



Three Waters Report and Outlook

FOR THE QUARTER ENDED 30 SEPTEMBER 2015



Our water, our future.



Wadestown Road is a busy suburban route that feeds the western hills of Wellington. Closing a 300 metre section for several weeks was never going to be popular with residents or commuters, but the congested nature of underground services meant it was the safest option.

We worked with the contractor, Construction Contracts Ltd, to develop a communications plan that would ensure road users were aware of the work under way, and the detours in place.

It was great to see positive feedback about this from affected customers.



Keeping a weather eye on El Nino, supply conditions

What does El Nino hold in store for Wellington? The weather pattern that means dry conditions for the east of the country is almost a certainty, and it is shaping up to be as strong as in 1997-98 – when large parts of the North Island suffered droughts. The impact on the Wellington region is less predictable, but we're preparing for increased watering restrictions if necessary.

National economic indices are showing a building sector in good heart, with residential construction up 5% year-on-year to June 30, and non-residential up 3.6%. While the capital goods price index for civil construction rose 2%, the pipelines index increased 4.4%. This and a suite of other factors leads us to think there will be a further increase to project costs. In our last Outlook we noted the falling dollar and other market forces would likely translate to higher costs. Material suppliers have recently quoted this rise to be in the order of 15%.

Road works affect contractor capacity

Locally, Transmission Gully is ramping up and activity will increase significantly during the coming earthworks season. We've noticed a few contractors who've tendered for work in the past few years have been absent from recent submissions due to work on NZ Transport Agency projects. This could have some impact on contractor capacity – putting our programme under pressure. We've reported previously about the work we're doing with our consultants and contractors to align our approach to health and safety under new legislation. Feedback from that suggests increased health and safety compliance and reporting requirements are increasing costs for contractors.

Natural resources plan

This quarter we completed our submission on the Wellington Natural Resources Plan. There are a few areas of interest for us, relating to water quality in urban areas, and the need for us to carry out work on stormwater network elements that can include streams.

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New connection applications

Quarter 1 (July – September) generally sees a bump in applications processed, though this year's wasn't as high as in 2014.

Previous quarter



This quarter



Year to date = 238

This quarter, last year = 118

Year to date, last year = 244

Our water is safe to drink

OUTCOME

1

Outcome	Strategic goal	Aspirational direction	Quarterly Status				Current Long Term Trend	Commentary
Safe Drinking Water	We provide safe and healthy drinking water.	Stay the same	Q1	Q2	Q3	Q4	We fully comply with the NZ Drinking Water Standards. We have no records to suggest that public health or public satisfaction has been compromised.	

Supply concerns ease while El Nino nears

After a dramatic autumn, the winter quarter was relatively uneventful with respect to the three waters. September was sunnier than usual, though cooler, while August rainfall was only 82% of normal. El Nino's mainly westerly flows mean that when rain does fall, it's more likely to be in the Hutt and Wainuiomata catchments. That's good for our supply options. We're in discussion with MetService on catchment specific forecasts, which will help with our reporting and management of summer demand management.

Updates on supply factors include:

- **Geosmin** – this harmless though unpleasant tasting organic compound has been affecting one of our two main storage lakes. Treatment with activated carbon is effective at current levels and we're working with the top geosmin experts in the country to look at along term resolution.

12,147.3 million litres of safe drinking water delivered to 138,500 connections.

In the same quarter last year (July – September 2014) we delivered 11,837.5 million litres.

This water met national drinking water standards, and our networks complied with Ministry of Health requirements. There were no reported incidents of public health relating to water. We did have a bit of a scare with a positive e-coli result from one reservoir, but a re-test was clear and there were no reports of illness, suggesting the first one may have been contaminated. Regional Public Health was notified immediately, as per our protocols.

- **Water age** – preliminary results from 15 months of testing the Hutt aquifer show all water supply wells in Lower Hutt are compliant for the age dating criteria of the NZ drinking water standards.
- **Iron bacteria** – levels are reducing in the two wells that were showing signs of this, and all 8 wells are expected to be available for the summer.
- **Algae** – the storage lake not affected by geosmin is experiencing some issues with algae clogging the filters, cutting filter run times by 50% or more before they need to be cleaned. We've encountered this before, and it's usually gone by summer, but we'll be getting some expert advice on this as well.

We reported in our previous Outlook that we were working on metrics and targets that provide a clear link between strategy, levels of service and three waters outcomes.

The representation above shows our goal for our safe outcome, with a quarterly and long term trend indicator and an aspiration for this trend in the long term.

Directions for other outcomes may be to improve or reduce from where they are now. We're in the process of socialising and setting these aspirations and long term trends with client councils.

Once agreed, we'll report our performance against each goal in this report, noting any short term issues and their possible impacts on long term trends. We'll also continue to report separately on individual council levels of service (in SLA reports). Goals for the Environment outcome are on page 6, and for the Resilience outcome on page 9.

OUTCOME 1

Our water is safe to drink

Measuring what matters – district metering

District metering involves dividing the distribution system into clearly defined areas to measure water usage. By installing flow meters at supply points and creating distinct boundaries, we can get a picture of how much water is being used.

The objective in establishing district metering areas (DMAs) is to identify and control, to an economic or rational level, the real losses within each metered area. This can then be extended to the distribution network as a whole.

The maximum size of a metering area is established based on an acceptable leakage run time. This means that once a leak occurs (that cannot be immediately detected above ground), it can be located acoustically within the shortest possible time according to economic parameters.

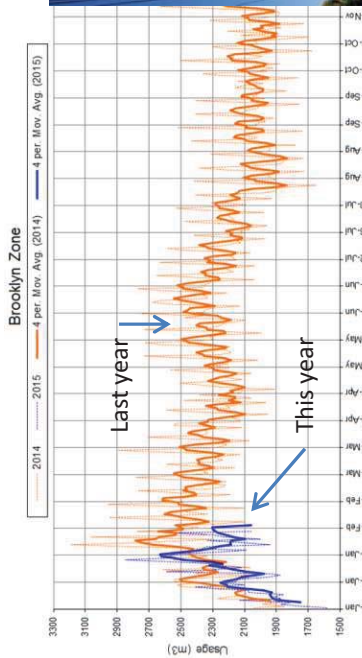
Ideally, awareness of the leak would occur on day one, leak surveying and location would occur on day two, and repair on day three, providing a maximum run leakage run time of three days.

In practice, however, it is often worthwhile assessing a rise in usage for at least three to five days, as there are often unexplained rises in usage that drop off after a couple of days. This would be

the case where a household leak was left flowing till the weekend for repair, for example. Leak detection contractors typically take about three days to provide a quotation and normally need a few days before being available to start on site. A medium sized zone will take about a week to survey and a maintenance contractor should be able to attend to major leaks within a week, with smaller leaks taking a further two weeks to be fixed.

Sometimes major traffic control is required for busy intersections and roadways. This can add a further week of planning, obtaining mark-outs to other underground services, and approvals to arrange traffic management. Wet weather will also extend location and repair times.

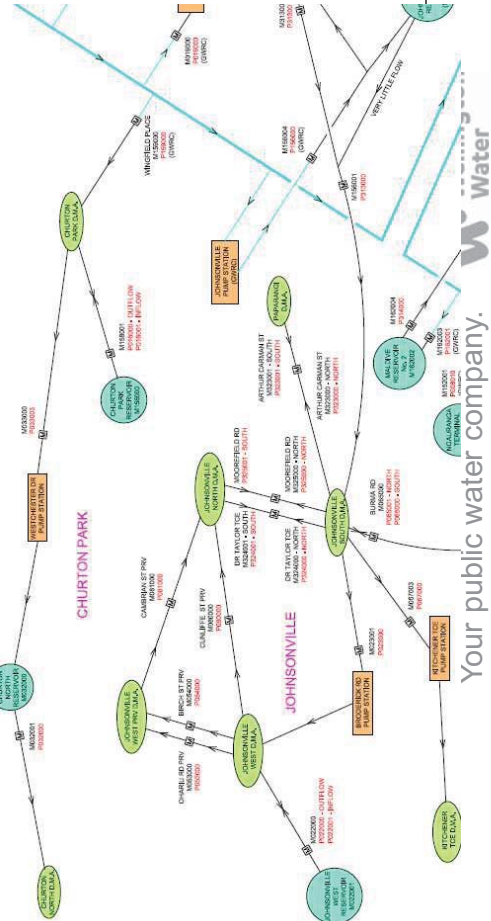
In terms of district metering area analysis, a cost-effective area should have about 30,000 metres of pipework. To survey an area of this size would normally take less than a week (depending on weather and the number of people carrying out the survey). The cost of installing area meters, managing the telemetry and water monitoring typically makes smaller district metering areas uneconomical and inefficient.



There are 16 DMA zones in Upper Hutt, 71 in Wellington, 33 in Lower Hutt and 14 in Porirua that are trended daily.

Data from district meters is collected via telemetry. Daily trends compare usage over time and show any unusual events, such as a burst or leak.

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We are respectful of the environment

Quick action on overflows avoids consent notices

We had a bit of a grim quarter with overflows from treatment plants and the network. However, prompt responses and reporting according to agreed procedures meant that we did not receive any consent-related notices.

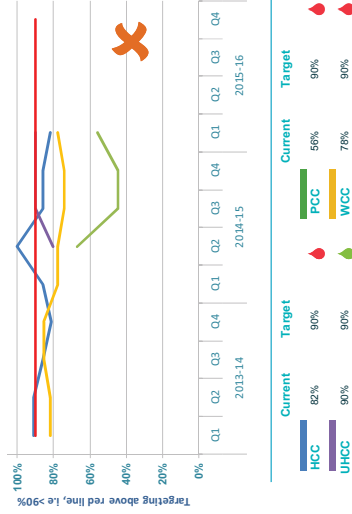
- A power failure led to a small dry-weather overflow at Moa Point wastewater treatment plant in September.
- There were a dozen wet-weather overflows from the Porirua wastewater treatment plant.
- There were seven dry weather network overflows, mainly due to root and fat blockages.

Even though we met consent requirements (which allow for wet weather discharges), we're flagging this performance as something that needs to be improved. Hence we've marked these with a cross in our detailed results (right), and an amber tick on our consent compliance results (top right).

In other areas of our environment work, we feel we're making good progress in supporting Te Awarua-o-Porirua Whaitua gain an understanding of the issues in that catchment. We're not as far along with our community education programme as we'd hoped to be, but workshops on that are starting this coming quarter.

Fresh Water Quality: % of sites compliant

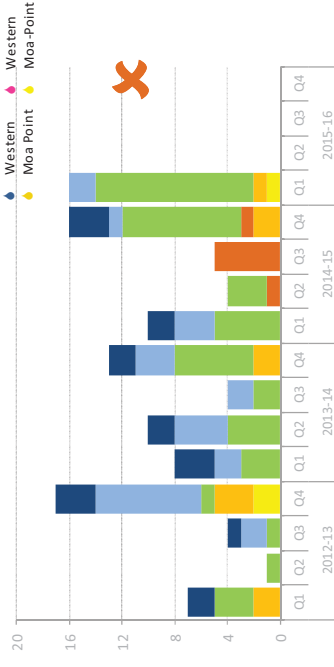
Target: 90% of all freshwater sites have a rolling 12 month median < or = 1000µg/l/100ml3



Consent compliance 1 July – 30 September 2015 (snapshot covering these activities)		
Nature of work	Target	Track
Extracting water	Full compliance	✓
Discharging water	Full compliance	✓
Wastewater – dry weather overflows	Full compliance	✓
Wastewater – wet weather overflows	Full compliance	✓
Stormwater discharges	Full compliance	✓
How we carry out our work	Full compliance	✓

Discharge events from treatment plants

Target: Nil non-consented overflow from treatment plants



OUTCOME
2

We are respectful of the environment

Outcome	Strategic goal	Aspirational direction	Quarterly Status				Current Long Term Trend	Commentary
			Q1	Q2	Q3	Q4		
Respectful of the environment	We minimise our impact on waterways and the ocean.	Improve						Freshwater quality samples are now being collected in addition to beaches. For three councils, sample results do not meet the performance target. Our knowledge will increase over time which will enable us to devise appropriate strategic plans.
	We minimise waste.	Improve						An initiative to minimise solids volumes disposed from Porirua WWTP through use of alternative polymer is under way. We are conducting a region-wide study on the effectiveness of regional water and wastewater treatment.
	We minimise our impact on the natural and built environment.	Stay the same						Our operations and improvement works are generally undertaken in accordance with consent conditions. We generally mitigate the visual impact of our works on the environment. We know we have an impact on the harbour environment but we don't have sufficient information to understand the overall impact because there are other contributing factors.
	We influence people's behaviour to minimise impact on the environment.	Improve						We have a range of regional initiatives that contribute towards influencing people's behaviour. Active involvement with Porirua Whaitua committee continues. There is an opportunity to consolidate our education work.

Whaitua committee hears growth story

The impact of forecast growth in the Porirua harbour catchment area was the key topic of discussion at a public meeting of Te Awarua-o-Porirua Whaitua Committee.

Following a presentation from council planning officers, the implications of growth forecasts and development plans on the three waters networks was discussed.

Committee members were keen to hear more, and will take part in a workshop with Wellington Water on the ability of the three waters networks to cope with growth.

The committee is also interested to know the implications of these forecasts on water quality standards.

We're working with Greater Wellington on a collaborative modelling project that will also help inform and guide whaitua committees. This is essentially an overview of the inputs and impacts on water quality in the region.



This table (above) shows the goals for our Environment outcome. These are long term goals, hence the most important indicator is the strategic or long term trend in which performance is moving, against the desired long term direction.

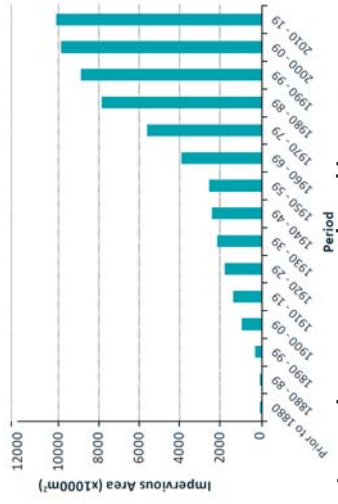
As noted on page 3, the current long term trend indicators, and the aspirational direction we want these goals to be moving, are still under discussion.

A slide from the presentation sets out anticipated growth areas in Porirua.

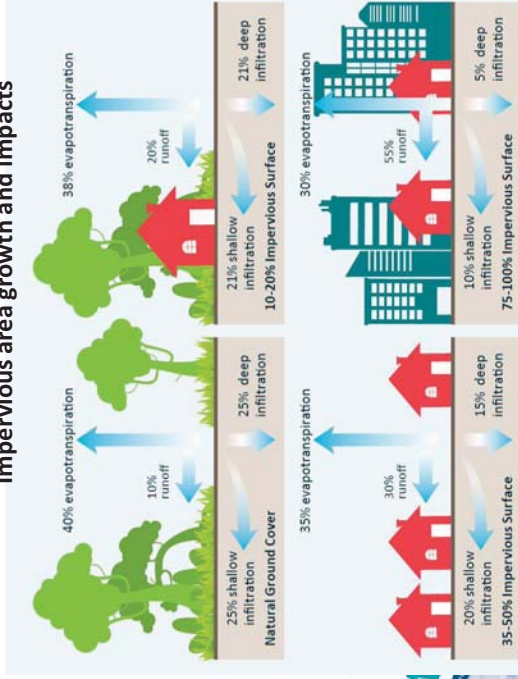
OUTCOME 2

We are respectful of the environment

We produce regular updates on our work to prepare integrated catchment management plans for Wellington City. The latest "ICMP News", discusses the increase in impervious area (right), and the impact of that process. More details on these plans, and copies of the ICMP News, are at wellingtonwater.co.nz/your-water/stormwater.



Impervious area growth and impacts



Reference: Paul MJ & Meyer JL, 2001. The ecology of urban streams, Annual Review of Ecology & Systematics 32:333-365



Communicating catchment management

Urban development typically follows a pattern of open land gradually disappearing under buildings, roads and pavements, and an associated rise in the piping of open streams.

The increase in impervious services and the effective re-shaping of the natural land form puts a greater strain on the natural streams that remain and the eventual receiving environment for urban stormwater. As the illustration (right) shows, development can increase run-off five-fold. With fewer opportunities for this water to filter itself on its way to the sea, this serves to concentrate the impact of any contaminants.

While the 'drains to sea' plaques that adorn many urban sump grates are effectively true, it is also true that most urban stormwater passes through some form of gross treatment.

Inlet sumps often allow for grit and other coarse particles to collect in chambers which have outlet pipes situated above the base of the chamber. Larger grit chambers can be built to provide an additional sedimentation stage for catchments or subcatchments. These chambers need to be inspected and cleaned regularly, and they do not filter soluble contaminants.

Constructed filter strips, such as swales or filter beds can remove some pollutants, but can be expensive to retro-fit into developed areas, and to maintain. Ponds or wetlands with various vegetation zones are even more effective as stormwater treatment devices, but of course are difficult to create from scratch, let alone in built-up areas.

A water-sensitive approach to urban design asks planners and designers to consider subdivision and development from the perspective of water conservation and management. It's an approach that is likely to be increasingly adopted in future.

Wellington Water is taking an integrated approach to managing stormwater issues to improve outcomes. As part of a resource consent that covers the discharge of stormwater, we're preparing catchment-based plans that consider the variety of characteristics that will affect stormwater quality. These plans will consider the interests and values of those who live in or carry out other activity in the catchment, urban growth and the overall goal of improving receiving environments. It is an approach we would expect eventually to apply throughout the region.



Networks that are resilient, now and in the future

Resilience goals largely on

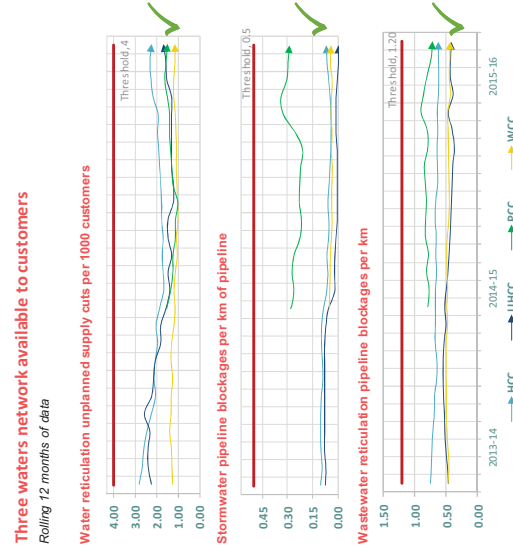
Reported outages remain below targets, suggesting renewals programmes are being funded and managed effectively. Design for solutions to areas affected by the April and May downpours is in progress, but is moving slower than we – and affected residents – would like. Stormwater hydraulic modelling is making good progress.

A review of fire hydrant testing is under way, as are improvements to managing electrical hazards when working on large water mains.

We're working with GNS to improve our knowledge of areas where pipes are buried in areas of earthworks fill, and with councils to update drinking water demand models. The water supply resilience project is heading towards a programme business case (see next page).

This table shows the strategic goals for our Resilience outcome. The commentary for these goals is summarised above.

Outcome	Strategic goal	Aspirational direction	Quarterly Status				Current Long Term Trend
			Q1	Q2	Q3	Q4	
Resilient now and in the future	We minimise 3 waters service outages and impact on our customers.	Stay the same					
	We minimise the impact of flooding on people's lives.	Improve					
	We provide an appropriate regional wide fire-fighting water supply	Stay the same					
	We operate and manage assets that are safe for our suppliers, people and customers.	Improve					
	We provide a seismically resilient network.	Improve					
	We minimise the risks associated with the loss of water services due to land movement.	Improve					
	We plan for sustainable water sources, future demand, growth and climate change.	Improve					





Networks that are resilient, now and in the future

Water supply resilience project gathers steam

City resilience, and in particular infrastructure resilience, has gained even more profile recently, at both local and central government levels. Wellington City joined the international 100 Resilient Cities project, and will appoint a resilience officer to oversee the city's preparation for recovery from a major event. Nationally, the government is counting the cost of the Christchurch rebuild increasingly closely. We can't afford another \$40 billion hit to bring a city back up to speed.

So what can we do? The water supply resilience project is Wellington Water's regional level response to this question. Starting with a careful statement of the problems we're facing, and the benefits from investing to address these problems, we've identified at a strategic level the required responses. This process is set out in the strategic business case for water supply resilience, which was endorsed by the Water Committee last quarter.

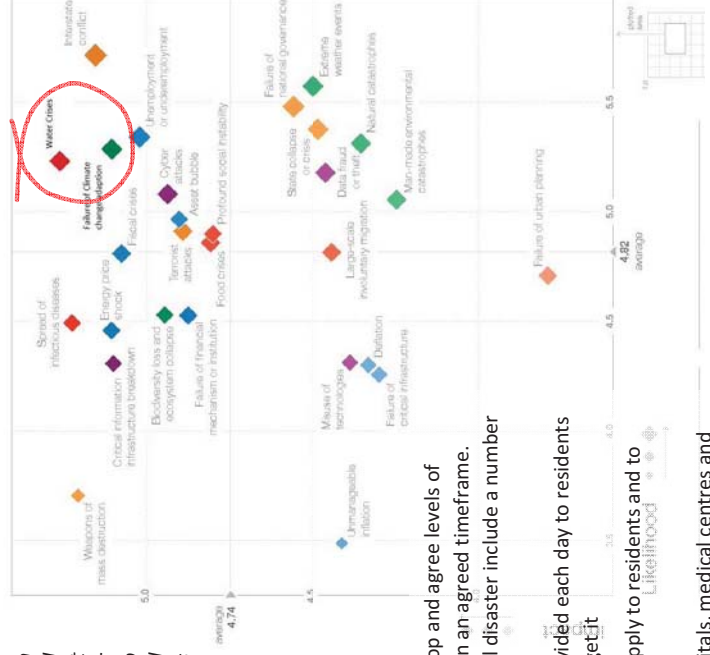
We're now working through the second stage of the process - the programme business case. In this stage, we'll develop and seek agreement on levels of service councils will invest to achieve, and the investment criteria against which options will be measured. We'll consider a wide range of options and what mix of options will best deliver our desired outcomes. This [roadmap] sets out the main steps and timeline for our programme business case.

Levels of service

The Water supply resilience project involves developing an investment plan for client councils' 2018 Long Term Plans to ensure our water supply networks meet agreed levels of service following a major shock, such as an earthquake.



Figure 1: The Global Risks Landscape: 2015



The World Economic Forum, which hosts the annual summit of global political and business leaders at Davos, Switzerland, rates water and climate change among the top ten risks (on and impact/likelihood matrix, right) facing the world in its 2015 Global Risk Report.

We're working with our client councils to develop and agree levels of service that are affordable and achievable within an agreed timeframe. Levels of service for water supply after a natural disaster include a number of factors:

- how much water could or should be provided each day to residents and how far they might have to walk to get it
- target times to reinstate a reticulated supply to residents and to businesses
- how to supply critical users such as hospitals, medical centres and emergency management facilities, and how much to supply them
- the target time to fully recover from an event, that is, to return to normal operating conditions.



Your public water company.

Wellington Water: Health and Safety

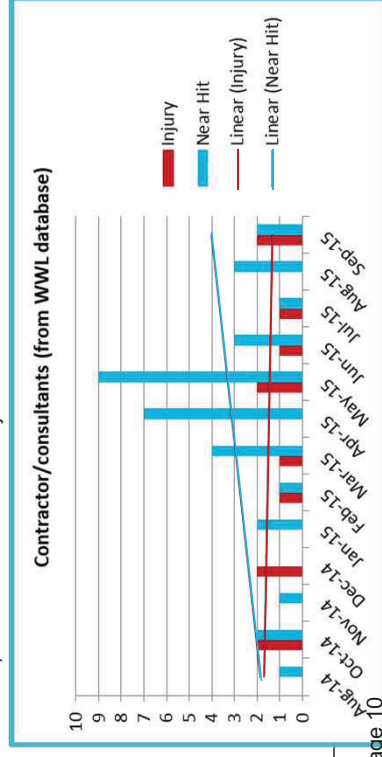
Reporting link to better results

During the quarter we took a look at the near hit and risk reports for Wellington Water for calendar year to date.

Of the 91 near hit incidents, the majority were a result of procedural errors – that is, people not following established safe practice. In some cases this was a matter of honest mistakes; in others, such as traffic management where procedure has been well publicised, we clearly need to do better.

Historical design flaws and failures on assets made up the next largest area.

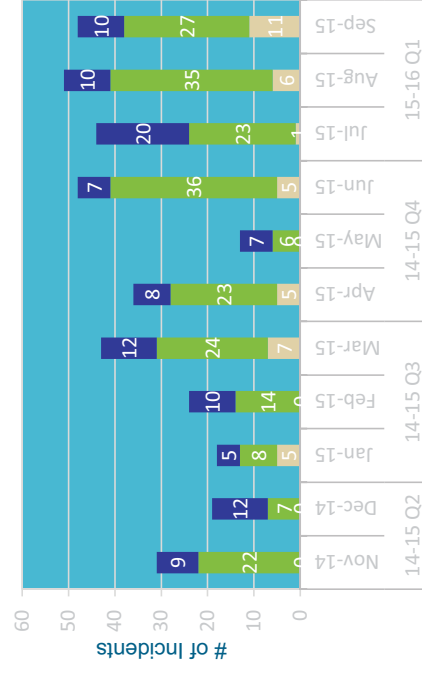
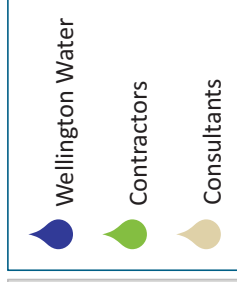
These insights confirm the importance of improved near miss reporting in identifying areas for attention, and the link to reduced injuries.



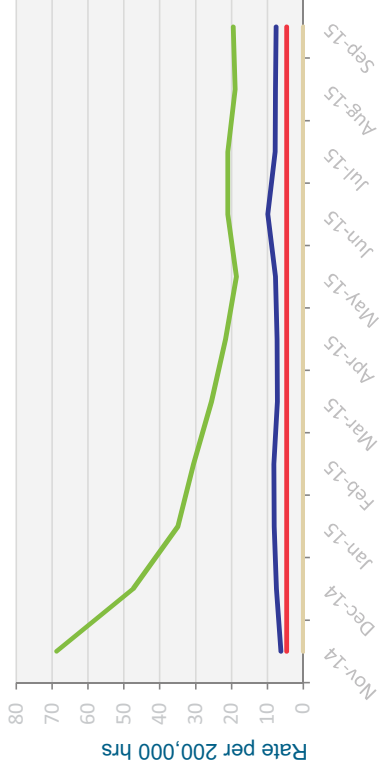
All health and safety incidents

Includes first aid injuries, lost time injuries, medical treatment injuries, return to work injuries, serious harm injuries, moderate injury, near hit /miss incidents and hazards

Benchmarking data has been obtained from the Business Leaders Safety Forum. WWL is comparing performance to the forum's figures for the mining, utilities and work management industry. This is also the sector Watercare contributes data to.



Injury Trends (Rolling 12 month)



Consultants and contractors data are not complete. Current data date back to November 2014. The rates for consultants and contractors can not be compared to the benchmark until a full 12 months of data is collected and we're happy we are receiving data from the majority of the consultants and contractors we use. But we thought it would be interesting to share early trends.



Your public water company.

Wellington Water: Programme delivery

Health, safety top priorities despite early setbacks

The capital works programme has been slower to ramp up than planned across three of the five councils. This is due to delays with some of our design and tendering programmes.

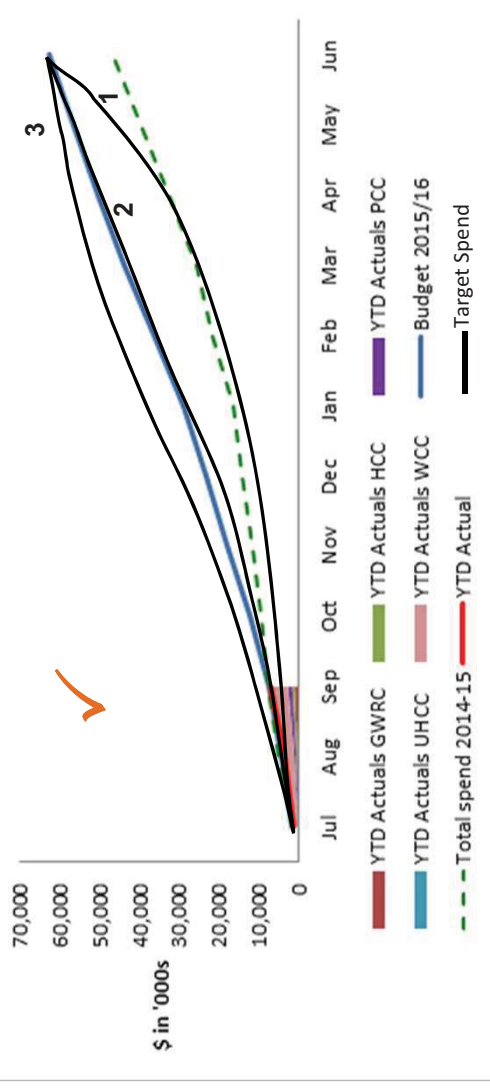
We have 295 active projects across our work programme. At the end of the July-September quarter, we'd completed 1% of projects, 94% were on track, 4% were significantly off track but forecast for completion at year end and 1% were on hold. Three projects that have been put on hold by councils, with budget values of \$5.705 million.

Improving health and safety was a key focus in Q1. A number of significant initiatives were implemented, with more focus on collaboration with our suppliers. This will continue to be a priority as we move towards implementation of the Health and Safety Reform Act next year.

We are already focussing on and planning for our 2016-17 programme delivery. We have identified the Fast-forward Design Programme as a key initiative to improve delivery of our capital works.

Capital expenditure, as at 30 September 2015, vs year-end forecasts

While 94% of projects are looking generally OK, we already have some projects off track and some on hold, and we're not where we'd like to be in terms of our Target Spend – which this year is line 3



Our capex Target Spend this year is represented by line 3. We want to smooth the programme over the year, and so avoid a rush of activity in the final quarter. While last year (green dashed line) was an improvement on the baseline (Target Spend line 1), it still showed a steeper uphill journey at the end of the year than we'd like.

Early planning of our forward designs and 2016-17 work programme will allow us to release our physical works contracts more evenly through the year leading to efficiencies within our programme delivery.

Wellington Water: Value for money

Culture a key element of delivering on value for money promise

Providing and demonstrating the value for money that Wellington Water creates is a strategic priority for us – and our clients.

More than just a way to deliver efficiently for long run benefits, we see the value for money priority as an aspect of culture. It is directly related to empowered people, and a safe working environment that encourages new ideas – and makes it OK to try new things.

We've developed a framework helps locate value for money initiatives against our three waters outcomes (using the strategic goals that appear in this report), and a set of criteria including benefits (financial and non financial), effectiveness, cost and time to deliver.

As part of this approach, we put the four territorial authority operational budgets under full scrutiny, and identified \$3.1 million that could be re-prioritised into higher value areas. One of these was the regional initiatives work, and in particular, the water supply resilience project.

Once funding was distributed to other high priority areas, we still expect to be able to return over \$1.4 million to shareholders in the current financial year.

Another key aspect under review is the way we buy services from our suppliers. Starting with our pool of consulting engineers, we're developing a buying model that we're confident will provide much greater value from the roughly \$10 million a year we spend on our clients' behalf in this area. It will also be a critical part of our improving the even delivery of our capital programme. This involves creating a panel of probably three preferred suppliers, but at the same ensuring they commit to building and sustaining a skill pool in the Wellington region. We expect to have this model in place early next year.

We look forward to featuring value for money improvements in the Outlook report, and will share more on our website.

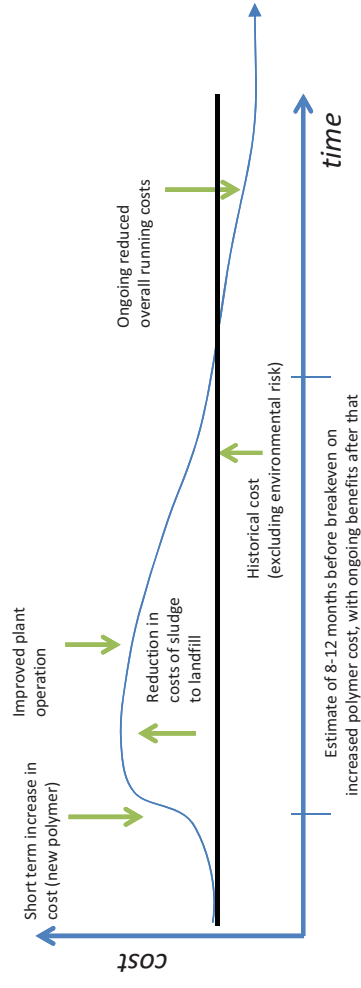
When it comes to wastewater sludge, the more it sticks the better

Sludge is a major problem for wastewater treatment plant operators (See Outlook for the June 2015 quarter). Removing water from sludge reduces disposal costs, and in fact 'dry' sludge content must meet minimum levels prior to being buried in landfill.

Effective sludge management improves overall treatment plant operation as well, reducing the load on downstream processes such as UV treatment. And it improves environmental outcomes, by delivering better quality effluent.

An important element in the drying process is the binding agent used to coagulate or polymerise sludge into larger particles. A trial of a more expensive type of polymerising agent at the Porirua plant proved so successful that a proposal to use the new agent was adopted immediately.

Operators are confident that the short term increase in costs will quickly be recovered in reduced landfill costs alone, let alone power savings and the reduced risk of environmental damage due to plant failure.



Wellington Water: National and local agendas



Mark Poehls, senior pipelines foreperson, demonstrates pipe cutting equipment at a Water Industry Operations Group meeting at the bulk water supply depot in Pomare, Upper Hutt, recently.

WIIOG was set up by water and wastewater industry operations professionals, for those engaged in the operations sector of the water industry. It aims to help share knowledge and best practice, promote the standards and training, and promote the value of water and the water industry. They also seek to represent operators view on issues relating to aspects of water, the water industry and other issues that may indirectly relate to the water industry.

At the national level ...

Building resilience and how water supports a productive economy

Both central and local government acknowledge water (along with other services) is critical for a productive economy. This message was reinforced through the Built Environment Leaders Forum, led by Ministry of Business Innovation and Employment (MBIE), that highlighted the need for utilities (such as Wellington Water) to first be resilient within themselves (compliance with the CDEMA) before they can help others in the region to be resilient (ie. via three waters networks).

It was also evident that central government has learnt from the Christchurch experience and is asking local government to step-up and manage resilience risks better.



Thoughts on regulation

What began with Treasury's National Infrastructure Plan and the promotion of common water standards and metadata to strengthen the evidence base and improve information disclosure has been carried further with a Local Government New Zealand position paper "Improving New Zealand's Water, Wastewater and Stormwater Sector". The paper signals three governance options for better managing the water sector: a multilateral contract or deed; a co-regulatory model; using the proposed Local Government Risk Agency. We're preparing a joint submission on behalf of our shareholding councils to respond to these proposals.

On the local level ...

Greater Wellington Regional Council's Natural Resources Plan is a form of secondary regulation focused on improving water quality that will have implications for how we provide our water services. We provided a submission on behalf of some of our councils and are anticipating actions we may need to take to ensure we are well positioned for implementation. We are also working with GWRC to lead and facilitate development of a climate change strategy for the Wellington region.

Congratulations to Al Forsyth, who was named Operator of the year at the Water New Zealand Conference. Alistair designed and built a high pressure cleaning device (far left) for our aquifer extraction bores, and a weir system to improve filtration maintenance that significantly improved quality and filtration outcomes at the Wainuiomata treatment plant.