Wellington Metropolitan
Water Services Asset Management Plan

2025

Revision table

Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
15/05/25 v1.1	For consultation to the Wellington Water Board & CE	L Bennett		CE
16/06/25 v2	Published AMP – live content frozen at this date.	L Bennett		

Note: Document revision is managed in detail in each Section of this AMP.

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Water Services Asset Management Plan
2025

Executive Summary

Overview

The *Wellington Metropolitan Water Services AMP 2025* outlines the strategies, investment plans, and risk management priorities for the management of three waters services—drinking water, wastewater, and stormwater—across the Wellington region. These services are provided by Wellington Water Ltd (WWL), which is owned by local councils but operates as a professional entity tasked with delivering safe, reliable, compliant, and affordable water services.

The AMP is a response to the pressures facing water infrastructure in the region, including aging assets, increased demand from population growth, climate change, and heightened regulatory standards. The document outlines the approach to asset management over the next 30 years, focusing particularly on the 2024–2034 Long Term Plan (LTP) period.

Strategic Direction and Regional Priorities

The AMP is guided by six strategic priorities established by the Wellington Water Committee:

1. Look after existing infrastructure.
2. Support urban growth.
3. Ensure sustainable water supply for the future.
4. Improve the water quality of rivers, streams, and harbours.
5. Reduce carbon emissions and adapt to climate change.
6. Increase resilience to natural hazards.

These priorities shape the operational and capital investment decisions, although WWL's ability to achieve them is influenced by funding levels determined by individual councils.

Key Strategic Challenges

The key strategic challenges faced by Wellington Water in this AMP are:

1. **Aging Assets:** WWL reports a significant proportion of assets are beyond their expected service life. For instance, 31% of the water supply network is in poor or very poor condition. Aging pipes and facilities lead to increased service failures and reactive maintenance, placing pressure on operational budgets and reducing service reliability.
2. **Climate Change and Seismic Risks:** Climate change is increasing the intensity and frequency of extreme weather events, impacting all three water systems. At the same time, Wellington's seismic risk—especially from the Wellington Fault—poses a threat to bulk water supply and wastewater systems. Major earthquake scenarios could result in more than 100 days without central water supply in parts of the region.

3. **Population Growth:** Population growth is forecasted to rise across metropolitan councils (Wellington, Lower Hutt, Upper Hutt, and Porirua), leading to increased demand for water services, wastewater treatment, and stormwater management. Growth creates a dual pressure: expanding networks while also renewing aged assets.
4. **Environmental and Regulatory Pressures:** Stricter environmental regulations (including the National Policy Statement for Freshwater Management and the Net Carbon Zero 2050 target) are raising expectations for wastewater treatment, stormwater discharge quality, and greenhouse gas emissions reductions. New standards require substantial investment in infrastructure and operational changes.

The Assets We Manage

WWL manages thousands of kilometres of pipelines, reservoirs, pump stations, and treatment facilities across three networks:

1. **Water Supply**: Sourced from rivers and aquifers, treated at plants including Te Marua, Wainuiomata, and Waterloo. The bulk system is owned by GWRC, with local networks owned by the territorial authorities.
2. **Wastewater**: Includes four large-scale treatment plants (Moa Point, Seaview, Porirua, and Western), extensive pipe networks, and pump stations.
3. **Stormwater**: Comprises gravity systems and pump stations to manage runoff and reduce flood risk, especially in low-lying and coastal areas.

Assets are prioritised for intervention by criticality (Very High Criticality Assets [VHCA], High Criticality Assets [HCA], and so on), which informs maintenance and renewal priorities. VHCA pipes, treatment plants, and reservoirs are given the highest attention due to the scale of impact from their failure.

The services provided by the three waters assets are:

1. **Water Supply**

   WWL supplies over 160 million litres per day to about 425,000 residents. Households use about 60 percent of the total supply, with 20 percent used by industry, businesses, schools, hospitals and fire services. Water losses are estimated at approximately 20 percent.

   The public water supply protects the community from water-borne illnesses, supports modern urban lifestyles, protects community safety through fire-fighting capabilities and supports industrial and residential development and the local economy.

2. **Wastewater Service**

   WWL treats over 150 million litres of wastewater a day on average. Wastewater contains 99 percent water used from domestic, industrial or commercial activities and about 1 percent human and other waste. This wastewater leaves homes and businesses through plumbing and enters the public wastewater network. This includes trade waste such as landfill leachate. Because the waste component contains bacteria and viruses that could be harmful to human health, it must be kept separate from the drinking water in accordance with the Health Act 1956. The public wastewater service supports the health of our communities and helps protect the natural environment.

Mana whenua put high value on avoiding contamination of water in the environment and in its natural state with wastewater. We have established partnerships with mana whenua to help achieve mutual interests in restoring and enhancing Te Mana o te Wai, which includes working to ensure that wastewater discharges do not adversely affect the values and practices attributed to waterways by our mana whenua partners.

3. **Stormwater Service**

Stormwater that is properly managed helps protect human health and welfare and reduces its potential impacts on property and the environment. This can only be achieved through an integrated approach to land use, in both existing and future areas of urban development. Stormwater management and improved environmental outcomes are linked with wastewater management, due to historical cross connections and intermittent overflows. Effective management will reduce risk over time and improve environmental outcomes while supporting growth.

The extent of the assets we manage

The three waters assets are described at a regional level in the Table below.

Asset condition assessments reveal that many critical assets (especially high and very high criticality assets) are aging and require prioritised investment based on risk and condition.

Table: Regional assessment of three waters assets

	Potable Water	Wastewater	Stormwater
Element	**Region**	**Region**	**Region**
Non-residential connections	10428	Metro: 10,521	Metro: 10,521
Average Age of the Network - **including** connection pipes	41.73	53.95	47.83
Average Age of the Network - **excluding** connection pipes	43.45	56.9	49.03
Number of treatment plants	4	4	N/A
Number of assets within treatment plants	10654	3473	N/A
Number of assets inside treatment plants with a condition grading	646	3282	N/A
Percentage of assets inside treatment plants with a condition grading	6.1%	94.5%	N/A
Number of assets inside treatment plants in poor or very poor condition	83	231	N/A
Percentage of assets inside treatment plants in poor or very poor condition	0.8%	6.7%	N/A
Number of pump stations (non WTP sites)	89	208	24
Number of reservoirs (non TP sites)	140	N/A	N/A
Number of reservoir and pump station sites with a condition grading	163	42	23
Percentage of reservoir and pump station sites with a condition grading	71%	20%	96%
Number of reservoir and pump station sites in poor or very poor condition	41	23	8
Percentage of reservoir and pump station sites in poor or very poor condition	18%	11%	33%
Length of pipe (km)	2491.7	2449.3	1923.2
Length of network (km) with a condition grading	2352.5	2380.6	1850.4
Percentage of network (km) with a condition grading	94.4%	97.2%	96.2%
Length of network (km) with a poor or very poor condition grading	676.64	683.2	260.9
Percentage of network (km) in poor or very poor condition grading	27.2%	27.9%	13.6%

Source: WWL (DPS) March 2025

1. **Water Supply Assets and Value**

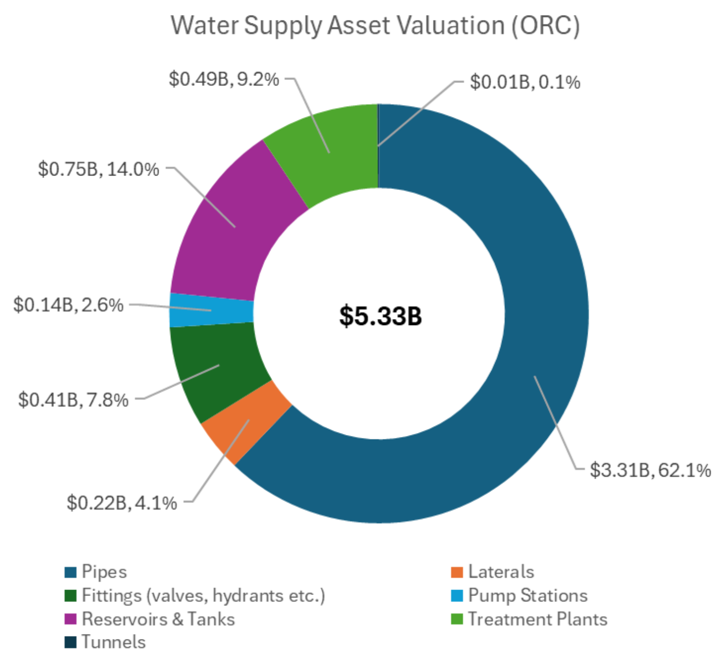
The metropolitan water supply predominantly serves its cities and operates within defined hydraulic catchments or supply zones. The asset groups and value are provided in the Table and Figure below.

Table: Water supply asset quantities

Asset Type	Unit of Measure	Quantity
Reservoir sites	No. sites	110
Reservoir tanks (network)	No.	146
Emergency tanks	No.	47
Pipes	km	2490
Pump Station Sites	No. sites	85
Treatment plants	No.	4

Sources: Table - WWL (DPS) December 2024; Figure - Asset valuations - GWRC March 2022; WCC, UHCC and HCC - June 2024; PCC - June 2023

Figure: Water supply asset replacement cost



2. **Wastewater Service Assets and Value**

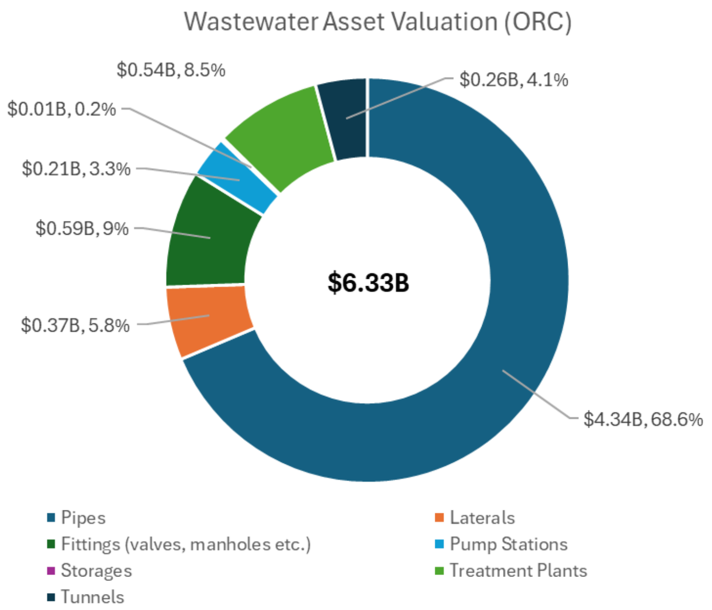
The regions wastewater networks generally serve areas within the region's cities and operate within defined hydraulic catchments. The asset groups and value are provided in the Table and Figure below.

Table: Wastewater asset quantities

Asset Type	Unit of Measure	Quantity
Pipes	km	2342.73
Pipes (Joint Venture)	km (JV)	112.8
Pumpstations (incl. Joint Venture)	No.	180
Treatment Plants	No.	4

Sources: Table - WWL (DPS) December 2024; Figure – Asset valuations - GWRC March 2022; WCC, UHCC and HCC - June 2024; PCC - June 2023

Figure: Wastewater asset replacement costs



3. **Stormwater Service Assets and Value**

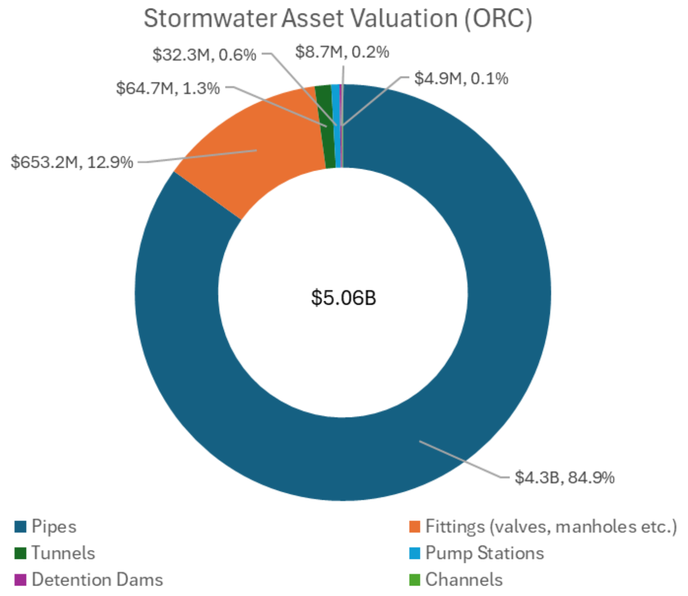
The stormwater service network generally serves areas within the region's cities and operate within defined hydraulic catchments. The asset groups and value are provided in the Table and Figure.

Table: Stormwater asset quantities

Asset Type	Unit of Measure	Quantity
Pipes	km	1832.07
Pumpstations	No.	24

Sources: Table - WWL (DPS) December 2024; Figure - Asset valuations - GWRC March 2022; WCC, UHCC and HCC - June 2024; PCC - June 2023

Figure: Stormwater asset replacement cost



Levels of Service and Performance Management

WWL employs a Service Goal Framework linked to outcomes such as health, resilience, affordability, and regulatory compliance. These outcomes are supported by performance indicators and targets tracked via dashboards and customer feedback.

Key Indicators are:

- **Water quality compliance**: Includes fluoride dosing and pathogen control.
- **Leak response times**: Critical to managing water losses.
- **Wastewater overflows**: Both dry and wet weather incidents.
- **Stormwater discharge quality**: Measured against environmental benchmarks.

Performance trends highlight growing maintenance workloads, increased leakage rates, and a heavy reliance on reactive maintenance. For example, 75% of all work orders are on the drinking water network, and the number of reactive faults is rising.

Demand Forecasting and Capacity Planning

Demand forecasting is a cornerstone of the AMP. Growth modelling incorporates population forecasts, housing intensification, and development proposals. WWL uses network models for all three waters to assess current and future capacity, identifying bottlenecks and informing investment priorities.

- **Drinking Water:** Average daily demand is increasing. Baseflow trends (water use per person) are stabilizing with conservation measures.
- **Wastewater:** Treatment plants are near capacity during wet weather due to inflow and infiltration. Major upgrades will be needed to cope with additional volume.
- **Stormwater:** Increased urbanisation is driving higher runoff volumes. 10-year and 100-year storm event scenarios are modelled for resilience planning.

Risk Management and Resilience

WWL takes a structured approach to risk using a regional framework. Risks are categorised by likelihood and consequence, and mitigation plans are linked to capital and operational priorities.

Our key risks are:

- Seismic events damaging bulk networks.
- Drought affecting water supply.
- Asset failures causing service disruptions.
- Non-compliance with environmental or safety regulations.

Our resilience measures include:

- Infrastructure redundancy (e.g., dual mains, storage reservoirs).
- Seismic strengthening of pipelines and treatment plants.
- CIR (Community Infrastructure Resilience) hubs for emergency water supply.
- Asset condition assessments and prioritised renewal programmes.

Environmental Stewardship and Carbon Reduction

WWL is committed to achieving environmental goals aligned with Te Mana o te Wai and Net Zero 2050. Actions include:

- Upgrading treatment plants to reduce nutrient and pathogen discharges.
- Improving stormwater systems to reduce pollution.
- Transitioning to lower-emissions technologies and vehicles.
- Tracking and reducing operational greenhouse gas emissions across all councils.

Challenges remain in financing upgrades and changing public behaviour, but the AMP outlines a clear strategy toward more sustainable infrastructure and operations.

Investment Planning and Funding Challenges

WWL has developed 10-year and 30-year investment forecasts across three waters. These include:

- **10-Year Operational Forecasts:** As per councils adopted Long Term Plan (LTP) 2024-2034. For the respective waters, this amounts to:
    - Drinking water: $755.5M
    - Wastewater: $640.5M
    - Stormwater: $112.1M

The 10-year Operational Investments by water are presented below:

WATER SUPPLY

Table: Water Supply - FY24/34 10 year operational investment forecast (values)

Year	Shareholder Council					
	GWRC	WCC	HCC	PCC	UHCC	Grand Total
FY24-25	$27,530,000	$28,052,880	$14,738,433	$4,835,900	$3,194,015	$78,351,228
FY25-26	$29,399,845	$22,978,319	$12,458,567	$4,815,225	$3,194,015	$72,845,971
FY26-27	$30,006,245	$22,731,544	$12,960,032	$4,820,013	$3,194,015	$73,711,849
27/28	$29,996,245	$22,642,285	$13,451,924	$4,824,993	$3,194,015	$74,109,462
28/29	$31,410,595	$22,402,913	$13,423,214	$4,787,172	$3,194,015	$75,217,909
29/30	$31,024,745	$22,132,212	$13,694,857	$4,780,172	$3,194,015	$74,826,001
30/31	$31,135,545	$22,790,760	$14,150,400	$4,780,172	$3,194,015	$76,050,892
31/32	$31,682,395	$22,649,613	$14,144,321	$4,780,172	$3,194,015	$76,450,516
32/33	$31,760,695	$22,470,138	$14,223,067	$4,780,172	$3,194,015	$76,428,087
33/34	$33,119,945	$22,156,453	$14,229,936	$4,787,172	$3,194,015	$77,487,521

Figure: Water supply - FY24/34 10 year opex investment forecast (stacked)

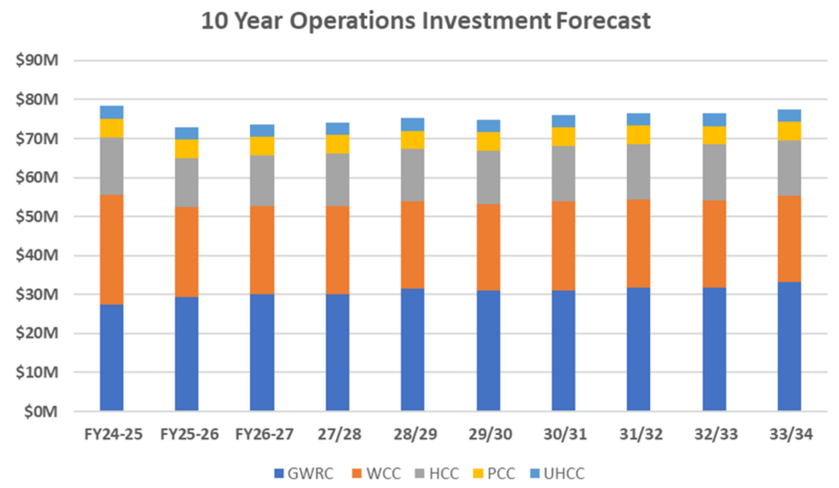


Figure: Water supply - FY24/34 10 year opex investment forecast (% by Council)

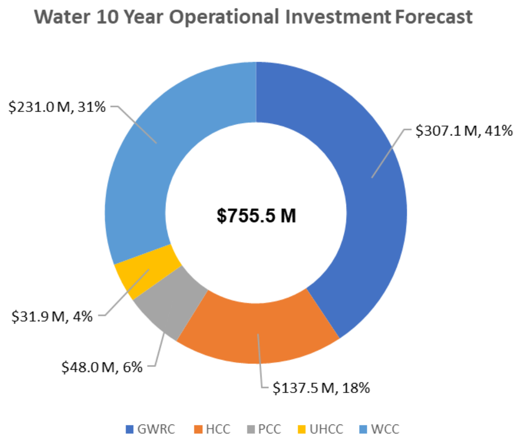
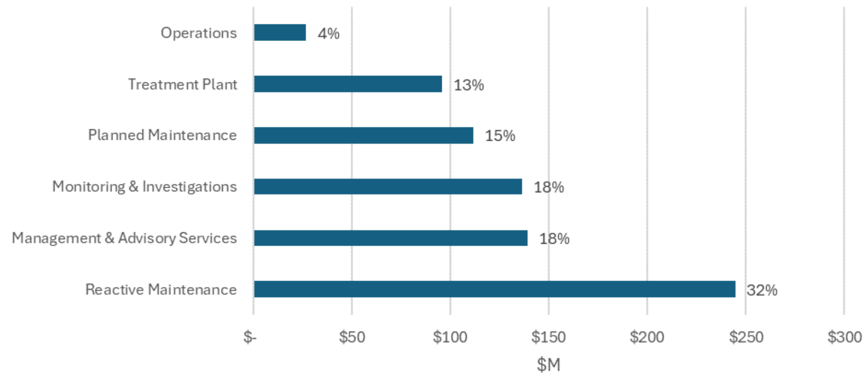


Figure: Water Supply – FY24/34 10 year opex investment forecast by category



WASTEWATER

Table: Wastewater FY24/34 10 year operational investment forecast (values)

Year	Shareholder Council				
	WCC	HCC	PCC	UHCC	Grand Total
FY24-25	$33,121,951	$18,572,741	$6,021,084	$5,843,585	$63,559,360
FY25-26	$33,315,756	$18,892,513	$6,049,583	$5,881,668	$64,139,520
FY26-27	$33,251,468	$18,829,596	$6,078,267	$5,908,508	$64,067,839
27/28	$33,360,477	$19,003,456	$6,107,138	$5,925,317	$64,396,387
28/29	$33,594,022	$19,088,653	$6,150,822	$5,964,565	$64,798,061
29/30	$33,809,208	$18,837,208	$6,151,072	$6,002,444	$64,799,932
30/31	$33,112,890	$18,351,820	$6,066,709	$5,877,785	$63,409,203
31/32	$33,237,539	$18,366,568	$6,076,709	$5,895,425	$63,576,240
32/33	$33,362,127	$18,332,803	$6,086,709	$5,917,625	$63,699,263
33/34	$33,662,239	$18,338,689	$6,110,709	$5,947,685	$64,059,321

Figure: Wastewater - FY24/34 10 year opex investment forecast (stacked)

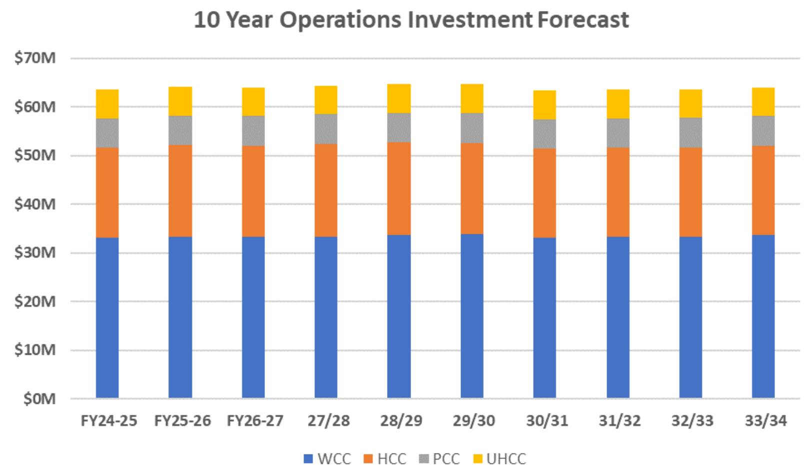


Figure: Wastewater - FY24/34 10 year opex investment forecast (% by Council)

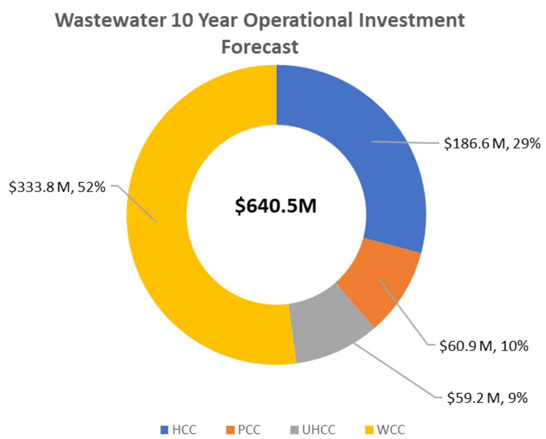
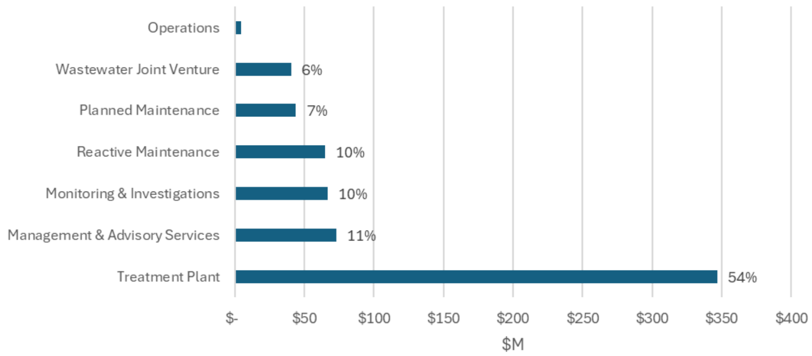


Figure: Wastewater – FY24/34 10 year opex investment forecast by category



STORMWATER

Table: Stormwater - FY24/34 10 year operational investment forecast (values)

Financial Year	Shareholder Council				
	WCC	HCC	PCC	UHCC	Grand Total
FY24-25	$4,423,976	$4,535,870	$1,443,016	$829,858	$11,232,719
FY25-26	$4,404,732	$4,548,964	$1,435,192	$829,858	$11,218,745
FY26-27	$4,315,795	$4,597,416	$1,401,720	$829,858	$11,144,788
27/28	$4,296,045	$4,661,664	$1,367,869	$829,858	$11,155,435
28/29	$4,301,873	$4,605,177	$1,362,006	$829,858	$11,098,913
29/30	$4,357,388	$4,584,979	$1,368,756	$829,858	$11,140,980
30/31	$4,395,158	$4,614,824	$1,453,119	$829,858	$11,292,958
31/32	$4,411,655	$4,606,155	$1,443,119	$829,858	$11,290,786
32/33	$4,466,543	$4,561,174	$1,433,119	$829,858	$11,290,693
33/34	$4,480,115	$4,548,419	$1,402,119	$829,858	$11,260,510

Figure: Stormwater- FY24/34 10 year opex investment forecast (stacked)

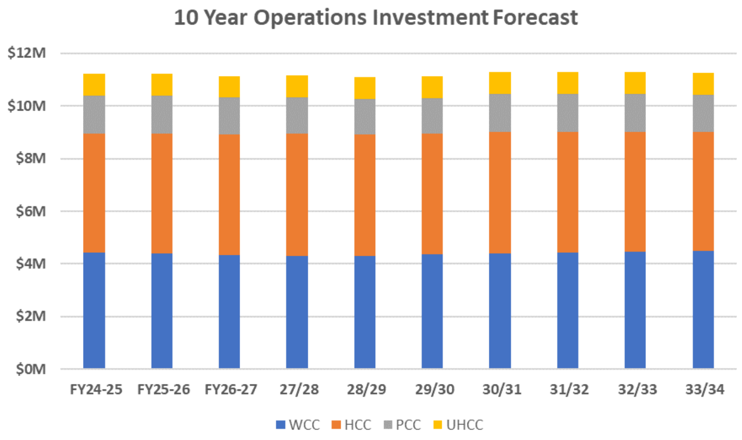


Figure: Stormwater - FY24/34 10 year opex investment forecast (% by Council)

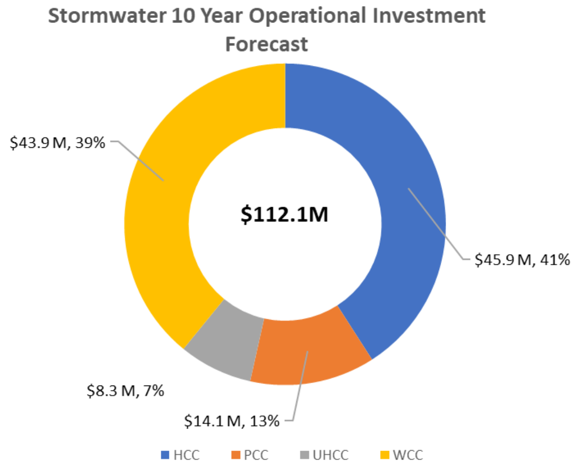
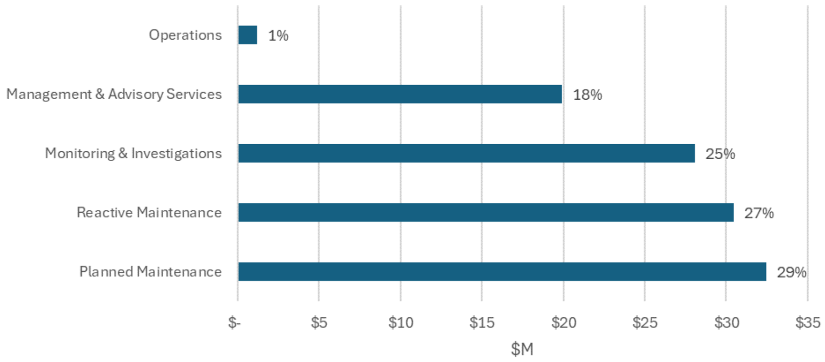


Figure: Stormwater – FY24/34 10 year opex investment forecast by category



30-Year Capital Needs: The figures used as those provided as part of council's infrastructure strategy development and used for 30-year Capital forecasts. Substantial increases projected to meet renewal backlogs, growth demand, and environmental compliance. The forecasts by water are presented below.

Notes:

1. *The 30-year capital forecast – see Figure and Table, covers all investment categories i.e., growth, levels of service, renewals. Investment Projections.*
2. *Funded and partially funded values [blue and red bands] are taken directly from the shareholder councils adopted LTP 2024/2034. The 'need' funding profile [grey band], is based on the submission to the National Transition Unit (for Entity C) of June/July 2023 and covers all assets including networks, reservoirs, pumpstations and control systems.*

WATER SUPPLY

Risks to achieving Levels of Service. The gap between funded and partially funded investment and the investment 'need' maybe observed by customers through increased water supply network leakage and possible water contamination events at reservoirs. Further risks are identified in the Risk section of this document.

Figure: Water Supply funding challenge

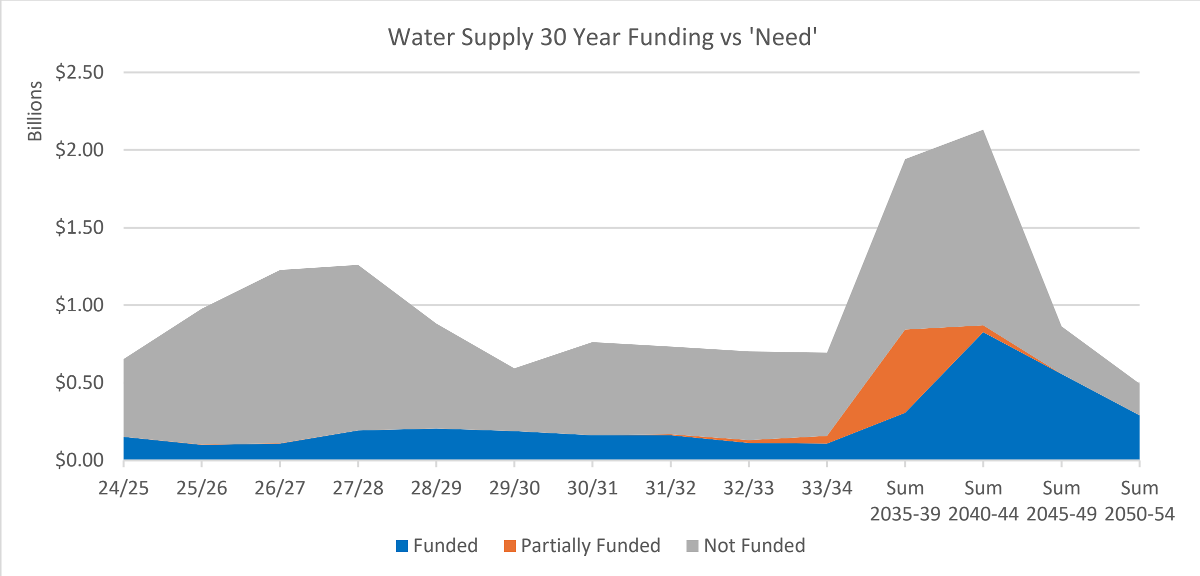


Table: Water Supply funding challenge (values)

Financial Year	Funded($M)	Partially Funded($M)	Not Funded($M)	Total($M)
24/25	151.99	0.20	501.16	653.35
25/26	100.15	2.00	874.20	976.35
26/27	108.93	2.00	1,116.44	1,227.37
27/28	192.18	1.10	1,067.74	1,261.02
28/29	205.68	-	676.43	882.12
29/30	188.59	-	405.59	594.18
30/31	161.87	1.10	599.84	762.81
31/32	162.13	5.44	566.83	734.40
32/33	112.74	19.56	571.53	703.84
33/34	109.39	48.68	535.65	693.73
Sum 2035-39	306.68	535.76	1,098.02	1,940.46
Sum 2040-44	825.98	45.00	1,259.76	2,130.74
Sum 2045-49	556.93	-	307.13	864.06
Sum 2050-54	289.70	-	204.57	494.28
Total	**3,472.96**	**660.85**	**9,784.89**	**13,918.70**

WASTEWATER

Risks to achieving Levels of Service. The gap between funded and partially funded investment and investment 'need' maybe observed by customers through increased wastewater network overflows into streets and waterways along with surface water contamination events. The impact on communities and the partnership with mana whenua may be negatively impacted. Further risks are identified in the Risk section of this document.

Figure: Wastewater funding challenge

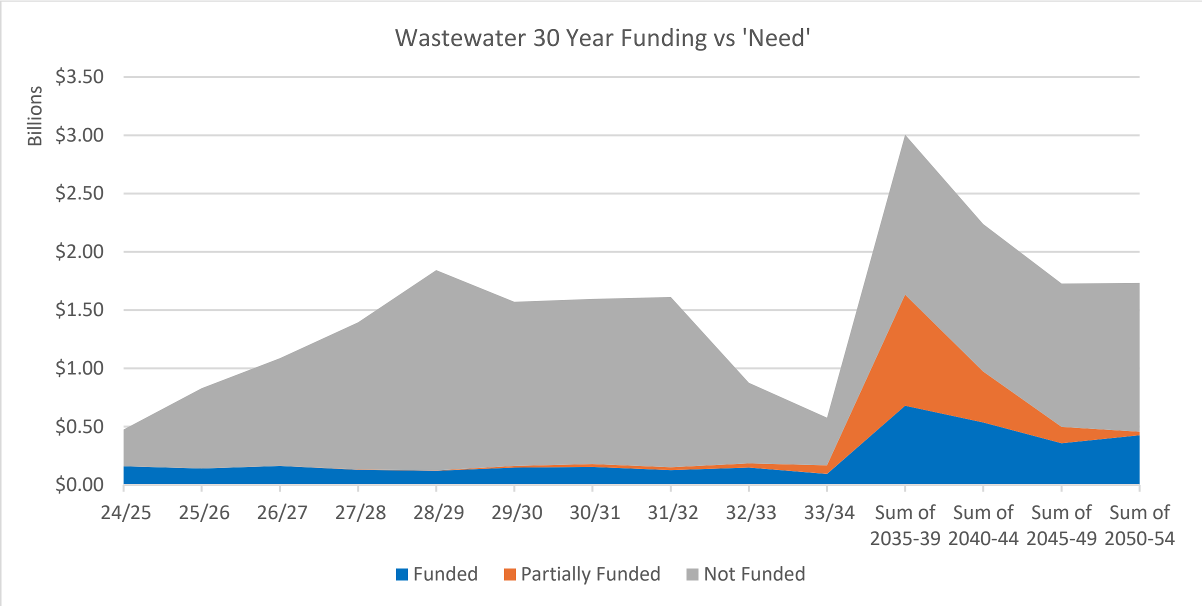


Table: Wastewater funding challenge (values)

Financial Year	Funded($M)	Partially Funded($M)	Not Funded($M)	Total($M)
24/25	161.03	0.41	315.27	476.71
25/26	141.82	0.41	687.37	829.61
26/27	162.88	0.41	925.61	1,088.90
27/28	131.31	0.90	1,264.84	1,397.05
28/29	123.06	2.25	1,717.04	1,842.35
29/30	149.11	14.63	1,409.27	1,573.01
30/31	155.79	23.71	1,418.11	1,597.61
31/32	127.54	23.86	1,462.66	1,614.06
32/33	149.13	34.79	694.07	877.99
33/34	95.40	73.78	407.86	577.04
Sum 2035-39	680.10	953.09	1,372.60	3,005.78
Sum 2040-44	536.63	435.54	1,265.79	2,237.96
Sum 2045-49	357.96	140.56	1,229.92	1,728.43
Sum 2050-54	426.40	30.75	1,277.70	1,734.86
Total	**3,398.15**	**1,735.10**	**15,448.11**	**20,581.36**

STORMWATER

Risks to achieving Levels of Service. The gap between funded and partially funded investment and the investment 'need' maybe observed by customers through increased extent of flooding (additional to current known flood prone areas). In specific locations this may exacerbate waterway and coastal contamination events where overflow into poorly performing (poor condition) wastewater network renewals results in overflows. Further risks are identified in the Risk section of this document.

Figure: Stormwater funding challenge

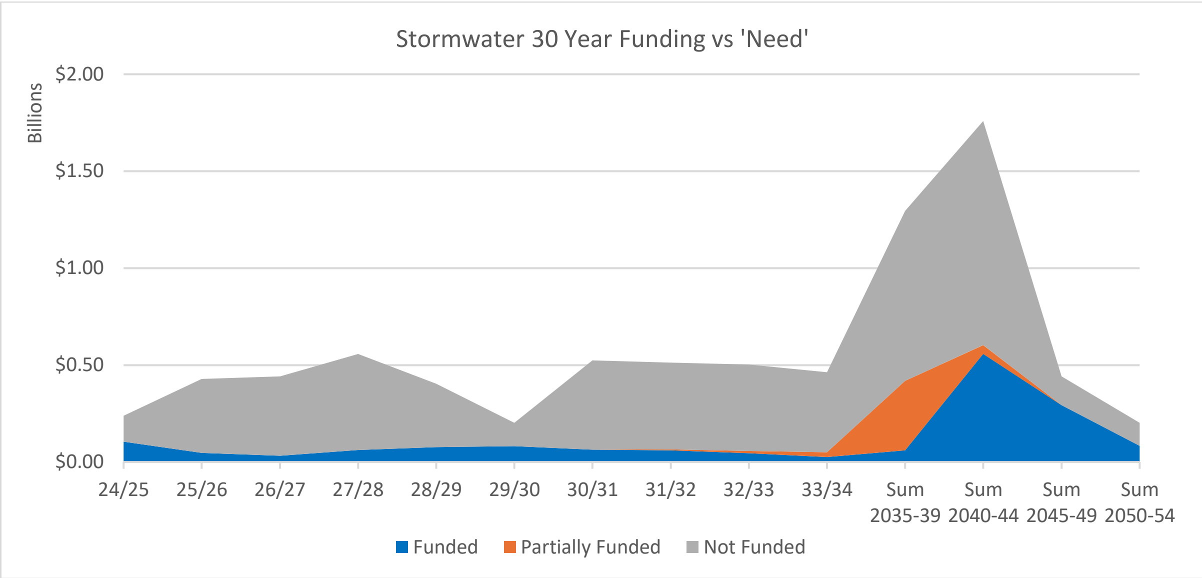


Table: Stormwater funding challenge (values)

Financial Year	Funded($M)	Partially Funded($M)	Not Funded($M)	Total($M)
24/25	104.40	-	134.90	239.30
25/26	46.96	-	381.80	428.76
26/27	32.74	-	408.45	441.18
27/28	62.42	-	494.45	556.87
28/29	76.14	-	327.95	404.09
29/30	81.61	-	121.15	202.76
30/31	62.94	1.00	460.14	524.08
31/32	61.18	4.94	446.29	512.40
32/33	45.02	12.16	445.75	502.94
33/34	25.96	23.72	414.29	463.97
Sum 2035-39	60.98	358.40	876.55	1,295.94
Sum 2040-44	557.88	45.00	1,156.02	1,758.90
Sum 2045-49	293.33	-	149.09	442.42
Sum 2050-54	82.79	-	118.85	201.64
Total	**1,594.35**	**445.22**	**5,935.67**	**7,975.25**

Partnerships and Stakeholder Engagement

WWL works closely with a broad range of stakeholders:

- **Mana Whenua:** Upholding Te Mana o te Wai and integrating Mātauranga Māori principles.
- **Councils:** Advising on investment, asset management, and regulatory compliance.
- **Regulators:** Meeting water quality and environmental standards.
- **Customers and Communities:** Providing safe, reliable services and transparent communication.
- **Industry and Suppliers:** Partnering for efficient service delivery and innovation.

Strong partnerships are essential for balancing technical, environmental, cultural, and social considerations.

Continuous Improvement and Asset Management Maturity

WWL acknowledges the need for stronger asset management practices, especially in data quality, business processes, and condition monitoring. Key improvement tasks include:

- Enhancing the accuracy of asset condition and age data.
- Defining and embedding cross-departmental business processes.
- Formalising depreciation and replacement cost valuations.
- Building internal audit and performance review functions.
- Implementing continuous improvement through ISO 55000-aligned practices.

An Improvement Plan with clear timelines and owners is included to support delivery.

Asset Disposal and Lifecycle Management

The AMP also addresses asset disposal processes, ensuring that decommissioned assets are managed in accordance with legal and environmental requirements. This includes formal evaluations and community/stakeholder consultation.

Conclusion

The *Wellington Metropolitan Water Services AMP 2025* provides a comprehensive roadmap for managing the region's critical three waters services in a challenging environment. It balances operational needs, strategic priorities, risk management, and environmental stewardship within the constraints of limited funding.

Key takeaways include:

- Proactive renewal and resilience planning are essential but underfunded.
- Environmental compliance and carbon reduction are growing drivers of investment.
- Customer service performance is threatened by increasing failures and budget constraints.
- Partnerships and process improvements are critical for long-term sustainability.

Ultimately, the AMP reflects a commitment to long-term stewardship of public infrastructure while recognising the real and pressing limitations faced by councils and communities.

Wellington Metropolitan
Water Services Asset Management Plan
2025

Glossary & Terms

Revision table

Note this revision table will be replaced once final editing is completed.

Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
9.12.24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
23.12.24 v0.2	Working draft issued for WWL feedback (3 Waters)	H. Blake-Manson	-	
11.3.25 v0.5	Working draft issued for WWL feedback (WS) – excludes improvements and risk updates	H. Blake-Manson	R. Blakemore	
10.4.25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			LB
06/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			RM

This Section

Date / Version	Description	WWL Contact
14/05/25 v1.1	First Sectional Release – separation of Glossary, Acronyms, and Te Reo table from Sections	R Millican

Acronyms

Acronym	Description
ACF	Asset Criticality Framework
AMP	Asset Management Plan (previously Regional Service Plan)
Capex	Capital expenditure
CIR	Community infrastructure resilience
DMA	District Metering Area
ETS	Emissions Trading Scheme
WTP	Water treatment plant
GWRC	Greater Wellington Regional Council
HCC	Hutt City Council
HVWS	Hutt Valley Water Services
ICMP	Integrated catchment management plans
I/I	Inflow and Infiltration
KRA	Key result areas
LoS	Level of service
LGA	Local Government Act
MCAR	Managing Critical Asset Risks [Programme]
NIWA	National Institute of Water and Atmospheric Research
NPS-FM	National Policy Statement for Freshwater Management
NPS-UD	National Policy Statement on Urban Development
Opex	Operating expenditure
PCC	Porirua City Council
REN	Renewals
RMA	Resource Management Act
RSP	Regional Service Plan (predecessor document series – 2021)
RTU	Remote telemetry unit
SAM	Small Area Monitor (water metering)
SAMP	Strategic Asset Management Plan
SCADA	Supervisory control and data acquisition
SLA	Service level agreement
SWDC	South Wairarapa District Council
TOTEX	Total expenditure
UHCC	Upper Hutt City Council
Veolia	Veolia New Zealand
VHCA	Very high criticality assets
WSA-TA	Water Services Authority-Taumata Arowai
WCC	Wellington City Council
WIML	Waugh Infrastructure Management Ltd
WWL	Wellington Water Ltd
WREMO	Wellington Region Emergency Management Office
WWTP	Wastewater treatment plant

Glossary

Term	Description
Bulk main	A pipe that conveys drinking water between a treatment plant to a local (city-owned) point of supply; normally a reservoir.
Effluent	Wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall.
Gully trap	Basin adjacent to a building that receives piped wastewater before going into the wastewater network. These are set below building floor level but above ground level to prevent wastewater getting inside a dwelling if there is a block or surcharge in the network.
Level of service	Level of service statements describe the outputs or objectives an organisation intends to deliver to customers.
Network	All connected assets which are used to deliver a particular service. E.g., Wastewater pipes, fittings, pumps etc from a property connection to and including the treatment plant and disposal outfall.
Network fittings	Point assets attached to a pipe network including nodes, valves, hydrants, meters, manholes, sumps, intakes and outlets.
Private wastewater lateral	A pipe that connects a house/building to the wastewater system, the section from the building to the property boundary is privately owned (excluding Wellington City Council)
Receiving environment	Waterways that Wellington Water discharges into and takes water from
Reticulation	Pipeline network
Reticulation main	A 50-200mm diameter pipe
Service pipe Also Service connection	A 20-32mm diameter pipe that connects the public drinking water network to a residence or business.
Three waters	Drinking water, wastewater and stormwater
Trunk water main	A water supply pipe equal to or greater than 250mm in diameter
Trunk sewer	A wastewater pipe equal to or greater than 250mm in diameter.
Wastewater	Any water that has been contaminated by human use. Wastewater is used water from any combination of domestic, industrial, commercial or agricultural activities, and any sewer inflow or sewer infiltration
Water race	A watercourse (ditch or channel) constructed to carry water from a source to a remote distribution point.
Wet well / dry well	A wet well is a liquid storage chamber in a pump station. Submersible pumps may be located within a wet well. A dry well is where pumps are located in a separate chamber adjacent and connected to the wet well.

Te Reo translation

Te Reo	**Translation / interpretation**
Aotearoa	New Zealand
Awa	River
Mana Whenua	The customary authority that iwi / hapu groups have over the land
Manaakitanga	Showing respect, generosity and care for others
Mauri	Life force
Takiwa	Catchment
Tangata whenua	The iwi / hapu groups that hold the mana whenua over the land
Te Mana o te Wai	Refers to the vital importance of water
Tikanga	Māori customary practices or behaviours
Wai-inu	Drinking water
Wai-kato	Full flowing river
Wai-kauau	Running water
Wai-kino	Dangerous / polluted water
Wai-manawa-whenua	Water from under the land
Wai-maori	Fresh water
Wai-mate	Dead water
Wai-ora	Pure / healthy water
Wai-piro	Odorous water
Wai-rere	Stream of water, waterfall
Wairua	Spirit or soul
Wai-tai	Sea water / salt water
Wai-tapu	Sacred water
Wai-tupuhi	Stormwater

Wellington Metropolitan
Water Services Asset Management Plan
2025

Introduction & Stakeholder Review

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

1. Introduction

Wellington Water Ltd (WWL) is council-owned and funded. We are the Wellington metropolitan region's professional water services provider, and our job is to provide safe and healthy drinking water, collect and treat wastewater, and ensure the stormwater network is well managed.

WWL exists so that the people in the Wellington Region have safe, reliable, compliant, affordable drinking water, stormwater, and wastewater services.

Our councils own the water infrastructure in the region. We provide our councils with advice on the level of investment that is needed to maintain, repair and upgrade their assets. Councils make decisions on the level on funding they can afford. Our job then is to work to those budgets and deliver water services based on the level of funding provided.

1.1 Our strategic focus

Our work is guided by the regional strategic priorities for water set by the Wellington Water Committee. These are to:

- Look after existing infrastructure;
- Support growth;
- Ensure sustainable water supply for the future;
- Improve water quality of our rivers, streams and harbours;
- Reduce our carbon emissions and adapt to the impacts of climate change; and
- Increase resilience to natural hazards.

Funding to achieve these priorities varies by council, and our ability to meet these priorities varies as a result.

1.1.1 Our work

As a company, WWL prefers to take a planned approach to managing three waters services rather than reactive to unplanned events. We can do this if councils' funding allows for investment in the agreed priority areas.

The Shareholder Councils adopted 2024-2034 LTP has directed us to ensure we look after existing infrastructure, particularly through an intensive focus on repairs being undertaken in a prioritised, timely and effective manner, and undertaking asset renewals. This does not mean, however, that growth and other level of service projects and programmes are being excluded.

It is important to note that a relatively high proportion of assets still in service are operating beyond their expected service life. Our data points to deterioration in water assets occurring faster than our ability to undertake asset replacement or refurbishment, with the likelihood that service failures will continue to rise. In a constrained funding environment a more reactive approach than is ideal under good asset management practice is necessary e.g., robust evidence and risk-based renewal prioritisation especially for piped networks.

1.2 Strategic direction, challenges and priorities

1.2.1 Strategic direction

It is WWL's role to deliver a set of activities that focuses on the strategic priorities, which in turn achieves our long-term outcomes and considers council specific issues and funding constraints. Every three years, through the long-term planning process, councils seek our advice that is refined on an annual basis. For the LTP 2024/34, we have delivered our advice to councils for their individual long-term plans (see the council specific AMPs). These recommendations result in an agreed, 10-year total expenditure plan for each council. Further information about the investment planning process can be found in the Strategic Asset Management Plan (SAMP), 2021.

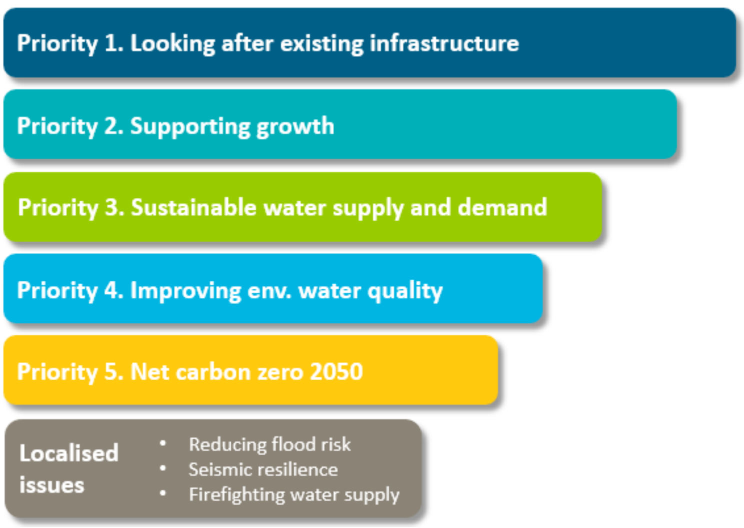
The shareholder councils' long-term plans are the key link between the three waters investment that is made and the impacts we can make as a company for each of our strategic priorities. The more we can think ahead and do what is needed at the right time, in the right order, the greater efficiencies will likely to be gained, and progress made against the outcomes.

1.2.2 Strategic challenges and priorities

We use our long-term customer outcomes and associated service goals to set priorities and guide decision-making. The current and aspirational performance and associated risk against each service goal were used to identify the five priority areas, in most cases the strategic priority delivers on more than one service goal. These were agreed with the Shareholder councils and the Wellington Water Committee – see Figure 1-1: Strategic Priorities.

Additional local issues specific to each council were also identified, such as making our network resilient to seismic activity, reducing flood risk and providing a suitable firefighting water supply. Localised issues are still strategic but with a more localised view based on addressing regional issues rather than system responses.

Figure 1-1: Strategic Priorities



1.3 Asset Management Plan

1.3.1 Purpose

Note this AMP uses the customer outcomes that were applied when preparing advice to Councils for LTP 2024-2034 and which pre-date the objectives in the company's Purpose Statement.

This water services AMP shows the connection between our highest order customer outcomes, our three waters strategy and implementing the operational and capital investment programmes, as well as outlining our approach to asset management.

The AMP is developed for WWL, but may be used by external parties to inform their Water Service Delivery Plan (WSDP). Due to matters of timing and objective, there will be differences in each document's outputs.

1.3.2 Development of the AMP

This water services AMP adopts an ISO 55000 aligned approach and as such, is intended to be a living document within an asset management system (AMS). It was developed from source artefacts using the most relevant data available at this time.

The key artefacts used to develop this AMP are:

- **Councils adopted Long Term Plan (LTP), 2024-2034**: Providing the forecasts for 10-year Capital and Operating expenditure, and Risk commentary.
- **30-Year capital programme forecast**: Provided as part of council's infrastructure strategy development and used for 30-year Capital forecasts.
- **Council specific AMPs**: Updated in 2025 to report their agreed investment plans for LTP 2024-2034. These AMPs are provided in a consistent template format which supports Councils to prepare their Water Service Delivery Plan (WSDP).
- **Regional Service Plan (RSP), 2021**: The RSP was developed to show the connection between our then-highest order customer outcomes, our three waters strategy and implementing the operational and capital investment programmes, as well as outlining our approach to asset management. It was not formally adopted by the Board, but it has influenced Wellington Water's asset management practises since through its component parts:
    1. Strategic Asset Management Plan (SAMP),
    2. Network Service Plan, and
    3. Council Investment Plans.

The content of this document should link to a future revision of the SAMP, which describes Wellington Water's approach to achieve our customer objectives through implementation of our strategies and asset management policy.

1.3.3 Assumptions – confidence and reliability

This section describes the underlying assumptions used in this plan, and the level of confidence WWL have in the data.

1.3.3.1 Assumptions and confidence

WWL continue to improve knowledge of the Shareholder Council's three waters assets and future investment needs through:

- Asset condition and criticality assessments
- Growth studies
- Strategic studies
- Global stormwater and wastewater overflow consents
- Refinement of the age-based network and pump station renewals profiling
- New methodology for measuring and reporting on leaks and faults in the network
- Technical studies e.g., material deterioration rates and
- A centralised asset register

Data and performance are essential to effective and efficient asset management decision making. Data is held within our information management systems, including software systems like Maximo, ArcGIS, etc. The information systems and flow of data are illustrated in the SAMP, 2021. WWL also tracks projects that are being delivered and manage finances related to asset management. This information is used to inform all parts of the asset management system (AMS), help make decisions, report to councils and update information they require e.g., asset valuation.

There are known issues with the asset data, assessment of performance and the management of information which WWL are working to address.

1.3.3.2 General and financial assumptions

General and financial assumptions - for this document are outlined below.

Table 1-1. General assumptions

General Assumption	Strategic Priority	Implications
The 2024 LTP has been developed based on no change to the current asset ownership or management model	All	Change in ownership including financial sustainability/sufficiency requirements may result in changes to loans and rates and will force revision of investment strategies, including prioritisation, within new boundaries.
A regional approach to managing the region's water services will result in the convergence of processes and standards, enabling more consistent and efficient operations.	All	Managing the assets of each council, by different approaches, is not effective.
Asset values presented in this plan are as per the latest valuations carried out for the individual councils (no adjustment for inflation)	Looking after existing infrastructure	Subsequent asset revaluations may change the overall cost of operating, maintaining and renewing assets, and therefore the charges for water services that need to be recovered from customers
The required level of service for system reliability will remain the same in the long term.	Looking after existing infrastructure	If the level of service increases the costs to

General Assumption	Strategic Priority	Implications
		provide the service will also increase.
Growth forecast numbers are aligned with council projections	Supporting growth	If misaligned investment timing will be incorrect potentially resulting in assets that do not meet capacity requirements and affect delivery in other priority areas.
Resource consents will be granted as required for the proposed long-term development options, and the funding requirements are reliable.	Supporting growth	Growth will not occur with impacts on timing and cost of asset/non-asset delivery solutions
If drinking water demand is not reduced, investment in additional water source/storage will be requiredsooner	Supporting growth, Sustainable water supply and demandl	Increase in cost to provide services sooner that would otherwise be required'
Stormwater only new national and regional environmental standards will increase the levels of service required for stormwater quality and impacts on coastal and freshwater.	Improving environmental water quality	Additional investment will be required to meet legislation
Stormwater systems for new developments outside of the current urban footprint will be built to have minimal impact on existing flows and water quality.	Reducing flood risk	If service levels are not met, operational costs will be incurred.
Climate change will have a significant impact on water activities within the planning horizon of this AMP and into the future.	Net carbon zero	Incorporated in Net carbon zero 2050 programme, and will feed long term planning.

Table 1-2. Financial assumptions

Financial Assumption	Strategic Priority	Implications if not achieved
Shareholder Councils will fund operational and capital investment at the level WWL has described as 'need'	All priorities	Service levels and performance measures will not be met
Asset values presented in this plan are those undertaken by Shareholder Councils via 2024 valuations (no adjustment for inflation)	Looking after existing infrastructure	Note only
Asset related projects and programme values/rates are based on unit rates, reflective of representative projects selected by WWL. As these are 'Level Zero' values the uncertainty may be at "+/- 100% in line with WWL approach to cost estimation. These values may not align with asset values established through the valuation i.e., may be under/over asset valuation rates	All priorities	Renewal/replacement values and forecast investment may be incorrect by orders of magnitude
Over the long term, the current replacement costs and the economic lives of assets provide a reasonable indication of future renewal costs and timing.	Looking after existing infrastructure	Renewal/replacement values and forecast investment may be incorrect by orders of magnitude
The scale (including cost), extent and timing of renewals across all physical assets has been estimated based on various methodologies including desktop, physical inspections, and inferred analysis (same materials, installation years etc)	Looking after existing infrastructure	Renewal/replacement values and timing for forecast investment may be incorrect by orders of magnitude
Climate change impacts have not been included in project/programme forecasting, particularly networks (land, waterway and coastal)		This clashes with two Strategic Priorities (Looking After Existing Assets; Net Carbon Zero).

Financial Assumption	Strategic Priority	Implications if not achieved
		Forecasts outside the LTP may be incorrect

1.3.3.3 Asset data confidence

Asset data completeness and confidence ratings are provided in Table 1-3 and Table 1-4 respectively.

Data confidence ratings for:

- water supply assets are provided in Table 1-5
- wastewater assets are provided in Table 1-6

stormwater assets are provided in

- Table 1-7

Table 1-3. Data reliability rating

Completeness rating	Completeness rating comment	Accuracy
A – Highly reliable	Data based on sound records, procedures, investigations, and analysis, documented properly and recognised as the best method of assessment. Data set is 95% complete.	+/- 5%
B – Reliable	Data based on sound records, procedures, investigations, and analysis documented properly but has minor shortcomings, for example some data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or extrapolation	+/- 15%
C – Uncertain	Dataset is substantially complete but 50% is extrapolated data	+/- 30%
D – Very uncertain	Dataset is substantially complete, and most data is estimated or extrapolated	+/- 40%
E - Unknown	No data held	

Table 1-4. Data confidence ratings

Confidence rating	Confidence rating comment	Accuracy
A – Accurate	Data based on reliable documents	+/- 5%
B – Minor inaccuracies	Data based on some supporting documentation	+/- 15%
C – Significant data estimated	Data based on local knowledge	+/- 30%
D – All data estimated	Data based on subject matter expert	+/- 40%
E - Unknown	No data held	

Table 1-5. Water supply asset data confidence

Water Type	Asset Type	Completeness	Confidence
Drinking water	Reservoirs	A	A
	Reservoir Assets	A to C	A to C
	Pipes	B	A to B
	Pump Station Sites	A to B	A to B
	Pump Station Assets	A to C	B to C
	Treatment Plants	A	A
	Treatment Plant Assets	B	C

Source: WWL DPS Asset Data Confidence Summary (2024)

Table 1-6. Wastewater asset data confidence

Water Type	Asset Type	Completeness	Confidence
Wastewater	Pipes	B	A to B
	Pump Stations	A to B	A
	Pump Station Assets	C to D	B
	Treatment Plants	A	A
	Treatment Plant Assets	B	A to B

Source: WWL DPS Asset Data Confidence Summary (2024)

Table 1-7. Stormwater asset data confidence

Water Type	Asset Type	Completeness	Confidence
Stormwater	Pipes	B	B
	Pump Stations	A	A
	Pump Station Assets	C to D	B

Source: WWL DPS Asset Data Confidence Summary (2024)

Since WWL's formation, an ongoing challenge has been matching the variable confidence in asset data quality because of combining the five shareholder councils' datasets. Each council followed its own approach.

The improvement of data and its reliability is an ongoing improvement task including the process to measure its completeness and confidence.

1.3.3.4 Population projections

WWL utilise the Sense Partners regional population forecasts for WCC, UHCC, HCC and PCC – see Figure 1-2, and Table 1-8. Sense partners projections are the generally accepted population projections for all councils.

Sense Partners 2023 population projections are scaled to SA2 statistical boundaries for 2023, 2026, 2033 and 2053 horizons. The 2023 projections are the most current, with no projections produced in 2024 (delay in the release of the Census data).

The next round of projections is expected in 2025. Greater Wellington's 'Future Development Strategy 2024' mentions regional population of around 760,000 in the next 30 years. This number aligns with the Sense Partners 50th percentile population projection for 2053

Figure 1-2: Population growth scenarios for metropolitan councils (2023-2053)

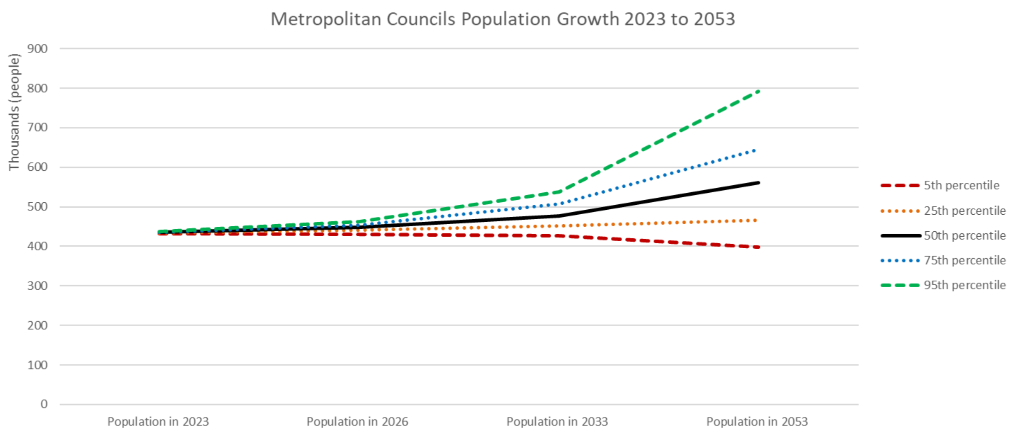


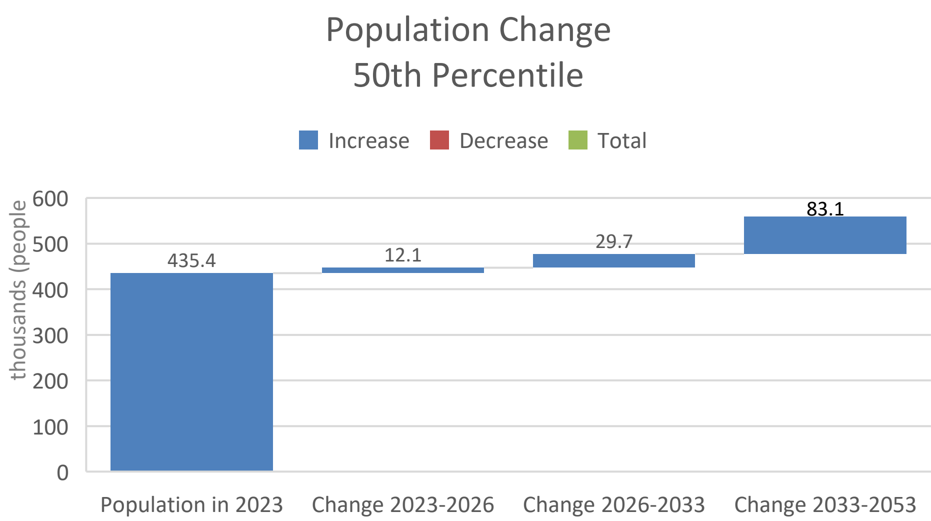
Table 1-8: Population Change 2023 – 2053 for metropolitan councils

Population Band	5th percentile	25th percentile	50th percentile	75th percentile	95th percentile
Population in 2023	432,948	434,325	435,401	436,456	437,899
Change 2023-2026	-2,079	6,135	12,144	17,600	24,600
Change 2026-2033	-4,906	11,468	29,669	53,745	74,511
Change 2033-2053	27,673	13,813	83,118	137,205	255,355

Notes:

- *i)* *PCC undertake their own population estimation assessments.*
- *ii)* *50th percentile data was provided by PCC which matches main population dataset.*

Figure 1-3: Population growth – 50th percentile scenario change for metropolitan councils (2023-2053)



1.3.4 Water Service Delivery Plans

Elements of this AMP and the higher tier AMPs may be used to support production of Water Service Delivery Plans (WSDP). Material differences between data presented in the AMP and WSDP may arise e.g., through WSDP investment sufficiency scenario modelling.

2. Partnerships and stakeholders

2.1 Mana Whenua engagement

The purpose of Mana Whenua Iwi engagement is to ensure we show importance to and engage with Iwi as we plan and carry out works as Wellington Water.

This work is being undertaken for the good of water and our communities. It is important we work with the people affected, to make sure we take care of their interests as we progress.

Wellington Water values relationships with mana whenua iwi, including Taranaki Whānui ki te Upoko o te Ika, Ngāti Toa Rangatira.

2.2 Our customers and the services we provide

Our customers are those who use our services. They are the people who live and work in the areas we service and benefit from the outcomes we seek to deliver; safe and healthy water; that the way we work results in a balance between the interests of water, people, and the environment; and that the three waters network is safe, reliable, and resilient. We strive to be customer-centric in delivering our services, as this leads to increased efficiency and improved outcomes over time. We distinguish customers as end users or beneficiaries of Wellington Water services, and our councils for which we provide services on behalf of.

In carrying out our work, Wellington Water acknowledges the mana whenua of the land to which our organisation and whānau of clients, suppliers and providers is connected through our home workplace in Pito-one Petone. We recognise the role and importance of mana whenua in achieving common objectives for the outcomes of three waters management. The principles of this relationship are partnership and working with those interested in planning, consenting and delivering water services to ensure this work is undertaken in a way that upholds the cultural values and kaitiaki responsibilities and obligations of mana whenua. These principles are carried out by involving mana whenua in the processes, projects and activities of Wellington Water, ensuring this work is guided by the values, tikanga and principles of mana whenua (where appropriate).

Expectations from WWL customers. Our three water networks serve customers who live, work and visit Wellington and the surrounding cities of Porirua, Lower Hutt and Upper Hutt. These customers expect:

- **Quality:** Water that is safe and pleasant to drink and/or can be delivered environmentally safe to the land or ocean. Swimmable quality water bodies.
- **Quantity:** Sufficient hydraulic capacity (volume, pressure, flow) to meet customer needs.
- **Reliability:** Though councils do not guarantee it, there is an expectation of continuous service. We aim to keep service disruptions to a minimum during normal operating conditions and inform customers when interruptions are necessary and service restoration timeframes in real time.
- **Affordability:** Cost of service is reasonable and comparable to other same-size regions.

2.2.1 Customers by water

The types of customers provided with this service are outlined in the following Tables.

Table 2-1 outlines the type of customers for the water supply service.

Table 2-1: Drinking Water - customers and services provided

Customer segment	Services provided
Water supply	
Residents	• Reticulated water supply • Firefighting supply • Te Puna Wai Ora natural water supply • Dowse Square natural water supply
Commercial properties	• Drinking water supply • Firefighting supply
Industry	• Drinking water supply • Industrial water supply • Firefighting supply
Developers	• Advice on servicing of developments
New Zealand Fire Service	• Firefighting supply

Table 2-2 outlines the type of customers for the water supply service.

Table 2-2: Wastewater - customers and services provided

Customer segment	Services provided
Wastewater	
Residents	• Reticulated domestic wastewater disposal
Commercial properties	• Reticulated wastewater disposal • Commercial (trade waste) wastewater disposal
Industry	• Reticulated wastewater disposal • Industrial (trade waste) wastewater disposal
Developers	• Advice on providing wastewater services to developments

Table 2-3 outlines the type of customers for the water supply service.

Table 2-3: Stormwater - customers and services provided

Customer segment	Services provided
Residents Commercial properties Industry	• Reticulated primary stormwater system to support public health by minimising “nuisance” flooding in moderate rainfall events • Minimising the adverse effect of stormwater run-off that exceeds the capacity of the primary stormwater system in severe rainfall events • Managing the environmental effects of stormwater discharges
Developers	• Advice on managing stormwater runoff from developments • Reticulated primary stormwater system (except in "greenfield" areas where the stormwater system is provided by the developer). • Advice on new stormwater assets to be completed as part of the development then vested to council. • Protection of natural drainage pathways.

2.2.2 Key customers stakeholders

Wellington Water is organised to respond to stakeholder asset management needs (current and future) as shown in Table 2-4.

Table 2-4: Wellington Water Ltd Stakeholders

Stakeholder member	Water Services Covered	Role
Councils and their customers	Three Waters	Own the three waters assets, make decisions on investments and budgets and report three waters performance to their communities. Prepare Long Term Plans and Wate Service Delivery Plans.
Iwi-Māori	Te Mana o te Wai Iwi & Hapū cultural heritage	All water to be respected and mauri of water to be protected and enhanced.
Elected Members, Committees, CEO, Management and Staff	Performance and management of services	Key internal stakeholders responsible for the management and operation of the Three Waters system
Wellington Water	Three Waters	Provides management services for three waters assets for councils and the community, across the lifecycle of the assets e.g., maintenance and operation of current assets. Provides programme management function for delivery of new assets. Maintains and operates all drinking water treatment plants, and the wastewater treatment plants.
Greater Wellington Regional Council	Three waters. Development, usage and discharge plans	Asset owner - drinking water catchment areas, intakes, treatment and bulk conveyance. Administers and enforces effective resource management and environmental compliance in the region. Applications are processed through Regional Council
Water Services Authority Taumata Arowai & Ministry of Health	Three Waters	Provide regulation on quality and quantity.
Audit NZ	Compliance and financial regulation	Carries out annual audits of Council on the Auditor-General's behalf to give ratepayers assurance that Council is appropriately reporting on how they spend public money, and, on the services they have provided.
Other Government agencies, Ratepayers Associations, Environmental groups, Fish and Game	Development, usage and discharge plans	These groups liaise with Council in relation to three waters services. Affected parties to Council's resource consents.
Fulton Hogan	Three waters excluding drinking water sources and treatment, wastewater treatment and disposal	Maintains and operates the networks under contractual arrangements.
Veolia NZ Ltd	Wastewater treatment and disposal	Maintains and operates all metro Wellington wastewater treatment plants under a long-term contract.
Other Utility Providers	Service delivery (Term Service Contracts)	Access to assets for operations and maintenance, including planned and reactive works. Payment for services provided within contract terms.
Emergency Management/Civil Defence	Emergency Operations	In the event of a Civil Defence emergency, they provide advice and work alongside emergency services, lifeline utilities and government departments
Contractor Panel	Three waters	Provides construction resources for delivery of new assets, and support during operational and emergency work when required.
Consultancy Panel	Three waters	Provides investigation, design, and project management services to support the planning and delivery of new assets.

Stakeholder member	Water Services Covered	Role
Eurofins ELS	Three waters	Provides a unified water quality laboratory testing service.
Customer Panel	Three waters	Provides an external, customer focused view to test and provide feedback on proposals and direction.

Wellington Metropolitan
Water Services Asset Management Plan
2025

The Assets we Manage

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

3. Three waters – the assets we manage

Wellington Water provides drinking water, wastewater and stormwater services to its customers. These three waters services are provided on behalf of its shareholder Councils: Greater Wellington Regional Council (GWRC), Hutt City Council (HCC), Porirua City Council (PCC) Upper Hutt City Council (UHCC) and Wellington City Council (WCC).

WWL are responsible for the maintenance, upgrade, renewal and development of the three waters infrastructure through the asset's entire lifecycle. To deliver the three waters services in a cost effective and sustainable way, delivery of services is managed in accordance with the strategic direction established in the SAMP.

The water cycle – see Figure 3-1 shows a generic water cycle diagram with interaction between the waters. Our three waters services utilise many of the features on this diagram but in unique contexts that are determined by the history of our development and the natural resources of our region.

Why we provide a public water supply

WWL supplies over 160 million litres of water per day (on average) to Upper Hutt, Lower Hutt, Porirua, Wellington. This supply serves a resident population of about 425,000 or 368 litres per resident per day. Households use about 60 percent of the total supply, with 20 percent used by industry, businesses, schools, hospitals and fire services. Water losses are estimated at approximately 20 percent.

The public water supply protects the community from water-borne illnesses, supports modern urban lifestyles, protects community safety through fire-fighting capabilities and supports industrial and residential development and the local economy.

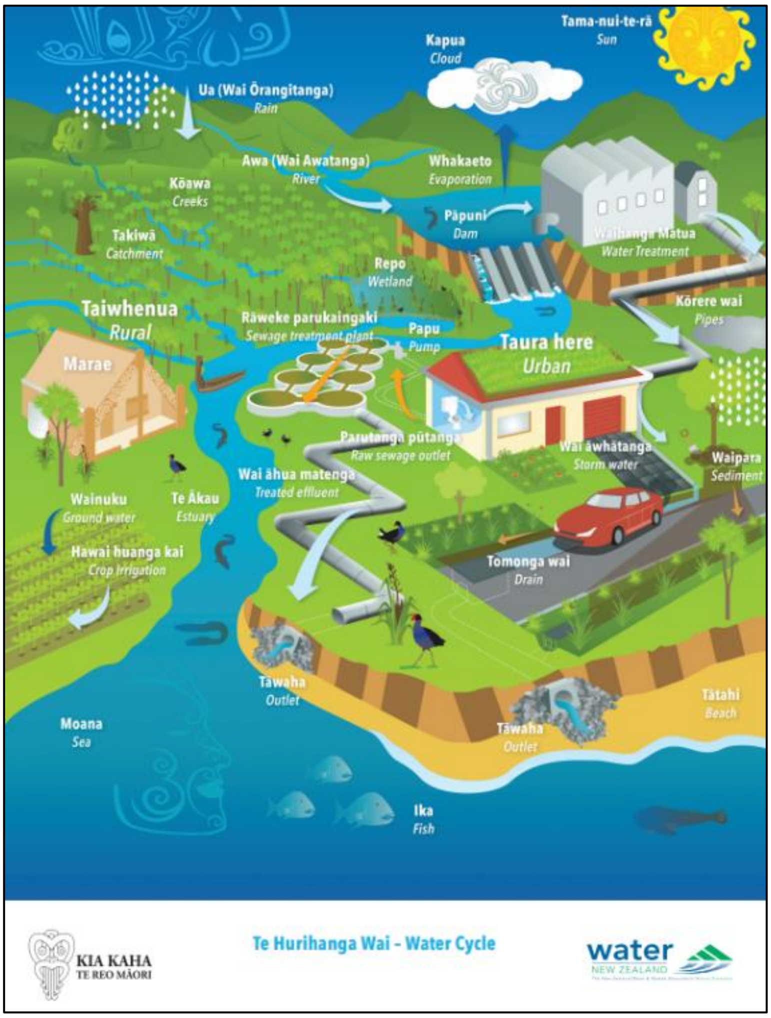


Figure 3-1: Te Hurihanga Wai - Water Cycle

Why we provide a public wastewater service

WWL treats over 150 million litres of wastewater a day on average. Wastewater contains 99 percent water used from domestic, industrial or commercial activities and about 1 percent human and other waste. This wastewater leaves homes and businesses through plumbing and enters the public wastewater network. This includes trade waste such as landfill leachate. Because the waste component contains bacteria and viruses that could be harmful to human health, it must be kept separate from the drinking water in accordance with the Health Act 1956. The public wastewater service supports the health of our communities and helps protect the natural environment.

Mana whenua put high value on avoiding contamination of water in the environment and in its natural state with wastewater. We have established partnerships with mana whenua to help achieve mutual interests in restoring and enhancing Te Mana o te Wai, which includes working to ensure that wastewater discharges do not adversely affect the values and practices attributed to waterways by our mana whenua partners.

Why we provide a public stormwater management service

Stormwater that is properly managed helps protect human health and welfare and reduces its potential impacts on property and the environment. This can only be achieved through an integrated approach to land use, in both existing and future areas of urban development. Stormwater management and improved environmental outcomes are linked with wastewater management, due to historical cross connections and intermittent overflows. Effective management will reduce risk over time and improve environmental outcomes while supporting growth.

3.1 Legislation and policies

The principal legislation and policies relevant to this document are provided in **Error! Reference source not found.**. Of the 48 items, arguably the most significant are.

- Water Services Act 2021
- Health and Safety at Work Act 2015
- Local Government Act 2002
- Resource Management Act 1991
- Wellington Regional Water Board Act 1972
- Building Act 2004 and Building (Dam Safety) Regulations 2022

There are also service agreements between WWL and each shareholder council. These reflect the specific water services and responsibilities via a ‘Contract for Provision of Management Services Relating to Water Services’. The common elements in these agreements include legal obligations, assets to be managed and work programmes.

3.2 Resource consents

To operate the three waters assets, WWL are required to have resource consents to undertake various activities. On behalf of councils, WWL is responsible for obtaining and implementing these consents under the Resource Management Act 1991 (RMA) to undertake various activities to provide the three waters services. In addition, Wellington Water also inputs to resource management policy and plan development processes to ensure that provisions relating to three waters management are appropriate and enable the delivery of these services.

The resource consents WWL manage are summarised in **Error! Reference source not found.**. The WWL consenting strategy is currently being updated, however current delivery for each service are summarized in Figure 3-2, Figure 3-2: Water Supply Resource consents - tactical plan (Janurary 2025) Figure 3-3 and Figure 3-4.

Overview of the IEWQ consent programme

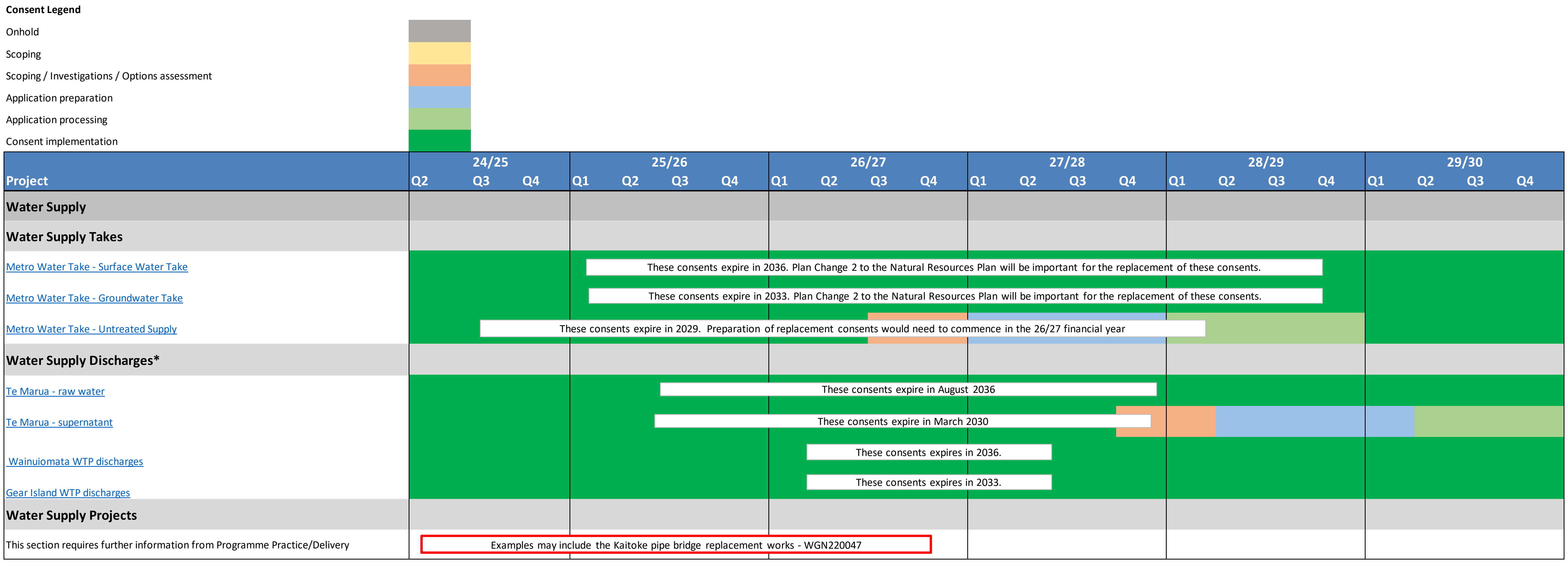


Figure 3-2: Water Supply Resource consents - tactical plan (Janurary 2025)

Overview of the IEWQ consent programme

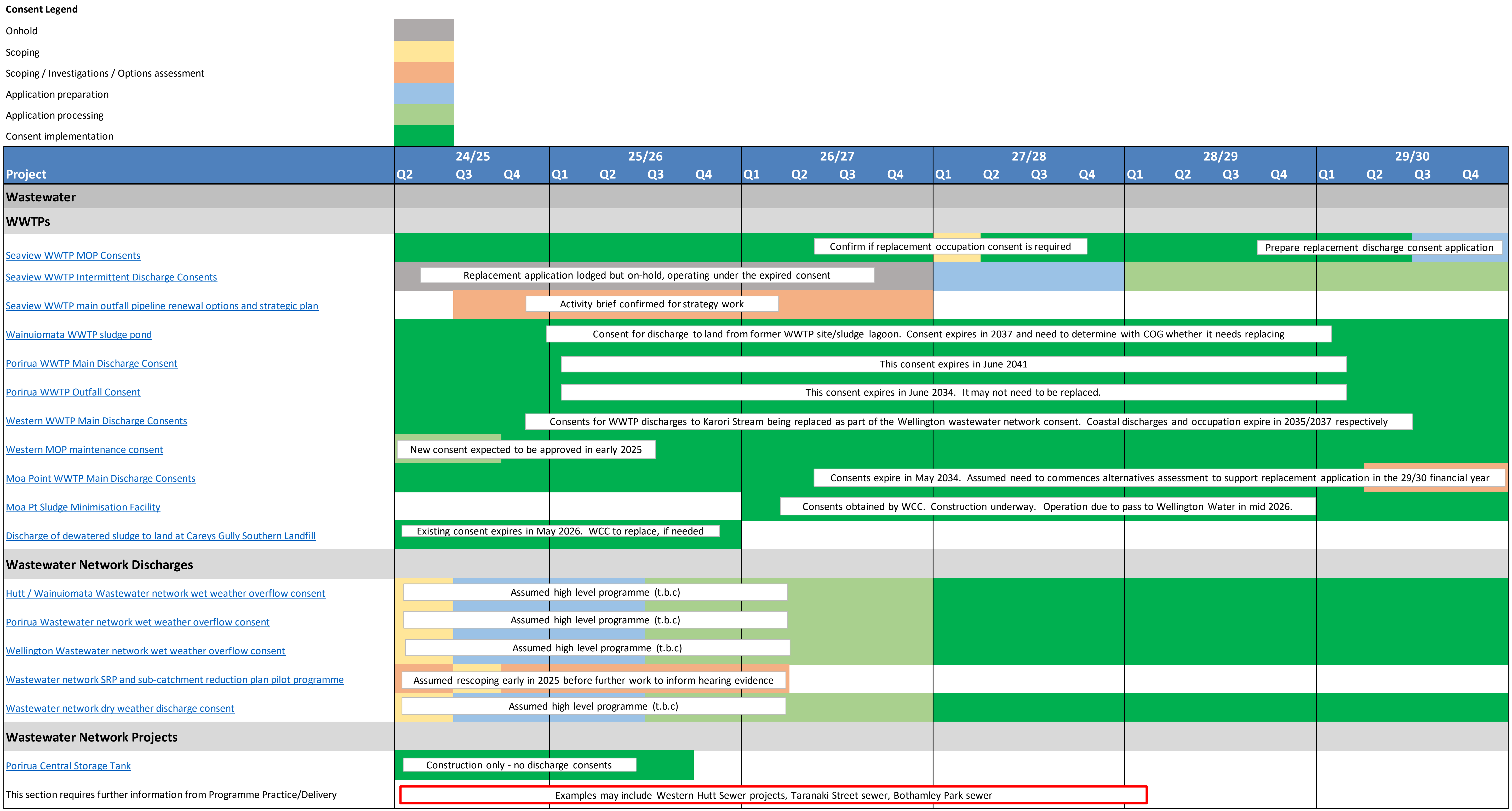


Figure 3-3: Wastewater Resource consents - tactical plan (Janurary 2025)

Overview of the IEWQ consent programme

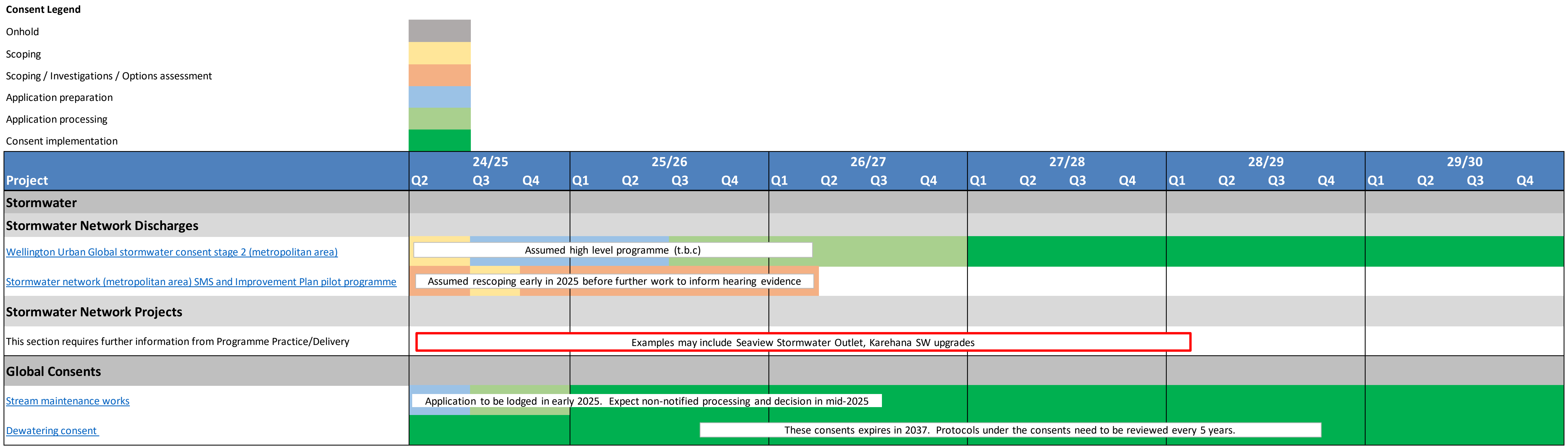


Figure 3-4: Stormwater Resource consents - tactical plan (Janurary 2025

3.3 How services are delivered

WWL have initiated a 'reset model from early 2025 – refer Figure 3-5.

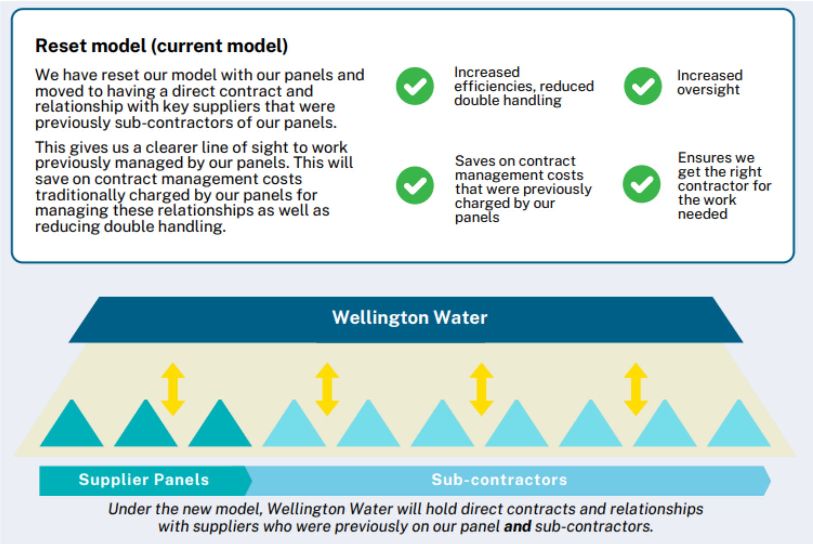


Figure 3-5: Project Delivery Planes - Reset Model[1]

This model ensures WWL leverages national and international expertise and resources while supporting local businesses that have worked in the region for decades. It also enables WWL to build a more integrated approach to delivering the work the shareholder councils fund, while building capability and supporting innovation across the sector.

3.4 How services are provided

WWL, on behalf of the councils, manages the extensive public networks that supply water to each property; remove, treat and discharge wastewater and drain stormwater. Private assets and those for other council activities, such as park irrigation or road sumps and leads, are not included. Figure 3-6 shows what this looks like in a typical urban street.

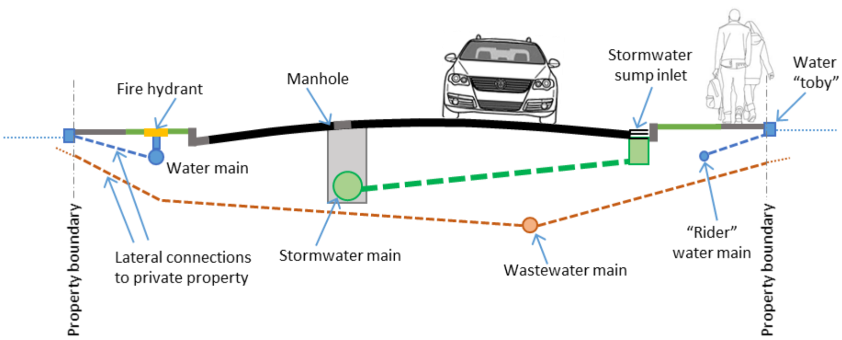


Figure 3-6: Typical network service in an urban street

[1] Source: 'Changes to Project Delivery', Wellington Water Ltd (2025). https://www.wellingtonwater.co.nz/assets/Independent-Review-Docs/Changes-to-Project-Delivery-Panels.pdf

3.4.1 Water supply

The water supply network begins at the treatment plant where water is transported through pressurised bulk mains that are typically 375 to 1400mm in diameter. The bulk mains lead to primary reservoirs where water is stored in the network. From the reservoirs, trunk mains that are typically 250 to 600mm in diameter convey water to either pump stations and secondary reservoirs or connect to reticulation mains that are smaller pipes 50 to 200mm in diameter. The connection from the public drinking water network to a residence or business is a private lateral that are typically 20 to 32mm in diameter but may be larger for commercial properties.

The water supply point of service is the 'toby' or water shut-off valve on the boundary of each property and, in the case of fire service connections, the fire service valve. Councils own and maintain all water supply pipelines and other parts of the water supply system from catchments up to the toby. All pipes, plumbing and fittings beyond the toby are owned by, and are the responsibility of, the property owner.

Other parts of the water supply network include maintenance chambers and manholes, which are used by network operators as access points along the network (valves, flowmeters or pressure reducing valves) to make quick repairs. Pump stations are another major part of the water supply network, with 85 pump stations within our serviced area. These pump stations are located at points in the network where drinking water needs to be pumped (usually uphill).

3.4.2 Wastewater

Wastewater from residences or businesses leave a building through plumbing and into a gully trap then a lateral pipe before connecting to the publicly owned wastewater network. The gully trap is a basin in the ground that receives piped wastewater from inside a building and acts as a safety valve to protect the inside of the house flooding if there is surcharging or blockage of the wastewater network. The lateral is a continuous pipe that may cross from private to public land and can serve more than one property. Wastewater from trade sources such as restaurants, may require pre-treatment in a grease trap or similar.

From the lateral, the wastewater flows to service branch lines that are typically 150mm in diameter. These pipes connect to reticulation mains that are 225 to 375mm in diameter, which carry more wastewater. These link into the trunk sewers that are typically 400 to 1800mm in diameter and transport the wastewater the remainder of the way to the treatment plant. In the metropolitan area Wellington, an average 154 million litres of wastewater per day is transported into four treatment plants: Moa Point, Western, Seaview and Porirua.

The councils own and we maintain all pipelines and other parts of the wastewater system up to and including the point of service. All drains, pipework and plumbing upstream of the point of service are owned by, and the responsibility of, the property owner. This generally includes drains beyond the property boundary.

Table 3-1 shows the individual council points of service.

Table 3-1. Council wastewater point of service

Council	Wastewater point of service
Hutt City Council	Connection between the council pipeline and the private lateral.
Porirua City Council	Where the lateral connection to the main crosses the property boundary or the connection to the main if the main is within the property.
Upper Hutt City Council	Where the lateral connection to the main crosses the property boundary or the connection to the main if the main is within the property.
Wellington City Council	Where the lateral connection to the main crosses the property boundary in the road reserve or the connection to the main if the main is within the property.

3.4.3 Stormwater

The point of service is the demarcation point between the customer's private drainage pipes and the city council's reticulation network. For stormwater drainage this differs by each local council as follows:

- The connection between the council pipeline and the private lateral. (Hutt City)
- Where the lateral connection to the main crosses the property boundary, or the connection to the main if the main is within the property. (Porirua City, Upper Hutt City and Wellington City)

Where a property is serviced by a pipeline draining to the road kerb, the point of service is the road kerb. The Councils own and maintain all stormwater pipelines and public drains up to and including the point of service.

All stormwater drains and pipework upstream of the point of service on private property are owned by, and are the responsibility of, the property owner. This includes pipelines discharging to the street gutter or to watercourses. Watercourses on private property are the responsibility of the property owner.

3.5 Three waters asset extent and value

The three waters assets are described at a regional level in Table 3-2.

Table 3-2: Regional assessment of three waters assets

	Potable Water	Wastewater	Stormwater
Element	Region	Region	Region
Non-residential connections	10428	Metro: 10,521	Metro: 10,521
Average Age of the Network - **including** connection pipes	41.73	53.95	47.83
Average Age of the Network - **excluding** connection pipes	43.45	56.9	49.03
Number of treatment plants	4	4	N/A
Number of assets within treatment plants	10654	3473	N/A
Number of assets inside treatment plants with a condition grading	646	3282	N/A
Percentage of assets inside treatment plants with a condition grading	6.1%	94.5%	N/A
Number of assets inside treatment plants in poor or very poor condition	83	231	N/A
Percentage of assets inside treatment plants in poor or very poor condition	0.8%	6.7%	N/A
Number of pump stations (non WTP sites)	89	208	24
Number of reservoirs (non TP sites)	140	N/A	N/A
Number of reservoir and pump station sites with a condition grading	163	42	23
Percentage of reservoir and pump station sites with a condition grading	71%	20%	96%
Number of reservoir and pump station sites in poor or very poor condition	41	23	8
Percentage of reservoir and pump station sites in poor or very poor condition	18%	11%	33%
Length of pipe (km)	2491.7	2449.3	1923.2
Length of network (km) with a condition grading	2352.5	2380.6	1850.4
Percentage of network (km) with a condition grading	94.4%	97.2%	96.2%
Length of network (km) with a poor or very poor condition grading	676.64	683.2	260.9
Percentage of network (km) in poor or very poor condition grading	27.2%	27.9%	13.6%

Source: WWL (DPS) March 2025

3.6 Three waters asset criticality

When an individual asset fails or is not in service, it can impact on the ability of a network or portfolio to deliver the intended services. This could generate multiple impacts, affect varying numbers of people, and cause differing degrees of damage to the natural environment. These various potential impacts can be built into a criticality framework.

Wellington Water is refining its application of asset criticality assessment to consistently measure and assign importance to assets based on our strategic approach. Criticality scores are calculated per asset, as asset groups, or as facilities. More information on strategic context can be found in the SAMP, 2021. **Error! Reference source not found.**

3.6.1 The WWL Asset Criticality Framework and its Application

Wellington Water developed the Asset Criticality Framework (ACF) - launched in May 2021 - that is used to consistently measure and assign importance to assets. The ACF provides a systemic structure and consistent mechanism for Wellington Water to use to:

- assign importance to individual water network assets
- determine the relative risk of significant assets failing in normal everyday service
- measure the consequence of an asset failing to deliver its expected contribution towards Wellington Water service goals.

Ultimately the purpose of the ACF is to enable Wellington Water to make effective asset management decisions. Criticality scores in this core framework are calculated per asset; assessed by the selection of the related WWL Twelve Service Goals, with each assessed by four Criteria, as depicted in Table 3-3. The compound of Criteria indices, per Goal assessed, are then summed to form a criticality score sum. Scaled ranges, supported by empirical trial, are rolled up into five Criticality Score bands. The Table also gives context to the related loss of service.

Table 3-3: Assessment Criteria of the WWL Asset Criticiality Framework (Ver 0.4, 2021)

Criticality factor	Description	Rating range
Duration to repair	Maximum reasonable timeframe for restoration of service for a particular service goal. *The longer time for restoration of service gives a higher score and higher criticality.*	1 – 3
Redundancy or contingency	Whether or not there is an alternative asset or functions available to use in the event of failure of the asset. *The lack of other options means a higher score and higher criticality.*	0 - 1
Severity Factor (for unmitigated failure)	The severity of the impact of failure or withdrawal of service of the asset, if not mitigated. *The more severe the impact relative to the service goal means a higher score and higher criticality.*	1 – 3
Exposure level	The number of people, and/or type of environment that could be exposed to adverse impacts if the asset failed and consequently the service was not delivered as per the service goal. *The more people affected and the more sensitive the environment gives a higher score and higher criticality.*	1 – 5

The Criteria here link the performance of the asset to the outcomes experienced by the community served by the asset. The framework identifies impacts on people, communities, and the natural environment. It measures the extent of impact on delivery of Wellington Water service goals, should a particular asset fail to meet its purpose, or be withdrawn from service (due to removal, damage, or failure). Further, master planners may then assign weightings (to Service Goal, &/or Criteria) to tune this model.

The 2021 version of the ACF was trialed on network piping, in concert with the Pipeline Intervention Guides (one for each type of network, with an inspection techniques guide). Scoring bands have stood well in application, but to assess larger groups of assets, application methods have been developed further during the last triennium.

Currently deployed specialist applications of WWL's Asset Criticality Framework are:

- Geospatial representation of criticality hotspots in Wellington's service networks
- Automated, widespread application of the Framework to networked water supply pipelines, driving capital renewal works priorities, in the Esri InfoAsset Manager geospatial and network modelling platform
- Facility-level assessment for whole pumping stations for water supply, across the region.

Developing deployment tooling is underway for:

- Facility-level assessment for all pumping stations for wastewater and stormwater networks
- Reservoir asset group criticality
- Water treatment plant asset group criticality.

Note at this time, criticality assessment of wastewater treatment plant assets is as undertaken by Veolia Ltd for WWL in 2022/23, using their refinement of RCM II, and vetted by WWL.

3.6.2 Asset criticality bands

Determined based on an assessment of the asset(s) failing against Wellington Water's service goals and criticality factors. The criticality bands are:

- **VLCA (1):** Very Low Critical Asset
- **LCA (2):** Low Critical Asset
- **MCA (3):** Moderate (Medium) Critical Asset
- **HCA (4):** High Critical Asset
- **VHCA (5):** Very High Critical Asset

This enables comparison between different types of assets and supports asset management decisions throughout the asset lifecycle. For example, an asset with a high criticality value would be scheduled for a higher level of intervention to ensure that we regularly monitor its condition. It would also be scheduled for renewal or refurbishment before there is any likelihood of failure. In contrast, an asset considered low criticality may have minimal intervention, will not be prioritised for renewal and may even be 'run to failure' to save on maintenance costs. Using different intervention strategies based on asset criticality contributes to maintenance of a resilient network and focuses resources on the highest criticality assets that most support our service goals. See Figure 3-7 for an overview of the network pipes with VHCA and an example where these are found for all three water networks in one localised area – see Figure 3-8.

Whilst in any capital programme we should expect high criticality assets to be of priority for repair or renewal, and that the criticality scoring is supported by lifecycle information and condition grading, low criticality assets must not be forgotten. For LTP-24 a proportion of funding was allocated for lower criticality assets, on the basis that these assets must also be renewed at a suitable point. In this case, condition assessment is not required, and assets are either treated as run-to-fail, or have business cases for renewal developed from operational data (number of failures, number of customer complaints, impact of leaks, etc.).

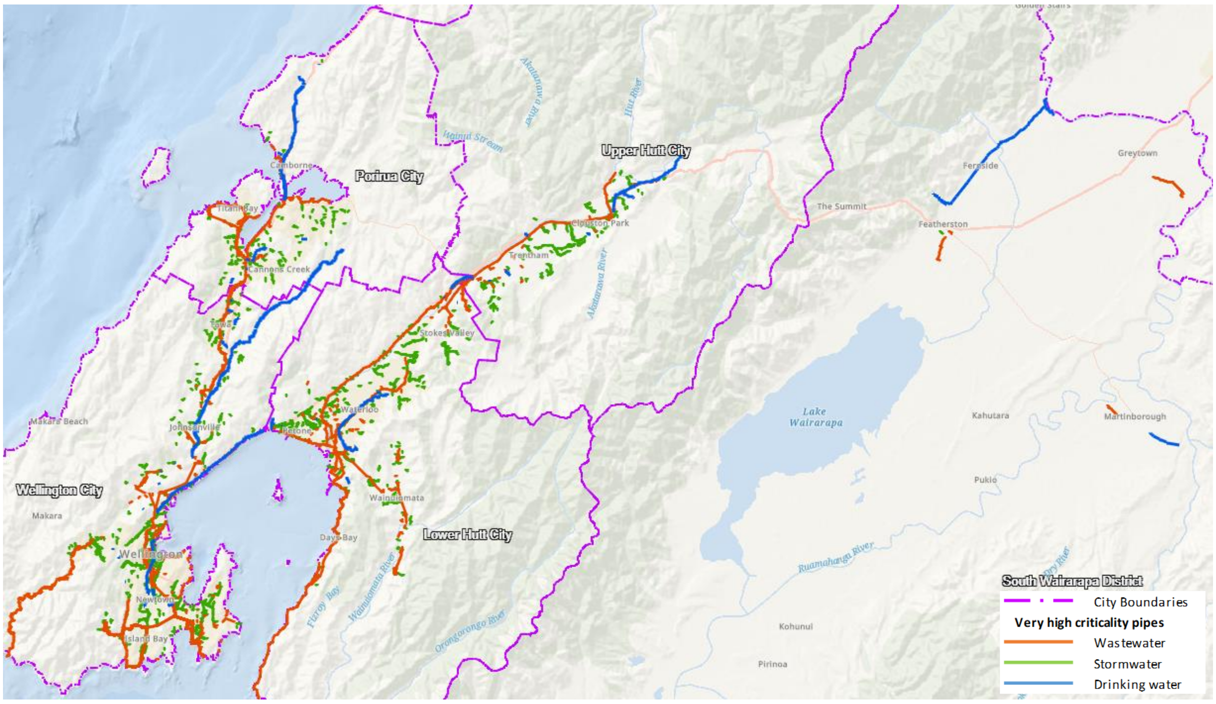


Figure 3-7: Overview of very high criticality network pipes (Three Waters)

Figure 3-8: Example of area where three waters very high criticality network pipes are located

Wastewater Pipes
Stormwater Pipes
Drinking Water Pipes

3.7 Three waters asset condition

Asset condition relates to the rate of deterioration of the physical state of an asset and includes knowledge of its structural integrity. Knowledge of condition is gained through health assessments undertaken throughout an asset's lifecycle at planned frequencies. Condition assessment endeavours to predict an asset's remaining service life and helps decisions on whether intervention is needed before it fails to deliver the service intended.

Intervention decisions are based on risk assessment – using condition and criticality as the basis of assessing service failure probability and consequence. Unexpected service failure can affect the safety and health of people and the environment, as well as the resilience of the economy. There may be consequential impacts to the reputation of the organisation or our clients, and financial penalties from failure to comply with legislation. Intervention guides are being prepared for different asset classes – to assist with assessment of criticality, maintenance planning and how condition assessment is planned.

3.7.1 Asset Condition Information

Condition information for each of the three waters is provided in

- Annex 3A Water Supply
- Annex 3B Wastewater
- Annex 3C Stormwater

3.7.2 Condition Assessment Programmes

Whilst, ongoing, operations teams collect asset performance information as part of the developing maintenance management system, two main programmes stand out, post- LTP-21.

3.7.2.1 Very High Criticality Assets – Health assessment programme

In the latter part of 2019 and in 2020, there was considerable publicity generated following the failure of critical wastewater assets in Wellington City such as the Dixon St Adit that connects to the Interceptor, and the Mt Albert Tunnel Sludge Pipeline. In addition, funding had to be diverted to refurbish a section of the Interceptor close to Moa Pt when condition assessment identified a rapid deterioration of this asset. These failures attracted significant political commentary about Wellington Water's performance in managing critical assets.

At the 22 May 2020 Board meeting, a commitment was made to "target the completion of the initial health assessments for all Very High Criticality Assets (VHCA) by the end of the 2020/21 financial year". Health assessments provide a view of the overall level of an asset's functionality considering factors such as age, condition, operation and performance history.

Assessment methodologies were developed and the VHCA programme was initiated which identified over 9000 VHCAs using the Wellington Water asset criticality framework as a basis. These represent about 10 percent of the assets we manage and are defined as those whose failure would have an unacceptable impact on the community and the environment (e.g., a trunk wastewater collapse in the CBD).

Driven by Govt. stimulus funding, a broad range of assets were assessed for their condition, primarily through visual assessment but also with specialised assessment practices. For linear assets and those in Water Treatment Plants, criticality assessment tools were developed, and a list of finite assets was drawn up. For other above-ground facilities (Pumping Stations, Reservoirs) a risk-based visual assessment technique was undertaken to assess *asset groups;* grouping assets around their key functions and effect on service delivery (also reflecting asset life expectancy, technical competence to remediate, failure modes, and so on).

The next phase of this programme was assumed to review High Criticality Assets (HCAs) in the same way; however, the next phase of Govt. stimulus funding was not directed to this activity.

3.7.2.2 Managing Critical Asset Risks (MCAR) programme

The Managing Critical Asset Risks (MCAR) programme is an evolution of the VHCA programme. MCAR is aiming to develop and implement a Wellington Water-wide approach to identify, understand, and manage our critical assets, and use this information to inform operational, investment, and strategic decision making. It has four main workstreams as depicted in the Table below.

Table 3-4: Workstreams under the MCAR programme

Workstream	Scope	Outcome
1. Identification, Classification, and Assessment of Critical Assets	Determine the **criticality** and **condition** (including **confidence**) of all Three Waters assets managed by Wellington Water. The workstream will be split into five asset areas – Linear (network), Pump Stations, Reservoirs, WTPs, WWTPs.	Wellington Water is aware of all its **critical assets** and their **condition**.
2. Remediation of unsatisfactory Critical Asset Condition	Track, plan, and quantify critical asset **remediation** / intervention activities determined by condition assessment results.	Wellington Water is aware of what remediation work needs to be completed, and our client councils are aware of the priority of asset renewal / replacement activities versus other investment needs.
3. Consolidated Reporting	Track the progress of criticality / condition determination progress, and make the results accessible to the various stakeholders who need them.	Wellington Water, individual teams, and client councils can understand current progress, and utilise the results to support their activities.
4. Foundational Programme Activities	Establish foundational artefacts to support both the *doing* and the *management* of the programme.	Wellington Water can effectively plan, deliver, manage, and report on the progress of the programme.

MCAR programmes have been running across three financial years with accrued condition data of adequate confidence for linear assets (including CCTV), treatment plant assets (engaging with civil and mechanical specialists, especially regarding dosing systems and rotating machinery), and pumping stations (focused on non-visual assessment, but attaining opportunistic information on assets at the sites, and currently focused on pump efficiency/ performance testing, non-destructive testing of manifold components, vibration and alignment testing, and structural examination). Reservoirs assessments have been rolled up into WWL's multi-skilled reservoir remediation team, where there is a close connection between discovered asset performance and water safety risks and direct action or capital works programming.

3.7.3 Condition data confidence

Asset condition is determined based on the outcome of any of the following: physical, visual, desktop, or modelled condition assessment activity. Inspection techniques differ by asset class with *Condition Grading* as follows:

- **Very Good (1):** No observable defects or deterioration.
- **Good (2):** No defects evident that if worsened would result in asset failure.
- **Moderate (3):** Defects evident that if worsened could result in asset failure.
- **Poor (4):** Significant defects and/or serious deterioration affecting an asset's structural integrity evident.
- **Very Poor (5):** If the asset has not already failed, it could fail at any time.

There has been an ongoing uplift in condition assessment work across all assets. A desktop assessment has been completed for pipe assets and field assessment of assets has been prioritised due to limited funding where there is perceived highest risk. Field assessment reports cover piped networks, water treatment plants, wastewater treatment plants, water reservoirs (storage vessels) and pumpstations.

WWL applies a *Confidence Score* to each Condition Grade applied to the AMIS. As with Condition Grade scoring, the Confidence Score is based around national/ international guidance. Example guides can be sourced from Water New Zealand, as: VISUAL ASSESSMENT OF UTILITY ASSETS (NZWWA, 2008), NZWWA Pipe Inspection Manual (NZWWA, 2006), and Infrastructure Asset Grading Guidelines (NZWWA, 1999). The following is typical of the national guidance on scoring a Confidence Score from 3W asset inspections:

Confidence Grade	General Meaning	Basis for Confidence Grade
A	**Highly Reliable**	Data based on sound records, procedures, investigations, and analysis which is properly documented and recognised as the best method of assessment.
B	**Reliable**	Data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings; for example, the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.
C	**Uncertain**	Data based on sound records, procedures, investigations, and analysis which is incomplete or unsupported, or extrapolation from a limited sample for which grade A or B data is available.
D	**Very Uncertain**	Data based on unconfirmed verbal reports and/or cursory inspection and analysis.
E	**Unknown**	None or very little data held.

3.7.4 Three waters pipe network condition

It is not feasible to have detailed knowledge of the condition of our entire piped network. The appropriate techniques for assessment are dependent on pipe material, location and depth, type of use for pipe and methods of operation. The relevant condition assessment techniques to be used will ultimately be outlined in our intervention guides. Importantly the relevant technique must be linked to the potential failure modes of the assets. The work to prepare intervention guides is ongoing.

Low risk assets may never be condition assessed until their service failure costs are unacceptable. However, intervention through maintenance, refurbishment or renewal for high criticality assets should occur in advance of any service failure.

Techniques for assessment of pressurised pipes may (but not always) be limited to laboratory testing of a short section of pipe that is removed from service. This can be an expensive exercise. Assessment of unpressurised pipes can often be undertaken with the use of CCTV and scanning techniques that don't require the asset to be taken out of service for an extended period.

In circumstances (such as for pressurised pipes) where there is little scope to acquire condition data for a particular asset, it is often necessary to apply knowledge from similar assets elsewhere – this knowledge may be from other utilities around New Zealand or even internationally to decide on a condition using peer to peer advice. This work has been undertaken for the water supply pipe network by WSP in 2018 (then Opus).

For the Wellington Water pipe network, a summary of the extent of network for which actual condition data is held can be viewed via its Tableau dashboard.

3.7.4.1 Piped network age

In the absence of supporting data on the physical state of assets, asset age based on assumed base lives may be used as a proxy to determine replacement timing. It may also help us decide in the first instance when maintenance or other interventions may be required. Ideally, by collecting and analysing more condition data, we will be able to move further towards condition-based remaining life as a general approach. The age profile of the assets is shown in later sections of this AMP. Using available information, including asset age, a summary of the pipe network condition is provided below. Condition grades and remaining useful life ranges from a WSP desktop assessment is shown in Table 3-4.

Table 3-4: Condition grades and remaining useful life ranges

Provisional Condition Grade	Remaining Useful Life Range*	Condition Description
1	>/= 75%	Very Good
2	50 – 74%	Good
3	25 – 49%	Moderate / Adequate
4	3 – 24%	Poor
5	</= 2%	Very Poor

*Remaining Useful Life percentage range table follows similar principals described in IPWEA Condition Assessment and Asset Performance Guidelines Practice Note 7 Water Supply and Sewerage, Table 9 - 2 (Water Mains).

3.7.5 Pump station condition

Pump stations can all be rated as critical assets. Some pump stations within the three waters networks have been identified as VHCA and are part of the current condition assessment programme – see Figure 3-9.

Note the annexes report pump station criticality by water type.

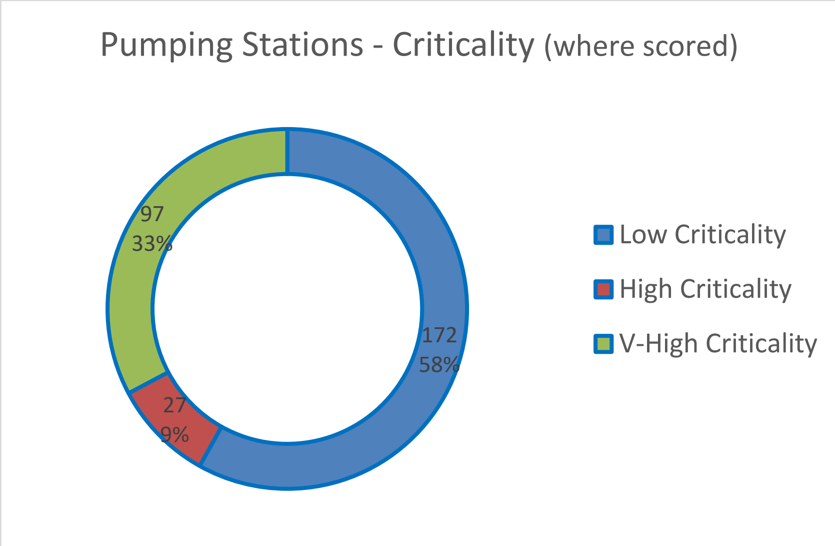
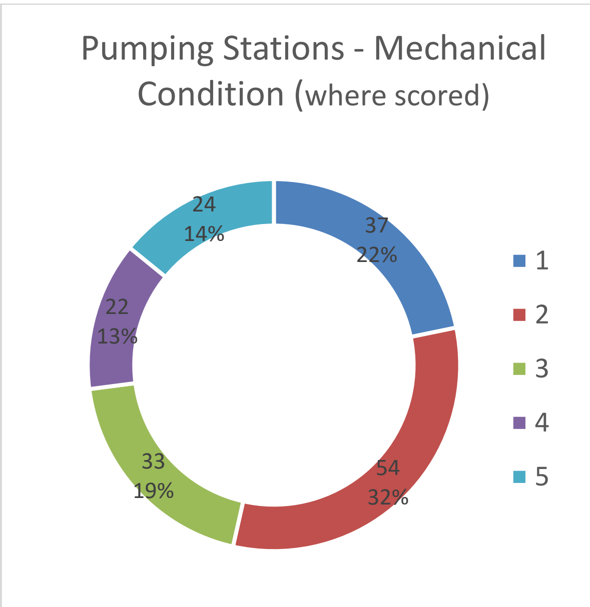
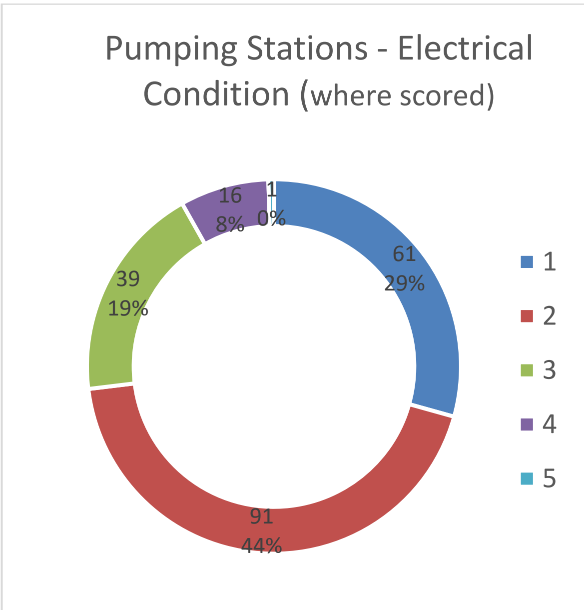


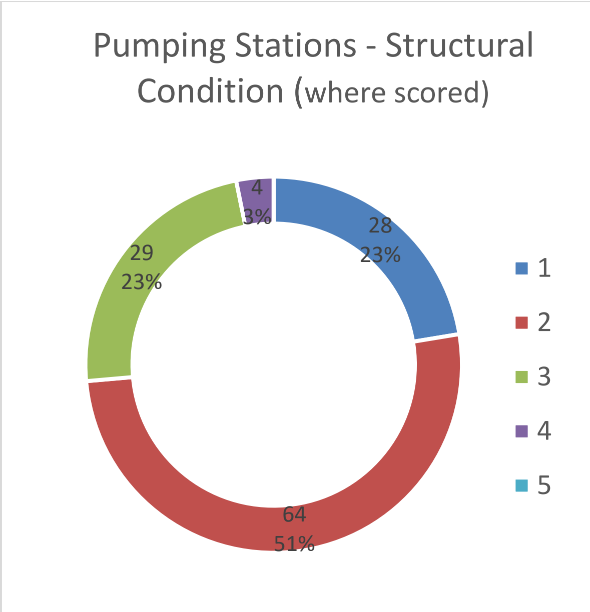
Figure 3-9: Pumpstation criticality (2025)

There has been considerable effort to undertake condition reports of pump stations – see Figure 3-10**Error! Reference source not found.** These reports have been used to assist to prioritise renewal or refurbishment work in pump stations.

Note the annexes report pump station condition by water type.







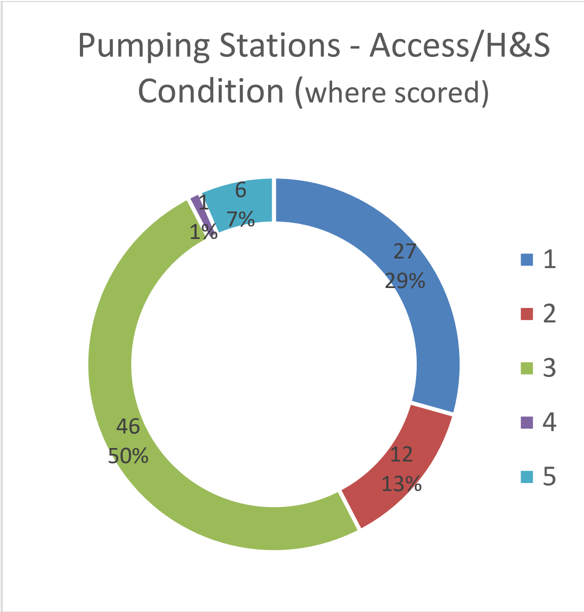


Figure 3-10: Pumpstation condition summaries (2025)

Notes:

i) Three waters pump stations,
ii) Includes South Wairarapa District Council sites

Assessment reports are saved to WWL's sharepoint system. Site information for each pump station is held in dedicated facility folders, and especially condition assessment or other pump station specific investigation information can be found here. Not all pump stations have been assessed, yet, with a focus on Medium Criticality through to Very High Criticality sites since 2022.

The condition assessment methodology that is being used to assess the condition of pumps is similarly documented This methodology includes producing an updated maintenance programme, ongoing condition assessment programme, updated renewal programme, asset risk analysis and the identification of sites that require urgent repair.

3.8 Control systems

Key parts of the three waters networks, such as treatment plants, pumping stations and reservoirs, are continuously monitored using SCADA systems see **Error! Reference source not found.**Figure 3-11. Network control is largely automated with manual oversight and intervention when required. Alarms are automatically raised in the event of a problem such as a pump station failure or low water level in a reservoir. The SCADA systems also collect data on the performance of the networks, which can be analysed to determine where improvements to the network may be needed.

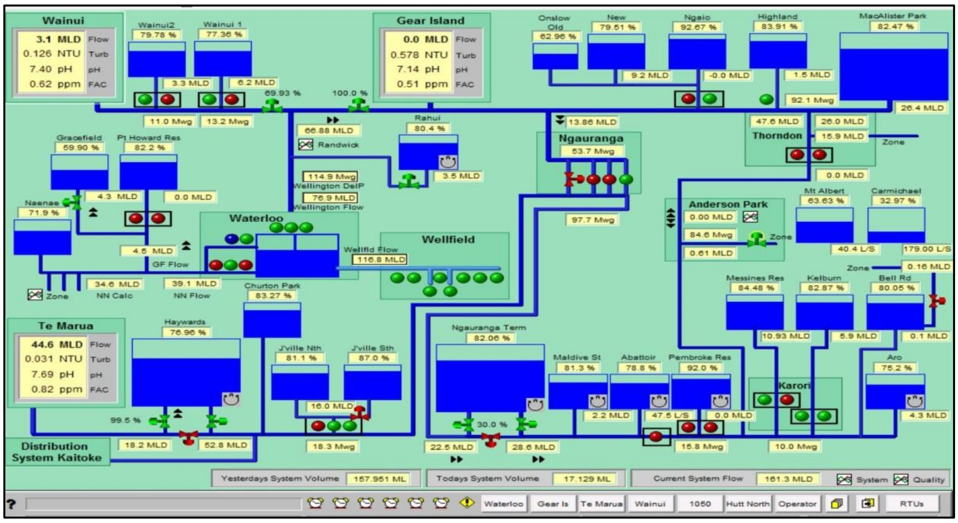


Figure 3-11: Example of the SCADA system – wastewater sites and systems connections (2021)

Figure 3-11 provides an overview of the control systems digital internet protocol (IP) communications network. The Veolia WW plants are not depicted on our SCADA graphics, they have their own separate network that WWL do not connect to. WWL pick up compliance data with our own RTU's installed at each of the plants and that goes straight into data historian.

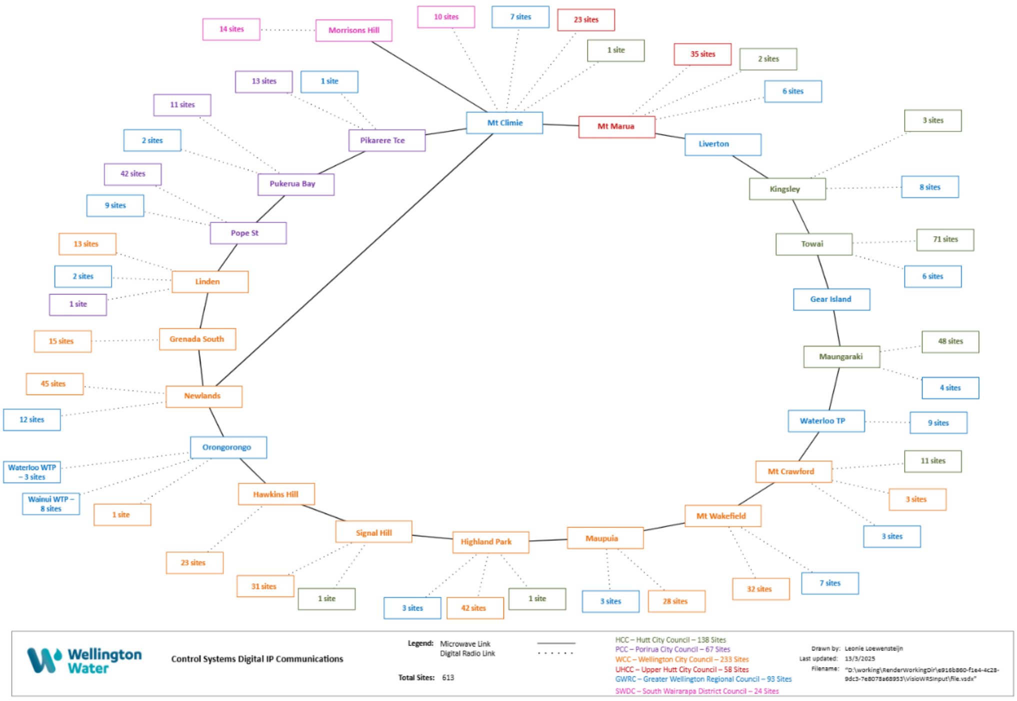


Figure 3-12: Digital IP communications network (2025)

3.8.1.1 Network components

The control systems network generally consists of three major components, as shown in Figure 3-13.Remote sites have telemetry equipment that connects them wirelessly to our microwave network, which in-turn relays data between the site and the master control system.

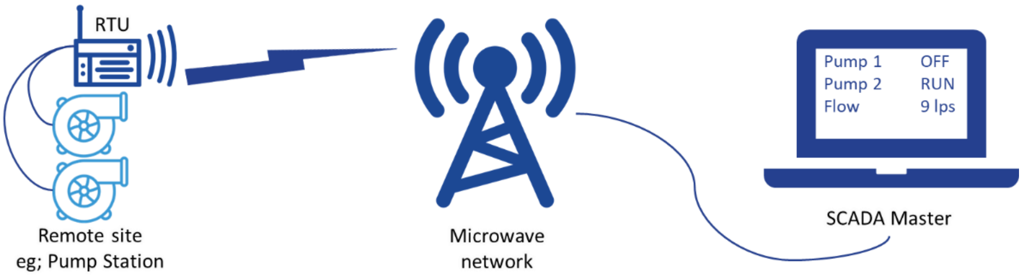


Figure 3-13: Control system network components

3.8.1.2 Remote sites

There are approximately 650 remote sites that are connected to our control system through telemetry. These sites are typically reservoirs, pump stations and area water meters and equipped with a remote telemetry unit (RTU) and a digital radio. RTUs receive data from equipment and instrumentation at the site, such as pump status, flow rate, water level, security alarms etc. and uses this information to automatically manage the operation of the site equipment. More complex sites with specialised equipment may have programme logic controllers that control their operation and pass data to the site RTU.

The RTU may also log (store) data and has backup power supply in case of electricity mains failures. Digital radios pass data from the RTU to the wider network as well as receiving information and instructions such as software updates, pump programme settings and manually initiated commands.

3.8.1.3 Microwave network

The Wellington Water microwave network comprises 25 microwave and digital base stations (repeaters) located at elevated sites around the region to give visibility to the remote sites that connect to them. They have also been configured as a ring network to provide an inherently resilient communications system (i.e., if communications are lost in one part of the ring, signals are automatically rerouted so that service continuity is maintained). This also enables each of the base stations to serve as location for a backup SCADA Master if required, adding a further element of contingency.

3.8.1.4 SCADA Master

The SCADA Master is the centralised computer that controls the entire SCADA network. It receives, processes and stores data and pushes notifications out to staff via Wellington Water's ICT infrastructure. This means that information about the remote sites can be made available to relevant staff to analyse or respond to as and when required. Examples include fault notifications received by field staff on mobile phones, or a system overview displayed on an operational manager's laptop in the office or at home. The SCADA Master is also where operating programmes for the remote sites are configured and disseminated from.

- 3.A. Water Supply
- 3.B. Wastewater service
- 3.C. Stormwater service

3.A. ANNEX Water supply

This annex describes the physical nature of water supply and how the assets contribute to service provision. It includes further description of the network's key attributes, extent and location.

Water supply related asset data is presented including:

- Asset overview including the extent and value
- Asset classes and components e.g. network pipes, pumpstations
- Asset condition and
- Resilience

This Annex should be read in conjunction withs 3.7 - Three waters asset condition

3.A.1. Water supply - overview

The water supply is a critical service and provides water for drinking, commercial and industrial purposes across the metropolitan areas.

3.A.2. Extent of service

The water supply to the four cities in the Wellington regional metropolitan area comes from three sources:

1. Headwaters of the Hutt River, abstracted from an intake at Kaitoke weir, and treated at the Te Marua Water Treatment Plant (WTP). Untreated water is stored in the Macaskill Lakes for summer use.
2. Wainuiomata and Orongorongo catchments, abstracted from river intakes and treated at the Wainuiomata WTP.
3. Hutt Valley artesian system primarily extracted and treated at the Waterloo WTP, although there is a standby treatment plant at Gear Island, Petone.

The breakdown of annual supply from each WTP is approximately:

- Te Marua 40% (25,700 ML)
- Waterloo 40% (27,000 ML)
- Wainuiomata and Gear Island 20% (11,000 ML).

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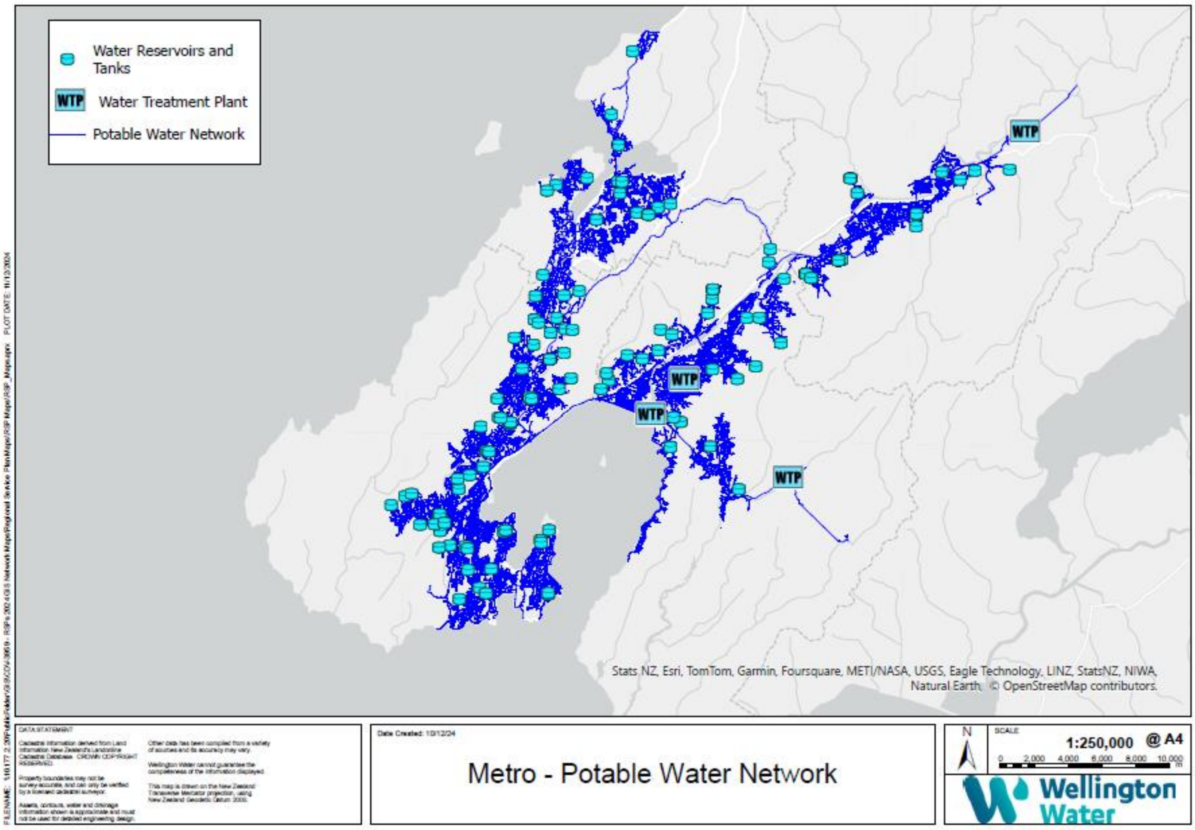


Figure 3-14 shows the extent of the water supply network, including treatment plants and the main distribution pipes and reservoirs.

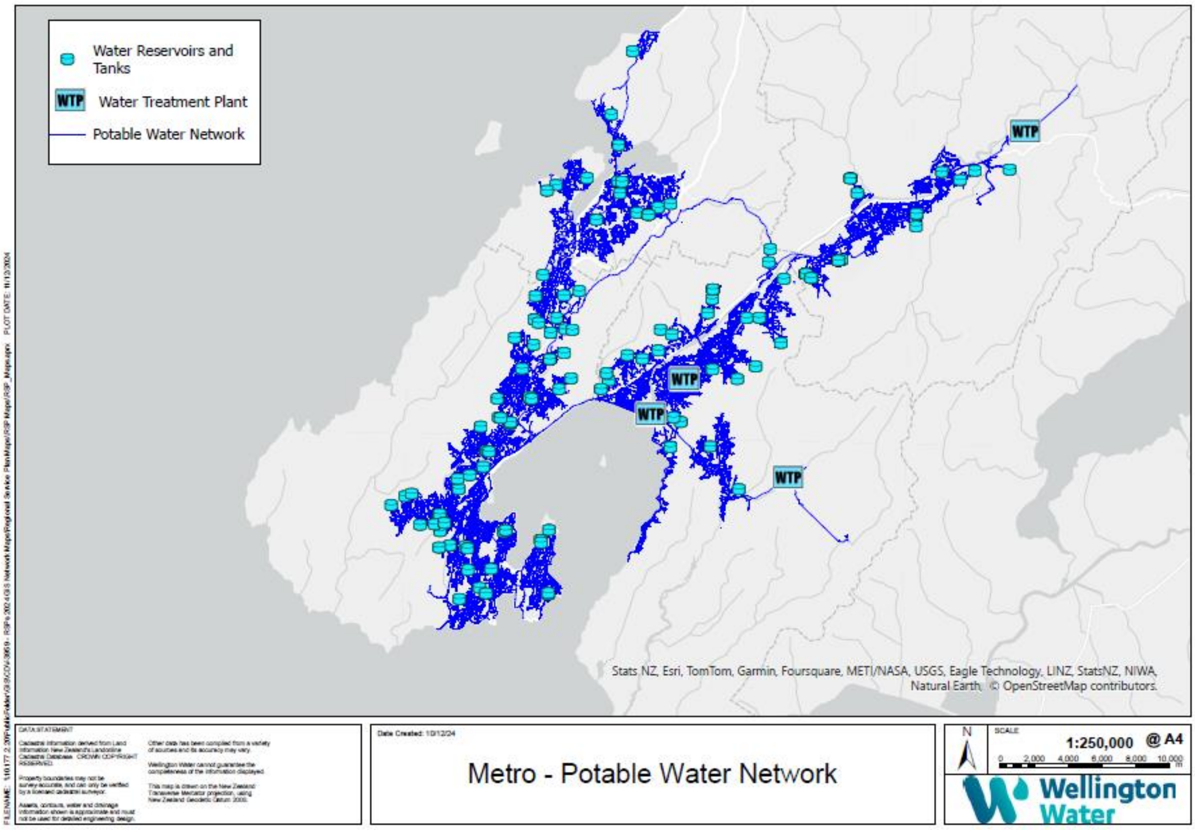


Figure 3-14: Water supply network

3.A.3. Assets and value

The metropolitan water supply water service serves Wellington city; operating as defined supply zones – also see the Part 3 AMPs. The asset groups and value are provided in Table 3-5 and Figure 3-15.

Table 3-5: Water supply asset quantities

Asset Type	Unit of Measure	Quantity
Reservoir sites	No. sites	110
Reservoir tanks (network	No.	146
Emergency tanks	No.	47
Pipes	km	2490
Pump Station Sites	No. sites	85
Treatment plants	No.	4

Notes:

i) Data source: DPS Wellington Water (December 2024) and WWL (Millican, R.,10.4.025),

ii) Reservoir counts can be determined either by the number of sites that have one or more reservoirs on them, or the total number of tanks across all sites e.g., Exploration Way (HCC) has three tanks at one site,

iii) Excludes SWDC assets.

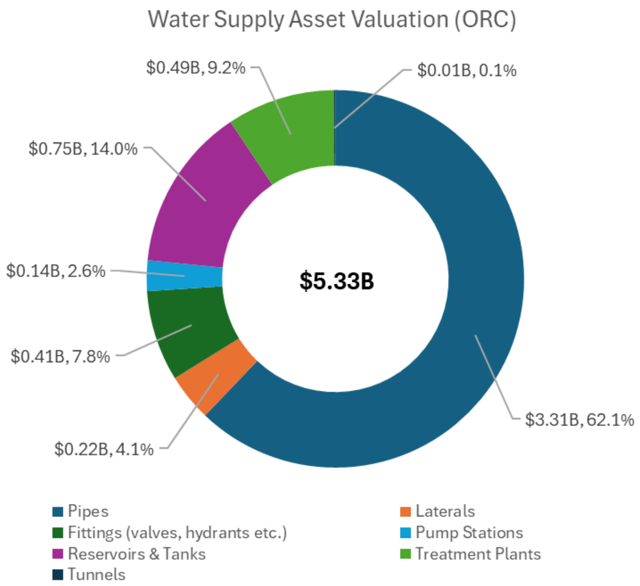


Figure 3-15: Water supply asset replacement cost

Source: Asset valuations - GWRC March 2022; WCC, UHCC and HCC - June 2024; PCC - June 2023.

3.A.4. Asset groups

The water supply networks - see Figure 3-16, begin with natural water sources which we take raw water from. This is then treated in one of our treatment plants to achieve drinking water quality standards. Treated water is transmitted via the bulk network (large pumps and pipelines) to storage locations (reservoirs) around our cities and suburbs. Local pipelines distribute this water to supply the needs of individual properties throughout the serviced area as well as making water available for firefighting purposes. Pipelines in the drinking water reticulation networks operate under pressure either directly from pumping, or relative to the elevation of the local storage reservoir.

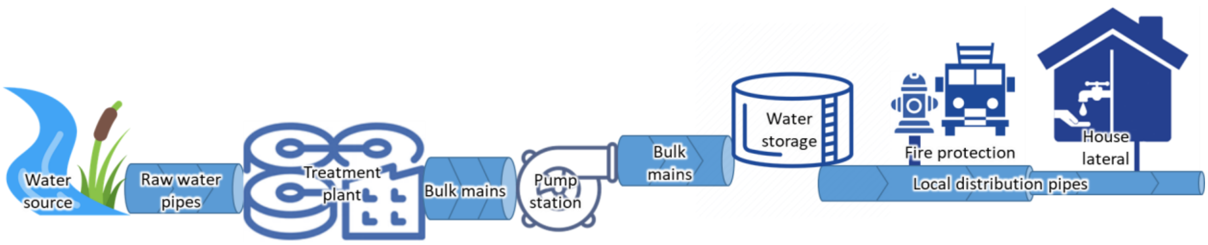


Figure 3-16: Water supply network schematic

3.A.4.1. Sources (intakes and bores) and treatment

The water sources described below include water catchments, intakes / well structures and WTPs.

Metropolitan water sources

The Hutt River water collection area covers 8,963 hectares of mountainous terrain at the southern edge of the TararuaRanges. The quantity of water taken from the water is limited by resource consents to ensure sufficient water remains to maintain the health of the river. On days when not all the water taken from the river is required for supply, some is diverted to the Macaskill Lakes at Te

Marua – see Figure 3-17 and Figure 3-18.. The Wainuiomata – Orongorongo water collection area is part of the Remutaka Ranges to the east of Wainuiomata. The catchment covers 7,601 hectares. As with the Hutt River supply, the quantity of water taken from the Wainuiomata and Orongorongo rivers is limited by resource consents to ensure sufficient water remains to maintain the health of the rivers.

Figure 3-17: Water supply – Kaitoke intake on the Hutt River

Figure 3-18: Te Marua Treatment Plant and Macaskill Lakes

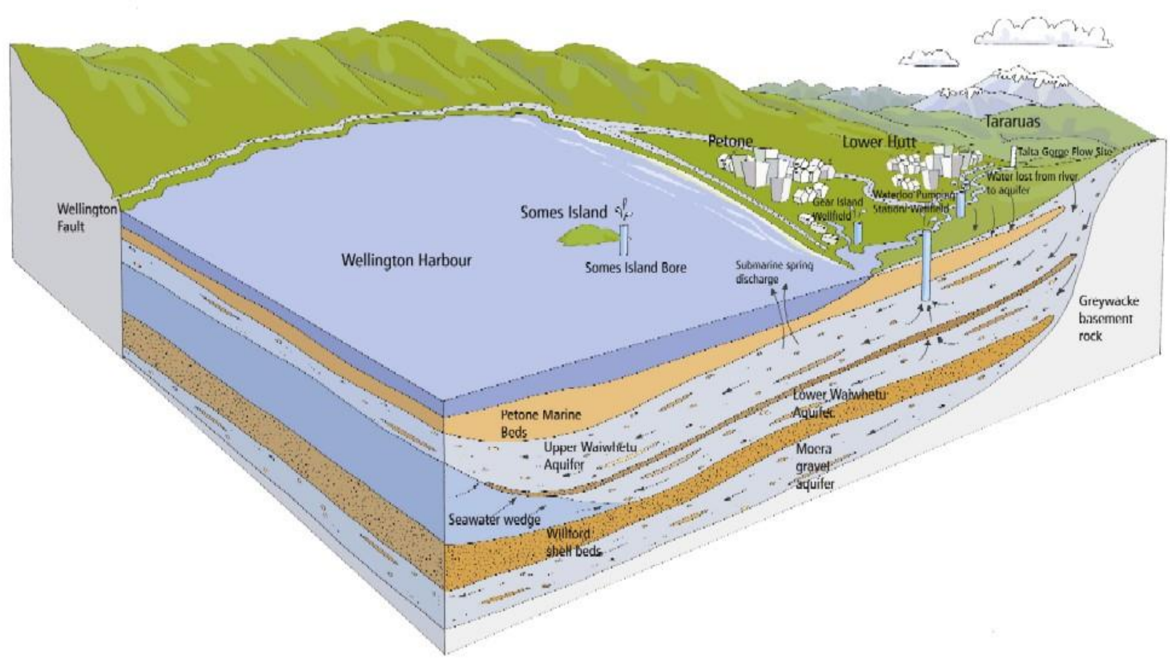
Land upstream of all river abstraction points supplying Te Marua WTP and Wainuiomata WTP is owned and managed by GWRC. The forested catchment lands have been under the control of GWRC or its predecessor authorities for many years, with active control of pest plants and animals and strictly controlled public access. A comprehensive description of the catchments and the management framework is given in 'Hutt and Wainuiomata/Orongorongo water collection areas management plan'[2]. The quality of the water coming from these catchments is high and contamination risks low.

Figure 3-19: Wainuiomata Treatment Plant

The confined Waiwhetu aquifer is a highly transmissive alluvial gravel sheet beneath Lower Hutt and the Wellington harbour. It is recharged from the Hutt River downstream of Taita Gorge and becomes confined by a layer of fine material above the gravels at around Kennedy Good Bridge. The Waiwhetu aquifer is artesian, meaning it is pressurised and water from a bore will flow naturally to the surface. The confining layer, known as the aquitard, extends to the heads of the Wellington Harbour and helps to protect the aquifer from contamination by shallow groundwater and saltwater intrusion. Natural filtering of the water while underground, as well as the positive artesian pressure, also help protect the quality of the water. Figure 3-20 shows a diagram of the Hutt aquifer system including the Waiwhetu aquifer.

[2] https://www.gw.govt.nz/your-region/plans-policies-and-bylaws/plans-and-reports/parks-plans/hutt-and-wainuiomata-orongorongo-water-collection-areas/

Figure 3-20: Cross section of the Hutt River aquifer system



Until 2017, the Waiwhetu aquifer was considered a secure groundwater source and water supplied to the Hutt Valley from Waterloo WTP – see **Error! Reference source not found.** was not treated for microbiological contamination. Following *E. coli* contamination in late 2016 and early 2017, and extensive investigations, it was concluded the source could no longer be considered secure. All water leaving the treatment plant is now disinfected with chlorine and ultraviolet light.

Figure 3-21: Waterloo Treatment Plant

The alkalinity of the water leaving all WTPs is adjusted to reduce the natural corrosive potential on pipelines and household plumbing fittings. Chlorine is added to disinfect the water and protect water quality in the distribution system, and fluoride is added as a dental health measure.

3.A.4.2. Pump stations and artesian fountains

Pump stations are used where there is insufficient pressure to allow the water to flow under gravity. There are 89 pump stations of varying sizes across the water supply network – see Figure 3-22. In addition to the water supply network, Wellington Water manages the artesian drinking water fountains in Petone (Te Puna Wai Ora) and in the Hutt City civic square – see Figure 3-23.

Figure 3-22: Te Marua pumps and pipework

Figure 3-23: Artesian fountain at Hutt City Civic Square

3.A.4.3. Water Storage (Macaskill Lakes)

The two Macaskill Lakes were constructed in 1983 (with crest raised in 2012) to store untreated water collected from the Hutt Valley at the Kaitoke Intake. The lakes are around 17 metres deep, with a combined usable capacity of 3,350 ML. Retention is formed by embankments on their southern and western sides. Stored water is pumped back to Te Marua WTP when river flows are too low to meet demand, or when the Kaitoke intake must be turned off during river fresh events – typically a day or two following most rainfall events.

Management of these two large water bodies and their ancillary assets (including: dams, spillways, draw-off towers, quality sampling systems, and so on) involves the following management systems that enhance the *Source Water Risk Management Plan*. In addition to asset management planning, there are:

- *Macaskill Lakes Water Quality Management Plan* – taste and odour complaints have been experienced periodically since around 2000 (with high Geosmin concentrations in late summer/autumn 2014). Monitoring from 2015 accrued data on chemistry, nutrient content, and biomass (including algae species and algal mat composition). The Plan, reviewed every five years and last updated in 2021, addresses the five principal public health risks for a body of water used as a source for drinking water treatment: Protozoal risk, Bacteriological risk, Virological risk, Cyanotoxin risk, and Chemical risk.
- *Lakes Cyanotoxin Protocol* – a specific protocol that supports the above approach. A joint working group developed a comprehensive risk assessment, proposing monitoring (included automated/online monitors), response planning, lake assessment trials and treatment plant upgrades (including filter conversion to BAC at Te Marua WTP, with GAC media). Alert levels are triggered at 50% and 75% of MAV.
- *Dams Safety Management Planning* – the risk management regulatory regime for dams in New Zealand is prescribed under the *Building Act 2004* and the *Building (Dam Safety) Regulations 2022* (which came into force on 13 May 2024). The large earthen and rock embankments constructed for retention at the Macaskill Lakes and their proximity to the Wellington Fault suggest significant failure modes under earthquake shaking. The *Macaskill Lakes Dam Safety Management System* (DSMS) refers specifically to managing the risk and

harmful effects of an uncontrolled release of reservoir contents. A monitoring, maintenance, and response regime is in place to manage identified failure risks, including cracking of lake liner, failure of outlet pipe, operational events that result in overtopping, adjacent slope instability (loss of freeboard and overtopping), and blockage/ failure of slipways. A review is underway (in FY2025/26) of the Lakes DSMS document suite and practices.

3.A.4.4. Water storage (service reservoirs)

Aside from the Macaskill Lakes at Te Marua, there are 193 reservoirs and tanks including emergency water tanks (refer Valuations) which hold a combined volume of 298 ML – the equivalent of about 119 Olympic sized swimming pools. These are generally of reinforced concrete construction to provide strength and resilience and may be built above or below ground. Reservoirs are located at elevated points around the network to provide constant pressure and supply to consumers.

The volume of water in any given reservoir has been determined by considering the likely demand of the area that it serves. This includes for normal daily (e.g., business and residential) demand, as well as fire-fighting requirements. Contingencies such as earthquakes are also being increasingly allowed for in sizing reservoirs. A new reservoir for example may be designed to hold enough water to provide minimum emergency water needs to customers for a limited period if the incoming supply has been cut-off.

3.A.4.5. Piped network (fittings and service connections)

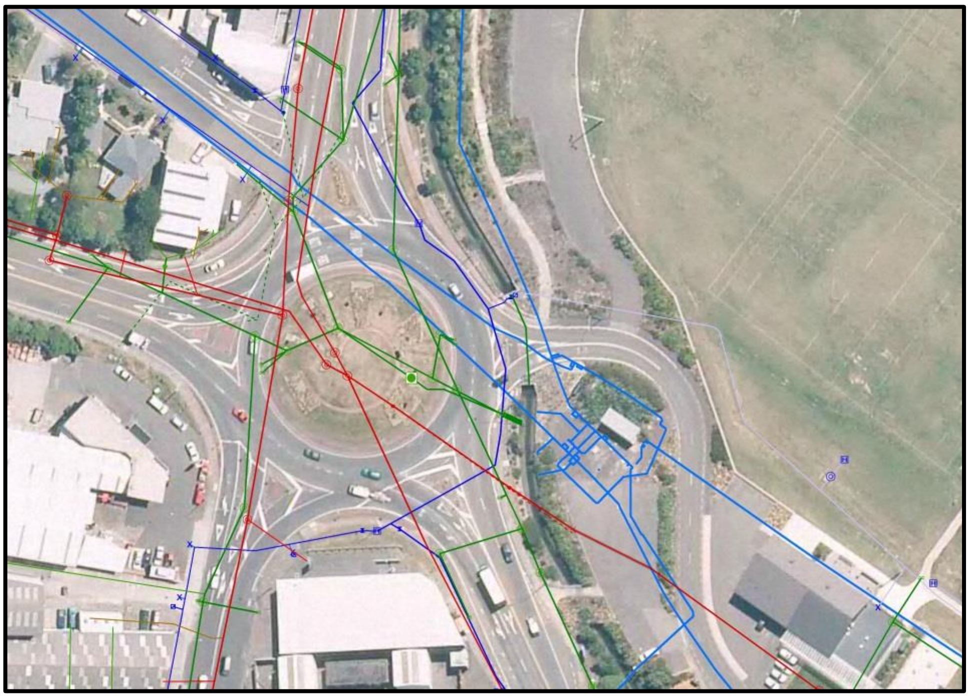
Water from the treatment plants is distributed through large diameter pipelines to storage reservoirs and then into the reticulation network – see Figure 3-24**Error! Reference source not found.**. There is substantial interlinking of the bulk distribution pipelines that allows most areas to be supplied with water from different sources if a supply source or treatment plant is temporarily taken out of operation.

Figure 3-24: New valve installation on a large diameter bulk water pipe

Topographical constraints and the need to avoid negative pressure in the pipe network have required some pipes to be installed in tunnels -Figure 3-25, with approximately 9.5 km of tunnels across the water supply network.

Figure 3-25: Pipe tunnel beneath Macaskill Lakes

The reticulation network delivers water to end users through approximately 2,380 km of pipes less than 300 mm in diameter and service connections, extending throughout urban areas – see Table 3-7**Error! Reference source not found.**.



Note: Blue lines are water, red lines are wastewater and green lines are stormwater.

Figure 3-26: Hutt Park intersection - a complex 3waters services intersection

Due to their extent, type and age, pipes are one of the most significant components of the region's drinking water network. There are approximately 2,490 km of water supply pipes. A summary of the drinking water pipe network assets by age, material and size is provided in Table 3-6 and Table 3-7.

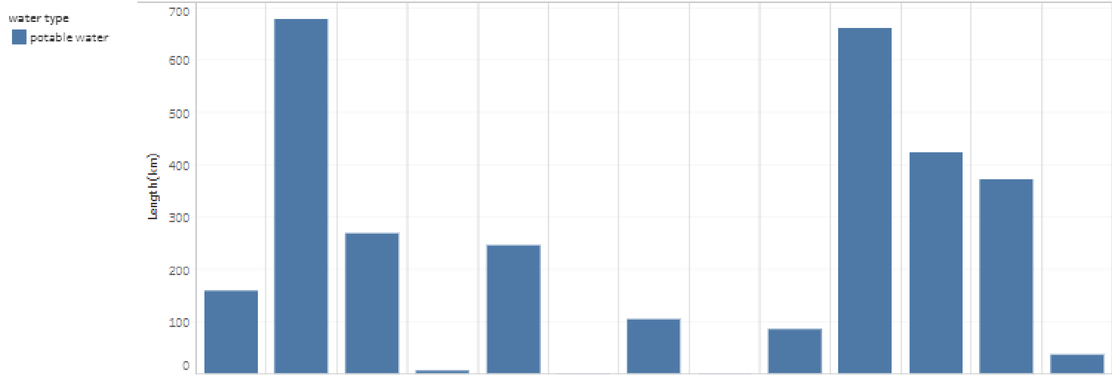
Note that the values are understood to include service connections, bring the total length to c. 3,000 km.

The overview of these assets is as follows:

- 30% of pipes are 0–30-year age band and 48% in the 30+-70-year age band. 15% of pipes are older than this including 7% 90+ years or older

- About half of the pipes were made of brittle materials such as asbestos cement and cast iron.
- It is the cohort of brittle pipes in the 30+-70-year age bracket that are less resilient to movement and stress.
- Asbestos cement pipes are common in the water supply network (22% of the network). This pipe material has steadily deteriorated, lasting approximately 50 years. The water supply network is pressurised to enable water to be available 'on tap'. As a result, failure is now occurring due to loss of material strength – either catastrophically as or through slow leakage
- 6% of the network has unknown/other material assigned, which includes some pipe above 1.5m diameter.
- 77% of the water supply network is made up of pipe less than 150mm in diameter, which are typically found in local streets. The larger pipes, called trunk mains, generally distribute drinking water from reservoirs to supply areas (e.g., suburbs).

Table 3-6: Water supply network assets – diameter and material profile



Note on "Brittle or Ductile" Pipes:
This categorization refers to the relative resilience of certain pipe materials when placed under stress from ground movement (e.g., during an earthquake). Brittle pipes are more likely to fracture in such conditions, while ductile pipes are more likely to withstand them.

water type	Nominal Diameter	Unknown	Brittle Materials						Ductile Materials					Other	Grand Total
		Unknown	Asbestos Cement	Cast Iron	Concrete	Copper	Earthenware	Galvanized Iron	Brass	Ductile Iron	Polyethylene	Polyvinyl Chloride	Steel	Other	
potable water	> 0 to 150	84	560	198	3	245		103	0	20	609	361	135	29	2,347
	> 150 to 300	1	115	47	0	0	0	0		57	39	59	92	3	413
	> 300 to 450	1	2	9	0					7	6	1	22	3	51
	> 450 to 600	0	0	9		0					1	0	23		34
	> 600 to 750			5	0					1			39		45
	> 750 to 900	0		0									38	0	38
	> 900 to 1050				1								17		19
	> 1050 to 1200	0			0								2		3
	> 1200 to 1500				0								0		0
	> 1500	62	0			0	0				0		0	0	62
	Unknown	10	1	0		1		0		0	7	2	1	0	22
	Total	158	678	269	5	245	0	103	0	85	662	423	372	35	3,035
Grand Total		158	678	269	5	245	0	103	0	85	662	423	372	35	3,035

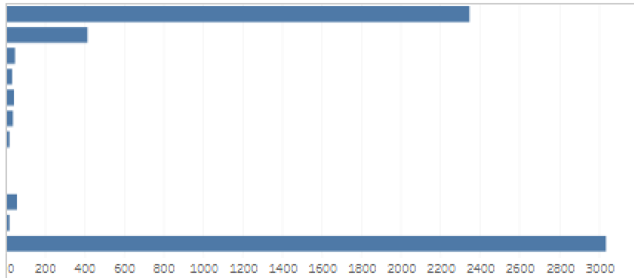
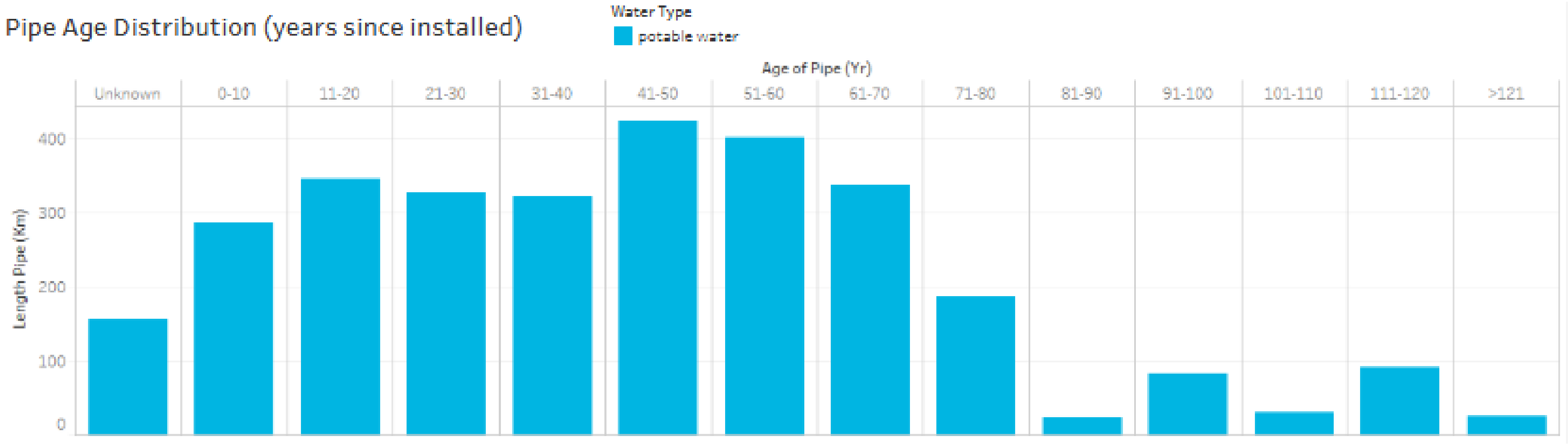


Table 3-7: Water supply network assets – age distribution and length profile


Pipe Age Distribution (years since installed)
Water Type
potable water
Age of Pipe (Yr)
Unknown
0-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
101-110
111-120
>121
Length Pipe (Km)
400
300
200
100
0

3.A.4.6. Network fittings

The term network fittings, as referred to here, encapsulates the many point features which are integral to the water supply networks. This includes all the valves, fire hydrants, flow meters and miscellaneous nodes that provide some function and/or facilitate access to the network. Most of the fittings are manually operated valves; control points which can allow, restrict, or prevent flow through the network. There are also several valves which automatically control flows and are either electronically actuated or work hydraulically through pressure settings. Hydrants provide the fire service with access to water needed to fight fires and are spaced at regular intervals across urban areas. Flow meters measure how much water is being used in the network at key locations (e.g., reservoirs and pump stations), and at the point of supply (i.e., to households, etc).

3.A.4.7. Service connections

There are approximately 167,000 service connections to our regional drinking water networks, most of which are 20 mm diameter household supplies, with larger sizes as required for non-residential purposes. Some of the latter may also have dedicated fire connections (e.g., to a dry riser for a multi-storey building). Non-residential supplies are typically metered, whereas residences can opt to pay for water by meter rather than by rates on a voluntary basis.

A drinking water service connection is the pipe and fittings from the main supply pipe in the street, to an individual property or facility. This comprises a tapping band or tee on the main, and a supply pipe to a valve (toby, manifold or otherwise) on the property boundary. Past this point, pipes and fittings within a property are considered the responsibility of the property owner.

The physical state of repair of service connections is important in the context of network leakage and demand management.

3.A.5. Community Infrastructure Resilience (CIR) assets

Community Infrastructure Resilience (CIR) assets are part of an above ground network that was established in 2018 to supply drinking water to the community in an emergency (e.g., after an earthquake that damages the primary drinking water network). The CIR network starts with water stations that take ground or surface (stream) water and treat it to the NZ Drinking Water Standards using carbon filtration, UV disinfection and chlorine dosing. The treated water is held in large on-site bladders and used to fill smaller bladders that can be distributed by vehicle to community collection points around the region - see Figure 3-27.

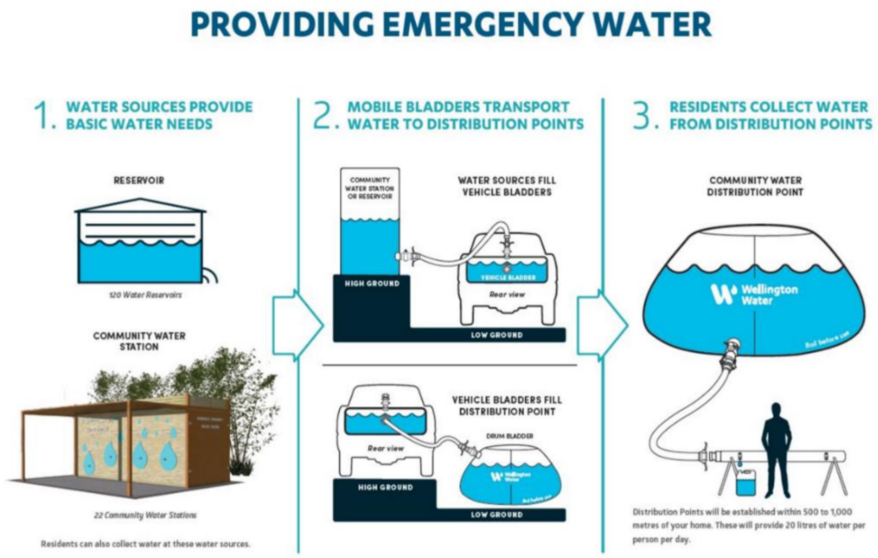


Figure 3-27: Community infrastructure resilience related assets

The CIR assets have an assumed useful life of 30 years. The above ground network includes:

- 37 alternative water source sites (including emergency water stations)
- 270 bladder locations (community distribution points and
- 17 Wellington Region Emergency Management Office (WREMO) community hubs.

The network will operate within and provide water "response islands"– areas which cities are likely to be divided into after an event. It is designed to be up and running after day 7 following a major earthquake or event and provide 20 litres of water per person per day until the primary network can be restored.

There are 27 community water stations, including 21 CIR treatment points, 63 "CIR Reservoir" Sites (reservoir sites available post- event and 67 reservoirs.) – refer 'Draft CIR Operationalisation report (23/24) offers: 17# ER Islands, 270# Community Distribution Centres (where bladders may be deployed).

3.A.6. Water supply asset criticality

Critical water supply assets are:

- Pump stations and reservoirs and trunk mains with no redundancy/contingency
- Assets servicing a very large % of the connected/vulnerable population
- Location based watermains that intersect a state highway/building or a water course
- Water sources and treatment plants are owned by GWRC and operated by WWL.

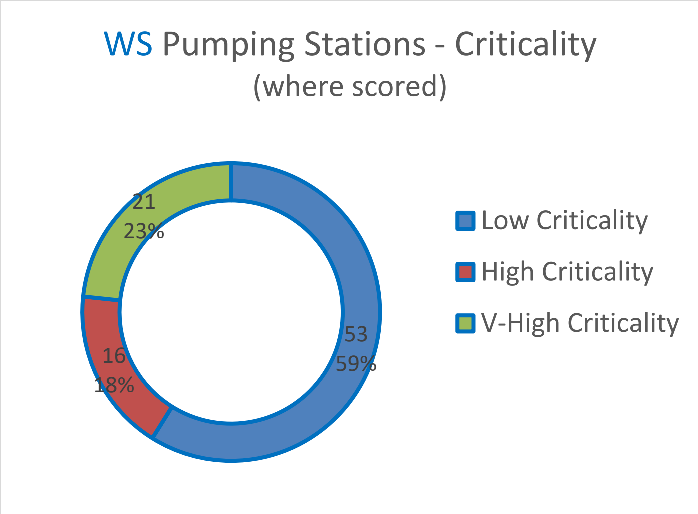


Figure 3-28: WS Pumping stations - criticality

3.A.7. Water supply assets condition

Note some fine details are yet to be updated.

Water supply network, pumpstation and treatment plant condition assessment information is provided below. The most recent network asset assessments were undertaken in 2024, pumpstation assessments are significant from 2018 to date, reservoirs in 2021 and treatment plants in stages from 2021 to date. A summary is provided in Table 3-8.

Table 3-8: Summary of water supply asset condition

Water supply (across all criticality bands)
31% of the network pipes have been assessed as being in poor and very poor condition. These have generally exceeded their expected life. 18% of the network is in moderate condition. Pumpstations – assessed at being in good or very good condition Reservoirs – Generally reservoir structures assessed to date are in moderate or good condition

3.A.7.1. Water supply network condition

The condition grading for VHCA network assets is provided in Figure 3-29 and Figure 3-30.

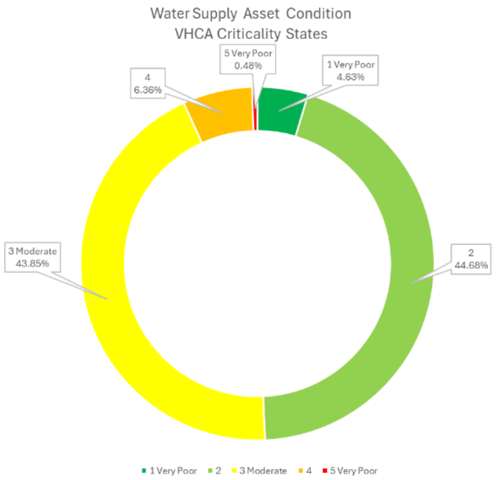


Figure 3-29: Water supply network asset condition - VHCA criticality state

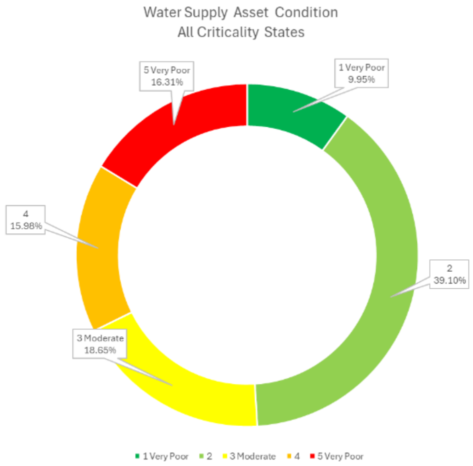
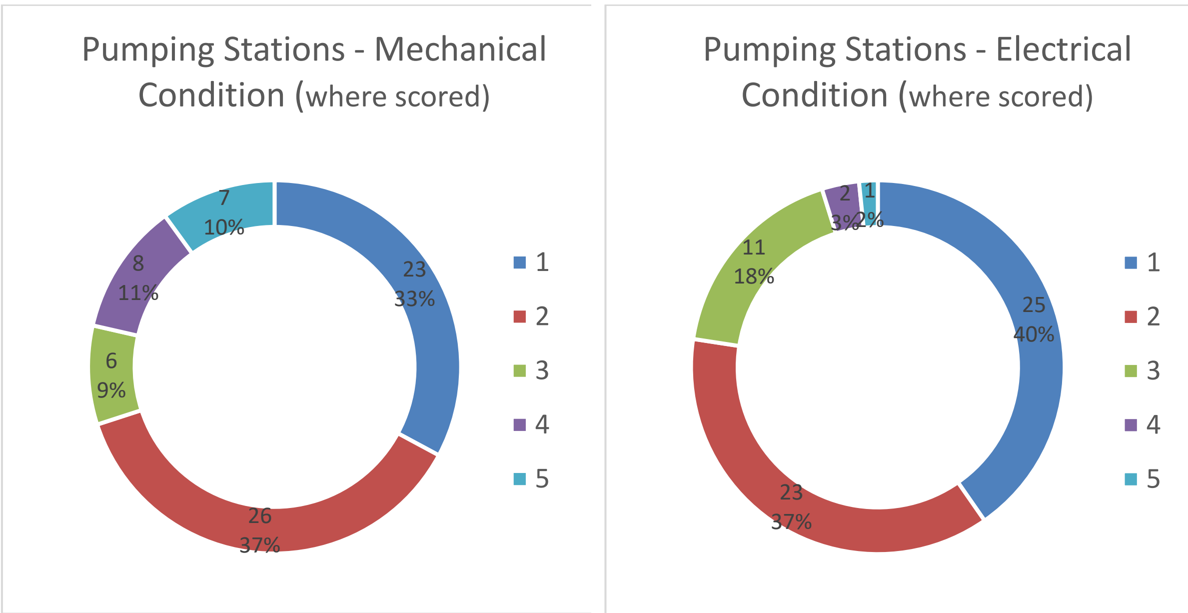
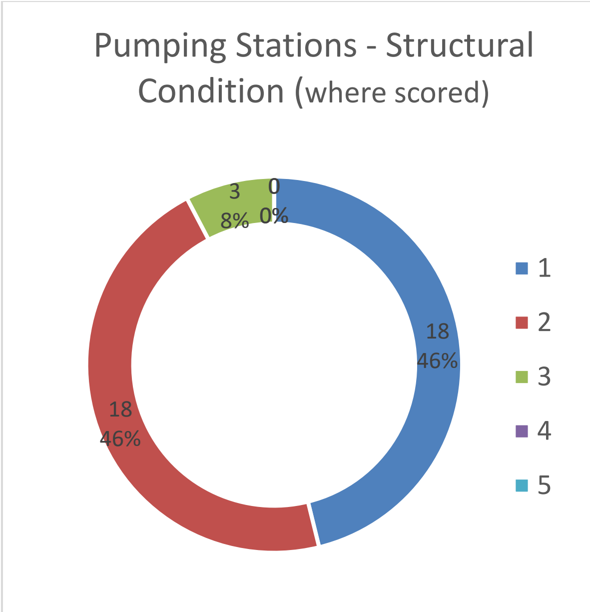


Figure 3-30: Water supply network assets condition – all criticality states

3.A.7.2. Water supply pump station condition

The condition of water supply pumpstation is provided in Figure 3-31.





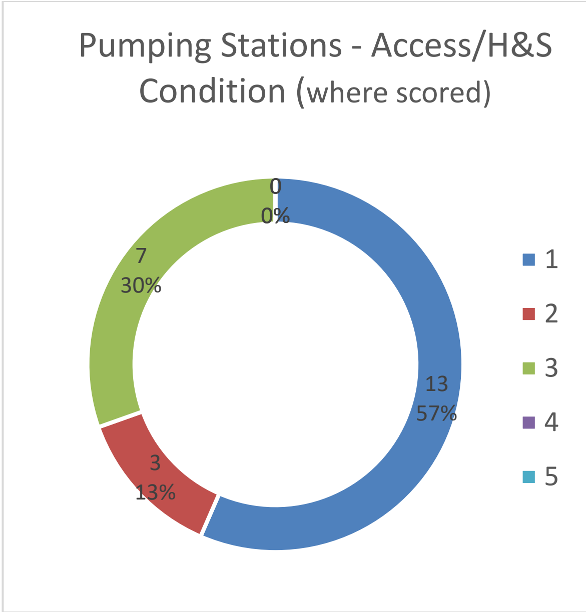


Figure 3-31: Water supply pump stations - (2025)

3.A.7.3. Reservoir (storage) condition

Note this section is to be updated with further commentary for how VHCA findings are being managed.

Reservoirs are identified as VHCAs. While their performance is determined against a range of factors – see Table 3-9 condition that can adversely affect service goals (e.g., contaminated water).

The condition assessment methodology that is being used to assess the condition of reservoirs and ensure that intervention occurs prior to an asset failing is documented. The asset condition status that was reported as part of the VHCA condition assessment programme (completed in March 2022), has stimulated a programme of intervention responses and further investigations. There is strong connection to a capital works plan.To aid prioritisation, a new “Risk Framework for Reservoir Management” has been proposed for the consideration of asset needs vs. budget. This is currently under review.

Table 3-9: Reservoir capital and renewals works programme (2024)

Count of Reservior Name	mn												
Row Labels	5	6	7	8	9	10	11	12	13	14	15	blank	Grand Total
FY22-23							**1**	**1**	**1**				**3**
Complete							1	1	1				3
FY23-24					**1**	**6**	**5**	**3**					**15**
Complete					1	5	5	3					14
Contract Issued						1							1
FY24-25					**1**	**2**	**7**	**4**	**1**				**15**
Contract Issued					1	1	6	3					11
Ready for RFQ/ To be programmed						1	1		1				3
Works in Progress								1					1
FY25-26		**1**	**1**	**1**	**1**	**11**	**5**	**2**	**1**	**1**			**24**
Considered for Abandonment						1	3						4
In Design					1	2			1				4
Ready for RFQ/ To be programmed		1	1	1		8	2	2		1			16
FY26-27	**1**		**1**		**6**	**17**	**11**	**12**	**6**		**2**		**56**
Considered for Abandonment					1		2	3	2		1		9
In Design			1		3	14	7	7	2		1		35
Ready for RFQ/ To be programmed	1				2	3	2	2	2				12
(blank)	**1**		**4**	**4**	**3**	**3**	**2**					**1**	**18**
No Works Proposed	1		4	4	3	3	2					1	18
Grand Total	**2**	**1**	**6**	**5**	**12**	**39**	**31**	**22**	**9**	**1**	**2**	**1**	**131**

3.A.7.4. Water supply treatment plant condition

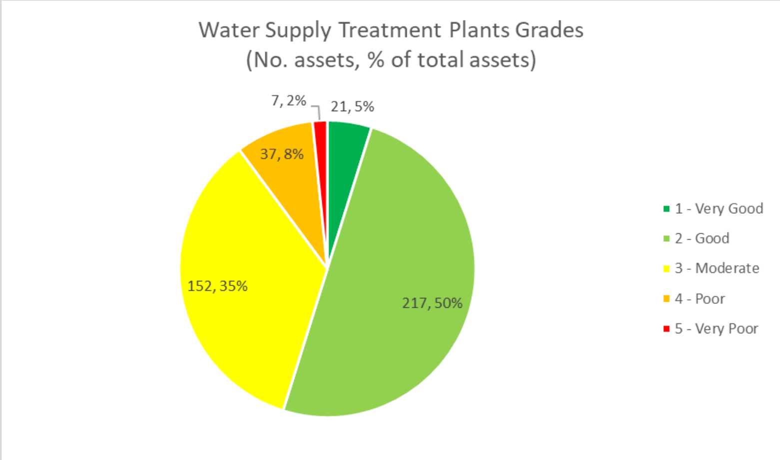
Note this section is to be updated with recent activity, and intentions for further condition assessments under the MCAR programme.

In 2021, Advisian was engaged to support maintenance optimisation work at the WTP facilities at Te Marua, Wainuiomata and Waterloo. The aim of the engagement was to trial a Maintenance Decision Tool process by applying it to a sample of assets as a pilot study at each site, helping to develop in-house capability to continue the process to completion. Condition assessment is part of the tool. From this work:

- Almost 300 assets across five process systems had analyses completed.
- An Asset Criticality Framework spreadsheet for each system was produced, giving both the individual applicable Service Goal values and the combined Criticality Factor score for each critical asset.
- Risk ratings to failure mode level based on the Wellington Water Asset Criticality Framework.
- For each critical failure mode, the current Planned Maintenance (PM) program was reviewed, modified where appropriate and additional tasks put forward where required. Approx. 52 existing PMs were reviewed, and 77 additions recommended for consideration.
- Critical spares requirements were reviewed. No items requiring special sourcing or stockholding were identified.
- Base level resource calculations for the PM program execution.

VHCAs have been identified for all treatment plants as part of the VHCA programme that were not addressed in the Advisian work. Methodologies for condition assessment of these assets have been derived and work is ongoing to complete the assessments before March 2022.

Water supply treatment plant asset condition grade data is provided in the following figures.



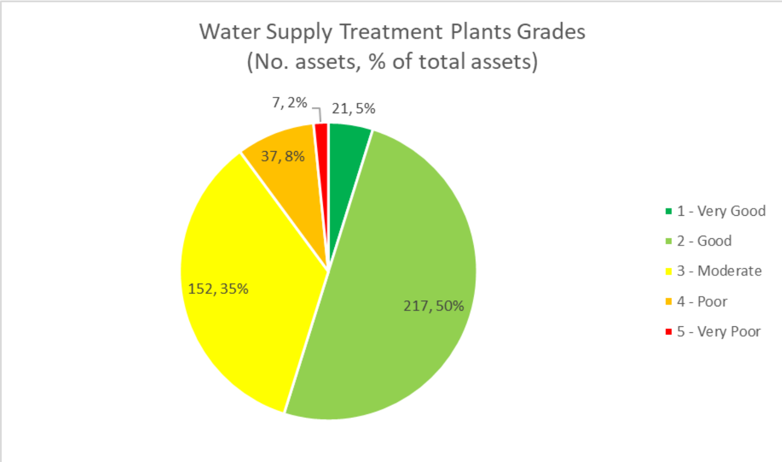


Figure 3-32: Water treatment plant condition grades by % of assets (2022)

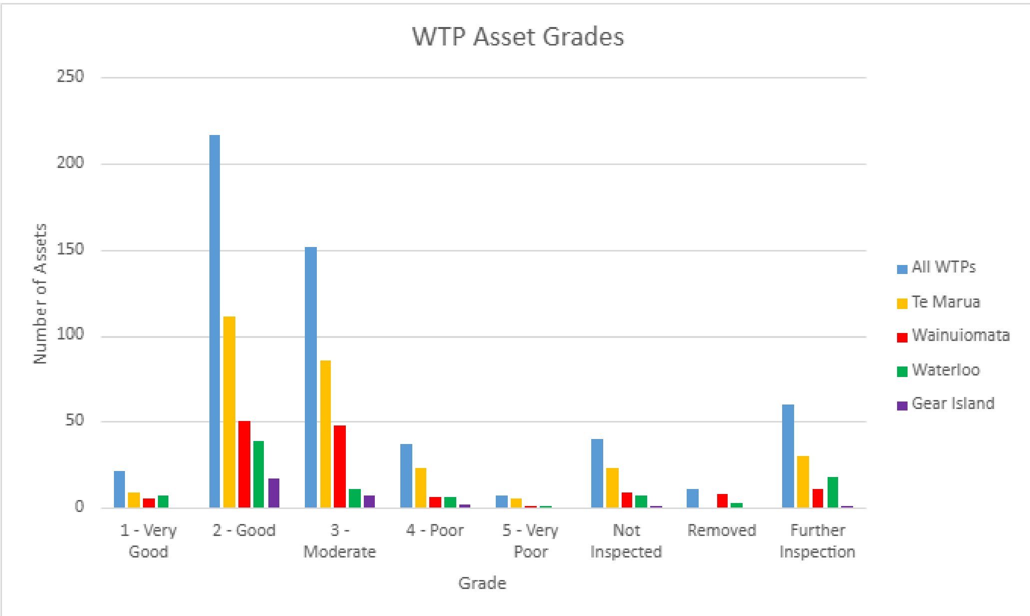


Figure 3-33: Water treatment plant condition grades by water treatment plant (2022)

3.B. ANNEX Wastewater service

This annex describes the physical nature of wastewater service and how the assets contribute to service provision. It includes further description of the network's key attributes, extent and location.

Wastewater service-related asset data is presented including:

- Asset overview including the extent and value
- Asset classes and components e.g. network pipes, pumpstations
- Asset condition and
- Resilience

This Annex should be read in conjunction withs 3.7 - Three waters asset condition

3.B.1. Wastewater service – overview

The wastewater service is a critical service for residential, commercial and industrial, purposes across metropolitan areas.

3.B.2. Extent of service

Urban areas of the Wellington region are serviced by reticulated wastewater networks which are intended to provide for the effective and reliable disposal of domestic and industrial wastewater from residential properties and the business community.

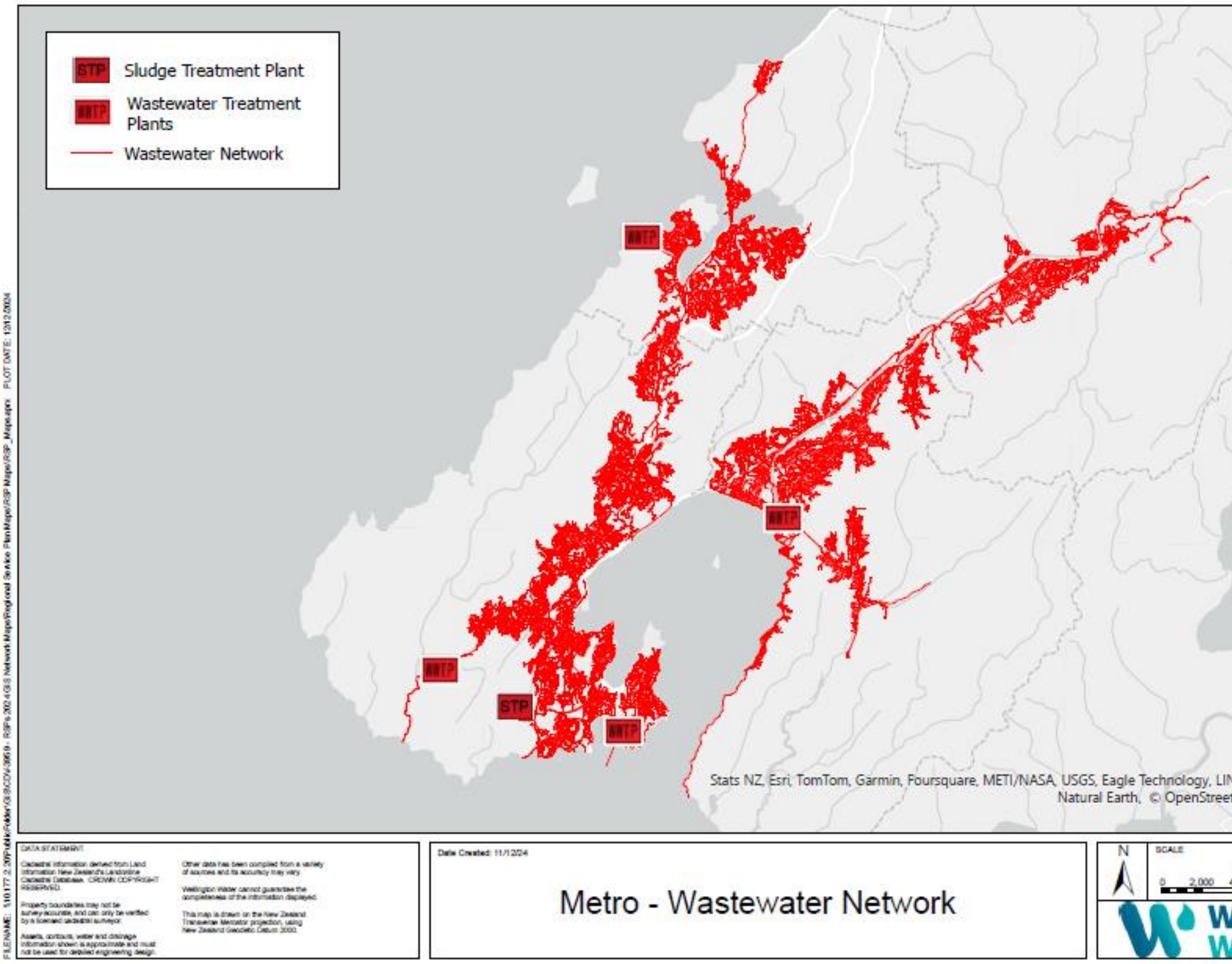


Figure 3-34, Figure 3-35, Figure 3-36, Figure 3-37 show the extent of the major wastewater network components, including pipes and treatment plants. There are four large-scale catchments that feed into each of the four main treatment plants.

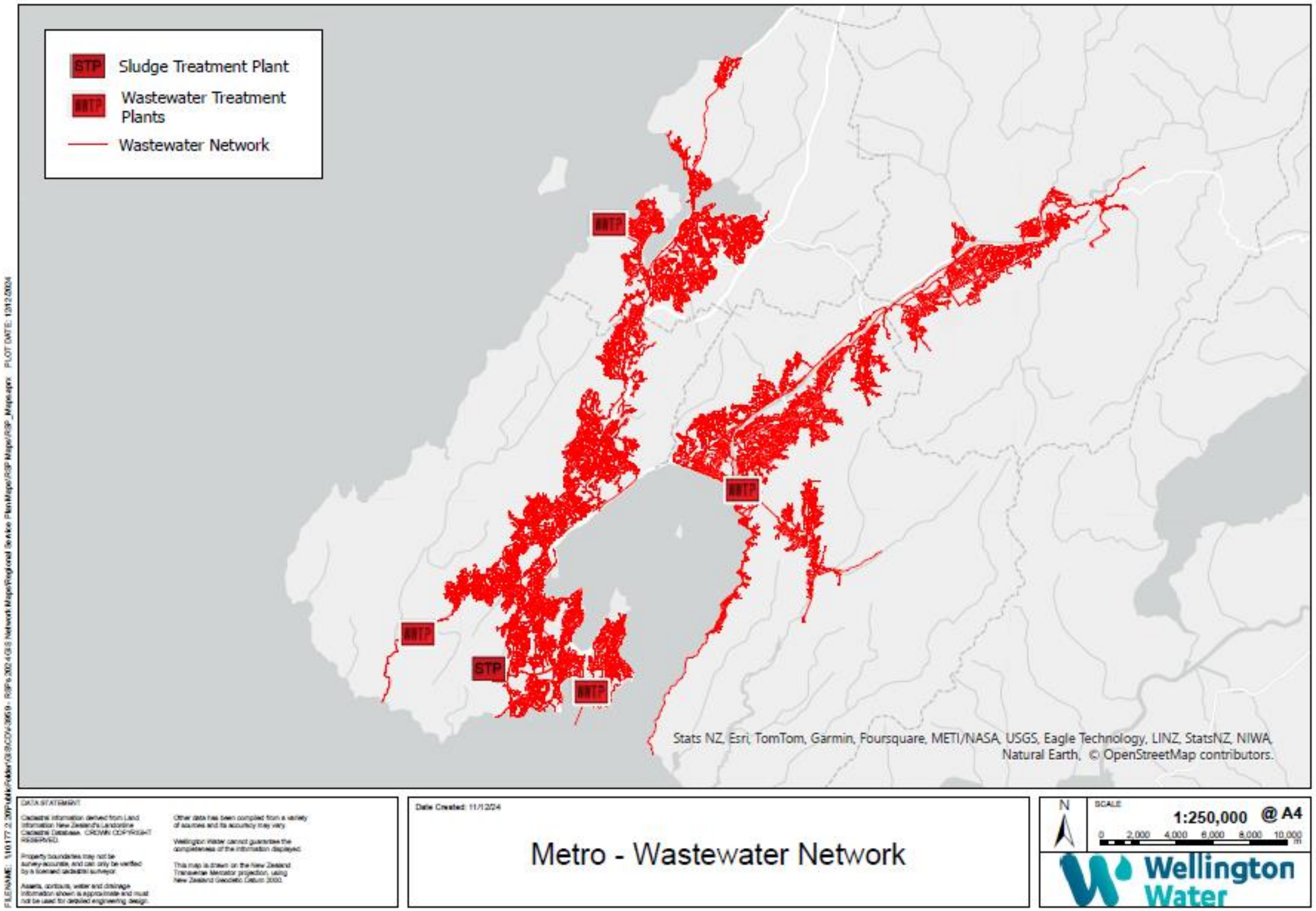
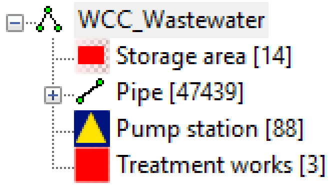


Figure 3-34: Metropolitan councils wastewater networks, treatment and outfalls



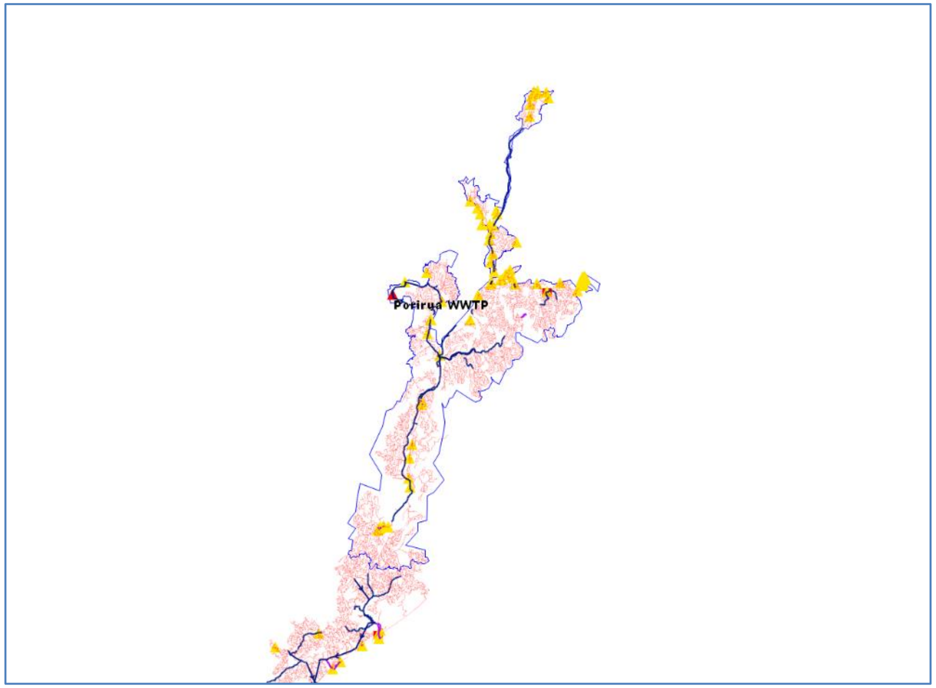


Figure 3-35: Porirua Wastewater Network and Treatment Plant Scale

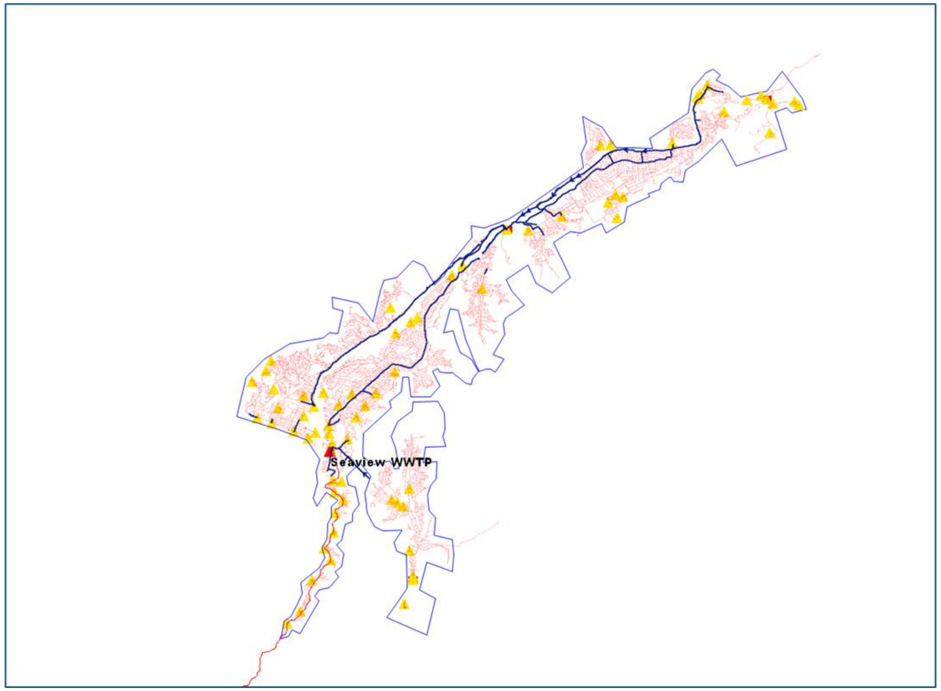


Figure 3-36: Hutt Valle Wastewater Network and Treatment Plant (including Outfall)

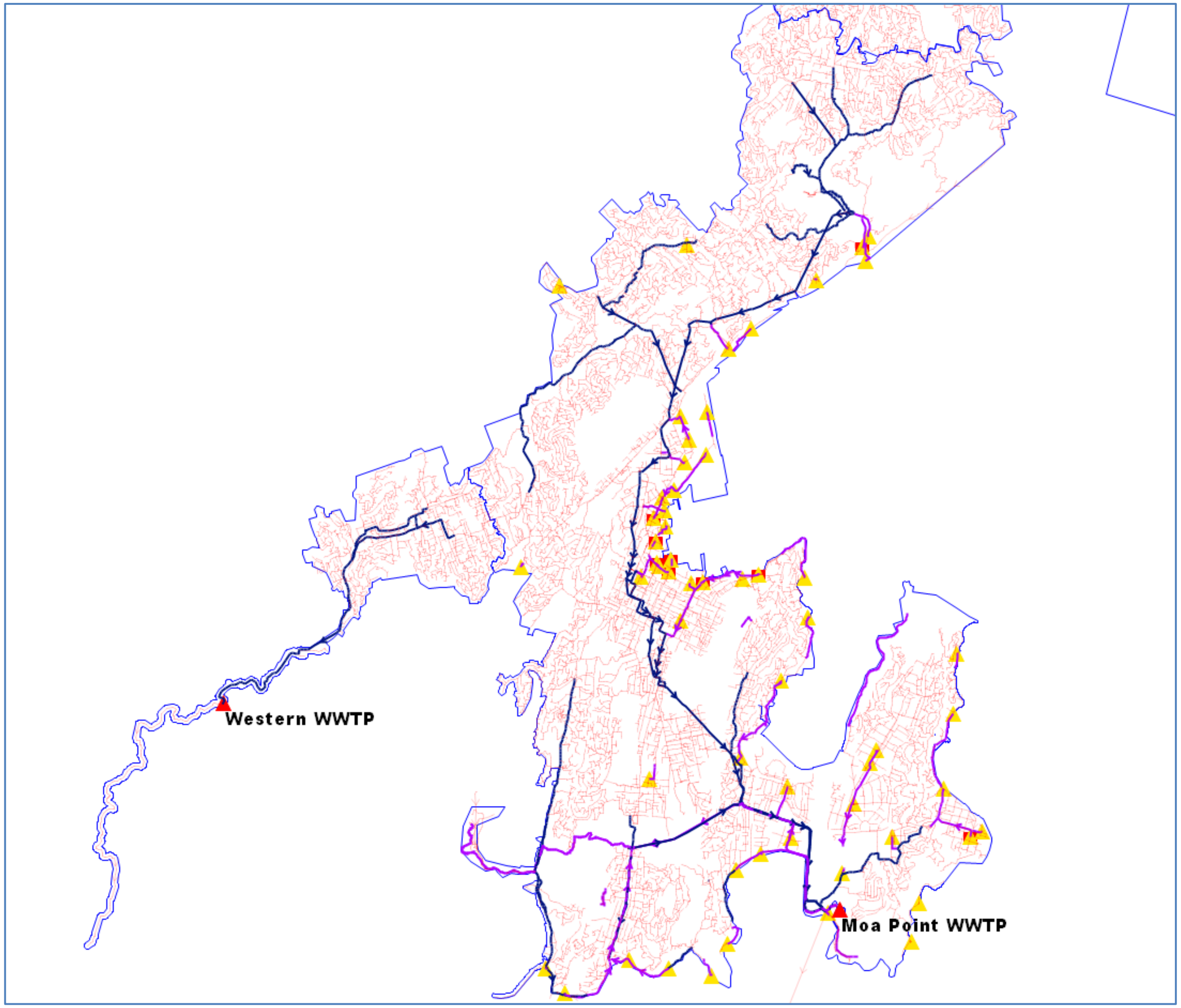


Figure 3-37: Wellington City wastewater network including Moa Point and Karori wastewater treatment plants

3.B.3. Assets and value

The regions wastewater networks generally serve areas within the region's cities and operate within defined hydraulic catchments. The asset groups and value are provided in Table 3-10 and **Error! Reference source not found.**36.

Table 3-10: Wastewater asset quantities

Asset Type	Unit of Measure	Quantity
Pipes	km	2342.73
Pipes (Joint Venture)	km (JV)	112.8
Pumpstations (incl. Joint Venture)	No.	180
Treatment Plants	No.	4

Notes:

i) Data source: DPS Wellington Water (December 2024),
ii) completeness and confidence of treatment plants cannot be determined by WWL as this is managed by Veolia,
iii) Carey's Gully is considered part of the Moa Point treatment process, and so has not been separately counted,
iv) excludes SWDC assets.

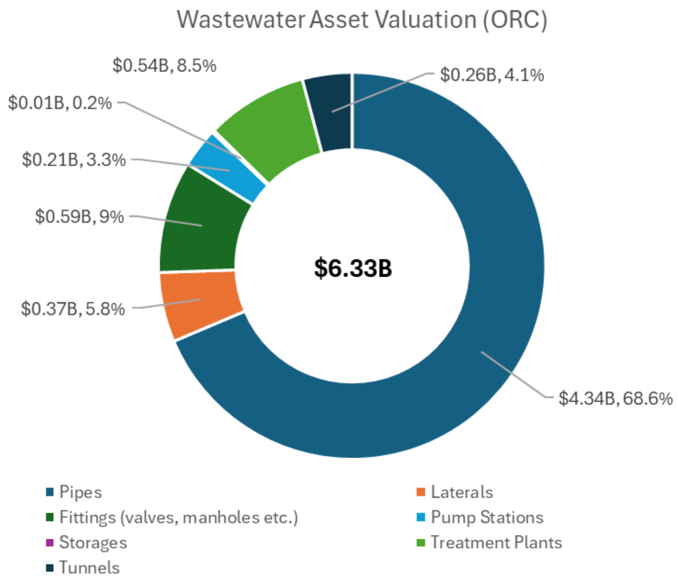


Figure 3-38: Wastewater asset replacement costs

Source: Asset valuations - GWRC March 2022; WCC, UHCC and HCC - June 2024; PCC - June 2023.

3.B.4. Asset groups

The wastewater reticulation networks - see **Error! Reference source not found.** to which each serviced property is connected consists of extensive networks of pipes (generally 150 mm in diameter). Most of the pipelines in the wastewater reticulation networks operate by gravity drainage. This means that the pipelines run downhill and are not intended to operate under pressure. Pumping stations are provided where gravity flow is not possible. The reticulation networks discharge into systems of trunk sewers of larger size that convey the wastewater to the treatment plants.

Treated effluent from the metropolitan treatment plants is discharged into the coastal marine area. The quality of effluent is regulated by way of conditions in resource consents for effluent discharges.

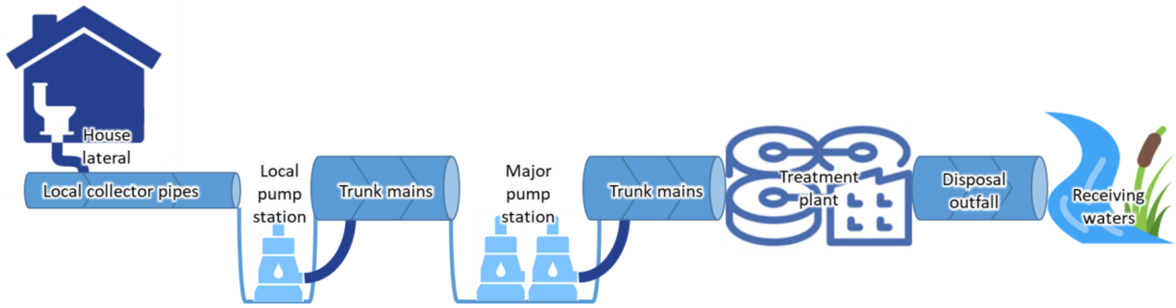


Figure 3-39: Wastewater service assets interaction

3.B.4.1. Service connections

There are approximately 167,000 service connections to the regional wastewater networks, most of which are 100 mm diameter household laterals, with larger sizes as required for non-residential purposes.

A wastewater service connection is the pipe and fittings from a property boundary to the collector main in the street. This may comprise an inspection point on the boundary, with a pipe running to a connection to the main or into a manhole in the street. Where public mains run within private properties, the connection is generally considered to be the first metre of pipe attached to the main or manhole. Pipes and fittings other than public mains and manholes within a property are considered the responsibility of the property owner.

The physical state of repair of service connections is important in the context of infiltration and exfiltration and hence network demand, overflows and water quality impacts.

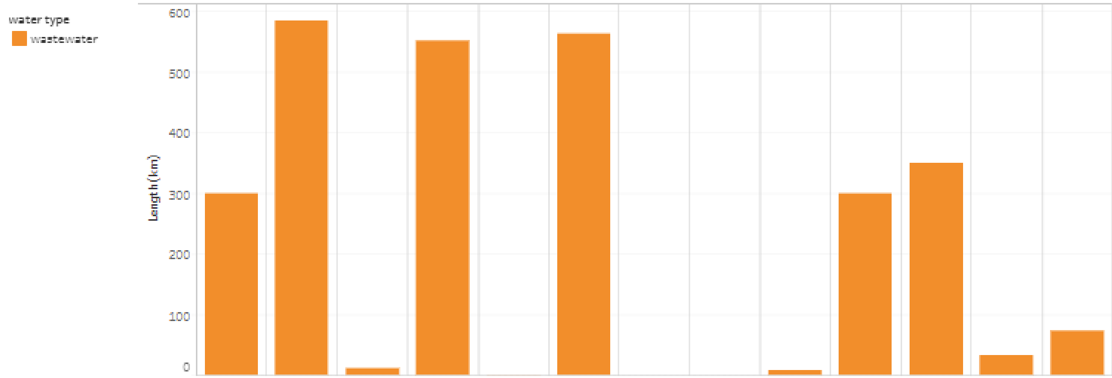
3.B.4.2. Piped network (gravity and pressure mains)

Due to their extent, type and age, pipes are one of the most significant components of the region's wastewater network. There are approximately 2,772 km of public wastewater mains, an increase of c 300km from 2021. A summary of the wastewater pipe network assets by age, material and size is provided in **Error! Reference source not found.** and **Error! Reference source not found.**. Below is an overview of these assets:

- 24% of the network assets are 0-30 years old, and the largest proportion (61%) in the 30+ to 80-year cohort. 15% of network pipes are in the aged 80 to 120+ year cohort.
- 4% of the network is 600m or greater in diameter while across the whole network, 13% are classified as 'unknown/other' material
- Approximately 60% of the pipes are made of brittle materials particularly asbestos cement, earthenware, and reinforced concrete. Concrete is still used for larger diameter wastewater pipes. These pipes are less resilient to seismic movement and stress e.g., repetitive heavy vehicle loading, slow movement of ground.

- Asbestos cement pipes are common in the wastewater network (21%). This pipe material has deteriorated, lasting only about 70 years. Particularly for pressurised pipes such as wastewater rising mains, catastrophic bursts may occur due to loss of material strength. Further, slow leaks (exfiltration) can occur into surrounding ground through cracks in the deteriorated pipe walls.
- Hutt City Council maintains wastewater mains, with property owners responsible for the lateral pipes from the main to their point of connection – refer WWL Fixing Your Lateral
- Most of the wastewater network is made up of 150mm diameter pipe, which are typically found in local streets. The larger pipes, called trunk mains, generally collect and transport wastewater between suburbs and towards centralised treatment facilities.

Table 3-11: Wastewater network assets – diameter and material profile



Note on "Brittle or Ductile" Pipes:
This categorization refers to the relative resilience of certain pipe materials when placed under stress from ground movement (e.g., during an earthquake). Brittle pipes are more likely to fracture in such conditions, while ductile pipes are more likely to withstand them.

water type	Nominal Diameter	Unknown	Brittle Materials						Ductile Materials					Other	Grand Total
		Unknown	Asbestos Cement	Cast Iron	Concrete	Copper	Earthenware	Galvanised Iron	Brass	Ductile Iron	Polyethylene	Polyvinyl Chloride	Steel	Other	
wastewater	> 0 to 150	47	511	5	307	0	510			0	118	286	7	37	1,831
	> 150 to 300	5	54	3	97		48			6	157	57	17	7	450
	> 300 to 450	4	13	3	46		3			0	18	3	0	11	101
	> 450 to 600	1	5	0	25		1			0	3	2	0	0	38
	> 600 to 750	0	0		17		0			0	1	2	6	1	27
	> 750 to 900	4	1		20		1			1	1		0	1	28
	> 900 to 1050	2	0		11		0				1	0	0		14
	> 1050 to 1200	0			17						0		0		18
	> 1200 to 1500	0			7								2	16	25
	> 1500	3			4		0								7
	Unknown	233	0		0		0				0	0	0	0	234
	Total	300	584	12	551	0	563			8	299	350	33	73	2,772
Grand Total		300	584	12	551	0	563			8	299	350	33	73	2,772

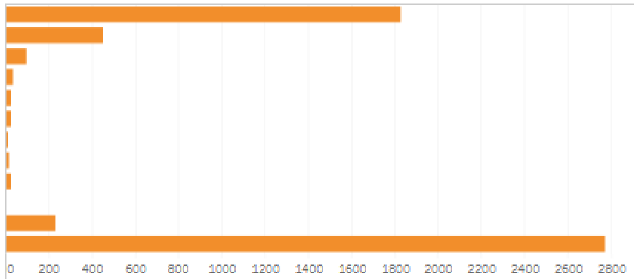
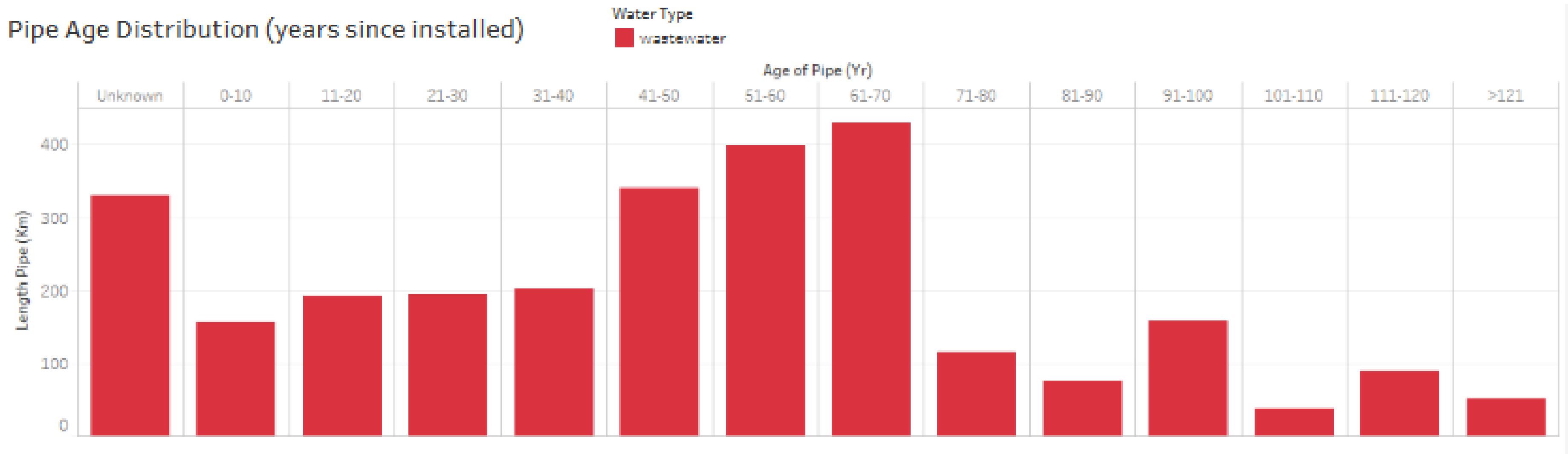


Table 3-12: Wastewater network assets – age distribution and length profile



3.B.4.3. Network fittings

The term network fittings, as referred to here, encapsulates the many point features which are integral to the wastewater networks. This includes all the inlets, outlets, manholes, inspection points, valves and miscellaneous nodes that provide some function and/or facilitate access to the network. Most fittings are manholes; access chambers typically built at every junction, change in direction, grade, or size in a piped gravity network.

3.B.4.4. Pump stations

Pump stations are necessary in some parts of the network where it is not possible to transport wastewater by gravity. There are 204 pump stations of varying sizes across the wastewater networks. These generally include below-ground wet wells which provide buffering storage for incoming flows. Submersible pumps or pumps in a separate chamber (dry well), operate when triggered by level sensors and lift wastewater to a higher elevation. Duty and standby pumping arrangements provide onsite backup while electrical, monitoring and control equipment is normally housed in an above-ground building or cabinet to aid the continuous operation of the site.

3.B.4.5. Wastewater storage tanks

There are currently three storage facilities in the WWL wastewater networks that provide additional flow buffering to reduce the number of overflows. The most significant of these is the 10 million litre storage facility at Silverstream which receives flow from Upper Hutt and discharges into the joint Hutt Valley wastewater network.

3.B.4.6. Wastewater treatment plants

Wastewater is treated in one of the four treatment plants. From 2020, the operational management of the metropolitan plants was combined in one contract with Veolia NZ (Veolia). Treated effluent is conveyed via outfall pipes to the receiving environment. These are significant components of the treatment plants – the Seaview outfall pipe for example is approximately 18 km long.

Porirua Wastewater Treatment Plant

The Porirua Wastewater Treatment Plant (WWTP) was built in 1989 and is owned under a joint venture by the PCC and WCC. The treatment process includes extended aeration with activated sludge, clarification and UV disinfection. Average daily flow is about 29ML per day with treated effluent disposed via a short coastal outfall at Rukutane Point. Sludge is dewatered using centrifuges and then disposed to landfill.

Figure 3-40: Porirua wastewater treatment plant

Moa Point Wastewater treatment plant

The Moa Point WWTP was built in 1998 and is owned by WCC. The treatment process includes primary sedimentation, moving bed bioreactors (MBBR), clarification and UV disinfection. Average daily flow is about 78 ML per day with treated effluent disposed via a long coastal outfall off Moa Point. Sludge is pumped to Carey's Gully where it is dewatered using centrifuges and then disposed to landfill.

Figure 3-41: Moa Point wastewater treatment plant

Western Wastewater Treatment Plant

The Western WWTP was built in 1997 and is owned by WCC. The treatment process includes MBBR, clarification and UV disinfection. Average daily flow is about 5.5 ML per day with treated effluent disposed via a short coastal outfall on Wellington's south coast near Tongue Point. Sludge is dewatered using centrifuges and then disposed to landfill.

Figure 3-42: Western wastewater treatment plant

Seaview Wastewater Treatment Plant

The Seaview WWTP was built in 2001 and is owned under a joint venture by UHCC and HCC. The treatment process includes primary sedimentation, aeration with activated sludge, clarification and UV disinfection. Average daily flow is about 71 ML per day with treated effluent transmitted 18 km and then disposed via a short coastal outfall at Bluff Point near Pencarrow Head. Sludge is dewatered using a thermal dryer and disposed to landfill.

Figure 3-43: Seaview wastewater treatment plant

Each of the WWTPs has its own suite of resource consents which expire at different times. Re-consenting these is often a complex process and may trigger significant investment requirements to satisfy consent conditions. Consented activities for the WWTPs include discharges to air, land, surface water and the coastal marine area, plus land use and other consents- see Appendix C including *Wellington Water Consenting Strategy* which is currently being updated.

3.8.2 Wastewater service asset criticality

Critical wastewater assets are:

- Wastewater treatment plants
- Pump stations and trunk mains with no redundancy/contingency
- Assets servicing a very large % of the connected/vulnerable population
- Location based Pipes that intersect state highways /buildings or are within 20 metres of a water course (includes pipe bridges)

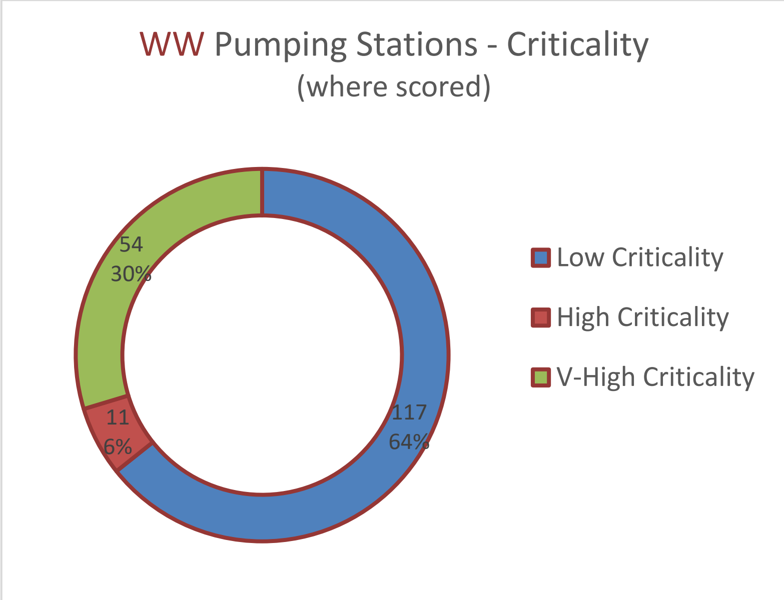


Figure 3-44: Wastewater pumping station - criticality

3.8.3 Wastewater service asset condition

Wastewater network, pumpstation, storage and treatment plant condition assessments are provided below. Network assessments were undertaken in 2024, pumpstation assessments in 2021 and treatment plants in 2023.

3.8.3.1 Wastewater network condition

The condition grading for network assets is provided in Figure 3-45and Figure 3-46

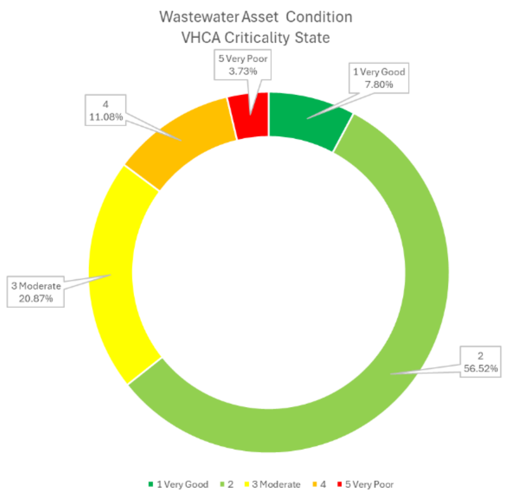


Figure 3-45: Wastewater network asset condition - VHCA criticality state

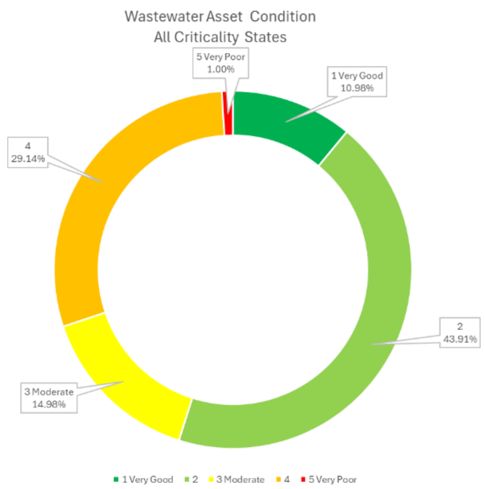


Figure 3-46: Wastewater network assets condition – all criticality states

3.8.3.2 Wastewater pump station condition

The condition of wastewater pumpstation assets is provided in Figure 3-46.

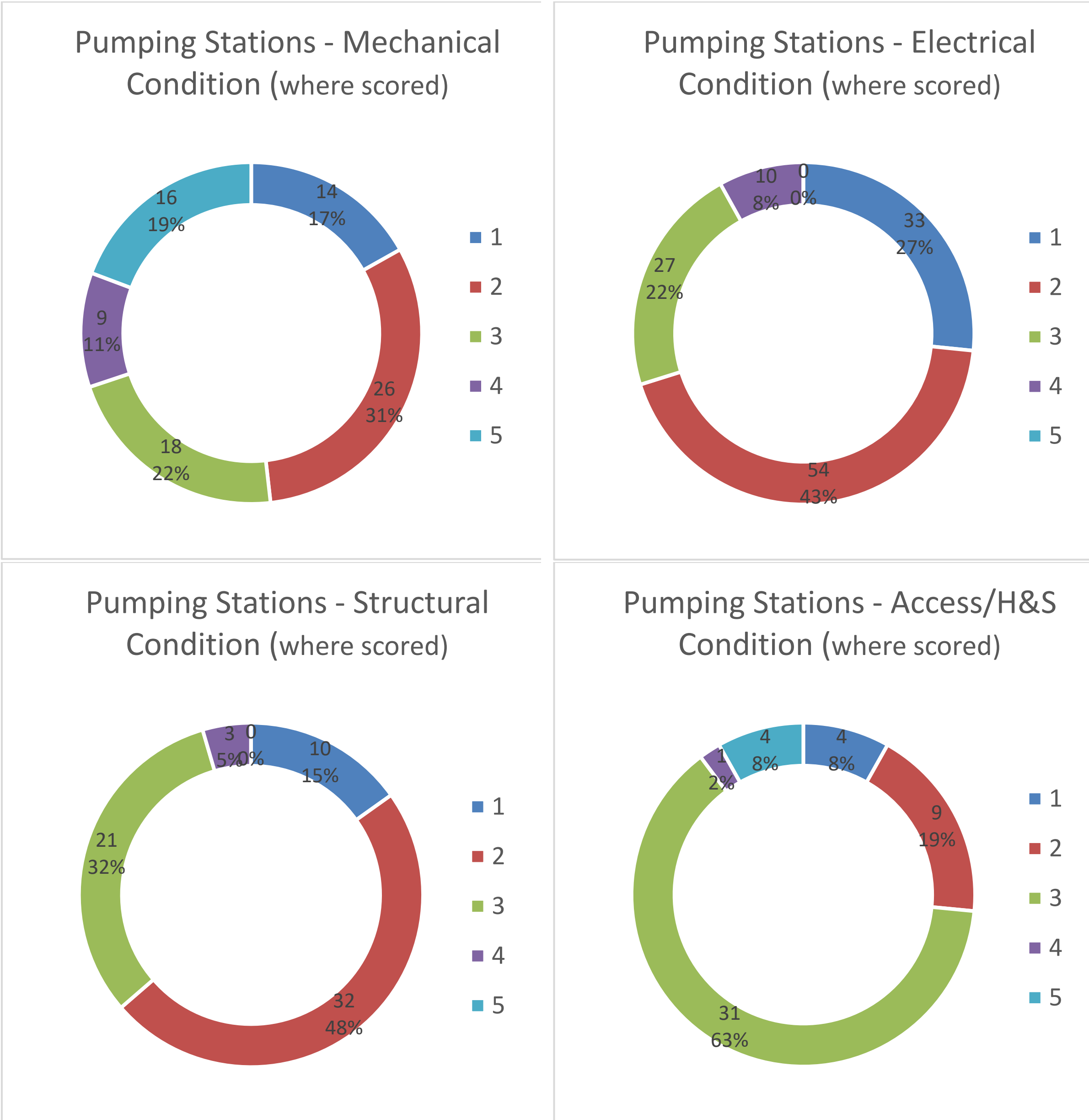


Figure 3-47: Wastewater pumpstation condition grade (2025)

3.8.3.3 Wastewater storage tank condition

To be provided

3.8.3.4 Wastewater treatment plant condition

Wastewater treatment plant data is held by WWLs contracted operator Veolia. A summary of treatment plant condition data is provided in Figure 3-48.

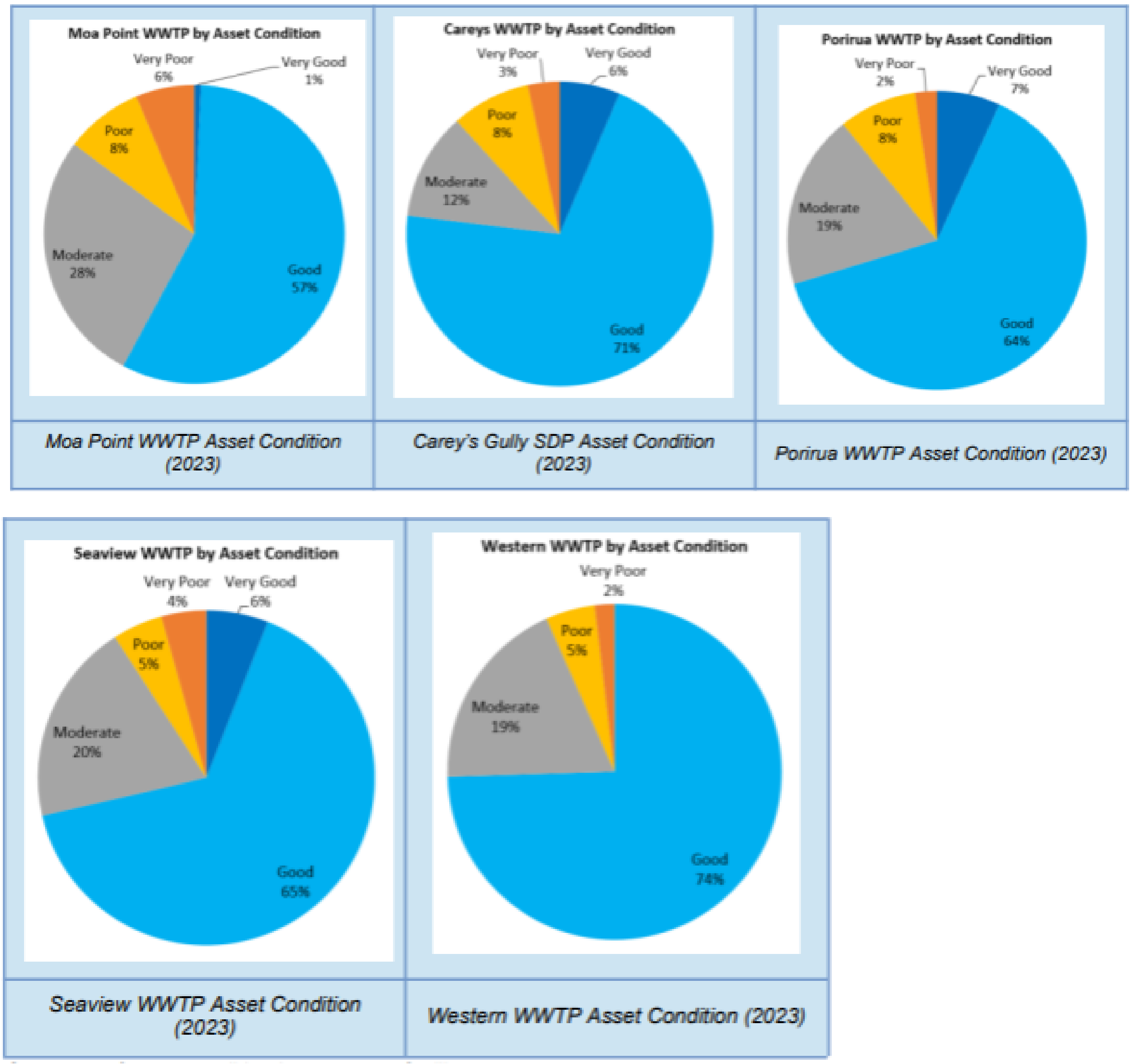


Figure 3-48: Wastewater treatment plant condition

Source: 2023 AMP for Wellington Regional Wastewater Treatment Plant Services Contract, Veolia

3.C. ANNEX Stormwater service

This annex describes the physical nature of stormwater service and how the assets contribute to service provision. It includes further description of the network's key attributes, extent and location.

Stormwater service-related asset data is presented including:

- Asset overview including the extent and value
- Asset classes and components e.g. network pipes, pumpstations
- Asset condition, and
- Resilience

This Annex should be read in conjunction withs 3.7 - General - Asset Condition

3.C.1. Stormwater service – overview

Stormwater systems are designed to protect public safety by managing rainfall and mitigating flood risks. Typically, piped networks are built to handle frequent rainfall events, often those with a 10-year Annual recurrence interval (equivalent to a 10% Annual Exceedance Probability, or AEP). When rainfall exceeds the capacity of these networks, stormwater systems rely on overland flow paths such as open channels to safely convey excess water and reduce flooding impacts. Overland flow paths are currently designed to handle rainfall of 100-year Annual recurrence interval or 1% AEP.

Current stormwater standards primarily focus on protecting residential habitable floors with the aim to prevent floodwaters from entering living spaces, where risks to life and property are most critical. However, there are no equivalent standards for stormwater flood protection for industrial and commercial properties, or transport areas.

Despite the standard for residential flood protection, many councils face significant challenges in managing flood risks during frequent rainfall events. Contributing factors include historical land use practices, limitations of infrastructure, increasing pressures of climate change and high cost of upgrades, which can exceed $1 million per property in some areas. These factors make addressing these issues particularly complex, leaving not only residential areas but also industrial and commercial properties increasingly at risk: Source: WWL (Dele, U., 2025).

3.C.2. Extent of service

Most developed areas of the Wellington metropolitan region are serviced by reticulated stormwater networks which are intended to provide for the effective disposal of regular rainfall runoff from residential properties and the business community.

The region's topography contains many well-defined watersheds and individual catchments. At a high level, there are two major catchments or Whaitua which drain to the two major harbours in the region – see Figure 3-49. Te Awarua o Porirua covers an area on the west of the region that drains into the Porirua harbour and includes developed areas between Johnsonville and Pukerua Bay. The Wellington Harbour and Hutt Valley Whaitua is described by the western and southern coastal areas, and the ranges to the north and east which bound the Kapiti and Ruamahanga (Wairarapa) catchments. The proximity of the coast, harbours, and streams results in a system of numerous localised networks. Rural areas are generally served by open streams and water courses, while runoff in urban areas is mostly directed through piped systems.

The status quo is expected to be maintained with no major decisions pending. shows the extent of the major stormwater components against the Whaitua catchments described above.

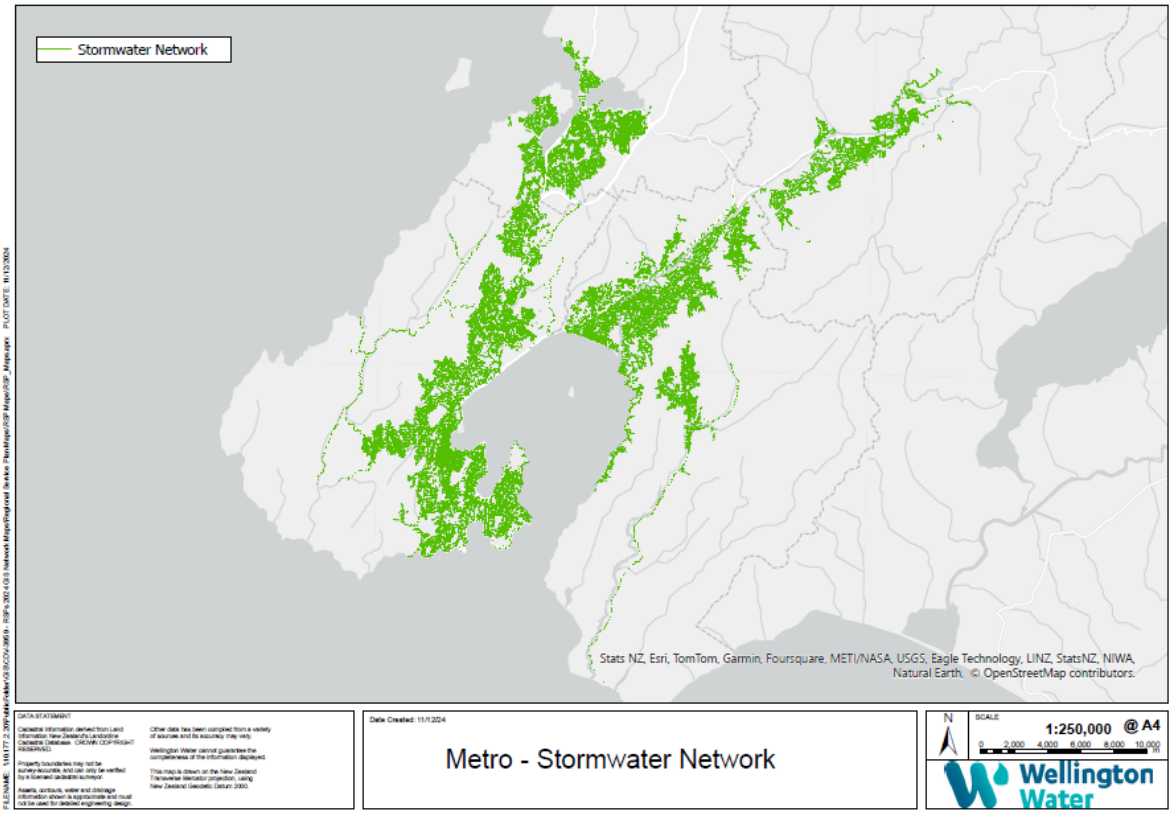


Figure 3-49: Metropolitan councils stormwater network

3.C.3. Assets and value

The regions stormwater networks generally serve areas within the region's cities and operate within defined hydraulic catchments. See the RSP Part 3s for the individual councils' three waters assets. The asset groups and value are provided in Table 3-13 and Figure 3-50.

Table 3-13: Stormwater asset quantities

Asset Type	Unit of Measure	Quantity
Pipes	km	1832.07
Pumpstations	No.	24

Notes:

i) Data source: DPS Wellington Water (December 2024),
ii) excludes SWDC assets.

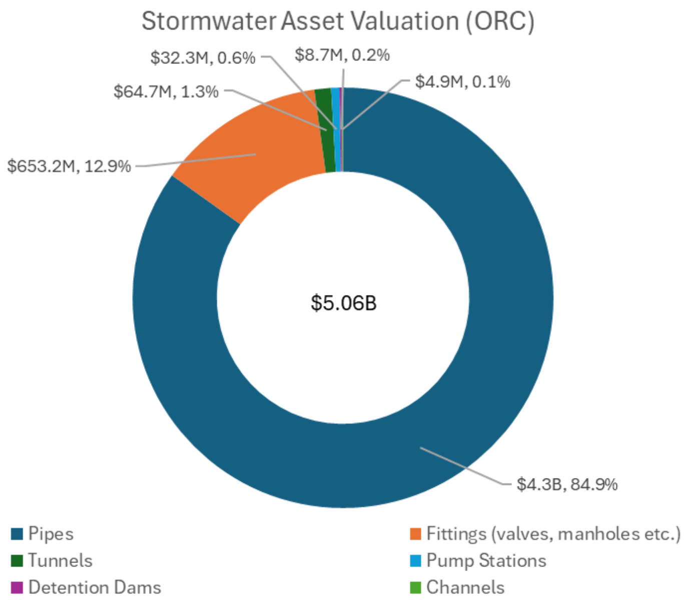


Figure 3-50: Stormwater asset replacement cost

Source: Asset valuations - GWRC March 2022; WCC, UHCC and HCC - June 2024; PCC - June 2023.

3.C.4. Asset groups

The stormwater networks - see Figure 3-51 - comprise pipes and channels which discharge into open drains, watercourses, harbours, and the ocean at many locations across the region. Most pipelines in the networks operate by gravity drainage, meaning that they run downhill and are not intended to operate under pressure. Pump stations are used in some areas where low-lying land cannot be effectively drained by gravity alone.

Intakes to the system generally incorporate debris traps to intercept solid material. Beyond this, stormwater is not typically treated to remove contaminants. More recently, green infrastructure such as wetlands and swales are being considered and built in response to the growing need to improve the quality of receiving waters.

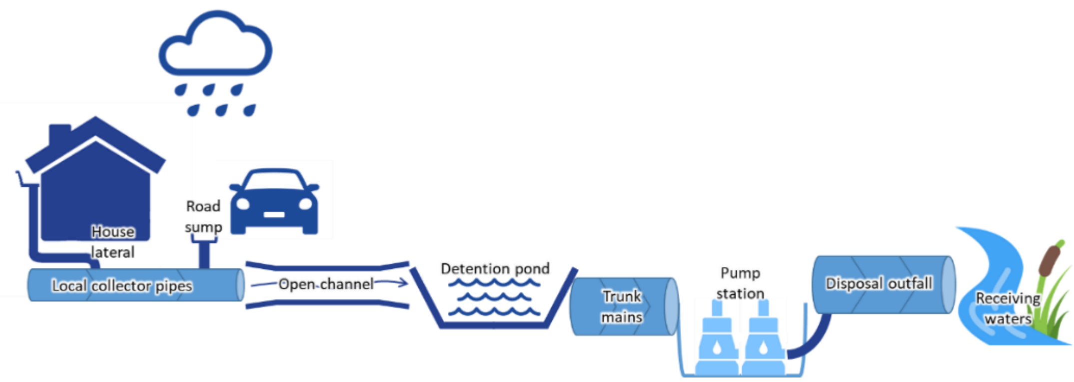


Figure 3-51: Stormwater network asset interactions

3.C.4.1. Open channels

The maintenance of streams and drainage channels is generally considered to be the responsibility of the landowner but may be critical to the effective function of the stormwater network. Larger rivers and streams are administered by GWRC under the 1976 watercourses agreement.

3.C.4.2. Overland flow paths and storage areas

While not formally identified as part of the stormwater network, overland flow paths and storage areas play an important role in managing stormwater for areas upstream of the stormwater network or for storms that exceed the capacity of the stormwater network. Detailed stormwater modelling of catchments allows overland flow paths and storage areas to be identified and therefore will provide an opportunity for more active management in the future.

3.C.4.3. Detention dams

Stormwater detention dams are used to capture surface run-off and overland flow to regulate their discharge downstream of the dam. Detention may be provided by way of a range of structures, from small bunded local ponds to larger dams and lakes. Of this type, there are seven in total, all within the Hutt Valley at the following locations.

- Emerald Hill Drive, Birchville
- Freyberg Road, Heretaunga
- Barberry Grove, Maungaraki
- Dowse Drive, Maungaraki
- Jacaranda Grove, Maungaraki
- Mulberry Street, Maungaraki
- Stanhope Grove, Korokoro

These are located at strategic points on tributaries to the Hutt River, thereby controlling the discharge of stormwater through each associated downstream urbanised area. Construction generally consists of an earth dam with inlet and outlet pipe-works, gates, spillways and in some cases supervisory control and data acquisition (SCADA) systems. Dams may be designed to cope with and have staged relief for flood levels up to one in 100-year storms. Floodable adjacent areas are protected as reserves and maintained to ensure the effective and efficient hydraulic operation of the dam in storm events.

Dam Safety Management: Mulberry and Stanhope Dams are classifiable under the Dam Safety regulations with risk management systems to be developed.

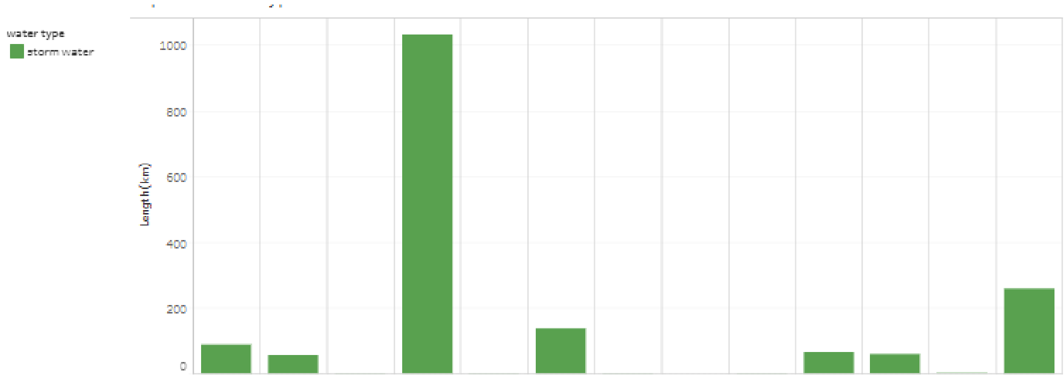
3.C.4.4. Piped network

Due to their extent, type and age, pipes are one of the most significant components of the region’s stormwater network. There are approximately 1,202 kilometres of stormwater pipes and increase of 50 km from 2021. Table 3-14 and

Table 3-15 present summaries of the stormwater pipe network assets by age, material, and size. Below is an overview of these assets:

- 21% of stormwater pipe is 0-30 years old, with 57% between 30+ to 80 years old.
- 72% percent of pipes were made of brittle materials; primarily concrete with some asbestos and earthenware (although concrete is still used for larger diameter stormwater pipes). These pipes are less resilient to movement and stress.
- Concrete pipes are very common in the stormwater network being favoured for their material strength. This is important for these typically large-diameter pipes which need to be able to support themselves and the ground, roads, and buildings etc above them. Concrete also provides good resistance to scouring that may occur from debris loading within the pipe.
- Stormwater pipes are generally larger than water supply and wastewater pipes, as they carry large amounts of water during heavy rain. 85% of stormwater pipes are up to 300 mm diameter, with larger pipes downstream due to combined flows.

Table 3-14: Stormwater network assets – diameter and material profile



Note on "Brittle or Ductile" Pipes:
This categorization refers to the relative resilience of certain pipe materials when placed under stress from ground movement (e.g., during an earthquake). Brittle pipes are more likely to fracture in such conditions, while ductile pipes are more likely to withstand them.

		Unknown	Brittle Materials						Ductile Materials					Other	
water type	Nominal Diameter	Unknown	Asbestos Cement	Cast Iron	Concrete	Copper	Earthenware	Galvanised Iron	Brass	Ductile Iron	Polyethylene	Polyvinyl Chloride	Steel	Other	Grand Total
storm water	> 0 to 150	10	35	0	65		42	0			4	36	1	17	210
	> 150 to 300	40	21	0	504	0	80			0	39	24	1	128	836
	> 300 to 450	11	1	0	187		10				21	2	0	37	268
	> 450 to 600	5	0	0	108	0	4				1	0	0	18	137
	> 600 to 750	2	0	0	51		0				0		0	16	70
	> 750 to 900	1	0		38		1				0	0	0	9	51
	> 900 to 1050	1	0		23		0				0	0	0	8	33
	> 1050 to 1200	1			19		0							7	26
	> 1200 to 1500	1			18		1							9	28
	> 1500	4			15		0				0			10	29
	Unknown	15	0		3		0				0	0	0	0	19
	Total	90	57	0	1,032	0	137	0		0	66	62	2	260	1,707
Grand Total		90	57	0	1,032	0	137	0		0	66	62	2	260	1,707

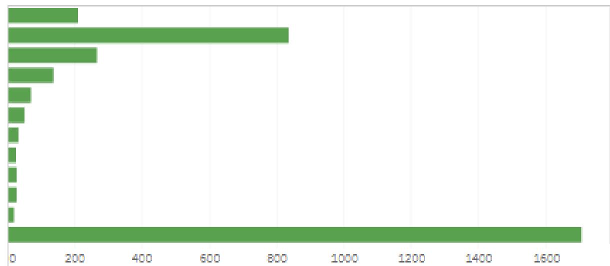
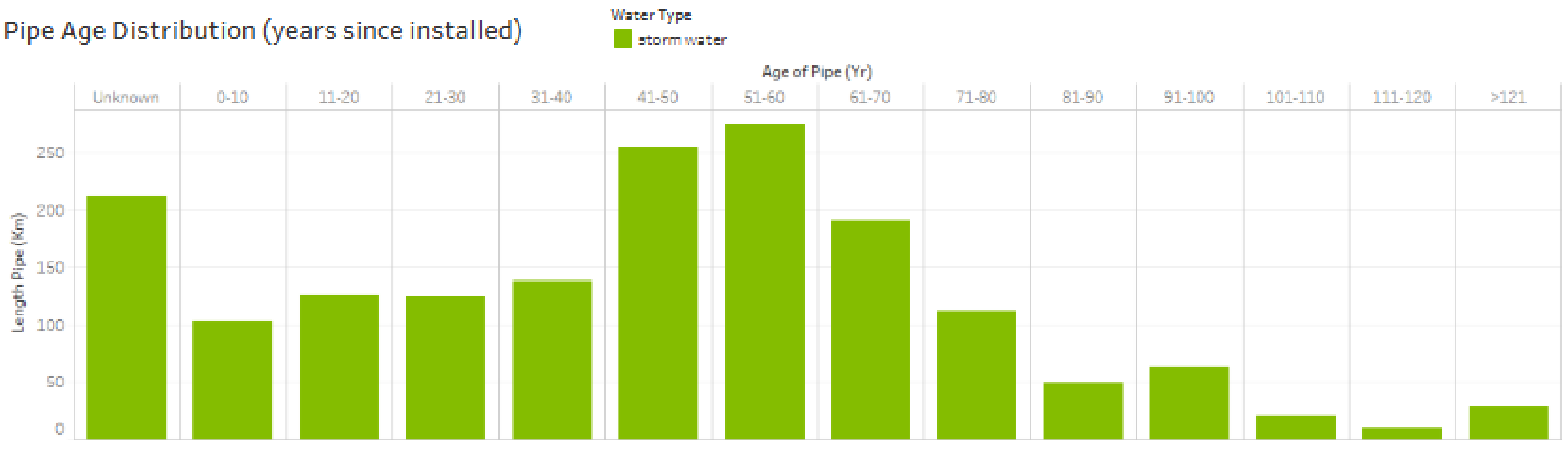


Table 3-15: Stormwater network assets – age distribution and length profile



3.C.4.5. Service connections

There are approximately 154,000 properties which connect directly or indirectly to our regional stormwater networks. Most of these are 100 mm diameter household laterals, with larger sizes as required for non-residential purposes.

A stormwater service connection is the pipe and fittings from a property boundary to a discharge point which may be to the kerb and channel, public main or manhole, sump, watercourse, or in some cases to land/soakage. This may comprise an inspection point on the boundary, with a pipe running to the discharge point. Where public mains run within private properties, the connection is simply the saddle or fitting to the main or manhole. Pipes and fittings other than public mains within a property are considered the responsibility of the property owner.

3.C.4.6. Network fittings

The term network fittings, as referred to here, encapsulates the many point features which are integral to the stormwater networks. This includes all the inlets, outlets, manholes, inspection points, valves and miscellaneous nodes that provide some function and/or facilitate access to the network. Most of the fittings are manholes; access chambers typically built at every junction, change in direction, grade, or size in a piped gravity network. The least number in this group is the valves, likely due to most pipes being designed to flow unrestricted to receiving waters. Where valves are installed in a stormwater network, it is normally to ensure one-directional flow as may be required where tidal influence or high stream levels may restrict drainage from the adjacent land.

3.C.4.7. Pump stations

Pump stations are necessary in some parts of the network where it is difficult to discharge by gravity to a stormwater main or open water course. Most of these are in the Hutt Valley where wide areas with minimal gradients and the presence of stop banks along the river corridor may prevent gravity drainage. There is also a pump station in Kilbirnie, completed in 2011, designed to alleviate stormwater flooding in this low-lying, urbanised, and tidally influenced drainage area.

3.C.5. Stormwater asset criticality

Critical stormwater assets are:

- Stormwater pump stations, detention ponds and soakage cells
- Pipes with diameter >=225mm (pre-2000’s) and >=300mm (2000’s onwards)

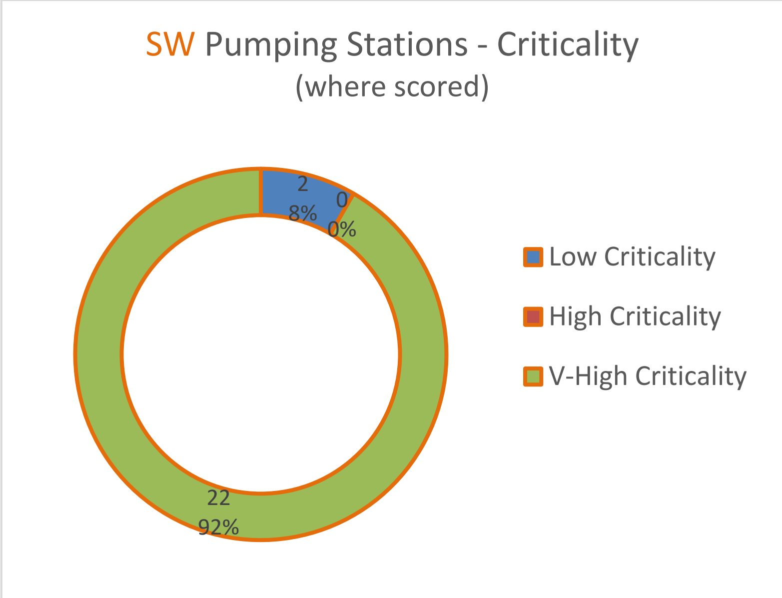


Figure 3-52: Stormwater pumping station criticality

3.C.6. Stormwater Asset Condition

Note some fine details are yet to be updated.

Stormwater network, pumpstation, storage and treatment plant condition assessment covering all assets is provided below. Network assessments were undertaken in 2024, pumpstation assessments in 2021 and treatment plants in (date tbd). A summary is provided in the following table.

Table 3-16: Summary – stormwater asset condition

Stormwater
Pipes generally assessed as being in good or very good condition. Pumpstations – assessed at being in good or very good condition

3.C.6.1. Stormwater network condition

The condition of stormwater network assets is provided in Figure 3-53 and Figure 3-54.

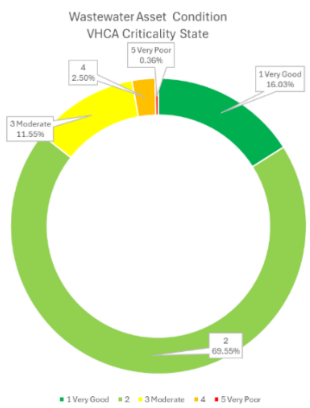


Figure 3-53: Stormwater network asset condition - VHCA criticality state

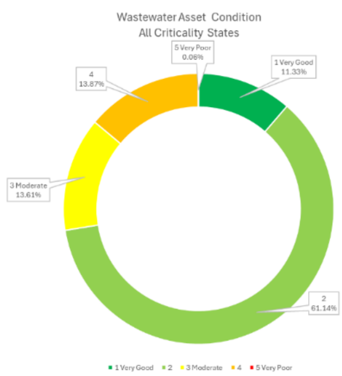


Figure 3-54: Stormwater network assets condition – all criticality states

3.C.6.2. Stormwater pumpstation condition

Stormwater pumpstation condition is provided in Figure 3-55.

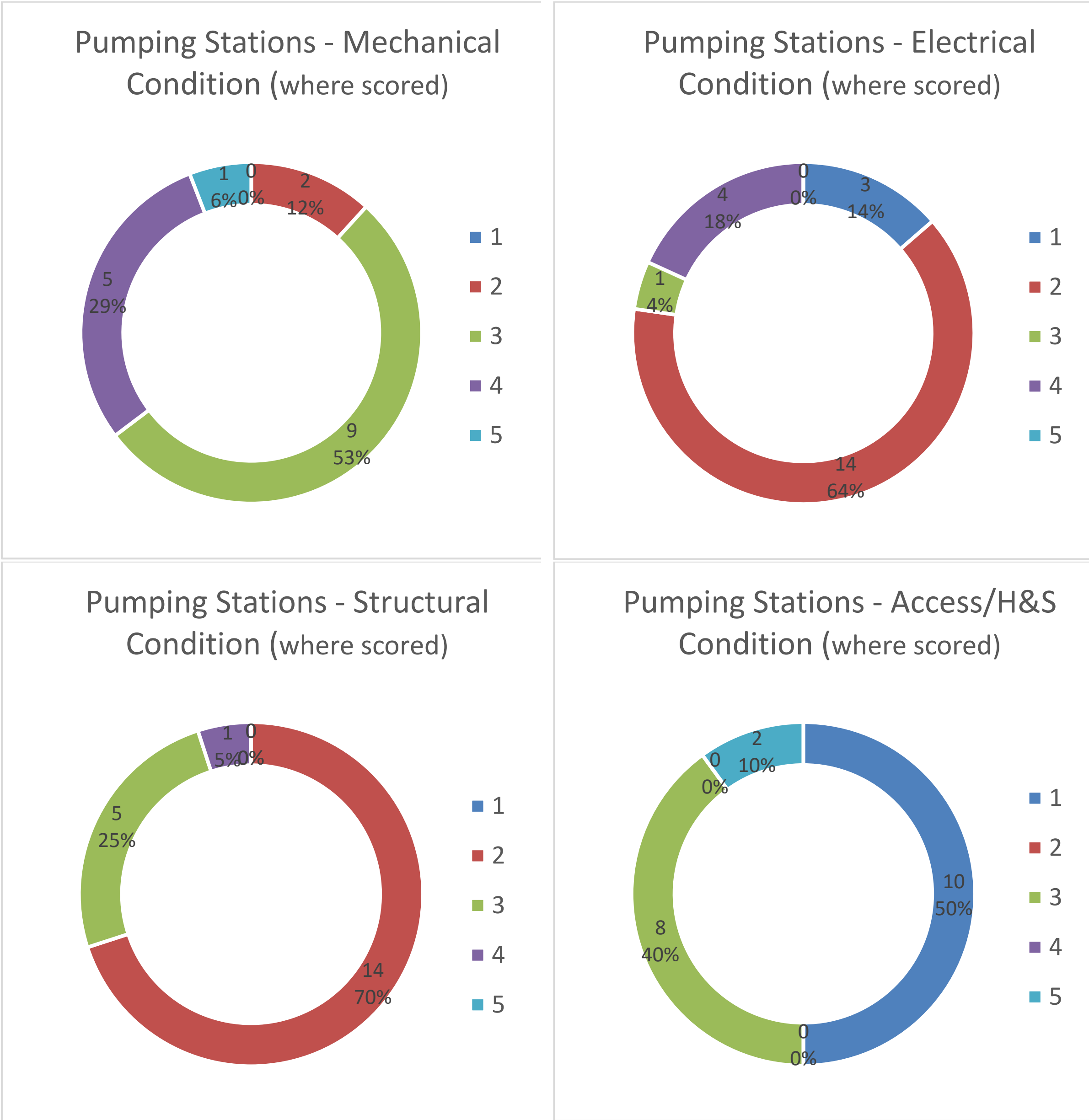


Figure 3-55: Stormwater pumpstations condition grade (2025)

3.C.6.3. Stormwater treatment plant condition

This section will develop with the developing approach to the challenge set by the regional Natural Resources Plan (NRP); stormwater management strategies that incorporate coastal water quality and the health and well-being of ecosystems. An example of formal regional stormwater treatment would be the *Te Kukuwai o Toa* wetland at Esldon Park (Porirua City), constructed in 2022.

Wellington Metropolitan
Water Services Asset Management Plan
2025

Service & Performance

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

4. Service goal framework, Levels of Service and performance measures

4.1 Strategic focus

Note this Section is important for the next iteration of this AMP.

In late 2024 our Board of Directors reset our strategic direction and developed a revised purpose statement along with four organisational outcomes to provide clarity and direction of our work. Our purpose sets the foundation of our work:

> *"Wellington Water exists so that people in the Wellington Region have safe, reliable, compliant and affordable drinking water, stormwater and wastewater services."*

This purpose drives our commitment to achieving our **organisational outcomes**:

- **Communities receive reliable three water services**; By ensuring reliable services, we fulfil our goal of delivery of services to the community.
- **Services delivered by Wellington Water are compliant**; Compliance with regulatory standards ensures the safety of the services we provide
- **Water services are affordable and provide value**; ensuring our services are accessible and affordable
- **Wellington Water is a strong and capable organisation ready to fold into a new asset-owning entity**. Building an organisation that prepares us for future transition and challenges.

To achieve these outcomes, we focus on our strategic priorities:

- **Looking after existing infrastructure**; to ensure the reliability of our services
- **Supporting growth**; aligns with our outcome of providing reliable services to a growing population
- **Ensuring sustainable water supply for the future**; addresses both current and future needs, supporting our purpose of reliability and affordability
- **Improving water quality of our rivers, streams and harbour**; this directly impacts the health and safety of our environment, te mana o te wai, community, and aligns with our compliance and reliability outcomes
- **Reducing our carbon emissions and adapting to the impacts of climate change**; reflects our commitment to sustainability and long-term affordability
- **Increasing resilience to natural hazards**, ensures our services remain reliable and robust in the face of challenges.

Through this alignment we can create a cohesive approach to the delivery of water services.

4.2 Long term customer outcomes

Note this section describes the outcomes as was used for the preparation of advice to Councils in this AMP. Further work is necessary to adapt to the revised organisational outcomes, 2024.

Wellington Water works to deliver the following long-term customer outcomes in the management of the three waters across the region.

- **Safe and healthy water.** We provide water services to ensure safe drinking water and work to eliminate the public health risks from wastewater and stormwater over time.
- **Respectful of the environment**. When we provide water services, we seek to avoid harm to the natural and built environment and over time enhance it for the benefit of future generations.
- **Resilient networks support our economy**. We provide reliable day-to-day water services that can withstand shocks and stresses and support a strong and growing regional economy.
- **Optimal performance** - we have a capable, adaptive, and collaborative workforce competent in applying asset management practices, using innovative practices and exchanges of knowledge to drive optimal performance.

These outcomes give us line of sight from our work to the longer-term service we want our customers to receive. The last outcome is internally focused and supports our aspirations towards being a mature asset management organisation.

By working to deliver these outcomes in line with our key result areas, we want to ensure the right investment decisions are made, at the right price, in the right timeframe - now and for future generations.

4.3 Wellington Water's service goals

Note this section describes the service goals as were used for the preparation of advice to councils in this AMP. The service goals are depicted in alignment to the previous customer outcomes.

Our approach to asset management is guided by the delivery of 12 service goals, four goals under each of the long-term customer outcomes to help show how we are doing, and plan what we are going to do next. These provide more definition to the three waters services we provide to our customers.

In practise, any of the activities we do to provide three waters services should clearly link back to these service goals, and so to our long-term customer outcomes. The activities required to achieve these goals are not specifically linked to any water service. For example, work towards achieving 'we maintain or enhance the natural and built environment' can be done through activities associated with all three waters – drinking water, wastewater and stormwater services. These outcomes align with and contribute to the achievement of the community outcomes our councils have defined for their communities. Supporting the achievement of these outcomes are 12 service goals, as shown in Figure 4-1.

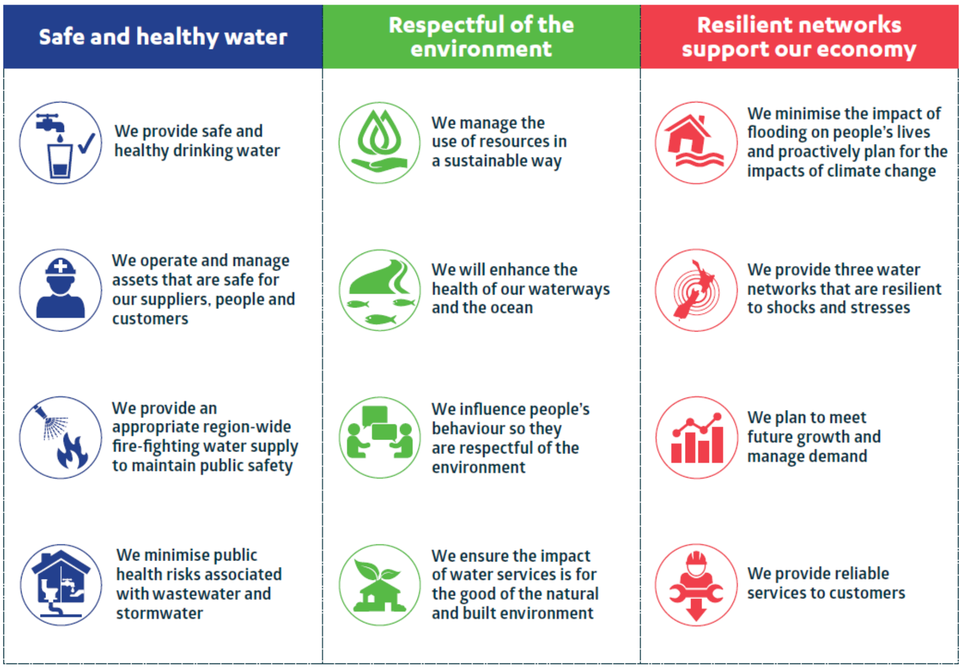


Figure 4-1: Service goals

Further details of the service goal and performance framework are included in the SAMP, 2021. The linkage between the service goals and strategic priorities is shown in Figure 4-2.

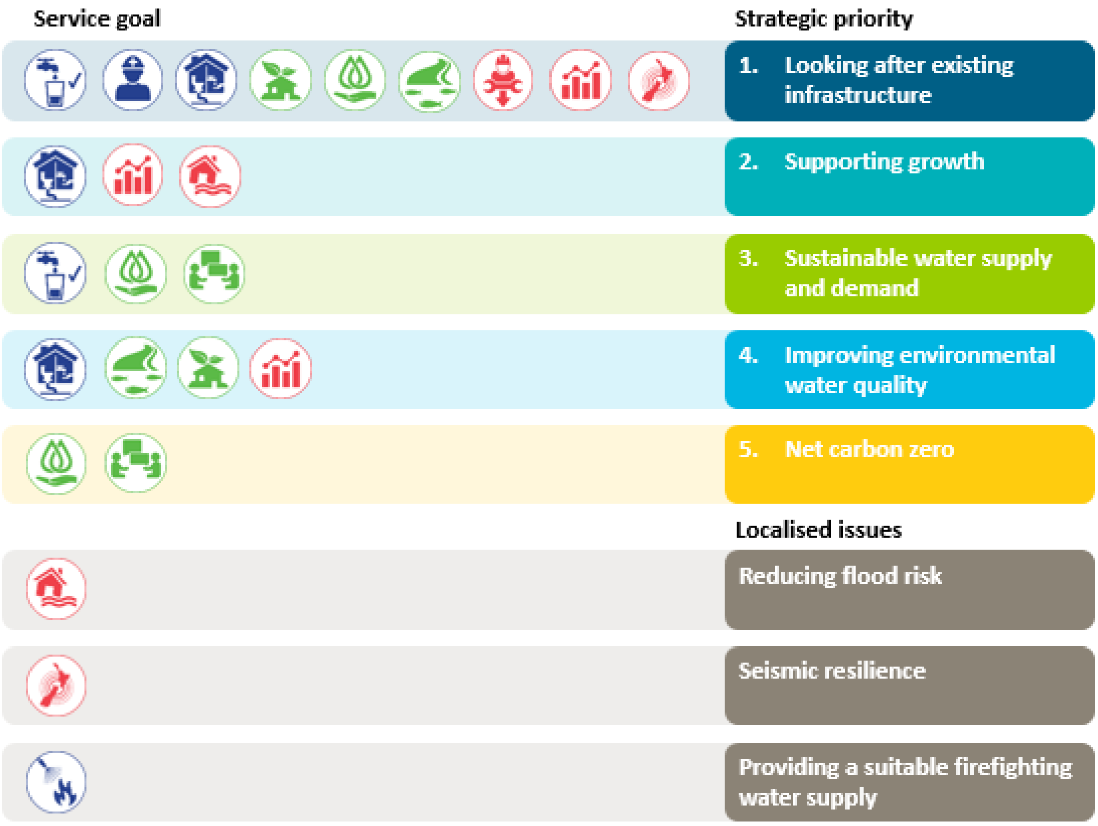


Figure 4-2: Service goals linkage to strategic priorities

4.4 Shareholder council community outcomes

The long-term customer outcomes and service goals were developed by Wellington Water to enable consistent planning approaches and development of service-based asset management tools. Council community outcomes and Levels of Service (LoS) were not developed in consultation with Wellington Water and are not useful for water service investment prioritisation.

It has therefore been a challenge for Wellington Water to align its three waters LoS (see above) with Councils' community outcomes and LoS. This difficulty has arisen because of the requirement of Councils to manage a wider portfolio of assets.

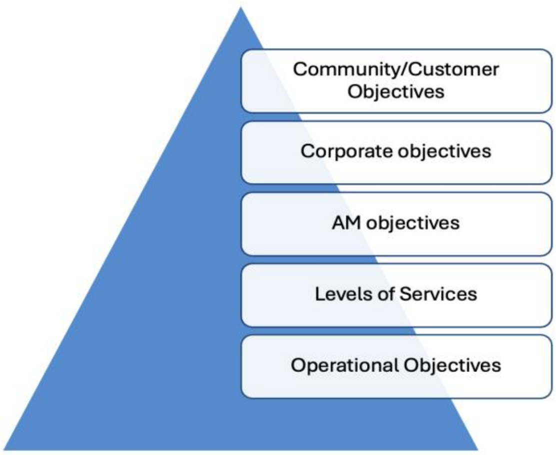
It is anticipated that from 2027-2028 economic regulation will support the approach taken by Wellington Water to formally adopt service goals and performance measures that can be used to prioritise investment.

4.5 Shareholder councils – Levels of Service and performance measures outcomes (achievement and forecast)

4.5.1 Levels of Service

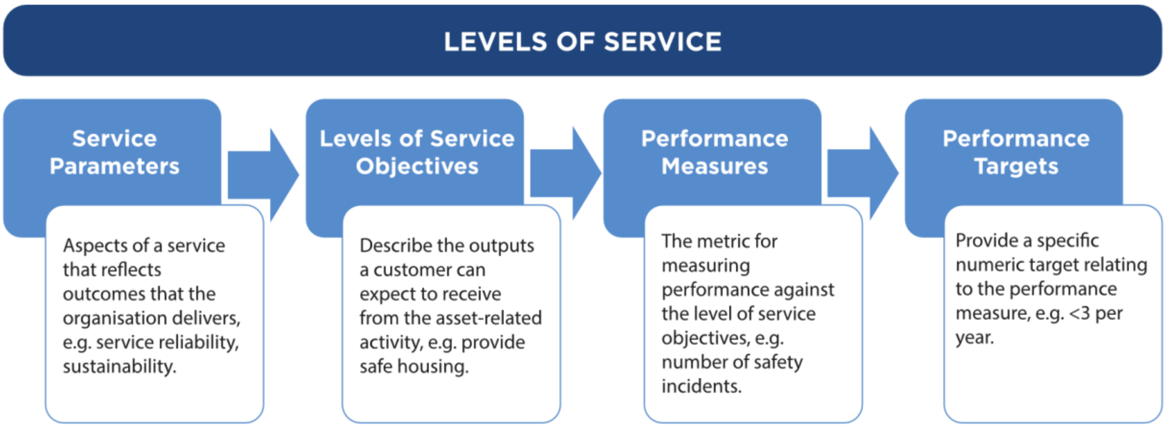
Levels of Service (LoS) define the type and extent of services delivered to the customer. They are written from a customer viewpoint such that a shareholder council can set targets against the LoS to demonstrate outputs and performance against the community outcomes. LoS are a link between Council's strategic goals and key priorities, asset management (AM) objectives, detailed operational objectives and performance measures – see Figure 4 3 and Figure 4 4.

Figure 4-3: Levels of service hierarchy



They are based on user expectations, statutory and national standard requirements.

Figure 4-4: Connection between service parameters and performance targets



Increased investment in OPEX and CAPEX over the 2024-34 LTP period is expected to make improvements to levels of service across the board. The levels of service in storm water are most difficult to predict and are out of Wellington Water and shareholder council's control, for example extreme storm events becoming more frequent.

4.5.2 Performance measures – achievement and targets

4.5.2.1 Wellington Water

For this water services AMP, the performance measures are provided in the applicable Annex:

- 4.A. Water supply
- 4.B. Wastewater
- 4.C. Stormwater

4.5.2.2 Shareholder councils

Shareholder Council specific performance results are stated in their respective council water services AMP document.

4.6 Other performance matters

4.6.1 Maintenance trends

Note further updates are to be applied to this section to bring it more up to date.

Maintenance of our regional networks is carried out under an alliance agreement. Work orders are recorded and tracked in a work management system (Maximo), with data since June 2020. The dashboards below shows a view of work orders per water for the financial year 2023-2024. It can be seen that:

- There is a growing trend in the number of work orders per month.
- Approximately 75 percent of work orders are undertaken on the drinking water networks.
- Majority of work orders are resolved by repair activities.
- Greatest number of faults are due to leaking pipes and fittings, with many on service connections.

At a high level it is apparent that there is an escalating trend in reactive maintenance, particularly in the drinking water network. This is already putting maintenance budgets under pressure and affecting our ability to carry out planned maintenance activities. A focus on looking after existing infrastructure is put forward in this document, including the need to increase investment in renewals and work to redress the balance between planned and reactive maintenance over time.

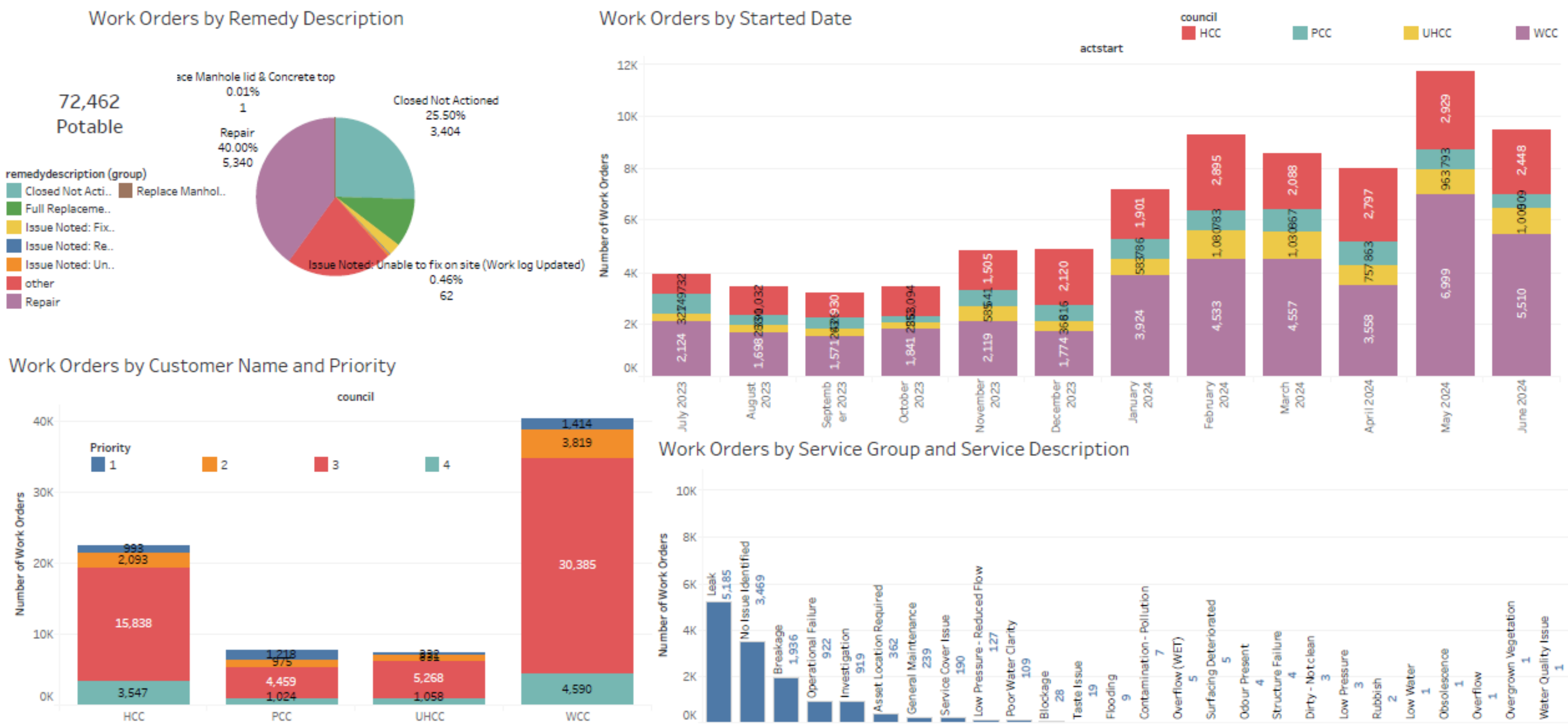

Work Orders by Remedy Description
72,462
Potable
remedydescription (group)
Closed Not Acti..
Replace Manhol..
Full Replaceme..
Issue Noted: Fix..
Issue Noted: Re..
Issue Noted: Un..
other
Repair
Closed Not Actioned 25.50% 3,404
Repair 40.00% 5,340
Issue Noted: Unable to fix on site (Work log Updated) 0.46% 62
Work Orders by Started Date
council
HCC
PCC
UHCC
WCC
actstart
Number of Work Orders
12K
10K
8K
6K
4K
2K
0K
July 2023
August 2023
September 2023
October 2023
November 2023
December 2023
January 2024
February 2024
March 2024
April 2024
May 2024
June 2024
Work Orders by Customer Name and Priority
council
Priority
1
2
3
4
Number of Work Orders
40K
30K
20K
10K
0K
HCC
PCC
UHCC
WCC
2,093
15,838
3,547
4,459
1,024
5,268
1,058
1,414
3,819
30,385
4,590
Work Orders by Service Group and Service Description
Number of Work Orders
10K
8K
6K
4K
2K
0K
Leak 5,185
No Issue Identified 3,469
Breakage 1,936
Operational Failure 922
Investigation 919
Asset Location Required 362
General Maintenance 239
Service Cover Issue 190
Low Pressure - Reduced Flow 127
Poor Water Clarity 109
Blockage 28
Taste Issue 19
Flooding 9
Contamination - Pollution 7
Overflow (WET) 5
Surfacing Deteriorated 5
Odour Present 4
Structure Failure 4
Dirty - Not clean 3
Low Pressure 3
Rubbish 2
Low Water 1
Obsolescence 1
Overflow 1
Overgrown Vegetation 1
Water Quality Issue 1

Figure 4-5: Water supply maintenance trends summary (2023-2024)

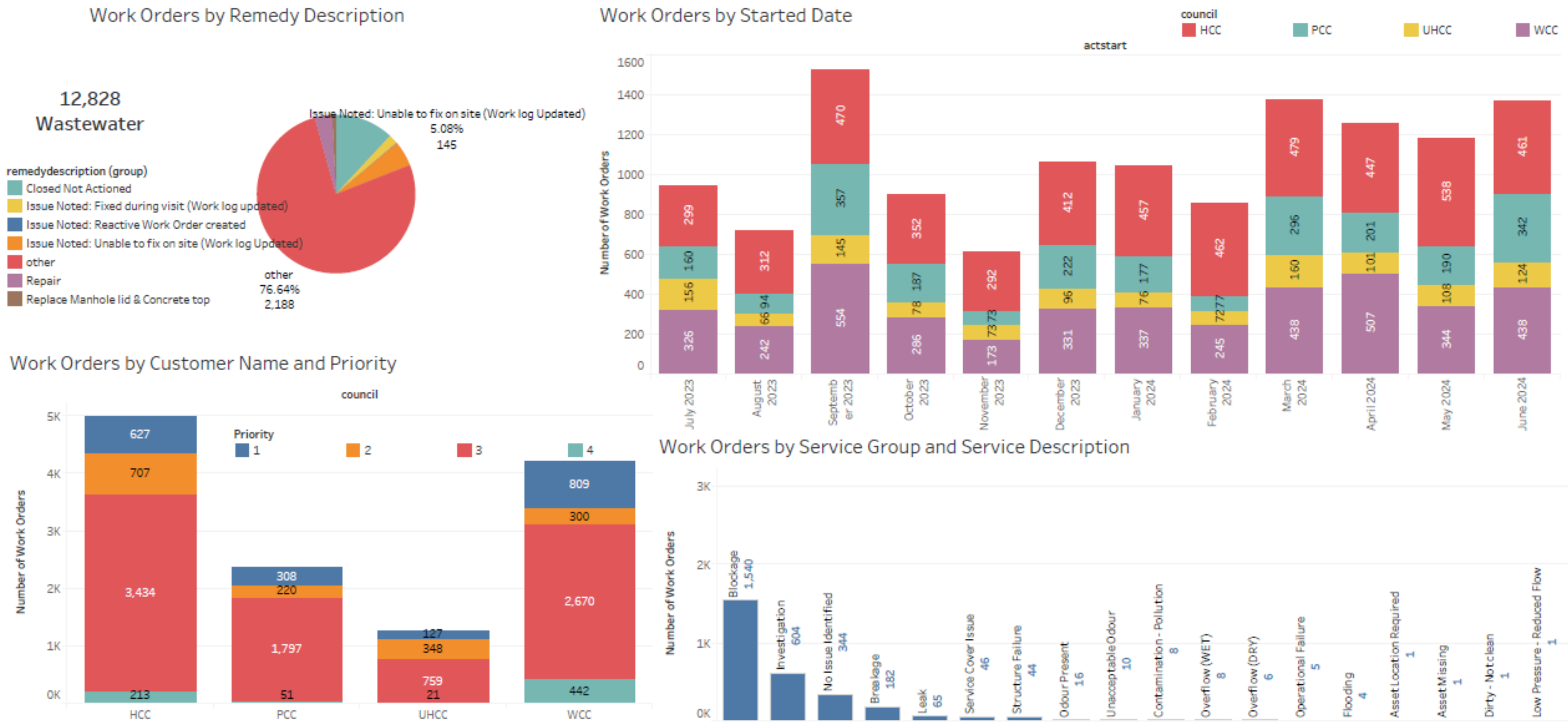


Figure 4-6: Wastewater maintenance trends summary (2023-2024)

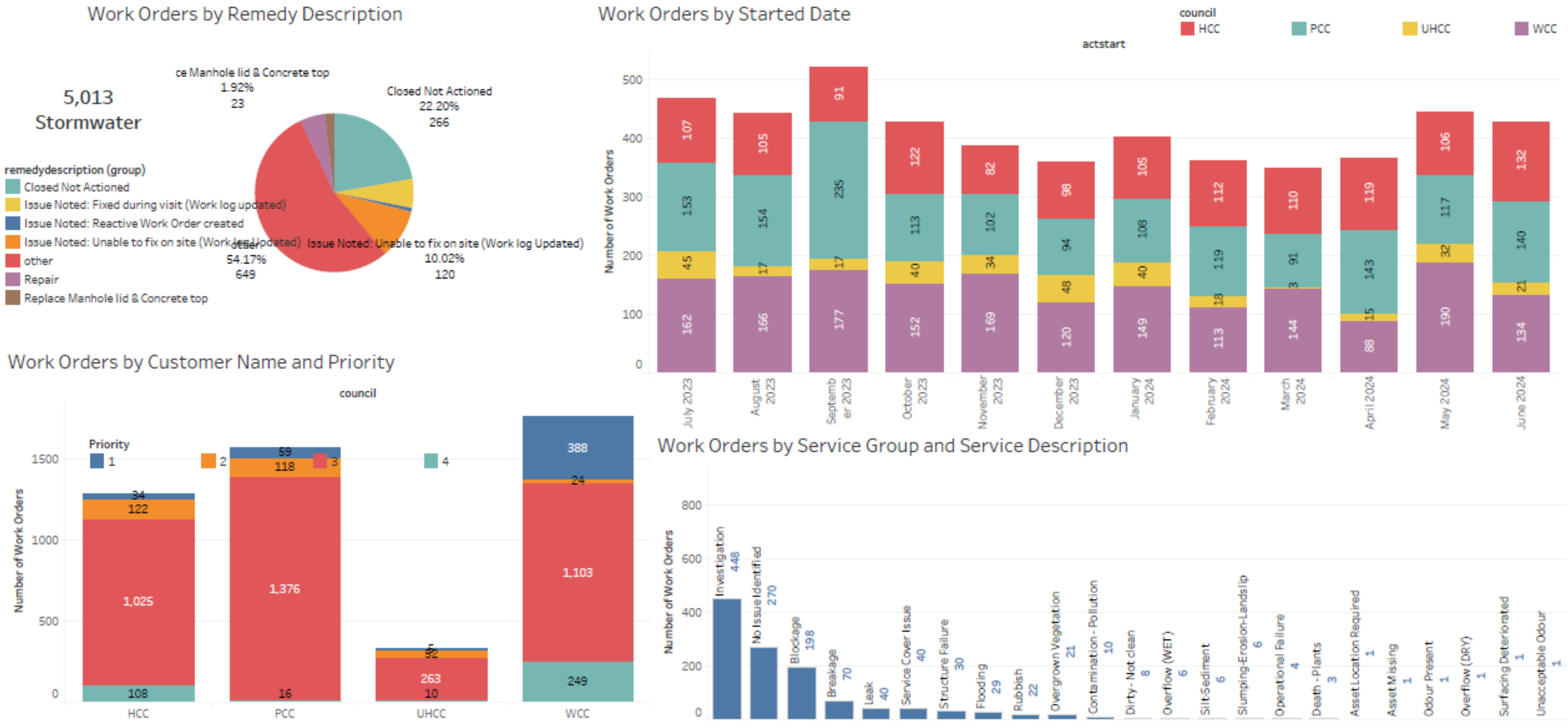


Figure 4-7: Stormwater maintenance trends summary (2023-2024)

4.6.2 Network seismic resilience and performance

4.6.2.1 Network resilience

Significant earthquakes are relatively low frequency events that could have major negative impacts on service performance and the community. Vulnerability modelling is used to predict which parts of the networks are more likely to be damaged by an earthquake and where the most critical and at-risk assets are located. We can then use this information to plan for the appropriate mitigation measures, which may include capex interventions such as seismic strengthening. It is also important for informing business continuity planning and potential operational responses. Figure 4-8 is an example of such a modelling output, showing predicted performance of the wastewater networks in a modelled earthquake event.

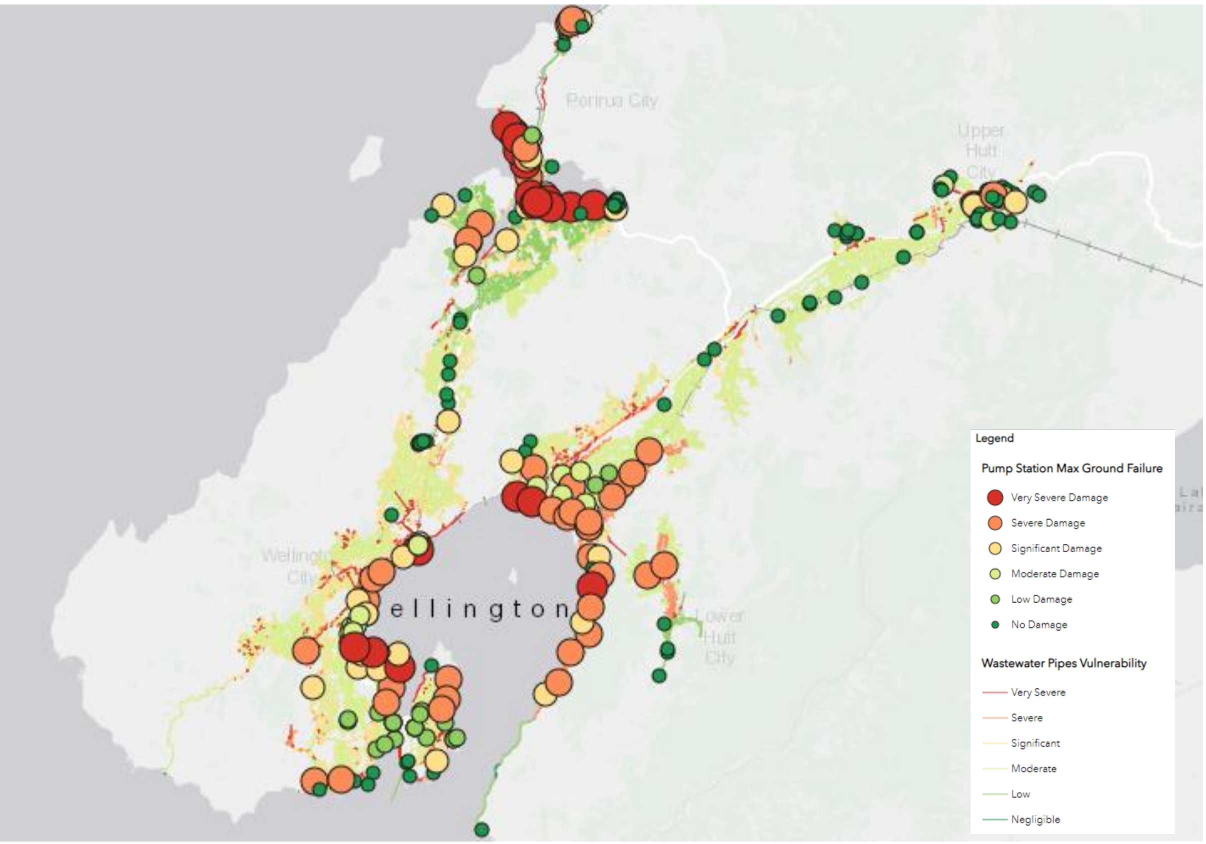


Figure 4-8: Predicted performance of the wastewater network in a seismic event

All pipes and pump stations are graded according to their predicted vulnerability, depending on their inherent material resilience, location, and the likely effects of ground acceleration. A Wellington fault M7.5 (Jim Cousins, 2010) earthquake with an epicentre in Thorndon is considered as the base scenario, to be consistent with other emergency management planning. An earthquake of this magnitude will cause fault ruptures, earthquake-induced landslides, liquefaction, and lateral spread. During such events the focus will be on Lifeline Utilities (as defined by WREMO/ NEMA – including ports & airports, road & rail, three waters, energy, and telecoms.). Three waters infrastructure located within or crossing these areas will be prone to damage; however, it is likely that stormwater assets will be given a lower priority for remediation.

The water supply network is also vulnerable to earthquake damage. A rupture of the Wellington Fault is expected to result in failure of critical bulk water pipes in several locations. Figure 4-9 shows that restoration times are expected to exceed 100 days in some parts of the network.

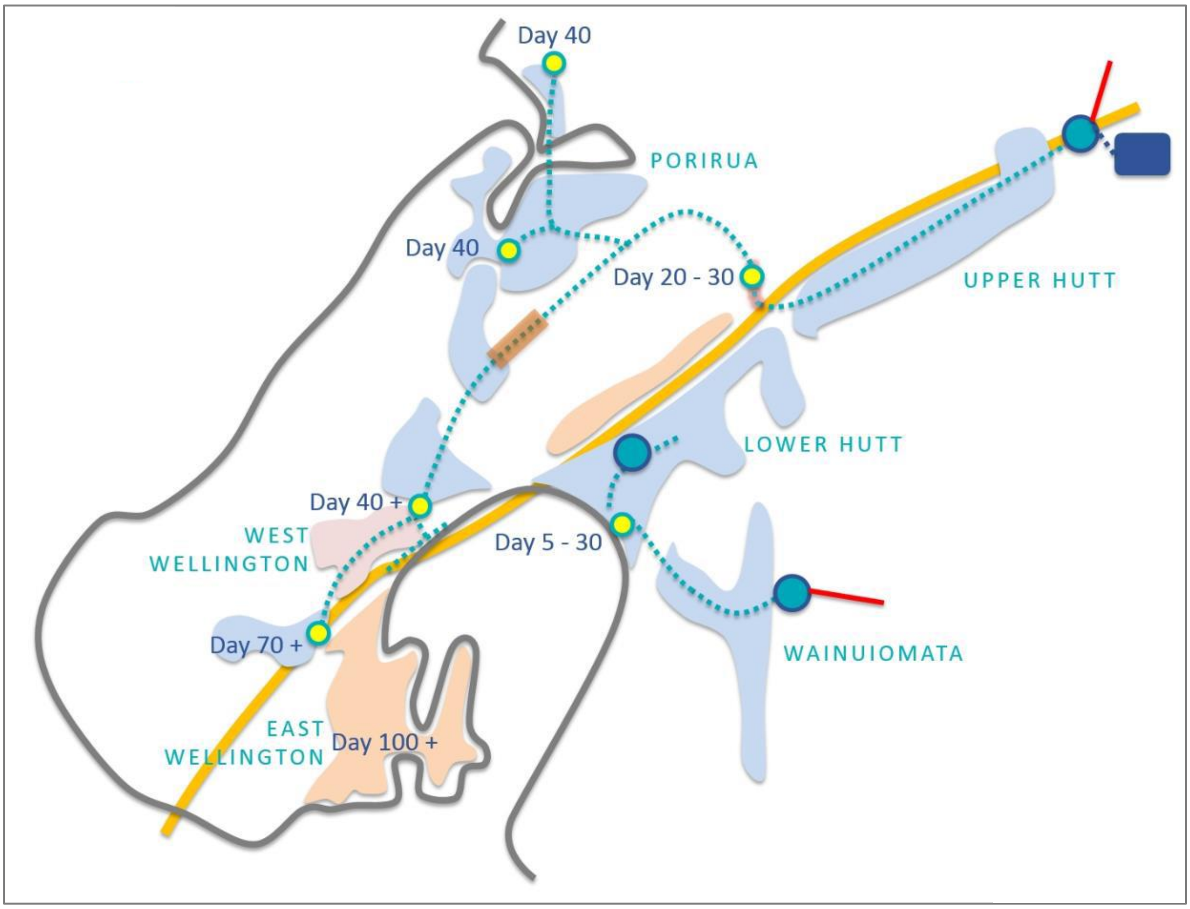


Figure 4-9: Predicted restoration times due to failures in the bulk supply network

A *Water Supply Resilience Programme Business Case* has been developed to identify the upgrades needed to address water supply seismic resilience issues in the long term. The business case includes the following key timeframes and goals for the levels of service following an event:

- **Emergency state (days 1-7).** Immediate emergency response. Focus is on assessing water network faults, mobilising and prioritising resources and setting up distribution points for the survival state. Users must be fully prepared and self-sufficient during this state.
- **Survival state (days 8-14).** Continued repairs to bulk network. Distribution points used to supply residents with water from reservoirs.
- **Economic state (days 15-30).** The emergency is over, and the region is moving towards restoration of normal water services to assist economic recovery. Major repair of the city's water supply reticulation network is underway. There is an emphasised focus on restoring reticulated water to the majority of the metropolitan area including residents and businesses.
- **Toward full restoration of the network.** All services are resumed as normal.

It is acknowledged that these levels of service are aspirational and will take 30+ years to implement under current funding levels. Until network resilience is improved, there remains a significant humanitarian issue being unable to provide a reticulated water and wastewater service for an extended period. On the water supply side, this has been addressed through creation of CIR (Community Infrastructure Resilience), which is an above-ground emergency supply network. The CIR network is a distributed collection of emergency water sources, containerised water treatment stations, and water bladders to distribute water within the community. Work is also in progress to develop emergency sanitation options for the community. This work is being led by WREMO with support from Wellington Water, Regional Public Health and the Territorial Authorities.

4.6.2.2 Seismic Performance

WWL have undertaken or commenced seismic surveys of three waters assets as identified in the Tables below.

Table 4-1: Water supply assets seismic survey

Council Owner	Source	Reservoirs	Pumpstations	Treatment Plants and Headworks	Mains / reticulation
All		Seismic Status Summary Workbook (WWI, 2022)			Potable Water Resilience - Critical Network Phase 2 Analysis - (MWH 2016)
HCC	Waterloo wellfield (2016, 2019)	Phase Three Seismic Assessment Update (2014)			HCC Reservoir Pipeline Seismic Coupling Review - FINAL (2014)
PCC		Incl couplings and sheds			
UHCC		WSP 2010	Water Supply Pumping Stations - Seismic and Geotechnical Assessments - (2016)		
WCC		Initial Seismic Review of Reservoirs and Pumping Stations (2012)			
GWRC	Waterloo Wellfield, Lower Hutt Structural Assessment of Wells Post Liquefaction, (Rev1, T+T, 2016) Project Design Report (WWL, 2019) - Waterloo Wellfield Seismic Upgrade		Kaitoke Intake and Strainers Upgrade Study (2015) Restraint of electrical equipment (Calibre 2018) Waterloo WTP (SKM 2013) Wainuiomata WTP (Connect 2019)		

Table 4-2: Wastewater assets seismic survey

Council Owner	Storage	Pumpstations	Treatment Plants	Mains / reticulation
All				Potable water resilience (MWH 2016); ZMP & Model updates (by zone, Connect Water 2018-2024)
HCC		Reports held per pump station		
PCC		Tangare Drive, Duck Creek (GHD 2018)		
UHCC				
WCC		WSP 2012		

Table 4-3: Stormwater assets seismic surveyTab

Shareholder Council	Reservoirs	Pumpstations	Treatment Plants	Mains / reticulation
All				
HCC		Te Mome (GHD 2021)		
PCC				
UHCC				
WCC				

4.6.2.3 Wastewater

WWL have partnered with WREMO to manage public expectations of the wastewater service during more extreme seismic events. For lesser seismic events, WWL partnered with Opus/WSP to develop a vulnerability model for pipeline and pumping assets. This is covered in more detail in seismic resilience Section 6.6.

4.6.3 Pump station performance

Pump stations performance data is routinely collected via SCADA and in our maintenance systems. Data includes incidences such as blockages, pump faults and overflows, all of which provide "lag indicators" of pump station performance (i.e., measurement of something after it has had an effect). This data is nonetheless useful to identify trends and issues so that interventions can be made where most necessary. Information is also gathered via regular site inspections and through specific investigations into pump performance. These activities are more proactive in attempting to identify and predict issues before they arise. As an example, we have recently commissioned a programme of thermodynamic testing and benchmarking of 17 high criticality water pump stations. This will help us to identify pumping inefficiencies, find potential energy savings, better plan maintenance activities, reduce critical failures, and ensure that the correct pumps and pumping regimes are in place. An example output from one of these tests – see Figure 4-10, shows to a high degree of accuracy how well the pumps are currently performing to the manufacturer's data.

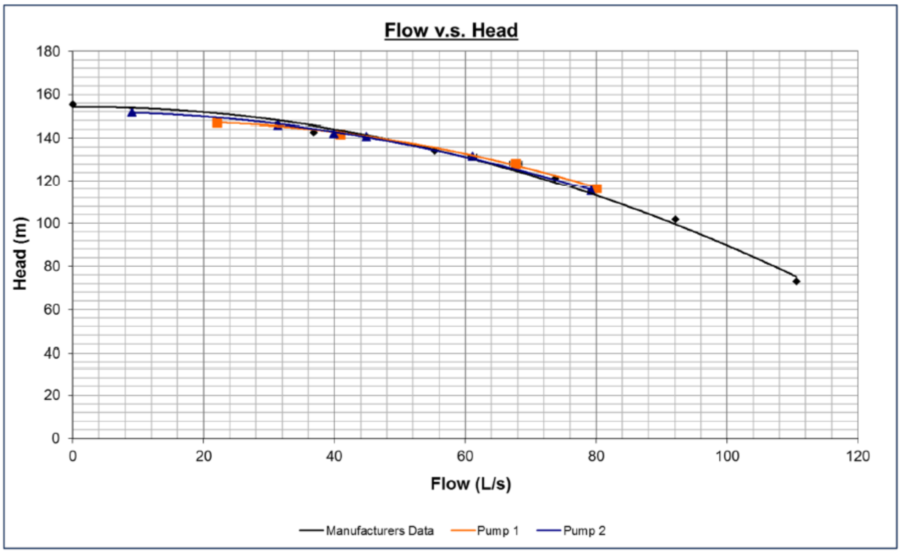


Figure 4-10: Example of a water supply pumpstation performance test (Pharazyn Street)

- 4.A. Water Supply
- 4.B. Wastewater
- 4.C. Stormwater

4.A. ANNEX Water Supply

4.A.1. Introduction

Network assets are the key physical components in providing three waters services; in the case of drinking water supply, from source collection point to customer service connection point. It is important that the assets perform to support good service delivery to customers and the achievement of goals and outcomes. By measuring performance, we gain a view of the capability of assets to help determine if the controls in place to mitigate service delivery risks are effective.

Asset performance is assessed in different ways depending on asset type. The following describes the operational performance of our assets at a regional level in terms of basic capability, utilisation and maintenance.

Wellington Water reports service performance for each of its councils under individual service level agreements (SLAs). Wellington Water's service goals and their achievement cannot be aligned to the shareholder councils LoS and therefore performance.

The performance metrics cover the mandatory measures set by the Department of Internal Affairs (DIA) plus others deemed relevant to monitoring the performance of our networks. As the SLAs are measured against targets per council and entities of varying size, it is not possible to present an aggregated view of SLA performance at a regional level.

Provided here are performance measures covering: Safety of Drinking Water, Fault Response Times, Demand Management, Maintenance of the Reticulation Network, Customer Satisfaction and Volume. Performance data – see Figure 4-11, supported by the commentary below[1].

Note that GWRCs customers are the connected territorial authorities

[1] Sources: 'Three Waters Long Term Plan 2024-2034: Final Information Pack and close out advice, (Hutt City Council)', Wellington Water Ltd, 15.8.2024. 'Three Waters Long Term Plan 2024-2034: Final Information Pack and close out advice, (Porirua City Council)', Wellington Water Ltd, 23.8.2024. 'Three Waters Long Term Plan 2024-2034: Final Information Pack and close out advice, (Upper Hutt City Council)', Wellington Water Ltd, 15.8.2024. 'Three Waters Long Term Plan 2024-2034: Final Information Pack and close out advice, (Wellington City Council)', Wellington Water Ltd, 23.8.2024. 'Finalisation of the Greater Wellington Regional Council Long Term Plan Three Waters Investment Programme, (Greater Wellington Regional Council)', Wellington Water Ltd, 24.6.2024.

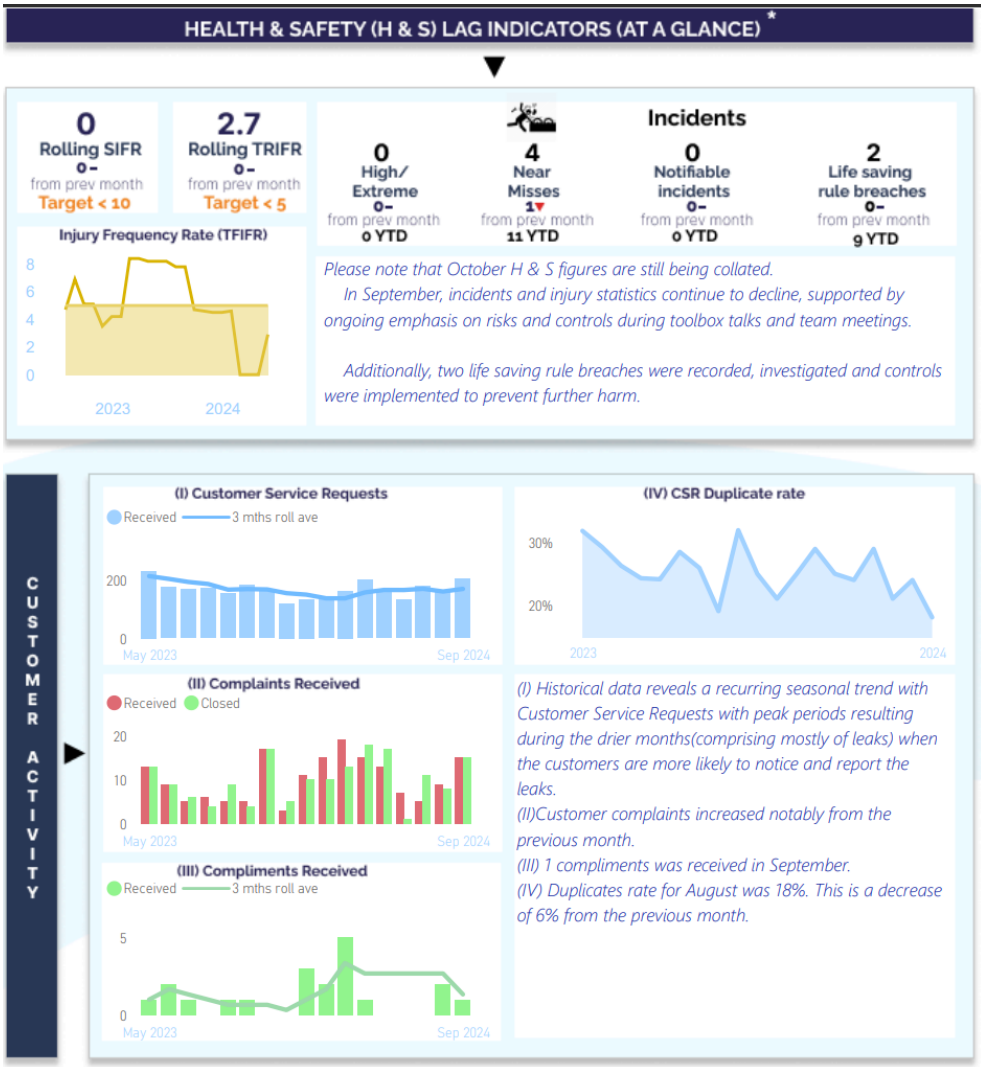


Figure 4-11: Excerpt from Porirua City Councils performance dashboard (PCC 2024)

4.A.2. Water supply performance measures

The water supply related performance metrics are provided below. Performance measures are described in terms of core measure requirements, background context, and an asset management outlook for each Council (or all Councils). A new performance measure for fluoride levels was introduced in 2023/24. Table 4-6 offers a summary of all performance metrics.

Performance Measure - fluoridation:

- The level of Fluoride leaving each Water Treatment Plant is within the Ministry of Health guidelines.

In light of its proven safety, effective protection against tooth decay, and affordability, fluoridation of drinking-water supplies has been written into legislation to provide a nationally consistent approach and to promote its adoption. The Health (Fluoridation of Drinking-water) Amendment Act 2021 enables the Director-General of Health to direct local authorities to add fluoride to a drinking-water supply; with an expectation that all metropolitan supplies shall be fluoridated, where practicable.

Context: Between July 2017 and June 2021, the facilities at the four metropolitan treatment plants (combined) met the recommended fluoride residual concentration of between 0.7 and 1.0 mg/L just 38% of the time, and the facilities had been out of operation 40% of the time. In 2022 the poor performance and management of Fluoridation became public knowledge, and the Independent Inquiry into the Cessation of Water Fluoridation at the Te Marua and Gear Island water treatment plants was undertaken. Primary findings were: a low priority was placed on this service (relative to other critical aspects of service delivery) in a reactive environment, asset management issues were ongoing, and there were dosing product quality problems. Fluoridation was being adequately undertaken at Waterloo and Wainuiomata WTPs, but with no redundancy and with product handling and operator safety issues.

Outlook: Table 4-4 describes this recently-applied measure in detail. Fluoride dosing has been added to the Regional Drinking Water Safety Plan as a Critical Control Point. The September 2022 revision of the Safe and Fluoridated Drinking Water Policy declares commitment to improving public health in this context.

GWRC (and supplied Council reticulation zones, excl. HCC) – GWRC own the treatment plant assets and have funded the rapidly-executed Stage 1 upgrades to fluoridation equipment at Te Marua and Gear Island WTPs (thus boosting dosage of treated water sourced from Waterloo WTP and supplied to Wellington City), including new monitoring equipment. The new systems had to be fully compliant with the Fluoridation of Drinking Water Supplies in New Zealand Code of Practice (Water NZ, 2014) and to be automated, safe and user-friendly for the operational teams. Stage 2 upgrades to regional fluoridation resilience are planned for FY2027/28 and FY2028/29 (including at Te Marua and Waterloo WTPs).

HCC – Following historic negotiations between HCC and the community, both Korokoro & Petone were supplied with non-fluoridated water, via a dedicated bulk supply pipeline. In 2023 WWL recommended implementation of "Option 2", involving an increase in fluoridation capacity at Waterloo WTP and installation of a dosing point on the Waterloo-Wellington pipeline.

Table 4-4: Fluoride performance measure (draft 2023-2024)

Measure	Target	2022/23	2023/24	Commentary
The level of fluoride leaving each Water Treatment Plant is within the Ministry of Health guidelines (0.7-1.0 parts per million) 95% or more of the time.	Achieved at all plants	*New measure for 2023/24*	Te Marua: 93.9% Wainuiomata: 96.7% Waterloo: 87.9% Gear Island: 83%	All plants except Gear Island were dosing within the MoH guidelines >95% of the time during the final quarter of the year, with Gear Island sitting at 93.9%. A combination of planned and reactive maintenance, as well as Health and Safety concerns with the fluoride loading process earlier in the year have contributed to not meeting this target at all Water Treatment Plants.

Performance Measures - bacterial and protozoal compliance:

- The extent to which the region's drinking water supply complies with bacterial and protozoal compliance criteria (previously part 4 and part 5 of the Drinking Water Standards for New ZLealand)

Context:

The drinking water regulator (Taumata Arowai) was established in 2021 ; early in its role it released revised drinking water standards, with annual reporting measures commencing with the 2022/23 period. Notable for WWL for this triennium was the transition of regulatory requirements from the Drinking Water Standards for New Zealand (DWSNZ) to the Drinking Water Quality Assurance Rules (DWAR), especially for bacteriological and protozoal criteria.

Whilst national water performance measurement matures under Taumata Arowai's Drinking Water Network Environmental Performance Measures (DWNEPM), WWL also reports on measures that municipal bodies have been reporting for the DIA *Non-Financial Performance Measures*. This DIA measure has for the moment been retained; notably it relates to the previous compliance regulation.

Reported Position:

Specific to the water treatment plants, WWL have reported the 2023/24 position as Table 4-6. It is worth noting that during the period the community was aware of such public discussions as the number of households Hutt City (reported in the press as 800#) "that did not receive water that had sufficient contact time with chlorine"). Network upgrades are underway to address this issue, but works extend into FY2025/26.

With regard to Table 4-6 and the compliance issues of 2022/23, independent biennial reports noted the following:

July-Dec 2022 (transition period from DWSNZ to DWQAR)

- All WTPs non-compliant (at some point) for Bacterial criteria, generally FACe[1] related
- All WTPs non-compliant (at some point) for Protozoal criteria, generally related to UV sensor verification, UV system calibration/ verification.

Jan-June 2023

- Waterloo WTP non-compliant for Bacterial criteria due to Chlorine Contact Time (described elsewhere)

Wainuiomata WTP non-compliant for Protozoa criteria due to filter performance on one day.

Note: [1] Free Available Chlorine equivalent (residual Chlorine available at a specific pH)

Outlook: –Regulatory compliance in drinking water supply is improving. With the indicative level of investment, the metro region can expect to achieve compliance with protozoal criteria. The bacteria compliance criteria are forecasted to be met once related initiatives are delivered that will increase the contact time for Chlorine-dosed water leaving the Waterloo Water Treatment Plant.**Performance Measures – attendance to call-outs***: (not applicable to GWRC)*

- Median response time to attend urgent call-outs
- Median response time to resolve urgent call-outs

- Median response time to attend non-urgent call-outs
- Median response time to resolve non-urgent call-outs.

Context: The time to respond and resolve urgent call-outs (where water supply is interrupted) is improving. However, the operational budget is shared with non-urgent jobs, and due to an increase in the number of jobs and flatlined operational budgets, the time that it takes to attend and resolve non-urgent jobs (e.g., leaks) may increase.

Outlook: UHCC, HCC, PCC - With the indicative level of investment, we expect to see increased incidence of leaks and bursts as the network continues to age and condition worsen. The rate of increase in non-urgent works begin to stabilise with increased maintenance activities, however WWL are unable to determine in detail to what extent the recommended budget will mitigate or reverse the trend of increased non-urgent response times.

WCC - With the indicative level of investment WWL expect to see an improvement in Year 1, followed by continued deterioration in non-urgent response times from Year 2 of the LTP when operational funding falls. For urgent response times, these jobs are always the priority and are generally not constrained by lack of resources. While WWL expect to see more urgent faults (as a result of deterioration in the network) we do not expect to see a significant change in the level of service provided.

Performance Measures: managing demand *(not directly applicable to GWRC)*

- The percentage of real water loss from the local authority's networked reticulation system
- Average consumption of drinking water per day per resident.

Context: Unfortunately, due to a lack of metering, accurate leakage data is difficult to ascertain with high confidence. The primary levers to reduce water consumption are to invest in operational maintenance activities in the network and to progress with implementation of customer metering. The implementation of water meters, cultural change, and the projected rate of leak repair, support the assumptions in the regional Bulk Water Stategy.

The population in **Hutt City** has steadily increased over time and is not tied to demand for water of the city as a whole (including leakage). From 2004-2015, demand for water reduced while the population has risen. Since then, population has risen approximately 10%, while water demand has increased nearly 40%.

The level of funding in councils' preferred budget allowances will likely begin to stabilise and reverse this trend. WWL are unable to determine in detail to what extent the recommended budget will mitigate or reverse this trend.

Performance Measures: continuity of service; water quality *(not applicable to GWRC)*

- The total number of complaints received about drinking water taste, clarity, odour, water pressure or flow, continuity of supply or the response to any of these issues; expressed per one thousand connections

Context: Complaints are a another measure to assess the overall quality of the network. Generally, the worse the network is performing, the higher the number of complaints. WWL have seen a significant increase in the number of complaints over the past three years, which tracks with the general performance of the network (in the other measures) trending downwards.

Outlook: –continuity of Service complaints are tied strongly to investment in the network. As above, we can expect to see a decrease in complaints under the council's preferred budgets and better performance, with the recommended budgets. Conversely WWL can expect to see the level of complaints continue to increase, particularly as asset renewal investment is insufficient to arrest continued deterioration of the asset base (funding below the recommended budget line).

The following table represents the summation of performance tables supplied to each council in the Stage 4 (LTP-24) advice memos.

Note these tables are to be updated with more recent information.

Table 4-5: Water supply performance measures - historic and projected achievement

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
Averageconsumption* of drinking water per day per resident	HCC	<385L	379L	381	410L	422L	Stabilisation or small improvement	Stabilisation or small improvement	Stabilisation or small improvement	Improving after Water Meters
	UHCC	<415L	394L	400L	443L	450L	Increased consumption (including losses)	Increased consumption (including losses)	Increased consumption (including losses)	Increased consumption (including losses)
	PCC	<320L	316L	321L	329 /339L	329L	Increased consumption (including losses)	Increased consumption (including losses)	Increased consumption (including losses)	Improving after Water Meters
	WCC	<365L	380L	390L	402L	416L	Increased consumption (including losses)	Increased consumption (including losses)	Increased consumption (including losses)	Improving after Water Meters implementation
	GWRC	<385L	372L	379L	398L	409L	Non-compliant	Non-compliant	Non-compliant	Improving
Median response time to attend non-urgent call-outs	HCC	<= 72 hours	162	193	548 hours	191 hours	Stabilisation but not meeting LOS.	Stabilisation but not meeting LOS.	Stabilisation but not meeting LOS.	Stabilisation but not meeting LOS.
	UHCC	<36 hours	166 hours	309 hours	316 hours	238 hours	Continued deterioration	Continued deterioration	Continued deterioration	Continued deterioration
	PCC	<= 20 days	6.3 days	11 days	21 days	6 working days	Continued deterioration	Continued deterioration	Continued deterioration	Continued deterioration

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
	WCC	<36 hours	235 hours	334 hours	654 hours	555 hours	Improvement, not meeting LOS	Return to status quo (deterioration of LOS)	Continued deterioration	Continued deterioration
	GWRC	<= 72 hours	N/A - No events	N/A - No events	N/A - No events	0 hours (no non-urgent call-outs)	N/A	N/A	N/A	N/A
Median response time to attend urgent call-outs	HCC	<=90 mins	135	114	98 mins	101 mins	Meet LOS	Meet LOS	Meet LOS	Meet LOS
	UHCC	<60 mins	266 mins	92 mins	77 mins	76 mins	Close to or meeting LOS target	Close to or meeting LOS target	Close to or meeting LOS target	Close to or meeting LOS target
	PCC	<=90 (mins)	136 mins	89 mins	145 mins	86 mins	Close to or meeting LOS target	Close to or meeting LOS target	Close to or meeting LOS target	Close to or meeting LOS target
	WCC	<60 mins	242 mins	114 mins	132 mins	151 minutes	Status quo, not meeting LOS	Status quo, not meeting LOS	Status quo, not meeting LOS	Status quo, not meeting LOS
	GWRC	<=90 mins	39 mins	N/A - No events	N/A - No events	0 mins (no urgent call-outs)	N/A	N/A	N/A	N/A
Median response time to resolve non-urgent call-outs	HCC	<= 20 working days	8	12	23 working days	16 working days	Stabilisation, meeting LOS.	Stabilisation, meeting LOS.	Stabilisation, meeting LOS.	Stabilisation, meeting LOS.
	UHCC	<15 days	10 days	21 days	21 days	27 days	Continued deterioration	Continued deterioration	Continued deterioration	Continued deterioration

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
	PCC	<= 20 days	11 days	20 days	30 days	11 working days	Continued deterioration	Continued deterioration	Continued deterioration	Continued deterioration
	WCC	< 5 days	14.5 days	22 days	40 days	45.1 days	Improvement, not meeting LOS	Return to status quo (deterioration of LOS)	Continued deterioration	Continued deterioration
	GWRC	<= 20 working days	N/A - No events	N/A - No events	N/A - No events	0 days (no non-urgent call-outs)	N/A	N/A	N/A	N/A
Median response time to resolve urgent call-outs	HCC	<= 8 hours	17.9	18.3	6.7 hours	4.6 hours	Continue to meet LOS	Continue to meet LOS	Continue to meet LOS	Continue to meet LOS
	UHCC	<4 hours	23.9 hours	7.8 hours	4.3 hours	2.2 hours	Close to or meeting LOS target	Close to or meeting LOS target	Close to or meeting LOS target	Close to or meeting LOS target
	PCC	<= 8 (hours)	17.9 hours	6.3 hours	4.2 hours	2.9 hours	Continue to meet LOS	Continue to meet LOS	Continue to meet LOS	Continue to meet LOS
	WCC	<4 hours	30.0 hours	17.4 hours	13.4 hours	13.6 hours	Status quo, not meeting LOS	Status quo, not meeting LOS	Status quo, not meeting LOS	Status quo, not meeting LOS
	GWRC	<= 8 hours	4 hours*	N/A - No events	N/A - No events	0 hours (no urgent call-outs)	N/A	N/A	N/A	N/A
Number of events in the bulk water supply preventing the continuous supply of drinking water to consumers	GWRC	0	0	0	0	0 events	0	0	0	0

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
Number of waterborne disease outbreaks	GWRC	0	0	0	0	0	0	0	0	0
Sufficient water is available to meet normal demand except in a drought with a severity of greater than or equal to 1 in 50 years	GWRC	<2% @	12%	20%	6.7%	7.4%	Achieve	Achieve	Achieve	Risk of Not Achieving
The extent to which the local authority's drinking water supply complies with part 4 of the drinking-water standards (bacteria compliance criteria)	HCC	100%	Compliant	Compliant	Non-compliant	Non-compliant	Non-compliant	Compliant	Compliant	Compliant
	UHCC	100%	Compliant	Compliant	Non-compliant	100%	Compliant	Compliant	Compliant	Compliant
	PCC	100%	Compliant	Compliant	Non-compliant	Compliant	Compliant	Compliant	Compliant	Compliant
	WCC	100%	Compliant	Compliant	Non-compliant	Compliant	Compliant	Compliant	Compliant	Compliant
	GWRC	100%	Compliant	Compliant	Non-compliant	Non-compliant	Non-compliant	Compliant	Compliant	Compliant
The extent to which the local authority's drinking water supply complies with part 5 of the drinking-water	HCC	100%	Compliant	Compliant	Non-compliant	Non-compliant	Compliant	Compliant	Compliant	Compliant

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
standards (protozoal compliance criteria)	UHCC	100%	Compliant	Compliant	Non-compliant	100%	Compliant	Compliant	Compliant	Compliant
	PCC	100%	Compliant	Compliant	Non-compliant	Compliant	Compliant	Compliant	Compliant	Compliant
	WCC	100%	Compliant	Compliant	Non-compliant	Non-Compliant	Compliant	Compliant	Compliant	Compliant
	GWRC	100%	Compliant	Compliant	Non-compliant	Non-compliant	Compliant	Compliant	Compliant	Compliant
The percentage of real water loss from the local authority's networked reticulation system	HCC	<= 20%	Data quality issues	0.31	37%	35%	Incremental improvement	Incremental improvement	Incremental improvement	Stabilisation (likely above 20% target)
	UHCC	<20%	Data quality issues	34%*	44%	41%	Incremental improvement	Incremental improvement	Incremental improvement	Incremental improvement
	PCC	<= 20%	Data quality issues	25%*	0.31	30%	Incremental improvement	Incremental improvement	Incremental improvement	Incremental improvement
	WCC	<20%	Data quality issues	26%	31%	28%	Incremental improvement	Incremental improvement	Incremental improvement	Incremental improvement
	GWRC	<= 0.25%	0.12%	0.05%	0.03%	0.08%	No change	No change	No change	No change

The total number of complaints received about drinking water taste, clarity, odour, water pressure or flow, continuity of supply or the response to any of these issues; expressed per 1000 connections	HCC	<=20	17.6	24.3	26.1	31.7	Improvement	Improvement	Improvement	Meet LOS
	UHCC	<20	3.5	7.3	9.2	12.3	Deteriorating but likely meeting LOS	Deteriorating, may not meet LOS	Deteriorating, may not meet LOS	Deterioration, inability to meet LOS in outer years
	PCC	<=20	13.3	13.1	17.9	33	Deteriorating, not meeting LOS	Deteriorating, not meeting LOS	Deteriorating, not meeting LOS	Deterioration, inability to meet LOS in outer years
	WCC	<20	14.2	16.8	18.7	23.2	Static or improving	Deteriorating	Deteriorating	Deterioration and inability to meet LOS
	GWRC	<=20	0	0.1	0	0 complaints	No change	No change	No change	No change
	UHCC	<=30	9.6	9	8.2	10	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS
	PCC	<=30	33.4	30.9	28.2	29	Status quo, may meet LOS	Status quo, may meet LOS	Status quo, may meet LOS	Status quo, may meet LOS
	WCC	<30	21.2	24.3	22.9	19.8	Deteriorating	Deteriorating	Deteriorating	Deteriorating

Notes:

***** Table 4-6: "Average consumption of drinking water per day per resident " – calculated as total measured demand (production delivered), divided by number of population.

@ Table 4-6: "Sufficient water is available to meet normal demand except in a drought with a severity of greater than or equal to 1 in 50 years" – this measure is declared in respect of the Annual Exceedance Probability (AEP) scale.

KEY: White/no colour = no data/not applicable; Grey = ambiguous/data issues; Green = meeting SLA threshold; Red/Pink = not meeting SLA threshold; Orange = improving from past/ progressing towards meeting SLA.

4.A.3. Water safety planning

This section describes the challenges of good water safety planning and reflects upon Wellington Water's advancing water quality systems, risk management, and monitoring workstreams.

4.A.3.1. Why this is a challenge

Very high standards of care are required for providers of services that can potentially make people sick, injure or kill them; the supply of drinking water is no different. Drinking water contamination has the potential to affect very large numbers of people and to cause harm at a level which is extremely serious to individuals, communities, and businesses. Drinking water risks are imposed on all consumers, including many who are particularly vulnerable to illness.

4.A.3.2. The national water safety context

Experts have estimated that, in addition to mass outbreaks, between 18,000 and 100,000 sundry cases of sporadic waterborne illness occur each year. At the time that *Part 2A of the Health Act* was debated in the House in 2007, a common theme was that there was little evidence that New Zealanders have had any problems with water-borne diseases.

The potential for contamination of drinking water to cause widespread illness and, potentially, deaths was clearly seen in the August 2016 outbreak of campylobacteriosis at Havelock North. With only slightly different circumstances and/or a different pathogen, the outcomes of this outbreak could have been substantially worse.

The *Havelock North Drinking Water Inquiry* was satisfied that the risks to public health from unsafe drinking water justify the application of the highest standards of care. In addition to sickness and suffering on a large scale, an outbreak of waterborne illness also causes substantial financial consequences and disruptions to schools, hospitals, and other workplaces and public facilities. The result of these findings was the *Water Reform* pathway.

In mid-2017, the Government established the *Three Waters Review*; in July 2020, the *Three Waters Reform Programme* was launched in response to the challenges facing three waters service delivery nationally; these included:

- ageing infrastructure
- historical under-investment
- source water contamination
- higher consumer expectations
- resilience for impacts of climate change and natural hazards
- evolving demographics and huge looming costs.

Since the approval of LTP-21, the *Water Services Act 2021* was established, along with a new drinking water regulator. Taumata Arowai was established in March 2021, taking over from the Ministry of Health as the drinking water regulator on 15 November 2021. Aside: from October 2023 Taumata Arowai's responsibilities extended to the environmental performance of public wastewater and stormwater networks.

4.A.3.3. Wellington Water's response

Central to Wellington Water's refined approach to water safety planning is the *Regional Drinking Water Safety Plan* (RDWSP) and WWL's developing Asset Management System (AMS).

Prior to the emergence of drinking water safety plans (DWSPs, including Public Health Risk Management Plans), suppliers relied on water quality monitoring programme results to demonstrate to consumers and inspectors that their drinking water was safe. This meant that risks were not identified until it was too late. However, such plans can sit in storage unless there is a determination to implement them.

4.A.3.4. Managing levels of service risks

Section 30 of the Water Services Act requires Wellington Water Ltd to prepare drinking water safety plans in relation to our owners' supplies; the plans, with all subsequent changes, must be lodged with Taumata Arowai. Section 31 outlines what the water Supplier's plans must at least cover:

- identifying any hazards that relate to the drinking water supply, including emerging or potential hazards
- assessing any risks associated with those hazards - identifying how those risks will be managed, controlled, or eliminated to ensure that drinking water is safe and complies with legislative requirements
- identifying how the drinking water safety plan will be reviewed on an ongoing basis, and how its implementation will be amended, if necessary, to ensure that drinking water is safe and complies with legislative requirements
- identifying how the drinking water supply will be monitored to ensure that drinking water is safe and complies with legislative requirements
- procedures to verify that the drinking water safety plan is working effectively
- a multi-barrier approach to drinking water safety that will be implemented as part of the plan.

Since LTP-21 the suite of safety planning documentation and supporting programmes managed by WWL is now advanced. The RDWSP is supported by a detailed monitoring and compliance plan, with a Take-to-Delivery scope. Thus, WWL has also developed *Source Water Risk Management Plans* (SWRMPs) and network contamination risk mitigations, such as the Backflow Prevention programme and ongoing monitoring and remediation of reservoir contamination risks.

The RDWSP and Ancillary Protocols:

The water quality management system is laid out as Figure 4-12. It is overseen by WWL's Safe Drinking Water Committee that review the risks developed in the Plan, endorse formal revisions, and monitor the improvements schedule development and implementation. In the September 2022 Drinking Water Safety Plan, the Risk Bowtie method was used to depict the Cause, Risk and Consequences; the Minimum Controls Exceptions are then scheduled. It was updated to reflect the Drinking Water Assurance Rules.

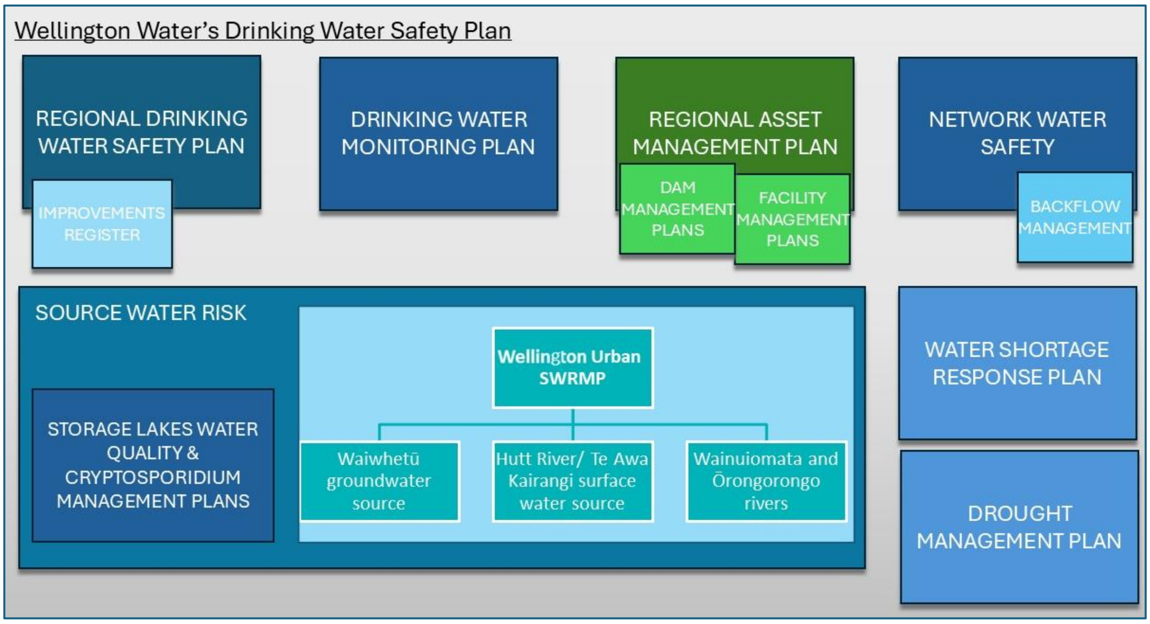


Figure 4-12: Wellington Water's regional drinking water safety plan.

Section 43(2) of the Water Services Act 2021 sets out the following requirements for Source Water Risk Management Plans. Notable is the introduction of references to national and regional freshwater plans to protect sources. The SWRMP describes:

- the catchment areas, including flow dynamics, land uses and environmental influences
- potential risks to each source, identified within the corresponding Catchment Risk Assessments
- how those risks will be managed, controlled, monitored or eliminated, including: an outline of key stakeholders, and outline the roles and responsibilities of those involved with managing the risks.

The SWRMP builds on the *Water Collection Areas Management Plan* we prepared with Greater Wellington Regional Council (GWRC) in 2016 and the *Three Waters Strategy*. This Wellington Urban SWRMP is a "living" document, as hazards and risk to drinking water safety change over time. This document will be updated to respond to ongoing stakeholder engagement, emerging risks and contaminants, and changes in regulatory requirements.

Released in July 2022 by Taumata Arowai (and revised in November 2022), the *Drinking Water Quality Assurance Rules* (DWQAR) impose requirements for the supply of safe drinking water and describe Supplier functions and duties. A structured approach directs the Supplier to select the appropriate compliance profile to their size and customer base, then to conform to General, Source Water, Treatment, and Distribution Rules (and *Very Small Communities Rules* – not applicable here). Thus, these modules are also supported by WWL's *Drinking Water Monitoring Plan* (Rev.2, Jan-23).

Water Safety in Reticulation (including Disinfection Residual):

The drinking water treatment process applies disinfection and pH correction before reticulation ("primary treatment"); final dosing ensures stability of the water ("buffering") and a Disinfection Residual in the network (adequate free Chlorine is available if a downstream hygiene breach occurs). Taumata Arowai's *Drinking Water Assurance Rules (*DWAR) frame the approach to Chlorine Contact

Time (calculated from Chlorine concentration and the period of retention before release to network).

Two *Residual Disinfection Exemption* applications (under Section 58 of the *Water Services Act 2021*) were made by WWL in FY2022/23:

> Te Marua DWTP: at maximum production flow, the capacity of the clearwater (Chlorine contact) tank may result in reduced contact time; however, adequate Chlorine contact time will amass before first customer, in bulk reticulation (in, and nearby the Plant). *This was accepted by Taumata Arowai*.
>
> Waterloo DWTP: this DWTP relies on Chlorine contact time within the bulk network (as onsite storage is limited); however, to manage network capacity and pressure issues there are two network cross-connections (one was closed at Waterloo Road; remaining are Epuni Street and Tilbury Street) that may result in customers receiving water that has not had full Chlorine contact time equivalent. Taumata Arowai did not grant exemption, and WWL were already undertaking the following associated upgrades in FY2024/25 (with funding requested for FY2025/26):
>
> - Upgrade of the Pharazyn Street pumping station to ensure satisfactory pump performance
> - Sunville and Rata supply zones to receive pressure control upgrades and measures
> - Booster pumping for Mission Street area
> - Booster pumping for private properties in White Lines East and Rossiter Avenue.

Network Backflow Prevention (BFP):

A significant aspect of drinking water contamination, downstream of compliant treatment at a DWTP, is backflow contamination in the reticulated network. Backflow is the unwanted reverse flow of potentially polluted or contaminated water back into a drinking water supply; defined in the Water Services Act 2021 as: “the unplanned reversal of flow of water or mixtures of water and contaminants into the water supply system”. Wellington Water is advancing a programme of protection measures, in collaboration with client councils and private parties.

Backflow occurs through:

- Back-pressure - when downstream pressure is greater than upstream pressure and pushes downstream fluids back upstream.
- Back-siphonage - when upstream pressure drops below downstream pressure and sucks downstream fluids back upstream.

Backflow is a risk to the safety of a drinking water supply when there is a direct or indirect cross-connection between the drinking water supply system and another fluid system. These cross-connections may introduce pollutants or contaminants into the drinking water network and convey them to other consumers potentially causing illness, injury, or death. In addition to the physical consequences there are also cultural consequences with some contaminants or pollutants, particularly those originating from the human body.

The potential for cross-connection exists immediately beyond the point of supply, so once drinking water has passed the point of supply and entered the consumers' privately owned system, it must be considered a risk to the drinking water network should a backflow event occur.

Backflow events in New Zealand are not well documented publicly due to privacy and the difficulty in identifying contamination points, but from conversations within Wellington Water (WWL) some historical local events include:

- Wellington Zoo - staff drinking water contaminated by herbicide.
- Thorndon - water taps at a school running beer from local brewery.
- Grenada North - hydroponics water found in a residential water main.
- Lower Hutt - paint factory system failure (but paint contained by boundary protection device).

Backflow can occur in both water supply networks and private property, as Figure 4-13. Other examples of contamination points are:

- source water abstraction points (such as well/ bore heads)
- hydrants (such as fire hydrants and flushing points)
- other network operational points (such as scours, air valves, and temporary connections).

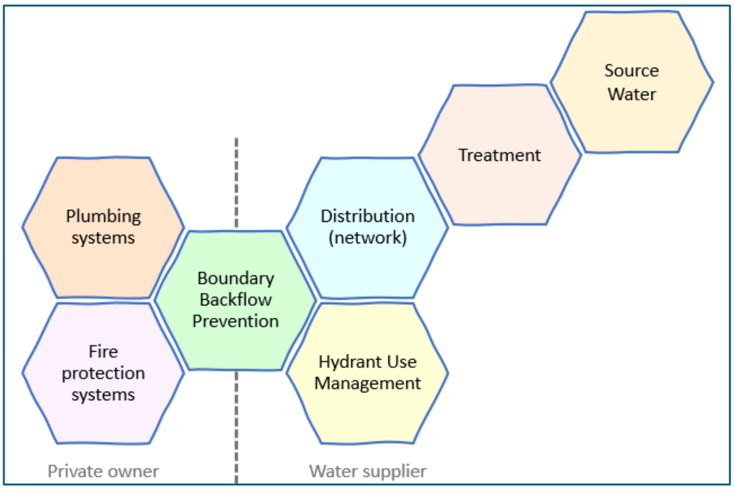


Figure 4-13: Key asset groups for backflow risk management

Complex challenges remain in the current regulatory environment. Figure 4-14 depicts the two sets of legislation that meet at the property boundary and the point of supply of drinking water. Due to the current management approach of our Client Councils, particularly through bylaws, many of the current Boundary BFP devices are privately owned and maintained. This necessitates cooperation between WWL and client councils, particularly with their building control teams, to achieve network protection and enable network compliance reporting to the Regulator.

Building Act 2004
and
Building Code

The purpose of the Building Act is to ensure people can use buildings safely and without endangering their health. The Building Code sets the performance standards that all building work must meet, even if that work doesn't need a building consent.

One of the Building Code requirements is that potable water is protected from contamination.

Under the Building Act 2004, all buildings (other than single residential buildings, unless they have a cable car) require a compliance schedule and annual building warrant of fitness. There are 15 Specified Systems, and automatic backflow preventors connected to a potable water supply is SS7.

Water Services Act 2021
and
Drinking Water Quality Assurance Rules 2022

The purpose of the Water Services Act is to ensure that drinking water suppliers provide safe drinking water to consumers. The Drinking Water Quality Assurance (DWQA) Rules impose requirements on drinking water suppliers around their duties in supplying safe drinking water.

The DWQA Rules require backflow risk points to be recorded and adequately protected. WSA Clause 27 and DWQA Rules D1.2, D2.7 and D3.1 to D3.6 related specifically to backflow prevention, however requirements of keeping the water safe and healthy are also inherent in other rules and clauses.

Figure 4-14: The Building Act and the Water Services Act meet at the property boundary

Protecting against backflow involves multiple facets, with complex data needs, including:

- adhering to well-founded design standards and SOPs
- installing backflow prevention devices or mechanisms
- maintaining a comprehensive management program
- appropriate education and training of all stakeholders
- consistent performance data capture and data quality control.

4.A.3.5. Further information

Appendix E to this AMP offers fuller details of foundation issues and WWL's five-year BFP programme.

4.B. ANNEX Wastewater

4.B.1. Introduction

This section covers the wastewater services performance.

4.B.2. Wastewater performance measures

The performance of WWTPs is monitored and reported under the consent conditions to operate them – see Table 4-6: Wastewater treatment plant performance (draft Annual Report 2024). One measure of this is the incidence of discharge events (i.e., when effluent from the treatment plant bypasses part of the treatment process and/or is discharged via an alternative route such as an overflow pipe rather than the main outfall). Compliance processes dictate what is required operationally when these events occur which may include beach closures and increased monitoring of receiving water quality until acceptable limits are achieved. Enforcement actions may also be taken by the environmental regulator ranging from infringement notices to prosecution. Longer-term, this information may be used to plan for upgrades and will be relevant to any consent renewal.

Table 4-6: Wastewater treatment plant performance (draft Annual Report 2024)

Moa Point	**Number**	**Issue**
Abatement notices	1	To-do abatement notice requiring works to be completed on the pumpstation.
Infringement notices	2	Non-compliant wastewater quality.
Western		
Abatement notices	1	To-do abatement notice requiring us to cease discharging into to Karori stream. This was due to a slip damaging the pipe.
Infringement notices	1	Non-compliant wastewater quality.
Porirua		
Infringement notices	1	Unauthorised discharge of wastewater, due to a sludge carryover event.
Seaview		
Infringement notices	26	24 related to odour issues at the plant while improvements were being made to reduce odour generally. Two related to non-compliant wastewater quality from the plant.

The below table shows the number of discharge events, reflecting data as recorded in source files and is intended to convey an overall trend. The underlying detail may differ from consenting records where varying measurement interpretations have been applied by the environmental regulatory authority over time. Consented limits for partially-treated discharges to the environment are implicit in approved consents and in operating practice, for specific situations. Note: discharge events from the Seaview WWTP are of fully treated effluent (the capacity constraint for this treatment plant is the outfall pipeline). Discharges from the other WWTPs are of partially treated wastewater and occur due to design capacity constraints within the plants themselves, or asset service faiklure events. Additionally, investment in capacity at Porirua WWTP in 2023 targeted near-zero discharge of untreated waters.

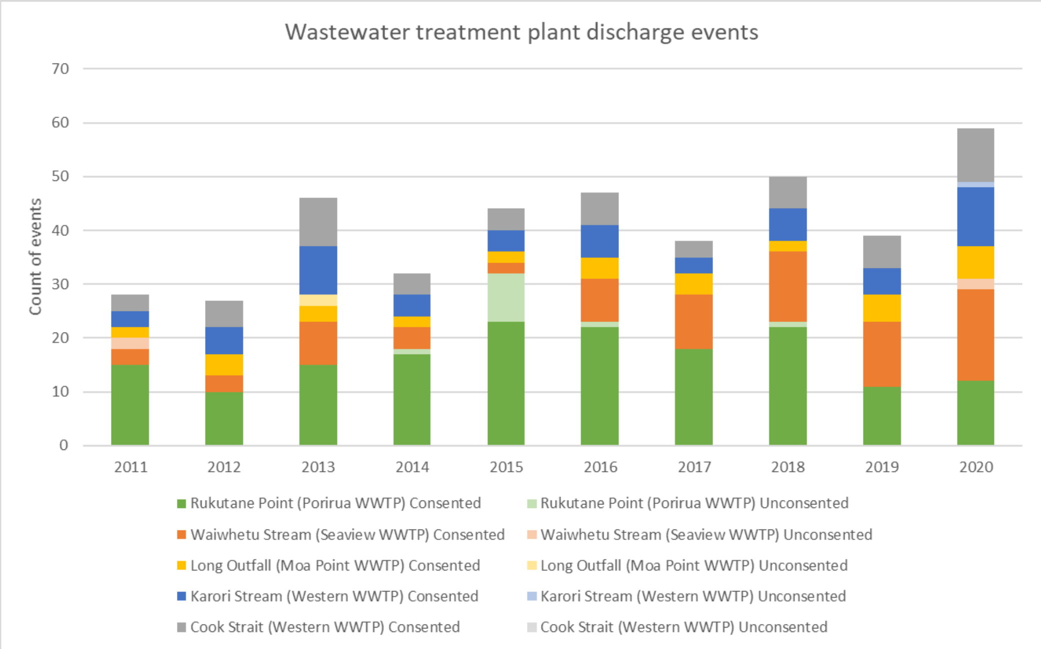


Figure 4-12: Wastewater treatment plant discharge events

Another key performance parameter for WWTPs is how well the treatment process improves the quality of the effluent discharged. In general, this aspect of treatment performance is met, although there have been regular non-compliances in recent years from Seaview and Moa Point in particular due to ageing equipment. This and other performance parameters are routinely monitored firstly for operational purposes through control systems which are used to manage treatment performance. Records are also kept as required for compliance purposes.

Performance Measure(s)*:*

- The number of dry weather sewerage overflows from the territorial authority's sewerage system, expressed per one thousand connections
- Median response time to attend a sewage overflow resulting from a blockage or other fault in the sewerage system
- Median response time to resolve a sewage overflow resulting from a blockage or other fault in the sewerage system
- The total number of complaints received about sewerage odour, sewerage system faults, sewerage system blockages and the response to any of these issues; expressed per one thousand connections

Context. UHCC. WCC. HCC It is difficult to draw strong conclusions on the performance of the **Hutt City** wastewater networks based on the DIA measures.

With reliable data only spanning three years, no reliable conclusions can be drawn about the performance of the network; in particular trending numbers of dry weather overflows.. Similarly, with wastewater response times, no reliable data is available before the 2021/22 financial year, and significant staffing issues have difficulties driving up response times, which are only now starting to normalise. Moreover, wastewater jobs should always have a high priority, but a proportion of these are reported as potable water issues when reported to councils. This results in a lower that intended prioritisation of the job, until crews can assess the job on-site. This means the high median response times for non-urgent water issues inadvertently drive up the response time of a portion of wastewater jobs. We will see an improvement in response and resolution times because of increased drinking water funding, as these incorrectly classified jobs will be identified more quickly.

In the longer term, backlog of renewals will grow indicating that the network is continuing to degrade over the period, and growth will put pressure on undersized assets. As a result, the number of dry weather overflows may increase.

Complaints about sewerage odour, faults, blockages and WWL's response to these issues have increase by 16%, indicating that performance is deteriorating, although not as dramatically as in the potable water space. This indicates that the wastewater network is comparatively doing better than the water network.

Outlook. WCC, HCC It is difficult to draw strong conclusions, however Councils level of investment will necessarily see an improvement in the performance (reflected in customer satisfaction) of the wastewater network in the short terms. It is unclear if this improvement will meet LOS targets for wastewater response and resolution times. In the longer term, the dry weather overflows and complaints may increase as network deteriorates and because of less wastewater planned and reactive maintenance activities due to flatline opex budgets.

Reaching zero dry-weather overflows is not achievable.

Performance Measure(s)*:*

- Number of abatement notices received in relation to the resource consents for discharge from sewerage systems
- Number of infringement notices received in relation to the resource consents for discharge from sewerage systems
- Number of enforcement orders received in relation to the resource consents for discharge from sewerage systems
- Number of successful prosecutions in relation to the resource consents for discharge from sewerage systems

Context. Actions from the regulator tend to be centred on operations at the Porirua WWTP, Seaview Wastewater Treatment Plant, Moa Point and the Western Wastewater Treatment Plant . The Seaview plant has had difficulties with compliance for several years, particularly this year, with one abatement notice and 28 infringement notices relating to odour.

Outlook.

UHCC & HCC. UHCC & HCC are Joint Venture partners in the Seaview Wastewater Treatment Plant, the focal point for investment in treatment service in this collection zone in our region.

All. The preferred level of investment from the council will see improvements at the wastewater treatment plants which should result in less actions from the regulator.

WCC. Council investment in wastewater treatment plant improvements are scheduled to be completed towards the end of the 2024-34 LTP period, at which point regulatory compliance will improve. With lack of asset redundancy, there will be periods of non-compliance until the funded renewals are complete.

Note these tables are to be updated with more recent information.

Table 4-7: Wastewater performance measures - historic and projected achievement

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
Median response time to attend a sewage overflow resulting from a blockage or other fault in the sewerage system	HCC	<= 90 mins	Data quality issues	19.4	8.4 hours (593 mins)	159 mins	Improvement	Improvement	Improvement	Improvement
	UHCC	<=60 mins	Data quality issues	151 mins	263 min	80 min	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS
	PCC	<= 90 mins	Data quality issues	163 mins	101 mins	79 mins	Status quo, will not meet LOS	Status quo, will not meet LOS	Status quo, will not meet LOS	Status quo, will not meet LOS
	WCC	<=60 mins	Data quality issues	100 mins	85 mins	80 minutes	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS
Median response time to resolve a sewage overflow resulting from a blockage or other fault in the sewerage system	HCC	<= 8 hours	Data quality issues	25.7 hours	30.3 hours // 35 hours	12.4 hours	Improvement	Improvement	Improvement	Improvement
	UHCC	<=6 hours	Data quality issues	36 hrs	5 hours	3.4 hours	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS
	PCC	<= 8 hours	Data quality issues	5.4 hrs	3.6 hrs	2.7 hours	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS
	WCC	<= 6 hours	Data quality issues	17.7 Hours	7.9 Hours	4.7 hours	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS	Status quo, likely will not meet LOS

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
Number of abatement notices received in relation to the resource consents for discharge from sewerage systems	HCC	0	2	1	1	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	UHCC	0	0*	1	1	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	PCC	0	0	1	0	0	Increasing compliance	Increasing compliance	Increasing compliance	Compliance
	WCC	0	0	2	0	1	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
Number of enforcement orders received in relation to the resource consents for discharge from sewerage systems	HCC	0	0	0	0	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	UHCC	0	0	0	0	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	PCC	0	0	0	0	0	Increasing compliance	Increasing compliance	Increasing compliance	Compliance

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
	WCC	0	0	0	0	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
Number of infringement notices received in relation to the resource consents for discharge from sewerage systems	HCC	0	0	2	5	15	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	UHCC	0	0*	2	4	15	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	PCC	0	0	0	0	1	Increasing compliance	Increasing compliance	Increasing compliance	Compliance
	WCC	0	1	1	2	3	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
Number of successful prosecutions in relation to the resource consents for discharge from sewerage systems	HCC	0	0	0	0	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
	UHCC	0	0	0	0	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
	PCC	0	0	0	0	0	Increasing compliance	Increasing compliance	Increasing compliance	Compliance
	WCC	0	0	0	0	0	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Improvement at WWTP leading to less regulatory action	Increasing compliance
The number of dry weather sewerage overflows from the territorial authority's sewerage system, expressed per 1000 connections	HCC	<20	6.25	3.6	5.3	1.7	Continue to meet LOS	Continue to meet LOS	Continue to meet LOS	Deteriorating due to growing renewal backlog & network degradation
	UHCC	<20	2.7	1.8	2	0.1	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS
	PCC	<20	14.71	5.9	9.3	4.9	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS
	WCC	Zero	11.7	6.2	5.5	2.9	Cannot reach level of service	Cannot reach level of service	Cannot reach level of service	Status quo, will not meet LOS

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
The total number of complaints received about sewerage odour, sewerage system faults, sewerage system blockages and the response to any of these issues; expressed per 1000 connections	HCC	<=30	19.1	20.6	22.1	24.1	Continue to meet LOS	Continue to meet LOS	Continue to meet LOS	Deteriorating due to growing renewal backlog & network degradation
	UHCC	<=30	9.6	9	8.2	10	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS	Status quo, meet LOS
	PCC	<=30	33.4	30.9	28.2	29	Status quo, may meet LOS	Status quo, may meet LOS	Status quo, may meet LOS	Status quo, may meet LOS
	WCC	<30	21.2	24.3	22.9	19.8	Deteriorating	Deteriorating	Deteriorating	Deteriorating

4.C. ANNEX Stormwater

4.D. Introduction

This section covers the stormwater services performance.

4.D.1. Stormwater performance measures

Context. Performance of the stormwater system is difficult to determine when assessing the DIA measures. Its performance is relative to the extremity of the storm events in any given year. Additionally, we assume that because of climate change, the frequency and extremity of storm events will increase over time, rendering the network less able to deal with extreme events. We have seen a dramatic increase in the number of complaints about stormwater performance over the past few years, although this has not led to an increase in the number of flooding events. This is due to the very narrow definition of flooding events under the DIA rules – as well as the difficulty in getting this data.

Note that the enforcement actions related to the stormwater system are not a good reflection of the performance of the network. Historically, enforcement actions from the regulator tend to centre around operational work which discharges contaminants into the system, which then pollute the environment. No enforcement action should not be taken as an indicator of network performance

Outlook. WCC, HCC Again, it is difficult to draw strong conclusions, but the preferred level of investment will likely see the number of complaints about the stormwater network performance continue to rise or start to even out. This level of investment will not be sufficient to mitigate damage to people, property, or infrastructure from the effects of climate change into the future.

The preferred level of investment will begin to mitigate the effects of climate change that we are already witnessing, but we will require a coordinated plan and engagement with councils and communities to determine a path moving forward to protect people, property, and infrastructure.

Note these tables are to be updated with more recent information.

Table 4-8: Stormwater performance measures - historic and projected achievement

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
For each flooding event, the number of habitable floors affected; expressed per 1000 connections	HCC	<0.24	N/A	0.3	N/A - No flooding events	N/A - No flooding events	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	UHCC	<=0.64	N/A - No flooding events	0.1	N/A - No flooding events	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	PCC	<0.24	2.12	0.4	N/A - No flooding events	N/A	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	WCC	<=0.13	0.03	1	N/A - No flooding events	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
Median response time to attend a flooding event	HCC	<=8 hours	N/A	71 hours	N/A - No flooding events	N/A - No flooding events	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	UHCC	<60 mins	N/A –No flooding events	0 mins*	N/A –No flooding events	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	PCC	<=8 hours	90 hrs	11 hrs	N/A - No flooding events	N/A	Weather dependant	Weather dependant	Weather dependant	Weather dependant

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
	WCC	<=60 mins	27 hours	62 hrs	N/A – No flooding events	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
Number of abatement notices received in relation to the resource consents for discharge from stormwater systems	HCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	UHCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	PCC	0	1	0	0	0	N/A	N/A	N/A	N/A
	WCC	0	0* (1)	0	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
Number of enforcement orders received in relation to the resource consents for discharge from stormwater systems	HCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	UHCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	PCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	WCC	0	0	0	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
Number of infringement notices received in relation to the resource consents for discharge from stormwater systems	HCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	UHCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	PCC	0	1	0	0	0	N/A	N/A	N/A	N/A
	WCC	0	0	0	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
Number of successful prosecutions in relation to the resource consents for discharge from stormwater systems	HCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	UHCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	PCC	0	0	0	0	0	N/A	N/A	N/A	N/A
	WCC	0	0	0	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
The number of complaints received by a territorial authority about the performance of its stormwater system, expressed per 1000 connections	HCC	<=20	6.71	14.3	18.2	8.5	Deteriorating	Deteriorating	Deteriorating	Not meeting LOS
	UHCC	<=20	2.3	3.9	5.6	2.1	Status quo, likely to meet LOS	Status quo, likely to meet LOS	Status quo, likely to meet LOS	Status quo, may not meet LOS in outer years
	PCC	<=20	14.53	18.7	25.5	8	Status quo, may not meet LOS (weather dependant)	Status quo, may not meet LOS (weather dependant)	Status quo, may not meet LOS (weather dependant)	Status quo, may not meet LOS in outer years
	WCC	<20	11.1	8.9	14.5	8.4	Deterioration of network, likely to meet LOS	Deterioration of network, likely to meet LOS	Deterioration of network, may not meet LOS	May not meet LOS in outer years
The number of flooding events that occurred throughout the year	HCC	<=2	0	2	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant

Performance Measure	Shareholder Council	Target	2020/21 Result	2021/22 Result	2022/23 Result	2023/24 Result	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast	2027-34 Trend
	UHCC	<=2	0	1	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	PCC	<=2	1	4	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant
	WCC	<=2	2	4	0	0	Weather dependant	Weather dependant	Weather dependant	Weather dependant

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Wellington Metropolitan
Water Services Asset Management Plan
2025

Demand & Growth

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

5. Demand and planning for the future

Demand and capacity information is provided in this section.

5.1 Demand drivers

5.1.1 Understanding demand

Demand represents the quantity of products or services wanted by customers at a specified price and time. Demand forecasting helps provide an understanding of future service demand trends and helps with planning to meet changing demand over time. There is a level of inherent uncertainty and risk in the demand management process outlined in Figure 5-1.

Demand management involves:

- Assessment of asset capacity
- Identifying demand drivers
- Forecasting future demand
- Assessing Demand-Supply gaps
- Identifying demand management solutions

Demand management planning is vital to ensure services are available at the required levels to meet customer requirements and expectations. It is also important to help effectively manage constraints and shortages of supply.

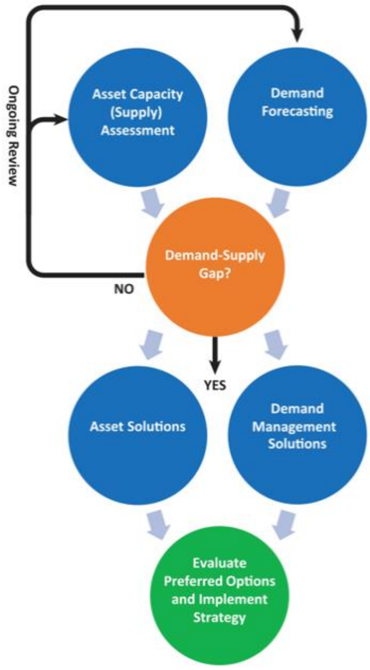

Figure 5-1: Outline of the demand management process

5.1.2 Meeting existing demand and forecasts

Stormwater service demand forecasting should consider the following factors:

- Hydraulic neutrality – where new development contributes no more stormwater than its pre-development levels
- Climate change forecasts
- Impacts of upstream land use changes e.g., additional hardstand in the upper catchment

Stormwater catchment management plans including adaptation pathways are a vehicle for demand forecasting.

Meeting Existing Demand. The range of stormwater demand management and mitigation measures include:

- Undertake stormwater hydraulic modelling to assist with growth and demand analysis and forecasting
- Network upgrades
- Risk and hazard planning and management
- Effective demand forecasting to ensure that future demand for the service is understood
- Management of customer demand, to reduce demand for over-utilised assets, through pricing, regulation and education.

Meeting Forecast Demand. Forecast demand can be estimate, however the level of uncertainty may be high due to factors such as rate of development and climate change. Methods for managing future demand include:

- Participation in wider organisation future planning and strategy development e.g., new properties required to have ‘hydraulic neutrality’
- Monitoring, planning and implementation of appropriate responses to future climate change impacts (including adaptation options)
- Developing with regional partners the adaptation option of “managed retreat” for the long-term (exampled by Seaview area)
- Identifying and prioritising growth projects based on planning discussions with the large developers
- Better growth forecasting by use of analysis of subdivision and building consent data and trends
- Timing funding and allocations based on the outcomes of negotiations with developers and budget estimates are used in the development contributions model
- Undertaking renewals projects with an element of upsizing due to growth capacity requirements have sufficient funding allocations split between renewals, levels of service and growth.
- *Note:* there is a significant cost escalation impact resulting from increased pipe diameters –a x3-4xdiameter increase is equivalent to x5-10 cost increase based on a 10% AEP LoS increase.

5.1.3 Key three waters demand drivers

Understanding and monitoring demand drivers – see Table 5-1, helps plan for future service demand and the development of organisational growth and demand strategies, policies and plans.

Table 5-1: Common demand drivers

Demand drivers	Explanation
Demographics	Trends in population growth, age demographics
Tourism	Seasonal peaks and tourism trends
Economic development	Economic climate and growth trends
Legislation	Legislation and regulatory requirement changes
Climate change	Climate change impacts and trends
Land use and land development	Land use and land development demand and trends

5.2 Capacity

Three waters network capacity is generally about its ability to store or transmit flows, i.e., its hydraulic capacity. A notable exception to this is the capacity of treatment plants which also includes their ability to remove contaminants (their treatment capacity). Hydraulic capacity can be simply expressed in terms of flow rate or volume but is also often stated in terms of peak demand events such as rainstorms (e.g., a 1 in 100-year event).

Overall capacity of the networks is determined by the capacity of individual components forming the infrastructure. Localised restrictions (bottlenecks) can greatly affect the performance of parts of or whole networks if the demand for flow is not able to be met. Practically, water networks are built to service reasonable and foreseeable demands with allowance for growth, peaks, and factors of safety – this is known as design capacity. When excess demand occurs, the network is over-capacity and likely unable to deliver the desired level of service (e.g., containing wastewater flows, or providing enough water supply).

5.2.1 Network capacity

The pipe networks are generally adequate to cope with typical daily demand but do experience shortfalls in peak circumstances. Wastewater networks may cope with dry weather flows, but overflows are experienced in specific locations during wet weather. This indicates capacity issues likely exacerbated by the inflow and infiltration of stormwater. Likewise, stormwater capacity can be exceeded during high rainfall leading to overland flow and potentially flooding of properties. For water supply pipes, firefighting demand is the governing factor, meaning that normal consumer demand is adequately met.

Key to understanding and managing network capacity issues is flow measurement and hydraulic modelling. . This helps WWL to predict and identify the following among other things:

- Pipe network exceedances in modelled events
- Wastewater overflows
- Overland flow paths
- Ponding/flooding areas
- Water demand shortfalls (flow and pressure)
- The effect of growth (property development) on existing capacity.

5.2.2 Network models – role

Hydraulic modelling provides valuable information required for decision making. Modelling helps to predict and identify the following among other things:

- Pipe network exceedances in modelled events
- Wastewater overflows
- Inflow and Infiltration
- Overland flow paths
- Ponding/flooding areas
- Habitable floor flooding
- Water network performance (pipe capacity and network pressure)

- Firefighting capacity

Once the issues are understood, models can help identify and prioritise infrastructure improvements currently and in future taking growth and climate change scenarios into consideration. Wellington Water has a comprehensive rolling programme of network modelling which is calibrated by measured flows. The models are updated regularly to reflect changes in population, rainfall patterns and infrastructure changes. Drinking Water models are updated every four years, wastewater modelling every nine years to ensure reliable information is available. Stormwater models are updated when there are changes that would modify the surface flooding and therefore the natural hazard presented in the district plan; these changes could be ground surface change, new Lidar or Climate Change information.

The information from Wellington Water models are currently used for:

- Operational reactive and planned works
- Long term upgrades and strategic network planning
- Land development applications
- Infrastructure solutions for capital delivery
- Legislative programmes such as wastewater and stormwater consent
- Natural hazard (Flooding) information in the District Plan
- Resilience and emergency scenarios
- Planning and feasibility of alternative network configurations
- Understanding of optimizing reservoir supply

5.2.3 Model status

Note the model programme will be provided at a later date.

5.2.3.1 Stormwater models

To understand the flood risk Wellington Water uses modelling to inform the performance of the stormwater system, the extent of overland flow paths and predicted future flood levels. To date we have modelled and mapped 33 of 35 urban catchments in the region and are updating models that are older than 10 years. Modelling stormwater risk also considers climate change implications to flooding. Analysing the rainfall, understanding, and surveying our assets and modelling the performance of the systems for frequent and extreme rainfall events and climate change will inform decision making and planning controls. Flood maps are provided in flood depth maps as well as flood hazard maps. Flood hazards consider the combination of depth and velocity. The modelled flood maps are and will be used in District Plans to support building and planning controls and informing council's district planning processes as to where to avoid development. Building resilience is achieved through maintaining overland flow paths and by setting minimum floor levels. Flood maps can be viewed publicly here:

- Rainfall flood risks in Wellington City and
- Working towards resilience – rainfall flood risks in Porirua

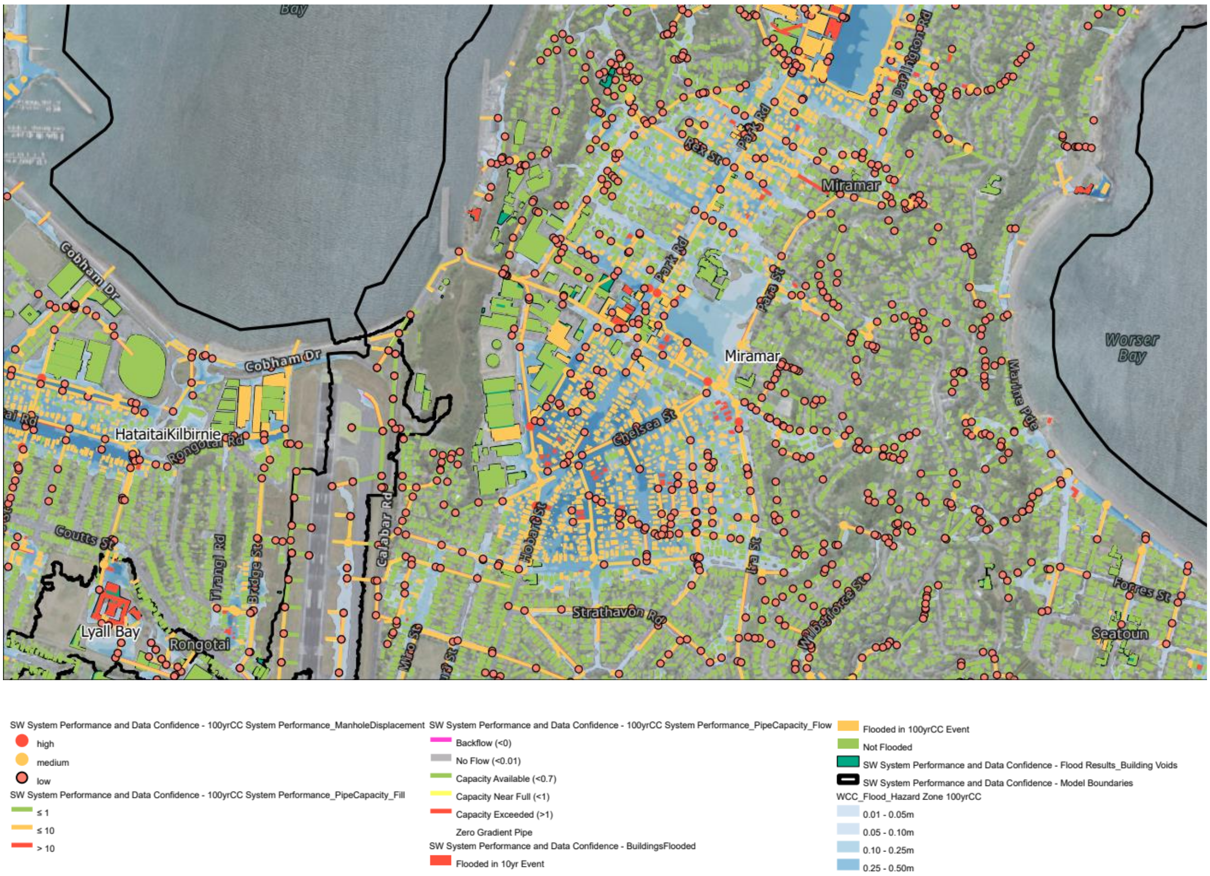

Figure 5-2: Example of stormwater system performance model

5.2.3.2 Wastewater modelling

Wellington Water has two types of wastewater models: Strategic models and detailed all pipe models. Strategic and detailed models are both important tools for wastewater network planning, with the former being best suited to long term planning, integrated with the treatment plants, and the latter best applied for highly localised capacity constraints, land development and operational queries.

Strategic Models are built in wastewater treatment catchment extents:

- Seaview Strategic Model
- Moa Point Strategic Model
- Karori Strategic Model
- Porirua WWTP strategic model

There are 10 detailed all pipe models in the region – see Figure 5-3.

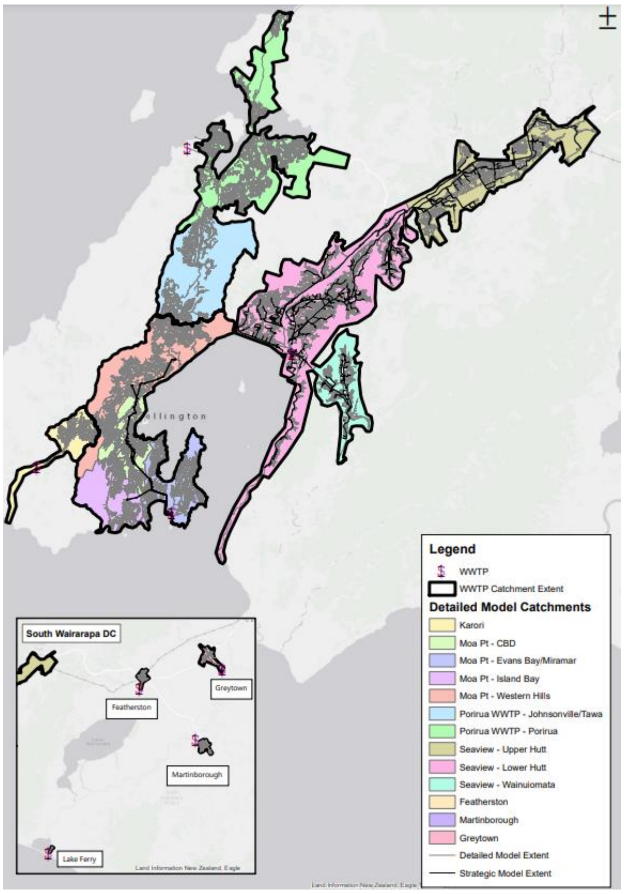

Figure 5-3: Wastewater models

The figure below is an example of a modelling output showing predicted performance of the wastewater networks in a modelled, 1-year overflow event. Specific pipes are predicted to experience flows which are at or over their capacity to carry, resulting in constructed and uncontrolled overflows at locations across the region. “Constructed” overflows are those where excess flow is diverted to the stormwater system or receiving waters. “Uncontrolled” overflows occur where there is no such built-in diversion, but excess flow escapes the system (e.g., through manhole lids that become dislodged under pressure). Both are clearly undesirable occurrences, as they introduce contaminants to receiving waters. Uncontrolled overflows also present a greater public health risk with the potential for human contact with wastewater in built up areas.

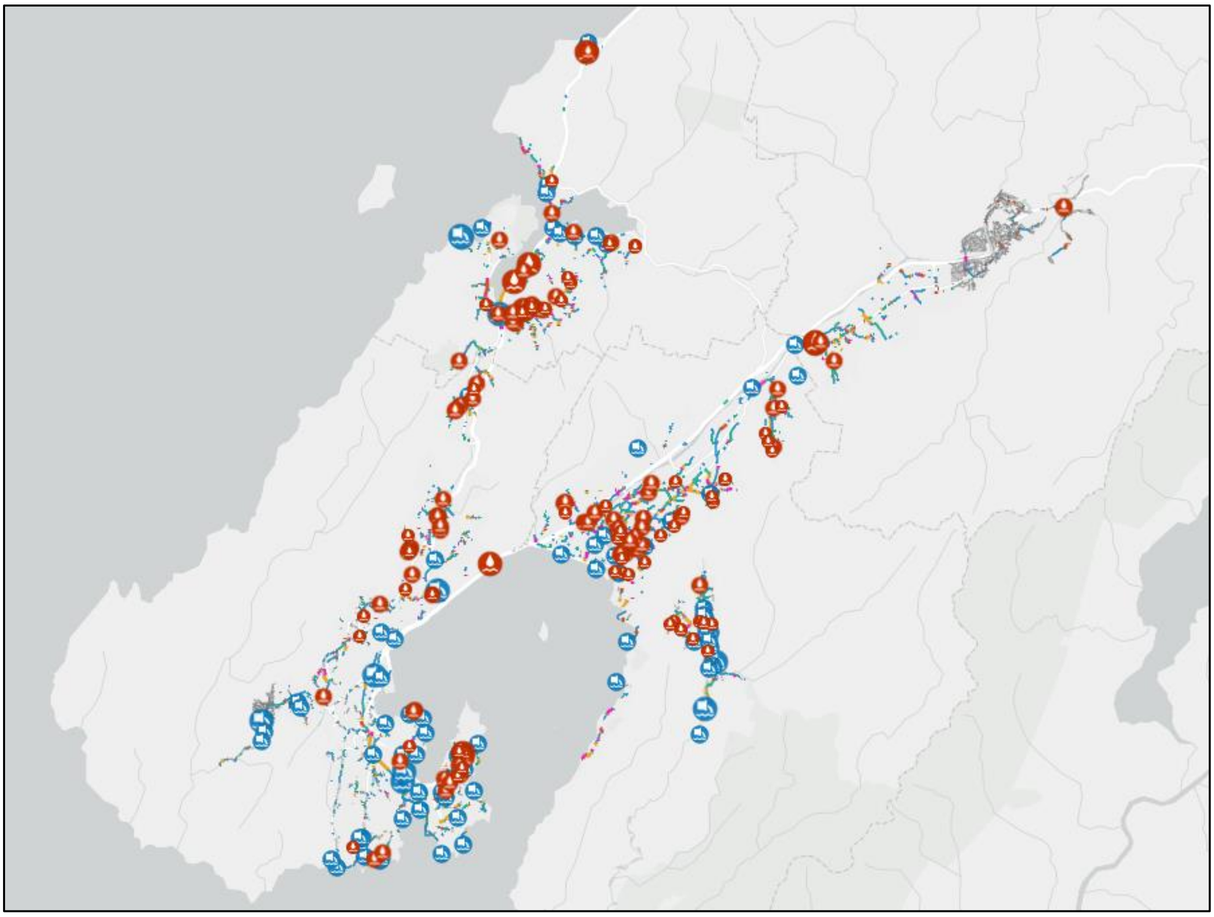

Figure 5-4: Predicted performance of wastewater networks showing locations for 1-year overflow event

5.2.4 Drinking water network modelling

The main objectives of drinking water network modelling are to:

- Assess and improve the understanding of the system through calibration.
- Assess current and future system performance under normal conditions and what-if scenarios.

This includes studies to identify areas where Level of Service is not met and identify and optimise network improvements or solutions to performance issues. Key Deficiency areas for pressure, fire flows and storage are identified are identified through hydraulic modelling along with the preferred upgrades for each area required to ensure levels of service are met.

Wellington Water has 15 drinking water models which are calibrated and updated 4 yearly and inform Zone Management Plans (ZMPs). The ZMP studies identify the deficiencies and recommend infrastructure solutions to support predicted population growth and provide the required LOS. The models are further delineated into District Metered Areas (DMAs) – see Figure 5-5.

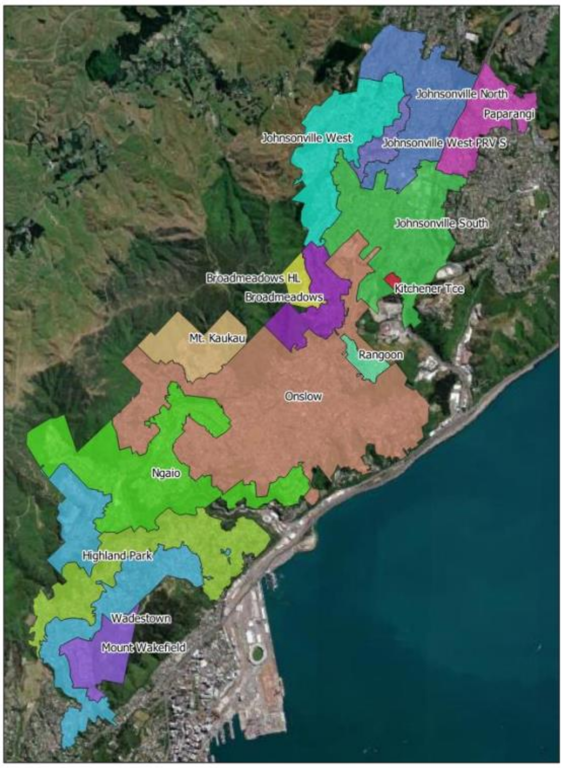

Figure 5-5: District Metered Areas (Johnsonville and Wadestown)- Example

5.2.5 Wastewater Treatment Plants – capacity

An assessment of commissioned reports for the wastewater treatment plant is provided in Table 5-2.

Table 5-2: Wastewater Treatment Plant Capacity

Wastewater Treatment Plant	Population			Design Capacity (persons)	Current Performance ADWF (average m3/day)	Wet Weather Flow	Comments
	2021	2033	2048				
Western (2000-2021)	13,559	15,563	16,785	15,500	3,780	15,600 (x4.1)	Plant designed for 17,000 pers. No significant increase in DWF in the past 20 years
Porirua (2017)		92,187	108,287	80,000	18,340	39,450 (x2.1)	Network overflows mean actual peaking factor is unknown
Moa Point (2022)	210,000			254,000	99,360	345,600	Consent WGN080003[31505] permits a continuous discharge of 260,000 m3/day
Seaview (2022)	159,000	190,546	219,512	unk	51,000	unk	

Notes:

i) Western WWTP assessment competed in April 2022,

ii) Porirua population prediction based on 2016 data with predictions to 2051,

iii) Network overflows limit the peak wet weather flow into the Porirua WWTP

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Wellington Metropolitan
Water Services Asset Management Plan
2025

Risk & Resilience

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

6. Risk management and resilience

This section documents the key issues that are faced regionally with delivery of the three waters services. The approach to determining a way to address these issues are considered across the three waters, as shown in Figure 6-1, which summarises the water influences against each priority. The responses used in this section feed into the investment profile information included in the AMP Part 3 documents. The ability to respond to the challenges varies between each of the councils, meaning that not all the responses below are funded.

There are also other regional (and national) challenges within the three waters sector, which include:

- Capacity of the market to deliver the increased investment needed
- Capability of the sector and
- Impending water reform.

These challenges are not discussed in this document.

Drinking water	Wastewater	Stormwater	Strategic priority
✓	✓	✓	1. Looking after existing infrastructure
✓	✓	✓	2. Supporting growth without adverse env. impacts
✓			3. Sustainable water supply and demand
	✓	✓	4. Improving environmental water quality
✓	✓	✓	5. Net carbon zero 2050
			Localised issues
	✓ (partial)	✓	Reducing flood risk
✓	✓	✓ (partial)	Seismic resilience
✓			Providing a suitable firefighting water supply

Key:
Direct linkage ✓
Partial linkage ✓ (partial)

Figure 6-1: Strategic priorities - links to three waters

6.1 Risk management approach and key risks

Renewals Planning falls within Strategic Priority 1. Asset renewal is the process of restoring the level of service delivered by an asset to its original design level, by upgrading or replacing the degraded components. The purpose of the renewal strategy is to maintain the levels of service by identifying the most cost-effective time to renew individual or groups of assets. Despite an uplift in renewals expenditure, the average age of the asset base continues to increase. There remains a significant amount of assets needing renewal over the short to medium term and there is an increasing focus on undertaking asset condition assessments to confirm the extent and timing of asset renewals required.

To improve network reliability, WWL recommends renewing and upgrading the network based on **performance and criticality**, as well as improving service performance and capacity.

Capturing better data will improve the quality of decisions and enable more prioritised and targeted investment. We are proposing an investment strategy to improve performance by reducing the backlog (and risk) in renewals over the next 30 years. Specific renewals budgets are proposed aimed at achieving a sustainable asset base that is renewed at a pace that matches deterioration. These budgets have been built from:

- Requirements for treatment plants, reservoirs and storage, pump stations and pipe networks
- Looking at forward requirements over the lifecycle of the asset base
- Retaining a suitable budget for reactive renewals to ensure that failed items can be replaced immediately

To note:

- Renewals needs are heavily dominated by pipe networks
- The recommended programme has been prioritised to achieve a balance between critical and non-critical assets

Deferral of renewal projects is resulting in increased service failures. These are observed by customers as interrupted water supply (no water), increasing pipe leakage and bursts, unplanned overflows from wastewater pipes, and collapsed stormwater mains. Across all failure modes, there is a resulting elevated health and safety risks e.g., contaminated water, collapsed roads, paths. Further there are consequential increases in unplanned (reactive) maintenance costs.

6.1.1 Headline challenges

While specific challenges have been identified with the water services, the pressing issues in relation to Three Waters are:

Common Issues (3 Waters)

- The extent and speed of urban growth is putting pressure on existing and future three waters infrastructure and services, increasing the likelihood and consequences of network disruption and failing to meet performance expectations
- Risks from natural hazards and climate change are leaving communities and water assets vulnerable to disruption and economic loss
- Consent expiry and subsequent renewal processes may impact across the capital, renewals and operations areas
- Historic under-investment in the region’s three waters infrastructure.

6.2 Key metropolitan risks and mitigation measures

The regional Three Waters risks are outlined in Table 6-1. These include where applicable: sources, treatment plants and disposal. Examples of specific infrastructure as also provided.

Table 6-1: Regional three waters risks and mitigation measures

Applies to	Activity	Risk Item	Key Mitigation Measures
		Looking After Existing Infrastructure	
HCC PCC UHCC WCC	**Three Waters**	Current 10-year LTP investment is well short of what is required to renew ageing parts of the network and fully support capacity increase for growth. Growth will put pressure on undersized assets (blockages, dry weather wastewater overflows, areas with no fire flow capacity, insufficient reservoir storage volumes). The current Capex spend will not address the backlog of renewals and level of service. Opex will increase due to reactive intervention when assets fail. Stormwater - Current 10-year LTP investment is well short of what is required to renew ageing parts of the network and improve levels of service for flooding. Wastewater - There is a significant quantity of wastewater pipework indicated by theoretical aged-based backlog. 10 Year LTP investment focusses on critical high-risk assets and condition assessments are ongoing to confirm condition and remaining life	• Condition Assessment of Assets in Theoretical backlog, taking a criticality and risk approach to prioritising assessment work • Updating asset data based on assessment findings and reassessment of backlog • Planning and implementing risk-based priority renewals within funding limits. This may require a review of the balance of renewals funding between the Three Waters as new asset information comes to light • WWL are developing a predictive failure model for AC pipes and other pipe materials to improve evidence base for critical renewals funding and planning
HCC PCC UHCC WCC GWRC (Water)	**Three Waters**	O&M budgets are insufficient for planned maintenance needed and will result in increased reactive maintenance (leaks, bursts). Operational funding for finding and fixing leaks is constrained and there is a backlog of works to complete. Whilst the benefit of leak management is now being seen, funding for pipeline renewal, preventative and reactive maintenance, and investigation and monitoring activities has been reduced or deferred. Operational funding level is insufficient to maintain new assets (such as stormwater quality devices and pressure sewer systems) vested into councils by developers. WWL responses focus on 'responding to impact rather than reducing impact'. Private assets are failing at similar rates to public ones, introducing additional inflow and infiltration into the network and treatment plant.	• Review and develop risk-based O&M works priorities • Develop an understanding of critical risks and hazards within the operational works areas, monitor and report and adapt programme to allocate resource to areas of highest priority • Work with other utility providers e.g., power, gas to renewal assets where they are undertaking work • Identify areas of expenditure that are imposed on operational costs by other stakeholders and utilities and that may present opportunity for saving through collaboration

HCC PCC UHCC WCC	**Three Waters**	Control of discharges i.e., wastewater overflows into environment unable to be guaranteed. As a result, mana whenua and community expectations are unable to be met e.g., (WCC) Murphy Street interceptor overflow point, Otari Wilton Bush.	• Fund growth related and levels of service improvement capital projects to enhance environmental water quality
HCC PCC UHCC WCC	**Two Waters**	Achievement of global wastewater network and stormwater discharge consents is estimated at $4.7B (2040 standards, unbudgeted) and there is no certainty investment will achieve GWRC targets	• None identified at present
HCC PCC UHCC WCC	**Two Waters**	**Water supply and wastewater services.** Pumpstations are at risk of failure due to a backlog of renewals, condition and funding constraints. The current Capex is not sufficient to address the required investment, and there is a backlog of mechanical and electrical asset related renewals. The lead time for specialist replacement equipment may be long, leaving customers with no or a lower level of service e.g., lower water pressure, routine wastewater overflows, increased reactive costs	• Target renewals and capital funding based on criticality.

6.3 Building resilience

6.3.1 Looking after existing infrastructure

Looking after existing infrastructure is foundational to core asset management. By looking after existing infrastructure, we can provide the water services that our current and future communities expect. It also means we have met the necessary legislative requirements for water quality, consent compliance and health and safety.

6.3.1.1 Why this is a challenge

Our councils own approximately $16.7 billion of three waters physical assets. If these assets are not renewed at the optimal rate, we will have to manage assets that are increasing in age and are susceptible to failures that result in leaks, overflows and service interruptions. Figure 6-2 summarises the challenges faced for this strategic priority.

The most significant current risk in not addressing the renewals backlog is 'runaway opex'. This is a situation where operational expenditure climbs year on year, and with capped operations budgets becomes focused on reactive works. This is highly undesirable and not only impacts on customer LoS, but can result in other impacts including consent non-compliance and possible public health and safety events.

Looking after existing infrastructure

Infrastructure is fundamental to the health, liveability and economic activity of our cities and towns. The region has more than $7.7 billion of three waters infrastructure that needs to be appropriately operated, maintained and renewed to ensure it meets the needs of current and future customers.

Why is looking after this infrastructure so important?

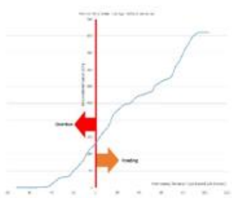
It is our customers' top priority...

The top 4 issues our customers want us to focus on are:

- Providing safe drinking water (59%)
- Ensuring drinking water is always available (46%)
- Ensuring wastewater doesn't cause any public health risks (44%)
- Ensuring wastewater services are always available (20%)

The availability of safe water services is highly valued by our customers

...but asset age is increasing...

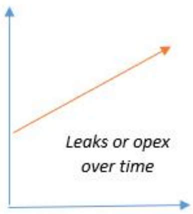


Asset age is increasing, with many past or approaching the end of their economic life.
This increasing age is the result of under-investment in asset renewals

...and its condition is deteriorating...

The available information suggests asset condition is often worse than its age would indicate, a risk highlighted by recent critical asset failures

...impacting on cost and reliability...



Aged, poor condition assets require more attention. This decreases levels of service, increases cost and diverts funding away from activities that support enduring service performance

...and our ability to meet our other strategic objectives

Assets in good condition:

- Reduces leaks & losses
- Improves water quality
- Enables growth
- Improves resilience

Existing infrastructure underpins our other strategic objectives. Improving its performance supports the achievement of these goals.

Figure 6-2: Challenges to looking after existing infrastructure

Underground assets and Wellington's topography make our three water assets uniquely challenging to manage. The underground assets are harder and more expensive to determine condition and remaining life. The assets are also highly interdependent of each other and can be pushed to capacity as growth pushes them to or beyond what they were originally designed for. More information on the condition, capacity and performance of the assets can be found in the water specific Annexes.

Recent critical asset failures such as the Dixon Street adit collapse, Moa Point wastewater main and the Mt Albert sludge pipes, as well as an observed increase in day-to day service failures that require a reactive response, highlight the importance of proactively looking after existing assets. If this is not done well, the potential consequences include increased repair costs, reduced levels of service for customers and increased risk of a major failure or environmental incident. One of the big issues we have is the quantity of pipes that are past their theoretical life. Currently, there are many overdue pipe renewals as they are already past their theoretical renewal date. There is also a large and growing number of assets coming up for renewal in the next 30 years. As this number of assets pass their theoretical life, this increases the likelihood of failure, and the operational investment required to respond to failures. This cycle is explained in Figure 6-3.

6.3.1.2 The funding challenge

There are several major capital investment drivers such as aging infrastructure, regulatory compliance and growth and demand. This creates tension between funding demand and affordability – see Figure 6-3**Error! Reference source not found.**, that is managed though careful assessment, prioritisation and risk management. This will continue to be closely managed.

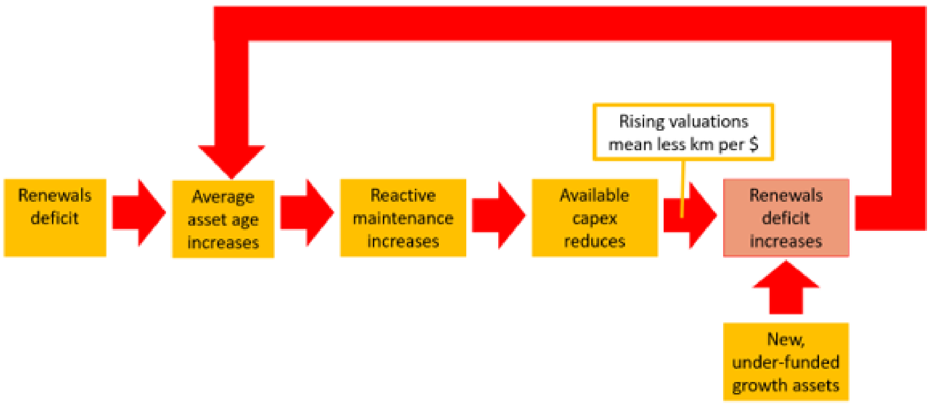


Figure 6-3: Operational / capital investment linkages

As the approach to looking after existing infrastructure improves, this also:

- Provides for a more resilient network
- Reduces the amount of water that is wasted
- Reduces the level of wastewater that enters waterways and reduce the amount of infiltration that enters the network causing overflows in wet weather
- Achieves energy savings through improved pumping and treatment efficiencies
- Refines the value/ cost balance in our asset investment practice.

6.3.1.3 Legislative links

There are several legislative documents that are needed to be complied with when providing the three waters services to our customers – see Appendix B.

6.3.1.4 Wellington Water's response

Managing the infrastructure efficiently and effectively requires the right balance of operational and capital investment. If there is sufficient capital investment over time the need for reactive maintenance will reduce. The reverse is also true if our asset base keeps on average getting older, we increase the risk of costly reactive maintenance needed to respond to service failures.

Appendix D summarises the activities that are undertaken through the alliance with Fulton Hogan and the wastewater treatment contract.

<u>Renewal of assets</u>

We need to:

- Increase overall investment levels in renewal of assets to progressively reduce the backlog of asset renewals.
- Prioritise renewals to ensure there is adequate investment in critical assets.
- Adopt more efficient renewal methodologies and processes to optimise the effectiveness of investment where practicable (e.g., trenchless technologies).

<u>Planned versus reactive maintenance</u>

WWL have identified that to deliver appropriate practice physical asset management it will be necessary to:

- Increase investment in planned maintenance to reduce the spending in reactive maintenance – see Figure 6-4 (the current state is at the left), with predominantly investment in reactive maintenance.

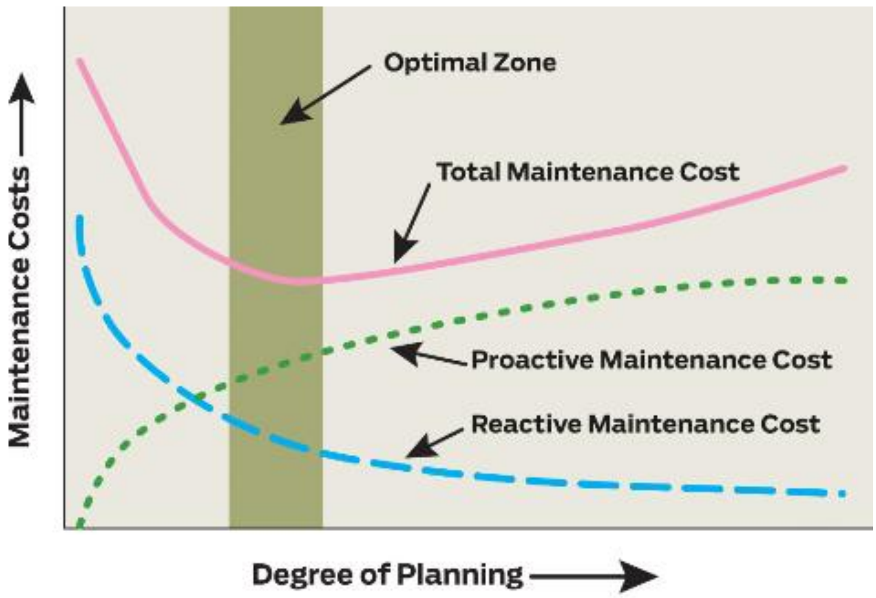


Figure 6-4: Relationship between planned and reactive maintenance

Source: IIMM – IPWEA (2020)

- Have asset type intervention guidelines to help develop maintenance and inspection programmes
- Undertake a more comprehensive condition assessment programme prioritised using the criticality framework guidance
- Ensure we have readily available data that we use to inform our maintenance activities.
- Ensure we have evidence of operations and maintenance costs at asset level to support the analysis of performance and funding needs.

Increase efficiency

WWL have identified that to increase efficiency of service delivery they need to:

- Ensure robust work processes and procedures that are easily accessible, understood and followed
- Ensure investment in agreed and stated activities and highlight the risks around the areas where investment is not possible
- Implement asset management plan improvements.

Water Safety Plan Implementation

It has been identified that WWL must review the effectiveness of its implementation of operational practices that minimise risks to drinking water safety, progressing with completion of tasks stated on the Improvement Plan

The Drinking Water Safety Committee reviews the adequacy of controls to be implemented to minimise or mitigate the risks that are identified in the water safety plan, on a systematic basis to ensure the water safety plan is kept live and that remedial action is scheduled.

6.3.1.5 Risks to Levels of Service

Looking after existing infrastructure is vital. If this is not done well the shareholder Councils and customers will continue to experience the following.

- An increase in response times i.e., longer to attend site and resolve issues
- An increased number and cost of asset failures – this links in closely with capex renewal funding. The more assets we can renew in a planned way, the smaller number of reactive capex and operational responses are needed.
- An increased level of water supply network leakage i.e., production water lost before it reaches customers
- An increased number of service interruptions for the customers
- Compromised / non-compliance with resource consents and other legislation. This includes drinking water safety, such as contaminated water could enter the network
- An increased number of wastewater overflows into the environment (waterways and to land).

6.3.2 Supporting growth

The metropolitan communities form an integral component of our water system, interacting with the three waters networks and assets. Water enters and leaves the water system through a multitude of daily interactions when taking water from the environment, distributing it across our cities, in and out of buildings and then back to the natural environment. As the number of people in our cities grow, housing demands rise, and new land is identified for development, our system must grow too.

6.3.2.1 Why this is a challenge

The Wellington region is experiencing significant growth in the short and medium term, which places considerable pressure on three waters infrastructure. Some of this growth is already supported through District Plans, with more anticipated in future District Plan revisions. On an ongoing basis, WWL-led investigations identify what changes or systems are needed for our three waters networks to meet future growth. Challenges identified as part of this work remain the substantial strain on existing networks due to additional demand taking up network capacity, investments not keeping up with growth, deterioration of assets, inefficient use of resources, and increasing customer and regulatory expectations.

6.3.2.2 Legislative links

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

Development capacity refers to the amount of development allowed by zoning and regulations in plans that are supported by infrastructure. It requires there is sufficient development capacity, as outlined in the Table below.

Table 6-2: Development capacity requirements

Timeframe	Development capacity requirements
Short-term (3 years)	Development capacity that is feasible, reasonably expected to be realised, zoned and serviced with development infrastructure
Medium-term (4-10 years)	Development capacity that is feasible, reasonably expected to be realised, zoned and either: • Serviced with development infrastructure, or • Funding for the development infrastructure is identified in a Long-term Plan.
Long-term (11-30 years)	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. Planned reforms of various legislation, planning instruments and financial tools will have an impact on how we prepare for, facilitate and fund future infrastructure for growth.

6.3.2.3 Wellington Water's response

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

In response to growth, WWL will work 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.

6.3.2.4 Planning for growth - three waters

Note further updates to this section are to be applied.

Planning for growth requires an understanding of the network's constraints and limits, triggers and responses. At each level of the 3 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.

WWL has undertaken a series of three waters growth studies to improve the 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.

6.3.2.5 Growth planning framework

WWL's growth planning framework is developing as information is gathered and assessed including across networks, available tools (e.g., hydraulic models) and as councils' urban growth plans are further developed. This is an ongoing programme. The growth planning framework is divided into four branches within the three waters network and aligns with future planning activities – see Table 6-3

Table 6-3. Growth planning framework

Regional (bulk system)
A long-term (+50 years) regional strategic approach involving a bulk infrastructure system and considering factors that could influence the three waters system (e.g., climate change, environmental limits, technology, community behaviours).
Objective: 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.
Objective: 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.
Objective: 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.
Objective: Council policy and Wellington Water requirements and standards include three waters management requirements for new developments that enable us to achieve our strategic priorities.

6.3.2.6 Investing for growth

Enabling growth will require 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- see Figure 6-5

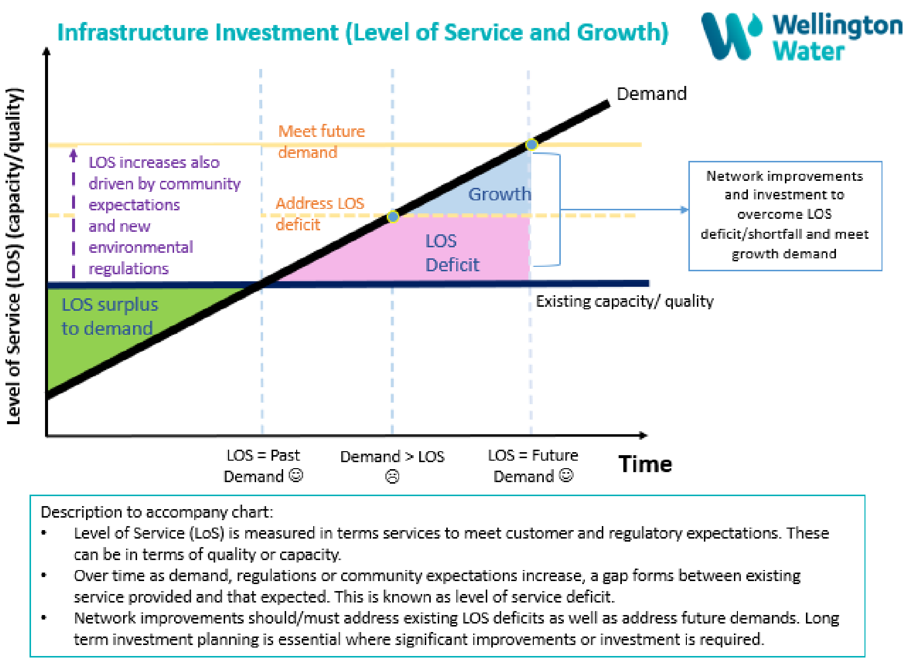


Figure 6-5: Three Waters Growth Infrastructure Investment

6.3.2.7 Risks to Levels of Service

If we don't respond to demand and grow our service capacity with the increasing population, we will continue to experience the following:

Water Supply

- More service interruptions as increased loading is put on already overloaded networks.
- Reduced drinking water operational storage capacity affecting the ability to supply drinking water.
- More water use restrictions.

Wastewater

- More service interruptions as increased loading is put on already overloaded networks (including pumping stations and treatmentplants).
- Overflows due to capacity limitations in the network.

Stormwater

- The impact of flooding events will increase as load is put on already overloaded networks.

6.3.2.8 Key document links

Note further work is required to update this section.

Recent studies have been undertaken to help inform Long Term Plans. These documents are shown below.

Hutt City Council

- Wainuiomata growth - 3Waters Cost Estimates - HCC

Porirua City Council

- Preliminary three waters catchment plan - PCC
- Wastewater information - PCC
- Water Supply information - PCC
- Stormwater information - PCC

Upper Hutt City Council

- Cost estimation of growth investment needed - UHCC

Wellington City Council

- Wellington Water Three Waters Assessment - Addendum Report (2020)
- Wellington Water Three Waters Assessment (2019)

6.3.3 Sustainable waters - supply and demand

Note further work is required to update this section.

Demand forecasting is important in the context of identifying future source, treatment plant and targeted network upgrade requirements. In combination with demand management, which has the proven ability to result in deferral of capital works, these can be very powerful tools which when delivered on also bring environmental benefits.

Sustainable water demand management mates to our stewardship of water and WWL's position on Te Mana o te Wai, managed in partnership with Mana Whenua: prioritise the health and wellbeing of water first, the second priority is the health needs of people, and the third is the ability of people and communities to provide for their social, economic, and cultural wellbeing.

I.

Assessments of demand – drivers forecasting and management are provided in this section. This should be read in conjunction with Section **Error! Reference source not found.** Error!

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Water Supply Wellington's water supply system relies on river flows that are supplemented by an aquifer and some lake storage as backup – see Figure 6-6. Available water exceeds water consumption for most of each year. However, dry spring and summer conditions can raise potentially serious water shortage concerns. This will only increase as climate change continues to be an issue, and the need for another treatment plant for operational resilience in case one plant is off-line.

Sustainable water supply and demand by 2030
Progress towards this priority must begin the in the next three years if the region is to meet the water supply demand for current and future communities

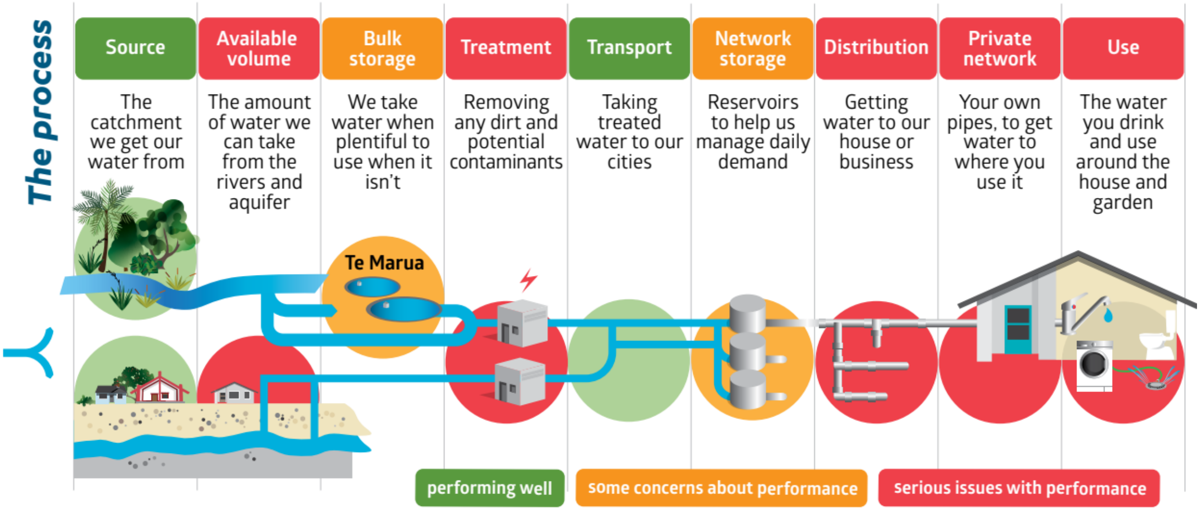

Figure 6-6: Water supply - sources to end use

Three Waters Demand Drivers

The demand drivers associated with each strategic priority / challenge are summarized in Table 6-4. More information on each strategic priority and demands can be found in this AMP**.**

Table 6-4: Strategic priorities and associated demand drivers

Priority / challenge	Demand driver
Looking after existing infrastructure	• Customer expectations • Increasing operational costs • Weather patterns • Population growth • Technological change • Central and local government policy • Asset condition
Supporting growth	• Population growth influencing drinking water and wastewater capacity requirements • Land use changes • Hydraulic neutrality • Development intensity
Sustainable water supply and demand	• Resource availability • Population growth • Central and local government policy • Customer expectations
Improving environmental water quality	• Central and local government policy • Land use changes • Customer expectations
Net carbon zero	• Central and local government policy • Customer expectations • Sea level rise
Reducing flood risk	• Central and local government policy • Customer expectations • Sea level rise • Hydraulic neutrality • Development intensity
Seismic resilience	• Population growth • Technological change • Asset condition
Firefighting water supply	• Population growth • Land use changes • Development intensity

6.3.3.1 Assessment of demand

Demand forecasting – water supply

The historic utilisation profile – see Figure 6-7**Error! Reference source not found.,** demonstrates that there is a progressive upward trend in production water use at the point of supply.

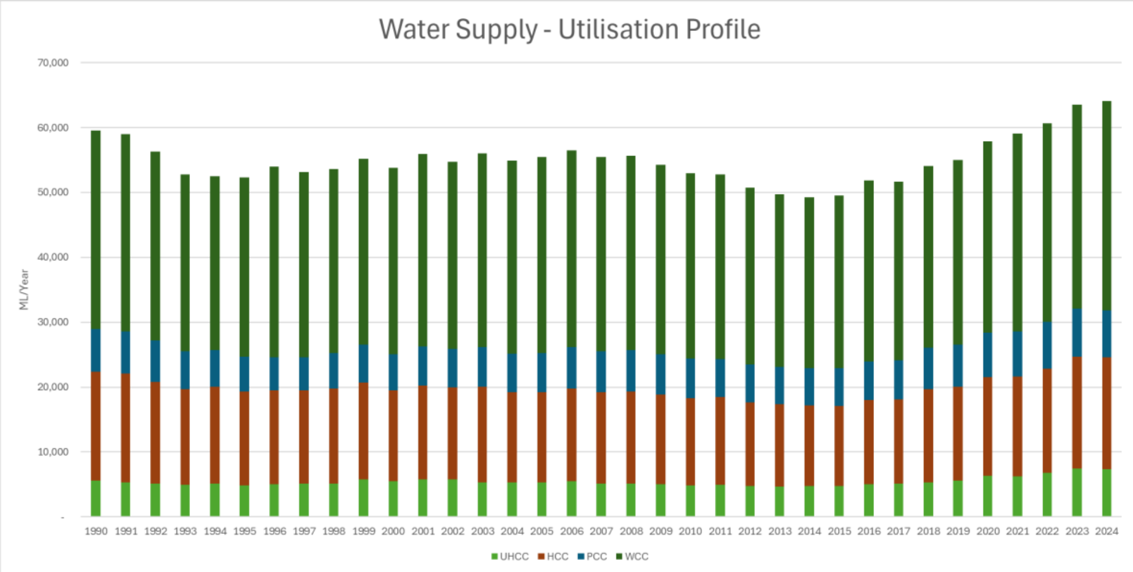

Figure 6-7: Water supply - utilisation profile

Notes.

i) bulk water at the point of supply to each Shareholder Council,
ii) maximum annual volume consented is 146,183 m3/year.

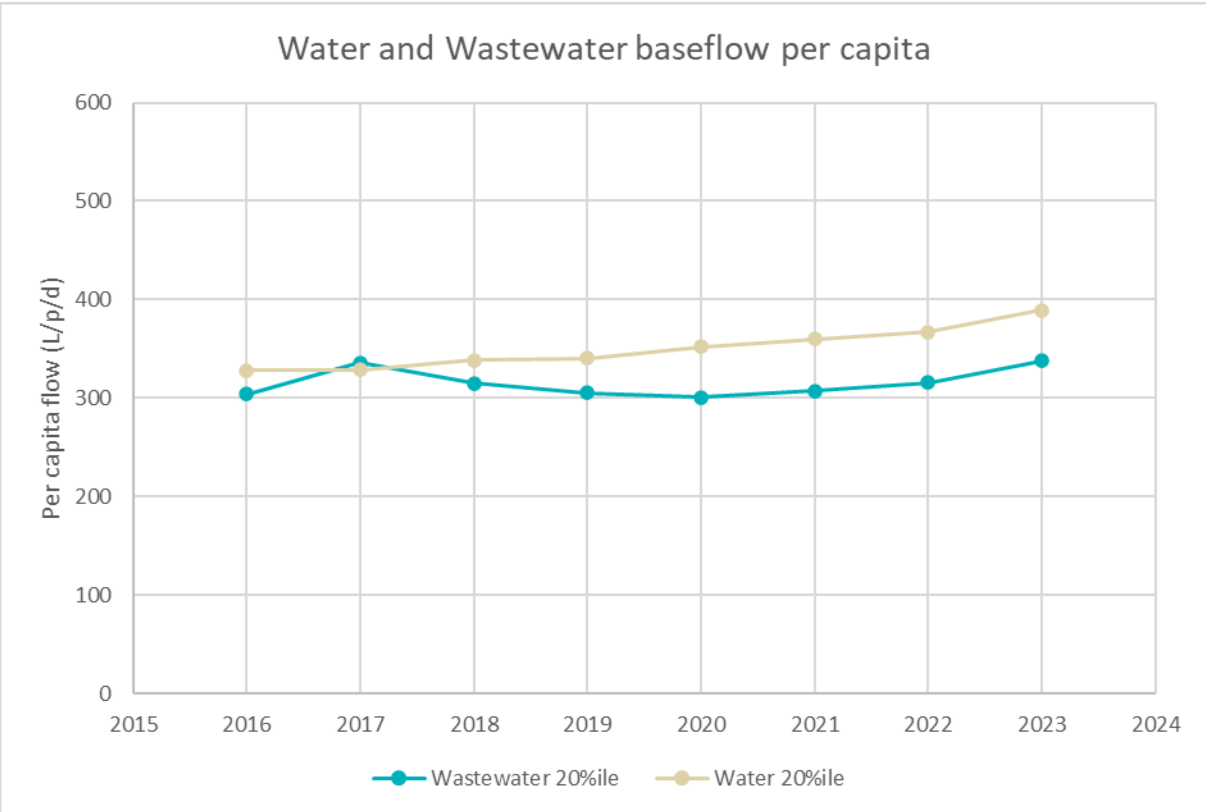

Figure 6-8: Water supply - per capita baseflow trends (including wastewater)

Demand forecasting - wastewater

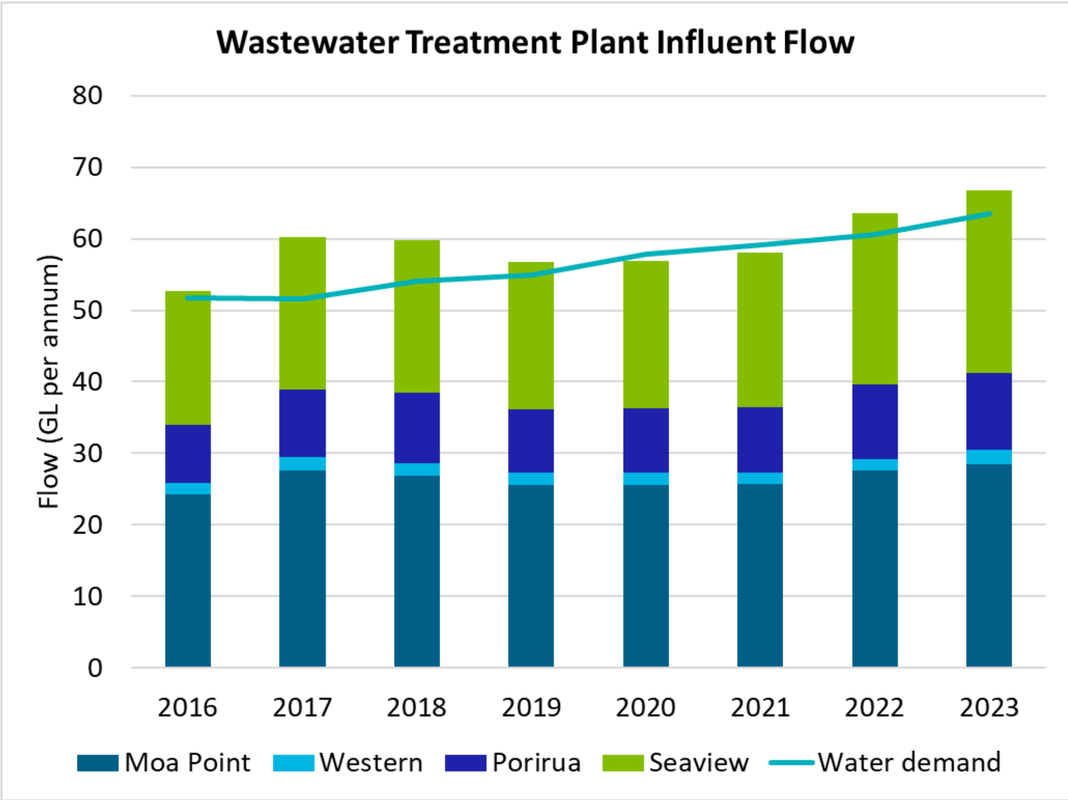

Figure 6-9: Wastewater treatment plant - utilisation profile

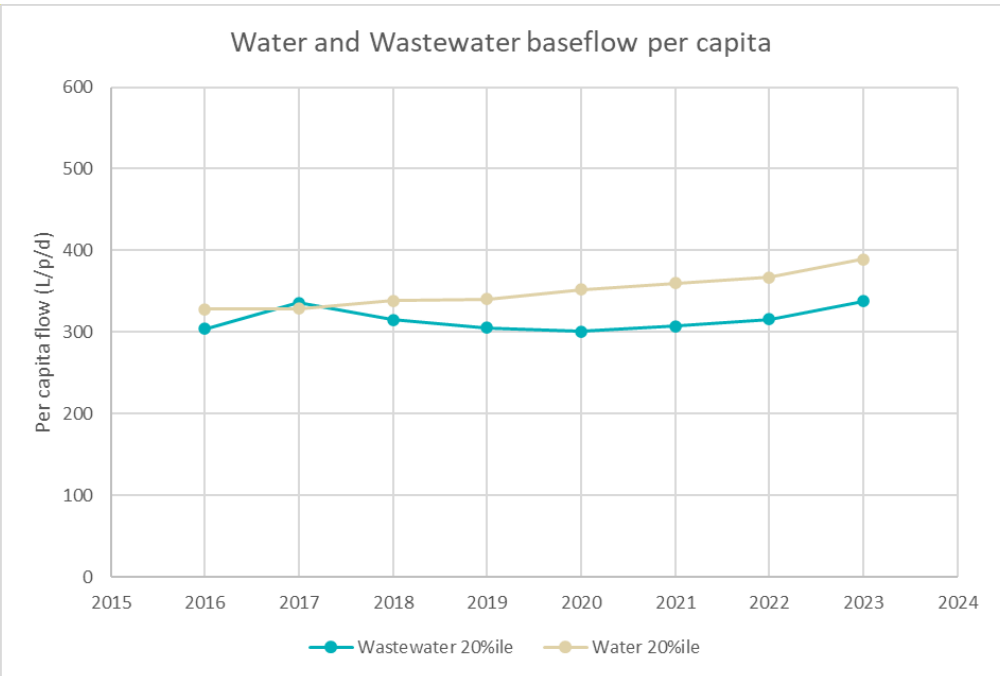

Figure 6-10: Wastewater - per capita baseflow trends (including water supply)

Demand forecasting - stormwater

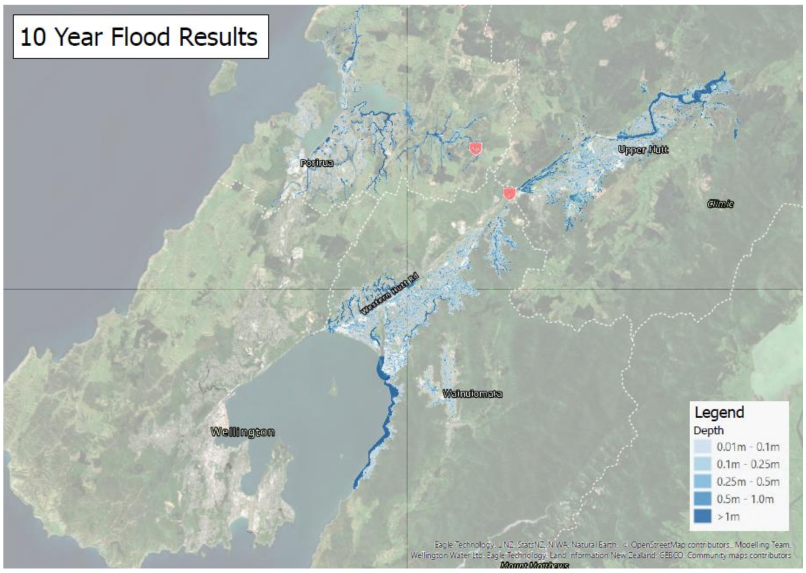

Figure 6-11: 10 Year Flood Events - Modelled Extent

6.3.3.2 Why this is a challenge

It is vital that there is enough water for everyone in the region. The Wellington CBD is currently facing a considerable water supply challenge. Wellington catchments are fully allocated, demand is high and growing and the network is close to maximum capacity. With climate change, sea level rise and a potential reduction in water distribution over time, WWL's ability to deliver expected services is becoming increasingly strained.

Upgrades to Te Marua WTP in 2024 and network leak management has reduced the risk of breaching targeted level of service, but WWL remains at risk of being unable to avoid enacting the summer water shortage protocols if a drought occurs. While this is very important and timely, to meet growth beyond this point, either a reduction in demand, a major supply upgrade or a combination of both is necessary – see Figure 6-12.

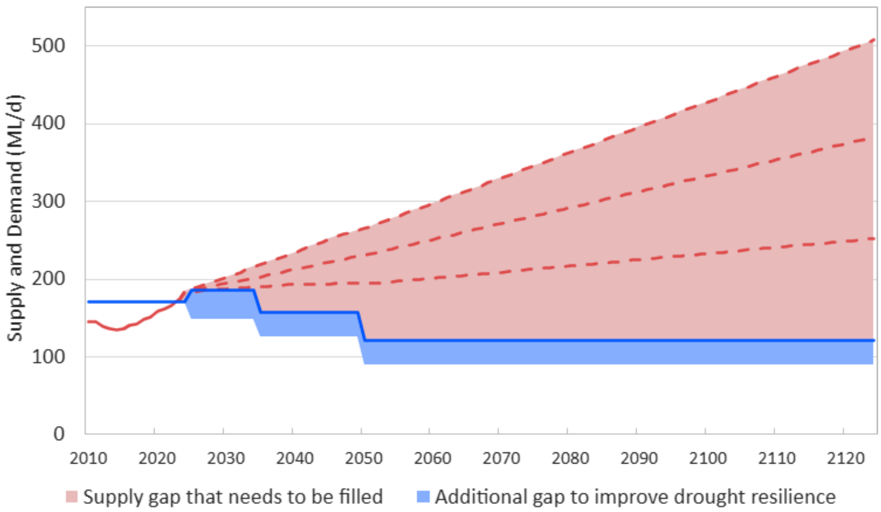

Figure 6-12: Elements of a sustainable water supply

Source: Wellington metropolitan bulk water and wastewater (2024)

6.3.3.3 Population growth and demand projections

Note further updates are to be applied to this section.

The population is growing at a rate consistent with expert predictions. There is some uncertainty, however e.g., economic factors. In the short-to-medium term, the expectation is for the current high growth trend to continue.

Water demand projections for the Wellington region were developed from population projections and estimates of future per capita demand, with a range of scenarios reflecting possible outcomes e.g., gradual improvements leading to efficiency gains or a step reduction from residential metering see Figure 6-13 (historic and predicted demands).

The peak capacity of the network is around 220 ML/d; however, demands greater than 210 ML/d become increasingly difficult to meet. The level of per capita demand reduction achieved in the next 5-10 years is critical to offset the impact of growth and reduce the risk of supply shortfall.

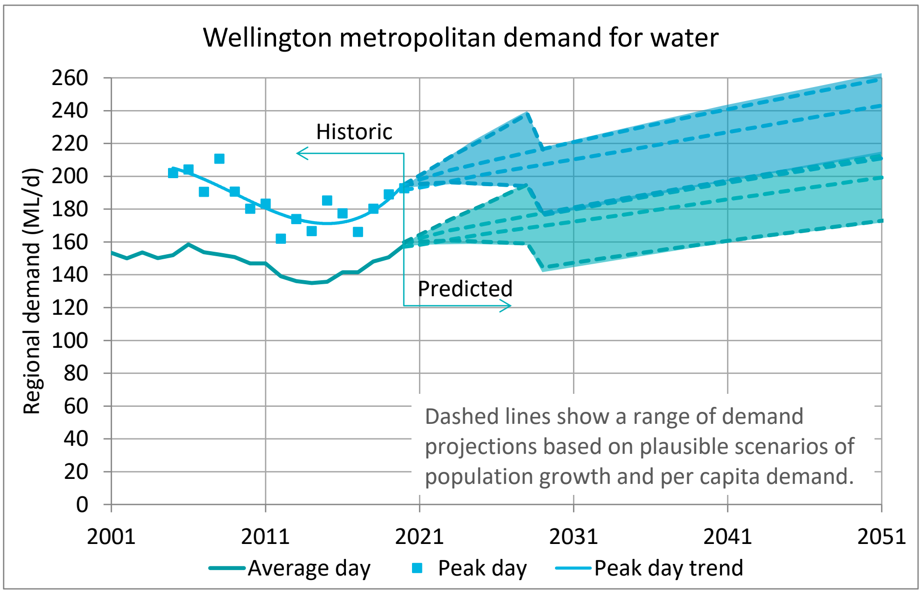

Figure 6-13: Water supply - historic and predicted demand profiles

6.3.3.4 Water supply - network performance

An assessment of network capacity against the high growth population projection was conducted to understand how network performance is expected to deteriorate in the short term (see Table 6-5Error! Reference source not found.). The assessment was completed using the Sustainable Yield Model – a water supply strategic planning tool developed in partnership with NIWA (National Institute of Water and Atmospheric Research). The assessment used a gross regional per capita demand of 374 L/p/d, which assumes the current increasing trend does not continue (i.e., from improvements in network efficiency).

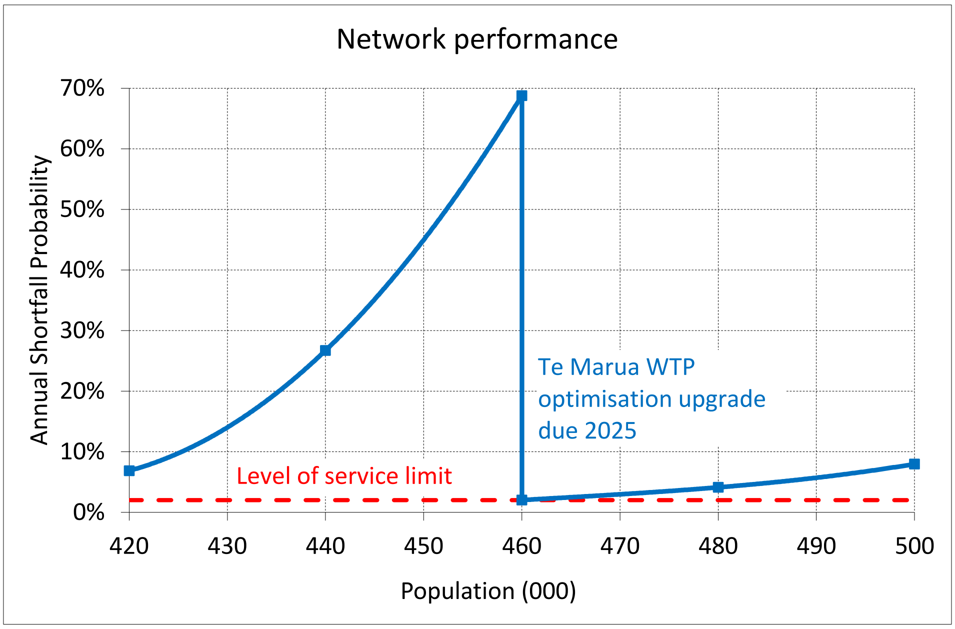

Table 6-5. Drought resilience performance with increasing population

The cause for rapid deterioration in network performance is due to limited treatment plant capacity. This means even a small increase in unrestricted demand above the current level will be difficult to meet until the Te Marua WTP upgrade is completed.

6.3.3.5 Wastewater - Network Performance

Note the data is to be provided for this section.

6.3.3.6 Stormwater - Network Performance

Note the data is to be provided for this section.

6.3.4 Managing Demand

Note the data is to be provided for this section – statements on the three waters demand management programme including funding.

Water Supply. WWL has identified that Shareholder councils can manage demand through installation of water meters, and investment in piped network renewals. Renewals investment at an annually increasing rate of 30% per year to 2030 is achievable by WWL.

Shareholder councils have identified through their 2024-2034 LTPs the funding for demand management – refer RSP Part 3.

Wastewater WWL provided advice to Shareholder Councils in 2024 that investment in network renewals would support a reduction in inflow and particularly infiltration of stormwater from properties and stormwater systems and groundwater through defects in brittle gravity pipes.

Stormwater Climate change projections point to increased intensity in rainfall events, which can then overwhelm piped and open systems designed against historic rainfall patterns i.e., are now increasingly likely to be under capacity.

WWL has identified stormwater system improvements such as those in HCC, and recommended that investment is provided.

6.3.4.1 Risks to Level of Service

Without reducing water consumption, WWL's customers will continue to experience the following:

- More water usage constraints
- Investment in water storage (i.e., reservoirs) being inflated in order to match high rates of demand
- Higher risk of not being able to supply sufficient drinking water with increasing population

6.4 Three waters - improving environmental water quality

Improving environmental water quality by 2040
It takes a long time for streams to degrade and a long time for them to restore; start the investment now to meet target timelines.

Our urban areas' reliance on water is fundamental for our cities. In providing essential water services, Wellington Water draws water from aquifers, streams and rivers, and discharges stormwater and treated wastewater (sometimes untreated wastewater) back into rivers, streams, coastline and harbours. Improving the health of the region's waterways is increasingly important to communities and the reputation of Wellington Water. The factors that impact the quality of our waterways through the stormwater and wastewater systems we manage are complex, and many of these factors are outside the control of Wellington Water. That being the case, we nonetheless understand that Wellington Water is a critical contributor to water quality. It is also evident that the state of our waters is not meeting community or government expectations.

6.4.1 Why this is a challenge

6.4.1.1 Funding and resources

The Improving Environmental Water Quality Programme has limited funding over the next three years, and our challenge is to make best use of the available resources. Bringing activities under the Environmental Water Quality Programme will provide visibility and alignment across Wellington Water and councils. Better coordination and collaboration will be necessary to ensure we do not duplicate or miss opportunities to leverage initiatives, such as work being undertaken for the Stage 1 Global Stormwater Consent.

6.4.1.2 Consistency and trust

The way WWL has responded to the community's water quality concerns is not consistent, and has led to differing approaches (e.g., Titahi Bay (reactive communication) and Owhiro Bay (multi-party)). As a result, we may miss opportunities to build trust with our communities and communicate the activities we are already implementing that contribute to improved water quality. Without trust, the timeframe to influence behaviour change within the community, especially the behaviour of other contributors to the stormwater system, will be greater.

6.4.1.3 Wastewater and stormwater management approach

The existing approach to wastewater and stormwater management has been influenced by historic practices that address historic public health and flooding concerns but fails to resolve current environmental issues and community expectations. Connected to this is the behaviour and practices of our communities. Improper waste discharges and misconnections are affecting both downstream communities and the environment. Contributing to this is an ageing and leaking network that is causing wastewater infiltration into the stormwater system, and stormwater infiltrating the wastewater system leading to wastewater overflows.

6.4.1.4 Current state of receiving waters

The receiving environment includes the waterways that are used for discharging into and taking water from. For Wellington Water, that is open and piped streams, the Hutt River and Wellington and Porirua harbours and coastline. Figure 6-14**Error! Reference source not found.** illustrates the factors that affect water quality in a receiving environment.

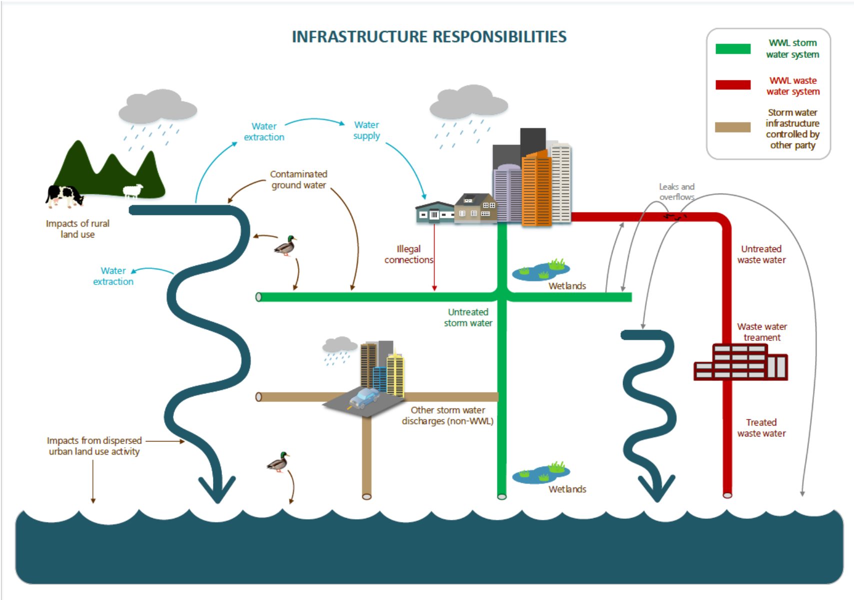

Figure 6-14: Wastewater and stormwater discharges (ownership and responsibilities)

The current state of our receiving waters is generally poor and is described further under the following attributes:

- **Ecological** health of rivers, streams, and harbours due to runoff from roads and urban land, leaks and wet weather overflows from wastewater pipes and contaminated groundwater.
- **Aesthetic** state of water (look and smell) from algal blooms, sluggish and smelly oxygen-starved streams, plastics and floating debris and staining from leachate.
- **Human health** is at risk when entering waters that are not safe to swim in due to sewage contamination, causing skin infections and physical illness.
- **Water's taonga status** is disregarded, with the life-giving and life-supporting qualities of water within Te ao Māori threatened. In its current state, water cannot support the cultural or recreational functions that Māori expect.

- **Communities are disconnected** from water, which means there is little sense of kaitiaki, or ownership, and people cannot see the state of the water or consequences of their behaviour.

6.4.2 Legislative links

6.4.2.1 National Policy Statement for freshwater management

The National Policy Statement for Freshwater Management (NPS-FM) provides local authorities with updated direction on how to manage freshwater under the Resource Management Act (RMA) 1991. It includes requirements such as improving degraded water bodies, identifying target outcomes for fish abundance and monitoring and reporting annually on freshwater. The NPS-FM recently set targets for 2040, which are likely to be higher due to the Whaitua process (see paragraph below). Performance targets need to be identified now so Wellington Water is able to measure our success. The non-mandatory measures we are currently proposing as regional key performance indicators do not reflect the NPS-FM targets and are as follows:

- Percentage of days during the bathing season (1 November to 31 March) that monitored beaches are suitable for recreational use.
- Monitored sites that have a rolling 12-month median value for *E. coli* (dry weather sample) that do not exceed 1,000 cfu/100mL.

By adopting these targets, Wellington Water could miss opportunities to influence how other contributors interact with the stormwater system we are responsible for. In addition, the NPS-FM has set initial targets for primary contact for human health and have defined the attribute parameters for ecosystem health. Wellington Water controls the stormwater network and can therefore directly impact human health. The challenge is that we can only influence the behaviour of the contributors concerning ecosystem health.

6.4.2.2 Te Mana o te Wai

Te Mana o te Wai is a concept that refers to the importance of water and recognises that protecting the health of freshwater protects the health and well-being of the 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. Te Mana o te Wai is relevant to all freshwater management and not just to the specific aspects of freshwater management referred to in the NPS-FM. It provides stronger direction on how Te Mana o te Wai should be applied when managing freshwater and establishes national direction for regional councils to put in action through their regional policy statements and plans.

Te Mana o te Wai follows a hierarchy of obligations that prioritises the health and well-being of water first, then the health needs of people (drinking water) and the ability of people and communities to provide for their social, economic and cultural well-being. Regional councils must apply these obligations when undertaking the NPS-FM through six principles: mana whakahaere, kaitiakitanga, manaakitanga, governance, stewardship and care and respect. By actioning and implementing the hierarchy of obligations and six principles, regional councils and Wellington Water will realise Te Mana o te Wai.

6.4.2.3 The whaitua process

The Wellington region is divided into five whaitua (catchments or spaces) with each assigned a whaitua committee to develop a programme to improve water quality, with the intent to shape future policy. This integrated approach to water management recognises the value of Ki Uta Ki Tai (from mountains to sea), the interconnectedness of nature, and sees the whole path of water, from mountains to sea, as something to be sustainably managed. This process is community-led, and the committees will need to understand the ways whaitua communities use and value water, where the problems are and how locals want to deal with those issues. The challenge will be managing committee and community expectations concerning policy targets and measures for success.

6.4.2.4 Proposed natural resources plan

To give effect to the NPS-FM, GWRC are requiring global consents and strategies for stormwater management through the proposed Natural Resources Plan (PNRP), which replaced the five operative plans for managing the coast, soil, discharges to land, fresh water and air. It was produced by the Wellington Regional Council in accordance with the RMA Act 1991. It provides the objectives, policies and methods for using the Wellington region's resources, such as reducing open fires in urban areas, protecting habitat for native animals and fencing waterways on farms. A particular focus is on protecting the mauri, or life-giving properties, of the region – specifically the mauri of fresh and coastal waters. The Plan requires that all water quality is maintained or is improved to provide for aquatic ecosystem health and for Māori recreational and cultural use. Following the PNRP and meeting its objectives will help improve water quality and receiving waters.

6.4.2.5 Resource Management Act 1991

The environmental regulatory framework governs where our water comes from, where waste and stormwater discharges, our structures and physical works. At present, it is going through extensive change that is creating high costs and uncertainty. In 2019, case law expanded upon the RMA's prioritisation of environmental outcomes over the development and operation of infrastructure, even when that infrastructure is necessary under other legislation. The Courts are clear that environmental outcomes such as 'no wastewater discharges to freshwater' must be achieved regardless of the cost and difficulty for required infrastructure projects. Rules and resource consent conditions must be complied with or Wellington Water will face environmental action and loss of confidence and trust.

Resource consent applications must be well managed to ensure they achieve the outcomes sought by councils and Wellington Water. This will require a high level of oversight with consent applications, fulfilment of conditions, ongoing monitoring of conditions and improved capability and gathering of evidence to support future applications.

6.4.2.6 Global Stormwater Consents

The strategy for managing stormwater discharges from local authority networks aims to achieve a progressive reduction in the negative effects of stormwater discharge to fresh and coastal water. This will be done in two stages: Stage 1 is gathering information about the effects of stormwater discharges over five years, and Stage 2 is implementing a longer-term action plan to achieve the identified improvements – see Table 6-6. The strategy includes a global approach to managing stormwater discharges across cities or districts.

Table 6-6: Two stage global stormwater consents

Stage 1	
Years 1-5	Monitoring to identify the negative effects from the stormwater network
	Review and update of a Stormwater Monitoring Plan annually
	Management of acute effects on human health
	Development of a Stormwater Management Strategy to prioritise progressive improvements under Stage 2
Stage 2	
From Year 6	Implementation of a Stormwater Management Strategy to meet water quality objectives
	Reducing impacts of untreated wastewater on fresh and coastal water
	Improving existing stormwater and wastewater infrastructure

Source: https://www.gw.govt.nz/stormwater-3
*PNRP water quality objectives, including whaitua specific objectives, also feed into Stage 2

6.4.2.7 Stormwater Working Party

Wellington Water's Network Management Group (NMG) and Network Strategy and Planning (NS&P) Group are currently establishing a stormwater working party to meet consent requirements under the Stage 1 Global Discharge Consent. The party will include representatives from iwi, councils, regional public health and GWRC (regulation and environmental science teams). The working group will review the annual stormwater monitoring report from NMG and assist in developing the stormwater management strategy with NS&P. The first meeting was scheduled in April 2021.

6.4.3 Wellington Water's response

WWL has provided a capex and opex programme that will contribute to improving water quality. These will come under the Improving Environmental Water Quality Programme to ensure alignment and sequencing of activities. A more disciplined and coordinated approach will be required, however (e.g., project plans that clearly identify the service goals, project scope and outcomes). As the programme develops, Wellington Water will consider prioritising projects based on the primary/secondary service goals and/or expand to include activities such as the renewals programmes where environmental water quality might not be a primary or secondary service goal.

Wellington Water currently performs water quality monitoring of the network to understand how the network is performing and to meet consent requirements. This monitoring identifies levels of *E. coli*, cross connections and broken pipes. A large portion of monitoring occurs near recreational sites, treatment plant outfalls and stormwater consent sites.

While councils own (and Wellington Water operate and maintain) 580 km of lateral pipelines, there is almost the same length in private ownership. Those pipes and connections are inspected during building consent, but over time the pipes age and start to deteriorate and modifications get made to the connections into those pipes or the ground around those pipes. Table 6-7 illustrates some of these issues.

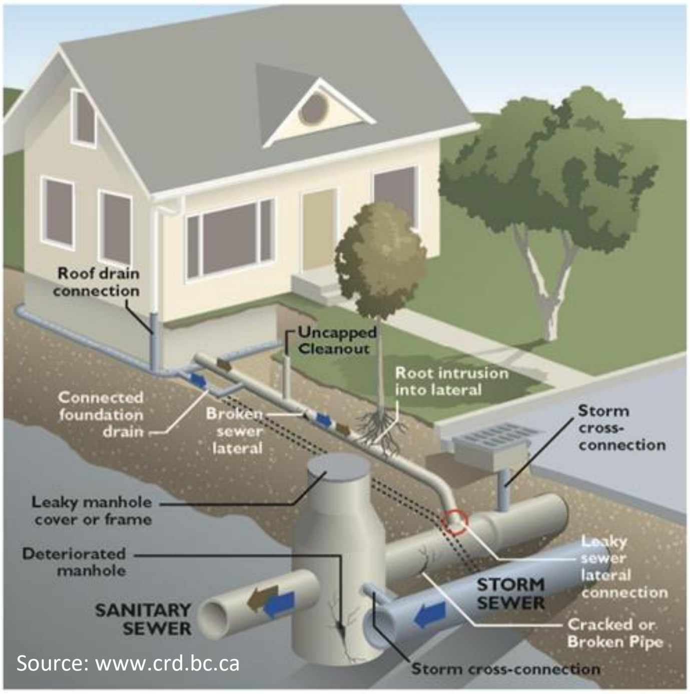

Table 6-7. Private ownership pipe issues

Wellington Water is currently implementing the *Knowing your pipes* project to reduce the amount of wastewater that goes into the environment before it is treated. It is also to help property owners identify issues before they become too big or expensive to fix on their own. Several tools are being used depending on the property:

1. **Water sampling:** obtain a baseline of the quality of water at the start of the project and target areas with the worst contamination.
2. **Visual inspections:** identify issues or faults such as broken gully traps or draining surface water; between 5 to 10 percent of properties with faults can be identified visually and fixed for a nominal cost.
3. **Smoke or dye testing:** identify major pipe faults and pipes that are misconnected between stormwater and wastewater.
4. **Closed-circuit television (CCTV):** assess pipe conditions using video cameras.

If an issue or fault is identified by Wellington Water, the property owner will be notified by letter of the type and need for repair. Follow-up inspections will be carried out to confirm appropriate repairs have been made.

Additional projects Wellington Water is working on to improve environmental water quality in the region:

- Human Health Mitigation project will identify chronic sources of pollution that may result in acute human health effects and then define and implement appropriate actions to mitigate these effects.
- Healthy Waterways project will improve our water quality by targeting the source of contamination (wastewater connected to stormwater and vice versa)
- Capital Renewals project will improve our wastewater network performance by identifying pipes that are likely not functioning efficiently and may fail if not replaced

- Critical Asset Condition Assessment workstream (attached to the MCAR programme) will inform our planning for future renewals and maintenance work by assessing the condition of critical pipes
- Network improvements to reduce sewage overflows
- Renewals using government stimulus funding
- New wastewater storage tanks to reduce frequency and severity of network overflows
- Upgrades to WWTPs (UV, hydraulics)

Our WWTPs provide water that is safe enough to put back into the environment. These are large community investments that require ongoing renewal and improvements to ensure adequate capacity is available for growing populations and the standard of treatment meets community and regulatory expectations. Wellington Water have combined the region's four WWTPs into a single contract to look after day-to-day operations and ensure a consistent level of service across the region. Any proposed capital expenditure to improve outcomes or reduce costs comes to us first for approval to confirm alignment with Wellington Water goals customer expectations.

6.4.3.1 Future state

Communities are a key part in our future state, as are Wellington Water, councils, and the need to do things differently. Decisions are made in a regulatory environment with a wide range of influences that impact Wellington Water’s activities and urban development. In the future state, we will make decisions in the best interest of our communities and achieve legislative intent. Developers and planners will be incentivised to build water sensitive infrastructure. We aspire to a future state where the water network is protected from contaminants, not just from changing behaviour or improving filtration, but addressing problems at the source. The future state will be supported by legislation and regulation that will help us achieve this.

Infrastructure, whether provided by Wellington Water or others, will be fit-for-purpose. We will have re-thought our management approach, taking a “whole-of-system” view and implementing ideas like water sensitive urban design to achieve these outcomes and with carbon neutral water services. Our approaches will need to be responsive to risks and issues, practical in our choices, feasible and financially viable for the communities they serve.

6.4.4 Risks to Levels of Service

If we don’t improve the environmental quality of our water, we will continue to experience the following.

- We will not be able to comply with water quality standard targets by 2040
- An increase in the number of non-swimmable days
- Increased risk of consent non-compliance
- Customer satisfaction will decrease

A key risk to the success of the programme is the level of community expectation. A successful engagement approach is key to managing this risk.

6.5 Three Waters - Net Carbon Zero 2050

Net carbon zero by 2050
Reducing carbon emissions usually comes with reducing cost; however, there are several activities to do first to ensure we align investment.

Our activities are entirely dependent on the climate and its impact on the environment. Wellington Water relies on consistent and sufficient rainfall to supply water to our customers; we return used and treated water back into the environment; and we capture and remove rainfall from developed areas to avoid or mitigate flooding. In delivering our services, Wellington Water must consider how our activities are impacting the climate (sustainability of our services) and how a changing climate could impact on us (changing how we deliver our services). Wellington Water must also get the right balance between building more infrastructure and reducing waste and high resource consumption. We need to reduce the speed and extent of climate change and adapt our services to ensure they are resilient to the changes that occur.

Greenhouse effect and global warming

The greenhouse effect is when greenhouse gases trap heat in the earth's atmosphere and, depending on the amount, cause a significant impact on the global climate. The rapid increase in human caused greenhouse gas emissions from burning fossil fuels for electricity, heat and transportation is increasing global temperatures. The impacts of global warming threaten the sustainability of the environment and its ecosystems.

NIWA modelling has projected that annual temperatures in the Wellington region could increase by up to 1°C by 2040, and 3°C by 2090. The potential for longer, hotter and drier weather is also expected to increase. Global temperatures are already more than 1°C warmer than pre-industrial revolution levels.

An increase in major storms and coastal erosion are also expected, in conjunction with sea level rise. This will be a particular problem for low-lying areas such as Petone and Seaview. A coastal vulnerability assessment was undertaken by GRWC for the entire region (except Wellington City who performed their own assessment) and identified Porirua, Pauatahanui, Seaview and Petone as the biggest risk.

6.5.1 Why this is a challenge

If we don't improve our mitigation of and adaption to the effects of climate change, we will continue to experience the following.

- We will not be able to meet carbon emission reduction targets by 2050 or those for biogenic methane by 2030
- Diminished public image if sector and community leadership position not leveraged
- Continued high cost of services related to resource use and recovery, and the link between traditional heavy infrastructure approaches and embedded carbon
- Water supply shortages due to the variability of supply and lack of storage
- Increased wastewater flows, overflows and environmental contamination
- Increased stormwater flows and impacts of flooding
- Decreased reliability of services due to the vulnerability of assets to sea level rise

6.5.1.1 Water supply service - climate change impacts

The main implication of climate change on our water supply services is water availability due to increases in risk of saline intrusion into the Waiwhetū aquifer and variable seasonal rainfall. The aquifer provides around 45 percent of the region's water supply (on average) and up to about 70 percent during dry summer periods. It runs beneath the harbour and is directly affected by the level of the sea water above it. Modelling indicates its water return may reduce by 30 percent under a scenario with 1.5m of sea level rise. Modelled scenarios also indicate that a significant increase in water storage (potentially five times current levels) will be necessary to accommodate supply fluctuations and forecast demand.

The changing climate will also impact ecosystems on and around surface water catchments (e.g., an increase in pest animals and plants, bush fires, algae blooms, etc.). This increased risk of contamination could make it more difficult finding safe drinking water and/or treating it. Potential impacts for drinking water include increased network leakage due to more extreme seasonal cycles in ground conditions and increases in summer demand due to extended dry periods (i.e., increased outdoor water use). Drinking water assets located in coastal areas exposed to sea level rise and coastal erosion will become more difficult to operate, maintain and will ultimately need relocation.

6.5.1.2 Wastewater service - Climate change Impacts

The expected implications of climate change on wastewater services will be the effects of increased rainfall intensity, temperature, groundwater levels and the relocation of services due to coastal erosion and rising sea levels. High intensity rainfalls already contribute to the frequency and extent of wastewater overflows due to the inflow of stormwater into the wastewater system (e.g., surface water entering low or damaged gully traps). This is only expected to increase.

Wastewater pipes below groundwater levels can be subject to infiltration where the pipes are not fully sealed. This is common due to ground movement, aged and failing rubber ring joints and construction defects. As groundwater levels in tidal areas rise with the sea levels, infiltration will increase across the region. Sea water in the wastewater system can also result in increased odour and corrosion. Higher water temperatures due to warmer temperatures overall could also contribute to increased odour and corrosion issues.

6.5.1.3 Stormwater Service - Climate Change Impacts

The most significant implication of climate change for all the Wellington region's water services is sea level rise and increased intensity of rainfall that produces flooding. This will be a particular problem for low-lying areas such as Petone and Seaview (NB: Gear Island DWTP and Seaview WWTP). A coastal vulnerability assessment was undertaken by GWRC for the entire region (except Wellington City who performed their own assessment) and identified Porirua, Pauatahunui, Seaview and Petone as the biggest risk.

We manage about 1700 km of stormwater pipes, which nearly all rely on gravity to drain water off streets and properties and into waterbodies and the ocean. In low lying coastal suburbs like Petone and Seaview, higher sea levels will reduce the stormwater network's ability to drain heavy rainfall. Rising sea levels will also raise groundwater levels, increasing rainfall runoff into the stormwater network by reducing the amount that can soak into the ground.

Another critical implication of increased intensity and frequency of rainfall is that capacity of the hydraulic network will be exceeded. Hydraulic modelling indicates that thousands of homes and businesses in the region will see an increase in flooding risk.

6.5.2 National and Legislative Dynamics

6.5.2.1 Climate Change Response (Zero Carbon) Amendment Act 2019

The Zero Carbon Act requires a reduction of net emissions of all greenhouse gases to zero by 2050 and a reduction of biogenic methane emissions by 2030. The Act establishes a framework where a series of five-year national emission budgets are created as milestones to reach the long-term target. The budgets are set by the Climate Change Commission, with the government expected to enact the policy actions to ensure the budgets are achieved.

The Zero Carbon Act also includes provisions that allow the government to require utilities like Wellington Water to report on climate change risks, adaptation plans and policies and progress against these upon request.

Climate Change Response (Zero Carbon) Amendment Act 2019 | Ministry for the Environment

6.5.2.2 Emissions Trading Scheme

Wellington Water is not currently required to participate in the ETS, and this is not expected to change after water reform. The ETS obligations for most of our emissions are the responsibility of upstream (electricity) or downstream (landfill) suppliers. The only emissions we are directly responsible for are the fugitive emissions from wastewater treatment. These are not included in the ETS, as there is no way to reduce these emissions or alternative technologies at this time. This could change in the future, however, as science and technology evolve.

6.5.2.3 National Adaptation Plan

New Zealand's first national adaptation plan contains strategies, policies and actions that will help New Zealanders adapt to the changing climate and its effects – so we can reduce the potential harm of climate change, as well as seize the opportunities that arise. Specific legislation is also expected to be introduced as part of the next round of RMA reform.

The plan was published in 2022; some actions in the plan were amended in January 2025 as part of the Government's response to the Climate Change Commission's national adaptation plan progress report. The Climate Change Commission will regularly monitor and report on the application and effectiveness of this Plan to ensure accountability.

Aotearoa New Zealand's first national adaptation plan | Ministry for the Environment

6.5.2.4 Paris Agreement (or Accord)

The Paris Agreement or Accord is a legally binding international treaty on climate change that was passed by 196 parties at the Climate Change Conference in Paris on 12 December 2015 (adopted on 4 November 2016). The agreement was to limit global warming to below 2°C (preferably 1.5°C) compared to pre-industrial revolution levels; each country was expected to set increasingly ambitious carbon emission reduction targets (known as Nationally Determined Contributions).

The Climate Change Commission's consultation document on its proposed budgets suggested a reduction of around 30 percent by early 2030. The Commission identified electricity as the greatest opportunity in reduction: electrification of the transport fleet and industrial process heat on the back of renewable electricity generation. New Zealand's first Contribution was to reduce greenhouse gas emissions to 30 percent below the 2005 levels by 2030.

At the last revision of this AMP, New Zealand was not on-track to meet its Paris Accord target. In January 2025 the Government submitted New Zealand's second Nationally Determined Contribution (NDC2), with an aim to reduce emissions by 51 to 55 per cent compared to 2005 levels, by 2035.

Nationally Determined Contribution | Ministry for the Environment

6.5.2.5 The National Greenhouse Gas Inventory

A greenhouse gas inventory informs action on climate change. Accurate emissions data are essential to understand current emissions and past trends, generate policy recommendations on climate change, and develop and monitor emissions reduction targets.

MoE manages the New Zealand Greenhouse Gas Inventory, covering all years from the base year (1990) to two years before it is due (the April 2024 inventory covers 1st January 1990 to 31st December 2022). Figure 6-15n depicts the national 1990-2022 Inventory snapshot, by industry type. The chart depicts a nett increase in nett emissions since 1990, and that Agriculture and Energy still lead the emissions table.

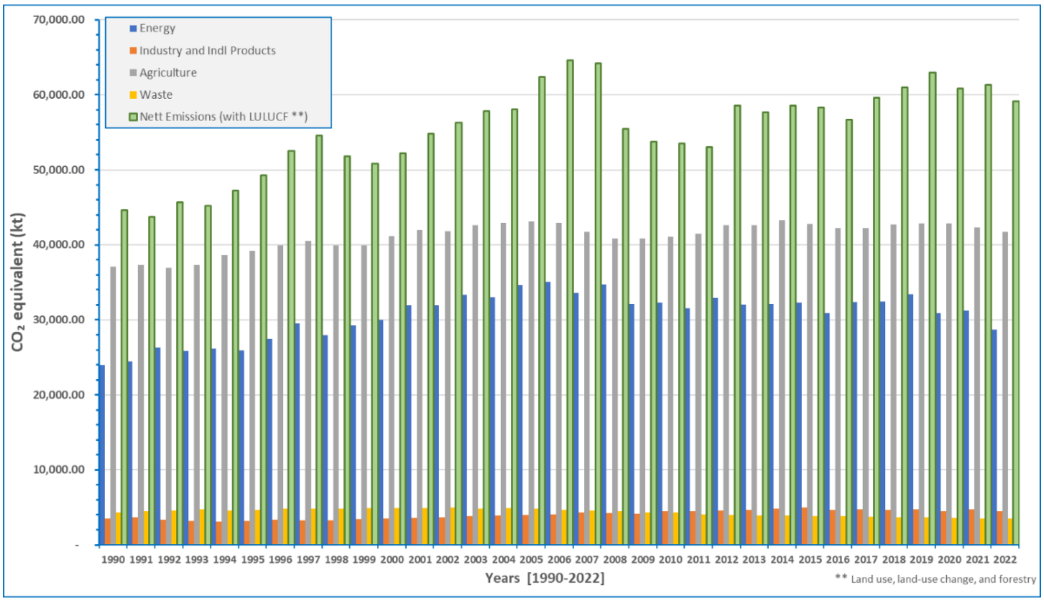

Figure 6-15: Emissions by Sector – New Zealand Greenhouse Gas Inventory (1990-2022)

Source: MoE website April 2024

6.5.3 Wellington Water's response

There are two distinct legislative approaches or 'systems' to climate change:

1. Mitigation: Reducing emissions to help reduce the impacts of climate change
2. Adaptation: Ensuring we are resilient to climate change impacts.

In this last triennium, Wellington Water's climate change mitigation system has developed in maturity, with a Carbon management programme based on PAS 2080 (PAS 2080:2023 Carbon Management in Infrastructure [BSI]). Example, advancing programmes addressing Capital and Operational Carbon are:

- Capital Carbon Baseline
- Capital Carbon Integration Programme
- Regional Emissions Reduction Roadmap
- Regional Biosolids Strategy.

6.5.3.1 Climate Change Mitigation

To mitigate climate change, we must consider the activities that generate emissions and the sources. The way the Climate Change Commission and government have approached this makes sense; we should follow this lead, as it will enable us to consider the consequences of the policy and regulatory changes that are necessary to achieve the lower emissions transition.

Figure 6-16 illustrates Wellington Water's climate change mitigation system. This aligns emissions with the Commission's categories (power, process heat, transport, etc.). There are also categories associated with inputs that we can control or influence – chemicals in the treatment process and emissions from our capital construction projects. Demand is another factor that must be considered; if there is no change in the way we undertake our services, our emissions will increase in proportion to population growth and demand increases on our services.

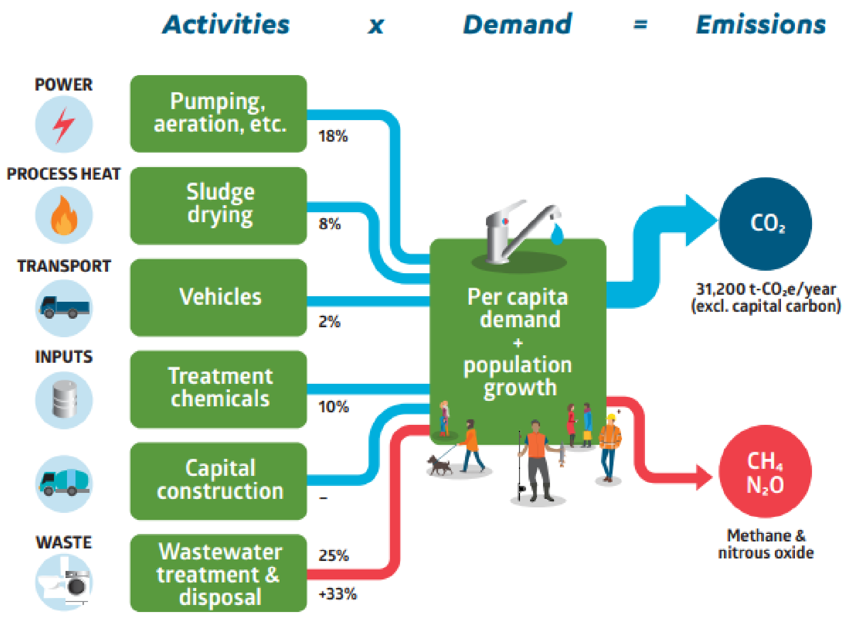

Figure 6-16: Wellington Water's activities in the context of its greenhouse gas emissions

In early 2019, Wellington Water completed a greenhouse gas emissions inventory from our operational activities using data from the 2017/18 financial year.

The inventory was revised and updated in 2020 to include emissions from wastewater treatment following updated international guidance on how this should be calculated.

In 2022, WWL updated the emissions inventory for operational and capital carbon for 2021/2022, using stimulus funding. Considered were the portion by which emissions were considered *direct*, and *indirect*, and to what extent this was expressed within each operational boundary (where WWL manages Council-owned 3W assets). Figure 6-17 and Figure 6-18 show the results from this inventory review, depicting both the portion by Council and by emissions type. The considered emissions classes are:

- Direct "Scope 1": direct emissions such as biogenic emissions from wastewater treatment processes and effluent discharge and natural gas consumption
- Indirect "Scope 2": indirect sources such as the purchase of electricity from the national grid
- Indirect "Scope 3": indirect sources such as deploying treatment chemicals and in landfill operation (including sludge disposal).

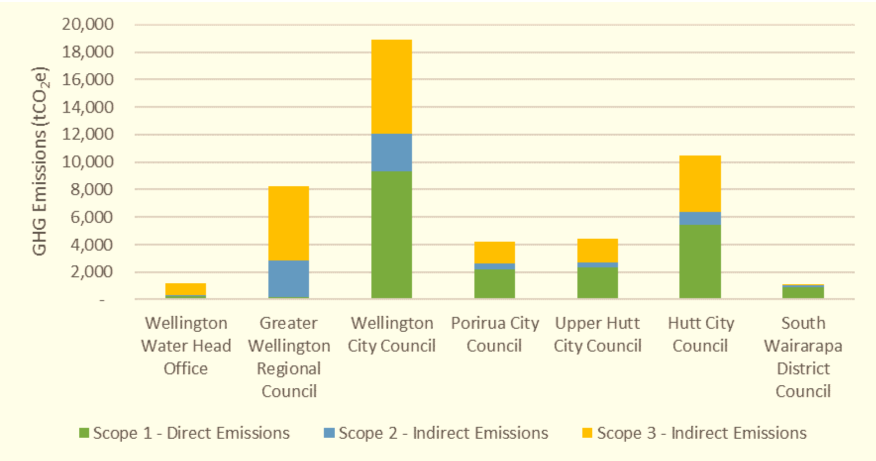

Figure 6-17: Operational greenhouse gas (GHG) emissions, by Council operational boundaries

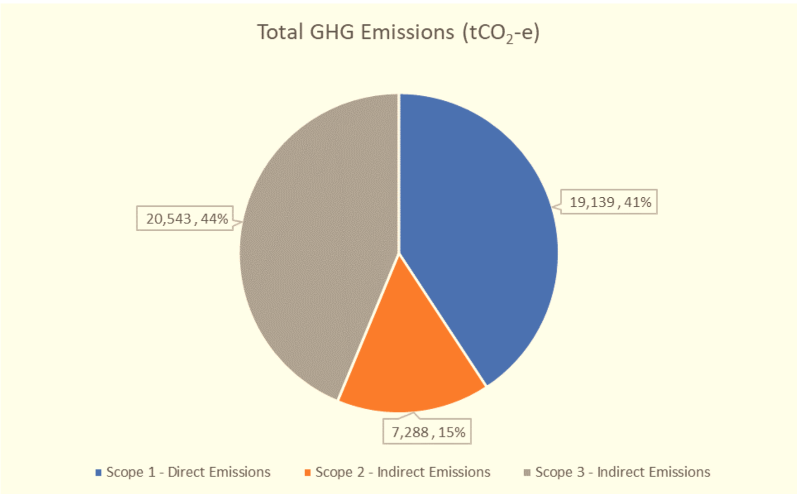

Figure 6-18: Operational greenhouse gas emissions, by emissions groups

Launched in August 2024 Wellington Water's Operational Carbon Audit Programme will establish a standardised, auditable process for reporting operational carbon emissions, in harmony with initiatives underway in the capital works sector. The programme aims to streamline the collection, analysis, and presentation of operational emissions data to meet ISO 14064 standards.

The programme's primary objectives include:

1. Standardised Reporting: a consistent, auditable emissions reporting framework.
2. Stakeholder Engagement: work closely with internal teams and councils to ensure alignment and input.
3. Baseline Development: create an emissions baseline for year-on-year comparisons.
4. Data and Tool Development: implement tools for efficient data collection, management, and ISO-aligned reporting.
5. Governance and Compliance: define roles and governance to ensure adherence to ISO standards.

6.5.3.2 Climate Change Mitigation

To mitigate climate change, Wellington Water have considered the activities that generate emissions and the sources, which was aligned to the Climate Change Commission's approach. The approach will enable us to consider the consequences of adopted policy, as well as regulatory changes, which are necessary to achieve the lower emissions transition.

Error! Reference source not found. illustrates Wellington Water's system of activities and so emissions measurement. This aligns emissions with the Commission's categories (power, process heat, transport, etc.). There are also categories associated with inputs that we can control or influence – chemicals in the treatment process and emissions from our capital construction projects. Demand is another factor that must be considered; if there is no change in the way we undertake our services, our emissions will increase in proportion to population growth and demand increases on our services.

Wellington Water launched the following objectives in LTP-21 and mitigation strategies for the identified greenhouse gas emissions; the following notes update WWL's position:

Based on these results, Wellington Water came up with the following objectives and mitigation strategies for the identified greenhouse gas emissions:

Fugitive emissions from wastewater treatment and methane emissions from landfilled sludge

> **Objective:** To understand the amount of emissions from our WWTPs and how we can influence these operationally and through investment. To use the energy and nutrient value of the sludge to reduce or avoid greenhouse gas emissions, including finding alternative beneficial uses for the product.
>
> **Mitigation:** Landfill sludge contains useful energy and nutrient value. Treated and stabilised sludge is commonly used as a source of biogas and as a fertiliser or soil conditioner in other countries. There is opportunity to revise the sludge treatment methodology used to reduce the volume produced and the transport required. There is a project already underway to reduce the volume of sludge being sent to landfill from the Moa Point WWTP.

Emissions from electricity consumption

Objective: To use electricity as efficiently as practicable, and to generate our own renewable electricity where economic.

Mitigation: New, larger-scale renewable generation is now lower in cost than conventional fossil fuels. This, in conjunction with policy measures like the impact of ETS, will see the amount of renewable generation increase into the future. This will mean that emissions per unit of electricity, and emissions per unit of water treated, will reduce over time.

Additional opportunities include:

- Converting sludge to biogas for generator fuel.
- Installing solar panels at treatment plants and pump stations.
- Reducing water demand under the sustainable water supply and demand strategic priority to reduce the amount of water needed for pumping and treatment.
- Fixing the wastewater system to make it more water-tight to reduce the risk of overflows and the amount of water needed for pumping and treatment.

Emissions from process heat

Objective: Where required, to obtain process heat from renewable fuels or electricity.

Mitigation: Changing the treatment plant configurations for a different heating source, replacing the entire sludge treatment process with a lower-carbon alternative or optimising performance of the existing dryer.

Emissions from process inputs (treatment chemicals)

Objective: To minimise emissions from water treatment by using products with low embedded carbon and optimise the chemical dosing process.

Mitigation: Reducing water demand under the sustainable water supply and demand strategic priority to reduce the amount of water needed for treatment.

Transport emissions

Objective: To use electric vehicles in our fleet where suitable models are available.

Mitigation: The availability of alternative fuel vehicles is currently limited but is changing rapidly. Both the Climate Change Commission and government have identified the conversion of fossil fuels to electricity as the greatest opportunity to reduce New Zealand's emissions. Policy measures are expected to make electric vehicles more widely available and cost effective. Electric vehicles can be phased in over time as existing vehicles reach end-of-life or end-of-lease.

Many other utilities (those in electricity) have begun shifting to electric vehicles, and several councils now have vehicle procurement processes in place to make electric vehicles the preferred option. This provides an increasing amount of experience with fleet conversions Wellington Water can draw upon.

Capital works programme

Objective: To consider whole-of-life carbon emissions when specifying, designing and building our capital construction projects.

Mitigation: Emissions from capital projects includes materials (i.e., concrete, steel, asphalt) and fuel/energy used during construction (i.e., diesel for truck and machinery); optimising carbon emissions on a capital project will result in lower costs due to minimising the amount of energy and materials used in construction.

There are often cost savings through alternative construction techniques, such as trenchless pipe installation. However, focussing on emissions at the start of a project, when outcomes are being defined, allows whole-of-life impacts (construction and operation) and the greatest opportunity for savings.

Reducing carbon emissions from the capital works programme will require changes from the entire project team, from designers and engineers through product suppliers. It will also require insight into the upcoming work programme and related emissions to different design methods and materials. This information is becoming more available, and we plan to baseline the expected emissions from our future work programme during the 2021/22 financial year.

6.5.3.3 Climate Change Adaptation

Modelling by NIWA has identified a range of potential regional impacts from climate change, including increasing temperatures and rainfall patterns (wetter wet's and dryer dry's). Figure 6-19 shows the climate change adaptation system and reflects the most significant expected climate impacts.

Figure 6-19: Climate change adaption system

Wellington Water came up with the following objectives and adaptation strategies for expected climate change impacts:

Adaptation to changing water availability

Objective: To understand and plan for the impact of climate change on our drinking water sources and supplies.

Mitigation: The Wellington region relies on consistent seasonal rainfall in its catchments. This means we store a low volume of water to get us through the summer when demand is at its highest and available supply from our surface water catchments is at its lowest. The risk is that changing climate increases the variability of rainfall into the catchments. It is important we plan for this increased variability (and increased demand) when developing our water supply strategy and planning. Our planning models have been specifically developed for us to consider scenarios with significant climate change impacts.

Adaptation to increased flows in the stormwater system

Objective: To understand and plan for the impact of climate change on our stormwater system.

Mitigation: Climate change is expected to increase the frequency and severity of high intensity rainfall, which can exceed the stormwater system's design capacity and result in property and roadway surface flooding. New developments are required to consider the impact of at least one metre sea level rise and a 20 percent increase in rainfall intensity, which should ensure they are designed to accommodate this risk. The ongoing development of our network hydraulic models is also enabling us to identify properties that are at risk.

Adaptation of coastal assets and services to sea level rise

Objective: To understand and plan for the impact of sea level rise on assets located in vulnerable coastal areas.

Mitigation: There is more than $400M of three waters assets in the wider Wellington region that are exposed to one metre of sea level rise, with another $250M of roads and other assets exposed, together with an unquantified but even more significant amount of private property. With this mix of public and private property and infrastructure risk, any decisions on how best to manage affected areas need to consider the current and future land use and be made by local councils in consultation with the affected community. It will be important that we can provide councils and the community with information on asset condition and the timing and nature of future interventions to help with this process.

For core assets such as treatment plants, pump stations and key pipeline networks, it is important Wellington Water understands the climate change risks and have plans in place to mitigate and manage these. These assets are often critical for services across the entire system and not just in the local, coastal areas.

6.5.3.4 Governance and oversight

Taking effective action to mitigate and adapt to climate change must happen across all areas of decision-making. The Taskforce for Climate-Related Financial Disclosures (TCFD) has provided the following guidance and good practice in this area -Figure 6-20.

- Institute regular reporting on vulnerability, risks and risk mitigation.
- Consider impacts and implications when making key decisions.
- Set emission reduction targets and monitor performance against those targets.

Figure 6-20: TCFD (disclosure) guidance on decision making

These recommendations have been captured in the Zero Carbon Act, clause 5ZW, which enables the Minister or Climate Change Commission to request utilities like Wellington Water to provide the following:

- Description of the organisation's governance concerning risks of, and opportunities arising from, climate change.
- Description of the actual and potential effects of the risks and opportunities on the organisation's business, strategy and financial planning.
- Description of the processes that the organisation uses to identify, assess and manage risks.
- Description of the metrics and targets used to assess and manage the risks and opportunities, including, if relevant, time frames and progress.
- Any matters specified in regulations.

6.5.3.5 Outlook for LTP-24 (Triennium 2024-27)

Priority settings for LTP-24 favour service delivery resilience and managing the backlog in asset replacement, with allowances for growth. The directives of period 2021 thru 2024 were to baseline Carbon emissions, with a firm basis of understanding in Capital Carbon, and to set measurable targets for improvement. However, in the lead-in to LTP-24, WWL was not able to acquire from client councils their Carbon targets for three waters infrastructure; councils have focused on other more tangible emissions sources such as transport (public transport), the airport, and waste disposal (landfill management).

The following figures summarise progress in each portfolio during the first triennium of LTP-21, and outcomes achievable under the intent of this Long-Term Plan.

CAPITAL	21-24 LTP	24-27 LTP
Inventory	Completed Baseline in 2022.	*none planned*
Targets	*none set*	*none set*
Actions	Identified hotspots; established Carbon Integration Programme (CIP).	Continue with CIP.
Monitoring	*ad hoc*	*at project level*
Reporting	SLT Quarterly Report, did not include emissions data.	SLT Quarterly Report with emissions data.
Reduction	*ad hoc*	*ad hoc*

Figure 6-21: Outlook for Capital Carbon Programmes on Review of LTP-24

OPERATIONS	21-24 LTP	24-27 LTP
Inventory	completed Inventory in 2022	Planned yearly
Targets	*none set*	*none set*
Actions	Identified actions in roadmap.	some in Regional Biosolids Strategy.
Monitoring	*none*	Planned yearly
Reporting	ad hoc demands from each council including quaterly - inconsistent.	Planned yearly for councils
Reduction	*Unknown*	*unknown*

Figure 6-22: Outlook for Operational Carbon Programmes on Review of LTP-24

6.5.4 Risks to Level of Service

If we don't improve our mitigation of and adaption to the effects of climate change, we will continue to experience the following.

- We will not be able to meet carbon emission reduction targets by 2050 or those for biogenic methane by 2030
- Diminished public image if sector and community leadership position not leveraged
- Continued high cost of services related to resource use and recovery, and the link between traditional heavy infrastructure approaches and embedded carbon
- Water supply shortages due to the variability of supply and lack of storage
- Increased wastewater flows, overflows and environmental contamination
- Increased stormwater flows and impacts of flooding
- Decreased reliability of services due to the vulnerability of assets to sea level rise.

6.6 Three Waters – Seismic Resilience

Seismic resilience is best considered at a regional scale, given the interconnected nature of the metropolitan network. However, there are localised issues specific to each City Council that also need to be addressed.

6.6.1 Why this is a challenge

As in other parts of New Zealand, the Wellington region is susceptible to earthquakes due to the proximity of fault lines and the vulnerability of our regional infrastructure. Seismic resilience improvements are necessary across all three waters networks if WWL is to reduce the impact of major earthquakes.

More than 80 percent of our wastewater infrastructure is vulnerable under a major earthquake. As WWL progressively replaces pipes that are near the end of their expected service life, they are replaced using modern materials and installation techniques that are more resilient.

However, experience indicates additional asset-related risks to WWL's service delivery:

- Shifting built-environment standards for resilience – new build
- Recently constructed assets now considered non-compliant with standards
- A historic focus on accommodation (building) risk management, with less emphasis on mitigating issues with process equipment (especially rotating machinery) and supporting ancillary services (small-bore services, power, telecoms., etc.).

6.6.2 The regional seismic event context

In the Greater Wellington region settlements and their related infrastructure have developed in locations influenced by around twelve known fault lines. Figure 6-24 depicts the location of the related hazard areas in the metropolitan region.

In an event, the disruption to delivery of council services will extend beyond damage to assets (including reticulated services) to restriction of access for responders, limitation of access to components and consumables, and to skilled supporting personnel. Damage to drainage networks may influence contamination of the water supply network.

In addition to services supported by the national Civil Defence programme, and with local facility WREMO, "Lifeline Utilities" coordinate through the Wellington Lifelines Group (WeLG) of which Wellington Water and its client councils are members. WeLG facilitates discussion on hazard identification and risk reduction measures for Wellington's infrastructure and understanding of the interdependencies between infrastructure organisations.

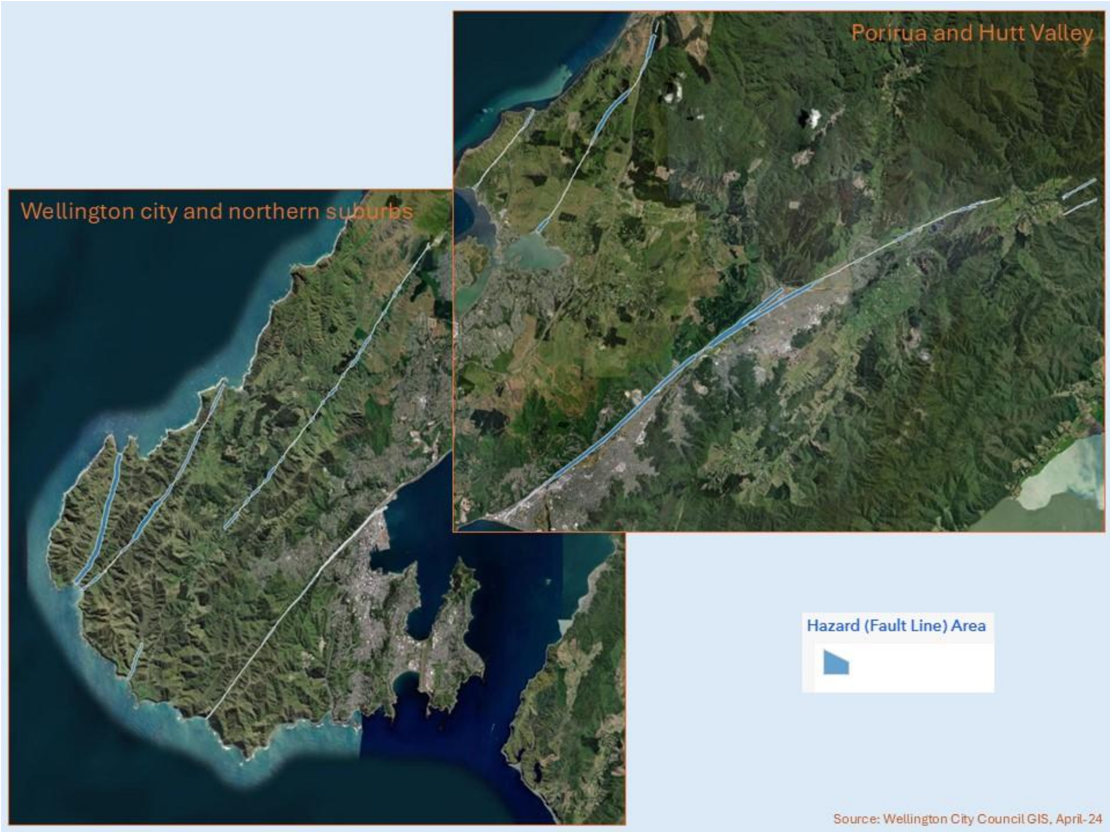

Figure 6-24: Seismic hazard fault lines and built-up areas in Greater Wellington

6.6.2.1 Water Supply Service – Seismic Event Impacts

The Water Supply Resilience Strategic Case (WWL, Aug-2015) set the context for development of response strategy. It identified the following key local problem statements:

- The network crosses numerous fault lines.
- The network itself is fragile and susceptible to breakage.
- The linear configuration of the network provides no redundancy.
- There will be disruption to other utility providers following an earthquake.

For a seismic event, of scale 1-in-200 to 1-in-300 year, the following asset failure events in the water supply network are likely. The list is in reverse order of magnitude and does not include expected failures that will occur in an event that exceeds a 1-in-300 year event.

- Waterloo DWTP aeration chamber and “reservoir” (treatment tanks, integrated with building structure) will sink and pipe connections will fail. It may take over a year to reinstate the water treatment plant.

There would be multiple reticulation system leaks, and:

- displacement of Randwick and Gear Island (DWTP) Valve Chambers and failure of pipeline connections
- leaking joints on the Wainuiomata pipeline and Rahui pipeline at Hutt Estuary Bridge
- multiple leaking joints on the bulk and trunk pipelines through Wainuiomata
- displacement of Wainuiomata pipeline - Waiwhetū Stream Crossing abutments
- leaking joints on the Wainuiomata pipeline connections to Tunnel Grove Valve Chamber

- leaking joints in the bulk water distribution pipelines from Te Marua DWTP to Porirua and Wellington
- displacement of the Ngaio/Onslow Rising main with failed joints in the gully above Kaiwharawhara Road.

Facilities assets could be affected as follows:

- Te Marua DWTP Clarifiers become inefficient, when Centrafloc skirts damaged. Outright failure is possible (including failed collection troughs).
- damage to Ngauranga Reservoir roof ("sloshing"), and to Haywards Reservoir roof
- leaking joints on Wainuiomata Intake raw water pipeline; cracks in the concrete pipe at Kaitoke
- damage to Gear Island DWTP raw water wells and leaking joints on the wellfield collector main
- failure of pipeline connections to Gear Island DWTP.

Ongoing effects of a seismic event (or another major environmental event):

- Landslides and rock fall in the vicinity of Kaitoke Intake. (no personnel entry for a while afterwards)
- Landslides in the vicinity of Orongorongo Intake including damage to intake pipelines.

6.6.2.2 Wastewater Service – Seismic Event Impacts

Traditionally, above-ground wastewater facilities have been treated to IL-3 level under contemporary seismic resilience guidance, where water supply facilities would be treated to IL4.

However, the workshop sessions of subscribing council representatives and other specialists in the region led by WREMO in around 2018/19 settled that in more extreme events, residents should be prepared to manage their own waste for a month or more.

Whilst resilience should be brought to water supply assets with targeted return to service times, it is more practical to approach the wastewater service as follows, supported by evidence from the recovery period after the Christchurch earthquakes of 2011. Figure 4-8 (Section 4.5.3.2): *Predicted performance of the wastewater network in a seismic event* is the most recent expression of the widespread effect of an event on our WW network.

- Chemical toilets are an interim measure.
- Private and community "long drops" are most effective, where they can be dug.
- Dual-bin composting toilets (where urine and faeces are separated) are effective for those confined to being indoors, but a method of removing the waste must be ensured.
- Wastewater treatment plants would be victim to disrupted collection service connection, and so are of a low priority; and, are not well suited to treating the mixed-sourced waste (including chemical waste) so arising.
- Any human waste collected (e.g., in a bag, or from a chemical toilet) should be taken straight to an emergency landfill facility.
- Residents to be discouraged from using their toilets, as the destination of the waste flushed is then unknown; though, likely to be a watercourse or groundwater, leading to another public health risk.

An example public factsheet is depicted in Figure 6-25 (source: WREMO/Civil Defence NZ), where the public is encouraged to think about managing their own waste for at least thirty days.

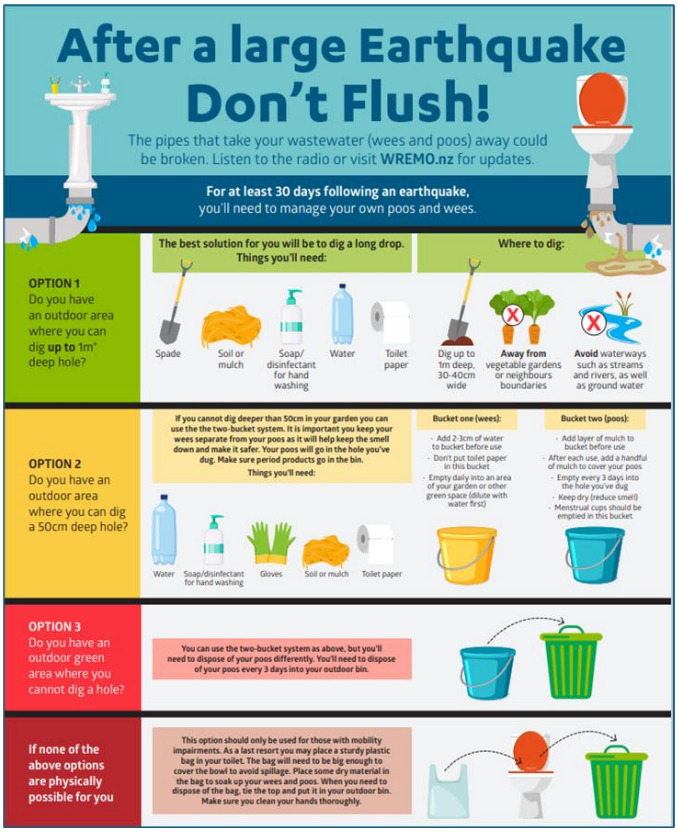

Figure 6-25: Wellington Region Civil Defence (WREMO) "Don't Flush" Infographic

The approach to lesser seismic events and WW assets resilience is covered in more detail in Section 6.6.3.2.

6.6.3 Wellington Water's response

6.6.3.1 Water Supply Service – response to seismic risk

Resilience improvements to our water supply network are needed to minimise disruption to customers in the event of a major earthquake. Due to the high and increasing costs of seismic resilience upgrades, and evolving knowledge on seismic loads, this strategy should be revisited, particularly in light of the affordability challenges facing Wellington. Consideration should be given to the benefit of having different levels of seismic resilience for more critical, larger and strategically located assets vs lower criticality assets. The strategy document can be viewed here.

Figure 6-26 depicts the expectations in return to service times after a significant seismic event under this strategy. This approach also levers off tactical planning and response interfaces with WREMO (Wellington Region Emergency Management Office) and Civil Defence. This assists with public education on preparedness, and manages service expectations under this type of extreme event.

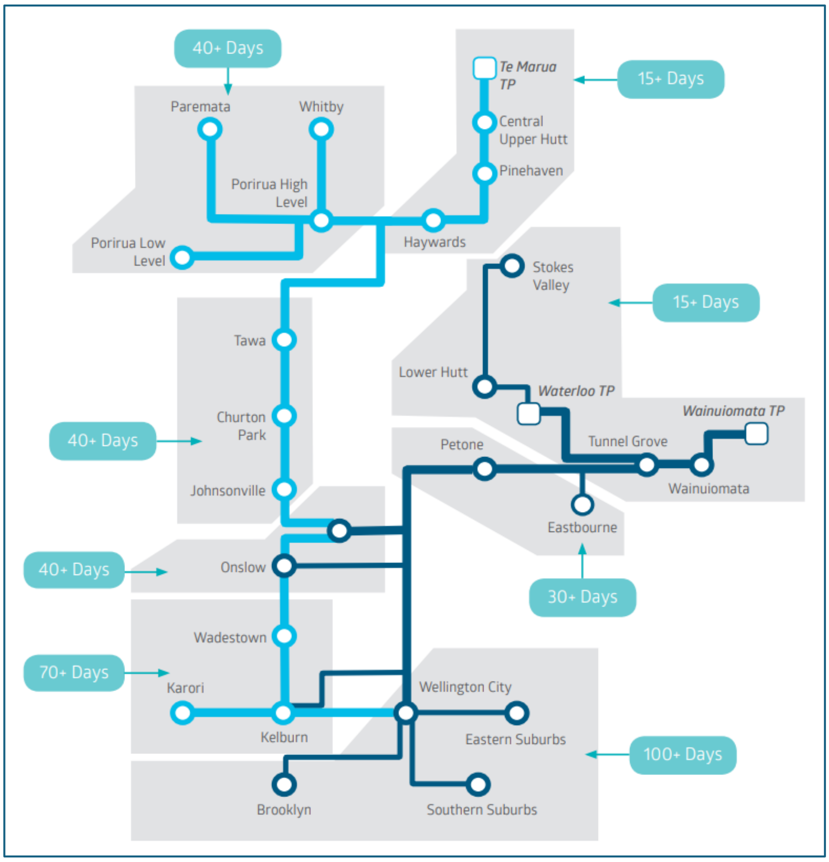

Figure 6-26: Expected water supply restoration times following a significant seismic event in Wellington

An example of pro-active investment in water supply resilience is the well-established Community Infrastructure Resilience (CIR) programme, offering a number of accessible 'hubs' managed by council-supported Civil Defence protocols, from which customers can collect safe water, fed from resilient network storage points and emergency drinking water treatment locations managed by WWL. Section 3.A.5 covers the *Community Infrastructure Resilience Assets*.

WWL is working with customers to educate them on opportunities to improve household resilience whilst ensuring our operational response plans meet agreed targets. With the established Infrastructure Response Planning Development programme of 2017, *Infrastructure Service Continuity Plans* are maintained for critical infrastructure; example plans cover maintenance depots operation, treatment plants, power supply, telemetry and communications, and contamination events.

6.6.3.2 Wastewater Service – response to seismic risk

For lesser events, and based on a WWL/ Opus study of 2018 (Report: *Resilience of Wellington Region Wastewater System - A Review of Seismic Resiliency)*, asset failure modes may be developed alongside typical localised seismic impact types, and severity scales discussed.

Failure modes for linear assets and at pumping stations are depicted in Tables 6-7 and 6-8, alongside a severity scale and the localised seismic impact type. GIS Maps are available to WWL staff that depict which parts of the regional network are more susceptible than others, and where seismic effects will be of which type (ground liquefaction, slope failure, fault rupture).

Table 6-7: Seismic Ground Damage Effects & Pipelines Failure Modes

GROUND DAMAGE	GRADE	FAULT RUPTURE	SLOPE FAILURE	LIQUEFACTION
No damage	0	-	No slope failure induced damage.	No liquefaction induced damage.
Low	1	-	Minor / rare slope failure damage.	Minor subsidence with low pipe damage.
Moderate	2	-	-	Moderate subsidence with deeper liquefaction, with enhanced pipe damage.
Significant	3	-	Slope deformation leading to localised deformation or damage to pipeline.	Large subsidence with shallow liquefaction leading to significant damage and potential intrusion of sand silt into pipeline.
Severe	4	Adjacent deformation zone with extensive ground deformation, leading to severe pipe damage. (20 m to 50 m of fault trace)	Failure of slope in sections with metres of displacement, leading to loss of some sections of pipeline.	Lateral spreading with tens to hundreds of millimetres of displacement with severe damage to pipeline.
Very Severe	5	Rupture zone with metres of displacement leading to complete damage of pipeline. (5 m to 20 m of fault trace)	Failure of slope with metres of displacement, leading to complete damage to pipeline.	Extensive lateral spreading leading to metres of displacements leading to complete damage to pipeline.

Table 6-8: Seismic Ground Damage Effects & Pipelines Failure Modes

GROUND DAMAGE	GRADE	FAULT RUPTURE	SLOPE FAILURE	LIQUEFACTION
No damage	0	-	No slope failure induced damage.	No liquefaction induced damage.
Low	1	-	Minor / rare slope failure damage.	Minor subsidence with possible damage to inlet and outlet pipes.
Moderate	2	-	-	Moderate subsidence with deeper liquefaction, with enhanced damage to inlet and outlet pipes, and minor tilting of pump station.
Significant	3	-	Slope deformation leading to possible deformation or damage to pump station.	Large subsidence with shallow liquefaction leading to severe damage to inlet and outlet pipes, and floatation / minor tilting of pump station.
Severe	4	Adjacent deformation zone with extensive ground deformation, leading to severe tilting and damage. (20 m to 50 of fault trace)	Failure of slope in sections with metres of displacement, leading to unrepairable damage to pump station.	Lateral spreading with tens to hundreds of millimetres of displacement with severe damage to pipes and floatation / tilting / damage to pump station.
Very Severe	5	Rupture zone with metres of displacement leading to complete damage of pump station. (5 m to 20 m of fault trace)	Failure of slope with metres of displacement, leading to complete damage to pump station.	Extensive lateral spreading leading to metres of displacements leading to destruction of pipe connections, severe floatation /tilting of pump stations.

To bring scale to the extent to which the Wellington region would be affected by the model given in the above, Table 6-9 shows the length of piping affected in each level of event severity. Maps and vulnerability scenario notes have been drawn up for all vulnerable areas of significant infrastructure, by each Council. Where lateral spread and liquefaction are the most significant seismic hazards threatening Porirua City, for Hutt City the danger of Inundation is raised - an area of approximately two square kilometres in Petone is likely to be inundated by seawater.

Figure 6-9: Seismic Ground Damage Effects - Pipelines affected (by length of pipe)

Ground Damage	Class	Fault Rupture	Slope Failure	Liquefaction
No damage	0	2,389 km	1,936 km	1,788 km
Low	1			285 km
Moderate	2			131 km (3,262)
Significant	3		351 km	48 km (1,025)
Severe	4	16 km	56 km	160 km (3,137)
Very Severe	5	20 km	83 km	31 km (526)

6.6.4 Managing Levels of Service Risk

If assets do not become resilient to seismic activity, WWLs shareholder councils will experience the following:

- Longer timeframes to reinstate service after a significant seismic event
- Being unprepared operationally to respond after a significant seismic event

6.6.4.1 Water Supply Service – service risk

Asset investment planning and, particularly, prioritisation approaches in the lead-up to LTP-21 offered the following core seismic event mitigation activities for water supply. Table 6-10 depicts the project list with an updated status for LTP-24. Prioritisation of renewals, compliance, and growth portfolios over the seismic portfolio has resulted in limited funding.

Table 6-10: GWRC Assets Seismic Resilience Programme Review at LTP-24

Bulk Water Seismic Resilience Projects as developed for LTP-21	Status at LTP-24
1. Waterloo DWTP Ground Improvements	Investigations completed. Ground strengthening highly risky, uneconomic, and unlikely to achieve project objectives. Decision endorsed by 3WDMC not to progress with project. Further work being carried out to determine next steps, contingency planning etc.
2. Te Marua DWTP Emergency Pump Station	*Complete*
3. Whiteman's Rd Rail Crossing	*Complete*
4. Waterloo Wellfield Seismic Upgrade	*Complete*
5. Waterloo Lime Silo Seismic Strengthening	*Complete*
6. Wainuiomata Lime Silo Seismic Strengthening	*Complete*
7. Te Marua Clarifiers Seismic Strengthening:	Not started
8. Macaskill Lakes Access Structures Seismic Strengthening	Not started
9. Kaitoke Flume Bridge (NB: constructed hold until Te Marua Emergency Pump Station is complete).	*Complete* (replaced with Network Arch Bridge)
10. Wainuiomata Float Balance Tank Seismic Strengthening	Not started
11. Kaitoke Road Bridges Seismic Strengthening	Initial assessments/Concept design completed, and recommendations endorsed by 3WDMC. Project on hold.
12. Silverstream Bridge Pipeline Replacement project	*Complete*
On hold (*at that time*): Kaitoke Intake and Strainer Improvements	Not started

6.6.4.2 Wastewater Service – service risk

In broad terms, WWL's response to the risk of a significant seismic event is to respond in unison with Civil Defence protocols and to support WREMO's public preparation approach. For lesser events with impact upon WW assets, this has been interpreted by WWL as follows:

- Vulnerability mapping (2015 Report discussed in Section 6.6.2.2) has been discussed with client councils.
- Wastewater Treatment Plants, since constructed in the 1990s, and whilst not designed to current codes, should be relatively resilient.
- Seismic structural assessments have been funded in the last two triennia by HCC for wastewater pumping stations.
- Upgrades to a small number of HCC pumping stations have been undertaken – notable are the VHCA-rated Ava and Barber WWPSs.

- 6.A. Water Supply
- 6.B. Wastewater
- 6.C. Stormwater

6.A. ANNEX Water supply risk management and resilience

6.A.1. Headline Challenges

The headline challenges are:

- Water assets are ageing at a faster rate than renewals. Historic underinvestment has resulted in aged infrastructure increasingly prone to failure
- Councils are facing acute water shortages, with demand increasing while supply is becoming more vulnerable.
- Changes to or new legislation e.g., price quality regulation will drive increased performance while capping investment
- Delivering the three elements of the water management programme including storage and water metering

Refer to the risks table below.

6.A.2. Key risks and mitigation measures

The regional and area specific water supply risks are outlined in Table 6-8. These include, where applicable: sources, treatment plants and disposal.

Table 6-8: Water supply risks and mitigation measures

Applies to	Activity	Risk Item	Key Mitigation Measures
		Looking After Existing Infrastructure	
GWRC	**Water Supply**	Current 10-year LTP investment is well short of what is required to renew ageing parts of the network.	• Condition assessment of assets in theoretical backlog, taking a criticality and risk approach to prioritising assessment work • Updating asset data based on assessment findings and reassessment of backlog • Planning and implementing risk-based priority renewals within funding limits. This may require a review of the balance of renewals funding between the Water Supply as new asset information comes to light • Implementation of Cathodic protection to significantly extend the asset life of the existing aging assets is a key mitigation – work underway.
HCC PCC UHCC WCC GWRC	**Water Supply**	Water demand has increased significantly over the last 10 years and has threatened to exceed the network capacity. This adverse trend has been primarily caused by an increase in water loss from the city council reticulation networks. This is contrary to the principles of Te Mana o te Wai. The key risks related to this (and identified in the WWL Risk register) are: • WWL will be unable to meet peak demand (acute); and • WWL will be unable to meet future demand (strategic).	GWRC and Wellington metropolitan councils via their LTP funding programmes to implement the 'Keep, Reduce, Add' sustainable water supply strategy. This means: • **Water loss reduction** Keep water in the pipes by managing water loss and replacing old infrastructure. • **Demand management** Reduce water demand through universal metering and demand management. • **Capital investment in the additional lakes/storages** Add more supply by completing the Te Marua WTP optimisation project and constructing the proposed Pākuratahi Lakes 1 and 2.
HCC PCC UHCC WCC	**Water Supply**	Water supply reliability over summer is at risk and a new water supply is needed. UHCC have not identified funding in their LTP for water metering.	• Implement a water metering programme • Invest in operational maintenance • Minimising the future cost of water infrastructure by exploring ways of reducing the demand for water and influencing water use behaviour
HCC PCC UHCC WCC	**Water Supply**	Reservoirs condition means that contamination can occur (risk to safe drinking water). There is insufficient funding for renewals. Overall operational and seismic storage across all councils is lower than target.	• LTP funding • Increased monitoring including using Storage Management Plan processes • Fund for seismic resilience improvements across targeted reservoirs
HCC PCC UHCC WCC	**Water Supply**	There is insufficient existing reservoir storage (design, growth, fire demand). Additional water storage capacity to meet resilience and the current growth shortfall is needed.	• Immediate demand management plan implementation • Storage upgrade planning, funding and mitigation • (HCC) Eastern Hills reservoir programme (by FY 30/31) • Fund for reservoir capacity improvements

		While growth is continuing, this is degrading remaining capacity. (PCC) Additionally, developers are installing onsite storage to mitigate some risk.	• PCC – new Porirua High Level and Plimmerton Farms reservoirs (2025-2028) to be delivered by others to meet growth and improve level of service. • WCC – additional reservoir to augment water supply storage in Johnsonville and Tawa water supply zones required but not funded.
PCC UHCC	**Water Supply**	Some water reservoirs including (UHCC) Broken Hill and Porirua are vulnerable to contaminants entering them. This could result in contaminants reaching customers and water not being safe to drink / unhealthy. Funding for the replacement Aotea reservoir has not been secured.	• Increase maintenance if funding is made available • Funding of remediation work (agreed) followed by renewal or capital works • Complete a water storage management plan • Immediate term demand management plan implementation • Storage upgrade planning, funding and mitigation
ALL	**Water Supply**	The Whaitua recommendations for changes to the GWRC Natural Resources Plan. Reduced water availability during through an expected increase in low flow limits after reconsenting water takes in the mid-2030's. There is therefore an inability to reconsent water takes in 2035 unless there is additional water storage available to offset a reduced ability to extract water at times of low river flow. There is a delivery lead time of 10 years for lakes works.	• Through the Whaitua processes, reduce the volume of water abstracted from catchments • Keep, add and reduce strategy. • Ensure funding remains committed for construction of Pākuratahi Lakes expansion in the final three years of the LTP (2031-34)
GWRC	**Water Treatment**	Waste stream at Wainuiomata Water Treatment Plant lacks redundancy and capacity. A failure of the plant, prior to completion of wash plant capacity & quality Upgrade in 2031/32, will impact the performance of the water treatment plant and will eventually cause failure of provision of water. Consents for discharge of contaminants from the waste stream are at risk of breach due to the waste stream inability to treat.	• Ensure that funding for FY 31/32 remain in future LTPs (or equivalent funding programmes) • If possible, bring forward funding given the criticality of this work to ensuring continuity of production water.
GWRC	**Water Treatment**	Condition of some Water Treatment Plant and Water Intake assets may lead to operational disruptions and increased operational costs if the assets fail before the currently scheduled renewals:- assets include Waterloo Wellfield Pumps, Waterloo Treated Water Pumps, Te Marua Booster Pumps, Te Marua Treatment Pumps, all Water Source Intakes, Macaskill Lakes water quality improvements to improve source water quality.	• Plan and implement a criticality-based renewals and resilience works programme across all intakes • Undertake supply upgrades e.g., Te Marua DAF, additional storage.
GWRC	**Water Treatment**	The full benefits of output capacity increase from Te Marua Treatment Plant optimisation will only be achieved once the pump station upgrade in completed in 2028/29. Both projects are funded in LTP. Until then, 50% of benefit realisation from delivering treatment plant optimisation by 2025, will help in reducing acute water shortage risk in the short term	• Continue phased treatment plant optimisation works Ensure funding identified in the 24/34 LTP for optimisation works in FY 28/29 are confirmed in the FY 27/37 LTP (or equivalent)

GWRC	**Water Treatment**	While water treatment plants and discrete parts of the network are seismically resilient to a degree, overall, bulk water assets do not meet the required earthquake resiliency standard for minimising impact and ensuring provision of safe drinking water following a significant earthquake event including Waterloo treatment plant (liquefaction), Te Marua clarifiers, Ngauranga Reservoir	• Establish the level of resilience of the current assets before mitigation plans are developed • Ensure sources e.g., Waterloo bores, transfer pumpstations and transfer mains are included in the resilience assessment • Provide a prioritized and funded programme of work

6.A.3. Growth risks to Levels of Service

Note further updates are to be applied to this section.

6.A.4. Water supplies - What is being done about this?

The potential for severe water shortage due to inadequate treatment capacity is being actively managed through our risk management process. A key mitigation measure is establishing water restrictions when demand is high. A summer demand risk assessment team meets frequently during the summer to review indicators and determine risk levels (see Figure below).

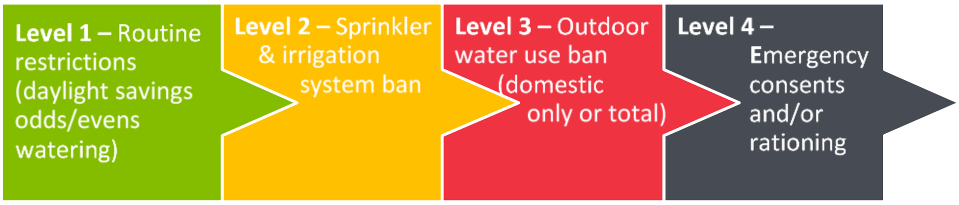

Figure 6-23: Water supply - risk levels

Level 2 restrictions have been necessary four times in the last five years, and only twice in the 10 years previous. Increasing demand will mean restrictions with greater impact in terms of frequency, severity and duration, though the risk of capacity shortage is now reduced with the Te Marua WTP upgrade complete.

Wellington Water's strategic response to the emerging challenge started in 2018 when the trend of increasing demand was identified. Council engagement at the time highlighted a preference to actively reduce demand while progressing options for increasing supply capacity. This led to a portfolio of demand management options being investigated, initiation of the Te Marua WTP optimisation project and completion of an economic case on the costs and benefits of residential metering.

Over the next 2-3 years an improvement in network efficiency is being targeted with additional support from Government stimulus funding. This will include an increase in operational leakage management, better management of water pressure in the network, and additional network meters to improve our understanding of demand and inform conservation programmes.

Our current expectation is that short term network efficiency improvements will yield a beneficial but likely marginal improvement to the overall supply-demand balance. A significant supply/demand intervention will be needed within the next 5-10 years to provide an appropriate level of water security. The options being progressed are discussed in the following sections on demand management and supply augmentation.

6.A.4.1. Water supply - demand management

Water demand is a function of the amount of water customers use and how much water is lost through service delivery. As alluded to above, growth in demand is beginning to compromise our level of service standard. While population growth is a fundamental driver to the rise in demand, the 'water intensity' of day-to-day and economic activity within the region, expressed in terms of gross per capita demand, is also increasing. This is best demonstrated by the rising trend in ‘base’ winter demand that is less prone to climatic variability, as shown in **Figure 6-24.**

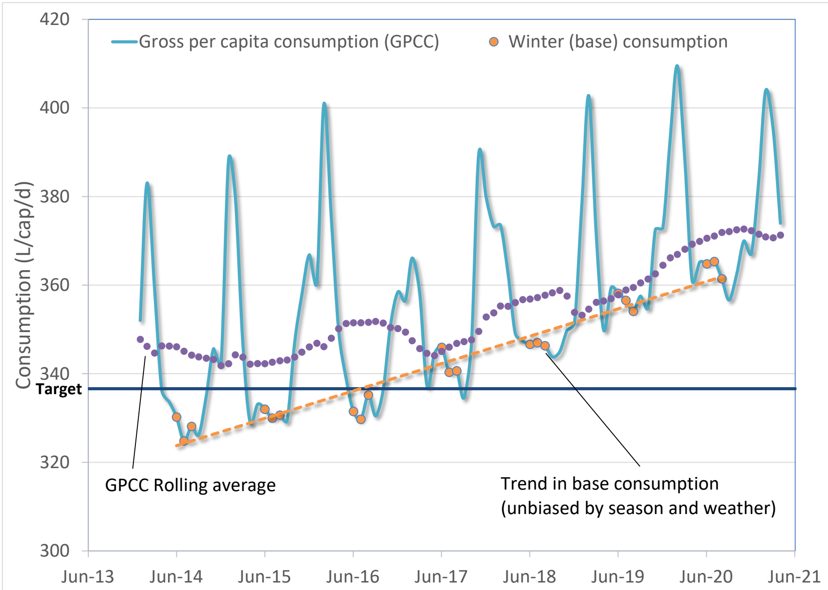

Figure 6-24: Water supply - gross per capita consumption

Customer water consumption, including losses (leaks) on private property makes up the bulk of network demand and comprises residential and non-residential (commercial, industrial, municipal, education, etc.) demand. Figure 6-25Error! Reference source not found. shows the components of water demand and the approximate breakdown.

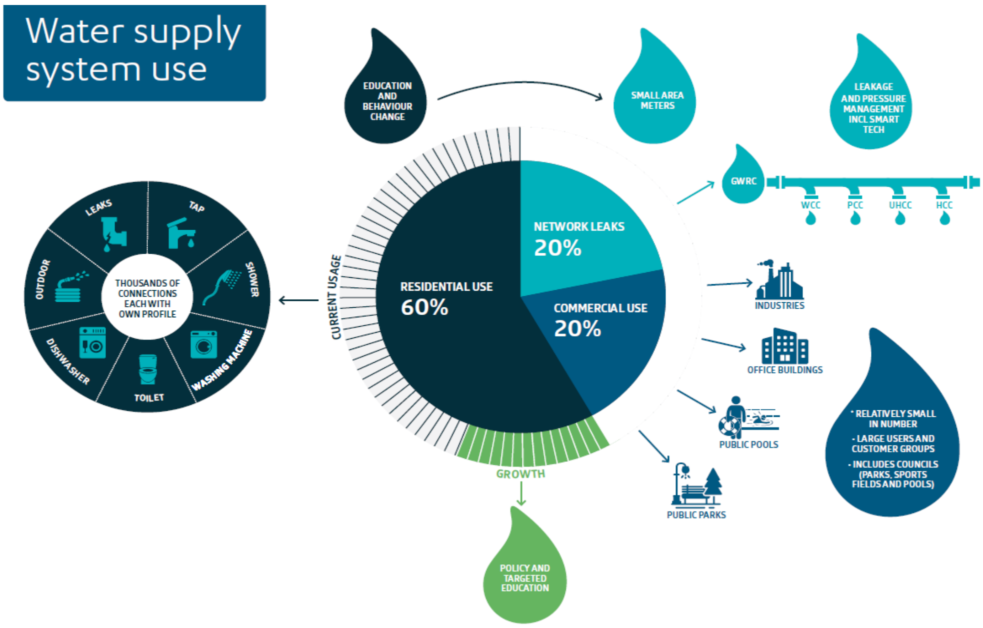

Figure 6-25: Water supply - components of water demand

Approximately 80 percent of non-residential customers are metered, and their bill includes a volumetric usage component. The remainder have small diameter connections and make up a relatively small portion of network demand. Residential customers are not metered nor charged on a per-usage basis and therefore currently have limited ability or incentive to manage their own water use. This also means that Wellington Water has a very restricted field of influence over customer demand.

Conversely, Wellington Water has greater control over water losses from the network and accordingly prioritises measures to reduce this component of demand. These types of losses include leaks and bursts and meter failures and under-registration and have grown to make up 20 percent or more of total network demand.

Wellington Water has set a target of 10 percent reduction in gross per capita consumption by 2026 with the explicit intention of helping defer and reduce the need for investment in supply augmentation. Leakage management will play a central role in achieving this target, with all Councils setting targets to reduce real losses. However, this alone may not deliver the full quantum of savings needed. Other forms of demand management will also need to play a role, including improved metering practices, expansion of customer metering, and driving water efficiency through behaviour change, building regulation and customer outreach.

6.A.4.2. Leakage management

Wellington Water currently manages water losses through reactive repairs triggered by customer reports of bursts and leaks, and proactive repairs responding to findings of acoustic leak detection sweeps. In recognition of the need to reduce the demand created by network leaks and the associated impacts on customers, Wellington, Hutt, Upper Hutt and Porirua City Councils allocated $3.1M of funds from the 2020 Reform Stimulus Funding to improving leakage control. The intent is to establish a region-wide routine leak detection programme, whereby detection crews canvas the entire network several times a year, guided by monitoring of district metering area (DMA) night flows.

Two projects are now underway; one focusing on building Wellington Water's physical capacity to identify and repair network leaks, the second on improving the efficiency and efficacy of our leakage control process and our ability to monitor leakage and track leakage control outcomes. The projects are set to conclude by the third quarter of 2021/22. The focus for the remainder of the 2021-24 LTP cycle will then shift to consolidating and building on the gains made by the Stimulus projects in an ongoing push towards industry best practice, which may include expanding to automated leak detection using in situ sensors and data analytics. It is anticipated that instituting effective leakage control across the network will be beneficial in terms of reversing the current deteriorating trend and offsetting the impact of growth. However overall gains in the next few years are expected to represent an incremental rather than step change improvement.

6.A.4.3. Water metering

Leakage cannot be measured directly. Managing leakage therefore depends on accurate accounting of water, which in turn requires metering of flows through the network and on to customers. Metering also plays an important role in the operation of the network itself. Wellington Water operates a large fleet of meters that monitor raw water extractions, flows through treatment works, bulk supply volumes and reticulation flows. These meters are connected by radio telemetry to our control system, through which their data output is captured, and their functional status can be monitored. Information on the types, models, age and maintenance records of network meters is currently under review with a view to developing an integrated metering strategy.

As identified earlier, metering of customer consumption focuses on non-residential customers. There are nearly 8,000 non-residential meters installed across the metropolitan Council areas. WCC and PCC own about 4,350 of these, while those in HCC and UHCC are owned by the customers themselves. Customer ownership presents a challenge to Wellington Water in terms of ensuring those meters are functional and accurate, which affects not only Wellington Water's ability to determine network leakage, but also the accuracy of Council billing. Approximately 92 percent of the non-residential meter fleet are recorded in our asset inventory, but less than 10 percent of these records are complete, making planning for renewals difficult. In addition, of the meters with a recorded date of installation, some 25 percent are older than the typical 15-year meter lifespan, which would indicate that under-reading could be a significant issue across the network.

Porirua City Council has embarked upon a non-residential metering expansion and renewal project, which will install more than 500 new and replacement meters. Commercial customer meters in other Council areas are being run to failure, with replacements funded on an as-needs basis. To improve the situation, a portion of operational funding over the coming LTP cycle is to be used for developing a plan for improving meter asset management as part of a broader metering improvement effort, with a view to implementing the plan in future funding cycles.

Some 450 households have been fitted with water meters as part of a survey group designed to provide a representative sample for estimating residential demand. These survey meters make up 0.7 percent of total residential connections, which is well below the 15 percent sample size required to achieve 10 percent confidence limits on water loss estimates as suggested in the Water NZ Water Loss Guidelines. The average age of the survey meters is 14 years, which again presents a reliability issue. Wellington Water is addressing these limitations by installing 15 'small area monitors' or SAMs, which are flow meters located on discrete residential pockets of the network. The SAMs are telemetered, allowing data to be transferred directly to Wellington Water's data server for immediate analysis. In addition to more robust estimates of residential consumption for network-wide water loss calculations, SAMs provide data on night-time usage to assist estimating leakage based on DMA minimum night flows. Importantly, leakage within SAMs, both private and network, must be tightly contained in order for SAMs to provide reliable data.

Ultimately, the most effective means of tracking consumption, and leakage, is to pair effective network metering with comprehensive customer metering. 'Universal' customer metering, which has been instituted in several Councils across New Zealand, not only captures customer demand, it provides a feedback mechanism that customers can use to understand and adjust their water usage and identify leaks. It also supports volumetric charging, which is a powerful tool for moderating demand.

Universal metering is made even more effective in managing demand when 'smart' technology is adopted. Smart meters record high resolution consumption data and transmit the data back to the water utility's servers for analysis. This can facilitate detection of leaks on the private network, detailed characterisation of customer demand, and close to real time online consumption feedback for customers where a customer portal is established, amongst other benefits.

Wellington Water recently commissioned a study on behalf of GWRC that confirmed the economic case for universal smart metering (both with and without volumetric charging). A key element of the economic case is the deferral of new source development from water savings derived across the network. Demand reduction of 10 percent is expected from improved network efficiency and customer behaviour change from greater awareness of consumption. The expected level of demand reduction increases to approximately 20 percent if volumetric charging is implemented, though this would be a decision for councils to make individually.

The Water Committee and a majority of councils have endorsed building a comprehensive business case for a decision on residential smart meters in 2024. The scope and funding required for this work is currently being confirmed, however is expected to be in the order of $3m-$5m.

Having commissioned a study that confirmed the economic case for universal smart metering, Wellington Water is now seeking to build the business case for the investment. A key element of the economic case is the water savings derived across the network through reduced losses from leakage and greater customer awareness. Documented experiences of water savings vary, but the conservative (low) assumption is that introduction of smart metering without volumetric charging will produce reductions in overall network demand of 1.6-2.5 percent and 7 percent from lower residential consumption and improved network leakage control, respectively. While there will be some overlap between the metering and leakage management savings referred to above, there is a clear case for universal smart metering to form part of the demand management effort.

6.A.4.4. Water Supply - Water Efficiency

Water efficiency refers to reducing water wastage as measured by the amount of water used for a particular purpose relative to the amount required. It can be applied to all sectors of the customer base to make a significant contribution to reducing gross demand. A function of behaviour (e.g., time or frequency of running a tap, hose or shower) and hardware (e.g., flowrate of the said fixture), customer water efficiency can be influenced through a number of avenues including customer education and engagement, improving technology and building standards, shifting markets towards efficient products and services, and encouraging customer uptake of efficient products and services.

While the short-term focus will be on reducing demand in areas we can directly influence (leakage and metering), Wellington Water has identified continued residential customer education, direct engagement with high water using commercial customers, and participating in the formulation of government policy and regulation as the main opportunities for promoting efficiency over the coming funding cycle. However, depending on leakage management and water metering outcomes, more expansive water efficiency efforts may be necessary in future cycles to achieve our demand reduction target.

6.A.4.5. Water Supply Augmentation

Figure 6-26, shows the current water supply development plan. To remain within the drought resilience level of service a significant demand reduction or supply upgrade is required by 2025. This is in addition to completing the Te Marua optimisation upgrade. Interventions staged between 2029 and 2035 reflect what could practically be achieved given current funding and development constraints.

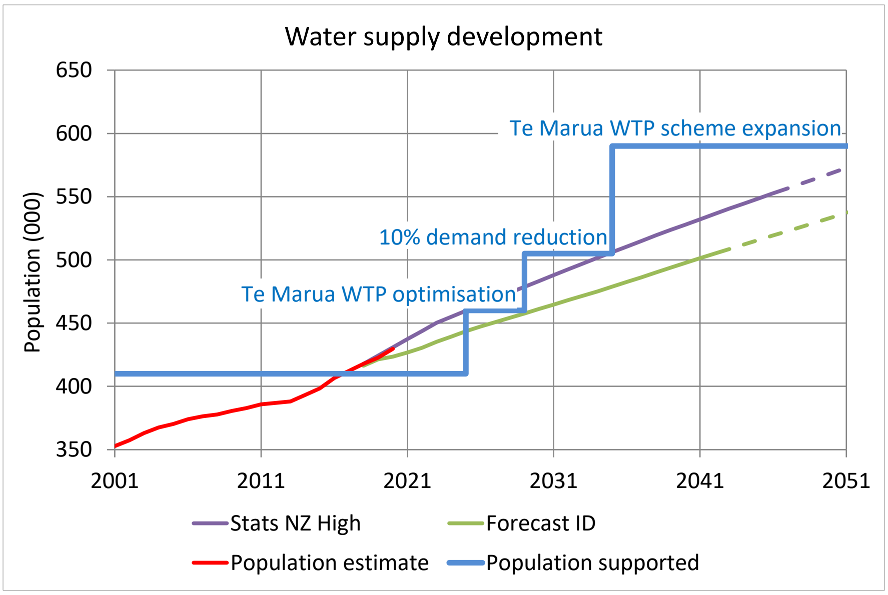

Figure 6-26: Water supply development plan

Key limitations of the current plan include funding and political risks associated with achieving a demand reduction of 10 percent (i.e., from residential metering) and a lack of alternative supply upgrade options.

Wellington Water currently has only one feasible supply upgrade option available to develop if/when required. The proposed Te Marua scheme expansion includes constructing additional bulk storage near Kaitoke – see Figure 6-27**Error! Reference source not found.**, a capacity upgrade to Te Marua WTP and an increase in distribution capacity via additional pump stations on the Kaitoke main.

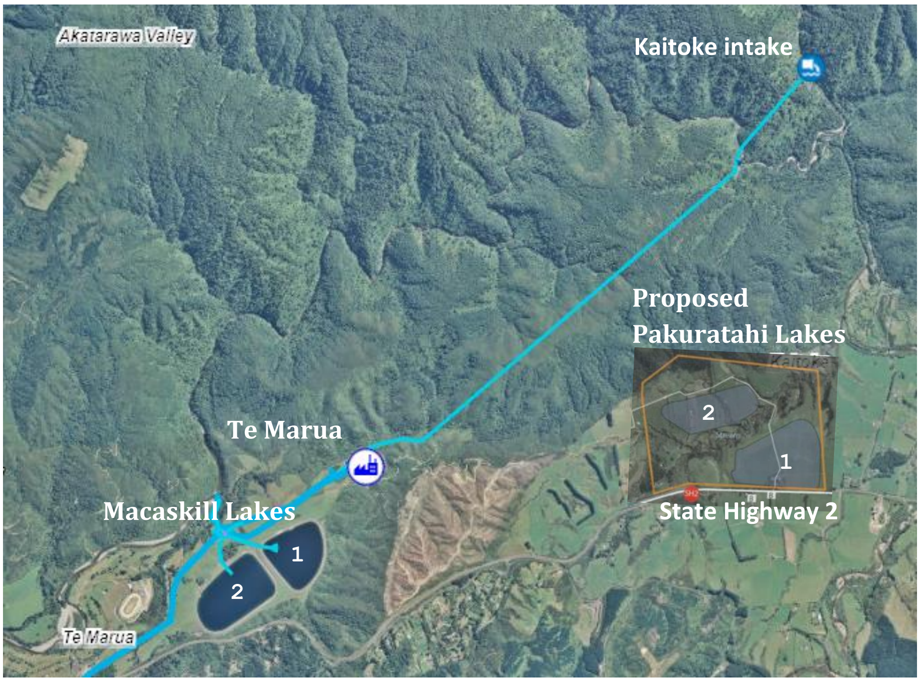

Figure 6-27: Te Marua scheme expansion with proposed additional storage lakes

Expansion of the Te Marua scheme has advantages in that; land for constructing additional storage is owned by GWRC and the existing water take at Kaitoke could be used to store surplus water during winter. The consenting risks of the scheme are low, and the development lead time could be compressed to around 5 years given the feasibility work completed 10 years ago. However, there are some concerns with the proposed upgrade, including that:

- Our context has changed since the original work was done and the scheme may no longer represent the best option (e.g., potentially greater importance placed on source resilience following the 2016 aquifer contamination, foreseeable changes in environmental regulation impacting cost/feasibility, etc).
- The cost estimate of $250-$500m is highly uncertain and not of sufficient confidence for economic assessment and decision-making.
- Having no feasible alternative options presents a risk in the event a fatal flaw is identified, or costs become uneconomic.
- The proposed scheme expansion increases dependence on the most critical WTP and does not seek to build security through greater diversity.

To address these issues an investigation is planned for 2021/22 and 2022/23 to develop a diversified portfolio of supply upgrade options and review the cost/feasibility of the Te Marua scheme expansion. A total of $800k opex has been included in our LTP recommendations to GWRC for this work. The supply investigation work will then be combined with demand management options to revise the water supply development plan to inform the 2024 investment cycle.

6.A.5. Localised Issue – Firefighting Water Supply

6.A.5.1. Why this is a challenge

Fire and Emergency New Zealand (FENZ) rely on our water networks to fight fires. They need WWLs networks to be able to provide enough water volume and pressure to fight a fire. Generally, the networks are adequate for firefighting, however there are localised areas where water volume and pressure could be improved.

Zone Management Plans (ZMPs) have been prepared for each part of the Wellington Water distribution network which capture deficiencies against the fire code as well as some indicative network improvements that could address these deficiencies. Addressing these deficiencies are considered when planning renewals and network upgrades. As part of development of the ZMPs the FENZ are consulted to capture the relative priority of addressing each deficiency.

Until the required network upgrades or changes to District plans are made, the risk needs to be managed operationally.

6.A.5.2. Maps and information have also been provided (to FENZ) of the expected fire flow available at each hydrant, distance to nearest fire hydrant for each property as well as a heat map to indicate the magnitude of the deficiency. Legislative Links

- Fire flow compliance in New Zealand is governed by the requirements of Standards New Zealand PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice (the Code of Practice). The Code of Practice is intended to provide guidance on assessing individual fire hazards and water flow requirements to match that hazard.
- Fire and Emergency New Zealand Act 2017

6.A.5.3. Wellington Water's response

The Code of Practice is non-mandatory but is used as a target level of service by most local authorities across New Zealand. In some locations, the level of service is modified to limit the maximum flow rate to the amount available from the water supply source.

WWLs prioritisation to get fire flow up to levels of service.

Priority 1: Beyond 135m, high criticality.

- **Status:** Currently underway

Priority 2: Beyond 135m, a few houses, or low flow high criticality

- **Status:** <50% of code and high exposure; hydrant at +135m but low exposure

Priority 3: Inadequate flow (<50%), a few houses

- **Status:** 50-80% of code and high exposure; future items likely to be lower risk

Priority 4: Inadequate flow (50-80%), a few houses

- **Status:** 50-80% of code and low to moderate exposure; future items likely to be lower risk following known programme

Priority 5: Minor fire flow deficiency

- **Status:** to be addressed following completion of other priority works

6.A.5.4. Risks to Levels of Service

If a suitable firefighting water supply is not provided, customers in areas with insufficient firefighting water supply will experience the following:

- Insufficient (availability) water to respond to a fire
- Hydrants unavailable for use when needed

6.B. ANNEX Wastewater Risk Management and Resilience

6.B.1. Headline challenges

The headline challenges are:

- Changes to or new legislation e.g., wastewater standard will drive increased investment
- If renewals do not occur at an accelerated rate, inflow and infiltration will increase – affecting adjacent waterways and treatment plants
- The quality of water in the environment must be improved to meet community expectations and regulations, but leaking, blocked or directly discharging stormwater and wastewater networks risk returning unsafe, contaminated water to the environment

Refer to the risks table below.

6.B.2. Key risks and mitigation measures

The regional and area specific water supply risks are outlined in Table 6-9. These include, where applicable: sources, treatment plants and disposal. Examples of specific infrastructure as also provided.

Table 6-9: Wastewater risks and mitigation measures

Applies to	Activity	Risk Item	Key Mitigation Measures
		Looking After Existing Infrastructure	
HCC PCC UHCC WCC	**Wastewater**	Contamination events will increase, with mana whenua and community expectations not being met as renewals investment is not at the right level	• Rapid response to notifications (onsite, stop overflows)
HCC PCC UHCC	**Wastewater**	Wastewater pump station renewal funding is not keeping pace with asset deterioration leading to capacity constraints and potential surcharge risks (environment and property damage). Note – also see Three Waters above for network pipe renewals	• Condition assessment of assets in the theoretical backlog group, applying a criticality and risk approach to prioritising assessment work • Updating asset data based on assessment findings and reassessment of backlog • Planning and implementing risk-based priority renewals within funding limits
PCC	**Wastewater**	Wastewater network resiliency is compromised due to underinvestment and growth is continuing ahead of asset renewals and capital upgrades. Key projects include the Eastern Porirua Regeneration Project - Overall upgrades - Wastewater (excl JV), Western Porirua, Ngati Toa lead development - Wastewater (excl JV), Whitby Wastewater (excl JV) Pipe Upgrade and CBD storage	• Review and improve operations plans and procedure to optimise performance within the known asset constraints • Develop contingency plans • Review the demand management data (including I &I reduction) benefits and any current implementation as part of an integrated wastewater strategy for PCC
WCC	**Wastewater**	The condition of some VHCA pipes under Wellington Airport have been determined as very poor. There is a significant cost to remedial works e.g., disruption, complexity. Improvements works have been deferred from the FY 23/24 capital programme Critical wastewater mains are in very poor condition and there is a potential for non-compliance: • BP Horokiwi (Newlands) $720k to maintain services • Western WWTP outfall (step country)	• Contingency planning • Increase maintenance (if possible) • Fund renewals covering all asset
PCC	**Wastewater**	The Paramata rising main surcharges at a location near SH59 and the main trunk railway. This could interrupt traffic and rail services.	• Fund increased capacity in the rising main • Identify and control/reduce inflow and infiltration
HCC UHCC	**Wastewater**	Erosion occurring on the Hutt River potentially undermining 825mm bulk wastewater pipeline adjacent to Taita rock	• Monitor and assess erosion impacts on bulk pipeline • Contingency plan development • Plan and seek funding for pipeline upgrades/erosion mitigation works

HCC UHCC	**Wastewater**	(HCC, UHCC) Seaview main outfall pipe working at around 50% capacity needs renewing or upgrading with no budget provision for physical works - expected to be around $700M. There is a consequential increase in opex and increase in treated discharges to Waiwhetū Stream	• Review and improve operations plans and procedures to optimise performance within the known asset constraints • Develop contingency plans • Plan and seek funding for outfall upgrades as part of an integrated wastewater strategy for HCC • Review the demand management data (including I &I reduction) benefits and any current implementation as part of an integrated wastewater strategy for HCC
HCC UHCC	**Wastewater Treatment**	Sludge dryer at Seaview WWTP is nearing its end of life (JV specific) with increased community dissatisfaction (odour)	• Monitor and assess dryer performance • Contingency plan development • Sludge dryer upgrades funded in the LTP
HCC UHCC	**Wastewater Treatment**	The redundancy of Seaview WWTP is inadequate for major maintenance while ensuring compliance can be met (JV specific). There is no funding to increase WWTP redundancy	• Contingency plan development, funding and implementation
WCC	**Wastewater Treatment**	Moa Point Sludge transfer facility (SMF) is not completed	• Construct the sludge management facility (SMF)
HCC WCC PCC	**Wastewater**	Capacity of parts of the wastewater network are insufficient to meet growth projections with current I&I and will cause overflows and will also not meet anticipated consent requirements	• Network optimisation programmes • Hydraulic modelling and planning • Contingency planning and monitoring • Network upgrade design, funding and implementation
HCC PCC UHCC	**Wastewater**	Streams, rivers and harbours contain faecal material	• Wastewater network hydraulic modelling and optimisation • Network upgrade planning and funding • Contingency planning and work e.g., detention areas • Stormwater discharge treatment options, planning and implementation
PCC	**Wastewater Treatment**	PCC WWTP unit process limitations (ammonia reduction requirements) will limit growth relate inflow	• Undertake ammonia reduction improvements in 2031/2032 (growth projections limited)
PCC	**Wastewater Treatment**	Sludge (solids) drying components at the new PCC WWTP are at capacity (limited redundancy)	• Continue project to improve the solids handling capacity and improve odour treatment (2025).
PCC	**Wastewater Treatment**	Landfill disposal of WWTP sludge at Spicer Valley may not be permitted after 2030 (consent renewal)	• Identify sludge reduction options (treat and reduce at source). • Identify and allocate funding for onsite treatment or removal to secure acceptable locations for disposal •
WCC	**Wastewater Treatment**	The condition of the Moa Point WWTP assets means that there will be compliance issues. The condition of the Western WWTP assets mean non-compliance may occur. Both WWTP are operating at or near the end of their useful lives.	• Undertake renewals and capital works as soon as possible

WCC	**Wastewater Treatment**	There is a complete reliance on the Southern Landfill to accept sludge from WWTP. Alternative sludge management options are not found or completed within the Wellington area e.g., Moa Point SMF, then sludge may need to be transported to the Waikato Region	• Fund Sludge Management Facilities works in the Long Term Plan
WCC	**Wastewater Treatment**	The Houghton Bay closed landfill produced leachate, which discharges this into Houghton Bay during wet weather events. The consent for leachate discharge has expired.	• Undertake landfill remediation

6.B.3. Growth risks to Levels of Service

Note this section is still to be completed.

6.C. ANNEX Stormwater Risk Management and Resilience

6.C.1. Headline challenges

The headline challenges are:

- The quality of water in the environment must be improved to meet community expectations and regulations, but leaking, blocked or directly discharging stormwater and wastewater networks risk returning unsafe, contaminated water to the environment
- Climate change impacting further on flood prone areas (increased frequency of damaging floods)
- Ensuring cohesive management across authorities of waterways for the benefit of people and property
- The impact of coastal changes e.g., increased water levels impeding stormwater and degrading discharge structure
- Allocating the high level of funding indicated to protect property and people

Refer to the risks table below.

6.C.2. Key risks and mitigation measures

The regional and area specific water supply risks are outlined in Table 6-10. These include, where applicable: sources, treatment plants and disposal. Examples of specific infrastructure as also provided.

Table 6-10: Stormwater supply risks and mitigation measures

Applies to	Activity	Risk Item	Key Mitigation Measures
HCC PCC UHCC WCC	**Stormwater**	Specific Growth Study notes that significant investment is required to upgrade stormwater assets across the City to meet growth and achieve target standards. This is not currently funded. Unbudgeted costs may arise. Funding is inadequate to address existing flooding issues.	• Investment in the stormwater network including adaption practices and mitigation measures • • Network optimisation programmes • Hydraulic modelling and planning • Contingency planning and monitoring • Network upgrade design, funding and implementation
HCC PCC UHCC WCC	**Stormwater**	Roles and responsibilities around management of stormwater where it enters urban streams and, in some cases, open channels is unclear. This includes planned maintenance activities.	• Agree on ownership, responsibilities and allocate a budget to manage urban streams and stormwater entry points. • Inform customers of ownership and management responsibilities
		Climate Change	
HCC PCC UHCC WCC	**Stormwater**	Coastal stormwater outfalls experiencing sea level rise resulting in increased sedimentation and need for more frequent clearing. (PCC/HCC/WCC) The stormwater network experiences flooding, high groundwater levels and climate change (coastal erosion impacts on outlets) (UHCC) Pinehaven stream stormwater improvements (Phases 4 and 5) investment has not been committed to. Without this work the objectives of the GWRC's flood management plan will not be met Climate change may drive an increase in the frequency and extreme (impacts) of storm event.	• Adaptive climate change modelling and planning • Long term stormwater planning • Investment in the stormwater network including adaption practices and mitigation measures. Cannons Creek works (Kainga Ora and PCC)

6.C.3. Growth risks to Levels of Service

Note this section is yet to be provided.

6.C.4. Localised issue – reducing flood risk

Flooding is one of the costliest natural hazards in New Zealand with serious and long-lasting impacts on homes and communities. Managing urban flooding involves a combination of infrastructure, urban planning, community preparedness and emergency response. In historical planning, the Wellington region's stormwater pipes were built to convey regular rainfall events and are particularly susceptible to heavy flows and flooding. As climate change becomes more of an issue, we need to find ways to mitigate the frequency and severity of flooding events.

6.C.4.1. Why this is a challenge

In the urban area, stormwater is conveyed in two ways. The primary stormwater system consists of constructed (e.g., pipes, channels etc.) and natural systems (e.g., streams, catchments, ponds, etc.) and conveys more frequent rainfall events. The secondary stormwater system consists of overland flow paths and conveys high rainfall events.

During high rainfall events, there is a high risk of flooding to many homes, businesses, and key transport routes due to the region's topography, increased rainfall intensities and potential sea level rise across the region. The urbanised areas are often situated in low lying gullies with development across flood plains and limited piped stormwater systems or overland flow path provisions to cater for flood flows. High rainfall events can also transmit large volumes of water and sediment via the streams and overland flow paths which can cause significant damage to property adjoining these areas and within the flood path.

The proposed intensified development due to growth near town centers and along public transport routes (railways and arterial roads) across the region is likely to require flood hazard mitigation works.

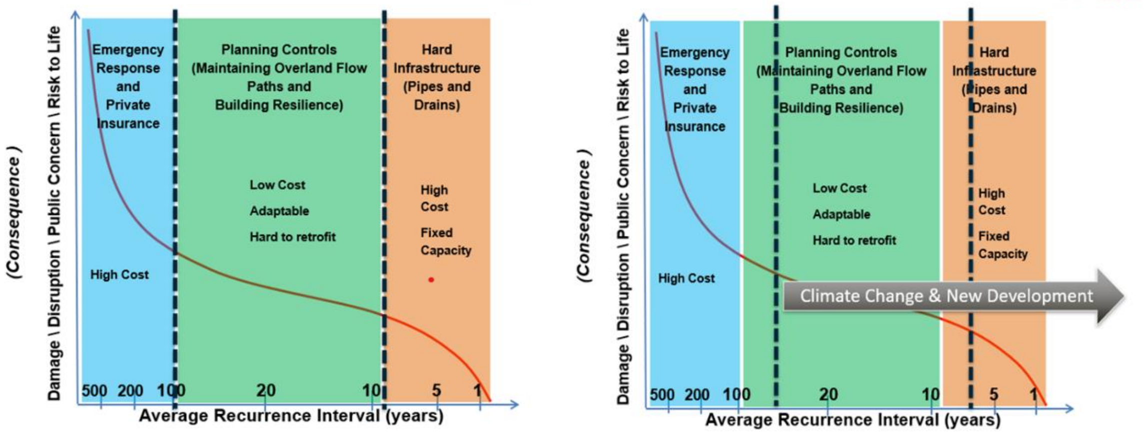

Figure 6-28: Stormwater service - level of service shift

The projected sea level rise of a meter over the next 100 years will make many parts of the existing stormwater network progressively less effective in conveying flood flows to the sea. This will affect a resulting greater number of flood prone properties. Similarly, the rainfall increase due to climate change will place additional pressure on the stormwater systems and will result in a reduction in the current service levels over time. As illustrated in Figure 6-28. the current level of service for infrastructure will be less in future years due to the impacts of climate change and development. These therefore need to be considered now in flood mitigation planning.

Insurance companies are increasingly excluding flood damage cover for properties that have been affected by flooding more than two times.

6.C.4.2. Legislative Links

The stormwater flooding activities are influenced by the following legislative requirements:

- Greater Wellington Regional Council's Proposed Natural Resources Plan
- Building Act 2004, Building Amendment Act 2013 and New Zealand Building Code: requires development to be built above the floodplain
- The Local Government Act 2002: The Councils have responsibilities through the Act to manage the stormwater system and provide flood protection and control.
- The Local Government Act 1974: Provides the authority for councils to construct, operate and maintain the Wastewater, Water and Stormwater systems. The Act requires the provision of stormwater services which includes the removal of regular rainfall.
- The Health Act 1956: Places an obligation on Council to improve, promote and protect public health within the territory. The provision of Stormwater services helps to promote and improve public health. Mitigating flooding protects public health due to non-exposure to contaminated floodwaters.
- The Resource Management Act 1991
- Climate Change Response (Zero Carbon) Amendment Act 2019
- Ministry for the Environment (MfE) in IPCC Guidelines set out baseline sea-level rise recommendations for local government to guide a risk assessment process.
- Civil Defence Emergency Management Act 2002

6.C.4.3. Wellington Water's Response

There are a range of measures that we can take to reduce the impact of flooding across the region. These measures include understanding, managing and then mitigating the flooding risk. Flood risk management can be through built infrastructure, planning controls and emergency response and flood awareness.

6.C.4.4. Understanding Flood Risks

To understand the flood risk Wellington Water will undertake catchment planning for the urban catchments in the region. The catchment planning will include modelling to inform the performance of the stormwater system, the extent of overland flow paths and predicted future flood levels. To date we have modelled and mapped 90 percent of the urban areas. Catchment planning will also include developing long-term flood mitigation solutions considering climate change factors. Analysing the rainfall, understanding, and surveying our assets and modelling the performance of the systems for frequent and extreme rainfall events and climate change will inform decision making and planning controls.

6.C.4.5. Managing Flood Risks

The modelled flood maps are and will be used in District Plans – see Figure 6-29**Error! Reference source not found.** to support building and planning controls and informing council's district planning processes as to where to avoid development. Building resilience is achieved through maintaining overland flow paths and by setting minimum floor levels. Managing flood risks also includes requiring the implementation of flood mitigation measures such as hydraulic neutrality from new developments – see **Error! Reference source not found.**.

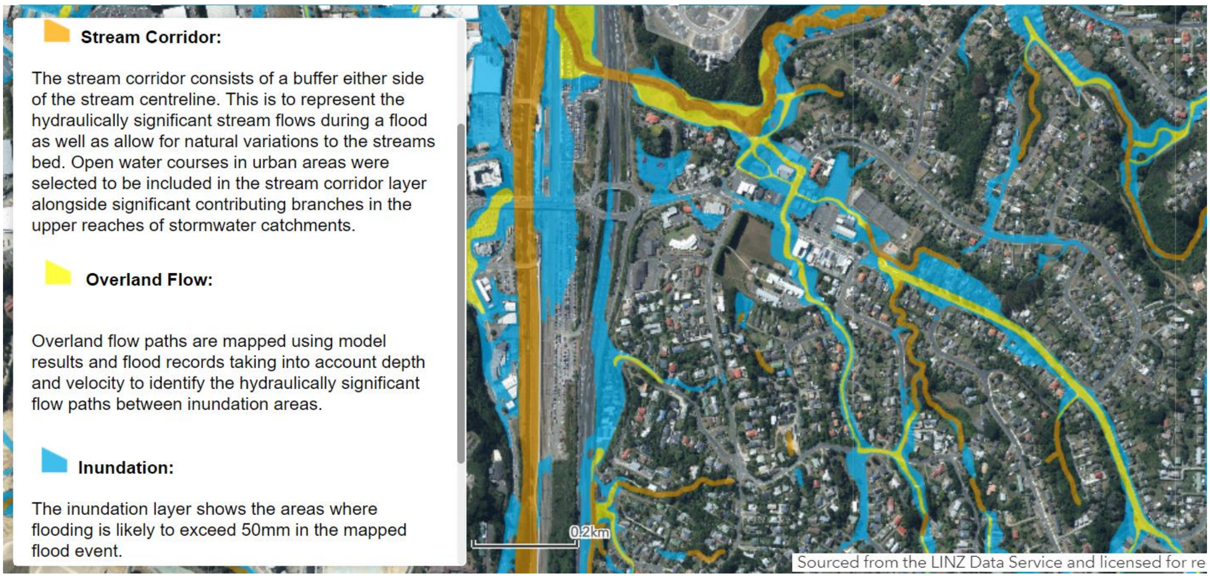

Figure 6-29: District plan maps

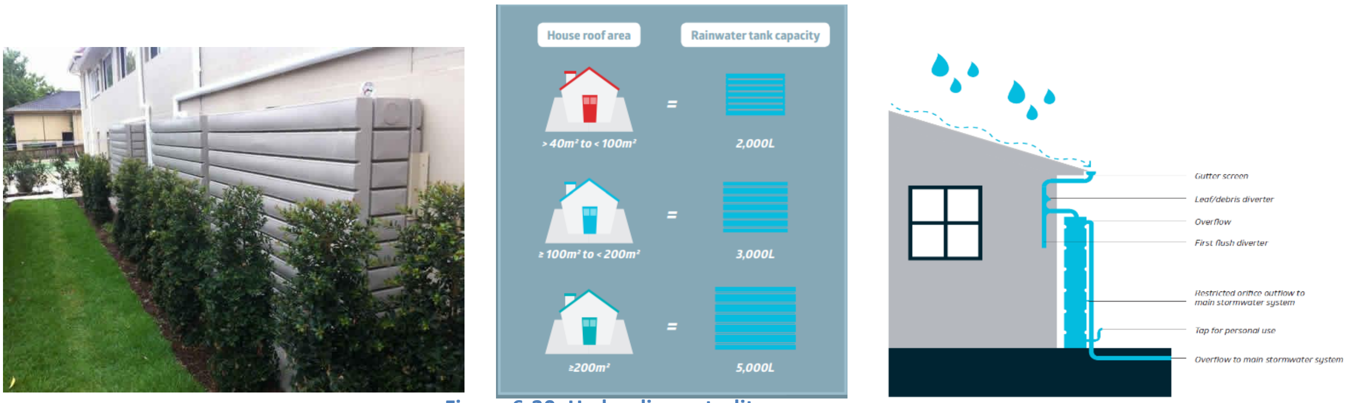

Figure 6-30: Hydraulic neutrality

During storm events we respond to requests for service, carry out maintenance to remedy asset failures and the effect of the storm as well as work closely with Civil Defence in managing major events. The post event response includes analyses to inform planning and management work as well as investigations to identify work required for damage recovery. We like to work closely with councils and their communities to understand and manage the impact of storm events.

6.C.4.6. Mitigating flood risk

Mitigating the flood risk for the future will include catchment planning, network upgrades and operational improvements.

Network upgrades will be prioritised based on factors such as the number of properties affected, likely impact of growth and existing level of service gaps. Network upgrades may include:

- Upgrades to piped network
- Improvements to overland flow paths
- Construction of flood control structures such as stormwater ponds, floodwalls, enlarged culverts, improved inlets, outlets and pump stations.

We maintain the stormwater network to ensure its ongoing operational efficiency. Maintenance actions need to be undertaken on a risk-based approach and include:

- Regular inspections and clearing of debris and blockages at inlets, outlets and in the piped network at high-risk locations
- Clearing of debris and blockages before and after significant flood events
- Regular inspections of stormwater pump stations.

In addition to above we will work with the public to educate them on their roles and responsibilities for maintaining any private stormwater assets and streams. Wellington Water will also work together with council transport and parks departments who also have responsibilities for some stormwater assets to achieve catchment level outcomes.

6.C.5. Risks to Level of Service

The major risk is to properties with floors below the design flood (100 years with climate change) levels and along coastlines where the stormwater network will become less effective with time due to sea level rise. The risks are linked to the timeliness of planning and investment to implement recommended measures to uplift the levels of service in existing flood prone areas. Investigating flooding problems and developing solutions for them takes time and therefore needs a consistent level of funding and resources to achieve the desired lift in the levels of service.

If we don’t reduce our flood risk, we will continue to experience the following:

- Increased operational response to flood events
- Increased number of floors flooding
- Increased overflows from the wastewater network
- Increased flooding of arterial roads

6.C.6. Localised Issue – Dam safety

6.C.7. Why This Is A Challenge

WWL’s Client Councils own many dams that are generally for water supply or flood mitigation. Dams require ongoing monitoring, surveillance, maintenance and operations to ensure the safety of people, property and the environment. This includes dams that are no longer operational but have not been sufficiently decommissioned and therefore may still require ongoing maintenance and safety management.

Building (Dam Safety) Regulations 2022 came into effect on 13 May 2024. The regulations were developed to establish a national approach to managing dams safely to ensure people, property and the environmental are protected from the potential impacts of dam failures. Previous to these regulations coming into effect, New Zealand did not have a consistent dam safety regulatory framework.

Classifiable dams (dams over 4 metres height and stores 20,000m^3 or more of fluid) are regulated. The regulations require a potential impact classification (PIC) which determines the risk level of the dam (low, medium or high), which dictates subsequent regulatory requirements. The regulatory requirements include a dam safety assurance program, intermediate and comprehensive dam safety reviews, emergency planning, surveillance and monitoring, operations and maintenance and other dam safety management activities.

The regulations establish the minimum legislative requirements for management of classifiable dams. The New Zealand Dam Safety Guidelines (New Zealand Society of Large Dams (NZSOLD), 2024) sets out the recommended NZ industry practice for all dams (higher standard than the regulations).

6.C.1. Legislative Links

The Building (Dam Safety) Regulations 2022 came into effect on 13 May 2024.

- Building Act 2004
- Building (Dam Safety) Regulations 2022.

6.C.2. Wellington Water's Response

There are many dams in the Wellington Region that are used to manage stormwater. The stormwater dams which are classifiable and have been delegated from client councils to WWL to manage the safety of are;

- Mulberry Street Dam (Part of the Western Hills Dams) – HCC – High PIC
- Stanhope Grove Dam (Part of the Western Hills Dams) – HCC – High PIC
- Whitby Lakes (Upper and Lower) – PCC – PIC Unknown.

Heretaunga Dam (UHCC) is a significant dam that is operated and maintained by WWL however this is not regulated as the height does not meet the classifiable criteria.

GWRC own some stormwater management dams which are classifiable however these are not managed by WWL.

The classifiable status of some inadvertent dams are currently being reviewed by WWL and the regulator (eg. Rochedale Culvert). There are also other stormwater dams in the region which are not classifiable and therefore not managed from a dam safety perspective, but are still maintained and operated by WWL.

The regulations set out the minimum requirements for classifiable dams, however WWL recommends all dams are managed in accordance with the NZSOLD guidelines to meet NZ recommended industry practice.

6.C.3. Risk To Levels of Service

The risks to levels of Service include:

- If adequate dam safety management is not undertaken, this puts people, property and the environment at risk of the potential impacts of dam failures
- Client councils are responsible for compliance with the regulations and could face penalties if the Building (Dam Safety) Regulations are not followed for classifiable dams.
- Some dams although may not be classifiable, may still have significant risks

Wellington Metropolitan
Water Services Asset Management Plan
2025

Asset Lifecycle Management

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

7. How we deliver the services (lifecycle management plans)

The SAMP, 2021 describes how Wellington Water operates, including the extended whānau approach to delivery. This section outlines the type of activities that are considered in response to the strategic priorities. The asset lifecycle steps are outlined in Figure 7-1.

Figure 7-1: Asset lifecycle steps

Source: IIMM 2020

7.1 Three waters service delivery overview

The three waters service delivery arrangements are summarised in Table 7-1.

Table 7-1: 3 Waters service delivery providers

Task	Planning	Delivery
Operations and Maintenance	WWL	WWL-Contractors
Capital	WWL	Contractor
Renewals	WWL	Contractor
Compliance	WWL	WWL

7.1.1 Strategic Priority and Service Delivery Linkages

The linkage between strategic priorities and service delivery are outlined in Table 7-2.

Table 7-2: Linkage between strategic priorities and service delivery

Task	O&M	Renewal	Capital
Priority 1: Looking after Infrastructure	Y	Y	
Priority 2: Supporting Growth			Y
Priority 3: Sustainable Water Supply and demand	Y		Y
Priority 4: Improving Environ. Water quality	Y	Y	
Priority 5: Net Carbon Zero 2050	Y	Y	Y

7.2 Identifying Needs and Planning

Each of the three waters has specific and key challenges. These are aligned against the strategic priorities. Each of these challenges is responded to using a variety of solutions.

Key Issue	Water Supply	Wastewater	Stormwater
Compliance Issues	Meeting drinking water standards	Meeting wastewater discharge standards	Meeting stormwater discharge quality standards
Priority tasks and activities	**Operations:** Routine maintenance and monitoring performance and compliance **Capital:** Treatment upgrades and improvements		
Meeting Growth and Demand	Supplying sufficient volume and quality water	Providing treatment and discharge capacity	Providing adequate stormwater drainage capacity
Priority tasks and activities	**Operations:** Efficient network management, water loss management. **Capital:** Source augmentation, Storage improvement, network extensions	**Operations:** Efficient treatment monitoring and management. **Capital:** WWTP upgrades and improvement network extensions	**Operations:** Efficient network management. Stormwater modelling, Discharge monitoring **Capital:** Network capacity upgrades and improvement, network extensions
Renewal of Ageing Infra-structure	Addressing renewal requirements to maintain LoS		
Priority tasks and activities	**Operations:** Collection and review of faults data, Reactive maintenance **Capital:** Renewals prioritising, planning and delivery		

7.3 Operations and maintenance plan

The purpose of the operations and maintenance activity is to ensure efficient operation and serviceability of assets so that they achieve their service potential over their useful lives. SWDC outsources the three waters service delivery to WWL.

WWL produce a forecast budget for operations and maintenance (OPEX) covering six areas. These are

1. treatment plants,
2. operations,
3. monitoring, and investigations,
4. management and advisory services,
5. planned maintenance, and
6. reactive maintenance.

WWL noted in communications with Shareholder Councils that:

(i) Budget holders are responsible for identifying the fixed portion of their budget, and in areas where they consider reductions should be made across items 1. to 6.
(ii) It recommends that investment for 1. to 4. is not reduced due to the relative critical nature of the items
(iii) It can undertake 'scalable' investment in 5. to 6. but if implemented is expected to result in increased wastewater overflows, water loss and therefore reactive responses.

In practice Priority One (P1) events such as health and safety risk take priority over utilisation of discretionary budget items – which is understood to be 5. – 6. above.

7.3.1 Operations and maintenance requirements

7.3.1.1 Addressing Strategic Priority One

Operational and maintenance strategies address Strategic Priority 1- Looking After Existing Infrastructure. The operational and maintenance activities cover the practices for optimising operation and maintenance activities to ensure:

- Reliable supply of safe water
- Achieve the optimum use of the asset at the agreed service levels
- Keeps the Three Waters facilities suitable, accessible, safe and well maintained
- Minimise total maintenance costs
- Levels of service are achieved across 3 Waters
- Compliance requirements are met

The strategic operational investment categories – see

Table 7-3. used at Wellington Water and the benefits and trade-off risks of funding, or not funding these, respectively.

Table 7-3: Operational investment benefits and risks

Investment category	Description	Investment value	Risk if not funded
Wellington Water opex	The operational budget for Wellington Water Limited.	A business that provides strategic advice and services to manage the operation and delivery of three waters services across our region.	No management of any processes or expenditure, no asset management improvement
Operations	The operation of assets to provide three waters services	The actions that make the services operate. The operation of processes and assets to make them work	Services not provided to customer
Monitoring	The recording, observation and review of services performance metrics	The required observation and reporting on the performance of services to ensure effective and efficient operations	Poor operations performance Consent non-compliance
Maintenance (Planned)	Proactive actions to prevent failure or performance	Reduces the likelihood of reactive service interruptions	Increased frequency of services failures or deterioration
Maintenance (Reactive)	Restoring the functional capability of assets to be operated to provide three waters services when they fail, or performance deteriorates	Allows the continued operation of three waters services across our region	Services failures or deterioration
Investigations	The examination of performance or current or future states	Improves the understanding of the current or future state or performance of the water service or its components. Identifies the need for change or future investment	Unexpected outcomes occur with no forward knowledge and inability to plan and make informed investment decisions
Strategy, policy, systems, procedures and standards	The scoping, development and implementation of strategic and systematic changes to business delivery	Alignment with strategic outcomes being sought by Clients and provide direction and process on how to achieve them	Poor strategic alignment and direction causing inefficient expenditure or failure to be positioned to meet future needs
Investigations	The examination of performance or current or future states	Improves the understanding of the current or future state or performance of the water service or its components. Identifies the need for change or future investment	Unexpected outcomes occur with no forward knowledge and inability to plan and make informed investment decisions

7.3.2 Operations Process and Asset Maintenance (Operational Prioritisation)

In most cases, the funding available for operational and maintenance activities will not cover all potential activities. For this reason, WWL need to be able to prioritise the types of activities that are undertaken first. WWL also link all activities undertaken back to achieving a strategic priority.

A high-level summary of the order of operational investment priorities is provided in Figure 7-2.

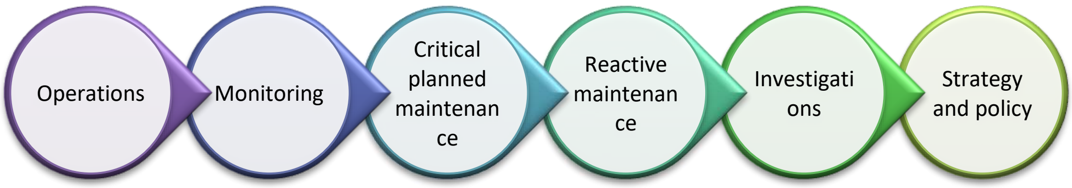


Figure 7-2: Operational priorities

Table 7-4 links the investment category shown above with a strategic priority.

Table 7-4. Strategic priority investment activities

Strategic Priority	Investment category	Types of activities included
Looking after existing infrastructure	Wellington Water operations	• Business leadership • Corporate functions • Management services
	Operations	• Operators' remuneration and associated HR costs • Operational contracts • Energy • Chemicals • Pest control • SLA agreements
	Monitoring	• Global consent monitoring, water quality monitoring (drinking water), freshwater quality monitoring, Beach Quality monitoring, rain gauge monitoring • Service compliance and operational performance monitoring
	Maintenance (Planned)	• Planned maintenance on each asset class (e.g., network, treatment plant) and includes activities such as inspection, pump checks, calibrations, flushing, earthquake trigger testing, SCADA licensing and support contracts
	Maintenance (Reactive)	• Reactive maintenance split by asset class (e.g., network, treatment plant), reactive CCTV inspection, reactive water leak repair
	Investigations	• Planned condition assessment programmes such as MCAR, linked to criticality • Inspection and condition assessments • Sanitary assessments, Water quality investigations, H&S assessments, specific incident investigations and renewals Backflow survey
	Strategy, policy, systems, procedures and standards	• Proposed Natural Resources plan appeals process, Whaitua process, district plan review support, zone operational plans
Supporting growth	Operations	
	Monitoring	
	Maintenance (Planned)	• Leak repair
	Maintenance (Reactive)	
	Investigations	• Growth studies • Model maintenance
	Strategy, policy, systems, procedures and standards	• Integrated planning

Strategic Priority	Investment category	Types of activities included
Sustainable water supply and demand	Operations	
	Monitoring	• Education
	Maintenance (Planned)	• Monitoring of SAM's
	Maintenance (Reactive)	
	Investigations	• Active leakage management • Private leakage inspection, • Proactive leak detection • Roving teams for private leakage Benchmark extraordinary commercial users
	Strategy, policy, systems, procedures and standards	
Improving environmental water quality	Operations	
	Monitoring	• Overflow and flow monitoring
	Maintenance (Planned)	• Maintenance of assets
	Maintenance (Reactive)	• Inflow and infiltration reduction
	Investigations	• Investigations including pressure testing Private infrastructure inspection • Drainage investigation (Roving) crews • First flush stormwater diversion
	Strategy, policy, systems, procedures and standards	• Green infrastructure guidance and bylaws Policy, guidance
Net zero carbon	Operations	• Communication - Support to council on climate change community engagement
	Monitoring	• Sea level rise and increase in rainfall monitoring
	Maintenance (Planned)	
	Maintenance (Reactive)	
	Investigations	• Sludge treatment review of requirements • Energy efficiency assessments • Climate change flooding impact vulnerability assessment
	Strategy, policy, systems, procedures and standards	
Localised issues • Reducing flood risk • Seismic resilience • Firefighting water supply	Operations	
	Monitoring	
	Maintenance (Planned)	
	Maintenance (Reactive)	
	Investigations	• Stormwater catchment planning • Seismic strengthening assessments • District plan flood hazard mapping • Stormwater model maintenance
	Strategy, policy, systems, procedures and standards	

7.3.3 Non-Asset Solutions

In taking a strategy-led approach to investment and a focus on outcomes, we acknowledge that capex solutions are but one of the tools at our disposal. There are also many courses of action that don't require capital investment and may offer better, more effective solutions depending on the circumstances. These are collectively termed non-asset solutions and cover an array of activities that are carried out to deliver on our outcomes. We will consider non-asset solutions prior to determining to pursue a capital investment option. Some examples of these are given in **b**

Table 7-5: Non-asset solutions

Investment category	Possible responses
Operations	• Pump station and treatment plant optimisation • Service delivery options • Collaboration with other utility operators • Changes in sludge management • Promotion and education regarding network issues • Community Groups
Planned maintenance	• Planned maintenance identified for all asset classes starting with the highest criticality first • Leakage management • Early warning systems
Investigations	• Asset condition information to inform investment decisions • Hydraulic Modelling to provide a better understand of demand • Inflow and infiltration reduction • Population growth assessments • Vulnerability modelling • Improving technology
Strategy, policy, systems, procedures and standards	• Bylaw reviews • Building controls • Design Standards • Active involvement in district plan changes and other major consents/development processes • Catchment planning • Working group participation • Advocacy on national issues

7.4 Renewals plan

Renewal, rehabilitation and improvements (including capital works) are defined along with investment projections. Each of the shareholder councils Part 3 documents have detailed the renewals profiles including backlog and forward programme.

7.4.1 Definitions

Definitions are provided as follows:

- **Capital / Improvement: Levels of Service (LOS) improvements and growth**. Improvements to parts of the networks not currently achieving service objectives - levels of service (LOS) improvements, and in network service capability to accommodate growth – growth improvements.
- **Rehabilitate:** increase the life of an asset by making improvements to the existing asset e.g., lining.
- **Renewals**: provide for the progressive replacement of parts of the networks that have reached the end of their useful lives.

7.4.2 Confirming the renewals extent

To improve network reliability, Wellington Water recommends renewing and upgrading the network based on performance and criticality, as well as improving service performance and capacity.

Capturing better data will improve the quality of decisions and enable more prioritised and targeted investment. We are proposing an investment strategy to improve performance by reducing the backlog (and risk) in renewals over the next 30 years. Specific renewals budgets are proposed aimed at achieving a sustainable asset base that is renewed at a pace that matches deterioration. These budgets have been built from:

- Requirements for treatment plants, reservoirs and storage, pump stations and pipe networks
- Looking at forward requirements over the lifecycle of the asset base
- Retain a level of budget for reactive renewals (based on history) to ensure that failed items can be replaced immediately

Notes:

i. Renewals needs are heavily dominated by pipe networks
ii. The recommended programme has been prioritised to achieve a balance between critical and non-critical assets

Deferral of renewal projects is resulting in increased service failures. These are observed by the customers as interrupted water supply (no water), increasing pipe leakage and bursts, unplanned overflows from wastewater pipes. Across all failure modes, there is a resulting elevated health and safety risks e.g., contaminated water, collapsed roads, paths. Further there are consequential increases in unplanned (reactive) maintenance costs.

7.4.3 Renewals approach- long term stewardship

WWL's approach to asset renewal focuses on long-term stewardship of the asset, which means planning for renewals at a pace that meets asset deterioration over time, according to the lifecycle of the asset. Based on this key principle, a renewal profile was developed using the following approach:

- Determine expected life of an asset based on age and material for every pipe
- Identify current backlog of pipes past their expected life
- Provide consistent regional approach to estimating replacement costs based on valuation data (assuming like-for-like replacement)

The asset renewal raw data produces a complex spend profile that is difficult for councils to manage and fully afford. To address this, the required spend was simplified using the following philosophy:

- A sustainable level of investment over 30 years; if extended, the backlog could not be addressed
- Year 1-2 spend is at the same level as forecasted in the LTP, which focuses on "no regrets" capex projects
- From year 3, programme spend is increased over two LTP cycles to reach a steady state by year 7
- A renewed focus on condition assessments (increased Opex spend the next 3-5 years) to provide better field data to determine the most critical projects going forward
- A reduction in reactive maintenance costs is not expected until years 8-10

There is a level of cost estimation risk (excludes contingency or risk uplift) concerning the renewal profile based on the latest valuation data, as actual costs could be different from those modelled.

7.4.4 Renewals forecasting

Note the regional three waters networks renewal profile figure is to be provided at a later date.

The combined three waters networks renewal profile is provided in [Figure to be provided].

The annexes to this section contain the renewal profile per water.

7.4.5 10- and 30-Year Programme Investment Forecasts

This section should be read in conjunction with the Annexes containing water supply, wastewater and stormwater 10- and 30-year investment forecasts.

7.4.5.1 Three waters – 10 Year operational forecasts

Note the regional three waters 10-year operational forecast figure is to be provided at a later date.

The break-down of operational investment for the three waters is provided in [Figure to be provided]. Future increases in Opex costs are likely due to increasing regulatory requirements driven through consent renewal, achieving compliance and future maintenance contract costs.

The annexes to this section contain the 10-Year operational forecasts per water.

7.4.5.2 Capital works drivers

Asset creation through capital works is the process driven by consumer growth or levels of service and most importantly water safety drivers. New capital investment involves the design and construction of new assets that will increase the capacity and/or performance of the Three Waters networks.

Key Asset Creation Drivers include:

- To meet legislative compliance including DWSNZ where possible
- To meet the demands of growth by supplying water to Council's customers through efficient utilisation of natural resources
- To meet the levels of service with respect to safe and effective supply of water in every town where applicable.

Shareholder Council specific 24/34 LTP outcomes are provided in each respective Part 3 AMP (refer s7.6.2)

Three waters capital planning priorities include:

- Asset condition assessments
- Asset data updated based on assessments
- Improvement of asset data quality and completeness
- Improvement and further development of renewals planning and programme development
- Review of Capital delivery framework

- Responding to legislative and compliance requirements.

A capital works project can incorporate one, two or all three of these categories. An example of the types of activities is shown in Table 7-6.

Table 7-6: Strategic capital investment

Strategic Priority	Investment category (LGA link)	Types of activities included
Looking after existing infrastructure	Renewals	Renewal or rehabilitate assets, this is the dominant investment type for this strategic priority. New assets will need to be added onto the renewals programme once constructed.
	Level of service	Improvement of asset to meet standards (e.g., drinking water quality, health and safety)
Supporting growth	Growth	Construction of new assets to service growth areas, this includes pipes, pump stations, wastewater storage, water sensitive urban devices and reservoirs.
	Level of service	Construction of new assets or upgrade of existing assets to enable growth.
	Renewal	When an existing asset is upgraded to cater for growth there can be a renewal component associated with the existing asset.
Sustainable water supply and demand	Level of service	Installation of new assets such as water meters
	Renewal	Renewals to address leakage
Improving environmental water quality	Level of service	Construction of new assets or upgrade of existing assets to improve water quality outcomes
	Renewal	Renewals to reduce inflow and infiltration
Net carbon zero	Level of service	Construction of new assets or upgrade of existing assets to reduce carbon emissions or address sea level rise A major construction consideration is sludge treatment and disposal
	Renewal	Consideration of renewal techniques and materials to consider the effect of carbon.
Localised issues • Reducing flood risk • Seismic resilience • Firefighting water supply	Level of service	Construction new assets or upgrading existing using more resilient materials, to provide a firefighting water supply or mitigating flood risk.
	Renewal	Renewing a pipe with a more resilient material
	Growth	Construction new assets or upgrading existing using more resilient materials, allowing for a firefighting water supply or considering the effect of flooding.

The Annexes contain water specific commentary regarding the drivers for capital works.

7.4.5.3 Three waters – capital programme forecast

Note the regional three waters capital forecast figure is to be provided at a later date.

The 30-year three waters capital forecast is shown in [Figures to be provided]. This covers all investment categories i.e., growth, levels of service, renewals.

The annexes to this section contain the capital programme forecasts per water and commentary regarding:

- The funding challenge
- Allocated funding

10-Year capital works forecast

The following Annexes contain 10- and 30-Year programme forecasts relative to water supply, wastewater and stormwater services.

- 7.A. Water Supply
- 7.B. Wastewater
- 7.C. Stormwater

7.A. ANNEX Water supply 10- and 30-Year programme investment forecasts

7.A.1. 10-Year Operational Forecasts

The break-down of operational investment for the water supply activity is provided in the figures and tables below. Future increases in Opex costs are anticipated due to increasing regulatory requirements and future maintenance contract costs.

With respect to water supply there has been a focus on leakage repair reporting on the gains made. Additional funding to continue to hold the gains made will be required. The 2024 Annual Report describes the gains.

The operational needs expenditure is approximately $755.5M

Table 7-7: Water Supply - FY24/34 10 year operational investment forecast (values)

Year	Shareholder Council					
	GWRC	WCC	HCC	PCC	UHCC	Grand Total
FY24-25	$27,530,000	$28,052,880	$14,738,433	$4,835,900	$3,194,015	$78,351,228
FY25-26	$29,399,845	$22,978,319	$12,458,567	$4,815,225	$3,194,015	$72,845,971
FY26-27	$30,006,245	$22,731,544	$12,960,032	$4,820,013	$3,194,015	$73,711,849
27/28	$29,996,245	$22,642,285	$13,451,924	$4,824,993	$3,194,015	$74,109,462
28/29	$31,410,595	$22,402,913	$13,423,214	$4,787,172	$3,194,015	$75,217,909
29/30	$31,024,745	$22,132,212	$13,694,857	$4,780,172	$3,194,015	$74,826,001
30/31	$31,135,545	$22,790,760	$14,150,400	$4,780,172	$3,194,015	$76,050,892
31/32	$31,682,395	$22,649,613	$14,144,321	$4,780,172	$3,194,015	$76,450,516
32/33	$31,760,695	$22,470,138	$14,223,067	$4,780,172	$3,194,015	$76,428,087
33/34	$33,119,945	$22,156,453	$14,229,936	$4,787,172	$3,194,015	$77,487,521

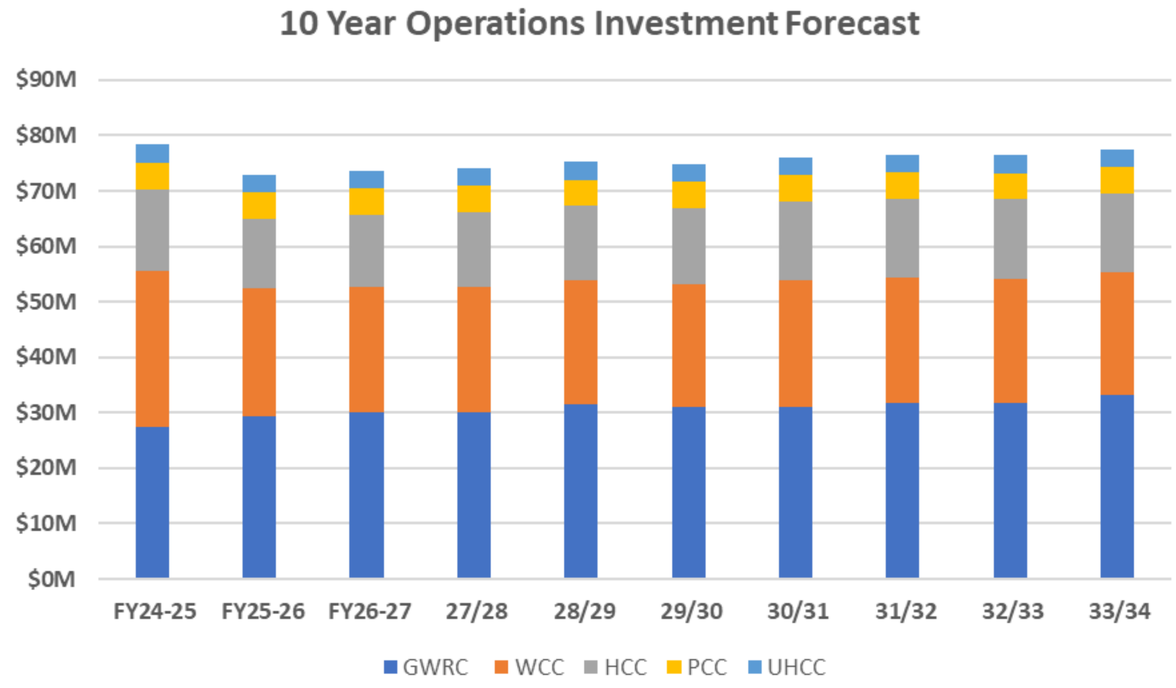


Figure 7-3: Water supply - FY24/34 10 year opex investment forecast (stacked)

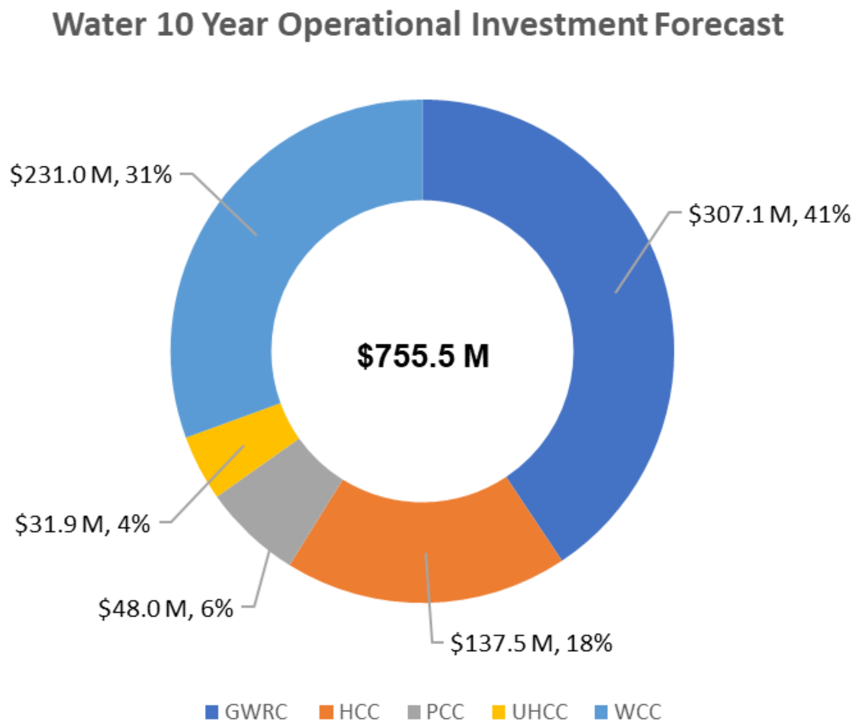


Figure 7-4: Water supply - FY24/34 10 year opex investment forecast (% by Council)

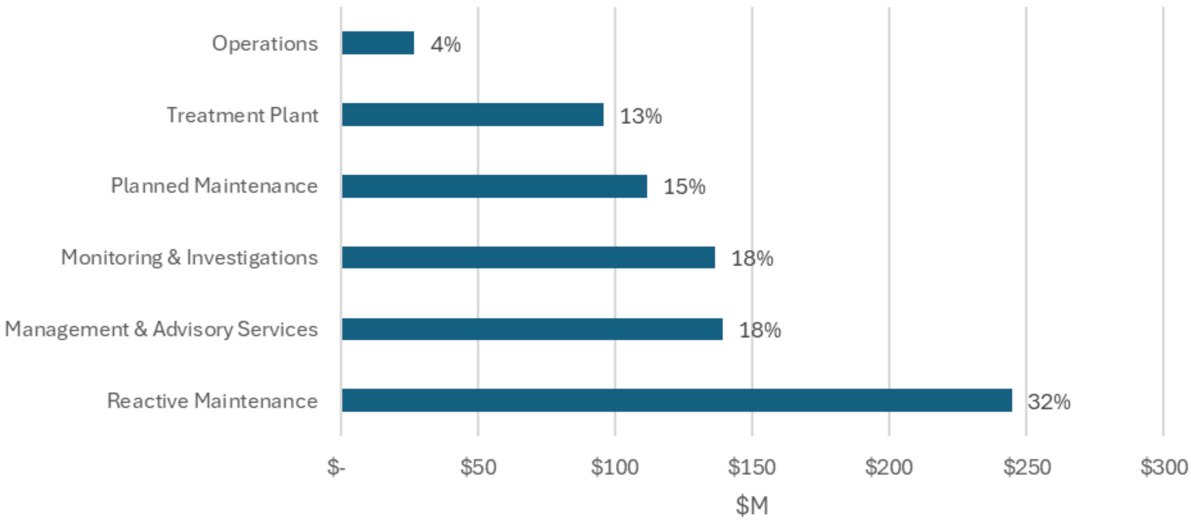


Figure 7-5: Water Supply – FY24/34 10 year opex investment forecast by category

7.A.2. Water Supply Renewals Profiles

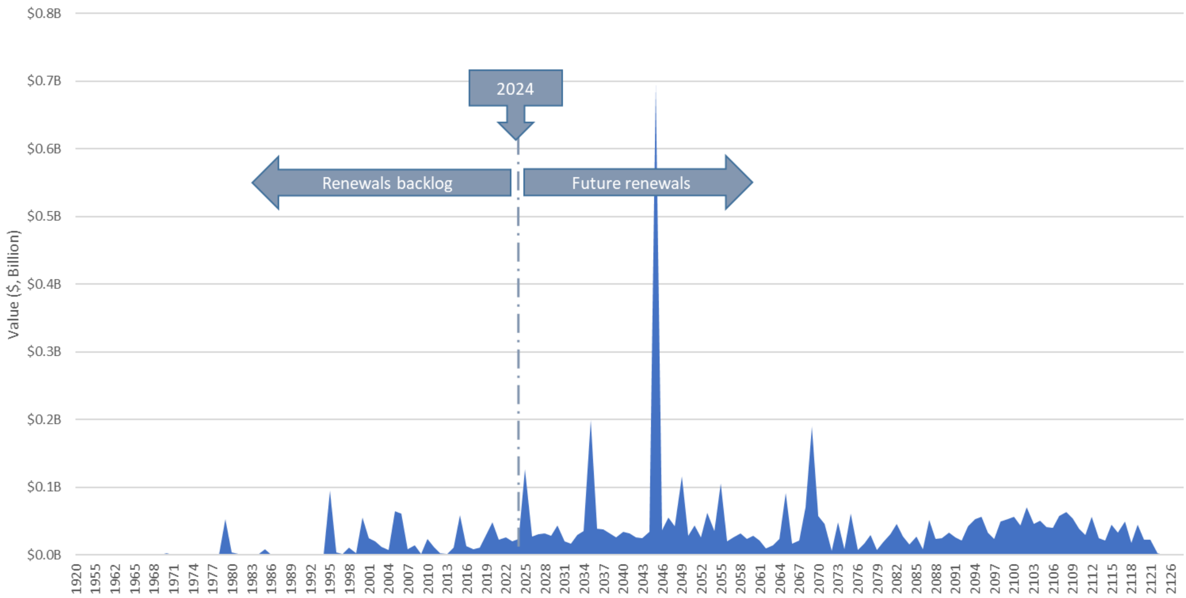


Table 7-8: Water supply renewals profile

Note. c. $0.7B estimate in 2045

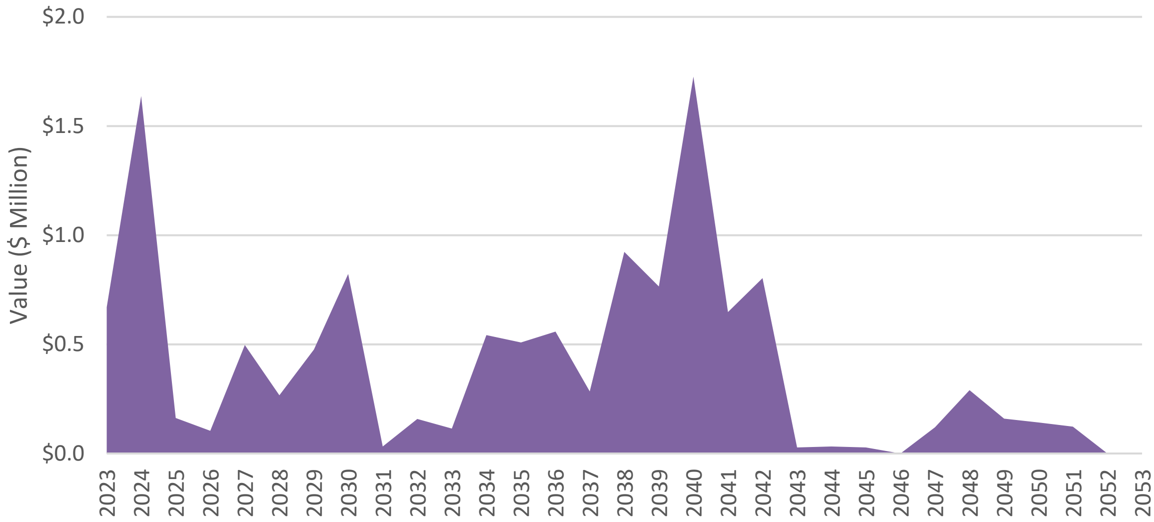
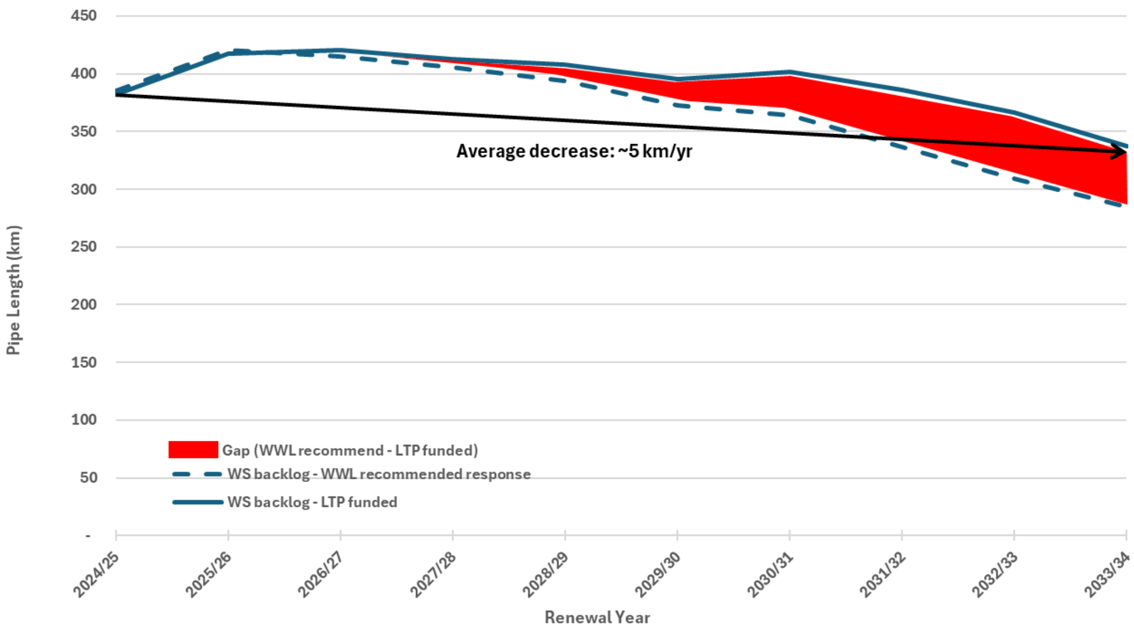


Table 7-9: Water supply – pumpstations renewals profile



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The contribution to the wastewater network backlog from each shareholder council over the 24-34 LTP 10 year period is:

- WCC removes ~1km/yr, equivalent to a 6.6% decrease
- UHCC adds ~0.3km/yr, equivalent to a 28% increase
- PCC removes ~0.16km/yr, equivalent to a 4.3% decrease
- HCC removes ~4km/yr, equivalent to a 24% decrease
- GWRC removes ~0.4km/yr, equivalent to a 58% increase

7.A.3. Capital Works Drivers

Water supply capital planning priorities include:

- Resource consent review and improvement programme to ensure all consent conditions are met on time
- Ongoing Drinking Water Safety infrastructure upgrade programme implementation
- Drinking water standards compliance
- Investigations and master planning for water supply expansion in the district.

7.A.4. Capital Programme Forecasts

WWL have through a series of advice notes provided shareholder councils with the recommended investment requirements which would over time result in control of Opex costs. Shareholder councils determined individually their funding, advising WWL of this in 2024 through the LTP 2024-2034 programme.

7.A.4.1. The Funding Challenge

The 30-year water supply capital forecast – see Figure 7-6 and Table 7-10, covers all investment categories i.e., growth, levels of service, renewals.

Investment Projections. Funded and partially funded values [blue and red bands] are taken directly from the shareholder councils adopted LTP 2024/2034. The 'need' funding profile [grey band], is based on the submission to the National Transition Unit (for Entity C) of June/July 2023 and covers all assets including networks, reservoirs, pumpstations and control systems.

Risks to achieving Levels of Service. The gap between funded and partially funded investment and the investment 'need' maybe observed by customers through increased water supply network leakage and possible water contamination events at reservoirs. Further risks are identified in the Risk section of this document.

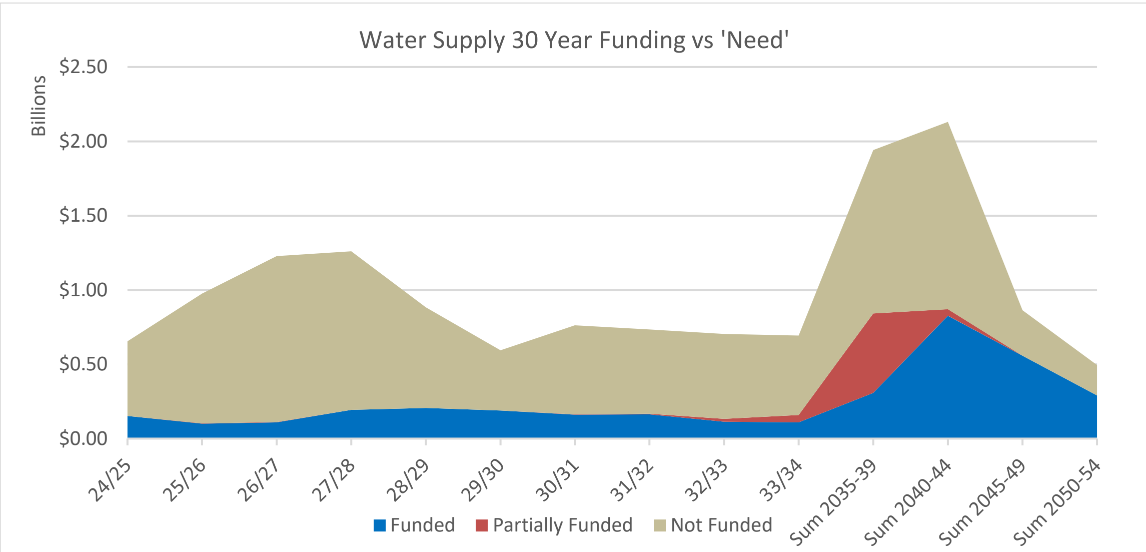

Figure 7-6: Water Supply funding challenge

Table 7-10: Water Supply funding challenge (values)

Financial Year	Funded($M)	Partially Funded($M)	Not Funded($M)	Total($M)
24/25	151.99	0.20	501.16	653.35
25/26	100.15	2.00	874.20	976.35
26/27	108.93	2.00	1,116.44	1,227.37
27/28	192.18	1.10	1,067.74	1,261.02
28/29	205.68	-	676.43	882.12
29/30	188.59	-	405.59	594.18
30/31	161.87	1.10	599.84	762.81
31/32	162.13	5.44	566.83	734.40
32/33	112.74	19.56	571.53	703.84
33/34	109.39	48.68	535.65	693.73
Sum 2035-39	306.68	535.76	1,098.02	1,940.46
Sum 2040-44	825.98	45.00	1,259.76	2,130.74
Sum 2045-49	556.93	-	307.13	864.06
Sum 2050-54	289.70	-	204.57	494.28
Total	**3,472.96**	**660.85**	**9,784.89**	**13,918.70**

7.A.4.2. Allocated Funding

Figure 7-7 shows the funded and partially funded investment agreed with the metropolitan shareholder councils.

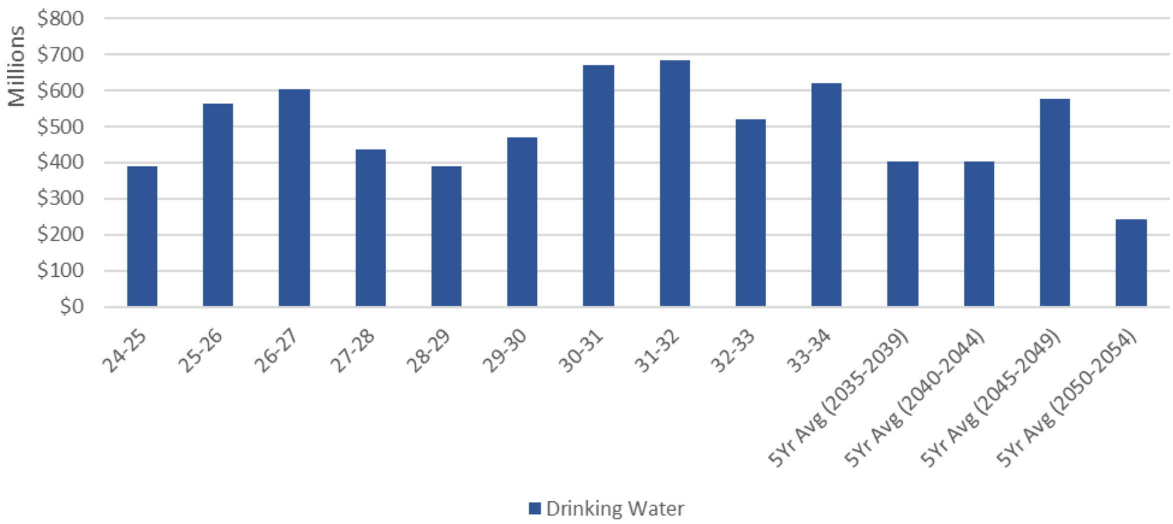

Figure 7-7: Water supply - 30 year capital investment profile as adopted by shareholder councils

Notes.

i) includes funded and partially funded investment,
ii) period beyond 2034 (2024-2034 LTP) aggregated in five year blocks.

The allocation between growth, levels of service and renewals is provided in Table 7-11.

Table 7-11: Water supply - 30 year investment profile by capital sector

Financial Year	**Water Supply ($M)**		
	Growth	Levels of Service	Renewals
Approximate % of total investment	30	31	39
24-25	97.950	139.762	152.357
25-26	130.591	285.957	147.878
26-27	140.704	329.035	133.778
27-28	118.549	169.465	147.265
28-29	109.385	109.710	170.684
29-30	182.204	102.898	183.437
30-31	356.369	139.818	174.964
31-32	343.319	175.186	166.537
32-33	260.248	105.195	155.795
33-34	257.675	182.067	179.055
5Yr Average (2035-2039)	138.109	120.770	143.005
5Yr Average (2040-2044)	56.308	106.332	239.409
5Yr Average (2045-2049)	188.360	195.966	193.600
5Yr Average (2050-2054)	34.058	68.693	140.336
	4.081.167	4.197.900	5.193.503

7.B. ANNEX Wastewater 10- and 30-Year programme investment forecasts

7.B.1. 10-Year Operational Forecasts

The break-down of operational investment for the wastewater activity are provided in is provided in the figures and tables below. Future increases in Opex costs are anticipated due to increasing regulatory requirements and future maintenance contract costs.

The operational needs expenditure is approximately $640.5M

Table 7-12: Wastewater FY24/34 10 year operational investment forecast (values)

Year	Shareholder Council				
	WCC	HCC	PCC	UHCC	Grand Total
FY24-25	$33,121,951	$18,572,741	$6,021,084	$5,843,585	$63,559,360
FY25-26	$33,315,756	$18,892,513	$6,049,583	$5,881,668	$64,139,520
FY26-27	$33,251,468	$18,829,596	$6,078,267	$5,908,508	$64,067,839
27/28	$33,360,477	$19,003,456	$6,107,138	$5,925,317	$64,396,387
28/29	$33,594,022	$19,088,653	$6,150,822	$5,964,565	$64,798,061
29/30	$33,809,208	$18,837,208	$6,151,072	$6,002,444	$64,799,932
30/31	$33,112,890	$18,351,820	$6,066,709	$5,877,785	$63,409,203
31/32	$33,237,539	$18,366,568	$6,076,709	$5,895,425	$63,576,240
32/33	$33,362,127	$18,332,803	$6,086,709	$5,917,625	$63,699,263
33/34	$33,662,239	$18,338,689	$6,110,709	$5,947,685	$64,059,321

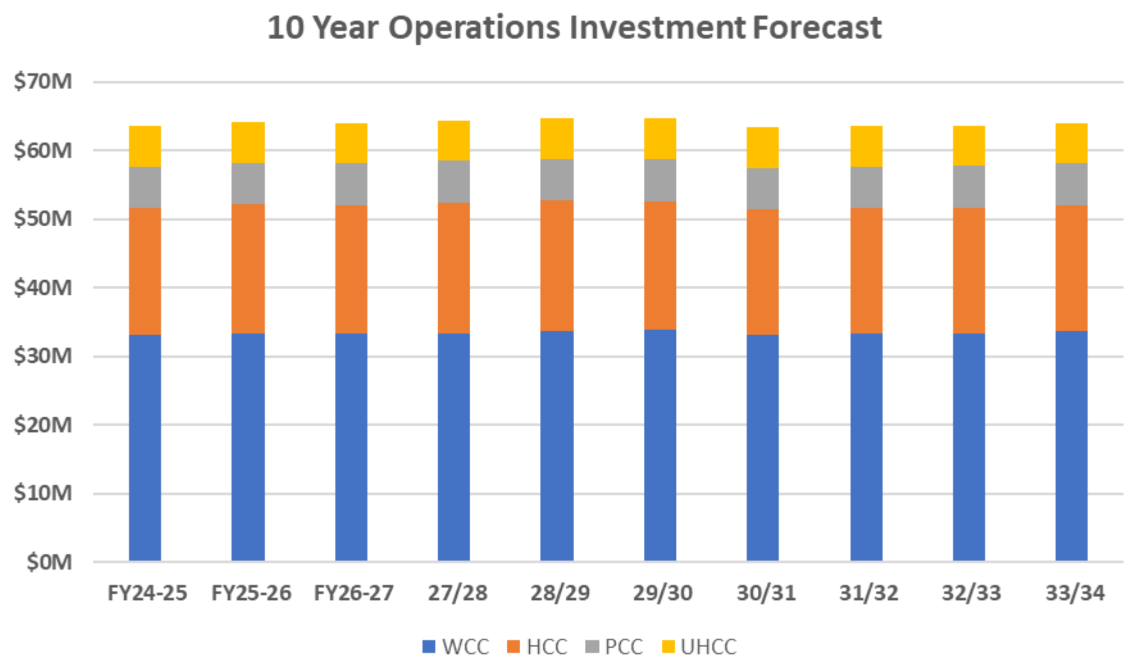

Figure 7-8: Wastewater - FY24/34 10 year opex investment forecast (stacked)

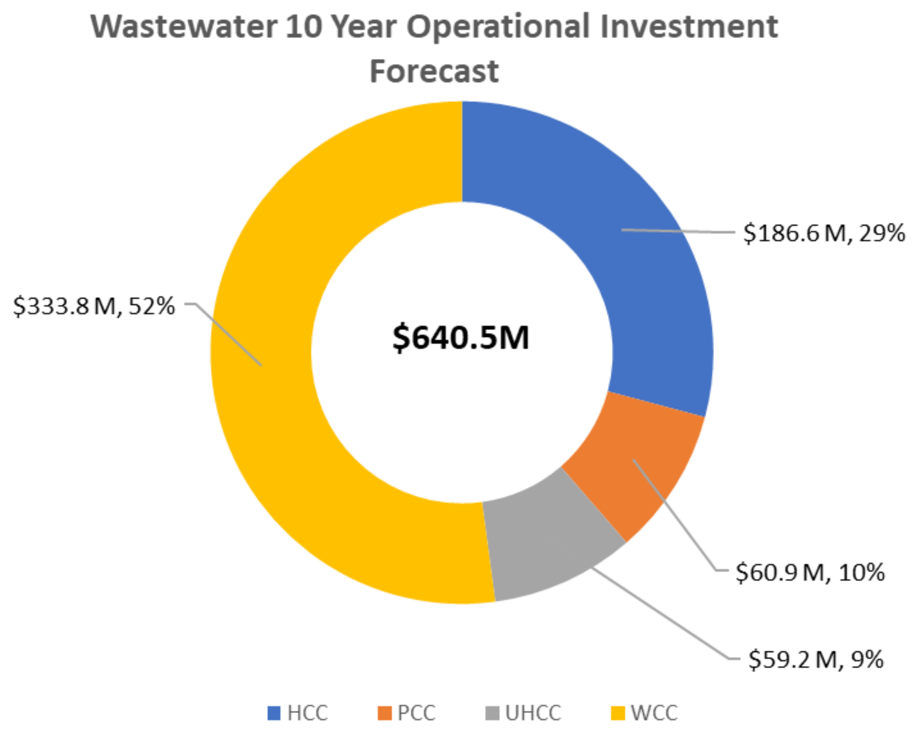

Figure 7-9: Wastewater - FY24/34 10 year opex investment forecast (% by Council)

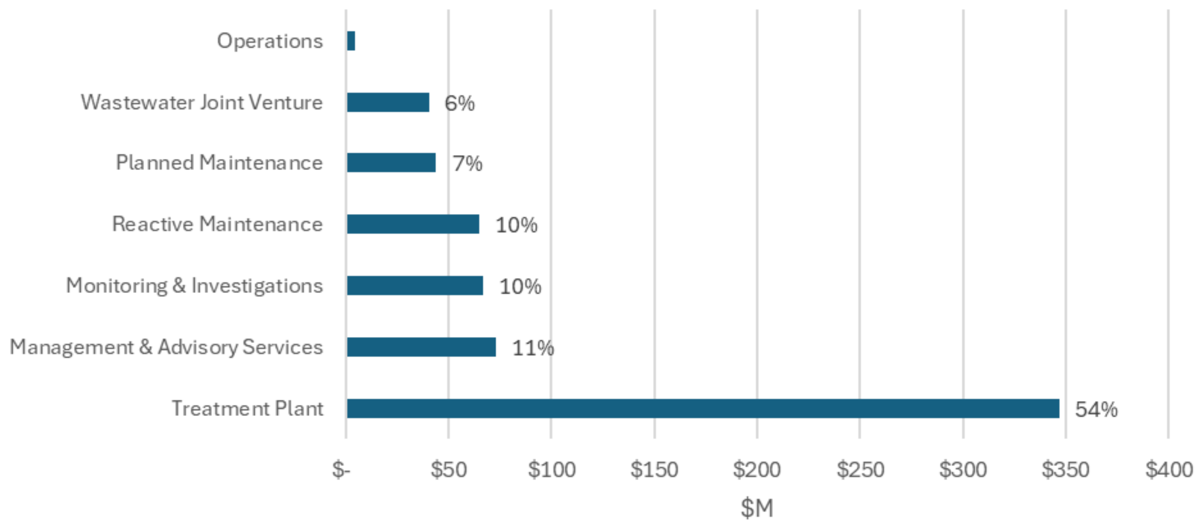

Figure 7-10: Wastewater – FY24/34 10 year opex investment forecast by category

7.B.2. Wastewater Renewals Profiles

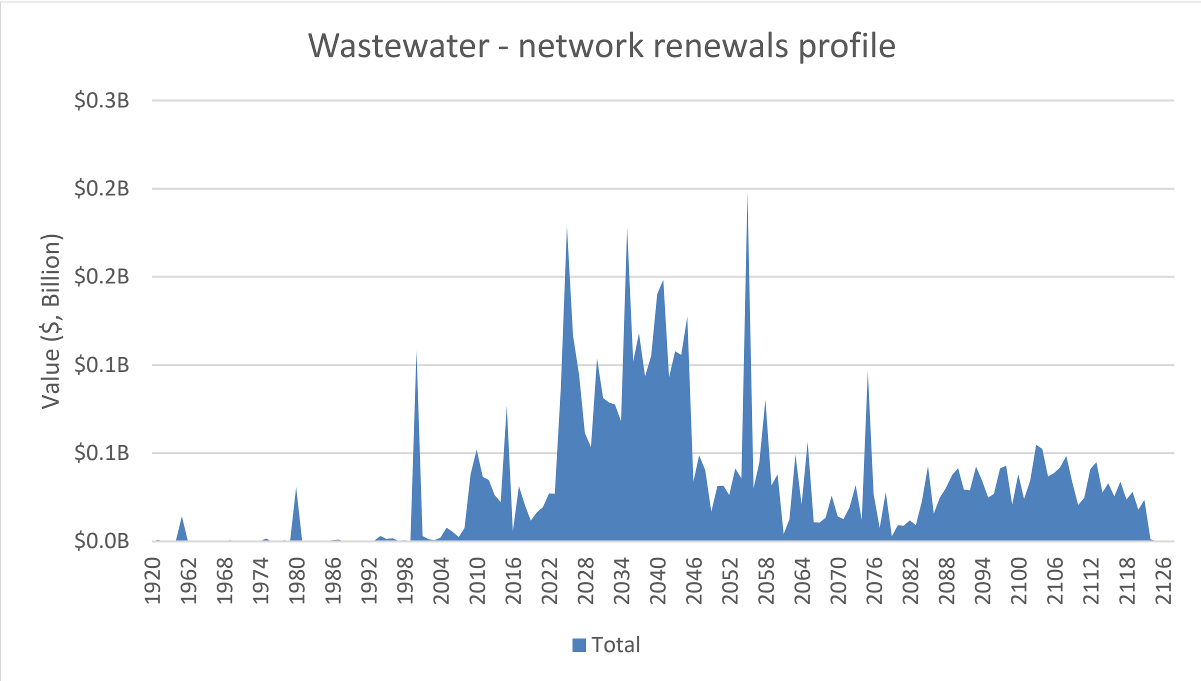

Table 7-13: Wastewater network renewals profile

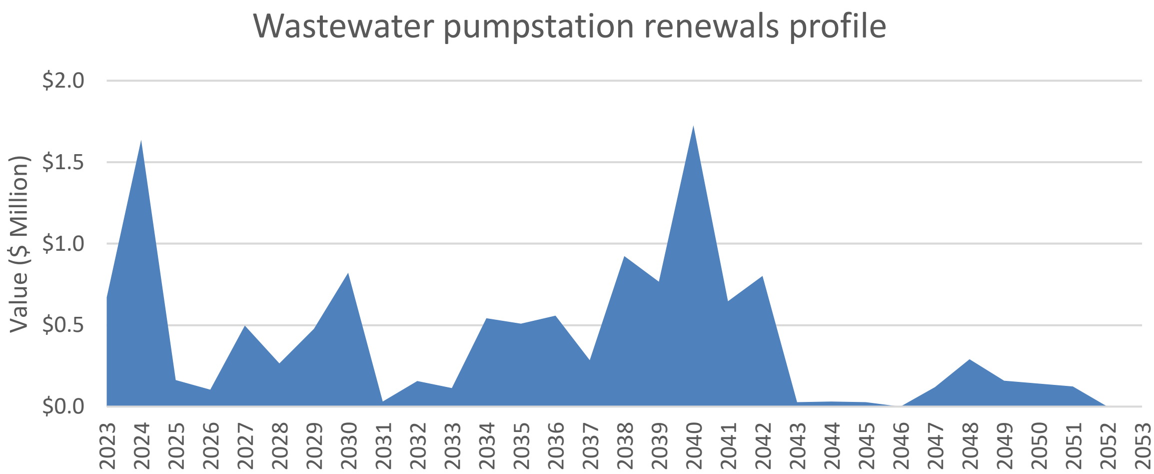

Table 7-14: Wastewater pumpstation renewals profile

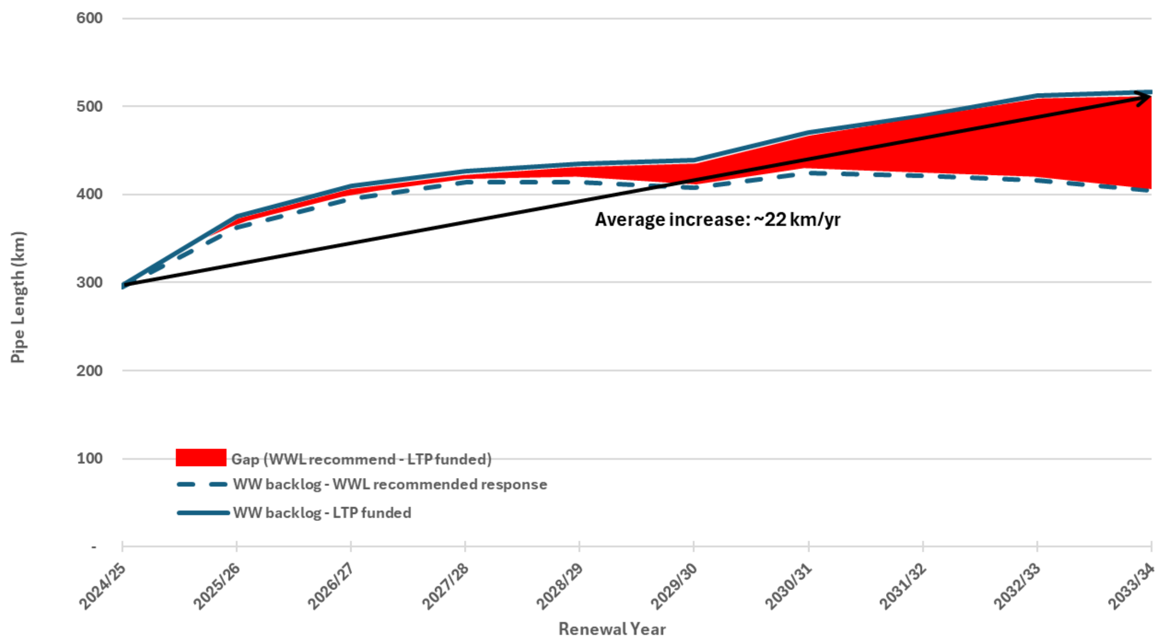

Figure 7-11: Wastewater Network Renewal Backlog - LTP 2024-2034 vs WWL Recommended Funding

The contribution to the wastewater network backlog from each shareholder council over the 24-34 LTP 10 year period is:

- WCC adds ~10km/yr, equivalent to a 48% increase
- UHCC adds ~2km/yr, equivalent to a 127% increase
- PCC adds ~4km/yr, equivalent to a 183% (local) or 193% (local + JV) increase
- HCC adds ~6km/yr, equivalent to a 144% (local) or 113% (local + JV) increase

7.B.3. Capital Works Drivers

Wastewater capital planning priorities include:

- Seeking resource consent and improvement programme to ensure all consent conditions are met on time
- Treatment plant upgrade planning and budgeting in response to performance and emerging changes to discharge quality standards
- Investigations and master planning for wastewater expansion in the district.

7.B.4. Capital Programme Forecasts

WWL have through a series of advice notes provided shareholder councils with the recommended investment requirements which would over time result in control of opex costs. Shareholder councils determined individually their funding, advising WWL of this in 2024 through the LTP 2024-2034 programme.

7.B.4.1. The Funding Challenge

The wastewater service capital forecast – see Figure 7-12 and

Table 7-15 covers all investment categories i.e., growth, levels of service, renewals.

Investment Projections. Funded and partially funded values [blue and red bands] are taken directly from the Shareholder Councils adopted LTP 2024/2034. The 'need' funding profile [grey band], is based on the submission to the National Transition Unit (for Entity C) of June/July 2023 and covers all assets including networks, pumpstations and control systems.

Risks to achieving Levels of Service. The gap between funded and partially funded investment and investment 'need' maybe observed by customers through increased wastewater network overflows into streets and waterways along with surface water contamination events. The impact on communities and the partnership with mana whenua may be negatively impacted. Further risks are identified in the Risk section of this document.

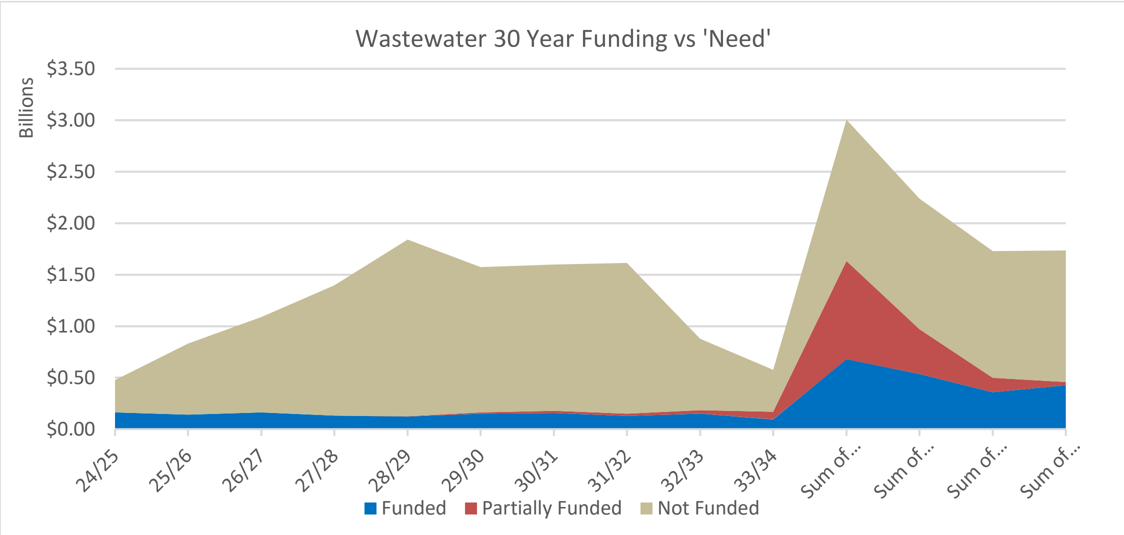

Figure 7-12: Wastewater funding challenge

Table 7-15: Wastewater funding challenge (values)

Financial Year	Funded($M)	Partially Funded($M)	Not Funded($M)	Total($M)
24/25	161.03	0.41	315.27	476.71
25/26	141.82	0.41	687.37	829.61
26/27	162.88	0.41	925.61	1,088.90
27/28	131.31	0.90	1,264.84	1,397.05
28/29	123.06	2.25	1,717.04	1,842.35
29/30	149.11	14.63	1,409.27	1,573.01
30/31	155.79	23.71	1,418.11	1,597.61
31/32	127.54	23.86	1,462.66	1,614.06
32/33	149.13	34.79	694.07	877.99
33/34	95.40	73.78	407.86	577.04
Sum 2035-39	680.10	953.09	1,372.60	3,005.78
Sum 2040-44	536.63	435.54	1,265.79	2,237.96
Sum 2045-49	357.96	140.56	1,229.92	1,728.43
Sum 2050-54	426.40	30.75	1,277.70	1,734.86
Total	**3,398.15**	**1,735.10**	**15,448.11**	**20,581.36**

7.B.4.2. Allocated funding

Figure 7-13 shows the funded and partially funded investment agreed with the metropolitan shareholder councils.

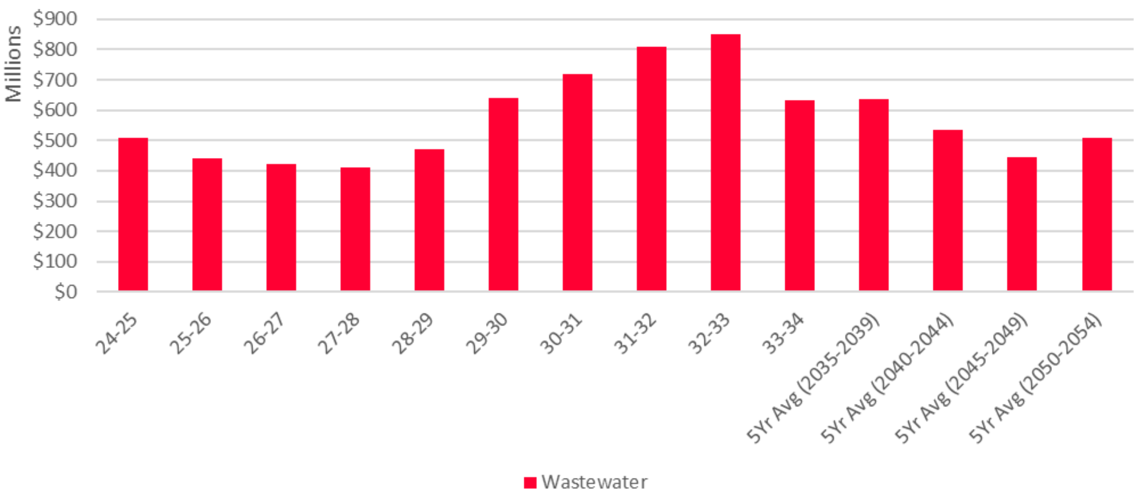

Figure 7-13: Wastewater - 30 year capital investment profile as adopted by shareholder councils

Notes.

i) *includes funded and partially funded investment,*
ii) *period beyond 2034 (2024-2034 LTP) aggregated in five-year blocks,*
iii) *includes join joint venture assets*

The allocation between growth, levels of service and renewals is provided in Table 7-16.

Table 7-16: Wastewater - 30 year investment profile by capital sector

Financial Year	Wastewater ($M)		
	Growth	Levels of Service	Renewals
Approximate % of total investment	9	49	42
24-25	37.875	126.797	345.095
25-26	46.911	148.786	244.990
26-27	19.549	156.306	246.864
27-28	32.907	160.171	217.257
28-29	41.204	214.334	214.547
29-30	68.607	253.758	318.885
30-31	76.129	323.012	320.083
31-32	68.110	350.193	392.122
32-33	66.126	409.671	375.894
33-34	66.329	353.565	213.994
5Yr Average (2035-2039)	85.527	304.920	246.104
5Yr Average (2040-2044)	69.815	256.099	208.289
5Yr Average (2045-2049)	17.732	283.292	144.966
5Yr Average (2050-2054)	8.100	277.113	223.896
Total		**8.103.715.84**	**7.006.006.40**

7.C. ANNEX Stormwater 10- and 30-Year Programme Investment Forecasts

7.C.1. 10-Year Operational Forecasts

The break-down of operational investment for the stormwater activity is provided in is provided in the figures and tables below. Future increases in Opex costs are anticipated due to increasing regulatory requirements and future maintenance contract costs.

The operational needs expenditure is approximately $112.1 M

Table 7-17: Stormwater FY24/34 10 year operational investment forecast (values)

Financial Year	Shareholder Council				
	WCC	HCC	PCC	UHCC	Grand Total
FY24-25	$4,423,976	$4,535,870	$1,443,016	$829,858	$11,232,719
FY25-26	$4,404,732	$4,548,964	$1,435,192	$829,858	$11,218,745
FY26-27	$4,315,795	$4,597,416	$1,401,720	$829,858	$11,144,788
27/28	$4,296,045	$4,661,664	$1,367,869	$829,858	$11,155,435
28/29	$4,301,873	$4,605,177	$1,362,006	$829,858	$11,098,913
29/30	$4,357,388	$4,584,979	$1,368,756	$829,858	$11,140,980
30/31	$4,395,158	$4,614,824	$1,453,119	$829,858	$11,292,958
31/32	$4,411,655	$4,606,155	$1,443,119	$829,858	$11,290,786
32/33	$4,466,543	$4,561,174	$1,433,119	$829,858	$11,290,693
33/34	$4,480,115	$4,548,419	$1,402,119	$829,858	$11,260,510

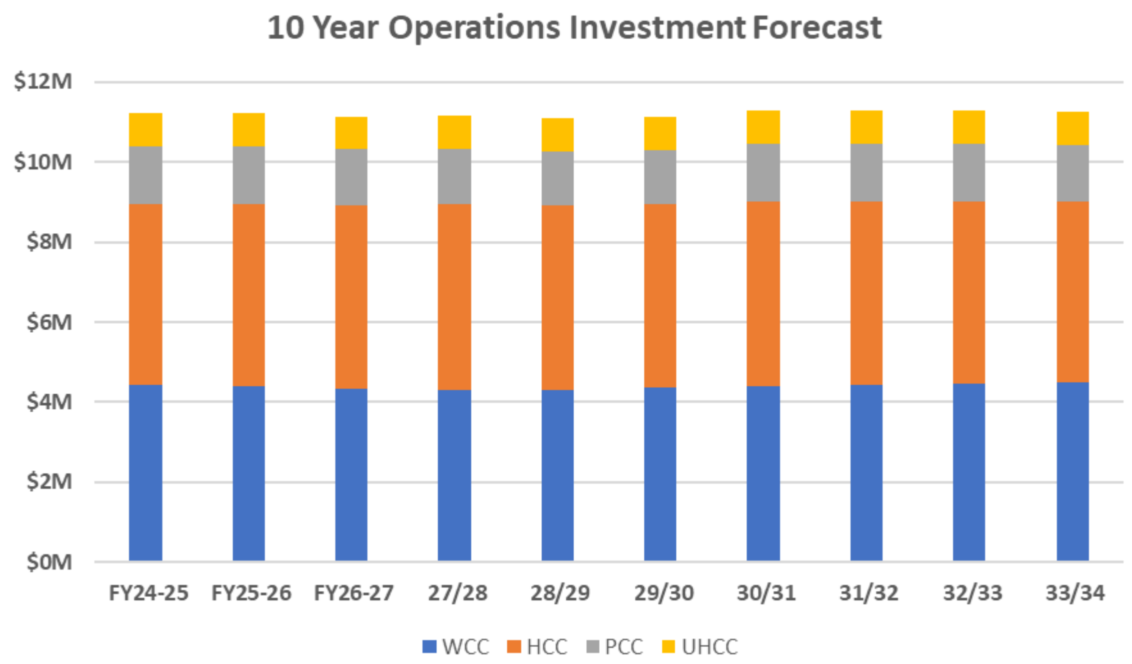

Figure 7-14: Stormwater - FY24/34 10 year opex investment forecast (stacked)

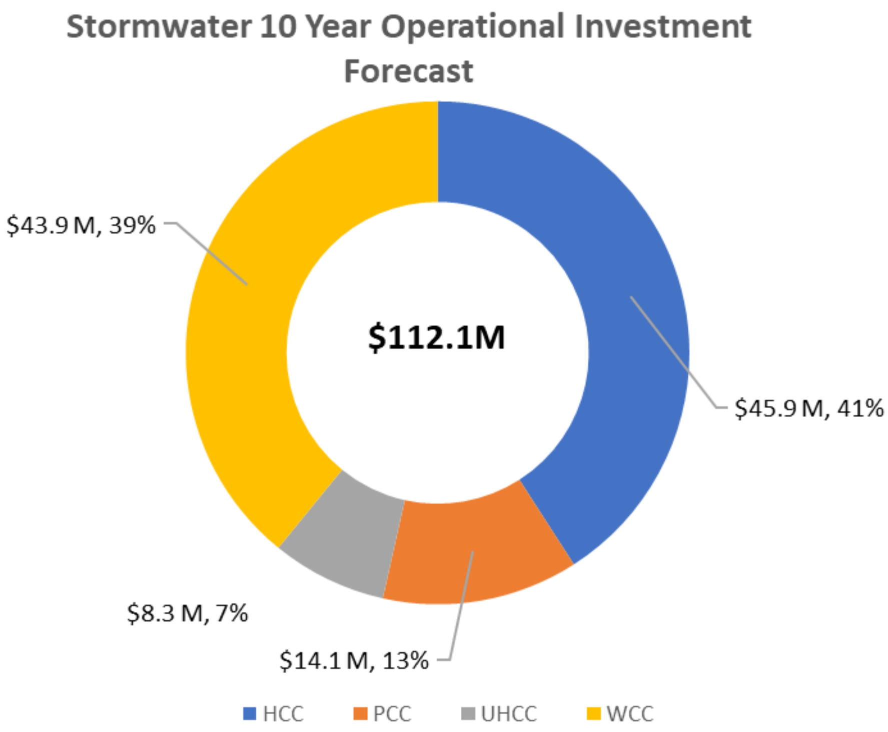

Figure 7-15: Stormwater - FY24/34 10 year opex investment forecast (% by Council)

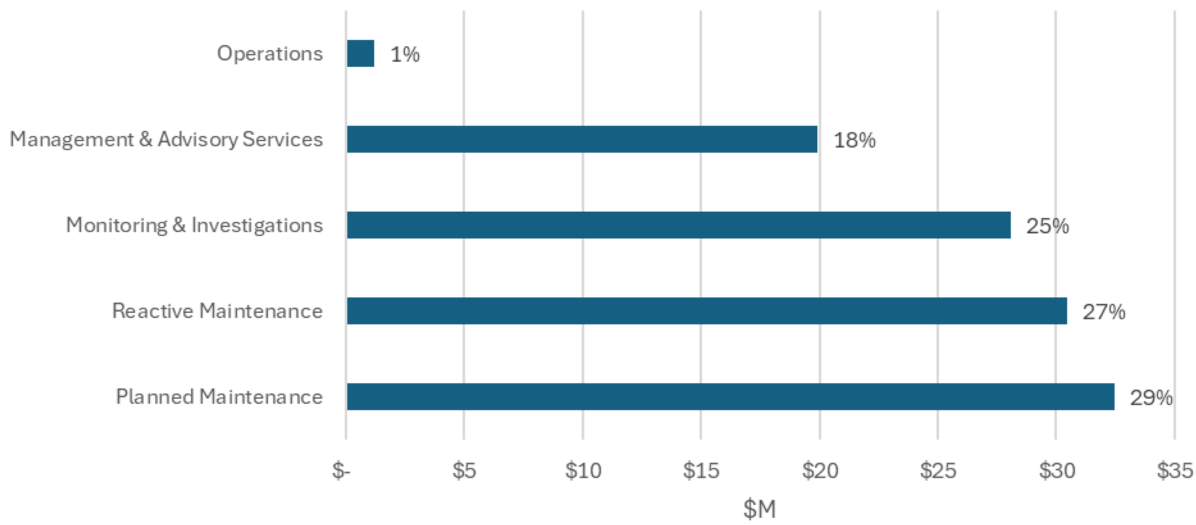

Figure 7-16: Stormwater – FY24/34 10 year opex investment forecast by category

7.C.2. Stormwater Renewals Profiles

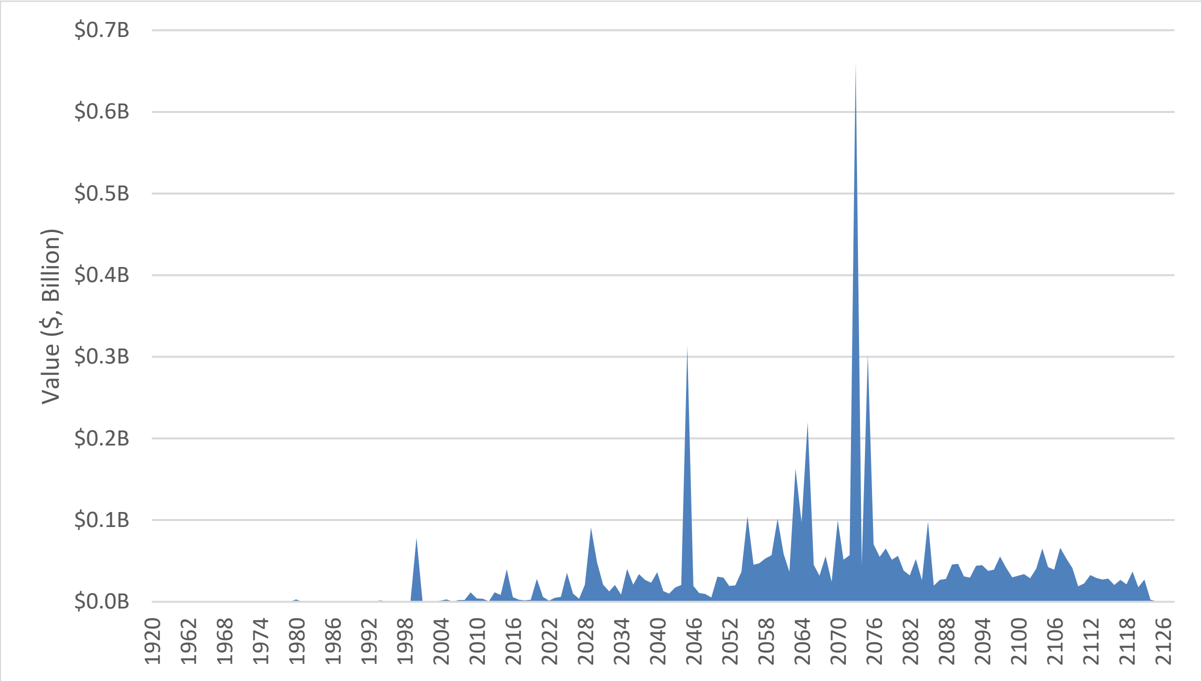

Figure 7-17: Stormwater network renewal profile

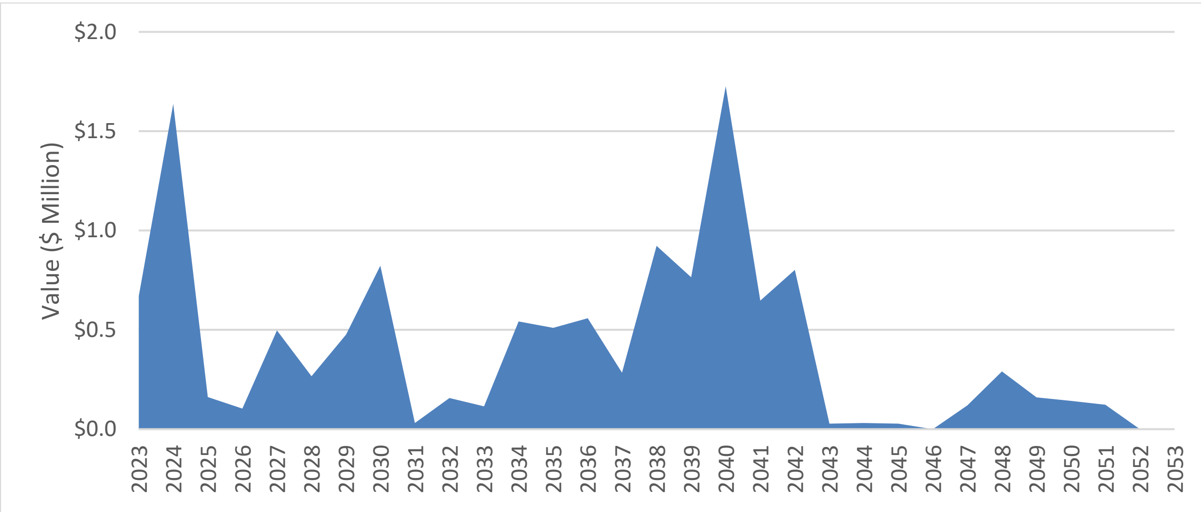

Figure 7-18: Stormwater pumpstation renewals profile

7.C.3. Capital Works Drivers

Stormwater capital planning priorities include:

- Resource consent review and improvement programme to ensure all Regional Plan conditions are met in the required timeframes
- Stormwater scheme planning and upgrade in response to current and emerging issues particularly climate change impacts
- Ensure compliance with comprehensive stormwater discharge consent

7.C.4. Capital Programme Forecasts

WWL have through a series of advice notes provided shareholder councils with the recommended investment requirements which would over time result in control of Opex costs. Shareholder councils determined individually their funding, advising WWL of this in 2024 through the LTP 2024-2034 programme.

7.C.4.1. The funding challenge

The stormwater service capital forecast covers all investment categories i.e., growth, levels of service, renewals.

Investment Projections. Funded and partially funded values [blue and red bands] are taken directly from the Shareholder Councils adopted LTP 2024/2034. The 'need' funding profile [grey band], is based on the submission to the National Transition Unit (for Entity C) of June/July 2023 and covers all assets including networks, pumpstations and control systems.

Risks to achieving Levels of Service. The gap between funded and partially funded investment and the investment 'need' maybe observed by customers through increased extent of flooding (additional to current known flood prone areas). In specific locations this may exacerbate waterway and coastal contamination events where overflow into poorly performing (poor condition) wastewater network renewals results in overflows. Further risks are identified in the Risk section of this document.

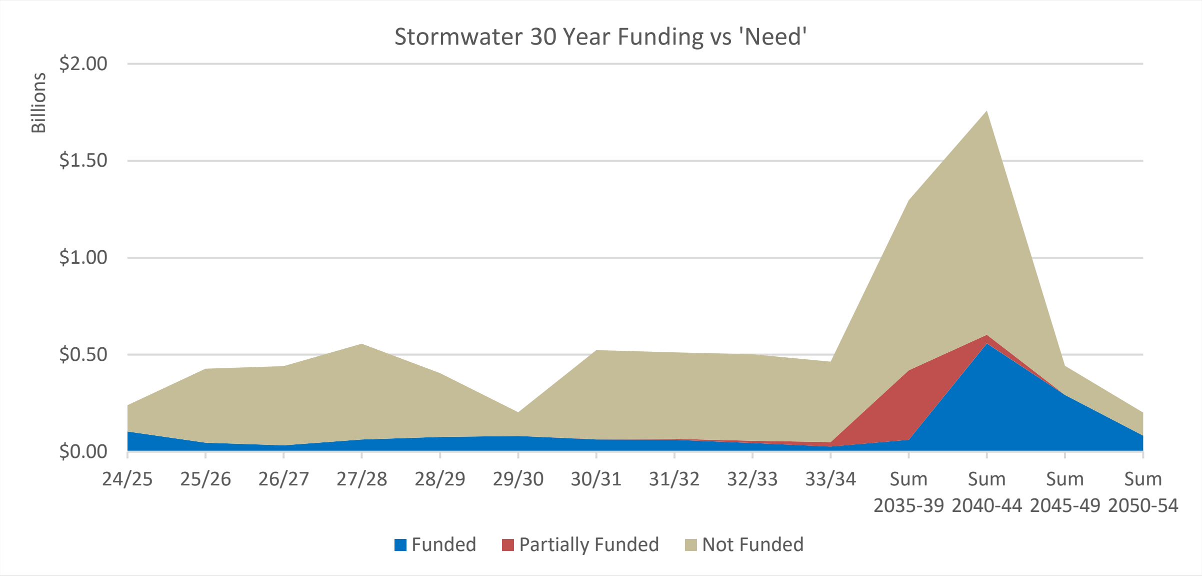

Figure 7-19: Stormwater funding challenge

Table 7-18: Stormwater funding challenge (values)

Financial Year	Funded($M)	Partially Funded($M)	Not Funded($M)	Total($M)
24/25	104.40	-	134.90	239.30
25/26	46.96	-	381.80	428.76
26/27	32.74	-	408.45	441.18
27/28	62.42	-	494.45	556.87
28/29	76.14	-	327.95	404.09
29/30	81.61	-	121.15	202.76
30/31	62.94	1.00	460.14	524.08
31/32	61.18	4.94	446.29	512.40
32/33	45.02	12.16	445.75	502.94
33/34	25.96	23.72	414.29	463.97
Sum 2035-39	60.98	358.40	876.55	1,295.94
Sum 2040-44	557.88	45.00	1,156.02	1,758.90
Sum 2045-49	293.33	-	149.09	442.42
Sum 2050-54	82.79	-	118.85	201.64
Total	**1,594.35**	**445.22**	**5,935.67**	**7,975.25**

7.C.4.2. Allocated funding

Figure 7-20 shows the funded and partially funded investment agreed with the metropolitan shareholder councils.

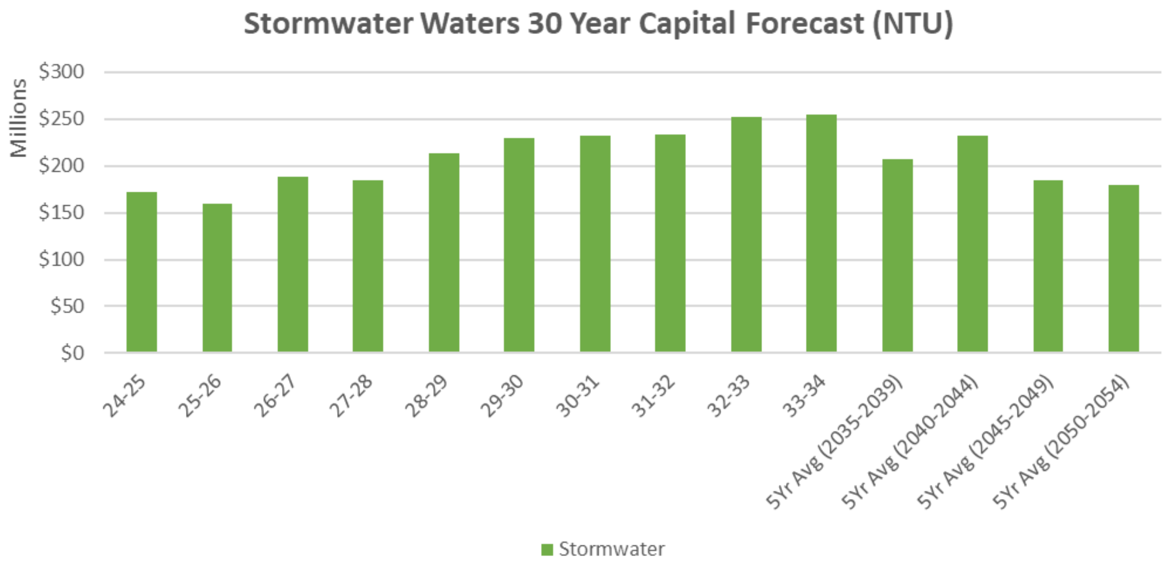

Figure 7-20: Stormwater - 30 year capital investment profile as adopted by shareholder councils

Notes.

i) includes funded and partially funded investment,
ii) period beyond 2034 (2024-2034 LTP) aggregated in five-year blocks

The allocation between growth, levels of service and renewals is provided in Table 7-19: Stormwater- 30 year investment profile by capital sector

Table 7-19: Stormwater- 30 year investment profile by capital sector

Financial Year	**Stormwater**		
Approximate % of total investment	Growth	Levels of Service	Renewals
	34	35	31
24-25	22,726	71,014	78,016
25-26	29,707	75,335	54,655
26-27	48,002	65,545	74,584
27-28	59,590	74,403	50,673
28-29	92,470	65,024	56,221
29-30	98,020	78,584	53,152
30-31	107,345	75,289	49,964
31-32	100,833	83,294	49,226
32-33	111,351	76,810	63,645
33-34	130,586	59,620	64,717
5Yr Average (2035-2039)	95,613	65,954	45,864
5Yr Average (2040-2044)	81,898	63,496	86,191
5Yr Average (2045-2049)	50,920	73,195	60,311
5Yr Average (2050-2054)	27,042	86,728	65,474
Total	2,077,993.00	2,171,781.00	1,884,049.00

8. Asset disposal (abandonment)

Assets are usually disposed of or abandoned when they are no longer able to deliver an acceptable or cost-effective level of service. Assets disposed of are removed from the relevant asset register. This most commonly occurs when assets are replaced, but can also be due to upgrades, network reconfiguration or obsolescence. Removal of a decommissioned asset from service may involve sale, demolition, relocation or abandonment. In all cases, health and safety considerations are paramount, especially when dealing with hazardous materials such as asbestos cement pipes.

An asset disposal plan provides the opportunity to review the configuration, type, and location of assets and service delivery requirements. It also formalises the consideration of liability, obligations and potential opportunities. In most cases (i.e., for reticulation assets) disposal plans may be generic across asset classes. The disposal of unique or site-specific assets such as pump stations may be better considered individually.

Process. The general process for asset disposal is described in Table 8-1.

Table 8-1: Asset disposal and abandonment process

Stage	Comments
1. Analyse factors impacting disposal	Consideration of the relevant factors and desired outcomes from the disposal process including: • **Information** – Retention of asset attribute and history data. • **Hazard mitigation** – Disposed assets and the disposal process don't pose undue risk to property, public health and safety, and the environment. • **Strategic fit** – How the disposal supports organisational goals. • **Financial** – Minimising disposal costs, the avoidance of ongoing maintenance costs, and the realisation of potential value. Consider professional services, physical works and in-house labour. • **Legal** – Addressing legal requirements and obligations related to all of the above.

2. Identify options	Options for disposal can be generally categorised as follows:
	• **Decommission** – Abandon the asset including physical disconnection and making safe. May or may not include establishing maintenance plans to ensure the decommissioned asset remains in a safe state indefinitely. Decommissioned assets may be re-commissioned, repurposed, permanently disposed of or transferred to another entity at a later date.
	• **Repurpose** – A number of options including relocation and the transfer to another function. A suggested priority order for asset repurposing is:
	  ○ within the activity
	  ○ other water services
	  ○ others within the local government authority
	  ○ other strategic partners
	  ○ lease to other utility providers
	• **Dispose** – Permanent disposal including complete removal, in-situ disposal, filling, demolition, site clearing and making safe.
	• **Transfer** ownership – Gifting or sale of the asset to another entity.

3. Select the best option	Evaluate and select the disposal option(s) which best address the factors impacting disposal as listed in stage 1. Record the analysis and rationale supporting the selection.

Stage	Comments
4. Develop and implement programme	Allow for all stages of disposal implementation including where applicable: • Consultation • Planning and design • Physical works and project management • Asset, financial and legal transactions • Update information systems
5. Close-off and review	Ensure all planned steps have been followed. Complete and record process review.

8.1 Legal requirements

Improved asset condition/performance data will allow better planning for disposal of assets through rationalisation of the asset stock or when assets become uneconomic to own and operate. In all cases, asset disposal processes must comply with our obligations under the:

- **Local Government Act 2002**, which covers public notification procedures required prior to sale and restrictions on the minimum value recovered.
- **Reserves Act 1977**, which covers procedures for changing or revoking the classification of reserves, including public notification prior to sale, resolution of objections, and a requirement to first offer surplus to the original owners.
- **Public Works Act 1981**, which outlines offer-back procedures where land was acquired under the terms of the Act.
- **Health and Safety at Work Act 2015**, which requires leadership and action from business, workers and Government towards reducing workplace injury and death tolls.
- **Health and Safety at Work (Asbestos) Regulations 2016**, is a legislative instrument made under and to give effect to the Act, and contain technical details pertaining to asbestos and asbestos containing materials.

Wellington Metropolitan
Water Services Asset Management Plan
2025

Improvement Planning

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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He wai, he wai
He wai herenga tāngata
He wai herenga whenua
He waiora
He wairua
Tis water, tis water
Water that joins us
Water that necessitates the land
Soul of life
Life forever

9. Continual asset management improvement

9.1 Asset management maturity

WWL is committed to continually improve asset management practices, processes, and tools. This is essential to ensure the asset system and services are effectively managed and delivered over the long term.

Asset Management practice is being developed in keeping with the NAMS guidelines as presented in their suite of asset management publications including the 2015 IIMM. Council is committed to delivering the most appropriate levels of service balanced with affordability and good industry practice.

Core and Advanced Asset Management. The Asset Management Policy states that Council is committed to meeting at least core asset management status for all activities. This is the most appropriate status for the scale, value and risk appetite of Council. The appropriate asset management status level will be reviewed periodically – see Figure 9-1.

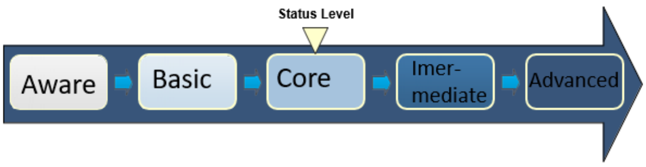

Figure 9-1: Appropriate level of asset management maturity

The last Three Waters asset management maturity assessment was conducted in 2021- see Figure 9-2.

Figure 9-2: Asset management - the continuous improvement cycle

9.2 Asset management improvement plan

Table 9-1 outlines the improvement tasks related to this document. Additional asset management improvement tasks are included in the SAMP, 2021.

Table 9-1: Improvement Plan

<table>
<tr><th>Asset Management Framework Component and Key Questions</th><th>Implications of not achieving appropriate maturity</th><th>Improvement Tasks</th><th>Risk Reference</th><th>Owner</th><th>Timeline</th></tr>
<tr><td rowspan="3">Levels of Service
• Have you defined appropriate level of service for your customers for each of the 3 waters?
• Have you defined appropriate performance measures for each level of service that can be tracked with time?
• Do you use the levels of service criteria for operational and capital investment decision making?</td><td rowspan="3">• Response times to customers unacceptable
• Costs for specific service responses not known and risks that service provided incurs unnecessary costs
• Resource consent compliance (wastewater, stormwater, and drinking water compliance issues occur)</td><td>1. Review service level performance measures as per recommended approach (ref R Blakemore document 2024). Document strict definition of performance measures adopted.

Develop and agree on minimum levels of service for reservoir storage volumes and wastewater overflows beyond which no additional connections will be allowed without mitigation or network upgrade</td><td></td><td>Service Planning</td><td>0-3 yrs</td></tr>
<tr><td>2. Ensure these measures are further expanded as a way of demonstrating the effectiveness and cost of any service request and self-initiated maintenance and operations tasks.</td><td></td><td>Service Planning and Operations</td><td>0-3 yrs</td></tr>
<tr><td>3. Ensure processes are in place for capital works programme project participants to confirm that completed projects achieve the improvement in, or maintenance of service required, that was originally briefed and reasons for departure from this brief.</td><td></td><td>Service Planning and Programme Management</td><td>0-3 yrs</td></tr>
<tr><td rowspan="5">Demand Forecasting and Management of Infrastructure for growth
How well do you:
• forecast demand for each of the 3 waters services (including impacts of climate change)?
• assess the possible impact to asset portfolios?
• evaluate demand management options as part of its network and/or project analysis?</td><td>Reduced levels of service forecasted in next 10 years because of predicted impact of planned developments and climate change</td><td>4. Develop stormwater catchment management plans that include costed options to mitigate flood damage from adopted service levels (Taks 1 including adopted climate change scenarios). Costed options within plans to include adaptation and do nothing.</td><td></td><td>Modelling</td><td>3-10 yrs</td></tr>
<tr><td rowspan="2">Limited storage capacity for outages and high demand periods (all 3 waters)</td><td>5. Local water supply reservoir storage or zone plans that address growth scenario assumptions and enable storage development that is staged over time.</td><td></td><td>Network Engineering/Modelling</td><td>3-10 yrs</td></tr>
<tr><td>6. Maintain sustainable yield models for growth scenarios and maintain and review water source development and demand reduction plans</td><td></td><td>Strategic Planning</td><td>Ongoing</td></tr>
<tr><td rowspan="2">Development proposals placing pressure on capacity of existing infrastructure without specific upgrades or demand management initiatives planned (eg metering)</td><td>7. Ensure that there is integrated regional planning of local, trunk wastewater transmission lines and treatment facilities that accommodate localised long term (30 yrs+) development plans approved by councils. Plan to draw on capacity studies completed to date and to be integrated with wastewater strategic plans driven by consents, resilience and renewal.</td><td></td><td>Strategic Planning</td><td>0-3 years</td></tr>
<tr><td>8. Ensure that infrastructure needs are accommodated in three waters infrastructure development costs funded by developers.</td><td></td><td>Strategic Planning and Land development</td><td>0-3 years</td></tr>
<tr><td rowspan="2">Asset Data and Information management
• How well are your asset data requirements defined?
• What asset information does the organisation collect?
• How does our organisation ensure the information has the requisite quality (accuracy, consistency, reliability)?</td><td rowspan="2">• Data is not available to support planned works and capex is heavily reactive. ·
• Data gaps exist to support operational work
• Confidence in data not documented
• Efficiency of work practices isn't known</td><td>9. Make provision for asset data fields within AMIS needed for direct input into renewal, growth and levels of service planning needs. Data to include fields recommended in asset class intervention guides.
10. Data confidence to be documented for asset condition.</td><td></td><td>Service Planning and DPS</td><td>0-3 years</td></tr>
<tr><td>11. Establish cost history at asset level for all asset interventions.
12. Maintenance and operations work includes collection of validated asset data that is necessary to assess asset condition and implement renewals, growth or levels of service improvements.</td><td></td><td>DPS, Service Planning and Operations (network and treatment plants)</td><td>0-3 years</td></tr>
<tr><td>Design Standards
How well are your design standards for capex and maintenance defined and updated?</td><td>• Design standards incomplete and out of date
• Requests for use of new materials and assets in capex projects or new development with no basis for approval
• Complaints that standards required are different to neighbouring councils</td><td>13. Ensure design standards are reviewed annually to accommodate technology changes, legislation and national consistency.
14. Ensure changes to design standards are supported with documentation that justifies the change (or rejection of change) on the basis of adopted risk and lifecycle cost.
15. Ensure product and material approvals are supported with documentation of expected asset performance and lifecycle cost.
16. Make provision to remove approval when there is evidence and proof of failure of product or material to achieve documented performance and lifecycle cost.</td><td></td><td>Design Team</td><td>0-3 years commencement - and ongoing</td></tr>
</table>

Criticality of Assets • How well do you use asset criticality to define operational responses, maintenance planning and renewals planning?	• Renewals planning is reactive to failure history and condition assessment of assets not prioritised according to criticality to ensure intervention before failure. • Lack of awareness of critical asset failure implications by operations staff may result in inadequate response to service failures • Asset criticality knowledge is intuitive and not formally linked to levels of service failure • Emergency response plans do not prioritise restoration of service to critical assets	17. Formulate and implement an automated process within the AMIS that assigns asset criticality using the adopted criticality framework as is basis. All asset types to be included. 18. Ensure algorithms that are used to assign automated criticality are documented and sense checked annually.		Network Engineering and DPS	0-3 yrs
		19. Integrate asset criticality into response time requirements for repairing asset failure		DPS and Operations	3-10 yrs
Asset Condition and Performance • How well do you measure and report on the condition and performance of assets? • How well do you monitor the physical health of its network over time, in order to inform risk and investment decisions?	• Data is not available to support renewals - including failure modes from asset failures · • Maintenance and renewals are reactive • Expected life is gleaned from experience or books - not field based evidence • There is no plan to collect asset data from planned or opportunistic work	20. Prepare a prioritised list of critical assets requiring condition assessment in the next 10 years based on desktop assessment of risk. Include assets that may require reassessment from previous work. Document methodologies to be used for each asset and include all plant and network assets. 21. Prepare a document that specifies data useful for assessing condition as opportunities arise during maintenance, operations or capital works construction for all asset types.		Service Planning	0-3 yrs
		22. Modify asset remaining lives on AMIS as condition assessment is completed.		DPS	0-3 yrs and ongoing
Managing Risk and Resilience. - including water and wastewater risk management plans, emergency management and business continuity • How well is risk management and resilience planning integrated into your asset management decision making?	• Emergency management plans and business continuity plans are not used to trigger responses to failures and events	23. Ensure emergency management plans are reviewed annually for currency. 24. Conduct scenario practices of plans for each of the three waters networks annually.		Emergency Management	Ongoing
	• Investment into flood protection and stormwater improvements is reactive and not prioritised from predictive models accounting for climate change	25. Integrate flood risk assessment into catchment management plans (as above) that can then be used to derive prioritised investments needed (capital works or adaptation) for each catchment.		Network Engineering/Modelling	3-10 yrs
	• Water safety plans and source water risk management plans are not referred to and used month by month to validate ongoing work practices and to identify improvements that address the six water safety principles	26. Review and modify water safety plans according to process adopted by Safe Drinking Water committee in 2024.		Regulation Directorate	Ongoing
	• Wastewater risk management plans are not in place	27. Prepare wastewater risk management plans for each treatment plant and connected catchment networks using approach that is compatible with water safety plans. Use plans to prioritise further works and to support consent applications.		Regulation Directorate	0-3 yrs
Operational Planning and Maintenance Standards How well does do you plan and manage operations and maintenance activities to keep assets in service and meet levels of service and budgets?	• Maintenance works are becoming more reactive with pressure to reduce planned maintenance • Operational response times to customer issues are unacceptable • Poor understanding of job history and costs • Understanding of maintenance standards and rework not available • Incidence of network blockages, overflows, pipe breakages, I&I and water supply leakage	28. Progressively link all assets to planned maintenance work (that should be done as good practice - not affordable). Include condition assessment as a form of planned maintenance. If assets are to be run to failure without planned maintenance, state accordingly against each asset. Prioritise this maintenance planning according to asset criticality and known poor asset performance. 29. Ensure maintenance history for assets is linked to costs for each intervention.		Maintenance Planning - network and plant with DPS cooperation	0-3 yrs, ongoing
Compliance monitoring and reporting • How well do you manage data collection and reporting to validate drinking water compliance, resource consent monitoring, workplace health and safety?	• Monitoring results provide frequent unexpected exceedances and result in reactive responses to restore compliance • Data recovery of historical monitoring is not available for trend analysis • Responsibilities for data collection, analysis, response and reporting is not documented or adequately resourced	30. Ensure monitoring result exceedances and non-compliances are linked to the appropriate governance committees for reporting and approval of recommendations for subsequent action.		Compliance and RMA	Ongoing
		31. Prepare documented plan for consent renewal and new consent applications that are associated with planned works. 32. Ensure estimated consenting costs are in plan. 33. Allow adequate time for consultation and funding approvals. 34. Ensure new assets are built to requirement standards and all relevant data is provided to Wellington Water for vested assets.		RMA team Land Development Team	0-3 yrs 0-3 yrs
	• Capex and opex budgets are inadequate to achieve compliance through network improvements, and operational response to exceedances	35. Utilise risk management plans and catchment management plans as evidence of the need (and priority) for additional expenditure to improve current and future likely compliance needs.		Service Planning	3-10 years

Renewals Prioritisation and Planning • How well do you plan and prioritise renewals capital expenditure?	• Renewals priorities are established through anecdotal evidence and staff opinion or political/customer pressure	36. Ensure all future renewals planning allows for budgets in each of the categories of critical (4,5), non-critical(1,2,3), reactive and opportunistic renewals. 37. Prioritise renewals using processes already documented for these categories.		Service Planning	3-10 years
	• Criticality and condition assessment programmes are not used to prioritise renewals	38. Ensure asset condition is assessed for high and very high criticality assets before briefing for their renewal.		Network Engineering	0-3 years
	• Renewals priorities are not linked to other needs such as growth planning and upgrades by other services	39. Utilise documented renewals processes to prioritise alongside upgrade requirements that are evidence based.		Network Engineering	0-3 years
Capital Works Planning and programme performance (from need initiation and scoping, through to briefing, options assessment, design, construction commissioning and handover) • How well does the organisation plan and complete capital expenditure, including renewal programmes	• Scope creep of projects occurs and is a prime cause of cost increases on project that may be a result of inadequate briefing and preparation of initial budgets. • Capital works projects do not get completed on time and may result in failure to complete overall annual programme • Capital projects handover incurs frustration from operational staff because of inadequate as built data, deficient operations and maintenance plans, poor quality work and lack of proposed operating budgets for the new assets	40. Project briefs to state asset performance or service performance improvements that are to be provided on completion of project. 41. Project briefs to outline items that are not in scope for project. 42. Project briefs to specify requirement for complete maintenance and lifecycle intervention requirements. 43. Business case for complex projects are well developed and adopted prior to completion of design and delivery briefs. 44. Project option assessments include evaluation on the basis of lifecycle costs. 45. Project plan (from initiation to completion) to specify estimated costs for key stages and requirements to track project costs at these key stages before moving on. 46. Project brief and subsequent specification to outline specific asset handover data requirements to allow future maintenance, condition and performance monitoring.		Network Engineering	0-3 yrs
		47. Project design to require provision of maintenance and intervention plan for all assets constructed. If no maintenance is required, then this shall be stated.		Programme Management	0-3 yrs
Asset Financial Planning and Management incl. Investment decision making and prioritization methodologies • How well does your organisation: Plan for asset-related expenditure and funding? • Revalue its assets and consider depreciation in its funding strategy? • Consider the whole of life cost of asset investments?	• The organisation retains a short-term view of financial requirements with risk of deferred backlog of works and reduced levels of service. • Risk that future customers are faced with meeting generational funding shortfalls because of deferral of renewals and higher reactive maintenance costs • Lack of understanding of loss of service potential (depreciation) leads to underfunding of renewals.	In addition to improvement tasks stated above: 48. Formalise regional valuation approach that includes documentation of methodology used to assess replacement values and asset lives for depreciation calculation. 49. Optimise valuations with outputs of condition assessment of assets.		Finance	0-3 yrs
Business Processes How well have business processes and individuals' accountabilities been defined and documented and reviewed?	• Confused accountabilities and responsibilities and lack of recognition by people of the impact of their work practices on others • Inability to check on implementation of operating procedures and practices	50. Identify the interactions that rely on cross department or work centre support and input e.g., capital works commissioning and handover to operations, budget setting for capital works programme and briefing for project completion. NB: There will be many of these interactions. 51. Work cooperatively to derive business processes with accountabilities to ensure these interactions are well defined and have clarity in accountability. Prioritise this work according to severity of lack of clarity in processes as assessed from feedback. 52. Attach supporting procedures and supporting information to these processes. 53. Complete business processes as above for those activities not relying on cross department input. 54. Ensure business processes are lodged in common library. 55. Derive internal audit programme for field-based auditing of operational and maintenance practices for work in pipe networks, and on fixed plant.		All departments under guidance from Risk and Assurance	0-3 yrs
Outsourcing and Procurement How well does your organisation: • procure assets and asset-related services like maintenance and consumables for different classes of assets? • exercise control over outsourced asset management services?	• Higher contracting costs. • Balance of risk not understood, risks of unintended cost coverage. • Poor contractor performance. Performance not aligned with AM objectives.	Apart from reviewing current procurement arrangements and agreements for effectiveness and cost efficiency, implementation of improvements outlined above will contribute to more effective improvement.		Finance (to be familiar with this plan)	Dependent on current work to review procurement practices

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Wellington Metropolitan
Water Services Asset Management Plan
2025

Appendix A: Legislation

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
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Appendix A. Legislation

Statute	Relevance
Biosecurity Act 1993	Pest management - National Pest Management Plans, bylaws, duty to inform/report.
Building (Dam Safety) Regulations 2008	Not yet in force but will contain dam classification and audit requirements.
Building Act 2004 No 72 Reprint as at 5 August 2013	Buildings including dams
Carriage of Goods Act 1979 No 43 Reprint as at 3 December 2007	
Civil Defence Emergency Management Act 2002: Reprint as at 5 August 2013	Civil Defence Emergency Management Groups
Climate Change (Forestry Sector) Regulations 2008	Affects both pre-1990 and post 1989 forests. Outlines fees and charges, land status notifications, collection or information and the methodology for carbon assessment and pre-1990 forest offsetting.
Conservation Act 1987 No 65: Reprint as at 28 November 2013	Conservation areas, management plans,
Electricity (Hazards from Trees) Regulations 2003	Prescribes distances from electrical conductors within which trees must not encroach and provides an arbitration system for disputes between tree owners and works owners (works being any fittings that are used, or designed or intended for use, in or in connection with the generation, conversion, transformation, or conveyance of electricity.
Electricity (Safety) Regulations 2010	Outlines safety compliance when dealing with electricity.
Electricity Act 1992	When electricity is generated from reservoir pumps, this Act will apply. Regulates the supply and use of electricity in New Zealand. Protects the health and safety of the public in connection with the supply and use of electricity in New Zealand
Electricity Industry Act 2010	Requires any industry participant to comply with the Code. GW could be an "industry participant" by being a "person, other than a generator, who generates electricity that is fed into a network".
Fencing Act 1978	Outlines the law in relation to the erection and repair of dividing fences and will be relevant to GW in any border fences it either has or requires with neighbouring properties.
Fire Extinguishers Regulations 1958 (SR 1958/148) as at 3 Sep 2011	Fire safety
Fire Safety and Evacuation of Buildings Regulations 2006	Legal Requirements to establish an Approved Fire Evacuation Scheme for Certain Buildings, Including Those Storing Hazardous Substances.
Fire Service Act 1975 as at July 2011	Fire safety and fire levy
Forest and Rural Fires Act 1977	Principal Fire Officer can take water from any river, creek, stream, watercourse, dam etc when in a state of emergency.
Forests Act 1949	Consolidation of the law relating to forestry. Will impact on GW's forestry operations on land that it owns.
Hazardous Substances & New Organisms Act 1996	Principal Legislative Document for HSNO Compliance
Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004	Outlines requirements for the management of dangerous goods and scheduled toxic substances.
Hazardous Substances (Personal Qualifications) Regulations 2001	Outlines requirements for the qualifications of staff in relation to handling of hazardous substances.

Statute	Relevance
Health Act 1956 No 65 Reprint as at 5 December 2013	Various
Health and Safety at Work Act 2015	Various
Land Drainage Act 1908	Outlines obligations and options for a local authority in managing land drainage activities.
Local Government (Financial Reporting) Amendment Regulations 2013	Water supply, treatment plants and facilities; and other assets such as reticulation system - disclosure required in annual report.
Local Government Act 2002	Various
Local Government Official Information and Meetings Act 1987	Outlines the obligations for GW in respect of official information requests.
Marine and Coastal Area (Takutai Moana) Act 2011	Existing Resource Consents unaffected
Occupiers' Liability Act 1962	Outlines the liability of occupiers and others for injury or damage resulting to persons or goods lawfully on any land or other property from dangers due to the state of the property or to things done or omitted to be done there
Ozone Layer Protection Act No 40 1996: Reprint as at 1 July 2011	To help protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer and to implement in New Zealand the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer
Public Audit Act 2001	Applies to audit of public sector organisations including performance, legislative compliance and financial performance
Public Works Act 1981 No 35: Reprint as at 5 December 2013	Compensation for use/damage
Radiocommunications Act 1989	Provides for the management of the radio frequency system.
Radiocommunications Regulations 2001	General compliance for radio transmitters.
Railways Act 2005	Applies to Orongorongo railway
Reserves Act 1977	Provides for the acquisition, control, management, preservation, development and use of public reserves and makes provision for public access to the coastline and countryside.
Resource Management (Measurement and Reporting of Water Takes) Regulations 2010	To establish a standardized system for water permit holders to accurately measure and report their water usage
Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011	To ensure that land potentially contaminated with harmful substances is properly identified and assessed before any development activities occur, with the goal of protecting human health
Resource Management (National Environmental Standards for Air Quality) Regulations 2004	Not applicable as the details will be in specific consents
Resource Management Act 1991	
Resource Management Act 1991 (National Policy Statement for Freshwater Management 2014)	Sets out the objectives and policies for freshwater management under the Resource Management Act 1991.
Road User Charges Act 2014	Vehicle ROC charges
Soil Conservation and Rivers Control Act 1941	Outlines requirements for the conservation of soil resources and for the prevention of damage by erosion, and to make better provision with respect to the protection of property from damage by floods

Statute	Relevance
Utilities Access Act 2010	Not applicable, although the National Code of Practice for Utility Operators' Access to Transport Corridors is applicable.
Water Services Act 2021	Water Supply (quality), wastewater and stormwater (performance and risk)
Water Services (Drinking Water Standards for New Zealand) Regulations 2022	Sets maximum acceptable values (MAVs) for contaminants in drinking water.
Water Services (Fees and Charges) Regulations 2021	Specifies the fees that must be paid for applications made under the Water Services Act 2021, essentially outlining the cost associated with activities like registering temporary drinking water supplies for planned events or applying for exemptions from certain compliance requirements under the Act
Wellington Regional Water Board Act 1972	Allows the Wellington Regional Council to operate a wholesale water supply for the region
Wild Animal Control Act 1976	Provides for the control of harmful species of introduced wild animals and for the regulation the operations of recreational and commercial hunters.

Wellington Metropolitan
Water Services Asset Management Plan
2025

Appendix B: Resource Consents

Revision table

Preparation of the Wellington Metro Water Services AMP

Date / Version	Description	Author WIML	Review WIML	Authorised WWL
09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
10/04/25 v0.91	Review of WWL comments, request for further information.	H. Blake-Manson		
16/04/25 v1	Finalised by WWL (LB/AS/RM)			L Bennett
6/05/25 v1.1	Frozen to release to Woogle (WWL Stakeholder info & Review)			R Millican

This Section

Date / Version	Description	WWL Contact
06/05/25 v1.1	First Sectional Release, plus stakeholder changes	R Millican
15/05/25	For consultation to the Wellington Water Board	L Bennett
16/06/25	For endorsement by the CE	L Bennett

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Appendix B. Resource consents

Water Supply Consents

Project Name:	Client council	Consent	Consent Expiry	Project Status	Background:	Timeline/key dates	Purpose of project / outcomes being sought:
Metro Water Take - Surface Water Take	Greater Wellington Regional Council	WGN000199 WGN000200 WGN000201	01.08.2036 01.08.2036 01.08.2036				Replacement of watertake consents.
Water take Consents - Waiwhetū Aquifer	Greater Wellington Regional Council	WGN970036 [33820] WGN970036 [33821]	01.08.2033 01.08.2033	Not commenced	There is a suite of resource consents that enable the take and use of ground water from the Waiwhetū Aquifer for the metropolitan water supply system. These consents are WGN970036 [33820] [33821]). They expire in August 2033	The existing consents expire in August 2033. Replacement consents will need to be lodged in February 2033. Preparation of replacement consents would need to begin in 2030-2031.	Replacement of watertake consents.
Water take Consents - Untreated public supplies	Greater Wellington Regional Council	WGN120153 [31553] WGN090243 [27458]	13.2.2029 13.2.2029	Not commenced	Resource consents WGN120153 [31553] and WGN090243 [27458] allow for the take and use groundwater from existing bores at Laings Road, Lower Hutt and Buick Street, Petone. The takes provide untreated water for public supply at these locations. Both consents expire on 13/02/2029.	The existing consents are due to expire on 13 February 2029. An application for a replacement consent will need to be lodged by 13 August 2028. Preparation of the replacement application would need to commence in the 2026/27 financial year.	Replacement of the resource consent
Te Marua - raw water	Greater Wellington Regional Council	WGN000199 [20538] WGN040102 [20539]	17.8.2036 17.8.2036	Not commenced	Resources consents associated with the discharge raw water +sand/gravel to Hutt River and with the scour outlets at the Te Marua WTP are provided in WGN000199 [20538] andWGN040102 [20539] respectively. These consents expire on 17/08/2036.	The existing consents expire on 17 August 2036. Applications for replacement consents will need to be lodged in February 2036.	Replacement of existing consents.
Te Marua - supernatant	Greater Wellington Regional Council	WGN XXXXXX [33662]	1.3.2030	Not commenced	Resources consents associated with the discharge supernatant to Hutt River at Te Marua are provided under WGN XXXXXX [33662]. This consent expires on 1/03/2030. Applications for replacement consents will need to be lodged on 1 September 2029. The preparation of the replacement consent application will need to commence approximately in early 2028	The existing consents expire on 1 March 2030. Applications for replacement consents will need to be lodged in September 2029. Preparation will need to commence in early 2028.	Replacement of existing consents.
Wainuiomata WTP discharges	Greater Wellington Regional Council	WGN150128 [33303] WGN150128 [33304] WGN150128 [33305] WGN150128 [33306]	1.8.2036 1.8.2036 1.8.2036 1.8.2036	Not commenced	There are a suite consents that provide for the discharges of supernatant and raw and treated water from the Wainuiomata WTP. These are WGN150128 [33303] [33304] [33305] [33306]. These consents expire in August 2036.	The existing consents expire in August 2036. Applications for replacement consents will need to be lodged in February 2036.	Replacement of existing consents.
Gear Island WTP discharges	Greater Wellington Regional Council	WGN190120 [35909]	13.8.2033	Not commenced	The discharge of raw groundwater from Gear Island to the Te Mome Stream is provided for by WGN190120 [35909]. This consent will expire on 13/08/2033. A replacement application will need to be lodged by 13 February 2033.	The existing consents expire on 13 August 2033. Application for replacement consent will need to be lodged by 13 February 2033.	Replacement of existing consents.
Global consent for operations and maintenance works in stream		Global consent	unk	All metro TAs	Global consent for operations and maintenance work in streams. An application has been prepared and is currently with the Customer Operations Group, who are considering the implementation costs. The application is expected to be lodged in early 2025, and be processed on a non-notified basis. A 25-year consent is being sought. There is potential need for the Wellington Water RM team to remain involved in the project over the consent duration to assist with the review of work protocols that may be required under consent conditions.	Consent expected to be granted in mid-2025.	To enable operations and maintenance work

Wastewater and contaminated land consents

Project Name:	Client council	Consent	Consent Expiry	Project Status	Background:	Timeline/key dates	Purpose of project / outcomes being sought:
Seaview WWTP MOP Consents	Hutt City Council Upper Hutt City Council	WGN050359 [24539] WGN120142 [33407] WGN120142 [31740] WGN930194	25.8.2031 25.8.2031 25.8.2031 13.01.2029	Not commenced	The existing main discharge permit for the discharge of treated wastewater to the CMA at Bluff Point was granted in 2006 (WGN050359 [24539]). This consent expires on 25 August 2031. Associated consents were granted in 2013 for discharges from outfall to the CMA (WGN120142 [33407]) and for construction of temporary channels to the foreshore (WGN120142 [31740]) during periods of maintenance. These consents expire on 25 August 2031. Replacement applications for these consents will need to be lodged in February 2031 and preparation of the applications will need to commence by February 2030. It is assumed that the Seaview MOP options strategic plan will provide the necessary alternatives assessment to support the application. The associated coastal permit which allows the occupation of the foreshore and seabed by the outfall structure was granted on 13 January 1994 (WGN930194). This consent expires on 13 January 2029. Under rule R204 of the Natural Resources Plan the occupation of space in the common marine and coastal area by a structure existing prior to the date of 31 July 2015 which is regionally significant infrastructure or owned by a network utility operator is a permitted activity. This occupation consent may therefore not need to be replaced. It is recommended that this assessed and confirmed with GWRC in late 2027 to ensure that sufficient time is available to prepare a resource consent application, should it be necessary.	The permit for the outfall expires on 13 January 2029. The consents for the discharges and temporary channels expire on 25 August 2031.	Replacement of the existing application.
Seaview WWTP Intermittent Discharge Consents	Hutt City Council Upper Hutt City Council	WGN120142 [33408] WGN120142 [33406]	1.2.2018 1.2.2018	On hold	There are two intermittent discharge consents associated with the Seaview WWTP (WGN120142 [33408] & [33406]). These consents provide for discharges to the Waiwhetū Stream in wet weather and when the MOP is out of action due to maintenance works. The existing consents were granted in 2013 and expired on 1 February 2018. An application for replacement consents was lodged in October 2017. The discharges to the Waiwhetū Stream continue to operate under the consent granted in 2013 in accordance with s124 of the RMA. This application is on hold and has an outstanding further information request. Wellington Water no longer considers the option proposed in the replacement application to be fit for purpose. The Seaview MOP options strategy will be a key precursor to work recommencing on this project. That work is due for completion in May 2027	Current consents expired on 1 February 2018 Replacement applications lodged in October 2017 Seaview MOP options strategy is due for completion in May 2027. The intermittent discharge consent project will likely by on-hold until that point.	Replacement of the existing application.

Seaview WWTP main outfall pipeline renewal options and strategic plan	Hutt City Council Upper Hutt City Council	n/a Activity Brief	n/a Activity Brief	On-programme	The purpose of this activity brief is to develop the preferred option for renewal of the Seaview Wastewater Treatment Plant (WWTP) Main Outfall Pipeline (MOP). The primary driver of this project is the limited capacity, poor condition, and ongoing risk of failure of the existing MOP. There are significant cost implications with refurbishing, replacing or upgrading the MOP, and any decisions regarding performance requirements for the pipeline will also have long term implications for the WWTP and upstream network. A whole-of-system approach will be applied to the project because of the connection and dependencies between the MOP, WWTP and upstream network. The key deliverables for this project are: 1. Options assessment report (options long/short list and feasibility study of shortlisted options with Level 0 cost estimate). The options assessment work will inform the strategic plan and will identify the interventions available to meet whole-of-system performance requirements including collection, bulk transport, treatment and discharge. 2. Strategic plan for the Hutt Valley wastewater system. The strategic plan will be developed through a co-designed process with Wellington Water and mana whenua. It is expected that this will incorporate the Dynamic Adaptive Policy Pathways (DAPP) methodology, as well as reflecting Mātauranga Māori. 3. Investment case for renewal of the Seaview WWTP main outfall pipeline. 4. Pre-concept design report with Level 1 cost estimate for the recommended option for renewal of the Seaview WWTP main outfall pipeline. 5. Activity brief to progress the recommended option for renewal of the Seaview WWTP main outfall pipeline through capital delivery gateway 1.	1. Options assessment report - June 2025 2. Strategic plan - Dec 2025 3. Investment case - June 2026 4. Pre-concept design report - May 2027 5. Activity brief - May 2027	To develop the preferred option for renewal of the Seaview Wastewater Treatment Plant (WWTP) Main Outfall Pipeline (MOP).
Seaview WWTP main outfall pipeline renewal options and strategic plan	Hutt City Council Upper Hutt City Council	n/a Activity Brief	n/a Activity Brief	On-programme	The purpose of this activity brief is to develop the preferred option for renewal of the Seaview Wastewater Treatment Plant (WWTP) Main Outfall Pipeline (MOP). The primary driver of this project is the limited capacity, poor condition, and ongoing risk of failure of the existing MOP. There are significant cost implications with refurbishing, replacing or upgrading the MOP, and any decisions regarding performance requirements for the pipeline will also have long term implications for the WWTP and upstream network. A whole-of-system approach will be applied to the project because of the connection and dependencies between the MOP, WWTP and upstream network. The key deliverables for this project are: 1. Options assessment report (options long/short list and feasibility study of shortlisted options with Level 0 cost estimate). The options assessment work will inform the strategic plan and will identify the interventions available to meet whole-of-system performance requirements including collection, bulk transport, treatment and discharge. 2. Strategic plan for the Hutt Valley wastewater system. The strategic plan will be developed through a co-designed process with Wellington Water and mana whenua. It is expected that this will incorporate the Dynamic Adaptive Policy Pathways (DAPP) methodology, as well as reflecting Mātauranga Māori. 3. Investment case for renewal of the Seaview WWTP main outfall pipeline. 4. Pre-concept design report with Level 1 cost estimate for the recommended option for renewal of the Seaview WWTP main outfall pipeline. 5. Activity brief to progress the recommended option for renewal of the Seaview WWTP main outfall pipeline through capital delivery gateway 1.	1. Options assessment report - June 2025 2. Strategic plan - Dec 2025 3. Investment case - June 2026 4. Pre-concept design report - May 2027 5. Activity brief - May 2027	To develop the preferred option for renewal of the Seaview Wastewater Treatment Plant (WWTP) Main Outfall Pipeline (MOP).

Wainuiomata WWTP Sludge Pond	Hutt City Council	WGN020159 [35957]	13.8.2037	Not commenced	Wainuiomata WWTP has been decommissioned and converted to a pumping station. WGN020159 [35957] authorises the discharge of contaminants to land and water from a contaminated site created using the site as a wastewater treatment plan and the incidental discharge of contaminants to land arising from on-site remediation activities. The consent expires on 13 August 2037. The pump station and consent are overseen by the Customer Operations Group. Steve Hutchison identified that work is required in the lead up to the consent expiry to determine if a replacement consent is required, i.e. does monitoring indicate that contaminants are continuing to be discharged from the site.	The current consent expires on 13/8/2037	To determine if the existing consent needs to be replaced and if so, obtain a replacement consent.
Porirua WWTP Main Discharge Consent	Porirua City Council	WGN2000229 [36816]	21.6.2041	Consent implementation	Existing consent for discharges to the coastal marine area was granted on 21 June2023 (WGN2000229 [36816]). This consent will expire on 21 June 2041. The consent conditions require WWTP reviews at specified milestones and if monitoring results exceed specified thresholds.	Existing consent will expire on 21 June 2041.	N/A
Porirua WWTP Outfall Consent	Porirua City Council	WGN980083 (03)	28.6.2034	Not commenced	The coastal permit that enables the occupation and use of the seabed by the Porirua WWTP outfall is WGN980083 (03). This was granted in 1999 and expires on 28 June 2034. As this expiry date for this permit was substantially different to that for the discharge it was not replaced as part of the discharge application that was lodged in 2020. Under rule R204 of the Natural Resources Plan the occupation of space in the common marine and coastal area by a structure existing prior to the date of 31 July 2015 which is regionally significant infrastructure or owned by a network utility operator is a permitted activity. This occupation consent may therefore not need to be replaced. It is recommended that this assessed and confirmed with GWRC in 2031 to ensure that sufficient time is available to prepare a resource consent application, should it be necessary.	The permit expires on 28 June 2034. A replacement application will need to be lodged by 28 December 2033.	Replacement of the outfall consent.
Western WWTP Discharge Consents	Wellington City Council	WGN060283 [35674] WGN060283 [33278] WGN060283 [35675] WGN060283 [35255] WGN060283 [25227] WGN020236 [22098]	31.12.2023 31.12.2023 28.7.2035 28.7.2035 1.6.2037	Not commenced	There are four existing discharge consents and one consent for occupation of the seabed associated with the Western WWTP. These consents are: WGN060283 [35674] & [33278] Discharge of Treated WW to the Karori Stream, expired on 31 December 2023 WGN060283 [35675] Discharge of Partially Treated WW to the Karori Stream, expired on 31 December 2023 WGN060283 [35255] Discharge of Treated WW to Coastal Marine Area, expires on 28 July 2035 WGN060283 [25227] Discharge of Partially Treated WW to the Coastal Marine Area, expires on 28 July 2035 WGN020236 [22098] Land Occupation by Outfall Structure, expires on 1 July 2037 Replacement consents for WGN060283 [35674] and WGN060283 [35675] were sought as part of the Wellington Wastewater Network Wet Weather Overflow application lodged on 29 May 2023 It is assumed that a combined application will be made to replace the consents for the coastal discharges and occupation by the outfall.	An application seeking replacement consents for the discharges to the Karori Stream was lodged on 31 May 2023. An application for replacement consents for the CMA discharges and occupation by the outfall will need to be lodged by 28 January 2035. Preparation of the application will need to commence at least by 28 January 2034. The preparation work and alternatives assessment process will need to commence at approx. January 2031.	Replacement of consents for discharges to coastal waters and occupation of the seabed by the outfall.
Western WWTP Main Outfall Pipeline (MOP) Maintenance Consent	Wellington City Council	WGN160340 [34178] WGN160340 [34179]	31.12.2023 31.12.2023	Delayed	Existing consents WGN160340 [34178] & [34179] provide for works in the bed of the Karori Stream and associated diversion of the flow of the Karori Stream to enable the maintenance of the Western WWTP MOP. These consents were granted in 2016 and expired on 31 December 2023. A replacement application was lodged in September 2023, s92 requests are currently being responded to. At present consent is expected to be granted in early 2025. The consent is currently operating under s124. Western MOP pipe bridge work does not require consent as it is a permitted activity.	The existing consents expired in December 2023. Applications for replacement consents were lodged in September 2023.	Replacement of the existing MOP maintenance consent initially

Moa Point WWTP Main Discharge Consents	Wellington City Council	WGN08003 [26182] WGN08003 [26183] WGN08003 [31505] WGN08003 [35047]	11.5.2034 11.5.2034 11.5.2034	Not commenced	Existing consents were granted in 2009 covering discharge of fully treated and partially treated wastewater, and for occupation of the seabed and foreshore by the long outfall WGN08003 [26182][26183][31505][35047]. These consents expire on 11 May 2034.	Existing consents are due to expire on 11 May 2034 Replacement consents will need to be lodged before 11 November 2033 Commencement of application preparation approx. November 2032 Commencement of alternatives assessment (assuming required) approx. November 2029	Replace resource consents for discharges and outfall
Moa Point Sludge Minimisation Facility	Wellington City Council	unk	unk	On-programme	Regional resource consents (air discharges and earthworks) and an alteration to the existing designation were required to enable the construction and operation of the sludge minimisation facility at Moa Point. These approvals were sought by Wellington City Council and were granted in 2022 and 2023 respectively. The facility is under construction and will be passed to Wellington Water to operate in mid-2026. This facility is related to the Carey's Gully consent which allows the discharge of dewatered human effluent ('sludge') contaminants to land (WGN070230 [26013]). This consent expires in May 2026 and may need to be extended (replaced with short term consents) should the Sludge Minimisation Facility not be operational in time. It is understood that replacement of this consent would be Wellington City Council's responsibility, if needed.	Mid-late 2026 when Wellington Water take over operation of the SMF.	Reduce the volume of sludge created by up to 80 percent by creating a stable, dry, odourless product that can be more easily transported, and used in productive ways .
Carey's Gully	Wellington City Council	WGN070230 [26013]	1.5.2026	Not commenced	This consent provides for the discharge of dewatered human effluent ('sludge') contaminants to land (WGN070230 [26013]). It expires in May 2026 and may need to be extended (replaced with short term consents) should the Sludge Minimisation Facility not be operational in time. The replacement of this consent would be Wellington City Council's responsibility, if needed.	The existing consent expires in May 2026	Replace / extend existing consents
Hutt Wainuiomata Wastewater Network Wet Weather Overflow Consent	Hutt City Council Upper Hutt City Council	WGN960002 (02) WGN010101 [20893] WGN96002 [23747] WGN090321 [32525] WGN090321 [32526] WGN110494 [31241]	17.6.2019 24.7.2019 17.6.2019 12.4.2025 12.4.2025 19.12.2029	On hold	Over the period from 1999 to 2014 Hutt City Council obtained 6 resource consents for wet weather overflows at 6 specific locations on its wastewater network. These consents were: Barber Grove Pump Station Consent No. WGN960002 (02), expired 17 June 2019 Wellington Road Pump Station Consent No. WGN010101 [20893], expired 24 July 2019 Silverstream Storage Facility Consent No. WGN96002 [23747], expired 17 June 2019 Malone Road Consent No. WGN090321 [32525], expires 12 April 2025 Hinemoa Street Consent No. WGN090321 [32526], expires 12 April 2025 Wainuiomata Pump Station Storage Tank Consent No. WGN110494 [31241] ,expires 19 December 2029 In March 2019 Wellington Water lodged resource consent applications for the Barber Grove Pump Station, Wellington Road Pump Station and Silverstream Storage Facility discharges. Following discussions with Greater Wellington Regional Council (GWRC) staff it was agreed that Wellington Water would lodge a catchment wide resource consent application for all wastewater network overflows in the Hutt Valley and Wainuiomata catchments. That global application was lodged with GWRC on 16 May 2023. The application is awaiting a further information request from GWRC. It has also been placed on-hold, at Wellington Water's request, while it considers implications of the funding confirmed by client councils and the implications of Plan Change 1 to the Natural Resources Plan. Work is underway to confirm the revised consenting strategy and is due for completion in 2024. Technical work is also about to commence on the scale of the challenge presented by the Target Attribute States and Coastal Water Objectives proposed in Plan Change 1.	The application was lodged with GWRC on 16 May 2023. A revised consenting strategy is currently being developed and a work programme is anticipated to follow.	Obtain discharge permits for the wet weather overflows from the Hutt Valley and Wainuiomata wastewater network

Porirua and Wellington (northern suburbs) Wastewater Network Wet Weather Overflow Consent	Porirua City Council Wellington City Council	Global consent	unk	On hold	There is no existing discharge consents associated with the Porirua and Wellington (northern suburbs) wastewater network. A global discharge application was lodged with GWRC on 31 May 2023. The application is awaiting a further information request from GWRC. It has also been placed on-hold, at Wellington Water's request, while it considers implications of the funding confirmed by client councils and the implications of Plan Change 1 to the Natural Resources Plan. Work is underway to confirm the revised consenting strategy and is due for completion in 2024. Technical work is also about to commence on the scale of the challenge presented by the Target Attribute States and Coastal Water Objectives proposed in Plan Change 1.	The application was lodged with GWRC on 31 May 2023.	Obtain discharge permits for the wet weather overflows from the Porirua and Wellington (northern suburbs) wastewater network. A revised consenting strategy is currently being developed and a work programme is anticipated to follow.
Wellington Wastewater Network Wet Weather Overflow Consent	Wellington City Council	Global consent	unk	On hold	A global discharge application was lodged with GWRC on 31 May 2023. The application is awaiting a further information request from GWRC. It has also been placed on-hold, at Wellington Water's request, while it considers implications of the funding confirmed by client councils and the implications of Plan Change 1 to the Natural Resources Plan. Work is underway to confirm the revised consenting strategy and is due for completion in 2024. Technical work is also about to commence on the scale of the challenge presented by the Target Attribute States and Coastal Water Objectives proposed in Plan Change 1. This application includes the replacement application for the Western WWTP discharges to the Karori Stream. See Western WWTP tab for more information.	The application was lodged with GWRC on 31 May 2023. A revised consenting strategy is currently being developed and a work programme is anticipated follow.	Obtain discharge permits for the wet weather overflows from the Porirua and Wellington (northern suburbs) wastewater network
Wastewater Network Strategic Reduction Plan (SRP) and Sub-catchment Reduction Plan Pilot Programme	Upper Hutt City Council Hutt City Council Wellington City Council Porirua City Council	n/a Activity Brief	n/a Activity Brief		The pilot project is intended to test methodologies included in the three wet weather overflow applications for the Strategic Reduction Plan and Sub-catchment Reduction Plans. The programme has been partially funded by NET OPEX budget. Hutt Valley Containment Standards is funded by NDC programme, the project has been delivered. PCC containment standard - not commenced yet. WSP has been asked to prepared proposal. The current review of the network consent consenting strategy is likely to result in reviews to the scope of this pilot programme.	Needs to be completed to support hearing evidence for the network consent applications.	To test methodologies set out in the wet weather overflow consents.
Wastewater network dry weather discharge consent	Upper Hutt City Council Hutt City Council Wellington City Council Porirua City Council	Global consent	unk	Not commenced	The dry weather discharges were removed from the applications lodged in 2023 as the Natural Resources Plan at the time did not provide a consent pathway for these discharges. Plan Change 1 rectified that situation. Therefore, an application is proposed to be lodged to cover these discharges. The current review of the consenting strategy for the wet weather overflow applications is considering whether the dry weather discharges should be integrated with the wet weather overflow documentation or kept separate.	There is currently a not a timeline for this project	Obtain consent and establish a transparent management process for dry weather discharges.
PCC Central WW Storage project	Porirua City Council	unk	unk	Under construction	7 Mega-litre wastewater storage tank adjoining the Porirua City Centre. Resource consents for the construction of the tank were granted from Porirua City Council and Greater Wellington Regional Council on 30 August 2021 and 30 November 2021 respectively. The Notice of Requirement was approved on 9 February 2022. The tank is currently under construction and is due for completion in January 2026. Discharges from the tank were intended to be covered by the Porirua wastewater network wet weather overflow consent application. However, at the time that that application was lodged 'new' wastewater overflows were not provided for by the Natural Resources Plan. Plan Change 1 has rectified this problem and consequently revisions to the wet weather application are needed to ensure that it legalises the future discharges from the storage tank to the Porirua Stream.	The applications were granted in 2021 and 2022. Construction of the tank is due for completion in January 2026.	To substantially reduce the wet weather overflows to the Porirua Stream

Global Dewatering consent		WGN170366 [34868] WGN170366 [34869] WGN170366 [34870]	13.10.2037 13.10.2037 13.10.2037	All metro TAs	This consent applies in Wellington, Lower Hutt, Upper Hutt and Porirua where the stormwater, sewer and bulk water infrastructure is located. The consent provides for the diversion and take of groundwater, the discharge of treated dewatered water to land and water, associated bores under WGN170366 [34868], [34869] and [34870]. The consent expires on 13 October 2037. Contaminated Land and Geotechnical Protocols under the consent need to be reviewed and updated every 5 years.	The existing consents expire on 13 October 2037. Applications for replacement consents will need to be lodged by 13 April 2037.	

Stormwater Consents

Project Name:	Client council	Consent	Consent Expiry	Project Status	Background:	Timeline/key dates	Purpose of project / outcomes being sought:
Global stormwater consent stage 2 (metropolitan area)	All metro TAs	Stage 2 GSC lodged	unk	Partially On Hold	The stage 2 global stormwater consent (GSC) forms a part of the Network Discharge Programme (NDP). The Stage 2 GSC is required under the Greater Wellington Natural Resource Plan (NRP) replacing the stage 1 stormwater consent (WGN180027 [34920]) that was granted on 30 November 2018 and expires on 30 November 2023. The Stage 2 GSC was lodged with the GWRC in July 2023. The proposed consent focus on managing the stormwater discharges from the local authority stormwater networks in a manner that progressively reduces their adverse effect. A timeframe of 35 years was proposed for this application, the long timeframe was proposed to enable staged improvements to be implemented for different stormwater network based on priority of different stormwater sub catchments. However, in March 2024 the overall NDP, including the Stage 2 GSC, was put on hold due to funding uncertainties as a result of client councils' LTP process. In September 2024, A separate piece of work has been initiated to re-confirm Wellington Water's overall NDP consenting strategies. In October 2024, environmental science work linking target attribute states (TASs) to the application has begun.	30 November 2023 -- Stage 1 GSC Expires 10 July 2023 -- Stage 2 GSC Application Lodged	Obtain the Stage 2 GSC to meet regulatory requirements
SW Pilot Programme	All metro TAs	Stage 2 GSC lodged	unk	Partially On Hold	The pilot project is intended to test methodologies included in the GSC application sub-catchment plans. The programme has been partially funded by NET OPEX budget. An initial draft for the Taupō Stream Pilot SCaMP has been prepared. The current review of the network consent consenting strategy is likely to result in reviews to the scope of this pilot programme.	30 November 2023 -- Stage 1 GSC Expires 10 July 2023 -- Stage 2 GSC Application Lodged	Obtain the Stage 2 GSC to meet regulatory requirements

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Appendix C: Summary of Risks

Revision table

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09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
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Appendix C. Summary of Risks

Strategic Priority	Risk	Implications
Looking after existing infrastructure	Frequency of unplanned service disruptions increases and customer satisfaction decreases, resulting in compounding reduction in level of service.	What service levels could be compromised: – Limited ability to respond to all levels of service disruptions. Timeframes to respond and fix failing assets increases. – Reduction in or no asset condition assessments completed. – Data, asset management improvements and ability to provide evidence-based assurance is compromised.
Looking after existing infrastructure	Planned maintenance is deferred, resulting in more reactive maintenance and compounding cost increases.	What service levels could be compromised: – Limited ability to respond to all levels of service disruptions. Timeframes to respond and fix failing assets increases. – Reduction in or no asset condition assessments completed. – Data, asset management improvements and ability to provide evidence-based assurance is compromised.
Looking after existing infrastructure	Risk of asset failure remains.	What service levels could be compromised: – Limited ability to respond to all levels of service disruptions. Timeframes to respond and fix failing assets increases. – Reduction in or no asset condition assessments completed. – Data, asset management improvements and ability to provide evidence-based assurance is compromised.
Looking after existing infrastructure	Delayed long term step change for operating costs is inevitable in later years.	What service levels could be compromised: – Limited ability to respond to all levels of service disruptions. Timeframes to respond and fix failing assets increases. – Reduction in or no asset condition assessments completed. – Data, asset management improvements and ability to provide evidence-based assurance is compromised.
Looking after existing infrastructure	Increased dissatisfaction from mana whenua and regulatory bodies / increased risk of fines.	What service levels could be compromised: – Limited ability to respond to all levels of service disruptions. Timeframes to respond and fix failing assets increases. – Reduction in or no asset condition assessments completed. – Data, asset management improvements and ability to provide evidence-based assurance is compromised.
Looking after existing infrastructure	Increased public dissatisfaction.	What service levels could be compromised:

Strategic Priority	Risk	Implications
		– Limited ability to respond to all levels of service disruptions. Timeframes to respond and fix failing assets increases. – Reduction in or no asset condition assessments completed. – Data, asset management improvements and ability to provide evidence-based assurance is compromised.
Looking after existing infrastructure	Renewal programme is not supported by sufficient evidence	– Risk of infrastructure failure will continue to grow. – Assets (especially critical assets) fail causing increased operational response requirements and corresponding compounding costs. – Compounding reduction in level of service.
Looking after existing infrastructure	The renewal backlog increases	– Risk of infrastructure failure will continue to grow. – Assets (especially critical assets) fail causing increased operational response requirements and corresponding compounding costs. – Compounding reduction in level of service. – Third party investment (e.g., Kāinga Ora) is not realised resulting in limited investment.
Looking after existing infrastructure	Other benefits gained through renewals will not be realised, e.g., leak reduction, resilience or reduction in inflow and infiltration.	– Backlog of renewals increases. – Renewals programme is based on limited condition data (linked to opex funding). – Third party investment (e.g., Kāinga Ora) is not realised resulting in limited investment. – Risk of infrastructure failure will continue to grow. – Increased operational response and corresponding compounding costs. – Compounding reduction in level of service.
Looking after existing infrastructure	Councils have different approval and quality procedures for new connections	– Existing infrastructure is affected by new connections i.e., pipes connected to the wrong service or are pushed through existing infrastructure. – Public health is comprised including water safety.
Supporting growth	Only selected growth areas are able to be funded	– Growth occurs in areas where there is not sufficient capacity to cater for the growth and no provision for investment has been included.

Strategic Priority	Risk	Implications
		– Increased operational response and corresponding compounding costs. – Compounding reduction in level of service.
Supporting growth	Level of service funding is not available to contribute to developer constructed infrastructure	– Growth occurs in areas where there is not sufficient capacity to cater for the growth and no provision for investment has been included. – Increased operational response and corresponding compounding costs. – Compounding reduction in level of service.
Sustainable water supply and demand	Additional leak detection and repairs are not funded (linked to renewals).	– Evidence for demand reduction is based on case studies and international practice that may not translate regionally. – Time horizon for investing in a new water source may not be able to be pushed out (dependent on other metropolitan councils) or may need brought forward.
Improving environmental water quality	No specific improvement projects are to be funded.	– 2040 target of swimmable water quality is not achievable. – Harbour and freshwater quality get worse, *E. coli* and other contaminants increase, and wastewater overflows increase. – Increased dissatisfaction from mana whenua and the public. – Compliance with consents is harder and non-compliances increase, resulting in increased costs and enforcement actions. – Short term investment may still be needed to meet new standards for consent renewals (currently unknown and unfunded).
Net carbon zero	No specific improvement projects are to be funded	– Net carbon zero target by 2050 is unable to be met.
Reducing flood risk	Known areas that are flood prone will not be addressed	– There is no additional funding to address flood mitigation issues as they arise (including investigations); existing flood prone areas remain at risk. – Increased public dissatisfaction.
Seismic resilience	Seismic strengthening of reservoirs	– Reservoirs may not hold water after a significant earthquake and unavailable for use. – Increased public dissatisfaction.
Firefighting water supply	Improvements to areas of water network that have limited firefighting capacity.	– Existing areas with limited firefighting capacity remain at risk. – Increased public dissatisfaction.

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Appendix D:

Operations and Maintenance Tasks

Revision table

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09/12/24 v0.1	New outline and re-write of document	H. Blake-Manson	-	
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Appendix D. Operations and maintenance tasks

The following table outlines tasks that form part of the possible operations and maintenance response from WWL's Operations group (two major operational teams: Network Operations and Treatment & Control Systems). This is not a complete task list and not all tasks listed here will be able to be funded.

Team	Water	Task
Operations – Network Operations	Drinking Water	Reservoir inspection, assessment and cleaning
		Extend bulk supply QA approach to distribution
		Update Waterloo WTP O&M manuals
		Network valves operating data capture
		Network flushing and scouring assessments
		Active leak control
		Auto Shut-Off Valve maintenance
		Blockage - Significant
		Cathodic Protection, opex
		CIR Systems Maintenance
		Complaint to Engineer
		Condition assessment / monitoring
		Earthquake Trigger Testing
		Facility Issue
		Fault
		Fault - Third Party Damage
		Featherston Utilities
		Fixing leaks
		Flood response
		Flow Meter Calibrations
		General Maintenance
		Health & Safety
		Hydrant Flushing & Scour Programme
		Hydrant Painting of Lids
		IMMEDIATE Information Request Council
		IMMEDIATE Instructed Works
		Information Request Council
		Information Request Public
		Instructed Works
		Investment in drinking water safety
		Key Hydrants testing programme
		Leak Detection
		Leaky Connection/Meter/Toby
		Lid Missing / Loose / Broken
		Locate Asset
		Longwood Water Race Maintenance

Team	Water	Task
		Loss of Service
		Maintenance and service improvement
		Major Burst or Breakage
		Meter Reading
		Monitoring SAMs
		Moroa Water Race Maintenance
		Network Maintenance
		Network planned maintenance
		New Connection
		New Meter
		Poor Quality Work
		Poor Water Quality
		Pressure Relief Valves and Valve Chambers
		Pump station maintenance
		Pump Stations Electrical Inspection & Maintenance
		Pump Stations Generator Inspection & Maintenance
		Pump Stations PPE & Safety Equipment Inspection & Maintenance
		Pump Stations Pump Inspection & Maintenance
		Pump Stations SCADA Control, Systems Inspection and Maintenance
		Pump Stations Site Inspection & Maintenance
		PW Emergency Tanks Inspection & Maintenance
		Reactive Maintenance
		Reducing operational leakage
		Relocate Asset
		Repair water main leaks
		Repair water main leaks - backlog
		Reservoir leak repair
		Reservoir maintenance
		Reservoir Site Inspection & Maintenance
		Reservoir Stations Electrical Inspection & Maintenance
		Roving private lateral inspection
		Roving Team Private Leakage
		Sanitary survey investigations
		Scaling Up of Resources
		Security Locks Reservoirs and Water Pump Stations
		Utilities maintenance
		Valve exercising - critical
		Valve exercising - non critical
		Works Operations Tools & Spare Parts
	Stormwater	Blockage - Significant

Team	Water	Task
		Complaint to Engineer
		Compliment Received
		Condition assessment / monitoring
		Culverts Operational Maintenance
		Fault
		Fault - Third Party Damage
		Flap Gate Maintenance
		Flood response
		Flushing and Cleaning
		Green infrastructure operations and maintenance
		IMMEDIATE Instructed Works
		Information Request Council
		Information Request Public
		Instructed Works
		Leaking pipes
		Lid Missing / Loose / Broken
		Longwood Water Race Maintenance
		Maintenance and service improvement
		Major Burst or Breakage
		Mitchell Stream Enhancement Plan
		Moroa Water Race Maintenance
		New Connection
		Outlet / Inlet Operational Maintenance
		Pinehaven Stream Enhancement and community connection
		Pollution
		Poor Quality Work
		Pump Stations Electrical Inspection & Maintenance
		Pump Stations PPE & Safety Equipment Inspection & Maintenance
		Pump Stations Pump Inspection & Maintenance
		Pump Stations SCADA Control, Systems Inspection and Maintenance
		Pump Stations Site Inspection & Maintenance
		Relocate Asset
		Riverlink Wetland Pilot Project
		Scaling Up of Resources
		Seepage
		Stormwater Network Planned Maintenance
		Stormwater Pipelines Siphons & Flushing
		Trades Road Wetland
		Waterway Issue
		Blockage - Minor

Team	Water	Task
	Wastewater (excl JV)	Blockage - Significant
		Cleaning Storage Tanks
		Complaint to Engineer
		Compliment Received
		Condition assessment / monitoring
		Eastern Porirua wastewater lateral inflow and infiltration reduction
		Facility Issue
		Fault
		Fault - Third Party Damage
		Flow Meter Calibration
		Flushing
		Follow up investigations to address contamination events
		IMMEDIATE Instructed Works
		Information Request Council
		Instructed Works
		Interceptor ventilation and odour treatment
		Leaking pipes
		Level monitoring for dry weather blockages
		Lid Missing / Loose / Broken
		Maintenance and service improvement
		Major Burst or Breakage
		New Connection
		Odour / Foul Air
		Overflow
		Poor Quality Work
		Proactive flushing, heavy cleaning and root clearance
		Pump Stations Electrical Inspection & Maintenance
		Pump Stations PPE & Safety Equipment Inspection & Maintenance
		Pump Stations Pump Inspection & Maintenance
		Pump Stations SCADA Control, Systems Inspection and Maintenance
		Pump Stations Site Inspection & Maintenance
		Pump Stations Wet Wells Inspection & Maintenance
		Relocate Asset
		Repair defective wastewater pipes
		Rising Mains Valve Annual Maintenance
		Roving Team Inflow & Infiltration
		Scada Callouts
		Scaling Up of Resources
		Seepage

Team	Water	Task
		Valve exercising - critical
		Valve exercising - non critical
		Ventilation improvements for corrosion protection
		Wastewater lateral inspection and management of repairs
		Wastewater Manhole Chamber Inspections
		Wastewater network asset condition assessment
		Wastewater network trunk sewer condition assessment (laser survey)
	Wastewater JV	Blockage - Significant
		Condition assessment / monitoring
		Facility Issue
		Network planned maintenance
		Network reactive maintenance
		Scada Callouts
		Scaling Up of Resources
		Ventilation improvements for corrosion protection
		Wastewater network trunk sewer condition assessment (laser survey)
		Wastewater network trunk sewer condition assessment (laser survey) - Onepoto Line
Operations - Treatment & Control Systems	Drinking Water	Field testing and monitoring system
		Gear Island WTP UV installation
		Bulk Regulatory Compliance
		Bulk Sampling & Testing
		Chemical purchase
		Consent Management
		Control systems data integrity improvements
		Control systems maintenance
		Fluoride dosing systems reliability
		GWRC SLA
		Planned Maintenance
		Reactive Maintenance
		Regulatory Compliance
		Resource Investigations
		Sampling & Testing
		Smart Services implementation programme
		South Wairarapa - Additional Drinking Water Sampling
	Stormwater	Beach Quality Monitoring
		Control systems data integrity improvements
		Fresh Water Quality Monitoring
		Global Stormwater Monitoring
		Greytown Control Systems

Team	Water	Task
		Greytown Water Races Monitoring & Consents
		Martinborough Control Systems
		Planned Maintenance
		Reactive Maintenance
		Smart Services implementation programme
		Water Races Monitoring & Consents
	Wastewater (excl JV)	Chemical purchase
		Consent Charges - Moa Point
		Consent Charges - Western
		Contract Variations - Moa Point
		Contract Variations - Western
		Control systems data integrity improvements
		Maintenance & Operational Charges - Moa Point
		Maintenance & Operational Charges - Western
		Management & Overhead Charge - Moa Point
		Management & Overhead Charge - Western
		Minor Asset Works - Moa Point
		Minor Asset Works - Western
		Moa Point WWTP UV renewal
		Operation of Sludge minimisation facility Southern Landfill
		Planned Maintenance
		Power - Moa Point
		Power - Western
		Reactive Maintenance
		Real-time monitoring, control and communication of wastewater network
		Residual Disposal - Moa Point
		Residual Disposal - Western
		Resource Consents - Wastewater
		Sludge minimisation plant operational costs
		Smart Services implementation programme
		Trade Waste Charge
		Trade waste database
		Trade Waste Investigations
		Trade Waste Monitoring
		Wastewater Sampling
		Water Quality Investigations
		WW Trunk Wainui Control Systems
	Wastewater JV	Bulk wastewater trunk maintenance
		Consent Charges - Seaview
		Contract Variations - Seaview
		Drainage Levy
		Gas - Seaview

Team	Water	Task
		Legal Fees
		Maintenance & Operational Charges - Porirua
		Maintenance & Operational Charges - Seaview
		Management & Overhead Charge - Porirua
		Management & Overhead Charge - Seaview
		Minor Asset Renewals - Seaview JV
		Monitoring
		Operation of sludge treatment facility
		Outlet Pipe Maintenance
		PCC JV Control Systems
		Porirua WWTP
		Porirua WWTP outfall capacity assessment
		Porirua WWTP outfall upgrade
		Power - Seaview
		Real-time monitoring, control and communication of wastewater network
		Residual Disposal - Porirua
		Residual Disposal - Seaview
		Seaview WWTP UV renewal
		Treatment Plant Operations

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Appendix E:
WWL’s Backflow Prevention Programme

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Appendix E. WWL's Backflow Prevention Programme

Background

Backflow is the unwanted reverse flow of water into a drinking water supply, potentially carrying pollutants or contaminants.

The Wellington Metro Water Safety Plan is the overarching water safety management plan for Wellington Water and the metropolitan Client Councils. When drinking water contamination risk is considered in the context of reticulation, contamination via backflow is a prominent risk and is possible in any part of the network. This may include abstraction points, process links, points of supply, reservoirs, scour valves, air valves, relief valves, hydrants, and so on.

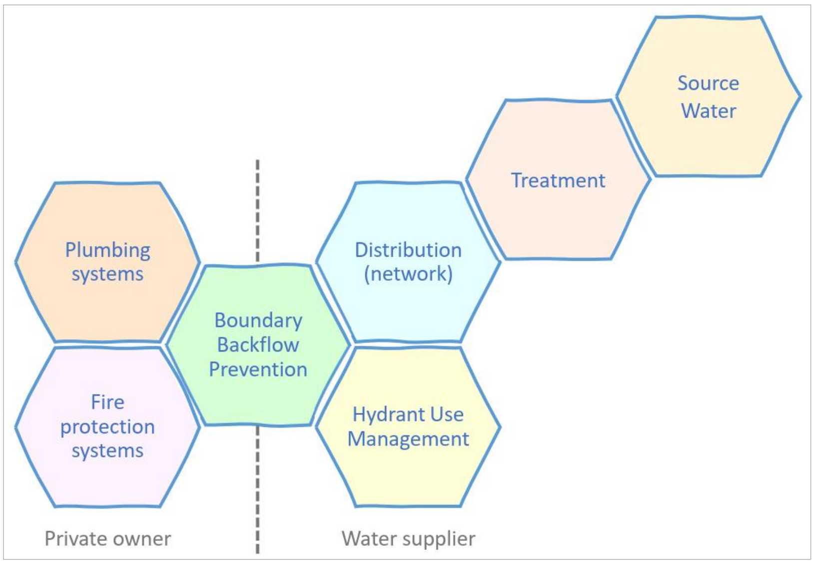
For Wellington Water, local backflow management issues include:

- **Unclear Roles and Responsibilities:** Councils have transferred drinking water supplier duties to Wellington Water but retain control over some activities like billing, enforcement, and funding.
- **Lack of Assurance:** Wellington Water cannot currently ensure that combined efforts provide sufficient protection against the risk of backflow.
- **Approach Gaps:** Deficiencies exist due to councils prioritising Building Act compliance and assuming Wellington Water handles WSA compliance.

A wholistic regional approach is essential for consistent and cohesive drinking water protection through backflow prevention across all networks under the care of Wellington Water. A Regional Backflow Prevention Program is being developed and implemented to address this need. Figure E-1 illustrates the key asset groups for backflow risk management. Activities in one group can affect water quality in another group, such as hydrant use dropping distribution network pressure and creating a backflow event at a boundary point of supply.

The Regional Backflow Prevention Programme has highlighted that the highest priorities for protection are hydrants (in particular, hydrant use) and points of supply (boundary backflow prevention).

Figure E-1: Key asset groups for backflow risk management



Hydrant issues

About 18,000 hydrants at risk of contamination via backflow or causing the hydraulic condition generating a backflow event elsewhere in the network.

Current legislation requires [hydrant] standpipe use to be limited to emergency services and to water suppliers conducting water supply operations and maintenance. A *Permit to Draw Water* process exists, but with no overarching management of users, equipment and activities. No bulk water filling stations are available to enable compliance. The data for compliance reporting is limited and there are no education, auditing or enforcement programmes.

In general terms, the reach of the protection regime falls short of the extent of hazards assumed.

Point of supply issues

At least 125,000 points of supply across the region with a wide variety of hazards within the sites served, possibly as many as 153,000.

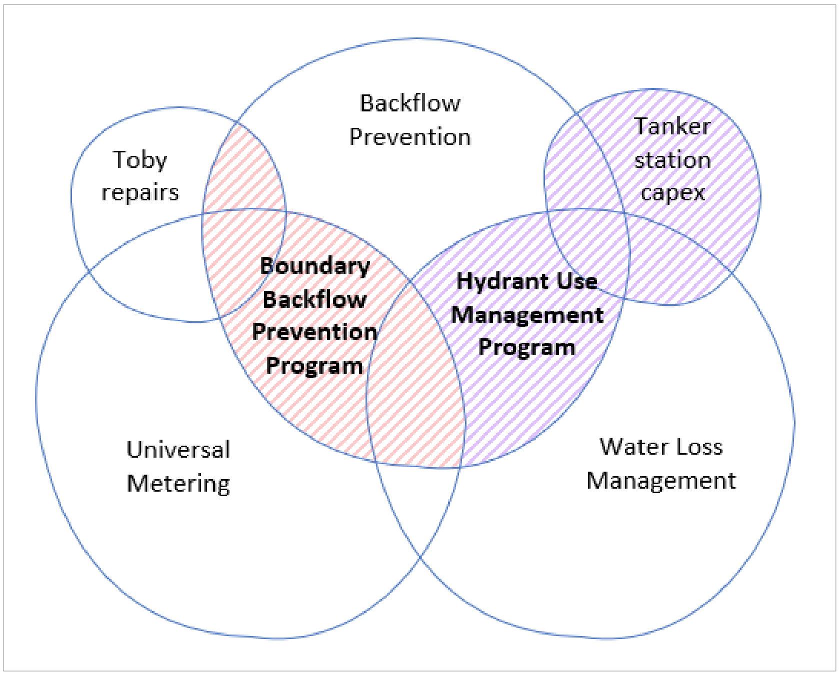
There is a lack of visibility of the protection status of all points of supply, and no clear compliance management plan covering all testable protection points. The reality of ownership and responsibility for devices protecting the supply network does not fully align with the requirements of governing authorities. Education, training, and competency – internally and externally – are in their infancy.

In general terms, the reach of the protection regime falls short of the extent of hazards assumed.

Interrelationships

Wellington Water has many functions and activities that intersect with drinking water protection through backflow prevention, and management of those intersections is quite different. Figure E-2 illustrates an example of some of those interactions and shows the two backflow prevention sub-programmes that are being developed and implemented to manage the work required.

Figure E-2: An example of intersecting Wellington Water functions and activities



The two sub-programmes are:

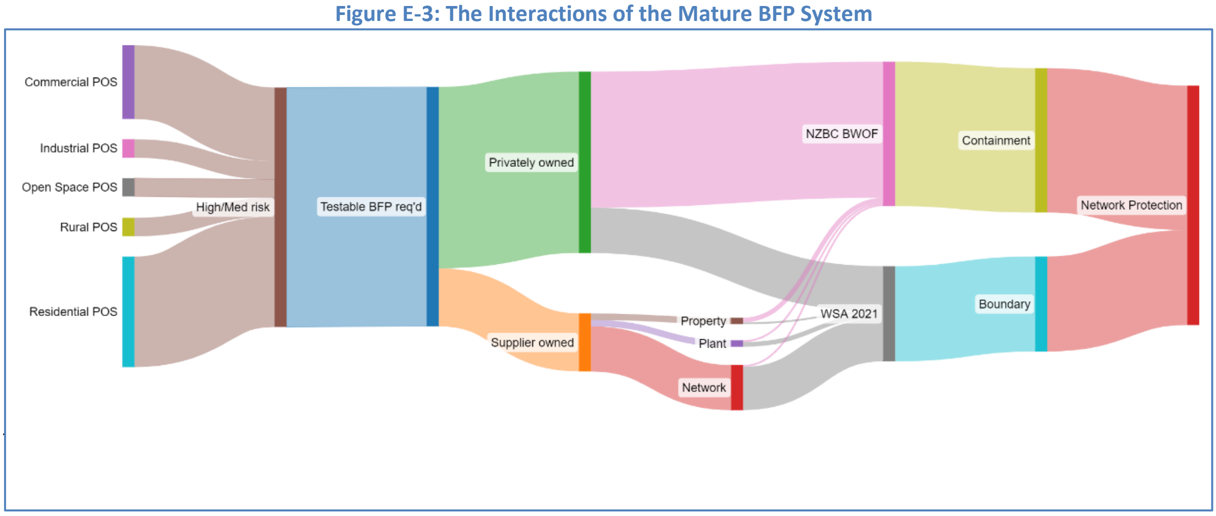
- **Hydrant Use Management Programme** – to collaborate with Water Loss Management, protect water quality and infrastructure, support compliance with the requirement of Drinking Water Quality Assurance Rules 2022 to limit who may use standpipes (have hydrant access), and provide compliant alternative bulk water supply points.

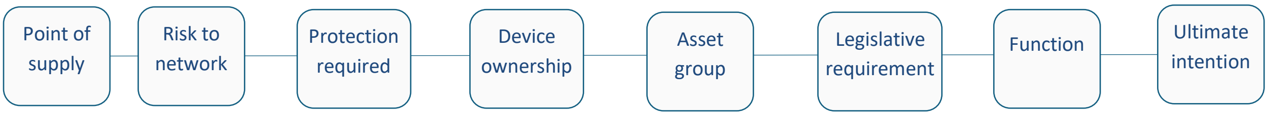
- **Boundary Backflow Prevention Programme** – to manage boundary backflow prevention in accordance with the Drinking Water Quality Assurance Rules and collaborate with key stakeholders to achieve compliance.

BOUNDARY BACKFLOW PREVENTION AND ITS COMPLEXITIES

Protection of the network at the boundary is made up of two parts – containment protection (stopping contamination leaving the site) and boundary protection (stopping contamination entering the network). The Figure E-3 below illustrates the relationships between points of supply (POS), risk, protection, ownership, legislative jurisdictions, and function for assumed high and medium risk situations. Relative magnitudes are indicative only, as existing records are insufficient to present an accurate picture of the current state.

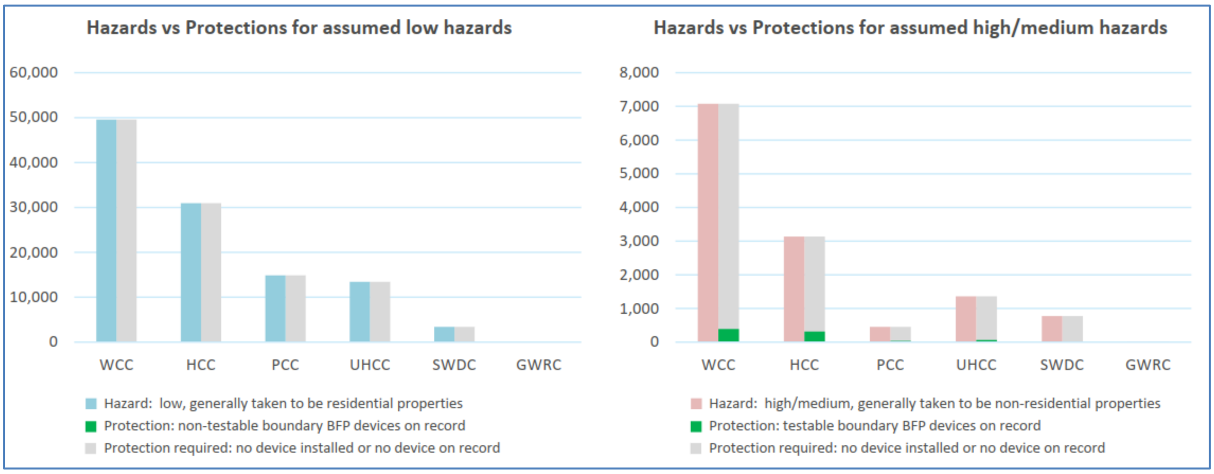
Figure E-3: The Interactions of the Mature BFP System





Hazards within properties and sites present backflow event risks to the drinking water supply at the point of supply, especially if there is insufficient protection in place. To simply deploy data that depicts business or property type, or to assume District Plan zoning, is not enough to appropriately identify hazards and classify risk. Moreover, to further survey and confirm this picture is estimated to be in the order of millions of dollars. Figure E-4 below depicts the disparity between assumed hazards and the related protections required.

Figure E-4: The current balance between assumed hazard points and the protections required.



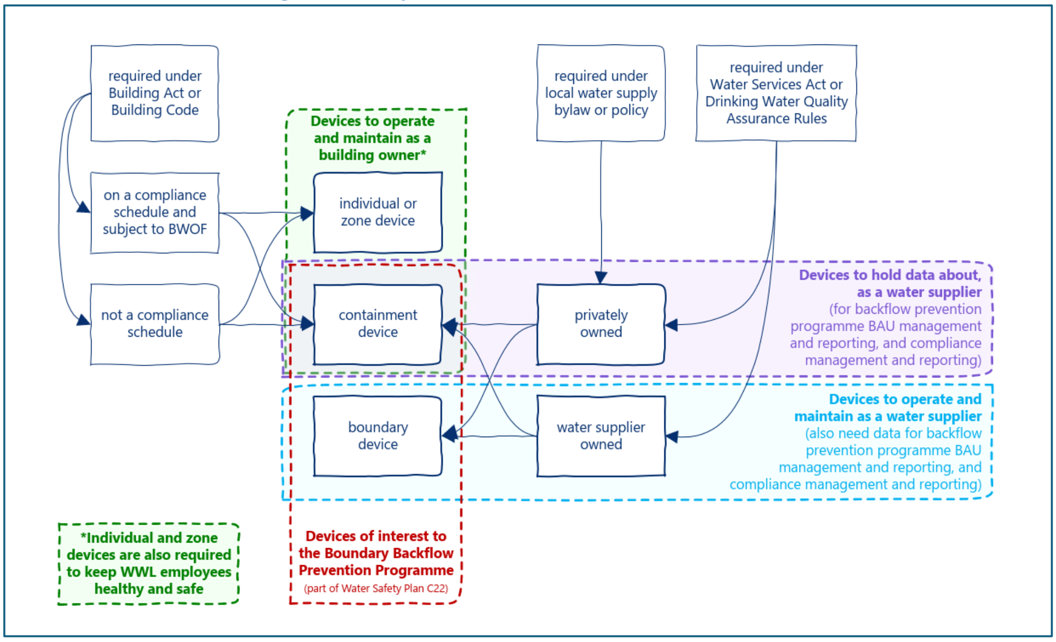
Boundary Backflow Prevention Compliance

Figure *n* depicts the complexities in the compliance model, with related information transactions shown. To coordinate a regional backflow prevention approach is to manage a robust management system, collecting the correct information, shared by multiple parties, with the system accommodating:

- Dual legislation frameworks:
  - Domestic, commercial and public properties falling under the *Building Act 2004*.
  - Water supply networks falling the *Water Services Act 2021.*
- Multiple bylaws and policies:
  - Five territorial authority water supply bylaws.
  - Several Council backflow prevention policies.
- Overlapping or intersecting authorities, including:
  - Water Suppliers
  - Councils as Water Suppliers (owners).
  - Councils as Building Consent Authorities.
  - Councils as Territorial Authorities (as building control compliance).

    - Council as land developers/managers of RMA.
    - Councils as property owners.
    - Taumata Arowai (water services regulator).
    - MBIE (building control regulator).
- Multiple owners and actors, including:
    - Private domestic property owners.
    - Private commercial property owners.
    - Tenants.
    - Private utilities.
    - Public asset owners.
- Multiple data formats, collection/collation regimes, and legislative reporting requirements.

Figure E-5: Key Data Transactions Under the two Acts



The developing BFP programme

Wellington Water is undertaking a five-year implementation programme to manage potential contamination sources for the regional water supply network that it manages. The three main activities are described below, with their current state of maturity.

<u>Regional Backflow Prevention Programme</u>

Extensive data assimilation and assessment has been undertaken over the past two years, with a clearer image of contamination risks emerging. This and next years' activities will include further information gathering, with maturing knowledge-sharing with other authorities, and the construction of the formal BFP management system. It is recommended that, during remaining years, system establishment and further verification is undertaken, leading to the state of "BAU".

<u>Hydrant Use Management</u>

Developing by year are standard designs for each Council area for bulk water filling points (tanker filling stations). To date WWL has collated the various practices and procedures that are in place for managing fire hydrants, having tested the findings on one isolated water network. Policy is being finalised and procedures being rolled-out, with an expected three-year advancement towards "BAU".

Boundary Backflow Prevention

WWL has interrogated an example, smaller water supply network to collect and collate hazard indications. Developing are the foundation principles, including priorities, key parameters, risk visibility, surveying and testing protocols, and common, multi-party data standards. Future years will develop the surveying and testing modules, and will recover further field discoveries, whilst finalising the other modules.