

THREE WATERS GROWTH PLANNING TO SUPPORT INTEGRATED INVESTMENT AND LAND USE PLANNING

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ABSTRACT

“If you fail to plan, you are planning to fail” Benjamin Franklin

In a constrained and ageing network, Wellington Water Limited (WWL) and its client councils are faced with some tough decisions on investment prioritisation. At the same time the Wellington Regional Growth Framework (WRGF) is planning for population growth upwards of 200,000 people (WRGF, 2021) over the next 30 years. Population growth will put pressure on existing infrastructure but also offers an opportunity to do things differently and to think more strategically about the outcomes we want for our communities and environment.

WWL have been on a journey since 2018 to refine three-waters growth planning. So far this has involved a range of studies to provide infrastructure assessments to support development capacity understanding on a council-by-council basis. Given growth by its very nature is complex, growth planning must be able to cope with dynamic shifts and respond to the uncertainties in predicting the pace and location of future growth patterns.

Our growth planning work has had a huge impact on the way WWL provides advice to our Client Councils on long term planning and investment in three-waters infrastructure.

WWL has adopted a strategy-led approach to respond to growth alongside upcoming RMA and Water Reforms. Some of the challenges include the need for thought leadership, limited skilled expertise in the sector, working with other regional infrastructure providers, and implementing emerging strategic water priorities during a period of significant housing demand requiring new connections to our network.

This paper explores WWL’s experiences in three waters growth planning, covering:

- Learnings from our journey of evolving three waters growth planning;
- Approaches to managing uncertainty and phasing growth infrastructure to allow new houses to connect to the network; and
- Reflections for future growth planning to achieve integrated land-use and investment planning.

KEYWORDS

Growth Planning, Asset Planning, Land Development, Strategy

PRESENTER PROFILE

Katrina Murison leads growth planning programme at Wellington Water. Her focus is on identifying and implementing strategic interventions to provide network capacity whilst looking after our environment and providing for intergenerational outcomes. Katrina is evolving Wellington Waters response to growth by collaborating with partners, improving the evidence base, and developing approaches to providing effective and timely growth advice.

Olena Chan is the Manager Growth and Land Development at Wellington Water, her focus is on lifting the integration of growth planning and investment. She oversees the delivery of growth strategies, studies and plans and advocates for the uptake of the strategic priorities for three waters in national, regional, and local planning policies. Olena promotes a strategy-led approach, a lift in investment for three-waters growth planning, and capacity and capability building within the sector.

1. INTRODUCTION

1.1 WELLINGTON WATER

Wellington Water provides drinking water, wastewater and stormwater services to customers throughout the Wellington region on behalf of our councils:

- Greater Wellington Regional Council (GWRC),
- Hutt City Council (HCC),
- Porirua City Council (PCC),
- South Wairarapa District Council (SWDC),
- Upper Hutt City Council (UHCC); and
- Wellington City Council (WCC).

1.2 THREE-WATERS NETWORK

Wellington Water manages regional three waters networks (drinking water, wastewater, and stormwater) comprising approximately 6,700 km of pipelines, 16 treatment plants, 145 water storage facilities (primarily treated water reservoirs), 322 pump stations, 29 km of tunnels and various associated assets.

Three waters assets are uniquely challenging to manage. They are underground; many are old, near or past the end of their economic lives, and we live in a region where the ground beneath our cities is on the move. Despite that, our water services have generally been very reliable. But their ongoing reliability cannot be taken for granted, as our assets are vulnerable to damage from natural events and prone to failure when reaching the end of their lives. We are also facing increasing expectations on levels of service and pressure to service growth.

1.3 WELLINGTON REGIONAL GROWTH

The Wellington region is under extreme pressure to provide more housing supply in response to the increasing cost-of-housing in the capital. Recently, Wellington was ranked the third hottest housing market in the world, with a 12-month housing inflation up to quarter 1, 2021 of 30.1% (Knight Frank Global Residential Cities Index, 2021). Population growth in the Wellington metropolitan area has been

generally tracking in line with the Stats NZ High predictions, with growth quickly outpacing capacity in many areas of the network.

The Wellington Regional Growth Framework (WRGF) is planning for population growth upwards of 200,000 people over the next 30 years across Wellington-Horowhenua region (GWRC, 2021). With some growth already enabled through operative District Plans, more is anticipated in future District Plan revisions to incorporate urban policy directives for intensification.

As our communities grow and change, the need to maintain infrastructure such as is vital to our region’s economic success. Population growth will put pressure on existing infrastructure but also offers an opportunity to do things differently and to think more strategically about the outcomes we want for our communities and environment.

1.4 POLICY AND LEGISLATIVE CONTEXT

We are responding to significant changes in the way New Zealand and the Wellington region plans for future growth.

The revised National Policy Statement on Urban Development 2020 (NPS-UD) has significant implications for councils’ urban development planning, with specific impacts on three waters infrastructure planning and investment. The NPS-UD aims to ensure New Zealand’s towns and cities are well-functioning urban environments that meet the changing needs of our diverse communities (HUD, 2020).

The NPS-UD 2020 directs local authorities to provide sufficient development capacity in their resource management plans, supported by infrastructure to meet demand for housing and business space. NPS-UD 2020 recognises sufficient development capacity requires integrated and strategic planning and funding decisions over the medium and long-term.

The NPS-UD defines development capacity as the amount of development allowed by zoning and regulations in plans that is supported by infrastructure over short, medium and long-term, as summarised in Table 1.

Table 1: Development capacity requirements (HUD, 2020)

Short-term (3 years)	Medium-term (4-10 years)	Long-term (11-30 years)
Development capacity that is feasible, reasonably expected to be realised, zoned and serviced with development infrastructure	Development capacity that is feasible, reasonably expected to be realised, zoned and either: <ul style="list-style-type: none"> • Serviced with development infrastructure, or • Funding for the development infrastructure is identified in a Long-term Plan. 	Development capacity must be feasible, identified in relevant plans and strategies and associated development infrastructure is identified in an infrastructure strategy.

Other legislative regulations that influence growth planning include the Resource Management Act (RMA) 1994, the National Policy Statement for Freshwater Management (NPS-FM) and the Local Government Act (LGA) 2002 among others.

Planned reforms of various legislation, planning instruments and financial tools will have an impact on how we prepare for, facilitate and fund future three-waters infrastructure for growth.

2. GROWTH STUDIES PROGRAMME

Growth studies were initiated to support the requirements of the National Policy Statement – Urban Development Capacity 2016 (NPS-UDC) to provide an evidence base to understand capacity in our networks and to assess three-water impacts as a result of land use changes prior to district plan reviews or changes.

So far, the growth studies programme has delivered the following studies:

- Porirua Three-Waters Catchment Plan covering 7-growth areas (2018-2019). A draft for discussion was provided to PCC in July 2019 to support Porirua Growth Strategy 2048 and District Plan review. Further work was completed to deliver detailed network assessments in Eastern Porirua and to support 2021 LTP.
- Wellington City - WCC Preferred Growth Scenario - Implications to Three-Waters to inform Draft Spatial Plan. November 2019 and an addendum in Feb 2020. Followed by an updated response to new population estimates considering scale of investment by growth suburb, and summarising three-waters constraints in each suburb.
- Upper Hutt Catchment Planning for Growth (Phase 1) to inform Plan Change 50 and upcoming Long-Term Plan (2021-2031) in August 2020.
- Hutt City - Wainuiomata study to support Plan Change 43 and the HCC Urban Growth Strategy 2012 – 2038. Presented to HCC in November 2020.
- Hutt City Growth Study to inform District Planning and provide infrastructure investment options to support growth. To be delivered in Q3 2021.
- Upper Hutt City Catchment Planning for Growth (Phase 2) using hydraulic models and updated population forecasts to provide infrastructure investment options to support growth. To be delivered in Q3 2021.
- South Wairarapa, participation in spatial planning development scenario screening process (2020).

3. LEARNINGS

Learnings from our journey of evolving three waters growth planning.

3.1 CHANGING HOW WE INVEST TO SUPPORT GROWTH

The growth studies have had a huge impact on the way WWL provided advice to our client councils on investing in three-waters infrastructure to meet demand. The estimated investment to fully address existing backlog, increasing level of service expectations (regulatory, community driven) and growth over the next 30 years, has resulted in significant investment profiles. With estimated investments for PCC (\$1.8 BN), WCC (\$2.3-5.2 BN) and UHCC (\$156M-\$300M). WWL recognised it was not possible for our client councils to invest in everything and there was a need to prioritise and focus investment.

There is considerable pressure on budgets for three waters for each council to continue renewing existing and aging assets, respond to growth and meet increasing levels of service expectations (water consumption, water quality and carbon emissions).

In a constrained and ageing network, WWL and its client councils are faced with some tough decisions on investment prioritisation. For example, Porirua is facing high growth in the short to medium term, with the government-led redevelopment of Eastern Porirua and private developer-led development in Whitby, and Northern Growth Area. Growth requires significant investment to address existing capacity shortfalls in the water storage and wastewater system, which already require major system upgrades to meet levels of service for existing customers.

We have identified the need to change the way we provide invest advice. Wellington Water completed an open and transparent disclosure of investment advice to each Client Council during the long-term-plan development, including early signals to support refining investment priorities. Two of the five strategic investment priorities are looking after existing assets and growth. Prior to this, growth had not been recognised as a specific priority for investment.

The extensive process to provide councils with best possible advice on their three waters investments has provided them with a greater understanding of the state of the networks and levels of investment needed to maintain or lift levels of service and capacity in the network to where they need to be over the longer term.

The investment profile is daunting, all councils are managing expectations on what is affordable and, in some cases, have consulted with communities on these issues.

Our client councils have adopted growth investment of approximately \$290M capex over next 10-year period; along with opex funding to progress growth planning to better define and inform future LTPs and infrastructure strategies.

3.2 CHANGING HOW WE RESPOND TO GROWTH

We have identified the need to change the way we respond to growth by adopting a strategy-led approach. This has meant, evolving our growth studies programme, embracing the dynamic nature of growth, and finding ways to manage our response to current growth demands whilst maintaining a long-term outlook.

3.2.1 Evolving growth studies programme

To date the growth studies have produced a lot of useful information to understand the current state of the three-waters networks and impacts of future growth demands on capacity. The findings of the studies have since been used to inform a range of planning and investment processes which they weren't explicitly designed for including Spatial Plans, District Plan Changes (e.g. land-use re-zoning), Structure Plans, Long-Term-Plans, 30-year infrastructure strategies and future development (growth) strategies etc.

In progressing the growth studies programme, we have faced many challenges and taken the opportunity to learn, reflect and improve. These challenges, include:

Approach/Methodology:

- Fitting growth studies into our workflow has resulted in conflicting objectives and overlap in functions and responsibilities by WWL teams.
- Prior to growth studies, regional levels of service were not well understood or defined, resulting in large components of level of service upgrades being described in the studies, before being able to provide for growth.
- Due to broad-scale pre-feasibility level of studies, infrastructure options can be driven by a set of narrow criteria, without clear investment logic linking costs and benefits of a recommended option.
- Limitations on hydraulic modelling resources. The ability for our models to build and run various growth scenarios in a timely way is challenging to deadlines being sought by the external planning and consultation processes. It is not always possible to carry out modelling work in time to assess growth assumptions.

Alignment with external requirements:

- Outputs not being fit-for-purpose to meet council needs (e.g. LG Act criteria for investment categories, developer contributions, and spatial planning priorities).
- Keeping up with pace of growth planning to make good decisions with the appropriate level of information and scaling effort.
- Responses to meeting emerging regulatory matters (e.g. management and treatment of stormwater and wastewater discharges to meet Wellington Proposed Natural Resource Plan (PNRP), and NPS-FM requirements).

Outputs:

- High pre-feasibility costs for potential solutions can distract from the outcomes being sought and result in a lot of follow-up to understand and describe the investment needs and triggers.
- Combining level of service, renewals and growth categories in some outputs resulted in large investment sums that are hard to dissect.

- Managing uncertainty from councils on how to manage growth investment in their infrastructure strategies and long-term plans.
- Creating link between studies and additional work required for prioritisation, cost-benefit analysis, investment triggers and timing of proposed solutions.

The growth studies programme has provided a great evidence base and opened the conversation with councils on the step-change in investment required to support growth. We continue to evolve studies as learnings are taken into consideration in scoping future work.

3.2.2 Embracing the dynamic nature of growth

Growth by its very nature is complex, and growth planning must be able to cope with dynamic shifts and respond to uncertainties that exist in predicting the pace and location of future growth patterns. Growth assumptions and scenarios are difficult to predict given large range of external drivers, such as property values, commercial development returns, bank interest rates and policies, economic prospects, demographic changes, policy and funding settings.

Many of the tools and approaches we currently use cannot easily cope with multiple growth scenarios. Due to the cost and complexity of existing models, it is often impractical to run multiple scenarios to assess low, medium and high growth forecasts, and potential changes in spatial distribution of growth. When developing our approach to growth planning, we are also reviewing the tools and methods we use to plan.

An adaptive, principled and evidence-based approach to growth-planning is needed to cater to changing growth conditions which has been considered in the development of an adaptive framework as described in Section 4.

3.2.3 Responding to rapid pace of growth

We are currently responding to an increase in demand for consenting, construction activity, and inspections for new connections to our networks. At the same time, our networks are constrained in many places, and therefore require mitigations or fast-paced responses to provide for development. We have been working with our suppliers and councils to develop a suite of options to support development, where network capacity is yet to catch-up or may not be practical. This includes approved solutions (e.g. stormwater hydraulic neutrality), policies, standards, and temporary mitigations.

3.2.4 Adopting a strategy-led approach

The growth studies identified there was a need for a step change in the way we plan our three-waters system if we are to meet the needs of our people and cities now and in the future. Several challenges were identified as part of this work, including substantial strain to existing networks due to existing demand taking up network capacity, investments not keeping up with growth, deterioration of assets, inefficient use of resources and increasing customer and regulatory expectations.

The need for a step-change, has led to the adoption of a strategy-led approach to address growth. A strategy-led approach means that we link our investment advice

and recommendations to support growth within wider context of our company strategic water priorities, council-growth strategies and customer commitments. We are adopting an evidence based, principled and adaptive approach which is scaled to provide timely advice.

A strategy-led approach can much more effectively cope with complexity, dynamic-situations and uncertainty.

Within the growth programme there is a strong drive for continuous improvement and capturing lessons learnt. We have revisited the activities in our overall response to growth and recommended changes to our activities based on:

- Being fit for purpose, timely and adaptive to changes in our physical and regulatory environments, knowledge of our assets and growth assumptions.
- Creating an adaptive growth planning framework, which encourages staging of effort, and applies a business case approach to options analysis and prioritisation.
- Creating opportunities to rethink our networks in the context of a longer-time horizon to consider issues such as climate change responses, changing community expectations, emerging technology and regulations.
- A strategic environmental assessment of growth to be able to understand and measure environmental impacts and identify strategic interventions.
- Addressing statutory planning processes and responses to changes in RMA and Local Government Act (LGA) planning and investment activities. Such as District/Regional Planning, Housing and Business Development Capacity Assessments (HBAs), Regional Policy Statement (RPS), Regional Growth Framework (RGF), Long-Term Planning, and Infrastructure Strategies.
- Responding to other major infrastructure programmes/projects which impact or provide opportunity for our networks.
- Maturing our approach to Future Demand Management, as part of ISO55000 accreditation – standardising how we plan for growth as an organisation, integrating our activities with other organisational functions and systematic processes for asset management.

4. CREATING AN ADAPTIVE GROWTH PLANNING FRAMEWORK

To be able to manage uncertainty and phasing growth infrastructure to allow new houses to connect to the network we are working to develop an adaptive growth planning framework.

4.1 INTEGRATED PLANNING FOR GROWTH

4.1.1 Evidence base

Planning for growth is underpinned by an understanding of the network's constraints and limits, triggers and responses. At each level of the three waters system, from bulk-infrastructure to local household connections, there is a need to recognise, assess and plan for growth infrastructure to match supply and demand.

Growth in the water network is typically an incremental process that can range from an extension to accommodate a new greenfield site to an individual connection from a property subdivision. When adding incremental service additions in this way, it is important to know what the ultimate capacity and configuration of the network and services is intended to be to ensure that levels of service and customer outcomes are not compromised when that capacity is exceeded. Not having this foresight could result in significant additional growth being enabled through council plans that cannot be serviced.

As outlined in Section 2.1, Wellington Water has been progressing a series of three waters growth studies to improve our understanding of where networks can accommodate further growth and where they need upgraded (e.g., new pipes, pump stations, reservoirs and treatment plants). These studies are providing direction on infrastructure needs supported through our learnings from day-to-day operations. In some cases, developers will install this new infrastructure; in other cases, they will make development contributions, and we will use this to build infrastructure to enable this growth. Continuing to build our evidence base will support our adaptive planning approaches.

4.1.2 Land Use Planning

The way we plan for growth is changing through emerging legislative changes and national policy directions. The changes aim to remove barriers to land development and infrastructure to allow our cities to grow and enable good decisions in urban developments.

We will participate at all planning levels to promote our three water strategic priorities and water management principles in land use decision-making frameworks, for example, national policy statements, spatial plans, district plans, growth strategies and land-use policies.

In response to growth, Wellington Water works with regional and district councils when planning future growth activities for the wider region. For example, Wellington Water is participating in the development of a Wellington Regional Growth Framework (WRGF), which is a regional spatial planning initiative that is

bringing together key stakeholders that oversee infrastructure and planning services for our cities and communities. This initiative is working toward integrated urban and infrastructure planning outcomes for the Wellington region.

Our understanding of growth demands relies on a long-term view of land-use planning and sequencing, and population demographics. We respond to where growth will occur by developing a future pipeline of growth projects. We use models, and planning and engineering assessments to inform our planning. Figure 3 below shows how we are looking to staging our advice and efforts to better align with land-use planning, three-water servicing and infrastructure investment advice.

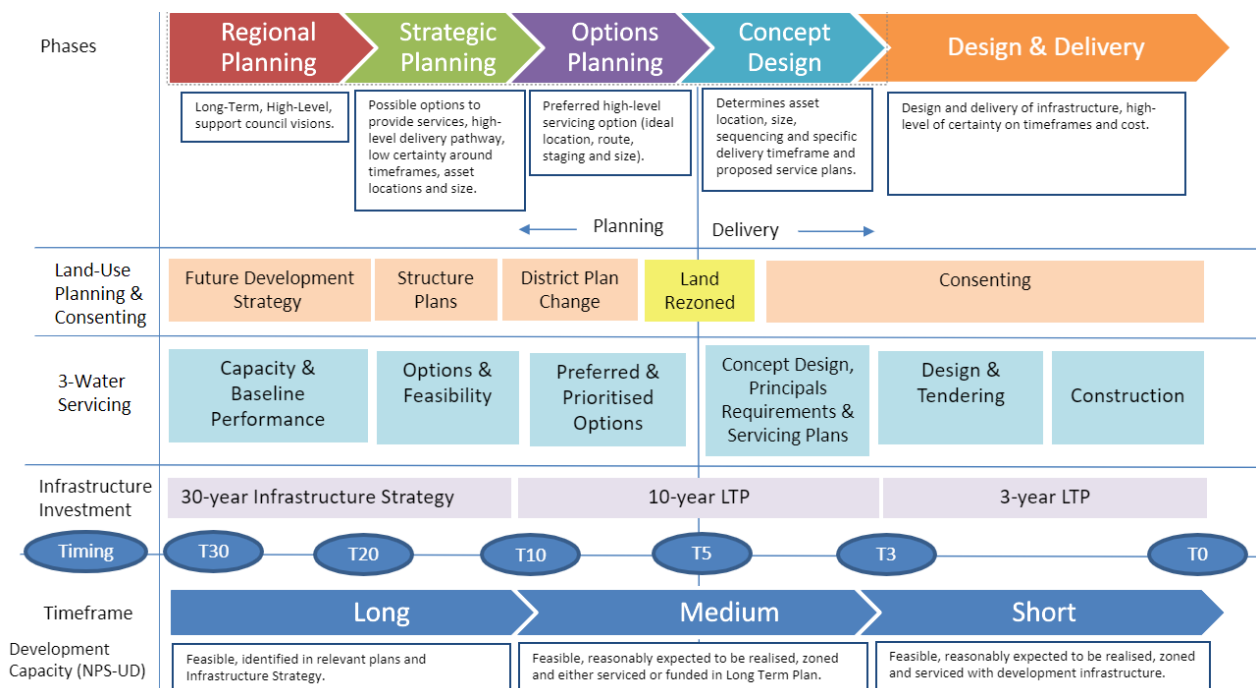


Figure 1: Integrated Land-Use and 3-W Infrastructure Planning Framework

4.1.3 Three waters infrastructure planning and investment

Our Council’s fund growth projects through their Long-Term Plans and further recover costs through development contributions. Any planned projects should align with our regulatory, environmental, and customer expectations. Our infrastructure planning and investment needs to be adaptable to changes in systems, standards and population movements as predicting the future involves a degree of uncertainty.

Although growth puts pressure on our networks, it also provides an opportunity for new investment and brings regeneration to the system. With new development comes new infrastructure and opportunities to renew old infrastructure in new development areas. As a result, growth can drive change and innovation into the three waters systems. Any changes to address capacity will need to optimise the way we build the system to meet the strategic priorities.

Enabling growth requires investment across all three waters and their components, from major bulk infrastructure down to individual connections. The required investment is dependent on the amount of growth. This is influenced by councils' decisions on where and how they enable this growth to occur.

Growth studies completed to date have identified significant investment to accommodate forecast growth for the Wellington region. This investment is necessary to overcome existing deficits resulting from past demand utilising latent system capacity and increased requirements driven by population growth, changing community expectations and environmental regulations. Figure 2 summarises how investment in new infrastructure must consider the interactions between level of service and growth.

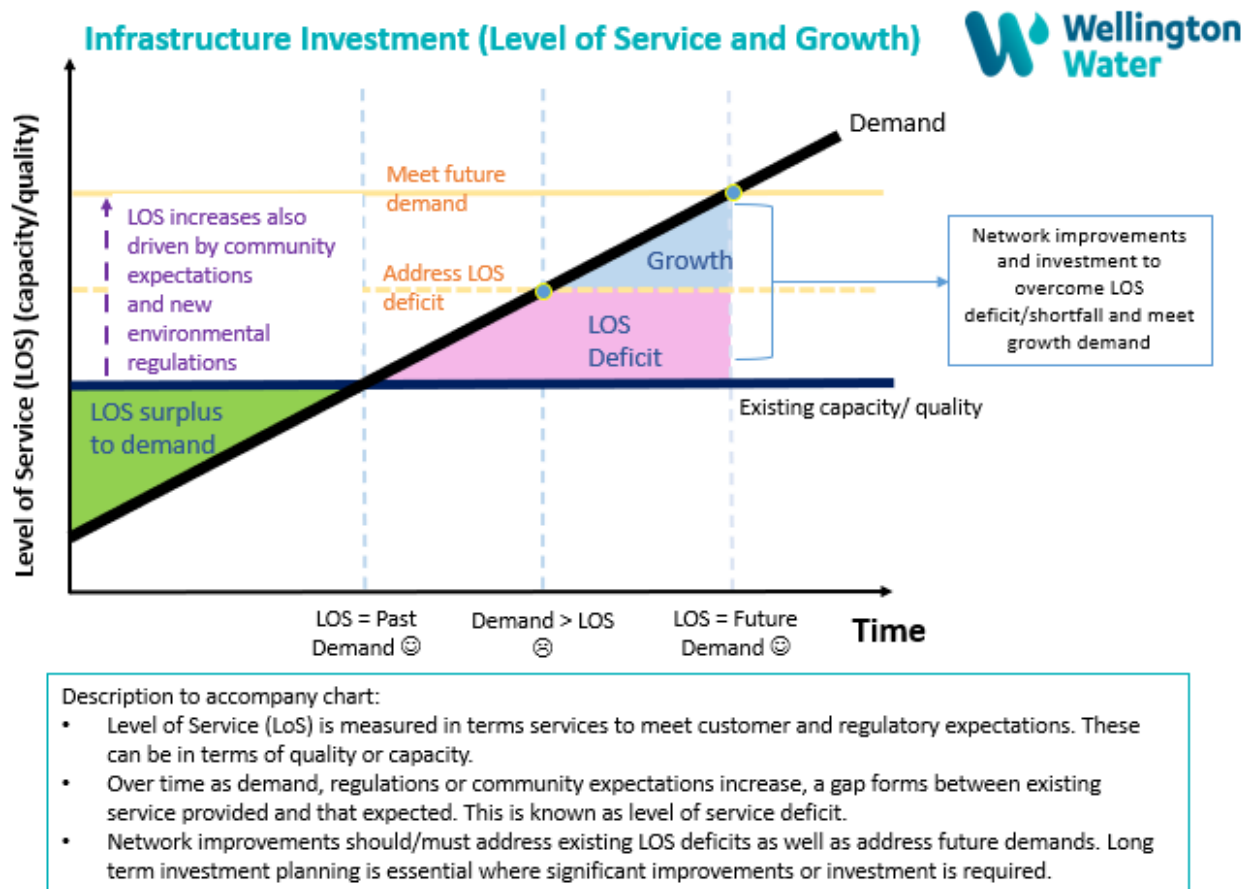


Figure 2: Three waters growth infrastructure investment

4.2 SYSTEM APPROACH TO GROWTH

Our metropolitan areas form an integral component of our water system, essentially making up the other half of our system beyond our physical water networks and assets. Water leaves and enters the water system via a multitude of daily interactions when taking water from the environment, distributing across our cities, in and out of buildings, and then back to the natural environment.

The water system exists to service our people and our metropolitan areas and as the number of people in our cities grow, housing demands rise, and new land is identified for development, our water system must grow too.

4.2.1 City and Network Level

Understanding our networks at a city-wide level will determine how to change our system to best support growth. Future capacity improvements will be identified in Growth Plans that incorporate investment needs, and influences on demand, forecasts and investment needs while considering a combination of projects, demand management, and operational improvements.

4.2.2 Catchment and Suburb Level

The system is altered by third parties proposing significant new development areas looking to connect to our networks. Where there is significant misalignment between city demands and our network supply, areas of new development cannot easily connect to the system. Planning at catchment and suburb level will avoid ad-hoc interventions to the public network and/or customised solutions on individual or isolated private properties.

We will take part in Council structure planning and rezoning proposals to understand development impacts and identify pathways to provide capacity in the right way and determine whether funding is to be provided via Council infrastructure plans or third parties.

4.2.3 Household/Building Level

Each new household or building that connects to the system provides an opportunity to incorporate water management principles and improvements. We will provide specialist three-waters advice to the Council to inform consent decisions being made on development proposals. We will apply design standards and complete inspections for new subdivision networks and development connections.

Where appropriate, we request three-water mitigation measures that support us to meet our strategic priorities, for example, water meters, stormwater, and wastewater storage, water sensitive devices, and water demand management devices in new housing and building developments.

4.2.4 Growth Planning Framework

Wellington Water’s growth planning framework is developing as we learn more about our networks, available tools (e.g., hydraulic models) and as councils’ urban growth plans are further developed. Our growth planning framework is divided into four branches within the three waters network and aligns with future planning activities, as shown in Table 3. We are working toward further developing and refining how we implement this framework over the coming years aligned to our strategy-led approach.

Table 3: Growth Planning Framework

Scale	Scope / Time Horizon	Objective/s
Regional (bulk system)	A long-term (+50 years) regional strategic approach involving bulk infrastructure system and considering factors that could influence the three waters system (e.g., climate change, environmental limits, technology, community behaviours).	We understand the extent and configuration of the core network elements required to enable the region’s long-term growth, service expectations and have planned the necessary investment pathway.
City/catchment (trunk system)	A medium to long-term (30-year) city/catchment view of the three waters network and interventions required for a growth area or catchment.	We understand the three waters infrastructure services required to achieve each city/district’s planned growth and have integrated it with other infrastructure where possible.
Suburb/growth area (network system)	A short to medium-term (3 to 10-year) view of servicing growth within a discrete growth area, prioritised based on district planning.	To provide detailed plans to service growth areas aligned with combined objectives, for growth capacity and levels of service.
Sub-division/household level (local system)	A short-term view as new subdivisions and development take place to adopt measures when building and vesting new networks and assets that align to wider network objectives and plans.	Council policy and Wellington Water requirements and standards include three waters management requirements for new developments that enable us to achieve our strategic priorities.

4.4 Developing our growth planning toolkit

We are on a journey to develop our tools and approaches to improve our integrated infrastructure planning and advice to support growth.

We are working on process improvements to achieve a proactive approach to growth planning, providing consistent frameworks, tools and methodologies for growth related decision-making and advice. Table 4 shows a summary of the types of elements that fit in our growth planning toolkit.

Table 4: Growth Planning Toolkit

Activity	Purpose
Growth Planning Manual & Framework	<p>A growth planning manual is under development to document our growth planning practices. The manual will cover the following types of topics:</p> <ul style="list-style-type: none"> • Growth Planning Methodologies • Managing Population Forecasts • Demand Management • Adaptive Growth Planning Framework • Responses to legislative/policy drivers and changes • Growth Contribution Attribution
Growth Planning GIS Tool	Document and communicate growth projects to support integrated investment decision making and works programming.
Environmental measures for growth planning	Define measures to be used to measure impact of growth, underpinned by a strategic environmental assessment of growth.
Business Case Approach for Growth Planning	Integrate business case approach to better inform decision-makers and provide a holistic review of costs, and benefits of projects
Three-Water Growth Studies, and Servicing Plans	To inform and ensure wider infrastructure planning aligns with growth planning.

5. REFLECTIONS

Reflecting on how we approach growth planning to achieve integrated land-use and investment planning. Wellington Water has had to respond and prioritise growth planning through intentional lift in capacity and investment within the organisation. The growth planning team has doubled in two-years. Dedicated investment for growth, will support the development of a future pipeline of projects to support growth through a strategy-led and strategic business case approach.

The combination of more resources and funding will enable improved delivery and phasing of work to provide timely advice in line with external planning processes and mature our approach to better asset management practices and methodologies.

At the same time, we must continue to adapt and improve our growth planning approaches, as we face challenges of new policy directives, RMA and Water Reforms and increased development and infrastructure activity in our region.

6. CONCLUSIONS

Growth planning requires an integrated, collaborative and responsive framework of tools, evidence and options to be able to support growth in a manner that is coordinated and responsive to new opportunities for innovation and investment. Wellington Water and our team of consultants and council-partners have been on a journey to improving our approaches to growth within the region. We are looking forward to the future creating a framework that enables our region to collaborate in response to complex intergenerational challenges such as climate change, environmental water quality and affordability.

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Wellington Regional Growth Framework (WRGF)

Wellington Water Client Councils:

- Greater Wellington Regional Council (GWRC),
- Hutt City Council (HCC),
- Porirua City Council (PCC),
- South Wairarapa District Council (SWDC),
- Upper Hutt City Council (UHCC); and
- Wellington City Council.

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