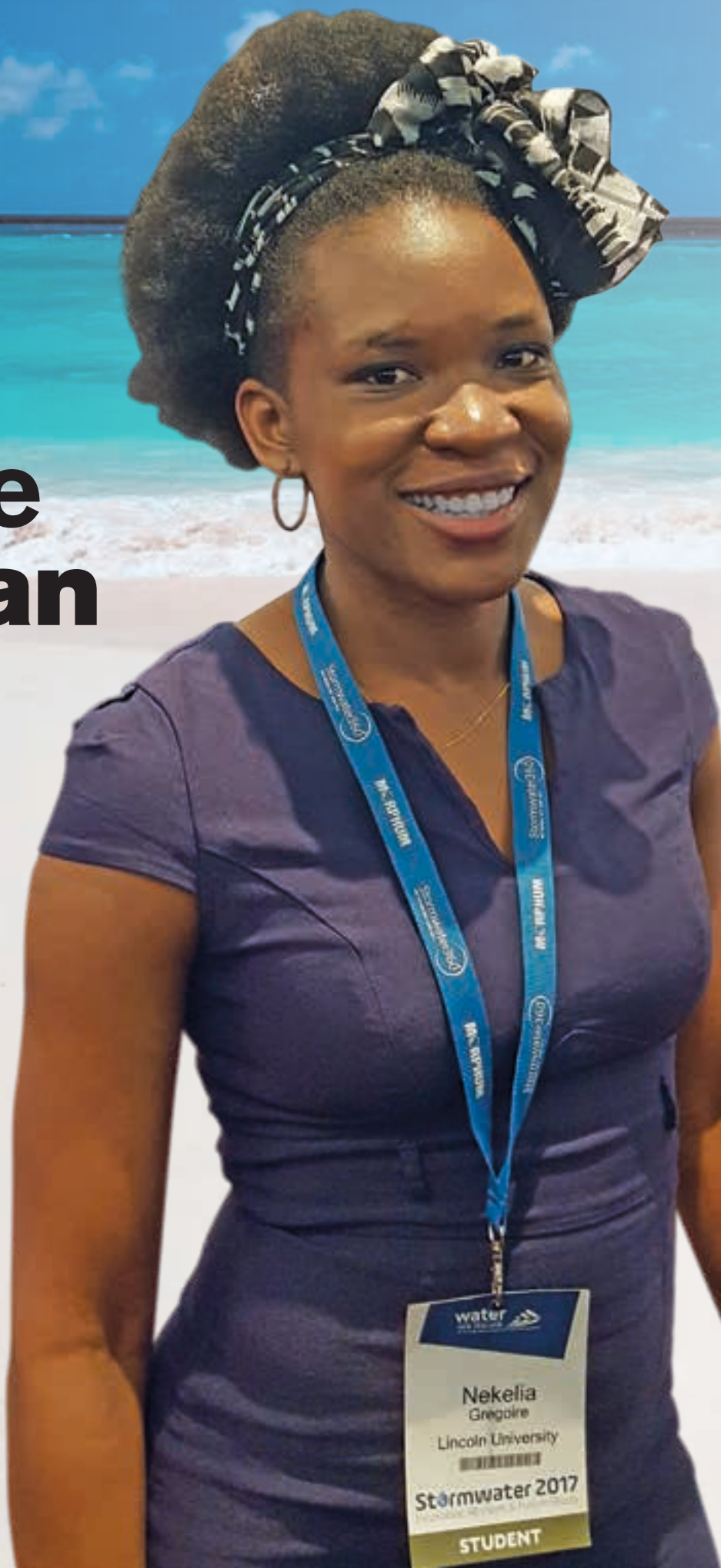
A long ways from the Caribbean

Water magazine talks to Stormwater Conference delegate Nekelia Gregoire, who is in New Zealand studying water management at Lincoln University.

By Alan Titchall.



Where are you from Nekelia?

I am from Dominica. This small tropical island, which is often mistaken for the Dominican Republic, is home to about 70,000 inhabitants whose official language is English, but who also speak Kweyol, which has its origins in French and West African languages.

Dominica is dubbed 'The Nature Isle' of the Caribbean and boasts of its lush evergreen rainforest, hot sulphur springs, boiling lake and 365 rivers – 'one for every day of the year'.

What did you do before coming here?

Before moving to New Zealand to pursue my Masters degree, I worked for the Government of Dominica as an agricultural extension officer, where I provided training and other services to farmers in various parts of the island.

After this, I moved to Trinidad and Tobago where I worked as an agricultural research officer with the responsibility of overseeing the operations of the Extension and Dairy & Calf Unit at the Sugarcane Feeds Centre (SFC), which is an institution of applied research, demonstration, development and training in tropical livestock production.

Please explain the sponsorship that brought you to New Zealand.

My postgraduate study is being sponsored by the Government of New Zealand under the New Zealand Development Scholarship (NZDS).

The NZDS give candidates from selected developing countries such as Dominica, the opportunity to gain knowledge and skills through the study of specific subject areas that will assist in the development of their home country.

The NZDS is funded by the New Zealand Aid Programme, the New Zealand Government's overseas aid and development programme, and is managed by the New Zealand Ministry of Foreign Affairs and Trade (MFAT).

What are you studying at Lincoln University?

I am pursuing an MSc in Water Resource Management. It is a shared degree between Lincoln University and the University of Canterbury, and is spearheaded by the Waterways Centre for Freshwater Management.

I am in the second year of my studies, where I am undertaking the thesis component. I am looking at the treatment of dissolved zinc and copper from roof runoff, using natural materials such as limestone, zeolite and mussel shell in a downpipe filtration system.

I will have completed my studies in February 2018.

What drew you to this industry?

I was drawn to the water industry because in the Caribbean we are faced with many water challenges.

Dominica is a tropical island that has a distinctive wet and dry season. We tend to experience very dry conditions in the first half of the year, and excessive rainfall and hurricanes in the second half of the year.

During the hurricane season, we experience severe flooding, which has been more frequent and intensive over recent years, as well as water quality problems. In addition to this, a large percentage of the workforce is farmers of whom more than 90 percent depend on rainfall as their source of water.

As a result, every year production is limited by insufficient rainfall during the dry season, which leads to scarcity of food on the market. Farmers also experience severe losses during the hurricane season.

Further to this, as a small developing island, we are faced with many social and economic problems that take priority over many of the water problems that we experience on a yearly basis. Having a background in agriculture and first-hand experience on the effects and losses incurred by the lack of and improper management of our water resources, I have endeavoured to increase my knowledge and skill in the area of water resource management to help increase awareness and alleviate some of these problems.

What do you plan to do after that?

Upon completion, I hope to work with the Government of Dominica in either the Ministry of Agriculture or the Ministry of Water Resource Management, where I can use the knowledge and skill that I have developed here in New Zealand to help better manage and safeguard our water resources for the development of the island.

I hope to help increase awareness on the severity of the impacts that the lack of and improper management of our water resources is having on the economy of Dominica and the livelihood of its people. I also hope to help in developing strategies to include policies that will help us better manage and safeguard our water resources for future generations.

After fulfilling the two years mandatory return to my home country as highlighted under the scholarship conditions, I hope to pursue further studies at the PhD level so that I can contribute further to the management of the water resources in Dominica and the Caribbean region by extension.

What has been the best thing about studying in New Zealand?

There are several things that I have enjoyed and will always cherish while studying here. However, the best thing about studying in New Zealand is that the working relationships with my lecturers, supervisors and various administrative staff both at Lincoln University and University of Canterbury has helped significantly, not only in the advancement of my academic career but also in my personal development.

What will you miss?

I will definitely not miss the cold, however, I will miss the warm and welcoming nature of the people, the constant encouragement and support, and the beautiful breathtaking sights. **WNZ**

The value of water

One of the consequences of the recent storms affecting Auckland stormwater, wastewater and water services has been considerable media comment about expectations of councils in managing our water resources. By **John Pfahlert**, CEO Water New Zealand, and **Garry Macdonald** from Beca.

Stormwater overflows mixed with sewage, debate around whether water bottling companies should pay for water, public debate about whether major rivers should be swimmable or wadeable, infrastructure replacement costs and the pressure on small councils – the list of topical issues surrounding the 'three waters' is getting quite lengthy!

And it's not just water and wastewater that's coming into focus, as flooding becomes an issue and debate starts about what level of protection is appropriate given more frequent extreme events – and climate changes.

The New Lynn flash floods and physical damage to properties is only the most recent example. We have seen 'flash floods' in other centres such as Wellington and Napier that have overwhelmed the stormwater systems designed for a 50 year annual recurrence interval (ARI) event. And this is apart from the regular flooding of households in Christchurch following the quakes, and relatively small changes in land levels that has had a massive impact on how stormwater is managed in the city. It also raises the issue of how we 'value' water. We sense a growing public hardening around holding government to account for the way water is managed. And it isn't just in this country that the issue is getting a public airing.

A new report from the USA finds that closing the nation's gap in investment in water infrastructure would create 1.3 million jobs and generate US$220 billion in economic activity. The analysis found a severe economic cost to inaction. At a national level, a one-day disruption in water service can lead to a loss of $43.5 billion in sales and $22.5 billion in GDP. The report, 'The Economic Benefits of Investing in Water Infrastructure', was commissioned by the Value of Water Campaign to better understand how investments in the nation's water infrastructure affects economic growth and employment.

To maintain reliable clean water services alone, the American Society of Civil Engineers estimates that the US needs to

invest an additional US$82 billion in water infrastructure per year over the next decade at all levels of government. Despite this increased need, the report finds that the Federal Government's contribution to water infrastructure continues to decrease, now just nine percent – down from more than 60 percent 40 years ago. The analysis falls against a national backdrop of increasingly complex water challenges that are exacerbated by overstressed and antiquated drinking water, wastewater, and stormwater management systems – as well as regulatory requirements that at times outpace the technological capabilities of the nation's water and wastewater facilities.

"The report findings make it clear that investments in water infrastructure generate high quality jobs, increases the competitiveness of American businesses, and leads to a significant injection of economic activity throughout the nation," says Radhika Fox, executive director of the Value of Water Campaign.

"That is the message we want public officials on Capitol Hill and across the country to hear: Investing in water equals jobs. Investing in water infrastructure builds a prosperous America."

So, there is an interesting association between the economic advantages of investing in water infrastructure (not just roads and transportation infrastructure as per our Roads of National Significance) and the consequences of loss of water services to industry and the country as a whole.

It's interesting to note that our own Government sees the economic benefit to the country of investing in rural irrigation schemes, but doesn't appear to have the supporting data/incentive to invest in urban sector water supply schemes.

There's been plenty of talk in this country about the bow wave of investment required to replace our ageing water infrastructure.

Central Government seems satisfied to leave the financial burden with local councils to deal with – on the apparent premise that three waters services are a 'local issue' that has little or no national significance.

The Value of Water Report suggests otherwise – that all water services, and any disruption to them, have a much wider economic and social impact than just at the local level.

Local Government New Zealand continues to beat the drums on adequate financing for water infrastructure, with the launch of Water 2050 – an initiative to develop cohesive water policy across the three waters and rural sectors.

The Havelock Inquiry will also lend its voice to the debate in due course.

The challenge for the water sector is to acknowledge that what happened at Havelock North is really our 'Pike River' moment.

We need to see the Inquiry as an opportunity to improve performance, not bury the issues and pretend it was a one off that couldn't happen on 'my patch'.

Failure to learn this time around may mean that next time it happens that isn't all we'll be burying. **WNZ**

Thinking ahead

Geoff Williams is a man to apply his grey matter to water matters. He talked to **Mary Searle Bell** about his passion for solving problems by measuring, monitoring and analysing.

If Geoff Williams is totally honest, he got into the water industry almost completely by accident. Geoff is a senior engineer responsible for asset management at Wellington Water, but back in the mid-90s, he had just graduated from Canterbury University and was off climbing Mt Kilimanjaro as part of a backpacking trip through Africa.

The plan then was for Geoff and his partner Jen to work and travel around the world, however, she secured a position at the University of Western Australia in Perth and Geoff followed. He applied for jobs suitable for a graduate engineer and was offered a role with the Water Corporation of Western Australia, which provides water services to the whole state.

It was a fascinating time to join the company – Western Australia was in the midst of a massive, decade-long drought and was needing to look for new water sources and innovations. And while Geoff and Jen's plan was to stay for just one or two years before continuing their travels, nearly 10 years and two children later, they were still in Perth and Geoff was still with the Water Corp.

"It was a huge organisation, which made it easy to move around and have different positions within the company," he says.

For the first two years, he was in the infrastructure planning branch, applying engineering theory to forward planning. Then came a two-year stint with the system monitoring and investigations team. Geoff describes this as a unique and specialised team – providing hydraulic performance testing, leak detection and pump performance testing services for the company.

"It was a hugely influential part of my career," he says. "We travelled all over Western Australia from Esperance to Kununurra and everywhere in between, but most importantly we learnt to value the operations side of the business."

In those years Geoff developed a deep respect for the operations staff.

This was the beginning of Geoff's passion for helping solve real problems by measuring, monitoring and analysing.

"It was also the beginning of something I've kept pretty much all my career – training myself to take the time to think deeply. When I do, I often get insights I wouldn't otherwise.

"It was a brilliant job. It appealed to my sense of wanting to solve engineering problems, but also the huge geographical area we covered meant we saw a wide variety of issues."

Geoff then spent a couple of years in a role learning all about drinking water quality management before returning to the systems investigation and monitoring team he loved, this time as its manager.

He describes it as good people, good expertise and great challenges.

"There were some specialist aspects to the role you wouldn't often get exposure to. For example, they used thermodynamic testing to assess pump performance – measuring the effectiveness of a pump by monitoring the water temperature change across the pump. It's not new, but it's a bit niche and thoroughly fascinating theory."

When Geoff returned to New Zealand in 2005, no one here was doing this.

"It was an obvious one for me – to introduce the technology to New Zealand, and we've been using it ever since.

"The Water Corporation had a strongly independent culture, and was willing to challenge the status quo," explains Geoff. "That time in Western Australia was particularly good at bringing engineering theory and marrying it with a strong practical basis.

"Don't stop because things look complicated, or because no one else is doing it that way," he advises. "I'd much rather try and fail than not try at all."

"Our team there was unique in many respects – it had a great mix of theory and reality. It was a dream job."

At the end of 2005, with a toddler and another baby on the way, Geoff and his wife decided to return to New Zealand to be nearer family. As Geoff's preference was in bulk water supply, he was naturally biased toward this sector when he began his job hunt. As there are only two bulk water networks here, he found himself choosing between Wellington or Auckland for their new home.

The Greater Wellington Regional Council was actively looking for a new water source at the time, and he slipped nicely into an infrastructure planning role.

"However, per capita demand for water in Wellington consistently dropped faster than the population grew – we're supplying less water now than we were 10 years ago – so the source development projects were deferred, and deferred again."

After a couple of different positions in bulk water, Geoff was made team leader in the assets and compliance area. It was a position he thoroughly enjoyed for two years, but with young children at home, he chose to prioritise family and opted to return to a senior engineer role.

In late 2014, the council's bulk water staff merged with Capacity Infrastructure Services to form Wellington Water, a company that manages three-waters services for five councils. This, in itself, creates a totally different feel, says Geoff, and has challenges that are not insignificant.

"We're trying to achieve integrated service planning across the region," he says. "There's significant variability across the asset base in terms of service standards, technology, asset condition and performance. One of our biggest challenges is to change the business from a focus on managing assets to delivering services – irrespective of water service or owner, and bring a total expenditure focus to investment decision-making. It's a huge task when you don't own the assets, so we have a strong focus on being a trusted advisor to our client councils."

Geoff says Wellington Water is becoming an extremely capable and collaborative organisation, and has fantastic leadership.

"We have people with great skills and a passion for the water business. And thinking regionally across the water networks is just the way it should always have been from the start.

"I was looking at operational costs: What's our biggest expense for bulk water? Our power bill. So I wondered what we could do to optimise costs. Could we buy it cheaper? Use it more effectively? This led to me learning all about the wholesale spot market in New Zealand and how hedge contracts can be used for risk mitigation.

"By being smarter about how we purchase power – buying from the spot market and managing price risk appropriately – we consistently save around $100,000 per annum on our power bill. We also upgraded the water supply optimiser to receive a live update of the spot price forecast – purchasing power as smart as we can," Geoff explains. "Not many councils do it, but it's really a no brainer."

The second strand of Geoff's strategy was to see how they could use less power. And here is where he introduced thermodynamic pump performance testing to drive pump refurbishments – on a payback basis rather than based on asset condition. He also researched pump refurbishment techniques to minimise the internal recirculation that results in wear. This all led to significant improvements in the hydraulic efficiency of the pumps themselves.

"Don't stop because things look complicated, or because no one else is doing it that way," he advises. "I'd much rather try and fail than not try at all."

Geoff also has a passion for strategic planning – particularly looking at how climate change may affect water sources in the long term. For example, how rising sea levels could affect the aquifer they draw water from, and applying the latest learning from IPCC global climate modelling.

"We engaged directly with hydrogeologists and the climate scientists at NIWA. We started with a blank sheet and took the science as far as we could – always keeping focused on how the work related to making better long-term decisions," he says. "We're getting some fascinating results out of that too – and not ones we expected either. For example, counterintuitive relationships between greenhouse gas concentrations and the impact on water availability.

"The future is looking very uncertain, and we need to start thinking about what this means for the type of infrastructure we'll need long term – there's more thought needed here," he says.

"Rather than wait for someone else to solve these challenging problems, we need to proactively engage with the scientific experts – tell them our problems and work together to find solutions." **WNZ**

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Significant environmental challenges

In March, the OECD produced its third assessment on our country's environmental performance – essentially an independent arms-length assessment of how we are progressing towards our environmental policy objectives. Water New Zealand Chief Executive **John Pfahlert** highlights the key points of the report and its implications for water.

The OECD 'Environmental Performance Reviews: New Zealand 2017' is the third report produced on this country, and the first since 2007.

It puts a spotlight on some of the conflicts and inconsistencies around the Government's policies on water, productivity and the environment.

It says, that while we are generally satisfied with our environment and the management of resources, more and more of us are concerned about water pollution and climate change.

The report points out that there is no national regulation for disposal of agricultural waste, despite the large size of this sector. Also, this country lacks national regulations for hazardous waste management, and lacks comprehensive, timely and internationally comparable data on waste generation, treatment and disposal.

Inconsistent policy implementation

The OECD found inconsistencies in policy implementation in the areas of environmental governance and management.

It says, that while New Zealand has significantly strengthened its collaboration with stakeholders and engagement with Maori communities on environmental policies, local authorities can lack staff and technical know-how. It says that this makes it difficult to translate policy into action, thereby leading to inconsistent policy implementation.

Once again, this finding resonates in the water sector where the fragmentation and small size of many councils can make it hard to deliver consistent outcomes.

Lack of adequate enforcement

The OECD report points to a lack of overall integration of discharge permits for air, water and waste on the basis of best available techniques.

It says a growing number of local authorities have adopted a risk-based approach, prioritising inspections on compliance history or consent conditions. But local authorities lack adequate enforcement capacity, particularly at the territorial level. While maximum fines for criminal offences have increased substantially, non-compliance remains relatively high.

Recommendations

The OECD says the Government ought to consider:

- A comprehensive evaluation of the effectiveness of the Resource Management Act and its implementation at the

local level – the Productivity Commission has just completed a report, Better Urban Planning (see story on page 32). It's worth noting that the Government has a tendency to ignore many of the Commission's reports.

- Establishing nationally standardised requirements for air and water discharge permits, and waste generation and management. Hopefully, our forthcoming suggestions around consistency for renewal of wastewater treatment plant consents will now land on more fertile ground.
- Improved data collection on the generation, disposal and treatment of waste. This aligns well with Water New Zealand's views on the tracking of liquid wastes.
- Providing better nationwide guidance, support and training to local authorities on permitting, compliance monitoring and enforcement.

The OECD report also delves into how the Government's business growth agenda will create more pressure on our water resources.

It points out that the agenda seeks to build a more competitive and productive economy by making exports account for 40 percent of GDP by 2025. The OECD says this will result in greater pressures on water unless government better integrates its economic and environmental policies to encourage more innovative and efficient use of land and water resources. Freshwater resources are an important natural asset for the country. However, agricultural intensification is increasing pressure on water resources.

Seventy-five percent of our fresh water is used for irrigation. Some regions are approaching water allocation limits, or have already surpassed them. Water quality continues to deteriorate in some regions due to diffuse pollution from agricultural and urban run-off. The main pollutants are nutrients (nitrogen and phosphorus), sediments and pathogens. Nitrogen surplus has increased in step with the growth in dairy herds. Half of monitored river sites have enough nitrogen to trigger algal blooms.

Freshwater policy reform

The 2011 National Policy Statement for Freshwater Management (NPSFM), amended in 2014, (and currently being amended again) is an important milestone towards addressing both water quality and quantity. It fills a long-standing gap in national policy direction under the RMA. All regional councils are to set limits to maintain or improve water quality, and phase out or avoid over-allocation. The policy statement also encourages stakeholders to help set water quantity and quality limits.

However, the NPSFM is being implemented too slowly. This has created uncertainty for water users and investors, and reduces opportunities to bring environmental impacts to acceptable levels.

The Government wants to double primary industry exports in real terms between 2012 and 2025 and it wants one million hectares of land under irrigation by 2025. To that end, it has established grants and concessionary financing for irrigation projects.

However, this financial support lacks systematic consideration of environmental and community costs. Similar support to improve urban storm and wastewater quality is lacking. The Government's economic policies are therefore potentially in conflict with its environmental policies, such as the NPSFM.

Economic instruments

Economic tools to encourage more efficient use of our precious land and water resources are under-used. This is partly because the Government declared that "no one owns water". Charges for water abstraction are minimal, covering only the administrative costs of resource consents. We have called for a national debate on water pricing – but the issue is complicated over the question of ownership.

In 2012, the Waitangi Tribunal confirmed Maori "rights and interests in their water bodies". However, New Zealand needs to further clarify and recognise Maori community rights and interests in water before the Government can ensure effective water policies. A number of options have set a precedent, including co-governance agreements, granting legal personhood to a water body, permanent allocation of water and/or monetary settlement.

Next steps

To ensure more robust resource and environmental planning, particularly around water assets, the OECD says there is a need to:

- Develop a whole-of-government long-term strategy to increase the added value of export products within climate and freshwater quality and quantity objectives.
- Increase financial support and capacity for regional councils to deliver on the NPSFM.
- Ensure that water quantity and quality limits set locally are ambitious and comprehensive.
- Review government support for irrigation to ensure that funding is only provided for projects that would not proceed otherwise, and that have net community-wide benefits.
- Expand the use of economic instruments to internalise environmental and opportunity costs, promote innovation and encourage efficient use of water (quantity and quality).

Urban water

Some cities are also reaching their limits to manage water effectively, creating overflows and pollution to nearby water bodies. More than half of Auckland's freshwater streams and one-third of marine waters have been ranked 'degraded' or 'poor'.

Greater use of pricing instruments, such as water and waste service fees, could encourage more sustainable use of land and resources. Such tools could also bring in revenues to operate and expand infrastructure and services.

The Government could consider providing more extensive national direction and guidance to ensure that local planning encourages good urban design outcomes, appropriately manages environmental systems, and considers climate change mitigation and adaptation goals.

The OECD report, along with many other recent findings, points to how it is becoming increasingly clear that there is much to be done to ensure the long-term sustainability of our water resources. **WNZ**

Water Industry Professionals Association

By **John Pfahlert**, Chief Executive, Water New Zealand,
and **Craig Hiddleston**, Executive Officer, Water Industry Operations Group.

The Water Industry Professionals Association (WIPA) is an operator registration programme that has been set up to ensure and maintain a high level of competency within the industry.

Those wanting to be registered as a WIP (water industry professional) must meet certain criteria that demonstrate their qualifications, experience and good character, which will ensure the professionalism of the association.

The initiative has been established by Water New Zealand and the Water Industry Operations Group of NZ (WIOG), and will be administered by Connexis, the infrastructure ITO.

Initially, registration will be voluntary, but the aim is to have mandatory registration within local authorities and their contractors in the future.

The water industry needs to recognise the critical and key role operational staff play in the operations and maintenance of water and wastewater networks. By implementing a professional registration programme, we can provide assurance to consumers that our drinking water and waste disposal is constructed, operated and maintained by registered specialists, who have the necessary skills, qualifications and competency.

With recent events, such as that in Havelock North, the water industry is under the microscope in respect of the effectiveness of the New Zealand Drinking Water Standards, industry training, and procurement and engagement of suppliers.

WIPA registration will provide industry stakeholders with a list of water and wastewater staff who are committed to best practice and who are complying with industry standards. Along with providing professionalism and recognition of operational staff involved in the treatment, maintenance and construction of water and wastewater assets, WIPA will raise the profile of the water industry operations sector, attracting a younger generation to the industry.

Members of WIPA (or WIPs – Water Industry Professionals) will be employees of organisations responsible for operating and maintaining water or wastewater treatment plants and reticulation, and employees of organisations responsible for constructing water and wastewater assets. In other words, local authorities and contractors.

The implementation of WIPA and its acceptance by stakeholders and employers will benefit everyone in the industry. In particular:

- It will provide reassurance that the industry adequately maintains safe drinking water supplies.
- It will ensure that wastewater treatment operates in a manner that protects the environment.
- It will control and ensure the operation of bulk water collection and distribution systems are done so in a manner that protects the public and the environment, and conserves our precious water resources.

Benefits to employers

- Employers can rest assured that their employees who are registered with WIPA have the necessary skills for their roles, and that they are committed to excellence in their role through continued professional development (CPD).
- The continued professional development units required should be attainable within a company's existing training spend.
- Employers will also benefit from increased productivity and long-term employment through the enhanced employee engagement registration with WIPA will bring.
- By insisting on using registered WIPs, employers would be practising sound risk management, and it will help develop and maintain a professional profile with key clients.

Benefits to employees

- As WIPs (water industry professionals), employees registered with WIPA will gain greater recognition for their skills, experience and competence by their employers and within the industry.
- WIP employees will be recognised as professionals working in an essential area of public health.
- Registration with WIPA will enhance employees career opportunities within the industry, and their membership of the association will provide interaction and networking opportunities with other industry professionals at training workshops, conferences and on social media.
- This enhanced engagement will lead to increased job satisfaction.

- It will ensure knowledge of appropriate technical standards, legislation, codes of practice and NZ standards is maintained.
- It will ensure water operatives that work on water and wastewater networks are qualified, experienced and competent.
- It will raise the profile of the water industry, creating a more attractable career path.

The programme is being implemented by the WIPA committee, who will oversee and support the initiative and provide ongoing support to registered WIPs.

Its purpose is to evaluate and approve applicants for WIP registration and evaluate and approve training providers that want to deliver continued professional development (CPD) training.

The committee will also be responsible for implementing and maintaining the Connexis database where all WIP registrations and training providers will be administered.

With changes in technology and greater emphasis on the protection of public health and the environment, the committee aims to promote high standards of technical expertise and professional conduct.

To be considered for registration, applicants will have to hold an approved NZQA water qualification, have four years' practical experience in the industry and have letters of recommendation from a senior representative of their employer, and a senior representative of an external organisation, such as a training assessor, client or local government.

Membership entails a registration fee of $200, and an annual fee of $150. WIPA members receive a certificate of registration and their names will be accessible by the public on the WIPA webpage.

They will receive a summary of CPD tier requirements and expectations. The committee believes that CPD of employees working in the water industry is paramount to building healthier communities, more productive and safer workplaces, and improved public confidence in the water industry. Consequently, CPD is mandatory and is a condition of re-registration, which takes place every two years. In this time, members are required to complete a minimum of 30 hours professional development.

CPD units can be achieved through either operation or specific training, or personal development. This could be in-house training by approved trainers, recognised equipment supplier training, hygiene and disinfection training, attendance at an industry conference or workshop, presenting a paper at a recognised forum, academic study, leading a project or workplace assessment.

The majority of people working in our industry are passionate about the crucial service they provide to their communities. Registration with WIPA demonstrates their ongoing commitment to maintaining industry best practices, and encourages continual development.

We recognise that standards have to be raised to boost public health, and WIPA will help achieve this. **WNZ**

Better urban planning

When it comes to planning reform **Murray Sherwin**, Chair of the New Zealand Productivity Commission, asks whether it's time for another new valve or a complete re-plumb?

More than 70 percent of Kiwis choose to live in cities. When they function well, cities provide us with vibrant places to live, work and play, greater choices of housing and jobs, higher incomes and a healthy natural environment.

But as cities grow, so does the potential for conflict over access to views, sunlight, infrastructure and natural resources such as rivers, harbours and clean air. Urban plans attempt to deal with those conflicts. They are also key to getting high-quality transport and water infrastructure and attractive public amenities. But most of us have never read our local district plan, despite the wide impact it has on the way we live.

The Productivity Commission's recent report, Better Urban Planning, sets out what a high-performing urban planning system should look like. In doing so, the Commission looked long and hard at the current system.

At the core of our planning system is the Resource Management Act (RMA). Introduced to better protect our natural environment, the Act has been amended 18 times over its 25-year history. Over that period, the quality of our lakes and rivers deteriorated, air quality in some smaller regions worsened, while development failed to keep up with demand in our high-growth cities, leading to skyrocketing land and house prices. Clearly, the system is not delivering for our built environment, nor has it protected our natural environment.

So why is it not working? In part, it fails by not dealing well with change. The RMA is biased toward the status quo and under-recognises the benefits of development. Ambiguous and broad language in the RMA allows councils to impose overly restrictive rules, ranging from arbitrary urban boundaries to sometimes bizarre requirements on developers under the guise of urban design.

Such rules and long-winded processes for getting plans in place mean cities are too slow to respond to growth pressures. Added to these barriers, is the intense political pressure from local home owners. They strongly lean to preservation of the status quo and not paying for new infrastructure.

The Commission recommends a future system that distinguishes between the built and natural environments, with clear objectives and principles for each specified in a single statute – a complete re-plumbing of the RMA.

Planning for enough development capacity to meet demand, within clear environmental limits, must be a priority. The Commission recommends a one-step merits review of notified plans in each region by an Independent Hearings Panel. The panel will check that plans meet the new high-level principles and objectives set out in legislation, while listening carefully to all voices within communities. Such a system will be speedier and less costly while supporting development and enhancing protection of the natural environment.

Spatial planning across regions should be mandatory. Regional spatial strategies will provide platforms for better integrating land use with infrastructure needs, and laying out the bones for each region's future development.

The Commission found that it is often council failures to supply sufficient infrastructure that stalls development. Councils, under ratepayer pressure, are often reluctant to add to debt, even though debt sensibly spreads the cost burden over asset lifetimes. Yet Auckland, even if it were willing to borrow more, is right up against its debt limits. Councils need to make more use of "user pays" and targeted rates. The Commission also proposes giving councils more funding tools and putting more debt onto others' balance sheets as ways to unblock much-needed investment.

Other key recommendations in the report include allowing developers to create new communities on the outskirts of growing cities, and measures to enhance participation of Maori in planning matters across all councils.

While a rewrite of the RMA is necessary, legislative change on its own won't be enough to make a future system work well. Central Government needs to provide greater stewardship and oversight of the system. And both central and local government must build their capabilities in policy analysis and technical knowledge relevant to planning.

Few participants in our inquiry were happy with the current system, and many were strongly critical, believing the RMA had not worked as intended and is in need of a fundamental rewrite. The potential gains from making the changes recommended by the Commission are large. The prize is dynamic, distinctive and highly functional cities providing access to affordable housing and well-paying jobs within a natural environment that we cherish and protect.

The Commission's Better Urban Planning report is available on our website, www.productivity.govt.nz. **WNZ**

New national drinking water database

By **Tracey Clode,** Beca.

The new Ministry of Health national drinking-water database, Drinking-Water Online, will be launched on July 1. Drinking-Water Online will replace the existing database, Water Information New Zealand (WINZ 6&7), which has been used since the late 1990s.

WINZ was developed and maintained by the Institute of Environmental Science and Research (ESR), providing a comprehensive and complementary service for drinking-water supply management. Importantly, it includes sample management, DWSNZ assessment and compliance, annual reporting, supply configuration, recognition of test methods, and approved laboratories.

The National Drinking-Water Database project was awarded to Beca in March 2016 with an objective to build a modern, robust platform that would meet the needs of the Ministry and the sector over the next 15 years.

The project is now progressing through its final stages. Drinking-Water Online builds on the functionality of WINZ, and will deliver improved benefits in accessibility, usability and integration. It has web accessible features that are intended to streamline some of the current systems used by the sector to update and access existing information.

Some of the features of Drinking-Water Online include personalised, role-specific sign-on, so suppliers can only access and update their own information; intuitive, user-friendly layout and structure; bulk upload capability; automatic transgression identification; and test scheduling. Drinking-Water Online is essentially much simpler and easier to use than the existing WINZ system. It will replace what is currently three separate tools with one, reducing duplication and inconsistencies.

As it is web based, it can run on most devices with internet access. Some rationalisation and right sizing has occurred – for example, functionality within the current databases associated with DWSNZ 2000, the grading calculation, and template Water Safety Plans have not been carried over to Drinking-Water Online. The July 1 transition provides an opportunity to update supply information and for users to archive historical data.

An industry advisory group of key stakeholders has been engaged to provide industry testing and feedback which has supported an interactive project methodology.

Industry testing took place in November 2016. Following that, two familiarisation training sessions were held in March and April this year for drinking water assessors and public health officers. Valuable feedback from these sessions has been collected by the Ministry for improvements now and into the future.

As well, the Ministry and public health units provided six half-day regional presentations in May for drinking-water suppliers to become familiar with Drinking-Water Online. The presentations provided an introduction to the features and operation of the new database, and included a hands-on tour of the database.

A training environment is available, and provides users with an opportunity to review their current information and supply details, as well as try out the new functionality. Data available on the training site has been imported directly from the current WINZ database, and there will be an opportunity before July 1 to update this before the 'go live'. After this, the training site will remain available for future use. However, data updates for final migration will be as follows:

- By May 31: Updated supply structure and contact information for networked suppliers and carriers to be forwarded to your local public health unit using a WS01 or WC01 form. This will be actioned by ESR and Beca for July 1.
- After July 1: Users will be able to directly update their own information through Drinking-Water Online. Supply structures and other information will continue to be updated through your local public health unit using a WS01 or WC01 form.

To arrange access to the training site please register for a Drinking-Water Online sign-on by emailing your local public health unit contact.

ESR is supporting the project and will continue to provide scientific and analytical support services associated with the data, information and administration of the new system.

Similarly, the breadth of stakeholders engaged with the current WINZ database is not expected to significantly change. However, specified self-supplier information will not be migrated on July 1 as the Ministry of Health is currently reviewing the registration requirements for these suppliers.

Drinking-Water Online is being launched on July 1 with the following transition sequence:

- The 2016/2017 Annual Report on Drinking-Water Quality will use the existing WINZ databases.
- May 2017, regional Drinking-Water Online presentations.
- Between May and June 30 users will be able to access the Drinking-Water Online training site and familiarise themselves with the database, validate supply structures, etc. Please contact your local public health unit to arrange access to the training site.
- July 1 is the official start date for input of water supply data into Drinking-Water Online. Information updated or changed in the training site will not be carried over to the live site.

The 2017/2018 Annual Report on Drinking-Water Quality will use the new Drinking-Water Online database.

The Ministry will work with Beca to explore potential options for any third-party water management system to integrate with Drinking-Water Online. If your organisation is interested in discussing how your complementary water supply systems could integrate with Drinking-Water Online, please contact winz@beca.com. **WNZ**

Asbestos cement pressure pipe manual

By **Adam Wheeldon**, Principal Environmental Engineer and Principal Author,
Opus International Consultants, Christchurch.

The new, and extensively updated, asbestos cement pressure pipe manual is now available online at www.waternz.org.nz/ACManual.

The new manual (second edition) now includes wastewater pressure pipes, in diameters from DN 50 to DN 600, and is made up of two volumes.

Volume one comprises the User Guide, and Volume two is Technical/Supporting Data. The lifetime prediction model (a user-friendly spreadsheet called "Deterioration modelling for pressure pipelines") is also included.

Volume one outlines the processes and procedures to guide asset managers with a consistent and repeatable approach to asbestos cement (AC) pressure pipe condition assessment.

Volume two of the document contains technical and supporting information including:

- Asbestos cement pipe deterioration
- Asbestos cement pipe condition assessment
- Lifetime prediction modelling and charts
- Condition grading and charts
- Glossary of terms and abbreviations
- Reference tables.

AC watermain pipe samples assessed since 2003

The original (first edition, August 2001) AC pipe manual was based on 240 condition assessments of AC watermain pipes. Since then, analysis of 790 pipe samples has shown that the average deterioration rate is around three percent greater than that of the 240 pipe samples assessed up to 2001.

AC wastewater pressure pipe samples assessed since 2003

Some 89 AC wastewater pressure pipes have been assessed for condition, and these form the basis of the deterioration rates used in the model.

Note: To the best of our knowledge, no stormwater pressure pipe samples have been assessed, and the new manual recommends using the results from the watermain pipe samples.

Guidance on pipe sampling

Detailed guidance related to pipe sampling for condition assessment is given, including what to look for and what to record. Condition assessment of pipes in-situ including core sampling is also covered.

Health and safety

Volume one includes a comprehensive user guide to working with asbestos from a water and wastewater pipeline perspective. This section has been developed to assist and enable asset owners, contractors, pipe condition assessors and other professionals (the users) to better understand the potential risks when working on or near AC pipes.

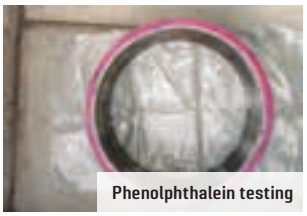
This section has been developed in conjunction with WorkSafe and provides a detailed example of a working practice check list. It also contains various other aspects of health and safety to consider, including:

- Why asbestos is a hazard
- Health and safety, and asbestos management planning
- Regulations and legislation
- Controlled equipment.

The need for appropriate training and personal protective equipment for personnel who will be working with AC pipes is highlighted.

Condition assessment techniques

The various condition assessment techniques are described, and the two principal methods of measuring deterioration depths are: phenolphthalein testing and computed tomography (CT) scanning (see images).


Phenolphthalein testing


CT scanning

Lifetime prediction model and charts

The lifetime prediction model has been updated, and three fields are auto-populated, based on the pipe data imputed.

A predicted lifetime range is now provided for water and wastewater pressure pipes from DN 50 to DN 600 (inclusive). The new charts are specific to pipe application (use), diameter, and pressure class.

Condition grading and charts

The condition grading system provides for five grades as per the New Zealand Infrastructure Asset Grading Guidelines. The grading is related to the probable remaining life of the pipeline, so that there is no need for a qualitative judgement regarding the pipe condition. WNZ

Modelling and digital water symposium

Joining the digital and modelling realms to address challenges of a changing climate.
By Water New Zealand Technical Coordinator **Lesley Smith**.

Adapting to issues around climate change emerged as one of the key discussions at this year's inaugural joint symposium hosted by the Water New Zealand modelling and digital water special interest groups in March.

The joint event was emblematic of crossover challenges and problems being worked on by practitioners in the two groups – data and model accuracy, integration and sharing of information, and how and when to employ our digital and modelled tool kit to solve problems of inflow and infiltration, climate adaptation, and water loss management, to name but a few.

The two-day event brought together council staff, engineering consultants, software service providers, and academics, to network and share knowledge. It built on the success of two previous modelling symposiums and provided a platform for information exchange through paper presentations, workshops, and an always popular dinner.

The growing need to start adapting current and future water infrastructure to future climate conditions was reflected in many of the papers, as well as in discussion. Papers were presented on water quality modelling under climate change conditions, and modelling of sea level rise impacts on flooding of Fiji's Nadi River, and a facilitated discussion was held with members of the Deep South Challenge.

The Deep South Challenge is a central government funded science challenge whose mission is to "enable New Zealanders to adapt, manage risk, and thrive in a changing climate". The objective is to understand the role of the Antarctic and Southern Ocean in determining our climate and our future environment, including the development of a world-class earth systems model.

The symposium provided an opportunity for scientists and water industry practitioners to launch a discussion on what model outputs are needed to inform climate adaptation decisions for water infrastructure.

The session included a case study from Dunedin City Council, which has implemented a replicable approach to embedding climate adaptation from wastewater and stormwater systems into risk management and long-term planning.

Wellington Water demonstrated some of the uncertainties for modellers, as they grapple with incorporating future climate scenarios into a sustainable yield body developed for the Waiwhetu aquifer.

The session made it clear that the effect of climate change on freshwater bodies, drinking water, wastewater and stormwater networks will be profound and far reaching.

Digital Water Group
WATER NEW ZEALAND

The Digital Water Group is a Water New Zealand special interest group catering to all people involved or interested in issues related to the collection, management and effective use of digital information for the water industry.

Modelling Group
WATER NEW ZEALAND

The Modelling Group is a Water New Zealand special interest group catering to all people involved or interested in modelling in the water industry.

What also became apparent was how little information practitioners have on locally specific climate projections, adaptation guidance, or how to deal with uncertainty.

This information is critical for modellers and other water practitioners to get councils and community buy in, in order to start the hard, but essential, task of embedding climate adaptation into water decision making.

Clearly there is much for the scientific community and water practitioners to collaborate on, and feedback from the session has been relayed to the Deep South Challenge scientists.

The conversation with the science community over climate change will be ongoing. But there are many other engaging and critical themes that will continue to challenge our modelling and digital water special interest groups. These include open data, integrated water modelling, and smart data management, amongst many others.

For further information on upcoming symposiums, to obtain copies of papers, or outputs of the climate change workshop, visit the events section of the modelling special interest group homepage: www.waternz.org.nz/modelling.

Further information on the Deep South Challenge programme of works, events, and how to get involved is available at: www.deepsouthchallenge.co.nz. **WNZ**

Keeping flushables moving

Cross-industry and cross-country collaborations aim to wipe out blockages.

By **Brianne Nakamur**, Water Environment Federation Collections Systems and Sustainability Manager, and **Lesley Smith**, Water New Zealand Technical Coordinator.

Many products in grocery store aisles carry warnings such as "toxic", "do not consume", "keep out of reach of children", and even "dangerous for the environment". Yet flushable wipes, for household cleaning and hygiene, have very few, if any, warnings about the harm that they can cause when flushed down the toilet.

The issue first surfaced in this journal in the March 2015 edition. Since then, Water New Zealand has been working both with international organisations and local representatives of wipes manufacturers and suppliers to address the problems caused by incorrect wipes disposal.

The mystery of the s-bend

Recently wipes have been getting a flurry of attention, with articles appearing across a range of print and digital media. Despite this coverage, what lies beyond the toilet s-bend remains a mystery to most public, to the dismay of those of us involved in the wastewater industry.

To raise consumer awareness of what can and can't be flushed, Water New Zealand members have been collaborating with the Ecolabelling Trust and the New Zealand Food and Grocery Council (FGC).

The FGC is an industry association that represents well-known brands responsible for the manufacture and supply of wipes. The council has produced a simple video explaining why toilets shouldn't be treated as a rubbish bin.

This video, along with a supporting press release and key messages, has been produced for local authorities to help spread the message and raise awareness about the problems caused by flushing wipes. These resources are available for download from: www.waternz.org.nz/wipesblockage.

A new and improved labelling guideline

Back in January, INDA and EDANA, the US and International Association of the Nonwoven Fabrics Industry, released the latest edition of their Code of Practice, called *Communicating Appropriate Disposal Pathways for Nonwoven Wipes to Protect Wastewater Systems*.

This code provides a set of voluntary guidelines to help manufacturers better communicate the appropriate disposal pathways for nonwoven products, such as baby wipes and flushable wipes. The revised edition outlines stricter labeling guidelines for non-flushable wipes and hygiene products (see box story).

Although the code is voluntary, manufacturers are encouraged to comply with it within 18 months of its release.

By encouraging a more prominent and uniform positioning of the 'Do Not Flush' warning, the code enables consumers to better recognise and identify what not to flush.

This new version of the code was developed with the input from wastewater professionals across North America. The FGC and Water New Zealand are now collaborating to encourage local adoption of this code.

An international problem

The new code follows a series of stalled negotiations over the establishment of an international 'flushability standard'.

In 2015, the International Standards Organization (ISO) launched a work group to establish a standard. The group was made up of 15 countries, with our country participating as an observer. However, in September 2016, negotiations over an International Standard came to an indefinite halt, due to a complaint from the ISO Toilet Paper Working Group.

At the same time, attempts to establish guidelines also came to a standstill. North American wastewater associations then began collaborating with INDA, a global association of the nonwoven fabric industry, to develop the fourth edition of the 'Flushability Guidelines'. However, disagreements between wipes manufacturers and wastewater sector experts led to the wastewater industry withdrawing from the development of the guidelines.

In response to the breakdown in negotiations, international wastewater groups issued a joint position statement on non-flushable and flushable labeled products as follows:

"To prevent problems with sewers, pipe and toilet blockages, plus the human and environmental cost of sewer flooding and pollution, the organisations signing this statement below agree that:

Only the 3Ps – pee, poo and toilet paper – should be flushed.

"Currently, all wipes and personal hygiene products should

When disposed of into the sewer wipes bind together in a process known as ragging.

Wipes bound with fat and oil and grease being removed from a blocked wastewater pump station.

be clearly marked as 'Do Not Flush' and be disposed of in the bin or trashcan.

"Wipes labelled 'Flushable' based on passing a manufacturers' trade association guidance document should be labelled 'Do Not Flush' until there is a standard agreed by the water and wastewater industry.

"Manufacturers of wipes and personal hygiene products should give consumers clear and unambiguous information about appropriate disposal methods.

"Looking to the future, new innovations in materials might make it possible for certain products to be flushed, if they pass a technical standard which has been developed and agreed by the water and wastewater industry. Preferably this standard would be developed under the banner of the International Standards Organization (ISO).

"Key requirements for any standard include that the product: breaks into small pieces quickly; must not be buoyant; does not contain plastic or regenerated cellulose; and only contains materials that will readily degrade in a range of natural environments."

Since the release of this statement in September 2016, the international position statement has been signed by 244 wastewater companies and authorities, and 69 partner organisations from 25 countries. Here, both Watercare and Wellington Water became signatories.

Improvements to the second edition Code of Practice

Clearer decision tree of what should have a 'Do Not Flush' warning. Any product that can be used in a bathroom setting is encouraged to be labelled with the DNF warning. Products that can be contaminated by faeces, menses, or urine are required to have the DNF symbol.

A bigger and clearer 'Do Not Flush' warning. The DNF warning must be in high contrast to the product packaging and is sized based on a ratio to the packaging.

More prominent display of the 'Do Not Flush' warning. The DNF warning must be prominently and permanently displayed on the product packaging near the point of dispensing as well as visible on the on-shelf packaging. This allows consumers to see the symbol both when purchasing and when using.

Get involved

Water New Zealand encourages its members to support the international campaign by promoting the following messages in local communities:

- Our wastewater systems have only been designed for poo, pee and toilet paper
- Our toilets are not rubbish bins
- The consequences of flushing wipes products creates expensive, messy problems for individuals, wastewater operators and the environment.

For further supporting resources go to: www.waternz.org.nz/wipesblockage. **WNZ**

Water loss training days

Around 50 people from the Pacific and New Zealand attended the Water Loss Training Days in Auckland during February.

By **Richard Taylor**, Thomas Consultants.

The purpose of the Water Loss Training Days was to upskill local authority water supply staff and others (consultants, suppliers, contractors, etc) in water loss assessment and management. We also aimed to cover the latest technologies being used to manage water losses.

Organised by Thomas Consultants in Auckland, and similar to the previous event in February 2015, we were privileged to have Dr Ronnie Mckenzie (WRP, Pretoria SA) attend this year as the chair of the International Water Association's Water Loss Specialist Group (WLSG). Ronnie contributed to the event with a number of excellent presentations on pressure management and network sectorisation as well as providing an update of the activities of the WLSG.

A great mix of people attended the event. Delegates included water supply staff from 19 councils (including Watercare), as well as staff from Pacific Island water utilities (Solomon Water, Water PNG, and Department of Utilities – Niue Island), consultants, maintenance contractor staff, and sponsor staff.

The main principles of water loss management were covered at the training – the water balance, water loss performance indicators, uncertainties in water loss calculations, the four main components of managing water losses, pressure management, design of district metered areas, bulk metering, apparent losses and metering, and strategies for partially metered and small systems. An interactive session was used to look at the drivers for water loss management and how a target level for real water losses could be set. An overview of the Water Loss Guidelines was also provided.

The training was mostly carried out by myself, with assistance from Ronnie Mckenzie and Charles Chapman (Detection Services). Presentations were made by Nish Dogra (Watercare), Eric Skowron (Jacobs Consultants), Simon Charles (Whangarei City Council), and Albert Hoffman (Horowhenua District Council).

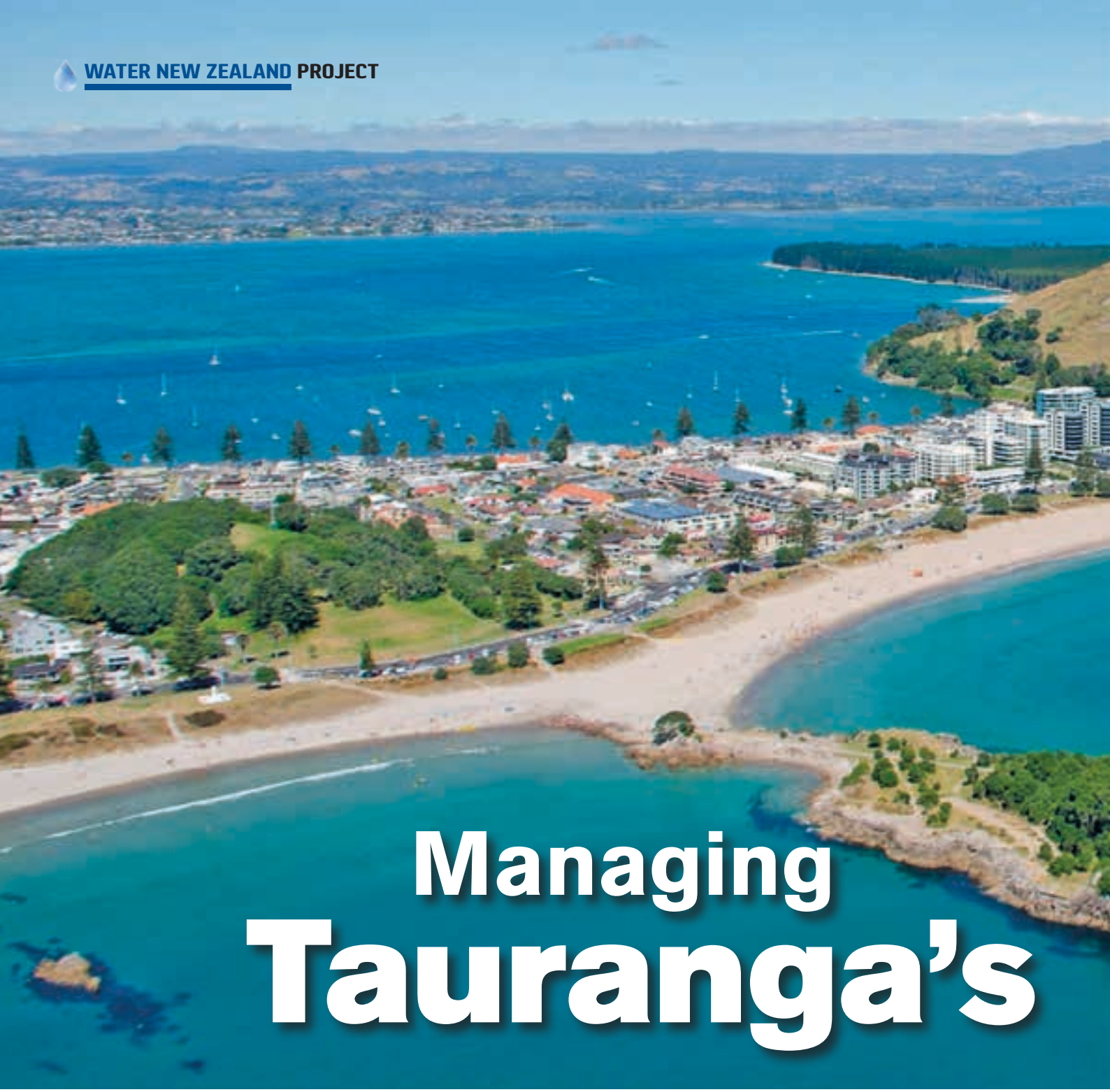
The event sponsors, ABB, Arthur D Riley & Co, Cla-Val Pacific, Deeco Services, Detection Services, and Jeff Booth Consulting, each gave a 20-minute presentation on their products and services as well as having their products on display.

In terms of the latest technologies available, Charles Chapman provided a very practical and informative session on active leak detection equipment and methods. Nish Dogra, Eric Skowron and some of the sponsors covered several exciting new technologies, including very high rate pressure logging (250 recordings per second, time stamped data, processed every minute) and the use of sophisticated data analysis (utilising flow and pressure data collected by a utility) to provide network operators with real time alerts to network events, and asset response and condition information. These technologies are considered to be the way of the future along with smart/automatic water metering.

Feedback from attendees indicated a high level of satisfaction, and that overall it was a very worthwhile, interesting and informative event. There were suggestions of including practical outdoor activities such as leak detection/site visits, more case studies, and more interactive/discussion/team work sessions. This feedback will be considered for the next event, proposed for February 2019.

I would like to thank Ronnie Mckenzie, Charles Chapman and the other presenters for their contribution to the training. I would also like to thank the six sponsors for their support and involvement with the event. **WNZ**

• For further information, contact richard.taylor@tcec.co.nz.



Managing Tauranga's

Downer has the operations and maintenance contract for the potable water, wastewater and stormwater assets throughout Tauranga City.
By **Alan Titchall.**

This article is based on Downer's entry to the CCNZ/Hirepool Construction Excellence Awards 2016.

Downer's performance-based contract focuses on the mechanical and electrical operations and maintenance of potable water, wastewater and stormwater assets throughout the Tauranga region.

The client is Tauranga City and the $22 million ($5.5 million a year) project started in 2013 and goes to June 2021, and includes four years right of extension if KPIs are met or exceeded.

These assets provide three waters services to over 120,000 residents. Downer secured this contract in 2013. With a locally based team comprising of 37 personnel, Downer undertakes mechanical and electrical maintenance of all water and wastewater treatment plants and pump stations, inspection, monitoring and renewal of over 1200 kilometres of watermain (including backflow testing). On the water fron the contract covers inspection and maintenance of 46 reservoirs, flushing and maintenance to over 4800 hydrants, meter reading services

three waters

for over 51,000 residential and 98 bulk water meters, and fresh water delivery where required.

Wastewater services involve monitoring, maintenance and renewal of over 800 kilometres of sewer main, M&E and grounds maintenance of two wastewater treatment plants and 143 pump stations.

Stormwater services involve the inspection and maintenance of over 490 kilometres of stormwater mains and 84 kilometres of open drains, inspection and maintenance of 122 stormwater catchment ponds, and monitoring and maintenance of two stormwater pump stations.

Asset management is carried out within Tauranga City Council using its system Accela. In addition to undertaking maintenance service tasks, Downer provides a service analysing asset information and developing business cases with regards to future capital expenditure, as well as providing market solutions and advice on innovation and cost savings measures.

"In addition, we collaborate with council in developing solutions and measures in tending to specific issues impacting the city's water assets as well as provide support with development of their forward works programme," says Downer.

The company's Optimisation Engineer works closely with council in identifying factors to be considered for the council's renewals programme.

"This may include investigating technology improvements or changes with current items such as new pipe materials or suppliers. One example has been the introduction of variable speed drives as replacement for fixed speed drives within the city's pump stations. These have provided energy savings to the network.

"Contract Workbench is used as the primary job management system. Workbench is a comprehensive suite of online reports

that is integrated in to the council's asset management system, Accela."

Downer says this system allows the team to summarise asset data into an easily useable form, enabling effective identification of recurring issues throughout the city.

"Workbench includes a mobile field package that allows ground staff to receive jobs and provide real-time updates from the field, reducing the need for staff to return to the depot.

"This has provided benefits such as improved productivity and communication as staff can provide council updates on job progress in real time. Emergency work requires a one hour response target. The use of GPS tracking allows dispatchers to check which field technician is most appropriate to tend to a request."

Tauranga City Council's call centre receives the service request and transfers them to Downer for investigation after it has been recorded into Accela. After logging the request into Workbench, it is then dispatched to the appropriate field staff for response. The location of field staff is monitored through GPS tracking, installed within each service vehicle.

Also employed is what the company calls 'the Downer smile' – an award winning programme developed for frontline staff and how they approach customer care as they interact daily with our clients' customers.

"Smile has been rolled out across the national business by our foremen, supervisors and managers. Smile cards and posters are highly visible throughout all depots."

Community relationships have also been strengthened over the past two years by members of Downer's water and grounds maintenance teams who have volunteered their assistance with the Stream and Estuary Clean-up programme.

"This programme run jointly by Tauranga City Council and Bay of Plenty Regional Council and supported by Tauranga estuary care groups and the Tauranga Envirohub involves engaging local schools in the region to take part in up to 10 clean-up day events throughout the year. In addition to providing staff and logistical support, Downer is a major sponsor of the event."

Downer says it works closely with the council to trial, review and implement innovations focused on improving the maintenance and operations of Tauranga's three waters network.

An example is Downer's involvement in improving Tauranga City Council's GIS system.

"While the council's pre-existing GIS system offered excellent access to spatial data, there were requirements relating to operational processes, planning and scenario analysis that were not easily addressed. This created significant demand on the GIS team as work-arounds became unwieldy and unsustainable. A more robust solution was sought which would provide increased efficiency in data accessibility and improve decision making relating to management of the three waters network."

Members of Downer's Three Waters team worked closely with Tauranga City Council in developing a solution that allowed it to better leverage geographic information as well as the underlying feature of the ArcGIS Platform that were previously under-utilised.

"Since these changes to the GIS system have been made, Tauranga City Council now has the ability to meet all their information requirements including; data integrity, valve isolation, emergency shutdowns, critical customer identification as well as DMA and pressure zone creation and reporting."

For instance, Tauranga City Council is now able to conduct criticality ranking of assets which was not previously feasible. This solution takes into account critical users such as hospitals, schools and dialysis patients.

"As asset criticality is now feasible, council can now conduct vulnerability scenarios quickly, accurately and on-demand within a fraction of the time of the former system."

Downer contract management team meets with the council monthly and presents a report, while an annual review is held to report on performance throughout the year.

"Council use this as part of their evaluation process when determining if the following year's contract extension will be awarded."

The contract allows for four, one-year extensions based on achieving a weighted KPI score of greater than or equal to 92.5 percent.

"The first extension was achieved and the contract comfortably achieved an overall KPI score exceeding 97 percent for the 2015/16 contract year.

"These scores have been achieved through a focused team, passionate about the delivery of a service for the communities in which they reside.

"The training and access to national support and systems improvements have all contributed to achieving these outstanding results repeatedly." **WNZ**

Members of Downer's Three Waters team worked closely with Tauranga City Council in developing a solution that allowed it to better leverage geographic information.

A passion for clean water

We have Dr Michael Taylor to thank for the procedures and guidelines that can provide clean and safe drinking water. He has dedicated his career to water quality – developing national drinking water standards as well as procedures for monitoring and surveillance of the quality of water supplies, and methodologies for water supply. **BY MARY SEARLE BELL.**

Michael says it all began with Jacques Cousteau. The exploits of the famous undersea adventurer got the English schoolboy very interested in diving. So much so, that after completing his chemistry degree he applied for a job in fisheries research with the thinking, "they would probably provide a boat, and I could probably con them into providing an aqualung…"


Dr Michael Taylor, QSM

After completing his PhD in organic chemistry, Michael worked as a senior scientific officer in charge of chemical oceanography in the Arctic team of the UK Ministry of Agriculture, Fisheries and Food. Then he continued to indulge his underwater passion with a role with the Norwegian Fishery Directorate's Institute of Marine Sciences.

At age 34, he decided to move to New Zealand, securing a position as a research fellow at the Cawthron Institute in Nelson. He initially was looking at the biochemistry of plant disease due to fungal pathogens, but soon reverted to aquatic problems.

He was responsible for setting up the water analysis laboratory at the Cawthron Institute, and was a member of the Ministry of Works and Development (MWD) water and soil division committee on hydrology and water quality. He advocated for inter-laboratory inter-calibration programmes, which led to DSIR setting up the ChemAqua programme for collaborative tests of water analysis.

In 1971, Michael saw a job advertised for chief chemist with the Auckland Regional Authority, and was surprised to land the role.

"I thought there'd be a lot of competition for the position – turns out there wasn't!"

This job got him involved in wastes, which he says was very useful background for his later work.

Five years on he took the role of manager – water quality with the Water and Soil Directorate research and survey group, which was set up by the MWD.

"There was a lot of uncertainty in those days about what were the important water quality parameters defining the public health safety of drinking water, and the efficacy of different aspects of treatment processes," Michael says.

He established the organisational structure and policy of the Hamilton Science Centre (now called the Water Quality Centre) and instituted a strongly quantitative and process-oriented approach to all aspects of water quality studies.

It was at this time that Michael began perfecting the art of dealing with politicians and bureaucrats.

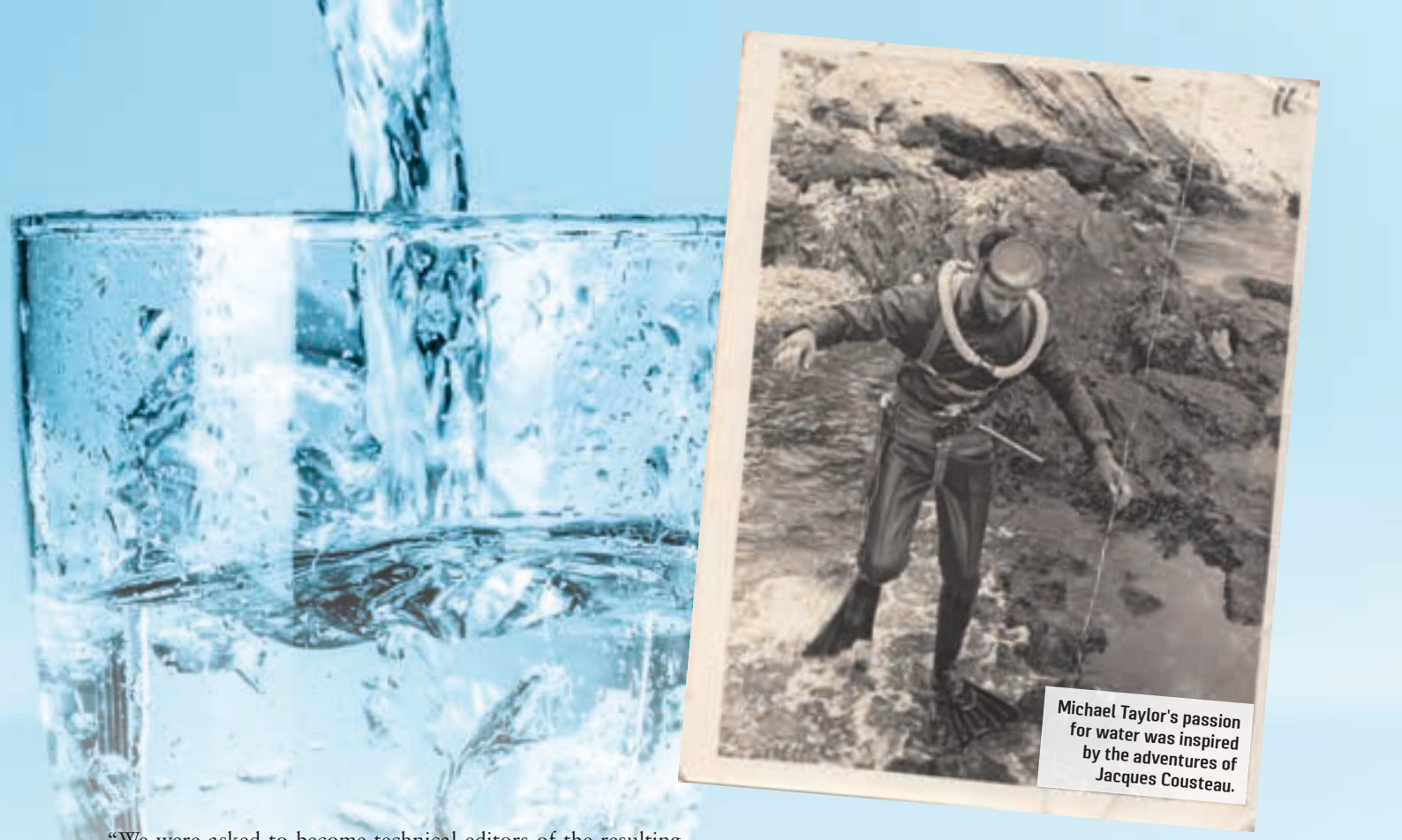
"The books on *Yes, Minister* and *Yes, Prime Minister* had just come out, and they were wonderful for seeing how government worked – I used them all the time from then on!"

It was during this period that Michael also began working with the World Health Organisation, undertaking short-term consultancies, running training courses throughout Asia on water quality monitoring and, occasionally, on hazardous waste management.

"My work with WHO took me to lots of interesting places like the Pacific Islands and China – not that I had much time to look at them because we were always busy working."

In 1980, Michael was made research and survey director of the Water and Soil Division of MWD, overseeing around 200 scientists and technicians throughout the country, providing scientific services to the National Water and Soil Conservation Authority.

"Our hydrological computing section submitted three papers to a UNESCO/WHO joint conference on the use of microprocessors in assessing drinking water – it turned out we were ahead of the rest of the world," says Michael.



Michael Taylor's passion for water was inspired by the adventures of Jacques Cousteau.

"We were asked to become technical editors of the resulting publication – my horizons were being expanded very quickly."

His next role was with the Department of Scientific and Industrial Research (DSIR). As chief director of the resources group he controlled a budget of $60 million and a staff of 700, overseeing the science output for the botany, ecology, geophysics, geological survey, soil and land science, and, of course, water sciences divisions.

In 1990 he turned 60 and was required to retire. But it wasn't long before he was working again, this time for the Ministry of Health.

"It was a concern to me that unsafe drinking water was a major risk to the health of the community," says Michael.

"The problem was, the Ministry of Health did not consider that drinking water was their core business. I couldn't get it put on the legislative programme while the Ministry gave priority to a Public Health Bill (which 12 years later has still not been passed). For two years running, drinking water legislation just lay on the table. Luckily, we eventually got a minister who wanted something done.

"That was the beginning of the Health (Drinking Water) Amendment Act 2007.

"In it, I set up the system so the bulk of the operation was done by District Health Boards, to minimise the chance that central government could disestablish it by carrying out yet another departmental restructure."

Another of Michael's achievements was to ensure that the drinking water assessors who evaluated the performance of the drinking-water suppliers had qualifications as good or better than those of the water suppliers – that way, the suppliers couldn't pull the wool over the inspectors' eyes, he says.

"Local Authorities started using the same qualifications and it improved the standards of drinking water almost overnight."

As well as establishing the drinking-water amendments to the Health Act, Michael's team published *Drinking-Water Standards for New Zealand 1995* and its revision in 2005, along with the *Guidelines for Drinking-Water Quality Management for New Zealand 1995*. The grading of community drinking-water supplies was also re-established, something that is currently being redone, along with a programme of reporting on the performance of drinking-water suppliers.

"I was working on it with David Ogilvie and Paul Prendergast since the mid-80s," he says.

"Graeme McBride of NIWA provided a sound foundation of Bayesian statistics. It's all done if they'll only look for it – it's hidden in plain sight.

"We predicted that an event such as the Havelock North poisoning would happen – we used the Walkerton experience in Canada (E.Coli 105 outbreak) as a model for testing the effectiveness of the proposed procedures.

"We had many arguments with LGNZ about costs, but were able to show from the well documented Walkerton event that the costs of a major outbreak are greater than those of prevention. It is all avoidable if you follow what's in the Act.

"It's been interesting, yet sad, to watch the progress of the Havelock North outbreak investigation. It is hard to see how the outbreak could have been so extensive if the procedures set out in the Health (Drinking Water) Amendment Act 2007 had been implemented. People's health is at risk if the regulators and supplier cut corners."

Michael retired for the final time in 2008, a year after seeing his Health (Drinking Water) Amendment Act 2007 achieve Royal Assent.

For his work with water and contribution to the industry, Michael has received many accolades. In 2000 he received the New Zealand Water & Wastes Association (NZWWA) medal, its premier award, which was renamed the Michael Taylor Award, and in 2007 he was invested as a Companion of the Queen's Service Order. **WNZ**

Full steam *ahead*

By **Helen Atkin**s, partner, **Vicki Morrison-Shaw**, senior associate, and **Rowan Ashton**, solicitor, of Atkins Holm Majurey.

The Government has put the pedal to the metal ahead of the looming 2017 general election and pushed forward with its reforms on a number of fronts.

The Resource Legislation Amendment Bill has finally worked its way through the system and passed into law, further amendments are proposed to the National Policy Statement for Freshwater Management (NPSFM), and a proposal to establish Urban Development Authorities is currently being consulted on.

While these changes go beyond mere tinkering, they are not the substantive reforms being called for in some quarters.

In this article we provide a brief overview of the Resource Legislation Amendment Act 2017 (RLA) and the proposed changes to the NPSFM. Due to space limitations, we will provide some commentary on the Urban Development Authorities proposal in future articles.

Resource Legislation Amendment Act 2017

The Resource Legislation Amendment Act 2017 (RLA) was passed into law on 18 April 2017, with the majority of the changes coming into effect a day later.[1]

The RLA amends the Resource Management Act 1991 (RMA) as well as five other acts[2], with the stated aim of creating "a resource management system that achieves the sustainable management of natural and physical resources in an efficient and equitable way."

The RLA contains around 40 individual changes aimed at delivering improvements to the resource management system. The changes include greater centralisation of resource management decision making and process changes intended to streamline decision making. Some of the more significant changes to the RMA and their implications are discussed below.

Procedural principles

New procedural principles are included in the RMA, requiring all persons exercising powers to take all practicable steps to:

1. Use timely, efficient, consistent, and cost-effective processes that are proportionate to the functions or powers being performed or exercised
2. Ensure that policy statements and plans include only those matters relevant to the purpose of the RMA and are worded in a way that is clear and concise, and
3. Promote collaboration between or among local authorities on their common resource management issues.

These procedural principles augment existing obligations to avoid unreasonable delay. Recourse to these principles will be a useful tool for participants navigating RMA processes.

Iwi Participation Agreements – Mana Whakahono a Rohe

The RLA's provision for iwi participation agreements/Mana Whakahono a Rohe (agreements) has attracted considerable controversy. These agreements are intended to provide a formal mechanism through which iwi authorities may participate in resource management processes, as well as assist local authorities to comply with their RMA duties, particularly sections 6(e), 7(a), and 8.

The process for reaching an agreement can be initiated by either iwi or local authorities. An agreement is required to address:

1. How iwi will participate in plan making processes
2. How iwi and councils will collaborate with monitoring under the RMA
3. A process for identifying and managing conflicts of interest, and
4. A process for resolution of any disputes regarding the agreement.

Agreements may also address:

1. How a local authority is to consult or notify an iwi authority on resource consent matters, where the RMA provides for consultation or notification
2. The circumstances in which an iwi authority may be given limited notification as an affected party, and
3. Any arrangement relating to other functions, duties, or powers under the RMA.

The RLA also includes guiding principles for the initiation, development, and implementation of agreements. These include working in good faith, transparent communications, a commitment to meeting statutory timetables, minimising cost delays, and recognising Treaty settlement legislation.

Once an agreement has been reached it cannot be altered or terminated without the consent of all parties.

National planning standards

The Minister must prepare national planning standards within two years of the RLA coming into force. The national planning standards must address:

1. A structure and form for policy statements and plans
2. Definitions, and
3. Requirements for the electronic functionality and accessibility of policy statements and plans.

The Minister may also elect to specify objectives, policies and methods (including rules) that must be included in plans. The public will be provided with an opportunity to make submissions on the standards before they come into effect.

Changes to resource consent processes

The RLA introduces a number of new features to resource consent processes:

1. Boundary activities. These are activities which breach boundary rules in district plans between privately owned blocks of land. If the relevant neighbour consents to the activity, then the activity is permitted.
2. Deemed permitted activities. These are activities that would be permitted but for a marginal or temporary non-compliance with rules. Provided that the environmental effects of the non-compliance are no different than they would be without the non-compliance, and the effects to any person are less than minor, the consent authority has a discretion to deem the activity permitted.
3. Fast track applications. These are applications for a controlled activity land use consent (other than subdivision of land) or other applications prescribed in regulations. Unless the application is notified, decisions must be made within 10 working days.
4. Express consideration of environmental offsets. Decision makers must have regard to any environmental benefit proposed to compensate for any adverse effects that may arise from the activity.
5. Further requirements for consent conditions. Conditions may only be imposed on consents where the applicant agrees to the condition or the condition is "directly connected" to an adverse effect on the environment, an applicable rule or national environmental standard. This sets a higher standard for imposition of conditions than the "logically connected" threshold set by the Supreme Court in the Estate Homes[3] case.

1. Changes to consenting procedures will come into effect from 1 October 2017.
2. The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012; The Environmental Protection Authority Act 2011; The Conservation Act 1987; The Reserves Act 1977; and The Public Works Act 1981.

6. Limited appeal rights. Rights of appeal to the Environment Court against resource consent decisions are removed for all boundary, subdivision and residential activity – except if the activities are non-complying.

In addition, the notification provisions have been re-written as a step-by-step code.

Collaborative and streamlined planning process

The RLA provides for two new plan making processes: "collaborative" and "streamlined".

The collaborative process is available to councils if certain criteria are met. The process provides for the establishment of a group whose membership is intended to reflect a balanced range of the interests. The group's purpose is to seek to achieve consensus, after which the council must draft a proposal that gives effect to the consensus position – although the council may also include provisions on matters where consensus was not reached. The council then publicly notifies the proposal for submissions. A review panel is established which provides recommendations on the proposal and matters raised by the submissions. The council must then accept or reject the recommendations of the review panel. The extent to which recommendations are accepted affects the availability of rights of appeal to the Environment Court.

The streamlined process is available on application of a local authority to the Minister where certain criteria are met showing that the expeditious preparation of a planning instrument is required. Where the Minister considers the streamlined process is appropriate the Minister must issue a direction specifying the details of a bespoke streamlined process. The Minister's direction must be presented to the House of Representatives and can be disallowed (revoked) if the House resolves to do so. The proposed planning instrument is provided to the Minister within the timeframe specified by the direction. The Minister may approve the instrument, send it back to the council for further consideration, direct changes to be made before implementation, or decline to approve the instrument. There are no rights of appeal against any decision or action of the responsible Minister, council, or any other person, other than judicial review.

Strike out of submissions

The RLA includes a power for local authorities to strike out submissions or parts of submissions where the submission is frivolous or vexatious, discloses no reasonable or relevant case, or is otherwise an abuse of process. This is similar to the power a court has in relation to proceedings brought before it.

Provisions to manage natural hazard risks

The RMA has been amended to require decision makers to recognise and provide for the "management of significant risks from natural hazards" as a matter of national importance under section 6, and to enable the refusal of subdivision consent under section 106 where there is a "significant risk from natural hazards". Determining the risk from natural hazards requires a combined assessment of the likelihood of the hazard, the damage that would result to the relevant land, and whether the use of land sought would exacerbate such damage.

Requirements to ensure land is available for housing and business

The functions of local authorities are amended to include "the establishment, implementation, and review of objectives, policies, and methods to ensure that there is sufficient development capacity in respect of housing and business land to meet the expected demands of the [district/region]". This amendment integrates with the National Policy Statement on Urban Development Capacity 2016, which provides specificity as to what "sufficient capacity" entails in particular regions and districts.

3. *Waitakere City Council v Estate Homes Limited [2006] NZSC 112 at paragraph [66].*

Ministerial powers

The RLA includes new powers for the Minister to make regulations:

1. Excluding stock from water bodies, estuaries, and coastal lakes and lagoons. Infringement fines of up to $2000 per offence are provided.
2. Prescribing situations where limited or public notification of resource consent applications is precluded.
3. Prohibiting or removing specified rules or types of rules that would duplicate, overlap with, or deal with the same subject matter that is included in other legislation, eg, matters regulated by the Hazardous Substances and New Organisms Act 1996 or the Fisheries Act 1996. This power does not apply to rules that regulate the growing of crops that are genetically modified organisms, so regulating such plants remains open to local authorities.

National Policy Statement for Freshwater Management

In February 2017, the Government released a Clean Water consultation document. The document targets having 90 percent of rivers and lakes swimmable by 2040, includes new maps and information on current water quality for swimming, invites applications to the Freshwater Improvement Fund, proposes a stepped regime for excluding stock from waterways, and proposes a number of amendments to the NPSFM.

The amendments proposed to the NPSFM are aimed at meeting the swimmable targets as well as building on proposals outlined in 2016 in the Next Steps for Freshwater document.

The proposed amendments include:

- Requiring councils to identify waterbodies suitable for swimming, those that will be once improved, plus timeframes for improvement
- Requiring councils to monitor macroinvertebrates in 'appropriate' (ie, wadeable) rivers and streams
- Limiting the concept of "maintain or improve" to within a freshwater management unit (ie, catchment/part catchment)
- Requiring councils to establish in-stream objectives for dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP)
- Requiring councils to consider the community's economic wellbeing when making decisions about water quantity, deciding what level or pace of water quality improvements will be targeted and when establishing freshwater objectives
- Amending policy CA3 to clarify that councils can only set freshwater objectives below national bottom lines:
  - For attributes that are currently below national bottom lines and only in the physical areas where the infrastructure contributes to the degraded water quality, and
  - If it is reasonably necessary for the continued operation of the infrastructure
- Removing the footnote in the current NPSFM in relation to coastal lakes and lagoons and providing direction about the monitoring requirements for such waterbodies
- Further clarification of what Te Mana o Te Wai means and how it will be implemented, as well as a new objective and policy requiring councils to recognise Te Mana o Te Wai when giving effect to the NPSFM.

Submissions on the Clean Water consultation document closed on 28 April 2017. No indication has as yet been given as to when the amendments may come into force, however, given it is an election year, the Government may wish to push this through prior to the election.

It is also noted that this is not the last step in the freshwater reform programme, with further steps relating to good management practices, allocation, and the land and water national science challenge expected to be progressed later this year. **WNZ**

Product test drive

By **Geoff Young** of BPO.

I thought, wouldn't it be cool if there was an independent review of water and wastewater technology in this magazine, which looked at available technology, similar to car reviews in car magazines?

Well, I am not offering quite that yet, but what I am proposing to do is a couple of reviews each year to help you make decisions about instrumentation. As many of you may already know, I am a bit of a geek when it comes to open channel flow measurement, so it is appropriate that the first 'test drive' is on an open channel flow device.

The product

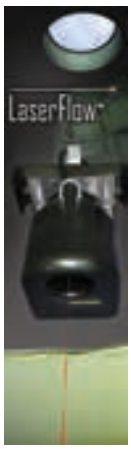
First up is the Teledyne ISCO LaserFlow unit for open channel flow. I first became aware of this technology about four years ago and, like a child with the latest toy in the toy shop, I wanted one. When I found out the price was between $25,000 and $30,000 depending on the add-ons, I was a little less enthusiastic.

Most would recognise ISCO as manufacturers of auto samplers and, speaking as someone who has used ISCO gear for over 25 years, it's got a well-earned reputation for reliability.

It has taken four years for the LaserFlow technology to reach the Antipodes and John Morris Scientific was generous enough to loan me a unit to have a play with. Whanganui District Council was then kind enough to let us install the unit upstream of a 12-inch Parshall flume that scored highly on compliance with the ASTM D1941 standard. (Sadly, the flume is not one that we installed but, when it is the first of these test-drives, beggars can't be choosers.)

The LaserFlow unit differs from most in the market place for the following reasons:

- It offers multiple point velocity measurement across the flow cross-section
- It is non-intrusive, so you are mounting it over the flow, not in the bottom of the flow (so there is no need to stop the flow and no need to get limbs and tools covered in the unmentionables found in the bottom of drains)
- It uses laser technology, and
- Post installation – no ragging.



Those unfortunate individuals who have worked in this field would have had experience with bottom-mounted area velocity devices. The one I have had the most experience with is the little brother of the LaserFlow, the ISCO 2150 device.

These units are pretty good pieces of kit except for the requirement to mount them in or near the bottom of the flow. The units have a transducer that seems to snag every piece of toilet paper or suchlike that passes through the pipeline. What doesn't get snagged on the transducer invariably gets caught up in the cable. Left unattended for too long, either the line will block or, as we have experienced sometimes, the transducer will become dislodged and torn away. This is not a criticism specifically of the 2150 – we have had three different makes of this type of device and they have all suffered the same problem. So, you either have to go down and clean them with a toilet brush on an extendable pole every couple of days or wait for the failure. The good news is, there is light at the end of the tunnel, laser light! Don't stare straight into it; it will probably blind you!

Our demo unit didn't have the ISCO mounting kit, so we had to make our own. No sweat, after all, we are Kiwis. Quick chat to the stainless steel workers next door and a mounting frame was fabricated. The LaserFlow transducer has quite a cool mounting method that enables you to extract it from the frame without getting down to it for situations like mounting it in a manhole. Downside: "Would you like fries with that?" – you have to buy the special ISCO recovery tool.

The physical mounting of the instrument in the flume chamber went relatively well. Battery-powered concrete drill and a Chemset gun and we were in business.

Levelling the instrument was done using a chain back to a vertical leg on the frame. Not being totally happy with that, we made a quick trip to the local hardware store and procured some additional chain and a turnbuckle and secured it to the roof of the flume chamber. Don't judge me – it's worth over $25K and it wasn't ours!

We are probably a bit paranoid about this after purchasing an $11,000 area velocity meter and

installing it at Franz Josef only to have it washed away to the Tasman Sea a couple of weeks later when the river decided it quite liked the land the Waste Water Treatment Plant was on. Admittedly, no chain would have saved that unit, but in this situation, it seemed prudent.

The controller for the unit was an ISCO 2160, very similar to the 2150, with configuration and download via the ISCO FlowLink software.

I would have preferred the signature controller for permanent installation as you don't have the problem with constantly replacing batteries. Configuration allows you to switch on or switch off up to 15 velocity measurement points – really useful when you have mounted it offset to the channel and don't want it measuring the velocity of the wall.

Also, if you did try and measure the wall, it returned a null value which was excluded from the average velocity measurement. Adjusting the level measurement was a case of physically measuring the level and entering the correct level in the adjustment box. The level measurement method was ultrasonic, which is not my favourite technology and, from my perspective, a bit of a let-down for what should otherwise be a nice piece of kit.

We would have liked to have done regular downloads during the test time, but the unit was five hours' drive from our office, so we waited patiently for the end of the trial.

Our results

I had great expectations for this to be an instrument that would be easy to set up and usable in a multitude of applications.

On this front the LaserFlow came up short. Just looking at the daily totals from the flume versus the LaserFlow, the LaserFlow results came back at a whopping 50 percent greater than the flume results.

Now remember that this is a flume that had a very good compliance score with the ASTM standard. So to better understand what was going on, I did a direct comparison of the level data, and although there was some differential between the local radar and the ISCO ultrasonic, there was nowhere near enough to explain the massive deviation in the daily totals, so I couldn't just blame the ultrasonic level.

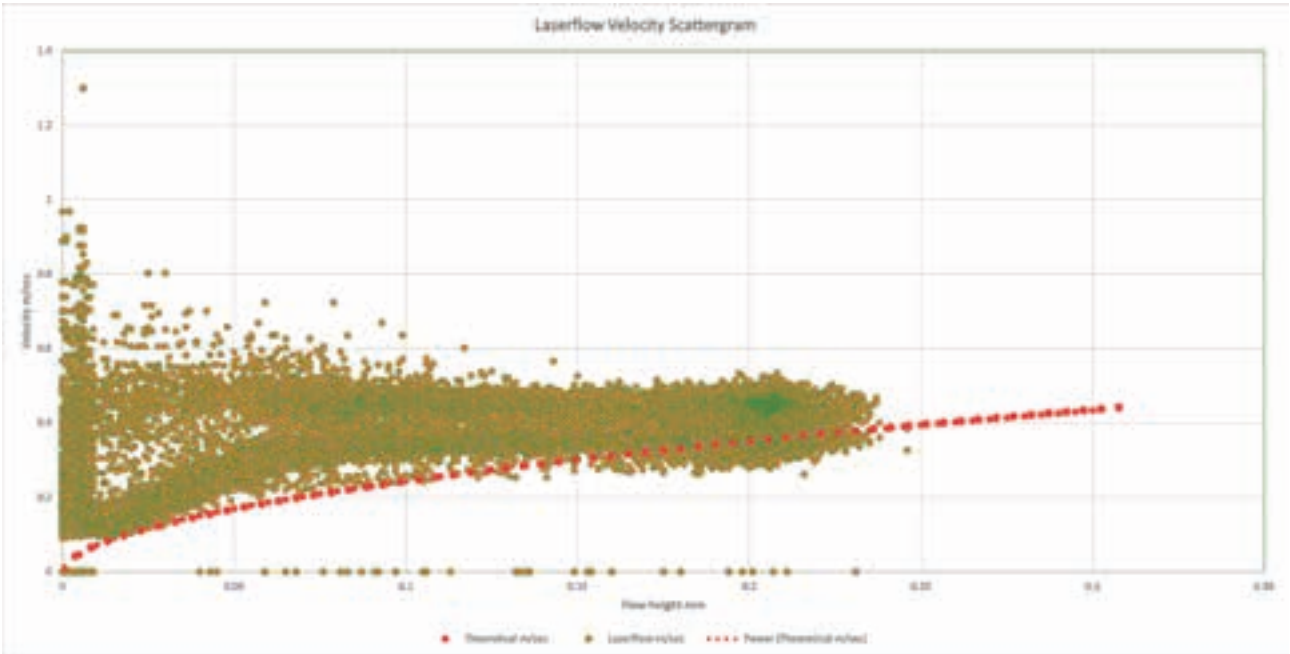
The next job was to look at the velocity measurement versus theoretical with a scattergram chart, and the issue revealed itself. There were a number of anomalies with the velocity data – the lower the flow got and, theoretically, the slower the flow got, the more inaccurate it became.

The chart with this review doesn't show the multiple points at greater than 2m/sec when there was no water in the channel. Conversely, as the level came up, the velocity stabilised and reflected a much closer relationship with the theoretical.

At velocities greater than 0.4m/sec and liquid levels higher than 200mm, the instrument appears to function pretty well, although the accumulation of zero velocity readings on the bottom of the scattergram is definitely not real and cause for concern.

The good points

- Non-intrusive measurement: No ragging, no tools covered in unmentionables, no retention bands and no standing in a live sewer. On this point alone, this instrument is a winner.
- Multipoint velocity measurement for average across the cross-section of the flow should enhance accuracy, providing there is adequate liquid depth and the average flowrate is above 0.4m/sec.
- Capable of remote transducer removal, to avoid confined space entry.
- If the unit becomes submerged, it has a traditional area velocity transducer on it that allows it to continue to measure depth and velocity.
- A good-sized memory that will collect a lot of data over a long period of time.



The not-so-good

- The 2160 controller takes Dolphin 6v alkaline lantern batteries. These last a bit over three days and cost a fortune. After the initial bench trial, we procured some lead acid rechargeable lantern batteries and managed to find a way to hook up a charge circuit to the unit to keep it running for the duration.
- FlowLink software: FlowLink software and I go back about 25 years. The original version I had was DOS-based and came on two floppy disks. It hasn't been a wonderful relationship. It's a bit like doing a Rubik's Cube with a blindfold on, only not as easy to solve (even blindfolded I can normally find a hammer). The version I was running this time was the Lite version which I still felt was overly complex. The reporting function on it is really quite powerful, once you figure out how to get the data out of it. For those of us old fashioned types who like to download it to Excel and then play with the data, it is an exercise almost as frustrating as trying to get hold of a real person from a telco when you have a line fault!
- Calibrating the level. It took me about 20 minutes and five or six goes before I was satisfied that the level was reading correctly. Although I was happy with the result I was getting after that, I still couldn't figure out why the first four goes failed. I did nothing different on the last go! Well, it turns out that when you set the level, it pays to turn all but one of the velocity points off, as it works its way through all of these before doing the level. This means that by the time the unit gets to setting the level, there is a good chance that the actual level has changed.
- Ultrasonic level measurement. Where do I start? I have never managed to get the accuracy from ultrasonics that I can get from submersible pressure, the old fashioned bubbler or the modern unguided radar. The other big bugbear I have with ultrasonics is use in steam and foam. Coming from an industrial background, these are major issues: There would be no way I would recommend one of these for use in a dairy factory!

Communication with the 2160

Let's start with the proprietary plugs: Nothing like it in the market place. The only supplier? ISCO! This thing is like Auckland Nouvelle Cuisine – you order a steak, that's all you are going to get.

I wanted to pick up a data feed from the unit to send to a telemetry system. That will require another module – $2800, thank you. How about a pulse output? That will require another module – mortgage your house. Want to interface with a sampler? For that you will require another special module. Even the download cable is not much short of $1000. When I spend this sort of coin on an instrument, I expect to be able to talk to or interrogate it in multiple ways without purchasing extra modules

Accuracy of velocity below 0.4m/sec

I was really excited when John Morris Scientific let me take this instrument away on the last day of the Water New Zealand conference in Rotorua. I set it up in our workshop

Juliet Browning, Environmental Division Manager, John Morris Group with reviewer Geoff Young.

to familiarise myself with the instrument, I messed around with level, but I didn't really have any means to check the velocity measurement. So I needed to test it in situ. The test site was chosen for its regularity, which should have produced a very stable level versus velocity relationship. Now of course I understand that at velocities of less than 0.4m/sec this instrument is going to give you some pretty hairy data.

What really disappointed me was that I hoped that this instrument was going to be easy to set up and use without the normal detailed study of the installation site. I was sadly mistaken. My theodolite, survey staff and Mannings spreadsheet can't be retired quite yet.

The price

Between $25,000 and $30,000 depending on options and add-ons. I know this is a revolutionary piece of kit, and I know that it is probably a low volume market, but one of this technology's biggest limitations is going to be affordability.

Conclusion and scoring

Overall, despite, my issue with the ultrasonics, the cost of any peripherals, the velocity accuracy issues and the accursed FlowLink software, this is actually a nice piece of kit. I am not going to rush out and replace our inventory of bottom lurking area velocity units with one, but it is certainly a piece of kit that I would happily have in our armoury and which has its place doing what I believe few other instruments are currently capable of doing adequately. I believe that in time, we would understand some of the velocity issues a lot better, and either data sort or install/configure to eliminate this error. The reputation of the bottom dwelling area velocity devices when it comes to accuracy is not exactly fantastic to begin with, so let's make sure we are comparing apples with apples.

The reliability of this kit is yet to be seen, but, given how robust most of ISCO's other gear is, it's probably a good bet. This instrument is definitely not for learner drivers; technicians who install and operate this piece of kit need to have significant experience in this field, no exceptions.

BPO score is 6 out of 10.

So here is a challenge for ISCO's opposition: let me test your unit if you think it is a match for (or better than) the LaserFlow.

If there is a water or wastewater instrument that you would like to see test driven, drop me a line on geoff.young@bpoltd.co.nz. Suppliers permitting, I will see what I can do. **WNZ**

People are counting on you

Choose the most accurate bacteria testing method

Accuracy matters when public health is at stake. Studies show that Colilert* and Colilert*-18 are more accurate than traditional testing methods. Simply put, they do a better job detecting coliforms and *E.coli* in water samples.

With fewer false-positives and false-negatives, Colilert* and Colilert*-18 deliver better results across the board:

Lower likelihood of exposing the public to undetected contamination

Quicker response to detected problems, which reduces remediation costs

Reduced erosion of public trust caused by false positive boil notifications

Less uncertainty, inconvenience, and expensive resampling for the utility

Reduced exposure to legal risk for the utility

Contact our dedicated New Zealand based Water Account Manager, Brad White, on **027 9744070** to learn more.

IDEXX

Taps off for

Thousands of New Zealanders around the country took on the challenge to go a whole day without turning on their taps – at home and at work – in a brand new project hoping to provide easy access to clean water for our Pacific neighbours.

Oxfam's Taps Off Day raised over $20,000 in support of families and communities in places such as Vanuatu and Papua New Guinea who do not have access to safe water.

Albany Junior High School (pictured) had over 200 pupils involved and raised $500. One of the teachers behind the event, Amanda Marsh, said it was an eye-opening experience for many of the kids.

"It made them think about what they take for granted. They were saying to me 'it's like the olden days'. Through Taps Off Day they became aware that this is a reality for many people."

One of the sponsors of the campaign Lautrec displayed posters at the foyer of their building and in lifts of their shared building to help spread the word to neighbouring businesses about the challenge.

Director Juliet Hyatt said; "Taps Off Day got the conversation started within the office about how much we take for granted with some of our international staff speaking about their personal experience.

"It really struck home the importance the WASH projects play within these communities."

Robert White of GHD, who assisted with the promotion of Taps Off Day, said: "While we are water engineers and proud of it, we still take it for granted. It's easy to forget that the coffee machine is plumbed and doesn't work if the water is turned off."

How **you and Oxfam** helped Fiji

Just over a year ago, on February 20 2016, one of the most severe cyclones the Pacific has ever seen hit Fiji. Cyclone Winston had an average wind speed of around 230kph and affected 62 percent of Fiji's population.

Some 30,369 houses, 495 schools and 88 health clinics were destroyed, and 44 lives were lost.

But, thanks to you, Oxfam was able to respond immediately. And just over a year on, this is what we have achieved.

We provided clean water and repaired damaged water sources. We distributed hygiene kits and provided hygiene education to prevent the spread of disease. We helped specific communities to access food and regain the means to support themselves. We ensured all community members – especially women, young children, young people and people with disabilities – were protected in the response. We worked closely with local organisations to ensure our response was as wide and effective as it could be.

Over 2000 hygiene kits were distributed, consisting of a bucket with a lid, laundry and bath soaps, sanitary pads, towels, toothpaste and a toothbrush, water purification tabs and collapsible water containers.

Ilisoni, 28, suffered a stroke that left him confined to a wheelchair. His home was flattened by Cyclone Winston, forcing him to spend months living in the community hall before his village could build a new house for him. There was no bathroom near his house, so a family member would have to carry him to the nearest toilet. Now, thanks to you, Oxfam and partner PCDF, Ilisoni has his own bathroom right next to his new house.

In addition, we constructed 234 single toilets and 24 other toilets attached to communal structures, as well as repairing 601 damaged ones. Drainage improvements were made, including the unblocking of drains and the removal of stagnant water.

We conducted a series of community health worker training sessions, which 240 individuals completed.

We restored water supplies: 127 damaged water supplies were repaired; 75 tap stands were built; 53 showers were constructed; 38 new water tanks were built; 12 spring water sources were cleaned and are being protected; 25 rain harvesting systems and water mains were repaired in 24 communities; and 76 affected communities and four schools received sanitation improvement works.

"The tanks were constructed back in the days when I was still a student it worked only for one year and something broke down that remained unrepaired for the past 8 years, it took Oxfam a few hours to repair," says Simione Koroicakou from the Verevere community, Ra Province, Fiji.

Anasa Sevukiwai, a 52 year old male from Raviravi Village says; "The community is now aware of the importance of Healthy Living in our community, the importance of wash, the caring of young children in the village, the cleaning of the village drain and the cleaning of our village at least every two weeks.

"The people have come to realise the importance of health and hygiene and of water treatment. The community has made good use of the water tank."

Together, we saved lives. We reached 20,229 people in over 2300 households across 140 communities in six provinces. Your generous support was the reason we could reach and assist so many vulnerable

The project launched on March 1 with the release of a short film, starring award-winning satirist and writer Te Radar. The film can be seen at www.tapsoff.org.nz.

Prior to the event, Charlene Fitisemanu from Oxfam said, "We're fortunate here in New Zealand to have easy access to water that is clean and safe to drink.

"Most of us don't even think about what it'd be like not to have an endless supply of this life-giving liquid at our fingertips.

"However, many of our neighbours in the Pacific aren't so lucky, and have to walk for hours to the nearest water source – often a river that's used for everything from drinking and washing, to bathing and using the toilet.

"The money raised from Taps Off Day will do real good in helping alleviate water poverty for people in the Pacific."

Taps Off Day happened on the same day as World Water Day, which happens every year on March 22. The day focuses attention on the importance of freshwater and advocates for the sustainable management of freshwater resources.

Oxfam would like to thank all the people who took part in Taps Off Day and special thanks to the generous sponsor that made the event happen: The Asmuss Group, Lautrec, MWH, now part of Stantec, GHD, Ecoflow, Cuesko and John Holland.

Top: GHD graduates take a break from their training course and find the taps are turned off. Above: Over 200 students from Albany Junior High School raised $500.

Photos: Alicja Grocz/Oxfam.

Left: The village of Nayavutoka.
Below: Ilisoni, 28, suffered a stroke that left him confined to a wheelchair. His home was flattened by Cyclone Winston, forcing him to spend months living in the community hall before his village could build a new house for him. There was no bathroom near his house, so a family member would have to carry him to the nearest toilet. Now, Ilisoni has his own bathroom right next to his new house.

women, men and children. Oxfam's Cyclone Winston response is earmarked to finish in June. Our main focus for these last few months is on enabling those affected by the cyclone to rebuild their livelihoods, access basic necessities and improve their access to services to ensure their long-term recovery.

This is your response as much as it is ours. You have reconstructed villages and provided people with life-saving aid. You have rebuilt lives and given people hope. You have set people up for a stronger future.

From the bottom of our heart – thank you. **WNZ**

Water woes not new to Selwyn District

Fluctuating water flows in the Selwyn area are nothing new for Greendale farmer Doug Gough. By **Janine Holland,** for Environment Canterbury.

Farming on the banks of the Selwyn River, the fifth generation farmer's understanding of the catchment has been honed through experience and exposure to the river's varying flows.

"It always goes underground at the main south road at Dunsandel and it is normal to be underground at this time of year," says Doug Gough.

"People complain about the river being dry but we have never swum in this stretch of the Selwyn, it's always very dry. The Waimakariri River at Sheffield went dry one summer in the 1900s before irrigation came about. Low river flows are not a new thing."

The way farmers and the regional council manage waterways has changed significantly in the past few decades and Doug says that's also had an impact.

"If you go back 50 years, there was much more intervention by the catchment boards, now there's a completely different approach. It's more of a user pays situation."

With less flood control work, vegetation has taken off in the main stem of the river, particularly gorse and broom.

"My father remembers the riverbed was completely free of gorse and broom, it was back to back clear shingle. Today there's very little exposed shingle compared to 10 to 15 years ago."

As gorse and broom are legumes, Doug believes they release nitrates into the waterways which could be a contributor to the catchment's nitrate problems.

Changes in the foothills are also impacting on the availability of water.

"There's a lot more forestry planted in the foothills behind Whitecliffs and Glentunnel, which has been taking up water as opposed to letting it run off."

Irrigation is not a major determinant of what's happens to the Selwyn River in the mid plains, as there's no irrigation above the farm, just to the sides, says Doug. Further, the farm's irrigation well is not linked hydraulically to the Selwyn River because of its depth.

The biggest variable affecting the river's flow is rainfall, and Doug says despite rain – the last three winters have been extremely dry.

"In 2013 we had a very wet winter and our well level at 60 metres deep rose significantly because of the winter recharge, both snow and rain. The three winters since have been very dry.

Yes, there has been rain but not enough to saturate the soil and go through."

The wet spring provided a 'reprieve' for many farmers, but the ongoing dry has resulted in declining or absent flows at Coes Ford and other lower parts of the catchment.

"If we look at the Selwyn River and look at Coes Ford, and the amount of development that has gone on with septic tanks and lifestyle blocks in the area, there's a lot of water being taken out and effluent being put into the ground.

"However there will be opportunities with Central Plains Water to augment the Selwyn River through the releasing of flows."

Protect your soils and everyone benefits

Doug says good management practice is about looking after your land and water resources with the future generations in mind.

On his 230 hectare property, bisected by the Selwyn River, Doug's first priority is farming for his soil types and climate.

With a mixture of soil types from riverbed and stony soils through to silt and clay with greater water holding capacity, Doug has learnt to vary his irrigation and cropping rotations to suit various soil types. Crops grown on the farm range from dry peas for export, grass, radish and cabbage seed, corn salad, mustard and buckwheat. Milling wheat and feed barley complete the suite, which is supplemented by dairy grazing, hogget and lamb grazing. However, no grazing takes place on the banks of the Selwyn River as the land is lighter. Instead this area is managed as a forestry block.

Irrigation was first set up in 1978 with a side rolls system. As there was never enough water to get around all the paddocks, "we had to be very selective where water went". Because of this, they've always been efficient and careful water users. To make sure they achieve best practice, Doug taps into the expertise of Tony Davoren from Aqualinc (formerly HydroServices).

"We were one of Tony's early clients and we've been with them ever since," he says.

Neutron probes installed since 1984 help them keep a close eye on soil moisture and watering reliability.

"We've never over-watered, and some of our crops don't get enough water. Others only get water at the end of the season, not to increase yield, but to increase seed weight."

Having a side roll irrigation system means more labour time shifting the system around, but Doug says this keeps you on your toes.

"If you have to shift your irrigator, you have to make choices and only put on water where it's really needed."

Now with a centre pivot as well, they can be more precise with their water application.

"We also leave space in the soil profile to hold any rain that falls so we don't have any leaching or run-off."

With water scarcity, Doug farms as if it's going to rain and takes into account his crop mix and plant needs.

"We're still trying to capture as much rainfall as we can and we're very conscious of irrigation moisture. It's a good thing not to forget the dryland techniques just because we are irrigated."

His other big mantra is maintaining the health of his soil.

"My focus is building up the soil so it holds more moisture. Incorporating crop residue and earlier plantings, so as a crop matures early it uses more of that winter/spring rainfall."

He's learnt the hard way to farm to his conditions.

"One ryegrass crop in the 1980s took seven irrigations before we got to yield. It was the wrong type of grass for this farm. So we changed variety species after that. This released more water for other crops which means a better outcome. The same amount of water can go twice as far."

Adapting farmer practice will be fundamental to maintaining sustainable farming in the future, he says. But he cautions time to transition is important along with sound evidence that new practices work.

Doug believes there's potential for the regulator to work more closely with farmers, utilising science to come up with innovative solutions to catchment-scale water issues.

"It would be great if Environment Canterbury could work with farmers by monitoring regional irrigation sites. Some farmers start irrigating before they should.

"If we had access to soil moisture data from a range of sites, that would help us work out when we really need to commence irrigation," he says.

"This doesn't take away from farmers measuring soil moisture themselves, but would be a good way of creating a more adaptive system by incorporating rainfall forecasts, soil moisture assessments and so on which would benefit everyone." **WNZ**

Training of middle management

Supplied by Hays New Zealand recruitment.

Almost half (48 percent) of our mid-level managers say the training and development they now receive has decreased compared to the early years of their career.

According to a survey by recruiting experts Hays, of 1516 Australian and New Zealand employees and employers, only 18 percent say training and development had increased by the time they reached mid-management level. The final 34 percent said it remained the same.

Yet employees say training and development is the second most important factor for them at work (selected by 78 percent), behind only work-life balance (85 percent) and ahead of a manager who cares about their staff (76 percent). Meanwhile, on-the-job learning is considered the most important method of upskilling for 85 percent, followed by formal training or courses paid by their employer (41 percent).

"It doesn't matter what size organisation you work for, or what industry it operates in, middle managers are the people who will one day shape and drive it, through good and bad times," says Jason Walker, managing director of Hays.

"But with flatter structures and fewer resources, middle managers are increasingly being asked to do more with less. From this perspective, why wouldn't you offer them ongoing learning and development to help them succeed today and prepare them for their future career step up?

"Ideally employers should develop their middle managers' technical skills, cultivate their knowledge and understanding of the organisation's goals, foster a belief in what the organisation is trying to achieve and help advance their leadership skills."

This could include: opportunities to lead other teams or departments outside their functional skill base for a set period of time; joining team or group projects across the organisation; being given senior-level projects to manage; participating in offsite meetings where they work on the business rather than in the business; and formal training for a set number of days every year.

"By being included in more senior level business discussions and receiving the opportunity to contribute ideas, middle managers can experience rapid on-the-job growth," says Jason.

"Mentoring is also important, as is the continuing development of emotional intelligence and soft skills."

Finally, Jason notes that development won't happen without intention.

"Map your career path and know where you want to be in the next two, five and 10 years. Know what skills you need to reach these goals so that you keep your career development on track." **WNZ**

Meeting the water skills challenge

By David Worsnop,
CEO, Connexis

The renewal of ageing infrastructure is one of the biggest challenges facing the three waters over the next 30 years.

With an investment in the region of $45.2 billion planned in the next 15 years alone, construction activity will soon be at an all-time high in the sector.

So too will the demand for competent, qualified people to carry out this work. With this in mind, there really is no better opportunity to ensure we have the people we need now and in the future.

The role of Civil Trades

The launch of Civil Trades at the end of 2015 (and the roll out of the associated qualifications in utilities maintenance and pipe installations) has the potential to transform the water reticulation sector.

For the very first time, water reticulation is recognised as a formal trade with a standardised, clearly identifiable benchmark of excellence. This will play a huge part in raising standards of workmanship and increasing consistency across the sector. Using competent, qualified staff will see asset owners, ratepayers and the industry itself benefit from better value for money, improved quality, increased longevity of assets, less rework, and improved health and safety.

There are currently more than 400 people working towards qualifications with a view to becoming Civil Trades certified, including 200 in pipe installations and utilities maintenance. Industry uptake has been steady but encouraging, and employers who have embraced Civil Trades have done so passionately.

A key focus for Connexis in the year ahead will be to continue to work closely with industry to increase the momentum and uptake of Civil Trades.

Skills recognition for the existing workforce

The initial phase of the Civil Trades rollout has concentrated on people already employed in the industry. The focus has been on candidates with five or more years of experience who are eligible to become Civil Trades certified through Recognition of Current Competence (RCC), ensuring that those with existing skills are adequately recognised.

Connexis is also offering individuals who hold expiring qualifications in water reticulation and infrastructure pipelaying the opportunity to upgrade to the new utilities maintenance and pipe installations qualifications.

This will enable previously qualified, skilled workers to maintain a current qualification and be eligible for Civil Trades certification. Candidates wishing to upgrade can cross-credit units from the qualifications already held, meaning they usually only need to complete a few units rather than starting the whole qualification from scratch.

Water as an attractive career option

The introduction of Civil Trades will also enable the water reticulation sector to attract high calibre new entrants to the industry with a recognised trade and a career pathway. The second phase of Civil Trades will focus on attracting and upskilling new entrants, and is very timely. At the end of last year the Government announced its target of 50,000 people in apprenticeships by 2020 while at the same time Connexis launched a suite of New Zealand apprenticeships for civil infrastructure, which can lead to Civil Trades certification.

Civil Trades and the civil contract process

We have recently entered year two of a five-year plan for the full integration of Civil Trades into the civil contract process. By 2020 we expect that Civil Trades will be embedded into Local Government tender attributes. This five-year window will give contractors time to engage and qualify staff in the Level 4 qualifications and apply for Civil Trades certification.

Connexis is presently working on informing Local Authorities on the change in qualification names and levels. The national certificates in water reticulation and infrastructure pipelaying were specified in many contracts for those people working on, connecting to, and maintaining council owned reticulation mains. Over the coming year we will be advising Local Authorities on how they can amend their contract requirements to reflect the new qualifications.

Next steps

Connexis is committed to working with the three waters to meet the skills challenge. We will be working on initiatives aimed at people working at all levels of the industry – from trades through to professional/technical roles.

In addition to the ongoing promotion of Civil Trades, Connexis will also be rolling out our brand new suite of water and wastewater qualifications, which have been developed in close consultation with the three waters industry. We are also partnering with Water New Zealand and the Water Industry Operations Group to relaunch a new, improved Water Industry Professionals Association (WIPA) continuing professional development regime.

We strongly encourage you to get on board, and look forward to working with you. **WNZ**

Melbourne treatment plant case study

Industrial clients and municipal wastewater plants have rigorous requirements to meet the consent discharge quality limits of district and regional councils. This was particularly apt with Auckland's water crisis back in March.

The city is not alone with its problems. For many years Melbourne Water, one of Australia's largest activated sludge WWTPs, experienced difficulties in mixing the anoxic zones for the nitrogen removal process. From start-up, the water authority had ongoing concerns that the conventional submersible high-speed mixers were not providing consistently homogenous mixing and were also incurring high maintenance costs as a consequence of frequent failure.

The installation used conventional submersible mixer technology similar to that used in most New Zealand WWTPs. At the time, this was seen as the best solution to maintain a homogenous zone at an acceptable power density.

A decision was made to trial an alternative hyperboloid mixing technology called the Invent Hyperclassic Mixer to evaluate if this new technology could provide a long-term solution to the problem.

Mike Smith from Invent Pacific outlines the trial and results below and the results were eye-opening in many ways.

Alternative technology

The Invent mixing systems are based on a hyperboloid agitation body rotating at low speed and low power input, which delivers high-efficiency mixing.

The shape of the hyperboloid mixer is based on extensive fluid mechanic modeling. The unique design achieves a flow profile that follows the mixer surface, thus minimizing fluid separation and the resulting energy losses. The transport ribs mounted on the mixer body cause the fluid medium to run off in a radial and tangential direction ensuring full circulation of the tank contents including corners.

The mixer energy input is predominantly at the tank floor and the resulting high bottom velocities give the hyperboloid mixer excellent suspension properties in combination with low power requirements.

Disruption of the water surface is also prevented avoiding any additional air input that would interfere with denitrification or during biological phosphate removal processes in anaerobic zones. Similarly, there is no generation of aerosols, or odour stripping.

The hyperboloid mixer is constructed of three main components: the drive unit, including the mounting plate, the shaft, and the hyperboloid mixer body.

The trial

As the WWTP had a number of identical anoxic zones, a side-by-side evaluation of mixing technologies was undertaken under full operating conditions. The trial was conducted with the two conventional mixers being replaced with a single Invent hyperbolic mixer.

Extensive MLSS performance tests were run to confirm the ability of the new mixers to deliver ± 10 percent variance in average solids concentration.

Details of the anoxic zones were: Dimensions: 12m x 13m x 4.5m deep; MLSS concentration 0.5 percent; SVI average of 80 ranging from 40 to 120; existing submersible mixer installation; two units 3.0kW each; and a 400mm propeller diameter.

Trail HyperClassic mixer: 1 unit 2.2kW (supplied with 3.0kW motor to match existing switch gear); Invent HyperClassic HCM2500-20-3.0; and 2500mm Hyperboloid disc.

The duration of the trial was over an eight week period, and in this time the two systems were subjected to extensive MLSS testing which included general operation and re-suspension characteristics.

The results

The Invent HyperClassic mixers also demonstrated complete re-suspension of solids

Table 1	INVENT Mixer	Submersible Mixer
No. MLSS tests	216	132
Average MLSS deviation	2.7%	5.9%
Installed power density	2.6 W/m3	~7 W/m3
No. test points >10% deviation	5	21

Table 2	Submersible Mixers	Invent HyperClassic
Tank Dimensions	12m x 13m x 4.5m deep	12m x 13m x 4.5m deep
Number of Mixers	48	24
Mixer Power (kW)	3	2.2
Energy Costs		
Total Installed Power (kW)	144	52.8
Duty	Continuous	Continuous
Power cost $/kW hr	0.19	0.19
Annual Energy Cost	$239,674	$87,880
Est. Maintenance Costs		
Annual service costs	$12,000	$6,000
Historical repair costs/year	$58,000	$0
Annual Operating Costs	$309,674	$93,880

after 24 hour stoppage within two hours (Table 1). No solid depositions were found. In 2011 Melbourne Water installed the Invent HyperClassic mixer system into the four new activated sludge tanks in lieu of conventional submersible mixers, based on the energy and maintenance savings.

Now in 2017, Melbourne Water has replaced all submersible mixers in the six existing secondary biological treatment tanks, in total 48 submersible mixers have been replaced with 24 Hyperclassic mixers.

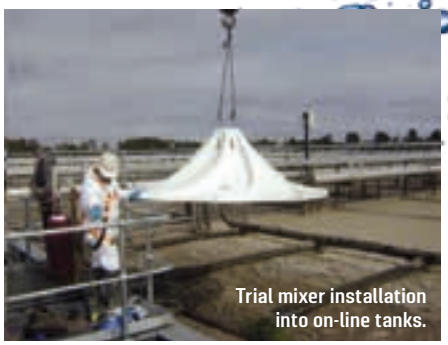
A comparison on the energy and maintenance savings is summarised in Table 2.

A solution

This trial clearly demonstrated the superior mixing ability of the Invent HyperClassic Mixers (and a 70 percent reduction in operating costs) and gave the water authorities assurance of homogenous mixing within the zone required. Moreover, since the testing was conducted in August 2008, the Invent mixer demonstrated an uninterrupted service record.

An additional advantage is the mixer has no service components below the water line. This has meant that the plant operators have been able to inspect the equipment without the need to hoist them out of the sludge. They can avoid contact with the biological effluent and hence reduce health and safety risks.

JIPL is the New Zealand agent for Invent. For more information, email info@jipl.co.nz. **WNZ**



Trial mixer installation into on-line tanks.

Microbial source tracking contamination

Auckland's beaches and waterways, like those in harbour cities across the world, are subject to intermittent microbiological contamination.

To protect the public, Auckland Council undertakes regular monitoring of faecal indicator bacteria (FIB) over the summer months and reports findings on LAWA.org.nz and the council's website.

Aquatic pollution is often presumed to be the result of human-related sources, such as designed overflows, ageing infrastructure, private septic systems or cross connections into separated stormwater systems. But because faecal pollution refers to human and wildlife waste, effective interventions need firstly to identify the source animal, and secondly, where it's located.

Since 2011, Auckland Council has conducted numerous investigations into water quality at beaches across Auckland in a programme that aims to reduce contamination in the region's waterways through effective interventions. It has also taken advantage of modern molecular techniques that better distinguish between human and animal sources of faecal pollution.

A meta-analysis of 10 of the council's investigations was presented by experts from Tonkin & Taylor and Martin Jenkins at the NZ Water Stormwater Conference in Auckland in early May. The analysis highlights the usefulness of microbial source tracking in developing effective strategies for mitigating contamination.

Identifying the source animal for elevated faecal indicator bacteria on Auckland's beaches means the most effective intervention measures are deployed.

With modern molecular techniques, genetic markers that are present in bacteria associated with different animals, including humans, can be identified.

While these markers can seem initially costly to identify, the use of faecal source tracking supports interventions that avoid needless and ineffective major spend. Locally, for example, an initial FIB analysis supported by targeted faecal source tracking resulted in identification of a single discharge point contributing significant quantities of human-related FIB. By confirming that a human sewage source was present, further work was then undertaken to trace the geographic source of contamination. Once the source was identified, management interventions were implemented. Post-remediation monitoring shows that these measures were successful.

From a non-infrastructure point of view, a Californian study identified dogs as a contributing factor to elevated FIB levels. Residents near the source were educated about proper pet waste disposal and the potential impacts on the environment. Subsequently canine faecal contamination within the environment reduced. Using this Californian example, it's easy to see that campaigns that drive human behavioural changes – such as keeping dogs on leashes and promoting and increasing the pooper scooper habit – can help to effectively reduce pollution and keep waterways open for recreation.

The investigations funded by the council include evidence that some of Auckland's bathing beach microbial contamination is not necessarily the result of humans. Contamination by birds and dogs also contributes to the overall profile of a waterway's safety risk, and this needs to be considered when developing interventions.

Based on the studies undertaken to date, and research on similar studies and intervention projects in other parts of the world, the Tonkin & Taylor team sees value for those responsible for network infrastructure in working with other departments as part of the overall goal to reduce contamination.

Justine Quinn, a senior freshwater scientist at Tonkin & Taylor, points out that avian sources are more challenging to manage as they're typically wild and highly mobile. However, interventions such as signage to discourage people feeding ducks and gulls could go a long way in reducing their pollution, she adds.

The findings of these studies also point to location-specific management interventions, Justine says.

"By incorporating network utility providers, local residents, farmers and recreational users of beaches and reserves, organisations can take a holistic approach to managing multiple contaminant sources.

"Ultimately this integration and insight means intervention measures are more effective, cheaper, and faster to deploy. This means more open beaches, more of the time – a win for everyone." **WNZ**

Tonkin + Taylor is expanding our comprehensive 3 Waters services in Australia and New Zealand

Our investment further integrates our services for water, stormwater, and wastewater and is driven by the need to address new and emerging 3 Waters issues in New Zealand.

Our new water services leaders, Clint Cantrell and Steve Nye, bring to Tonkin + Taylor more than 50 years of combined international experience in stormwater, wastewater, and water projects and programmes.

Steve Nye

Steve's previous experience in 3 Waters global leadership roles for a large multi-national consulting firm means he has a tremendous depth of knowledge and experience in 3 Waters strategy and planning. His recent appointment will see him leading the continued growth of T+T in Australia.

Clint Cantrell

Clint's mission-critical roles on large infrastructure programmes throughout the UK, US, Australia and NZ will support T+T's award-winning scientists, engineers and planners to continue delivering exceptional value and services to our clients in New Zealand. His 3 Waters leadership roles have saved his clients billions of dollars in capital costs.

T+T 3 Waters services address critical client needs including master planning, consent development and compliance, stormwater flooding, water supply, dams, safe swim studies, NPSFM compliance, and complex infrastructure design/delivery.

Tonkin+Taylor

Exceptional thinking together

www.tonkintaylor.co.nz

Tender traumas and triumphs

Heather Murray, **Senior Consultant**, **Plan A**, explains five ways to make your investment in tendering pay off.

A fascinating recent study by NZ Rise identified that the average costs to businesses of responding to a RFP was around $23,500, with some respondents identifying costs up to $84,000 per RFP. And this did not include sales team time or loss of income when billable time is diverted into preparing tenders.

Yet, government tendering is a primary source of business for most companies operating in the water sector. It's here to stay, like it or lump it – so your best response is to find ways to make your company's investment in tendering truly worthwhile.

With the new public sector financial year about to start, there will be a raft of tenders hitting the market in the next month or two – aiming to spend government-allocated budgets on maintaining and building our three waters assets. So it's worthwhile to get this tendering process right – to maximise win rates and optimise the investment you make into bidding processes.

How do the best companies manage their tenders so their win rates are high, and the time and effort they invest pays off? We quizzed Plan A's tender specialist team to find the hallmarks of those tenderers who have the art of winning tenders nailed. They came up with five fundamental practices that lead to cost-effective development of high quality tenders and above average success rates.

1. Take time to develop a strong competitive bid strategy at the start of your bid development process. Just providing a tender that answers the questions no longer gives you the edge over your competitors. If that's your approach, you'll have to win the job based on being the cheapest. You can cut your price to the bone, and do the job for a low margin – but that makes any effort put into tendering marginal in its value.

By contrast, if you generate clear win themes and differentiators that set your proposal apart and align with factors that are important to your client, your chances of winning are way higher and less dependent on having a rock-bottom price.

2. Involve your key people in developing that strategy, stress-testing it, and critically reviewing the way that is articulated in your Executive Summary. Do this at the start of your bid development process, so that any potentially de-stabilising additions or changes later are minimised.

3. Once your win themes are agreed and clearly articulated in your Executive Summary, don't stop there! Roll them out through every section of your tender, reinforce them, re-interpret them and flesh them out at every possible opportunity. Start each section with a client-focused introduction, demonstrating your understanding of their needs and objectives. Your bid writing team must have an in-depth understanding of your win themes, and the insight, the mandate and the confidence to make linkages with the attribute information that they massage (or write from scratch) for your bid.

Make sure your bid writers gain a thorough understanding of your overall bid strategy and your competitive positioning. You can – and should – expect and support them to generate content that reinforces and, where necessary, challenges that overall strategy.

No matter how good your strategy and your methodology is, it won't score points unless it's expressed clearly and convincingly in your bid document.

4. Manage your review processes carefully. A cast of several senior people called in to review a bid in its late stages, without having early involvement in strategy development, is a recipe for disaster. Most often, their inputs will be at cross-purposes, not reflecting the investment made into strategy development and win themes that have been captured throughout the sections of the bid by your diligent and astute bid writing team. The result? Most often a beat-up of the bid writers and a last-minute hash-up of what was previously a compelling and client-focused proposal. The solution is to stick with the same review team, capture their inputs at the start, and stage the reviews so there are no surprises.

5. Answer the "So What?" test. Look for independent, client-focused input into your strategy development and reviews, to make every claim of strength in your bid lead to a direct and clearly explained benefit to your client. What may seem an obvious advantage to you may well be something that your client really doesn't care about, or a feature that your competitors will also claim. Involving someone with knowledge of best practice tendering in the water industry, insight into what your clients' tender evaluators are looking for, and the authority to guide, challenge and support your tender team may be the best investment you will make.

There's no doubt that tendering costs money, whether you manage all your bids in-house or you seek external assistance. But losing tenders is far more expensive – not only is your investment in tendering sunk, but you're also left wondering how to keep your business afloat and prospering without the work that might have been won.

If it's worth tendering for a project, it's worth investing the time and effort to win it! Good luck with your tenders this year. **WNZ**

▪ Heather Murray has extensive experience in writing and managing tenders in the three waters sectors. She leads a team of tender specialists who provide bid management, strategy facilitation, tender writing, reviewing, graphic design expertise to supplement internal tendering resources in a wide range of industries, both in New Zealand and internationally.
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High quality compressed air for Malabar WWTP

Sydney's Malabar Waste Water Treatment Plant was recently upgraded with three Kaeser CSDX series rotary screw compressors, along with a Sigma Air Manager 4.0 compressed air management system.

Australia's largest water and wastewater service provider, Sydney Water, is a state-owned corporation, wholly owned by the New South Wales government. Sydney Water collects and treats around 1.5 billion litres of wastewater each day, through a network of over 25,000 kilometres of wastewater pipes, 677 pumping stations, 14 water recycling plants and 16 wastewater treatment plants.

Malabar Waste Water Treatment Plant (WWTP) is Sydney Water's largest wastewater treatment plant. It has an average daily discharge of almost 500 ML.

Work on the improvement project started in 2014 and is expected to be completed by mid-2019. The project is being delivered by 4Malabar, an alliance between Sydney Water, John Holland, UGL Engineering and GHD.

The compressed air system upgrade is one of several improvements.

Compressed air is used for a number of plant site services across Malabar WWTP, including valving, pneumatic actuation and sparging. A reliable and efficient supply of quality compressed air is critical to deliver these site services and was therefore a key criteria in selecting the new system.

The latest generation CSDX series rotary screw compressors from Kaeser were selected, and Kaeser says they provide significant energy savings in multiple ways:

- Every CSDX series rotary screw compressor is equipped with a low speed and highly efficient screw compressor block featuring the high performance and flow-optimised Sigma Profile rotors. The Sigma Profile achieves power savings of up to 15 percent compared with conventional screw compressor block rotor profiles for a highly energy efficient solution.
- Efficiency is further enhanced with the inclusion of a premium efficiency IE3 drive motor, which complies with and exceeds prevailing Australian GEMS regulations for 3 phase electric motors.
- The Kaeser 1:1 drive design further eliminates the transmission losses associated with gear or v-belt driven systems as the motor directly drives the screw compressor block.

To reliably and efficiently manage the compressed air system a Sigma Air Manager 4.0 (SAM 4.0) was installed. An in-house centralised control system, SAM 4.0 enables compressor performance to be precisely matched to actual air demand thereby allowing additional energy savings.

Kaeser says the SAM 4.0 utilises adaptive 3D advanced control to make air generation and treatment even more intelligent, reliable and efficient. The algorithm of the adaptive 3D advanced control orchestrates the operation of the Kaeser compressed air system. As a result, just the right amount of compressed air power is provided to suit the specific needs of the application, with maximum energy efficiency. The adaptive 3D advanced control continuously analyses the relationship between various parameters (eg, switching and control efficiency), and proactively calculates the optimum combination from a range of many in order to achieve optimum efficiency.

Up and running for some time now, the Kaeser compressed air system is said to be reliable and efficient in delivering the high quality compressed air that the Malabar Waste Water Treatment Plant requires.

The standard CSDX series of rotary screw compressors from Kaeser are available with drive powers up to 90 kW, a working pressure 7.5, 10 or 13 bar and with free air deliveries from 79.86 to 16.16 m3/min.

For more information visit www.kaeser.co.nz or phone 0800 447 820.

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