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NOVEMBER / DECEMBER 2020 ISSUE 217

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Issue 217 NOVEMBER / DECEMBER 2020

INSIDE

- 4 President's comment - Energised by the challenges and opportunities ahead
- 6 New Board members
- 8 Haere Ra, Megan Wraight by Stu Farrant
- 10 The future of water
- 12 Modelling Group Symposium
- 14 Membership survey reveals key concerns
- 16 Wet wipes campaign
- 17 New competency framework
- 19 New water industry programme

CONFERENCE

- 22 Minister Mahuta's address
- 24 Taumata Arowai - Bill Bayfield
- 26 Meet our winners
- 28 2020 Beca Young Water Professional
- 30 The Expo
- 32 Water as leverage for better infrastructure
- 34 Six steps to water transformation - Raveen Jaduram
- 36 A taste of the conference
- 38 We are all about wai - Gillian Blythe
- 40 Stormwater conference - Paper of the Year

FEATURES

- 20 Huge interest in Te Ao Māori worldviews
- 44 Chesapeake Bay - what has changed?
- 50 Water and the land transport assets
- 52 When wastewater becomes your next water source
- 58 Unified risk-and-resilience for success in utilities - Nigel Toms
- 62 Water treatment - alliance project model
- 66 Water storage under climate change - flexible decision-making

REGULARS

- 48 Profile - Clare Feeney
- 56 Profile - Matthew Lillis
- 68 Legal
- 70 Pacific - Oxfam
- 72 Comment - Tom Hardy

'Ka ora te wai, ka ora te whenua, ka ora nga tangata'
'If the water is healthy, the land is healthy, the people are healthy'



P24



P28



P44

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.

Energised by the challenges and opportunities ahead



Helen Atkins
President, Water New Zealand

This is my first report to you since becoming president in September this year. I am writing this just after we have finally managed to hold our Water New Zealand conference and expo two months late at Claudelands in Hamilton.

Obviously being able to hold a successful face-to-face conference was a big highlight for us. We had around 1200 attendees and a full house of exhibitors which was absolutely fantastic.

The dinner was a sell-out affair. The DIA/Taumata Arowai workshop the day before the conference was also a full-house with huge engagement from all those who attended.

The Local Government Minister, Hon. Nanaia Mahuta led the powhiri and set out her vision for the sector over the next term of government.

She described without apology that the reform programme is ambitious. I would echo her comments and add it is also overdue and essential.

The conference was packed with excellent technical papers and presentations, outstanding exhibitor stands and posters. The social programme was, as always, embarked on with enthusiasm.

Like most people I have to confess that I will be pleased to see the back of 2020. However, it is not all doom and gloom looking back and, more importantly, looking forward.

I look towards the future of the water services sector with positivity. It is no exaggeration to say we are facing a time of unprecedented change over the next three to five years.

This year we have seen the establishment of Taumata Arowai and we will see the enactment of the Water Services Bill around the middle of next year. The Government has signalled, and begun, a process of looking to partner with local authorities to help them meet the financial challenges that a new drinking water regulator will bring.

It is the first time in a generation or more that we are starting to see a real commitment towards investment in water services infrastructure. All of this investment is long overdue and comes at a time when the demands on our freshwater resources have never been so great.

As a sector we rely heavily on the quality of freshwater to provide safe drinking water to our communities. On the other side of the ledger we are also responsible for point and non-point discharges from wastewater and stormwater systems.

The Government's freshwater reform programme is both aspirational and hard-hitting. Everyone will be required to 'do their bit' in no insignificant way if the goal of achieving improved water quality in a generation is to be achieved.

One area of reform that I am personally particularly focused on is the incorporation of the concept of Te Mana o te Wai into water services regulation.

The Water Services Bill requires those exercising functions, powers and duties to give effect to Te Mana o te Wai (the meaning of which is set out in the National Policy Statement – Freshwater Management 2020). In broad terms the concept is stated to be: "... concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community."

Water New Zealand is currently working on a guide to assist members in relation to what giving effect to Te Mana o te Wai means for the sector.

It is a very busy time in 2020 and will continue to be so for the foreseeable future. The team at Water New Zealand, led by the Board, are working on a variety of initiatives that you will continue to hear about via Pipeline and other communications.

Finally, I want to pay tribute to Kelvin Hill, our retiring president, for his leadership over the past couple of years.

I also want to officially welcome the Board consisting of some new and old faces – Lorraine Kendrick, Tim Gibson, Iain Rabbits, Deborah Lind, Garth Dibley, Troy Brookbanks and Priyan Perera.

We are all very energised by the challenges and opportunities ahead.

Helen Atkins

Also see Helen's legal column discussing Te Mana o te Wai in Water Services on page 68.

OPPORTUNITY OF A LIFETIME

Water challenges are escalating around the globe, placing people and communities, our environment, and our very future at risk. By 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity. We are a Fortune 1000 global water technology provider with one mission: to help our customers solve water through the power of technology and expertise. Together, we can make water more accessible and affordable, and communities more resilient. Let's create a world that is more water-secure and sustainable for all. We have the opportunity of a lifetime to solve water. Let's work together and lead the way.

#LetsSolveWater



Congratulations to our new board members, Dr Deborah Lind and Tim Gibson

Dr Deborah Lind is keen to ensure the many experienced and diverse voices of our water sector are heard at the Government's decision-making table.

She is currently Technical Director – Water Advisory for AECOM and brings to the board extensive experience from working in the water sector around the world for the past 25 years.

Deborah has held both internal leadership and external advisory roles across the regulated UK water industry, New Zealand councils and CCOs, as well as Australia and the Pacific Islands.

She is a member of the Institute of Directors, a Chartered Scientist with the Royal Society of Chemistry and has completed executive training at the Mt Eliza Business School, as well as the Society of Local Government Managers (SOLGM) Accelerated Leadership Programme.

Deborah has been a member of Water New Zealand for the past 15 years. She has been Chair of the Auckland Water Advisory Group, a Northern Branch Committee member of the Institute of Public Works Engineering Australasia (IPWEA) and Queenstown Lakes District Council representative on the Water Utilities Association (WUA).

She says the regulatory reforms offer significant opportunities to engage and prepare our next generation of managers, leaders, and water sector champions for the challenges ahead.



Dr Deborah Lind

Tim Gibson has an in-depth understanding of the water sector based on an active involvement and highly successful career in the industry.

He has been a Water New Zealand member for more than 20 years and has been involved in a number of special interest groups and the Annual Conference Steering Group.

He is currently a member of the Water Utilities Association and Water Services Managers' Group and has been Chair of the Water Industry Group (WIG) within the Connexis governance structure since 2017.

Tim is Executive General Manager of Citycare Water. He is a civil engineer and Master of Business Administration and has more than 30 years' experience in the construction and infrastructure industries, across both the private and public sectors.

Tim is also a member of the Institute of Directors and is a Director and Chairman of Apex Environmental.

Tim will bring this extensive experience to support Water New Zealand to anchor its leadership position and industry representation through the upcoming structural reform of the water sector and beyond.

He strongly believes in a collaborative approach for Water New Zealand to continue positioning itself as the industry advocate and "go-to" advisor for the Three Waters sector.

Diversity, industry training, smart technology and its practical applications, implementing industry best practices and operational standards, and improving health and safety performance are areas that Tim has highlighted as key drivers for the sector and Water New Zealand as we move into the new environment.



Tim Gibson

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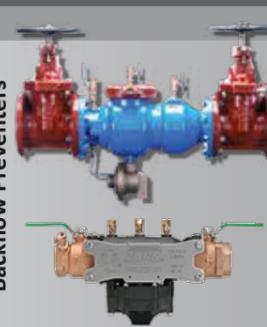


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Haere Ra Megan Wraight

By Stu Farrant

As the last gasps of winter rattled Aotearoa, the trail-blazing landscape architect and wahine toa, Megan Wraight passed away on August 31, 2020.

A passionate and visionary landscape architect, Megan embraced the role of public spaces to uplift our spirits and welcome ecology into the heart of our cities.

As a pioneer of the practice of water-sensitive design, Megan was a strong advocate for collaboration and strove to weave a narrative of water within many designs which have come to be the treasured spaces within our daily lives.

Megan understood the importance of water to sustain life and the potential for urban design to unearth the often severed connections with our lost waterways through celebrating water as a Taonga rather than a polluted waste stream to dispose of.

At a time long before national policy statements, unitary plans or design guidelines Megan founded the practice (Wraight + Associates) with a passion to connect people with spaces and use these spaces to support environmental benefits for generations to come.

Her transformation of Wellington's waterfront is anchored in Waitangi Park (delivered as a Wraight Athfield Landscape + Architecture project) where a complex mix of raingardens, wetlands (including both subsurface and surface) and stormwater harvesting system was a globally innovative expression of water-sensitive design defining our built environment.

The fact that the project succeeded is a credit to



her tenacity to always push what she knew was worthwhile be it through the council meeting, value engineering meeting or Environment Court hearing.

In the years since, Megan has helped shaped

our urban water landscape through projects including Silo Park, Jellicoe Street, Pukeahu National War Memorial, Tiramarama Way and Christchurch Coastal Pathway – which provide just a glimpse into her legacy which spans the length and breadth of Aotearoa.

Projects of this calibre do not eventuate by taking the easy option and Megan had an infectious ability to tackle challenges head-on and ensure that the full potential of projects was carried through to completion.

While the passing of Megan Wraight brings sadness to so many, let her be an inspiration to us all to push aside mediocracy and always remember that advocacy takes tenacity and change is worth the fight...she was most definitely a fighter.



Left: Megan Wraight – a trail-blazing landscape architect and wahine toa. Above: Wellington's Waitangi Park where a complex mix of raingardens, wetlands (including both subsurface and surface) and stormwater harvesting system was a globally innovative expression of water-sensitive design defining our built environment.

Bay of Plenty Regional Council gains IANZ accreditation for chlorine by titration

Bay of Plenty Regional Council has successfully gained IANZ accreditation for chlorine by titration and can now provide a competitively priced service for FAC performance checks on portable meters as per the New Zealand Drinking Water Standards 2005 (Revised 2018).

The current schedule of testing takes place six monthly in November and May with meters returned within the week. If interested then please contact a member of the laboratory and sampling services team through the contact centre on **0800 884 880** or email jobsforlab@boprc.govt.nz

For further information on our laboratory testing services go to www.boprc.govt.nz



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Brave Blue World: The future of water

Water New Zealand hosted a virtual screening of the documentary *Brave Blue World* to more than 600 water enthusiasts. By Renee Butler, Water New Zealand Marketing coordinator.

The earth has the same amount of water as it did when it was first formed 4.5 billion years ago. The big difference is that there are now more than seven billion people relying on water for their survival.

With the added pressures of aging infrastructure, limited funding, climate change and continued pollution, the worldwide water sector is facing some immense challenges.

Brave Blue World is an international documentary that provides an optimistic view on the future of water. It examines how new technologies and innovations are being adopted all over the world to create a more sustainable future.

This film is pioneering in its storytelling and scenery, presenting compelling examples from across six continents and outer space to show the positive side of what is possible for water.



Last month, Water New Zealand jumped at the opportunity to share this documentary with our members and the public.

We wanted to help raise awareness about the way we use drinking water, stormwater, and wastewater in New Zealand and how we can be more sustainable.

Throughout the week of the October 12-15, we hosted a virtual screening of the documentary to more than 600 water enthusiasts.

Many people chose to watch it within their small work groups while others hosted events for their whole organisation.

Post screening, we held a *Brave Blue World*

virtual panel discussion to dive deeply into the topics talked about in the film and to discuss the relevance to the New Zealand sector.

Thank you to our panellists Clare Feeney, Joan Davidson, Christine McCormack and Robert Blakemore who provided a thought-provoking discussion for the audience post-screening.

Matt Damon says when interviewed for the film: "How lucky are we that we are the ones who get to solve this."

With that in mind, Water New Zealand is talking to our members to see what ways we can support new innovations in the sector and raise awareness about the importance of water and the role everyone plays in protecting it.

If you have not had a chance to watch the film yet, it is now available on Netflix.

Thank you to the Water Environment Federation who made it possible for partners around the world to host virtual screenings.



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Water New Zealand's Modelling Group 2021 symposium

By Nadia Nitsche.

Hydraulic and hydrological modelling has been an important analytic tool for several decades. While modelling continues to develop as an analytical tool, other data analytic methods and datasets are also maturing rapidly. These tools can be used to complement each other to provide the evidence for investment that is demanded by decision makers within the water industry.

The Water New Zealand Modelling Group provides a forum for those of us using these tools to get together and help us achieve the outcomes required by engineers, environmental practitioners, designers and planners.

Our next annual symposium will be held in Christchurch on March 10-11, 2020 and abstracts for this are now open. They can be sent to Katrina Guy at Water New Zealand.

The Modelling Group also provides a forum for discussion. Every year we

have portfolios that we contribute and lead to provide guidance or input for the modelling industry.

This year's focus is on establishing Stormwater Modelling Guidelines for the industry. A workshop was held at the Water New Zealand conference and additional workshops will be scheduled in December and March. Wastewater and water supply modelling guidelines have already been completed.

We also like to get together at regional events to share ideas, studies and learning – obviously this has been trickier this year than in others.

The Water New Zealand Modelling Group currently has 297 members and we are always keen to hear from anyone who may be interested in what we do.



You can contact us via www.waternz.org.nz/Modelling or www.linkedin.com/groups/5152599/

Christchurch Young Water Professionals visit Grundfos

By Jessica Hamilton.

The Christchurch Young Water Professionals (YWP) Committee recently visited Grundfos where they learnt about the history, background and components that make up the various types of pumps. The tour finished at the testing station with a demonstration of how the pumps are tested

along their performance curve, including the very valuable lesson about the difference in sound when a pump is running at its duty point versus undergoing cavitation. The afternoon ended with some nibbles and refreshments at one of the local establishments. A big thanks to Jase Keen and Tim Hines at Grundfos for taking the time to guide the tour and answer all of our questions and to GHD for sponsoring the lovely food.



WATER LOSS TRAINING EVENT

25 & 26 February 2021, in Auckland



This is an ideal opportunity for water network staff and management to learn more about water loss and the management of water supply networks.

Come, learn, share and discuss. There will be a small expo. Case studies are welcome.

Register at www.eventbrite.co.nz (search water loss training).

The event will include a special 90 min streamed session for wider interest.

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'If you manage water losses well, you manage the water network well'

Training opportunity to tackle national water loss challenges

Around one fifth of water supplied to New Zealand's water supply networks is being lost through leakage.

In the 2019 fiscal year, participants in the National Performance Review lost nearly 120 million cubic metres of water through their water supply systems.

With increased population pressure, changes in climate and increased public interest in the health of our water bodies, there is growing pressure to reduce this enormous wastage.

A two-day water-loss event is being scheduled in Auckland on February 25-26, 2021 to provide practical training to help water professionals tackle the challenge.

A special session will also be held to help councils and senior managers understand and manage issues.

The event will help council staff navigate and implement water loss tools and approaches outlined in the New Zealand water loss guidelines and bench loss software.

These resources can be downloaded by Water New Zealand members from: www.waternz.org.nz/waterlossguidance.

Workshop organiser, Richard Taylor from Thomas Consultants, says case studies will provide opportunities to learn from the experiences, challenges and successes of others.

Anyone attending the workshop can share their story by emailing

richard.taylor@tcec.co.nz. He says suppliers who want to be involved should also make contact soon, as opportunities are limited.

"This workshop will be an ideal opportunity for water network staff and management to receive technical training and learn more about water loss and the management of water supply networks to achieve acceptable levels of leakage.

"As well, it's a chance for staff to learn and connect with each other, and there'll be an expo presenting water loss related products and innovations to the group."

For the first time, council elected members, CEOs and senior managers will be able to learn about the high-level key principles in relation to water loss including:

- The financial and environmental benefits of managing water loss to acceptable levels;
- Best performance indicators for water loss (why using percentages can be very misleading);
- Acceptable levels of water loss;
- What Non-Revenue Water (NRW) is.

This 90-minute session will be streamed 'real time' to those who register.

For more information search for "water loss training" on Eventbrite (www.eventbrite.co.nz). Any questions can be sent to info@tcec.co.nz.

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Membership survey reveals key concerns

Water New Zealand CEO, Gillian Blythe, outlines steps being taken to address some of the key concerns facing members.



Regulatory reform and training initiatives are two key areas that Water New Zealand's members have indicated we need to be focused on over the next 12 months.

Each year Water New Zealand surveys our members to ensure that we are providing support in key areas of concern and interest. This helps us understand how our members feel about the services we provide, what is important to them and what the direction should be in the future. The survey helps us to:

- Determine how satisfied members are;
- Assess performance compared to the benchmarks of other associations;
- Assess the importance of key issues the sector is facing;

Water New Zealand CEO, Gillian Blythe.

- Determine if our members are aware of, and are using, our services;
- Determine where members would like Water New Zealand to focus its efforts.

As a new CEO to the three waters sector, I'm very aware that we are embarking on some major changes and that this understandably causes some anxiety and disruption.

The changes also provide some big opportunities. As a membership-driven organisation, Water New Zealand needs to ensure we are providing leadership and support and that we listen to and understand our members' concerns.

Nearly 500 members completed this year's survey, and it has become clear that the two key areas of focus are the regulatory reforms and training initiatives.

Water New Zealand has been focusing on these areas. We have been working with Taumata Arowai to help provide links for members to engage with the establishment regulator through workshops, meetings and webinars.

We are also working with members to prepare a submission on the Water Services Bill, at the same time ensuring that there is good understanding of the proposed regime and the changes it will introduce.

In the training space we have been making some big strides in

the development of the Water New Zealand Competency Framework.

The framework is designed to provide the basis for establishing a workforce with the right skills and capabilities for an effective, efficient, accountable and resilient three waters sector in New Zealand.

We welcome feedback on the framework and the competencies developed for Drinking Water Treatment Operator, Waste Water Treatment Operator and Drinking Water Distribution Operator.

This is the first step in a journey the water sector in New Zealand is taking to upskill a fit-for-purpose workforce. See our article on page 17.

The Water Industry Professionals Association (WIPA) Continuing Professional Development and Registration programme was also a key focus for the organisation this year.

This was jointly established by the Water Industry Operations Group and Water New Zealand as a system recording the professional development of people working in the water and wastewater industry.

We will continue to work hard and build on the progress we have made in the past year. Lastly, we thank everyone who took the time to complete the survey and let us know what we can do to improve your membership experience.

David Papps appointed to Beca Group Board

Beca has appointed David Papps to the Beca Group Limited (BGL) Board.

A statement from the company says that David Carter, Beca's Executive Chair, is particularly delighted to have David Papps join the board, having worked closely with him on multiple projects during the early stages of his career.



"David's range of technical, project and management roles across Beca's New Zealand, Singapore and Australian businesses has helped shape our business. In addition to his technical expertise, David brings to the board an inquiring and considered mind as well as an in-depth knowledge of Beca's Australian business. This appointment is just another step in the substantial contributions he has already made to our Beca group."

David is a Chartered Professional Engineer with 25 years' experience in water and coastal engineering. After graduating with a Masters of Applied Science (Coastal Engineering) from the University of British Columbia and a PhD (Civil Engineering) from the University of Canterbury, he worked briefly for the [then] Department of Scientific and Industrial Research before joining Beca in 1995.

His particular areas of specialist expertise include hydraulic and coastal management plus major project leadership, on projects ranging from catchment studies to marine outfalls to advanced water treatment facilities.

David Carter also acknowledged the massive contributions of two other current BGL directors, Catherine Drayton and Don Lyon, who will step down from the board in March 2021 after serving eight years and 14 years respectively.



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The elephant that shouldn't be in the (wee) room

Tauranga City Council is preparing to kick off its third summer 'wet wipe' campaign, featuring Trumpet the elephant, as a continued push to remind residents and visitors why they shouldn't be flushing wet wipes.

Like many cities around the world, Tauranga has long been battling wet wipes in its wastewater system.

The problem peaked in January 2018, when Pilot Bay (an internationally-recognised beach) was closed temporarily due to a sewerage overflow caused by wet wipes. As a result, Tauranga City Council launched an integrated campaign to start a conversation about taking care of Tauranga's wastewater system and improve environmental and community outcomes.

The campaign achieved a 40 percent reduction in the number of blockages caused by wipes in the first two years and the council hopes to see similar results this summer.

The council is committed to keeping awareness up as wipes are as popular as ever and it's easy for people to slip back into old habits.

Trumpet the elephant has become a well-recognised character locally and a favourite with kids. The friendly elephant, illustrating the size of the wet wipe problem, will feature in the YEAH/NAH wet wipe campaign again this year.

Tauranga has 135,000 residents across 56,000 households and as holidaymakers descend on the city over the summer the

population swells.

Council water education specialist, Hannah Sherratt says it is essential to engage with tourists as well as locals.

"Particularly this summer, as we are expecting to see high numbers of tourists due to the international travel ban."

The council's focus is to talk directly to visitors and holidaymakers who may be hearing its message for the first time, while also reminding residents to 'save our pipes from wipes' during summer.

"We'll be doing this in two phases, firstly increasing reach and awareness through Facebook and Instagram videos and then reinforcing those messages through education.

"Both phases are aimed at inspiring residents and holidaymakers to enjoy their summer activities while disposing of their wet wipes in a sensible way.

"Our key goal is to raise community awareness that the toilet is not a rubbish bin and that no wipe can be flushed – even if the package infers that it can. As a result, we should see fewer sewerage overflows as fewer wipes get flushed."

The new summer campaign will launch in mid-December 2020 and run for eight weeks through to early February 2021.

Flushability Standards update

On behalf of members Water New Zealand has been working with the International Water Services Flushability Group (IWSFG) on a new internationally agreed flushability specification.

Technical Manager Noel Roberts says the specification is currently in its final stages and he expects it to be published very soon.

As well as being a member of the IWSFG, Water New Zealand, on behalf of members, has been working with WSAA (Water Services Association of Australia) which is working for its members to develop joint Australia/New Zealand flushability standards which will help enforce correct labelling on all products.

The new Australia/New Zealand Standard, created in conjunction with wipe manufacturers, is expected to be out for consultation late this year.



New competency framework – the key to a skilled workforce

Water New Zealand is developing a competency framework for use by the wider water industry.

A workforce with the right skills and capabilities is key to developing an effective, efficient, accountable and resilient Three Waters sector in New Zealand.

Water New Zealand and our partners, the Water Industry Operations Group (WIOG) have formed the Water Industry Professionals Association (WIPA) continuing development programme to ensure a high level of competency within the industry.

This is supported through a new Water New Zealand Competency Framework which sets out to describe what people should be able to do and what they need to know to competently undertake their work.

This competency framework is a work in progress and should be viewed as the first step in a journey the water sector in New Zealand is taking to upskill a fit-for-purpose workforce.

The competency framework is based on the Institute of Asset Management Competency Framework. It has been modified to suit the New Zealand Three Waters Industry as well as be compatible with ISO 55000 series, ISO 9001, Water Safety Plans, Applicable NZ standards and Water New Zealand Guidance Documents.

The framework is being developed on a role-by-role basis.

Currently the following roles are available on the Water New Zealand website:

- **Drinking Water Treatment Operators:** These are the people who operate the systems and equipment used to treat raw water so that it can be supplied to the community. They operate water treatment processes like chemical dosing, filtration and disinfection. They collect and analyse data on the processes and carry out first-line maintenance tasks.
- **Wastewater Treatment Operators:** These are the people who operate the systems and equipment used to ensure that sewage is treated before being returned to the environment. They operate wastewater treatment processes such as preliminary and biological treatment, they collect and analyse data on the processes and carry out first-line maintenance tasks.
- **Drinking Water Distribution Operators:** These are the people who look after the pipes, mains and pumping stations that supply the community with water. They carry out planned, preventative maintenance as well as respond to incidents such as burst pipes and major leaks.
- **Wastewater Network Operators:** These are the people who look after the sewers and pumping stations which carry wastewater from people's homes to wastewater treatment plants. They carry out planned and preventative maintenance and diagnose and respond to faults and blockages.

An overview document has also been developed which is updated each time an additional role is developed. The overview document is available at www.waternz.org.nz/Competency-Framework-Overview.

The framework is intended to help the water industry to identify the knowledge and skills required by their workforce, to help assess levels of staff training that may be required and to develop training programmes.

Currently a guidance document is being developed to assist individuals as well as organisations in how to engage and apply the framework.

The competency framework has a review panel tasked with reviewing it before it is made available on the Water New Zealand website. The review panellist are: Jim Graham – Taumata Arowai, Robert Blakemore – Wellington Water, Ian Couling – WSP, Priyan Perera – Watercare, Richard Kruse – Downer, Sarah Lowndes – Downer, Hugh Blake-Mason – Citycare.

Go to www.waternz.org.nz/Competency-Framework-Overview and if you have any feedback please email our training development manager, Mumtaz Parker: training@waternz.org.nz.

A wave of recent water sector graduates

Despite challenges around the pandemic, 44 water sector workers have recently completed their New Zealand Certificate Level 4 in drinking and wastewater treatment.

Water New Zealand CEO, Gillian Blythe, says that the sector is well aware of the need to improve both our country's water infrastructure and service delivery, and these training programmes will help ensure we have a workforce with the right skills and training.

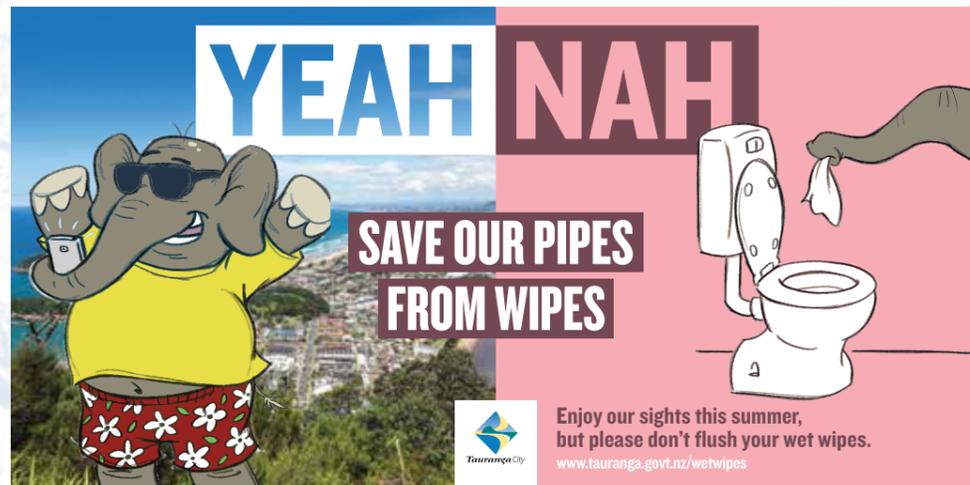
"Suitably qualified people are the key to ensuring we have safe drinking water, clean and useable beaches and rivers now as well as for future generations.

"We hope to see some of these graduates continue their industry training beyond their level 4."

In February this year, the infrastructure ITO, Connexis, released two new Level 5 water-related diplomas: Drinking-water Treatment, and Wastewater Treatment.

These diplomas have been developed with industry and are targeted at qualified operators working in supervisory positions within New Zealand's water and wastewater treatment plants.

If you want to find out more about Tauranga City Council's wet wipes campaign, visit www.tauranga.govt.nz/wetwipes or contact Hannah Sherratt by email on Hannah.sherratt@tauranga.govt.nz



Wai on Tap

– councils urged to support new summer campaign

RefillNZ's new Wai on Tap campaign aims to reduce the mountain of plastic waste caused by bottled water and, as RefillNZ's Jill Ford explains, there's a big role that councils can play.

Summer is on its way and it's getting warmer so people are out more and needing to rehydrate. With summer comes hundreds of thousands, possibly millions, spent on marketing bottled drinks – with sales of bottled water and sports drinks in NZ increasing every year.

To tackle the growing sea of unnecessary plastic waste, RefillNZ is launching a summer campaign to encourage people to Join the #Refillution – Drink Differently with Wai on Tap.

With street promotion, social media and an online impact calculator, people will be able to work out how much money and plastic they save by not buying bottled beverages.



The campaign will reinforce key messages about how great New Zealand tap water is.

Some of the best in the world

The campaign will reinforce key messages about how great our tap water is:

- Some of the best in the world, filtered to ensure safe and great tasting drinking water.
- The most sustainable choice when it comes to quenching thirst – no single use plastic and no extra transport compared with some other options.
- Switching to tap water provides safe and great tasting water with minimal impact on the environment.

- 100 percent free, 100 percent plastic free and 100 percent sugar free.

Research here and overseas shows that 50 percent of people would drink more water when out if there were more drinking fountains. And 61 percent say they want drinking fountains with bottle fillers in parks.

Thanks to funding from the Ministry for the Environment, RefillNZ now has more than 1400 public drinking fountains on the map/app covering

about 95 percent of the population (a few regions are still missing).

Sadly, that's just one fountain for every 3135 people. Often the fountains are hard to spot because they are grey metal poles, that blend into the background.

It's often easier and more convenient to find somewhere to buy bottled drinks than find a drinking fountain.

For campaign marketing material your council can use, you can contact jill@refillnz.org.nz.

Optimising fountain use

As fountains can be expensive to install, depending on where they are situated, it's important that people use them. Key success factors to optimising use are:

- Placing them where people want them.
 - Avoiding toilet blocks.
 - Ensuring they are hygienic and easy to spot.
- Directional signage and high visibility designs are critical to people using water

fountains. Councils need to invest so that drinking fountains are found and used, just as beverage companies do with vending machines,

Get your council on board to support the campaign and help more people refill – make current fountains more visible, have active maintenance programmes to keep them hygienic, and install more drinking fountains.

Because water fountains help to reduce waste from plastic pollution, councils can apply funding from the waste levy to install more fountains as part of their waste minimisation activities.

You can find more about this by going to the MfE website and downloading the document, *Waste Spending Levy, Guidelines for Territorial Authorities*.

New water industry programme

aims to set new standards in technology and innovation



Water New Zealand has joined WSAA's new industry-leading technology innovation programme, W-Lab, which aims to give water utilities access to global innovation experiences and set new standards in industry-led technology and innovation.

W-Lab was created by a collaboration of water utilities led by Isle Utilities, an independent consultancy supporting municipal and industrial users to make well-funded water strategy and technology decisions, and ThinkPlace, specialists in using design thinking to tackle complex problems.

Water New Zealand Technical Manager, Noel Roberts, says that currently many entities in the New Zealand water industry are stretched, so joining W-Lab, which concentrates solely on innovation, will help Water New Zealand members drive improvements, efficiencies and better community outcomes.

“W-Lab programmes conducted to date have been a lot more customer-centric, and many New Zealand utilities aren't quite in that space yet but need to work towards it so, in that regard, I think W-Lab will be useful.”

“We are going through interesting times with the development of a new water regulator, and possible service delivery changes.

“Hopefully, through W-lab, we can jump a decade of learning and get up to speed very quickly.”

Leading the W-Lab programme, Dr. Alex Cech, chief technology officer at Isle Utilities (Asia-Pacific), says they have designed a programme that is engaging and ultimately inclusive.

“We provide support for technology and innovation across our diverse membership, regardless of size, location, or type.”

W-Lab was launched in March this year and hosted an Ideation Summit, followed by a series of four Launch Pads. These were attended by more than 150 water professionals, with a clear goal to build a roadmap.

“We have released the first W-Lab roadmap which will guide us to leverage



technology and innovation in order to secure the future of the water industry. The framework consists of four lenses through which we view the opportunities ahead; these are nature, customer, flows, and enterprise.

“There are also several intangible benefits that will come out of building a whole industry roadmap. One of them is a clear and consistent message to the private sector on what is important to the water sector and why.”

ThinkPlace general manager Victoria, Sarah Patterson, says that W-Lab's combined breadth of experience means that it is big enough to give water utilities access to global innovation experience

and capabilities and small enough to provide local context.

There are currently 100 water utilities and councils under the W-Lab banner.

“It is great to see the W-Lab strategy being driven by W-Lab members and their specific requirements,” says WSAA executive director Adam Lovell.

He says this means that utilities large and small have a voice and that the solutions being developed will be tailored to Australian and New Zealand water utilities and to utility size, rather than a standardised approach.

For more information, please contact Tanya Kogileru at: tanya.kogileru@isleutilities.com

Huge interest in Te Ao Māori worldviews

*"He puna mātauranga, kia ora ai te tāngata
A source of knowledge, to enlighten the people"*

Putting relationship before partnership and ensuring that engagement with Māori is genuine and not an “add-on”, was some of the key advice at a recent joint Water New Zealand Climate Change Group and Engineering NZ’s The Sustainability Society webinar on Te Ao Māori worldviews.

The webinar, Māori Worldviews, Climate and Carbon Pathways, proved to be one of Water New Zealand’s most popular online events with more than 500 registrations and almost 250 people joining the live discussion.

Three guest panellists shared their perspectives on how holistic Māori world views and aspirations for kaitiakitanga can inform climate action and carbon zero pathways in Aotearoa.

The panellists were Matthew Tukaki, executive director of the NZ Māori Council, CEO of the Māori Carbon collective, and Chair of the National Māori Authority of NZ, Donna Awatere-Huata, Māori Climate Commission representative assisting meeting our climate change target under the Paris Agreement, and Johnnie Freeland who’s helping navigate a whakapapa-centred response to climate change in Tāmaki Makaurau through the Mana Whenua Kaitiaki forum.

During the course of nearly two hours, the discussion traversed a wide range of topics, including the roles of Māori and non-Māori in partnering to support Māori world views; the many Waitangi Tribunal reports; the ideology of whakapapa, intergenerational wisdom, and Māori view of time; Māori logic; loss of urupa- and whenua; and degradation of harbours and awa.

The webinar was MC’d by Troy Brockbank and Emily Afoa – both recent Water New Zealand Young Water Professional of the Year recipients.

“It’s great that so many people in our industry want to learn more about Te Ao Māori world views, and we’ll be addressing those questions in the future,” says Troy.

As well as a big turnout, there were still 40 unanswered questions on the board when the discussion came to a close.

Participants described the session as being insightful and practical as well as real, honest, raw, and challenging – a must-listen for all those working with water, acknowledging our nation’s

past in order to move into the future together.

One particularly concerning gap in the water sector is the lack of young Māori water engineers. It was suggested that there were just five in the whole country – and two of them were Emily and Troy.

“We’d love to hear from any others who may be out there, and who have not connected with us because, we need more Māori working in a leadership capacity and we need to grow our connectedness across the water sector,” Troy says.

“All of us at The Sustainability Society are really keen to help support the continued kōrero, looking forward to going through those additional questions and seeing what themes emerge,” says Ed Clayton.

Attendees suggested there was a need to do more work to digest the discussions and then apply the insights to planning.

“For our sector to play a strong regenerative leadership role in the future of our system we need to be willing to confront the missteps and boundaries of our current ways.

“This is a paradigm change which never feels like gentle tinkering; more it feels like confronting upheaval. But the desire to learn different ways of thinking and working was very evident in the questions and feedback from the attendees at the session,” Troy says.

Catherine Taiapa, of Water New Zealand’s Climate Change Group welcomed these discussions and acknowledged “the challenges and discomfort this can bring to both Māori and non-Māori as we aim to work differently together. This webinar was the first of a series of webinars planned as part of the Water New Zealand Climate Change Group that we hope will do just that”.

Water New Zealand again thanks our specialist panellists Donna, Matthew, and Johnnie for their willingness to share their knowledge, experience and insights with our audience.

Mauri Ora!

Feedback received from attendees:

- “Personally, I found Matthew’s answer to the first question – What can we as Pākeha water engineers do differently to

engage with Māori in the work that we do, very useful and the most obvious one...Engage early.” *Andrew.*

- “Congrats on an incredibly successful first webinar. Perhaps an impossible act to follow, but perhaps I’m thinking in the square! We put it up on the big screen in the Hub at Watercare with 30 or so people tuning in plus others that were there having their lunch.” *Chris.*
- “I came out of it feeling very emotional. It was deeply moving and very inspiring – and there is also a strong element of practical leadership that I think can come out of it, too.” *Clare.*
- “Thanks Troy to you and the other speakers for taking the time to explain (again! – also took the point about a lack of collective memory/knowledge and the need to continually re-educate). I learnt an awful lot that I hadn’t previously properly understood. Some particularly insightful aspects for me included the idea that as the living embodiment of both tipuna and mokopuna, the past and future are as significant as the present to individual Māori because it’s also them being affected. Similarly, things that happen in, or to, the natural environment also

happen to the individual because the environment and individual are one and the same. They’re inextricably linked. “We don’t think about nature, we are nature”. Climate change is of concern because of its impact not only on the way (and quality) of life and the whenua, but because of the impact it may have on the cultural landscape. Urupa and Tūrangawaewae may physically cease to exist and with them connections and even identity. The cart analogy also very relatable.” *Adrienne.*

- “Thanks for your time in the webinar today. Looking forward to finding ways to contribute.” *Kade.*
- “Thanks for chairing a cool webinar session. I work in the Pacific in a space that empowers indigenous worldviews to protect forests but also the broader connected ecosystems. I found the seminar really interesting” *Michael.*
- “I really enjoyed the webinar and listening to others vocalising exactly how I feel was pretty awesome.” *Merci.*
- “I found it very insightful. Whilst I don’t work in water, the principles were all still relevant to me. Thank you.” *Ian.*
- “WOW! Awesome lineup, so much mana” *Sina.*
- “Great event, thanks for organising!” *Caroline.*

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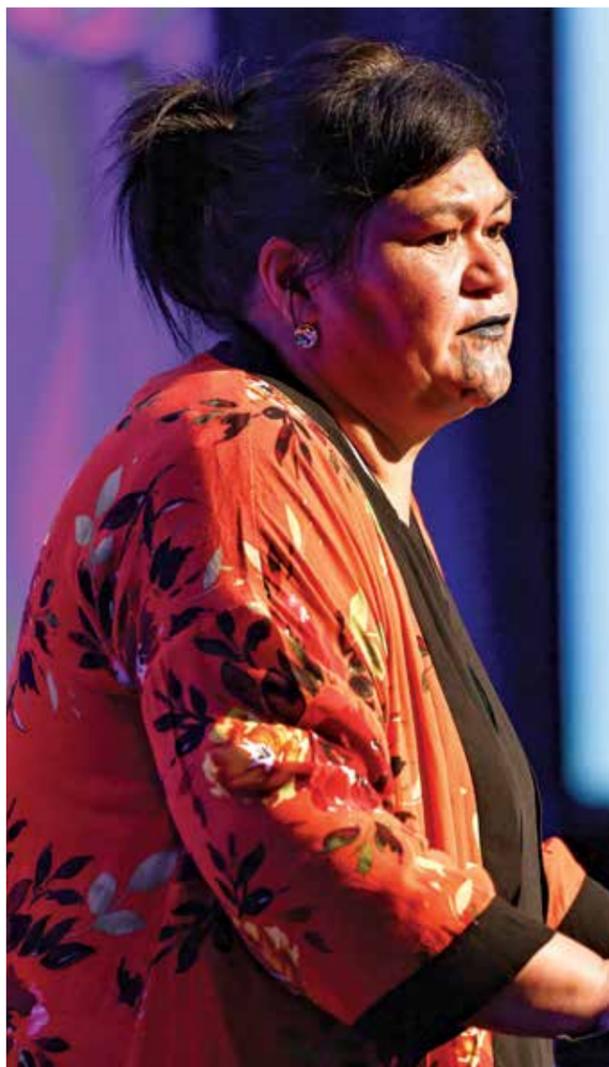
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Building a lasting transformation

Minister of Local Government, Hon Nanaia Mahuta, updated the Water New Zealand conference on how the Government’s water reform programme will work, in partnership with councils, the water sector and iwi/Māori representatives, to address the issues the sector faces, saying it is a chance to achieve lasting transformation and a legacy contribution.



Minister of Local Government, Nanaia Mahuta.

In describing the Government’s overall vision for water, the Minister of Local Government, Nanaia Mahuta, told the more than 1200 attendees at the Water New Zealand conference that in pulling together all aspects of its three waters agenda – strengthened regulation, dedicated national-level oversight, and service delivery reform (coupled with sustainable urban growth), “we want New Zealand to have an integrated and holistic water management system, from the source to the tap and back out to the receiving environment”.

The Minister talked about the need to comprehensively reform the drinking water regulatory environment combined with targeted improvements to waste and stormwater regulation.

Taken together, she said, the new measures will ensure New Zealand’s drinking water is consistent with international best practice, while improving oversight and transparency of wastewater and stormwater networks.

She said the new Water Services Bill aims to ensure drinking water suppliers provide safe water to consumers – a significant step forward from existing legislation, where there is no clear requirement for drinking water to be safe.

The Minister also said that the Bill enshrines the principle, articulated by the Havelock North inquiry, that suppliers must own the safety of drinking water and have drinking water safety plans with a multi-barrier approach.

Also in the new legislation is the requirement for drinking water suppliers to have a source water risk management plan, and for regional councils to work with suppliers to manage and protect the sources of drinking water.

Along with this will be targeted reforms to wastewater and stormwater through establishing new national-level reporting and monitoring requirements for council and Crown owners of these systems.

She noted too that as representatives and key players across the water sector, delegates’ “unique perspective, skillsets and experience will be critical to making this regime work as its intended to”.

“Water New Zealand’s role, in terms of leading and supporting the industry, will be pivotal.” she said.

A new holistic approach through Te Mana o te Wai

Another key shift in the legislation is the requirement to give effect to Te Mana o te Wai. This she said, aligns with the definition in the Freshwater National Policy Statement under the Resource Management Act. Importantly, it will require councils to engage with tangata whenua in areas such as the source water protection or water management decisions.

She reminded the conference of the “perilous state” of the three waters assets, saying the evidence bears this out:

- Up to \$575 million is needed to upgrade drinking water plants to meet standards.
- About \$3-\$4 billion for wastewater plants to meet environmental standards.
- Several billion dollars needed to fix aging stormwater pipes and networks.

She noted that councils that own and run water services – in particular, rural councils with smaller funding bases – need assistance to meet these massive looming costs.

In her speech she also discussed how the Government is committed to partnering with the local government sector to look into the establishment of larger, multi-regional water providers across the country.

She said that as a starting point, the Government would like to see the creation of a small number of entities that:

- Are publicly owned, with a preference for collective council ownership;
- Are of a sufficient size to take advantage of cross-boundary economies of scale and catchments of interest;
- Are asset owning, with balance sheet separation and improved access to capital;
- Are structured as statutory entities, guided by professionals and led by competency-based boards, with mechanisms to allow for iwi/Māori input.

The Minister said these entities would “ultimately deliver more affordable, efficient, reliable and resilient water services,

“We want New Zealand to have an integrated and holistic water management system...”

while significantly improving the safety and quality of drinking water, and the performance of wastewater systems”.

But, she stressed, while the entities would service larger areas and have efficiencies in doing so, this is not about cutting jobs in the water industry.

“There will always be a need for a highly skilled local workforce. These reforms will provide greater career pathways for your industry and a stable pipeline of works.”

She noted too that the Government also wanted these entities to be guided by a system of economic regulation which will “improve transparency and accountability for consumers and communities, and enable performance benchmarking”.

In further outlining her vision for the sector the Minister included the point that the Government wanted to see water providers that enable the industry to continue to build technical capability and attract talent.

“We want these entities to be innovative, and make use of water sensitive engineering solutions and sustainable urban design.”

The vision includes a service delivery system that, she said, leads to better outcomes for communities, not just in terms of safety, but in terms of equitable access to more affordable and reliable water services.

And the Government also wants to see “a system that respects, enhances and listens to you as highly skilled and crucially important industry professionals”.

The Minister urged delegates at the conference to take the opportunity to have input through the Select Committee process.



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Taumata Arowai

– a whole new perspective on Wai

In a keynote address to the conference, Taumata Arowai establishment CEO, Bill Bayfield said the new regulator intends to work collaboratively with water suppliers but it will also hold them to account.

In the biggest shake up of the water regulatory environment in decades, Bill Bayfield told a packed audience that the key focus of Taumata Arowai will be working to ensure that all New Zealand communities have access to safe drinking water.

As well, he said that the new organisation will oversee, administer and enforce an expanded and strengthened drinking water regulatory system, and that includes holding suppliers to account if necessary.

While regional councils will remain the primary regulator of the country's waste and stormwater networks, Taumata Arowai will "shine a light" on the regulation, management and environmental performance of these networks.

He said that the organisation would work "collaboratively to build a strong self-directing sector, by supporting and encouraging suppliers initially focused on safe drinking water".

Havelock North indicated how devastating outcomes can be if water supplies are not safe. Currently in New Zealand, he reminded the audience, that four years on, we cannot be confident in all cases that water that comes out of the tap is safe to drink. As well, there is a lack of confidence in the performance of our waste and stormwater networks.

In a series of points, he said that the name Taumata Arowai, which cannot be translated, conveys the weight, responsibility and authority of the organisation's role as a regulator and that it would give effect to its name by "building towards a whole system perspective on water, Wai is Wai, and by lifting our sights and aspiring with you for the highest outcomes for three waters".

He told the audience that the organisation intends to:

- Work collaboratively to build a strong self-directing sector by supporting and encouraging suppliers initially focused on safe drinking water.
- Have a transparent regulatory strategy so suppliers and others will know what is expected of them, and of Taumata Arowai;
- Empower people and communities by providing information on safe drinking water, as well as wastewater and stormwater network performance;
- Take a proportionate and risk-based approach including compliance, monitoring and enforcement ("fit-for-purpose").

The new regulator would be critical to lifting the performance across the system.

Bill told delegates that all persons with functions and duties under the Water Services Bill must give effect to Te Mana o te Wai and noted that Taumata Arowai will be the first Crown agency to embed Te Mana o te Wai in how it carries out its functions.

A Māori Advisory Group will advise on Māori interests and knowledge and they will work closely with the Taumata Arowai Board.

"This approach recognises that Te Ao Māori world views consist of fundamentals of tikanga, Mātauranga Māori and kaitiakitanga."

Bill said the organisation will continue to engage with iwi/Māori on how it gives effect to Te Mana o te Wai, and what guidance it can give the sector on giving effect to it.

Under the Bill, Taumata Arowai will have a responsibility to

maintain and build capability within the sector and is in discussion with Water New Zealand, Engineering NZ, Connexis and the new WTO on how to identify gaps, and the training, education and professional development that might be needed to fill those gaps.

Also in the legislation is extensive powers enabling Taumata Arowai to declare, and to support and direct the management of, drinking water emergencies arising from major infrastructure damage, contamination events, or droughts, after consulting the Minister.

These include the ability to:

- Direct that water be taken from an alternative source;
- Prohibit the use of drinking water for non-urgent purposes;
- Direct that water is to be supplied to consumers by water carriers;
- Direct a territorial authority to supply drinking water to another district;

- Cancel a non-essential large public event or gathering, which would require additional water supplies which are not available.

Outlining the timeline for the organisation Bill said that Taumata Arowai the Water Services Regulator Act 2020 was passed in July.

That establishes it as a Crown agent, sets out its objectives, and allows for the Board and Māori Advisory Group to be established.

Taumata Arowai will become an entity once the Board and Maori Advisory Group are in place. This is expected to occur in March 2021 and Taumata Arowai is likely to be fully operational in the second half of 2021.

The exact date will be determined when the Water Services Bill is passed and regulations are in place. In the meantime, the Ministry of Health will continue to be the regulator for drinking water safety.

Taumata Arowai workshop

– have a real korero

Stick with us and please get engaged with the submission process. This was the clear message from the Taumata Arowai establishment CEO Bill Bayfield and staff speaking at the Water New Zealand pre-conference workshop.

More than 200 water sector professionals took the opportunity to attend the new establishment regulator's first big outing since it was set up eight months ago.

Bill Bayfield jokingly introduced himself as a "ghost-chip" CEO – leading an organisation that hasn't yet been established.

The three waters reform is the biggest shift in the delivery of drinking water in 30 years. A key topic at the workshop covered how the new regulatory environment, including the Water Services Bill, will affect suppliers.

Bill said that the sector's experience will be invaluable in going forward and in designing a new fit-for-purpose regulatory regime.

He reminded the audience of the backdrop to the reforms – the systemic issues raised in the Havelock North inquiry – and the long overdue need to improve the safety of drinking water, along with waste and stormwater, in many parts of the country.

This is against the current challenges ahead which stem from a lack of effective regulation, aging infrastructure, under-investment and climate change – all challenges exacerbated by Covid-19 and the fiscal challenges raised as a result.

It's hoped that the new Water Services Bill will be enacted in late May or early June 2021. The first reading is expected before Christmas.

However, he emphasised the Bill was still a work in progress and that there are likely to be considerable changes as it goes through the consultation period. He urged all attendees to ensure they read the draft legislation and become engaged as it works its way through the Select Committee process.

As it is currently written, the Bill gives Taumata Arowai a strong role in lifting sector capability but Bill Bayfield pointed out that the new regulator does not yet have a clear understanding of the capability of the sector to deal with the challenges faced.

He said that, from his perspective, sector capability is highly variable and this needs to change.

"We need confidence that all organisations responsible for managing and operating drinking and wastewater systems have the best training, education and professional development, and if that isn't already the case, we need to know where the gaps are."

The reforms are in part an acknowledgement that more needs to be done to give greater recognition to Māori as a treaty partner – by government, councils and communities.

As a result, the requirement to give effect to Te Mana o te Wai will be a big step change in the way drinking, waste and stormwater is regulated.

The Water Services Bill requires that all persons who perform or exercise powers or duties under the legislation give effect to Te Mana o te Wai. Bill Bayfield says this means all suppliers and authorities need to start the journey of bringing this into their planning and practice.

Later in the session, workshop panellists discussed key concepts of Te Mana o te Wai and the "rich conversations" needed in order to bring it into effect.

The four panellists, Katy Te Amo from Taumata Arowai, Troy Brockbank from Water New Zealand and WSP Opus, Jo Gascoigne from the Ministry for the Environment, and Ngaa Rauira Puumanawawhiti from the Department of Internal Affairs, led a discussion on how Te Mana o te Wai can be integrated into how water is managed.

While the panellists agreed the sector still had a long way to go in order to embrace Te Ao Māori cultural understanding and to bring it into the system, there was a clear pathway forward.

On a practical basis that means real dialogue and engagement with local hapu and iwi about what Te Mana o te Wai means in a particular area, or waterway, would be critical to success.

In other words, the advice is, do your homework and have a real korero.



Bill Bayfield told a packed audience that the key focus of Taumata Arowai will be working to ensure that all New Zealand communities have access to safe drinking water.

Meet our winners

There was strong competition across all of our award categories this year and Water New Zealand warmly congratulates our winners.

- Beca Young Professional of the Year: Hannah Edmond, *Mott MacDonald*.
- Ronald Hicks Memorial Award (sponsored by Mott MacDonald): Rob Tinholt, *Watercare Services*.
- Hynds Paper of the Year Award: *Vibration Sensors: Listening for network leaks*.
- Hynds Presentation of the Year Award: Evie Wallace, *Beca*.
- Poster of the Year: Belinda Baker, *AWMA Water Control Solutions*.
- IXOM Operations Prize: Kawerau District Council Water Team of Riaan Nel, Wayne Brooking, Brett Cole, John Bremner and Glenn Penn.
- Site Safe Health and Safety Innovation Award: Downer
- Pipeline and Civil Project Award: Buller District Council
- TRILITY Young Author of the Year: Evie Wallace, *Beca*.
- Water New Zealand Trainee of the Year Award: Ethan Keith, *Horowhenua Alliance*.



Rob Tinholt (c) with Mark Milke, University of Canterbury (l), and Kelvin Hill.

Ronald Hicks Memorial Award sponsored by Mott MacDonald: Rob Tinholt

The 2020 award winner of the Ronald Hicks Memorial Trust Fund is Rob Tinholt, Watercare Services, for the paper presented at the 2019 Water New Zealand Annual Conference, entitled: *The Value of Biosolids in New Zealand: An Industry Assessment*. The paper provides an assessment of biosolids management in New Zealand supported by an industry-wide survey. It analyses both New Zealand and international examples, and sets out pathways for improvement in New Zealand. The judges said the paper provides numerous insights that clarify an important sewage treatment problem in New Zealand.



Buller Mayor Jamie Cleine and CEO Sharon Mason accept the award.

Pipeline and Civil Project Award: Buller District Council

The Pipeline and Civil Project Award was won by Buller District Council for its Westport Water Tunnel Pipeline project, which reinstated a collapsed main tunnel and restored gravity flow through a new fully enclosed 2.5 kilometre pipeline. The judges said that the project demonstrated the benefits of construction innovation, teamwork and a high standard of consideration for the environment. This entry stood out, showing that a smaller organisation can deliver significant high-value projects under budget, on time, and with an excellent safety result.



Shannon Neyland from Downer with Water New Zealand CEO, Gillian Blythe.

Site Safe Health and Safety Innovation Award: Downer

The Site Safe Health and Safety Innovation Award was won by Downer for the creation of its worker proximity app using Bluetooth and smart phones. Delivering essential services safely during the lockdown meant field staff needed to maintain physical distance from each other and the public. Using Bluetooth technology, the Downer Proximity app works by detecting nearby mobile phones and sends an alert as a reminder to keep physical distance when people get within a metre of each other. The app also assists with contact tracing.



Operations and Services Manager Hanno van der Merwe accepted the award on behalf of the team.

IXOM Operations Prize: Kawerau District Council Water Team

The Kawerau District Council water team of Riaan Nel, Wayne Brooking, Brett Cole, John Bremner and Glenn Penn won this award for the resourceful solutions-oriented focus to improve their processes and operational outcomes during the Covid-19 pandemic. The team did outstanding work to ensure compliance of the Kawerau Waste Water Treatment Plant following the impact of a new dairy factory in the region and 47 resource consent exceedances in 2019. The plant's 10-year maintenance shutdown coincided with lockdown but despite that, the team decided to complete the work to ensure that it could be brought back to a compliant state.

5S Society YWP Conference Attendance Award

Membership of the Select Society of Sanitary Sludge Shovelers (5S Society) comes through industry peers acknowledging a long and successful involvement in both Water New Zealand and the wider water sector. This year four members were inducted at the group's breakfast – **Kelvin Hill, John Black, Dr Marion Savill and Professor Mark Milke.**

The 5S Society YWP Conference Attendance Award is made possible by ongoing personal donations from members of the 5S Society and Water New Zealand. The objective of this prize is to provide the opportunity for young water professionals to attend the Water New Zealand Conference & Expo or Water New Zealand Stormwater Conference. This year there were two recipients – **Leah Agustin** from Beca and **Natalie Yeh** from Harrison Grierson.



Ethan Keith with Kelvin Hill (r).

Water New Zealand Trainee of the Year Award: Ethan Keith

The Water New Zealand Trainee of the Year Award went to Ethan Keith from the Horowhenua Alliance. Ethan began

working for Downer in December 2018 on a 10-month contract through the Whanake kite Ora Programme – a programme providing guidance and support through a holistic health model for Maori. At the conclusion of the contract, Ethan was offered a permanent role as a water serviceman with the Horowhenua Alliance – a joint venture between Downer and the Horowhenua District Council. He is now completing the New Zealand Certificate in Infrastructure Level 3 where he is learning new skills laying water, stormwater and wastewater mains. Ethan has been described as self-motivated and enthusiastic with natural leadership skills, and as a result has quickly moved into a support role for the crew foreman.



The award for the Australian-based authors was accepted by Rehan Nayagam (r) seen here with Aaron Hynds (l).

Hynds Paper of the Year Award: *Vibration Sensors: Listening for network leaks*.

Authors: Eddy Mofardin; David Bergmann; Andrew Forster-Knight; Juan Londono; Jonathon Crook; Alan Bailey. This paper provides insight into an excellent example of how a utility need and a commitment to system improvement has driven innovation. South East Water decided to install smart water meters as a part of their customer-focused approach to water conservation. But they also wanted to reduce system leakage upstream of their customers. The development of vibration sensors that are incorporated into smart meters as a method for early detection and location of water leaks has been taken through research and early field trials with the intent of system wide rollout.



Evie Wallace (r) with Water New Zealand CEO, Gillian Blythe.

TRILITY Young Author of the Year award winner: Evie Wallace

Hynds Presentation of the Year Award: Evie Wallace

Paper Title: *IPCC Emissions Factors – Challenging a Fortyfold Jump in Nitrous Oxide*
The judges said that Evie Wallace (Beca) gave an informative and engaging presentation on the application of the IPCC guidelines for wastewater treatment. She used the Christchurch Wastewater Treatment Plant as a case study to demonstrate an alternative approach for calculating nitrous emissions. The technical committee was impressed by how Evie conveyed the technical information in a manner that was easy to follow and understand.

Poster of the Year: Belinda Barker

Sharing Experiences in Flood Barrier Technology – Selection and Implementation
The judges said this poster provides insight into an excellent example of how flood barrier technologies can be efficiently used to minimise the effects from destructive and expensive flooding in urban and suburban areas. The various technologies incorporate concealed flood barriers, tilting flood barriers and access flood doors. The poster clearly showcased these technologies in an easy to read form without too much confusing and muddling information.



Hannah Edmond

2020 Beca Young Water Professional

Hannah Edmond is already having a big impact on New Zealand's water sector, bringing her international expertise and knowledge to help move New Zealand towards a lower carbon future.

In nominating Hannah Edmond for the Beca Young Water Professional of the Year Award one supporting statement described her desire for “delivering positive outcomes in her work, her commitment to detail, and strong project management skills” as having been of huge benefit to New Zealand’s water sector.

The nomination also describes how in the two years she has been in New Zealand her work has already had a positive impact on New Zealand’s communities and environment.

Hannah who is British, moved to Mott MacDonald’s Auckland office from the company’s United Kingdom tunnels team and in this short period of time has taken on flagship projects and forged strong industry relationships in New Zealand, championing good engineering practices and better social outcomes.

A second supporting statement adds that the 31-year-old has emerged as one of the leading practical minds on reducing carbon in infrastructure in New Zealand with a specific focus on water and wastewater assets.

“She has combined robust technical expertise with project management skills and genuine enthusiasm for the topic.”

Hannah, who is now a Principal Civil Engineer at Mott MacDonald’s Wellington office, is an experienced project manager and has worked on tunnels, wastewater and water networks and wastewater treatment, and delivery using Building Information Modelling (BIM).

She told *Water* that she was genuinely really surprised to win the award and said it was very humbling as there are many

deserving people working in the sector.

“I guess my focus is on getting my head down and looking at the best way to do things.

“Raveen’s [Jaduram] presentation struck a chord with me, about not doing things for personal gain,” she says.

She agrees she is passionate about the water sector and has very deliberately chosen to move into it and that she has made tactical choices about where she is working and what she is working on.

“I am an engineer who wants to make a difference in people’s lives (even if they don’t realise it) so when they do turn the tap on, they get clean water.”

While she has brought her British project knowledge to New Zealand, Hannah says she has also learnt a great deal here and one of the biggest lessons is around how much people appreciate the environment and resources we have, more so perhaps than in Britain, even if there is still a fair way to go.

She is most impressed with the Māori philosophy around the care and guardianship of water – the new holistic approach through Te Mana o te Wai – and is encouraged that this is being articulated by leaders in the sector.

Hannah’s nomination also noted that she is seen as having been instrumental in progressing low carbon engineering in New Zealand, leading Mott MacDonald’s delivery of Watercare’s carbon baseline assessments for its Enterprise Model capital works programme, the first programme-wide carbon baseline developed in Australasia.

Hannah Edmond (centre) with Water New Zealand CEO Gillian Blythe and Clive Rundle, Beca’s group director – utilities.

She’s also been a core member of the team developing and running training sessions on the Moata Carbon Portal for New Zealand.

Hannah joined Mott MacDonald in the United Kingdom as a graduate in 2013 and early on she identified opportunities for innovation, realising that every project worked on by her team reinvented the wheel when it came to modelling underground assets in London.

She won internal funding to develop a combined 3D model of London’s underground assets to streamline future design projects and the tool is still updated and used today.

Early experience with significant UK water projects such as Counters Creek, a NZ\$600 million flood alleviation scheme, and Thames Tideway Tunnel, allowed her to develop strong skills in Common Data Environments and BIM quality assurance for efficient design development, all the way through to construction. This experience has been instrumental in developing skills in New Zealand.

Mott MacDonald’s Water teams in Auckland and Wellington have also benefited from Hannah’s strong project management capability and efficient delivery of water assets for New Zealand communities.

She is seen as taking pride in her work, and striving for better social outcomes in everything she delivers.

She explains that in her engineering role, she is seeking to apply and communicate global experiences and practices, adapting them for a New Zealand context to increase value in the projects delivered.

“My goal is to embed low carbon thinking into my projects early. I believe through doing this, the water sector has an opportunity to play a substantial role in reducing New Zealand’s carbon emissions towards the goal of zero carbon.”

She says that the water profession faces many challenges and that the Covid-19 crisis has demonstrated “how quickly the landscape we work in can change, thus reinforcing the increasing importance of adaptability and resilience”.

Hannah believes that overcoming these challenges in the future “will require contribution from the whole water profession to develop holistic new methods to meet needs, reduce lifecycle carbon, cost and improve operational efficiency which are all fundamental to achieving sustainable and social outcomes”.

Hannah also has a strong interest in Humanitarian Engineering and Disaster Relief. She’s a volunteer at Red Cross in the Refugee Resettlement programme and also a registered affiliate for RedR – the Register of Engineers for Disaster Relief. Hannah has helped fundraise for clean water solutions in Nepal as part of a WaterAid programme.



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Advanced Analytics for the Water Industry

Water as leverage for better infrastructure

The Netherlands, 26 percent of which is below sea level, has been working on its water governance systems since the 12th Century and this delta-rich country has plenty of water infrastructure solutions it is happy to share.

Henk Ovink, the Special Envoy for International Water Affairs for the Kingdom of the Netherlands told conference delegates that if the world was to mitigate the huge ramifications of climate change, societies had to avoid replicating the infrastructure of the past and embrace inclusion, collaboration and new ways of developing our cities, economies, agriculture and industries.

The way we plan our developments impacts on climate change and makes the world more vulnerable to the wildfires, droughts and floods we are currently experiencing. He says, “The extremes are becoming more extreme.”

Because water connects to each of the 17 goals in the 2015 United Nations’ Sustainable Development Goals he sees water as leverage for the change that is needed and as an enabler to drive sustainable development.

It is all about integrating interests across society and our institutions, building partnerships through relentless inclusive approaches – leaving no one behind, and preparing for the future with long term sustainable plans that inform innovative groundbreaking projects we can implement today, building a pipeline of green-blue investments.

The Netherlands, 26 percent of which is below sea level, has been working on its water governance systems since the 12th Century (1122) when 20 communities worked together on water safety and quality.

Over the centuries it has developed a delta system and learnt to live with water. Nowadays its rivers have more room to meander and to flood. The country also boasts cities where a “water square” and other smart infrastructure ensures that after heavy rain the water is temporarily stored and then naturally flows back into the soil and thus into the aquifers.

Henk worked with the Obama administration after New York’s Hurricane Sandy and developed an innovation challenge ‘Rebuild by Design’ which brought all stakeholders to the table.



This approach to stimulate innovative solutions to build resilience has been scaled up across the United States and into other parts of the world, most recently with his new programme in Asia “Water as Leverage” where he works in three cities in India, Bangladesh and Indonesia.

He pointed to Chennai as an example of a water scarcity problem. While it has heavy rain, it is only for a very short period and the rivers can’t hold the water. A concrete-heavy city means the aquifer is depleted and polluted.

Henk described a new plan to capture the water by way of a nature-based system, which does not result in pollution-increasing and carbon-creating desalination plants and also mitigates the risk of floods.

In essence, he says a partnership is all about being radically inclusive.

“Reach out to others and provoke yourself to not replicate the past but embrace the future. I invite you to hold hands together as a society and in communities to empower each other to step up ... we are ready to work with you and reach out,” he said.

Huge contribution

Water New Zealand board member

Lorraine Kendrick paid tribute to the huge contribution outgoing president, Kelvin Hill has made to the organisation and sector when she presented him with the Past President Pin at the gala dinner.

Kelvin has had a career spanning 30 years in the sector and has been a Water New Zealand member since 2005 and a board member since 2013. He served as president for the last two years.

He was elected to the WSMG (Water

Service Managers’ Group) committee in 2007 and served on the Water Industry Group for training across the water sector. He also joined the conference technical committee in 2008 and served on the group until 2018.

During his time as President, Kelvin continued to build strong relationships with key stakeholders and Water New Zealand membership groups as well as bringing the iwi perspective into the organisation.

As a water sector leader, Kelvin is passionate about supporting and encouraging young people into the sector and promoting the water industry as a great place to work.



In accepting the pin, Kelvin said he sees his legacy in the appointment of Water New Zealand’s new CEO Gillian Blythe and that he intends to stay active in continuing to support the sector into the future.



Congratulations to the Registered Water Industry Professionals. It is fantastic to see individuals attain their continuing professional development. Well done for walking the talk and leading the way for the water industry professionals. WIPA is the water industry’s CPD (continuing professional development) and registration scheme. From left to right – (holding certificates) – Nick Hewer-Hewitt (Wellington Water), Bruce Nesbitt (Kapiti Coast District Council), Nigel Hesford (Connexis), David Hight (Hamilton City Council) alongside supporters from Water New Zealand, the Water Industry Operations Group (WIOG) and with registered water industry professionals line managers.

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Six steps to water transformation



A keynote speaker at the Water New Zealand conference, Raveen Jaduram, the former CEO at Watercare shared six framework components that will help our sector through the journey of water reform. The following is a precis of his presentation.

The transformation of the industry has to start with the transformation of our organisations, says Raveen. “And transformation is the focus on managing, improving and controlling culture because we are dealing with people.

“It’s happening quite quickly. So, these six components have no order, you can mix them.”

Aspiration

“What we have to do is identify what is the ‘aspiration’ for each organisation. We know what the aspiration for the Government is, because the Minister has outlined what they are. She wants everyone in New Zealand to have access to clean, safe drinking water, she wants everyone to have clean beaches and we have similar aspirations. But what I am saying is – let’s identify what is important for ...those individual councils. What’s their vision? What’s their purpose? What defines them?

“There will be some that say, I don’t want chlorination, I don’t want fluoridation, I don’t want people to pay on the basis of user-pays. Well that’s not aspiration.

“What I am saying is drill down, keep peeling the onion until we get to the core priorities. What are the things that the councils definitely do not want to let go? What are the non-negotiables? What is dear to them?

“Because the wisdom of the councillors is that they represent the people and so that must be the view of the people and, at the end of the day, any transformation has to benefit the citizens otherwise why would we do it if it doesn’t benefit the people?”

Around anticipation

Raveen says that the Government has sent clear signals of what its intentions are and what water sector reform is coming, which can be anticipated, but there are other things also happening around water.

“We know there are climate change impacts and water is the currency of climate change. Any impact will first be seen through water: droughts, floods, heavy rain, no rain, long durations of dryness, growth, changing demographics, aging infrastructure, aging population, reducing ratepayer funding,

cost of renewal, and of course increasing standards and compliance.

“These long lists of considerations will begin to allow us to start reflecting on what the realities are. And many of the councils probably will already have done that, and therefore it is quite easy to jump to the solution.

“As an engineer we usually jump to the solution because it is obvious, but the reality is we have to take with us the people – the staff and the community, and many of them need to go through the process and that’s why I’m suggesting these six components.”

Leadership

“Just as Minister Mahuta has demonstrated leadership we all have to show leadership. This transformation requires leadership.

“Transformation requires change and change is difficult. People like stability. People like what is known. And when we start talking about change, we are removing their comfort and their safety. And their uncertainty causes anxiety.”

He said this causes anxiety for staff and will cause anxiety for the supply chain.

“A lot of small councils have local suppliers of services and they will be concerned that if we end up with a few very large water entities through the water sector reform, large entities tend to do business with large entities. So what is going to be the impact on them? What are the impacts on customers, ratepayers, stakeholders?

“And so, leadership is all about engaging with these individuals, talking with them, understanding their concerns. Because those individuals who have most to lose are the ones who are most likely to oppose the change. So, you’ve got to bring them with you.

“And many organisations implement change programmes very badly. Change needs to be driven, leadership means you need to get into the driver’s seat, you have to take control, you have to reach the hearts and minds of the people.

“This means we need to have effective and genuine engagement. Fair engagement. Fair communication. We need to be listening, openly and with honesty. We need to speak

regularly, we have to listen and then we have to refine the communication, the message, so we can tap into that collective wisdom of that community. Because that is powerful stuff. What your community, your council, your district, what their views are, is very important. And we need to capture that.”

Urgency and pace

“Research has shown that the over-confident, very knowledgeable individuals among us are prone to put too much faith in our intuition. We believe that is the answer because we are used to it. We are good at it.

“But we need to put in some cognitive effort and utilise the facts and those messages that we receive back from staff and community so that, just as I have said in the anticipation area, we can start picking up more of what is known.

“More than what we think we know. The quick, intuitive decisions we make are based on the knowledge that we have, and it is the missing bits that will get us to make the wrong decisions. We need to reflect on the fact that once this process starts it is going to move quickly.”

Collaboration, partnership, diversity and respect

“I put these together because we have a very complex challenge in front of us. Complex challenges require lots of brains.

“Innovation comes from collective wisdom. We need to work together, we need all those differences of views, we need those diversities of thought, we need those challenges.

We don’t want to be those people who look at our neighbouring city or district and discount the good things they may be doing, just because it is not what we do.

“The reality is most people do what they do because they believe in it and there’s a reason. It is only when we begin to respect what they do, that we accept there is a reason they are holding that point so dear to themselves.

In conclusion Raveen said these the six components could go in any order but identify what are the drivers for each of the councils.

“What are they aspiring to do? What is it that they can anticipate? Where is the leadership? Join hands, work together, work quickly, and bring about the change that we need.”

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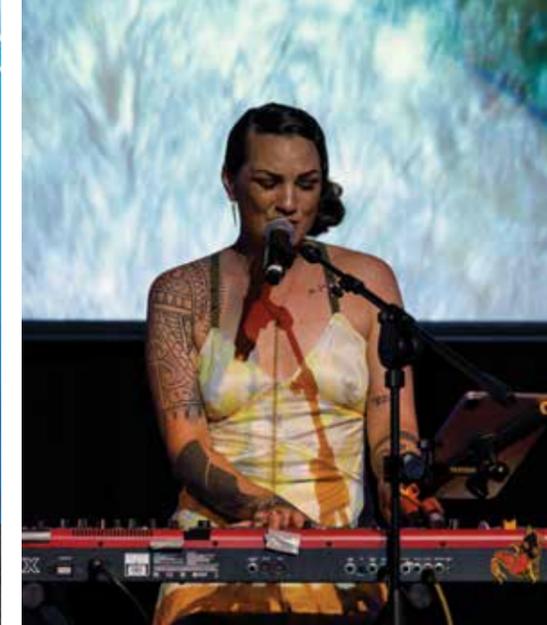


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A taste of the conference

The 1200 delegates who attended the Water New Zealand Conference and Expo enjoyed a jam-packed few days gaining valuable insights and industry updates coupled with some serious networking and plenty of time to socialise. Here's just a few of the highlights.



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We are all about Wai

Water New Zealand's recently-appointed CEO, Gillian Blythe, took the opportunity at her first Water New Zealand Conference and Expo to outline the role and direction of the organisation as the three waters sector transitions into the new regulatory environment.

As the conference was winding up after a very packed two and a half days, Water New Zealand CEO Gillian Blythe told delegates that the vision of healthy sustainable water, whether in our awa, puna, beaches or lakes, or providing safe drinking water and restoring the health and mana of wastewater and stormwater, was at the heart of our work.

To unpack how Water New Zealand could do the mahi to support this vision I see it being all about WATER.



Relationships: Starting with relationships because that underpins all of the organisation's goals, and Water New Zealand needs to be a trusted, credible partner to our members and the wider community.

Water New Zealand will represent members and the sector on a range of topics to ensure that members' voices have been heard in engagement with regulatory decision-makers and in critiquing policies. As well as working with government, we want to refresh and build collaborative relationships with other industry bodies domestically and internationally.

Events: As well as our two major events, the Water Conference and Expo and the Stormwater Conference, Water New Zealand is working with the International Water Association to bring the ASPIRE Conference to New Zealand in 2023.

But we also provide many opportunities for members to stay in touch through webinars and informal coffee catch-ups. And next year, in response to membership feedback, look out for more regional events, roadshows, as well as single day events on specific topics such as modelling, climate change and backflow.

Of course, stay up to date through our fortnightly Pipeline newsletter, by following us on LinkedIn as well as via our website and our *Water* publication.

Workforce Training: This is a particularly important focus for us. The new regulatory environment will require increased competency across the sector and there are a growing number of opportunities for those working in the sector to upskill. We want to encourage people to join the sector and be able to access training to ensure the workforce can support the delivery of safe and healthy water.



So, in this space we have been working on the development of a comprehensive competency framework and, with our partners, the Water Industry Operations Group (WIOG), on developing a CPD scheme – the Water Industry Professionals Association (WIPA). You can read more about this on our website and in this publication.

Technical Advice: Technical advice, manuals and guidelines are the backbone of our organisation. We will continue to identify projects to support our members and produce useful and credible technical documents and other forms of advice.

Our special interest groups provide members with a great opportunity to share and develop ideas. We also produce our annual National Performance Review that has been providing important annual benchmarking information, since 2008 on drinking water, wastewater and stormwater services.

Wai is Wai: Throughout our conference we have heard why Te Mana o te Wai is such a fundamental concept for Māori and for all New Zealanders who treasure this precious taonga.

Te Mana o te Wai – the integrated and holistic well-being of the water – means that we all need to work together to uphold the mana of water.

We see Wai is Wai, as the beginning of Water New Zealand's Te Ao Māori journey.

Fundamentally, we want to be able to support our members to work with local iwi/Māori to understand what it means to give effect to Te Mana o te Wai.

We are very conscious that we cannot assume we know the answers, and so we have begun to engage with iwi/Māori to seek guidance that we will then share.

In the end we are all about water. This is certainly a challenging and exciting journey to be on.

He waka eke noa – we are all in this together.



Stormwater

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Does your detention meet your intention?



Congratulations to Mark Groves (WSP), Bodo Hellberg (Tauranga City Council), Brendon Schicker (WSP) and Warren Bird (WSP) for their **2020 Stormwater Conference – Paper of the Year.**

The winning paper addresses assumptions used in industry to estimate detention requirements. With an increasing focus on greenfield pre-development flow rates, design

methods and the underlying assumptions can cumulatively have a large impact on estimates for detention requirements as well as orifice discharge rates.

Abstract

Increased run-off from urban development is often mitigated through the use of attenuation systems. These act to limit the post development discharge to the 'greenfield' pre-development flow rate (referred to as 'hydraulic neutrality').

Whilst the concept is applied relatively uniformly, there are methodological differences in how these systems are designed across New Zealand.

What do these differences actually mean in terms of effects and which method provides the best outcome in terms of good stormwater management and delivering resilient design?

This paper seeks to explore those differences in order to provide clear guidance to practitioners and regulators.

The Resource Management Act requires consenting authorities to consider natural hazards. Flooding is clearly a natural hazard, but no guidance is provided on the definition of a flood event.

Councils throughout New Zealand have developed their

own regulatory rules and technical guidance documents to address the requirement to control flood hazards under the RMA.

This individualised approach has resulted in significant variations in attenuation device design aiming to achieve 'hydraulic neutrality'.

In many cases attenuation is a preferred option to mitigate the increased peak discharge rates and subsequent downstream flooding. The common approach in New Zealand to designing attenuation devices is to use discrete design rainfall events, with significant variations among councils on required target Annual Exceedance Probability (AEP) and temporal storm patterns.

In order to identify the most suitable design approach numerous hydrological parameters are varied in the analysis to investigate the efficiency of attenuation devices to mitigate the peak flow rates and subsequent downstream flooding

using a theoretical subdivision as an example.

In the analysis presented, a two-stage orifice approach is tested, targeting events from 50 percent to two percent AEP.

A variety of temporal storm patterns that are frequently used in New Zealand to size the outlet capacity and attenuation volumes are then assessed.

Various methods of targeting the greenfield discharge rate are then tested (e.g.: tc (time of concentration) of mitigation site, tc of stream catchment, and across a range of durations).

A further variation in the design is the calculation of the volume. Some councils apply a simplified approach in which the attenuation volume is the product of the rainfall runoff and some empirical factors without flow routing.

Other councils require the routing of the design storm through the attenuation device to calculate the required

volume. Both approaches are considered in the analysis.

To test performance, the full suite of designed attenuation devices is tested in a continuous simulation with 30 years of rainfall records from the rainfall gauge station that was used to design the attenuation devices.

Pre-development and post-development flood flow frequency curves are then generated from the results and overlaid for comparison.

It is intended that these results will provide practitioners and policy makers evidence-based guidance on the most appropriate design procedure to achieve hydraulic neutrality and peak flood flow mitigation.

This helps to ensure that the impacts of urban growth or intensification are managed in a sustainable manner through resilient design to protect downstream communities.

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Solo has recently undergone a journey to challenge and transform the company. Under new ownership, Alan Sutcliffe joined as CEO in early 2019, bringing with him a fresh set of values and a determination to throw out the traditional profit first approach and instead choosing to focus on doing business for good.

The outcome has been a new vision and mission and a complementary set of values for the company, all focused on running a sustainable operation with the good of people and the planet at its core.

“We have recentred the entire business around sustainability,” says Alan. “This has led us to look at our end-to-end supply chain, and how we can change how we manufacture to reduce our carbon footprint.

“We have also committed to embracing a circular economy approach, setting up systems to ensure that ours and others HDPE (high density polyethylene) products and waste are recycled.”

However, this revamp is more than just about the physical products the company supplies to the three waters industries. Alan’s focus has equally been on supporting the people who work in the business and in his spare time has been “chipping away at a Doctorate”, studying the culture of sustainable businesses and the impact this has on the companies’ bottom lines.

“I am testing the theory that the outcome of running a sustainable operation has a positive effect on factors like culture, retention of staff and productivity, and this ultimately leads, to better profits.”

“When we began this process, we started with our ‘why’ – the real purpose that gets us out of bed every morning – and defining those values that are really important to us. The clear message from our team was that we should focus our efforts on ensuring a ‘better tomorrow’ was front and centre in everything we do, working to protect our people and our planet by applying truly sustainable manufacturing.

“The ‘truly’ is important to us at Solo.

“Anyone can turn the lights off at night and claim they are doing better. That isn’t enough for us. Standing for better means acting as true guardians and applying our values to everything we do.”

From this, Alan and his team developed two sets of values, one to conserve and protect the planet and one to care and watch over the people at Solo. Next, they aligned these values with four of the United Nations Sustainable Development Goals, developing strategies for each goal.

The two planet-focussed goals are responsible consumption and production, and climate change.

Under these values, Solo is committed to doing all it can to reduce its carbon footprint, starting with manufacturing locally and recycling waste and products at end of life.

“HDPE carries a Type 2 plastic code and is

one of the safest forms of plastic. It is solvent resistant and has high strength characteristics. It’s the perfect material for pipes and one of the easiest plastics to recycle – it will last for 100 years, then you can dig it up, chip it and use it to manufacture something else.

“We already recycle all our own waste PE, and we have now started a scheme with some of our customers to collect and recycle their waste.

“If the products are too thick to go into our machine, we send it away to be chipped first, before using it in the production of new pipes.”

Each month, Solo proudly updates its new website to show the amount of plastic it has recycled for the year – at the time of writing in October, this total was up to 54.7 tonnes.

Solo’s people-focussed goals are decent work and economic growth, and good health and well-being.

To this end, Alan is striving to ensure his staff achieve that elusive work/life balance.

“Where we can, we are encouraging staff to work from home – we were doing this well before Covid made it a thing – and we’re looking at how we can reduce the hours in the working week, without negatively impacting production levels or pay.

“This can be harder in the factory compared to the office.

“Out in the factory, we have a number of older workers, some in their 60s and 70s, and while we want to keep them for as long as they want to work, it may suit them better to work fewer days, or shorter days, as they ease into retirement.

“We pay our staff a decent living wage – no one is on the minimum wage – and we have introduced a care scheme, where staff can

donate their unused sick leave to colleagues who need extra time off work due to illness.”

Like many other industrial businesses, Solo has an older and predominately male workforce, so Alan is doing all he can to increase training, upskilling and diversity.

“We employed our first female engineer recently, and each year we take on school leavers as apprentices.”

“We also work with external training bodies to upskill our staff and currently have 30 employees enrolled in programs to help develop their digital and communication skills. Seeing them grow in confidence and engagement with more than just their day to day roles is so rewarding.”

This, in a nutshell, is what Alan sees as truly sustainable manufacturing.

“We are doing this primarily for the benefit of our people and the planet. However, it also gives us a unique selling position, as clients with similar sustainability goals will chose to use suppliers who share the same values.”

Bigger and better

Plastic has a ghastly reputation – one tied up in waste lying inert in landfills for thousands of years. However, there are plastics and there are plastics. One is deserving of its appalling reputation – the plastic of single use bags and those soft plastics that are tricky to recycle. The other is a strong, durable and, ultimately, easily recycled material, ideal for a number of products. HDPE falls squarely into the second bracket. With a high strength-to-density ratio, HDPE is ideal for pipes, both for potable and wastewater.

One of its primary advantages is that it is light – making it easier and more cost effective to transport and to lay. Also, because of being lightweight, sections can be welded together and transported in longer lengths, meaning fewer joints and no leaks underground.

Also, HDPE pipes have superior earthquake resistance and smooth internal walls limiting the ability of bacteria to cling and grow inside the pipe.

Traditionally, however, HDPE has been used for smaller pipes, but that is changing too.

“Our latest investment is a new machine which makes our new product called Infrapipe, to a maximum diameter of a staggering five metres.

“The machine is coming from Europe and should be with us in March. It’s a very exciting development for us.

“We will soon be able to manufacture very large diameter pipes here in Auckland for the New Zealand market, drastically reducing transport costs and vehicle emissions.

“While they will predominately be used for storm and wastewater (low pressure), this latest technology will now allow large diameter, lightweight pipes to run happily under medium



Infrapipe is the perfect technology for tanks



An example of Infrapipe being used for manholes.

CEO Alan Sutcliffe with their new Infrapipe product for New Zealand. Pictured here is a sample 3m diameter section with the machine capable of producing up to 5m!



pressure applications for water supply too. Previously this has required solid wall pipes. “Our existing site-based welding teams are already fully competent in installing this technology to guarantee integrity having deep experience in butt, electrofusion and extrusion welding”

A key feature of this new pipe technology is that they are not composed of heavy solid plastic, rather, they use spiral wound hollow cores around an inner core.

“This has no effect on their rating and allows us to calculate exactly the amount of plastic required for each specific application, saving on cost and waste.”

When structural loading is not an issue, Solo can increase the amount of recycled plastic used

in this new product. For example, for culvert pipes, Solo can use recycled plastic milk bottles, further lessening the plastic disposal burden on the country.

“The advantages this machine will bring are enormous and wide reaching,” says Alan.

“The pipes themselves are strong and durable and have a wide range of uses for the whole infrastructure industry, including tanks, manholes, culverts and marine outfalls.

“For New Zealand, we are proud to be able to bring manufacturing back onshore, which is good for the local economy, and in doing so, we’re reducing the carbon footprint of the plastic pipes we use, which is better for the planet.

“In my book, that’s a win:win outcome for all!”



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Chesapeake Bay: What has changed?



Chesapeake Bay in Maryland, USA.

Former associate director at the US Environmental Protection Agency's (EPA) Chesapeake Bay Program Office, Rich Batiuk was a keynote speaker at the 2019 Water New Zealand Stormwater Conference. He outlined the enormous task of working across many partners and states to restore the water quality in one of the United States' most vital estuaries – a partnership that was able to show significant progress over its 37 years in existence. However, now several states within the bay's watershed, along with environmental groups, have sued the EPA for failure to uphold its commitment to enforcing the partnership's accountability system. **Debra Harrington** asked Rich Batiuk what has gone wrong.

Earlier this year you spoke about the success of the partnership and said the outlook was optimistic. What's happened since then?

As part of the Midpoint Assessment of states' progress towards achieving their 2025 pollution load reduction goals, by 2018, each state agreed to submit detailed, locally driven plans describing how they would achieve their goals in the next seven years.

Based on EPA's review of those state plans, Pennsylvania's plan would only achieve 75 percent of its goal and New York's plan only 67 percent of its goal. Further, Pennsylvania acknowledged a US\$300 million annual funding shortfall.

EPA accepted both states' plans without taking any actions under the Partnership's accountability framework set up to address such shortfalls in plans and commitments to action and funding.

And in January 2020, the EPA Chesapeake Bay Program Office director described the agreed to 2025 cleanup deadline as

“aspirational” and stated that the Chesapeake Bay Total Maximum Daily Load or TMDL is “not an enforceable document”.

Three states – Maryland, Virginia, Delaware and the District of Columbia are now suing the EPA. They say that the EPA took “no further action” after identifying in August 2019 that New York and Pennsylvania were each on track to fall short of their 2025 pollution load reduction targets by at least 25 percent. What actions was EPA expected to take?

Back in 2008, the seven watershed state governors and the EPA Administrator agreed to put in place an accountability system for ensuring public accountability for progress or lack thereof.

EPA was given the role to oversee the accountability system and take actions as needed to ensure all the states made timely progress on meeting their written commitments towards achieving their pollution load reduction targets by the agreed to 2025 deadline.

At that time, EPA published a detailed listing of specific federal regulatory, enforcement and funding actions it could take, under



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the federal Clean Water Act, if a state or states failed to achieve their public milestones or submitted plans which failed to describe how they would ultimately achieve their pollution load reduction goals.

All these agreements and the entire accountability system was included as part of the 2010 Chesapeake Bay TMDL published by EPA on behalf of the seven watershed states.

In approving Pennsylvania's and New York's plans, which both fall short of achieving their respective 2025 goals, EPA declined to take any federal actions it committed to taking under these exact circumstances starting back in 2008.

Are all the other states in the watershed – Maryland, Virginia, West Virginia, Delaware and the District of Columbia – on track to meet their pollution load reduction goals by 2025?

The District of Columbia and West Virginia have already achieved their pollution load reductions goals. Delaware, Maryland, and Virginia submitted plans which describe how their state would achieve their goals, however, the EPA found each states' plans lacked important details on how the state could ramp up programmes to achieve such high levels of practice implementation.

Why are there such differences in the level of progress made to date between Pennsylvania and New York and the other five watershed states?

In the case of Pennsylvania, with more than 33,000 farms within the Chesapeake Bay watershed, agriculture is by far the highest sources of nitrogen, phosphorus and sediment pollutant loads.

Without a state funded agricultural cost share programme and lacking the necessary infrastructure to work directly with tens of thousands of principally small family-owned and operated farms, Pennsylvania has long recognised it can't address local water quality impairments on thousands of miles of local streams and rivers much less its contributions to Chesapeake Bay water quality challenges.

New York's portion of the Chesapeake Bay watershed is largely rural, and agriculture is also the largest source of pollutants. Economic challenges to its dairy industry have also hindered progress towards its goal.

Following the 2010 Chesapeake Bay TMDL or regulatory pollution diet, the bay's water quality has gradually improved, even stimulating a resurgence of the natural reproduction of oysters in Virginia. But for its progress to continue, regional leaders and environmentalists say, all states must meet the goals outlined in their pollution reduction plans. What is the state of water quality right now?

Even recognising the record-high river flows recorded in 2019, there is growing evidence that the progress made in restoring water quality, including increased acreages of underwater bay grasses, is leveling off due to lack of continued reductions in pollutant loads.

Long term improvements in Bay and watershed water quality conditions were largely driven by massive reductions in pollutant loads from municipal and industrial wastewater treatment



facilities as improvements in air quality resulting in significant reductions in atmospheric deposit of nitrogen.

There has not been similar progress in reducing pollutant loads from agriculture and stormwater that is needed to continue the positive water quality improvements.

It was an enormous task to bring together so many agencies to work towards a common goal. What are the current challenges you now face in working towards improving the state of the water in Chesapeake?

There are several challenges facing the state/federal/local/academic/business partnership in the coming years and decades ahead.

Increasing the level of funding acknowledged by state and local partners as being needed to fully implement their plans to achieve their 2025 goals, is the biggest immediate challenge. This is particularly true for providing for the much-expanded levels of agricultural best management practices and technical assistance needed by farmers as well as stormwater management system implementation.

Adapting to the current and longer-term effect of climate change is a critical need not only for achieving and maintaining the Chesapeake Bay's water quality restoration goals, but also its fisheries, public access and many other restoration and protection goals.

• Rich Batiuk is a former associate director for science, analysis and implementation at the United States Environmental Protection Agency's Chesapeake Bay Program Office.



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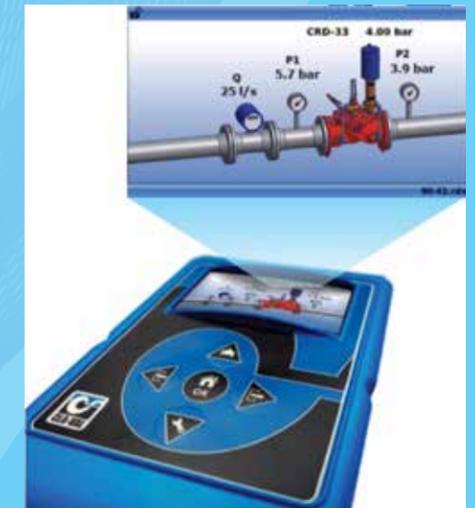
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A strategy for sustainability

The 2020 Stormwater Professional of the Year is Clare Feeney, someone who is less about engineering and pipes and more about growing social, cultural, environmental and economic well-being through successful environmental training. **By Mary Searle Bell.**

Clare describes herself as a strategic trainer. She has decades of hands-on environmental management, monitoring and training experience, working in universities and regional government and as a consultant.

“My love for the environment began growing up on the beach in Mount Maunganui. My dad slapped a mask and snorkel on me at the age of five and the whole family was in the water all the time.”

Clare says her father loved nature – a keen tramper and hunter, he shared his passion with his family, taking them on many “amazing” camping holidays.

“When I was 11, we moved to Auckland, something I found very discombobulating. Fortunately, I had an amazing geography teacher, Anne Gluckman, who was a huge influence on me.

“Thanks to her, I chose to do physical geography at university, studying coastal, fluvial, glacial, soils and biogeography, climatology and more. I loved it.

“I ended up doing a Master’s in limestone hydrology. It’s a fascinating subject – one you probably don’t want to get me, or any other limestone hydrologist, started on because we may not stop.

“Basically, limestone is structurally a very strong rock, but it’s soluble in water. It’s this characteristic that makes rivers carved through limestone disappear below the ground into wonderful underground drainage systems, such as we see at Waitomo.”

After university, Clare took a year to teach geography in what was then Western Samoa, before heading to the University of New South Wales to be a geography researcher for a year.

When she came back to New Zealand for a summer holiday, her Master’s thesis supervisor offered her a job, so she returned to the University of Auckland to become a lecturer in the Geography and Environmental Science Department.

After two years, she was considering doing a Ph.D. when she instead applied for a job at the then Auckland Regional Water Board (which later became part of the Auckland Regional Council). The subsequent 14 years were spent working in environmental management.

“At the Water Board, I was involved in projects of various sizes, most notably the Manukau Harbour Action Plan, which was



“The water sector could effect the most amazing change in the environment and the economy.”

triggered by Tainui’s Waitangi Treaty claim. It was, and I reckon still is, New Zealand’s best example of genuinely integrated catchment management.

“Over time, my job evolved from that of a water resources manager to a communicator. Because I enjoyed talking about the

work we were doing, I was frequently asked to speak to various community groups on it. They always asked such good questions – I loved it,” she says.

“While I enjoyed working in council and thought the people were fantastic, I decided to take the plunge and set up on my own, starting my business in environmental education.

“At that time... there were no external consultants in this field, it was all done in-house.”

Then, in the mid-80s, a group of rural soil conservators at the Council realised that the city’s development was causing huge environmental problems with accelerated sediment run-off into streams and onto bathing beaches.

“They did their research and worked closely with the industry to identify solutions, and asked me to help with industry training.

“The team was fantastic, and Brian Handyside and I kicked off the erosion and sediment control training in Auckland that later spread around the rest of the country.

“Ever since then I’ve been fascinated by training – it’s so hard to do it really well, and produces such amazing results when it works.”

That was the beginning. These days, along with central and local government, her clients include manufacturers, universities, professional and trades associations and civil construction firms.

“My hands-on operational experience now informs a more strategic approach to training, where I help environmental experts to develop, deliver and evaluate the results of the great training only they can do.”

Clare has written all about her methodology in a book she called, *How to Change the World: A Practical Guide to Successful Environmental Training*.

First published in 2013, the second edition is just out, and details a pathway to life-long and life-wide learning – what she calls “learning for life on earth”.

“Partnership is absolutely the core to successful training. The basic principles are to work with industry and get their help to define the issues, and then work together on delivering the solutions and measuring the outcomes

across all the well-beings – social, cultural, environmental and economic.”

Clare says her membership of the NZ Association of Training and Developers has provided her with skills that help her to bridge the gap between environmental experts and expert trainers.

“Mumtaz Parker, the training development manager at Water New Zealand, is one of these training experts, and she’s bringing great professional training skills to the water sector.”

Clare was involved in the development of the Stormwater Education, Training and Sector Development Plan for Water New Zealand, working with Stormwater Group Chair, James Reddish and the committee.

“By using the water sensitive urban cycle as an overarching concept, we could visually map out the training priorities in a one-page diagram. This makes it so much easier for people wanting training on a specific topic to see in one diagram where they can get it.”

Late last year, Clare founded the Environment and Sustainability Strategic Institute.

“My mission now is to turn every job into a green job. We can do this in a really cost-effective way by working through strong sector associations like Water New Zealand, because every sector of the economy has some kind of industry group that can develop and deliver targeted and relevant environmental training to its members.”

Clare says effective environmental training delivers outcomes that create jobs, grow profits and improve the environment, in line with the Government’s well-being goals.

“I want to live in a healthy world where everyone has the chance to lead a life of choice and meaning.

“The buzzword of the hour is ‘regenerative’; we can build back better from Covid by creating green jobs that heal people and places.”

According to Clare, now is a wildly exciting time to be involved in the environment. And, as water goes through everything, the water sector could effect the most amazing change in the environment and the economy.

“It’s a fabulous opportunity. The water industry is poised to do the most marvellous things.”

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Water and the land transport assets – twinning streams

Standardising transport sector data to improve land transport asset information will support better decision-making about our land transport assets and what sits (or flows) on, under and next to them. By Jane Strange, Manager – Asset Management Data Standards Development team at Waka Kotahi.

The land transport Asset Management Data Standard (AMDS) project is a collaboration between Waka Kotahi NZ Transport Agency and the Road Efficiency Group (REG)¹ to improve land transport asset information to support better decision-making about New Zealand’s land transport assets – roads, highways, bridges, cycleways, railways and what sits (or flows) on, under and next to them.

The standard is designed to be system neutral, flexible and extensible and to be consistent with the latest international and New Zealand data standards and practices across all types of infrastructure.

It will provide the foundation for a BIM²/Digital Engineering for Transport approach that will allow us to model vertical (building) and horizontal (road and rail) assets in a consistent way that allows them to be mapped and visualised in multiple dimensions.

How does this relate to water?

There is an obvious and significant crossover between transport and water infrastructure – both physically and in terms of planning, environmental, sustainability and resilience objectives set by local and central government. Waka Kotahi NZ Transport Agency stormwater assets channel water flows into local authority stormwater assets. We are all in it together in our quest to deliver safe and healthy resources and environments that enhance well-being and liveability for communities.

There is also explicit central government direction to work together – the Treasury Infrastructure Plan 2015³ directs infrastructure sectors to collaborate to develop common data standards to realise greater national and cross-sector planning, procurement and value chain efficiencies.

The payoff – better investment decision-making across sectors

Greater data standardisation and sharing across Waka Kotahi, the other 67 ‘road controlling authorities’ (mainly councils) and construction and maintenance partners across the land transport sector alone will realise significant benefits through improved efficiencies, network planning and resilience.

Harmonising transport data with water, power and building data

standards will unlock new potential to maximise our infrastructure investment as a nation.

What exactly is the AMDS and how is it being built?

The AMDS project is developing and implementing a common language and data model that defines and describes assets, their attributes, characteristics, properties, location, performance and the contextual information needed to perform efficient and effective end-to-end life cycle asset management.

The standard is being developed iteratively, with input from Waka Kotahi and industry SMEs via workshops and the visualisation and commenting tool at www.nzta.govt.nz/amds.

We invite you to have a look and to register to contribute your feedback.

The standard will be completed by July 1, 2021 and will be managed and updated as a living standard by Waka Kotahi to respond to technology and practice changes.

Three Waters collaboration

The water sector Three Waters initiative⁴ is on a similar journey, using the same BIM Industry Foundation Classes (IFC)⁵ to describe assets in water networks.

For stormwater assets, Three Waters is ahead of the AMDS. Waka Kotahi will use the Three Waters data design for stormwater assets, and the AMDS will be consistent with the way that the Three Waters standard is being developed.

This is a great step towards cross-sector harmonisation, and we are very keen to keep collaborating with the Three Waters team.⁶

¹ <https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/>
² Building Information Modelling (BIM) https://en.wikipedia.org/wiki/Building_information_modeling; <https://www.building.govt.nz/projects-and-consents/planning-a-successful-build/scope-and-design/bim-in-nz/>
³ <https://infracom.govt.nz/>
⁴ <https://bipnz.org.nz/3-waters-asset-data-standards/>
⁵ <https://technical.buildingsmart.org/standards/ifc/>
⁶ For a more detailed analysis of how Three Waters and the AMDS can align, see the AMDS Standard, Appendix 6: High level overview of three standards – Austroads, AMDS, BIM/IFC <https://www.nzta.govt.nz/assets/Roads-and-Rail/amds/data-model/NZTA-AMDS-001-standard-202008.pdf>
⁷ <https://www.nzta.govt.nz/assets/About-us/docs/sustainability-action-plan-april-2020.pdf>
⁸ <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/gpsonlandtransportfunding/>



Environment and sustainability – water

Part of the ethos behind the AMDS is to integrate the information needed to measure, track and realise all of Waka Kotahi’s strategic drivers as they impact on assets, including activating both the Waka Kotahi NZ Transport Agency Sustainability Action Plan⁷ and environmental drivers under the Government Policy Statement⁸ on Land Transport.

Dominic Phillips, Data Architect expert, has been working with the Safety, Health and Environment team to ensure that the standard includes zones, measures and attributes that reflect bio-diversity, environmental quality and heritage aspects. This is another place that water issues coalesce with transport – for instance in fish passages, drainage and bio-filtration ponds.

Implementation of the standard

Developing the standard is the first step, but to ensure strong uptake Waka Kotahi is designing an opt-in implementation package.

Roll out to councils, partners and industry consultants will start from 1 July 2021. We are also actively encouraging asset management system vendors to get on board so that asset managers have several compliant asset management system options, including those that cater to a wide range of asset types and/or are part of integrated enterprise solutions.

Councils can choose both when they want to start and the level of support they require:

Shane Gorinski, AMDS Programme Manager says that local government organisations are particularly busy and stretched at present due to transport planning, water compliance and Covid-19 challenges.

“We are committed to working with their timeframes and priorities. Having said that, many of the councils we have spoken to are keen to get going as soon as possible.”

The team is prototyping the implementation approach with a range of councils and internally at Waka Kotahi.

“We are also working with our internal asset and data management teams and council partners to understand the impact of compliance on processes, skills and systems and therefore to design and test implementation and training materials to assist with a smooth transition,” he says.

Waka Kotahi will also participate in a cross-sectoral prototyping exercise led by Greg Preston from Canterbury University.

Using a flooding scenario, data experts from water, power and transport will work together to simulate an integrated data approach. This is likely to take place in a smaller centre in January.

Joining forces will create greater impact for all sectors, and the data standardisation wave is on its way.



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When wastewater becomes your next water source

A far-sighted, strategic wastewater treatment plant enhancement project in California offers an example of how water recycling can benefit both urban and agricultural communities; which has potential relevance to addressing some of New Zealand's supply/demand challenges. By Matt Thompson, Wastewater Systems Manager, City of Paso Robles; Ashutosh Shirolkar, Project Manager, Black & Veatch; Kaitlin Zusy-Gellerman, Engineering Manager, Black & Veatch.

Drought in some parts of New Zealand this year is on a par with 2013, a year which presented some of the worst water supply/demand challenges in decades.

The situation in Auckland – where 77 days of continuous drought made January-April 2020 the city's driest such period on record – received the greatest attention, but Hastings saw 29 continuous days of drought in 2020, compared to 33 days in 2013; and the Waikato District saw 61 continuous days of drought this year – two less than 2013.

Water recycling has proven an effective measure in helping mitigate supply/demand imbalances across the world.

Globally, cities are increasingly using recycled water – treated wastewater – for filling lakes, vehicle or street washing, or park irrigation; and there is increasing interest in indirect potable water recycling.

When reuse is considered as the percentage of the total water used, Kuwait, Israel and Singapore lead the way.

The current drought raises the profile of water recycling's potential in New Zealand.

Former Water New Zealand board member, John Mackie recognises the technology is proven, but that its introduction needs to go hand-in-glove with garnering public acceptance.

“The technology is there to turn wastewater into drinking water, but there is also the cultural aspect. The point is how acceptable is that water going to be to people for them to actually use it.” Former North Shore Mayor George Wood, however, is proposing that Auckland begins using recycled water to irrigate parks and golf courses during the drought – extending a trial from the mid-2000s.

A farsighted, strategic wastewater treatment plant (WWTP) enhancement project in Paso Robles, California, USA, provides a strong example of how water recycling can benefit both urban and agricultural communities; which has potential relevance to addressing some of New Zealand's supply/demand challenges.

In addition to reducing pressure upon local water resources, the Paso Robles project further protects water resources by reducing the concentrations of nutrients in local water bodies.

Higher concentrations of nutrients and other chemicals typically pose a greater challenge when drought and/or abstraction reduces surface and groundwater levels.

Paso Robles' WWTP serves a population of approximately

31,000 people. The average dry weather flow was 8.1 megalitres per day (MLD) in 2019.

As with much of California the city was experiencing significant pressures upon its urban water supplies and those for the surrounding agricultural communities. Local groundwater sources, in particular, were facing pressure.

To help address this the city's 2014 master plan included provision to develop tertiary treatment facilities at Paso Robles WWTP to produce high-quality recycled water. The project was completed in 2019, with Black & Veatch as designer and engineer of record.

The tertiary treatment project – equivalent to building a new plant at the existing site – included flow equalisation, cloth filtration, ultraviolet (UV) light disinfection, a recycled water storage pond and a concrete wetwell in preparation for the recycled water distribution system pump station.

The tertiary treatment facility's capacity is 20.8 MLD. There are three filters (two duty and one standby) and two UV channels.

The facilities produce California Title 22-compliant recycled water. This means the filter effluent needs to be less than 2 Nephelometric Turbidity Units (NTU) at all times.

If the influent turbidity goes over 5 NTU for more than 15 minutes, then a coagulant addition is required per the regulations.

Within Paso Robles the recycled water can be used to irrigate city parks, schools, and local government facilities; as well as residential, commercial, and industrial landscape irrigation.

In addition the recycled water is suitable for agricultural and vineyard irrigation and groundwater recharge.

Recycled water is stored in a pond on site, supporting the city's water resilience in the face of drought conditions. When demand for the recycled water is low, the plant returns excess treated flows into the Salinas River.

Further enhancements of local water bodies was provided by the nutrient harvesting system; which stops harmful overloading of nutrients including phosphorus, nitrogen and ammonia in local and state water resources.

The need for nutrient removal was driven by a drop in raw sewage influent to the point that phosphorus concentrations



1. Matt Thompson, City of Paso Robles. 2. Ashutosh Shirolkar, Black & Veatch. 3. Kaitlin Zusy-Gellerman, Black & Veatch. 4. The additional treatment facilities are designed to sit within the site's existing footprint. 5. One of the tertiary treatment plant's three filters.



and magnesium hardness levels in the influent were significantly higher than in typical domestic wastewater.

Conditions became perfect for struvite to form in the plant's piping and equipment. This occurred due to the lower flow conditions causing the plant's secondary biological basins to inadvertently remove phosphorus.

In terms of purpose, delivery and operation the tertiary treatment and nutrient removal project was an exemplar of sustainability. Existing facilities were repurposed: an on-site pond was converted for daily storage of recycled water; existing, redundant secondary sedimentation basins were repurposed and converted to equalisation basins.

The choice of solutions was driven by the desire to save energy and minimise chemical use – including the ability to minimise the UV dose – to reduce energy use at times when recycled water demand is low and the flow is sent to the river.

The advanced nutrient harvesting system recovers ammonia,

nitrate and phosphorus from the sidestream treatment process to produce a commercial-grade fertiliser.

This resource efficiency measure also provides the city with a potentially saleable product. If this comes to fruition there is the possibility of helping offset some of the system's operating costs.

In a further smart use of natural forces and resources, Black & Veatch designed the tertiary treatment process to flow by gravity. This eliminates the need for pumping, which saves energy consumption, thus reducing the plant's carbon footprint, as well as saving equipment and energy costs. Maintenance is also simplified.

Flow equalisation, achieved by the repurposing of the plant's unused secondary sedimentation tanks, allows the disinfection processes to operate continuously and at a more constant rate; while use of UV disinfectant eliminates the potential of disinfection by-product formation.

So the City of Paso Robles, with support from Black & Veatch, has achieved an energy efficient asset which enhances, and offsets

pressure on, local water resources.

The nutrient harvesting system provides a potential revenue stream which may offset costs and, because the quality of the recycled water produced by tertiary treatment facilities exceeds California's requirements to the extent that Paso Robles will be able to meet state regulations for many years to come, the asset is future proofed. The additional treatment facilities have all been designed to sit within the site's existing footprint.

All of which adds up to an award-winning combination. In September 2020 the project was named Global Water Awards' 2020 Wastewater Project of the Year.

A facility of this type has potential applications in New Zealand, where recycled water could be used more frequently as a resource to irrigate land that may be prone to more frequent and more prolonged droughts; and improve the quality of rivers and lakes that are under pressure from an increasing nutrient load.



6. The nutrient harvesting system stops overloading of nutrients in local water resources.
7. Sustainable by design: An existing pond was converted for recycled water storage.
8. UV disinfection facility: UV eliminates disinfection by-product formation.

6



7



8

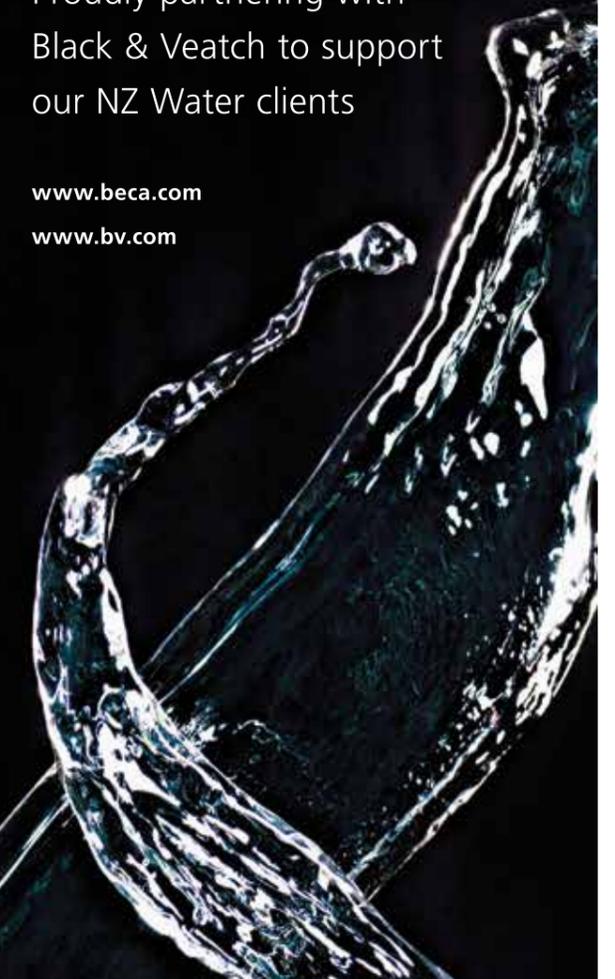


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A passion for the great outdoors, for the environment and for giving back

Young, passionate and motivated, this year's Young Stormwater Engineer of the Year, Matthew Lillis, has managed to embrace his love of the environment in his work and play and in giving back through Engineers Without Borders. **By Mary Searle Bell.**

As a child, Matthew Lillis wanted to build bridges and other structures, however, at school he excelled in the arts. In fact, it was his grades in English and history that got him into engineering school at the University of Auckland.

"The Auckland Uni civil and environmental engineering degree is really flexible. It's great, you get to pick and choose the papers you prefer (including a general education history paper).

"After my first general year of engineering, I chose to continue in the structural stream but quickly found that the massive mathematical calculations that come with structural engineering are simply not for me. So, I moved across to hydrology and environmental engineering."

Matthew soon discovered he really liked working with the environment, particularly stormwater modelling.

"This kind of engineering provided me with much more interesting problems. I much preferred analysing the way stormwater runs, over the eight different ways a beam could fail!"

He subsequently took all the stormwater papers available, along with papers on wastewater.

After finishing his degree, but before starting his first graduate job, Matthew indulged in his other passion, hiking and trail running, and spent three months on his feet, out in the wild.

Once he returned to the city, he joined engineering and environmental management consulting firm Pattle Delamore & Partners (PDP) as a stormwater graduate.

"I was given a fantastic variety of work – groundwater modelling, soakage, water supply, wastewater systems, everything really. It was only afterwards that I realised what a broad grounding in environmental engineering it had given me, and it helped me to understand everything that is tangentially related to projects in any environmental field."

At the same time, Matthew got involved with Engineers Without Borders (EWB). He worked on several, mostly rainfall, water supply projects in rural Vanuatu in his spare time.

When he chose to move on from PDP after three years, he worked for Hamilton City Council as a project manager for 32 hours a week, allowing him to dedicate eight hours a week to EWB.

"With EWB, I got to spend a month in Vanuatu working



Young Stormwater Engineer of the Year, Matthew Lillis.

on the Wawan rainfall water supply project, which was amazing. We had an engineer on the ground in Vanuatu, and when I was back in New Zealand, I managed a team looking after budgets, design changes, our relationships with funders and so on. It was really good project management experience for me."

Along with his year as operations manager for EWB, Matthew helped set up the organisation's Waikato chapter.

Back at his main job with the council, his role broadened his horizons further.

"My original position was as a project manager and the first

two projects I was given were roading and pipe renewal. It was a different challenge given my environmental and technical expertise.

"I love project management, however, this made me truly realise how much more passionate I was about the environment."

Fortunately, he has since been able to move back to environmental work. Over the past five years he has managed a number of environmental projects, such as flood models, along with providing technical support and advice, and updating the council's stormwater standards document.

Two years ago, Matthew set up on his own as a consultant and continues to project manage environmental projects on a freelance basis.

Currently, he's nearing the end of a massive catchment management planning project that plans for water and stream management for the Mangakootukutuku Catchment in Hamilton. The catchment includes Peacocke, a new community being built in the southeast of Hamilton city. When complete, it will boast several thousand new houses and involves the construction of a new bridge over the Waikato river.

Matthew has been involved in the management of the stormwater and stream systems, groundwater, ecology, slope stability, and land use in the catchment. He's also involved in planning the wastewater, and water supply systems for the whole development.

"It has had me completely absorbed for the past three years. But it's been a very cool opportunity especially so early in my career.

"I've been given a high level of responsibility, as well as the ability to influence outcomes, which is fantastic, although stressful at times.

"We've been very scientific in our approach and have stretched the capabilities of what best practice can do."

When the project winds up at the end of the year, Matthew plans to take some time out. Along with his work, he built his own

tiny house two years ago and completed a philosophy paper (for fun) and needs to recharge before diving back into work.

"Huge opportunities have opened up for me as a consequence of running this project and I need to decide in which direction to go. I'm quite keen to return to university to do some teaching, but freelance contracting may allow me to travel and work.

"I definitely need a bit of time out from huge projects – the catchment management plan for Peacocke was roughly the length of a Ph.D., not counting the many appendix reports.

"I'd like to do something smaller for a while."

Matthew's work hasn't gone unnoticed, and he was named as the Young Stormwater Engineer of the Year for 2020.

"I was pretty stoked to win," he says adding that his work to get water to remote villages in Vanuatu was a rare experience, and he felt that helped his chances.

Matthew is very much the next generation of water engineer. One deeply dedicated to the environment, but equally concerned about getting his own work/life balance right.

"I love nature and the outdoors, and the flexibility of working freelance allows me to indulge this."

A few years ago, while still at PDP, Matthew travelled to Morocco to compete in a gruelling seven-day race across the Sahara Desert.

It entailed running marathons on days one, two and three, two marathons on day four, then taking the fifth day off before running yet another marathon on day six, followed by a final seven kilometres on day seven, for a total distance of 240 kilometres.

However, perhaps Matthew's biggest achievement here, ironically, was not completing this run across the desert, but managing to get a stormwater engineering firm to sponsor him to do it.



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Unified risk-and-resilience for success in utilities

Chief Financial Officer at Watercare, and technical author of the recently published standard PAS 60518 on Enterprise Risk and Resilience Management (ERRM) for utilities, Nigel Toms, advocates a unified risk-and-resilience approach to help mitigate against crises. He spoke about this as part of the Thought Leadership stream at the Water New Zealand conference.



utilities, providing a pathway for development regardless of where they are on their risk and resilience journeys.

Published in July 2020 and sponsored by the Dubai Electricity and Water Authority (DEWA), PAS 60518 is designed to lead organisations through the process of developing risk management capability and building their adaptive capacity to enhance resilience.

The standard reflects how risk and related resilience thinking has changed. Resilience was previously viewed as the ability to recover quickly from difficulties but is now seen as

the ability to survive a crisis and thrive in a world of uncertainty (See figure 1).

Resilience is more challenging to understand than risk and should be viewed as an organisation's adaptive capacity to respond to unexpected (including very low likelihood/very high consequence) events.

Lifeline utilities should look to build and improve enterprise resilience to ensure they can continue to provide their critical services, regardless of the myriad of potential challenges they could face.

There is a clear link between risk and requirements for increased resilience. An understanding of the most significant risks provides a guide on the key areas of focus where resilience requires enhancement.

Resilience has always included business continuity and incident management but now needs to be extended to comprise the development of wider adaptive capacity to resist, respond and recover from extreme events and then to consider how to reinforce for the future (see figure 2).

This is a continuing journey that includes the need to protect critical assets and develop response and recovery capability.

Utilities across the world are currently grappling with both the immediate challenges of the Covid-19 crisis as well as emerging risks such as cyber and longer-term issues such as climate change and resource scarcity.

In this increasingly complex world, organisational success will be ensured by integrating risk management with resilience approaches.

I have long been a champion of unifying risk-and-resilience and have been applying it here at Watercare successfully for a number of years.

The perfect opportunity arose to highlight its importance to large organisations when I was invited to become the technical author of the recently published PAS 60518:2020 titled *Developing and implementing enterprise risk and resilience management (ERRM) in utilities standard*.

The role and importance of global standards in guiding and enabling organisational success in an increasingly complex world cannot be overstated. An international standard provides best practice approaches and highlights solutions that can guide industries during times of crisis or growth, and even changes in thinking and accelerate innovation.

Published by the British Standards Institution (BSI), Publicly Available Specification (PAS) standards, are a fast-track approach to providing easily accessible international standards.

Developed by a steering group of stakeholders from relevant fields, a PAS can improve and influence entire industries and marketplaces and can go on to become ISO (International Organisation of Standards) standards.

As technical author responsible for the drafting and development of the PAS 60518 standard and as a member of the International Steering Committee, I worked to ensure that the standard provided a process for integrating risk and associated resilience for

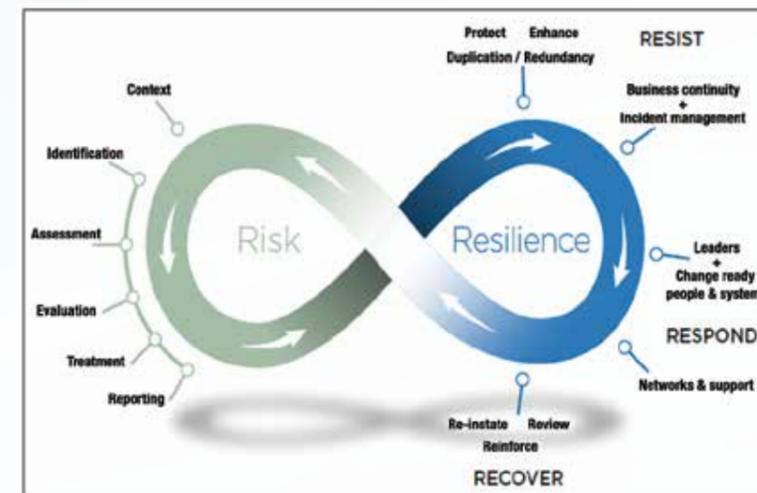


Figure 1: The PAS 60518 uses an integrated enterprise risk and resilience (ERRM) model) Watercare Services Limited, Auckland, NZ.

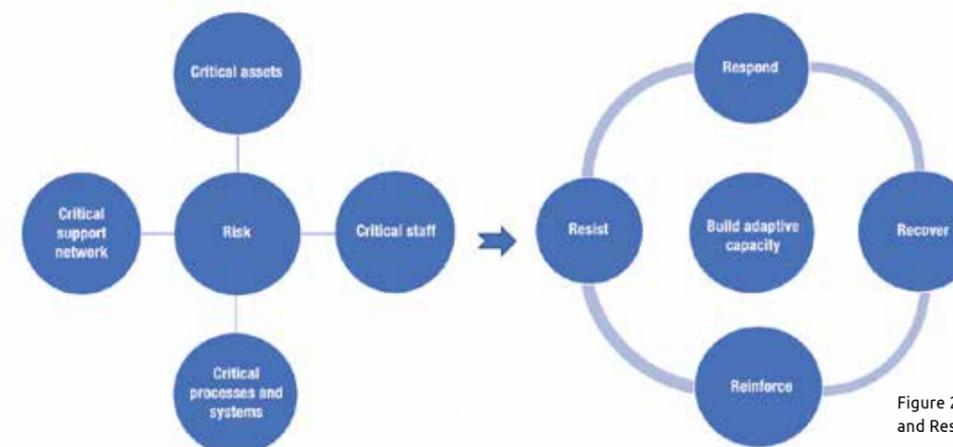


Figure 2: Linking Risk and Resilience.

Then there is a need to understand critical asset vulnerabilities, extending capabilities of staff and understanding key business processes and how these can be quickly changed to address circumstances.

There is also the need to address critical support networks and extend organisation-wide capability.

Finally, consider future improvements and replace 'build back better' with wider thinking such as 'building back differently' or, in the case of climate change, 'build back somewhere else!'

It is often difficult to contextualise these challenges, so a simple example is given below and should be considered with the areas highlighted to improve resilience in Figure 2.

Assume that during the period of the event that normal operations, levels and quality of outputs must be maintained (no forgiveness from regulators for any perceived failings) and all work would have to be completed in the same timeframe:

- The operating capacity of one critical asset must be slowed below its current minimum capacity (specified operating envelope) and another with different technology must be enhanced to operate above its current maximum capacity. Both must continue to operate with no failures as these would result in significant customer impacts.
- There is a requirement for major changes to processes and systems to support new operations, some of these changes are new and not previously attempted. Again, this must be achieved without failures.
- Additional construction projects must be initiated and delivered, through procurement to completion in timeframes that have

never previously been attempted.

- Leveraging support from extended networks, with consultants, contractors and suppliers will all be required to provide enhanced and additional support.
- With a limited number of critical staff available to support these initiatives, the organisation will need to flex to provide support from across the wider business and upskill to ensure this support can be maintained as this will need to be sustained for many months.

While these circumstances may seem unrealistic, this is the work ongoing to address the drought in Auckland and responses to Covid-19; droughts and fires have also called for a wider range of response actions.

Success in these circumstances can be greatly improved by advanced preparation as well as training to create and enhance adaptive capacity. The key focus areas for ERRM include:

- Maximising organisational capability.
- Informing the understanding of risk management, including areas where more risk could be accepted.
- Identifying areas where business continuity and incident management plans are required.
- Aiding decisions on capital investment to increase organisational resistance.
- Improving resilience, including response, recovery and supporting resource and network capabilities.

An integrated approach to understanding risk and using this to guide resilience development will make an organisation increasingly capable and quick-to-recover when faced with

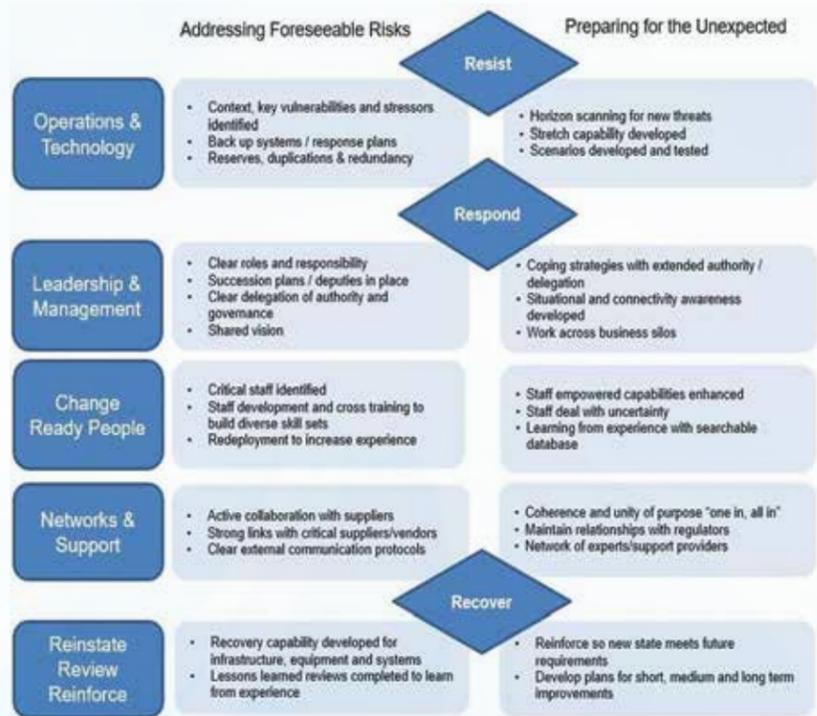


Figure 3: Outline of a resilience framework.

challenges. A continuing programme of resilience work should ideally be undertaken to ensure that the organisation can adapt to changing environments.

Utilities and other large organisations should develop and implement ERRM policies and frameworks that are driven by the context of the organisation (strategic objectives, vision and mission) and directly address its risk profile and operating model.

It should aid directing the risk and resilience function, prioritise enterprise risks and provide effective oversight of the processes that drive risk management, specific mitigation and wider resilience development actions.

Ideally, the ERRM policy and framework should be accessible to staff at all levels and reviewed regularly to account for any organisational changes. Training staff to ensure understanding, competence and capability, will enable organisation-wide commitment to ERRM, and successful performance when these challenges occur.

Effective risk and resilience practices to increase adaptive capacity take time to build and need to be driven by the leadership team within organisations. Understanding and prioritising risks is a key requirement to make the case for the investment in resilience.

Making the case for enhanced resilience is difficult to achieve in purely financial terms (that is considering the return on such

an investment in monetary terms) and a changed approach to justifying this investment is required to prevent resilience actions from continually being reprioritised into future years.

A better understanding of the vulnerabilities that increasing resilience seeks to address, and the financial costs of impacts, needs to be considered in making a wider and more balanced investment decision.

This should lead to considering investment in terms of how this is improving resilience maturity over time and should be supported by resilience metrics to highlight progress.

The adage that what gets measured gets done, is important in moving thinking on the importance of increasing resilience.

The leadership team should also build resilience thinking into the company's culture, by demonstrating their own personal commitment to it. This includes being active in the development and exercise of plans and having processes to maintain unity-of-command when senior executives are absent.

Risk and resilience is a continuing journey and PAS 60518:2020 includes information, templates and practical examples that together provide a path to ordered development, taking utilities on a structured journey to develop and improve their organisational resilience (see figure 3).

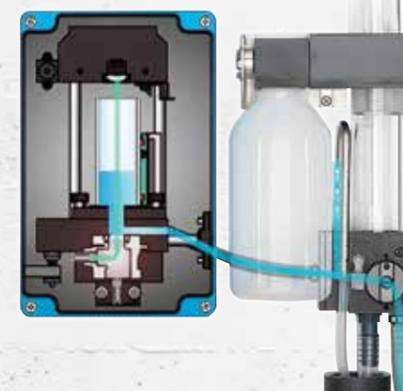
For more information on PAS 60518 please visit: shop.bsigroup.com/ProductDetail?pid=00000000030390660.

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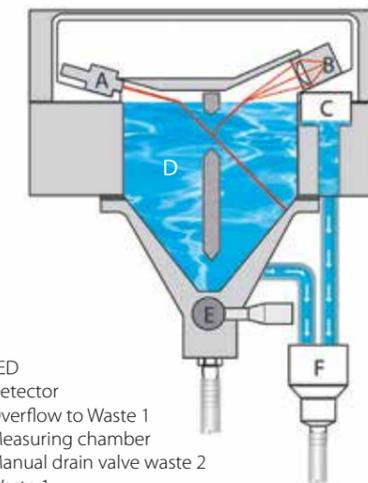
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Alliance project model delivers clean water to Pahiatua

After years of enduring a permanent boil water notice, the people of Pahiatua now have access to safe drinking water that exceeds the New Zealand Drinking Water Standards, following a successful alliance between the Tararua District Council and FILTEC. Article supplied by Stephen Lee, Project Manager at FILTEC.

Pahiatua takes its drinking water from two sources, the Mangatainoka River and the Pahiatua bore. However, there was a decline in the bore's volume and the river water supply frequently suffered from high turbidity and taste and odour issues from organics.

Over the years, there had been unsuccessful searches and investigations for alternative water sources to supplement supply and several sites were assessed but deemed not suitable due to poor water quality or insufficient volume.

So, continued use of the Mangatainoka River and Pahiatua bore became the most feasible option to meet the town's demand for water.

Pahiatua required a water treatment plant (WTP) that would reliably and consistently produce safe drinking water from the river, bore or a blend of both for a future population of up to 10,000 people.

Designing a resilient WTP that allows for resilience and flexibility in operation is complex, especially when it involves integrating new plant with legacy assets and meeting expectations of delivering a seamlessly operating water treatment system.

FILTEC's client, the Tararua District Council (TDC)

Prime Minister Jacinda Ardern opened the Pahiatua Water Treatment Plant in September (image courtesy of Stuff Ltd).



The water is chlorinated prior to being stored in the reservoir above the township. This picture shows the Pahiatua Water Treatment plant chlorine room.

had a focus on ensuring a quality outcome that would meet the complex treatment requirements of the available water sources.

To meet the objectives, TDC decided that an alliance approach was the best way to achieve a quality outcome and navigate through the complex treatment and resource constraints. Hence, FILTEC and TDC formed an alliance after the preliminary design phase was complete.

The alliance approach differs from the traditional design and build contracts in that a joint team is formed, made up of members from both parties to work through all issues and decisions as though a single entity.

It encourages the client and contractor to develop solutions collaboratively with a 'best for project mindset' by enabling a cooperative approach to design and decision-making with the client, contractor, sub-contractors and consultants working openly to achieve the best outcome.

The alliance model sets up a framework that does not include typical design and construct contractual controls such as fixed price, liquidated damages and bonds.

The incentive for the alliance is built around a risk/reward model, where both parties are rewarded for good performance or penalised for sub-standard performance against an agreed target budget and KPIs.



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years in the water treatment industry.

During the Pahiatua WTP project the alliance between the council and FILTEC has navigated its way through various design challenges such as:

- Two source water streams with contrasting water properties.
- Potentially turbid water up to 100NTU.
- Taste and odour issues.
- Low level noise restrictions due to the plant being located in a residential area.
- HSNO location certification requirements.
- Trade waste production limitations.
- Changing HSNO requirements.
- History of previous water treatment solutions failing, adding to reputational risk.
- Important Level 3 – earthquake design requirements.
- Covid-19 restrictions.

Matt Ewen, the managing director of FILTEC, says the alliance team showed great resolve in progressing the Water Treatment Plant build during a year hampered by Covid-19 restrictions and that it “brought to light the advantages of working collaboratively under an alliance framework to deliver this important piece of infrastructure”.

As a result, the Pahiatua WTP has many innovative features:

- It is designed to be operated remotely and only needs staff to visit for maintenance.



The advanced oxidation UV system treats seasonal taste and odour issues when required.

- It utilises ultrafiltration and advanced oxidation technology to treat taste and odour issues.
- Incorporates an innovative automated motorised rail system for switching out chlorine drums.

The company also noted that this alliance delivery model proved its benefit for this challenging project and is well worth considering for project delivery, especially for complex or large-scale projects, as all parties work collaboratively sharing the risks and rewards to deliver the desired outcome.

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Water New Zealand Photo Competition

Do you have a great photo of a recent water project? It's that time of year again to start getting your best water shots together and enter Water New Zealand's annual photo competition.

One of our favourite tasks at Water New Zealand is to go through the fantastic range of photos we see each year in the competition.

As we are all about the three waters, we particularly love seeing photos of projects and people working in the sector. But great holiday snaps of gorgeous water spots are also very welcome. We try to use as many of the photo competition entries as we can in our publications throughout the year.

The competition will be open for most of the summer months but get in early and send your best photos to us at enquiries@waternz.org.nz. The winner is decided by online voting.

The winning entry will receive a free registration to the Water New Zealand Conference & Expo 2021 including the Gala Dinner, valued at \$1700.

Visit www.waternz.org.nz/PhotoCompetition
for the conditions of entry and more information.

Images top to bottom: Mangere BNR reactor mixers final inspections, Matt Girvan (Paul Doherty); Glen Eden Storage Caisson, Watercare and McConnell Dowell, Timaru Waste Stabilisation Ponds at Dawn, Russell Grant - Timaru DC; The Hope River, Richard Sutton - ESR

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Flexible decision-making for water storage under climate change

Anita Wreford of Lincoln University outlines the first application of Real Options Analysis for hydrological data in New Zealand which, she writes, paves the way for future applications in other locations, and for other types of decisions, for long-lived investments that are sensitive to uncertain climate futures.

Water availability, supply and distribution are already presenting challenges across water users in New Zealand.

Climate change, as well as population and economic changes, will exacerbate these pressures. What do we know about what a changing climate will mean for water availability?

On one hand, we have a range of projections of future climates that allow us to model future water availability across different regions in New Zealand. Broadly, we know that we can expect changes to the distribution of rainfall across New Zealand over the course of the century and beyond, relative to the 1986-2005 time period.

The Ministry for the Environment provides projections of climate change, which are freely available (¹Ministry for the Environment 2018), and contain information by region under different scenarios of future climate change.

But, on the other hand, these projections contain high levels of uncertainty, stemming both from uncertainty regarding our future emissions of greenhouse gases and uncertainty in the understanding and representation of climate processes in models.

While some of these uncertainties may reduce over time, others are irreducible.

How then, can we plan for the future to ensure we are prepared for the range of changes that may occur?

While the uncertainties can present challenges to our planning, there are several ways we can change our thinking and the tools we use.

First, we can consider a range of plausible climate futures, rather than just one. And we can apply different types of methods to help us make decisions, beyond the familiar ones such as Cost Benefit Analysis (CBA).

Here I discuss an approach that focuses on flexibility to handle future uncertainty, but other useful approaches consider diversification and 'robustness' – changes that work well across a range of futures, rather than optimising for one future that may not eventuate.

Questions about future water availability inevitably turn to water storage as an adaptation to manage variability, enabling greater security of supply. But it is an expensive option – water storage facilities are a significant investment and it can be difficult to justify the immediate costs when the benefits may not be seen for several years.

Furthermore, because of the uncertainty identified previously there is considerable scope for over- or under-investment; either providing too much storage that turns out to be unnecessary if water availability increases in future, or too small and limiting future options.

In a research project funded by the Deep South National Science Challenge, we attempt to tackle this problem of uncertainty by

Climate change adaptation guidelines

Adaptation to the extreme climate and weather events experienced in Australia and New Zealand has already cost the urban water industry millions of dollars.

To address the changing climate effectively, it is essential that the water industry build climate resilience into their long-term planning and decision-making processes, says Water New Zealand Technical Manager, Noel Roberts.

In a first for the urban water industry, 17 utilities, including Watercare, collaborated to produce guidelines which provide a framework for increasing the resilience of water utilities and the communities they serve. Information was drawn from the experience of the water industry to identify best practice and provide clear principles to guide the industry toward an organised, pragmatic and defensible approach to adaptation. You can download the guidelines from the Water Services Association of Australia (WSAA) website. www.wsaa.asn.au/publication/climate-change-adaptation-guidelines.

applying a method called Real Options Analysis (ROA), to water storage investment decisions in New Zealand. ROA is really an extension of CBA, but the difference is that it allows – and estimates an economic value for – flexible strategies that can be adjusted over time depending on how the future climate plays out.

By placing an explicit value on flexibility and learning over time, ROA makes investments as efficient as possible and adaptable to a range of climate futures, avoiding costly over – or under-investment.

It is particularly suited for large irreversible investments.

In this research project, we use a range of climate scenarios (four different scenarios of future climate, using six different models, to provide 24 potential futures) to simulate expected changes in water availability over the course of the century.

Our application focuses on water storage for agricultural production. Hydrologists from NIWA built a simple reservoir model to estimate the size of reservoir/s required to meet crop and pasture needs to maintain production in a given location under these 24 different water availability scenarios for the future.

The size of reservoir is chosen for the current time period based on the net present value of the reservoir between now and 2050, for the range of scenarios, including an allowance in the design for an extension in 2050 if necessary.

The net present value (NPV) calculations are based on the costs and benefits of the production with, and without, water storage.

In a second stage of analysis, the NPV out to 2090 is estimated

based on the size of reservoir chosen in 2050 and the water availability between then and 2090.

As a result, the most cost-effective investment based on current information is made now; and at the future time point this will be reviewed; and the storage capacity will either be expanded, or not, depending on the information and observations available at that time.

This approach identifies the most cost-effective solution as it analyses many potential futures and specifies which strategy to pursue in any of those contingent situations.

In this particular project we apply ROA to a site in Canterbury as an example, using a hypothetical reservoir but actual local climate and hydrological data. For this example, the most efficient decision was to choose the smallest storage size now, and again in 2050.

While this size would not cover all the water requirements in every climate scenario, the production benefits with more available water were not large enough to justify the construction costs.

The decision was sensitive to changes in input variables, particularly milk price, construction cost and discount rate.

This is the first application of ROA for hydrological data in New Zealand, and paves the way for future applications in other locations, and for other types of decisions for long-lived investments that are sensitive to uncertain climate futures.

¹Ministry for the Environment 2018. *Climate Change Projections for New Zealand: Atmosphere Projections Based on Simulations from the IPCC Fifth Assessment, 2nd Edition*. Wellington: Ministry for the Environment.

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Te Mana o te Wai in water services and a warning regarding wastewater discharges

An exploration of the application of Te Mana o te Wai to the water services sector and outlining a case which is a stark reminder of the unacceptability of allowing unauthorised wastewater discharges into freshwater bodies.



By Helen Atkins, Director and Tom Gray, Solicitor, Atkins Holm Majurey.

Te Mana o te Wai

A requirement has been proposed under the Water Services Bill for any person exercising functions, powers and duties under the Bill to give effect to Te Mana o te Wai. This is the first legislative application of the term defined in the National Policy Statement for Freshwater Management 2020 (NPSFM 2020).

Under the NPSFM 2020, Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. Protecting the mauri of the wai, Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

Te Mana o te Wai applies to all freshwater management, encompassing six principles from the NPSFM 2020 relating to the roles of tangata whenua and other New Zealanders in the management of freshwater:

- Mana whakahaere:** The power, authority, and obligations of tangata whenua to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater.
- Kaitiakitanga:** The obligation of tangata whenua to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations.
- Manaakitanga:** The process by which tangata whenua show respect, generosity, and care for freshwater and for others.
- Governance:** The responsibility of those with authority for making decisions about freshwater to do so in a way that prioritises the health and well-being of freshwater now and into the future.
- Stewardship:** The obligation of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generations.
- Care and respect:** The responsibility of all New Zealanders to care for freshwater in providing for the health of the nation.

The effects of Te Mana o te Wai are very broad under the Water Services Bill with the strong requirement that the term be “given effect to”. The application of Te Mana o te Wai focuses on the source water but also extends to the distribution and use of the water in the environment and community.

This involves stronger protection of freshwater bodies, the sustainable use of that water, and maintenance and improvement of water ways for future generations.

The broad terminology of both the six principles above and the requirement in the Water Services Bill favours an approach that integrates local iwi and mana whenua in each step of water services operations under the Bill from management level decision-making processes to general everyday maintenance and enhancement of the water bodies.

Confirming that the overall health and well-being of water bodies is paramount in the NPSFM 2020 also removes the likelihood of being able to mitigate or offset adverse effects to water in the Bill.

It is likely that allocation will also require changes to provide for the relationship of Māori with freshwater. Obligations to sustain present and future generations may require a more equitable approach than the current first-in-first-served approach which contradicts tikanga.

Minister David Parker¹ has stated his intention that the NPSFM 2020 be extended to estuaries, saying it is more appropriate for this NPS to cover estuaries than the Coastal Policy Statement because freshwater bodies are what directly affect estuaries.

The Water Services Bill is currently in its First Reading stage with public submission expected to be requested late this year or early next.

Manawatu-Wanganui Regional Council v Rangitikei District Council [2020] NZDC 12891

The District Court has released a scathing decision from Judge Dwyer regarding the sentencing of Rangitikei District Council for discharges of a contaminant (human effluent) into water over several months in 2019.

The prosecution by Manawatu-Wanganui Regional Council came after multiple complaints were made by the public about a sewage discharge.

Although the District Council was prompt to accept responsibility with an early guilty plea, the Court found that such offending was so repugnant as to warrant severe penalties.

The source of the discharge was an overflow pipe from a pump station on the bank of the Hautapu River in the District Council sewerage network in Taihape.

¹ Note the Prime Minister was still to confirm ministerial portfolios at the time of writing this article.

The area has recognised values and a high degree of vulnerability due to its use for swimming – which the community has encouraged.

Whilst actual physical effects of the discharges are unknown due to an absence of data, it was agreed that there were eight to 10 discharges of raw sewage containing a range of pathogens and viruses which presented real risk of severe illness to humans.

The Court held that whilst prohibited under the Regional Plan, the discharge was particularly offensive as it was repugnant to New Zealanders, fairly obvious to passers-by, would have contributed to the river’s contaminant load, and had the potential to cause serious harm.

Consideration of the specific cultural offence to Māori was also weighed as a matter of national importance under the RMA.

Offering no special treatment for councils, the Judge stated “the bottom line is that in the absence of holding necessary resource consents, territorial authorities have no more right to discharge contaminants into our waterways than anyone else and may be prosecuted when that occurs.”

The offending pipe was an overflow pipe from a manhole described by the District Council as a “rogue connection” that they were not aware of which was why the discharge continued for such a long period of time.

Judge Dwyer gave little slack for this, accepting; “the presence of this pipe was unknown but [having] to observe that territorial authorities ought reasonably be required to know how their systems work... Arguably, if there had been regular checking of the sewerage system from time-to-time someone might have asked the question,

“Where does the overflow pipe in the manhole go?”

Although the District Council must accept responsibility and ought to have been aware of the pipe, the Court rejected the submission by the Regional Council that the District Council had acted recklessly or that the continued discharge was deliberate.

The District Council’s culpability was described as moderate, further mitigated by the lack of evidence of direct harm to persons who might have come into contact with river waters or any evidence of ongoing adverse effects on the river.

Addressing points raised by the Regional Council, the Court went on to agree that local authorities generally should display a commitment to compliance and protection of the environment, and that they must follow best practice at all times. However, it was not accepted that penalties should necessarily be increased automatically when a territorial authority is involved.

Finally, the Court found that penalties needed to be set at a level which drives home to territorial authorities the need to ensure that their sewerage systems are operated in accordance with best practice, including regular checks of their systems.

Failing to receive a discount for past good character due to previous enforcement action, but receiving a discount for an early guilty plea, the District Council was fined \$60,000.

Judge Dwyer also noted that had there been any more evidence available as to the magnitude of the discharges or actual adverse effects on either the river environment or persons using it, that figure would have been considerably increased.



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Refugees help design handwashing stations

Creating effective handwashing facilities in the Rohingya camps means embracing community input. **By Elizabeth Stevens** of Oxfam.

The bad news came on May 15 2020: in a camp for Rohingya refugees in Bangladesh, the first case of Covid-19 was detected. The arrival of the disease is unwelcome anywhere, but no one wants to see what happens when the virus gets a toehold in communities like these.

“Forty thousand people per square kilometre,” says Oxfam’s Enamul Hoque. “That’s twice the population density of Dhaka. You can’t imagine how crowded the camps are.”

Hoque is Oxfam’s coordinator for water, sanitation, and hygiene (WASH) in the Rohingya camps.

When a wave of refugees arrived from Myanmar in 2017, fleeing violence, he was there to help establish a system that now includes water tanks and taps, handwashing stations, latrines, and a faecal sludge processing plant.

But existing handwashing facilities, though effective against diarrhoeal disease, could be vectors for the hyper-contagious new virus, so Hoque and his team set out to create a safer design.

Hand-cranked water spigots were out, foot pedals were in, and simplicity was key.

So was the local feedback.

“We installed a prototype of the handwashing station and then interviewed about 43 people after they used it,” says Hoque. “Based on what they told us, we altered the design.”

Oxfam has an approach to designing water and sanitation facilities we call “social architecture.”

“It means the community is part of the design process,” says Hoque. “We are especially interested in hearing input from women and girls, because they have so many responsibilities related to water and keeping their families clean.”

In this case, he says, “...girls in particular wanted to engage with us about the design. They weighed in on everything from the number of legs it should stand on to the installation of hooks for hanging stuff.

“They told us a mirror would be a big improvement, so we’re adding one. It’s important that a handwashing station be something you like to use, so all of this was significant. In important ways,

Oxfam installed Contactless Handwashing Devices which are activated with a foot pedal to avoid transmission of the virus from touching the soap. Rohingya refugee camp, Cox’s Bazar, Bangladesh. *Photo: Fabeha Monir/Oxfam.*

the station is their design.”

Hoque says that what was also significant was that this process helped girls take charge of a piece of their lives.

“The Rohingya refugees have experienced so much trauma and loss, and girls stuck in the camps have almost no space to exercise their minds and their power. We invited them to think like architects and design something that would benefit them and their families.”

“Innovation takes time and resources that can be very hard to come by in emergencies like this,” he says, “but the results can be far-reaching.”

For the care-givers

The new handwashing station is ready for manufacture. Every aspect of it, from the size and shape of the basin to the height of the water tank has been vetted by the women and girls who will use it most.

It features foot pedals so users don’t need to touch anything with their hands. The height makes it easy to operate for children and people in wheelchairs. The soap is liquid and enclosed, which discourages both germ-sharing and pilfering.

The structure offers so little surface area that when cyclone winds come roaring through the camps, chances are it won’t topple. And each will be fitted with a mirror.

“In the camps, there are very important do’s and don’ts,” says Oxfam innovation officer Iffat Fatema.

“Do wash hands. Don’t waste water. Do avoid crowds. Don’t risk contamination by touch. The handwashing station enables people to follow all the rules. The foot pedals make it possible to wash hands without contaminating a tap or soap container, and to avoid waste, they produce a slow stream of water. And there will be one for every few houses, so it should be possible to visit them while keeping social distance.”

She says that having a handwashing station near the home makes it much more likely that people will practice safe hygiene.

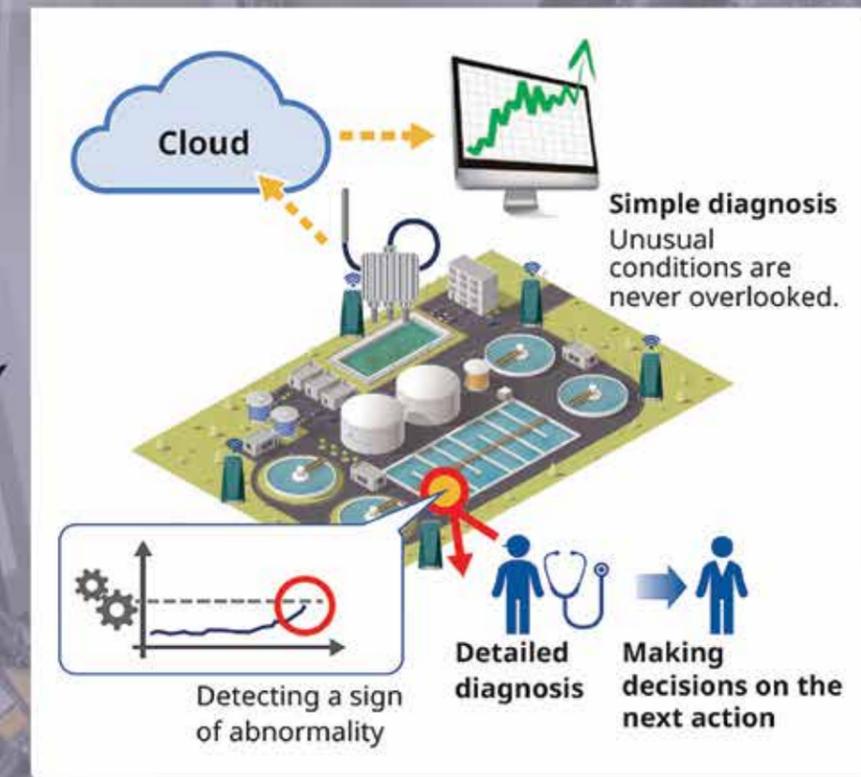


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AFTER



BEFORE





Digitisation – time to walk the walk

There are a multitude of factors that can impact the performance and life of plant process equipment. By Tom Hardy, Automation Solutions Innovator, Yokogawa.

The Internet of Things (IoT), Big Data, Industry 4.0 and many other terms have been discussed for nearly a decade but with little in the way of actual outcomes.

Extravagant marketing has dazzled us with possibilities yet often failed to provide anything tangible. Often for end-users the result has been costly disillusionment on the basis of promises that have failed to materialise.

The rise of IoT and its potential as a new market has attracted many new vendors and consultants with questionable understanding of industrial processes.

Rotating machinery is the most widely used form of mechanical equipment in process industries yet is also the most problematic. Operational faults can not only lead to machine and process downtime, but also excess energy consumption, loss of production, safety incidents and has the potential for catastrophic damage.

Research has shown that most of the equipment damage in this space is caused during installation, start-up, or shutdown. Other

factors can slowly erode performance such as bearing wear, part degradation, lubrication issues, and imbalance developments.

Degradation will reveal itself in many ways, the challenge being to identify signs and take corrective action early. In doing so you can improve reliability, performance, increase overall life expectancy and maximise return on investment.

Degradation can be difficult to identify because it occurs very slowly and over long periods. Indicators are very subtle and challenging to pick up using normal diagnostic methods. Yet the benefits in doing so are huge, allowing early stage correction in the most efficient and least disruptive manner.

Each application has its nuances, but in general there are a multitude of factors that can impact the performance and life of plant process equipment.

Understanding the process, its environment and how they impact performance is the first step in planning and optimising maintenance strategies.

Research suggests that approximately 40 percent of expenditure for rotating machinery is wasted in ineffective maintenance. Conventional preventative techniques performed during operator rounds are time intensive and not always possible to perform effectively; degradation often detected too late to be useful.

Utilising sensors designed for condition monitoring can provide precise readings at more frequent intervals and allow for more accurate decision-making without the maintenance overhead. Sensing early stage degradation can give operations personnel the data to make more informed decisions on an ongoing basis.

In pursuing such a strategy you will be opening up a huge well of data and it's easy to become disillusioned and intimidated. Yet careful, and early stage understanding of how to deal with such a rich dataset, along with expected outcomes, can smooth the process.

Machine learning technology can perform advanced analytics and pattern recognition on sensor data, detecting anomalies faster than any human ever could, all the while generating alerts and automated performance reports.

In doing so the creation of large databases of asset health progressively improves the effectiveness of the software, building a broader understanding of how process components impact overall performance.

Creation of equipment profiles, comparing like-for-like performance of assets, guiding anomaly detection rapidly and with greater accuracy all contributes to the protection of process integrity. This is where the real value lies and where many proposed solutions have fallen down in recent years.

Devices designed for this purpose need to be easy to install compared to fixed precision sensors, keeping overhead to a minimum.

Operations teams also understand how the same conditions that contribute to machine degradation also affect the control and monitoring equipment around them.

The last thing they need is to add hardware which is not fit for purpose, so any sensors used need to have the ability to withstand the same harsh exposure.

Commercial products are not necessarily the best fit for harsh industrial applications and while cheap flick and stick sensors can have cost appeal, there can be significant performance and longevity issues.

Beyond the sensors, selecting complementary technology for existing plant architecture is important. It is important to have an IoT communications protocol that won't interfere with existing industrial wireless networks.

With sensor and connectivity issues addressed you need to be mindful of where your data will be held and analysed. You need the initial flexibility and reassurance that you can start small and scale up as, and when, desired.

Outcomes matter so consider all aspects of what you want to achieve with condition monitoring and keep compromise to a minimum. If it's not fit for purpose, there is a lack of understanding of your needs, or it's all or nothing then it just might not be for you. enquiries@nz.yokogawa.com

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Filtec	63
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ifm Electronics.....	9
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Kliptank.....	34
Lutra.....	65
NZ Controls.....	31
Promax	49
Pump Systems.....	33
Reliant Solutions.....	40
Rendertech	37
Solo Plastics.....	42
Swan.....	61
Thomas Consultants.....	12
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Waterco (NZ) Ltd.....	13
Waterpro.....	23
Xylem	5
Yokogawa	71

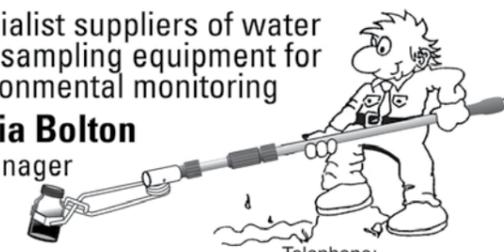
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