INFRASTRUCTURE COMMITTEE MEETING
OF THE VILLAGE OF LIONS BAY
HELD ON TUESDAY, JULY 2, 2024 AT 6:00 PM
COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY
AND VIA ZOOM VIDEO CONFERENCE

TO JOIN THE MEETING, CLICK HERE: https://us02web.zoom.us/j/2780145720
TO JOIN VIA PHONE, DIAL 778-907-2071 AND ENTER MEETING ID: 278 014 5720

We are privileged to be meeting and doing work on behalf of the residents of Lions Bay on the traditional unceded territory of the Squamish and Musqueam Nations.

AGENDA

1. Call to Order

2. Appointment of Recorder

3. Approval of the Agenda
THAT the agenda be approved as submitted.

4. Public Questions & Comments

5. Approval of Minutes
A. Infrastructure Committee Meeting Minutes – May 30, 2024. *(page 4)*
THAT the Infrastructure Committee Meeting Minutes of May 30, 2024 be approved as circulated.

6. Business Arising from the Minutes
A. Infrastructure Committee Meeting Minutes – April 18, 2024. *(page 12)*
Request for changes from RCM – Ken Berry (MKB)

7. Unfinished Business

Identifier	Description	Responsible	Status
23111	All I.C. members will be provided with a copy of the IMP and the enhanced Asset Management Plan. The document is complicated and requires a dedicated I.C. meeting to fully understand the implications for the Village.	KB/PWM	

23112	Convene a February I.C. Round Table Meeting to focus on a 10 and 20 year horizon plan to identify the new and replacement infrastructure requirements and related expenses.	NTA/All	
23113	CAO and/or Council to be asked to allow members of the I.C. to have selective access to the PW document library.	PWM	
23117	BU will review the SCADA system on behalf of the I.C. and work with the PWM to up-grade the hardware and software. A Requirements Document is anticipated at mid 2024.	BU/PWM	Partial
23121	HM to assist the PWM in preparing REQ/RFP documentation for estimate and work on water main replacement Creekview Place and for the estimate for Highview Place. HM to assist the PWM and CAO in reviewing submissions once received.	HM/PWM	
24021	Continue to work with the CAC to prepare a joint recommendation to Council with respect to both short term zone water metering and longer term universal metering.	All	
24022	Assist the PWM/PWD in any way by providing time and expertise in regards to enabling flow from Alberta Creek to be diverted into the Harvey Creek WTP to supplement our potable treated water supplies during the summer of 2024 and beyond.	All	
24044	NTA to contact Staff to gain access to the 2015 water supply and tank fill time data and analysis and allow for joint review of improved real time data in 2024.	NTA	
24051	Review the potential consequences of a major forest fire above the Village on our watersheds and report back to Council with a firm recommendation as to the best course of action to ensure a continuous potable water supply.	All	
24052	The potential for raw water shortages in 2024, and the possibility for compromised raw water quality after a forest fire necessities the Village has a full contingency plan for an alternative raw water supply. HM is to prepare a spreadsheet outlining the pros and cons of all the options to allow the I.C. to engage in a full discussion and recommendation to Council at a later date.	HM	

8. New Business

A. Review of the ASAP Project to date.

I. Lions Bay ASAP Budget May 2024 (Lions Bay Temp. Water Supply) *(page 19)*

II. Lions Bay ASAP Budget June 2024 (Waterworks Solutions Inc.) *(page 20)*

III. ASAP Schedule *(page 22)*

IV. Lions Bay Hwy. Tank Reconfiguration (DRAFT) (ASAP) *(page 23)*

B. Review of the ENSuRe (Excessive Ntu ShUtdown RoutinE) project to date.

C. Review of the 2023 Water Quality Report. *(page 30)*
Question and Answer Session.
Information/concepts that should be publicly emphasised.

D. Initiation of the long-term raw water source investigation and recommendation.

9. Public Questions & Comments

10. Adjournment

11. Next Meeting – July 18 (or 25), 2024

INFRASTRUCTURE COMMITTEE MEETING
OF THE VILLAGE OF LIONS BAY
HELD ON THURSDAY, May 30, 2024 AT 6:00 PM
COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY
AND VIA ZOOM VIDEO CONFERENCE

MINUTES

In Attendance : Mayor Ken Berry
Councillor Neville Abbott – Chair
Committee Member Anthony Greville
Committee Member Hilary Monfared
Committee Member Brian Ulrich

Absent with regrets : Councillor Jaime Cunliffe

Staff : Director of Operations Karl Buhr

1. Call to Order

The Chair called the Infrastructure Committee Meeting order at 18:09 pm.

2. Appointment of Recorder

ASG was appointed recorder this meeting.

3. Approval of the Agenda

Moved/Seconded
THAT the agenda of May 30, 2024, Infrastructure Committee be adopted as amened.
Amendment; to include a discussion and review of the leak detection initiatives, specifically those below the Highway Tank.
CARRIED.

4. Public Questions & Comments

A. Resident Marek Sredzki offered a comment that he too is very much interested in leaning about the outcome fo the leak detection initiative below the highway.

5. Approval of Minutes

A. Infrastructure Committee Meeting Minutes – March 21, 2024
THAT the Infrastructure Committee Meeting Minutes of March 21, 2024 be approved as circulated.
CARRIED.

B. Infrastructure Committee Meeting Minutes – April 18, 2024
THAT the Infrastructure Committee Meeting Minutes of April 18, 2024 be approved as circulated.
One change, the date March 15 should be changed to March 21.
CARRIED.

6. Business Arising from the Minutes

A. With reference to the potential raw water supply shortage this summer, the following endorsement of the ASAP initiative was approved.
The Infrastructure Committee reviewed the Alberta Supply Augmentation Project report materials as delivered by the Director of Operations and we do not have any issues or technical concerns with the information presented. Further, we believe utilizing the Alberta Creek water license as a third source of raw water, and employing a third watershed, is the best option currently available to the Village to mitigate the effects of on-going summer low water flows in the two source creeks, and may provide some relief in the event there is a wildfire above the Village in one of the current watersheds. The I.C. recognizes the use of Alberta Creek water is consistent with the IMP, and as such the project may be eligible for debt financing under the Infrastructure Funding Referendum. The I.C. supports and endorses the Alberta Supply Augmentation Project proposal as presented.

7. Unfinished Business

A. Action Steps 24042 and 24043; Ken Berry reported he had made no further movement with respect to costing out the full project consisting of 4 or 5 functioning wells, mostly outside of Village boundaries, and had made no further inquiries of the MoE and MoH in regards to regulatory approvals etc. KB did state the well project was of lesser importance, and that he had handed it over to Staff to continue/complete.
B. 24011 ASG presented a report that was briefly discussed. It was agreed that the I.C. would ask Council and the COA to include asking the Provincial Government to stockpile 6 – 10 portable potable WTP units for smaller municipalities and First Nations. Such a question could be asked at the UBCM in September. More discussion as to the best options for Lions Bay is required.
C. 24042 The conclusions of the Carollo report were discussed without the I.C. seeing the actual report. Nonetheless, the I.C. endorsed the DOO Buhr recommendations to proceed with the Alberta Creek supply initiative.

8. New Business

A. After some discussion, the I.C. agreed to ask Council and the COA to consider including a request of the Provincial Government to purchase and stockpile several portable potable water treatment plants to be made available to small communities in the event of a local emergency. This request is to be a part of the Lions Bay submission to the upcoming UBCM in Vancouver, September 18-19th, 2024.
B. Alternative water supply - HM agreed to begin, and subsequently manage, the process of collating a spreadsheet outlining al the options and their various pros and cons. The

I.C. will assist in this compiling, and once we have the necessary data we can review and make an informed recommendation to Council.
To be discussed further at the next I.C. Meeting in June.

9. Public Questions & Comments

A. Resident Marek Sredzki questioned the merits of individual property water metering. His belief is that a cost vs. benefit study should be commissioned, to include all administrative costs.

10. Adjournment

Moved/Seconded
THAT the Infrastructure Committee Meeting be adjourned.
CARRIED

The meeting adjourned at 20:14.

11. Next Meeting

Next meeting of the Infrastructure Committee was scheduled for June 20, 2024.

INFRASTRUCTURE COMMITTEE MEETING
OF THE VILLAGE OF LIONS BAY
HELD ON THURSDAY, May 30, 2024 AT 6:00 PM
COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY
AND VIA ZOOM VIDEO CONFERENCE

Discussion and Background Notes

Contributions by: Anthony Greville
Brian Ulrich

Also in attendance: Ken Berry
Neville Abbott
Hilary Monfared
Karl Buhr

Identifier	Description	Responsible	Status
23111	All I.C. members will be provided with a copy of the IMP and the enhanced Asset Management Plan. The document is complicated and requires a dedicated I.C. meeting to fully understand the implications for the Village.	KB/PWM	
23112	Convene a February I.C. Round Table Meeting to focus on a 10 and 20 year horizon plan to identify the new and replacement infrastructure requirements and related expenses.	NTA/All	
23113	CAO and/or Council to be asked to allow members of the I.C. to have selective access to the PW document library.	PWM	
23117	BU will review the SCADA system on behalf of the I.C. and work with the PWM to up-grade the hardware and software. A Requirements Document is anticipated at mid 2024.	BU/PWM	Partial
23121	HM to assist the PWM in preparing REQ/RFP documentation for estimate and work on water main replacement Creekview Place and for the estimate for Highview Place. HM to assist the PWM and CAO in reviewing submissions once received.	HM/PWM	
24011	ASG to approach bigger vendors regarding portable water treatment plants	ASG	✓

24021	Continue to work with the CAC to prepare a joint recommendation to Council with respect to both short term zone water metering and longer term universal metering.	All	
24022	Assist the PWM/PWD in any way by providing time and expertise in regards to enabling flow from Alberta Creek to be diverted into the Harvey Creek WTP to supplement our potable treated water supplies during the summer of 2024 and beyond.	All	
24041	Once the Village is in receipt of a commissioned report from Carollo Engineers Canada, regarding utilizing Alberta Creek, said report should be reviewed and a recommendation forwarded to Council as how best to proceed with the initiative.	All	✓
24042	KB to continue his discussions with the drilling companies to determine the full cost of finding sufficient well water supplies, accessing the well sites permanently, providing energy, pumping costs etc., classifying the water quality, and treating the water the water if necessary (mineral contamination, GUIDI or GARP classifications).	KB	✓
24043	KB to continue his discussions with the British Columbia MoE and Ministry of Health to determine the regulatory requirements and possible treatment steps that will be needed to allow any well water supplies to be added to the existing community water system.	KB	✓
24044	NTA to contact Staff to gain access to the 2015 water supply and tank fill time data and analysis and allow for joint review of improved real time data in 2024.	NTA	
24051	Review the potential consequences of a major forest fire above the Village on our watersheds and report back to Council with a firm recommendation as to the best course of action to ensure a continuous potable water supply.	All	
24052	The potential for raw water shortages in 2024, and the possibility for compromised raw water quality after a forest fire necessities the Village has a full contingency plan for an alternative raw water supply. HM is to prepare a spreadsheet outlining the pros and cons of all the options to allow the I.C. to engage in a full discussion and recommendation to Council at a later date.	HM	

NOTES:

24011 ASG presented a report that was briefly discussed. It was agreed that the I.C. would ask Council and the COA to include asking the Provincial Government to stockpile 6 – 10 portable potable WTP units for smaller municipalities and First Nations. Such a question

could be asked at the UBCM in September. More discussion as to the best options for Lions Bay is required.

24042 The conclusions of the Carollo report were discussed without the I.C. seeing the actual report. Nonetheless, the I.C. endorsed the DOO Buhr recommendations to proceed with the Alberta Creek supply initiative.

24042 Mayor Berry has come to the conclusion, that considering the progress being made with respect to Alberta Creek, the priority to drill wells outside of the Village boundaries has been lowered. Consequently, he had decided to differ this action item to Staff.

24043 Mayor Berry has come to the conclusion, that considering the progress being made with respect to Alberta Creek, the priority to drill wells outside of the Village boundaries has been lowered. Consequently, he had decided to defer this action item to Staff.

Harvey Creek Flow Meter Up-date.
It has been determined that scaling was unlikely to have occurred internally to the Harvey Creek magnetic flow meter line and similarly, it is also unlikely that any hydrocarbon based fouling of the electrodes occurred either. Considering the PWD unease at breaking the seal on the flow meter, and enhanced by revised calculations showing negligible differences between any calculated and measured flow rates, this issue is now determined to be satisfactorily closed.

Water Distribution System Leak Detection within the Village.
The DOO Buhr reported significant progress has been made with respect to identifying and subsequently sealing numerous leaks within the Village water distribution system over the previous 6 months. Figures quoted include a June 2023 average water consumption rate of 820,000 usgpd opposite a May 2024 consumption rate of 305,000 usgpd.

In particular, the PWD determined there was a large leak, 110,000 usgpd, below the Highway Tank that has now been fully identified and steps are being taken to fix all the constituent leaks. The encouraging consequence of fixing this significant leak is that the Highway Tank is now, no longer experiencing multiple fill cycles at night.

The DOO reports there is still one leak of 25,000 usgpd on the private side that is known but not yet specifically identified. Similarly, the DOO and PWD know of two small leaks on the pubic side A/C mains on Upper Bayview Road.

While this is encouraging news, the DOO was at pains to record that leaks previously were consuming 78% of Village finished water volumes, and this is now down to less than 60%; however, the leakage loss needs to be at 15 - 20% in order to run an efficient water system.

The overnight water use rate has now decreased from 460,000 usgpd down to 120,000 usgpd. This is both encouraging and discouraging at the same time. Discouraging in that if 120,000 usgpod are being consumed at night, this represents nearly 33% of all water consumed in the Village is being lost to the ground as “non revenue” water.

Another way to consider the numbers presented by DOO Buhr is that, the current water demand of 305,000 usg is equal to 1,155,000 litres per day, and when divided by 1,400 residents, equals 825 litres per person per day (lpppd). The Lower Mainland average is 290 lpppd while the Canadian average is 310 lpppd. Europe is closer to 150 lpppd.

The 120,000 usgpd being lost as leaks represents 455,000 litres, or 325 lpppd! Lions Bay is leaking twice as much water per person per day than individuals in Europe consume!

Potable Water Demand Volume in 2024.
The DOO reported that during the 2015 raw water shortage event, the Village residents responded well, and the historical data indicates late summer consumption was 425,000 usgpd. In May 2024 the Village averaged 305,000 usgpd, however, this is well before the irrigation season is underway, and the weather has been comparatively cool. The unknown for 2024 is where the demand volumes will settle once the summer heat arrives; hence the need to continue to be aggressive in terms of identifying and fixing distribution system leaks, both public and private.

One encouraging development in terms of proper management of the raw water supply is that the recently engaged engineering firm conducted some new T-10 calculations (used to determine the internal tank baffle factor and detention time in a water storage tank, and therefore calculate correct chlorine Ct ratios etc.). These calculations have suggested the Village can increase the flow through the Magnesia Creek system, lessening the stress on the Harvey Creek system, and offering a better water balance. This new operating protocol should allow the Village to make better use of the water in the Creeks, and possibly increase the supply of “useable water” from Magnesia Creek during times of low flow.

Individual Property Water Metering.
Individual property water metering (Universal water metering) was discussed without any real consensus being achieved. All agree there are benefits to universal metering if the Village was able to store raw water. There are also benefits available when considering our current infrastructure configuration, namely the ability to identify water leaks quickly and accurately. Noting the conversation above, this is important.

However, the cost of installing water meters, their on going operational and administrative costs, and an undecided replacement cycle cost (every 10 years – or not?) does bring into question the overall cost/benefit calculation, more so when the benefit will really only be felt for 6 – 8 weeks a year.

The DOO was clear in noting the Village water consumption is over twice the regional average, and much of this extra consumption can be put down to system leakage. If universal water metering is the most efficient way to identify and fix said leaks, then it must be the best option!

The I.C. can find complete consensus in regards to zone metering, making a water meter installation a mandatory part of any new building permit (be that a new building or a substantial renovation requiring a permit) and fully supports the DOO in his current water meter trial focusing on commercial buildings, multifamily buildings, and other selected residences.

Alberta Supply Augmentation Project.
DOO Buhr presented his Alberta Supply Augmentation Project proposal to the I.C. in verbal format. The actual submission to Council was withheld until it was a public document, so scrutiny was not possible. Having said, this, the I.C. had previously stated its support of employing the water flow available in Alberta Creek to supplement the Village supply during times of summer drought. Similarly, the I.C. noted the use of Alberta Creek is consistent with the IMP and project funding should be available through the Infrastructure Funding Referendum.

DOO Buhr reported that Alberta Creek has a current flow rate of approximately 50 lps, or about 800 usgpm, or 1.1 mm usgpd! If the Village could draw into this flow (expected to be much lower in August and September) it could assist significantly in lowering the stress on both Magnesia and Harvey Creeks. The plan has been fully outlined in the comprehensive presentation to Council; it is anticipated there will be many revisions to the initial plan as presented.

Subsequent to the meeting, DOO asked ASG to review and comment on the water quality in Alberta Creek as shown in multiple third-party water analyses drawn in 2024. These analyses indicated the water quality in Alberta Creek is likely somewhat spring fed, as calcium, hardness, alkalinity, and pH are higher than found in Harvey and Magnesia Creeks (but similar to the "ground water" supplying those Creeks in September 2023). This subtle change in water quality can be considered as a positive since it is less corrosive to the distribution system and resident homes containing copper piping and lead solder.

As outlined above, the I.C. listened to DOO Buhr, asked significant questions, and concluded it can endorse the proposal, and wrote such an endorsement to be presented by the Chair to the Special Council Meeting of 04 June.

Alternative Raw Water Supply Options.
With little time left to complete the meeting, it was noted that with a potential raw water supply issue in 2024, due to drought conditions, and a potential raw water quality issue in the event of a significant forest fire above the Village that effects more than one of three watersheds, it is imperative that Lions Bay has a contingency plan in place to secure a secondary source of raw and/or potable water.

Options include, but not limited to;

Well water (available volume, cost, and quality/treatment requirements unknown)
Full treatment of existing creek water supplies (answer for forest fires, not drought)
Desalination (expensive to install and run – high pumping costs)
Pipeline from Metro / West Vancouver (significant expense – do they have water to spare)

HM agreed to begin, and subsequently manage, the process of collating a spreadsheet outlining al the options and their various pros and cons. The I.C. will assist in this compiling, and once we have the necessary data we can review and make an informed recommendation to Council.
To be discussed further at the next I.C. Meeting in June.

INFRASTRUCTURE COMMITTEE MEETING
OF THE VILLAGE OF LIONS BAY
HELD ON THURSDAY, APRIL 18, 2024 AT 6:00 PM
COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY
AND VIA ZOOM VIDEO CONFERENCE

MINUTES

In Attendance: Mayor Ken Berry
Councillor Neville Abbott – Chair
Committee Member Anthony Greville
Committee Member Hilary Monfared (via conference)

Absent with regret: Councillor Jaime Cunliffe
Committee Member Brian Ulrich

Staff:

1. Call to Order

The Chair called the Infrastructure Committee Meeting order at 18:15 pm.

2. Approval of the Agenda

Moved/Seconded
THAT the agenda of April 18, 2024, Infrastructure Committee be adopted as amened.
Amendment; to include the addition of the data from 2015 to assist in managing the anticipated 2024 source water supply shortage.
CARRIED

3. Public Questions & Comments

A. Resident Marek Sredzki offered a comment that growth in Lions Bay is inevitable, he cited the possible demolition and development of the townhouse/commercial site, and such growth should not be hampered by a lack of water. He advocated the examination of well water as a possible raw water source to increase raw water supply to the Village.

4. Approval of Minutes

A. Infrastructure Committee Meeting Minutes – March 21, 2024

Due to the concern regarding the lack or a quorum for some of the 21 March meeting, minutes were not presented. The issue was resolved, and the missing minutes will be available for the May meeting.

Moved/Seconded
No vote was taken with respect to the 15 March I.C. Meeting Minutes.

5. Business Arising from the Minutes

6. Unfinished Business

Identifier	Description	Responsible	Status
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23112	Convene a February I.C. Round Table Meeting to focus on a 10 and 20 year horizon plan to identify the new and replacement infrastructure requirements and related expenses.	NTA/All	
23113	CAO and/or Council to be asked to allow members of the I.C. to have selective access to the PW document library.	PWM	
23117	BU will review the SCADA system on behalf of the I.C. and work with the PWM to up-grade the hardware and software. A Requirements Document is anticipated at mid 2024.	BU/PWM	Partial
23121	HM to assist the PWM in preparing REQ/RFP documentation for estimate and work on water main replacement Creekview Place and for the estimate for Highview Place. HM to assist the PWM and CAO in reviewing submissions once received.	HM/PWM	
24011	ASG to approach bigger vendors regarding portable water treatment plants	ASG	
24021	Continue to work with the CAC to prepare a joint recommendation to Council with respect to both short term zone water metering and longer term universal metering.	All	
24022	Assist the PWM/PWD in any way by providing time and expertise in regards to enabling flow from Alberta Creek to be diverted into the Harvey Creek WTP to supplement our potable treated water supplies during the summer of 2024 and beyond.	All	
24041	Once the Village is in receipt of a commissioned report from Carollo Engineers Canada, regarding utilizing Alberta Creek, said report should be reviewed and a recommendation forwarded to Council as how best to proceed with the initiative.	All	
24042	KB to continue his discussions with the drilling companies to determine the full cost of finding sufficient well water	KB	

	supplies, accessing the well sites permanently, providing energy, for pumping etc., classifying the water quality, and treating the water the water if necessary (mineral contamination, GUIDI or GARP classifications).		
24043	KB to continue his discussions with the British Columbia MoE and Ministry of Health to determine the regulatory requirements and possible treatment steps that will be needed to allow any well water supplies to be added to the community water system.	KB	
24044	NTA to contact Staff to gain access to the 2015 water supply and tank fill time data and analysis and allow for joint review of improved real time data in 2024.	NTA	

23112 It was agreed the April Meeting would be to consider short and medium term infrastructure projects and the May meeting will be set aside to consider long term infrastructure requirements.

24011 ASG will attend the up-coming BCWWA Conference in Whistler and has 4 companies to approach, including Veolia, AWC, Bi Pure, and Water n' Waste Tech.

24021 The CAC is currently penning a draft recommendation to Council which will come before the I.C. at our May meeting for review and comment.

7. New Business

A. Discussion around short-term solutions to looming water shortage.

The Village currently does not have a Public Works Manager, and there was no staff representative made available for the meeting.
It was the understanding of the Chair, the major source of water leakage within the Village is now considered to be downstream of the Highway Tank, and likely in the lower section of the Village (and not in the piping immediately below the tank). Work is still being done to confirm the exact locations, as it is suspected there could be several leaks contributing to the losses. The overall non-revenue water losses due to leakage are still being reported to be in the range of 200,000 usgpd, or 50% of overall winter water demand.
The previous PWM believed his findings are that non-revenue water losses of up to 75% of winter demand could be due to leakage, which, if true, would reduce overall consumption to the 300 l/d/p level experienced in Metro Vancouver.

It is possible, if water demand is reduced to 225,000 usgpd, or a third of 2023 demand, then with good management, potable water supply to the residents may not be

interrupted during the 2024 summer season. This will require continued vigilance in terms of leak detection and fixing, and an aggressive pubic education programme.

For reference, 1,400 residents × 300 l/p/d = 420,000 l/d = 110,950 usgpd. Current winter demand is close to 400,000 usgpd (with 200,000 usgpd in leakage confirmed to be below the Highway Tank).
The Summer time goal is to establish a daily water demand of 225,000 usgpd (opposite a 2023 consumption rate of 740,000 usgpd). 225,000 usgpd = 850,000 l/d which calculates out to be 600 l/d/p, or twice the Metro Vancouver average.

B. Update Water metering – Request for Council.

The I.C. confirms the most significant benefit associated with water metering is the identification, and subsequent fixing, of water leaks. When considering the above agenda item, it is essential, and somewhat obvious, that water leakage must be properly addressed – water metering is the most important part of the solution.
Water metering installation and operations program costs need to be considered, both costs, recovery through rate structure and grant opportunities be fully articulated to the community. In order for water metering to be successful in Lions Bay, the identified water leaks have to be fixed – again somewhat obvious. And this too involves costs to the residents. If the leaks are on the public side, while the costs will be incurred by the PW budget, ultimately the residents will pay. More significantly, when leaks are detected on the private side (which they will be as original infrastructure ages out past its useful life) then the residents will have to personally pay for the repairs to their property. This is perfectly reasonable, but the cost will be in the $1,000 - $10,000 range per occurrence (in 2024 dollars).

The I.C. supports the proposed new water by-law from a technical perspective as long as the community fully understands what is being asked. Further, the I.C. suggest the water metering should be grant funded as we believe there are other projects that also require access to limited funding. Most certainly the proposed new water by-law should be on the table for discussion within the community.

The I.C. fully endorses the current initiative to proceed with zone metering, and to expand this to include a pilot programme which will focus on the larger water consumers such as commercial, multiplex dwellings and the “large leak repeat offenders”.

C. Options for Alberta Intake.

The I.C. believes using the Alberta Creek water license flow to enhance the Harvey Creek and Magnesia Creek flows during times of low creek flow is workable. A preliminary review suggests water can flow by gravity from the Alberta Creek intake to the Harvey

Creek WTP, while the increase in head from the Alberta Creek intake to the Harvey Creek in-take in approximately 3 meters.
For the summer of 2024 the I.C. would recommend Council instructs staff to continue with an aggressive leak detection programme, when appropriate (do not "call wolf" too early) a technical based appeal to residents to conserve water, good management of the water resource, and finally , the introduction fo Alberta Creek supply into the Harvey Creek in-take as the best option for ensure a safe and continuous water supply.

Action Step – Once the Village is in receipt of a commissioned report from Carollo Engineers Canada, regarding utilizing Alberta Creek, said report should be reviewed and a recommendation forwarded to Council as how best to proceed with the initiative. See Item 24041.

D. Drilling Program – short or long-term?

There was considerable discussion surrounding the option to drill for well water, both within the Village boundaries, and immediately outside on Crown lands.
The Mayor, and one resident, have been in discussions with a mining sector drilling company and have also had contact with the MoE concerning the anticipated raw water supply shortage. Council and I.C. members were not aware of, nor have been made privy to the outcomes, of these meetings.
There was a debate over the urgency of initiating well drilling and whether any flow can be successfully introduced into our potable water system before the August/September anticipated supply shortage deadline.
All agree the mechanical requirements can be reached to drill a test well within the Village boundaries, but questions remain as to the volume of water obtained that could be pumped from one test well, the number of wells that will be needed to make any material difference to our supply, access to the well sites, electrical power and pumping requirements, especially from wells currently on Crown lands, and with the regulatory requirements that will have to be met to allow for the well water to be added to our community water supply.
Well water is clearly an option that has to be considered as it is not as vulnerable to contamination in the event there is a forest fire in our surface water watersheds. Whether or not wells can be put on line in time to meet the 2024 demand is to be determined, but regardless, wells should be properly considered as a potential raw water supply source in the medium term.

Action Step - KB to continue his discussions with the drilling companies to determine the full cost of finding sufficient well water supplies, accessing the well sites permanently, providing energy, for pumping etc., classifying the water quality, and treating the water the water if necessary (mineral contamination, GUIDI or GARP classifications). The cost to drill one test well is much different than the cost to put several wells of fully treated potable water on line. See Item 24042.

Action Step – KB to continue his discussions with the British Columbia MoE and Ministry of Health to determine the regulatory requirements and possible treatment steps that

will be needed to allow any well water supplies to be added to the community water system. See Item 24043.

E. Learning for the 2015 experience to manage anticipated 2024 raw water supply shortage.

Discussion centred on learning from the 2015 season, when the Village experienced a similar raw water supply situation. It was recalled flow into the in-takes declined rapidly in July and early August, but at some point in mid August, this decline levelled off and remained reasonably constant until the fall rains arrived. At the time it was determined the water from the saturated ground might have supplied the Village for close to 300 days.
Having this information available to the PWM and I.C. could allow for a similar curve to be drawn in real time in 2024, and based on superior flow monitoring in the Creeks would allow the administration to properly manage our water supply.
If this enhanced water management opportunity can be combined with continued leak detection and fixing, consumer education and conservation and with Alberta Creek possibly available to supplement the Harvey Creek supply, the Village should be able to ensure continued potable water supply all summer and into the early fall.

Action Step – NTA to contact Staff to gain access to the 2015 water supply and tank fill time data and analysis and allow for joint review of improved real time data in 2024. . See Item 24044.

8. Public Questions & Comments

No public comments or delegation were forthcoming.

9. Adjournment

Moved/Seconded
THAT the Infrastructure Committee Meeting be adjourned.

CARRIED

The meeting adjourned at 20:17.

10. Next Meeting – May 16, 2024

The next meeting is scheduled for May 16, 2024.

_____ _____

Chair Corporate Officer

Date Adopted by Committee:	

Class B Cost Estimate - Summary **6/25/2024**

	Direct Costs	Total Cost
Div 01	General Requirements	$19,500
Div 03	Concrete	$32,900
Div 26	Electrical	$126,000
Div 31	Earthworks	$16,000
Div 32	Roads and Site Improvements	$-
Div 33	Utilities	$233,150
Div 34	Transportation	$-
	Direct Costs:	**$ 427,550**
	Construction Contingency ~ 15% of Direct Costs	**$ 64,133**
	Total Direct Costs (with contingency)	**$ 491,683**
ENGINEERING COSTS (NOT YET MODIFIED SINCE MAY 31)		$ 142,702
CONTRACTOR'S TEMPORARY CONSTRUCTION SERVICES & FACILITIES (2%)		Included in direct cost
OFF-HOUR SECURITY		$ -
GEOTECHNICAL INVESTIGATION		$ -
QUALITY CONTROL AND TESTING - allowance		$ -
ENVIRONMENTAL OR LEGISLATIVE PERMITS - (0.7% of construction costs)		$ -
OWNER'S CONSTRUCTION OVERHEAD COSTS		Not included
CONSTRUCTION INSURANCE		Not included
	Total Indirect Costs	**$ 142,702**
	Contingency ~ 10% of Indirect Costs	**$ 14,270**
	Total Indirect Costs (with contingency)	**$ 156,972**
	Escalation	**Not included**
	Total costs as of 2024 ($CDN)	**$ 648,655**

General Notes:

The construction cost estimate is based on measured quantities from the design drawings, unit prices based on a combination of pricing based on works of a similar nature, contractor quotes, and estimates of labour, material, and equipment costs including contractor overhead and markups.

Costs exclude considerations/items such as GST, deviation of existing unknown services or extraordinary conditions.

Lions Bay – Alberta Creek Transfer System
Quotation – June 25, 2024

Alberta Creek Inlet

1 – 3” Bray 31 Series Butterfly Valve with Lever Operator
1 – 3” Cla-Val Excess Flow Shutoff Valve
2 – Flange Style Pipe Supports
2 – SS Wafer Lug Bolt kits
2 – SS Nut Bolt and Washer Sets with EPDM Gaskets

Your lot net price, all taxes extra ……..

Oceanview Tie In

1 – Endress + Hauser Pressure Transmitter with Integral Display
2 – 4” Flange x 3” Groove Sch 40 304 SS Elbow with T-O-Let
1 – 3” Victaulic 89E Coupling
1 – Cla-Val X43H Line Strainer
2 – 3” SS Bolt, Nut and Washer Sets with EPDM Gaskets
1 – ¾” SS Ball Valve
1 – Wall Support for Altitude Pilot
8 – LS-300 Link Seals

- Remove Existing Ductile Iron Spool
- Install new SS Elbow and locate coring location in ceiling (5” Core by others)
- Wall Mount Altitude Pilot and connect to Pressure Sustaining Line.
- Tie Altitude Pilot to Reservoir Sensing Line
- Install Inlet Elbow

Your lot net price, all taxes extra ……..

Pump Package

2 – 3” Bray 31 Series Butterfly Valves with Lever Operators
1 – **Grundfos CR 10-6 Pump (240 Volt Single Phase)**
1 – Aluminum Pump Base
1 – 3” Val-Matic 1403A.1 Wafer Silent Check Valve
2 – 3” Victaulic 89E Couplings
1 – 2” Victaulic 89E Couplings
2 – Pressure Gauge/Transmitter Tees with SS Ball Valves
2 – Endress + Hauser Pressure Transmitters with Integral Display
2 – 3” Flange x Groove Sch 10 304 SS Wall Spools
2 – 3” Flange x Groove Sch 10 304 SS Spools with T-O-Lets
1 – 2” 300# Flange x 3” 150# Flange Sch 10 304 SS Spool
1 – 2” 300# Flange x 3” Groove Sch 10 304 SS Spool

Cont.2

Lions Bay – Alberta Creek Transfer System
Quotation – June 25, 2024

1 – 2” Groove x 3” Flange Sch 10 304 SS Spool
1 – 3” Flange x Flange Sch 10 304 SS Spool
2 – SS Pipe Supports
2 – 3” SS Nut, Bolt and Washers set with Garlock Gasket
2 – Wafer Lug BFV Bolt Kits
1 – 3” Wafer Check SS Bolt, Nut and Gasket Kits
2 – 2” 300# SS Nut, Bolt and Washers sets with Garlock Gaskets
- Package to be assembled Inside the Kiosk at Site

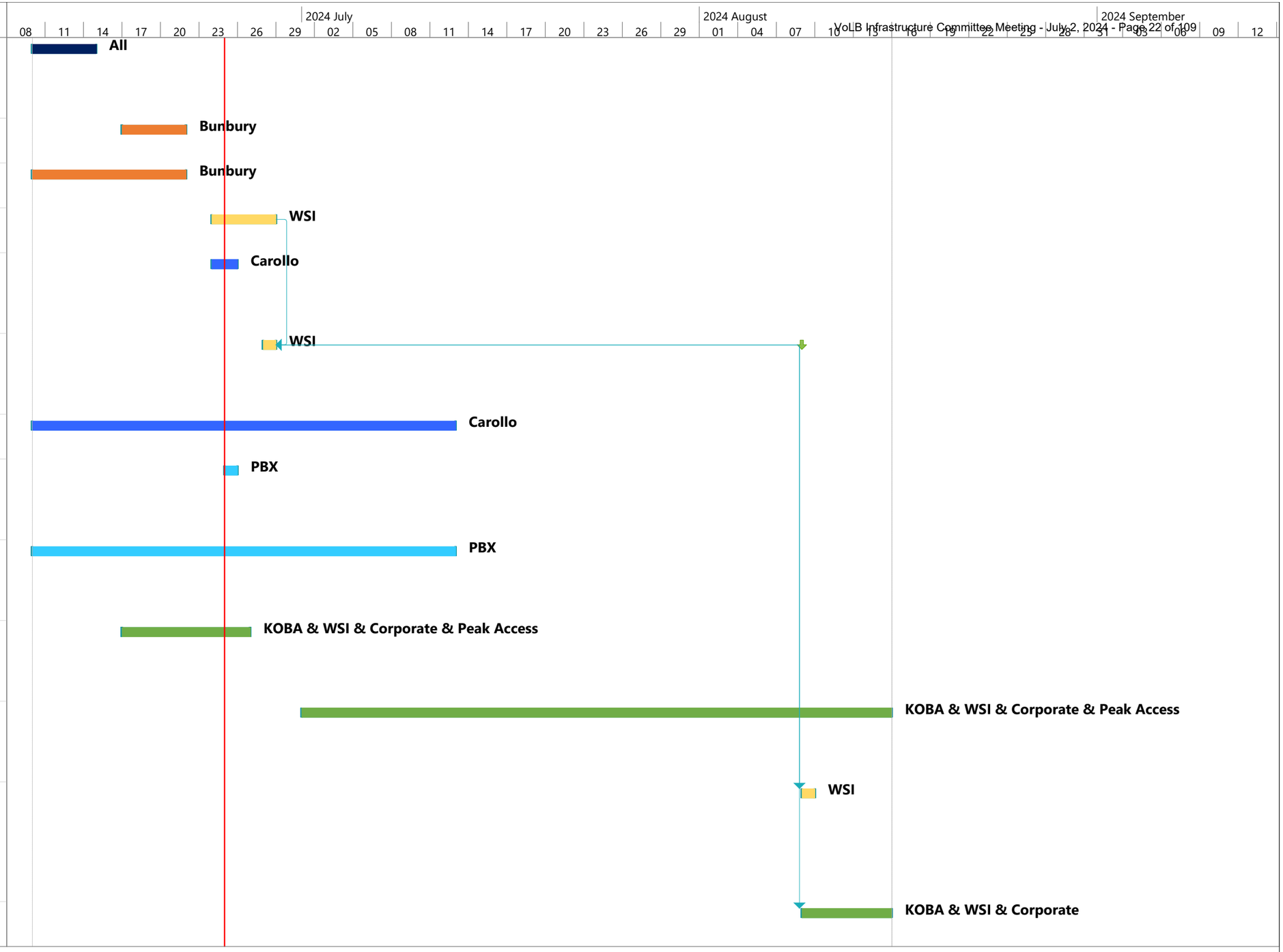
Your lot net price, all taxes extra ……

Harvey PRV Tie In
1 – 3” Mueller Gate Valve
1 – 3” Magnetic Flowmeter Endress + Hauser Promag W400
1 – 4” Flange x 3” Flange x 4” Groove Sch 10 304 SS Tee
1 – 4” Groove x Flange Sch 10 304 SS Spool with T-O-Let
1 – 3” Flange x 3” Flange Sch 10 304 SS Spool
1 – 3” Flange x 3” Groove Sch 10 304 SS Elbow
1 – 4” Victaulic 89E Coupling
1 – 3” Victaulic 89E Coupling
1 – ¾” SS Ball Valve
8 – LS-300 Link Seals
1 – 3” Groove x 3” Flange Sch 10 304 SS Wall Penetration Spool
2 – 4” SS Nut, Bolt and Washers sets with Garlock Gaskets
5 – 3” SS Nut, Bolt and Washers sets with Garlock Gaskets
- Isolate Valves and remove existing Flange x Groove Spool
- Install new 4” SS Piping
- Install new 3” Valve, Flow Meter and 3” SS Piping
- Install new SS Elbow and locate coring location in ceiling (5” Core by others)

Your lot net price, all taxes extra ……

David Berton – Project Manager
604-209-9049

ID	Task Name	Duration	Start	Finish
1	Engineering Contracts Confirmed	5 days	Mon 24-06-10	Fri 24-06-14
2	Field Surey	5 days	Mon 24-06-17	Fri 24-06-21
3	CAD Survey Files	10 days	Mon 24-06-10	Fri 24-06-21
4	Design Support	5 days	Mon 24-06-24	Fri 24-06-28
5	Finalize Mechanical Equipment List	2 days	Mon 24-06-24	Tue 24-06-25
6	Order Pump and Pump Kiosk	1 day	Fri 24-06-28	Fri 24-06-28
7	100% Detailed Design	25 days	Mon 24-06-10	Fri 24-07-12
8	Mechanical Equipment List SENT TO PBX	1 day	Tue 24-06-25	Tue 24-06-25
9	100% Electrical Detailed Design	25 days	Mon 24-06-10	Fri 24-07-12
10	Contracting Contracts Confirmed	8 days	Mon 24-06-17	Wed 24-06-26
11	Install Pipeline	34 days	Mon 24-07-01	Thu 24-08-15
12	Arrival of Pump & Pump Kiosk on site (6 week lead time)	1 day	Fri 24-08-09	Fri 24-08-09
13	Commision Pipeline	5 days	Fri 24-08-09	Thu 24-08-15



Plot Date:

The Village of LIONS BAY

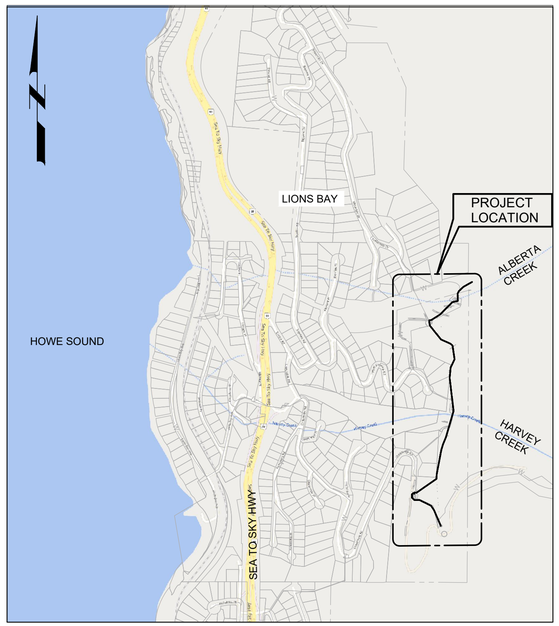
THE VILLAGE OF LIONS BAY

LIONS BAY HIGHWAY TANK RECONFIGURATION

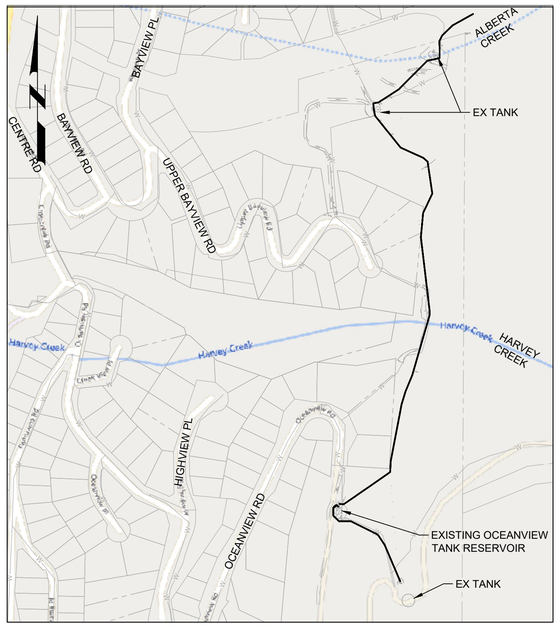
JUNE 2024

90% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

DRAFT



VICINITY MAP



LOCATION MAP

carollo®

2365 GORDON DRIVE, SUITE 208
KELOWNA, BC V1W 3C2
PHONE (250) 448-1088

JOB NO.	203013
DRAWING NO.	00G01
SHEET NO.	OF

LAST SAVED BY: JJabla

PROJECT NO. 11599A10 FILE NAME: 203013_00G01.dwg

SHEET NO.	DRAWING NO.	DESCRIPTION
		(G) - GENERAL
1	00G01	COVER SHEET
2	00G02	DRAWING INDEX AND DESIGN CONDITIONS
		(C) - CIVIL
3	00GC01	ABBREVIATIONS, LEGEND AND SYMBOLS
4	00C01	EXISTING CONDITIONS AND DEMOLITION PLAN
5	00C02	SITE PLANS AND YARD PIPING
6	00C03	TANK CONNECTION DETAILS
7	00C04	PIPE ALIGNMENT PLAN AND PROFILE STA 0+00.00 - STA 4+60.00
8	00C05	PIPE ALIGNMENT PLAN AND PROFILE STA 4+60.00 - STA 10+00.00
9	00C06	HARVEY CROSSING PIPE ANCHOR DETAILS
		(S) - STRUCTURAL
10	00GS01	GENERAL NOTES, LEGEND AND SYMBOLS
11	00S01	TANK AND PUMP KIOSK CONCRETE PADS
12	00S02	DETAILS 1
		(M) - MECHANICAL
13	00GM01	GENERAL NOTES, LEGENDS AND SYMBOLS
14	00M01	HARVEY PRV TIE-IN DETAILS (COMING FROM DAVE BERTON)
15	00M02	PUMP KIOSK (COMING FROM DAVE BERTON)
		(E) - ELECTRICAL
16	00GE01	GENERAL LEGEND AND SYMBOLS
17	00GE02	ABBREVIATIONS
18	00E01	(COMING FROM PBX)
19	00E02	(COMING FROM PBX)
20	00E03	(COMING FROM PBX)
21	00E04	(COMING FROM PBX)
22	00E05	(COMING FROM PBX)
		(T) - TYPICAL DETAILS
23	00TA01	ARCHITECTURAL 1
24	00TA02	ARCHITECTURAL 2
25	00TC01	CIVIL 1
26	00TC02	CIVIL 2
27	00TE01	ELECTRICAL 1
28	00TE02	ELECTRICAL 2
29	00TE03	ELECTRICAL 3
30	00TH01	HVAC 1
31	00TL01	LANDSCAPE 1
32	00TM01	MECHANICAL 1
33	00TM02	MECHANICAL 2
34	00TN01	INSTRUMENTATION 1
35	00TN02	INSTRUMENTATION 2
36	00TS01	STRUCTURAL 1
37	00TS02	STRUCTURAL 2

REV	DATE	BY	DESCRIPTION
			90% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED CL/DK
DRAWN JJ
CHECKED SH
DATE JUNE 2024

DRAFT

carollo

The Village of LIONS BAY

THE VILLAGE OF LIONS BAY
LIONS BAY HIGHWAY TANK RECONFIGURATION
GENERAL
DRAWING INDEX AND DESIGN CONDITIONS

VERIFY SCALES
BAR IS 25mm ON ORIGINAL DRAWING
0 25
IF NOT 25 mm ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203013
DRAWING NO. 00G02
SHEET NO.
OF

LAST SAVED BY: JJabla

PROJECT NO. 203013-100000 FILE NAME: 203013_00G02.dwg

Plot Date: 10/5/2022 11:05:10 AM

ABBREVIATIONS

	△	DELTA, DEFLECTION ANGLE, OR CENTRAL ANGLE
	#	NUMBER (REBAR Ø)
	@	AT (MEASUREMENT)
	+/-	PLUS/MINUS
A	ABC	AGGREGATE BASE COURSE
	ABND	ABANDONED
	AC	ASPHALTIC CONCRETE
	ACI	AMERICAN CONCRETE INSTITUTE
	ACP	ASBESTOS CEMENT PIPE
	ADDL	ADDITIONAL
	ADJ	ADJACENT, ADJUST(ABLE)
	AL	ALUMINUM
	APPROX	APPROXIMATE(LY)
	ARV	AIR RELEASE VALVE
	ASSY	ASSEMBLY
	ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
	AVG	AVERAGE
	AVV	AIR AND VACUUM VALVE
B	BC	BEGIN CURB
	BF	BLIND FLANGE
	BFP	BACK FLOW PREVENTER
	BFV	BUTTERFLY VALVE
	BH	BOREHOLE
	BLDG	BUILDING
	BM	BENCH MARK
	BO	BLOW OFF
	BOC	BACK OF CURB
	BOP	BOTTOM OF PIPE
	BOT	BOTTOM
	BV	BALL VALVE
	BVC	BEGINNING OF VERTICAL CURVE
	BYP	BYPASS
C	CATV	CABLE TV
	CAV	COMBINATION AIR VALVE
	CB	CATCH BASIN
	CC	CENTER OF CURVATURE, CENTER TO CENTER, CONCRETE CURB
	CDT	CONDUIT
	CF	CUBIC FEET
	CFM	CUBIC FOOT PER MINUTE
	CFS	CUBIC FEET PER SECOND
	CI	CAST IRON
	CIP	CAST IRON PIPE
	CIPP	CURED IN PLACE PIPE
	CJ	CONSTRUCTION JOINT
	CL	CENTER LINE
	CLK	CHAIN LINK
	CLR	CLEAR / CLEARANCE
	CLSM	CONTROL LOW STRENGTH MATERIAL
	CMLC	CEMENT MORTAR LINED AND COATED
	CMP	CORRUGATED METAL PIPE
	CMU	CONCRETE MASONRY UNIT
	CO	CLEANOUT
	CONC	CONCRETE
	CONN	CONNECT, CONNECTION
	CONST	CONSTRUCTION
	CONT	CONTINUOUS OR CONTINUATION OR (D)
	COORD	COORDINATE
	CP	CONTROL POINT
	CPLG	COUPLING
	CSP	CORRUGATED STEEL PIPE
	CTJ	CONTROL JOINT
	CTL	CONTROL
	CTR	CENTER, CENTERED
	CU	CUBIC
	CULV	CULVERT
	CY	CUBIC YARD
D	D	DRAIN, DEPTH
	D/W	DRIVEWAY APRON
	DEG or °	DEGREE
	DEMO	DEMOLISH, DEMOLITION
	DET	DETAIL
	DI	DROP INLET
	DIA or Ø	DIAMETER
	DIFF	DIFFERENCE
	DIM	DIMENSION
	DIP	DUCTILE IRON PIPE
	DIST	DISTANCE
	DR	DRIVE, DRAIN
	DWG(S)	DRAWING(S)
E	E	ELECTRICAL, EAST, EASTING
	EA	EACH
	EC	END OF CURB
	ECC	ECCENTRIC REDUCER
	EG	EXISTING GROUND
	EL	ELEVATION
	ELL	ELBOW
	ELEC	ELECTRICAL
	EMH	ELECTRICAL MANHOLE
	EOP	END OF PIPE
	EP	EDGE OF PAVEMENT
	EQ	EQUAL
	EQUIP	EQUIPMENT
	ES	EACH SIDE
	ESMT	EASEMENT
	EVC	END OF VERTICAL CURVE
	EW	EACH WAY
	EX/EXIST	EXISTING
	EXP	EXPANSION
	EXT	EXTERIOR
F	FC	FLEXIBLE COUPLING
	FCA	FLANGE COUPLING ADAPTER
	FF	FINISHED FLOOR
	FG	FINISHED GRADE
	FH	FIRE HYDRANT
	FIN	FINISH
	FL	FLOOR, FLOW LINE
	FLEX	FLEXIBLE
	FLG	FLANGE(D)
	FM	FORCE MAIN
	FND	FOUNDATION
	FO	FIBER OPTIC
	FOB	FLAT ON BOTTOM
	FOC	FACE OF CURB
	FOT	FLAT ON TOP
	FPM	FEET PER MINUTE
	FS	FIRE SERVICES
	FSP	FABRICATED STEEL PIPE
	FT or '	FOOT, FEET
	FTG	FOOTING
G	G	GAS, GUTTER
	GA	GAUGE
	GAL	GALLONS
	GALV	GALVANIZE(D)
	GB	GRADE BREAK
	GC	GROOVED COUPLING
	GEN	GENERAL, GENERATOR
	GM	GAS METER
	GND	GROUND
	GPD	GALLONS PER DAY
	GPM	GALLONS PER MINUTE
	GR	GRADE
	GRTG	GRATING
	GSP	GALVANIZED STEEL PIPE
	GV	GATE VALVE
H	HDPE	HIGH DENSITY POLYETHYLENE
	HORIZ	HORIZONTAL
	HP	HIGH POINT
	HPGM	HIGH PRESSURE GAS MAIN
	HW	HEADWALL, HOT WATER
	HWL	HIGH WATER LEVEL
	HWY	HIGHWAY
	HYD	HYDRANT
I	ID	INSIDE DIAMETER
	IE	INVERT ELEVATION
	IN or "	INCHES
	INCL	INCLUDE, INCLUDING
	INSTR	INSTRUMENTATION
	INV	INVERT
	IP	IRON PIPE
	IRR	IRRIGATION
J	JT	JOINT
L	L	LENGTH
	LAT	LATERAL, LATITUDE
	LB(S)	POUND(S)
	LF	LINEAL FEET
	LH	LEFT HAND
	LONG	LONGITUDINAL
	LP	LOW POINT
	LT	LEFT
	LWL	LOW WATER LEVEL
M	MATL	MATERIAL
	MAX	MAXIMUM
	MECH	MECHANICAL
	MFR	MANUFACTURER
	MGD	MILLION GALLONS PER DAY
	MH	MANHOLE
	MIN	MINIMUM
	MISC	MISCELLANEOUS
	MJ	MECHANICAL JOINT
	MON	MONUMENT
N	N	NORTH, NORTHING
	NA	NOT APPLICABLE
	NE	NORTHEAST
	NG	NATURAL GAS
	NIC	NOT IN CONTRACT
	NO. OR #	NUMBER
	NOM	NOMINAL
	NW	NORTHWEST
O	O.F.	OUTSIDE FACE
	OC	ON CENTER
	OD	OUTSIDE DIAMETER, OUTSIDE DIMENSION
	OHE	OVERHEAD ELECTRIC
P	PB	PULLBOX
	PC	POINT OF CURVATURE
	PCC	POINT OF COMPOUND CURVE
	PERP	PERPENDICULAR
	PH	POTHOLE
	PI	POINT OF INTERSECTION
	PL	PLATE, PROPERTY LINE
	POB	POINT OF BEGINNING
	PP	POWER POLE
	PRC	POINT OF REVERSE CURVATURE
	PROP	PROPERTY
	PL	PROPERTY LINE
	PSI	POUNDS PER SQUARE INCH
	PT	POINT, POINT OF TANGENCY
	PV	PLUG VALVE
	PVC	POINT OF VERTICAL CURVATURE
	PVC	POLYVINYL CHLORIDE
	PVI	POINT OF VERTICAL INTERSECTION
	PVMT	PAVEMENT
	PVT	POINT OF VERTICAL TANGENCY
Q	QTY	QUANTITY
R	R	RADIUS
	RAD	RADIAL
	RCB	REINFORCED CONCRETE BOX CULVERT
	RCP	REINFORCED CONCRETE PIPE
	RED	REDUCER
	REF	REFERENCE
	REINF	REINFORCE(D)(ING)(MENT)
	REQ'D	REQUIRED
	REV	REVISION
	RFCA	RESTRAINED FLEX COUPLING ADAPTER
	RH	RIGHT HAND
	R/W or ROW	RIGHT OF WAY
	RR	RAILROAD
	RT	RIGHT
S	S	SLOPE, SOUTH
	SCH	SCHEDULE
	SD	STORM DRAIN
	SDDI	STORM DRAIN DROP INLET
	SDMH	STORM DRAIN MANHOLE
	SE	SOUTHEAST
	SECT	SECTION
	SHLD	SHOULDER
	SHT	SHEET
	SIM	SIMILAR
	SL	SLOPE
	SPEC(S)	SPECIFICATION(S)
	SQ	SQUARE
	SS	SANITARY SEWER
	SSCO	SANITARY SEWER CLEANOUT
	SSMH	SANITARY SEWER MANHOLE
	SST	STAINLESS STEEL
	ST	STREET
	STA	STATION
	STD(S)	STANDARD(S)
	STL	STEEL
	STRUCT	STRUCTURAL
	SW	SOUTHWEST
	SWK	SIDEWALK
	SYM	SYMMETRICAL
T	TB	THRUST BLOCK
	TC	TOP OF CURB
	TEL	TELEPHONE
	TOG	TOP OF GRATING
	TMH	TELEPHONE MANHOLE
	TOC	TOP OF CONCRETE
	TOP	TOP OF PIPE
	T.O.W. or TW	TOP OF WALL
	TRD	TREAD
	TYP	TYPICAL
U	UC	UNDERCUT
	UG	UNDERGROUND
	UGE	UNDERGROUND ELECTRIC
	UNKN	UNKNOWN
	UNO	UNLESS NOTED OTHERWISE
	USA	UNDERGROUND SERVICE ALERT
V	V	VERTICAL, VALVE
	VAR	VARIES
	VB	VALVE BOX
	VC	VERTICAL CURVE, VICTAULIC COUPLER
	VCP	VITRIFIED CLAY PIPE
	VERT	VERTICAL
	VLT	VAULT
	VPI	VERTICAL POINT OF INTERSECTION
W	W	WATER, WIDTH OR WEST
	W/	WITH
	W/O	WITHOUT
	WL	WATER LEVEL
	WM	WATER METER
	WS	WATER SURFACE
	WSP	WELDED STEEL PIPE
	WSTP	WATERSTOP
	WV	WATER CONTROL VALVE
	WW	WASTEWATER
X	XFMR	TRANSFORMER
Y	YD	YARD

LINE WORK

NEW STRUCTURES OR EDGE OF PAVEMENT

EXISTING STRUCTURES (SCREENED)

NEW PIPING (TRIPLE LINES)

NEW PIPING (SINGLE LINE)

EXISTING PIPING (TRIPLE LINES) (SCREENED)

EXISTING PIPING (SINGLE LINE)(SCREENED)

HIDDEN LINE OR TRAIL EDGE

CENTER, MONUMENT, OR SURVEY LINE

GUARDRAIL

EXISTING CONTOURS (SCREENED) — 310

NEW CONTOURS — 310

NEW FENCE — X — X

EXISTING FENCE (SCREENED) — X — X

REMOVE OR ABANDONED (CROSS HATCHING: FENCE SHOWN AS EXAMPLE)

POWER POLE & LINE — OHE — PP — OHE

CABLE TV (UNDERGROUND) — CTV — CTV

FIBER OPTIC — FO — FO

FUEL — F — F

NATURAL GAS — NG — NG

UNDERGROUND ELECTRIC — UGE — UGE

SANITARY SEWER — SS — SS

FORCEMAIN SANITARY SEWER — FM — FM

STORM DRAIN — SD — SD

TELEPHONE — TEL — TEL

WATER — W — W

PROPERTY LINE OR RIGHT OF WAY

SLOPE

NEW ROAD

EXISTING ROAD (SCREENED)

FUTURE ROAD, WATER EDGE OR RIDGE

CURB & GUTTER

CURB

SWALE

FLOWLINE

SHORING

RAILROAD TRACKS

LIMITS OF CONSTRUCTION — LOC — LOC

SILT FENCE — SF — SF — SF

EASEMENT

EXISTING EASEMENT

CITY LIMITS

EXISTING GRADE (PROFILE)

PROPOSED GRADE (PROFILE)

MATCH LINE — MATCH LINE STA XXX SEE DWG XXX

COORDINATES / ELEVATION

COORDINATES — XX — N 1600000 E 1000000 — N XXXXXXX.XX E XXXXXXX.XX

CONTROL POINT — XX

SPOT ELEVATION — FG XX.XX

ANY SPECIFIC DESIGNATIONS NOTED WILL NEED TO REFER TO ABBREVIATIONS

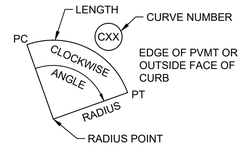
EXISTING SPOT ELEVATION — X 1325.00

SLOPE CALLOUT — 2:1 — 2 / 1 — 2.0% — S=0.0020

ROADWAY / PIPE CURVES

ROADWAY / PIPE CURVE

(SEE TABLE ON EACH PAVING AND GRADING OR CIVIL PIPING DWG WITH ROADWAY / PIPE CURVES.)



HATCH PATTERNS

AGGREGATE BASE COURSE (ABC)

ASPHALT PAVING

OR

(WITH AERIAL)

BEDROCK

CLSM

CONCRETE (ALL CLASSES)

DRAIN ROCK

GRAVEL

GRATING — SPAN

LANDSCAPING

RIPRAP

EXISTING/ UNDISTURBED SOIL

STRUCTURAL FILL OR BACKFILL

STEEL

STAGING AREA

TREAD PLATE

SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	EXISTING CONTROL POINT		LIGHT
	EXISTING MONUMENT		UTILITY POLE
XX	CONTROL POINT		UTILITY POLE GUY WIRE
B-XX	SOIL BORING LOCATIONS	PP	POWER POLE
PH	POTHOLE		FIRE HYDRANT
PHXX	POTHOLE NUMBER	CO	CLEANOUT
	FLOW/SLOPE DIRECTION		AIR RELEASE VALVE
	MANHOLE		BLOW OFF VALVE
	CATCH BASIN		HOSE BIBB / YARD HYDRANT
E	ELECTRICAL MANHOLE AND PULL BOX		SERVICE CONNECTION
M	METER BOX		BURIED VALVE
P	PULL BOX		FLANGE
T	TELEPHONE PEDESTAL		BALL VALVE
CTV	CABLE TV		BUTTERFLY VALVE
	POWER TOWER		CHECK VALVE
	GATE		GATE VALVE
	GUARD POST		PLUG VALVE
	HEADWALL		PIPE CAP OR CONNECTION
	ROCK WALL		REDUCER
	SHRUB/HEDGE	BC 1C	UNDERGROUND/ OVERHEAD WARNING (STATE/REGION SPECIFIC)
	TREE		
	SIGN/SIGN POST		

BREAK LINE

PIPE BREAK PLAN VIEW

PIPE BREAK CROSS SECTION

NORTH ARROW/ PLANT NORTH

SCALE — 0 10' 20' 40' — SCALE: 1" = 20'

EQUIPMENT/DEVICE KEY TAG — 1

EQUIPMENT/DEVICE NUMBER — XXX-XX-XXX

KEY NOTE — X

REVISION DELTA — 2

EXISTING ELEVATION — T.O.W. XXXX.X± (EXIST)

ELEVATION — TOC XXXX.XX

PIPE TAG — PIPE SIZE — X" XXX — FLOW STREAM — FUTURE — FUTURE PIPING (WHERE APPLICABLE)

* FOR EXISTING PIPING SHOW AS EX. SIZE FLOW STREAM

REV	DATE	BY	DESCRIPTION

90% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED CE
DRAWN CE
CHECKED
DATE JUNE 2024

DRAFT

carollo

The Village of LIONS BAY

THE VILLAGE OF LIONS BAY

LIONS BAY HIGHWAY TANK RECONFIGURATION

CIVIL

ABBREVIATIONS, LEGEND AND SYMBOLS

VERIFY SCALES
BAR IS 25mm ON ORIGINAL DRAWING
0 25
IF NOT 25 mm ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203013
DRAWING NO. 00GC01
SHEET NO.
OF

LAST SAVED BY: Jabla

PROJECT NO. 201341-100000 FILE NAME: 203013_00GC01.dwg

PLAN

FILE: 203013_00C01

GENERAL NOTES:

1. REFER TO DWG. NO. 00GC01 FOR GENERAL LEGEND AND SYMBOLS.
2. ELEVATIONS ARE BASED ON GEODETIC DATUM CGVD28 AND SURVEY DATA PROVIDED BY BUNBURY & ASSOCIATES LAND SURVEYING LTD DATED 6TH OF JUNE 2024. COORDINATES ARE DERIVED FROM UTM NAD83 (CSRS) ZONE 10.

SCALE

0 15 30 60

SCALE: 1 = 30 (HORIZ)

REV	DATE	BY	DESCRIPTION
			90% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED CL/DK
DRAWN JJ
CHECKED SH
DATE JUNE 2024

DRAFT

carollo

The Village of LIONS BAY

THE VILLAGE OF LIONS BAY

LIONS BAY HIGHWAY TANK RECONFIGURATION

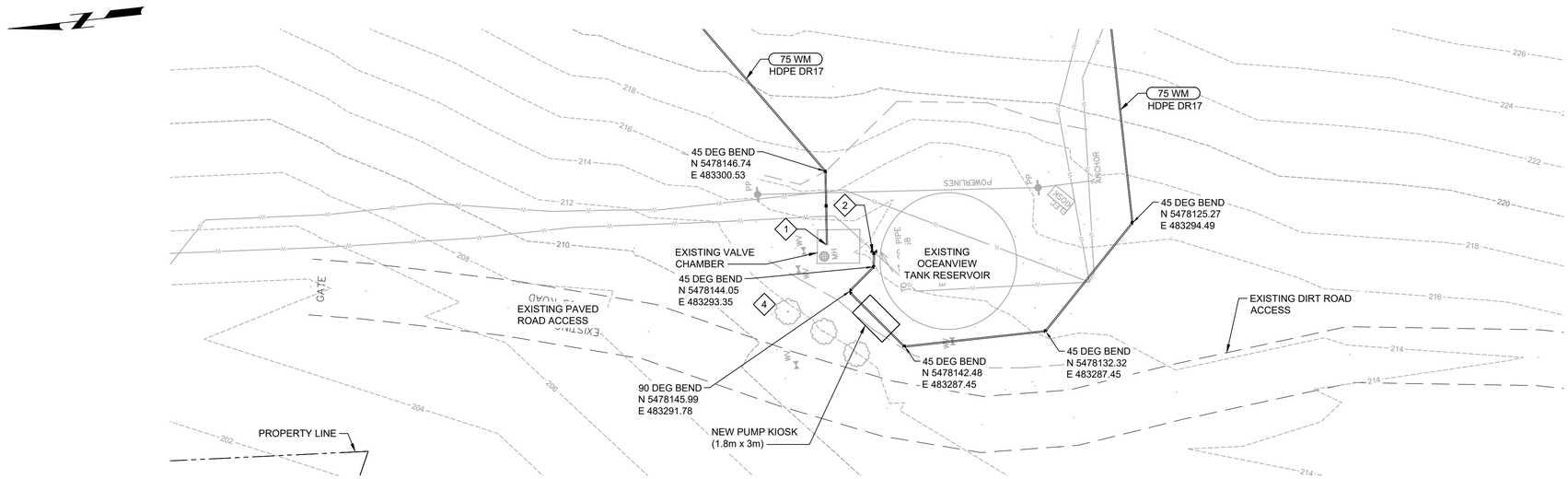
CIVIL

EXISTING CONDITIONS AND DEMOLITION PLAN

VERIFY SCALES
BAR IS 25mm ON ORIGINAL DRAWING
0 25
IF NOT 25 mm ON THIS SHEET, ADJUST SCALES ACCORDINGLY

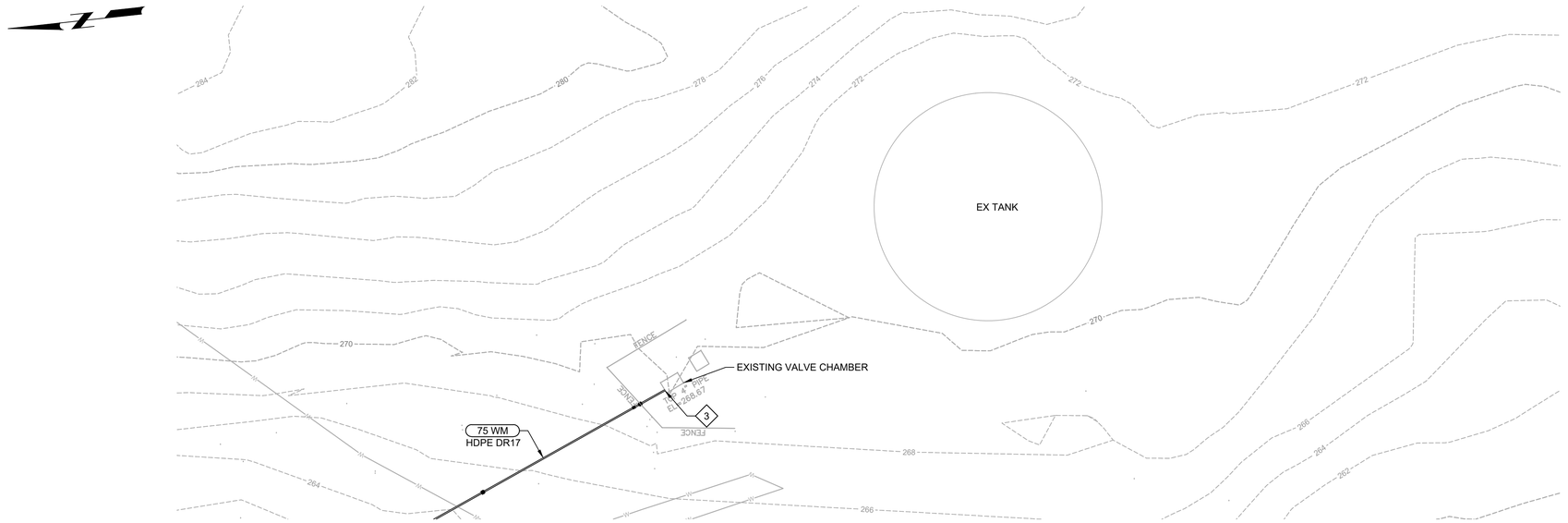
JOB NO. 203013
DRAWING NO. 00C01
SHEET NO.
OF

PROJECT NO. 12345A.10 FILE NAME: 203013_00C01.dwg



PLAN

FILE: 203013_00C02



HARVEY TREATMENT PLANT

PLAN

FILE: 203013_00C02

GENERAL NOTES:

1. REFER TO DWG. NO. 00GC01 FOR GENERAL LEGEND AND SYMBOLS.
2. ELEVATIONS ARE BASED ON GEODETIC DATUM CGVD28 AND SURVEY DATA PROVIDED BY BUNBURY & ASSOCIATES LAND SURVEYING LTD DATED 6TH OF JUNE 2024. COORDINATES ARE DERIVED FROM UTM NAD83 (CSRS) ZONE 10.
3. HDPE PIPE TO BE 75mm (3") IPS DR 17 CONFORMING TO PE MATERIALS DESIGNATION CODE PE4710.
4. HDPE PIPE TO BE BUTT HEAT FUSION BONDED IN ACCORDANCE WITH ASTM D3261. VICTAULIC COUPLINGS TO BE USED AS INDICATED ON THE DRAWINGS.
5. BENDS AS SHOWN ON THE DRAWINGS ARE APPROXIMATE LOCATIONS AND DEFLECTIONS. THE PIPE IS TO BE FIELD FIT TO MINIMIZE PIPE DEFLECTION.
6. BEND FITTINGS ARE TO BE USED SPARINGLY, AND ONLY WHEN THE PIPE DEFLECTION WOULD EXCEED THE MANUFACTURERS RECOMMENDATIONS WITHOUT THEM.
7. HDPE PIPE TO BE INSTALLED BETWEEN 0-100mm FROM THE SURFACE AT ALL TIMES. VERTICAL BENDS TO BE INSTALLED WHERE REQUIRED.
8. HDPE PIPE TO BE INSTALLED AND SUSPENDED ON ROLLERS AS REQUIRED.
9. AT ACCESS ROAD CROSSINGS, PIPE TO BE PROTECTED BY CONCRETE.
10. MAXIMUM BEND RADIUS:
    NO FLANGE OR FITTING PRESENT = 2400 mm
    FLANGE OR FITTING PRESENT = 8,890mm

KEY NOTES:

1. CONNECT TO OVERLAND 75 WM PIPE INTO THE EXISTING UNDERGROUND CONCRETE VALVE CHAMBER.
2. CONNECT 75 DI TEE TO EXISTING TANK DISCHARGE PIPE.
3. CONNECT TO EXISTING PRV CHAMBER. SEE MECHANICAL DWG FOR DETAILS.
4. APPROXIMATE LOCATION OF SCREENING TREES. EXACT NUMBER, LOCATION, AND SPECIES TO BE AS DIRECTED BY THE VILLAGE.

REG. PIPE BEND (DEG)	REG. PIPE LENGTH (mm)	REG. PIPE LENGTH (m)
5	209.47	0.209
11.5	481.77	0.482
22.5	92.60	0.943
45	1885.19	1.885
67.5	2827.79	2.828
90	3770.38	3.770

SCALE

0 2.5 5 10

SCALE: 1 = 5 (HORIZ)

REV	DATE	BY	DESCRIPTION
			90% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED CL/DK
DRAWN JJ
CHECKED SH
DATE JUNE 2024

DRAFT

carollo

The Village of LIONS BAY

THE VILLAGE OF LIONS BAY

LIONS BAY HIGHWAY TANK RECONFIGURATION

CIVIL

SITE PLANS AND YARD PIPING

VERIFY SCALES
BAR IS 25mm ON ORIGINAL DRAWING
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IF NOT 25 mm ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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DRAWING NO. 00C02
SHEET NO.
OF

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PROJECT NO. 12345A.10
FILE NAME: 203013_00C02.dwg

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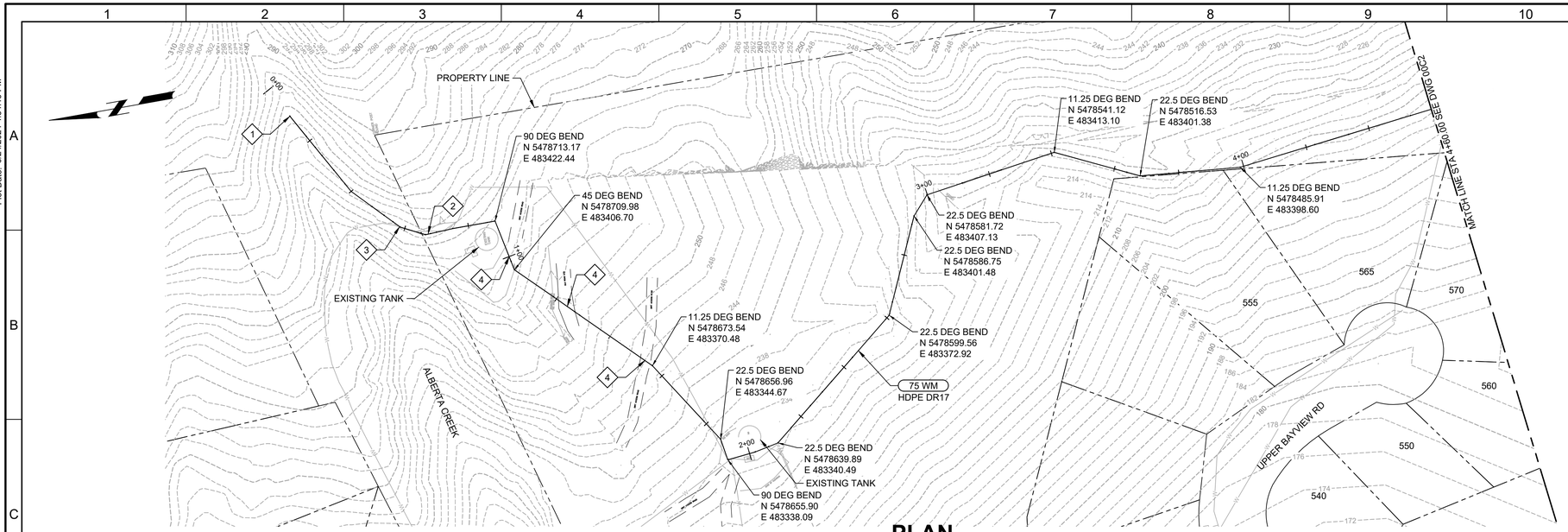

PLAN

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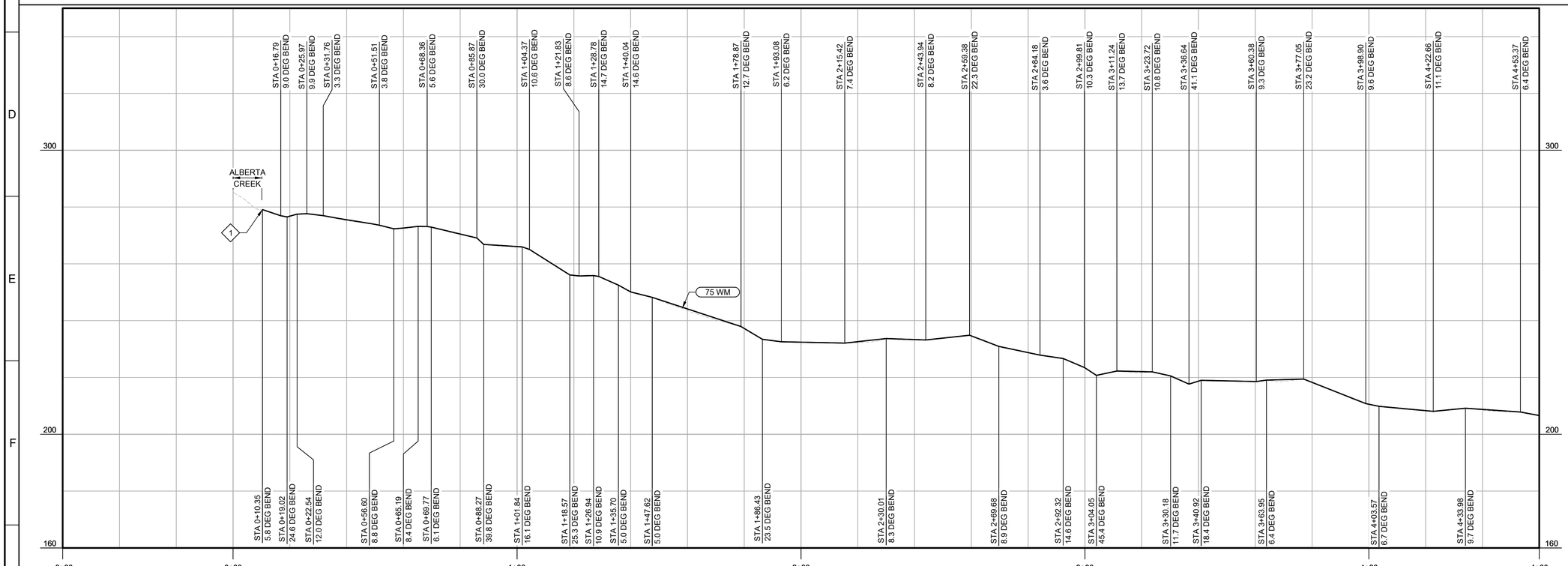

PROFILE

FILE: 203013_00C04

GENERAL NOTES:

1. REFER TO DWG. NO. 00GC01 FOR GENERAL LEGEND AND SYMBOLS.
2. ELEVATIONS ARE BASED ON GEODETIC DATUM CGVD28 AND SURVEY DATA PROVIDED BY BUNBURY & ASSOCIATES LAND SURVEYING LTD DATED 6TH OF JUNE 2024. COORDINATES ARE DERIVED FROM UTM NAD83 (CSRS) ZONE 10.
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6. BEND FITTINGS ARE TO BE USED SPARINGLY, AND ONLY WHEN THE PIPE DEFLECTION WOULD EXCEED THE MANUFACTURERS RECOMMENDATIONS WITHOUT THEM.
7. HDPE PIPE TO BE INSTALLED BETWEEN 0-100mm FROM THE SURFACE AT ALL TIMES. VERTICAL BENDS TO BE INSTALLED WHERE REQUIRED.
8. HDPE PIPE TO BE INSTALLED AND SUSPENDED ON ROLLERS AS REQUIRED.
9. AT ACCESS ROAD CROSSINGS, PIPE TO BE PROTECTED BY CONCRETE.
10. MAXIMUM BEND RADIUS:
    NO FLANGE OR FITTING PRESENT = 2400 mm
    FLANGE OR FITTING PRESENT = 8,890mm

KEY NOTES:

1. DESIGN AND BUILD NEW INTAKE WEIR AND SYSTEM (TO BE DESIGNED AND FIELD FIT BY THE VILLAGE OF LIONS BAY).
2. CONTRACTOR TO EXPOSE AND TIE-IN TO 100 WATER PIPELINE FROM INTAKE. A 75 MANUAL SHUTOFF VALVE TO BE INSTALLED AT THIS LOCATION.
3. EXISTING 100 WATER PIPELINE SECTION TO BE FLUSHED AND REUSED (TO BE RE-INSTATED BY THE VILLAGE OF LIONS BAY).
4. PIPE TO BE PROTECTED BY CONCRETE AT ACCESS ROAD CROSSINGS, SEE DETAIL.

REG. PIPE BEND (DEG)	REG. PIPE LENGTH (mm)	REG. PIPE LENGTH (m)
5	209.47	0.209
11.5	481.77	0.482
22.5	92.60	0.943
45	1885.19	1.885
67.5	2827.79	2.828
90	3770.38	3.770

SCALE

0 10 20 40
SCALE: 1 = 20 (HORIZ)

0 10 20 40
SCALE: 1 = 20 (VERT)

REV	DATE	BY	DESCRIPTION

90% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED CL/DK
DRAWN JJ
CHECKED SH
DATE JUNE 2024

DRAFT

carollo

The Village of LIONS BAY

THE VILLAGE OF LIONS BAY

LIONS BAY HIGHWAY TANK RECONFIGURATION

CIVIL

PIPE ALIGNMENT PLAN AND PROFILE
STA 0+00.00 - STA 4+60.00

VERIFY SCALES
BAR IS 25mm ON ORIGINAL DRAWING
0 25
IF NOT 25 mm ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203013
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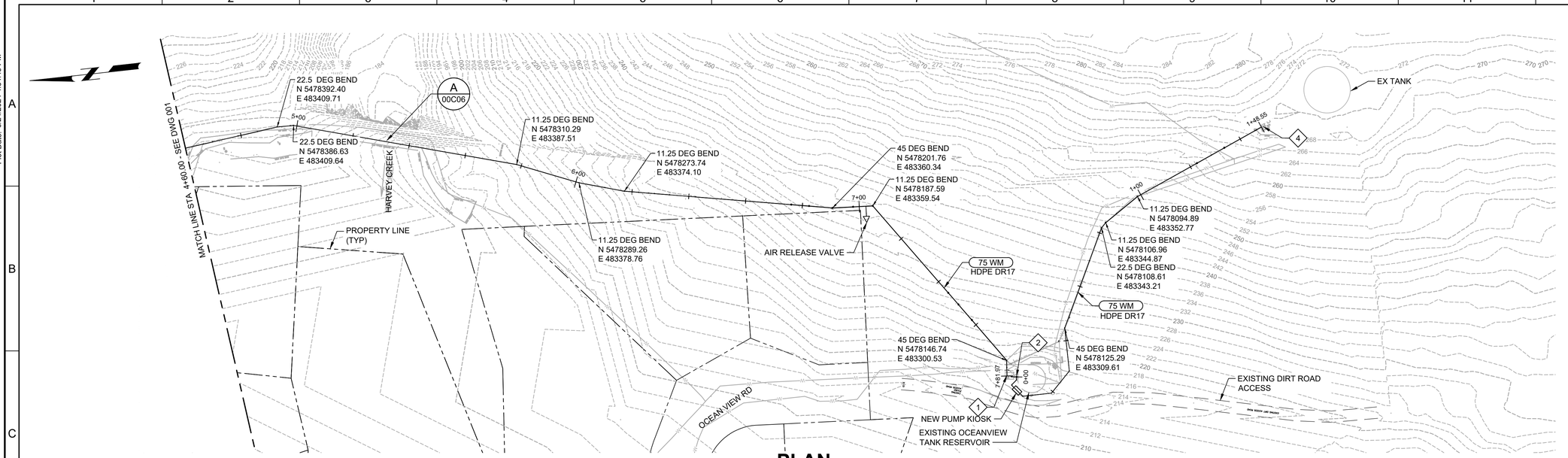
SHEET NO. OF

LAST SAVED BY: JJabla

PROJECT NO. 12345A.10 FILE NAME: 203013_00C04.dwg



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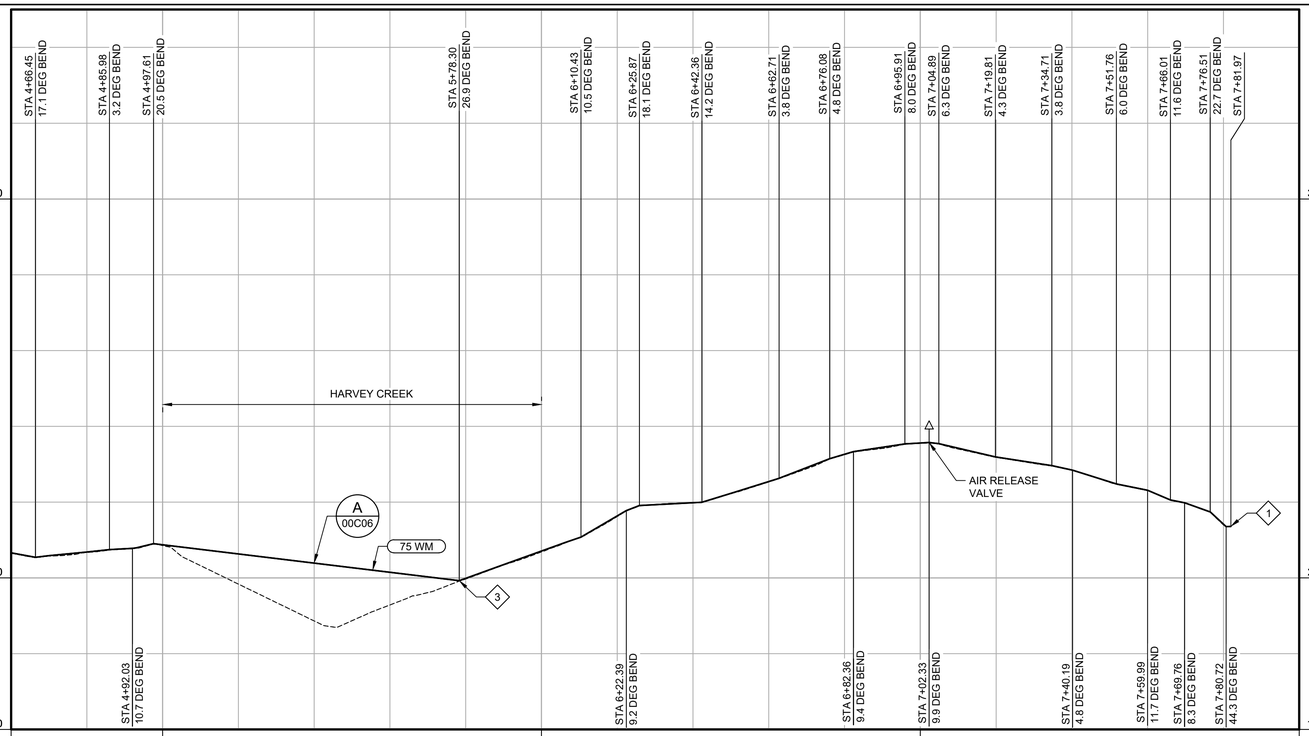

SUPPLY TO EX VALVE CHAMBER

PROFILE

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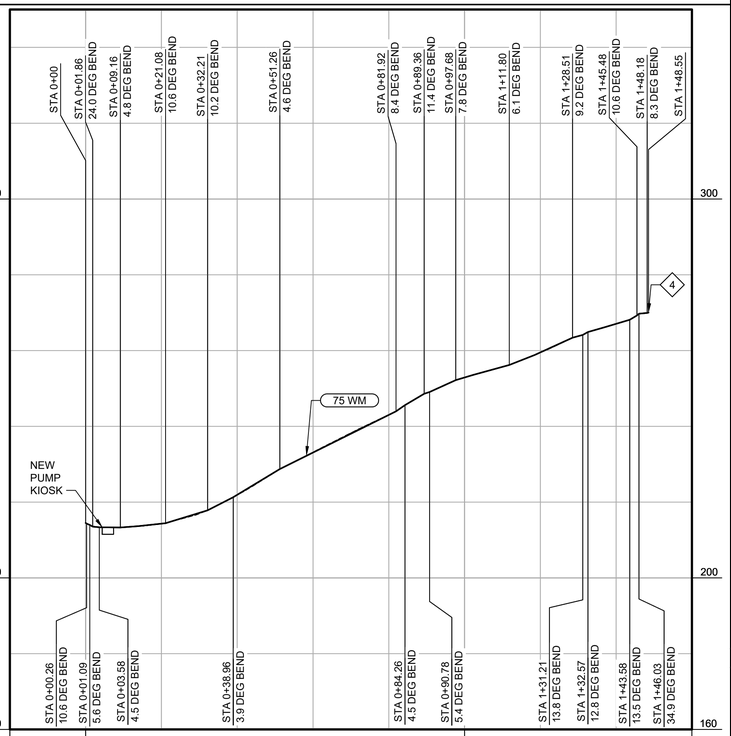

DISCHARGE FROM EX TANK

PROFILE

FILE: 203013_00C05

GENERAL NOTES:

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KEY NOTES:

1. CONNECT TO OVERLAND 75 WM PIPE INTO THE EXISTING UNDERGROUND CONCRETE VALVE CHAMBER.
2. CONNECT 75 DI TEE TO EXISTING TANK DISCHARGE PIPE.
3. INSTALL 50mm BLOWDOWN VALVE.
4. CONNECT TO EXISTING PRV CHAMBER. SEE MECHANICAL DWG FOR DETAILS.

REG. PIPE BEND (DEG)	REG. PIPE LENGTH (mm)	REG. PIPE LENGTH (m)
5	209.47	0.209
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SCALE

0 1 2 4
SCALE: 1 = 2 (HORIZ)

0 0.5 1 2
SCALE: 1 = 1 (VERT)

REV	DATE	BY	DESCRIPTION

90% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED CL/DK
DRAWN JJ
CHECKED SH
DATE JUNE 2024

DRAFT

carollo

The Village of LIONS BAY

THE VILLAGE OF LIONS BAY

LIONS BAY HIGHWAY TANK RECONFIGURATION

CIVIL

PIPE ALIGNMENT PLAN AND PROFILE
STA 4+60.00 - STA 9+20.00

VERIFY SCALES
BAR IS 25mm ON ORIGINAL DRAWING
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IF NOT 25 mm ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203013
DRAWING NO. 00C05
SHEET NO.
OF

LAST SAVED BY: Jiabla

PROJECT NO. 12345A.10 FILE NAME: 203013_00C05.dwg

The Village of LIONS BAY

2023 ANNUAL REPORT: DRINKING WATER QUALITY

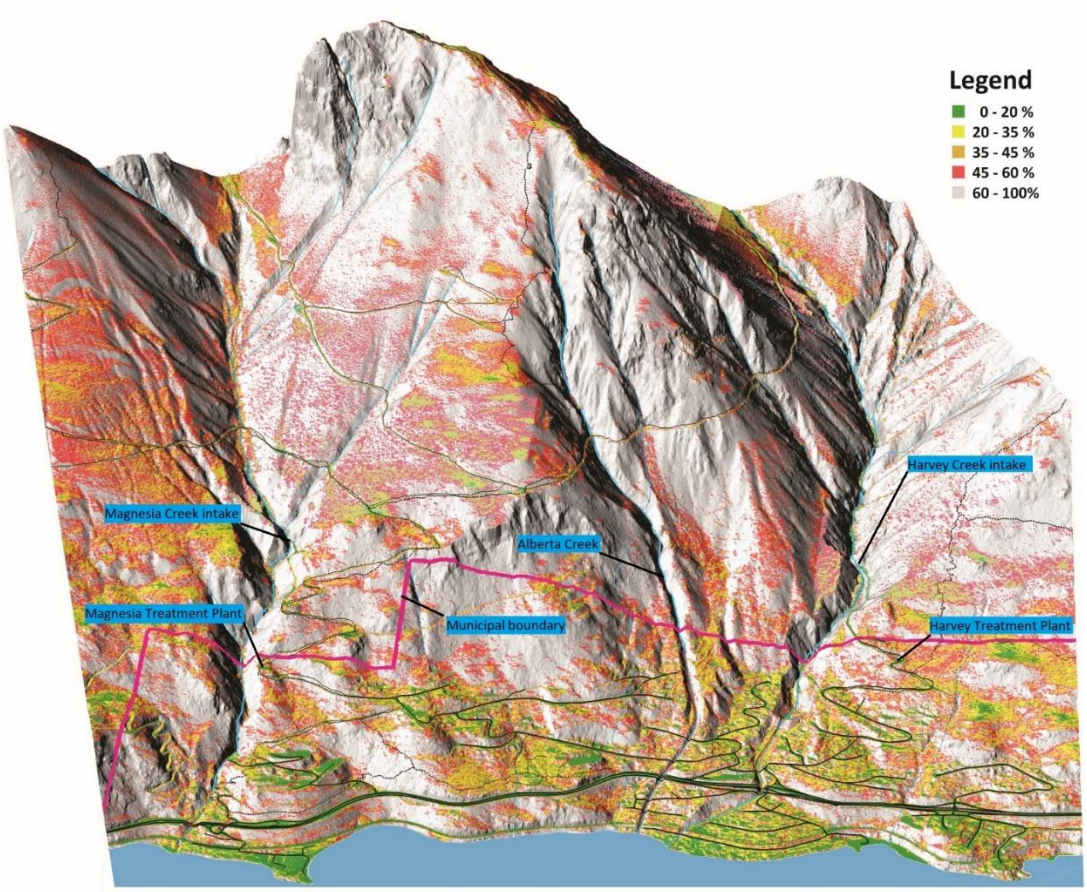
SUBMITTED 26 JUNE 2024
V 2.0

CONTENTS

1. EXECUTIVE SUMMARY

The Village of Lions Bay is a small Lower Mainland BC municipality located on Highway 99 midway between Vancouver and Squamish along the steep eastern shore of Howe Sound. Unlike most fellow members of the Metro Vancouver Regional District which receive drinking water from the Greater Vancouver Water District (GVWD), Lions Bay operates its own water supply and treatment system.

Supply is drawn at weirs on Crown land above the municipality on Harvey and Magnesia creeks, piped approx. 700 and 600 m respectively to ultraviolet/chlorination treatment plants, and distributed in 16.1 km of watermains to approximately 550 residential, 3 institutional/school and 3 commercial users.



There is no raw water storage, no filtration and no user metering. With low economies of scale, Lions Bay drinking water is expensive: the 2023 water operating budget was $1,054,000 including allocated staff costs, approximately 28 percent of the total municipal operating budget excluding amortisation. The water budget is funded by flat annual utility fees on each class of user, approximately 560 residential, one 35-student school, three multi-family and three commercial accounts, an average of $1945 each.

To measure water quality, samples are drawn throughout the year from multiple locations in the distribution system, and analysed in-house, at Vancouver Coastal Health's central laboratory and at accredited third-party laboratories.

In 2023, the municipality met *Drinking Water Protection Regulation* that no treated water sample was positive for *E. coli* and that "in each 30-day period, over 90 percent of…samples have zero Total Coliform, and no sample has more than 10 Total Coliform per 100 millilitres [in fact, no treated water sample tested positive for Total Coliform whatsoever]."

The municipality also monitors unregulated water quality parameters including acidity, chemicals, metals and more, according to recommendations from:

- The Health Canada *Guidelines for Drinking Water Quality;*
- The Drinking Water Officer assigned to Lions Bay;
- World Health Organisation (WHO) and U.S. Environmental Protection Agency (USEPA), where there are no Health Canada recommendations for given parameters.

In 2023, the municipality met all recommended limits.

2. INTRODUCTION

Lions Bay operates a Municipal Water Utility under the *Local Government Act,* the *Drinking Water Protection Act* and the *Drinking Water Protection Regulation*, which collectively obligate the municipality to:

- Operate the utility under operating permit(s) issued by the Ministry of Health Services;
- Engage in water quality monitoring;
- Prepare [this] annual report on water quality for the year.

Administration and enforcement of the regulations falls to Drinking Water Officers (DWO) representing regional Health Authorities. Lions Bay's health authority is Vancouver Coastal Health (VCH).

The kilogram, the SI unit of mass , was originally defined as the mass of a litre volume of water. Concentrations stated in mass per volume measures such as milligrams per litre (mg/l) for water solutions and suspensions happen to be effectively equivalent to volume per volume measures such as parts per million (ppm). Concentrations are reported herein as mass per volume, typically mg/ℓ or µg/ℓ (micrograms per litre), whether or not they are traditionally reported in ppm.

This report provides a synopsis of the year's water quality testing and the municipality's measures to protect and enhance drinking water quality, as well as background on water supply, treatment and distribution. Per Treatment Plant Operating Permits for Facility 3317552347 (the Magnesia Plant) and Facility 3317552348 (the Harvey Plant), the report is due no later than six months from the end of the calendar year reporting period.

3. SOURCE WATER

Lions Bay's drinking water originates from rainfall, snowmelt and groundwater flows in two surface creeks watersheds above the village. With no dams or reservoirs feasible in the steep terrain, water is drawn on demand direct from surface creeks under provincial water licenses:

Stream, catchment area above	License	Licensed quantity	Drawn in Jan 1 - Dec 31, 2023 by

intake contour		(m^3/year)	flow totalizer (m^3)
Harvey Creek, 635 hectares	C119916	41,483 (9,125,000 iG)	694,100 (239% of license)
	C119917	248,898 (54,750,000 iG)	
Magnesia Creek, 421 hectares	C059405	45,461 (10,000,000 iG)	124,900 (127% of license)
	C065267	19,912 (4,380,000 iG)	
	C065316	33,186 (7,300,000 iG)	
Alberta Creek, 51 hectares	C042330	82,966 (8,250,000 iG)	0 (not utilised)

At weirs on the creeks, water is screened for rocks, branches and leaves, and then flows by gravity to the Harvey and Magnesia Treatment Plants for disinfection by ultraviolet and chlorine. Both plants are classified under the Environmental Operators Certification Program as Class I Water Treatment facilities. Certification was renewed in 2023 and is valid until November 16, 2028 (see APPENDIX: CERTIFICATIONS).

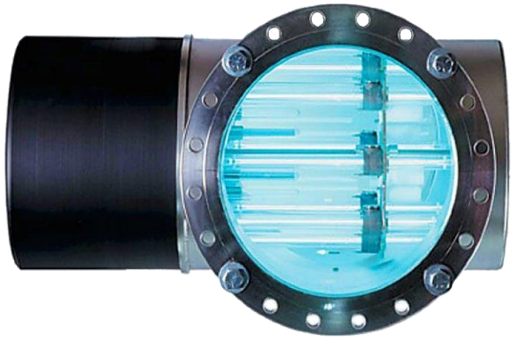
After treatment, water flows to users through an EOCP Class II Water Distribution System, also requiring the equivalent operators (and also renewed in 2023 and valid until November 16, 2028) comprising:

- 3 potable water tanks, Harvey, Magnesia and Highway;
- 16.8 km of watermain (various sizes and materials from the 1960s to 2010)
- 13 pressure reducing valve arrangements (3 updated, 10 overdue for replacement);
- 2 water treatment plants (Harvey Creek WTP, Magnesia Creek WTP)
- 529 property connections, also referred to as curb stops;
- 72 fire hydrants
- 250 shutoff, blowoff, sampling and isolation valves.

4. FOUR-BARRIER APPROACH

The municipality employs four barriers against pathogens in raw water and against bacterial regrowth in storage and distribution systems.

4.1 PRIMARY BARRIER – UV DISINFECTION



At each treatment plant, incoming raw water flows through ultraviolet (UV) reactors in which UV radiation alters microorganisms' cell DNA, preventing their further reproduction. UV is very effective against chlorine-resistant *Giardia* and *Cryptosporidium* protozoa, and against bacteria.

UV reactors automatically adjust lamp intensity to maintain the required UV dose and when adequate dosing cannot be maintained, flow stops and the system alarms.

4.2 SECONDARY BARRIER – CHLORINE

Past the UV reactor, water is injected with a 12 percent solution of sodium hypochlorite, the same substance used to disinfect swimming pools, and the active ingredient of bleach. Sodium hypochlorite in aqueous solution disrupts cell respiration and DNA reproduction and is used worldwide as a safe, inexpensive and effective barrier against viruses that cause cholera, polio, typhoid, hepatitis, enteric and other waterborne diseases, and as a disinfectant present throughout the distribution system.

4.3 TERTIARY BARRIER – SAMPLING

Every weekday except statutory holidays, municipal staff draw water samples to test in-house for turbidity and chlorine residual. One sample a week is sent to the VCH central laboratory for *E. coli* and Total Coliform testing. More extensive bi-annual testing at an accredited third-party lab is conducted for general water chemistry, metals and other contaminants. There are 13 sample locations in Lions Bay:

Sample Location	Source	Free chlorine	Turbidity	Bacteriological	Metals, chemicals
Harvey Plant	Harvey Creek raw	NA: before chlorination	Daily	Monthly	Biannual
Harvey Tank	Harvey Plant	Daily	Daily	Weekly	Biannual
PRV-3		Daily	Daily	Weekly	NA: mid-system
Store/Cafe		Daily	Daily	Weekly	Biannual
Lions Bay Avenue		Daily	Daily	Weekly	Biannual
Kelvin Grove		Daily	Daily	Weekly	Biannual
Harvey UV Reactor		NA: before chlorination	NA: same water as Harvey Plant	Monthly	NA: same water as Harvey Plant
Community Centre				Biannual only	
Magnesia Plant	Magnesia Creek raw	NA: before chlorination	Daily	Monthly	Biannual
Magnesia Tank	Magnesia Plant	Daily	Daily	Weekly	Biannual
PRV-5		Daily	Daily	Weekly	NA: mid-system
Brunswick Beach		Daily	Daily	Weekly	Biannual
Magnesia UV Reactor		NA: before chlorination	NA: same water as Magnesia Plant	Monthly	NA: same water as Magnesia Plant

The municipality's response to unexpected results depends on the significance of the parameter and ranges from re-sampling, to flushing water mains, to issuing boil water advisories or orders as outlined in APPENDIX: CONTAMINATION RESPONSE PROTOCOL on p.21. Lions Bay's most recent boil water advisory was in December 2014. Municipal testing and monitoring provides a representative picture of drinking water quality within the public water system, but the municipality does not test end-user water, where water quality can change significantly due to pipe material, standing time, temperature and other factors.

BACTERIOLOGICAL TESTING

The *Drinking Water Protection Regulation* requires routine sampling and testing for *E. coli* and Total Coliform bacteria. Named for discoverer Theodor von Escherich, *Escherichia coliform* or *E. coli* is a group of bacteria that form in the colon of warm-blooded animals, particularly mammals, and also birds. Presence of *E. coli* in a water sample indicates recent fecal contamination, and thus the possible presence of additional disease-causing bacteria, viruses and protozoa. The *Drinking Water Protection Regulation* standard for *E. coli* in treated water is None Detectable. **In 2023, no tested sample from Lions Bay's treated water system tested positive for *E. coli***.

The Total Coliform group of bacteria is composed of various bacteria with similar characteristics to *E. coli*. Natural niches for members of this group range from being fecal-specific, to those widely distributed in water, soil and vegetation. The *Drinking Water Protection Regulation* standards for Total Coliform (for more than 1 sample taken per month) require at least 90 percent of samples with no detectable Total Coliform bacteria per 100 ml; and no one sample with more than 10 Total Coliform bacteria per 100 ml. **In 2023, no tested sample from Lions Bay's treated water system tested positive for Total Coliform.**

2023 sample dates	Days since last	TREATED WATER SAMPLE LOCATION (based on operational needs[1] sampled water can be from the Harvey or Magnesia System)															
		Harvey Tank		PRV-3		Store/Café		Lions Bay Ave.		Kelvin Grove		Magnesia Tank		PRV-5		Brunswick	
		Total Coliform (TC) and *E. coli*, colony-forming units per 100 ml															
		TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*
Wed. Jan 04	4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jan 09	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jan 16	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jan 23	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jan 30	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Feb 06	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
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Mon. Apr 17	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Apr 24	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	N/A	N/A	<1	<1
Mon. May 01	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. May 08	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. May 15	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. May 23	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. May 29	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jun 05	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jun 12	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jun 19	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	RMFL	RMFL
Mon. Jun 26	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tue. Jul 04	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thu. Jul 13	9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jul 17	4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jul 24	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Jul 31	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tue. Aug 08	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Aug 14	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Aug 21	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Aug 28	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tue. Sep 05	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Sep 11	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Sep 18	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

[1] For example an intake being blocked or maintenance on a plant

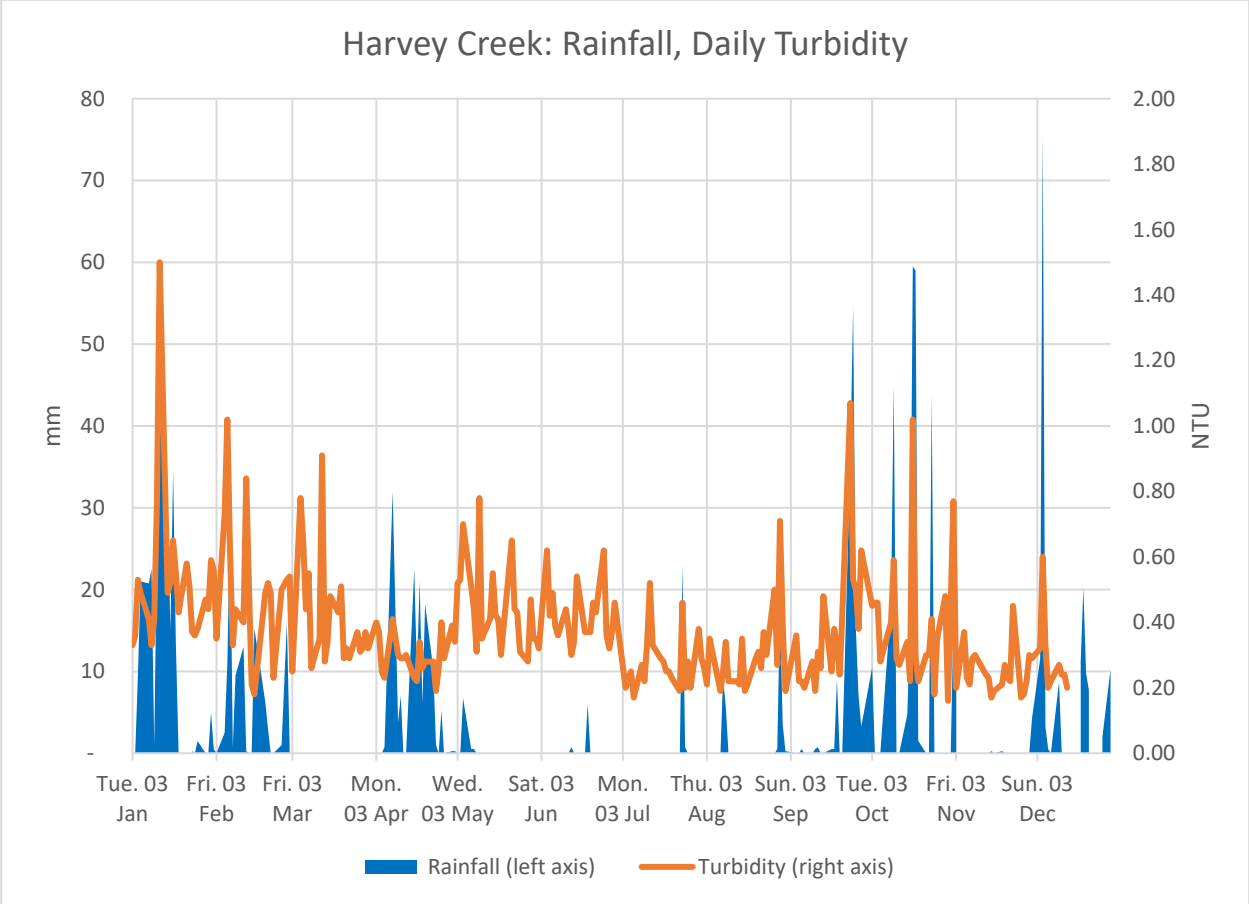
Mon. Sep 25	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tue. Oct 03	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tue. Oct 10	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Oct 16	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Oct 23	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Oct 30	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	RMFL	RMFL
Mon. Nov 06	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tue. Nov 14	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Nov 20	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Nov 27	7	<1	<1	<1	<1	Closed	Closed	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Dec 04	7	<1	<1	<1	<1	Closed	Closed	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Dec 11	7	<1	<1	<1	<1	Closed	Closed	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mon. Dec 18	7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Wed. Dec 27	9	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL

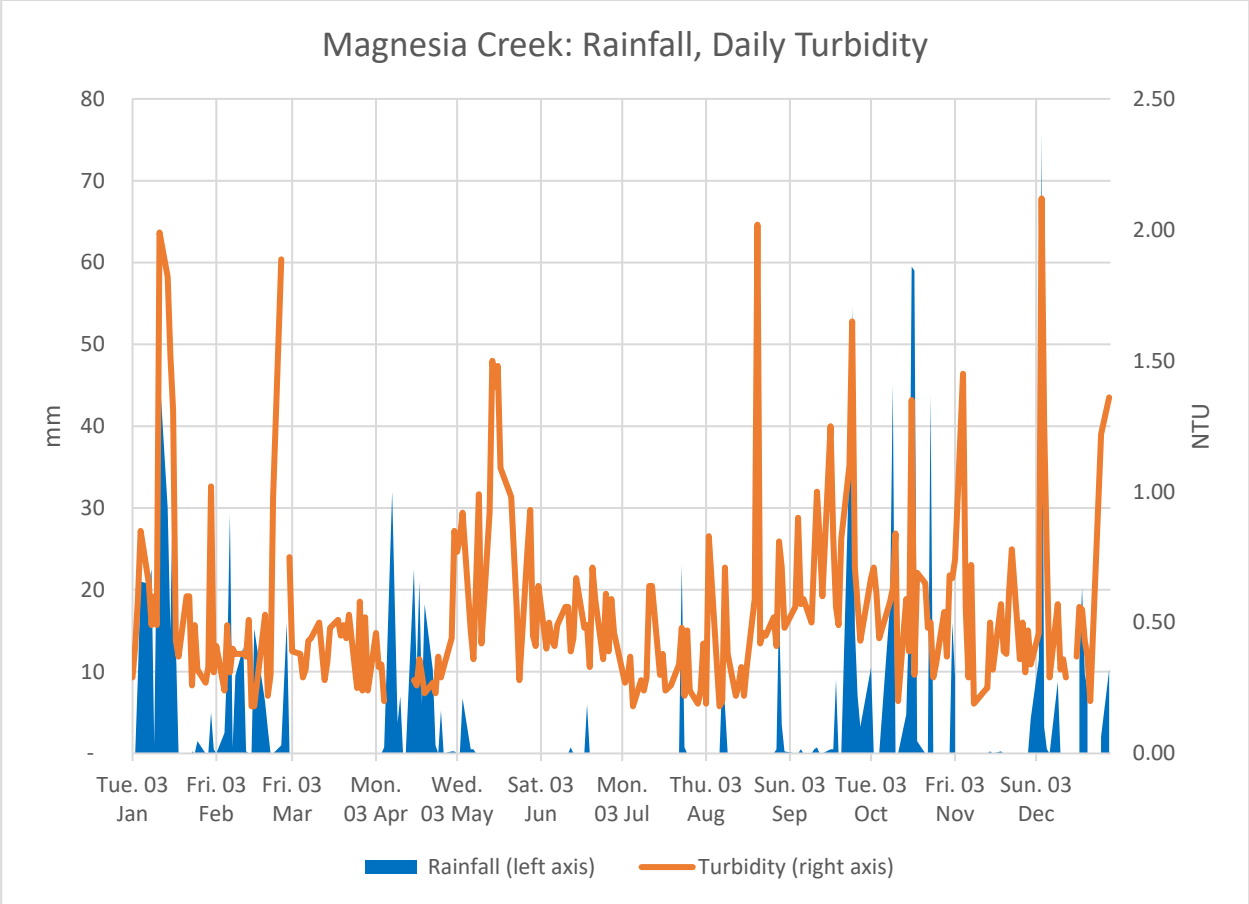
2023	**Harvey UV reactors**		**Magnesia UV reactors**	
	Coliform-forming units/100 ml	**E. Coli-forming units/100 ml**	**Coliform-forming units/100 ml**	**E. Coli-forming units/100 ml**
04-Jan	<1	<1	<1	<1
06-Feb	<1	<1	<1	<1
13-Mar	<1	<1	N/A	N/A
03-Apr	<1	<1	<1	<1
01-May	<1	<1	<1	<1
05-Jun	<1	<1	<1	<1
04-Jul	<1	<1	<1	<1
08-Aug	<1	<1	<1	<1
05-Sep	<1	<1	<1	<1
03-Oct	<1	<1	<1	<1
06-Nov	<1	<1	<1	<1
04-Dec	<1	<1	<1	<1

N/A = Not Available or plant
RMFL = Result Missing From Lab

A NOTE ON TURBIDITY

Lions Bay raw water arises in steep, forested catchments, and is particularly subject to fluctuating turbidity, the haziness in water arising from organic, inorganic and mineral particulates washing into the creeks during rain events. Measured in Nephelometric Turbidity Units (NTU), turbidity is a measure of the concentration of suspended particles in a sample of water, determined using a light-scattering method. Both UV and chlorine treatment are affected by turbidity. Particulates shadow, absorb and scatter UV light, and microorganisms obscured in particulate crevices may avoid direct contact with chlorine (chlorine residual levels are therefore increased whenever turbidity rises above 1 NTU in finished water). In 2023, based on weekday-only daily readings, turbidity never exceeded 3 NTU in either Harvey or Magnesia Creek, and there were no periods of more than one day with NTU between 2 and 3 NTU:





Detailed NTU data are provided in an appendix on p.39.

A NOTE ON CHLORINE RESIDUAL

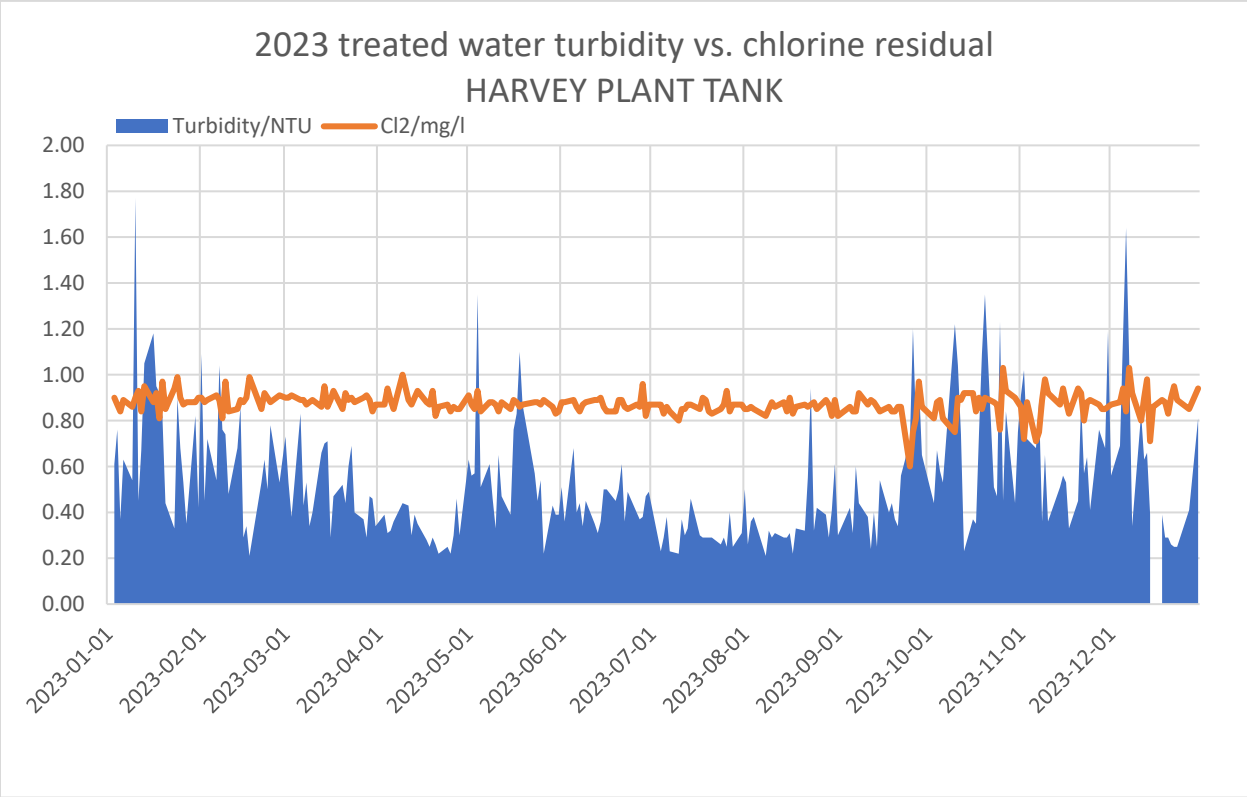
Chlorine residual levels are not directly regulated by the *Drinking Water Protection Act* or the *Drinking Water Protection Regulation:*

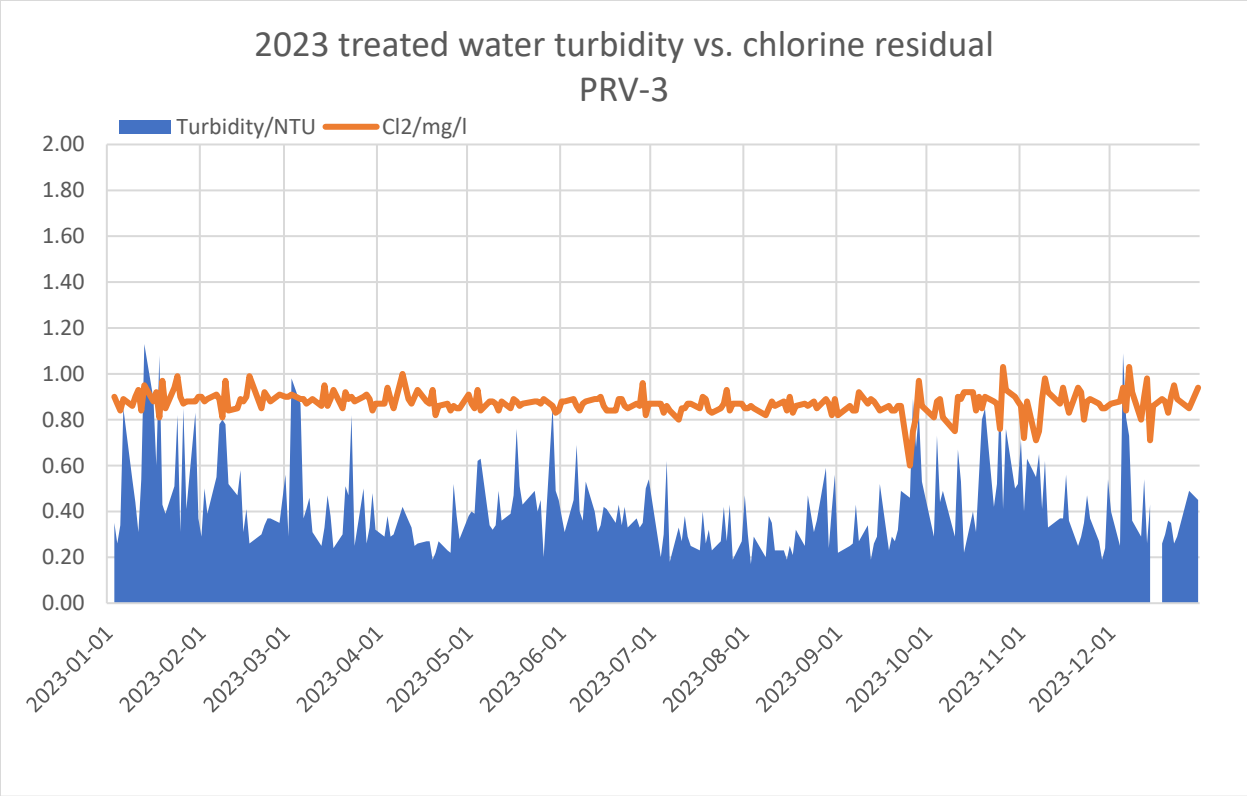
- On the high end of possible concentrations, *Guidelines for Canadian Drinking Water Quality* state that a "guideline value [for maximum concentration of chlorine] is not necessary due to low toxicity at concentrations [typically] found in drinking water."
- At the low end, no minimum chlorine concentration regulations exist for British Columbia. However, the 2020 *Health Canada Guidelines for Canadian Drinking Water Quality: Guideline Technical Document—Chlorine* indicates:
    - The USEPA Surface Water Treatment Rule requires a minimum disinfectant residual of 0.2 mg/ℓ for water entering the distribution system and that a detectable level be maintained throughout the distribution system.
    - Chlorine concentrations in most Canadian drinking water distribution systems range from 0.04 to 2.0 mg/ℓ.
    - In general, a chlorine residual of 0.2 mg/ℓ is considered a minimum level for the control of bacterial regrowth in the distribution system by WHO and USEPA

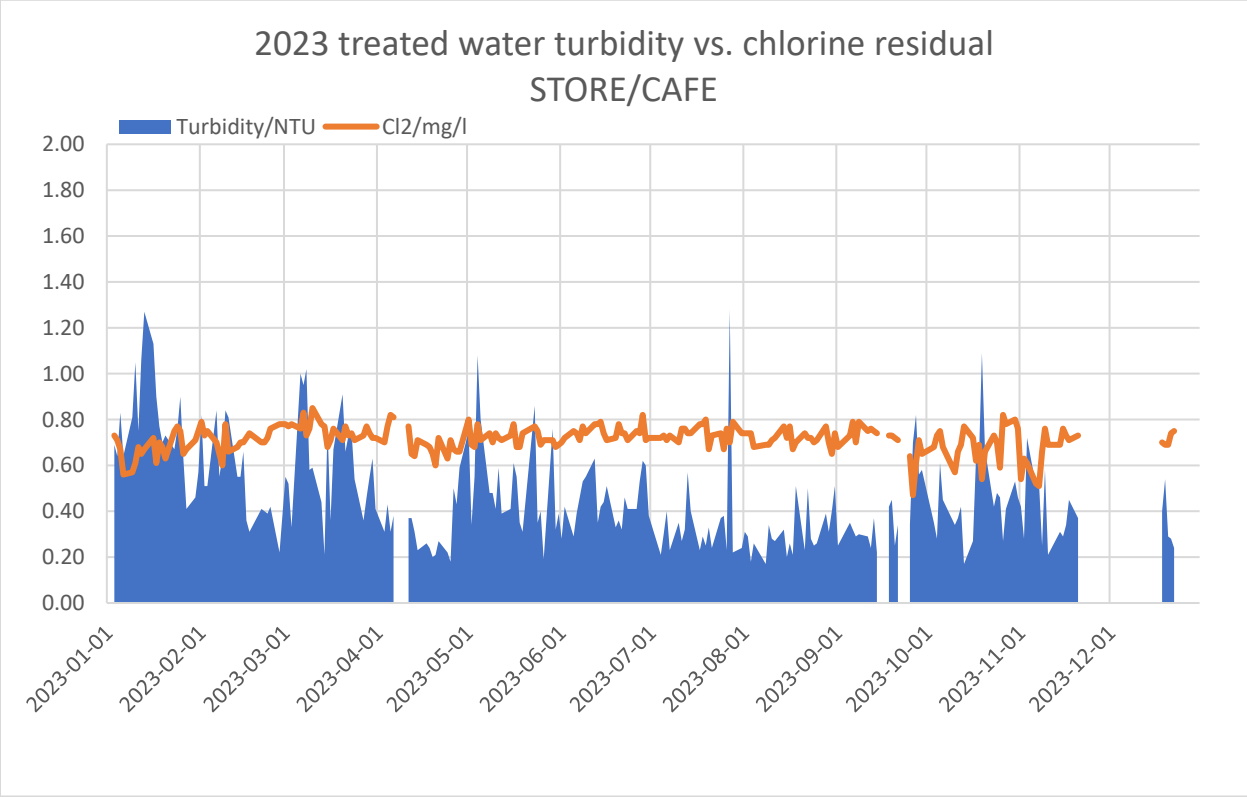
The municipality's objective is to maintain at least 0.2 mg/ℓ chlorine residuals in all parts of the system. In practice, two to five times that level is generally present, leading to occasional user complaint of bleach or chemical smell. Work is being done on active control loops to increase operator confidence to drop chlorine to lower levels.

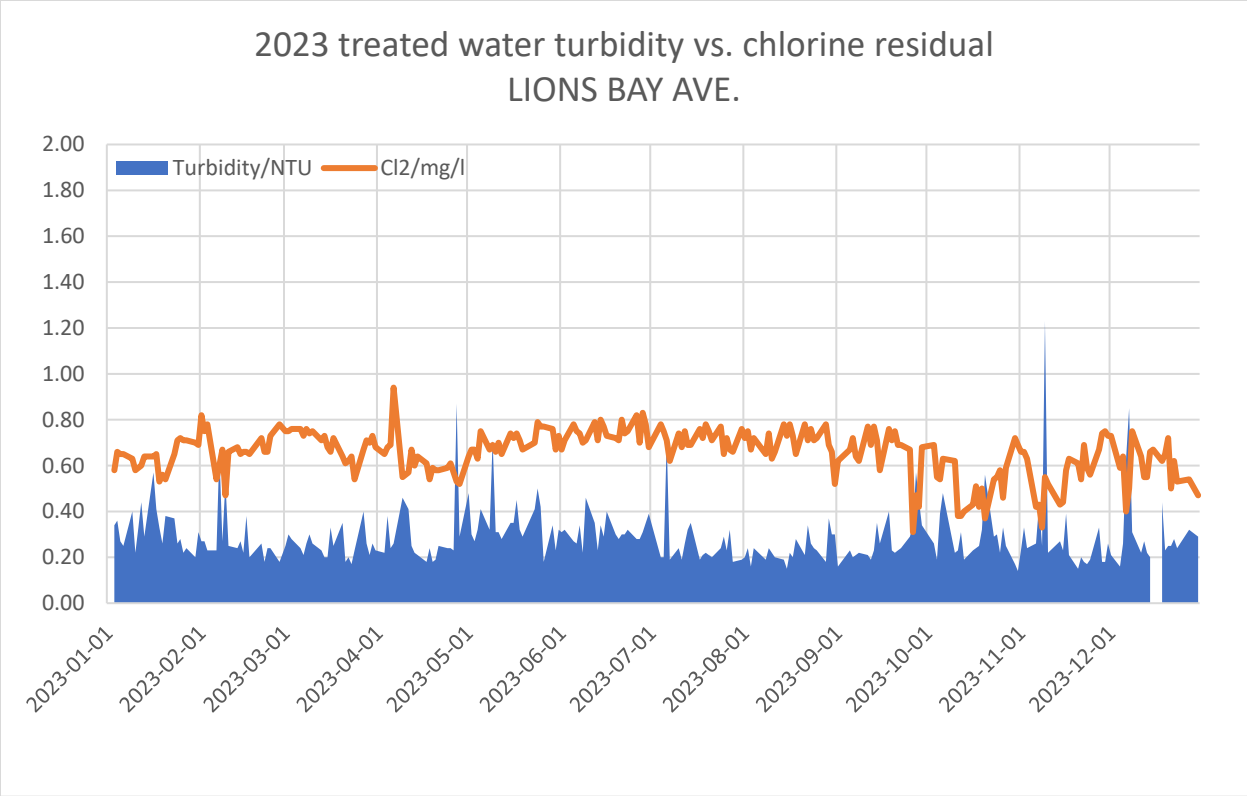
Summary of 2023 chlorine residuals/mg/ℓ								
	Harvey Plant Tank	PRV-3	Café	Lions Bay Ave	Kelvin Grove	Magnesia Plant Tank	PRV-5	Brunswick Beach
SAMPLE COUNT	247	247	222	247	247	244	247	247
MIN	0.60	0.61	0.47	0.31	0.20	0.46	0.58	0.20
MAX	1.03	1.02	0.85	0.94	0.85	1.23	0.92	0.87
MED	0.87	0.83	0.72	0.67	0.46	0.86	0.78	0.62
AVG	0.87	0.83	0.71	0.66	0.47	0.86	0.78	0.61

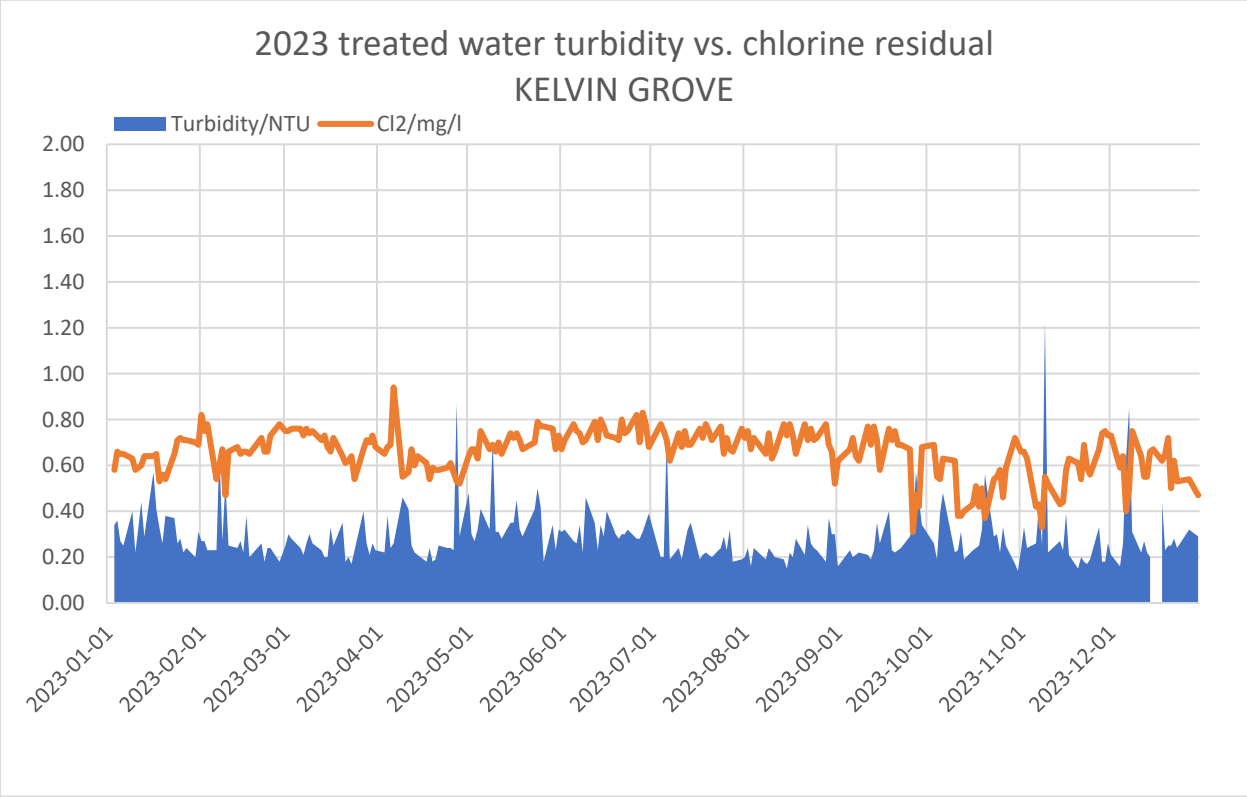
Detailed numerical data on turbidity and chlorine residual at each sample station are provided in APPENDIX: *TREATED* WATER TURBIDITY, Cl2 RESIDUAL. Graphical representation follows.

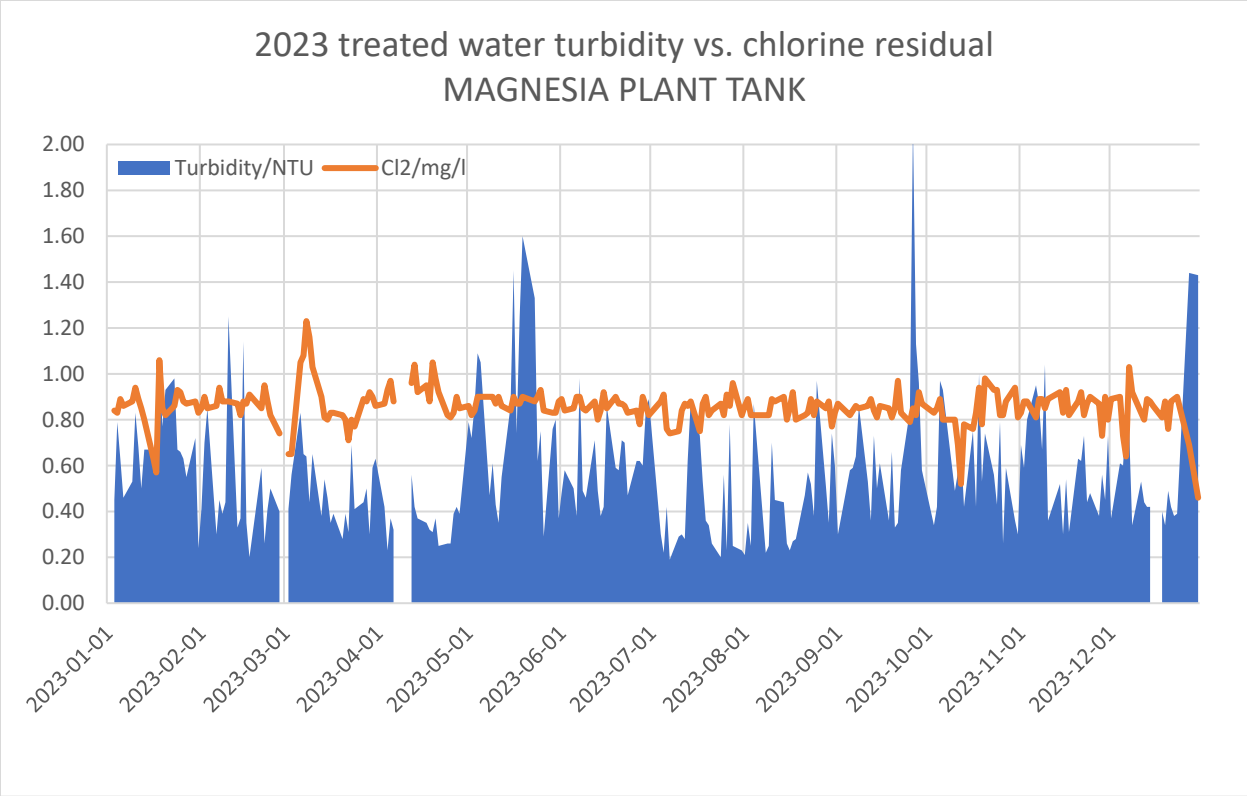


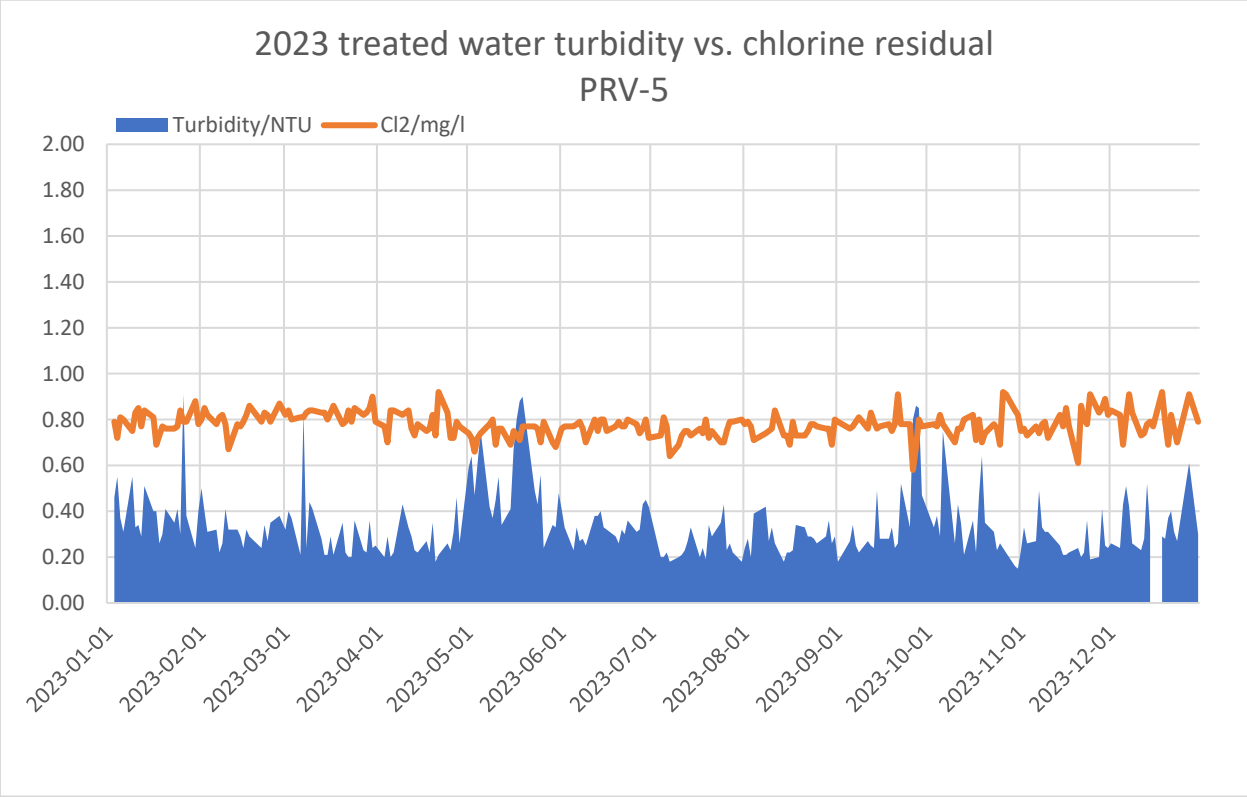

2023 treated water turbidity vs. chlorine residual
PRV-3
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01

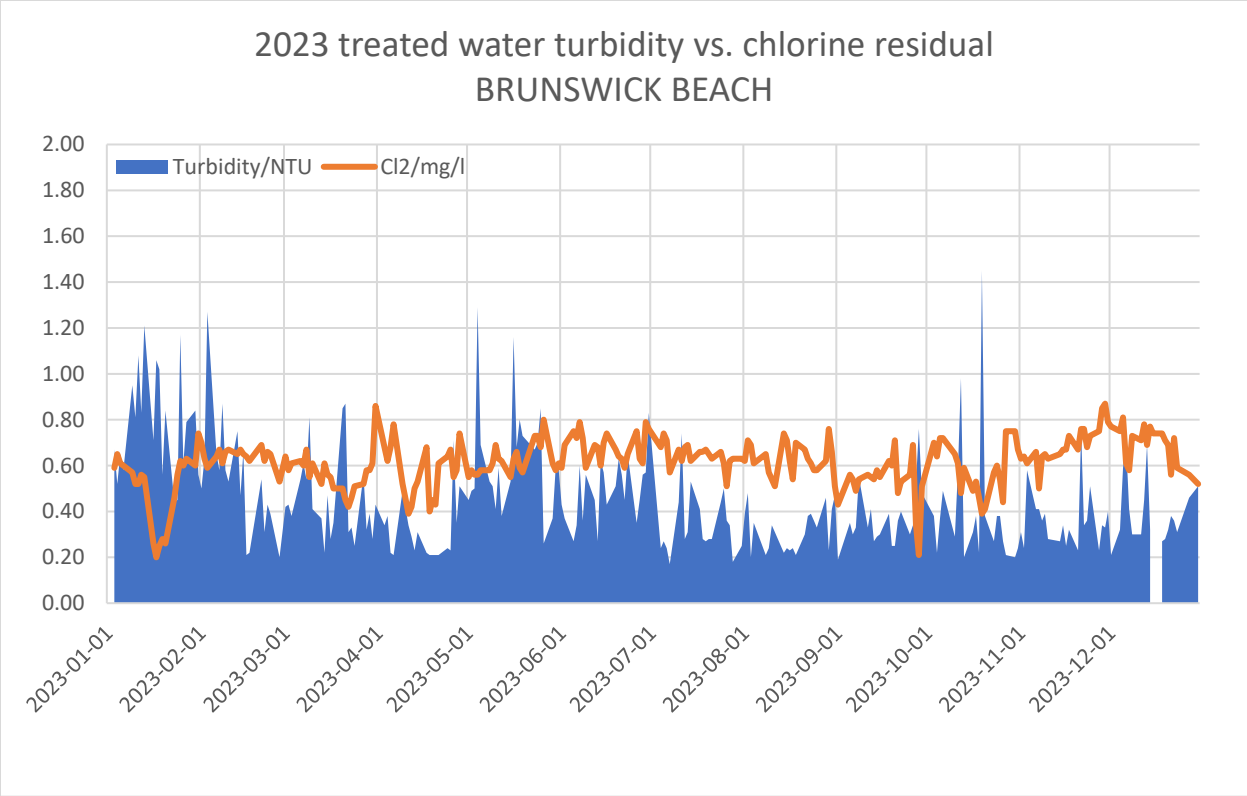

2023 treated water turbidity vs. chlorine residual
STORE/CAFE
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
LIONS BAY AVE.
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
KELVIN GROVE
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
MAGNESIA PLANT TANK
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
PRV-5
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01



A NOTE ON CHLORINE DISINFECTION BY-PRODUCTS

Trihalomethane (THM) and haloacetic acid (HAA) by-products form when chlorine reacts with organic substances in water. Health Canada considers THMs to be potentially carcinogenic:

> *"High levels of THMs may also have an effect on pregnancy. A California study found that pregnant women who drank large amounts of tap water with high THMs had an increased risk of miscarriage. These studies do not prove that there is a link between THMs and cancer or miscarriage. However, they do show the need for further research in this area to confirm potential health effects."*

Health Canada recommends total THMs below 100 µg/ℓ (micrograms per litre) averaged over quarterly sample results. This criterion was met by Lions Bay in 2023:

Lions Bay 2023 total trihalomethanes/µg/ℓ (see Appendix for details)				
Sample location → Sample date ↓	**Lions Bay Ave.**	**Kelvin Grove**	**Community Centre**	**Brunswick Beach**
Tue. March14	23.6	27.9	31.3	28.9
Wed. June 7	30.6	47.1	36.9	27.7
Tue. September 26	42.6	43.2	60.6	24.8
Wed. December 6	97.3	72.1	59.3	66.5
Average	**48.5**	**47.6**	**47.0**	**37.0**

While the municipality is not required to test for HAAs, various Health Canada publications state a maximum acceptable concentration for HAA in drinking water of 80 µg/ℓ based on a running annual average of at least quarterly samples, and that utilities should make every effort to maintain concentrations ALARA ("as low as reasonably achievable") without compromising the effectiveness of disinfection. Lions Bay commenced testing for HAAs starting in the 4th Quarter 2023:

Lions Bay 2023 total haloacetic acids/µg/ℓ (see Appendix for detail)				
Sample location → Sample date ↓	**Lions Bay Avenue**	**Kelvin Grove (Works Yard)**	**Community Centre**	**Brunswick Beach**
Wed. December 6	57.7	52.9	55.9	66.6

A NOTE ON pH

pH is a logarithmic scale that specifies the acidity or basicity of water solutions. Values range from zero, the most acidic, to 14, the most basic. Pure water has a pH of 7, considered neutral. pH is of concern in water systems because at acidic values, water is corrosive to metals, such as iron in water mains and copper and lead solder in residential plumbing. Conversely, at basic pH values, carbonate scale forms and disinfection is less efficient (see box). Health Canada indicates an acceptable pH range for drinking water of 7.0 to 10.5. Lions Bay water is consistently slightly more acidic than this guideline:

> Sodium hypochlorite hydrolyses in aqueous solution: $NaOCl + H2O \leftrightarrow Na^+ + HOCl + OH^-$. HOCl (hypochlorous acid) disassociates to $H^+ + OCl^-$, more so at alkali (high) pHs. HOCl is 20 times more germicidal than its OCl^-(hypochlorite) ion, so NaOCl is less effective at alkali pHs.

Lions Bay 2023 pH at 10 sample locations, after flush		
Sample date → Sample location ↓	**6 Mar.**	**26 Sep.**
Harvey raw water	6.93	6.64
Magnesia raw water	6.88	6.67
Harvey Tank	6.99	6.62
Store/café	6.93	6.62
Lions Bay Ave.	6.96	6.74
Kelvin Grove	6.99	6.92
Community Centre	6.94	6.72
Magnesia Tank	6.91	6.76
Brunswick Beach	7.03	6.98
Lions Bay Beach Park	6.93	6.78

Consideration of active pH control commenced in 2023, for implementation when funds allow, probably utilising soda ash injection.

A NOTE ON ALKALINITY & HARDNESS

Alkalinity measures the presence of bicarbonate, carbonate and hydroxide. It represents a water's capacity to buffer pH swings that could compromise water quality or taste. Adequate alkalinity helps control corrosion, prevents scaling, and ensures the effectiveness of disinfection processes. The

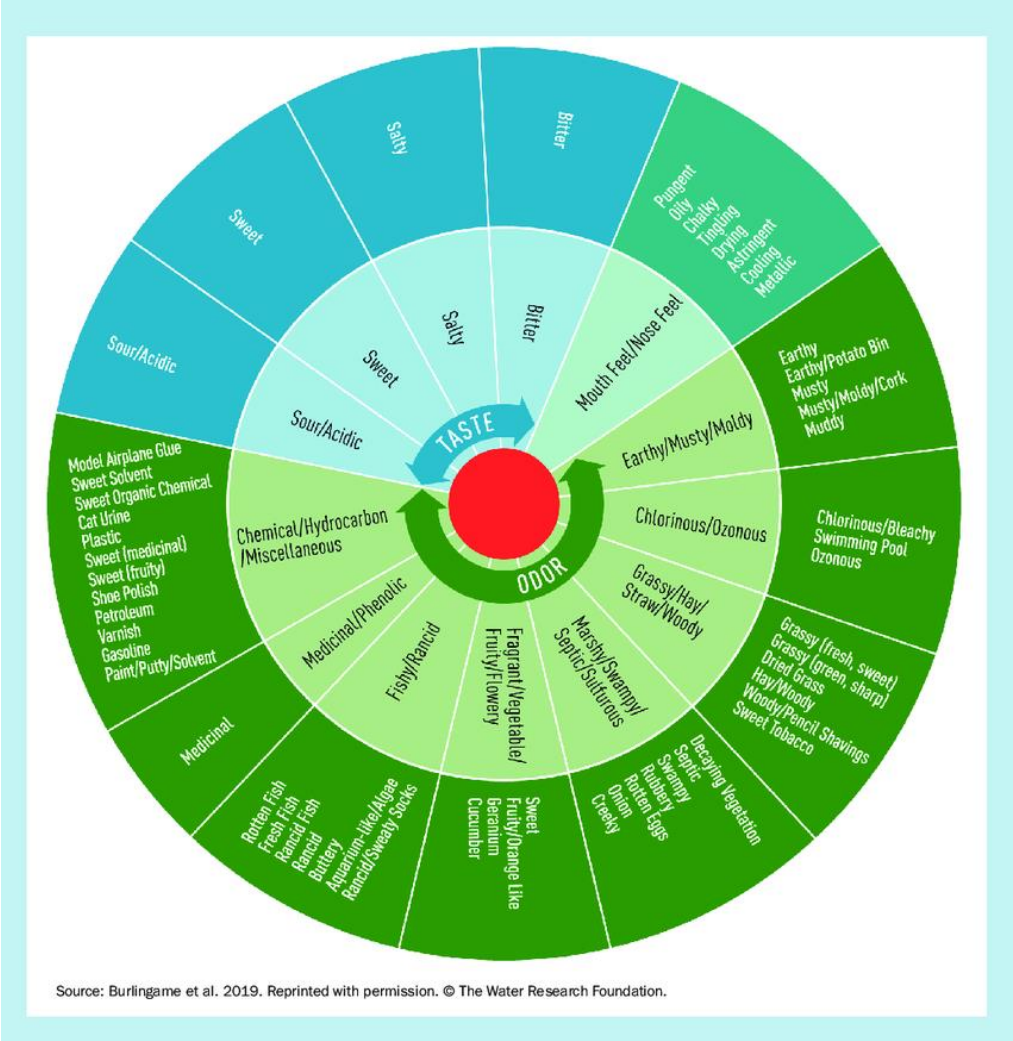
recommended alkalinity range for drinking water is typically within 20-200 mg/ℓ. Lions Bay's alkalinity is significantly lower, as expected from a catchment geology with non-carbonate rocks.
Hardness is a measure of dissolved calcium and magnesium minerals. Hard water is not a health risk, but a nuisance because of mineral buildup and poor soap and detergent performance. The hardness of water is measured as milligrams of calcium carbonate per litre of water; in general, water with less than 60 mg/ℓ CaCO3 is considered soft, water with 60-120 mg/ℓ moderately hard, and water with greater than 120 mg/ℓ hard. Lions Bay water is very soft, for the same reasons it is not alkaline:

Lions Bay 2023 alkalinity and hardness at 10 sample locations, after flush				
Sample date →	**6 Mar.**		**26 Sep.**	
Sample location ↓	**Alkalinity (as mg/ℓ $CaCO_3$)**	**Hardness (as mg/ℓ CaCO3)**	**Alkalinity (as mg/ℓ $CaCO_3$)**	**Hardness (as mg/ℓ CaCO3)**
Harvey raw water	5.8	7.29	3.4	3.82
Magnesia raw water	5.6	17.8	3.9	6.88
Harvey Tank (glass-lined steel)	6.6	7.28	4.7	5.27
Store/café	6.2	7.23	5.1	5.78
Lions Bay Ave.	6.5	7.46	6.4	7.66
Kelvin Grove	7.0	7.90	8.8	9.66
Community Centre	6.3	7.40	5.8	6.74
Magnesia Tank (concrete)	5.8	16.4	4.4	11.7
Brunswick Beach	6.7	8.11	6.6	23.5
Lions Bay Beach Park	6.1	7.08	4.9	5.78

Details are available in APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2023) starting on p.52.

A NOTE ON TASTE & ODOUR

Public Works staff are proud of Lions Bay's water quality and that there has been no need for a Boil Water Advisory in ten years. Complaints of too much chlorine are being addressed by considering automation of injection rates on a process control feedback loop. Taste and odour considerations include:



Source: Burlingame et al. 2019. Reprinted with permission. © The Water Research Foundation.

A NOTE ON METALS AND OTHER SUBSTANCES

Trace metals enter the water supply through natural and human means. Some metals are essential for life, while others can cause chronic or acute poisoning. Health Canada has set maximum concentration limits for most metals except calcium (chemical symbol Ca), cobalt (Co), magnesium (Mg), molybdenum (Mo), nickel (Ni) and potassium (K). Twice-annual testing for a wide range of substances was performed, as found in APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2023) starting on p.52. In general there is not much evidence of any substantial corrosion in delivered water, but maybe a little higher metals in some locations.

All 2023 samples were within the limits for metals and other substances set in the Guidelines for Canadian Drinking Water Quality.

A NOTE ON ASBESTOS

Health Canada has concluded that there is no convincing evidence that asbestos ingested through water is harmful to health, and has not established drinking water guidelines for asbestos. However, USEPA's enforceable maximum contaminant level (MCL) for asbestos is set at 7 million fibres per litre (MFL), on findings that some people who drink water containing asbestos well in excess of the MCL for many years may have an increased risk of developing benign intestinal polyps. A portion of the municipality's water mains are still asbestos-cement (A-C). In an abundance of caution samples are taken once per year in two pertinent locations, and analysed for asbestos. 2023 results are zero asbestos above an analytical sensitivity of 0.42 million fibers per liter:

Asbestos analysis by transmission electron microscope to EPA Standard 100.2mf		
Sample 07 Nov. 2023 Analysis 14 Nov. 2023	**Upper Bayview Rd. (sample location downstream of 450 m of A-C piping)**	**Oceanview Rd. (always same water as Upper Bayview, w. no A-C piping)**
Analytical sensitivity (AS), million fibers per liter (MFL)*	0.42	0.42
Chrysotile, count	0	0
Amosite, count	0	0
Crocidolite, count	0	0
Actinolite, count	0	0
Tremolite, count	0	0
Anthophyllite, count	0	0
Total asbestos, count	*0*	*0*

*USEPA indicates an AS of less than 0.2 MFL is desired for drinking water, so the lab will be exhorted to achieve this sensitivity in future by analysing sufficient volumes of sample.

4.4 QUATERNARY BARRIER – WATER MAIN FLUSHING & TANK CLEANING

The municipality aims to flush distribution mains twice per year, which is accomplished by opening fire hydrants and blow off valves to briefly produce flowrates high enough to scour pipe walls. To not affect summer water conservation efforts, flushing usually takes place March-April and October-November. The scouring of pipe walls and the pressure fluctuations that occur despite careful handling often cause additional breaks and leakage, so flushing is not engaged in lightly. Inspection and cleaning of the municipality's water storage tanks occurs on a five-year cycle, by remotely operated vehicle (ROV) or diver (disinfected with chlorinated water before entering the tanks). All three drinking water tanks were inspected and cleaned in March 2022, next due in 2027. Further details on the distribution system follow.

5. DISTRIBUTION SYSTEM

5.1 STORAGE TANKS

Unit	**Material**	**Dimensions**	**Actual capacity**			**Year built**
			ℓ	**iG**	**USG**	
500,000 Harvey Tank	Glass-fused bolted	11.446 m max. operating depth. Fill on 1 cm-sensitivity	2,343,000	515,000	618,000	2019

	steel	ultrasound height sensor.				
100,000 Magnesia Tank	Cast-in place concrete	10.0 m X 10.0 m footprint, 4.300 m max. operating depth. Fill on 1 cm-sensitivity ultrasound height sensor.	440,000	97,000	116,000	1997
20,000 Highway Tank. Obsoleted in 2017 with advent of Harvey Tank. Slated for replacement (2025?) by small break-head tank or PRV.	Cast-in place concrete	5.87 m diameter X 3.66 m operating depth. Fill on 1-foot mechanical valve cycle	95,500	20,500	25,000	1959
100,000 Oceanview Tank. Obsoleted in 2017 with advent of Harvey Tank. Had been planned for demolition, until May 2024 repurposing for Alberta Supply Augmentation Project	Cast-in place concrete	8.6 m diameter X 7.3 m operating depth.	424,000	93,000	112,000	1984
20,000 iG Phase IV Tank, obsoleted 2021 (replaced by PRV at Upper Bayview Road)	Air gap to distribution network. Slated for demolition.					
25,000 iG Phase V Tank, obsoleted 2021 (replaced by PRV at Upper Bayview Road)						
30,000 iG Brunswick Tank, obsoleted mid-2000s						
35,000 iG Phase VI (Sunset) Tank, obsoleted late 1990s						

5.2 WATER MAINS

primarily made from ductile iron, with some asbestos-cement (AC), cast iron and polyvinyl chloride (PVC):

Installed treated water mains (excluding pipes from intakes to plants)		
NOMINAL ID		INSTALLED LENGTH/m
mm	inch	
100	4	602
150	6	10,060
200	8	4,430
250	10	1,010
	Total	16,102

See p.31 for further discussion of the effect of leakage on consumption.

5.3 FILTRATION EXEMPTION

Drinking Water Microbial Treatment Objectives for Surface Water Supplies in BC recommends filtration and one form of disinfection for drinking water treatment, but provides for filtration exemption upon meeting four conditions:

CONDITION 1

Provide overall inactivation using a minimum of two disinfection processes of 4-log (99.99%) reduction of viruses and 3-log (99.9%) reduction of Cryptosporidium *and* Giardia*.*

The municipality utilises UV as the primary and chlorine as the secondary disinfection pathway. Manufacturer specifications for the dual Trojan Swift UV reactor units installed at both treatment plants indicate a 3-log reduction of *Cryptosporidium* and *Giardia* at raw water ultraviolet transmittance (UVT) values down to 70%. 2023 UVT was (full data on p.39):

Lions Bay water systems raw water UVT, 2023		
	Harvey/%	**Magnesia/%**
MIN	77.0	82.1
MAX	96.4	97.6
MED	92.1	95.1
AVG	91.6	94.2

In 2021 the UV reactors at the Harvey Plant were upgraded from two to four lamps to offer UV disinfection capacity at lower UVTs and higher flowrates.

Chlorine contact time (CT) is achieved in storage and transit as follows:

Retention and contact times at various consumption rates			
At daily USG consumption of …	**In Harvey tank (when supplying normal 80% of demand)**	**In Magnesia tank (when supplying normal 20% of demand)**	**In system overall, including 98,000 USG volume in watermains**
350,000	53 hours	40 hours	57 hours
500,000	37 hours	28 hours	40 hours
650,000	29 hours	21 hours	31 hours

Status at end of 2023: condition met.

CONDITION 2

E. coli *in raw water not to exceed 20 colony-forming units per 100 ml…in at least 90% of weekly samples from the previous six months.*

In 2023 *E. coli* in raw water did not exceed 20 colony-forming units per 100 mL in 48 of 50 (96%) of samples for Harvey Creek, and 47 of 47 (100%) of samples for Magnesia Creek, meeting this criterion:

Raw water *E. coli*, colony-forming units/100 ml

2023	Harvey Creek	Magnesia Creek
Wed. Jan 04	2.0	<1
Mon. Jan 09	44.1	4.1
Mon. Jan 16	RMFL	RMFL
Mon. Jan 23	9.8	1.0
Mon. Jan 30	<1	<1
Mon. Feb 06	<1	<1
Mon. Feb 13	2.0	4.1
Tue. Feb 21	1.0	<1
Wed. Mar 01	<1	N/A
Mon. Mar 06	<1	<1
Mon. Mar 13	<1	<1
Mon. Mar 20	<1	1.0
Mon. Mar 27	<1	<1
Mon. Apr 03	<1	<1
Tue. Apr 11	1.0	N/A
Mon. Apr 17	<1	<1
Mon. Apr 24	<1	<1
Mon. May 01	<1	<1
Mon. May 08	<1	<1
Mon. May 15	<1	<1
Mon. May 23	<1	<1
Mon. May 29	11.0	3.1
Mon. Jun 05	<1	<1
Mon. Jun 12	<1	<1
Mon. Jun 19	<1	<1
Mon. Jun 26	<1	<1
Tue. Jul 04	<1	<1
Thu. Jul 13	<1	<1
Mon. Jul 17	<1	<1
Mon. Jul 24	<1	1.0
Mon. Jul 31	<1	<1
Tue. Aug 08	<1	<1
Mon. Aug 14	<1	<1
Mon. Aug 21	<1	<1
Mon. Aug 28	<1	<1
Tue. Sep 05	<1	<1
Mon. Sep 11	<1	<1
Mon. Sep 18	<1	<1
Mon. Sep 25	186.0	14.6
Tue. Oct 03	2.0	<1
Tue. Oct 10	3.1	1.0
Mon. Oct 16	<1	1.0
Mon. Oct 23	<1	1.0
Mon. Oct 30	1.0	<1
Mon. Nov 06	<1	<1
Tue. Nov 14	<1	<1
Mon. Nov 20	<1	<1
Mon. Nov 27	<1	<1
Mon. Dec 04	<1	<1

Mon. Dec 11	<1	<1
Mon. Dec 18	<1	1.0
Mon. Dec 25	Lab closed	Lab closed

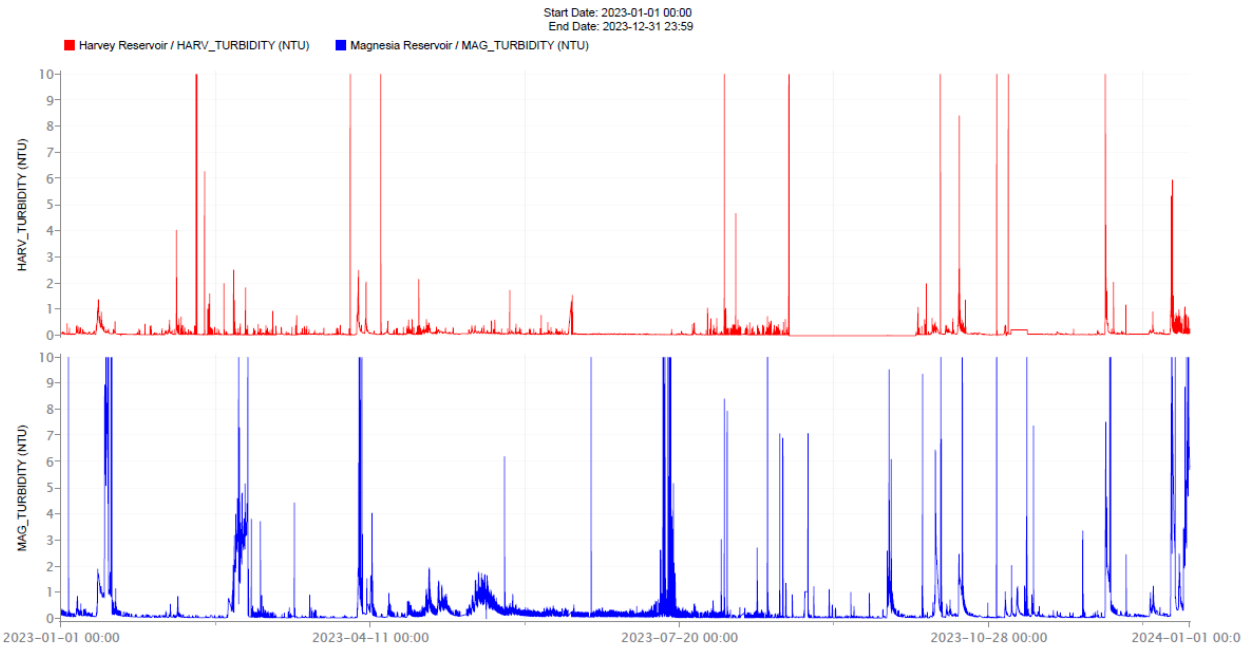
RMFL=Results Missing From Laboratory

Status at end of 2023: condition met.

CONDITION 3

[Maintain] average daily turbidity levels measured at equal intervals (at least every four hours) immediately before the disinfectant is applied…around 1 NTU, but…not exceed[ing] 5 NTU for more than two days in a 12-month period.

As discussed in 11 on p.11 above, no single *daily* turbidity readings reached 5 NTU, but to satisfy the 4-hour minimum interval criterion of the Condition, the 2.1 million readings taken by the plants' NTU meters every 30 seconds were plotted using the FlowWorks visualisation tool:



The data were averaged by hour to find that **in only one two-day period was the average of NTU sampled at least every four hours higher than 5, namely the one ending at 22:30 on Dec. 31, when the average of the previous 48 hours of NTU readings from Magnesia Creek was 5.07.** On the other hand, the NTU meters' current upper cutoff is 10 NTU, so this assessment might be entirely spurious. The municipality is thus proceeding with plans to handle situations where NTU exceeds a certain level (>5 proposed) for a certain period (4 hours proposed), via a programmatic process control change (ENSuRe, Excessive Ntu ShUtdown RoutinE) that will:

- Shut down the given plant if the UV reactor has not already shut down due to insufficient UV dosage, and lock it out until explicitly cleared
- Throw necessary alarm notifications by text, email and voice dial (utilising recent upgrades to

the SCADA platform) to bring operators to site to:

- Reconfigure the network to bring the Village's entire supply onto the unaffected plant (unless the excess NTU period is likely to be short)
- Watch the affected intake for clearing, and flush the line when it does
- Bring the affected plant back online.

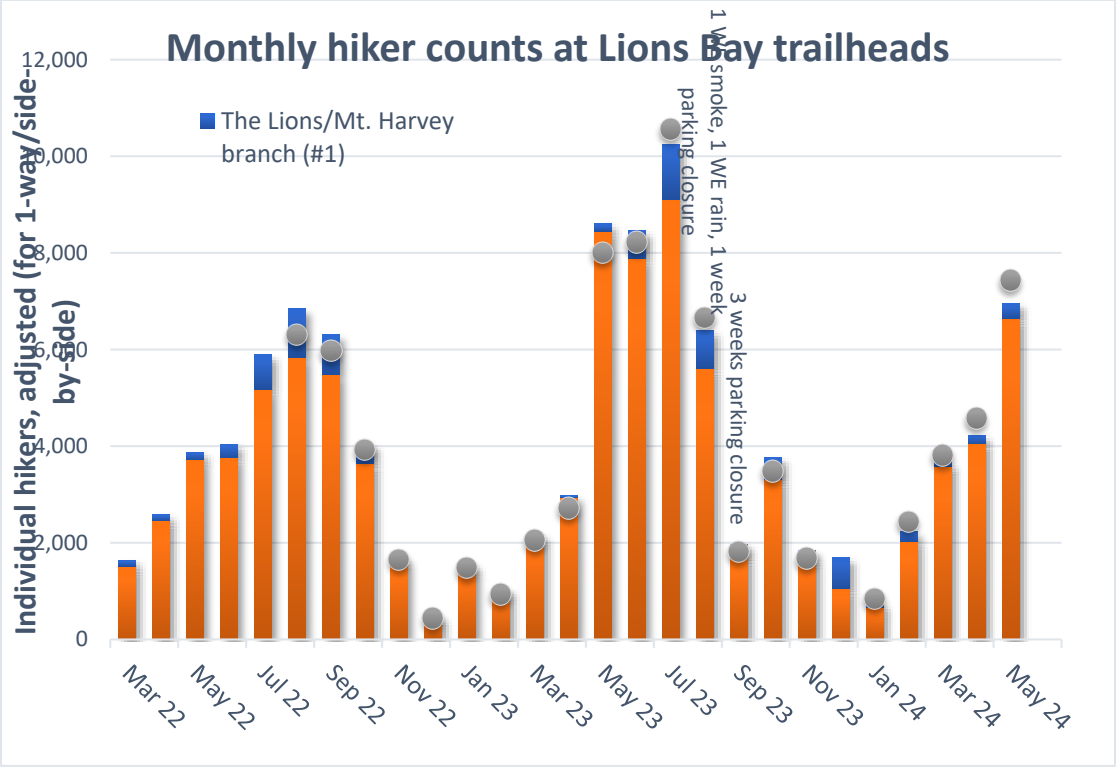
Status at end of 2023: open (to be implemented before the 2024 rains arrive in late September).

CONDITION 4

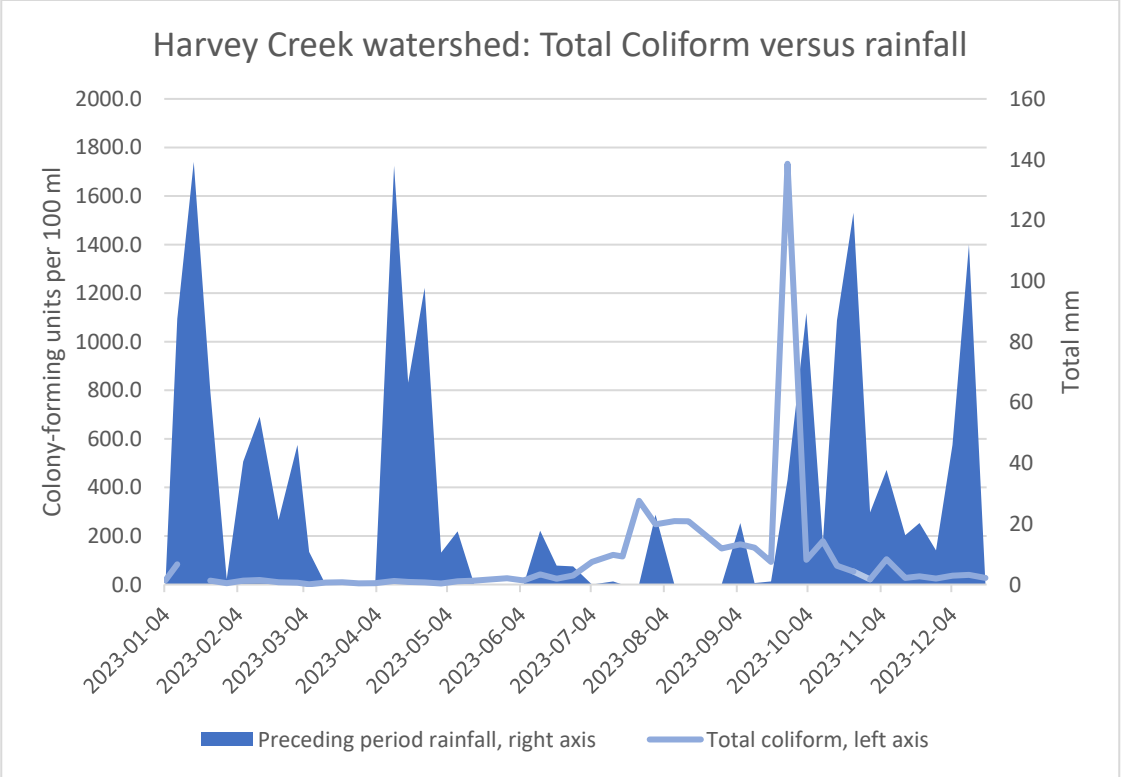
A watershed control program…that minimizes the potential for fecal contamination in the source water.

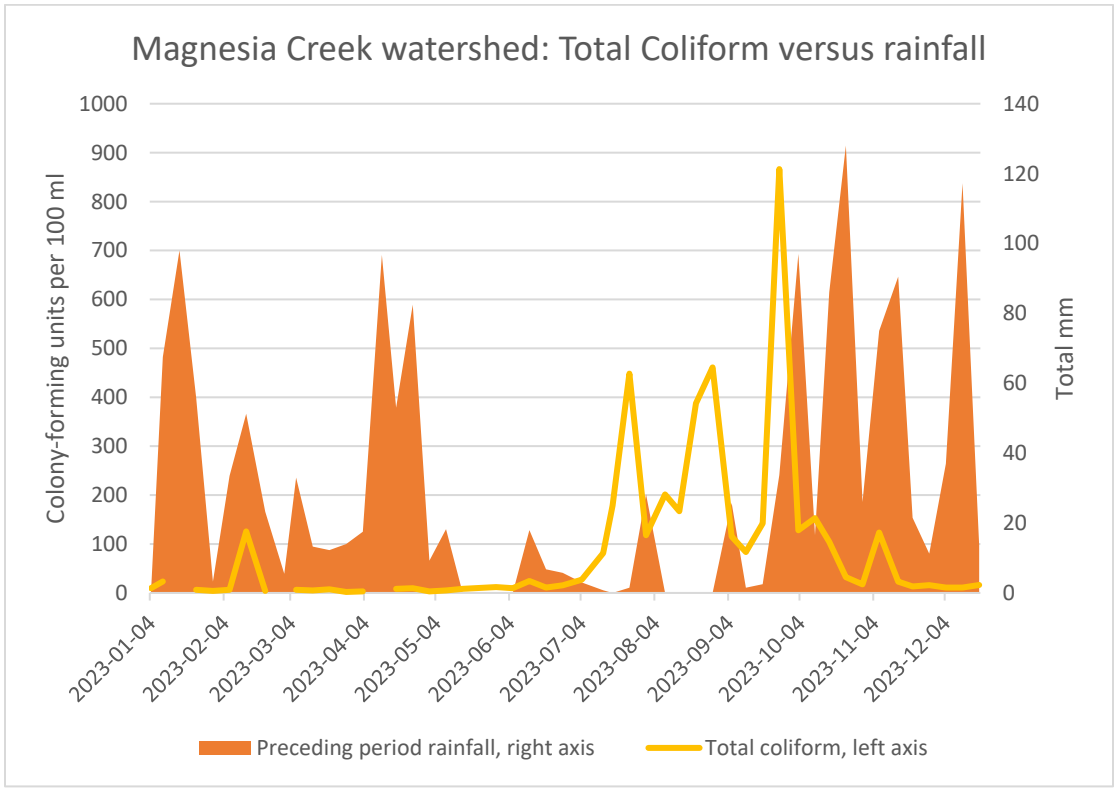
The municipality's watersheds fall under the jurisdiction of the Ministry of Forests, Land and Natural Resource Operations (FLNRO). Their "Community Watershed" designation provides some protection under the Forest and Range Practices Act, although recreational access, mining, forestry and energy development uses are not excluded.

Fecal coliform is present in the digestive tracts of all mammals and birds. Wild mammals including bear, cougar, deer, squirrels, mice and more, and dozens of species of bird, are abundant in the area, but difficult to quantify. As to human mammal presence in the watersheds, trail counter data commencing March 2022 quantify recreational hikers to the popular Tunnel Bluffs trail into the Magnesia watershed, and the less-used Lions/Mt. Harvey trail entering the Harvey watershed:



Resulting TC is:

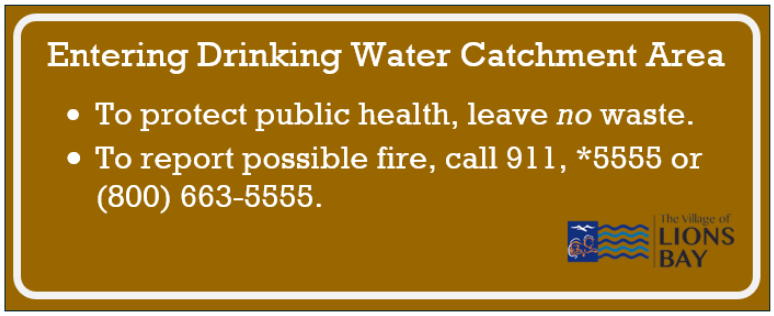




TC spikes in different watersheds in the same week (Sep. 25) are notable, and assumed to be due to the first significant rain, which fell in both watersheds that week, and washed the preceding three months

of detritus into the creek. Independent of rain, TC readings also climb in summer due to rising temperature.

For the purposes of this Condition it is assumed that TC arises from human presence in the watersheds. Consideration of DNA testing to confirm this assumption was dropped when enquiry indicated results would not be explicit enough. With plans to provide well-signed permanent toilet facilities at the "Tunnel Bluffs Y" in abeyance until funded by other levels of government, the municipality funds portable toilets at the Lions Bay Field and Sunset Drive parking areas. Judging by piles of toilet paper all the way along the trails, they are not as effective as needed. Signs similar to this are being erected at municipal boundaries in June 2024:



Status at end of 2023: open.

6. OPERATOR TRAINING

A further approach employed by the municipality to satisfactorily operate the water system is enhanced operator training. Under the *Drinking Water Protection Act* and the *Drinking Water Protection Regulation,* the Environmental Operators Certification Program (EOCP) classifies water supply and distribution systems in order to determine training requirements for operators; each system is required to have at least one Chief Operator certified to the classification level of the system. Additionally, any person whose actions may affect the operation of a water system requires certification. Certified Operators are required to earn continuing education units to remain in good standing. EOCP classifies Lions Bay's water treatment system as Class 1, and distribution system as Level 2 (certificates at p.38). In 2023, EOCP-certified municipal personnel were:

STAFF MEMBER	JOB CLASSIFICATION	EOCP CERTIFICATIONS
AU (Chief Operator)	Treatment Plant Operator 1	Water Treatment Plant Operator 1, Water Distribution System Operator 2
AY	Foreman 1	Water Treatment Plant Operator 1, Water Distribution System Operator 2
GS (since Nov. 2023)	Public Works Technician 1	Small Water Systems, Water Treatment Plant Operator 1

7. STRATEGIC WATER ISSUES

Supply

Year to year, creek flows are subject to rainfall, groundwater entering the channel (which is subject to when groundwater was last fully replenished), and melt from fluctuating snowpack (which is subject to rain-on-snow, insolation (sunshine), wind and cloud cover). For much of the year, creek flow exceeds the capacity of both treatment plants, but in summer it seems to be trending increasingly tight. Local climate projections call for warmer winters and longer, hotter summers, with total rainfall levels similar to today, but occurring more intensely. With no raw water storage, Lions Bay currently relies entirely on water being in the creeks when it is needed. In recent late summers supply has been around 300,000 GPD in Harvey Ck. and 190,000 GPD in Magnesia Ck. In summer staff watch rainfall predictions and manage fill levels to use as much of the creeks as possible.

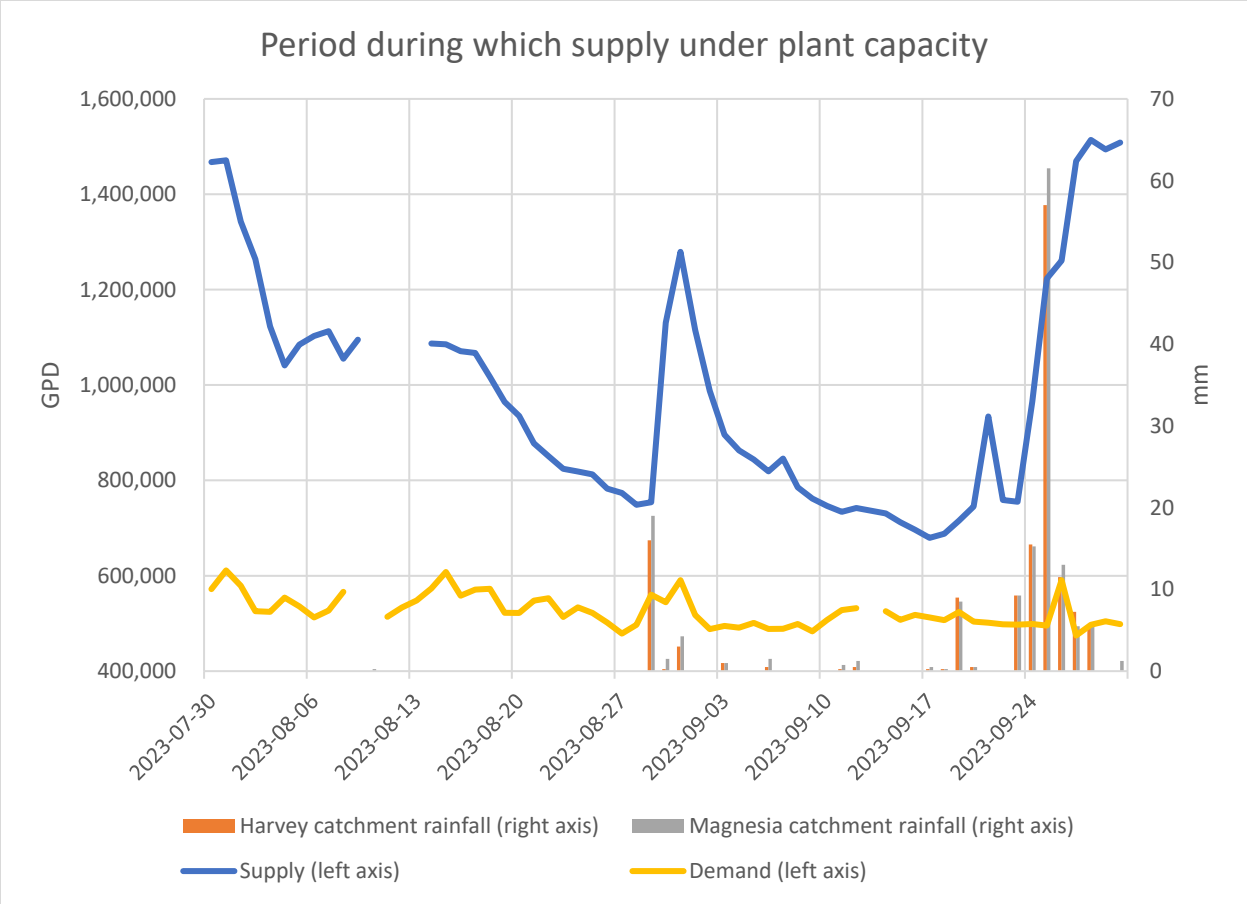
In 2017 the municipality commenced working with the Hydrotechnical Engineering group at UBC's Civil Engineering Department[2], to jointly collect data from the watersheds to model the relationship between snowpack, weather and supply, particularly the relative contribution of (presumably) steady groundwater flows, all to be able to model supply in order to make operating decisions…

- …in the short term by knowing what creek supply will do until the next rainfall event, to know what conservation level to set;
- …in the long term by knowing when to begin considering supply alternatives including:
    - Wells
    - A modular full-supply or peak-shaving desalination plant—in 2018 the municipality acquired the last remaining undeveloped waterfront land in the community to hold in reserve for a plant site;
    - A pipeline to the MVWD.

Direct measurement of creek supply at intake level was implemented in late 2023[3], but is not yet integrated with SCADA. Pending access to those data, creek flow can also be deduced from plant inlet flowrate during periods of low supply, because when the plant is taking in water, it takes the entire production of the creek. Using that data, in 2023 Lions Bay reached groundwater-only supply on August 17, after which supply decayed linearly other than just after two fortuitous rain events, which allowed the municipality to avoid Level 3 conservation for the entire non-excess supply period (in which a given creek flowrate is under the approx. 900,000 GPD capacity of either plant):

[2] Driven by Associate Professor Dr. Steven Weijs, whose research interests include water resources management, mountain & catchment hydrology, flood forecasting, uncertainty, information theory and control of water systems, with a larger research question of how to use observations of complex water systems to enable informed decisions about water resources.

[3] Using pressure transducers in whole flow pools just above our creek intakes, correlated using rating curves produced from salt-dosing proportional measurements just downstream.



Problematic intakes

Lions Bay's water catchments are mountainous and unstable. Access to the creek intakes is by narrow gravel roads subject to rock and tree fall on which safety protocols restrict access whenever rainfall parameters are exceeded, just when decreased flow or increased turbidity need to be investigated. The geomorphology of the watersheds is a product of glaciation and post-glacial erosion. At what is now Howe Sound, the most recent or Fraser glaciation began 33,500 years ago and peaked 17,500 years ago. As the climate rewarmed, ice retreat was delayed several thousand years by floating glaciers grounding on the seabed, with several minor readvances. Glacial marine sedimentation--mud and rock dropped from icebergs--is believed to have ceased by 10,600 years before present. With the ice gone, water erosion and mass wasting (debris slides and flows, rockfall, avalanches) rapidly reworked unstable glacial sediments, declining over time such that by no later than 7,500 years ago the landscape was similar to today. Steep rockfall aprons developed on mid to lower slopes. Magnesia, Alberta and Harvey Creeks re-incised their debris cones and alluvial fans have formed at their mouths into the ocean.

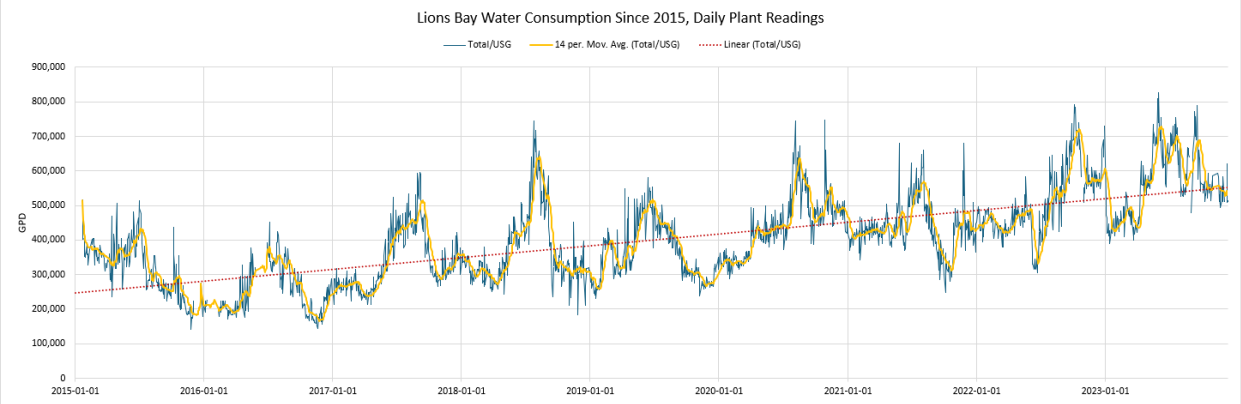
The watersheds are heavily forested with western big-leaf maple and conifers producing copious leaves and needles which build up on intake screens, occasionally requiring clearing twice a day. Large rocks (over 0.5 m) move down the creeks during heavy rain and fill the intake weirs. Medium rocks (10 – 50 cm) block the intake grates. Small rocks (1-10 cm) fill the settling chambers.

A 2017 design to screen small solids at the Magnesia weir was a failure; in late 2023 engineers were

engaged to consider a better approach, perhaps an open raceway/riffle design to float off vegetation and to drop out medium and small rocks, not requiring confined-space safe work protocols to clear, with a fuel-cell powered gate valve to close off feed when not in use to prevent debris buildup on the grate. A better-designed 2018 upgrade to the profile of the Harvey weir allows it to self-clear blockages at the intake grate.

Excessive demand due to leakage

Measured water demand has been increasing since 2015 at an average rate of 14% a year, to an all-time high in early summer 2023 of 810,000 GPD:



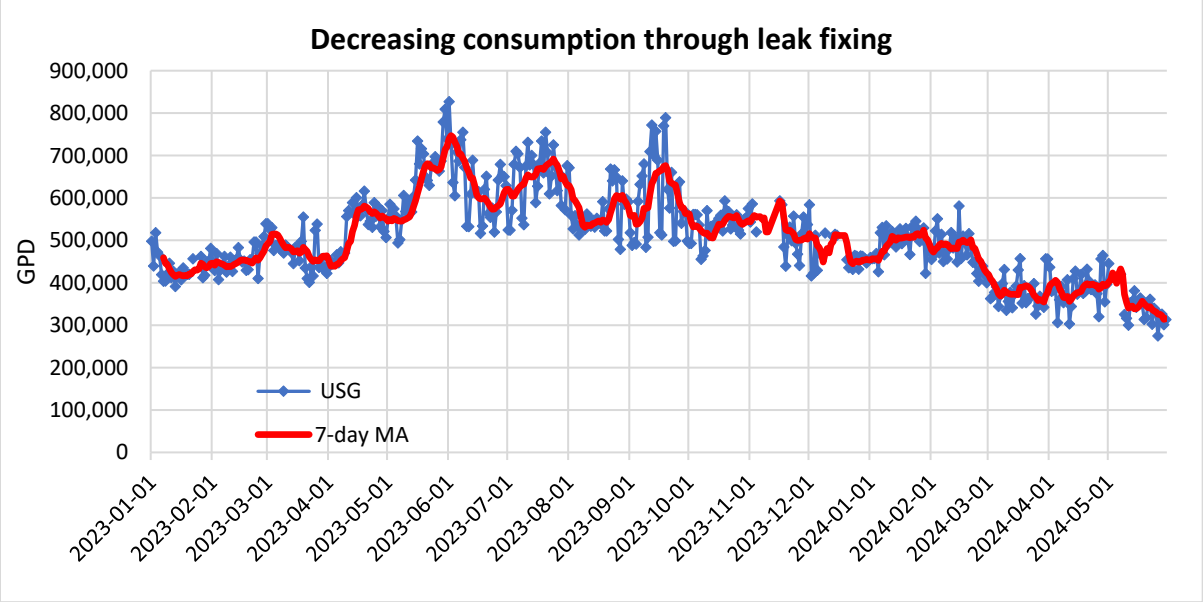
At the end of 2023 annual average consumption was 1689 liters per person per day (ℓ/p/d), almost four times the 464 ℓ/p/d (2021 data) demand of nearby District of West Vancouver with similar weather, residents per property and outdoor water use:

Year	Consumption/m^3 (methodology potentially suspect < 2023)	Census population	ℓ/capita/day
2016	351,318	1334	722
2017	472,527		970
2018	533,000		1095
2019	508,000		1043
2020	623,000		1279
2021	612,000	1390	1206
2022	699,000		1378
2023	856,939		1689

With Lions Bay not having added population in the period, and with no expectation that residents use water differently to 10 years ago, increasing consumption is seen to be due to accelerating leakage, primarily in aging private-side service lines installed from the late 1950s through the 1970s. Poor service line condition is to some extent exacerbated by the use of polybutylene installed in over 700,000 Canadian homes between 1978 and 1995 as a lighter and cheaper option than copper, but now banned under the National Plumbing Code due to its consistent failure in use. Residential service lines are also being damaged by growing tree roots: what was a 2-inch sapling when a line was installed 50 years ago is today a 24-inch tree pushing pre-Code backfill into the line (most municipal watermains run in roads

where there are no trees, although there are runs through the forest that are maintained by removing vegetation every five years).

By late 2023, leakage was determined from overnight flows to be 380,000 GPD, 80% of overall demand at the time. The municipality launched a full court press to find and address public and private leaks, especially when by Sep. 2023 all indications were that supply in summer 2024 was going to be tight. Consumption has been brought from 650,000 GPD in June 2023, to under 300,000 GPD in June 2024:



Outdoor Water Use Bylaw No. 484, 2015 restricts residential, commercial, and public water uses during low supply periods:

In 2023, Conservation Level 1 was set on June 1, with Level 2 necessary from Aug. 1 through Oct. 12.

Limited capital

No major water projects were undertaken in 2023, although several system enhancements were implemented:

- New process control routines, *Overnight Leakage Determination Routine (OLDeR)* and *Excessive NTU Shutdown Routine (ENSuRe),* discussed elsewhere in this report
- Pressure transducers installed in total-flow pools just upstream of the Magnesia and Harvey weirs to correlate to the streams' rating curves, in order to provide direct measurement of available water, particularly in times of tight supply. These installations will be connected to the system by cellular modem or private radio mesh in late 2024.

As a small residential community with a limited tax base, Lions Bay's infrastructure spending shortfall is growing. While an Infrastructure Levy has been collected since 2019, capital spending still requires federal and provincial grant help. Outstanding water capital projects include:

- Replacing 1065 meters of 1960s era cast iron pipe as well as remaining asbestos-cement pipe, the Centre, Upper Bayview, Bayview Place, or CUBB Project. Three grant applications for this $3-4 mil. project have been unsuccessful.
- Replacement of 795 meters of water main at Bayview Road from Stewart to Mountain, the so-called DWIP (Drainage & Water Infrastructure Project), now turned down in four grant-funding applications

- Pressure reducing valve (PRV) stations that are not compliant with confined-space worker safety requirements, and that have outlived twice the best practice replacement cycles. Three such PRV stations were replaced at Mountain Drive, Upper Bayview Road, and mid-Bayview Road in 2021 and brought online in 2022, at a cost of $500,000 each.
- The 20,000 Highway Tank was obsoleted in 2017 with the advent of Harvey Tank. Slated for replacement with small break-head tank or PRV.
- Filtration, which would cost $10-14 mil. in 2017 dollars to implement at two plants
- Operators tend to dial in conservative (high) chlorine dosing to ensure adequate chlorine residual throughout the distribution network. But high chlorine causes negative customer feedback, especially close to the plants. In 2024, realtime remote chlorine metering will be installed at the far ends of the distribution system, to allow use of chlorine concentrations to control dosing pumps, rather than staff setting an injection rate and watching the response manually over a timespan of days.
- A problematic Magnesia Intake, as discussed above
- pH adjustment to meet *Guidelines for Canadian Drinking Water Quality* pH regulations, and to mitigate the effects of corrosion in homes with copper plumbing.

2023 work program

The municipality's annual drinking water work program is driven by regulatory monitoring and reporting to meet *Drinking Water Protection Act* and *Drinking Water Protection Regulation* requirements. The municipality's Core Service Level Review (available at www.lionsbay.ca) details the routine tasks and staff resources involved in operating and maintaining the water system.

All core maintenance was completed in 2023 except for two watermain flushes; one full mains flush was conducted over a week in Nov. 2023. The Harvey Intake and Plant gave virtually no trouble in 2023, unlike the Magnesia Plant:

System outages, 2023			
From	**To**	**Days**	**Notes**
13 Jan.	19 Jan.	7	Magnesia Creek intake clogged w. vegetation. Entire Village fed from Harvey Plant.
24 Feb.	17 Mar.	3	Magnesia Creek intake frozen. Entire Village fed from Harvey Plant.
18 Mar.	29 Mar.	21	Magnesia Plant on lo-flow bypass to restore chlorine residual. Entire Village fed from Harvey Plant to allow use of Harvey network flowmeters to deduce overnight leakage rates.
7 Apr.	16 Apr.	10	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.
19 Apr.	20 Apr.	2	Magnesia Plant on lo-flow bypass to restore chlorine residual. Entire Village fed from Harvey Plant.
18 Jul.	19 Jul.	1	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.
29 Aug.	30 Aug.	2	Magnesia Plant down due to lightning-caused SCADA outage[4]. Tank drawn down without impacting fire reserve.

[4]In Aug. 2023, City of Burnaby SCADA personnel attended the Magnesia Plant as a municipality-to-municipality favour to help with a control system outage caused by lightning strike. While here, they indicated that running an electromagnetic data line in the same conduit as a 600 V power feed is not only not to Code, but may be inducing stray voltages and spurious control signals. This possible issue will be addressed by switching to fibreoptic data cable service in mid-2024.

11 Oct.	12 Oct.	2	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.
13 Oct.	2 Nov.	21	Magnesia Plant on lo-flow bypass to put entire Village on Harvey Plant to allow use of Harvey System flowmeters to deduce overnight leakage rates
2 Nov.	3 Nov.	2	Harvey communication fault. Plant continued operating as normal with on-site staff attendance.
5 Dec.	7 Dec.	3	Magnesia Plant on lo-flow bypass to allow use of Harvey System flowmeters to deduce overnight leakage rates
27 Dec.	31 Dec.	5	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.

-0-

APPENDIX: WATER SITUATION PROTOCOLS

VOLB = Village of Lions Bay Public Works Manager (or designate)
VCH = Vancouver Coastal Health

Situation	Notifying Agency	Agency Notified	Notification Time Frame
E. coli – positive for any treated water sample	VCH Labs	VOLB & VCH	Immediate
VOLB and VCH will be notified immediately by VCH Labs. Any subsequent samples from the same sampling station will be immediately examined by the laboratory. The chlorine residual noted on the Water Operator's field sheet will be reviewed by VCH Labs and compared to lab analysis test results to determine if there is any localized loss of disinfectant residual. Immediate collection of a repeat sample, where possible both upstream and downstream of the positive sample location. VCH and VOLB will liaise and determine the need for a Boil Water Advisory (BWA) to be issued. If it is determined to be warranted, VCH will issue the BWA. VCH Lab will test subsequent samples. Once consecutive negative sample results are returned, VOLB will liaise again with VCH and determine whether the BWA can be lifted.			
Total coliform >10/100 ml in raw water & low chlorine residual in treated water	VOLB	VCH	Immediate
Chemical contamination	VOLB	VCH	Immediate
Chemical contaminants may include nitrates and nitrites, salts, pesticides, metals and toxins. While it is recognised that due to semi-annual sampling, timely detection of some chemical contaminants may not be possible, but when they are, VCH will immediately be notified, and steps will commence to isolate the contaminated area. The level of contamination will be determined through sampling and analysis, and public health risk factors will be determined. If necessary a public advisory will be issued and carried out by VOLB under the guidance of VCH. Once the contamination is remedied and consecutive negative sample results are returned from VCH Lab, VOLB will again liaise with VCH and determine whether the public advisory can be lifted.			
Turbidity events >5 NTU	VOLB	VCH	Immediate
UV treatment effectiveness diminishes with increased turbidity due to UV absorbance and reflection and a correspondingly low UV transmittance (UVT) rate. The system automatically increases UV lamp intensity to counter lower UVT. Once the UVT drops below a minimum of 26.25 mJ/cm^2, the UV reactors stop flow and alarm VOLB on-call staff, who investigate the alarm at the plant. A turbidity result of 1 - 3 NTU along with corresponding chlorine residual levels are flagged and monitored. Any sections of the distribution system generating high turbidity results are field-checked and flushed if deemed advisable by VOLB. For turbidity > 5 NTU, microbiological testing is increased at all sampling locations; chlorine residual sampling and testing is likewise increased and VOLB contacts VCH, which may issue a Boil Water Advisory.			
Disinfection failures/continued loss of residual	VOLB	VCH	Immediate for continued loss of residual
If a daily chlorine residual anywhere in the system is below 0.2 mg/ℓ, operators increase dosage at the affected			

plant, and depending on conditions, may elect to dump some water to bring more higher-chlorine water into the tank.

Should chlorine residual remain below 0.2 mg/ℓ for 24 hours, chlorine will be added directly to the tank and chlorine residuals will be checked frequently throughout the system, while investigating the root cause. VOLB will contact VCH, who may issue a Boil Water Advisory if continued loss of residual is observed.

Loss of pressure due to high demand	VOLB	VCH	Immediate

In the event of adverse pressure loss due to high demand, VOLB will adjust the system to isolate the affected section, and then take measures to supplement pressure in the affected area.

Water main breaks	VOLB	VCH	Immediate

In the event of a water main break where chemical or microbiological contamination of the system is suspected, VOLB will adjust the system to isolate the contaminated section and consult with VCH regarding further actions; all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination. Water samples will be taken from the vicinity and downstream of the break if possible and tested for the suspected contamination. The same procedures as noted under *E. coli* above will be implemented if required.

Lack of water due to drought or other causes	VOLB	EMBC & VCH	Information only; as drought situation progresses

Raw water supply to the water treatment plants is monitored by direct measurement of total-flow pools just upstream of intakes. If supply at a plant decreases rapidly, staff ascertain and address the root cause of the problem (i.e. whether the decrease is due to a blockage or a break).

Lack of water due to low supply or other causes affecting supply such as debris torrents, and unsafe access under safety protocols results in conservation measures being instituted, commencing June 1 with Level 1 of the municipality's Outdoor Water Use Bylaw. Level 2 is utilized as required to further reduce outdoor use of water along with public outreach. The highest levels of conventional restriction, Level 3, is reserved for serious supply shortage. In late 2023, two further Red and White levels were introduced in response to possible unprecedented shortage in 2024. When lack of supply continues VOLB will liaise with EMBC, VCH, and FLNRO for both information and a consolidated response to events as they unfold.

APPENDIX: CERTIFICATIONS

EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay Water Distribution System

Facility No. 675

has been classified as a

Class II WD System

CHAIR, BOARD of DIRECTORS

PRESIDENT and CEO

Dated: November 16, 2023
At: Burnaby, BC
Valid until: November 16, 2028

A society incorporated under the Society Act, S.B.C. S-28724

EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay – Magnesia Water Treatment Plant

Facility No. 2330

has been classified as a

Class I WT Facility

CHAIR, BOARD of DIRECTORS

PRESIDENT and CEO

Dated: November 16, 2023
At: Burnaby, BC
Valid until: November 16, 2028

A society incorporated under the Society Act, S.B.C. S-28724

EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay – Harvey Water Treatment Plant

Facility No. 2329

has been classified as a

Class I WT Facility

CHAIR, BOARD of DIRECTORS

PRESIDENT and CEO

Dated: November 16, 2023
At: Burnaby, BC
Valid until: November 16, 2028

A society incorporated under the Society Act, S.B.C. S-28724

APPENDIX: *SOURCE* WATER RAINFALL, NTU, UVT

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Tue. 03 Jan	90.6	0.33	0.00	95.0	0.29	0.00
Wed. 04 Jan	91.9	0.36	0.00	94.6	0.41	0.00
Thu. 05 Jan	89.0	0.53	9.50	94.9	0.59	8.50
Fri. 06 Jan	86.9	0.49	21.00	91.6	0.85	21.50
Mon. 09 Jan	87.4	0.41	20.75	91.8	0.65	13.75
Tue. 10 Jan	86.9	0.33	22.50	92.3	0.49	15.00
Wed. 11 Jan	90.1	0.41	1.00	94.1	0.60	0.75
Thu. 12 Jan	82.1	0.77	25.75	92.6	0.49	18.50
Fri. 13 Jan	86.2	1.50	46.50	88.4	1.99	33.75
Mon. 16 Jan	82.5	0.49	30.00	89.0	1.82	20.25
Tue. 17 Jan	86.4	0.52	15.00	89.0	1.52	12.75
Wed. 18 Jan	80.4	0.65	34.50	89.2	1.31	22.00
Thu. 19 Jan	89.6	0.55	13.50	94.4	0.43	9.25
Fri. 20 Jan	91.1	0.43	0.25	94.8	0.37	0.25
Mon. 23 Jan	90.7	0.58	N/A	95.1	0.60	0.50
Tue. 24 Jan	91.9	0.51	N/A	95.6	0.60	0.25
Wed. 25 Jan	92.5	0.37	0.25	96.2	0.26	1.00
Thu. 26 Jan	92.6	0.36	0.00	96.5	0.49	0.00
Fri. 27 Jan	93.1	0.38	1.50	96.6	0.32	2.00
Mon. 30 Jan	93.9	0.47	0.00	97.6	0.27	0.00
Tue. 31 Jan	94.1	0.44	0.00	96.9	0.33	0.00
Wed. 01 Feb	94.6	0.59	5.00	97.5	1.02	0.00
Thu. 02 Feb	94.3	0.56	0.50	97.4	0.31	9.25
Fri. 03 Feb	93.8	0.35	0.00	97.2	0.41	0.00
Mon. 06 Feb	89.0	0.73	2.50	95.7	0.24	3.00
Tue. 07 Feb	82.5	1.02	11.00	94.9	0.49	9.75
Wed. 08 Feb	88.4	0.61	29.25	94.3	0.31	18.25
Thu. 09 Feb	90.2	0.33	0.75	95.2	0.40	1.00
Fri. 10 Feb	90.7	0.44	9.50	95.8	0.38	9.00
Mon. 13 Feb	90.3	0.40	13.00	95.4	0.38	13.75
Tue. 14 Feb	91.7	0.84	0.25	95.4	0.37	0.50
Wed. 15 Feb	91.8	0.51	0.00	95.6	0.51	0.51
Thu. 16 Feb	92.9	0.21	0.00	96.3	0.18	0.75
Fri. 17 Feb	92.9	0.18	15.25	96.6	0.18	8.25
Tue. 21 Feb	91.4	0.49	6.25	96.3	0.53	6.25
Wed. 22 Feb	91.8	0.52	3.00	96.7	0.22	2.25
Thu. 23 Feb	93.2	0.49	0.00	96.1	0.30	0.00
Fri. 24 Feb	95.6	0.23	0.00	96.3	0.98	0.00
Mon. 27 Feb	93.7	0.50	1.00	95.3	1.89	2.00
Wed. 01 Mar	93.9	0.53	16.00	N/A	N/A	N/A
Thu. 02 Mar	94.1	0.54	0.75	96.3	0.75	8.75
Fri. 03 Mar	93.7	0.25	N/A	96.7	0.39	9.75
Mon. 06 Mar	93.2	0.78	N/A	96.2	0.38	3.25
Tue. 07 Mar	93.9	0.65	N/A	96.9	0.29	6.25
Wed. 08 Mar	93.9	0.44	0.00	96.8	0.32	1.50
Thu. 09 Mar	94.0	0.55	0.00	96.7	0.43	1.00
Fri. 10 Mar	93.8	0.26	0.00	97.2	0.44	0.00
Mon. 13 Mar	85.3	0.35	N/A	97.0	0.50	14.00

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Tue. 14 Mar	89.1	0.91	N/A	95.7	0.39	0.25
Wed. 15 Mar	91.8	0.28	N/A	97.1	0.28	0.28
Thu. 16 Mar	92.6	0.34	N/A	96.6	0.35	N/A
Fri. 17 Mar	92.4	0.48	N/A	96.6	0.48	0.00
Mon. 20 Mar	89.0	0.43	N/A	89.1	0.51	0.25
Tue. 21 Mar	90.0	0.51	N/A	95.3	0.45	3.00
Wed. 22 Mar	90.4	0.29	N/A	95.5	0.49	0.00
Thu. 23 Mar	91.6	0.32	N/A	95.6	0.44	0.00
Fri. 24 Mar	91.5	0.29	N/A	95.4	0.53	3.00
Mon. 27 Mar	91.9	0.37	N/A	96.0	0.25	0.00
Tue. 28 Mar	92.8	0.31	N/A	96.7	0.58	0.00
Wed. 29 Mar	93.2	0.32	N/A	96.9	0.24	0.00
Thu. 30 Mar	93.3	0.37	N/A	96.9	0.52	0.00
Fri. 31 Mar	93.4	0.32	N/A	96.7	0.24	0.00
Mon. 03 Apr	92.9	0.40	N/A	96.9	0.46	13.75
Tue. 04 Apr	92.7	0.37	N/A	96.5	0.33	0.25
Wed. 05 Apr	92.8	0.25	0.00	96.4	0.34	0.34
Thu. 06 Apr	92.6	0.23	0.75	96.4	0.20	0.25
Sun. 09 Apr	92.1	0.41	32.00	N/A	N/A	N/A
Tue. 11 Apr	91.0	0.30	3.75	N/A	N/A	N/A
Wed. 12 Apr	91.1	0.29	7.00	94.6	N/A	N/A
Thu. 13 Apr	91.5	0.29	0.00	94.1	N/A	N/A
Fri. 14 Apr	92.1	0.30	0.00	95.3	N/A	N/A
Mon. 17 Apr	88.3	0.23	22.50	90.5	0.28	17.25
Tue. 18 Apr	90.9	0.22	10.00	94.4	0.26	9.00
Wed. 19 Apr	89.4	0.34	21.00	89.3	0.36	16.50
Thu. 20 Apr	87.9	0.26	6.00	89.2	0.30	6.00
Fri. 21 Apr	88.1	0.28	18.25	82.8	0.23	0.23
Mon. 24 Apr	86.7	0.28	10.25	85.5	0.27	0.27
Tue. 25 Apr	93.6	0.19	1.00	88.2	0.23	1.25
Wed. 26 Apr	90.9	0.26	0.00	94.4	0.37	0.00
Thu. 27 Apr	87.7	0.40	5.25	93.7	0.29	5.00
Fri. 28 Apr	89.6	0.29	0.00	93.3	0.33	0.00
Mon. 01 May	90.5	0.39	0.25	92.6	0.44	0.25
Tue. 02 May	89.5	0.34	0.25	92.7	0.85	0.25
Wed. 03 May	89.9	0.52	0.00	91.3	0.77	0.00
Thu. 04 May	89.7	0.53	0.00	91.1	0.82	0.00
Fri. 05 May	89.3	0.70	6.75	92.1	0.92	8.50
Mon. 08 May	91.1	0.51	0.50	94.6	0.47	0.00
Tue. 09 May	90.7	0.44	0.50	94.3	0.36	0.00
Wed. 10 May	90.3	0.31	0.00	94.2	0.66	0.00
Thu. 11 May	89.6	0.78	0.00	93.3	0.99	0.00
Fri. 12 May	90.3	0.35	0.00	93.2	0.42	0.00
Mon. 15 May	89.6	0.41	0.00	91.6	0.92	0.00
Tue. 16 May	90.0	0.55	0.00	91.9	1.50	0.00
Wed. 17 May	90.6	0.42	0.00	91.8	1.40	0.00
Thu. 18 May	89.5	0.41	0.00	92.0	1.48	0.00
Fri. 19 May	89.7	0.30	0.00	92.2	1.09	0.00
Tue. 23 May	91.8	0.65	0.00	94.4	0.98	0.00
Wed. 24 May	92.1	0.44	0.00	94.7	0.77	0.00
Thu. 25 May	92.0	0.43	0.00	94.3	0.56	0.00
Fri. 26 May	89.9	0.31	0.00	92.1	0.28	0.00

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Mon. 29 May	91.3	0.28	0.00	92.9	0.78	0.00
Tue. 30 May	92.2	0.47	0.00	94.4	0.93	0.00
Wed. 31 May	92.3	0.35	0.00	94.9	0.45	0.00
Thu. 01 Jun	92.3	0.35	0.00	95.0	0.41	0.00
Fri. 02 Jun	94.5	0.32	0.00	94.2	0.64	0.00
Mon. 05 Jun	92.4	0.62	0.00	94.7	0.40	0.00
Tue. 06 Jun	92.6	0.42	0.00	94.2	0.50	0.00
Wed. 07 Jun	90.4	0.49	0.00	92.4	0.43	0.00
Thu. 08 Jun	92.0	0.39	0.00	93.3	0.41	0.00
Fri. 09 Jun	92.6	0.36	0.00	93.4	0.49	0.00
Mon. 12 Jun	91.6	0.44	0.00	92.5	0.56	0.00
Tue. 13 Jun	93.1	0.38	0.00	93.3	0.56	0.00
Wed. 14 Jun	93.6	0.30	0.75	94.0	0.39	1.25
Thu. 15 Jun	94.2	0.34	0.00	95.4	0.44	0.00
Fri. 16 Jun	93.9	0.54	0.00	95.2	0.67	0.00
Mon. 19 Jun	94.5	0.37	0.00	95.3	0.48	0.00
Tue. 20 Jun	93.7	0.37	6.00	94.9	0.49	6.25
Wed. 21 Jun	94.0	0.37	0.00	95.4	0.33	0.00
Thu. 22 Jun	94.1	0.46	0.00	94.8	0.71	0.00
Fri. 23 Jun	92.9	0.43	0.00	93.4	0.59	0.00
Mon. 26 Jun	93.3	0.62	0.00	93.3	0.36	0.00
Tue. 27 Jun	94.3	0.36	0.00	94.4	0.61	0.00
Wed. 28 Jun	94.8	0.32	0.00	94.5	0.39	0.00
Thu. 29 Jun	94.9	0.37	0.00	94.3	0.59	0.00
Fri. 30 Jun	95.2	0.46	0.00	94.9	0.46	0.00
Tue. 04 Jul	94.2	0.20	0.00	94.7	0.27	0.00
Wed. 05 Jul	95.3	0.23	0.00	95.5	0.29	0.00
Thu. 06 Jul	93.8	0.25	0.00	94.3	0.37	0.00
Fri. 07 Jul	94.0	0.17	0.00	94.1	0.18	0.00
Mon. 10 Jul	94.6	0.27	0.00	95.2	0.28	0.00
Tue. 11 Jul	95.0	0.22	0.00	95.1	0.24	0.00
Wed. 12 Jul	95.5	0.34	0.00	95.8	0.29	0.00
Thu. 13 Jul	95.5	0.52	0.00	95.6	0.64	0.00
Fri. 14 Jul	94.7	0.33	0.00	95.3	0.64	0.00
Mon. 17 Jul	95.0	0.29	0.00	95.6	0.30	0.00
Tue. 18 Jul	95.6	0.28	0.00	96.3	0.38	0.00
Wed. 19 Jul	96.1	0.25	0.00	96.7	0.24	0.00
Thu. 20 Jul	94.5	0.25	0.00	95.4	0.25	0.00
Fri. 21 Jul	95.1	0.23	0.00	95.2	0.26	0.00
Mon. 24 Jul	95.4	0.19	0.00	95.6	0.34	0.00
Tue. 25 Jul	92.8	0.46	23.00	95.7	0.48	29.00
Wed. 26 Jul	93.7	0.20	0.75	95.5	0.22	1.00
Thu. 27 Jul	94.6	0.28	0.00	96.1	0.47	0.00
Fri. 28 Jul	94.7	0.20	0.00	96.1	0.24	0.00
Mon. 31 Jul	95.8	0.38	0.00	96.5	0.19	0.00
Tue. 01 Aug	96.2	0.29	0.00	96.8	0.24	0.00
Wed. 02 Aug	94.3	0.26	0.00	94.8	0.42	0.00
Thu. 03 Aug	94.0	0.21	0.00	95.2	0.19	0.00
Fri. 04 Aug	95.2	0.35	0.00	95.9	0.83	0.00
Tue. 08 Aug	94.2	0.19	0.00	95.5	0.18	0.00
Wed. 09 Aug	92.3	0.25	9.25	94.3	0.20	9.25
Thu. 10 Aug	92.8	0.34	5.75	95.8	0.71	4.75

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Fri. 11 Aug	94.3	0.22	0.00	96.1	0.38	0.00
Mon. 14 Aug	95.0	0.22	0.00	95.9	0.22	0.00
Tue. 15 Aug	94.5	0.21	0.00	95.6	0.26	0.00
Wed. 16 Aug	95.1	0.35	0.00	94.7	0.33	0.00
Thu. 17 Aug	94.8	0.19	0.00	96.1	0.22	0.00
Fri. 18 Aug	95.1	0.21	0.00	96.4	0.33	0.00
Mon. 21 Aug	95.9	0.29	0.00	96.7	0.59	0.00
Tue. 22 Aug	95.8	0.31	0.00	95.2	2.02	0.00
Wed. 23 Aug	95.3	0.26	0.00	96.0	0.42	0.00
Thu. 24 Aug	95.5	0.37	0.00	96.5	0.46	0.00
Fri. 25 Aug	96.0	0.30	0.00	96.9	0.45	0.00
Mon. 28 Aug	95.5	0.50	0.00	96.5	0.52	0.00
Tue. 29 Aug	96.0	0.27	0.50	96.4	0.41	0.75
Wed. 30 Aug	92.8	0.71	17.75	96.4	0.81	N/A
Thu. 31 Aug	94.5	0.39	3.50	96.3	0.71	4.25
Fri. 01 Sep	94.9	0.19	0.25	96.4	0.48	0.00
Tue. 05 Sep	95.9	0.36	0.00	97.6	0.56	0.00
Wed. 06 Sep	96.2	0.22	0.00	96.6	0.90	0.00
Thu. 07 Sep	94.6	0.22	0.50	96.8	0.57	1.50
Fri. 08 Sep	95.7	0.20	0.00	96.3	0.59	0.00
Mon. 11 Sep	96.3	0.28	0.00	96.8	0.50	0.00
Tue. 12 Sep	95.3	0.19	0.50	95.9	0.75	0.75
Wed. 13 Sep	95.8	0.31	0.75	96.8	1.00	1.25
Thu. 14 Sep	95.8	0.26	0.00	96.4	0.82	0.00
Fri. 15 Sep	95.6	0.48	0.00	96.5	0.60	0.00
Mon. 18 Sep	96.3	0.25	0.50	96.5	1.25	1.25
Tue. 19 Sep	96.4	0.38	0.50	97.0	0.82	0.50
Wed. 20 Sep	95.5	0.33	9.00	96.7	0.56	8.50
Thu. 21 Sep	95.5	0.24	0.00	96.9	0.49	0.00
Fri. 22 Sep	96.2	0.42	0.00	96.6	0.82	0.00
Mon. 25 Sep	77.0	1.07	36.50	89.7	1.10	29.75
Tue. 26 Sep	89.2	0.53	54.50	90.1	1.65	51.50
Wed. 27 Sep	87.5	0.50	15.25	89.1	0.71	15.50
Thu. 28 Sep	90.3	0.38	7.00	91.1	0.57	8.25
Fri. 29 Sep	91.1	0.62	3.25	93.0	0.43	4.50
Tue. 03 Oct	91.1	0.45	10.50	95.2	0.67	11.00
Wed. 04 Oct	92.9	0.46	0.00	93.8	0.71	0.00
Thu. 05 Oct	92.9	0.46	0.00	93.3	0.61	0.00
Fri. 06 Oct	92.7	0.28	0.00	95.3	0.44	0.00
Tue. 10 Oct	86.8	0.40	18.25	90.6	0.58	21.25
Wed. 11 Oct	84.8	0.59	45.00	89.3	0.63	46.75
Thu. 12 Oct	90.2	0.29	0.00	87.8	0.84	0.25
Fri. 13 Oct	91.2	0.27	0.00	93.8	0.20	0.00
Mon. 16 Oct	90.0	0.34	4.75	92.4	0.59	5.75
Tue. 17 Oct	90.4	0.22	16.25	92.1	0.39	15.25
Wed. 18 Oct	79.3	1.02	59.50	85.9	1.35	66.80
Thu. 19 Oct	83.6	0.30	59.00	82.8	0.30	59.50
Fri. 20 Oct	89.5	0.22	1.50	91.6	0.69	1.50
Mon. 23 Oct	92.0	0.30	0.00	95.3	0.65	0.00
Tue. 24 Oct	91.2	0.30	0.00	95.9	0.48	0.00
Wed. 25 Oct	86.1	0.41	43.75	94.3	0.50	46.75
Thu. 26 Oct	90.5	0.18	0.00	94.7	0.29	0.00

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Fri. 27 Oct	90.9	0.35	0.00	94.3	0.34	0.00
Mon. 30 Oct	93.0	0.48	0.00	95.7	0.54	0.00
Tue. 31 Oct	91.2	0.16	0.00	96.1	0.37	0.00
Wed. 01 Nov	93.0	0.46	0.00	96.2	0.68	0.00
Thu. 02 Nov	79.8	0.77	16.00	93.0	0.67	22.50
Fri. 03 Nov	88.3	0.20	9.50	91.4	0.74	13.00
Mon. 06 Nov	80.3	0.37	N/A	85.6	1.45	25.00
Tue. 07 Nov	87.7	0.23	N/A	91.3	0.55	8.25
Wed. 08 Nov	90.5	0.21	N/A	90.0	0.29	0.00
Thu. 09 Nov	90.9	0.29	N/A	94.2	0.72	1.25
Fri. 10 Nov	96.2	0.30	N/A	92.8	0.19	17.50
Tue. 14 Nov	90.5	0.24	N/A	93.9	0.24	0.00
Wed. 15 Nov	91.5	0.23	0.00	94.7	0.25	0.00
Thu. 16 Nov	92.3	0.17	0.25	95.1	0.50	0.50
Fri. 17 Nov	92.5	0.19	0.00	95.6	0.32	0.00
Mon. 20 Nov	90.1	0.21	0.25	93.9	0.57	0.25
Tue. 21 Nov	91.2	0.27	0.00	94.9	0.39	0.00
Wed. 22 Nov	88.5	0.23	0.00	94.7	0.38	0.00
Thu. 23 Nov	91.2	0.22	0.00	95.2	0.62	0.00
Fri. 24 Nov	90.9	0.45	0.00	95.5	0.78	0.00
Mon. 27 Nov	93.1	0.17	0.00	95.9	0.36	0.00
Tue. 28 Nov	92.5	0.18	0.00	95.8	0.50	0.00
Wed. 29 Nov	93.0	0.22	0.00	96.1	0.31	0.00
Thu. 30 Nov	93.8	0.30	0.00	95.6	0.47	0.00
Fri. 01 Dec	93.0	0.29	4.25	96.4	0.34	5.50
Mon. 04 Dec	86.9	0.32	11.50	94.6	0.46	10.50
Tue. 05 Dec	84.2	0.60	75.75	82.1	2.12	81.75
Wed. 06 Dec	87.6	0.33	3.25	86.5	1.26	3.50
Thu. 07 Dec	89.7	0.20	0.50	92.9	0.75	0.75
Fri. 08 Dec	90.2	0.22	0.00	94.2	0.29	0.00
Mon. 11 Dec	88.1	0.27	8.75	93.7	0.57	5.75
Tue. 12 Dec	90.2	0.24	0.00	93.4	0.32	0.00
Wed. 13 Dec	91.2	0.24	0.00	95.6	0.36	0.00
Thu. 14 Dec	91.2	0.20	N/A	95.6	0.29	2.25
Fri. 15 Dec	90.3	N/A	N/A	95.0	N/A	4.00
Mon. 18 Dec	89.0	N/A	N/A	94.8	0.37	4.75
Tue. 19 Dec	86.7	0.50	11.25	90.5	0.56	13.50
Wed. 20 Dec	86.5	0.32	20.25	88.4	0.55	18.75
Thu. 21 Dec	86.7	0.33	9.75	91.0	0.43	10.50
Fri. 22 Dec	88.0	0.27	7.75	92.4	0.37	10.50
Sat. 23 Dec	89.7	0.31	N/A	93.6	0.20	N/A
Wed. 27 Dec	89.8	0.28	2.00	92.4	1.22	5.45
Sat. 30 Dec	88.6	0.38	10.25	86.1	1.36	8.00
MIN	77.0	0.16	N/A	82.1	0.18	N/A
MAX	96.4	1.50	N/A	97.6	2.12	N/A
MED	92.1	0.34	N/A	95.1	0.46	N/A
AVG	91.6	0.38	N/A	94.2	0.55	N/A

APPENDIX: *TREATED* WATER TURBIDITY, Cl_2 RESIDUAL

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Tue, 03 Jan		0.61	0.90	0.3	0.8	0.69	0.73	0.34	0.58	0.25	0.75	0.45	0.84	0.4	0.7	0.67	0.59
Wed, 04 Jan	1	0.76	0.87	0.2	0.8	0.64	0.71	0.36	0.66	0.26	0.67	0.79	0.83	0.5	0.7	0.52	0.65
Thu, 05 Jan	1	0.37	0.84	0.3	0.8	0.83	0.67	0.27	0.65	0.45	0.70	0.63	0.89	0.3	0.8	0.65	0.61
Fri, 06 Jan	1	0.63	0.89	0.8	0.8	0.64	0.56	0.25	0.65	0.18	0.51	0.46	0.86	0.3	0.8	0.58	0.60
Mon, 09 Jan	3	0.54	0.86	0.5	0.8	0.81	0.57	0.40	0.63	0.25	0.36	0.53	0.88	0.5	0.7	0.95	0.57
Tue, 10 Jan	1	1.77	0.90	0.4	0.8	1.05	0.61	0.22	0.58	0.96	0.40	0.83	0.94	0.3	0.8	0.81	0.52
Wed, 11 Jan	1	0.45	0.93	0.3	0.8	0.75	0.68	0.33	0.59	0.21	0.46	0.68	0.89	0.3	0.8	1.08	0.52
Thu, 12 Jan	1	0.67	0.84	0.5	0.8	1.06	0.65	0.44	0.60	0.47	0.35	0.50	0.85	0.2	0.7	0.83	0.56
Fri, 13 Jan	1	1.05	0.95	1.1	0.8	1.27	0.67	0.29	0.64	0.19	0.47	0.67	0.80	0.5	0.8	1.21	0.55
Mon, 16 Jan	3	1.18	0.88	0.8	0.8	1.13	0.72	0.57	0.64	0.32	0.30	0.67	0.63	0.4	0.8	0.71	0.26
Tue, 17 Jan	1	0.95	0.92	0.6	0.8	0.90	0.61	0.41	0.65	0.32	0.60	0.69	0.57	0.4	0.6	1.06	0.20
Wed, 18 Jan	1	0.92	0.81	1.0	0.7	0.77	0.70	0.33	0.53	0.32	0.35	1.07	1.06	0.2	0.7	1.02	0.25
Thu, 19 Jan	1	0.82	0.97	0.4	0.8	0.70	0.68	0.26	0.56	0.27	0.21	0.77	0.85	0.3	0.7	0.56	0.28
Fri, 20 Jan	1	0.44	0.85	0.3	0.7	0.73	0.63	0.38	0.54	0.24	0.30	0.93	0.82	0.4	0.7	0.84	0.26
Mon, 23 Jan	3	0.33	0.94	0.5	0.8	0.67	0.75	0.37	0.65	0.25	0.26	0.98	0.86	0.3	0.7	0.44	0.46
Tue, 24 Jan	1	0.90	0.99	0.8	0.8	0.76	0.77	0.26	0.71	0.19	0.65	0.67	0.93	0.4	0.7	0.45	0.56
Wed, 25 Jan	1	0.68	0.90	0.3	0.8	0.90	0.75	0.28	0.72	0.22	0.46	0.66	0.92	0.3	0.8	1.17	0.62
Thu, 26 Jan	1	0.53	0.87	0.8	0.8	0.63	0.65	0.22	0.71	0.40	0.55	0.63	0.88	0.9	0.7	0.61	0.60
Fri, 27 Jan	1	0.35	0.88	0.4	0.8	0.41	0.67	0.24	0.71	0.34	0.66	0.55	0.87	0.3	0.7	0.79	0.63
Mon, 30 Jan	3	0.82	0.88	0.8	0.8	0.46	0.71	0.20	0.70	0.25	0.36	0.72	0.88	0.2	0.8	0.84	0.60
Tue, 31 Jan	1	0.42	0.90	0.3	0.8	0.57	0.75	0.31	0.69	0.32	0.80	0.24	0.83	0.4	0.7	0.56	0.74
Wed, 01 Feb	1	1.09	0.90	0.2	0.8	0.82	0.79	0.27	0.82	0.22	0.65	0.41	0.85	0.5	0.8	0.50	0.70
Thu, 02 Feb	1	0.45	0.88	0.5	0.8	0.51	0.73	0.27	0.75	0.38	0.78	0.70	0.90	0.4	0.8	0.63	0.63
Fri, 03 Feb	1	0.72	0.89	0.3	0.8	0.51	0.75	0.23	0.78	0.67	0.75	0.85	0.85	0.3	0.8	1.27	0.59
Mon, 06 Feb	3	0.54	0.91	0.5	0.8	0.84	0.70	0.23	0.54	0.28	0.46	0.30	0.86	0.3	0.7	0.65	0.64
Tue, 07 Feb	1	1.04	0.89	0.7	0.8	0.55	0.65	0.66	0.60	0.24	0.51	0.45	0.94	0.2	0.8	0.58	0.67
Wed, 08 Feb	1	0.76	0.81	0.8	0.7	0.64	0.60	0.27	0.67	0.30	0.51	0.39	0.88	0.2	0.8	0.87	0.61

[5] For example an intake being blocked or maintenance on a plant

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Thu, 09 Feb	1	0.74	0.97	0.7	0.9	0.84	0.78	0.53	0.47	0.31	0.35	0.44	0.88	0.4	0.7	0.58	0.66
Fri, 10 Feb	1	0.48	0.84	0.5	0.7	0.81	0.66	0.25	0.66	0.42	0.27	1.25	0.88	0.3	0.6	0.53	0.67
Mon, 13 Feb	3	0.68	0.85	0.4	0.8	0.55	0.68	0.24	0.68	0.30	0.37	0.33	0.87	0.3	0.7	0.75	0.65
Tue, 14 Feb	1	0.86	0.89	0.5	0.8	0.55	0.70	0.27	0.65	0.27	0.70	0.37	0.82	0.2	0.7	0.47	0.67
Wed, 15 Feb	1	0.29	0.88	0.3	0.8	0.66	0.70	0.22	0.66	0.21	0.65	1.14	0.88	0.2	0.7	0.66	0.65
Thu, 16 Feb	1	0.34	0.90	0.4	0.8	0.36	0.72	0.38	0.66	0.36	0.64	0.35	0.87	0.3	0.8	0.21	0.64
Fri, 17 Feb	1	0.21	0.99	0.2	0.8	0.31	0.74	0.20	0.65	0.39	0.48	0.20	0.91	0.2	0.8	0.22	0.62
Tue, 21 Feb	4	0.53	0.85	0.3	0.8	0.41	0.70	0.26	0.72	0.49	0.32	0.59	0.85	0.2	0.7	0.54	0.69
Wed, 22 Feb	1	0.63	0.92	0.3	0.8	0.40	0.70	0.18	0.66	0.27	0.59	0.26	0.95	0.3	0.8	0.31	0.62
Thu, 23 Feb	1	0.50	0.90	0.3	0.8	0.39	0.72	0.24	0.66	0.19	0.61	0.41	0.88	0.2	0.8	0.43	0.66
Fri, 24 Feb	1	0.78	0.88	0.3	0.8	0.42	0.76	0.24	0.73	0.26	0.59	0.50	0.82	0.3	0.7	0.39	0.65
Mon, 27 Feb	3	0.53	0.91	0.3	0.9	0.22	0.78	0.18	0.78	0.19	0.79	0.40	0.74	0.3	0.8	0.20	0.53
Wed, 01 Mar	2	0.73	0.90	0.5	0.8	0.55	0.78	0.25	0.75	0.25	0.64	N/A	N/A	0.3	0.8	0.42	0.64
Thu, 02 Mar	1	0.53	0.90	0.2	0.9	0.52	0.77	0.30	0.75	0.23	0.64	0.41	0.65	0.4	0.8	0.43	0.58
Fri, 03 Mar	1	0.38	0.91	0.9	0.8	0.33	0.78	0.28	0.76	0.22	0.68	0.56	0.65	0.3	0.8	0.38	0.61
Mon, 06 Mar	3	0.83	0.89	0.8	0.8	1.00	0.76	0.24	0.76	0.22	0.58	0.83	1.05	0.2	0.8	0.54	0.62
Tue, 07 Mar	1	0.43	0.89	0.3	0.8	0.95	0.83	0.21	0.73	0.29	0.70	0.65	1.08	0.8	0.8	0.61	0.60
Wed, 08 Mar	1	0.53	0.87	0.4	0.9	1.02	0.73	0.26	0.76	0.34	0.64	0.64	1.23	0.2	0.8	0.54	0.67
Thu, 09 Mar	1	0.34	0.88	0.4	0.8	0.58	0.76	0.30	0.74	0.32	0.70	0.44	1.16	0.4	0.8	0.81	0.55
Fri, 10 Mar	1	0.40	0.89	0.3	0.8	0.59	0.85	0.26	0.75	0.28	0.68	0.65	1.03	0.4	0.8	0.41	0.61
Mon, 13 Mar	3	0.66	0.86	0.2	0.8	0.44	0.78	0.23	0.71	0.30	0.49	0.38	0.90	0.2	0.8	0.37	0.52
Tue, 14 Mar	1	0.70	0.95	0.3	0.9	0.21	0.77	0.20	0.73	0.21	0.68	0.54	0.81	0.2	0.8	0.22	0.61
Wed, 15 Mar	1	0.71	0.86	0.4	0.8	0.77	0.68	0.20	0.68	0.25	0.58	0.46	0.80	0.2	0.8	0.47	0.56
Thu, 16 Mar	1	0.29	0.89	0.3	0.8	0.36	0.71	0.33	0.66	0.26	0.52	0.35	0.83	0.2	0.8	0.28	0.55
Fri, 17 Mar	1	0.47	0.93	0.2	0.8	0.67	0.76	0.25	0.72	0.20	0.52	0.39	0.83	0.2	0.8	0.35	0.50
Mon, 20 Mar	3	0.52	0.85	0.3	0.8	0.91	0.71	0.35	0.64	0.34	0.50	0.28	0.82	0.3	0.7	0.85	0.50
Tue, 21 Mar	1	0.44	0.92	0.5	0.8	0.66	0.77	0.18	0.61	0.29	0.57	0.39	0.80	0.2	0.7	0.87	0.45
Wed, 22 Mar	1	0.60	0.89	0.4	0.8	0.73	0.73	0.20	0.62	0.26	0.49	0.31	0.71	0.2	0.8	0.31	0.42
Thu, 23 Mar	1	0.69	0.90	0.8	0.8	0.75	0.74	0.17	0.64	0.23	0.42	0.69	0.80	0.2	0.7	0.33	0.46
Fri, 24 Mar	1	0.40	0.88	0.2	0.8	0.54	0.71	0.23	0.54	0.26	0.42	0.41	0.77	0.3	0.8	0.25	0.51
Mon, 27 Mar	3	0.37	0.90	0.5	0.8	0.36	0.73	0.40	0.67	0.25	0.25	0.44	0.89	0.2	0.8	0.56	0.52
Tue, 28 Mar	1	0.29	0.91	0.2	0.8	0.46	0.77	0.26	0.71	0.36	0.55	0.50	0.88	0.2	0.8	0.32	0.58
Wed, 29 Mar	1	0.47	0.89	0.3	0.8	0.55	0.74	0.21	0.70	0.28	0.57	0.30	0.92	0.3	0.8	0.39	0.58
Thu, 30 Mar	1	0.46	0.84	0.4	0.8	0.63	0.72	0.26	0.73	0.26	0.57	0.59	0.90	0.2	0.9	0.28	0.61

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Fri, 31 Mar	1	0.34	0.87	0.3	0.8	0.41	0.72	0.23	0.68	0.52	0.54	0.63	0.86	0.2	0.7	0.43	0.86
Mon, 03 Apr	3	0.39	0.87	0.2	0.8	0.31	0.70	0.22	0.65	0.37	0.28	0.42	0.87	0.2	0.7	0.34	0.68
Tue, 04 Apr	1	0.31	0.94	0.3	0.9	0.43	0.77	0.38	0.68	0.23	0.71	0.23	0.93	0.2	0.7	0.38	0.62
Wed, 05 Apr	1	0.32	0.89	0.2	0.8	0.31	0.82	0.24	0.69	0.27	0.65	0.37	0.97	0.2	0.8	0.22	0.68
Thu, 06 Apr	1	0.36	0.85	0.3	1.0	0.38	0.81	0.26	0.94	0.23	0.62	0.32	0.88	0.2	0.8	0.21	0.78
Sun, 09 Apr	3	0.44	1.00	0.4	0.8	N/A	N/A	0.46	0.55	0.35	0.57	N/A	N/A	0.4	0.8	0.49	0.52
Tue, 11 Apr	2	0.43	0.89	0.3	0.8	0.37	0.77	0.41	0.57	0.33	0.49	N/A	N/A	0.3	0.8	0.34	0.39
Wed, 12 Apr	1	0.30	0.87	0.3	0.8	0.37	0.65	0.25	0.67	0.26	0.68	0.56	0.96	0.2	0.7	0.29	0.42
Thu, 13 Apr	1	0.39	0.90	0.2	0.9	0.31	0.64	0.22	0.60	0.31	0.33	0.42	1.04	0.2	0.7	0.23	0.50
Fri, 14 Apr	1	0.35	0.93	0.2	0.8	0.23	0.71	0.21	0.64	0.28	0.64	0.37	0.92	0.2	0.7	0.31	0.53
Mon, 17 Apr	3	0.28	0.88	0.2	0.8	0.26	0.69	0.18	0.61	0.22	0.56	0.35	0.95	0.2	0.7	0.22	0.68
Tue, 18 Apr	1	0.25	0.87	0.2	0.8	0.24	0.68	0.24	0.54	0.20	0.59	0.32	0.88	0.2	0.7	0.21	0.40
Wed, 19 Apr	1	0.29	0.93	0.1	0.8	0.20	0.65	0.18	0.59	0.30	0.80	0.31	1.05	0.3	0.8	0.21	0.45
Thu, 20 Apr	1	0.26	0.82	0.2	0.7	0.21	0.60	0.19	0.58	0.24	0.40	0.37	0.98	0.1	0.7	0.21	0.43
Fri, 21 Apr	1	0.22	0.86	0.2	0.8	0.27	0.72	0.25	0.58	0.20	0.45	0.25	0.92	0.2	0.9	0.21	0.61
Mon, 24 Apr	3	0.25	0.87	0.2	0.8	0.22	0.63	0.24	0.59	0.25	0.35	0.26	0.82	0.2	0.8	0.24	0.64
Tue, 25 Apr	1	0.22	0.84	0.2	0.8	0.18	0.71	0.24	0.61	0.21	0.37	0.26	0.81	0.2	0.7	0.23	0.67
Wed, 26 Apr	1	0.30	0.86	0.5	0.8	0.50	0.67	0.23	0.57	0.30	0.37	0.39	0.83	0.3	0.7	0.71	0.55
Thu, 27 Apr	1	0.46	0.85	0.3	0.8	0.43	0.66	0.87	0.53	0.23	0.38	0.42	0.90	0.4	0.7	0.35	0.58
Fri, 28 Apr	1	0.30	0.85	0.2	0.7	0.59	0.66	0.29	0.52	0.22	0.39	0.39	0.85	0.2	0.7	0.51	0.74
Mon, 01	3	0.63	0.91	0.3	0.8	0.75	0.80	0.48	0.64	0.25	0.21	0.79	0.86	0.5	0.7	0.45	0.55
Tue, 02 May	1	0.56	0.87	0.4	0.8	0.34	0.69	0.30	0.67	0.31	0.31	0.72	0.82	0.6	0.7	0.49	0.58
Wed, 03	1	0.57	0.85	0.3	0.7	0.55	0.68	0.27	0.67	0.46	0.60	0.86	0.84	0.4	0.6	0.50	0.56
Thu, 04 May	1	1.35	0.93	0.6	0.8	1.08	0.78	0.32	0.63	0.28	0.44	1.09	0.90	0.6	0.7	1.29	0.56
Fri, 05 May	1	0.51	0.84	0.6	0.8	0.80	0.71	0.41	0.75	0.43	0.36	1.05	0.90	0.7	0.7	0.69	0.58
Mon, 08	3	0.61	0.88	0.3	0.8	0.48	0.74	0.32	0.67	0.38	0.72	0.47	0.90	0.4	0.7	0.53	0.58
Tue, 09 May	1	0.46	0.88	0.3	0.8	0.48	0.70	0.71	0.69	0.27	0.48	0.61	0.90	0.3	0.8	0.51	0.61
Wed, 10	1	0.33	0.87	0.3	0.8	0.41	0.74	0.31	0.66	0.32	0.33	0.43	0.87	0.4	0.6	0.41	0.69
Thu, 11 May	1	0.65	0.84	0.4	0.8	0.59	0.72	0.31	0.70	0.46	0.32	0.35	0.90	0.5	0.7	0.59	0.63
Fri, 12 May	1	0.47	0.88	0.3	0.8	0.39	0.71	0.28	0.65	0.34	0.29	0.55	0.86	0.3	0.7	0.38	0.62
Mon, 15	3	0.39	0.85	0.3	0.7	0.41	0.73	0.35	0.74	0.74	0.65	0.86	0.84	0.4	0.6	0.53	0.55
Tue, 16 May	1	0.76	0.89	0.4	0.8	0.61	0.78	0.35	0.72	0.35	0.56	1.45	0.90	0.6	0.7	1.16	0.63
Wed, 17	1	0.83	0.88	0.7	0.7	0.55	0.68	0.45	0.74	1.15	0.41	0.74	0.87	0.8	0.7	0.68	0.66
Thu, 18 May	1	1.10	0.86	0.5	0.8	0.35	0.68	0.32	0.71	0.33	0.32	1.25	0.87	0.8	0.7	0.80	0.59

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Fri, 19 May	1	0.87	0.87	0.4	0.8	0.31	0.74	0.29	0.67	0.38	0.28	1.60	0.90	0.9	0.7	0.73	0.57
Tue, 23 May	4	0.57	0.88	0.4	0.8	0.86	0.77	0.41	0.70	0.52	0.30	1.33	0.88	0.4	0.7	0.67	0.73
Wed, 24	1	0.45	0.88	0.4	0.8	0.35	0.75	0.50	0.79	0.39	0.36	0.62	0.90	0.4	0.7	0.70	0.73
Thu, 25 May	1	0.54	0.87	0.4	0.7	0.40	0.69	0.42	0.77	0.28	0.26	0.75	0.93	0.5	0.7	0.85	0.68
Fri, 26 May	1	0.22	0.89	0.2	0.7	0.19	0.71	0.18	0.77	0.23	0.40	0.29	0.84	0.2	0.7	0.26	0.80
Mon, 29	3	0.43	0.86	0.8	0.7	0.76	0.71	0.34	0.76	0.24	0.34	0.76	0.83	0.3	0.7	0.37	0.61
Tue, 30 May	1	0.39	0.83	0.4	0.7	0.32	0.68	0.23	0.67	0.35	0.31	0.80	0.83	0.3	0.6	0.59	0.58
Wed, 31	1	0.39	0.84	0.4	0.8	0.39	0.69	0.32	0.73	0.30	0.37	0.37	0.88	0.4	0.7	0.58	0.61
Thu, 01 Jun	1	0.51	0.88	0.3	0.8	0.28	0.70	0.31	0.67	0.34	0.26	0.48	0.89	0.4	0.7	0.43	0.59
Fri, 02 Jun	1	0.36	0.88	0.3	0.8	0.42	0.72	0.32	0.71	0.43	0.29	0.58	0.84	0.3	0.7	0.37	0.69
Mon, 05 Jun	3	0.68	0.89	0.4	0.8	0.29	0.75	0.27	0.78	0.25	0.22	0.50	0.85	0.2	0.7	0.27	0.75
Tue, 06 Jun	1	0.40	0.86	0.6	0.8	0.39	0.74	0.26	0.75	0.22	0.35	0.38	0.90	0.3	0.7	0.34	0.72
Wed, 07 Jun	1	0.44	0.84	0.4	0.7	0.46	0.71	0.34	0.74	0.27	0.52	0.98	0.90	0.2	0.7	0.60	0.79
Thu, 08 Jun	1	0.34	0.87	0.3	0.8	0.53	0.77	0.22	0.70	0.23	0.42	0.49	0.85	0.2	0.7	0.36	0.72
Fri, 09 Jun	1	0.45	0.88	0.5	0.8	0.55	0.74	0.46	0.71	0.33	0.54	0.46	0.84	0.2	0.7	0.56	0.59
Mon, 12 Jun	3	0.35	0.89	0.4	0.8	0.63	0.78	0.35	0.79	0.36	0.55	0.71	0.88	0.3	0.8	0.45	0.69
Tue, 13 Jun	1	0.31	0.89	0.3	0.8	0.35	0.78	0.23	0.71	0.25	0.41	0.49	0.80	0.3	0.7	0.27	0.68
Wed, 14 Jun	1	0.36	0.90	0.3	0.8	0.42	0.79	0.34	0.80	0.29	0.34	0.38	0.84	0.4	0.8	0.62	0.60
Thu, 15 Jun	1	0.50	0.86	0.4	0.8	0.44	0.74	0.29	0.77	0.29	0.29	0.42	0.92	0.3	0.8	0.57	0.70
Fri, 16 Jun	1	0.50	0.84	0.4	0.8	0.51	0.71	0.40	0.73	0.23	0.46	0.86	0.85	0.3	0.7	0.43	0.74
Mon, 19 Jun	3	0.45	0.84	0.3	0.8	0.33	0.72	0.30	0.72	0.30	0.53	0.59	0.90	0.2	0.7	0.51	0.67
Tue, 20 Jun	1	0.50	0.89	0.4	0.8	0.36	0.78	0.28	0.71	0.34	0.41	0.58	0.87	0.2	0.7	0.63	0.64
Wed, 21 Jun	1	0.61	0.89	0.3	0.8	0.32	0.74	0.30	0.80	0.25	0.36	0.71	0.87	0.3	0.7	0.56	0.63
Thu, 22 Jun	1	0.36	0.86	0.4	0.8	0.46	0.74	0.30	0.74	0.31	0.39	0.70	0.86	0.3	0.7	0.45	0.59
Fri, 23 Jun	1	0.49	0.85	0.3	0.7	0.41	0.71	0.32	0.75	0.31	0.39	0.47	0.83	0.3	0.8	0.65	0.65
Mon, 26 Jun	3	0.40	0.87	0.3	0.8	0.41	0.75	0.28	0.82	0.26	0.47	0.62	0.84	0.3	0.7	0.35	0.75
Tue, 27 Jun	1	0.37	0.86	0.3	0.8	0.53	0.74	0.28	0.70	0.26	0.49	0.62	0.78	0.3	0.7	0.45	0.63
Wed, 28 Jun	1	0.38	0.96	0.3	0.9	0.62	0.82	0.31	0.83	0.25	0.43	0.60	0.90	0.4	0.7	0.56	0.61
Thu, 29 Jun	1	0.47	0.82	0.5	0.8	0.60	0.71	0.35	0.78	0.25	0.43	0.84	0.86	0.4	0.8	0.57	0.79
Fri, 30 Jun	1	0.49	0.87	0.5	0.8	0.38	0.72	0.39	0.68	0.38	0.44	0.89	0.82	0.4	0.7	0.83	0.76
Tue, 04 Jul	4	0.23	0.87	0.2	0.8	0.21	0.72	0.20	0.78	0.21	0.38	0.30	0.88	0.2	0.7	0.24	0.68
Wed, 05 Jul	1	0.29	0.83	0.3	0.8	0.30	0.73	0.20	0.75	0.19	0.52	0.22	0.91	0.2	0.8	0.27	0.74
Thu, 06 Jul	1	0.38	0.86	0.6	0.7	0.40	0.71	0.71	0.71	0.23	0.41	0.42	0.76	0.2	0.7	0.24	0.71
Fri, 07 Jul	1	0.23	0.84	0.1	0.7	0.23	0.73	0.19	0.62	0.21	0.58	0.19	0.74	0.1	0.6	0.17	0.57

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Mon, 10 Jul	3	0.22	0.80	0.3	0.7	0.35	0.70	0.24	0.74	0.26	0.46	0.29	0.75	0.2	0.6	0.44	0.67
Tue, 11 Jul	1	0.37	0.85	0.2	0.8	0.27	0.76	0.19	0.68	0.20	0.47	0.30	0.84	0.2	0.7	0.74	0.62
Wed, 12 Jul	1	0.30	0.85	0.3	0.8	0.32	0.76	0.26	0.75	0.26	0.46	0.28	0.87	0.2	0.7	0.28	0.68
Thu, 13 Jul	1	0.33	0.87	0.2	0.8	0.57	0.74	0.32	0.69	0.38	0.39	0.62	0.86	0.2	0.7	0.31	0.69
Fri, 14 Jul	1	0.46	0.87	0.2	0.8	0.40	0.74	0.35	0.69	0.30	0.55	0.88	0.88	0.3	0.7	0.53	0.62
Mon, 17 Jul	3	0.30	0.85	0.2	0.8	0.23	0.78	0.19	0.76	0.20	0.35	0.73	0.75	0.2	0.7	0.41	0.66
Tue, 18 Jul	1	0.29	0.90	0.4	0.8	0.29	0.78	0.21	0.72	0.22	0.42	0.53	0.87	0.2	0.7	0.28	0.66
Wed, 19 Jul	1	0.29	0.89	0.2	0.8	0.25	0.80	0.22	0.78	0.23	0.46	0.36	0.90	0.1	0.8	0.27	0.67
Thu, 20 Jul	1	0.29	0.84	0.3	0.7	0.33	0.67	0.21	0.75	0.31	0.52	0.34	0.82	0.3	0.7	0.28	0.65
Fri, 21 Jul	1	0.29	0.83	0.2	0.7	0.24	0.73	0.20	0.71	0.26	0.59	0.26	0.84	0.2	0.7	0.28	0.63
Mon, 24 Jul	3	0.26	0.85	0.2	0.7	0.37	0.74	0.24	0.77	0.27	0.52	0.20	0.87	0.3	0.7	0.44	0.66
Tue, 25 Jul	1	0.29	0.87	0.4	0.7	0.38	0.67	0.29	0.65	0.37	0.44	0.56	0.82	0.4	0.7	0.50	0.61
Wed, 26 Jul	1	0.25	0.93	0.2	0.8	0.23	0.76	0.23	0.72	0.22	0.28	0.23	0.91	0.2	0.7	0.36	0.51
Thu, 27 Jul	1	0.40	0.84	0.4	0.7	1.28	0.70	0.32	0.67	0.25	0.27	0.78	0.86	0.2	0.7	0.34	0.62
Fri, 28 Jul	1	0.25	0.87	0.1	0.8	0.22	0.79	0.18	0.66	0.22	0.55	0.25	0.96	0.2	0.7	0.18	0.63
Mon, 31 Jul	3	0.31	0.87	0.2	0.7	0.24	0.74	0.19	0.76	0.17	0.54	0.23	0.82	0.1	0.8	0.25	0.63
Tue, 01 Aug	1	0.50	0.85	0.4	0.8	0.31	0.74	0.20	0.72	0.20	0.61	0.21	0.86	0.2	0.7	0.39	0.62
Wed, 02 Aug	1	0.26	0.85	0.3	0.8	0.29	0.74	0.24	0.75	0.22	0.44	0.35	0.89	0.2	0.7	0.48	0.71
Thu, 03 Aug	1	0.36	0.86	0.1	0.7	0.18	0.74	0.16	0.67	0.20	0.54	0.25	0.82	0.2	0.7	0.20	0.69
Fri, 04 Aug	1	0.38	0.85	0.2	0.8	0.26	0.68	0.24	0.72	0.27	0.51	0.87	0.82	0.3	0.7	0.35	0.61
Tue, 08 Aug	4	0.21	0.82	0.2	0.7	0.17	0.69	0.19	0.65	0.20	0.32	0.22	0.82	0.4	0.7	0.21	0.65
Wed, 09 Aug	1	0.32	0.85	0.3	0.8	0.34	0.69	0.24	0.74	0.23	0.41	0.25	0.82	0.2	0.7	0.24	0.57
Thu, 10 Aug	1	0.29	0.88	0.3	0.7	0.28	0.71	0.22	0.63	0.27	0.40	0.70	0.89	0.3	0.7	0.34	0.54
Fri, 11 Aug	1	0.31	0.86	0.2	0.8	0.27	0.72	0.20	0.66	0.21	0.48	0.45	0.88	0.2	0.8	0.31	0.51
Mon, 14 Aug	3	0.29	0.88	0.2	0.8	0.32	0.77	0.19	0.78	0.17	0.43	0.44	0.90	0.1	0.7	0.22	0.74
Tue, 15 Aug	1	0.29	0.84	0.1	0.8	0.20	0.72	0.15	0.73	0.16	0.42	0.26	0.80	0.2	0.7	0.24	0.71
Wed, 16 Aug	1	0.31	0.90	0.2	0.8	0.26	0.77	0.22	0.78	0.18	0.38	0.23	0.85	0.2	0.6	0.23	0.62
Thu, 17 Aug	1	0.22	0.83	0.2	0.8	0.21	0.67	0.20	0.73	0.18	0.58	0.27	0.92	0.2	0.7	0.24	0.54
Fri, 18 Aug	1	0.33	0.86	0.3	0.8	0.51	0.70	0.28	0.65	0.35	0.67	0.28	0.80	0.3	0.7	0.21	0.70
Mon, 21 Aug	3	0.32	0.87	0.2	0.8	0.23	0.74	0.21	0.78	0.23	0.32	0.47	0.82	0.3	0.7	0.30	0.67
Tue, 22 Aug	1	0.55	0.86	0.4	0.8	0.50	0.72	0.34	0.71	0.28	0.41	0.57	0.83	0.2	0.7	0.38	0.63
Wed, 23 Aug	1	0.94	0.87	0.3	0.8	0.28	0.72	0.26	0.76	0.27	0.36	0.52	0.89	0.2	0.7	0.39	0.61
Thu, 24 Aug	1	0.32	0.88	0.3	0.8	0.25	0.70	0.24	0.71	0.25	0.43	0.38	0.82	0.2	0.7	0.36	0.58
Fri, 25 Aug	1	0.42	0.85	0.3	0.8	0.26	0.71	0.23	0.72	0.25	0.73	0.97	0.88	0.2	0.7	0.33	0.58

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Mon, 28 Aug	3	0.39	0.89	0.5	0.8	0.39	0.77	0.18	0.78	0.19	0.44	0.51	0.85	0.2	0.7	0.46	0.62
Tue, 29 Aug	1	0.29	0.87	0.2	0.8	0.31	0.70	0.37	0.69	0.41	0.45	0.35	0.88	0.3	0.7	0.23	0.76
Wed, 30 Aug	1	0.41	0.82	0.4	0.8	0.40	0.65	0.30	0.66	0.27	0.41	0.74	0.77	0.2	0.6	0.41	0.66
Thu, 31 Aug	1	0.61	0.89	0.5	0.8	0.51	0.74	0.30	0.52	0.22	0.50	0.60	0.83	0.2	0.8	0.47	0.51
Fri, 01 Sep	1	0.30	0.82	0.2	0.8	0.25	0.68	0.16	0.62	0.21	0.56	0.30	0.87	0.1	0.7	0.19	0.43
Tue, 05 Sep	4	0.42	0.86	0.2	0.8	0.35	0.73	0.23	0.67	0.20	0.29	0.58	0.82	0.2	0.7	0.35	0.56
Wed, 06 Sep	1	0.31	0.84	0.2	0.7	0.32	0.79	0.20	0.72	0.22	0.36	0.59	0.84	0.3	0.7	0.30	0.54
Thu, 07 Sep	1	0.60	0.84	0.4	0.8	0.29	0.70	0.21	0.64	0.22	0.36	0.64	0.86	0.2	0.7	0.33	0.49
Fri, 08 Sep	1	0.44	0.92	0.2	0.8	0.30	0.79	0.22	0.62	0.26	0.74	0.86	0.85	0.2	0.8	0.55	0.54
Mon, 11 Sep	3	0.38	0.87	0.3	0.8	0.29	0.75	0.21	0.77	0.27	0.38	0.53	0.86	0.2	0.7	0.33	0.56
Tue, 12 Sep	1	0.24	0.89	0.1	0.8	0.24	0.76	0.19	0.69	0.28	0.41	0.36	0.89	0.2	0.8	0.41	0.55
Wed, 13 Sep	1	0.40	0.88	0.2	0.8	0.37	0.75	0.23	0.77	0.23	0.42	0.73	0.84	0.2	0.7	0.27	0.54
Thu, 14 Sep	1	0.25	0.86	0.2	0.8	0.22	0.74	0.35	0.71	0.27	0.44	0.50	0.81	0.4	0.7	0.29	0.58
Fri, 15 Sep	1	0.54	0.84	0.5	0.8	Close	Close	0.26	0.58	0.35	0.64	0.61	0.86	0.2	0.7	0.30	0.55
Mon, 18 Sep	3	0.40	0.86	0.2	0.7	0.42	0.73	0.40	0.76	0.34	0.43	0.36	0.85	0.2	0.7	0.39	0.62
Tue, 19 Sep	1	0.44	0.84	0.2	0.8	0.45	0.73	0.23	0.71	0.27	0.58	0.66	0.81	0.3	0.7	0.25	0.60
Wed, 20 Sep	1	0.37	0.84	0.2	0.7	0.25	0.72	0.22	0.75	0.21	0.67	0.33	0.85	0.2	0.7	0.25	0.71
Thu, 21 Sep	1	0.34	0.86	0.3	0.7	0.34	0.71	0.23	0.69	0.22	0.64	0.35	0.97	0.2	0.9	0.36	0.48
Fri, 22 Sep	1	0.56	0.86	0.4	0.8	Close	Close	0.24	0.69	0.19	0.57	0.58	0.83	0.5	0.7	0.40	0.53
Mon, 25 Sep	3	0.71	0.60	0.4	0.6	0.34	0.64	0.29	0.67	0.59	0.30	0.84	0.79	0.3	0.7	0.30	0.56
Tue, 26 Sep	1	1.20	0.75	0.8	0.6	0.70	0.47	0.34	0.31	0.31	0.26	2.08	0.85	0.8	0.5	0.34	0.69
Wed, 27 Sep	1	0.78	0.81	0.6	0.7	0.82	0.61	0.57	0.47	0.58	0.59	1.13	0.82	0.8	0.6	0.53	0.34
Thu, 28 Sep	1	0.97	0.97	0.8	0.9	0.56	0.71	0.45	0.42	0.54	0.73	0.96	0.92	0.8	0.8	0.76	0.21
Fri, 29 Sep	1	0.65	0.86	0.5	0.8	0.58	0.65	0.34	0.68	0.29	0.75	0.58	0.87	0.4	0.7	0.48	0.51
Tue, 03 Oct	4	0.44	0.81	0.2	0.7	0.35	0.68	0.26	0.69	0.26	0.33	0.34	0.83	0.3	0.7	0.38	0.70
Wed, 04 Oct	1	0.67	0.88	0.7	0.8	0.28	0.73	0.19	0.55	0.24	0.26	0.42	0.85	0.3	0.7	0.22	0.64
Thu, 05 Oct	1	0.58	0.89	0.4	0.8	0.61	0.75	0.39	0.54	0.26	0.21	0.97	0.89	0.2	0.8	0.37	0.72
Fri, 06 Oct	1	0.53	0.81	0.4	0.7	0.45	0.68	0.48	0.63	0.19	0.41	0.93	0.80	0.7	0.7	0.49	0.72
Tue, 10 Oct	4	1.22	0.75	0.2	0.6	0.34	0.57	0.22	0.62	0.43	0.64	0.49	0.80	0.2	0.7	0.29	0.65
Wed, 11 Oct	1	1.04	0.90	0.6	0.8	0.37	0.66	0.23	0.38	0.22	0.21	0.57	0.69	0.4	0.7	0.58	0.61
Thu, 12 Oct	1	0.74	0.89	0.5	0.8	0.42	0.69	0.31	0.38	0.29	0.22	0.68	0.52	0.3	0.7	0.98	0.48
Fri, 13 Oct	1	0.23	0.92	0.2	0.9	0.17	0.77	0.19	0.40	0.26	0.47	0.42	0.78	0.2	0.8	0.20	0.59
Mon, 16 Oct	3	0.37	0.92	0.4	0.8	0.27	0.72	0.23	0.43	0.27	0.82	0.75	0.76	0.3	0.8	0.31	0.49
Tue, 17 Oct	1	0.35	0.84	0.3	0.7	0.63	0.62	0.24	0.51	0.23	0.23	0.42	0.83	0.2	0.7	0.38	0.53

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Wed, 18 Oct	1	0.75	0.90	0.5	0.7	0.64	0.69	0.25	0.42	0.19	0.28	1.00	0.94	0.4	0.8	0.22	0.46
Thu, 19 Oct	1	1.09	0.85	0.8	0.8	1.09	0.54	0.32	0.50	0.45	0.23	0.53	0.78	0.6	0.7	1.45	0.39
Fri, 20 Oct	1	1.35	0.90	0.8	0.9	0.67	0.66	0.56	0.37	0.30	0.26	0.74	0.98	0.3	0.7	0.38	0.41
Mon, 23 Oct	3	0.51	0.88	0.4	0.8	0.42	0.73	0.29	0.54	0.32	0.73	0.56	0.93	0.3	0.7	0.27	0.57
Tue, 24 Oct	1	0.47	0.87	0.5	0.8	0.48	0.70	0.30	0.55	0.26	0.34	0.43	0.93	0.2	0.7	0.38	0.60
Wed, 25 Oct	1	1.23	0.76	0.9	0.7	0.46	0.59	0.22	0.58	0.51	0.41	0.79	0.82	0.2	0.6	0.38	0.54
Thu, 26 Oct	1	0.45	1.03	0.4	0.9	0.27	0.82	0.33	0.46	0.22	0.20	0.26	0.82	0.2	0.9	0.27	0.44
Fri, 27 Oct	1	0.84	0.93	0.7	0.9	0.41	0.78	0.25	0.59	0.18	0.30	0.59	0.88	0.2	0.9	0.21	0.75
Mon, 30 Oct	3	0.44	0.90	0.5	0.8	0.53	0.80	0.17	0.72	0.37	0.32	0.36	0.94	0.1	0.8	0.20	0.75
Tue, 31 Oct	1	0.75	0.88	0.5	0.8	0.46	0.76	0.14	0.69	0.16	0.33	0.30	0.81	0.1	0.8	0.24	0.67
Wed, 01 Nov	1	0.91	0.86	0.7	0.8	0.42	0.54	0.23	0.66	0.15	0.50	0.69	0.83	0.2	0.7	0.31	0.63
Thu, 02 Nov	1	1.02	0.72	0.4	0.7	0.28	0.63	0.33	0.66	0.23	0.36	0.59	0.88	0.3	0.7	0.24	0.64
Fri, 03 Nov	1	0.72	0.88	0.6	0.8	0.72	0.61	0.24	0.63	0.26	0.33	0.80	0.88	0.2	0.7	0.58	0.61
Mon, 06 Nov	3	0.68	0.71	0.5	0.6	0.51	0.52	0.26	0.42	0.22	0.20	0.95	0.81	0.2	0.7	0.41	0.66
Tue, 07 Nov	1	0.88	0.75	0.6	0.7	0.52	0.51	0.43	0.43	0.22	0.20	0.87	0.89	0.4	0.7	0.41	0.50
Wed, 08 Nov	1	0.36	0.89	0.4	0.8	0.25	0.66	0.25	0.33	0.24	0.75	0.67	0.89	0.3	0.7	0.36	0.64
Thu, 09 Nov	1	0.65	0.98	0.6	0.9	0.58	0.76	1.23	0.55	0.21	0.27	1.04	0.85	0.3	0.7	0.39	0.65
Fri, 10 Nov	1	0.36	0.92	0.3	0.8	0.21	0.69	0.22	0.52	0.24	0.85	0.36	0.89	0.3	0.7	0.28	0.63
Tue, 14 Nov	4	0.51	0.87	0.3	0.7	0.31	0.69	0.27	0.43	0.24	0.71	0.52	0.92	0.2	0.8	0.27	0.65
Wed, 15 Nov	1	0.56	0.94	0.3	0.9	0.29	0.76	0.23	0.44	0.20	0.47	0.30	0.83	0.2	0.7	0.34	0.67
Thu, 16 Nov	1	0.53	0.88	0.5	0.8	0.34	0.73	0.39	0.58	0.23	0.75	0.54	0.93	0.2	0.8	0.25	0.67
Fri, 17 Nov	1	0.33	0.83	0.3	0.8	0.45	0.71	0.21	0.63	0.33	0.64	0.31	0.82	0.2	0.7	0.32	0.73
Mon, 20 Nov	3	0.45	0.94	0.2	0.8	0.37	0.73	0.15	0.61	0.18	0.42	0.63	0.88	0.2	0.6	0.23	0.67
Tue, 21 Nov	1	0.88	0.92	0.2	0.8	Close	Close	0.20	0.54	0.16	0.40	0.62	0.92	0.2	0.8	0.75	0.76
Wed, 22 Nov	1	0.57	0.80	0.3	0.7	Close	Close	0.18	0.69	0.16	0.34	0.73	0.82	0.2	0.8	0.34	0.76
Thu, 23 Nov	1	0.64	0.88	0.4	0.8	Close	Close	0.17	0.59	0.20	0.77	0.44	0.87	0.3	0.7	0.36	0.68
Fri, 24 Nov	1	0.41	0.89	0.3	0.8	Close	Close	0.19	0.56	0.17	0.69	0.48	0.90	0.1	0.9	0.51	0.73
Mon, 27 Nov	3	0.76	0.87	0.2	0.8	Close	Close	0.33	0.67	0.23	0.30	0.38	0.87	0.2	0.8	0.23	0.75
Tue, 28 Nov	1	0.72	0.85	0.1	0.8	Close	Close	0.18	0.74	0.21	0.58	0.56	0.73	0.4	0.8	0.34	0.85
Wed, 29 Nov	1	0.68	0.85	0.2	0.8	Close	Close	0.18	0.75	0.34	0.50	0.45	0.90	0.2	0.8	0.33	0.87
Thu, 30 Nov	1	1.19	0.86	0.5	0.8	Close	Close	0.26	0.73	0.29	0.71	0.73	0.80	0.2	0.8	0.40	0.79
Fri, 01 Dec	1	0.56	0.87	0.4	0.8	Close	Close	0.21	0.73	0.18	0.61	0.37	0.89	0.2	0.8	0.21	0.77
Mon, 04 Dec	3	0.69	0.88	0.2	0.8	Close	Close	0.16	0.59	0.15	0.28	0.61	0.90	0.2	0.8	0.32	0.75
Tue, 05 Dec	1	1.17	0.94	1.0	0.8	Close	Close	0.26	0.64	0.20	0.44	0.60	0.73	0.4	0.6	0.59	0.81

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Wed, 06 Dec	1	1.64	0.84	0.8	0.8	Close	Close	0.63	0.40	0.41	0.33	0.80	0.64	0.5	0.8	0.70	0.61
Thu, 07 Dec	1	1.08	1.03	0.7	0.9	Close	Close	0.85	0.50	0.44	0.34	0.76	1.03	0.4	0.9	0.41	0.58
Fri, 08 Dec	1	0.34	0.92	0.3	0.8	Close	Close	0.31	0.75	0.44	0.31	0.34	0.92	0.2	0.8	0.30	0.73
Mon, 11 Dec	3	0.83	0.80	0.2	0.7	Close	Close	0.22	0.64	0.21	0.51	0.53	0.83	0.2	0.7	0.30	0.71
Tue, 12 Dec	1	0.63	0.90	0.5	0.8	Close	Close	0.27	0.55	0.23	0.41	0.44	0.80	0.2	0.7	0.45	0.78
Wed, 13 Dec	1	0.66	0.98	0.2	0.9	Close	Close	0.22	0.55	0.27	0.37	0.42	0.89	0.5	0.7	0.69	0.69
Thu, 14 Dec	1	0.39	0.71	0.4	0.7	Close	Close	0.20	0.66	0.17	0.73	0.42	0.88	0.3	0.7	0.32	0.77
Fri, 15 Dec	1	N/A	0.86	N/A	0.8	Close	Close	N/A	0.67	N/A	0.46	N/A	0.86	N/A	0.7	N/A	0.74
Mon, 18 Dec	3	0.39	0.89	0.2	0.8	0.40	0.70	0.44	0.62	0.33	0.49	0.40	0.81	0.2	0.9	0.27	0.74
Tue, 19 Dec	1	0.29	0.88	0.3	0.8	0.54	0.69	0.23	0.65	0.21	0.50	0.34	0.88	0.2	0.7	0.28	0.71
Wed, 20 Dec	1	0.29	0.83	0.3	0.8	0.29	0.69	0.25	0.72	0.35	0.44	0.49	0.76	0.3	0.6	0.32	0.69
Thu, 21 Dec	1	0.26	0.90	0.3	0.8	0.28	0.74	0.25	0.50	0.23	0.39	0.42	0.88	0.4	0.8	0.38	0.56
Fri, 22 Dec	1	0.25	0.95	0.2	0.8	0.24	0.75	0.28	0.62	0.25	0.46	0.38	0.89	0.3	0.7	0.36	0.72
Sat, 23 Dec	1	0.25	0.89	0.2	0.8	Close	Close	0.24	0.53	0.22	0.47	0.39	0.90	0.2	0.7	0.31	0.59
Wed, 27 Dec	4	0.41	0.85	0.4	0.7	Close	Close	0.32	0.54	0.35	0.64	1.44	0.69	0.6	0.9	0.46	0.56
Sat, 30 Dec	3	0.81	0.94	0.4	0.8	Close	Close	0.29	0.47	0.29	0.81	1.43	0.46	0.3	0.7	0.51	0.52

*TURBIDITY > 0.90 NTU HIGHLIGHTED

**Cl_2 RESIDUAL <0.2 mg/ℓ HIGHLIGHED (NONE)

APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS

ABRIDGED REPORT OF 21 MAR. 2023 (SAMPLES 14 MAR.)

Page : 3 of 16
Work Order : VA23A5458
Client : Village of Lions Bay
Project : ----

Analytical Results

Sub-Matrix: **Surface Water**
(Matrix: **Water**)

					Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	14-Mar-2023 12:45	14-Mar-2023 10:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-017	VA23A5458-018	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm		0.0410	0.0150	----	----	----
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		5.8	5.6	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.29	17.8	----	----	----
pH	----	E108	0.10	pH units		6.93	6.88	----	----	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	<3.0	----	----	----
Turbidity	----	E121	0.10	NTU		<0.10	0.12	----	----	----
Transmittance, UV (@ 254nm)	----	E404	1.0	% T/cm		91.0	96.6	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.65	0.68	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0383	0.0190	----	----	----
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00011	0.00010	----	----	----
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00179	0.00261	----	----	----
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.010	----	----	----
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	0.0000172	----	----	----
Calcium, total	7440-70-2	E420	0.050	mg/L		2.40	5.98	----	----	----
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Copper, total	7440-50-8	E420	0.00050	mg/L		0.00068	0.00672	----	----	----
Iron, total	7439-89-6	E420	0.010	mg/L		<0.010	0.015	----	----	----
Lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	0.000149	----	----	----
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.316	0.698	----	----	----
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00014	0.00087	----	----	----
Mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	----	----	----

Page	:	4 of 16
Work Order	:	VA23A5458
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: Surface Water (Matrix: Water)					Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	14-Mar-2023 12:45	14-Mar-2023 10:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-017	VA23A5458-018	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000466	0.000274	----	----	----
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	----	----	----
Potassium, total	7440-09-7	E420	0.050	mg/L		0.101	0.088	----	----	----
Rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	0.000124	----	----	----
Silicon, total	7440-21-3	E420	0.10	mg/L		2.64	5.17	----	----	----
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, total	7440-23-5	E420	0.050	mg/L		0.978	1.99	----	----	----
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00676	0.0304	----	----	----
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.96	5.05	----	----	----
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	----	----	----
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000038	<0.000010	----	----	----
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Zinc, total	7440-66-6	E420	0.0030	mg/L		0.0042	0.0064	----	----	----
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	<2.0	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	14-Mar-2023 12:35	14-Mar-2023 12:35	14-Mar-2023 09:00	14-Mar-2023 09:00	14-Mar-2023 06:35
						VA23A5458-001	VA23A5458-002	VA23A5458-003	VA23A5458-004	VA23A5458-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	6.6	----	6.2	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.42	7.28	7.82	7.23	7.38
pH	----	E108	0.10	pH units		----	6.99	----	6.93	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121	0.10	NTU		----	<0.10	----	<0.10	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		----	1.86	----	2.04	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.208	0.0413	0.0379	0.0370	0.0251
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00017	0.00011	<0.00010	<0.00010	<0.00010
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00246	0.00178	0.00180	0.00174	0.00175
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	0.000071
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	E420	0.050	mg/L		2.42	2.41	2.44	2.40	2.46
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00124
Cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00016	<0.00010	0.00017	<0.00010	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		0.0156	0.00434	0.0160	0.00493	0.00144
Iron, total	7439-89-6	E420	0.010	mg/L		0.141	<0.010	0.038	0.036	0.010
Lead, total	7439-92-1	E420	0.000050	mg/L		0.000473	0.000050	0.000720	0.000261	<0.000050
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.334	0.307	0.420	0.301	0.300
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00508	0.00019	0.00046	0.00042	0.00093
Mercury, total	7439-97-6	E508	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000474	0.000482	0.000478	0.000489	0.000539
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00050
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	14-Mar-2023 12:35	14-Mar-2023 12:35	14-Mar-2023 09:00	14-Mar-2023 09:00	14-Mar-2023 06:35
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-001	VA23A5458-002	VA23A5458-003	VA23A5458-004	VA23A5458-005
						Result	Result	Result	Result	Result
Total Metals										
Potassium, total	7440-09-7	E420	0.050	mg/L		0.111	0.103	0.103	0.100	0.106
Rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00024	<0.00020	0.00023	<0.00020	0.00024
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		2.66	2.48	2.46	2.51	2.50
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420	0.050	mg/L		2.13	2.09	2.04	2.11	1.88
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00686	0.00665	0.00659	0.00653	0.00675
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.82	0.56	0.55	0.50	0.67
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420	0.00030	mg/L		0.00448	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000066	0.000037	0.000038	0.000040	0.000032
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		0.0041	<0.0030	0.0081	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B	1.0	µg/L		----	26.6	----	30.7	----
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		----	26.6	----	30.7	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		----	90.5	----	91.1	----
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		----	99.9	----	99.7	----

Page	:	8 of 16
Work Order	:	VA23A5458
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	14-Mar-2023 06:35	14-Mar-2023 05:30	14-Mar-2023 05:30	14-Mar-2023 05:55	14-Mar-2023 05:55
						VA23A5458-006	VA23A5458-007	VA23A5458-008	VA23A5458-009	VA23A5458-010
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		6.5	----	7.0	----	6.3
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.46	9.82	7.90	11.9	7.40
pH	----	E108	0.10	pH units		6.96	----	6.99	----	6.94
Solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	<3.0	----	<3.0
Turbidity	----	E121	0.10	NTU		<0.10	----	<0.10	----	<0.10
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.31	----	1.32	----	1.45
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0287	0.0275	0.0291	0.0219	0.0351
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00177	0.00232	0.00207	0.00146	0.00171
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	0.00361	<0.000050
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.014	<0.010	0.035	<0.010
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	E420	0.050	mg/L		2.50	3.16	2.70	2.23	2.49
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		0.00074	0.0503	0.00360	0.130	0.0267
Iron, total	7439-89-6	E420	0.010	mg/L		<0.010	0.112	0.021	0.029	0.029
Lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	0.00463	0.000199	0.00214	0.000208
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	0.0024	<0.0010	0.0046	<0.0010
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.297	0.470	0.282	1.53	0.288
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00014	0.00114	0.00018	0.00030	0.00035
Mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	<0.0000050	----	<0.0000050
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000520	0.000484	0.000501	0.000374	0.000460
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	0.00254	<0.00050	0.00790	<0.00050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	14-Mar-2023 06:35	14-Mar-2023 05:30	14-Mar-2023 05:30	14-Mar-2023 05:55	14-Mar-2023 05:55
						VA23A5458-006	VA23A5458-007	VA23A5458-008	VA23A5458-009	VA23A5458-010
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420	0.050	mg/L		0.104	0.107	0.102	0.091	0.100
Rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	0.00023	0.00021	0.00020	0.00021
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		2.53	2.39	2.51	2.04	2.42
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420	0.050	mg/L		1.88	1.93	1.88	1.90	2.05
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00687	0.00702	0.00678	0.00600	0.00683
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.74	0.58	0.73	<0.50	0.63
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00468	<0.00010
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000032	0.000029	0.000033	0.000012	0.000036
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	0.0358	<0.0030	0.372	<0.0030
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	----	<2.0	----	<2.0
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Bromoform	75-25-2	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Chloroform	67-66-3	E611B	1.0	µg/L		26.3	----	27.9	----	31.3
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		26.3	----	27.9	----	31.3
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		91.6	----	91.9	----	92.5

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	14-Mar-2023 06:35	14-Mar-2023 05:30	14-Mar-2023 05:30	14-Mar-2023 05:55	14-Mar-2023 05:55
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-006	VA23A5458-007	VA23A5458-008	VA23A5458-009	VA23A5458-010
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		99.6	----	99.6	----	98.9

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	14-Mar-2023 10:20	14-Mar-2023 10:20	14-Mar-2023 10:50	14-Mar-2023 10:50	14-Mar-2023 08:20
						VA23A5458-011	VA23A5458-012	VA23A5458-013	VA23A5458-014	VA23A5458-015
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	5.8	----	6.7	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		16.8	16.4	8.00	8.11	7.16
pH	----	E108	0.10	pH units		----	6.91	----	7.03	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121	0.10	NTU		----	<0.10	----	<0.10	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		----	0.86	----	1.17	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0095	0.0190	0.0215	0.0259	0.0426
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	0.00012	<0.00010	0.00011	0.00010
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00239	0.00238	0.00202	0.00204	0.00200
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	0.000051	<0.000050	<0.000050
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000897	0.0000148	0.0000105	<0.0000050	0.0000055
Calcium, total	7440-70-2	E420	0.050	mg/L		5.69	5.52	2.72	2.76	2.36
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		0.607	0.00353	0.00283	0.00094	0.0431
Iron, total	7439-89-6	E420	0.010	mg/L		0.022	0.013	0.015	0.016	<0.010
Lead, total	7439-92-1	E420	0.000050	mg/L		0.00181	<0.000050	0.000073	<0.000050	0.00171
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.641	0.644	0.294	0.295	0.307
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00080	0.00074	0.00091	0.00020	0.00021
Mercury, total	7439-97-6	E508	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000246	0.000262	0.000541	0.000492	0.000444
Nickel, total	7440-02-0	E420	0.00050	mg/L		0.00119	<0.00050	0.00062	<0.00050	0.00237

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	14-Mar-2023 10:20	14-Mar-2023 10:20	14-Mar-2023 10:50	14-Mar-2023 10:50	14-Mar-2023 08:20
						VA23A5458-011	VA23A5458-012	VA23A5458-013	VA23A5458-014	VA23A5458-015
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420	0.050	mg/L		0.091	0.090	0.104	0.107	0.103
Rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	<0.00020	0.00021	0.00023	<0.00020
Selenium, total	7782-49-2	E420	0.000050	mg/L		0.000110	0.000144	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		5.10	5.22	2.51	2.53	2.54
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000018
Sodium, total	7440-23-5	E420	0.050	mg/L		3.27	3.31	1.86	1.88	2.12
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.0272	0.0274	0.00808	0.00778	0.00662
Sulfur, total	7704-34-9	E420	0.50	mg/L		4.69	4.67	0.67	0.62	0.76
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	0.00285
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	<0.000010	0.000029	0.000033	0.000038
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		0.172	<0.0030	<0.0030	<0.0030	0.0198
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B	1.0	µg/L		----	14.8	----	28.9	----
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		----	14.8	----	28.9	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		----	91.3	----	91.0	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	14-Mar-2023 10:20	14-Mar-2023 10:20	14-Mar-2023 10:50	14-Mar-2023 10:50	14-Mar-2023 08:20
						VA23A5458-011	VA23A5458-012	VA23A5458-013	VA23A5458-014	VA23A5458-015
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		----	99.5	----	99.5	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Page	:	14 of 16
Work Order	:	VA23A5458
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	14-Mar-2023 08:20	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A5458-016	--------	--------	--------	--------	
					Result	----	----	----	----	
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	6.1	----	----	----	----	
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	7.08	----	----	----	----	
pH	----	E108	0.10	pH units	6.93	----	----	----	----	
Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	----	----	----	----	
Turbidity	----	E121	0.10	NTU	<0.10	----	----	----	----	
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.65	----	----	----	----	
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0383	----	----	----	----	
Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Barium, total	7440-39-3	E420	0.00010	mg/L	0.00184	----	----	----	----	
Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	----	----	----	----	
Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	----	----	----	----	
Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	----	----	----	----	
Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	----	----	----	----	
Calcium, total	7440-70-2	E420	0.050	mg/L	2.34	----	----	----	----	
Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	----	----	----	----	
Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	----	----	----	----	
Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Copper, total	7440-50-8	E420	0.00050	mg/L	0.0188	----	----	----	----	
Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	----	----	----	----	
Lead, total	7439-92-1	E420	0.000050	mg/L	0.000564	----	----	----	----	
Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----	
Magnesium, total	7439-95-4	E420	0.0050	mg/L	0.300	----	----	----	----	
Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00020	----	----	----	----	
Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----	
Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000484	----	----	----	----	
Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----	
Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----	

Page	:	15 of 16
Work Order	:	VA23A5458
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	14-Mar-2023 08:20	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-016	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Potassium, total	7440-09-7	E420	0.050	mg/L		0.099	----	----	----	----
Rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00020	----	----	----	----
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420	0.10	mg/L		2.50	----	----	----	----
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420	0.050	mg/L		2.10	----	----	----	----
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00683	----	----	----	----
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.74	----	----	----	----
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000036	----	----	----	----
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	----	----	----	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		<1.0	----	----	----	----
Bromoform	75-25-2	E611B	1.0	µg/L		<1.0	----	----	----	----
Chloroform	67-66-3	E611B	1.0	µg/L		31.2	----	----	----	----
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	----	----	----	----
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		31.2	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		92.7	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		98.7	----	----	----	----

ABRIDGED REPORT OF 28 SEP. 2023 (SAMPLES 26 SEP.)

Analytical Results

Sub-Matrix: Surface Water (Matrix: Water)				Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
				Client sampling date / time	26-Sep-2023 12:45	26-Sep-2023 10:30	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C2879-017	VA23C2879-018	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
Absorbance, UV (@ 254nm)	----	E404/VA	0.0050	AU/cm	0.0470	0.0430	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	3.4	3.9	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L	3.82	6.88	----	----	----
pH	----	E108/VA	0.10	pH units	6.64	6.67	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L	<3.0	<3.0	----	----	----
Turbidity	----	E121/VA	0.10	NTU	0.13	0.19	----	----	----
Transmittance, UV (@ 254nm)	----	E404/VA	1.0	% T/cm	89.7	90.6	----	----	----
Organic / Inorganic Carbon									
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	1.68	1.67	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0525	0.0527	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	<0.00010	0.00012	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.00143	0.00129	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L	<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	<0.010	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	0.0000064	0.0000142	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	1.27	2.31	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	<0.000010	<0.000010	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	0.00133	0.00520	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L	<0.010	0.021	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	0.000089	0.000112	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	0.158	0.270	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00057	0.00094	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----

Page	:	4 of 16
Work Order	:	VA23C2879
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: Surface Water (Matrix: Water)					Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	26-Sep-2023 12:45	26-Sep-2023 10:30	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-017	VA23C2879-018	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000159	0.000154	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.114	0.072	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00026	<0.00020	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	0.000060	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.63	2.69	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		0.524	0.965	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00420	0.0126	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		<0.50	1.61	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00041	0.00046	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000043	<0.000010	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		<2.0	<2.0	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Page	:	5 of 16
Work Order	:	VA23C2879
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	26-Sep-2023 12:35	26-Sep-2023 12:35	26-Sep-2023 09:00	26-Sep-2023 09:00	26-Sep-2023 06:35
						VA23C2879-001	VA23C2879-002	VA23C2879-003	VA23C2879-004	VA23C2879-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		----	4.7	----	5.1	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		5.14	5.27	8.44	5.78	8.33
pH	----	E108/VA	0.10	pH units		----	6.62	----	6.62	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121/VA	0.10	NTU		----	0.52	----	0.37	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		----	2.02	----	2.06	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0879	0.0852	0.0332	0.0643	0.0177
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00011	0.00012	0.00010	0.00010	<0.00010
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00211	0.00204	0.00270	0.00208	0.00264
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	0.000090
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	0.015	<0.010	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000100	0.0000073	<0.0000050	0.0000055	<0.0000050
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		1.70	1.75	2.62	1.95	2.78
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00102
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	0.00012	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00810	0.00715	0.0681	0.00535	0.00136
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.028	0.026	0.021	0.038	<0.010
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000113	0.000101	0.00687	0.000314	<0.000050
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.217	0.219	0.462	0.221	0.337
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00199	0.00194	0.00075	0.00148	0.00081
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000362	0.000381	0.000593	0.000375	0.000771
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	0.00299	<0.00050	0.00057
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Page : 6 of 16
Work Order : VA23C2879
Client : Village of Lions Bay
Project : ----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	26-Sep-2023 12:35	26-Sep-2023 12:35	26-Sep-2023 09:00	26-Sep-2023 09:00	26-Sep-2023 06:35
						VA23C2879-001	VA23C2879-002	VA23C2879-003	VA23C2879-004	VA23C2879-005
						Result	Result	Result	Result	Result
Total Metals										
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.141	0.136	0.154	0.142	0.160
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00030	0.00032	0.00033	0.00031	0.00037
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.76	1.71	2.33	1.80	2.44
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.71	2.66	2.38	2.58	2.32
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00562	0.00552	0.00807	0.00589	0.00824
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		<0.50	0.56	0.87	0.56	0.93
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00107	0.00097	<0.00030	0.00060	<0.00030
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000061	0.000060	0.000027	0.000057	0.000028
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	0.0242	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L		----	48.5	----	57.6	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		----	48.5	----	57.6	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		----	100	----	102	----
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		----	99.9	----	99.8	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	26-Sep-2023 06:35	26-Sep-2023 05:30	26-Sep-2023 05:30	26-Sep-2023 05:55	26-Sep-2023 05:55
						VA23C2879-006	VA23C2879-007	VA23C2879-008	VA23C2879-009	VA23C2879-010
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		6.4	----	8.8	----	5.8
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		7.66	11.9	9.66	14.2	6.74
pH	----	E108/VA	0.10	pH units		6.74	----	6.92	----	6.72
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		<3.0	----	<3.0	----	<3.0
Turbidity	----	E121/VA	0.10	NTU		<0.10	----	<0.10	----	0.38
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		1.46	----	0.82	----	2.04
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0302	0.0313	0.0348	0.0169	0.0583
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		<0.00010	0.00010	0.00010	<0.00010	0.00011
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00248	0.00256	0.00267	0.00222	0.00224
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	0.00147	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	0.034	<0.010	0.064	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		2.58	3.63	3.44	2.68	2.30
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	0.000015	<0.000010	0.000012	<0.000010
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00088	0.0222	0.00125	0.0725	0.0332
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.011	0.162	0.055	<0.010	0.048
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	0.00588	0.000148	0.000827	0.000326
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	0.0061	<0.0010	0.0086	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.297	0.697	0.259	1.82	0.242
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00052	0.00281	0.00060	0.00018	0.00152
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	<0.0000050	----	<0.0000050
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000677	0.000725	0.000729	0.000579	0.000482
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	0.00173	<0.00050	0.0244	<0.00050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	26-Sep-2023 06:35	26-Sep-2023 05:30	26-Sep-2023 05:30	26-Sep-2023 05:55	26-Sep-2023 05:55
						VA23C2879-006	VA23C2879-007	VA23C2879-008	VA23C2879-009	VA23C2879-010
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.153	0.175	0.156	0.165	0.152
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00028	0.00038	0.00036	0.00036	0.00035
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		2.12	2.38	2.40	1.91	1.95
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.32	2.50	2.30	2.42	2.58
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00784	0.00841	0.00858	0.00794	0.00695
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		0.84	1.08	1.08	1.05	0.69
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00082	<0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00031	<0.00030	<0.00030	<0.00030	0.00063
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000034	0.000023	0.000030	<0.000010	0.000053
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	0.0103	<0.0030	0.292	0.0037
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		<2.0	----	<2.0	----	<2.0
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Bromoform	75-25-2	E611B/VA	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Chloroform	67-66-3	E611B/VA	1.0	µg/L		42.6	----	43.2	----	60.6
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		42.6	----	43.2	----	60.6
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		100	----	101	----	100

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	26-Sep-2023 06:35	26-Sep-2023 05:30	26-Sep-2023 05:30	26-Sep-2023 05:55	26-Sep-2023 05:55
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-006	VA23C2879-007	VA23C2879-008	VA23C2879-009	VA23C2879-010
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		99.7	----	100	----	101

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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Client : Village of Lions Bay
Project : ----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

					Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	26-Sep-2023 10:20	26-Sep-2023 10:20	26-Sep-2023 10:50	26-Sep-2023 10:50	26-Sep-2023 08:20
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-011	VA23C2879-012	VA23C2879-013	VA23C2879-014	VA23C2879-015
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		----	4.4	----	6.6	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		14.9	11.7	23.6	23.5	6.61
pH	----	E108/VA	0.10	pH units		----	6.76	----	6.98	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121/VA	0.10	NTU		----	0.72	----	<0.10	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		----	1.86	----	0.57	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0268	0.0976	0.0144	0.0138	0.0600
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		<0.00010	0.00015	0.00012	0.00012	0.00012
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00250	0.00214	0.00410	0.00387	0.00248
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	0.000158
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.010	<0.010	0.015	0.015	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000589	0.0000154	0.0000201	0.0000163	0.0000077
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		5.13	3.98	8.24	8.24	2.22
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		0.000010	0.000012	0.000013	0.000012	<0.000010
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.538	0.00572	0.00132	0.00087	0.0693
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.015	0.051	0.038	0.022	0.026
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.00183	0.000077	<0.000050	<0.000050	0.00115
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.505	0.425	0.735	0.711	0.259
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00129	0.00232	0.00066	0.00042	0.00178
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000171	0.000175	0.000228	0.000255	0.000500
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00099	<0.00050	<0.00050	<0.00050	0.00321

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Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	26-Sep-2023 10:20	26-Sep-2023 10:20	26-Sep-2023 10:50	26-Sep-2023 10:50	26-Sep-2023 08:20
						VA23C2879-011	VA23C2879-012	VA23C2879-013	VA23C2879-014	VA23C2879-015
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.106	0.096	0.129	0.126	0.145
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	0.00022	0.00020	0.00032
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000090	0.000089	0.000113	0.000099	<0.000050
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		3.99	3.46	5.38	5.15	1.95
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		3.50	3.43	3.68	3.51	2.43
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.0259	0.0212	0.0409	0.0410	0.00678
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		4.19	3.33	7.32	7.18	0.65
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00036	0.00097	<0.00030	<0.00030	0.00083
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000055
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.171	<0.0030	0.0039	<0.0030	0.0160
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L		----	37.9	----	24.8	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		----	37.9	----	24.8	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		----	103	----	101	----

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Work Order	:	VA23C2879
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Project	:	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	26-Sep-2023 10:20	26-Sep-2023 10:20	26-Sep-2023 10:50	26-Sep-2023 10:50	26-Sep-2023 08:20
						VA23C2879-011	VA23C2879-012	VA23C2879-013	VA23C2879-014	VA23C2879-015
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		----	101	----	98.7	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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Work Order	:	VA23C2879
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Project	:	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	26-Sep-2023 08:20	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-016	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		4.9	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		5.78	----	----	----	----
pH	----	E108/VA	0.10	pH units		6.78	----	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		<3.0	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU		0.49	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		2.14	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0776	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00011	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00221	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		0.000053	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000074	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		1.93	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.0174	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.046	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000493	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.233	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00190	----	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000439	----	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	----	----	----	----

Page	:	15 of 16
Work Order	:	VA23C2879
Client	:	Village of Lions Bay
Project	:	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	26-Sep-2023 08:20	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-016	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.138	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00031	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.76	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.66	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00600	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		0.55	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00081	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000059	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		<2.0	----	----	----	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		<1.0	----	----	----	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L		<1.0	----	----	----	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L		52.6	----	----	----	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		<1.0	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		52.6	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		99.2	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		100	----	----	----	----

APPENDIX: ASBESTOS REPORT OF 10 NOV. 2023 (SAMPLES 7 NOV.)

Contact: Thomas Chang
Company: ALS Environmental
Address: 8081 Lougheed HWY, Suite 100
Burnaby, BC V5A 1W9

Project / Location: VA23C6772
PO Number: VA23C6772
ALS Work Order: 23110415

NARRATIVE: Analysis performed on FEI Tecnai TEM equipped with EDAX Octane T Plus Silicon Drift Detector and Z2 Analyzer. Fiber morphology, selected area electron diffraction (SAED), and energy dispersive x-ray analysis (EDXA) used to determine species. All sample collection is performed outside of ALS Cincinnati is therefore the sole responsibility of the client. Contact your local authority for information on method selection, sampling instructions, and reporting requirements prior to submission.

NOTICE: All US EPA Public Water System (PWS) drinking water compliance samples must be filtered by the laboratory within 48 hours of sampling. ALS cannot report analytical results directly to the EPA unless all of the information required by the state EPA agency is provided via the COC at the time of receipt. Report revisions resulting from failure to provide this information via the COC will result in additional administrative fees. ALS is not responsible for late or inaccurate EPA reporting as a result of client sample collection errors or sample information omissions. Water samples originating from outside the United States do not fall under the US EPA drinking water guidelines and are therefore not required to meet the 48 hour hold and are not reported to any agency.

METHOD CODES: "EPA 100.2" refers only to drinking (potable) PWS samples for EPA compliance which are required to be filtered within 48 hours of sampling and are analyzed at >10,000x for asbestos fibers >10µm long. "ENV 005" refers to a modified version of EPA 100.2 developed for all other non-potable, non-compliance, and non-US waters which are also analyzed at >10,000x for asbestos fibers >10µm long but are not required to meet the 48 hour hold time. "EPA 100.1" refers to waters analyzed by a modified version of the method for asbestos fibers of any size. All excess water is disposed immediately following adequate filtration. All filtered samples are disposed after 60 day archive. All TEM grids analyzed are archived for a minimum of 3 years. Results apply only to portions of samples analyzed.

SUMMARY: An AS of <0.2 MFL is desired for drinking (potable) waters, and an AS of <7 MFL is generally acceptable for non-potable waters. Whenever possible, a sufficient volume is analyzed to yield the desired AS based on the detection of 1 confirmed asbestos fiber in the total area analyzed. However, waters containing excessive solids may require filtration of volumes too low to achieve the desired AS. In any case, a minimum of 4 and maximum of 10 grid openings are analyzed regardless of the AS reached or the asbestos concentration detected. Representative EDXA spectra and/or photomicrographs are available upon request for an additional fee.

NA=Not Applicable, AS=Analytical Sensitivity, MFL=Millions of Fibers per Liter, MRL=Method Reporting Limit

ALS Cincinnati accredited by NY ELAP for Asbestos in Water by EPA 100.2

OH State Lab No.: 4077, OH Analyst Nos.: 2268 (P. Hizar), 3431 (A. Sohn)
PA State Lab No.: 68-01320, PA Certification No.: 003
WA State Lab No.: 211
NY State Lab No.: 11371

Pamela M. Hizar

Pamela M. Hizar
ALS Asbestos Technical Lead & Microscopy Department Manager

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Phone (513) 733-5336 Fax (513) 733-5347 www.alsglobal.com

IDENTIFICATION

Client ID:	VA23C6772-001	VA23C6772-002
ALS ID:	23110415-01A	23110415-02A
Method:	ENV 005	ENV 005
MRL:	<7MFL	<7MFL
Collection:	11/7/23 2:30 PM	11/7/23 2:50 PM
Filtration:	11/10/23 10:30 AM	11/10/23 10:30 AM
Elapsed:	NA	NA
Sample Comments:	*HIGH SUSPENDED SOLIDS CONTENT*	*HIGH SUSPENDED SOLIDS CONTENT*

ANALYSIS

Analyst:	Pamela Hizar	Pamela Hizar
Completed:	11/10/23 2:00 PM	11/10/23 2:30 PM
Volume (L):	0.025	0.025
Avg. Opening Area (mm^2):	0.0102	0.0102
No. Openings Analyzed:	10	10
AS (MFL):	0.42	0.42

COUNT

Chrysotile:	0	0
Amosite:	0	0
Crocidolite:	0	0
Actinolite:	0	0
Tremolite:	0	0
Anthophyllite:	0	0
Total Asbestos:	0	0

CONCENTRATION (MFL)

Chrysotile:	<AS	<AS
Amosite:	<AS	<AS
Crocidolite:	<AS	<AS
Actinolite:	<AS	<AS
Tremolite:	<AS	<AS
Anthophyllite:	<AS	<AS
Total Asbestos:	<AS	<AS
Analysis Comments:	*NONE*	*NONE*

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