

**GREATER VANCOUVER WATER DISTRICT (GVWD)
BOARD OF DIRECTORS**

REGULAR BOARD MEETING

Friday, May 27, 2022

9:15 A.M.

**Meeting conducted electronically pursuant to the Procedure Bylaw
28th Floor Boardroom, 4515 Central Boulevard, Burnaby, British Columbia
Webstream available at <http://www.metrovancover.org>**

[Membership and Votes](#)

A G E N D A¹

A. ADOPTION OF THE AGENDA

1. May 27, 2022 Regular Meeting Agenda

That the GVWD Board adopt the agenda for its regular meeting scheduled for May 27, 2022 as circulated.

B. ADOPTION OF THE MINUTES

1. April 29, 2022 Regular Meeting Minutes

That the GVWD Board adopt the minutes for its regular meeting held April 29, 2022 as circulated.

pg. 4

C. DELEGATIONS

D. INVITED PRESENTATIONS

E. CONSENT AGENDA

Note: Directors may adopt in one motion all recommendations appearing on the Consent Agenda or, prior to the vote, request an item be removed from the Consent Agenda for debate or discussion, voting in opposition to a recommendation, or declaring a conflict of interest with an item.

¹ Note: Recommendation is shown under each item, where applicable. All Directors vote unless otherwise noted.

1. WATER REPORTS

1.1 Award of Contract Resulting from Request for Proposal No. 22-015: Supply and Delivery of Sodium Hypochlorite *pg. 9*

Note: This report was also presented to the Liquid Waste Committee on Wednesday, May 18, 2022.

That the GVWD Board:

- a) approve award of a contract for an estimated value of \$11,992,000 (exclusive of taxes) to Brenntag Canada Inc., for an initial 3-year term, resulting from Request for Proposal No. 22-015: Supply and Delivery of Sodium Hypochlorite, subject to final review by the Commissioner; and
- b) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.

1.2 Award of Contract Resulting from Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets *pg. 12*

That the GVWD Board:

- a) authorize an increase of the project budget in the amount of \$8,000,000 for the Newton Pump Station No. 2 project, bringing the revised total project budget to \$53,000,000;
- b) approve award of a contract in the amount of up to \$12,362,769 (exclusive of taxes) to Michels Canada Co. resulting from Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets, subject to final review by the Commissioner; and
- c) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.

1.3 State of the Assets Report – Water *pg. 17*

That the GVWD Board receive for information the report dated May 3, 2022, titled “State of the Assets Report - Water”.

F. ITEMS REMOVED FROM THE CONSENT AGENDA

G. REPORTS NOT INCLUDED IN CONSENT AGENDA

H. MOTIONS FOR WHICH NOTICE HAS BEEN GIVEN

I. OTHER BUSINESS

1. GVWD Board Committee Information Items and Delegation Summaries *pg. 68*

J. BUSINESS ARISING FROM DELEGATIONS

K. RESOLUTION TO CLOSE MEETING

Note: The Board must state by resolution the basis under section 90 of the Community Charter on which the meeting is being closed. If a member wishes to add an item, the basis must be included below.

L. RISE AND REPORT (Items Released from Closed Meeting)

M. ADJOURNMENT/CONCLUSION

That the GVWD Board adjourn/conclude its regular meeting of May 27, 2022.

**GREATER VANCOUVER WATER DISTRICT
BOARD OF DIRECTORS**

Minutes of the Regular Meeting of the Greater Vancouver Water District (GVWD) Board of Directors held at 10:53 a.m. on Friday, April 29, 2022 in the 28th Floor Boardroom, 4515 Central Boulevard, Burnaby, British Columbia.

MEMBERS PRESENT:

Burnaby, Chair, Director Sav Dhaliwal
 North Vancouver City, Vice Chair Director
 Linda Buchanan*
 Anmore, Director John McEwen*
 Belcarra, Director Jamie Ross*
 Burnaby, Director Pietro Calendino*
 Burnaby, Director Mike Hurley*
 Coquitlam, Director Craig Hodge*
 Coquitlam, Director Richard Stewart*
 Delta, Director Jeannie Kanakos*
 Delta, Alternate Director Dylan Kruger* for
 George Harvie
 Electoral Area A, Director Jen McCutcheon*
 Langley City, Director Gayle Martin*
 Langley Township, Director Jack Froese*
 Langley Township, Director Kim Richter*
 Maple Ridge, Director Mike Morden*
 New Westminster, Director Jonathan Coté*
 North Vancouver District, Director Lisa Muri*
 Pitt Meadows, Director Bill Dingwall*

Port Coquitlam, Director Brad West*
 Port Moody, Director Rob Vagramov*
 Richmond, Director Malcolm Brodie*
 Richmond, Director Harold Steves*
 Surrey, Director Linda Annis*
 Surrey, Director Doug Elford*
 Surrey, Director Laurie Guerra*
 Surrey, Director Doug McCallum*
 Surrey, Director Allison Patton*
 Tsawwassen, Director Ken Baird*
 Vancouver, Director Christine Boyle*
 Vancouver, Director Adriane Carr
 Vancouver, Director Melissa De Genova*
 Vancouver, Director Lisa Dominato*
 Vancouver, Alternate Director Pete Fry* for
 Kennedy Stewart
 Vancouver, Director Colleen Hardwick*
 Vancouver, Director Michael Wiebe
 West Vancouver, Director Mary-Ann Booth*
 Commissioner Jerry W. Dobrovolsky
 (Non-voting member)

MEMBERS ABSENT:

Surrey, Director Mandeep Nagra

STAFF PRESENT:

Chris Plagnol, Corporate Officer
 Amelia White, Legislative Services Supervisor, Board and Information Services

*denotes electronic meeting participation as authorized by Section 3.6.2 of the *Procedure Bylaw*

A. ADOPTION OF THE AGENDA

1. April 29, 2022 Regular Meeting Agenda

It was MOVED and SECONDED

That the GVWD Board adopt the agenda for its regular meeting scheduled for April 29, 2022 as circulated.

CARRIED

B. ADOPTION OF THE MINUTES

1. March 25, 2022 Regular Meeting Minutes

It was MOVED and SECONDED

That the GVWD Board adopt the minutes for its regular meeting held March 25, 2022 as circulated.

CARRIED

2. April 14, 2022 Regular Joint Meeting Minutes

It was MOVED and SECONDED

That the GVWD Board adopt the minutes for its regular joint meeting of the MVRD, MVHC, GVWD and the GVS&DD Board of Directors held April 14, 2022 as circulated.

CARRIED

C. DELEGATIONS

No items presented.

D. INVITED PRESENTATIONS

No items presented.

E. CONSENT AGENDA

It was MOVED and SECONDED

That the GVWD Board adopt the recommendations presented in the following items as presented in the April 29, 2022 GVWD Board Consent Agenda:

- 1.1 Regional Public Works Mutual Aid Agreement
- 1.2 GVWD 2021 Water Quality Annual Report
- 1.3 Environmental Policy for the Greater Vancouver Water District
- 1.4 Engagement Plan and Proposed Rates for Water DCC Program Implementation
- 1.5 2022 Lawn Watering Communications and We Love Water Campaign Update
- 2.1 Audited 2021 Financial Statements
- 3.1 Asset Management and Long Term Financial Planning

CARRIED

The items and recommendations referred to above are as follows:

1.1 Regional Public Works Mutual Aid Agreement

Report dated March 11, 2022, from Peter Navratil, General Manager, Liquid Waste Services and Brant Arnold-Smith, Program Manager, Security and Emergency Management, seeking the GVWD Board's approval of the Regional Public Works Mutual Aid Agreement.

Recommendation

That the GVWD Board authorize the Board Chair and Chief Administrative Officer to sign the new Regional Public Works Mutual Aid Agreement.

Adopted on Consent

1.2 GVWD 2021 Water Quality Annual Report

Report dated March 8, 2022, from Larry Chow, Program Manager, Interagency Projects and Quality Control, Water Services, providing the GVWD Board with a summary of the GVWD 2021 Water Quality Annual Report.

Recommendation

That the GVWD Board receive for information the report dated March 8, 2022, titled "GVWD 2021 Water Quality Annual Report".

Adopted on Consent

1.3 Environmental Policy for the Greater Vancouver Water District

Report dated March 7, 2022, from Heidi Walsh, Director, Watersheds and Environment, Water Services and Kirstie Rendall, Supervisor, Environment, Water Services, seeking the GVWD Board's approval of the *Environmental Policy for the Greater Vancouver District* and *Environmental Performance Goals*.

Recommendation

That the GVWD Board approve the *Environmental Policy for the Greater Vancouver Water District* and related document, *Environmental Performance Goals*, as presented in the report dated March 7, 2022, titled "Environmental Policy for the Greater Vancouver Water District".

Adopted on Consent

1.4 Engagement Plan and Proposed Rates for Water DCC Program Implementation

Report dated April 8, 2022, from the Water Committee, together with report dated March 3, 2022, from Joe Sass, Deputy Chief Financial Officer/Director, Financial Planning and Operations, requesting the GVWD Board's direction to proceed with engagement on the updated Engagement Plan and Proposed Rates for Water DCC Program Implementation.

Recommendation

That the GVWD Board:

- a) direct staff to proceed with engagement on the proposed implementation of a water DCC program as described in the report dated March 3, 2022, titled “Engagement Plan and Proposed Rates for Water DCC Program Implementation”; and
- b) direct staff to proceed with engagement on the proposed implementation of the water DCC program with rates determined using a 50% assist factor.

Adopted on Consent

1.5 2022 Lawn Watering Communications and We Love Water Campaign Update

Report dated March 22, 2022, from Larina Lopez, Division Manager, Corporate Communications and Amy Weiss, External Relations Project Coordinator, Corporate Communications, External Relations, providing the GVWD Board with an update on communication plans for watering regulations and the annual regional water conservation campaign.

Recommendation

That the GVWD Board receive for information the report dated March 22, 2022, titled “2022 Lawn Watering Communications and We Love Water Campaign Update”.

Adopted on Consent

2.1 Audited 2021 Financial Statements

Report dated April 7, 2022, from Linda Sabatini, Acting Director, Financial Operations, Financial Services, seeking the GVWD Board’s approval of the Audited 2021 Financial Statements for the Greater Vancouver Water District.

Recommendation

That the GVWD Board approve the Audited 2021 Financial Statements for the Greater Vancouver Water District.

Adopted on Consent

3.1. Asset Management and Long Term Financial Planning

Report dated April 19, 2022, from Cheryl Nelms, General Manager, Project Delivery, and Dean Rear, Chief Financial Officer, Financial Services, providing the GVWD Board with an overview of the current asset management and financial planning practices.

Recommendation

That the GVWD Board direct staff to provide context for decision making by completing long-range plans for major capital projects including an asset inventory, asset condition assessment, and a proposed timeline of maintenance, repair, replacement, and funding requirements for these major projects and report back to the Board with this plan.

Adopted on Consent

F. ITEMS REMOVED FROM THE CONSENT AGENDA

No items presented.

G. REPORTS NOT INCLUDED IN CONSENT AGENDA

No items presented.

H. MOTIONS FOR WHICH NOTICE HAS BEEN GIVEN

No items presented.

I. OTHER BUSINESS

1. GVWD Board Committee Information Items and Delegation Summaries

It was MOVED and SECONDED

That the GVWD Board receive for information the GVWD Board Committee Information Items and Delegation Summaries, dated April 29, 2022.

CARRIED

J. BUSINESS ARISING FROM DELEGATIONS

No items presented.

K. RESOLUTION TO CLOSE MEETING

No items presented.

L. RISE AND REPORT (Items Released from Closed Meeting)

No items presented.

M. ADJOURNMENT/CONCLUSION

It was MOVED and SECONDED

That the GVWD Board conclude its regular meeting of April 29, 2022.

CARRIED

(Time: 10:54 a.m.)

CERTIFIED CORRECT

Chris Plagnol, Corporate Officer

Sav Dhaliwal, Chair

52363502 FINAL

To: Water Committee and Liquid Waste Committee

From: Roy Moulder, Director, Procurement, Procurement and Real Estate Services
Bryan Shoji, Director, Wastewater Treatment & Residuals Management, Liquid Waste Services
Andrew de Boer, Acting Director, Operations & Maintenance, Water Services

Date: April 28, 2022 Meeting Dates: May 11, 2022
May 18, 2022

Subject: **Award of Contract Resulting from Request for Proposal No. 22-015: Supply and Delivery of Sodium Hypochlorite**

RECOMMENDATION

That the GVWD and GVS&DD Boards:

- a) approve award of a contract for an estimated value of \$11,992,000 (exclusive of taxes) to Brenntag Canada Inc., for an initial 3-year term, resulting from Request for Proposal No. 22-015: Supply and Delivery of Sodium Hypochlorite, subject to final review by the Commissioner; and
- b) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.

EXECUTIVE SUMMARY

Sodium hypochlorite is used by Water Services for drinking water disinfection at the Seymour Capilano Filtration Plant, Coquitlam Water Treatment Plant, and the secondary disinfection facilities. Liquid Waste Services uses sodium hypochlorite for effluent disinfection at the Annacis Island, Lions Gate, and Lulu Island Wastewater Treatment Plants.

Two proposals were received in response to Request for Proposal (RFP) No. 22-015: Supply and Delivery of Sodium Hypochlorite. Brenntag Canada Inc. (Brenntag) was identified as offering the best proposal based on technical evaluation and offered the lowest unit rates where comparison was possible. Based on the evaluation of the proposals, it is recommended that a contract be awarded to Brenntag. The term of the Agreement is 3 years with an option to extend for one additional 2-year term as mutually agreed by the parties. The 3-year term has an estimated value of \$11,992,000 excluding taxes. The 5-year term, if extended, will have a maximum value of \$23,076,000 excluding taxes. The Agreement will commence on July 1, 2022.

PURPOSE

This report is to advise the GVWD and GVS&DD Boards of the results of RFP No. 22-015: Supply and Delivery of Sodium Hypochlorite and to recommend award of a 3-year contract for an estimated value of \$11,992,000 (exclusive of taxes) to Brenntag Canada Inc.

BACKGROUND

Pursuant to the *GVWD and GVS&DD Officers and Delegation Bylaws No. 247, and 284, 2014 (Bylaws)* and the *Procurement and Real Property Contracting Authority Policy (Policy)*, procurement contracts

which exceed a value of \$5 million require the approval of the GVWD and the GVS&DD Board of Directors.

This report is being brought forward to the Water Committee and the Liquid Waste Committee to consider a recommendation to the GVWD and GVS&DD Boards to authorize award of a contract for Supply and Delivery of Sodium Hypochlorite.

SUPPLY REQUIREMENTS

Sodium Hypochlorite is a key component in the treatment of drinking water and is utilized by Water Services (WS) at the Seymour Capilano Filtration Plant (SCFP), Coquitlam Water Treatment Plant (CWTP) and the secondary disinfection facilities of the Greater Vancouver Water District. Liquid Waste Services (LWS) uses sodium hypochlorite for effluent disinfection at the Annacis Island, Lions Gate, and Lulu Island Wastewater Treatment Plants (AIWWTP, LGWWTP, and LIWWTP) of the Greater Vancouver Sewerage and Drainage District. AIWWTP also uses sodium hypochlorite in conjunction with caustic soda to control odours. The continuous uninterrupted supply of sodium hypochlorite is critical for treatment of both drinking water and wastewater.

EVALUATION

RFP No. 22-015 was issued and closed on February 14, 2022. The RFP contemplated an initial term of three years with an option to extend for an additional two years upon mutual agreement between parties. Two proposals were received and determined to be compliant. The RFP allowed for issuing a single contract for the supply for WS and LWS facilities, or issuing multiple contracts, based on what would be most advantageous to the Corporation. Proposals were evaluated based on 40% technical and 60% financial. Due to the criticality of this chemical supply the evaluation considered risk mitigation and the ability of the proponents to maintain supply to the Corporation's facilities. Both proponents identified local manufacturing facilities to alleviate possible supply chain issues. The technical component of the proposals was evaluated by staff from both WS and LWS, while the financial component was evaluated by a representative from Procurement and Real Estate Services. Based on the technical and financial criteria Brenntag Canada Inc. was ranked highest.

Table 1: Proposal Pricing Summary

Proponent		Projected Costs over 3-Year Term (exclusive of taxes)		
		Bulk	Non-Bulk	Total
Brenntag Canada Inc.	Water Services	\$6,349,000	\$1,114,000	\$7,463,000
	Liquid Waste Services	\$4,370,000	\$159,000	\$4,529,000
	TOTAL:			\$11,992,000
ClearTech Industries Inc.	Water Services	N/A	\$1,538,000	N/A
	Liquid Waste Services	N/A	\$220,000	N/A

A summary of the 3-year term proposal pricing is shown in Table 1. Bulk sodium hypochlorite is delivered using tanker trucks to WS and LWS facilities, in quantities of 20,000 L or greater. Non-bulk sodium hypochlorite is delivered in smaller loads of 2,000 – 8,000 litres to the secondary disinfection facilities or as top-up loads to the main facilities. If extended for a 5-year term, the contract will have

a maximum value of \$23,076,000 excluding taxes. This maximum value includes the expected increased chemical purchases and anticipated price escalations over the 5-year term.

It is recommended to award one contract as Brenntag provided the lowest pricing on the non-bulk and was the only proponent that offered bulk pricing.

ALTERNATIVES

1. That the GVWD and GVS&DD Boards:
 - a) approve award of a contract for an estimated value of \$11,992,000 (exclusive of taxes) to Brenntag Canada Inc., for an initial 3-year term, resulting from Request for Proposal No. 22-015: Supply and Delivery of Sodium Hypochlorite, subject to final review by the Commissioner; and
 - b) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.
2. That the GVWD and GVS&DD Boards terminate Request for Proposal No. 22-015: Supply and Delivery of Sodium Hypochlorite, and direct staff to report back to the GVWD and GVS&DD Boards with options for an alternate course of action.

FINANCIAL IMPLICATIONS

If the GVWD and GVS&DD Boards approve Alternative 1, a contract will be awarded to Brenntag Canada Inc. in the amount of \$11,992,000 (exclusive of taxes) to supply the chemicals as and when needed. This amount is within the operating budgets of the facilities. The proposal from Brenntag Canada Inc. was identified as offering best overall value, including the most cost effective pricing. Rates for the optional 2-year extension would be negotiated at time of renewal.

The GVWD and GVS&DD Boards have the choice not to proceed with Alternative 1, but staff will need further direction in relation to the project. Alternative 2 could disrupt the continuation of sodium hypochlorite supply to the water and wastewater treatment plants.

CONCLUSION

Request for Proposal No. 22-015 was issued for the supply and delivery of both bulk and non-bulk volumes of sodium hypochlorite and Brenntag was identified as the highest ranked proponent with the lowest pricing. Based on the evaluation of the proposals, it is recommended that the GVWD and GVS&DD Boards authorize the Commissioner and corporate Officer to award and execute a 3-year contract with Brenntag Canada Inc., for the unit rates provided in their proposal in an estimated contract value of \$11,992,000 (excluding taxes).

50176827

To: Water Committee

From: Roy Moulder, Director, Procurement, Procurement and Real Estate Services
Joel Melanson, Division Manager, Engineering and Construction, Water Services

Date: April 28, 2022 Meeting Date: May 11, 2022

Subject: **Award of Contract Resulting from Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets**

RECOMMENDATION

That the GVWD Board:

- a) authorize an increase of the project budget in the amount of \$8,000,000 for the Newton Pump Station No. 2 project, bringing the revised total project budget to \$53,000,000;
 - b) approve award of a contract in the amount of up to \$12,362,769 (exclusive of taxes) to Michels Canada Co. resulting from Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets, subject to final review by the Commissioner; and
 - c) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.
-

EXECUTIVE SUMMARY

To meet future water supply demands, Metro Vancouver is replacing the existing Newton Pump Station in the City of Surrey with the Newton Pump Station No. 2 (NEPS2). The project is being delivered in two phases: construction of new outlets on the existing Newton Reservoir, followed by the construction of the new pump station.

As a result of Request for Qualifications (RFQ) No. 21-109, four (4) experienced trenchless construction firms were shortlisted and invited to respond to Request for Proposals (RFP) No. 21-468 for the construction of 150 meter-long microtunnelling section of the project. Michels Canada Co. (Michels) was identified as offering the strongest technical proposal meeting the project requirements with the second lowest price. Based on the evaluation of proposals, it is recommended to award RFP No. 21-468 to Michels in the amount of up to \$12,362,769 (exclusive of taxes).

An increase in project budget is required to complete this work; however, with permanent savings realized from other projects, there will be no increase to the overall approved GVWD Capital budget.

PURPOSE

This report is to advise the GVWD Board of the results of RFP No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets, to request an increase in capital funding allocated for project completion, and to recommend award of the contract in the amount of up to \$12,362,769 (exclusive of taxes) to Michels Canada Co. to enable the NESP2 project to proceed.

BACKGROUND

Pursuant to the *GVWD Officers and Delegation Bylaw No. 247, 2014 (Bylaw)* and the *Procurement and Real Property Contracting Authority Policy (Policy)*, procurement contracts which exceed a value of \$5 million require the approval of the GVWD Board of Directors.

This report is being brought forward to the Water Committee to request an increase in capital funding for project completion and consider a recommendation to the GVWD Board to authorize award of a contract for Construction Services for Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets.

PROJECT DESCRIPTION

As shown in the attachment to this report, Metro Vancouver is planning to construct the NEPS2 adjacent to the existing Newton Pump Station, in the City of Surrey.

Construction of the NEPS2 will be phased over three years in two separate sections:

1. Microtunnelling Phase – This includes construction of approximately 150 meters of 2100 mm diameter tunnel under the existing Newton Reservoir and the installation of two new 900 mm diameter steel outlet pipes which will connect the two existing reservoir cells to the new pump station.
2. Pump Station Construction Phase – This includes a three-story pump station which will house four pump bays, each with 300 horsepower, and relevant mechanical and electrical equipment. Construction of the pump station phase is expected to commence in the summer of 2023.

This RFP requested proposals for the completion of the Microtunnelling Phase.

As a result of Request for Qualifications No. 21-109, four (4) experienced trenchless construction firms were shortlisted and invited to respond to RFP No. 21-468. The RFP closed on February 25, 2022 and the three (3) submissions received are summarized in Table 1.

Table 1: Proposal Submissions

Proponent	Proposed Fee (exclusive of taxes)
Pomerleau, Inc.	\$9,588,158.22
Michels Canada Co.	\$12,362,769.00
Ward & Burke Microtunnelling Ltd.	\$16,493,421.00

Proposals were evaluated based on 50% technical and 50% financial. The technical component of the proposals was evaluated by staff within the Water Services Department and the financial component was evaluated by staff within the Procurement Division.

The submission from Michels was identified as the highest ranked, offering the technically strongest and second lowest cost proposal. Michels demonstrated excellent knowledge of the project through their proposal and provided the most suitable construction methodology. Michels has a solid record of successfully delivering projects for Metro Vancouver, as demonstrated with the construction of the NSWTP Conveyance Project, as well as the microtunnel portion of the Port Mann Main No. 2

(North). Michels' references have all given the company excellent feedback and provided confidence in their ability to meet commitments with a high degree of quality in their work and professionalism.

The proposal submitted by Pomerleau was based on an alternate tunnelling methodology consisting of two smaller tunnels instead of one larger tunnel as requested in the RFP. This alternate method was previously evaluated and dismissed due to the higher risk to the integrity of the existing reservoirs which need to be continuously in service during construction. For this reason, Pomerleau's proposal did not meet the technical requirements of the project and was not selected even though it was the lowest cost.

The proposal pricing from Michels Canada Co. is above the Engineer's estimate and approximately double the allocated budget for this portion of the project work. The higher than anticipated costs are largely due to significant price escalations in material, supply chain issues, shortage in labour due to a busy construction market, as well as the high-risk nature of the work.

Based on the RFP results, the projected cost for NEPS2, including equipment purchase, construction and contingency, is now \$53,000,000 and a budget increase of \$8,000,000 is required to complete the work. This increase to the budget of \$8,000,000 can be funded by permanent savings realized from the construction of the Port Mann Main No. 2 (South) and Douglas Road Main No. 2 Projects.

ALTERNATIVES

1. That the GVWD Board:
 - a) authorize an increase of the project budget in the amount of \$8,000,000 for the Newton Pump Station 2 project, bringing the revised total project budget to \$53,000,000;
 - b) approve award of a contract in the amount of up to \$12,362,769 (exclusive of taxes) to Michels Canada Co. resulting from Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets, subject to final review by the Commissioner; and
 - c) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.
2. That the GVWD Board terminate Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets, and direct staff to report back to the GVWD Board with options for an alternate course of action.

FINANCIAL IMPLICATIONS

If the GVWD Board approves Alternative 1, the approved project construction budget for Newton Pump Station No. 2 project would increase from \$45,000,000 to \$53,000,000 to cover the projected costs. A contract will be awarded to Michels Canada Co. in the amount of \$12,362,769 (exclusive of taxes) to complete the construction work. This amount is above the budget allocated for this portion of the project due to current market conditions (including significant price escalations in material, supply chain issues and shortage in labour due to a busy construction market) and due also to the high risk associated with the nature of this project. The proposal from Michels Canada Co. was highest ranked and offered the strongest technical and second lowest cost proposal.

The increase to the project budget of \$8,000,000 can be funded by permanent savings realized from the construction of the Port Mann Main No. 2 (South) and Douglas Road Main No. 2 Projects. As a result of these savings there will be no increase to the approved GVWD Capital Budget.

The GVWD Board has the choice not to proceed with Alternative 1, but staff will need further direction in relation to the project. Alternative 2 will result in a delay to the project schedule and is anticipated to add additional costs to the overall project.

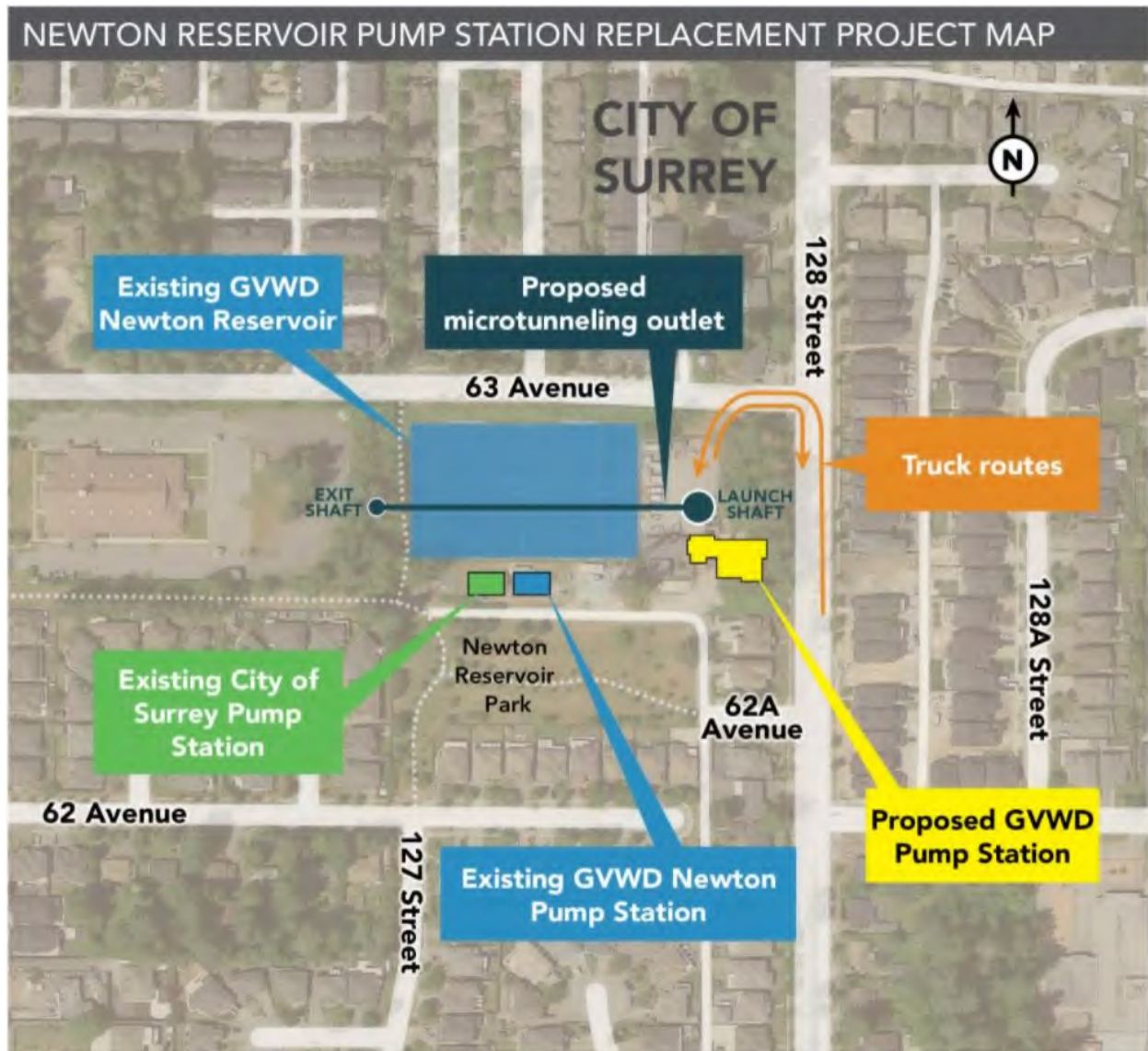
CONCLUSION

Request for Proposal No. 21-468: Newton Pump Station No. 2 – Reservoir Tunnelling and Outlets closed on February 25, 2022, and Michels Canada Co. was identified as offering the technically strongest and second lowest cost proposal. The proposed price exceeded the allocated budget for this task. Based on the evaluation of the three (3) proposals, it is recommended that the Board increase the allocated project budget in the amount of \$8,000,000 and authorize the Commissioner and the Corporate Officer to award and execute the contract to Michels Canada Co. in the amount of \$12,362,769 (exclusive of taxes). This increase to the budget of \$8,000,000 can be funded by the savings realized from the construction of the Port Mann Main No. 2 (South) and Douglas Road Main No. 2 Projects.

Attachment

Newton Reservoir Pump Station Replacement Project Map

49162531



To: Water Committee

From: Daniel Roberge, Deputy GM Operations, Water Services
Jennifer Crosby, Director, Project Management Office, Project Delivery

Date: May 3, 2022 Meeting Date: May 11, 2022

Subject: **State of the Assets Report - Water**

RECOMMENDATION

That the GVWD Board receive for information the report dated May 3, 2022, titled “State of the Assets Report - Water”.

EXECUTIVE SUMMARY

The *State of the Assets Report - Water* (Attachment 1) provides a summary of the asset inventory, condition, replacement value, and forecast long-term investment needs of the nine water asset classes. The overall condition has been assessed as “Good” for water assets. Current analysis indicates that the 2022–2026 Financial Plan contains sufficient funding to adequately maintain these existing assets. Key drivers going forward creating pressure on future budgets are growth, resilience, and regulatory changes which are not considered in this report and will be addressed separately.

Confidence in the accuracy and repeatability of the data used to generate the report ranges from uncertain (asset valuation) to reliable (asset inventory, asset condition). Continuous improvement of asset data, information technologies, and business practices is ongoing to better enable evidence based decision making and sustain targeted service levels.

PURPOSE

To present the *State of the Assets Report - Water* as part of the ongoing implementation and continuous improvement of asset management practices for the utility, consistent with the approved *Asset Management Policy for Water Services* (Attachment 2).

BACKGROUND

At the May 24, 2019 meeting, the GVWD Board approved the *Asset Management for Water Services Policy*. The policy formalized asset management principles related to maintaining existing assets and a framework to balance asset performance, risk, and cost to deliver water services. Metro Vancouver is continuing to develop an asset management program for water assets in alignment with this policy and international best practices. Publishing this *State of the Assets Report - Water* is an important milestone in asset management for Metro Vancouver.

STATE OF THE ASSETS - WATER

Metro Vancouver provides clean, safe drinking water through its member jurisdictions for 2.7 million residents in the Lower Mainland. This includes acquiring and managing supply, as well as treating, testing, and delivering water through a complex system of built assets. These water assets are divided into nine asset classes.

Condition and Replacement Value

The *Asset Management for Water Services Policy* defines asset performance categories and targets as an indicator of an assets' likelihood of failure. One of the performance categories is asset condition. For all assets, a 1 to 5 (very good to very poor) condition scoring system is used. The minimum condition standard for all assets is grade 3 (fair) to grade 4 (poor) or better and grade 2 (good) to grade 3 (fair) or better for critical assets. Where inspection-based condition information is not available, asset age is used to infer condition. Overall condition for water assets is "good".

Asset replacement value is the estimated cost for a like-for-like replacement of an asset, not including land acquisition, ground improvement, or higher levels of treatment. The methodology used to estimate the replacement value is a combination of subject matter experts' input and unit rate estimating based on historical replacement costs. The total asset replacement value of all built assets for the regional water utility is estimated at over \$20 billion. Table 1 summarizes the asset inventory and condition by each asset class:

Table 1: Water Asset Summary

Asset Class	Inventory	Condition
Water Mains	520 km of pipes	Fair
Reservoirs	26 reservoirs	Fair
Dams	5 dams	Good
Water Treatment Plants	2 water treatment plants	Very Good
Pump Stations	19 pump stations	Fair
Water Supply Areas (built asset only)	3 water supply areas	Good
Rechlorination Stations	8 rechlorination stations	Good
Communications Systems	Communications towers, SCADA, RTUs (multiple)	Good
Works Yards	5 works yards	Good

Projected Renewal Expenditure Requirements

Over the next 30 years, the projected renewal expenditure required to maintain water assets averages \$263 million annually. The projected annual renewal expenditure as per the 2022-2026 Financial Plan, averages \$248 million annually.

Projected renewal expenditure requirements in the *State of the Assets Report - Water* are calculated based on current asset condition (evidence-based and/or age-inferred), replacement costs, industry-accepted estimated service life, and straight-line asset deterioration. The projected renewal expenditure requirements are subject to change based on external market factors, the addition or removal of assets, and targeted levels of service.

The renewal budget projections in the *State of the Assets Report - Water* reflect the capital budget included in the 2022-2026 Financial Plan. For subsequent years beyond 2026, an annual 3.38% increase is applied, based on the 20-year average Non-Residential Construction Price Index for the Vancouver area.

CONTINUOUS IMPROVEMENT

Continuous improvement of asset data, information technologies, and business practices is an important and integral process of any asset management program. The report outlines several improvement opportunities to enhance the accuracy and completeness of information presented in the report to better enable data-driven decision making and sustain service level targets. Work on these improvements is already underway and will continue.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Staff will consider the findings from the *State of the Assets Report - Water* when preparing financial projections for consideration in future annual budgeting cycles. Current analysis indicates that the 2022–2026 Financial Plan contains sufficient funding to adequately maintain the existing assets. Capital and operating investments needed for new assets to address growth, resilience, and regulatory changes are not considered in this report and are addressed separately.

CONCLUSION

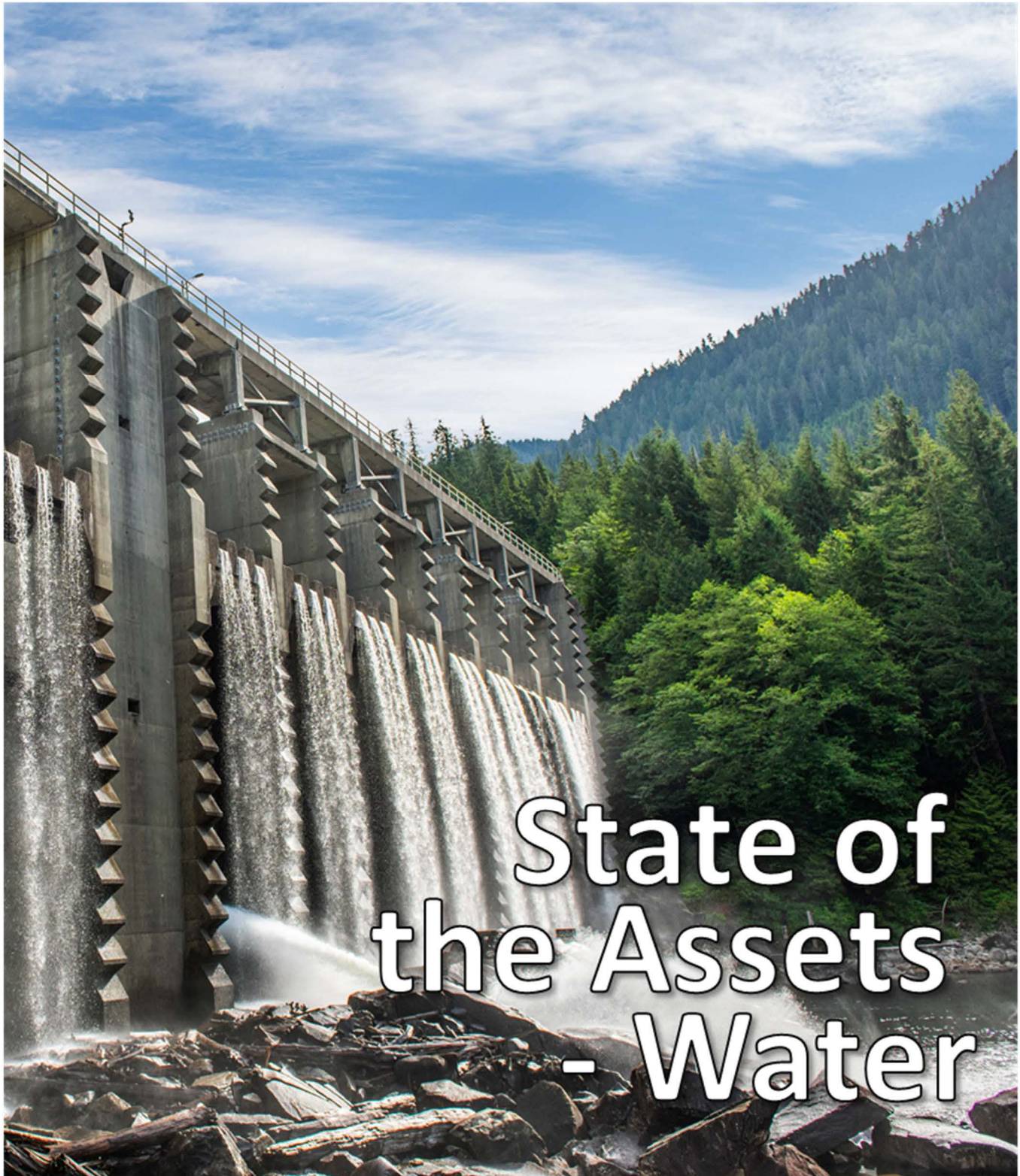
The *State of the Assets Report - Water* summarizes currently available information on asset inventory, condition, and replacement value of the nine built asset classes. The overall condition of water assets has been assessed as “Good” and current analysis indicates that the budget maintain these assets projected in the 2022-2026 Financial Plan is adequate to maintain these existing assets in good condition.

Confidence in the accuracy and repeatability of data used in the report ranges from uncertain (asset valuation) to reliable (asset inventory, asset condition). Continuous improvement of asset data, information technologies, and business practices is ongoing to better enable evidence based decision making and sustain targeted service levels.

Attachments

1. State of the Assets Report - Water, April 2022 (50007319)
2. Asset Management for Water Services Policy, dated May 24, 2019 (26620082)

49427314



Cover page photo is Seymour Falls Dam.



Executive Summary

Metro Vancouver provides clean, safe drinking water through its members for 2.7 million residents in the Lower Mainland. This includes acquiring and maintaining supply, as well as treating, testing, and delivering water through a complex array of natural and built assets. The water assets are divided into nine asset classes.

The *State of the Assets Report - Water* provides a summary of the inventory, valuation, and condition of the built assets. It also provides a forecast of long-term investment needs. Included below is the status of the five key indicators that are covered in the report.



* Class 5 estimate accuracy range

The methodology to determine the status of these five key indicators and recommendations for continuous improvement is also provided in the report, such as improving the accuracy and coverage of data, including asset valuation.

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Introduction

Metro Vancouver is continuing to refine its asset management program for its water infrastructure in alignment with international best practices. The *Asset Management Policy for Water Services* was approved in 2019 to establish principles to balance asset performance, risk, and cost of delivery of water services with the following service level objectives:

- Maintain quality of the drinking water delivered
- Maintain capacity and reliability of the water supply system
- Improve environmental stewardship
- Minimize timeline to recover from a major event (including seismic, power interruption, and climate change)

Based on the requirements in the policy, several activities are underway to mature the asset management practices for the water assets. These activities include:

- Improving the quality of the data and information in the asset registry
- Developing an asset assessment framework and associated asset assessment plans
- Conducting risk assessments
- Improvements to the information systems that manage asset data
- Ongoing development of Asset Management Plans

The outputs from these activities will significantly improve the quality of the asset information and the analytics presented in this report.

Summary of Water Services Assets

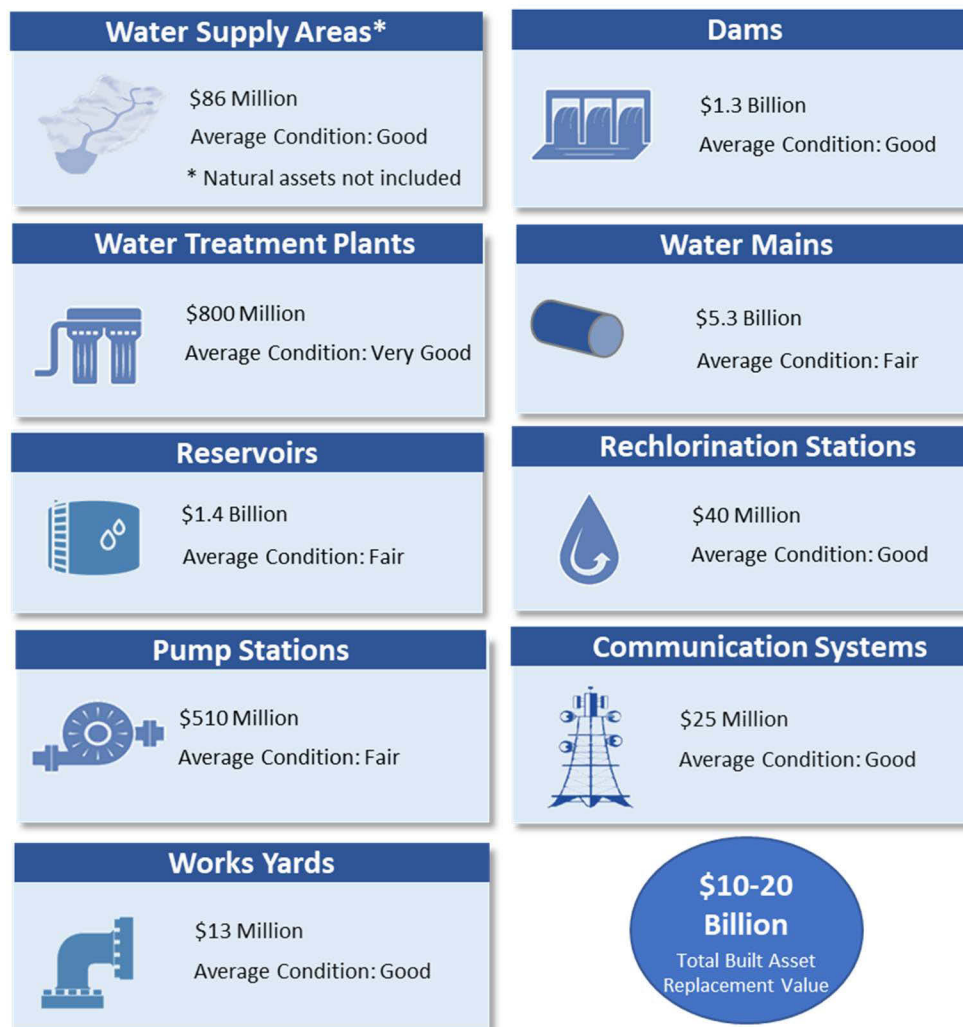
NATURAL ASSETS

Metro Vancouver's natural assets for water services are comprised of the forests, streams, rivers, and lakes that make up the protected water supply lands, and provide ecosystem services essential to the region's water supply. Whether naturally occurring or constructed and enhanced to improve function, these assets must be operated and maintained. If managed appropriately, natural assets do not require replacement. As the tools and methodologies for quantitatively assessing natural assets evolve, Metro Vancouver will determine how best to inventory and assess natural assets in order to ensure they can be managed in accordance with the principles set out in the *Asset Management Policy for Water Services*.

BUILT ASSETS

Built assets such as dams, treatment plants, water mains, pump stations, and reservoirs have been engineered/constructed to store, treat, and deliver drinking water to our customers.

SUMMARY BY ASSET CLASS





Methodology

Asset Inventory

The asset inventory in this first version of the *State of the Assets Report - Water* is exclusively focused on the built assets. The assets within each asset class are generally presented at the facility level. Future editions of the report will include information on the natural assets and provide further details on the built assets within each asset class.

Asset Valuation

Asset replacement value is the estimated cost for a complete like-for-like replacement of an asset, not including land acquisition, ground improvement, or new technologies. The methodology used to estimate the replacement value is a combination of opinions from subject matter experts and unit rate estimating based on historical replacement costs. The estimated replacement value for the complete portfolio of water assets has been shown as a Class 5 estimate accuracy range.

Asset Condition

For all built asset classes, a 5-point condition scoring system is used. Condition is graded along the 5-point scale with a corresponding heat map to aid in visualizing the relative performance of the assets.

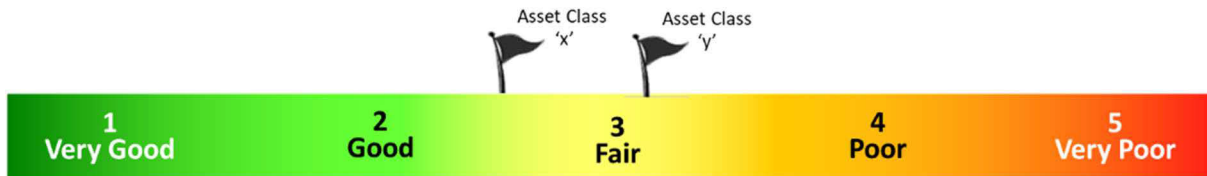


Figure 1 – Sample Asset Class Condition Scale

- 1: Very Good** – New or excellent condition, no apparent defects.
- 2: Good** – In good state of repair, some minor defects (e.g. finishes) that do not detract from functionality.
- 3: Fair** – Some non-critical defects are apparent.
- 4: Poor** – Failure possible, some critical defects are apparent and functionality is affected.
- 5: Very Poor** – Failure imminent (within 12 months).

The condition scale will be used to benchmark the relative condition of each asset class and to assist in monitoring the changing condition of the assets over time. When evidence-based condition information is not readily available (often due to concealed (e.g. buried/inaccessible) location), an age-inferred analysis has been used as a proxy for asset condition. Staff knowledge is considered an example of evidence-based condition. In some cases, the condition of certain asset classes has been determined through a hybrid of evidence-based and age-based condition.

A condition score, weighted by asset valuation, is applied to each asset class so that the relative conditions can be benchmarked across the asset portfolio. To assist in evaluating the distribution across the five condition grades within each asset class, a heat-mapped donut chart is used.

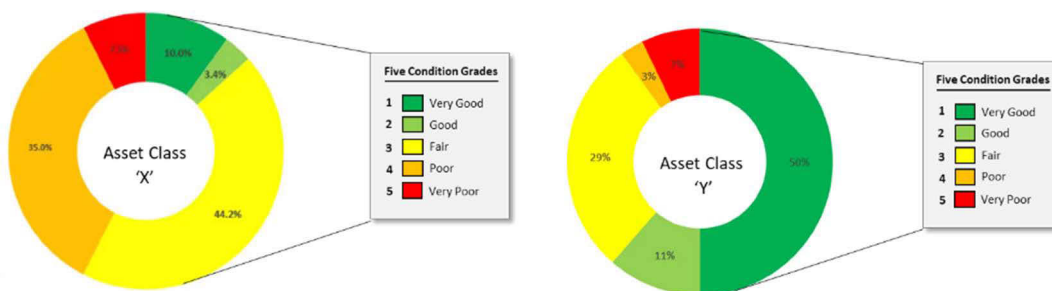


Figure 2 – Sample Asset Condition Distribution Within an Asset Class

Forecasting for Asset Investment Needs

Metro Vancouver maintains built assets with regular maintenance and replacement at end of lifecycle. New assets are added to the system through capital development.

Asset investment needs and projected renewal expenditure requirements are estimated based on the current asset inventory, condition, estimated service life, and the deterioration curve of each asset type. Investment needs are subject to change based on various factors including external market factors, the addition or removal of assets, levels of service expectations, and maintenance standards.

Renewal expenditure budget projections in the State of the Assets Report reflect the forecasted capital budget included in the 2022—2026 Financial Plan. From year six (2027 onwards), an annual 3.38% increase was applied, based on the 20-year average Non-Residential Construction Price Index (NRCPI) for Vancouver from Stats Canada. For each class, a portion of the capital needs are allocated to ongoing asset maintenance.

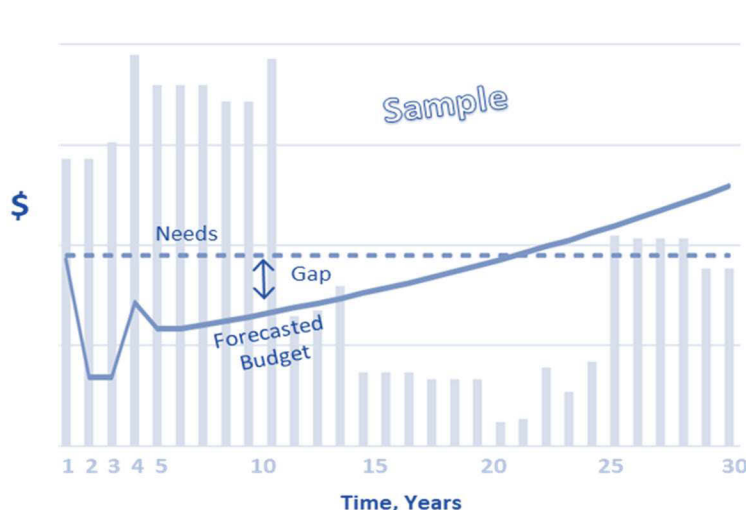


Figure 3 – Sample Investment Needs Forecast

The annual expenditure (needs) is shown as a dashed line and the annual forecasted budget (based on a 3.38% increase from year 2027 onwards) is shown as a solid line. Divergence of the two lines reveals variances between the forecasted budget and projected asset investment requirements to maintain assets at condition levels identified in the *Asset Management Policy for Water Services*.

Asset Data Confidence

Asset data and information was collected from various sources, including the geographical information system, work management system/asset inventory, offline inventory spreadsheets, staff interviews, and discussions with other internal stakeholder groups.

Data confidence ratings are a combination of the accuracy and repeatability of the data. Accuracy represents an estimate of the “correctness” of the raw data considering the margin of error. Repeatability represents the process for collecting and analyzing the data to produce consistent results.

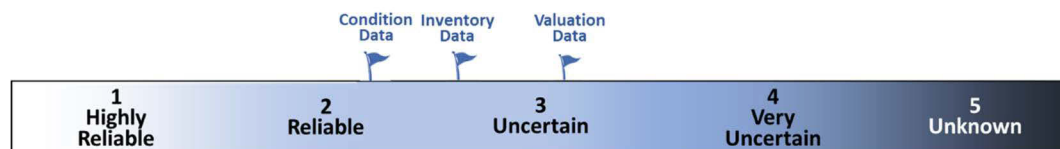


Figure 4 – Data Confidence Scale

- **Inventory Data** — This category is considered to be between “reliable” and “uncertain” as it was retrieved from existing systems that are generally considered current, but there are some identified gaps.

- **Valuation Data** — This category is deemed to be “uncertain” due to the nature of the estimating methodology and does not reflect the unique features of each site and external market factors.
- **Condition Data** — This category is estimated to be “reliable” due to the higher ratio of evidence-based assessments over age-inferred analysis.

Several initiatives are underway to address the data confidence challenges mentioned above. With improved inventory, valuation, and condition data, the estimates of investment needs and infrastructure gaps will become more accurate and repeatable. See the Asset Management Continuous Improvement section for further details.

State of the Assets Overview

Asset Valuation and Condition

The replacement value of the built assets in Metro Vancouver's water infrastructure is estimated to be in the range of \$10-20 Billion. The nine asset classes have an average condition score of 2.37, weighted by asset valuation, indicating that the portfolio is currently in **"Good"** condition overall. As per the *Asset Management Policy for Water Services*, the minimum standard for asset physical condition is Grade 2 to 3 or better for high criticality assets and Grade 3 to 4 or better for all other assets.

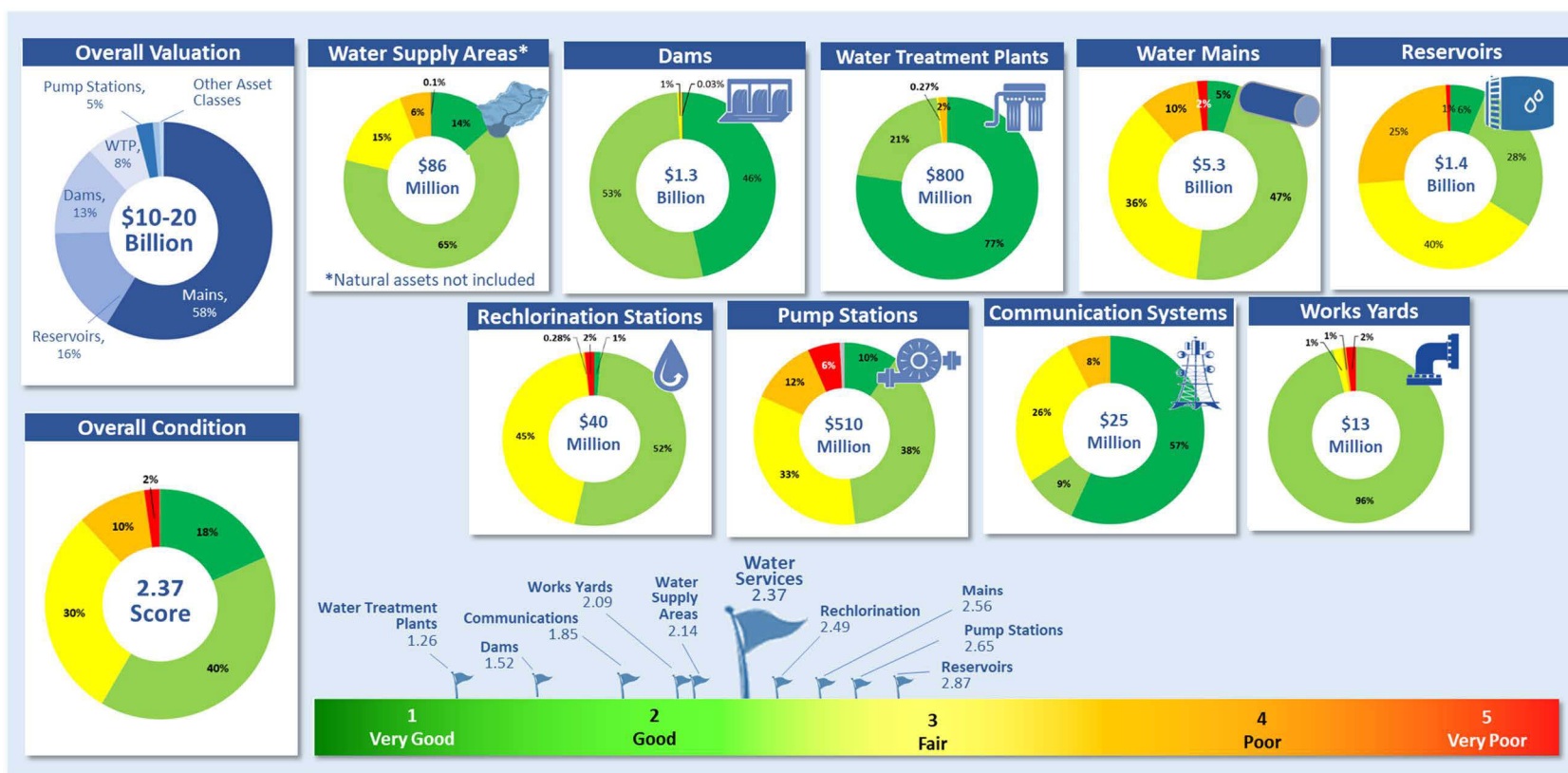


Figure 5 – Utility Valuation & Condition (2021 data)

Asset Investment Needs

The projected average annual renewal expenditure required to maintain the built assets in the water infrastructure at a minimum physical condition score of 3 (Fair) is approximately **\$263 Million**. The annual renewal budget over that timeframe, based on the 2022—2026 Financial Plan, is projected to average **\$248 Million** annually.

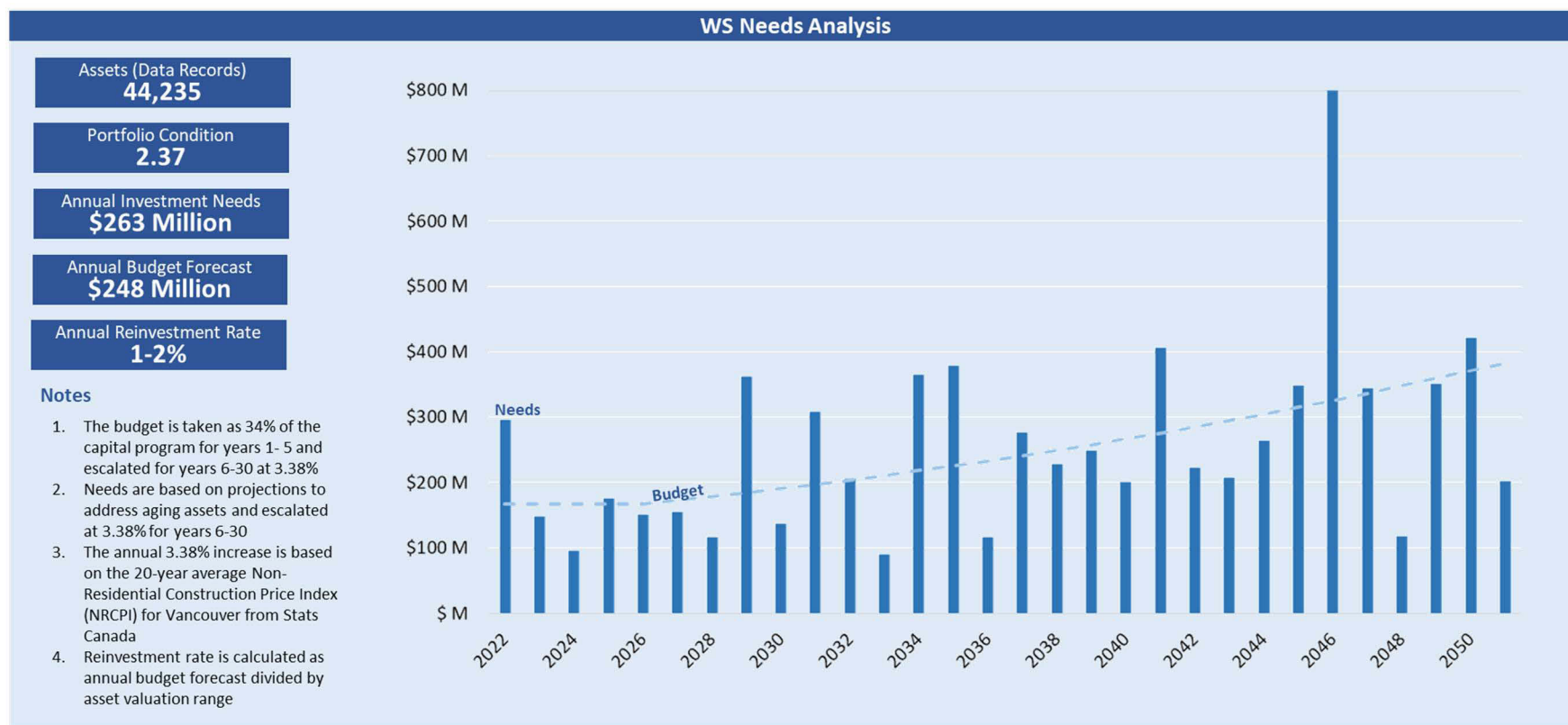


Figure 6 – Utility Investment Needs

Asset Classes

Metro Vancouver manages a system of treatment and transmission facilities to deliver water to member jurisdictions for distribution to residents and businesses.

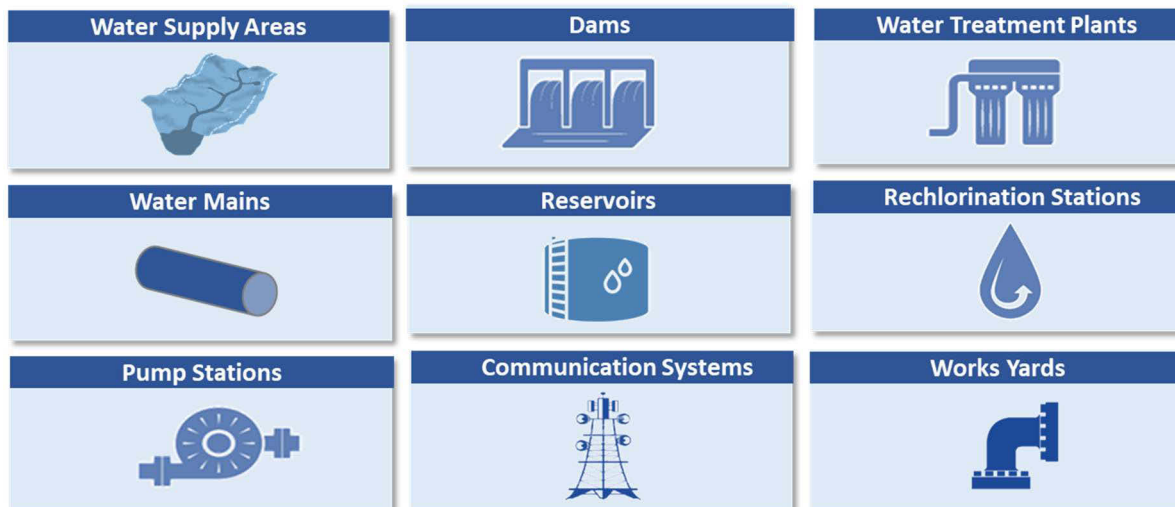
Natural Assets

Metro Vancouver's natural assets for water services are comprised of the forests, streams, rivers, and lakes that make up the protected water supply lands, and provide ecosystem services essential to the region's water supply. Whether naturally occurring or constructed and enhanced to improve function, these assets must be operated and maintained. If managed appropriately, natural assets do not require replacement.

As the tools and methodologies for quantitatively assessing natural assets evolve, Metro Vancouver will determine how best to inventory and assess natural assets in order to ensure they can be managed in accordance with the principles set out in the *Asset Management Policy for Water Services*.

Built Assets

The water services utility comprises nine asset classes: water supply areas, dams, water treatment plants, water mains, pump stations, reservoirs, rechlorination facilities, communication systems, and works yards. The nine asset classes covered in this report are predominantly built assets. In 2020 Metro Vancouver delivered 378,700 million litres (ML) of treated drinking water to the region.



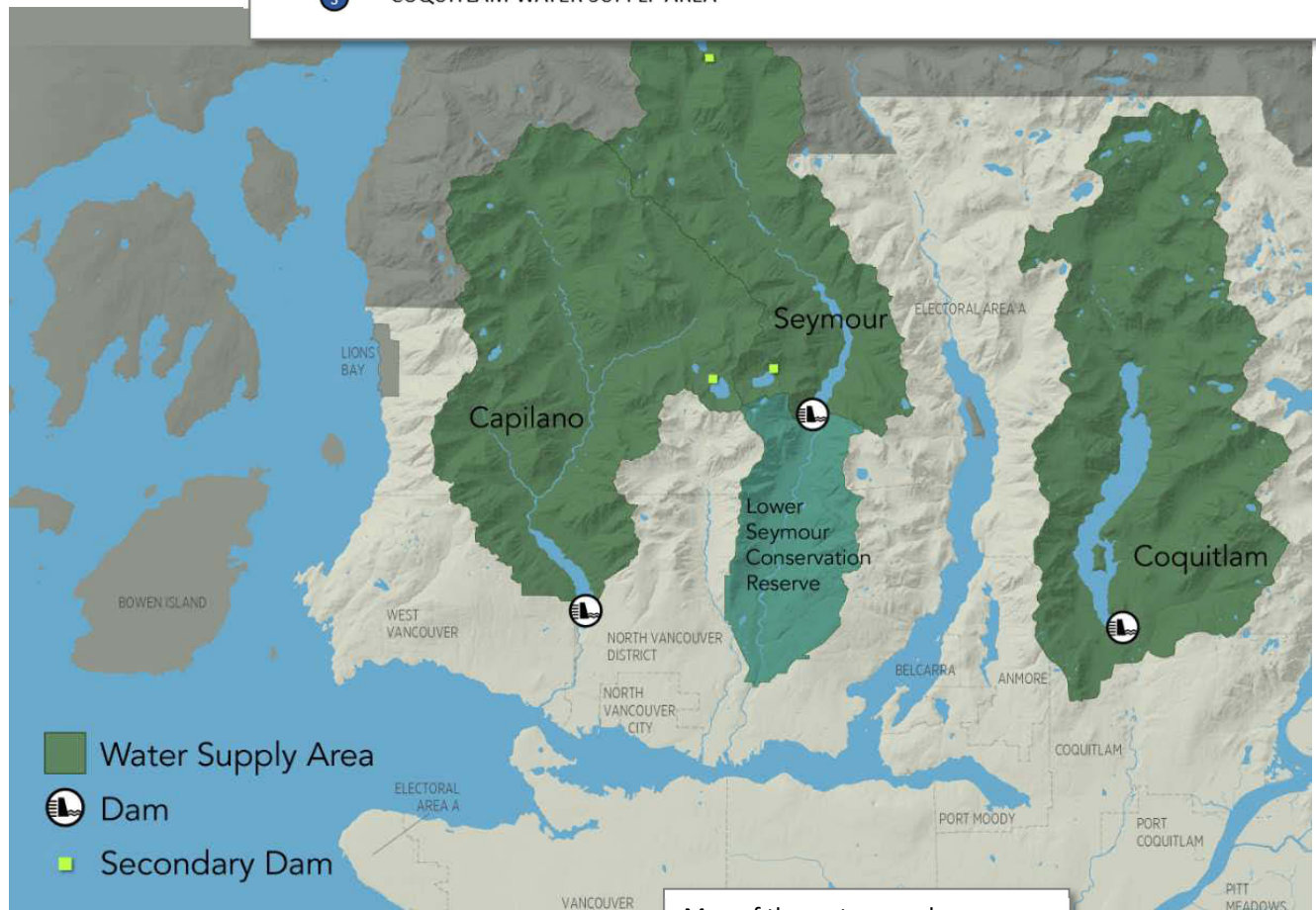


Water Supply Areas

INVENTORY SUMMARY

This asset class includes three water supply areas which store the rain and melting snow that flow downhill to their respective storage reservoirs. The water supply areas contain the following types of built assets: buildings, drainage structures, trails, and reservoir booms. The water supply areas are closed to public access and managed as natural assets of the highest importance to the region.

- ① CAPILANO WATER SUPPLY AREA
- ② SEYMOUR WATER SUPPLY AREA
- ③ COQUITLAM WATER SUPPLY AREA



Map of the water supply areas



METRO VANCOUVER WATER SUPPLY AREAS

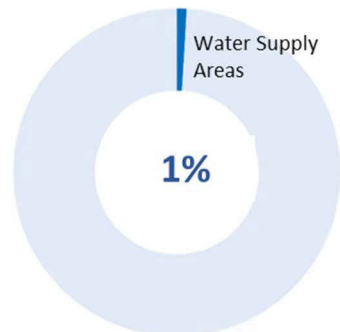
Asset Valuation

REPLACEMENT VALUE
OF BUILT ASSETS

**\$86
Million***

*NATURAL ASSETS NOT INCLUDED

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

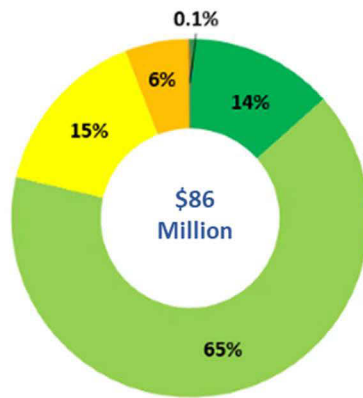
METHOD OF CONDITION ANALYSIS

Based on information from subject matter experts, the built assets in the water supply areas are considered to be in “good” condition overall.

Age-Based

Evidence-Based

DISTRIBUTION BY CONDITION GRADE



Five Condition Grades

- 1 Very Good
- 2 Good
- 3 Fair
- 4 Poor
- 5 Very Poor

BENCHMARKED CONDITION SCORE



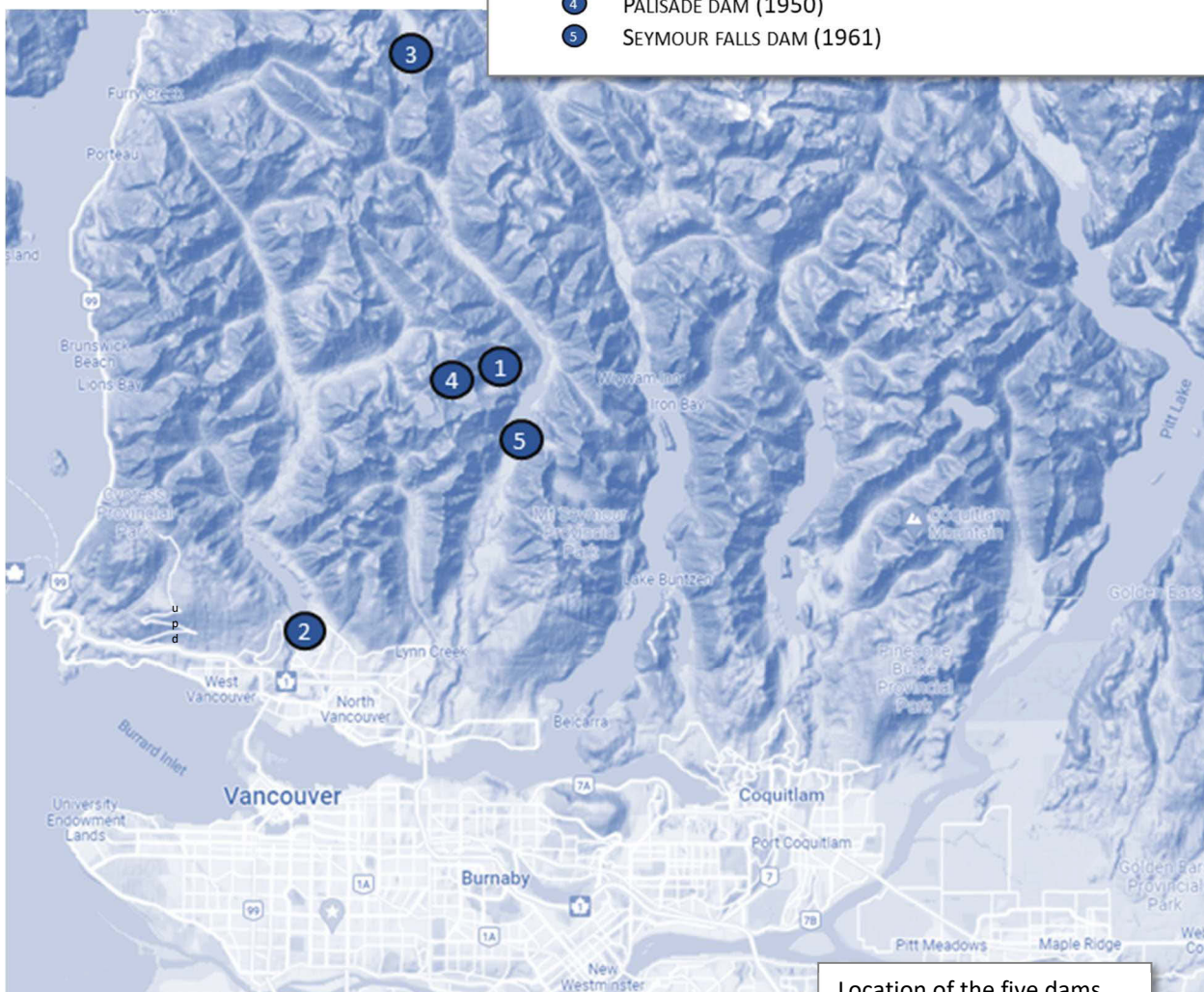


Dams

INVENTORY SUMMARY

THIS ASSET CLASS INCLUDES FIVE (5) DAMS, AS FOLLOWS:

- ① BURWELL DAM (1950)
- ② CLEVELAND DAM (1955)
- ③ LOCH LOMOND DAM (1973)
- ④ PALISADE DAM (1950)
- ⑤ SEYMOUR FALLS DAM (1961)



Location of the five dams



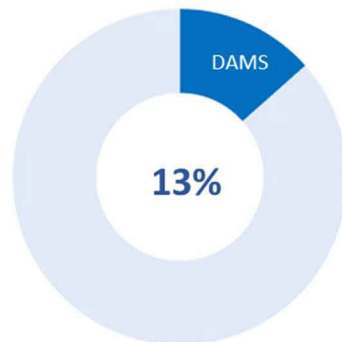
CLEVELAND DAM

Asset Valuation

REPLACEMENT VALUE

**\$1.3
Billion**

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

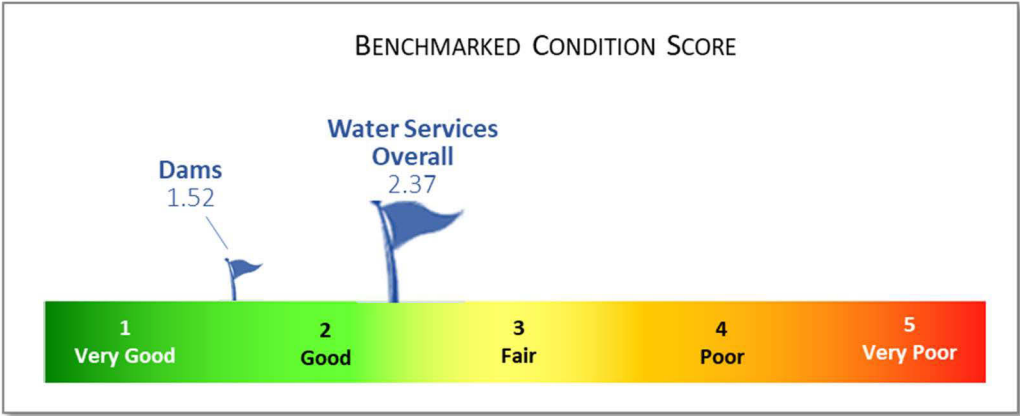
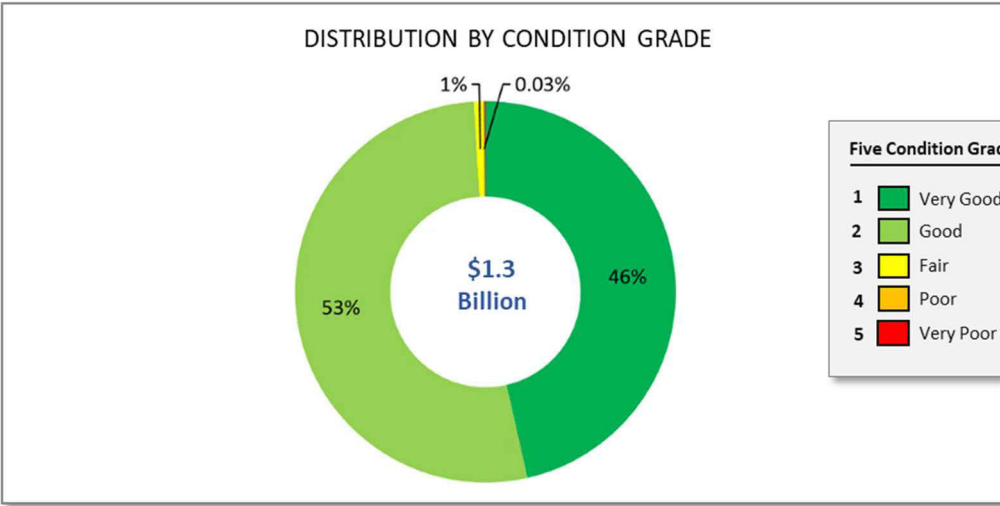
METHOD OF DAM CONDITION ANALYSIS

The “good” condition of the dams has been estimated with a hybrid model. Some of the dams have evidence-based condition provided by SMEs. For the alpine dams, an age-inferred model evaluates the current age of the different categories of assets at the dams (i.e. civil, mechanical, electrical, instrumentation) relative to their useful service lives.

Age-Based

+

Evidence-Based





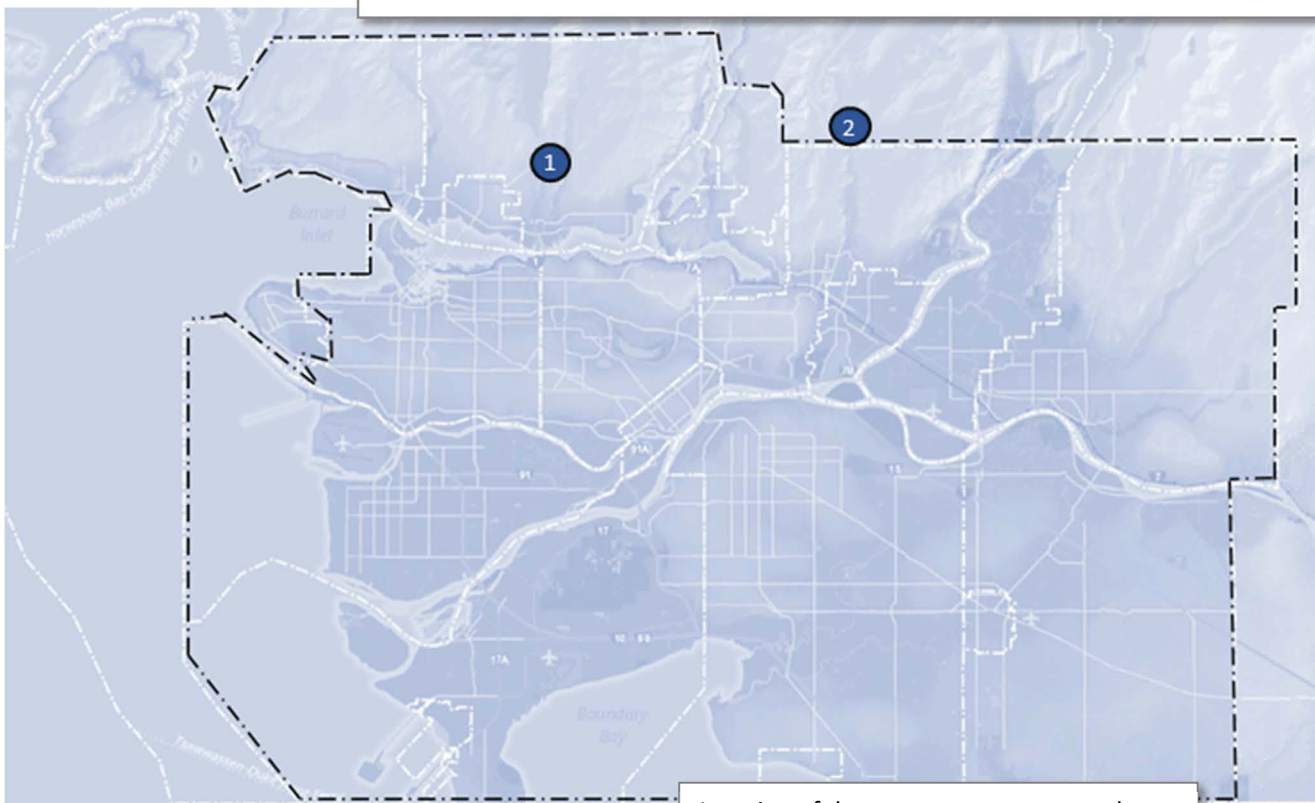
Water Treatment Plants

INVENTORY SUMMARY

Two state-of-the-art water treatment plants treat the region's drinking water from the source lakes to supply the region with water. The Seymour-Capilano Filtration Plant can treat up to 1.8 billion litres of water per day. Underground tunnels and buried pipes transport water from the Seymour Reservoir and Capilano Reservoir, so that water from both water sources can be treated at one facility. The Coquitlam Water Treatment Plant treats around 380 million litres of drinking water each day sourced from Coquitlam Reservoir, about one-third of the total water supply delivered in the region. The two facilities draw water from three water supply areas: Capilano, Seymour, and Coquitlam.

This asset class includes two water treatment plants, as follows:

- ① SEYMOUR CAPILANO FILTRATION PLANT (2009)
- ② COQUITLAM WATER TREATMENT PLANT (2001/2014)



Location of the two water treatment plants



SEYMOUR CAPILANO FILTRATION PLANT

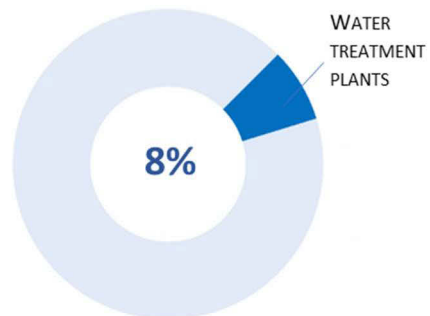
Asset Valuation

REPLACEMENT VALUE*

**\$800
Million**

* Based on historical costs
for like-for-like replacement
inflated to present day.

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

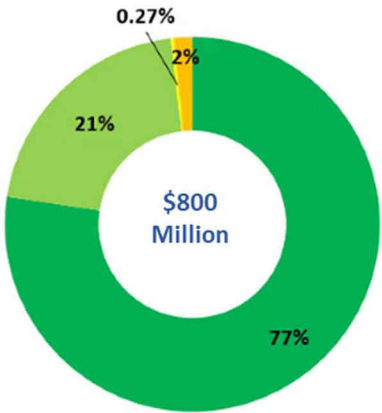
METHOD OF CONDITION ANALYSIS

Based on information from subject matter experts, the water treatments plants, as an asset class, are currently considered to be in “very good” condition.

Age-Based

Evidence-Based

DISTRIBUTION BY CONDITION GRADE



Five Condition Grades

- 1 Very Good
- 2 Good
- 3 Fair
- 4 Poor
- 5 Very Poor

BENCHMARKED CONDITION SCORE

Water Treatment Plants
1.26

Water Services Overall
2.37

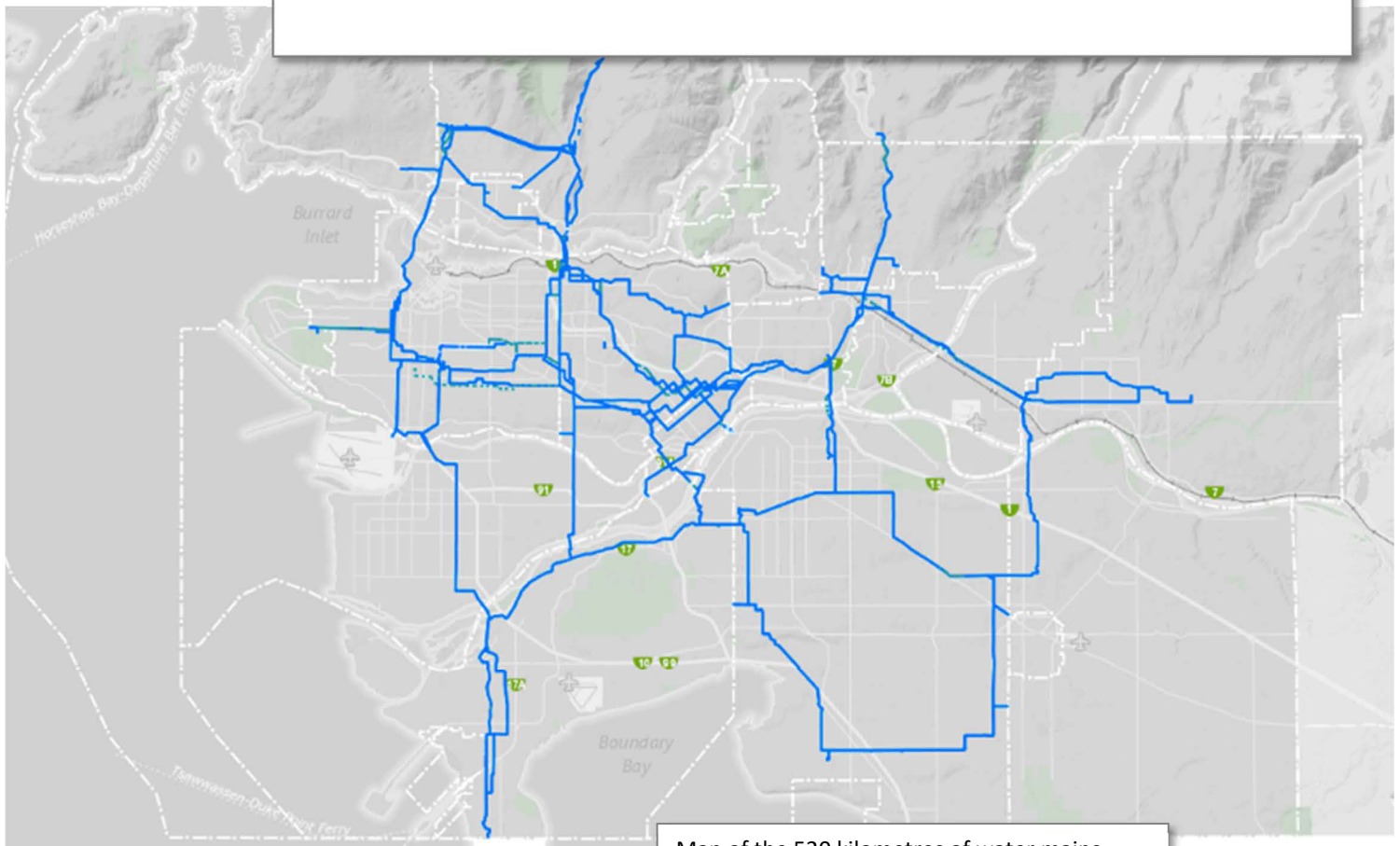




Water Mains

INVENTORY SUMMARY

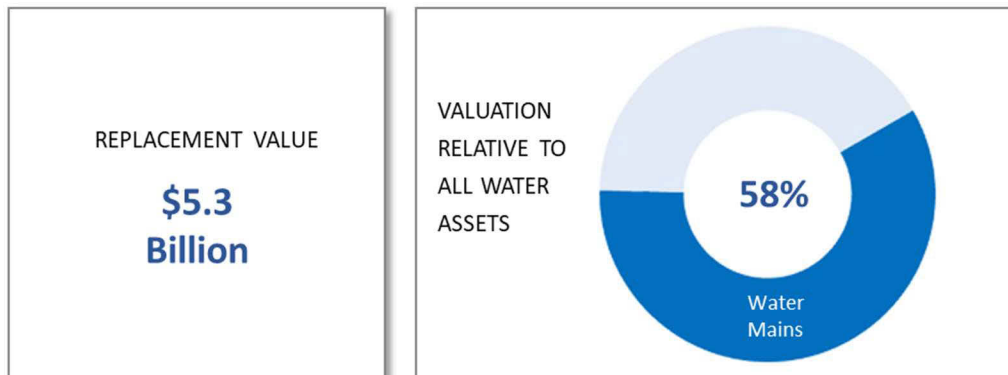
Metro Vancouver supplies about one billion litres of drinking water each day (rising to over 1.5 billion in summer) to the residents of the region. There are approximately 520 kilometres of water mains, ranging from 35 centimetres to 3 metres in diameter, which connect a network of reservoirs, dams, pump stations, and rechlorination stations.



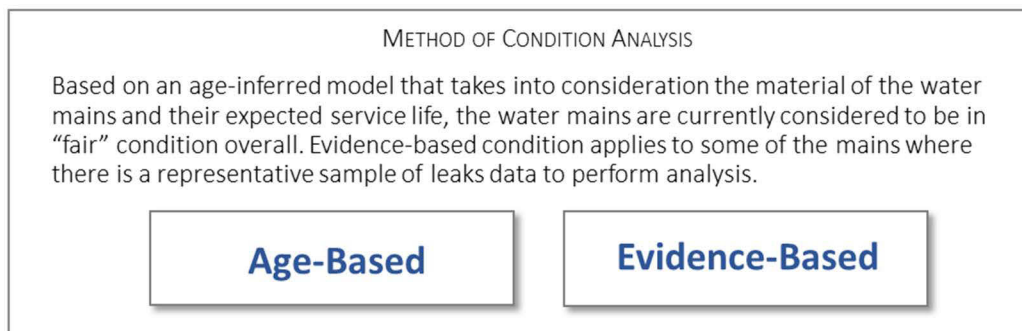
Map of the 520 kilometres of water mains



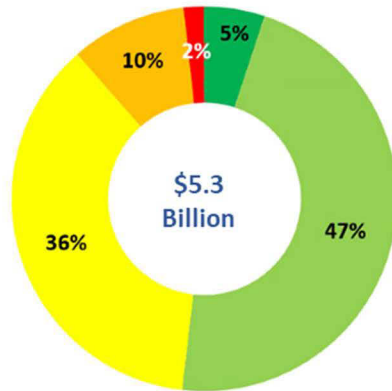
Asset Valuation



Asset Condition



DISTRIBUTION BY CONDITION GRADE



Five Condition Grades

- 1 ■ Very Good
- 2 ■ Good
- 3 ■ Fair
- 4 ■ Poor
- 5 ■ Very Poor

BENCHMARKED CONDITION SCORE

**Water Services
Overall**

2.37

**Water
Mains**
2.56





Reservoirs

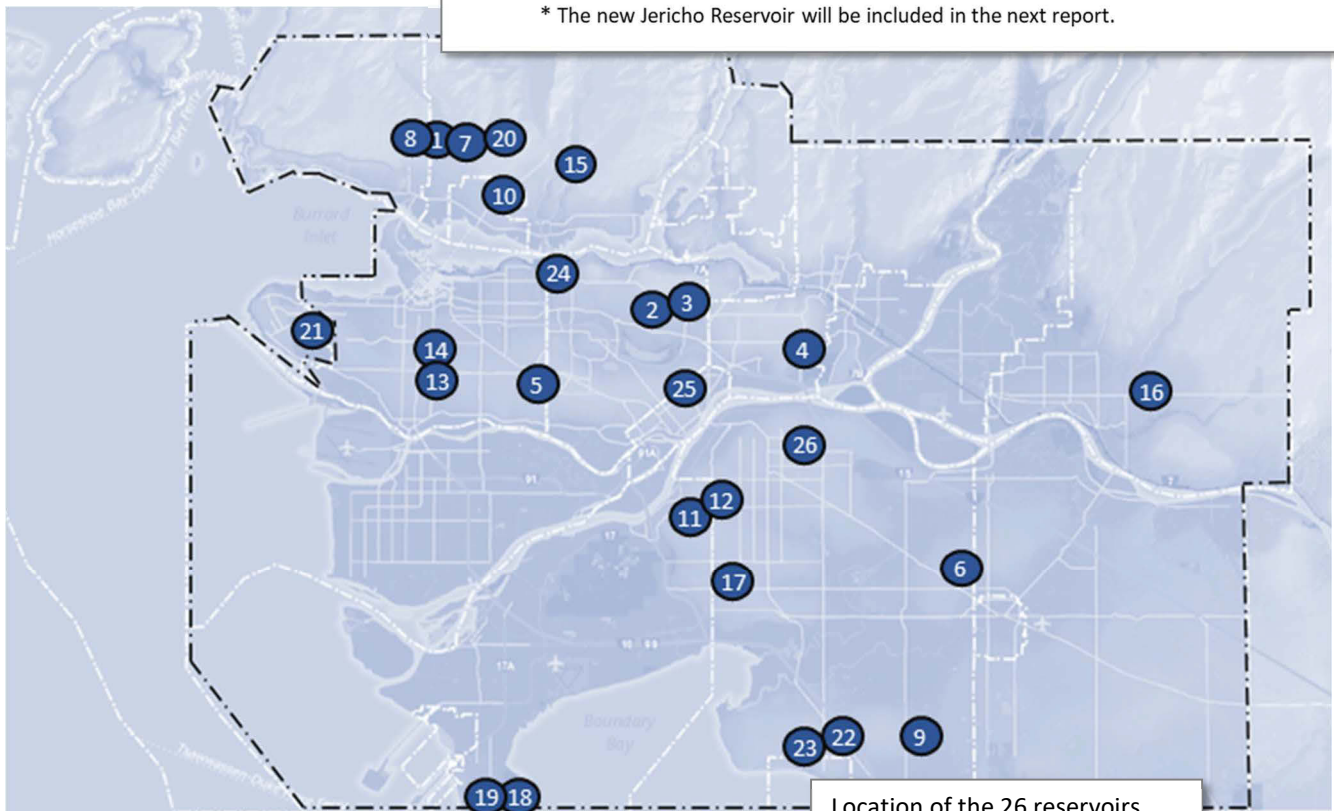
INVENTORY SUMMARY

The in-system water reservoirs store water at various locations throughout the region. These reservoirs are filled overnight via a combination of pumping and gravity, so that enough water is available during high water demand times like early morning when many residents shower, flush toilets, and prepare meals and when businesses and institutions start operating. The source reservoirs are excluded from this asset class as they are included in the water supply areas.

This asset class includes twenty-six* reservoirs, distributed throughout the region.

- | | |
|------------------------------|----------------------------------|
| 1 Break Head Tank | 14 Little Mountain Reservoir |
| 2 Burnaby Mountain Reservoir | 15 Lynn Valley Reservoir |
| 3 Burnaby Mountain Tank | 16 Maple Ridge Reservoir |
| 4 Cape Horn Reservoir | 17 Newton Reservoir |
| 5 Central Park Reservoir | 18 Pebble Hill Reservoir - 1 & 2 |
| 6 Clayton Reservoir | 19 Pebble Hill Reservoir - 3 |
| 7 Clearwell Reservoir | 20 Prospect Avenue Reservoir |
| 8 Glenmore Tank | 21 Sasamat Reservoir |
| 9 Grandview Reservoir | 22 Sunnyside Reservoir 1 |
| 10 Greenwood Park Reservoir | 23 Sunnyside Reservoir 2 |
| 11 Hellings Tank/ Reservoir | 24 Vancouver Heights Reservoir |
| 12 Kennedy Park Reservoir | 25 Westburnco Reservoir |
| 13 Kersland Reservoir | 26 Whalley Reservoir |

* The new Jericho Reservoir will be included in the next report.



Location of the 26 reservoirs

SAMPLE ASSET PHOTOS



CLAYTON RESERVOIR, EXTERIOR



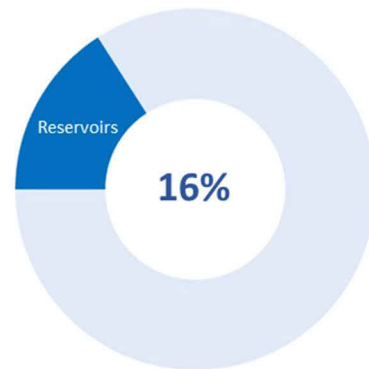
CLAYTON RESERVOIR, INTERIOR

Asset Valuation

REPLACEMENT VALUE

**\$1.4
Billion**

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

METHOD OF CONDITION ANALYSIS

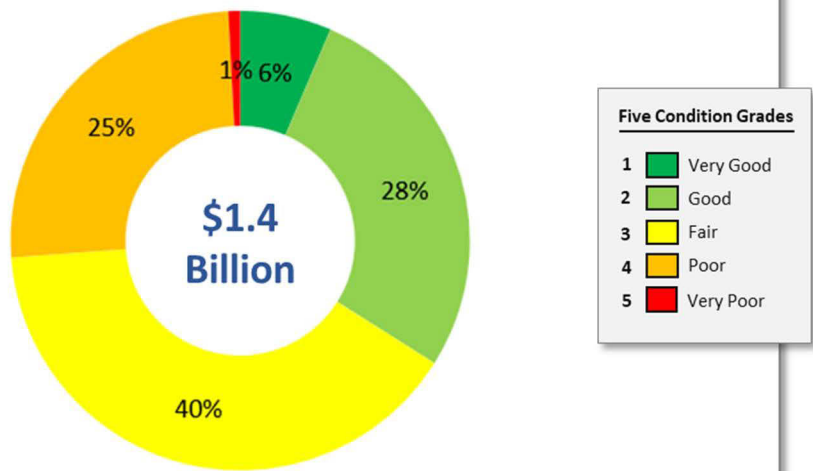
Based on a combination of age-inferred and evidence-based analysis, the reservoirs are considered to be in “fair” condition overall.

Age-Based

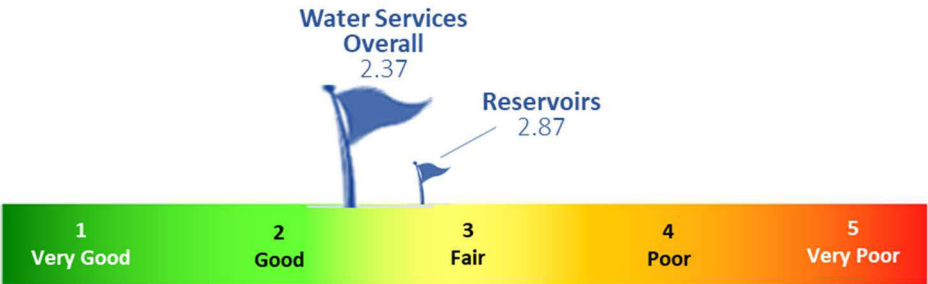
+

Evidence-Based

DISTRIBUTION BY CONDITION GRADE



BENCHMARKED CONDITION SCORE





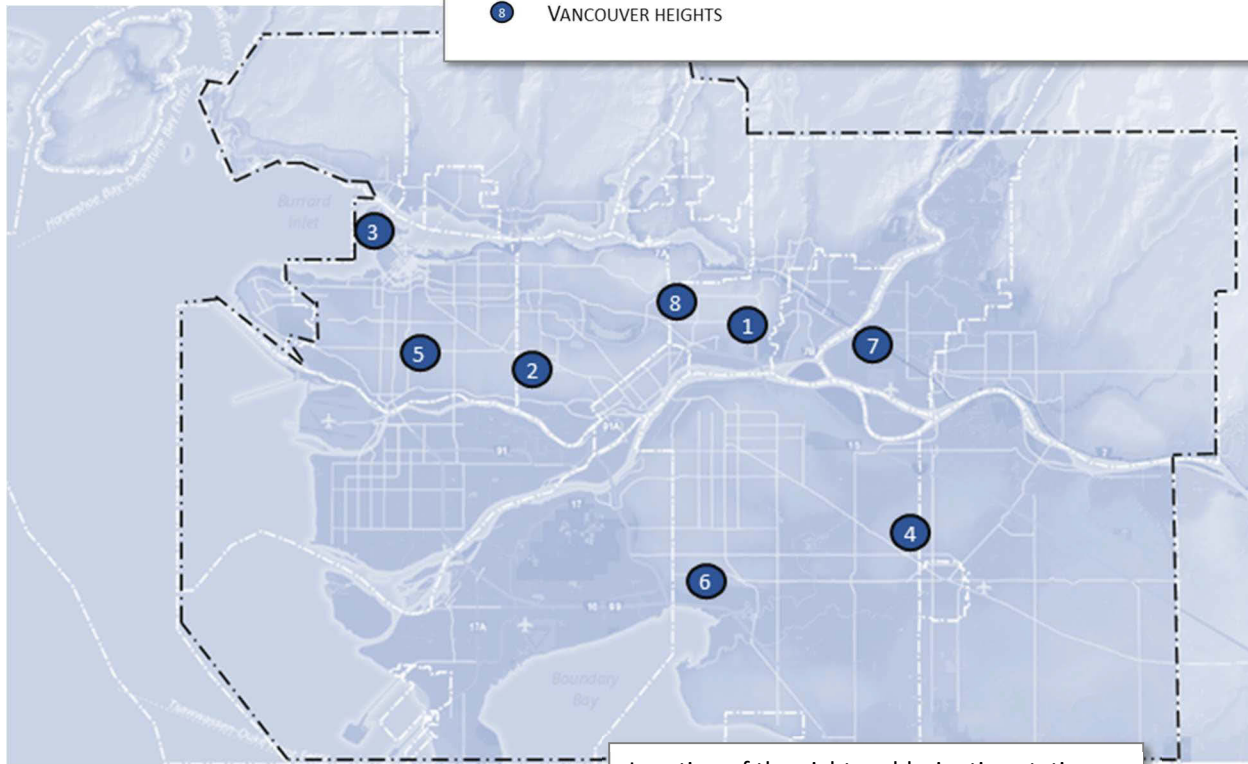
Rechlorination Stations

INVENTORY SUMMARY

As water flows through the water supply system, the chlorine added at the water treatment plants gradually breaks down, creating the potential for bacteria growth. If required, chlorine is added at rechlorination stations to preserve water quality as water travels to homes, businesses, and industries. Secondary treatment ensures water continues to meet Health Canada's standards as it travels through water mains across the region.

This asset class includes eight (8) rechlorination stations, as follows:

- 1 CAPE HORN
- 2 CENTRAL PARK
- 3 CHILCO
- 4 JERICO/CLAYTON
- 5 KERSLAND
- 6 NEWTON
- 7 PITT RIVER
- 8 VANCOUVER HEIGHTS



Location of the eight rechlorination stations

SAMPLE ASSET PHOTOS



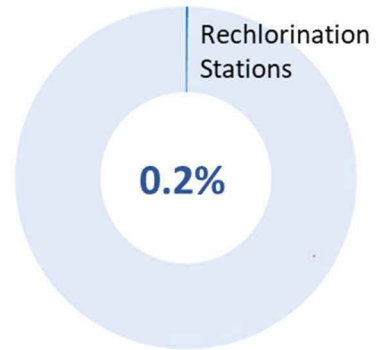
JERICHO/CLAYTON RECHLORINATION STATION

Asset Valuation

REPLACEMENT VALUE

**\$40
Million**

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

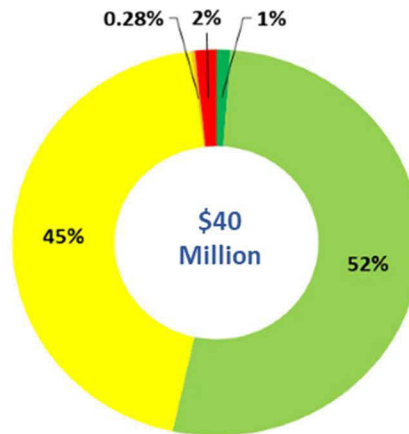
METHOD OF CONDITION ANALYSIS

Based on information from subject matter experts, the rechlorination stations, as an asset class, are currently considered to be in “good” condition overall.

Age-Based

Evidence-Based

DISTRIBUTION BY CONDITION GRADE



Five Condition Grades

- 1 Very Good
- 2 Good
- 3 Fair
- 4 Poor
- 5 Very Poor

BENCHMARKED CONDITION SCORE

Water Services
Overall
2.37



Rechlorination
Stations
2.49



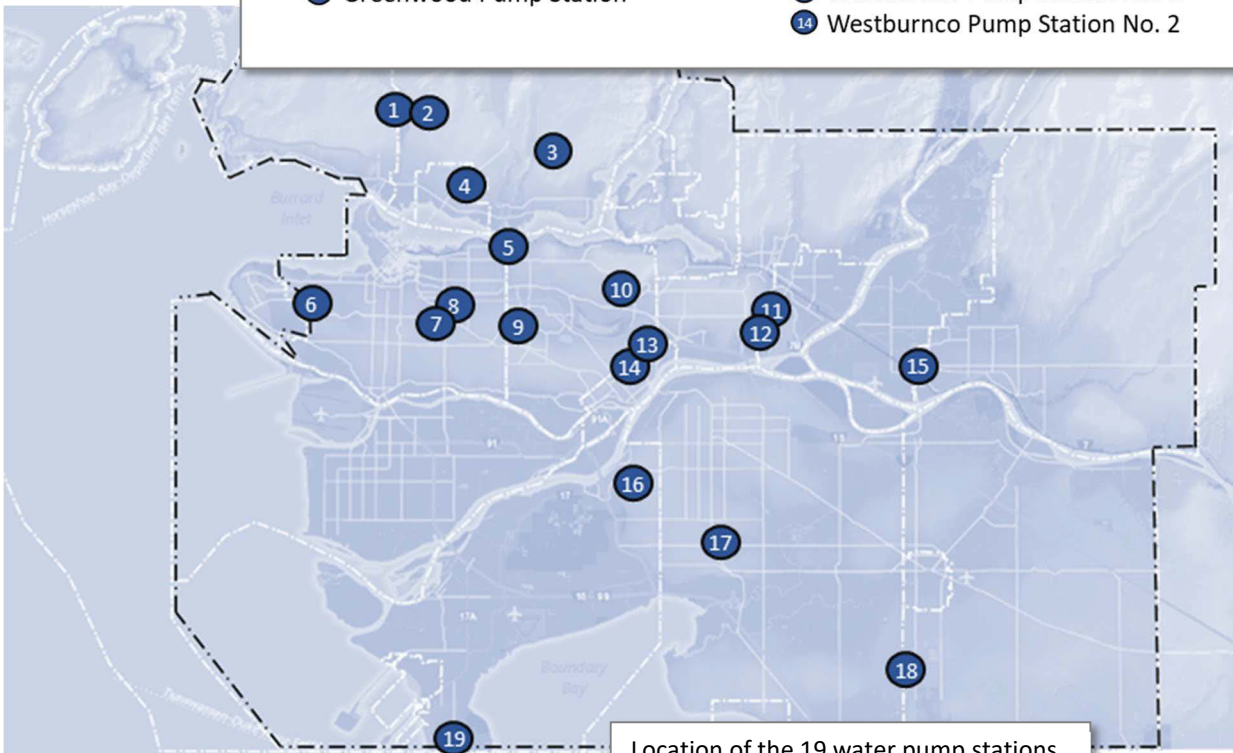


Pump Stations

INVENTORY SUMMARY

The water network includes 19 pump stations to move water around the region so that it may flow into local government distribution systems, where it is delivered to businesses, institutions, and residences.

- | | |
|--------------------------------------|----------------------------------|
| 15 Barnston-Maple Ridge Pump Station | 7 Kersland Pump Station |
| 10 Burnaby Mountain Pump Station | 8 Little Mountain Pump Station |
| 11 Cape Horn Pump Station No. 1 | 4 Mahon Pump Station |
| 12 Cape Horn Pump Station No. 2 | 17 Newton Pump Station |
| 2 Capilano Raw Water Pump Station | 16 North Delta Pump Station |
| 9 Central Park Pump Station | 19 Pebble Hill Park Pump Station |
| 1 Cleveland Dam Pump House | 6 Sasamat Pump Station |
| 18 Grandview Pump Station | 5 Vancouver Heights Pump Station |
| 3 Greenwood Pump Station | 13 Westburnco Pump Station No. 1 |
| | 14 Westburnco Pump Station No. 2 |



Location of the 19 water pump stations

SAMPLE ASSET PHOTOS



WESTBURNCO PUMP STATION NO. 2



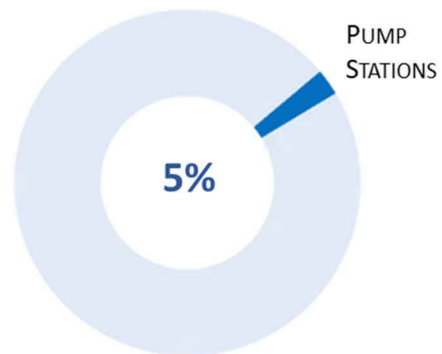
BARNSTON MAPLE RIDGE PUMP STATION

Asset Valuation

REPLACEMENT VALUE

**\$510
Million**

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

METHOD OF CONDITION ANALYSIS

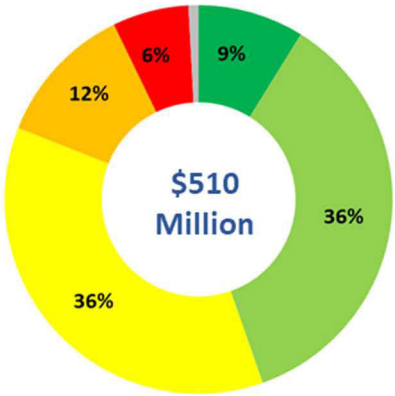
Based on a combination of physical condition assessments and an age-based analysis using categories of assets at the pump stations (i.e. civil, mechanical, electrical, instrumentation) relative to their useful service lives, the pump stations are currently considered to be in “fair” condition overall.

Age-Based

+

Evidence-Based

DISTRIBUTION BY CONDITION GRADES

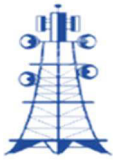


Five Condition Grades

- 1 Very Good
- 2 Good
- 3 Fair
- 4 Poor
- 5 Very Poor

BENCHMARKED CONDITION SCORE





Communications Systems

Asset Inventory

INVENTORY SUMMARY

This asset class includes the following five asset categories:

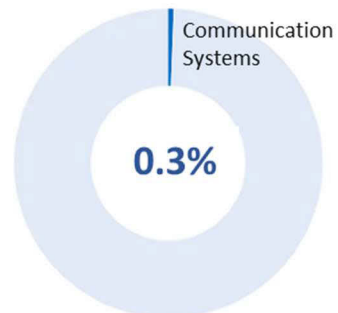
- ① SCADA System – Supervisory Control and Data Acquisition
- ② CDAC Systems – Computerized Data Acquisition & Control (at SCFP & CWTP)
- ③ SCADA Radio Communication Systems (Repeater Sites and Towers)
- ④ SCADA Remote Terminal Units (RTU) & Wireless Remote I/O Units
- ⑤ Voice Radio Systems

Asset Valuation

REPLACEMENT VALUE

**\$25
Million**

VALUATION
RELATIVE TO
ALL WATER
ASSETS



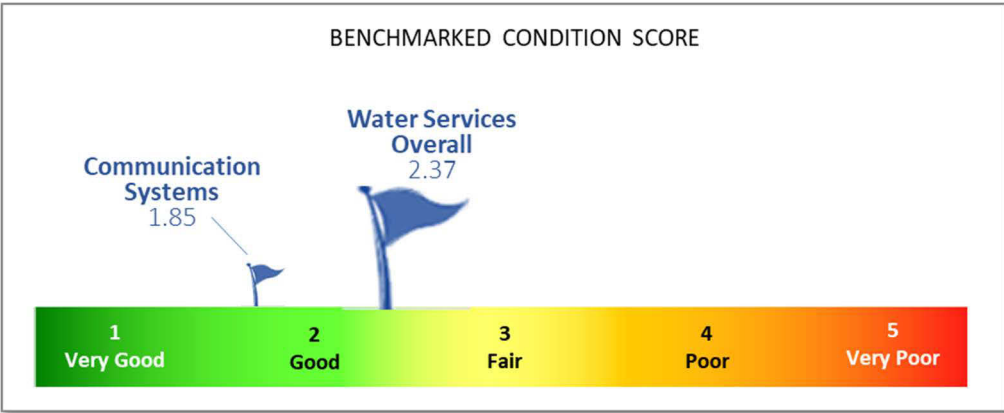
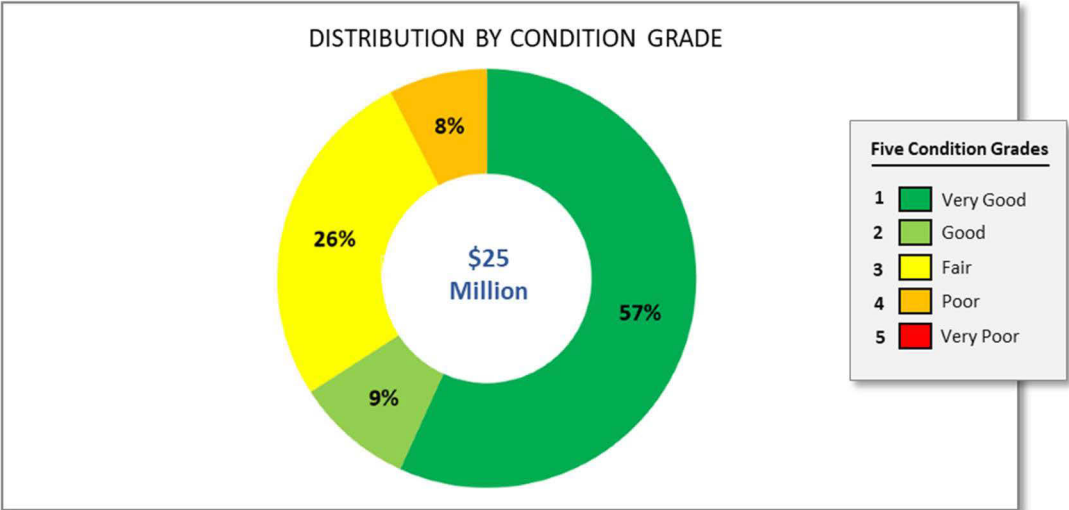
Asset Condition

METHOD OF CONDITION ANALYSIS

Based on information from subject matter experts, the automation and communications assets, as an asset class, are currently considered to be in “good” condition overall.

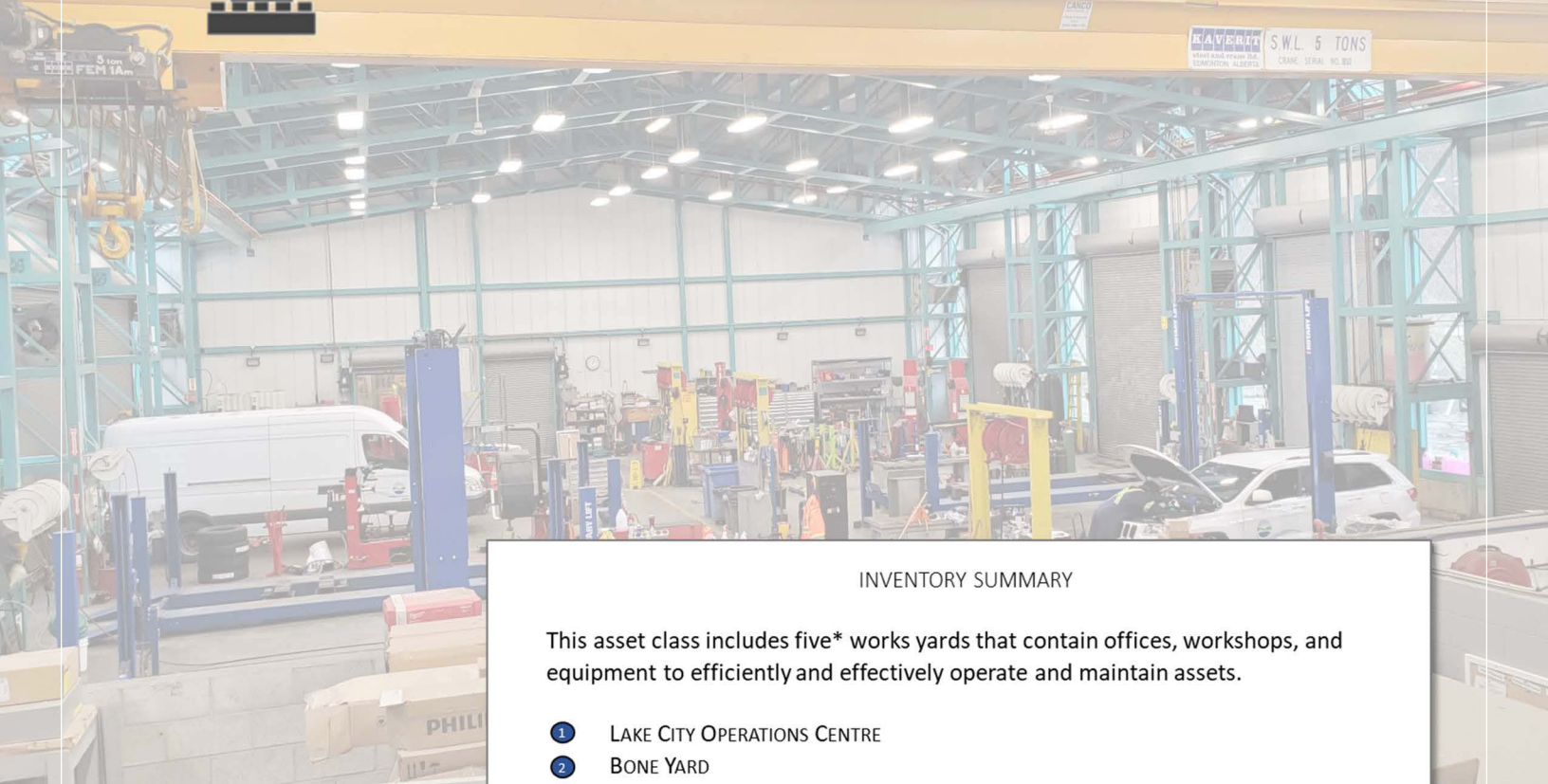
Age-Based

Evidence-Based





Works Yards

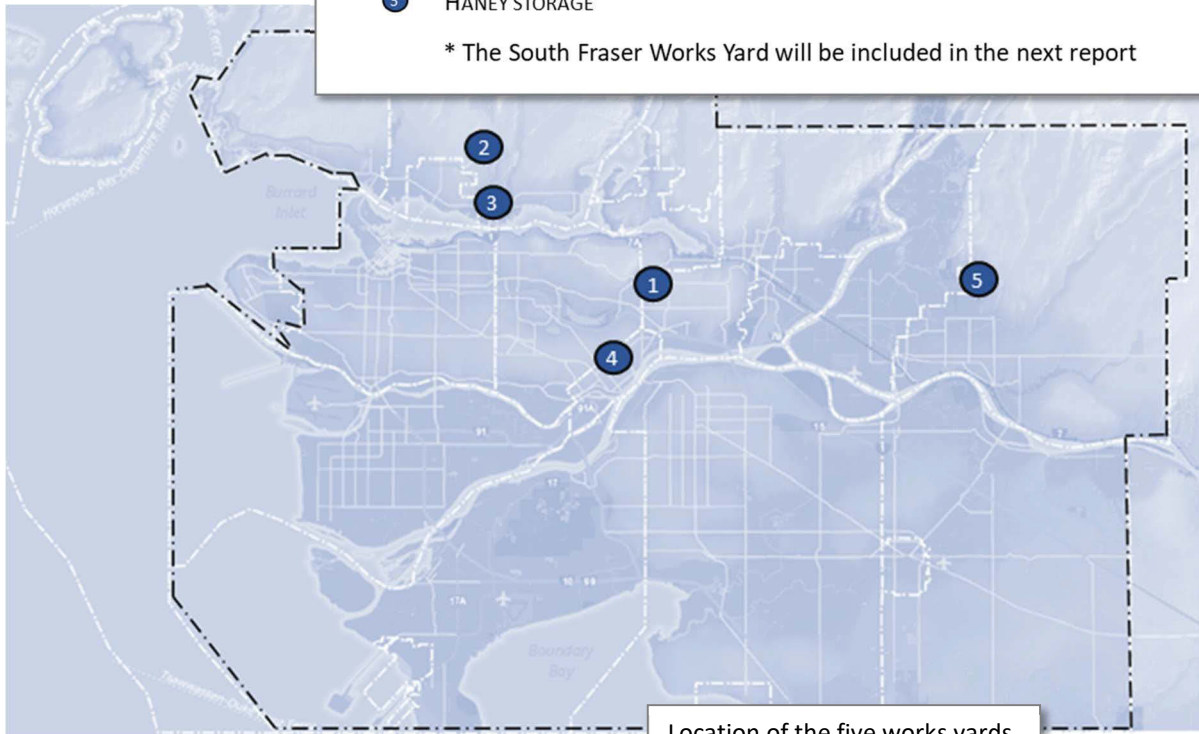


INVENTORY SUMMARY

This asset class includes five* works yards that contain offices, workshops, and equipment to efficiently and effectively operate and maintain assets.

- ① LAKE CITY OPERATIONS CENTRE
- ② BONE YARD
- ③ BEACH YARD
- ④ WESTBURNCO WORKS YARD
- ⑤ HANEY STORAGE

* The South Fraser Works Yard will be included in the next report



Location of the five works yards

SAMPLE ASSET PHOTOS



BONE YARD



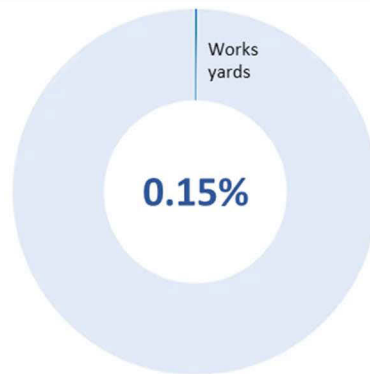
LAKE CITY OPERATIONS CENTRE

Asset Valuation

REPLACEMENT VALUE
(BUILT ASSETS ONLY)

**\$13
Million**

VALUATION
RELATIVE TO
ALL WATER
ASSETS



Asset Condition

METHOD OF CONDITION ANALYSIS

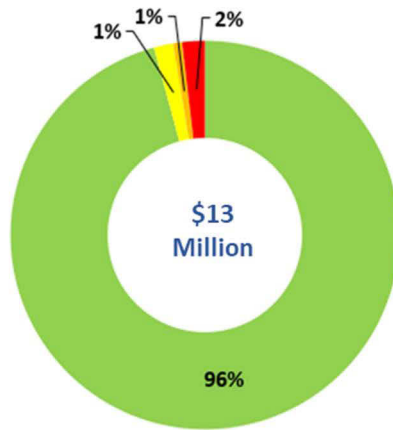
Based on a combination of field assessments and age-based analysis, the works yards are currently considered to be in relatively “good” condition overall.

Age-Based

+

Evidence-Based

DISTRIBUTION BY CONDITION GRADE



Five Condition Grades

- 1 ■ Very Good
- 2 ■ Good
- 3 ■ Fair
- 4 ■ Poor
- 5 ■ Very Poor

BENCHMARKED CONDITION SCORE



1
Very Good

2
Good

3
Fair

4
Poor

5
Very Poor



Asset Management Continuous Improvement

Continuous improvement of asset data, information technologies, and business practices is an important and integral process of any asset management program. The following asset management improvement opportunities have been identified to improve the accuracy and completeness of information presented in this State of the Assets Report and better enable data-driven decision making and sustain targeted service levels. Work on each of these improvement opportunities is currently underway.

Asset Register

- Improve completeness, accuracy, and repeatability of asset data
- Update asset valuation of each asset class
- Store key asset information or attributes in a standard asset hierarchy
- Continue to update the asset register for new assets brought into service

Asset Condition Assessments

- Prepare and update asset assessment plans for each asset class
- Collect asset condition and performance information and replace current age-based condition data
- Utilize modern inspection technologies and opportunities when infrastructure is exposed to collect asset condition information for infrastructure that is not readily accessible
- Develop asset deterioration curves for each asset type
- Update estimated service life of each asset type

Asset Risk Assessments

- Develop risk registers for each asset class
- Implement risk management framework

Information Systems

- Identify gaps and implement improvements in related information systems
- Improve asset related data analytics and reporting capabilities

Asset Management Plans

- Complete and update long term investment needs assessment
- Develop asset management plans to summarize asset information and identify risks to service delivery
- Prepare long range infrastructure investment scenarios to address the risks



Appendix A – Glossary

Asset Class is a group of facilities that have similar characteristics and deliver a common type of service.

Asset Portfolio is a collection of the asset classes within a utility, such as Water Services or Liquid Waste Services.

Asset Type is a group or category of assets within a facility that have common characteristics and are a subset of the Asset Class

Data Confidence is the correctness and repeatability of the data.

Deterioration Curve is the rate of physical or non-physical degradation of an Asset Type over time

Estimated Service Life is a measure of how long the asset is expected to deliver an adequate level of service.

Investment Needs is the projected renewal expenditure requirements.

Non-Residential Construction Price Index (NRCPI) measures changes in contractors' selling prices of new non-residential building construction by class of structure (commercial, industrial, institutional).

ASSET MANAGEMENT FOR WATER SERVICES

Effective Date: May 24, 2019

Approved By: GVWD Board

Policy No. FN-028

PURPOSE

To establish asset management principles and framework to balance asset performance, risk, and cost to deliver water services.

POLICY

Water Services delivers water storage, treatment and transmission services through an extensive and complex portfolio of natural and built assets.

This Policy outlines Metro Vancouver's commitment and methodology to manage these assets in a manner that minimizes asset failure risks and impact to customers and optimizes the lifecycle value of assets to consistently meet asset performance targets and enable evidence-based decision making to continuously provide quality services.

NATURAL ASSETS

The Water utility's natural assets, comprised of the forests, streams, rivers, and lakes that make up the protected water supply lands, provide ecosystem services which are essential to the region's water supply and the environmental sustainability of the area. Whether naturally occurring, or constructed and enhanced to improve function, these assets must be operated and maintained. If managed appropriately, natural assets do not require replacement.

As the tools and methodologies for quantitatively assessing natural assets evolve, Water Services will determine how best to inventory and assess natural assets in order to ensure they can be managed in accordance with the principles set out in this Policy.

BUILT ASSETS

Built assets such as dams, treatment plants, water mains, pump stations, and reservoirs have been engineered/constructed to store, treat, and deliver water services to our customers.

ASSET MANAGEMENT PRINCIPLES

The methodology for managing Water Services assets is guided by the following principles:

- a) Integrated: a comprehensive approach that examines the combined implications of managing all aspects of the asset life cycle. This includes interdependencies of assets or asset systems
- b) Risk-based: manage asset risk relative to defined performance targets and asset criticality and focus expenditures and priorities based on risk and associated cost and benefit

BOARD POLICY

- c) Sustainable: a long-term approach to estimating asset investment and activities, which will better enable assets to meet future challenges, including changing demographics, legislative requirements and technological, financial, climatic and environmental factors
- d) Fiscally Responsible: ensure activities and decisions aim at reducing the life cycle cost of asset ownership, while achieving defined asset performance targets
- e) Systematic: a formal, consistent, repeatable and methodical approach to the management of assets
- f) Innovative: continuous improvement in Asset Management by examining new tools, technologies, practices and solutions

ASSET CLASSES

This Policy is applicable to the management of each Water Services asset in the following nine asset classes:

- Watersheds
- Dams
- Water Treatment Plants
- Water Mains
- Pump Stations
- Reservoirs
- Rechlorination Stations
- Communications Systems
- Works Yards

ASSET DATA AND INFORMATION

To measure performance of Water Services assets, Water Services will develop and maintain an Asset Registry with comprehensive and accurate asset data and information. Data will be organized in a structured manner so that it can be stored, analyzed and reported at an adequate level for different business needs. Integrity of the data shall be constantly monitored, updated and maintained to provide accurate asset information.

The Water Services Asset Registry will include at a minimum, the following:

- Asset grouping (e.g. utility, asset class)
- Asset location (e.g. facility, sub-facility/process)
- Asset details (e.g. make, model, material, size, install date, expected service life)
- Asset identification (e.g. type, number, description)
- Asset criticality and risk information
- Financial information (e.g. acquisition and disposal costs, estimated replacement cost, Operations & Maintenance costs)
- Asset condition and/or estimated remaining service life

ASSET PERFORMANCE AND LIKELIHOOD OF FAILURE

Water Services will manage and renew each asset in accordance with clearly defined asset performance metrics and targets. Asset performance information is used as an indicator of an assets' likelihood of failure. Water Services asset performance categories, key performance indicators and targets are provided in the table below.

Performance Category	Performance Category Description	Key Performance Indicator (KPI)	Minimum Standard
Condition	Asset physical condition	Condition Score (see table below)	<p><i>All assets:</i> Condition Score is Grade 3 (Fair) to Grade 4 (Poor) or better</p> <p><i>High criticality assets:</i> Condition Score is Grade 2 (Good) to Grade 3 (Fair) or better</p>
Maintenance Costs	Cost to maintain the asset (e.g. labour, parts)	Annual asset maintenance costs	Annual asset maintenance cost is less than 20% of replacement cost
Obsolescence	Asset is obsolete; technology is no longer supported and cannot be maintained or replaced	Assets with obsolete technology	No assets with obsolete technology
Functionality	Current functionality of the asset (e.g. capacity, velocity, safety)	Asset functionality vs as-designed functionality	Asset functioning as-designed

Water Services will use a 1 to 5 condition scoring system in accordance with the table below. When condition information is not available, an age based remaining service life will be used as a proxy for asset condition. Condition information will be stored in the asset register at a level most practical to capture and maintain the condition data. Water Services will develop asset specific descriptions based on the table below to enable assignment of Grade 1-5 condition score for all assets.

Condition Score		Description
Grade 1	Very Good	New or Excellent condition, no apparent defects.
Grade 2	Good	In good state of repair, some minor defects (e.g. finishes) that do not detract from functionality.
Grade 3	Fair	Some non-critical defects are apparent.
Grade 4	Poor	Failure possible, some critical defects are apparent and functionality is affected.

Condition Score		Description
Grade 5	Very Poor	Failure imminent (within 12 months).

Water Services will consider asset vulnerability in assessing likelihood of failure. Vulnerability is the extent to which the asset or grouping of assets can withstand a potential failure and includes factors such as asset redundancy, asset material, soil type and cathodic protection.

ASSET CRITICALITY AND CONSEQUENCE OF FAILURE

Asset criticality is a measure of the asset's relative consequence of failure. It is considered in planning asset replacement, rehabilitation, operations and maintenance strategies as well as alternative risk mitigation strategies (e.g. emergency preparedness and response planning). High criticality assets (e.g. marine crossings) have the potential for significant impact on services if they fail. Failure of low criticality assets (e.g. portable sump pump) will have low or no impact on services. As there is less tolerance to asset failure for high criticality assets, they will be monitored more frequently and have higher priority for asset inspection and improvement work than medium or low criticality assets. The information outlined in the table below will be considered to determine asset criticality (consequence of failure).

Consequence of Failure Category	Consequence of Failure Criteria
Worker and Public Safety	Injuries from physical infrastructure failure
Ecological & Public Health	Negative environmental impact, not meeting GVWD Operating Permit requirements, poor drinking water quality, unacceptable pressure deviation, loss of water service
Social	Water use restrictions, loss of use of facility / property
	Disruption to land / marine transportation services
Economic	Asset restoration and supplemental O&M costs
	Economic impact to third parties
	Economic impact from penalties

The following criteria are taken into consideration in assessing the relative consequence of failure:

- Population/number of people affected
- Type of infrastructure/services affected (e.g. hospital, school, park, highway, rail)
- Location of potential failures (e.g. waterways, land use)

ASSET RISK AND LIFECYCLE MANAGEMENT STRATEGIES

Managing risks to assets is essential to maintaining expected Water Services service levels and the core focus of Asset Management. Risk is the combination of likelihood and consequence of a failure event occurring:

Risk = Likelihood x Consequence

Key performance indicators and asset performance targets will be monitored to identify the likelihood of failure of an asset. When asset data and information indicates that an asset is failing to meet performance target(s), Water Services staff will identify the relative consequence if the asset fails (asset criticality), assess the risk and identify options to address the risk. Risk mitigation options could include asset replacement, rehabilitation, modified operations and maintenance strategies as well as modified emergency preparedness and response planning.

In evaluating different options, economic, social and environmental benefits will be considered for each option. Total asset life cycle costs including capital investment, expenditures related to operations and maintenance of the asset and decommissioning costs will be considered.

Where infrastructure investment is required, Water Services will consider opportunities to address other needs or future requirements (e.g. capacity increase, seismic resiliency improvement, etc.) consistent with integrated infrastructure investment planning and the following service level objectives:

- Maintain Quality of the Drinking Water Delivered
- Maintain Capacity and Reliability of the Water Supply System
- Improve Environmental Stewardship
- Minimize Timeline to recover from a Major Event (including Seismic, Power Interruption and Climate Change)

ASSET MANAGEMENT PLANS

Water Services will have Asset Management Plans to summarize asset performance data and information, including a summary of performance risks. Asset Management Plans will also outline the risk mitigation strategies (including capital investments, operating and maintenance strategies and emergency response strategies) and short and long term projected costs.

Water Services will have 10 facility-level Asset Management Plans as follows:

- Watersheds
- Dams
- Seymour Capilano Filtration Plant (SCFP)
- Coquitlam Water Treatment Plant (CWTP)
- Water Mains
- Pump Stations
- Reservoirs
- Rechlorination Stations
- Communications Systems
- Works Yards

BOARD POLICY

Asset Management Plans will be updated on a regular schedule (minimum every 5 years). Information from the facility-level Asset Management Plans will be aggregated and summarized to prepare a departmental *Water Services Asset Management Plan*.

CONTINUOUS IMPROVEMENT

Water Services will examine, monitor, identify and address asset management improvement opportunities to enhance asset management tools, technologies and business practices.

Staff will be trained to support asset management activities from assessing asset condition to renewing assets to improve asset performance. Water Services will report on improvement activities related to the Water Services Asset Management Program.

COMMITTEE INFORMATION ITEMS AND DELEGATION SUMMARIES

Greater Vancouver Water District

Board Meeting Date – Friday, May 27, 2022

This information item, listing recent information received by committee, is provided for the GVWD Board's information. Please access a complete PDF package [here](#).

Water Committee – May 11, 2022*Delegation Summaries:*

No delegations presented

Information Items:

- 5.1 Lower Seymour Conservation Reserve Management Plan 2022
- 5.2 Water Services Wildfire Preparedness Update

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