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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Mike Brannon, Director, Operations and Maintenance, Water Services
Linda Parkinson, Director, Policy Planning and Analysis, Water Services

Date: May 1, 2026 Meeting Date: May 13, 2026

Subject: **Water Supply Preparedness for Summer 2026**

RECOMMENDATION
THAT the Water Committee receive for information the report dated May 1, 2026, titled "Water Supply Preparedness for Summer 2026."

EXECUTIVE SUMMARY
As of May 1, snowpack levels are approximately 44% per cent of the historical average, and spring and summer forecasts indicate above-normal temperatures and lower-than-normal precipitation. Environment and Climate Change Canada is forecasting 2026 to be one of the hottest years on record. To protect the system over the summer, Metro Vancouver implemented Stage 2 water restrictions — which prohibit all lawn watering — starting on May 1. These measures are needed to conserve water amid low snowpack conditions, mitigate the impacts of potential drought, and maintain system pressure during critical infrastructure upgrades. Stage 3 restrictions are anticipated to begin in early June to further support the reliable delivery of water throughout the summer. It is anticipated that the existing snowpack and expected full-source reservoirs, supported by widespread compliance with watering restrictions, will ensure sufficient source water to meet water demands during the high-demand season. Proactive public education supported by strong member jurisdiction enforcement of the water restrictions will be essential this summer.

PURPOSE
To provide an annual update on the status of water supply before the high-demand period based on available data as of May 1, 2026.

BACKGROUND
Following the Water Committee's 2026 Work Plan, this report is based on the current condition of the source water supply, trends in water usage, and includes plans for operating the source reservoirs and the water system during the high-demand season.

Current State of Source Water Supply
Metro Vancouver's source reservoirs are filled each winter and spring by precipitation and snowmelt, and the water needs to last through the summer and into the fall. Snowpack conditions are monitored up until June 15 each year, which informs operational strategy and timing to refill source reservoirs. Snowpack measurements are routinely conducted at sample sites across the Capilano, Seymour, and Coquitlam Water Supply Areas. The April 1, 2026, snow survey results assessed snowpack at 55 per cent of the historical average. April has been predominantly warm and dry, and the snowpack has reduced further relative to historical average. The May 1, 2026, snowpack is at 44% percent of the historical average for this date. The 3-month temperature outlook for April through June shows a higher likelihood of above normal temperatures on BC's south coast (~80 per cent probability). Further, Environment and Climate Change Canada are forecasting 2026 to be one of the hottest years on record. Although snowpack plays a crucial role in supplying the region during the high-demand season, the region is not

entirely reliant on it. Precipitation during the high-demand season temporarily reduces water use across the region and can contribute to the storage level in the three main reservoirs and the alpine lakes. Currently, the three-month precipitation outlook shows a drier-than-normal spring.

Stored Water-Source Reservoirs

a) Capilano Reservoir: As of May 1, the reservoir was at 94 per cent of full summer storage capacity. The Cleveland Dam spillway gate was raised on March 24 to fill the reservoir by the end of May. The spillway gate was proactively raised earlier than last year in response to lower snowpack.
b) Seymour Reservoir: As of May 1, the reservoir was 86 per cent of full summer storage capacity. Seasonal Stop Log installation was completed on March 31 to fill the reservoir by late May.
c) Coquitlam Reservoir: The reservoir is controlled by BC Hydro within specific terms and conditions established by an agreement with the Greater Vancouver Water District (GVWD). Based on the agreement, BC Hydro will operate its facilities in 2026 so the reservoir can provide sufficient water during the high-demand season.
d) Alpine Lakes: GVWD's three alpine lake sources, Palisade, Burwell, and Loch Lomond, are used as reserves to supplement the Capilano and Seymour reservoirs during the summer period. Burwell and Palisade Lakes are at full capacity, and as of May 1, Loch Lomond is at 94 per cent expected to be filled by late spring.

System Operations Outlook for Summer 2026

The First Narrows Crossing, one of the system's key supply pipes from the Capilano and Seymour reservoirs, has been out of service since last fall to allow for work to take place on the Stanley Park Water Supply Tunnel project. While the system is well equipped to supply the region for where it's needed most, if too much water is used during the summer for non-essential purposes, then the increased demand could affect water pressure. Reduced water pressure could affect firefighters' ability to use water for emergencies.

Water usage patterns will be closely monitored, and adjustments will be made to the transmission system and withdrawals from the three source reservoirs to meet regional water needs throughout the high-demand season. The three alpine lakes will be used as needed.

To manage seasonal demand, Metro Vancouver and its members activate Stage 1 of the Drinking Water Conservation Plan (DWCP) annually from May 1 to October 15. The DWCP is a regional policy developed collaboratively with member jurisdictions and implemented and enforced through member bylaws. It uses a staged approach, with progressively stricter water use restrictions during periods of high demand, shortages, or emergencies. The most recent escalation to Stage 2 was during the summer of 2023 in response to warmer and drier weather conditions, sustained high water use, and seasonal forecasts indicating continued drought conditions into the fall.

Factors influencing Stage 2 Activation

Protecting the system for essential and emergency needs is the priority. While reservoir levels are currently normal, low snowpack and limited rainfall mean there is little opportunity for replenishment as water is used. Given the forecast for 2026 to be one of the hottest years on record, demands can be expected to rise significantly, which will stress the system, particularly with the ongoing work to complete critical infrastructure upgrades. Based on current forecast and system analysis, Metro Vancouver activated Stage 2 on May 1, and anticipates moving to Stage 3 in early June.

Factors influencing the implementation of higher stages of water restriction include:

- The province has advised water suppliers to prepare for dry conditions. Forecasts suggest a dry summer with potential drought, and snowpack levels are less than half of normal, and significantly lower than last year.
- Reducing seasonal water demand is essential while the current work for the Stanley Park Water Supply Tunnel project is completed.
- Higher water use can lead to pressure fluctuations that may affect firefighting. Protecting the system for essential and emergency needs is the priority.

Metro Vancouver Communication and Education Support During High-Demand Season
Metro Vancouver is engaging and coordinating with member jurisdictions and stakeholders in advance of and throughout the high-demand season to align education, communications, and outreach efforts.

Metro Vancouver conducts annual public water conservation education campaigns and communications to support the *Drinking Water Conservation Plan* through the following initiatives, which were outlined in the report titled "Drinking Water Conservation Communications Update," presented to the Water Committee at the April 8, 2026, meeting:

- Water restrictions promotion: Reminds and educates residents about seasonal water restrictions, particularly those related to lawn watering restrictions, and supports member jurisdictions' public education and enforcement programs;
- Water conservation behaviour-change campaign: Encourages residents to reduce and use drinking water more mindfully outdoors by sharing practical conservation tips; and
- Water Wagon outreach program: Promotes the region's high-quality tap water, educates residents about the drinking water system, and provides water conservation tips.

ALTERNATIVES
This document is an information report; no alternatives are presented.

FINANCIAL IMPLICATIONS
During the hotter, drier months, water demand rises significantly compared to winter, putting extra strain on the water supply system. To address this, Metro Vancouver's seasonal pricing structure reflects the increased costs of building larger infrastructure and higher operational expenses, such as additional pumping needed to meet peak summer demands. For 2026, the Greater Vancouver Water District (GVWD) water rates for members are $0.7575 per cubic metre (1,000L) during the non-peak season and $1.5062 per cubic metre during the peak season.

With the implementation of higher restrictions, the goal is for the region to consume less water. This will have an impact on water sales in the summer months. It must be noted that the actual reductions achieved through higher stage restrictions are highly dependant on weather, enforcement, and the behaviour of residents across the region.

OTHER IMPLICATIONS
Implementing higher water restrictions has broad implications for residents, certain public sector operations, and some business sectors across the region. Impacts are mainly associated with reducing discretionary and non-essential outdoor water use, requiring adjustments to landscaping, irrigation, and certain service activities across the region.

The move to Stage 2 on May 1, led to an increased number of inquiries to both member jurisdictions and Metro Vancouver particularly from residents who have invested in new lawns or nematode applications, as well as from the landscape and irrigation businesses that provide these services. As restrictions heighten, monitoring and enforcement activities also need to increase which may require additional resources from members.

A move to Stage 3 will have additional impacts on businesses such as commercial car washes and cleaning operations as well as further reductions in watering of playing and sports fields and golf courses.

Feedback from the Regional Engineers Advisory Committee indicated support for implementing higher restrictions for the summer.

CONCLUSION

While source reservoir levels are currently within normal range and anticipated to be full by early June, low snowpack and forecasts of limited rainfall mean there is little opportunity for replenishment as water is used. Spring and summer forecasts indicate above-normal temperatures and lower-than-normal precipitation, which is likely to drive up demands, driven by outdoor use, particularly lawn watering. It is critical that Metro Vancouver residents and businesses follow watering restrictions so there is sufficient water available for where it's needed most: cooking, cleaning and drinking. Following water restriction region wide will support the transmission system as work to upgrade the infrastructure through Stanley Park is completed.

In addition to the annual public education initiatives, outdoor watering restrictions outlined in the *Drinking Water Conservation Plan* supported by strong enforcement by member jurisdictions will help reduce water use during the upcoming high-demand season. Metro Vancouver relies on member jurisdictions and the public to help manage demand effectively.

ATTACHMENT

1. Presentation re: Water Supply Preparedness for Summer 2026.

REFERENCES

1. Drinking Water Conservation Plan:
   https://metrovancouver.org/services/water/Documents/drinking-water-conservation-plan.pdf

Water Supply Preparedness for Summer 2026

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Director, Operations and Maintenance, Water Services

Linda Parkinson
Director, Policy, Planning, and Analysis, Water Services

Water Committee, May 13, 2026
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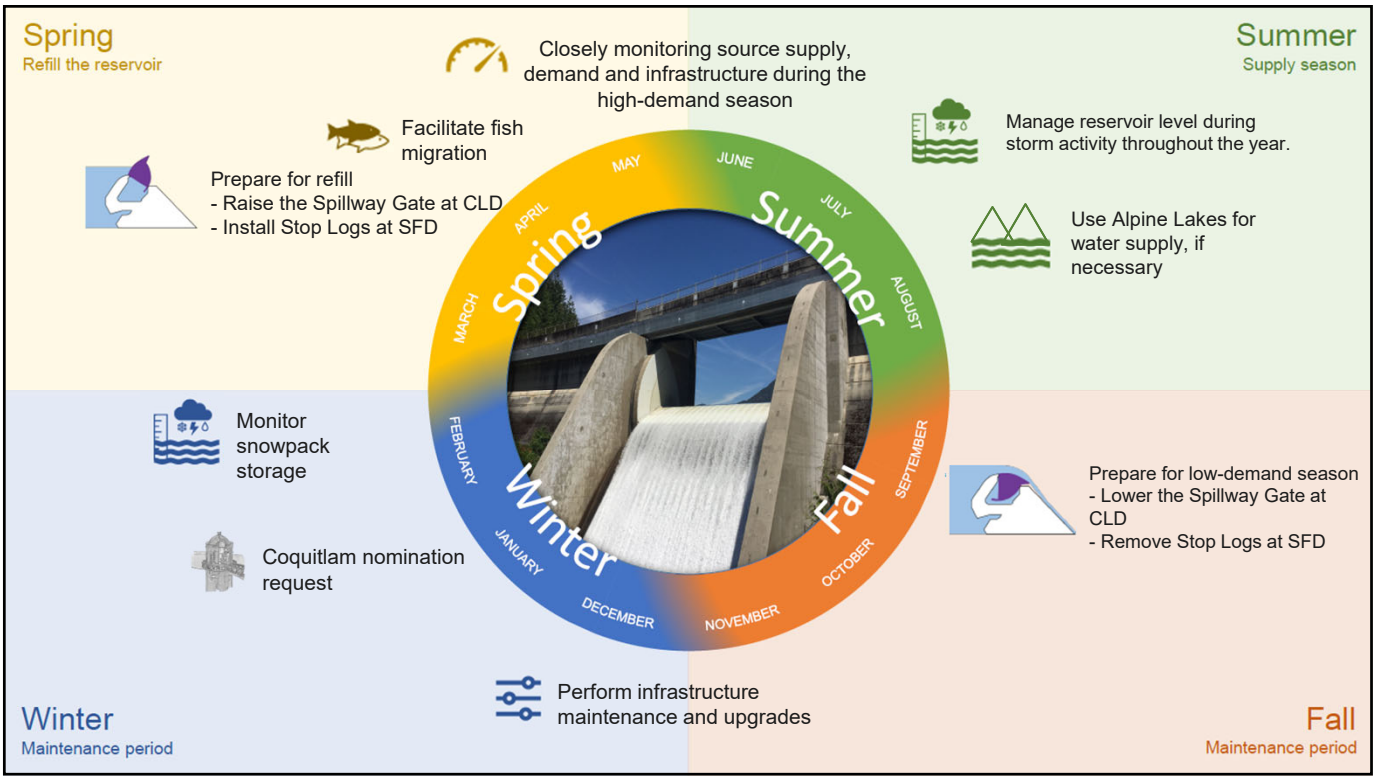

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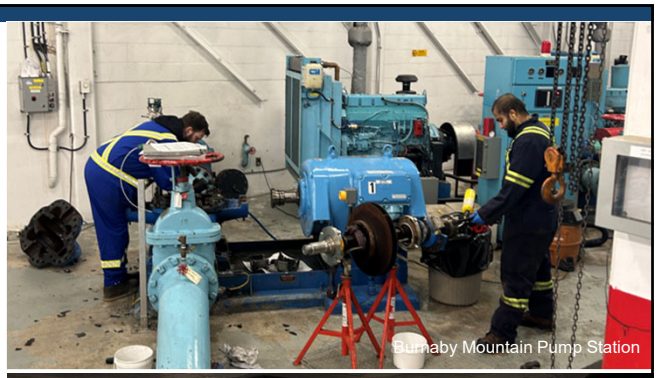
PREPARING FOR SUMMER

Winter Maintenance & Upgrades

UV Reactor Maintenance


Burnaby Mountain Pump Station

Sunnyside Reservoir – Seismic Upgrades

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3

PREPARING FOR SUMMER

Winter Maintenance & Upgrades

Seymour Falls Dam – Stop Log Install

SNWST Valve Chamber Construction

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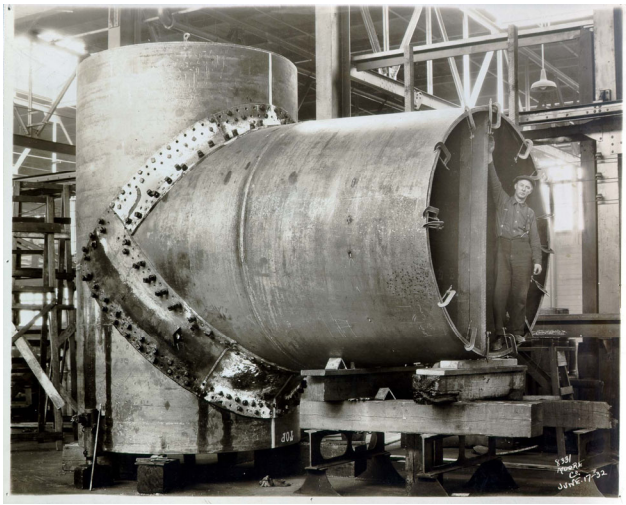
4

STANLEY PARK WATER SUPPLY TUNNEL

Work currently underway

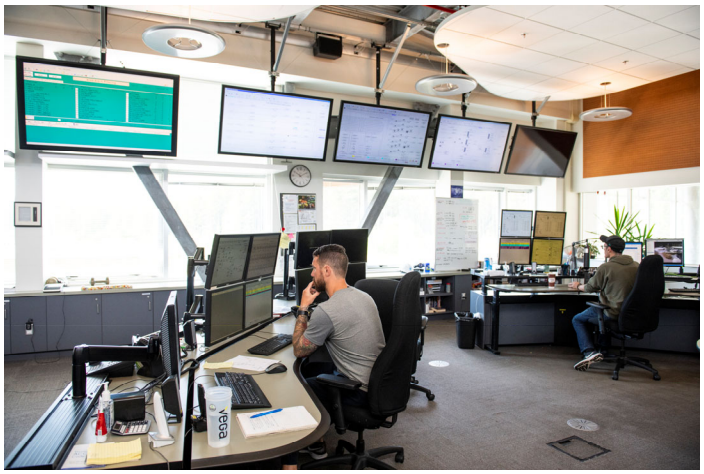


1932 Water Supply Tunnel

ONGOING MONITORING

Storage Levels, Water Use, and System Performance

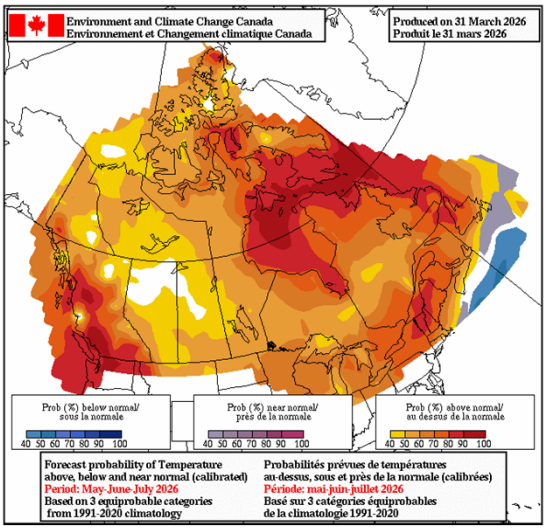
Snowpack Monitoring

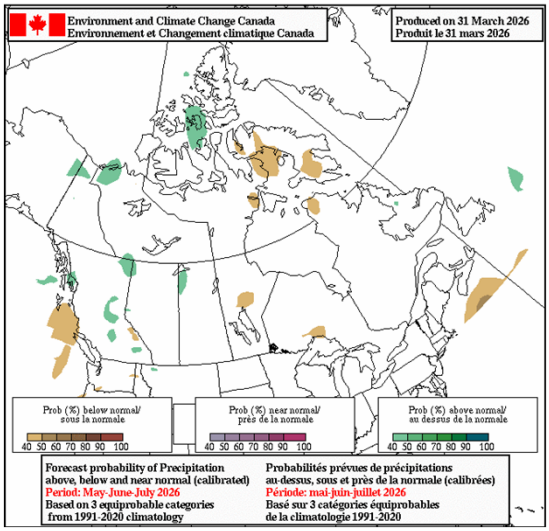


Closely monitoring system performance 24/7

SEASONAL FORECASTS – ENVIRONMENT CANADA

Temperature & Precipitation





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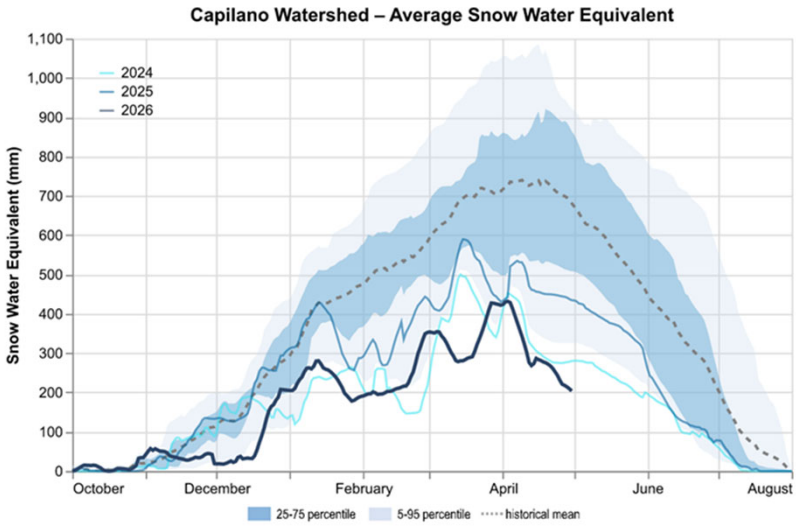
7

SNOWPACK & SOURCE RESERVOIRS

As of May 1, the snowpack remains well below normal at 44% of historical average.



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8

9

HOW WE'RE RESPONDING

Restrictions and Communications

- Activated Stage 2 on May 1
- Prepare to move to Stage 3 in early June
- Working with member jurisdictions, public, and key stakeholder

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10

FACTORS INFORMING DECISION

Keeping Seasonal Water Use Down

- Forecasts suggest hot, dry summer with potential drought – drives up water use
- Snowpack levels are less than half of normal, and significantly lower than last year – limits supply
- Completing work at the Stanley Park Water Supply Tunnel Project
- Prioritizing essential and emergency needs

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11

SUMMARY OF STAGE 2 AND 3 RESTRICTIONS

Activity	Stage 2	Stage 3
Watering lawns	Not allowed	Not allowed
Watering trees, shrubs, and flowers (excluding edible)	Allowed with automated irrigation	Allowed only with hose or drip irrigation
Topping up or filling aesthetic water features	Not allowed	Not allowed
Washing impermeable surfaces	Only for health or safety reason or to prepare a surface for paint or treatment	Only for health or safety reason or to prepare a surface for paint or treatment by a commercial cleaning operation
Washing vehicles and boats	Allowed	Only at water efficient commercial car washes
Topping up or refilling pools & hot tubs (residential)	Allowed	Not allowed
Watering sports fields and golf courses	Reduced	Further reduction

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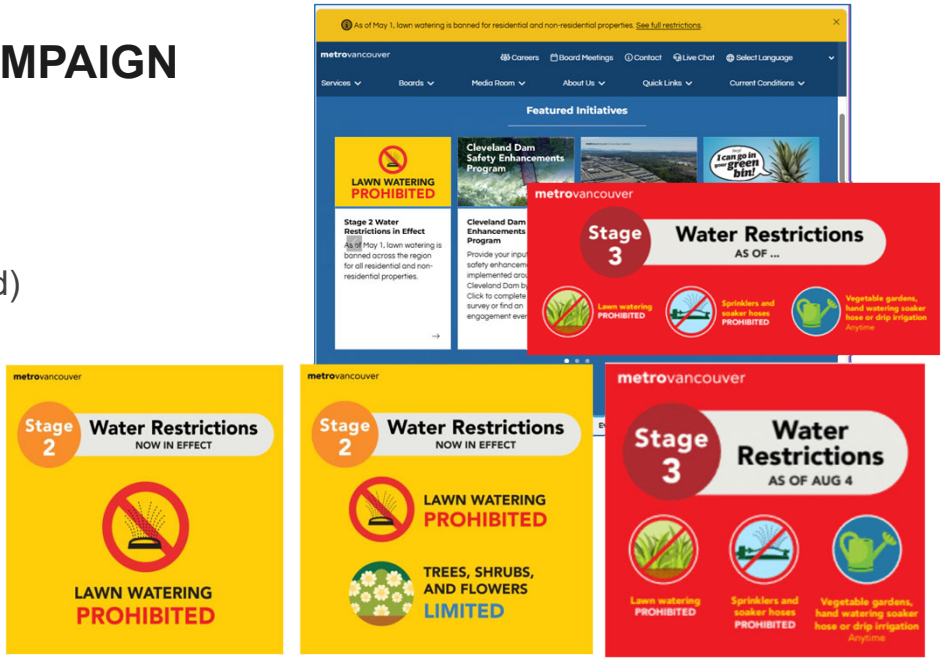
12

EDUCATION CAMPAIGN

- Materials available for members to use (as is or co-branded)
- Social media images, print materials, digital files, and custom materials when requested



HOW WE'RE SUPPORTING MEMBERS

- Key messages
- FAQs for call centres
- Campaign materials
- Communicating with impacted business sectors
- Summer Support Program (June and July)

REINSTATING THE SUMMER SUPPORT PROGRAM

For June and July to support Stage 3 activation

- Program will provide monitoring and communication materials to households non-compliant with water restrictions
- Working with previous contractor to set up the program
- Recruitment ongoing which will inform number of teams
- Looking to expand monitoring to the weekend and early morning hours

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15

Low Water Level Capilano Reservoir Fall 2022

Questions

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16

16

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Linda Parkinson, Director, Policy, Planning and Analysis, Water Services

Date: April 29, 2026 Meeting Date: May 13, 2026

Subject: **Water Use by Sector Report: 2004 – 2023**

RECOMMENDATION
THAT Water Committee receive for information the report dated April 29, 2026, titled "Water Use by Sector Report: 2004 – 2023".

EXECUTIVE SUMMARY
The Greater Vancouver Water District (GVWD) “Water Use by Sector Report 2004 – 2023" (the 2023 report) outlines the trends in water use in the Metro Vancouver region from 2004 to 2023. The 2023 report is based on data provided by 20 member jurisdictions.

The percentage of water consumed in the region that is metered at the end-user has increased by 4.1 per cent since 2021. Almost half, 49.2 per cent, of water consumed in the region is unmetered. However, the percent of water consumed that is metered is expected to increase with the implementation of new metering programs (both mandating universal metering and voluntary programs) across the region.

In 2023, the average total per-capita water consumption is calculated at 387 litres per-capita per day (LPCD) for the region. Most of the water used in the region was by the Residential sector, 64.3 per cent. The Industrial, Commercial and Institutional (ICI) sector accounted for 29.7 per cent, and the Agricultural sector 1.3 per cent. These figures are calculated using a total system loss estimate of 13.2 per cent, based on self-reported estimates by member jurisdictions.

PURPOSE
To provide Water Committee with information on drinking water use trends and consumption by sector in the Metro Vancouver region.

BACKGROUND
The 2023 report is the latest edition of a detailed report that provides information on the region's drinking water use patterns and trends. The first edition of this report was completed in 1997, and Metro Vancouver currently publishes the report on a bi-annual basis covering a rolling 20-year time frame. The 2023 Report supersedes all previous editions.

A request for water billing and metering data from 2022 and 2023 was sent to member jurisdictions staff in July 2024. Members provided their submissions to Metro Vancouver between August 2024 and February 2025. Metro Vancouver staff worked collaboratively with member jurisdiction staff and completed final verification and data correction work between March 2025 and November 2025. Staff continue to work on improving the data sets for future reports. The findings, key metrics, and general trends were presented and discussed at the Regional Engineers Advisory Committee Water Sub-Committee (REAC-WSC) meeting on January 28, 2026 as well as the Regional Engineers Advisory Committee (REAC) meeting on April 10, 2026.

TRENDS IN REGIONAL WATER USE

The following summary points are based on the 2023 report, with a comparison to the 2021 Water Use by Sector report data:

Metering Practices in the Region:

- Metering practices and the extent of metering vary by sector and member jurisdiction. An estimate of the sectors metered in each member jurisdiction is summarized in Table 1. Member jurisdictions provide these estimates, and estimates vary year-over-year.
- Metering progress is reported in terms of both number of connections metered and amount of water consumed by the end user that is metered. In 2023, there were 171,816 metered accounts in the GVWD region, representing 34 per cent of the total serviced connections and 51 per cent of total water consumption. In 2021, metered accounts in the GVWD region represented 36 per cent of the total serviced connections and 47 per cent of total water consumption. The decrease in serviced metered connections is attributed to the improvements in the accuracy of members' billing systems and the consolidation of single-family into multi-family properties.

Table 1: Estimated Percentage of Metered Connections by Sector in 2023

Jurisdiction	Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural
Anmore	96%–100%	N/A²	96%–100%	66%–95%	N/A²	N/A²
Belcarra	96%–100%	N/A²	N/A²	96%–100%	N/A²	N/A²
Burnaby	0%–5%	0%–5%	66%–95%	66%–95%	66%–95%	66%–95%
Coquitlam	0%–5%	0%–5%	96%–100%	96%–100%	96%–100%	96%–100%
Delta	6%–35%	66%–95%	96%–100%	66%–95%	96%–100%	96%–100%
City of Langley	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%
Township of Langley	0%–5%	0%–5%	96%–100%	96%–100%	96%–100%	36%–65%
Maple Ridge	6%–35%	6%–35%	96%–100%	96%–100%	66%–95%	96%–100%
New Westminster	0%–5%	96%–100%	96%–100%	96%–100%	96%–100%	N/A²
City of North Vancouver	0%–5%	0%–5%	96%–100%	N/A²	96%–100%	N/A²
District of North Vancouver	0%–5%	6%–35%	66%–95%	96%–100%	96%–100%	N/A²
Pitt Meadows	6%–35%	0%–5%	66%–95%	66%–95%	96%–100%	96%–100%
Port Coquitlam	0%–5%	6%–35%	96%–100%	96%–100%	96%–100%	96%–100%
Port Moody	0%–5%	0%–5%	6%–35%	66%–95%	96%–100%	N/A²
Richmond	96%–100%	36%–65%	96%–100%	96%–100%	96%–100%	96%–100%
Surrey	66%–95%	36%–65%	96%–100%	96%–100%	66%–95%	66%–95%
Sc̓əw̓ aθən məsteyəxʷ (TFN)	66%–95%	66%–95%	96%–100%	N/A²	N/A²	N/A²
Electoral Area A (University Endowment Lands) [1]	96%–100%	96%–100%	96%–100%	96%–100%	N/A²	N/A²
Vancouver	6%–35%	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%
West Vancouver	96%–100%	96%–100%	96%–100%	96%–100%	N/A²	N/A²

96%–100% 66%–95% 36%–65% 6%–35% 0%–5% N/A²

[1] *GVWD provides drinking water to the University Endowment Lands (UEL) which is part of Electoral Area A, a member jurisdiction.*

[2] *Not applicable; There are no identified connections of this sector type, OR Institutional connections could be metered but may not appear as billed accounts for certain jurisdictions.*

Regional Water Consumption Trends:
Figure 1 shows the total annual water consumption in the region from 2004 to 2023, together with estimates of the population serviced by the GVWD (and member jurisdictions' sources) and total regional population. The regional population increased by about 40 per cent, from 2.14 million in 2004 to 2.98 million in 2023. The serviced population (without private sources) increased by 41 per cent for the same period.

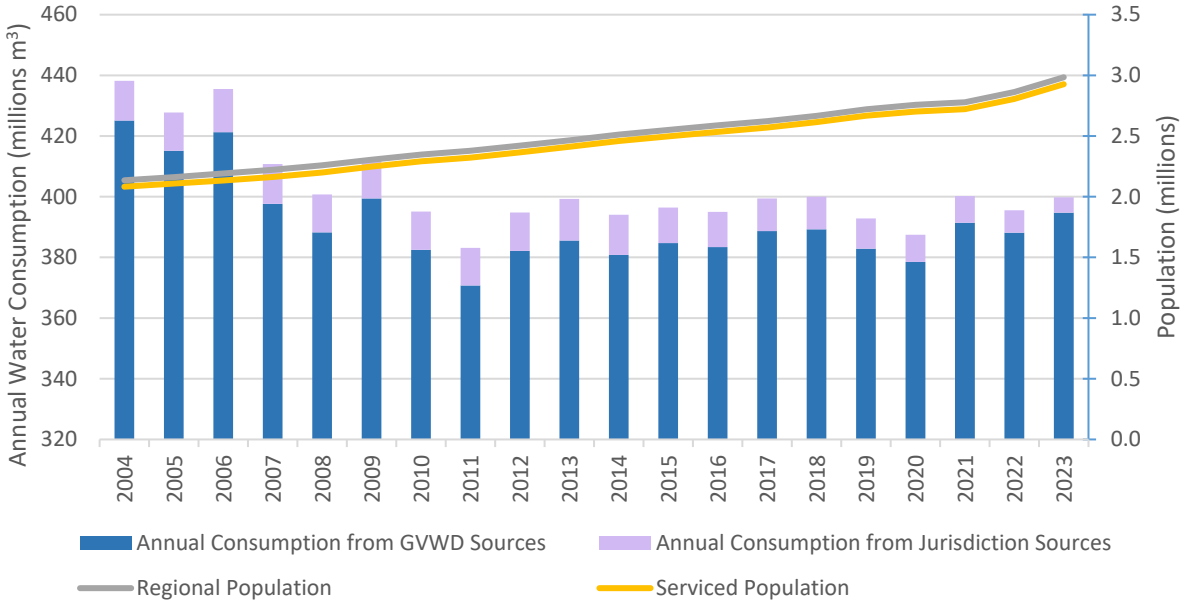

Figure 1: Total annual GVWD supplied water consumption and serviced population
Note: Annual consumption values are taken from GVWD records of total supplied volumes and include member jurisdictions' systems losses and unmetered consumption.

System Losses
For the purposes of this report, system losses include leaks in member jurisdiction distribution systems, faulty meters, fire-fighting needs, flushing of water mains, and other unmetered water uses in the distribution process. System loss estimates are self-reported by member jurisdictions. Estimates of system losses by member jurisdictions range from one per cent to 25 per cent. This results in an estimated 13.2 per cent for the region. Within the Metro Vancouver transmission system, the water loss is estimated using metered data at less than one per cent.

It is noted that there is large variation in self-reported system losses. Also, self-reported system losses of 1-15 per cent for systems that have not achieved universal metering are likely low. Losses for members with universal metering are calculated by subtracting the member jurisdiction metered water sales from water purchased from Metro Vancouver and range from 20.2 to 25.3 per cent.

Residential Consumption
Most of the residential consumption in the region is not metered. Since many member jurisdictions fully meter ICI connections, total unmetered consumption minus system losses can be used as an approximation of residential consumption. There are two main sources of errors with this approach:

- Reporting a higher system loss (per cent) will result in a lower estimated residential consumption, and vice-versa.

- Estimates of residential water use are most reliable when the majority of non-residential water use is metered and only a small amount remains unmetered. In practice, however, this condition is not met across the region. As shown in Table 1, some member jurisdictions have not yet fully metered their ICI and agricultural sectors, which reduces the accuracy of residential consumption estimates.

The estimated water consumption by sector in 2023, using member jurisdictions' self-reported system losses (an estimated 13.2 per cent regional system losses), is illustrated in Figure 2.

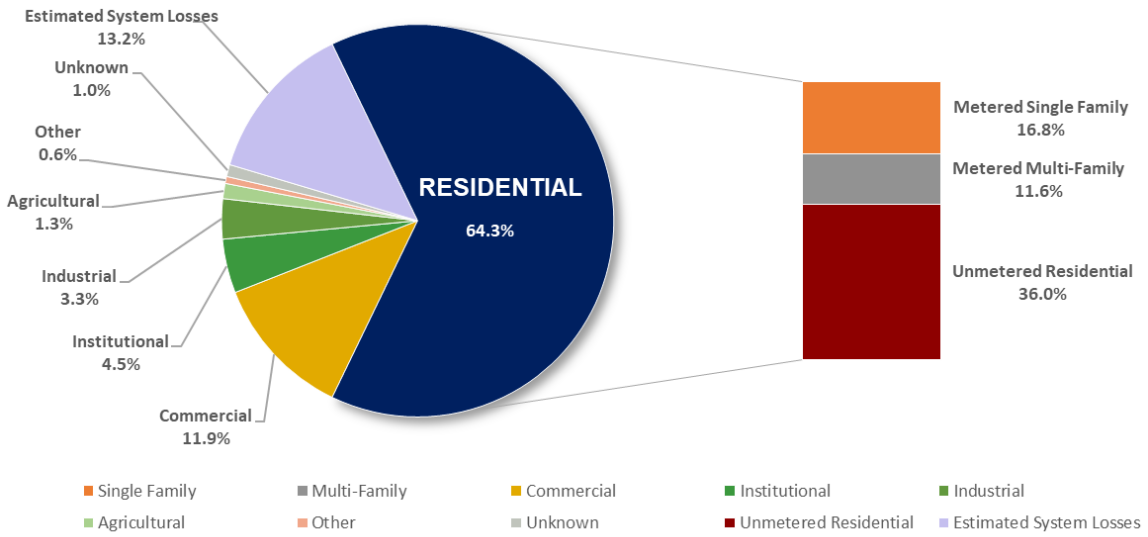

Figure 2: Estimated water consumption by sector in 2023, using member jurisdictions' self-reported system losses

ICI sector consumption in 2023 decreased by 1 per cent compared to 2021. Figure 3 illustrates the 2023 ICI sector water consumption further disaggregated into twenty-one subsectors. The chart compares the sub-sector consumption for odd years from 2011 to 2021 and includes the current report cycle, 2022-2023. The agricultural sector consumption is included in the ICI sector because it represents a small share of regional drinking water consumption (1.3 per cent in 2023). Agricultural sector water use figures represent water provided by regional and municipal sources only. It is understood that the Agricultural sector relies heavily on water from private wells and surface water sources to meet total needs.

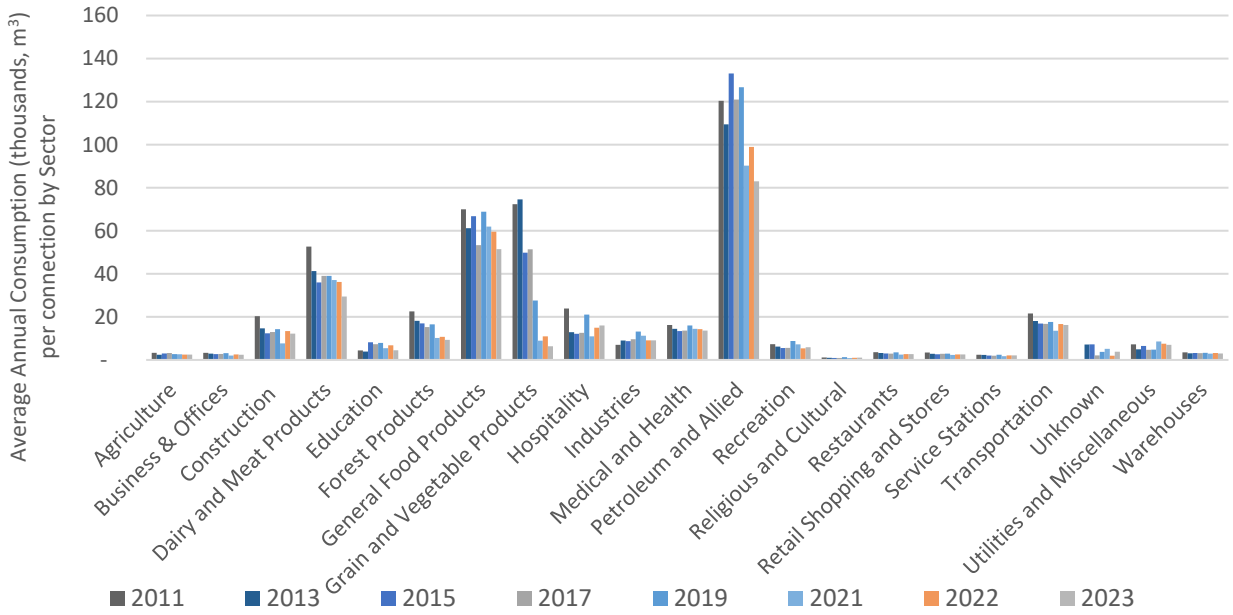

Figure 3: Average annual consumption per ICI connection by sector, 2011 to 2023, only showing current report cycle and odd years for visual clarity.

Regional Per-Capita Water Consumption Trends:
Per-capita water consumption is generally reported in two ways: total water consumption and residential consumption. For systems that are universally metered, both figures can be calculated directly. However, if a system is not universally metered, residential consumption can only be back calculated and requires an estimate of system losses. This results in inherent problems in using this metric, particularly if used to compare jurisdictions.

- **Total Per-Capita Water Consumption**: In 2023, the total drinking water supplied from GVWD and member jurisdictions' sources was 400 million cubic metres, representing an average water consumption of 387 LPCD for the region.
- **Residential Per-capita Consumption**: In 2023, the weighted average regional per-capita residential consumption is estimated at 245 LPCD. The estimated residential per-capita consumption varies between 141 and 519 LPCD for member jurisdictions.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The report is compiled by staff from Metro Vancouver, with significant input from member jurisdiction staff in providing data and reviewing results. The Water Services, Policy, Planning and Analysis program budgets cover the data collection, processing and reporting of regional results.

System losses are non-revenue water. In 2023, using the regional estimate of 13.2 per cent and the blended rate of $0.8676 per m3, non-revenue water for the region can be estimated at $45.8M. Promoting metering programs will enhance accuracy of the non-revenue water estimate in the region.

OTHER IMPLICATIONS

The report is based on data provided by member jurisdictions and developed through a collaborative quality assurance and review process. Findings and trends were discussed with the Regional Engineers Advisory Committee Water Sub-Committee and the Regional Engineers Advisory Committee. The report provides a shared data set to support regional and local water planning and conservation work. Members have also expressed interest in improving the accuracy and consistency of system loss reporting, including exploring alignment with the American Water Works Association (AWWA) methodology for reporting non-revenue water.

CONCLUSION

The 2023 report was developed using data provided by member jurisdiction staff and presents water consumption trends in the Metro Vancouver region. Water use by sector trends in the region provides valuable information for utility planning and developing water conservation and efficiency programs. Historical water use patterns in the region can inform the planning and effectiveness of these programs.

The percentage of water consumed in the region that is metered at the end-user has increased by 4.1 per cent since 2021. However, almost half, 49.2 per cent, of water consumed in the region is unmetered. Both the number of metered connections and the percentage of water consumed that is metered metrics are expected to increase with the implementation of new metering programs (both mandating universal metering and voluntary programs) across the region.

Most of the water used in the region in 2023 was by the Residential sector, 64.3 per cent. The ICI sector accounted for 29.7 per cent, and the agricultural sector, 1.3 per cent. These figures are calculated using a regional system loss estimate of 13.2 per cent, based on self-reported loss estimates by members. In 2023, average total per-capita consumption was estimated at 387 litres LPCD for the region. Within member jurisdictions, the total per-capita consumption rates varied from 265 to 610 LPCD.

ATTACHMENTS

1. Greater Vancouver Water District and Member Jurisdiction Water Use by Sector Report: 2004 – 2023.
2. Water Use By Sector Report 2004 – 2023 Presentation.

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metrovancouver | WATER

Greater Vancouver Water District and Member Jurisdiction Water Use by Sector Report 2004–2023

Water Services Department
Policy, Planning and Analysis Division

About Metro Vancouver

Metro Vancouver is a diverse organization that plans for and delivers regional utility services, including drinking water, sewers and wastewater treatment, and solid waste management. It also regulates air quality, plans for urban growth, manages a regional parks system, provides affordable rental housing, and serves as a regional federation. The organization is a federation of 21 municipalities, one electoral area, and one treaty First Nation located in the region of the same name. The organization is made up of four separate legal entities, each governed by its own Board of Directors. Board directors are elected officials from member jurisdictions.

About the Greater Vancouver Water District

The Greater Vancouver Water District (GVWD) is a statutory corporation that serves its 18 member municipalities, one electoral area, and one treaty First Nation. The GVWD provides high-quality drinking water through its member jurisdictions to over three million residents across the region — that's more than half of BC's population. This includes acquiring and maintaining supply, as well as treating, testing, and delivering water through a complex system of water supply areas, dams, treatment facilities, reservoirs, pump stations, and over 520 kilometres of large diameter water mains.

From the regional system, drinking water is then conveyed to individual homes and businesses through infrastructure owned and operated by member jurisdictions. The GVWD and its member jurisdictions work together to plan and manage the supply and transmission of drinking water across the region.

Territorial Acknowledgement

Metro Vancouver acknowledges that the region's residents live, work, and learn on the shared territories of many Indigenous peoples, including the 10 local First Nations: q̓ icə̓y (Katzie), q̓ ʷɑːn̓ ƛ̓ ən̓ (Kwantlen), kʷikʷəƛ̓ əm (Kwikwetlem), máthxwi (Matsqui), xʷməθkʷəy̓əm (Musqueam), qiqéyt (Qayqayt), Semiahmoo, Sḵwx̱wú7mesh Úxwumixw (Squamish), scəw̓ aθən məsteyəxʷ (Tsawwassen), and səlilwətaɬ (Tsleil-Waututh).

GVWD Members

Village of Anmore
Village of Belcarra
City of Burnaby
City of Coquitlam
City of Delta
Electoral Area A
City of Langley
Township of Langley
City of Maple Ridge
City of New Westminster
City of North Vancouver
District of North Vancouver
City of Pitt Meadows
City of Port Coquitlam
City of Port Moody
City of Richmond
City of Surrey
City of Vancouver
District of West Vancouver
scəw̓ aθən məsteyəxʷ (Tsawwassen First Nation)

Contents

Executive Summary 2
1. Report Context 10
2. Methodology, Assumptions, and Calculations 11
3. Regional Trends 22
List of Acronyms and Conversions 42

Executive Summary

The *Greater Vancouver Water District (GVWD) and Member Jurisdiction Water Use by Sector Report: 2004 - 2023* outlines drinking water use patterns and trends in the Metro Vancouver region. The report was developed in collaboration with member jurisdiction staff and outlines the trends in water use, compares water usage patterns and metering practices in the Metro Vancouver region from 2004 to 2023. The Report can be used to inform planning and implementation of regional and member jurisdiction policies and programs, including those focused on water conservation and demand side management.

As illustrated in the summary table below, the percentage of water consumed in the region that is metered has increased by 4.1 per cent since 2021. Almost half, 49.2 per cent, of water consumed in the region is unmetered. This includes unmetered residential use and system losses.

In 2023, the total water provided by GVWD and member jurisdictions with their own sources was 400 billion litres. Dividing this by the population serviced (2.93 million) yields an average total per capita water consumption of 387 litres per capita per day (LPCD) for the region. Within member jurisdictions, the total per capita consumption rates varied from 265 to 610 LPCD, with variability attributed consumption by the Industrial, Commercial, Institutional and Agricultural sectors, population density, metering levels and estimate of system losses.

In 2023, the weighted average regional residential per capita consumption is estimated at 245 LPCD. The estimated residential per capita consumption varies between 141 and 519 LPCD for member jurisdictions, with variability attributed to metering levels, estimate of system losses and population density. Given the region is not universally metered, residential per capita consumption must be back calculated. This metric must be treated with uncertainty, particularly for those members with lower levels of metering.

The following table summarizes key metrics and a comparison to the previous report:

Water Use by Sector Report: 2004 – 2023

Metric		2021 Report	2023 Report	Change %
Metered accounts	% of Total serviced connections in the region	35.5 %	34.4%	↓ 1.1 %
Metered consumption	% of Total water consumption in the region	46.7 %	50.8 %	↑ 4.1 %
Total annual consumption – water supplied by GVWD and member jurisdiction sources	Billion litres	400	400	↔ 0.0 %
Serviced Population – population served by GVWD and member jurisdiction sources	Number of people	2,721,660	2,926,855	↑ 7.5 %
Total per capita water consumption – regional average	Litres per capita per day	416	387	↓ 7.0 %
Estimated residential per capita consumption – regional average	Litres per capita per day	253	245	↓ 2.8 %

2023 Water Consumption Highlights

- Most of the drinking water used in the region is by the Residential sector, 64.3 per cent. The Industrial, Commercial, Institutional (ICI) sector accounted for 29.7 per cent and the Agricultural sector 1.3 per cent. (These figures are calculated using a regional system losses estimate of 13.2 per cent, based on self-reported estimates by members).
- System losses include leaks in member jurisdiction distribution systems, faulty meters, fire-fighting needs, flushing of water mains, and other unmetered water uses in the distribution process. System losses estimates are self-reported by member jurisdictions. Estimates of system losses by member jurisdictions range from 1 per cent to 25 per cent. This equates to a regional estimate of 13.2 per cent of system losses.
- Self-reported system loss estimates of 1 – 15 per cent for member jurisdictions that are not universally metered are lower than losses for member jurisdictions that have universal metering which range from 20.2 – 25.3 per cent.
- The ICI sector's consumption decreased by 1 per cent since 2021. Water consumption for the ICI sector is divided into 20 sub-categories. The Retail Shopping and Stores sector has the highest total water consumption and most connections in 2023. However, the Petroleum and Allied Industry sector has the highest consumption per connection.

2023 Water Metering Highlights

Metering practices and the extent of metering vary by sector and member jurisdiction. An estimate of the sectors metered in each member jurisdiction is summarized in the table below. Member jurisdictions provide these estimates, and estimates vary year over year.

- The Residential sector consists of single-family and multi-family connections. Most members metered more connections in the multi-family sector than single-family.
- The ICI and Agriculture sectors are fully metered in most member jurisdictions. The number of connections for the ICI sector has remained fairly constant over the past few years.
- Metering progress is reported in both number of connections metered and amount of water consumed that is metered.
    - In 2023, there were 171,816 metered accounts in the region, representing 34.4 per cent of the total serviced connections, and 50.8 per cent of total water consumption.
    - The proportion of metered and unmetered connections in 2023 by member jurisdiction is shown in the first figure below.
    - The proportion of metered and unmetered consumption by member jurisdiction is shown in the second figure below.

Estimated Percentage of Metered Connections by Sector in 2023

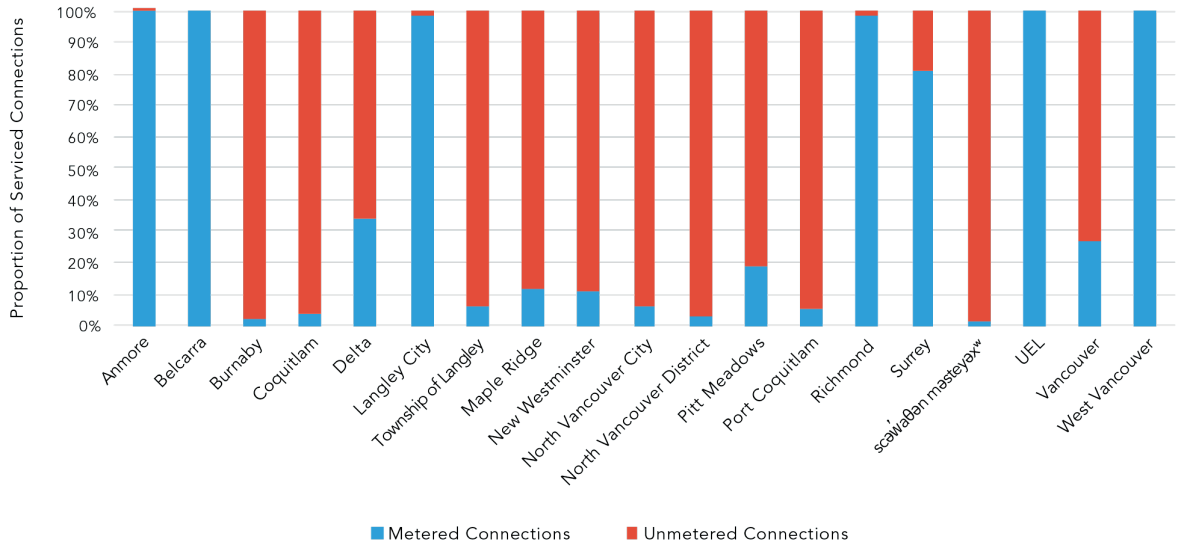
Jurisdiction	Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural
Anmore	96%–100%	N/A[2]	96%–100%	66%–95%	N/A[2]	N/A[2]
Belcarra	96%–100%	N/A[2]	N/A[2]	96%–100%	N/A[2]	N/A[2]
Burnaby	0%–5%	0%–5%	66%–95%	66%–95%	66%–95%	66%–95%
Coquitlam	0%–5%	0%–5%	96%–100%	96%–100%	96%–100%	96%–100%
Delta	6%–35%	66%–95%	96%–100%	66%–95%	96%–100%	96%–100%
City of Langley	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%
Township of Langley	0%–5%	0%–5%	96%–100%	96%–100%	96%–100%	36%–65%
Maple Ridge	6%–35%	6%–35%	96%–100%	96%–100%	66%–95%	96%–100%
New Westminster	0%–5%	96%–100%	96%–100%	96%–100%	96%–100%	N/A[2]
City of North Vancouver	0%–5%	0%–5%	96%–100%	N/A[2]	96%–100%	N/A[2]
District of North Vancouver	0%–5%	6%–35%	66%–95%	96%–100%	96%–100%	N/A[2]
Pitt Meadows	6%–35%	0%–5%	66%–95%	66%–95%	96%–100%	96%–100%
Port Coquitlam	0%–5%	6%–35%	96%–100%	96%–100%	96%–100%	96%–100%
Port Moody	0%–5%	0%–5%	6%–35%	66%–95%	96%–100%	N/A[2]
Richmond	96%–100%	36%–65%	96%–100%	96%–100%	96%–100%	96%–100%
Surrey	66%–95%	36%–65%	96%–100%	96%–100%	66%–95%	66%–95%
Scəw̓ aθən məsteyəxʷ (TFN)	66%–95%	66%–95%	96%–100%	N/A[2]	N/A[2]	N/A[2]
Electoral Area A (University Endowment Lands) [1]	96%–100%	96%–100%	96%–100%	96%–100%	N/A[2]	N/A[2]
Vancouver	6%–35%	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%
West Vancouver	96%–100%	96%–100%	96%–100%	96%–100%	N/A[2]	N/A[2]

96%–100% 66%–95% 36%–65% 6%–35% 0%–5% N/A[2]

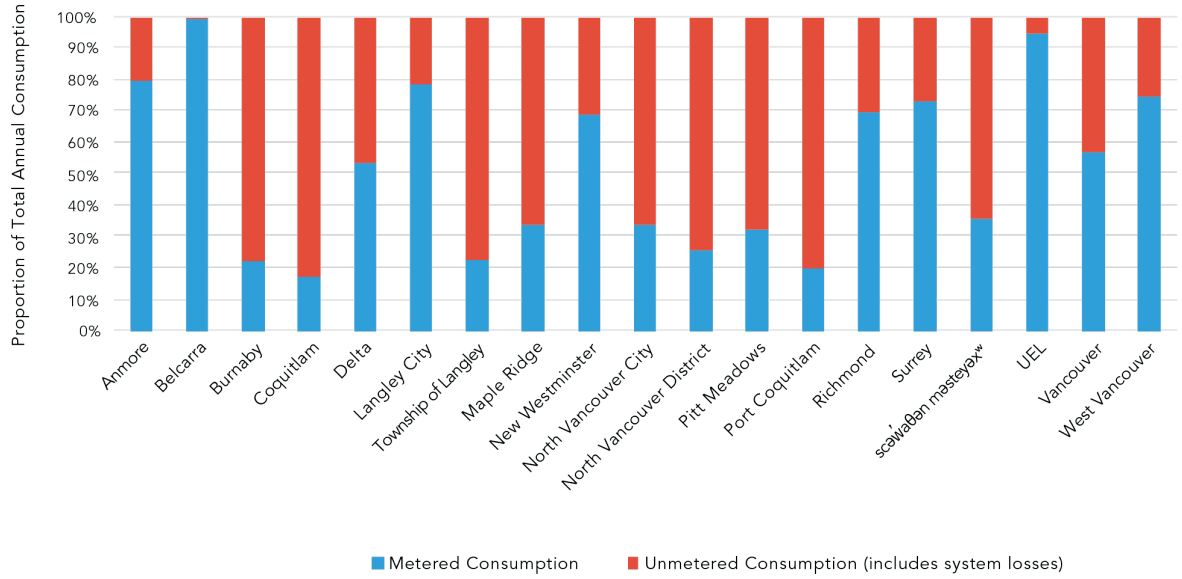
[1] *GVWD provides drinking water to the University Endowment Lands (UEL) which is part of Electoral Area A, a member jurisdiction.*

[2] *Not applicable; There are no identified connections of this sector type, OR Institutional connections could be metered but may not appear as billed accounts for certain jurisdictions.*

Proportion of metered and unmetered connections in 2023 by jurisdiction



Proportion of metered and unmetered consumption in 2023 by jurisdiction



Per Capita Water Consumption

Per capita water consumption is generally reported in two ways – total water consumption and residential consumption. For systems that are universally metered, both figures can be calculated. However, if a system is not universally metered, the residential consumption can only be back calculated and requires an estimate of system losses.

Total per capita consumption is calculated by dividing total water consumption by total serviced population and is reported in liters per capita per day (LPCD). Total per capita water consumption is a very commonly used metric across utilities due to its simplicity and ease of communication. However, it does not account for key variations between members such as variations in ICI and agricultural consumption, and it does not account for the extent of leaks in the system.

In 2023, the average total per capita water consumption is calculated as 387 LPCD for the region.

Given the region is not universally metered, residential per capita consumption must be back calculated, and this results in inherent uncertainty when using this metric, particularly if used to compare jurisdictions. System losses are self-reported. Higher system loss estimates will result in a lower estimate of residential per capita consumption, and vice-versa. In this report, the estimated residential per capita consumption for the region is determined using a weighted average of all member jurisdictions' residential consumptions.

In 2023, the weighted average residential per capita consumption is estimated at 245 LPCD for the region.

System Losses

System losses include leaks in member jurisdiction distribution systems, faulty meters, fire-fighting needs, flushing of water mains, and other unmetered water uses in the distribution process. System losses estimates are self-reported by member jurisdictions. Estimates of system losses by member jurisdictions range from 1 per cent to 25 per cent (see Table below). This equates to a regional estimate of 13.2 per cent. It is noted that there is large variation in self-reported system losses.

Self-Reported System Losses in 2023

Member Jurisdiction	Self Reported System Losses
Village of Anmore	20.2%
Village of Belcarra	1.0%
City of Burnaby[1]	10.0%
City of Coquitlam	17.0%
City of Delta	10.0%
City of Langley	21.4%
Township of Langley	10.0%
City of Maple Ridge	10.0%
City of New Westminster	10.0%
City of North Vancouver	10.0%
District of North Vancouver	11.5%
City of Pitt Meadows[1]	10.0%
City of Port Moody	15.0%
City of Port Coquitlam	15.0%
City of Richmond	16.0%
City of Surrey	10.0%
Scəw̓ aθən məsteyəxʷ (TFN)	10.0%
Electoral Area A (University Endowment Lands)	7.0%
City of Vancouver	17.0%
District of West Vancouver	25.3%
Region System Loss	13.2%

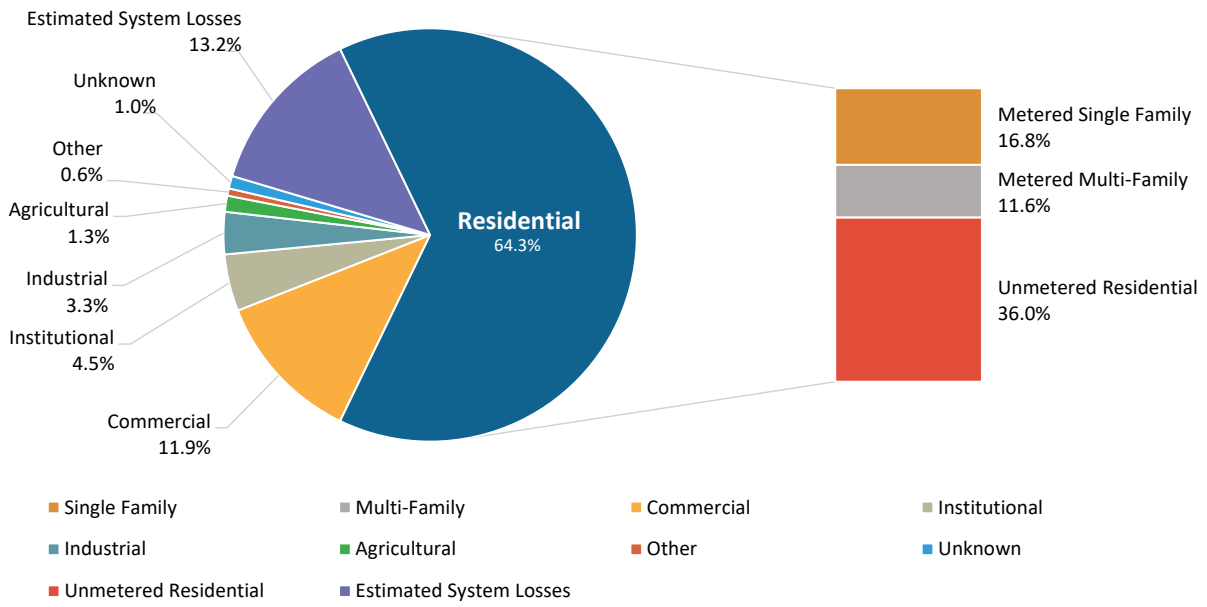
[1] *City of Burnaby and City of Pitt Meadows did not report a system loss percent, 10% was used for consistency with estimates by similar members.*

Water Use by Sector

The figure below illustrates the region's overall water use breakdown, by sector, in 2023 based on estimates of residential use, metered consumption data, and self-reported member jurisdiction system losses.

Estimated water consumption by sector in 2023

Using member jurisdictions' self-reported system losses



1. Report Context

The report provides data from 2004 to 2023 on residential drinking water consumption, consumption by sector, and total per capita consumption for the region using billing data of metered accounts provided by 20 member jurisdictions. Data on metered accounts, metered water consumption and system losses, as self-reported by members are provided, and per capita residential consumption is estimated.

The purpose of the report is to:

1. Summarize historical water consumption trends in the region from 2004 to 2023.
2. Collect and compare water usage patterns and metering practices within the region.
3. Inform planning and implementation of GVWD and member jurisdiction policies and programs for water conservation and demand side management.

As of 2023, the GVWD provided drinking water through its twenty member jurisdictions to approximately 2.93 million residents. The GVWD supplies 99 per cent of water to the 20 member jurisdictions in the region. The City of Delta, the Township of Langley, and the District of West Vancouver derive a portion of their water supply from their own managed sources. In addition, a small population within the Village of Anmore, the Village of Belcarra, the Township of Langley, the District of North Vancouver, the City of Maple Ridge, and the City of Surrey use water from private sources. The data in this report includes all water supplied by the GVWD and its member jurisdictions and does not include water supplied by private sources. University Endowment Lands (UEL) is not a member of GVWD and is part of Electoral Area A. UEL provides drinking water to the University of British Columbia. UEL provides data for this report and is included in all tables and figures in this report as a jurisdiction serviced by GVWD.

In this report, the terms water consumption, water use, water demand, water and drinking water refer to the drinking water supplied by GVWD and member jurisdictions to the regional population, meeting regulated and mandated drinking water guidelines. This 2023 report appends water consumption statistics for 2022 and 2023 to the previous report. This report supersedes all previous editions and provides data from 2004 to 2023.

In this report, Agricultural sector use refers to drinking water use from GVWD and municipal sources only. It is understood that this represents only a small portion of total water use by that sector. Other sources include groundwater and surface water (e.g. Fraser River).

Disclaimer

This report is for general information only, and without any guarantee, representation, or warranty of any kind, whether expressed, implied, or statutory. The GVWD, and its members, assume no liability whatsoever with respect to any use of the information in this report, or any errors or omissions therein. Any reliance on the truth, accuracy, currency, or completeness of the information in this report is entirely at the risk of the user.

2. Methodology, Assumptions, and Calculations

Data Management

Between 1985 and 1996, not all GVWD-supplied member jurisdictions submitted data. Table 2.1 outlines the participating member jurisdictions and the corresponding year when the collection of water consumption data began.

Before 2018, water consumption by Scəw̓ aθən məsteyəxʷ (TFN) was included as part of the City of Delta data. Similarly, before 2013, water consumption by the Village of Anmore was included as part of the City of Port Moody data and water consumption by the Village of Belcarra was included as part of the District of North Vancouver data. UEL data was not received or partially received for 2004 – 2017 and was estimated to ensure meaningful regional results.

The data for this report is derived from water billing records for metered accounts requested from member jurisdictions who receive water from the GVWD. Each metered account is considered one connection. The data are then processed and aggregated into member jurisdiction-level and regional-level results. Where possible anomalies have identified and corrected, however, some anomalies may remain in the provided data. The Report provides water use by sector results from 2004 to 2023 for the 20 member jurisdictions that submitted data. All consumption data are presented in cubic metres (m^3).

Metro Vancouver receives data from its member jurisdictions and relies on their reporting systems. Therefore, the accuracy and reliability of any data or information collected, calculations completed, and results presented are not guaranteed and should not be assumed. All data and results presented in this report are subject to change with each iteration or as member jurisdictions provide updated data and additional comments during data verification and updates.

Table 2.1: Member Jurisdiction participation in the Water Use by Sector Report

Member Jurisdiction	Start of Data Collection
Village of Anmore	2013
Village of Belcarra	2013
City of Burnaby	1991
City of Coquitlam	1993
City of Delta	1996
City of Langley	1987
Township of Langley	1991
City of Maple Ridge	1988
City of New Westminster	1990
City of North Vancouver	1986
District of North Vancouver	1986
City of Pitt Meadows	1988
City of Port Coquitlam	1989
City of Port Moody	1987
City of Richmond	1985
City of Surrey	1990
Scəw̓ aθən məsteyəxʷ (TFN)	2018
Electoral Area A (University Endowment Lands) [1]	1986
City of Vancouver	1986
District of West Vancouver	1985

[1] *GVWD provides drinking water to the University Endowment Lands (UEL) which is part of Electoral Area A, a member jurisdiction. UEL is used throughout this report.*

Data Requests

For this report, each member jurisdiction was requested to provide the following data for 2022 and 2023:

- Number of service connections, both metered and unmetered, and a breakdown of either category by sector
- Sources of water and volume consumed from each member jurisdiction's water source (GVWD and all other non-GVWD sources)
- Population served by non-GVWD water sources
- An estimate of system losses
- An estimate of the percentage of metered connections in eight General Sectors
- Water consumption by billing period or by year, including the type of land use, classified by British Columbia Assessment Authority (BCAA), Actual Use Codes (AUCs)

Since 2005, 22 “By Sector Classification” (BSC) codes have been developed to report water use for industrial, commercial, and institutional sectors, as shown in Table 2.3. For the ICI sector, the data from 2009 to 2023 is used for all comparisons as these are reported by member jurisdiction(s).

The most recent data request included an instructional guideline for submission requirements, templates, and a checklist of primary data checks to be signed. For some member jurisdictions, additional information and discussions were needed to clarify, correct, or update the data provided in previous years.

Data Received

Member jurisdictions have provided summarized water consumption data, billing information, and AUCs for each metered billing account. Member jurisdictions provide de-identified billing records for metered accounts within their jurisdiction system information via a questionnaire.

In response to requests for data, all 20 member jurisdictions responded with data for 2022 and 2023. Table 2.2 presents a checklist of data received from each member jurisdiction organized by year.

Table 2.2: Data received by jurisdictions during study period 2004 – 2023

Jurisdiction	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Anmore										○	○	○	○	○	○	○	○	○	○	○
Belcarra										○	○	○	○	○	○	○	○	○	○	○
Burnaby	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Coquitlam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Delta	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Langley	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Township of Langley	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Maple Ridge	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
New Westminster	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of North Vancouver	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
District of North Vancouver	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pitt Meadows[2]	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Port Coquitlam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Port Moody	●	●	●	●	●				●	○	○	○	○	○					●	●
Richmond	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Surrey	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Scəw̓ aθən məsteyəxʷ (TFN)															●	●	●	●	●	●
UEL										○	○	○	○	○	○	○	○	○	○	○
Vancouver	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
West Vancouver	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● Data provided ○ Partial data provided Data not provided or not available

Data Integrity and Quality

Prior to submission, member jurisdictions were requested to complete basic checks of their data such as removing duplicates and maintaining 'Null' accounts (accounts with no assigned AUCs) to within 1–5% of total consumption. The provided data were reviewed to ensure that each account with consumption data has been assigned a corresponding AUC.

The data verification process by Metro Vancouver staff included, but was not limited to the following:

- Checking for changes in service connection information
- Assigning a nominal "999" (Unknown) code to any account that does not have a corresponding AUC
- Verifying missing and erroneous data with member jurisdictions

Sector Categorization and Conversions

For this report, it is assumed that the residential sector had a high level of accuracy in assigned AUC codes across the region. However, water consumption data in the ICI sectors present a unique challenge since BSC classifications are applied to define water consumption.

There are differences in the assignments of AUCs within a member jurisdiction and throughout the reporting periods. For example, a bank may have the AUC '210 – bank', classified as BSC '2-business or office', or the more generic AUC '200 – stores and service –commercial' classified as BSC '16-retail shopping and stores'. Some buildings may also be classified by only one of their multiple uses, such as medical offices, stores, restaurants and offices. Therefore, the number of connections and corresponding consumption under each BSC category should be considered an estimate. Table 2.3 shows the BSC codes that categorize and analyze the industrial, commercial, and institutional sector data with their corresponding eight General Sector categories used for this report:

1	Single-Family Residential	**5**	Industrial
2	Multi-Family Residential	**6**	Agricultural
3	Commercial	**7**	Other
4	Institutional	**8**	Unknown

The "Other" sector represents connections to transportation, communications, utilities, and other member jurisdiction facilities not classified under institutional.

The "Unknown" sector is assumed to represent commercial water use based on consumption volumes. These accounts appear as "NULL" or blank with no AUCs assigned in the billing records provided. These

"Unknown" accounts without a corresponding AUC code were given an unused code (999) and processed into the eighth sector.

Data Analysis

Once the data were analysed, and where possible, verified by the member jurisdiction, they were uploaded to an intranet web application by year and member jurisdiction. Inbuilt algorithms converted the AUCs into eight General Sector codes and produced regional results, which Metro Vancouver staff used for further analysis. Statistics were compiled for consumption by sector, and the composite results were formatted into tables and graphs featured in this report.

The regional results were appended to information from previous editions. Data from each member jurisdiction were analyzed to produce the aggregated regional results covering the study period from 2004 to 2023.

With the categorization of all consumption data into respective AUCs and BSCs codes and the eight sector categories described above, consumption data were aggregated by sector for each member jurisdiction. Regional results for water consumption by sector were generated and analyzed further, forming the basis of this report. Amalgamated data for the region were compiled based on the analysis of data provided by the member jurisdictions.

Table 2.3: By Sector Classification codes and their corresponding General Sector Codes

Sector	By Sector Classification code	General Sector Codes
Single-Family Residential	0	Single-Family Residential (1)
Agriculture	1	Agricultural (6)
Business and Offices	2	Commercial (3), Institutional (4), Industrial, (5)
Construction	3	Commercial (3), Industrial (5)
Dairy and Meat Products	4	Industrial (5)
Education	5	Institutional (4)
Forest Products	6	Industrial (5)
General Food Products	7	Industrial (5)
Grain and Vegetable Products	8	Industrial (5)
Hospitality	9	Commercial (3)
Industries	10	Industrial (5)
Medical and Health	11	Commercial (3), Institutional (4)
Petroleum and Allied	12	Industrial (5)
Recreation	13	Commercial (3), Institutional (4)
Religious and Cultural	14	Institutional (4)
Restaurants	15	Commercial (3)
Retail Shopping and Stores	16	Commercial (3)
Service Stations	17	Commercial (3)
Transportation	18	Commercial (3), Industrial (5), Other (7)
Warehouses	19	Commercial (3), Industrial (5)
Utilities and Miscellaneous	20	Other (7), Institutional (4)
Multi-Family Residential	21	Multi-Family Residential (1)

Assumptions and Calculations

To produce regional results, calculations and estimates of certain parameters were conducted. The following sections describe how various parameters were derived and the assumptions for each calculation or estimation.

Drinking Water Sources

The GVWD treats and delivers water from the Capilano, Seymour, and Coquitlam reservoirs and is the sole water provider for most member jurisdictions in the region. However, three member jurisdictions also derive water from non-GVWD sources to supplement their water supply by the GVWD. In 2023, approximately 2.5 per cent of water consumed in the City of Delta was from their own sources, while the Township of Langley and the District of West Vancouver used their own sources to supply 8.3 per cent and 32.4 per cent of their water consumption, respectively. Furthermore, a small percentage of the population in the Villages of Anmore and Belcarra, the City of Delta, the Township of Langley, the City of Maple Ridge, the District of North Vancouver, and the City of Surrey have private wells and sources.

This report presents consumption statistics for all water supplied by the GVWD and member jurisdictions. Water supplied by private sources and the populations serviced by private sources are not included in the calculations or results presented in this report.

Serviced Population

Population estimates for member jurisdictions and the region for the study period 2004 to 2023 are presented in Tables 2.4A and 2.4B. Regional population figures were updated to current population estimates and are expected to generally align with those provided in the *2023 Water Consumption Statistics Report.* The regional population estimates published in the *2023 Water Consumption Statistics Report* are obtained from Metro Vancouver's Planning Analytics Division within the Regional Planning and Electoral Area Services Department.

The serviced population in 2023 is estimated to be 2,926,855 residents (Tables 2.4A and 2.4B). Serviced population excludes population using private wells. The GVWD regional population figure includes population using private wells.

For reference the total population of Metro Vancouver in 2023 was approximately 3.0 million. This figure includes jurisdictions not serviced by GVWD. These include Bowen Island, Barnston Island, Howe Sound, Indian Arm, Lions Bay, and White Rock.

Table 2.4A: GVWD and member jurisdictions serviced populations, 2004 – 2023 (Village of Anmore to the District of North Vancouver)

	Anmore[1]	Belcarra[1]	Burnaby	Coquitlam[1]	Delta	Langley City	Langley Township[1]	Maple Ridge[1]	New Westminster	North Vancouver City	North Vancouver District[1]	TOTAL Serviced Population	TOTAL Regional Population
2004	N/A	N/A	206,049	118,100	100,678	24,060	76,604	60,466	58,950	46,839	86,207	2,082,554	2,135,418
2005	N/A	N/A	207,771	118,189	100,716	24,197	77,866	61,417	59,716	47,039	86,215	2,108,095	2,161,429
2006*	N/A	N/A	210,036	118,608	100,754	24,334	74,164	63,198	60,653	47,282	86,222	2,133,691	2,191,993
2007	N/A	N/A	214,302	119,028	100,957	24,619	75,299	64,055	61,927	47,346	86,230	2,162,364	2,221,299
2008	N/A	N/A	218,125	120,625	101,159	24,960	78,151	65,519	63,659	48,114	86,249	2,199,264	2,258,279
2009	N/A	N/A	222,938	123,942	101,362	25,225	80,168	68,866	65,223	48,680	86,754	2,248,150	2,305,286
2010	N/A	N/A	226,938	127,531	101,564	25,487	83,492	70,573	66,837	49,424	87,224	2,291,534	2,346,950
2011*	N/A	N/A	229,461	130,446	101,767	25,702	84,551	71,855	67,894	50,097	87,576	2,321,661	2,378,301
2012	N/A	N/A	233,642	133,892	102,578	26,156	88,738	72,992	67,999	50,958	88,255	2,365,951	2,421,404
2013	2,190	284	235,925	137,550	103,378	26,467	92,777	73,775	69,326	51,950	89,062	2,411,896	2,463,943
2014	2,227	303	240,310	140,879	104,760	26,564	95,534	75,314	71,514	53,596	89,832	2,459,398	2,511,998
2015	2,227	314	241,809	143,887	105,634	26,569	98,659	77,201	72,894	55,538	90,441	2,496,813	2,550,012
2016*	2,240	322	244,641	145,849	106,390	27,035	101,906	79,912	74,659	56,094	91,379	2,533,969	2,587,744
2017	2,395	342	246,581	148,123	107,480	27,779	107,643	81,357	76,113	56,875	92,186	2,569,451	2,622,334
2018	2,380	383	250,293	149,725	109,381	28,334	109,962	84,999	78,060	58,212	93,060	2,614,236	2,666,144
2019	2,425	373	255,280	151,494	110,983	28,823	112,389	87,708	80,051	59,191	93,314	2,667,463	2,720,107
2020	2,424	383	258,725	153,382	112,437	29,475	114,844	87,514	82,108	60,214	93,543	2,702,191	2,756,668
2021*	2,429	414	261,807	155,553	113,093	30,330	115,809	89,712	82,943	61,547	94,193	2,721,660	2,778,152
2022	2,491	441	269,848	160,902	115,713	31,058	120,929	92,380	86,172	63,674	96,102	2,805,662	2,862,066
2023	2,596	458	281,521	168,373	120,075	32,281	127,470	96,566	90,630	66,546	99,152	2,926,855	2,983,994

[1] Population on private wells excluded for the Village of Anmore, the Village of Belcarra, the City of Coquitlam (2002 – 2008), the Township of Langley, the City of Maple Ridge, the District of North Vancouver, and the City of Surrey.
[2] UEL population does not include the University of British Columbia daytime population.
** Indicates a census year for which member jurisdictions population figures are based on published census figures with an undercount adjustment.*

Table 2.4B: GVWD and member jurisdictions serviced populations, 2004 – 2023 continued (City of Pitt Meadows to the District of West Vancouver)

	Pitt Meadows	Port Coquitlam	Port Moody	Richmond	Surrey[1]	sc̓əw̓aθən məsteyəxʷ (TFN)	UEL[2]	Vancouver	West Vancouver	TOTAL Serviced Population	TOTAL Serviced Population
2004	15,977	53,710	26,908	175,833	383,758		17,624	585,570	45,221	2,082,554	2,135,418
2005	16,169	53,938	27,659	177,773	393,275		18,606	592,185	45,365	2,108,095	2,161,429
2006*	16,423	54,026	28,610	180,226	404,099		19,588	599,894	45,574	2,133,691	2,191,993
2007	16,731	54,265	29,758	183,521	415,479		20,376	602,818	45,653	2,162,364	2,221,299
2008	17,494	55,248	31,047	186,715	429,051		21,164	606,251	45,732	2,199,264	2,258,279
2009	18,041	55,982	32,615	190,921	444,460		21,952	615,209	45,812	2,248,150	2,305,286
2010	18,173	56,676	33,536	194,391	462,220		22,740	618,836	45,891	2,291,534	2,346,950
2011*	18,398	57,012	33,872	194,818	476,781		23,529	621,932	45,970	2,321,661	2,378,301
2012	18,632	57,781	34,166	196,745	491,013		24,667	631,576	46,163	2,365,951	2,421,404
2013	18,814	58,411	34,505	200,057	502,727		25,813	642,476	46,410	2,411,896	2,463,943
2014	19,139	59,284	34,641	202,798	515,971		27,244	652,889	46,598	2,459,398	2,511,998
2015	19,423	60,493	34,838	205,106	526,467		28,466	660,146	46,700	2,496,813	2,550,012
2016*	19,632	61,483	35,026	207,313	537,740		27,861	667,669	46,820	2,533,969	2,587,744
2017	20,057	62,053	34,920	209,345	547,590		28,729	673,003	46,878	2,569,451	2,622,334
2018	20,272	63,186	35,013	212,672	558,421	1,194	29,693	681,897	47,099	2,614,236	2,666,144
2019	20,281	64,079	35,032	216,697	573,248	1,348	30,764	696,356	47,626	2,667,463	2,720,107
2020	20,152	64,239	34,949	218,866	584,554	1,823	31,638	702,755	48,167	2,702,191	2,756,668
2021*	20,195	64,264	34,979	221,177	592,260	2,357	32,298	697,730	48,570	2,721,660	2,778,152
2022	20,589	65,449	35,664	227,506	614,359	3,576	33,945	715,363	49,501	2,805,662	2,862,066
2023	21,314	67,709	36,844	236,652	645,506	4,029	35,750	742,567	50,816	2,926,855	2,983,994

[1] Population on private wells excluded for the Village of Anmore, the Village of Belcarra, the City of Coquitlam (2002 – 2008), the Township of Langley, the City of Maple Ridge, and the City of Surrey.

[2] UEL population does not include the University of British Columbia daytime population

** Indicates a census year for which member jurisdictions population figures are based on published census figures with an undercount adjustment.*

Metered and Unmetered Consumption

For each member jurisdiction, unmetered consumption is derived by subtracting the total metered consumption from the total volume of water billed by the GVWD. The total volume of water billed by the GVWD is derived from the *2023 Water Consumption Statistics Report*, which reports on the volume supplied to member jurisdictions at designated supply points in the transmission system.

Total Volume Billed by GVWD	+	Total Volume supplied by member jurisdiction sources	–	Total Metered Consumption (from billing data provided by member jurisdictions)	=	**Unmetered Consumption**

The difference between the totals was calculated and categorized as unmetered water consumption in each member jurisdiction and for the region. Unmetered consumption includes member jurisdiction system losses, unmetered residential consumption, unmetered ICI consumption.

System Losses

System losses include leaks in member jurisdiction distribution systems, faulty meters, fire-fighting needs, flushing of water mains, and other unmetered water uses in the distribution process.
System losses do not refer to losses on private property or unmetered residential, commercial, industrial, institutional, agricultural or other end-use water consumption. Losses incurred during water treatment and GVWD transmission are not included in the 'system losses' category and are not included in this report.

System losses can be calculated for members that are universally metered. Member jurisdictions that are not universally metered cannot readily calculate their system losses and must provide estimates. Member jurisdictions provided estimates of annual system losses as a percentage of total consumption. In 2023, these estimates ranged between 1 to 25 per cent.

It is understood that self-reported estimates of 1–15 per cent for systems that have not achieved universal metering are likely low. Losses for the members with universal metering, which are calculated, range from 20.2 – 25.3 per cent.

Residential Consumption

Most of the residential consumption is not metered in the region. Since many member jurisdictions fully meter ICI connections, total unmetered consumption minus system losses can be attributed (mainly) to residential consumption. The following equation estimates the percentage of total consumption attributable to residential use for member jurisdictions with unmetered residential consumption:

Unmetered Consumption + Metered Single-Family Consumption + Metered Multi-Family Consumption – System Losses (%) x Total Consumption = **Estimated Residential Consumption**

This equation results in an estimate only. There are two main sources of error to note:

- Reporting a higher system loss (%) will result in a lower estimated residential consumption, and vice-versa.
- Estimates for residential consumption would be more accurate if unmetered non-residential water use is assumed to be negligible compared to unmetered residential water use. That is, if all other sectors were close to 100% metered. However, as shown in Table 3.1, not all members have fully metered their ICI and Agricultural sectors.

Per Capita Water Consumption Estimates

Per capita water consumption is generally reported in two ways – total water consumption and residential consumption. For systems that are universally metered, both figures can be calculated. However, if a system is not universally metered, the residential consumption can only be estimated and requires an estimate of system losses.

Total Per Capita Consumption

Total (or Gross) per capital per day consumption is total water consumption divided by total serviced population and is reported in liters per capita per day (LPCD). Total water consumption data is based on the total water provided by GVWD and members own sources if applicable. Total serviced population is based on annual population estimates for each member jurisdiction (Table 2.4A and 2.4B) and is used to calculate the per capita consumption figures.

Total per capita water consumption is a very commonly used metric across utilities due to its simplicity and ease of communication; however, it does come with inherent problems.

- It is a coarse metric as it does not account for key variations between members.
- It does not account for variations in ICI and agricultural consumption between members.
- It does not account for the extent of leaks in the system.
- It is difficult to effectively compare jurisdictions using the total water consumption metric given the differences in the water use by sector, for example Residential versus ICI split and Agriculture.

Residential Per Capita Consumption

Another commonly used metric is residential per capita consumption.

- Given the region is not universally metered, it must be back calculated using estimated system losses, and this results in inherent problems in using this metric, particularly if used to compare jurisdictions.
- It must be treated with uncertainty, particularly for those members with lower levels of metering.
- The extent of leaks in the system is unknown as system losses are self-reported.
- Higher system loss estimates will result in a lower estimate of per capita residential consumption, and vice-versa.

In this report, the estimated residential per capita per day consumption for the region is determined using a weighted average of all member jurisdictions' residential consumptions. The proportion of residential consumption to total consumption varies across the region and is subject to residential and non-residential distribution, the extent of metering, reported system losses, and varying population estimates.

3. Regional Trends

Regional Water Metering Trends

This section presents regional results of all water consumption data received from 2004 to 2023. Information is provided on metering practices in the region and regional water consumption trends.

Metering Practices in the Region

Metering practices and the extent of metering vary by sector and member jurisdiction. An estimate of the sectors metered in each member jurisdiction in 2023 is summarized in Table 3.1. Member jurisdictions provide these estimates via the questionnaire, and estimates vary year over year. The extent of metering in Table 3.1 is self-reported by member jurisdictions and may not reflect the data results on metered water consumption in this report.

Table 3.1: Member jurisdiction metering estimates in 2023

Jurisdiction	Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural
Anmore	96%–100%	N/A*	96%–100%	66%–95%	N/A*	N/A*
Belcarra	96%–100%	N/A*	N/A*	96%–100%	N/A*	N/A*
Burnaby	0%–5%	0%–5%	66%–95%	66%–95%	66%–95%	66%–95%
Coquitlam	0%–5%	0%–5%	96%–100%	96%–100%	96%–100%	96%–100%
Delta	6%–35%	66%–95%	96%–100%	66%–95%	96%–100%	96%–100%
City of Langley	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%
Township of Langley	0%–5%	0%–5%	96%–100%	96%–100%	96%–100%	36%–65%
Maple Ridge	6%–35%	6%–35%	96%–100%	96%–100%	66%–95%	96%–100%
New Westminster	0%–5%	96%–100%	96%–100%	96%–100%	96%–100%	N/A*
City of North Vancouver	0%–5%	0%–5%	96%–100%	N/A*	96%–100%	N/A*
District of North Vancouver	0%–5%	6%–35%	66%–95%	96%–100%	96%–100%	N/A*
Pitt Meadows	6%–35%	0%–5%	66%–95%	66%–95%	96%–100%	96%–100%
Port Coquitlam	0%–5%	6%–35%	96%–100%	96%–100%	96%–100%	96%–100%
Port Moody	0%–5%	0%–5%	6%–35%	66%–95%	96%–100%	N/A*
Richmond	96%–100%	36%–65%	96%–100%	96%–100%	96%–100%	96%–100%
Surrey	66%–95%	36%–65%	96%–100%	96%–100%	66%–95%	66%–95%
Scəw̓ aθən məsteyəxʷ (TFN)	66%–95%	66%–95%	96%–100%	N/A*	N/A*	N/A*
UEL	96%–100%	96%–100%	96%–100%	96%–100%	N/A*	N/A*
Vancouver	6%–35%	96%–100%	96%–100%	96%–100%	96%–100%	96%–100%
West Vancouver	96%–100%	96%–100%	96%–100%	96%–100%	N/A*	N/A*

96%–100% 66%–95% 36%–65% 6%–35% 0%–5% N/A*

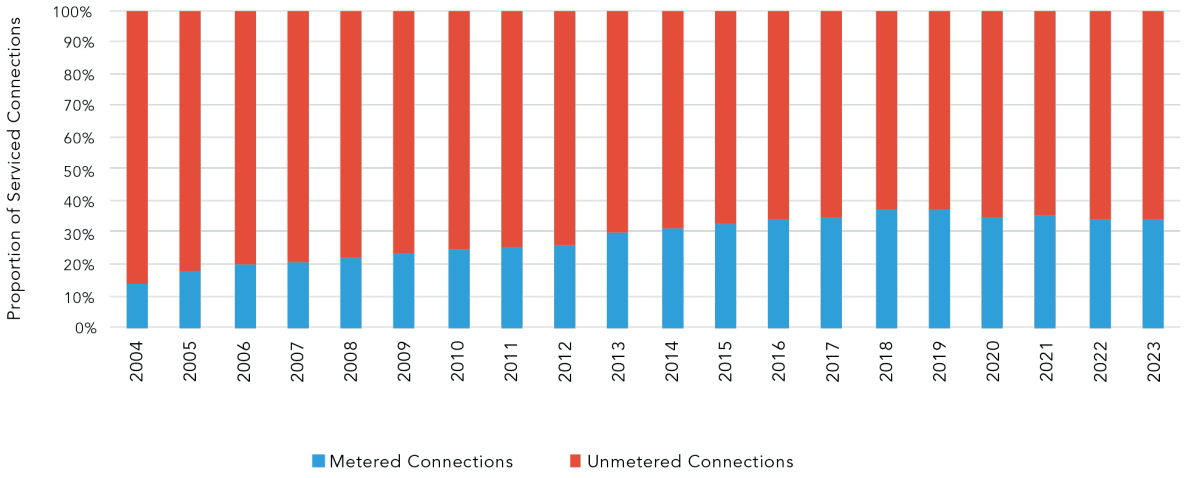
** N/A – not applicable; OR there are no identified connections of this sector type, OR Institutional connections could be metered but may not appear as billed accounts for certain member jurisdictions.*

Number of Metered Connections

Table 3.2 shows the region's total number of unmetered and metered connections over the 2004 to 2023 study period. Figures 3.1, 3.2 and Table 3.3 provide the number of unmetered and metered connections as a percentage of total serviced connections. Note that if a property has several separately metered connections assigned different account numbers by the member jurisdiction, each connection is counted individually.

In 2023, there were 171,816 metered accounts representing 34.4 per cent of the total serviced connections.

Figure 3.1: Proportion of metered and unmetered connections in the GVWD region*



** The proportion of metered connections is lower starting 2020 due to a substantial increase in the total number of connections attributed to improvements in billing system accuracies.*

Figure 3.2: Proportion of metered and unmetered connections in 2023 by jurisdiction

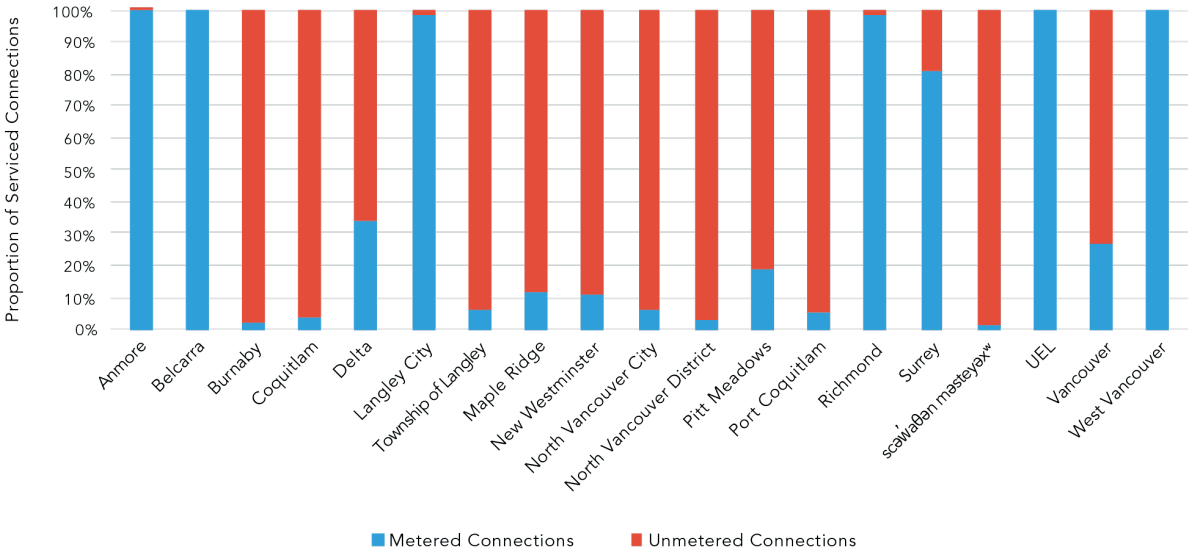
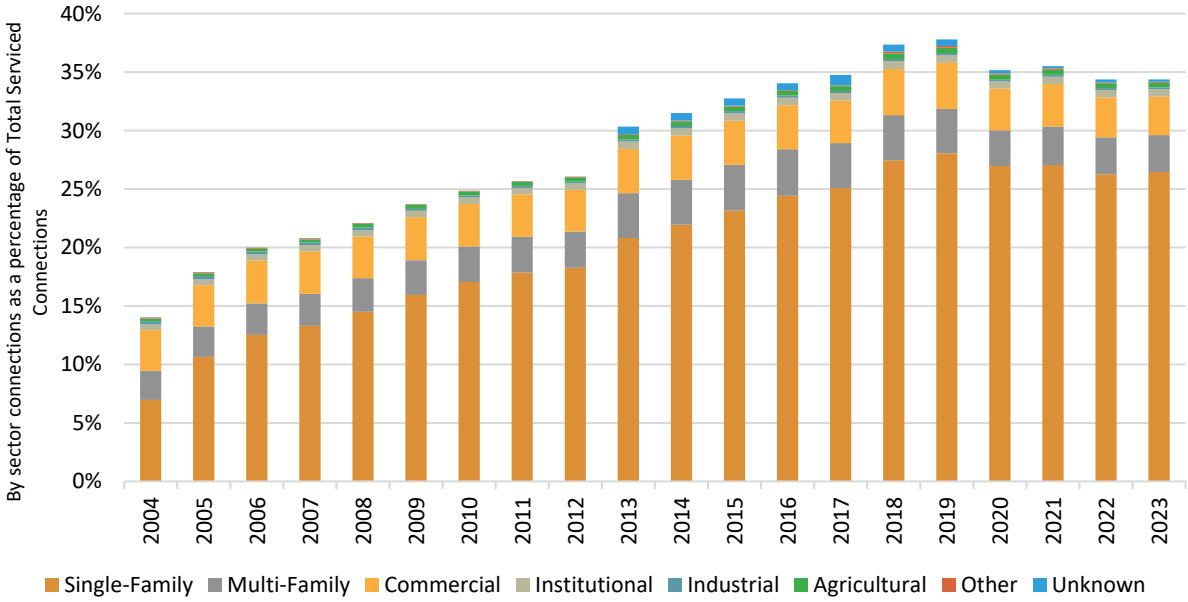


Figure 3.3: By sector distribution of metered connections as a percentage of all serviced connections in the region, 2004 to 2023



**2020 change in data is attributed to improvements in billing system accuracies for one member. The total serviced and unmetered connections in 2020 significantly increased compared to the 2019 data. Therefore, the total number of serviced, unmetered and metered connections from 2020 and 2023 are deemed more accurate. Increase of unknowns in 2013 is attributed to a new conversion system of AUCs to general sector categories and increased accuracy of reporting.*

Table 3.2: Total number of unmetered and metered serviced connections in the GVWD, 2004 – 2023

Year	Total Number of Serviced Connections	Number of Unmetered Connections	Number of Metered Connections	Breakdown of Metered Connections							
				Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural	Other	Unknown[3]
2004	463,948	398,907	65,041	32,349	11,500	16,160	2,249	1,300	1,079	398	6
2005	462,908	380,111	82,797	49,275	12,055	16,317	2,304	1,316	1,111	412	7
2006	465,599	372,564	93,035	58,363	12,521	17,013	2,533	1,134	1,069	395	7
2007	469,570	371,957	97,613	62,450	12,835	17,039	2,554	1,136	1,125	467	7
2008	475,512	370,488	105,024	68,980	13,674	16,881	2,551	1,145	1,503	285	5
2009	469,978	358,563	111,415	74,957	13,950	17,291	2,526	778	1,644	263	6
2010	474,123	356,293	117,830	80,832	14,412	17,285	2,543	785	1,695	272	6
2011	476,998	354,579	122,419	85,151	14,666	17,255	2,573	769	1,725	274	6
2012	486,001	359,361	126,640	88,765	15,072	17,307	2,681	790	1,743	276	6
2013	445,137	310,099	135,038	92,666	17,005	16,897	2,802	817	1,692	306	2,853
2014	447,611	306,630	140,981	98,251	17,211	16,908	2,838	823	1,757	308	2,885
2015	449,742	302,483	147,259	104,266	17,489	16,930	2,870	832	1,779	316	2,777
2016[1]	458,351	297,645	153,612	110,203	17,975	16,980	2,883	840	1,780	324	2,627
2017	458,066	298,888	159,178	114,877	17,609	16,714	2,920	817	1,865	337	4,039
2018[2]	428,609	268,482	160,127	117,734	16,504	16,900	2,896	776	2,080	630	2,607
2019[2]	431,084	268,170	162,914	120,933	16,412	16,938	2,840	764	1,956	630	2,441
2020	473,121	306,780	166,341	127,603	14,426	16,948	2,781	753	2,036	554	1,240
2021	477,184	307,775	169,409	129,105	15,682	17,320	3,022	764	2,049	578	889
2022	496,127	325,630	170,497	130,253	15,725	16,912	3,184	810	2,004	329	1,280
2023	499,936	328,120	171,816	132,225	15,778	16,519	3,108	790	2,003	353	1,040

[1] *The difference in total for 2016 is due to Port Moody providing only total connections.*
[2] *The fluctuation in unmetered connections from 2018 to 2019 is attributed to increased billing system accuracies by the City of Burnaby during system upgrades.*
[3] *Increase of unknowns in 2013 is attributed to a new conversion system of AUCs to general sector categories and increased accuracy of reporting.*

Table 3.3: Percentage of unmetered and metered serviced connections in the GVWD, as a percentage of all serviced connections, 2004 – 2023

Year	Total Number of Serviced Connections	Number of Unmetered Connections	Number of Metered Connections	Breakdown of Metered Connections							
				Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural	Other	Unknown[3]
2004	100.0%	86.0%	14.0%	7.0%	2.5%	3.5%	0.5%	0.3%	0.2%	0.1%	0.0%
2005	100.0%	82.1%	17.9%	10.6%	2.6%	3.5%	0.5%	0.3%	0.2%	0.1%	0.0%
2006	100.0%	80.0%	20.0%	12.5%	2.7%	3.7%	0.5%	0.2%	0.2%	0.1%	0.0%
2007	100.0%	79.2%	20.8%	13.3%	2.7%	3.6%	0.5%	0.2%	0.2%	0.1%	0.0%
2008	100.0%	77.9%	22.1%	14.5%	2.9%	3.6%	0.5%	0.2%	0.3%	0.1%	0.0%
2009	100.0%	76.3%	23.7%	15.9%	3.0%	3.7%	0.5%	0.2%	0.3%	0.1%	0.0%
2010	100.0%	75.1%	24.9%	17.0%	3.0%	3.6%	0.5%	0.2%	0.4%	0.1%	0.0%
2011	100.0%	74.3%	25.7%	17.9%	3.1%	3.6%	0.5%	0.2%	0.4%	0.1%	0.0%
2012	100.0%	73.9%	26.1%	18.3%	3.1%	3.6%	0.6%	0.2%	0.4%	0.1%	0.0%
2013	100.0%	69.7%	30.3%	20.8%	3.8%	3.8%	0.6%	0.2%	0.4%	0.1%	0.6%
2014	100.0%	68.5%	31.5%	22.0%	3.8%	3.8%	0.6%	0.2%	0.4%	0.1%	0.6%
2015	100.0%	67.3%	32.7%	23.2%	3.9%	3.8%	0.6%	0.2%	0.4%	0.1%	0.6%
2016	100.0%	64.9%	33.5%	24.0%	3.9%	3.7%	0.6%	0.2%	0.4%	0.1%	0.6%
2017	100.0%	65.2%	34.8%	25.1%	3.8%	3.6%	0.6%	0.2%	0.4%	0.1%	0.9%
2018	100.0%	62.6%	37.4%	27.5%	3.9%	3.9%	0.7%	0.2%	0.5%	0.1%	0.6%
2019	100.0%	62.2%	37.8%	28.1%	3.8%	3.9%	0.7%	0.2%	0.5%	0.1%	0.6%
2020	100.0%	64.8%	35.2%	27.0%	3.0%	3.6%	0.6%	0.2%	0.4%	0.1%	0.3%
2021	100.0%	64.5%	35.5%	27.1%	3.3%	3.6%	0.6%	0.2%	0.4%	0.1%	0.2%
2022	100.0%	65.6%	34.4%	26.3%	3.2%	3.4%	0.6%	0.2%	0.4%	0.1%	0.3%
2023	100.0%	65.6%	34.4%	26.4%	3.2%	3.3%	0.6%	0.2%	0.4%	0.1%	0.2%

Metered Water Consumption

Figures 3.4 shows the proportion of metered and unmetered water consumption based on volume in the region and Figure 3.5 shows the breakdown for each member jurisdiction. Metered consumption is the volume of water consumed that passes through a metered connection. In 2023, metered consumption accounted for 50.8 per cent of total water consumption.

Figure 3.4: Proportion of metered and unmetered consumption in the GVWD region

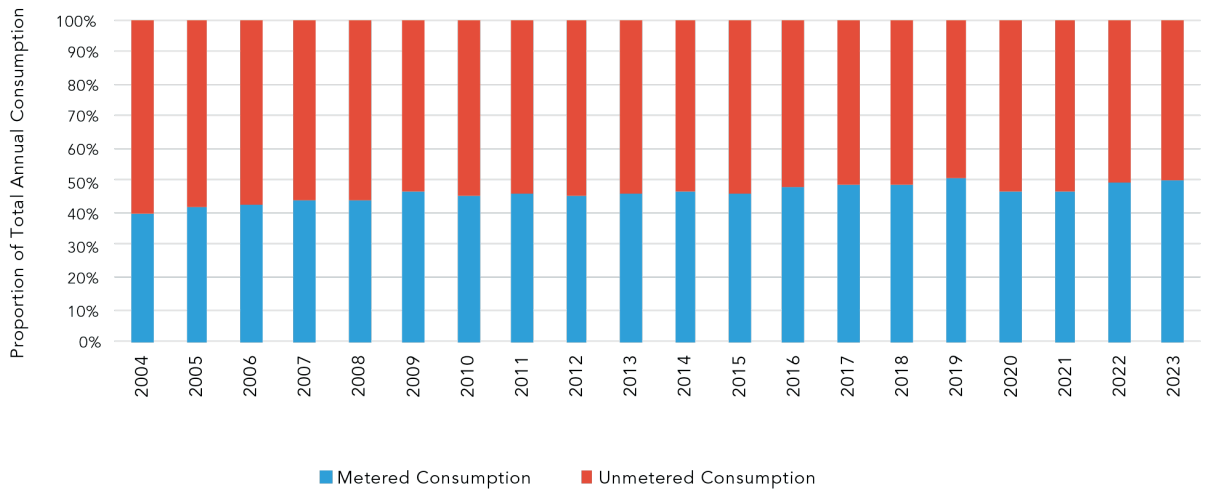
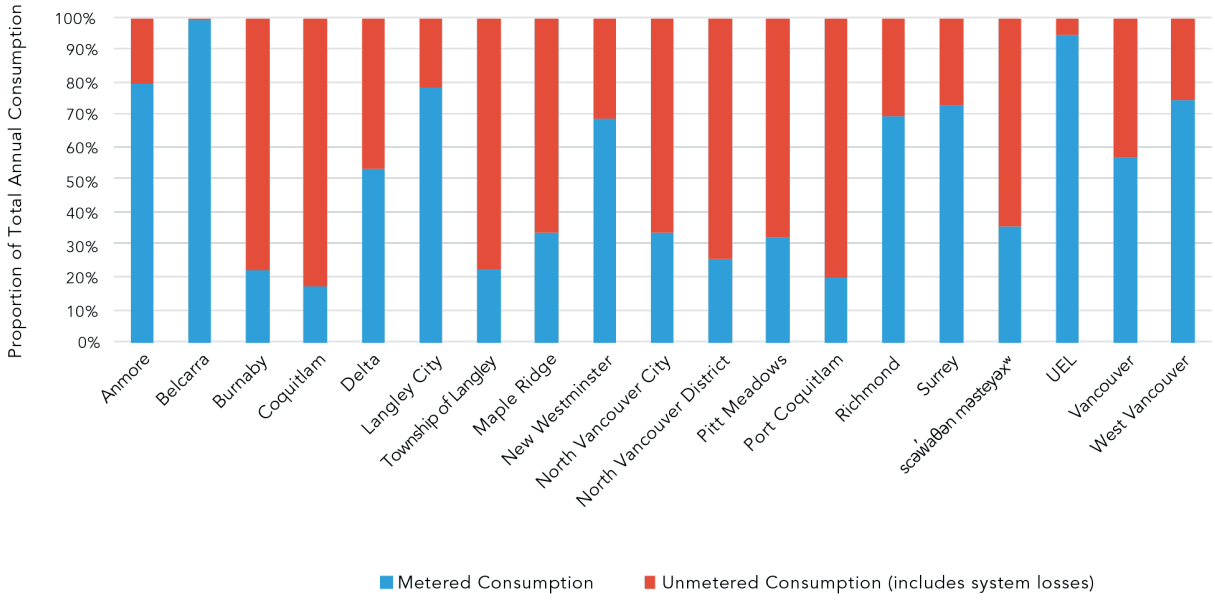


Figure 3.5: Proportion of metered and unmetered consumption in 2023 by jurisdiction



Residential Sector Metering

The Residential sector comprises single-family and multi-family residential connections across the region. The residential sector is the largest consumer of water in the region, and this sector is experiencing the most significant changes in water consumption and patterns across the region. Continued net population growth, increase in multi-family and mixed-use developments, and densification of urban and semi-urban areas within member jurisdictions are all contributing factors.

As described in the Methodology section, the data used for this report provide an estimate of the residential consumption, and it is assumed that unmetered consumption is primarily residential connections.

Single-family Residential

As presented in Table 3.3, an estimated 65.6 per cent of serviced connections in the region are unmetered as of 2023. It is assumed that this comprises only residential properties, although the distribution of unmetered connections between single-family and multi-family properties requires more and improved data. The exceptions are single-family homes in the City of Langley, the City of Richmond, and the District of West Vancouver, that have 100 per cent metering of the single-family sector.

For the reporting period 2004 to 2023, metering programs in the City of Surrey and the City of Vancouver effectively increased water metering for single-family residences by 47,852 and 9,849 more metered connections, respectively. The City of Surrey and the City of Vancouver have ongoing policies and by-laws that mandated the installation of meters with the construction of new homes or significant renovations to existing homes.

Multi-family Residential

Most member jurisdictions have a portion of their multi-family residential connections metered. Multi-family residential refers to apartment buildings, townhouses, duplexes, condominiums, and other structures that provide more than one self-contained dwelling unit. The multi-family connections across the region are counted per strata or building or complex and not individual units.

See Tables 3.2 and 3.3 and Figure 3.3 above for changes in residential connections since 2004.

Industrial, Commercial, Institutional and Agricultural Metering

The region's ICI and agricultural connections are mostly metered. Common exceptions to ICI connections' metering include properties owned and operated by member jurisdictions, such as parks, cemeteries, yards and public washrooms.

As of 2023, ICI connections in most member jurisdictions are fully metered, however as per Table 3.1 there are several members that have not fully metered this sector. The number of connections in the ICI sector has remained fairly constant (see Figure 3.3). This report assumes that 'Unknown' connections are within the commercial sector as a subset of the ICI sector.

See Tables 3.2 and 3.3 and Figure 3.3 above for changes in ICI connections since 2004.

Regional Water Consumption Trends

Member jurisdiction metering data is analyzed and compiled to produce water consumption statistics for the region provided in this section.

Regional Consumption and Population Trends

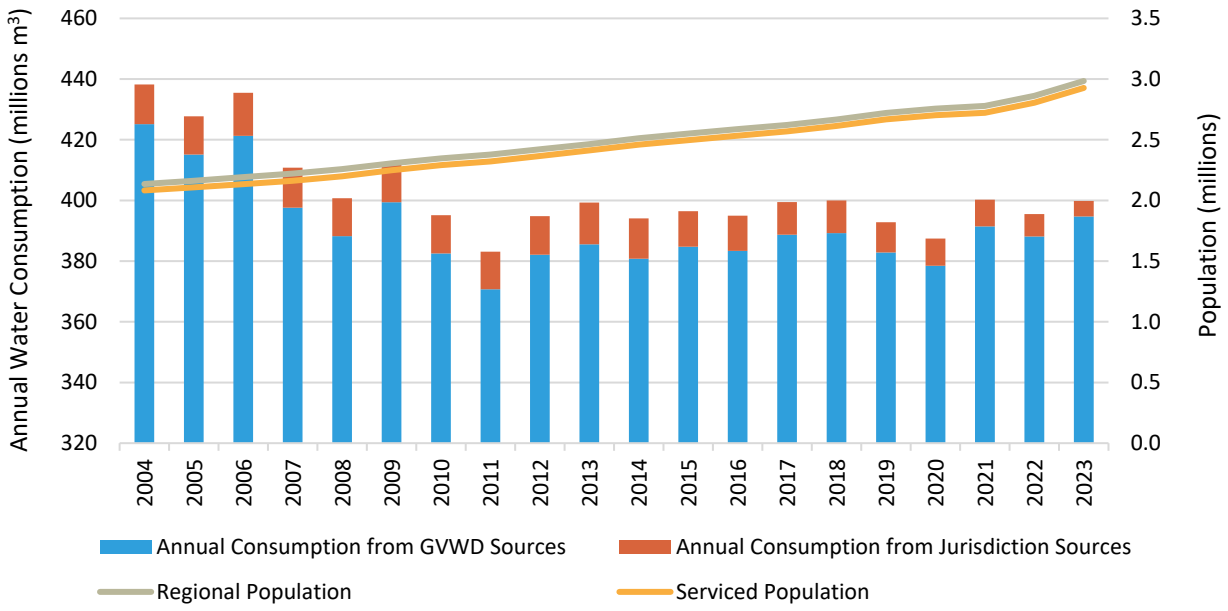
Figure 3.6 shows the total annual water consumption in the region from 2004 to 2023, along with estimates of the population serviced by the GVWD and total regional population. Population estimates are shown in Table 2.4A and 2.4B. Consumption data, by year and by sector, are shown in Table 3.4 (in cubic meters) and Table 3.5 (as a percentage of total consumption)

Over the study period, the regional population increased by about 40 per cent, from 2.14 million in 2004 to 2.98 million in 2023. The serviced population (without private sources) increased by 41 per cent for the same period.

Using the regional consumption (GVWD plus member sources) of 400 million m^3 and a serviced population of 2.93 million, the total per capita consumption is estimated as 387 L/capita/day in 2023.

Figure 3.7 illustrates the proportional consumption of GVWD supplied water in 2023 by member jurisdiction, with comparisons to 2004 and 2013. Member jurisdictions that receive 5 per cent or more of GVWD-supplied water are considered to have regional significance to the regional results for metering, consumption, and by-sector consumption. For 2023, this includes (in alphabetical order) the cities of Burnaby, Coquitlam, Delta, Richmond, Surrey and Vancouver.

Figure 3.6: Total annual GVWD supplied water consumption and serviced population



Note: Annual consumption values are taken from GVWD records of total supplied volumes.

Table 3.4: Annual water consumption by sector (m^3) in the GVWD, 2004 – 2023[1]

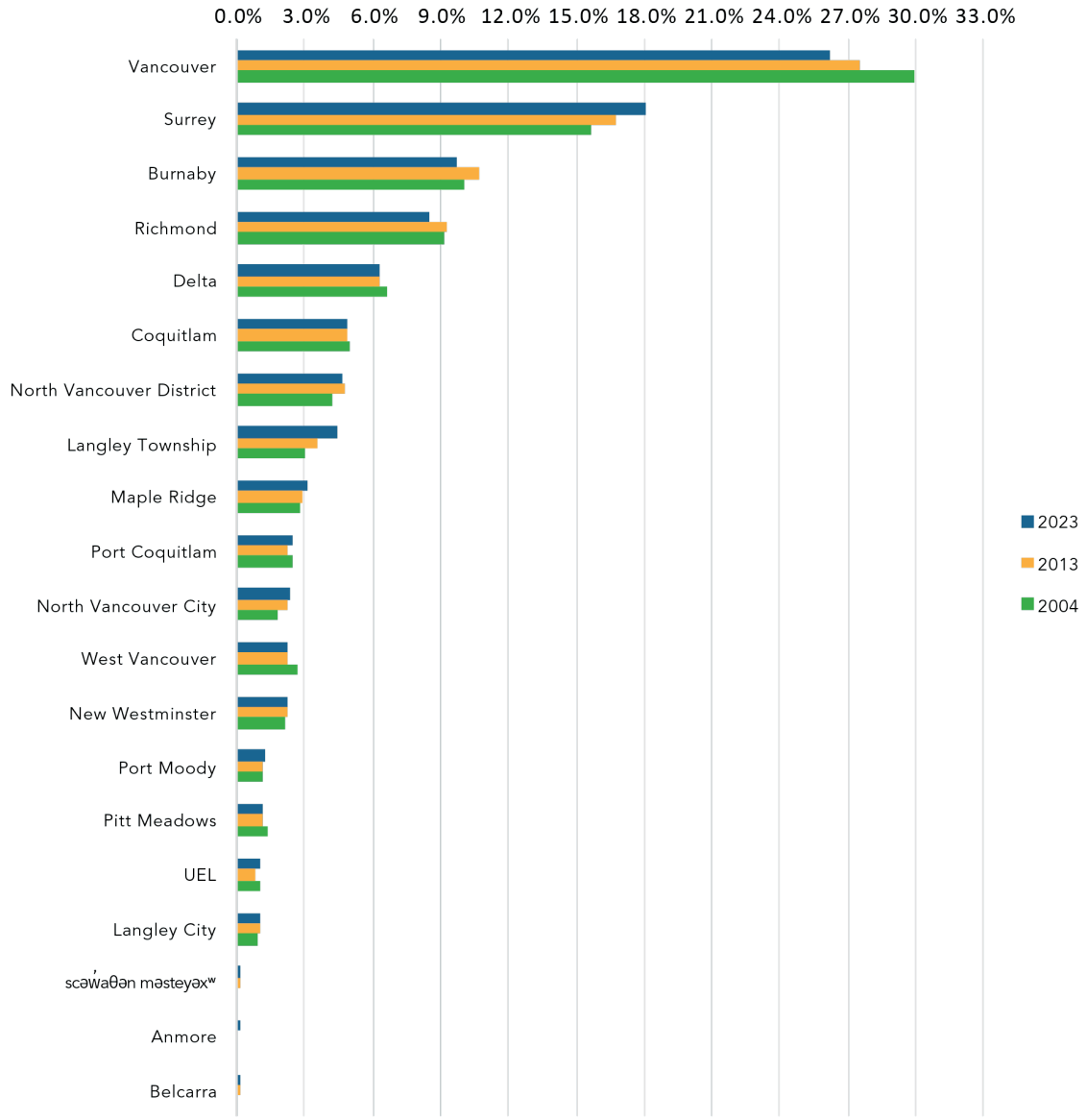
Year	Total Consumption Volume	Volume Purchased From GVWD	Volume from Own Sources	Unmetered	Total Metered	Breakdown of Metered Sectors							
						Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural	Other	Unknown
2004	438,209,324	425,119,473	13,089,851	261,643,411	179,565,913	13,494,219	37,843,488	65,567,859	21,678,954	28,933,445	5,452,845	3,576,621	18,483
2005	427,729,798	415,144,759	12,585,039	247,507,928	180,221,870	18,856,218	37,773,854	64,989,060	21,178,546	28,391,580	5,394,603	3,601,581	36,118
2006	435,489,943	421,282,153	14,207,789	247,856,596	187,633,347	26,348,933	37,845,738	69,561,265	19,933,094	25,007,329	5,925,048	2,989,912	22,028
2007	410,773,851	397,614,182	13,159,669	229,664,522	181,109,329	24,596,881	38,986,822	66,701,325	19,526,377	23,557,499	4,572,099	3,142,168	26,158
2008	400,743,014	388,225,939	12,517,074	222,441,817	178,301,197	26,586,887	40,754,264	60,136,587	19,813,736	23,086,813	5,418,035	2,490,645	14,229
2009	411,813,321	399,412,536	12,400,785	216,840,556	194,972,765	29,792,789	44,312,970	70,736,503	21,551,761	20,706,247	5,611,336	2,256,458	4,701
2010	395,133,028	382,512,704	12,620,324	215,383,001	179,750,027	30,307,269	40,984,232	63,903,276	19,791,987	17,076,378	5,405,822	2,276,251	4,811
2011	383,120,626	370,741,490	12,379,136	204,421,298	178,699,328	30,472,378	42,648,307	63,156,987	19,256,940	16,409,830	4,812,231	1,938,986	3,669
2012	394,801,733	382,128,901	12,672,832	215,036,324	179,765,409	31,798,132	43,730,526	61,723,415	19,491,231	16,138,526	4,919,349	1,960,030	4,200
2013	399,283,258	385,561,760	13,721,528	213,609,830	185,673,428	33,390,638	47,125,742	57,360,528	20,486,249	17,357,319	4,370,899	2,412,120	3,169,933
2014	394,074,037	380,806,432	13,267,605	208,461,695	185,612,343	35,027,019	45,810,242	54,932,877	21,146,007	17,699,203	5,290,415	2,618,285	3,088,294
2015	396,441,311	384,732,889	11,708,422	212,872,496	183,568,815	37,415,119	45,277,772	53,234,265	19,929,099	15,726,177	5,778,319	2,795,230	3,412,835
2016	394,981,321	383,379,069	11,602,252	204,623,290	190,358,031	39,953,503	47,392,702	53,915,819	21,296,867	16,430,469	5,228,947	2,973,733	3,165,989
2017	399,444,004	388,689,194	10,754,810	202,950,546	196,493,458	41,839,044	42,335,645	53,205,722	18,912,677	19,801,275	6,373,358	2,617,658	11,408,080
2018	399,999,680	389,248,572	10,751,088	203,782,780	196,216,881	45,079,280	49,243,327	54,870,141	18,956,946	15,239,916	5,435,746	3,365,947	4,025,578
2019	392,820,217	382,859,926	9,960,291	191,839,541	200,980,676	46,661,674	50,662,024	53,514,554	22,031,100	15,577,884	5,370,181	2,655,272	4,507,988
2020	387,457,690	378,480,047	8,977,643	204,157,586	183,300,104	58,038,297	44,401,577	42,409,898	14,677,552	14,428,011	4,461,128	2,325,346	2,558,296
2021	400,237,912	391,433,821	8,804,091	213,209,198	187,028,714	45,257,754	52,088,084	44,527,791	19,783,153	14,853,011	5,378,585	2,310,979	3,359,358
2022	395,523,832	388,139,272	7,384,560	199,777,815	195,746,017	55,573,212	47,301,190	49,865,503	17,924,313	14,195,473	4,933,396	2,117,538	3,835,392
2023	399,814,923	394,723,939	5,090,984	196,718,262	203,096,661	67,181,336	46,209,034	47,439,008	17,810,573	13,204,078	5,028,078	2,273,251	3,951,305

[1] *The elevated Unknown value in 2017 is due to an anomalous reporting year for the City of Surrey.*

Table 3.5: Annual water consumption by sector (% of total consumption) in the GVWD, 2004 – 2023)

Year	Total Consumption Volume	Volume Purchased From GVWD	Volume from Own Sources	Unmetered	Total Metered	Breakdown of Metered Sectors							
						Single-Family	Multi-Family	Commercial	Institutional	Industrial	Agricultural	Other	Unknown
2004	100%	97.01%	2.99%	59.71%	40.29%	3.08%	8.64%	14.96%	4.95%	6.60%	1.24%	0.82%	0.00%
2005	100%	97.06%	2.94%	57.87%	42.13%	4.41%	8.83%	15.19%	4.95%	6.64%	1.26%	0.84%	0.01%
2006	100%	96.74%	3.26%	56.91%	43.09%	6.05%	8.69%	15.97%	4.58%	5.74%	1.36%	0.69%	0.01%
2007	100%	96.80%	3.20%	55.91%	44.09%	5.99%	9.49%	16.24%	4.75%	5.73%	1.11%	0.76%	0.01%
2008	100%	96.88%	3.12%	55.51%	44.49%	6.63%	10.17%	15.01%	4.94%	5.76%	1.35%	0.62%	0.00%
2009	100%	96.99%	3.01%	52.66%	47.34%	7.23%	10.76%	17.18%	5.23%	5.03%	1.36%	0.55%	0.00%
2010	100%	96.81%	3.19%	54.51%	45.49%	7.67%	10.37%	16.17%	5.01%	4.32%	1.37%	0.58%	0.00%
2011	100%	96.77%	3.23%	53.36%	46.64%	7.95%	11.13%	16.48%	5.03%	4.28%	1.26%	0.51%	0.00%
2012	100%	96.79%	3.21%	54.47%	45.53%	8.05%	11.08%	15.63%	4.94%	4.09%	1.25%	0.50%	0.00%
2013	100%	96.56%	3.44%	53.50%	46.50%	8.36%	11.80%	14.37%	5.13%	4.35%	1.09%	0.60%	0.79%
2014	100%	96.63%	3.37%	52.90%	47.10%	8.89%	11.62%	13.94%	5.37%	4.49%	1.34%	0.66%	0.78%
2015	100%	97.05%	2.95%	53.70%	46.30%	9.44%	11.42%	13.43%	5.03%	3.97%	1.46%	0.71%	0.86%
2016	100%	97.06%	2.94%	51.81%	48.19%	10.12%	12.00%	13.65%	5.39%	4.16%	1.32%	0.75%	0.80%
2017	100%	97.31%	2.69%	50.81%	49.19%	10.47%	10.60%	13.32%	4.73%	4.96%	1.60%	0.66%	2.86%
2018	100%	97.31%	2.69%	50.95%	49.05%	11.27%	12.31%	13.72%	4.74%	3.81%	1.36%	0.84%	1.01%
2019	100%	97.46%	2.54%	48.84%	51.16%	11.88%	12.90%	13.62%	5.61%	3.97%	1.37%	0.68%	1.15%
2020	100%	97.68%	2.32%	52.69%	47.31%	14.98%	11.46%	10.95%	3.79%	3.72%	1.15%	0.60%	0.66%
2021	100%	97.80%	2.20%	53.27%	46.73%	11.18%	13.01%	11.13%	4.94%	3.71%	1.34%	0.58%	0.84%
2022	100%	98.13%	1.87%	50.51%	49.49%	14.05%	11.96%	12.61%	4.53%	3.59%	1.25%	0.54%	0.97%
2023	100%	98.73%	1.27%	49.20%	50.80%	16.80%	11.56%	11.87%	4.45%	3.30%	1.26%	0.57%	0.99%

Figure 3.7: Proportional consumption of GVWD supplied water in 2023 by member jurisdiction, with comparisons to 2004 and 2013



Note: The City of Delta, the Township of Langley, and the District of West Vancouver supplement GVWD supplied water with member jurisdiction water sources. In 2023, approximately 2 per cent, 8 per cent, and 32 per cent of total annual water consumed in these three member jurisdictions, respectively, was derived from non-GVWD sources (not represented in Figure).

Estimated Regional Residential Consumption

Estimated residential consumption is determined on a per member jurisdiction basis, and these estimates are combined to produce estimates for the region. As described in the Methodology section, for member jurisdictions that meter all ICI connections, unmetered consumption minus system losses is assumed to represent all unmetered residential consumption. Along with metered residential consumption, this forms the total residential consumption for each member jurisdiction.

- Based on these assumptions and the data provided and analyzed, it is estimated that residential consumption accounted for approximately 64.3 per cent of total water consumption in the region in 2023. This represents an annual volume of 257,279,549 m^3 for the residential sector in 2023 (Figure 3.8).
- The weighted average regional per capita residential consumption is estimated at 245.1 L/capita/day in 2023. The residential per capita consumption varies between 141 and 519 L/capita/day for member jurisdictions.
- Figure 3.8 shows the proportion of estimated residential consumption (calculated using the self-reported system losses of 13.2 per cent which are included in the non-residential consumption) as part of overall consumption from 2004 to 2023.
- Figure 3.9 provides estimates on a per capita basis.

Figure 3.8: GVWD total and estimated residential consumption, 2004 to 2023

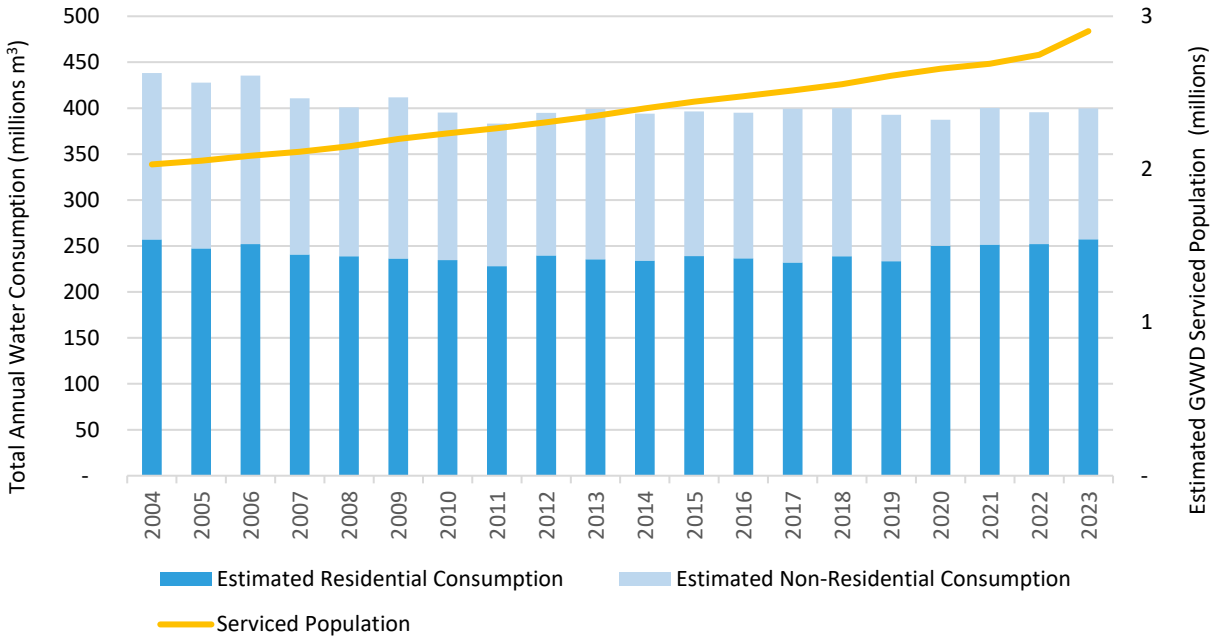
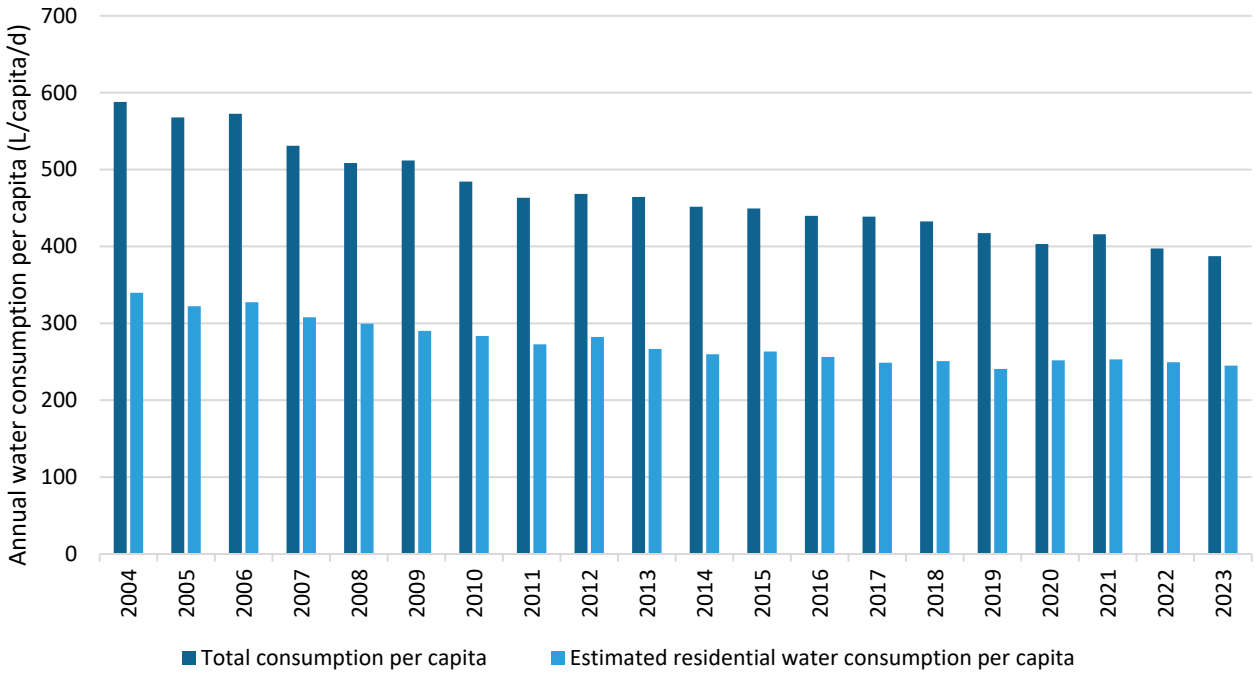


Figure 3.9: Per capita total and estimated residential consumption, 2004 to 2023



As described in the Methodology section, the challenges with estimating the residential consumption and per capita consumption result in high uncertainty. One reason is the variation in self-reported system losses, and the fact that system losses are understood to be under-reported given information available for fully metered municipalities locally.

Figure 3.10 illustrates the region's overall water use breakdown in 2023 based on estimates of residential use, metered consumption data, and self-reported member jurisdiction system losses.

Figure 3.10: Water consumption in the GVWD region by sector in 2023

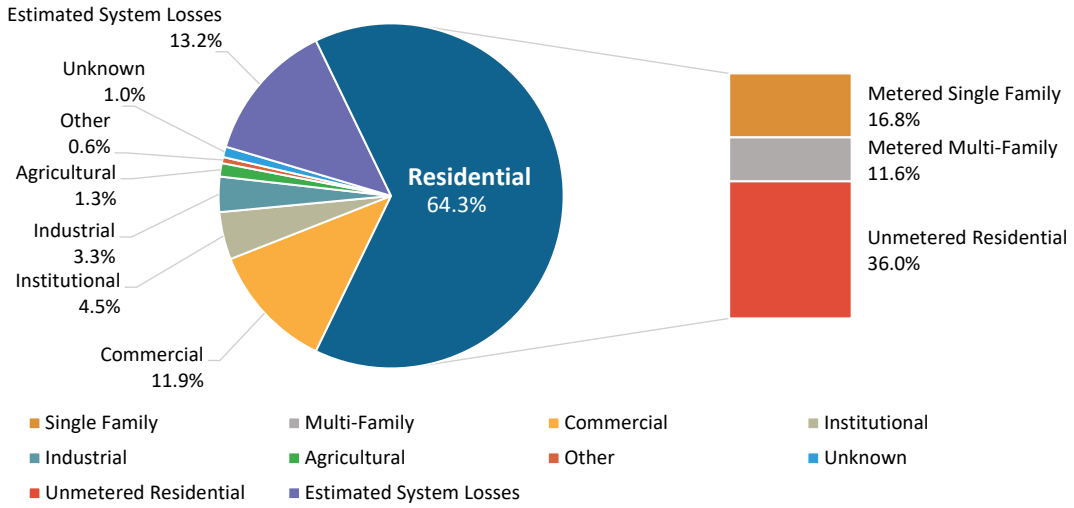


Table 3.6: Self Reported System Losses, 2023

Member Jurisdiction	Self Reported System Losses[1]
Village of Anmore	20.2%
Village of Belcarra	1.0%
City of Burnaby[2]	10.0%
City of Coquitlam	17.0%
City of Delta	10.0%
City of Langley	21.4%
Township of Langley	10.0%
City of Maple Ridge	10.0%
City of New Westminster	10.0%
City of North Vancouver	10.0%
District of North Vancouver	11.5%
City of Pitt Meadows [2]	10.0%
City of Port Moody	15.0%
City of Port Coquitlam	15.0%
City of Richmond	16.0%
City of Surrey	10.0%
Scəw̓ aθən məsteyəxʷ (TFN)	10.0%
UEL	7.0%
City of Vancouver	17.0%
District of West Vancouver	25.3%
Region System Loss	13.2%

[1] For members that are fully metered, system losses can be calculated, and the calculated figure is used.
[2] City of Burnaby and City of Pitt Meadows did not report a system loss percent, 10% was used for consistency with estimates by similar members.

Regional Industrial, Commercial, Institutional, and Agricultural Consumption

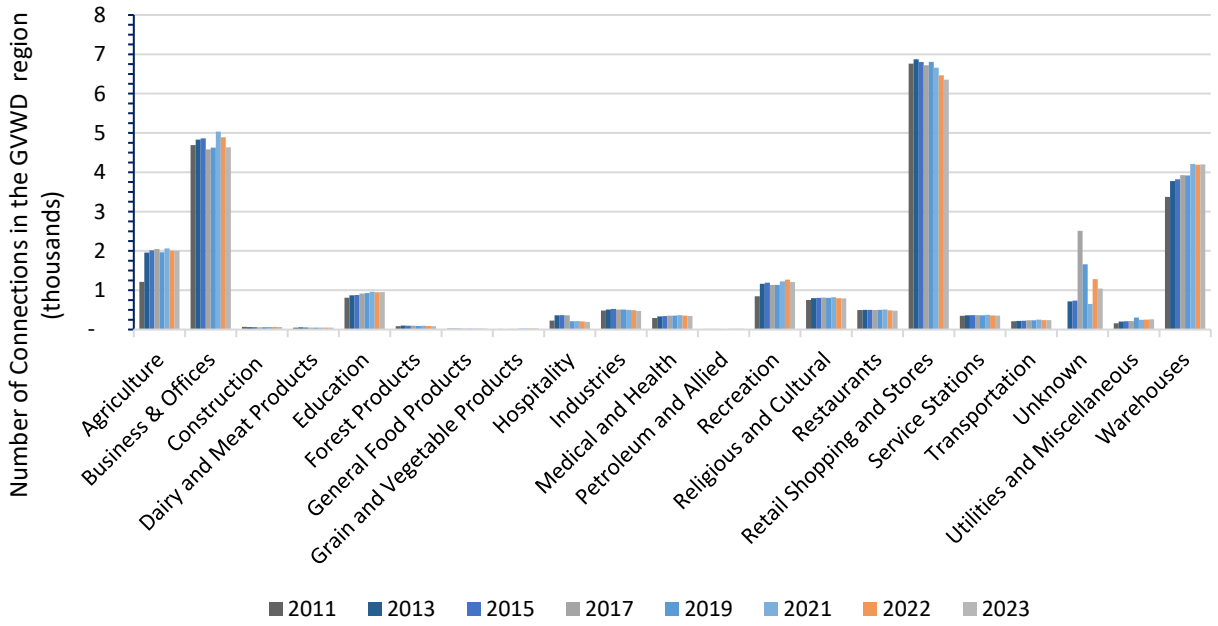
Metered water consumption for the ICI sectors (industrial, commercial, institutional), and agricultural was separated by sub-sectors using By Sector Codes (BSC), as defined in Methodology. This was completed for each member jurisdiction, and their data were combined for the overall ICI consumption in the region. For the purposes of this report, Agricultural sector consumption is included in the ICI sector because it represents a small share of regional consumption (1.3 per cent in 2023). It is understood that the Agricultural sector relies heavily on water from private wells and surface water sources to meet total water needs.

The metered connections shown for each category are based on the coding of properties by the BC Assessment Authority and the codes assigned to ICI accounts by member jurisdictions for their properties. There could be overlaps between categories. For example, in the case of a restaurant located in an office building or shopping centre, the restaurant may have been included in the Business and Office sector or the Retail Shopping and Stores sector instead of the Restaurant sector. There are variations in the assignment among member jurisdictions as well. Figure 3.11 shows the number of connections by BSC categories.

Metered consumption for all ICI connections during 2023 was 89,706,292 m^3 or 245,771 m^3/day. The ICI sector consumption in 2023 decreased by 1 per cent compared to 2021. ICI consumption in the region from 2009 to 2021 is shown by BSC categories in Figure 3.12 and Figure 3.13. Metered connections and consumption by BSC category in the region from 2009 to 2021 are provided in Table 3.7, Table 3.8, and Table 3.9.

In 2023, there were 23,803 metered connections in the ICI sector in the region (see Tabel 3.7), representing a 15 per cent overall increase in ICI connections since 2009. The most significant decrease in connections appears to have been in the General Food Products and Hospitality sub-sector since 2009, according to data provided by member jurisdictions. Conversely, the leading increase in the number of connections for the same period, 2009 to 2021, is in the Agriculture subsector, followed by the Grain and Vegetable Products subsector. From the data provided for 2023, there are 1040 accounts categorized as ‘Unknown’ that are assumed to be commercial.

Figure 3.11: Number of metered ICI connections by sector in the region, 2011 to 2023, only showing current report cycle and odd years for visual clarity



Note: Due to scale, several subsectors, such as General Food Products and Grain and Vegetable Products, show low numbers of connections on this chart. Refer to Table 3.7 for details of the number of connections. The 'Unknown' sub-sector consumption is assumed to be within the ICI sector due to the high consumption per connection and varies considerably from year to year. Therefore, the distribution of ICI consumption between the sub-sectors can only be assumed as correct. Reducing the 'Unknown' consumption could increase consumption in other ICI sub-sectors, although this correlation has not been established.

Figure 3.12: Metered ICI water consumption by sub-sector, 2011 to 2023, only showing current report cycle and odd years for visual clarity

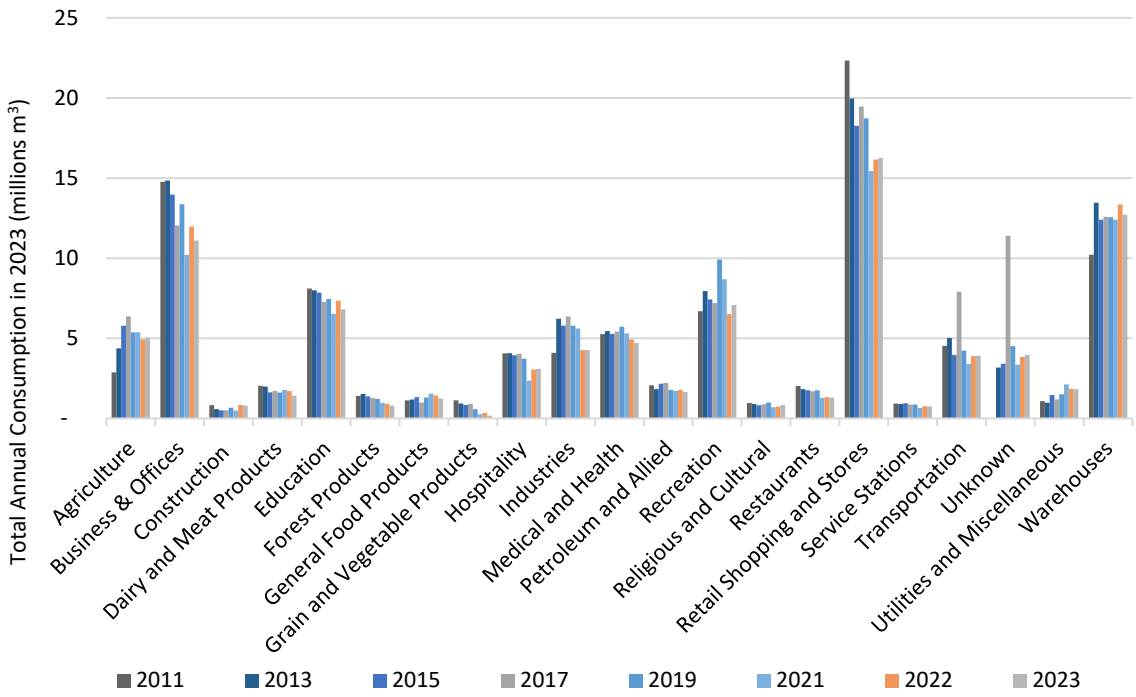


Figure 3.13: Average annual consumption per ICI connection by sector, 2011 to 2023, only showing current report cycle and odd years for visual clarity

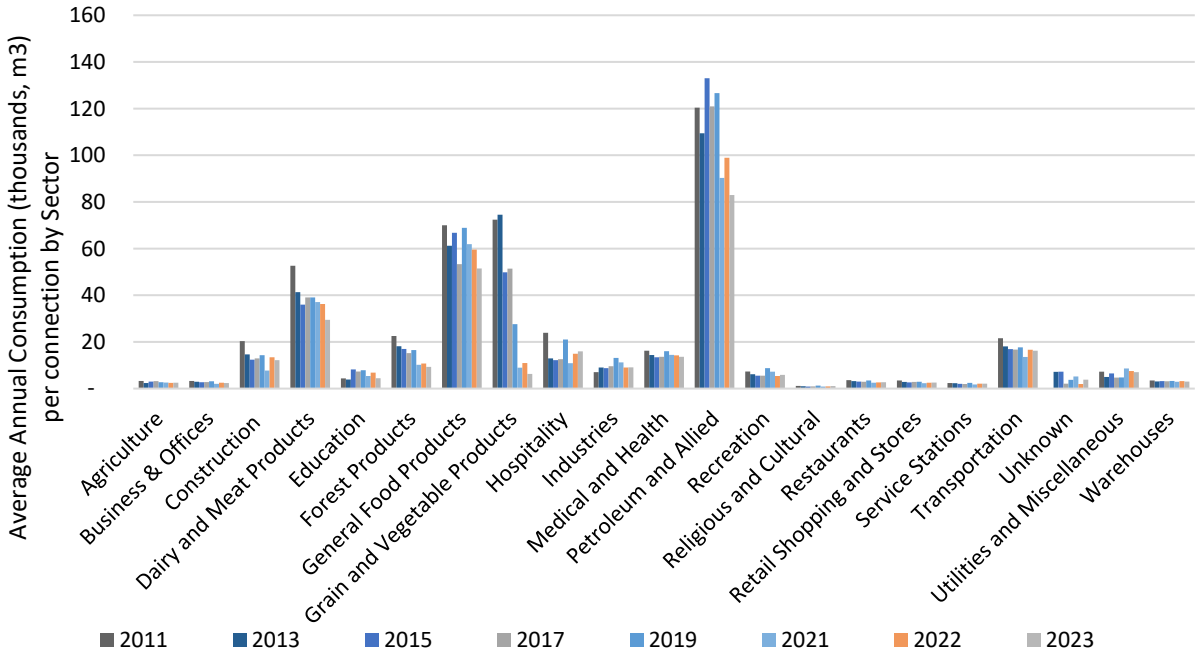


Table 3.7: Number of metered ICI connections in the GVWD, 2011 – 2023

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Agriculture	1,213	1,232	1,957	2,012	2,014	2,008	2,047	2,117	1,965	2,045	2,061	2,004	2,003
Business and Offices	4,693	4,778	4,831	4,856	4,864	4,884	4,582	4,727	4,628	4,727	5,033	4,893	4,634
Construction	68	67	61	61	61	61	58	63	62	63	64	63	65
Dairy and Meat Products	49	49	56	55	52	51	50	50	49	51	48	47	48
Education	810	859	869	874	877	880	914	970	927	959	962	947	950
Forest Products	85	88	100	98	96	96	99	92	91	94	96	90	86
General Food Products	26	30	26	26	25	25	25	24	24	24	25	24	24
Grain and Vegetable Products	17	17	14	17	17	17	18	21	23	30	30	29	27
Hospitality	229	227	363	362	366	362	362	233	213	218	216	207	194
Industries	485	499	507	509	524	524	509	524	510	494	499	491	470
Medical and Health	293	297	333	335	340	348	354	358	354	361	368	352	347
Petroleum and Allied	17	19	17	17	16	16	18	18	14	19	19	20	20
Recreation	848	884	1,162	1,175	1,191	1,167	1,134	1,154	1,134	998	1,224	1,270	1,207
Religious and Cultural	753	766	796	800	806	806	813	798	804	820	821	797	795
Restaurants	495	506	500	500	500	495	497	500	499	511	508	489	481
Retail Shopping and Stores	6,762	6,717	6,873	6,837	6,802	6,775	6,722	6,742	6,806	6,674	6,662	6,464	6,358
Service Stations	351	356	364	361	365	367	365	361	360	372	374	358	354
Transportation	210	198	218	220	225	223	237	247	237	254	251	238	241
Unknown*	6	6	718	737	736	729	2,510	1,776	1,660	611	650	1,280	1,040
Utilities and Miscellaneous	157	166	204	207	212	217	216	420	307	229	248	253	259
Warehouses	3,373	3,384	3,776	3,801	3,822	3,867	3,927	3,909	3,917	4,166	4,211	4,193	4,200
Total ICI	**20,940**	**21,145**	**23,745**	**23,860**	**23,911**	**23,918**	**25,457**	**25,104**	**24,584**	**23,720**	**24,370**	**24,509**	**23,803**

Table 3.8: Total annual consumption (m^3) by ICI Sector in the GVWD, 2011 – 2023

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Agriculture	2,874,700	2,978,111	4,370,899	5,290,415	5,778,319	5,228,947	6,373,358	5,435,746	5,370,181	4,461,128	5,378,585	4,933,396	5,028,078
Business and Offices	14,773,008	14,629,640	14,851,606	14,042,936	13,972,849	13,738,019	12,044,864	12,826,540	13,375,150	9,588,918	10,200,786	11,984,750	11,107,645
Construction	827,207	675,473	574,165	534,716	505,032	528,189	508,765	551,636	665,127	461,297	492,310	839,111	793,864
Dairy and Meat Products	2,039,482	1,986,586	1,989,966	1,856,366	1,629,368	1,764,124	1,718,349	1,702,173	1,619,660	1,617,932	1,779,941	1,702,822	1,413,104
Education	8,105,182	8,484,541	8,000,265	8,424,362	7,849,664	9,204,561	7,283,083	7,414,364	7,446,165	5,992,321	6,526,284	7,352,437	6,807,124
Forest Products	1,403,048	1,558,854	1,528,380	1,774,760	1,381,714	2,110,455	1,263,828	1,117,542	1,216,137	1,100,847	980,087	917,351	802,204
General Food Products	1,128,304	1,154,783	1,178,851	1,158,129	1,323,530	1,276,955	986,785	1,167,238	1,307,092	1,602,952	1,547,661	1,429,600	1,235,182
Grain and Vegetable Products	1,124,712	1,076,940	923,730	1,156,317	834,737	873,392	910,692	839,360	581,563	308,415	268,893	338,073	170,597
Hospitality	4,063,991	3,916,504	4,075,020	3,957,919	3,939,975	4,006,433	4,030,877	3,803,325	3,726,530	2,155,869	2,356,784	3,051,145	3,098,659
Industries	4,094,634	5,189,816	6,219,990	6,317,926	5,791,855	5,468,927	6,364,543	5,901,679	5,792,675	5,651,744	5,609,620	4,259,788	4,267,615
Medical and Health	5,260,639	5,103,095	5,454,672	5,398,172	5,267,389	5,323,191	5,418,018	5,360,656	5,716,430	5,227,934	5,306,888	4,934,462	4,715,262
Petroleum and Allied	2,067,736	2,236,477	1,824,307	2,407,832	2,161,766	2,273,089	2,216,994	1,542,335	1,773,323	1,450,958	1,715,261	1,781,441	1,658,770
Recreation	6,691,842	6,709,566	7,952,761	8,156,687	7,429,613	7,453,127	7,202,069	7,112,742	9,920,718	4,367,287	8,692,343	6,513,346	7,075,129
Religious and Cultural	954,033	906,574	893,846	883,622	816,720	879,990	884,188	925,602	984,143	674,117	697,098	742,341	841,505
Restaurants	2,029,921	1,957,901	1,826,487	1,757,683	1,758,543	1,755,793	1,694,900	1,629,555	1,761,151	1,199,376	1,274,523	1,325,763	1,295,858
Retail Shopping and Stores	22,338,045	21,420,296	19,959,111	19,207,566	18,261,095	18,591,661	19,460,307	19,667,621	18,730,881	14,865,549	15,449,324	16,155,464	16,256,343
Service Stations	929,413	909,982	898,363	834,042	943,168	882,551	867,032	1,765,848	866,100	651,858	650,414	759,308	743,186
Transportation	4,536,628	3,331,413	5,021,542	4,621,785	3,957,717	3,902,607	7,905,947	4,841,142	4,236,506	3,363,552	3,404,936	3,890,839	3,910,545
Unknown*	3,669	4,200	3,169,933	3,088,294	3,412,835	3,165,989	11,408,080	4,025,578	4,507,988	2,558,719	3,359,358	3,835,392	3,951,305
Utilities and Miscellaneous	1,073,656	1,081,856	978,396	1,052,615	1,460,622	1,617,671	1,191,725	1,548,461	1,508,483	1,699,402	2,130,809	1,850,667	1,822,811
Warehouses	10,212,862	9,957,491	13,464,758	12,852,940	12,399,413	12,966,153	12,584,366	12,715,132	12,550,976	11,859,818	12,397,764	13,358,501	12,711,508
Total ICI	**96,532,713**	**95,270,098**	**105,157,048**	**104,775,082**	**100,875,924**	**103,011,826**	**112,318,769**	**101,894,274**	**103,656,979**	**80,859,992**	**90,219,671**	**91,955,996**	**89,706,292**

Table 3.9: Average annual consumption per connection (m^3) by ICI Sector in the GVWD, 2011 – 2023

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Agriculture	2,370	2,417	2,233	2,629	2,869	2,604	3,114	2,568	2,733	2181	2610	2,462	2,510
Business and Offices	3,148	3,062	3,074	2,892	2,873	2,813	2,629	2,713	2,890	2029	2027	2,449	2,397
Construction	12,165	10,082	9,413	8,766	8,279	8,659	8,772	8,756	10,728	7322	7692	13,319	12,213
Dairy and Meat Products	41,622	40,543	35,535	33,752	31,334	34,591	34,367	34,043	33,054	31724	37082	36,230	29,440
Education	10,006	9,877	9,206	9,639	8,951	10,460	7,968	7,644	8,033	6249	6784	7,764	7,165
Forest Products	16,506	17,714	15,284	18,110	14,393	21,984	12,766	12,147	13,364	11711	10209	10,193	9,328
General Food Products	43,396	38,493	45,340	44,543	52,941	51,078	39,471	48,635	54,462	66790	61906	59,567	51,466
Grain and Vegetable Products	66,160	63,349	65,981	68,019	49,102	51,376	50,594	39,970	25,285	10280	8963	11,658	6,318
Hospitality	17,747	17,253	11,226	10,933	10,765	11,067	11,135	16,323	17,495	9889	10911	14,740	15,972
Industries	8,443	10,400	12,268	12,412	11,053	10,437	12,504	11,263	11,358	11441	11242	8,676	9,080
Medical and Health	17,954	17,182	16,380	16,114	15,492	15,297	15,305	14,974	16,148	14482	14421	14,018	13,589
Petroleum and Allied	121,632	117,709	107,312	141,637	135,110	142,068	123,166	85,685	126,666	76366	90277	89,072	82,938
Recreation	7,891	7,590	6,844	6,942	6,238	6,387	6,351	6,164	8,748	4376	7102	5,129	5,862
Religious and Cultural	1,267	1,184	1,123	1,105	1,013	1,092	1,088	1,160	1,224	822	849	931	1,058
Restaurants	4,101	3,869	3,653	3,515	3,517	3,547	3,410	3,259	3,529	2347	2509	2,711	2,694
Retail Shopping and Stores	3,303	3,189	2,904	2,809	2,685	2,744	2,895	2,917	2,752	2227	2319	2,499	2,557
Service Stations	2,648	2,556	2,468	2,310	2,584	2,405	2,375	4,892	2,406	1752	1739	2,121	2,099
Transportation	21,603	16,825	23,035	21,008	17,590	17,500	33,358	19,600	17,876	13242	13565	16,348	16,226
Unknown*	–	–	4,415	4,190	4,637	4,343	4,545	2,267	2,716	4188	5168	2,996	3,799
Utilities and Miscellaneous	6,839	6,517	4,796	5,085	6,890	7,455	5,517	3,687	4,914	7421	8592	7,315	7,038
Warehouses	3,028	2,943	3,566	3,381	3,244	3,353	3,205	3,253	3,204	2847	2944	3,186	3,027

List of Acronyms and Conversions

Acronyms

AUC	Actual Use Code
BC	British Columbia
BCAA	British Columbia Assessment Authority
BSC	By-Sector Classification
GSC	General Sector Codes
GVWD	Greater Vancouver Water District
ICI	Industrial, Commercial and Institutional (*includes Agriculture in this report*)
MJ/Member(s)	Member Jurisdiction(s) supplied by the GVWD
MF	Multi-Family
LPCD	Liters Per Capita Per Day
SF	Single-Family
SIC	Standard Industrial Classification
SQL	Structured Query Language
UEL	University Endowment Lands

Conversions

100 cubic feet = 2.8316847 m^3 = 2831.684659 Liters

1 m^3 = 1,000 Liters

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Low water levels at Coquitlam Reservoir during fall 2022

Water Use by Sector Report 2004 – 2023

Linda Parkinson
Director, Policy, Planning and Analysis, Water Services

Water Committee Meeting, May 13, 2026
84704066

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1

OVERVIEW

Water Use by Sector Report 2004 – 2023

- Provides information on population, metering, water consumption by sector, and estimated consumption per capita at regional and jurisdiction levels
- Assists water demand planning and policy development
- Data provided by all members for this report cycle
- Report is published once every two years

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2

KEY METRICS

Water Use by Sector Report 2004 – 2023

Metric		2021 Report	2023 Report	Change %
Metered accounts	% of Total serviced connections in the region	35.5 %	34.4%	↓ 1.1 %
Metered consumption	% of Total water consumption in the region	46.7 %	50.8 %	↑ 4.1 %
Total annual consumption – water supplied by GVWD and member jurisdiction sources	Billion litres	400	400	↔ 0.0 %
Serviced Population – population served by GVWD and member jurisdiction sources	Number of people	2,721,660	2,926,855	↑ 7.5 %
Total per capita water consumption – regional average	Litres per capita per day	416	387	↓ 7.0 %
Estimated residential per capita consumption – regional average	Litres per capita per day	253	245	↓ 2.8 %

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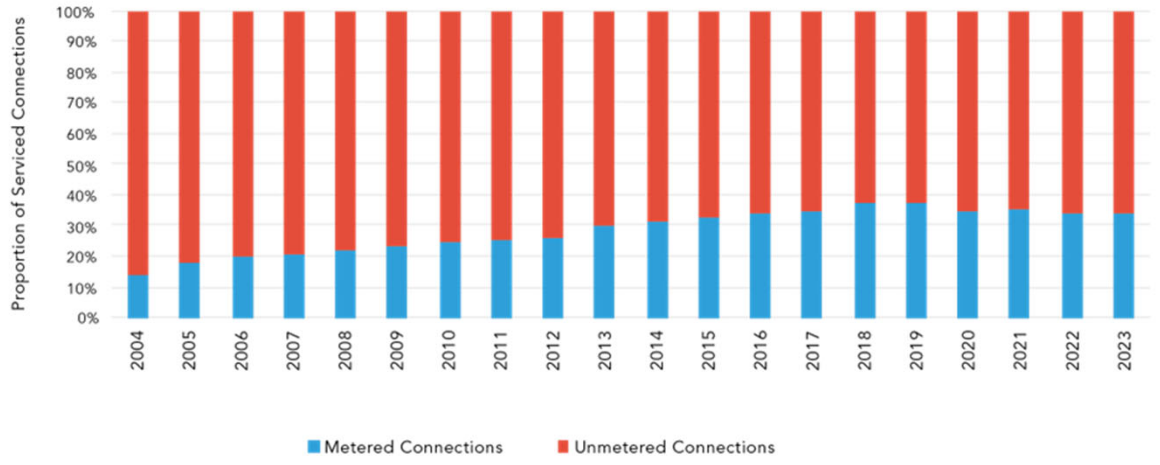
3

METERED AND UNMETERED CONNECTIONS

Proportion of Metered and Unmetered Connections - Regional



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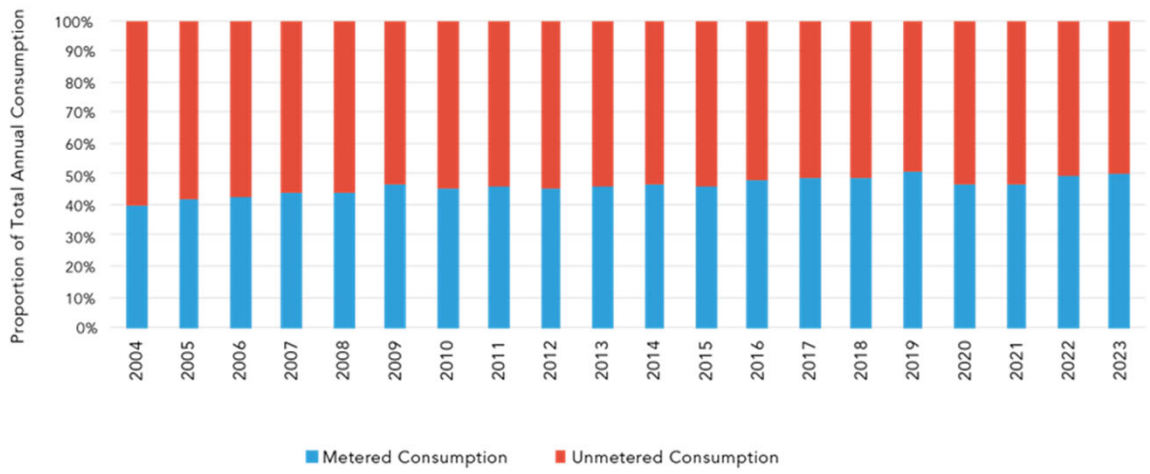
4

METERED AND UNMETERED CONSUMPTION

Proportion of Metered and Unmetered Consumption - Regional



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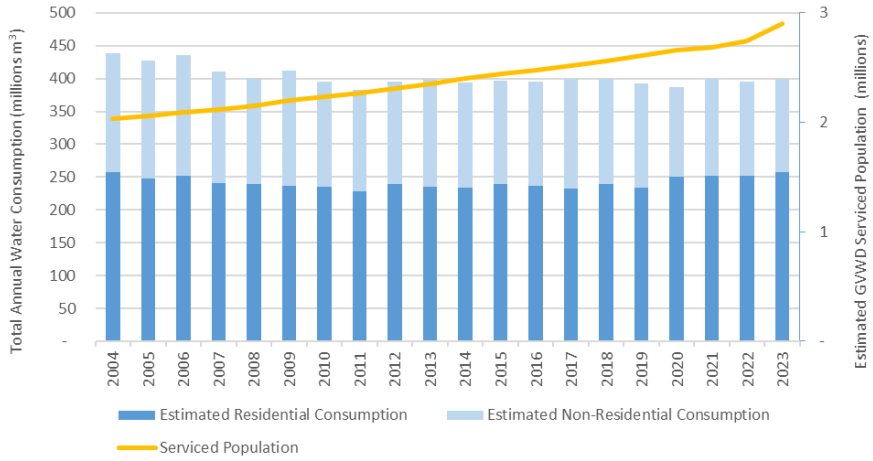
5

TOTAL AND RESIDENTIAL CONSUMPTION

Estimated Total and Residential Consumption, GVWD Serviced Population



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6

2023 SELF REPORTED SYSTEM LOSSES

Jurisdiction	Self Reported System Losses
Village of Anmore	20.2%
Village of Belcarra	1.0%
City of Burnaby[1]	10.0%
City of Coquitlam	17.0%
City of Delta	10.0%
City of Langley	21.4%
Township of Langley	10.0%
City of Maple Ridge	10.0%
City of New Westminster	10.0%
City of North Vancouver	10.0%
District of North Vancouver	11.5%
City of Pitt Meadows[1]	10.0%
City of Port Moody	15.0%
City of Port Coquitlam	15.0%
City of Richmond	16.0%
City of Surrey	10.0%
Tsawwassen First Nation	10.0%
University Endowment Lands	7.0%
City of Vancouver	17.0%
District of West Vancouver	25.3%
Region System Loss	13.2%

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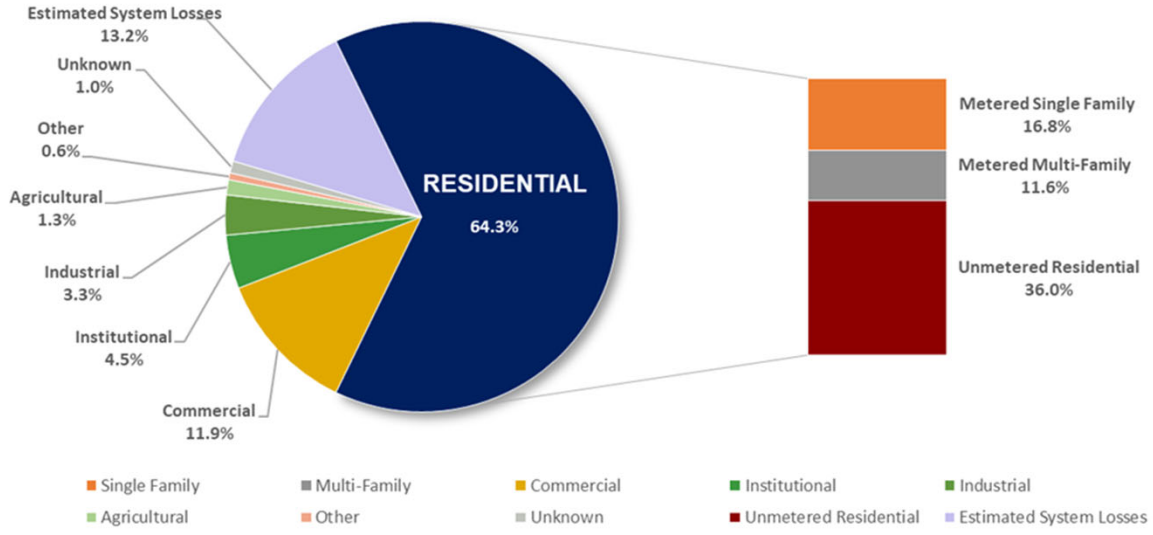
7

WATER CONSUMPTION BY SECTOR – 2023

Using Reported System Loss



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8

RECOMMENDATIONS & NEXT STEPS

- Explore benefit of transitioning to evidence-based estimate of system losses
- Clean up and fix irregularities with historical data
- Continue working with member jurisdiction staff on how we can improve the report and data collection for the next report cycle 2024 – 2025

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9

10

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Cheryl Nelms, General Manager, Project Delivery

Date: April 29, 2026 Meeting Date: May 13, 2026

Subject: **2026 Major Projects Update No. 1 – Water**

RECOMMENDATION
THAT the Water Committee receive for information the report dated April 29, 2026 titled "2026 Major Projects Update No. 1 - Water."

EXECUTIVE SUMMARY
Metro Vancouver follows best practices related to governance and oversight on all of Metro Vancouver's capital projects. A key deliverable is to provide regular updates on the portfolio of high value, risk, and consequence capital projects being delivered by the Project Delivery Department.

PURPOSE
This report is the first of two annual updates on the major water projects being delivered by the Project Delivery Department.

BACKGROUND
Metro Vancouver is investing in water and wastewater treatment, transmission, and collection system assets with three main objectives:

- Meet provincial and federal regulatory requirements for higher levels of wastewater treatment for discharges to local waterbodies.
- Reinforce our system to enable uninterrupted service delivery through major climate or seismic events and meet growth.
- Sustain our system, ensuring we can safely and reliably meet the needs of our customers while keeping rates affordable.

Each year, the Metro Vancouver Boards adopt a budget for the upcoming year and endorse a five-year financial plan. Regular updates on capital projects provide information to support good governance of the organization, decision making, project management, and financial oversight. In February 2026, the first of three annual Capital Program updates was provided to the Committees and Boards. In April 2026, the first of three annual Financial Performance Reports was provided to the Boards through the Performance and Audit Committee. This report provides the first of two additional updates on major projects being delivered by the Project Delivery Department.

Table 1: Capital Program Reporting

	J	F	M	A	M	J	J	A	S	O	N	D
Capital Program Update		✔					✔				✔	
Additional Major Utility Project Updates					✔				✔			
Financial Performance Report				✔			✔				✔	

INFRASTRUCTURE MARKET UPDATE

The outlook for major public infrastructure projects in British Columbia is expected to remain strong over the next 20 years across utilities, transportation, energy, and vertical infrastructure. Combined with water and wastewater upgrades, this creates a sustained and highly competitive consultant and contractor market environment. For Metro Vancouver, this means delivering projects within an active market where labour availability, contractor capacity, and supply chain pressures will continue to influence cost, schedule, and procurement outcomes. For larger projects, particularly those exceeding ~$500M, the market is seeing fewer bidders and increased risk aversion. Contractors are more selective in pursuing opportunities and are pricing risk more explicitly. As a result, packaging, risk allocation, and delivery model decisions are increasingly influencing both competition and overall pricing outcomes.

PORTFOLIO UPDATE

Across the Project Delivery Department portfolio, projects are progressing through planning, design, construction, and commissioning, reflecting phased delivery aligned with long-term service needs and financial sustainability. Key milestones have been achieved, including completion and commissioning of major wastewater treatment components, substantial progress on several large-diameter water supply tunnels, and delivery of early and enabling works that position future treatment and capacity upgrades.

The portfolio also continues to face challenges inherent to infrastructure of this scale, including complex regulatory and permitting requirements, archaeological considerations, market pressures, and ongoing engagement with First Nations. In response, projects are being re-sequenced or phased where appropriate, with priority placed on regulatory compliance and critical system capacity, while non-essential components are deferred to manage affordability and risk. These challenges are being actively managed through established project management, contingency, and stage-gate governance processes, with regular Board oversight at key decision points.

PROJECT DELIVERY MAJOR PROJECTS UPDATE - WATER

Annacis Water Supply Tunnel

The Annacis Water Supply Tunnel is a new crossing of the Fraser River that, when combined with the Annacis Water Main North and Annacis Water Main South projects, will increase water supply capacity to communities south of the Fraser River. The new tunnel will span 2.3 km from New Westminster to Surrey and will be 4.5 m in diameter. The project consists of a tunnel and deep vertical shafts on each side of the river which will accommodate the installation of a 2.6-m-diameter welded steel water main. Underground valve chambers will also be constructed adjacent to each shaft to regulate flow and facilitate connection of the water main to the existing water transmission system. The project is driven by growth requirements and will also be seismically resilient and able to withstand a major earthquake.

Construction began in early 2022 and is approximately 75 per cent complete. The shafts were completed in 2024, and tunnel excavation was completed in summer 2025. Current work includes construction of the valve chambers and installation of the water main inside the shafts, with tunnelling works complete. Construction is scheduled to be completed and the tunnel in service by 2028. Additional information and project updates are available on the project webpage (Reference 1).

Annacis Water Supply Tunnel		Status
Progress	Construction (70% complete)	●
Schedule	On schedule	●

Budget	Tariffs on steel pipe were unexpected; additional cost is being managed within budget	●
Next Milestone	Construction completion in late 2027 followed by commissioning in 2028. Stage Gate 4 (project close-out) in 2028.	

Cambie-Richmond Water Supply Tunnel
The Cambie-Richmond Water Supply Tunnel is a 1.1-km-long, 4.5-m-diameter crossing under the Fraser River from Vancouver to Richmond. The project consists of a tunnel and deep vertical shafts located on each side of the river to facilitate the installation of a 2.1-m-diameter welded steel water main. Each shaft site will also include the construction of underground valve chambers to facilitate water control functions. This is a resiliency driven project that will ensure the delivery of high-quality drinking water following a major earthquake.

The project definition phase was completed in 2022, followed by property acquisition in Vancouver and Richmond to facilitate construction and long-term land tenure for the shafts and valve chambers. Preliminary design began in 2024 and is in progress. Current activity includes completing geotechnical and environmental site investigations and archaeological assessments. Detailed design and construction will follow, with construction planned to begin by about 2031. Additional information and project updates are available on the project webpage (Reference 2).

Cambie-Richmond Water Supply Tunnel		Status
Progress	Preliminary Design (25% complete)	●
Schedule	On schedule	●
Budget	On budget	●
Next Milestone	Completion of preliminary design in late 2026 or early 2027. Stage Gate 2 will occur in early 2027 to seek approval to proceed to the next detailed design phase.	

Coquitlam Lake Water Supply Project
The region's population is projected to reach four million by 2045, driving the need to expand access to Metro Vancouver's largest water source, Coquitlam Lake. The Coquitlam Lake Water Supply Project will double the capacity to access water from the Coquitlam source to meet the region's future drinking water needs and address the impacts of climate change.

The project consists of a new 8.5-km-long by 5-m-diameter intake tunnel and a new water filtration treatment plant. The project is currently in the preliminary design phase, focusing on permitting and regulatory activities. Procurement for design consultants for the intake and tunnel is underway. Pilot treatment testing facilities have been constructed, and commissioning is anticipated for May 2026. Staff are engaging kʷikʷəƛ̓əm (Kwikwetlem First Nation) through a co-developed and co-led collaborative impact assessment, which has taken longer than expected to complete. The assessment is expected to be completed by May 2026. Key regulatory and permitting applications are being submitted in April/May 2026. The project schedule and cost estimate will be updated once sufficient preliminary design has been undertaken in 2027/2028 to more clearly define the scope of work. Project completion is required by the late 2030s to meet future drinking water demands. Additional information and project updates are available on the project webpage (Reference 3).

Coquitlam Lake Water Supply Project		Status
Progress	Preliminary Design (5% complete)	🟢
Schedule	On schedule for overall program; regulatory/permitting process has been protracted and is being managed within the overall schedule	🟢
Budget	On budget	🟢
Next Milestone	Stage Gate 2 – Approval to proceed to Design Phase	

Coquitlam Water Main (Coquitlam Main No. 4)
Metro Vancouver is constructing the new Coquitlam Water Main as part of the overall strategy to increase the capacity of the Coquitlam system. The Coquitlam Water Main is a key regional transmission main that will expand the capacity of the Coquitlam source for the next 50 years to reliably meet current and future demands for drinking water. The new water main is approximately 12 km long, spanning from the north end of Pipeline Road to Mariner Way at Riverview Crescent, in the City of Coquitlam. The diameter of the new steel water main ranges from 2.2 m to 3.5 m. This is the largest water main Metro Vancouver has constructed.

Construction is divided into four sections: Pipeline Road North Section, Robson to Guildford Section, City Centre Tunnel Section, and Cape Horn Section. Early works for third-party utility relocations to prepare the site for eventual installation of the Pipeline Road North Section is in the procurement stage. Construction of the Robson to Guildford Pre-Build Section is ongoing, with approximately 90 per cent of steel pipe installed, and completion anticipated by late 2026/2027. Several construction issues have been identified but are forecast to be managed within the approved budget and overall schedule. Detailed design is nearing completion for the City Centre Tunnel and Cape Horn Sections, and procurement for a Cape Horn Section pre-build is underway. Stage Gate 3 approval for the remaining mainline sections is anticipated to begin in 2027. Project completion is required by the mid-2030s to meet future drinking water demands. Additional information and project updates are available on the project webpage (Reference 4).

Coquitlam Water Main (Coquitlam Main No. 4)		Status
Progress	Detailed Design (90% complete) and Construction – Robson to Guildford Section Pre-build (90% complete)	🟢
Schedule	On schedule for overall project; anticipated schedule slippage on Robson to Guildford Pre-Build Section is being managed within overall project schedule	🟡
Budget	On budget; remission for steel pipe tariffs underway; third party utility relocations and geotechnical challenges on Guildford Pre Build Section being reviewed	🟢
Next Milestone	Stage Gate 3 – Approval to proceed to Construction Phase	

Lulu Delta Water Supply Tunnel
The Lulu Delta Water Supply Tunnel is a 2-km-long marine crossing under the Fraser River between Richmond and Delta, near the George Massey Tunnel. This maintenance-driven project will replace the

existing Lulu Delta crossing to ensure reliable delivery of high-quality drinking water to Delta and scəw̓aθən məsteyəxʷ (Tsawwassen First Nation).

The project consists of vertical shafts on each side of the Fraser River and a deep tunnel under the river to facilitate the installation of a welded steel water main. Underground valve chambers will also be constructed near surface to allow connection into the existing water transmission system. The project definition phase began in 2025 and is scheduled to be completed in 2027. As part of this phase of work, the shaft locations and tunnel alignment will be confirmed, followed by the acquisition of property at the shaft site locations. The timing for subsequent design and construction phases is currently planned to be deferred by several years for financial sustainability reasons. Design is expected to begin in the early 2040s.

Lulu Delta Water Supply Tunnel		Status
Progress	Definition (20% complete)	●
Schedule	The start of the project definition phase was delayed due to stakeholder engagement which has pushed the end date out by about 4 months. Future design and construction phases deferred by several years for financial sustainability reasons.	●
Budget	On budget	●
Next Milestone	The completion of the project definition phase in 2027 followed by property acquisition. The project will then be deferred with design commencing in approximately 2040.	

Pitt River (Haney) Water Supply Tunnel
The Pitt River (Haney) Water Supply Tunnel is a 1-km-long tunnel crossing beneath the Pitt River between Port Coquitlam and Pitt Meadows. The new tunnel will replace the existing Haney Mains No. 2 and No. 3, which are vulnerable to damage during an earthquake. The project will ensure the reliable delivery of high-quality drinking water to Pitt Meadows and Maple Ridge.

The project consists of vertical shafts on each side of the Pitt River and a deep tunnel which will facilitate the installation of a welded steel water main. Valve chambers will also be constructed to facilitate connection into the existing water transmission system and to provide water control functions. The project definition phase was completed in late 2024, and property acquisition at the shaft sites is ongoing and is anticipated to be completed later this year. Design and construction are planned to be deferred for several years for financial sustainability reasons, with design expected to begin in approximately 2040.

Pitt River (Haney) Water Supply Tunnel		Status
Progress	Definition (100% complete) – Currently securing property rights for future construction	●
Schedule	On schedule. Future design and construction phases deferred by several years for financial sustainability reasons.	●
Budget	On budget	●

Next Milestone	The completion of property acquisition by the end of 2026. The project will then be deferred with design commencing in approximately 2040.

Second Narrows Water Supply Tunnel
The Second Narrows Water Supply Tunnel is a 1.1-km-long, 6.5-m-diameter tunnel crossing beneath the Burrard Inlet between North Vancouver and Burnaby. The project includes installation of three welded steel water mains inside the tunnel that will replace the three existing mains, which were constructed at shallow depths at the bottom of Burrard Inlet between the 1940s and the 1970s and do not meet current seismic standards.

The project includes two deep vertical shafts constructed on each side of the inlet, a deep tunnel under the inlet, and large valve chambers to regulate water flow through the transmission system. The project will ensure the continued reliable delivery of high-quality drinking water to the Cities of Vancouver, Burnaby, New Westminster, and Surrey. Construction of this project began in 2019 and reached substantial completion in 2025. The first of three water mains was tied into the system in the fall of 2025, with the remaining two mains to be tied into the system during the low demand winter seasons over the next two years. Full system commissioning is anticipated by 2028. Current activities include the construction of tie-in piping work at both sites, work on the existing water system components required in advance of final tie-in works, and partial site restoration. Additional information and project updates are available on the project webpage (Reference 5).

Second Narrows Water Supply Tunnel		Status
Progress	Construction (95% complete)	●
Schedule	On schedule	●
Budget	On budget	●
Next Milestone	Stage Gate 4 (project close out) in 2028	

Stanley Park Water Supply Tunnel
The Stanley Park Water Supply Tunnel is a maintenance driven project and is required to replace an existing water main which was constructed at shallow depths through Stanley Park in the early 1930s. The existing water main has experienced several leaks in recent years and has reached the end of its service life. The project involves the construction of a new water main inside a deep underground tunnel to minimize impacts to Stanley Park.

The new tunnel will be 1.4 km long, approximately 4.5 m in diameter and will include a 2.6 m diameter welded steel water main which will be connected into the existing water transmission system through new underground valve chambers. Construction began in late 2024 and is scheduled to be complete by 2029. Current work activities include the excavation of the primary entry work shaft at the main Stanley Park works yard, and the construction of temporary bypass piping and valves to divert drinking water around the work sites at the Burrard and Chilco shaft sites, which is required to facilitate construction of the new shafts. The bypass work is currently experiencing delays due to the technical complexity of the work and unforeseen site conditions. The project team and contractor are working extended hours and implementing mitigation measures to recover some of the schedule delay. Additional information and project updates are available on the project webpage (Reference 6).

Stanley Park Water Supply Tunnel		Status
Progress	Construction (20% complete)	🟢
Schedule	Delay in completing temporary bypass due to highly complex work and unforeseen conditions.	🟡
Budget	On budget	🟢
Next Milestone	Tunnel excavation to commence in late 2026. Final completion and in-service by 2029. Stage Gate 4 (close-out) in 2029 or 2030.	

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
As part of the capital planning process, the timing of each project is reviewed and updated annually based on available resources, strategic prioritization, risk to system operations, and financial sustainability. Each project is subject to its own cost review on a regular basis, as well as regular stage gate approvals. Project-specific reports will be provided as warranted to provide greater detail and address any required changes to project scope, schedule, or budget.

OTHER IMPLICATIONS
This information has also been provided to the Regional Engineers Advisory Committee as part of Metro Vancouver's commitment to providing regular capital program updates to its members.

CONCLUSION
This report provides a status update on the major water projects being delivered by the Project Delivery Department. These updates are provided twice a year in May and September. Individual project reports will continue to be provided as needed, particularly at key decision-making milestones.

ATTACHMENT
1. Presentation re: "2026 Major Projects Update No. 1 - Water".

REFERENCES
1. Metro Vancouver, Annacis Water Supply Tunnel. metrovancouver.org/services/water/annacis-water-supply-tunnel.
2. Metro Vancouver, Cambie-Richmond Water Supply Tunnel. metrovancouver.org/services/water/cambie-richmond-water-supply-tunnel.
3. Metro Vancouver, Coquitlam Lake Water Supply Project. metrovancouver.org/services/water/coquitlam-lake-water-supply-project.
4. Metro Vancouver, Coquitlam Water Main. metrovancouver.org/services/water/coquitlam-water-main.
5. Metro Vancouver, Second Narrows Supply Tunnel. metrovancouver.org/services/water/second-narrows-water-supply-tunnel.
6. Metro Vancouver, Stanley Park Water Supply Tunnel. metrovancouver.org/services/water/stanley-park-water-supply-tunnel

2026 Major Projects Update No. 1

WATER

Cheryl Nelms, P.Eng., PhD
General Manager, Project Delivery

Water Committee Meeting – May 13, 2026
84439562

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1

ADDITIONAL MAJOR PROJECTS UPDATE

May 2026

- Updates provided to Committee and Board two times a year
- Individual project reports will continue to be provided at key decision-making milestones

Capital Program Reporting	J	F	M	A	M	J	J	A	S	O	N	D
Capital Program Update		✓					✓				✓	
Additional Major Utility Project Updates					✓				✓			
Financial Performance Report				✓			✓				✓	

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2

MAJOR PROJECTS IN 10-YEAR CAPITAL OUTLOOK

Water	Liquid Waste
Annacis Water Supply Tunnel	Annacis Stage 5 Expansion Projects
Cambie-Richmond Water Supply Tunnel	Annacis Outfall
Coquitlam Lake Water Supply	Iona Island WWTP Upgrade Projects
Coquitlam Water Main	North Shore WWTP Program
Second Narrows Water Supply Tunnel	Northwest Langley WWTP Program
Stanley Park Water Supply Tunnel	

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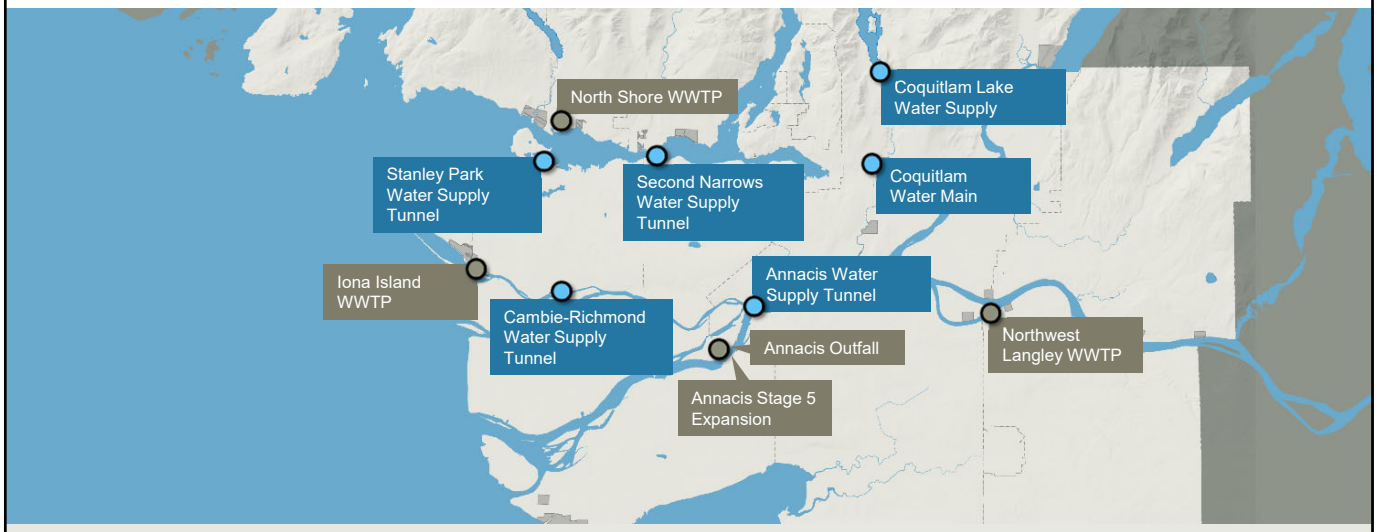
3

MAJOR PROJECTS

Positioned to deliver $14.3B liquid waste and water projects over the next 10 years



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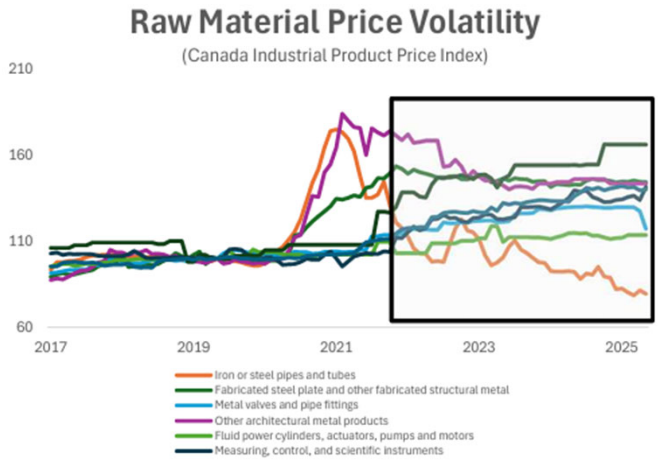
4

INFRASTRUCTURE MARKET UPDATE

Market Trends Impacting Major Projects

- Active infrastructure market requires competitive packaging, risk allocation, and delivery model decisions
- Escalation, tariffs, and PST on portion of engineering services
- Labour constrained until 2034 for specialized trades - electrical, mechanical, tunnelling, and process equipment



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6

WATER MAJOR PROJECTS

Project	Progress	Schedule	Budget
Second Narrows Water Supply Tunnel	🟢	🟢	🟢
Annacis Water Supply Tunnel	🟢	🟢	🟢
Stanley Park Water Supply Tunnel	🟢	🟡	🟢
Lulu Delta Water Supply Tunnel *	🟢	🟢	🟢
Pitt River (Haney) Water Supply Tunnel *	🟢	🟢	🟢
Cambie-Richmond Water Supply Tunnel	🟢	🟢	🟢
Coquitlam Lake Water Supply	🟢	🟢	🟢
Coquitlam Water Main (Coquitlam Main No. 4)	🟢	🟡	🟢

* Projects to be deferred after Project Definition phase complete. Design to commence in 2040

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7

STANLEY PARK WATER SUPPLY TUNNEL

Maintenance

PROGRESS UPDATE

- Replacing a 1930s water main at end of service life
- Construction began late 2024
- Central shaft construction underway, bypass piping at Burrard and Chilco shaft sites in progress

Last Stage Gate: Construction Approval (2023)
Next Stage Gate: Close-out (2030)

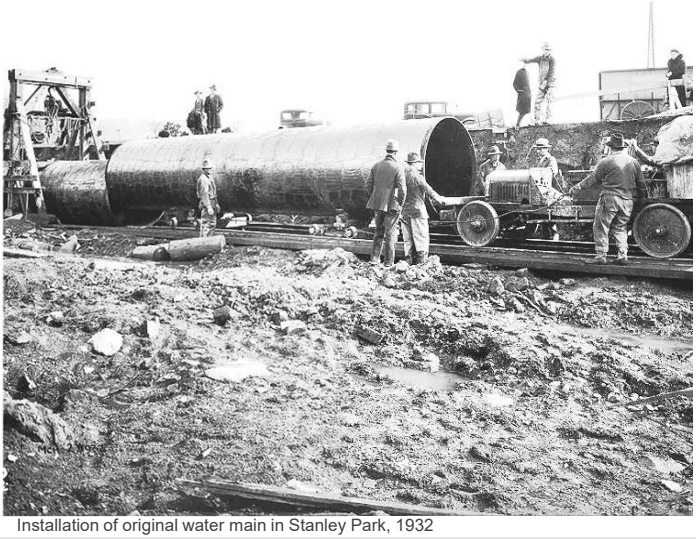
8

8

STANLEY PARK WATER SUPPLY TUNNEL

Replacing Aging Infrastructure

Leak repair, 2016



Installation of original water main in Stanley Park, 1932

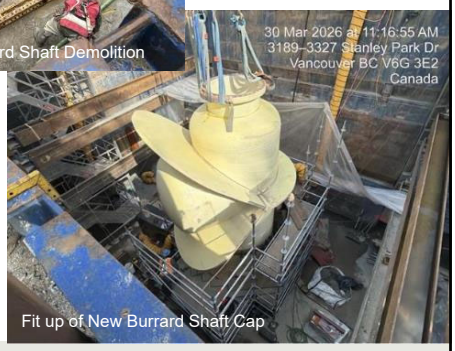
9

STANLEY PARK WATER SUPPLY TUNNEL

Project Update

- Capilano Mains isolated in October 2025
- Demolition and removal of existing infrastructure complete
- Installation of bypass piping ongoing
- New South Shaft cap placed on existing shaft
- Delay in completing temporary bypass due to highly complex work and unforeseen conditions
- Work also ongoing at central shaft

Existing Burrard Shaft Demolition



Fit up of New Burrard Shaft Cap

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10

STANLEY PARK WATER SUPPLY TUNNEL

Road Header and Tunnel

Road Header for Tunnel Excavation

Tunnel Cross Section

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11

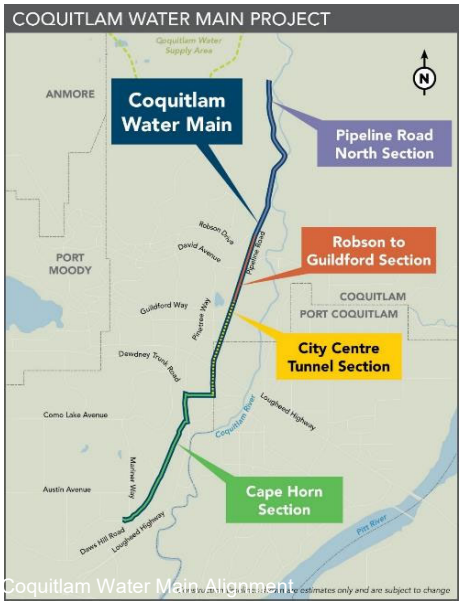
COQUITLAM WATER MAIN PROJECT

Accommodate Growth

PROGRESS UPDATE

- Pipeline Road North – early works – third party utility relocations procurement underway
- Robson to Guildford Section – construction ongoing, 90% installed, resolving construction issues, completion late 2026/early 2027
- City Centre Tunnel Section – detailed design wrapping up
- Cape Horn Section – pre-build procurement underway

Last Stage Gate: Detailed Design (N/A)
Next Stage Gate: Construction Approval (2027)



Coquitlam Water Main Alignment

12

12

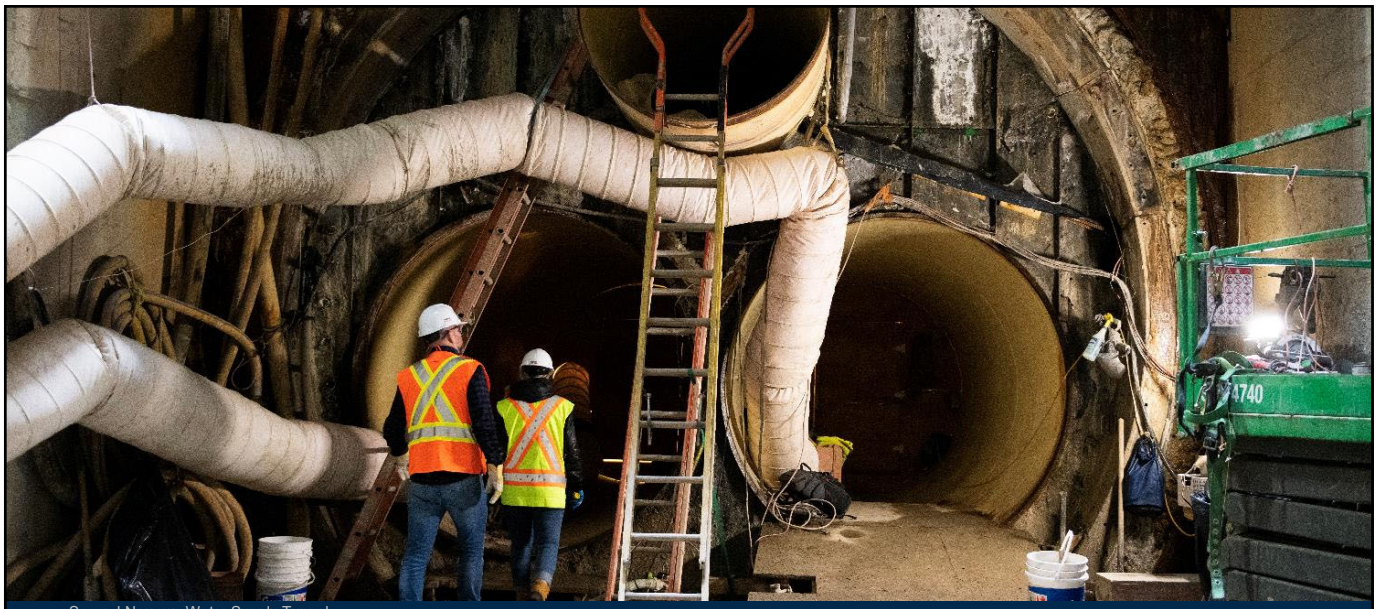
COQUITLAM WATER MAIN PROJECT

Robson to Guildford Section – 3.2 m diameter steel pipe installation

Robson to Guildford Section – 3.2 m diameter steel pipe weld inspection

13

13



Second Narrows Water Supply Tunnel

Questions?

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14

14

15

TUNNELS - CONSTRUCTION

Growth, Resilience, Maintenance

Second Narrows Water Supply Tunnel

- Resiliency project to replace existing shallow buried water mains with a new deep tunnel
- Substantially completed September 2025
- Final tie-ins in progress, fully completed by 2028

Last Stage Gate: N/A
Next Stage Gate: Close-out (2029)

Annacis Water Supply Tunnel

- Growth project
- Tunneling phase completed October 2025
- Steel pipe and valve chambers in progress
- Final completion 2028, in-service 2029

Last Stage Gate: N/A
Next Stage Gate: Close-out (2030)

Stanley Park Water Supply Tunnel

- Replacing a 1930s water main at end of service life
- Construction began late 2024
- Central shaft construction underway, bypass piping at Burrard and Chilco shaft sites in progress.

Last Stage Gate: Construction Approval (2023)
Next Stage Gate: Close-out (2030)

16

16

SECOND NARROWS WATER SUPPLY TUNNEL

Overview Plan

- 1.1 km long tunnel, with two shafts
- Tunnel 30 meters below bottom of Burrard Inlet
- Achieves current seismic standards
- First (of three) water mains tied in October 2025
- Remaining two tie-ins to be completed over next two years
- Total system in service in 2028

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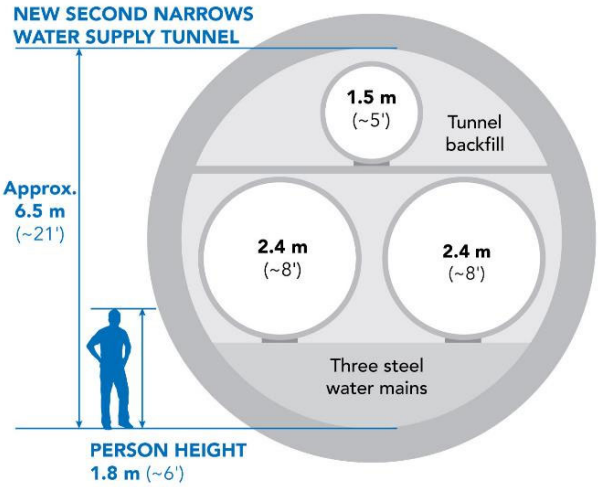
17

SECOND NARROWS WATER SUPPLY TUNNEL

Three Water Mains Inside Tunnel



Three water mains inside tunnel

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18

SECOND NARROWS WATER SUPPLY TUNNEL

Valve Chambers

- First water main tie-in completed
- Both valve chambers completed
- Pre-build work for final two tie-ins to commence this summer

South Valve Chamber

North Valve Chamber

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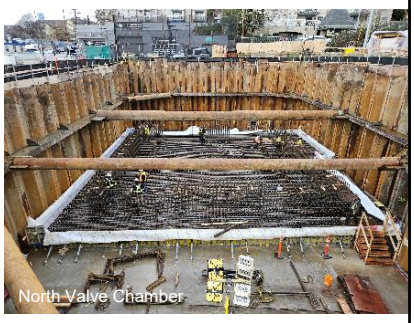
19

ANNACIS WATER SUPPLY TUNNEL

Tunnel Boring Machine

Tunnel Pipe Installation


North Valve Chamber

Archaeological Investigations at South Site

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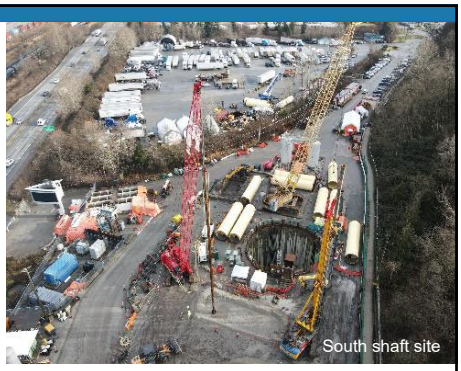
20

ANNACIS WATER SUPPLY TUNNEL

Project Update

- Tunnel construction completed last summer
- Watermain installation in tunnel completed earlier this year
- Work in progress:
  - South valve chamber excavation
  - North valve chamber construction
  - Tunnel pipe grout backfill
- Complete construction 2028
- Site restoration 2028-2029



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21

TUNNELS – PLANNING & DESIGN

Growth, Resilience, Maintenance

Lulu Delta Water Supply Tunnel

- Maintenance driver
- Project definition commenced early 2025
- Coordination on-going with City of Delta and Richmond, Tsawwassen First Nation
- Timing of future design and construction phases deferred

Last Stage Gate: Project Definition (2024)
Next Stage Gate: Preliminary Design (TBD)

Pitt River Water Supply Tunnel

- Resiliency driver
- Coordination on-going with City of Port Coquitlam.
- Property acquisition in progress
- Timing of future design and construction phases deferred

Last Stage Gate: N/A
Next Stage Gate: Preliminary Design (TBD)

Cambie-Richmond Water Supply Tunnel

- Preliminary design commenced fall 2024
- Site investigation in progress
- Coordination on-going with City of Vancouver and City of Richmond and First Nations underway

Last Stage Gate: Preliminary Design (2024)
Next Stage Gate: Detailed Design (2026)

22

22

CAMBIE RICHMOND WATER SUPPLY TUNNEL

Overview Plan

- Site plan showing shaft sites and tunnel alignment
- Resilience project to provide drinking water following major earthquake
- Preliminary design commenced last year
- Detailed design to commence in 2027
- Construction to commence in approx. 2031

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23

CAMBIE RICHMOND WATER SUPPLY TUNNEL

Site Investigations in Progress

- Site investigations underway
- Geotechnical, environmental and archaeological investigations
- Results will inform preliminary design inputs and engineering analyses
- Preliminary design will confirm depth of vertical shafts and tunnel to withstand earthquake loading conditions
- Next detailed design phase will include specifications, drawings

Borehole drilling investigations in Fraser River

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24

PITT RIVER AND LULU DELTA WATER SUPPLY TUNNELS

Overview and Status Update

Pitt River Water Supply Tunnel:

- Resilience project to provide drinking water following major earthquake
- Replace existing Haney Mains 2 and 3 across the Pitt River
- Project Definition phase completed 2025. Property acquisition on-going
- Upon completion of property acquisition, project will be deferred with design commencing in approx. 2040

Lulu Delta Water Supply Tunnel:

- Maintenance project to replace existing marine crossing
- Project Definition phase is progress, to be completed late 2026 or early 2027
- Property acquisition will follow Project Definition, then project will be deferred with design commencing in approx. 2040

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25

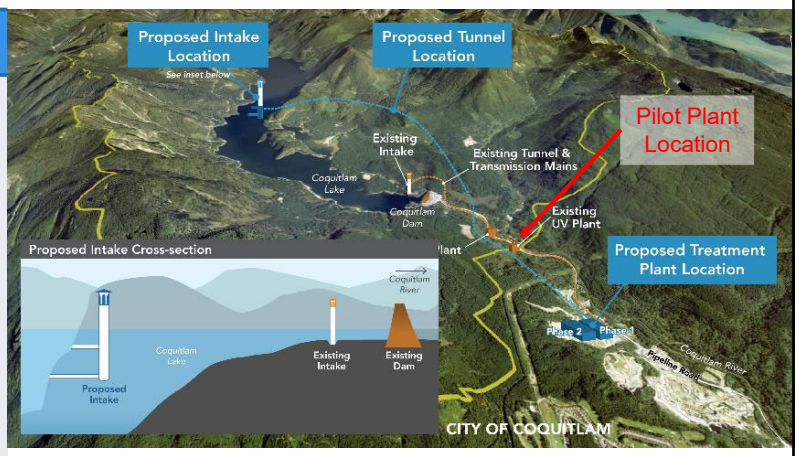
COQUITLAM LAKE WATER SUPPLY PROJECT

Accommodate Growth

PROGRESS UPDATE

- Treatment pilot testing plant construction complete, commissioning May 2026
- Procurement of design consultants for intake and tunnel underway
- Engagement with First Nations ongoing
- Key regulatory/permitting applications submittal Q2 2026

Last Stage Gate: Preliminary Design (2021)
Next Stage Gate: Detailed Design (2029)



Project location and components

26

26

COQUITLAM LAKE WATER SUPPLY PROJECT

Treatment pilot test plant exterior

Treatment pilot test plant equipment