

Annual Drinking Water Report 2019

Resort Municipality of Whistler



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1.0 EXECUTIVE SUMMARY

This report summarizes the Resort Municipality of Whistler's (RMOW) drinking water quality program for the 2019 report period. The two municipal systems, Community and Emerald Estates, are administered under separate Permits to Operate a Water Supply System. As in previous years, the RMOW has satisfied the conditions for the Permits to Operate.

The Community and Emerald Water systems are operated and maintained by the RMOW's Water Utility Group and are monitored 24 hours/365 days per year via the Supervisory Control and Data Acquisition (SCADA) system to ensure optimal functionality. In addition, the RMOW administers programs relating to leak detection, cross connection control, unidirectional flushing, water conservation and sampling.

The sampling program forms the backbone of regulatory compliance with the Permits to Operate. The sampling data are monitored by the RMOW and Vancouver Coastal Health (VCH) as soon as they are processed by the laboratory. This report provides a summary of the sampling results from the report period. Any actions needing to be taken, would have occurred immediately once the results were available.

Sampling at water sources (raw) was performed 69 times across 3 sources in the Emerald Estates System and 154 times at 13 sources in the Community System throughout the report period. Water samples were taken every other week and were tested for:

- E. coli and total coliform bacteria.
- Turbidity
- pH
- Temperature

Sampling in the distribution system (treated) was performed 51 times at 2 locations in the Emerald Estates System and 372 times over 25 Sampling Stations in the Community System throughout the report period. Water samples were taken every other week and were tested for:

- E. coli and total coliform bacteria
- Turbidity
- pH
- Temperature
- Free Chlorine Residual

Sampling at both the source and throughout the distribution system for additional physical and chemical parameters is conducted annually. Bi-products of disinfection are tested once every quarter at distribution sites.

For the Community System a total of 526 bacteriological samples were submitted during the report period indicating the minimum sampling frequency (as specified in the permit to operate) was exceeded.

In 2016, the Guidelines for Canadian Drinking Water Quality (GCDWQ) with respect to pH were updated from an Aesthetic Objective of 6.5 – 8.5 to an Operational Guideline of 7 – 10.5. The samples taken throughout the distribution system during the report period indicate that the water supplied has pH levels on a monthly average of between 6.5 and 7.5. As a result, the water in the Whistler system sometimes falls outside the current guidelines for this parameter. See [Section 5.0 – Water Stability](#) for further discussion.

No Drinking Water Advisory/Boil Water Advisories were issued during the report period.

Table 1 The RMOW's water supply and distribution system are governed by the following regulations

Regulation	Jurisdiction	Link
Drinking Water Protection Act and Regulation	Province of British Columbia	https://www2.gov.bc.ca/gov/content/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/laws-related-to-health-in-bc/drinking-water-protection-act
Water Sustainability Act	Province of British Columbia	https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/laws-rules/water-sustainability-act
Ground Water Protection Regulation	Province of British Columbia	https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/laws-rules/groundwater-protection-regulation
Permit to Operate	Vancouver Coastal Health	http://www.vch.ca/public-health/environmental-health-inspections/drinking-water
Guidelines for Drinking Water Quality	Province of British Columbia	https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines
Guidelines for Canadian Drinking Water Quality	Health Canada	https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

The RMOW completed several operational and capital improvements during the report period, each of which will increase system reliability and ensure long-term availability.

2.0 GENERAL DESCRIPTION

In Whistler there is one private water distribution system at Whistler Blackcomb, and two municipal (RMOW) managed systems, Community and Emerald Estates.

The two municipal systems, Community and Emerald Estates are administered under separate Permits to Operate. These water systems are Class IV Water Distribution Facilities, as classified by the Environmental Operators Certification Program (EOCP). The systems consist of:

- One (1) active surface water intake;
- Fifteen (15) groundwater wells;
- 13 storage reservoirs;
- 20 individual pressure zones;
- Nine (9) Pump stations;
- 8 Treatment locations
- a Supervisory Control and Data Acquisition (SCADA) monitoring system;
- approximately 177 km of water pipes;
- approximately 13,345 residential water service connections and 1042 commercial and other water service connections (the methodology used to count service connections has been update for this report period) and;
- 520 municipal fire hydrants.

The benefit of having many sources of clean drinking water means that the RMOW has very good redundancy at a source level. However to meet the demand for treated water, there are infrastructure management challenges that drive the need for water conservation and investment in the water system, for example:

- More prescriptive drinking water guidelines;
- Due to the location of public and private infrastructure relative to interface zones, the need to be adequately prepared for wildfire emergencies;
- Increased human presence in and around the 21 Mile Creek watershed;
- The impact of climate change on source waters if the glaciers recede and snowpack is lower than usual;
- Although the infrastructure is “relatively new” it is aging, and ongoing replacement is necessary;
- Vulnerability of overall supply to meet peak demand requirements in case of service interruptions due to unforeseen emergencies.

2019 was the first complete year that the RMOW owned and operated the private Van West Water Utility in Function Junction, which is now incorporated into the Community System. The Whistler Blackcomb system operates independently by acquiring its water supply from eight wells located on the mountain¹.

¹ Data sourced from Whistler Blackcomb Mountain Drinking Water system summary, 2017

3.0 WATER SOURCES

The Resort Municipality of Whistler has the ability to obtain its water from numerous sources:

Surface Water

- Twenty-One Mile Creek
- Blackcomb Creek (not used for Drinking Water, taken offline and locked out in 2012)

Groundwater

- Emerald Estates Wells (3):
- Community Wells (4):
- Alpine Meadows Wells (3):
- Twenty-One Mile Creek Aquifer Wells (2);
- Function Junction Wells (3);
- Cheakamus Crossing Well (1).

The RMOW uses both a surface water intake, and groundwater wells to provide domestic drinking water and fire protection supply for the municipality. The Twenty-One Mile Creek surface water intake comprised 42% of the water used in the distribution system during the report period, making it the largest single source. The Community water system, of which the Twenty-One Mile Creek intake is a part, supplied 94% of Whistler's potable water during the report period with the remainder being supplied by the Emerald Estates water system.

Surface Water - Twenty-One Mile Creek

When online, the surface water from Twenty-One Mile Creek is the largest single source of RMOW's drinking water. The use of this source is limited by periods of high turbidity. Turbidity is continuously monitored, and the intake is suspended at greater than 1 NTU. In times of high demand coinciding with an NTU of greater than 1, the RMOW will submit a request to VCH for an extension of the NTU limit from 1 to 2. This change is applied once approval from a VCH Drinking Water Officer is received and is returned back once the risk to supply has subsided. The NTU limit was extended from 1 NTU to 2 NTU in between May 23rd and June 13th 2019.

Protection Program

The update and implementation of the Source Water Protection Plan (SWPP) is a requirement of the Permit to Operate. The objective of the SWPP is to ensure that exposure to unacceptable concentrations of contaminants in the source water are minimized and to implement procedures and policies that will support the long-term sustainability of the surface water resource.

The SWPP was completed in September 2015 and contains recommendations for annual work programs. The work program is updated annually based on the results of the previous year's monitoring and the results of a watershed hike that takes place in the summer months of each year.

The Technical Advisory Committee met on September 25, 2019 and hiked into the watershed in order to review completed initiatives and determine a work plan for 2020. Minor non-mechanized trail works on the Rainbow Lake Trail were completed within the report period.

There were significant trail works completed on the ridgeline above Rainbow Lake. A watershed sign was added to the ridge that lies between Rainbow and Hanging Lakes and the trail descending into the watershed is marked by a chicane. Minor watercourse upgrades along the side of the hiking trail are recommended for 2020. The RMOW Parks and Operations team in conjunction with the RMOW Water Utilities Group, coordinate the fly in fly out of the outhouse holding tanks (the 21 Mile intake is shut down during the time that task is completed).

Image 1 Rainbow Lake Watershed Entrance from Hanging Lakes Trail



The ranger program has continued to monitor watershed use summer compliance during the report period. The following are the annual observations from the ranger program:

- 1 Grizzly encounter
- Nearly daily black bear sightings
- 5 Mule deer observed
- 1 Mountain goat observed
- 1 Wolf track and 1 cougar scat
- Guided tour rarely encountered
- Organized large groups common
- Camping at Hanging Lake increased
- 1 campfire outside designated site
- Significant positive trail experience comments
- Most users from S2S corridor
- Many guests poorly prepared

Table 2 Rainbow Lake Alpine Ranger Program reporting numbers

Year	User Numbers / Operational days	Average User Count	Operational Period	Dogs (prohibited)	Bikes (prohibited)	SAR Calls
2016	-	-	-	10	6	-
2017	-	-	-	10	12	1
2018	5945 users / 76 days	78 users/day	June 30 - September 14	4	1	1
2019	4534 users / 140 days	32 users/day	June 13 - October 31	5	3	1

For winter compliance, meetings were held in late 2018 with Forest Lands and Natural Resource Operations staff and the organizations representing the snowmobile community (private and public) to discuss compliance with the prohibition of snowmobiling in the watershed. As a result of these discussions, it appears that for the winter of 2018/2019, a decrease in snowmobile activity in the watershed was observed.²

The Source Water Protection Plan (SWPP) is available on the RMOW's website.

Blackcomb Creek

The Blackcomb Creek surface water source may not be used without consent of VCH and was not used within the report period. The RMOW would only consider using this source in an emergency (e.g. wildfire) situation, and would follow the Emergency Response and Contingency Plan (ERCP) to deploy it. If activated, a Boil Water Order would be necessary.

Groundwater - Wells

Protection Program

Maintenance of the Groundwater Water Protection Plan (GPP) is a requirement of the Permit to Operate. Completed in 2008 the plan is comprised of several measures designed to facilitate enhanced protection of the quantity and quality of groundwater used for Whistler's drinking water. A review of this plan internally began in 2019 and will be continued in 2020.

² Aerial photos displaying snowmobile activity supplied to RMOW Utilities Group Manager by FLNRO

The primary objectives are:

1. To ensure exposure to unhealthy concentrations of contaminants in the drinking water is minimized; and
2. To implement procedures and policies that support long-term sustainability of the groundwater resource.

Table 3 Groundwater Resource Protection Plan Framework

Groundwater Resource Protection	
Wellhead Protection Area Initiative	Identifies areas that have a higher potential risk of contamination and targets these areas for enhanced management and protection of the long term water quality and sustainability of the groundwater supply. These are visible in Appendix D – Maps of Water System .
Groundwater Pollution Areas of Concern	Identifies the potential groundwater pollution risk factors, providing an assessment of the areas of concern.
Management Options	Promotes public awareness, formulates appropriate well decommissioning procedures, and addresses legislative considerations, provincial regulations, bylaws, municipal policies, and community plans.
Contingency and Spill Response Plans	Groundwater monitoring plan is in place and is maintained by geotechnical and hydrological consultants. Emergency situation response to pollutant/contaminant spill and aquifer contamination are also incorporated.
Water Quality Monitoring	Regular sampling, review, and reporting procedures are in place to ensure safe and clean groundwater supply.

Monitoring Program

The RMOW's Source Water Protection Plan requires annual analysis of groundwater from W212-1, W217, W218, W205-1, W205-2, W205-3, W211, and monitoring wells (MW) for potable water quality parameters and Potential Contaminants of Concern (PCOCs).

The Groundwater Monitoring Summary, last completed by Piteau Associates, is presently on hold as the RMOW evaluates what information is needed. The level of monitoring required will be reviewed in the updated Groundwater Resource Protection Plan (2008). The review of this plan was started in 2019, but not completed.

4.0 TREATMENT & DISTRIBUTION SYSTEMS

Community System

Surface Water - Twenty-One Mile Creek

Treatment

Water drawn from the Twenty-One Mile Creek surface water source undergoes primary disinfection by means of UV treatment. The water then receives primary and secondary disinfection (chlorine sourced from an on-site sodium hypochlorite generation system is added to the water for the purpose of either destruction or inactivation of pathogens and for protecting the distribution system).

The water treatment facility has been classified as a Level 1 by the EOCP as of November 28, 2017.

Groundwater - Wells

Treatment

The wells are combined into single treatment points where feasible. The water then receives secondary disinfection (chlorine sourced from calcium hypochlorite added to the water for the purpose of protecting the distribution system).

The following sections contain more details at each of the specified well sites.

Community Wells

Aquifer

The Village Wells W205-1, W205-2, W205-3 and W211 are located in the day skier parking lots off Blackcomb Way. The wells are all screened in channels of fill sediments deposited by Fitzsimmons Creek. The capacity of the aquifer appears to be limited by the maximum rate of recharge from the creek.

Alpine Meadows Wells

Aquifer

Alpine Meadows is supplied by wells W202, W210 and W213 and is also integrated with the surface water supply for the Community System. Wells W202 and W210 have their screens placed in alluvial sediments deposited by Nineteen Mile Creek.

Improvements

The Alpine Reservoir Level Control (E108) project will result in better utilization of the gravity-fed 21 Mile Creek water supply, rather than pumping well water from Alpine Meadows wells. This project was substantially completed in 2017. Some minor deficiency and communications items were completed in 2018. The scope of this project included the necessary design, materials, installation and programming in order to automatically control the connection between the Alpine Meadows water system and the Whistler Village system with a series of new valves, an altitude valve sensor and automated communications and control system.

Twenty-One Mile Creek Aquifer Wells

Aquifer

The Twenty-One Mile Creek Aquifer Wells W218 and W219 are located on the Valley Trail in between Rainbow Park and Lorimer Road. The former was constructed in 2007 and put into service in 2009. The combined extraction rate of both wells is restricted to a flowrate of 74.9L/s. Well W219, located 50m to the west, draws from the same aquifer. This second well, constructed in 2013, was only operated for sampling during the report period.

On August 27th 2019 the RMOW submitted an application for an environmental assessment exemption for the use of W219 in conjunction with W218. The intention is that W219 would be used alternatively to W218, but could be operated in tandem during times of high demand when the 21 Mile Creek surface water supply is offline due to turbidity. These periods of high demand coincide with high surface water turbidity throughout the year but most often during the months of April, May, June, October and November.

The operation of well W219 in conjunction with W218 exceeds the *Reviewable Projects Regulation* of 75 L/s for groundwater extraction, and thus an Environmental Assessment Certificate under the BC *Environmental*

Assessment Act or exclusion of such under s.10 (1)(b) is required. The Resort Municipality of Whistler seeks an exemption under s.10 (1)(b). In addition to this exemption request the Resort Municipality of Whistler is continuing with its water conservation initiatives and will further investigate other infrastructure upgrades to maintain a reliable supply of drinking water to the community.

Improvements

An electrical cable to W219 was replaced, and the W218 and W219 electrical safety interlock systems were prescribed.

Function Junction Well

Aquifer

Production well W212-1 is located in Function Junction and was drilled for Intrawest in 2000 as part of a program to supply additional water to Whistler South in support of their Spring Creek development. The well has subsequently been taken over by RMOW. It is screened in coarse gravel and coarse sand. Well 212-1 is tested multiple times a year for high levels of Iron and Manganese. In 2019, this well did not exceed the GCDWQ recommended levels of Iron but did exceed the guideline for Manganese. Well W212-2 is still active but does not supply water to the system due to high levels of Manganese. This well is run to waste when it is used for monitoring purposes.

Cheakamus Crossing Well

Aquifer

Production well W217 was commissioned in 2008 to supply the Olympic Athlete's Village. This well supplies groundwater from the same aquifer as the Function Junction wells.

Emerald Estates System

Aquifer

The community of Emerald Estates is located on the west shores of Green Lake and is serviced by a local water distribution system supplied by three groundwater wells identified as W201-1, W201-2 and W201-3. Prior to 2018, W201-3 was run infrequently and only for the purpose of testing. It now provides drinking water in addition to W201-1 and W201-2. The wells are all screened in the fan of Rideau Brook.

Improvements

Upgrades to the Emerald Estates pump station were completed in late 2019. This improvement project was performed in tandem with the upgrade of the Emerald water treatment facility. This project included upgrades to the electrical and SCADA systems as well as moving the chlorine disinfection system out of the pump station facility and into the same facility as the Emerald UV water treatment.

Emerald UV Treatment Facility

To address any potential vulnerability to contamination, a water treatment facility was constructed to perform treatment on groundwater from W201-1, W201-2 and W201-3 using ultra-violet light as a primary disinfection and chlorine treatment as secondary disinfection. This facility was commissioned in June 2018 and obtained Professional Engineer sign-off on June 20th, 2019 as per the Drinking Water Permit requirement.

The water treatment facility was classified to Level 1 by the EOCP on November 28, 2017.

Chlorination Plan

In 2014 VCHA recommended maintaining a minimum free chlorine residual post-reservoir of 0.4 mg/l, this is also a condition of the Permit to Operate a Water System. This level has been maintained since 2014 and is being tested biweekly for levels at each sample station in the distribution system. These levels have been consistent since implementing this plan and no detectable contamination has been noted.

System Maintenance and Upgrades

The Resort Municipality of Whistler maintains and continues to improve its water distribution system to provide the best service possible. The following were some of the key successes from this report period.

Project – White Gold Water Main Replacement

Approximately 1.8 km of water mains were replaced in the White Gold neighborhood impacting water utility infrastructure on Nancy Green Drive, Fitzsimmons Road South, Fitzsimmons Road North, Toni Sailer Lane, and Ambassador Crescent. The project upgraded water main infrastructure from asbestos cement to PVC materials and service lines to neighbouring properties. The completion of this project will allow for a return to normal operating pressure, as a result home owners were notified to confirm that their in-home pressure reducing valves are functional. The in-ground infrastructure installation was completed and commissioned November 2019.

Program – Review of Source Water Flows

The RMOW completed a review of source water flow volumes in 2019. Historically Maximum Day Demand (MDD) was calculated as a daily average of total weekly demand. This was due in part to the data from the SCADA system being difficult to report out on. This has been improved so that the MDD calculation is more accurate by streamlining the data interpretation process.

Program – Volumetric Water Metering Pilot Project

A contract was awarded in early October 2019 for a pilot project to implement volumetric water billing via water meter in the neighbourhood of Function Junction. The new system will encourage water conservation, improve leak detection and ensure rate equitability. Function Junction was chosen for the pilot project due to its nature as an isolated system as well as RMOW having recently become their official water utility service provider through the acquisition of the Van West Water Utility that serviced the neighbourhood.

Maintenance – Hydrants

Each year the RMOW contracts a service provider to inspect and maintain the fire hydrants. 532 hydrant inspections were performed during this report period.

Maintenance – Reservoirs

The RMOW deferred the contract for a service provider to completed reservoir inspections for this report period as all reservoirs had been inspected in 2017 and 2018.

Program – Reservoir Chlorine Decay Rate

Due to a combination of the fire storage requirement, and low turn-over rates in the Stonebridge, Sunridge, and the Taluswood reservoirs, sometimes the chlorine residual values are lower than the target for the serviced distribution system. The RMOW is continuing to explore methods to address the chlorine decay rate in these reservoirs.

Upgrade - Utilities SCADA

Upgrades to the SCADA HMI Software system uncovered issues relating to the volume of data being sent across the radio network. These volume issues were addressed with further implementation and the resolving of technical issues relating to data loggers at SCADA sites across the system. Work on the radio software and network has already shown quantifiable improvements to SCADA communication failure rates as these fell to 3.5% in December from 12% in June 2019.

Van West Infrastructure Decommissioning

It has been recommended to decommission unused water system infrastructure that had become part of the RMOW's water system with the acquisition of the Van West Water System in Function Junction. These include an old reservoir, surface water intake and one (1) groundwater well. The RFP process has been initiated in late 2019 but contracts have not yet been awarded.

5.0 STANDARDS & TESTING RESULTS

The Community and Emerald Estates Systems are operated under separate Permits to Operate. These permits include conditions that must be met in order to maintain these permits including sampling parameters and frequency which is what this section focuses on.

A copy of the permits are included in [Appendix C – Permits to Operate a Water Supply System](#).

Sampling Program – Sources (Raw)

Table 4 RMOW Water Source Sampling Program

Sample Period	Testing Parameter
Two Weeks	pH, Temperature, Turbidity, E. Coli, Total Coliforms
Quarterly	Total Organic Carbon (TOC), Heterotrophic Plate Count (HPC), Polycyclic Aromatic Hydrocarbons (PAH), Iron and Manganese
Annually	Water Chemistry

Sampling Program – Distribution System (Treated)

The DWPR states that the water supplier (RMOW) must monitor its drinking water source and system at a frequency established by the regulations laid out in its operating permit. The RMOW is required to sample its distribution system 25 times per month (300 times per year) for the Community Water System and 4 times per month (48 times per year) for the Emerald Estates Water System. The RMOW has established a water quality

sampling and testing program that samples the potable water supply quality at 37 locations throughout the municipality.

Table 5 RMOW Water Distribution Sampling Program

Sample Period	Testing Parameter
Two Weeks	pH, Temperature, Turbidity, Free CL2 (Residual Chlorine), E. Coli, Total Coliforms
Quarterly	Total Organic Carbon (TOC), Heterotrophic Plate Count (HPC), Trihalomethane (THM), Polycyclic Aromatic Hydrocarbons (PAH), Iron and Manganese
Annually	Water Chemistry (two randomly chosen sites annually)

Bacteriological Sampling

The RMOW must complete a minimum bacteriological sampling frequency of 25 per month in the Community Water System distribution system and a frequency of 4 per month in the Emerald Estates Water System distribution system.

The sampling intervals and standards for bacteriological testing are as follows:

<i>Drinking Water Protection Act</i>	
DRINKING WATER PROTECTION REGULATION	
[includes amendments up to B.C. Reg. 352/2005, December 9, 2005]	
Parameter:	Standard:
Fecal coliform bacteria	No detectable fecal coliform bacteria per 100 ml
<i>Escherichia coli</i>	No detectable <i>Escherichia coli</i> per 100 ml
Total coliform bacteria	
(a) 1 sample in a 30 day period	No detectable total coliform bacteria per 100 ml
(b) more than 1 sample in a 30 day period	At least 90% of samples have no detectable total coliform bacteria per 100 ml and no sample has more than 10 total coliform bacteria per 100 ml

A summary of the bacteriological sampling results can be found in [Appendix A – Consumption and Sampling Data](#).

Physical and Chemical Parameters

Water is tested for a wide range of physical and chemical parameters to ensure that the potable water delivered meets the *Guidelines for Canadian Drinking Water Quality (GCDWQ)*.

In the RMOW systems, sampling for these parameters occurs at each of the raw water sources and at two random sampling stations in the distribution system. The results of the laboratory reports for the report period are included in [Appendix A – Water Consumption and Sampling Data](#).

Water Stability

The 2017 VCH Water System Evaluation Report contained the following request: *“Please provide a report outlining which of the RMOW sources do not meet these guideline and outline any remediation strategies under consideration”*. Water sampling results relating to Water Stability can be found in [Appendix A Table Annual Water Sampling Results](#).

A corrosion control conceptual technical design memo was commissioned and received by the RMOW in October 2019. This draft included an overview of corrosion control requirements for drinking water supplies as well as cost estimates to provide corrosion control to eight (8) existing water facilities in Whistler. These eight (8) facilities include: the Emerald UV Facility (P290), the Alpine Meadows well sites, the 21 Mile Creek UV Station, Community Pump Station, Function Junction Wells and the Cheakamus Pump Station. The status of the RMOW’s water stability and subsequent options for addressing issues pertaining to this were presented to council in January 2020. The recommendations to address corrosion in drinking water typically induced by water with low pH and hardness values are to invest in infrastructure that would potentially mitigate some of these issues by introducing chemical dosing at these locations.

6.0 CONDITIONS OF PERMIT TO OPERATE

The RMOW holds two Permits to Operate a Water Supply System. One (1) for the RMOW Community Water System and one (1) for the RMOW- Emerald Estates Water System. See [Appendix C - Permits to Operate a Water System](#).

Bacteriological Sampling

See [Section 5.0 Standards & Testing Results](#). The Conditions for both RMOW Permits to Operate were met for the report period.

Water Resource Protection Plan

Both RMOW Permits to Operate require an update and implementation of the Source Water Protection Plans. Refer to [Section 3.0 Water Sources](#) for reference to the Water Protection and Monitoring Programs.

Cross-Connection Control Plan

Cross Connection Control (CCC) Bylaw No. 2233, 2019 was adopted by Council on September 3, 2019. The primary objective of the Bylaw is to provide the RMOW with the ability to enforce compliance with the CCC Program that was established in 2014 and to ensure continued annual testing of backflow preventers.

The immediate focus of enforcement has been to focus on contacting customers classified as high-hazard, so as to bring them into compliance.

Uni-Directional Flushing Program

This annual flushing program begins in May each year generally completing by the end of September. This program does not run during periods of high water usage or elevated stages of water conservation. In 2019, unidirectional flushing was performed on the available water lines in 5 areas/neighbourhoods. These areas were flushed in sections and can be identified as the following: Cheakamus Crossing, Benchlands, Emerald Estates, Rainbow and Alpine. In 2018, the areas that were flushed were Alta Vista, Tapley's, Taluswood, Creekside, Bayshore's, Spring Creek and Function Junction. Several pipe lines are not flushed since they achieve the minimum flushing velocity required several times throughout the year and therefore are considered self-cleaning. There are also a few small sections of pipe that do not have the necessary connections/equipment required to be flushed.

Emerald UV Treatment System Commissioning

As per the Emerald Estates Water System Permit to Operate, the Emerald UV treatment system obtained commissioning sign-off from a Professional Engineer prior to the deadline of July 1st, 2019. This sign-off was received on June 20th, 2019.

7.0 SIGNIFICANT EVENTS & PUBLIC NOTIFICATION

Drinking Water Advisory/Boil Water Advisory

No Drinking Water Advisory/Boil Water Advisories were required during the report period.

Power Failure at 21 Mile Creek Surface Water Intake

In December 2018 a power failure followed by a series of control failures resulted in a significant quantity of untreated surface water entering the distribution system. To address concerns about the systems resilience in the face of unexpected emergencies, a programmable control and UPS upgrade has been completed to prevent this issue from reoccurring.

8.0 OPERATOR QUALIFICATIONS AND TRAINING

According to the Drinking Water Protection Regulation, under the *Drinking Water Protection Act*, staff working within the water system must have a minimum level of certification under the Environmental Operators Certification Program (EOCP). This ensures that the RMOW's staff are adequately trained to operate, maintain and repair the water supply and distribution systems in order to maintain the safety and quality of drinking water.

Table 6 Operations Staff EOCP Certifications

Certification	Number of Employees Certified
WT-1	5
WD - IV	3
WD - III	2
WD - II	4
WD - I	2
None	1

APPENDIX A – CONSUMPTION AND SAMPLING DATA

Bacteriological Testing Summary

Table 7 Summary of bacteriological testing results

Water Sample Location	Raw or Treated	Water System	# Samples	Total Coliforms			E. Coli		
				Min	Max	Avg	Min2	Max3	Avg4
W201-1 – SS409	Raw	Emerald	26	<1	<1	n/a	<1	<1	n/a
W201-2 – SS410	Raw	Emerald	23	<1	22.3	2.9	<1	<1	n/a
W201-3 – SS411	Raw	Emerald	22	<1	14.5	3.8	<1	<1	n/a
9225 Lakeshore Drive - S131 - SS403	Treated	Emerald	25	<1	<1	n/a	<1	<1	n/a
9525 Emerald Drive - R238 - SS406	Treated	Emerald	11	<1	<1	n/a	<1	<1	n/a
9525 Emerald Drive – P290	Treated	Emerald	26	<1	<1	n/a	<1	<1	n/a
Alpine Meadows 8319 Mountainview Dr.- P245 - SS412	Treated	Whistler Main	25	<1	<1	n/a	<1	<1	n/a
Alpine Meadows 8330 Rainbow Dr.- S101 - SS421	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Alta Vista 3333 Carleton Way - S104 - SS459	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Athlete's Village 1300 Mount Fee Rd. SS491	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Athlete's Village 1010 Janes Lake Rd. P278, SS495	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Blackcomb Benchlands 4700 Glacier Dr. - P256 - SS441	Treated	Whistler Main	11	<1	<1	n/a	<1	<1	n/a
Function Junction Aquifer 1397 Alpha Lake Road - SS500	Treated	Whistler Main	25	<1	<1	n/a	<1	<1	n/a
Function Junction Aquifer 1092 Millar Creek Road S107 – SS803	Treated	Whistler Main	25	<1	<1	n/a	<1	<1	n/a
Millar's Pond 2773 Cheakamus Way S121 - SS477	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Nicklaus North 8407 Golden Bear Pl. P266/S123 - SS424	Treated	Whistler Main	14	<1	<1	n/a	<1	<1	n/a
Nordic Estates 2642 Whistler Road P264 - SS462	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Rainbow 8925 Hwy. 99 - S137 – SS494	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Rainbow 8522 Ashleigh Mclvor Drive – P283 – SS496	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a

Spring Creek 1559 Spring Creek Road. P273/S132 - SS480	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Spruce Grove 7314 Blackcomb Way P267/S126 - SS427	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Stonebridge 5483 Stonebridge Dr. P275 - SS488	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Sunridge Plateau 3840 Sunridge Drive P265 - SS456	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Tapley's Farm 6671 Crabapple Dr. S103 - SS433	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Twin Lake / Tamarisk 1300 Block Alta Lake Rd. SS482	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Upper Taluswood 2400 Taluswood Pl. P270 - SS465	Treated	Whistler Main	25	<1	<1	n/a	<1	<1	n/a
Whistler Cay Heights 6295 Palmer Dr. Snowflake Prk SS#430	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Whistler Creek 2149 Lake Placid Rd - S106 - SS471	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Whistler Creek 2601 Gondola Way - R228 SS474	Treated	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Whistler Village 4297 Mountain Square - Mountain Ln - SS453	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Whistler Village 4335 Main Street - Main St. - SS450	Treated	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
19 Mile Ck Aquifer; Well No. W202 SS418	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
19 Mile Ck Aquifer; Well No. W210 SS419	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
19 Mile Ck Aquifer; Well No. W213 SS420	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
21 Mile Creek; R-231 SS#436	Raw	Whistler Main	24	<1	260.2	32.5	<1	4.1	2.5
Alta Lake Aquifer, Well No. W218 SS498	Raw	Whistler Main	11	<1	<1	n/a	<1	<1	n/a
Alta Lake Aquifer, Well No. W219 SS498	Raw	Whistler Main	1	<1	<1	n/a	<1	<1	n/a
Athlete's Village Aquifer, W217	Raw	Whistler Main	13	<1	<1	n/a	<1	<1	n/a
Blackcomb Creek, R-232/ SS439	Raw	Whistler Main	9	9.7	137.6	34.3	<1	6.1	1.9
Fitzsimmons Creek Aquifer, W205-1 SS444	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Fitzsimmons Creek Aquifer, W205-2 SS445	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Fitzsimmons Creek Aquifer, W205-3 SS446	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Fitzsimmons Creek Aquifer, W211 SS447	Raw	Whistler Main	12	<1	<1	n/a	<1	<1	n/a
Function Junction Aquifer W212-1 SS483	Raw	Whistler Main	11	<1	<1	n/a	<1	<1	n/a

Monthly Consumption Summary

Table 6 Monthly Consumption Summary 2019

Monthly Water Consumption 2019																
	2019		% Change	2018		% Change	2017		% Change	2016		% Change	2015		% Change	Total Percent Change
January	441,443		-6%	470,942		-1%	476,162		20%	401,729		8%	370,353		1%	19%
February	399,185		-5%	416,576		8%	383,694		-13%	431,206		14%	376,817		3%	6%
March	427,692		7%	399,575		-1%	402,808		-24%	518,769		6%	487,232		32%	-12%
April	378,067		-13%	426,676		14%	375,703		3%	363,751		3%	352,562		-20%	7%
May	468,358		-29%	589,158		34%	420,654		-20%	497,014		29%	383,938		14%	22%
June	531,249		9%	483,165		-8%	525,266		3%	501,142		-28%	696,328		57%	-24%
July	605,811		6%	572,737		-4%	594,848		11%	527,593		-14%	615,103		-10%	-2%
August	633,560		-19%	787,377		-2%	799,142		21%	668,798		9%	612,039		2%	4%
September	475,086		-2%	484,112		-10%	533,518		3%	518,075		-6%	553,060		-9%	-14%
October	354,793		-17%	430,794		-8%	460,326		30%	350,826		-4%	363,883		7%	-2%
November	323,498		2%	317,409		-23%	395,108		16%	344,968		10%	314,547		-6%	3%
December	404,678		9%	366,681		-13%	430,903		-15%	504,795		0%	505,518		7%	-20%
Total Water Consumption (m³)	5,443,420		-5%	5,745,203		-1%	5,798,132		3%	5,628,667		0%	5,631,380		5%	-3%

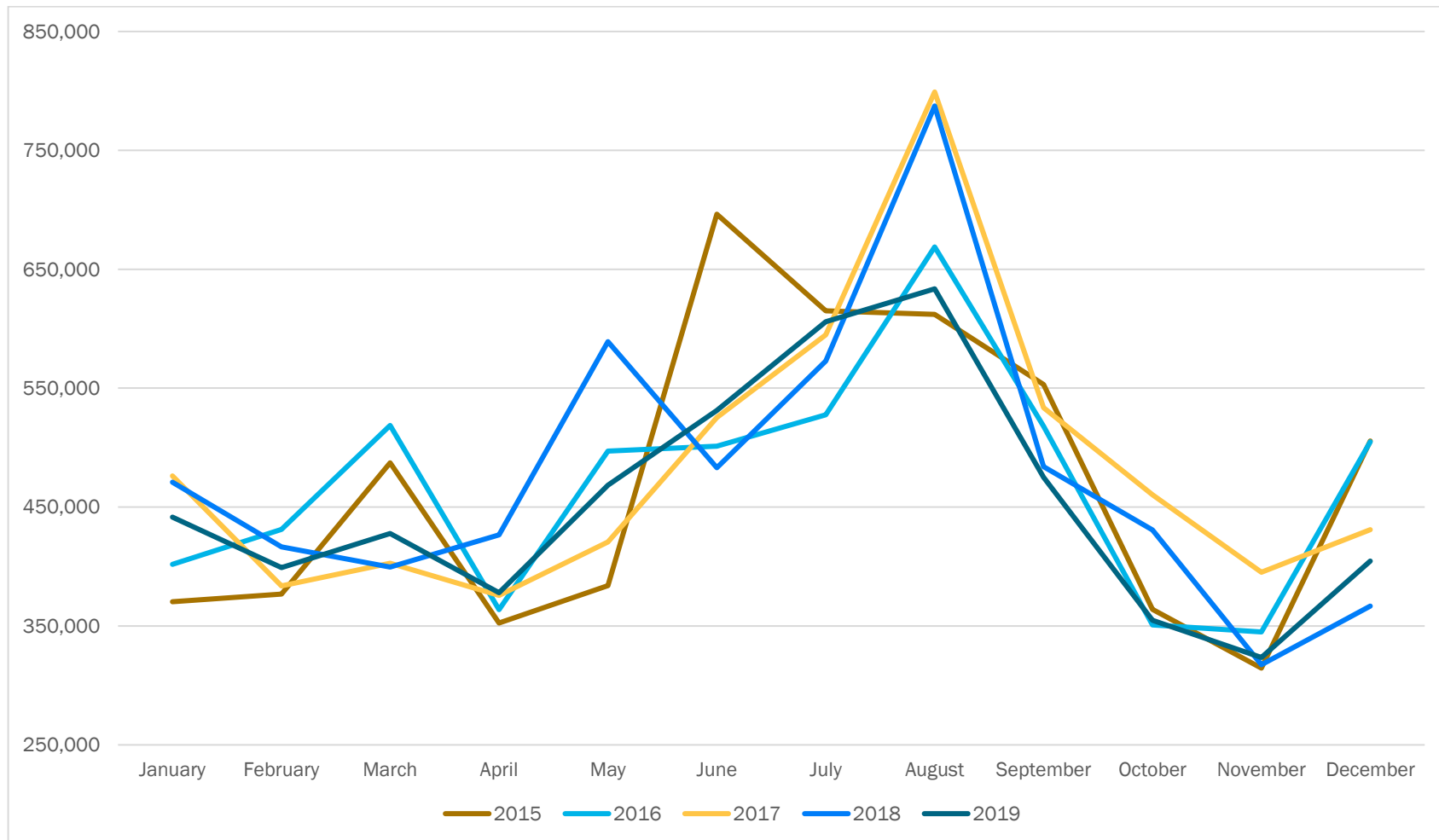


Figure 1 Monthly Water Consumption 2019 (m3)

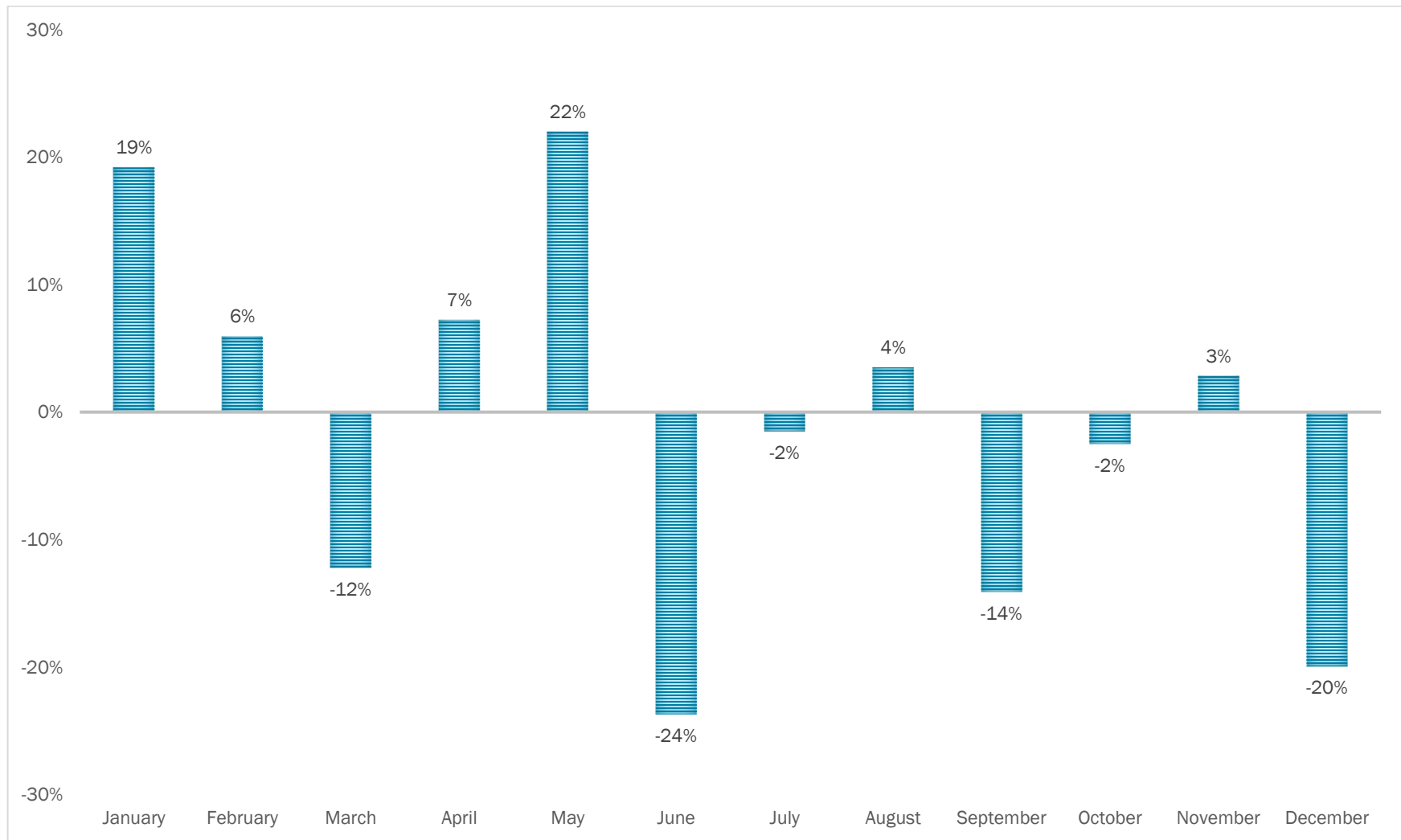


Figure 2 Total Percent Change 2015-2019

Source Water Summary

Table 7 Source Water Summary 2019

Source Water Sites	2019		2018		2017		2016		2015	
	m ³	%	m ³	%	m ³	%	m ³	%	m ³	%
R231 21 Mile Creek	2,310,513	42%	2,093,835	36%	2,241,453	39%	2,303,292	41%	2,520,437	45%
R232 Blackcomb Creek	-	-	-	-	-	-	-	-	-	-
Total Surface Water	2,310,513	42%	2,093,835	36%	2,241,453	39%	2,303,292	41%	2,520,437	45%
Emerald Wells W201 1-2-3	255,500	5%	259,944	5%	276,017	5%	274,991	5%	259,127	5%
W202 Alpine	143,799	3%	327,306	6%	288,532	5%	301,268	5%	298,432	5%
W210 Alpine	185,090	3%	153,250	3%	153,501	3%	158,422	3%	220,204	4%
W213 Meadow Park	174,281	3%	147,963	3%	127,437	2%	175,818	3%	168,999	3%
W205 & W211 Community Wells	656,830	12%	865,370	15%	792,672	14%	497,866	9%	380,922	7%
W212-1 Function Junction	412,625	8%	447,225	8%	351,841	6%	312,097	6%	279,604	5%
W212-2 Function Junction	0	0%	0	0%	0	0%	0	0%	0	0%
W217 Cheakamus Crossing	252,650	5%	229,303	4%	251,282	4%	252,352	4%	220,290	4%
W218 21 Mile Well #1	1,051,873	19%	1,221,006	21%	1,316,459	23%	1,354,525	24%	1,294,719	23%
W219 21 Mile Well #2	0	0%	0	0%	0	0%	-	-	-	-
Total Ground Water	3,132,648	58%	3,651,368	64%	3,556,612	61%	3,325,375	59%	3,110,943	55%
Total Water	5,443,161	100%	5,745,203	100%	5,798,065	100%	5,628,667	100%	5,631,380	100%

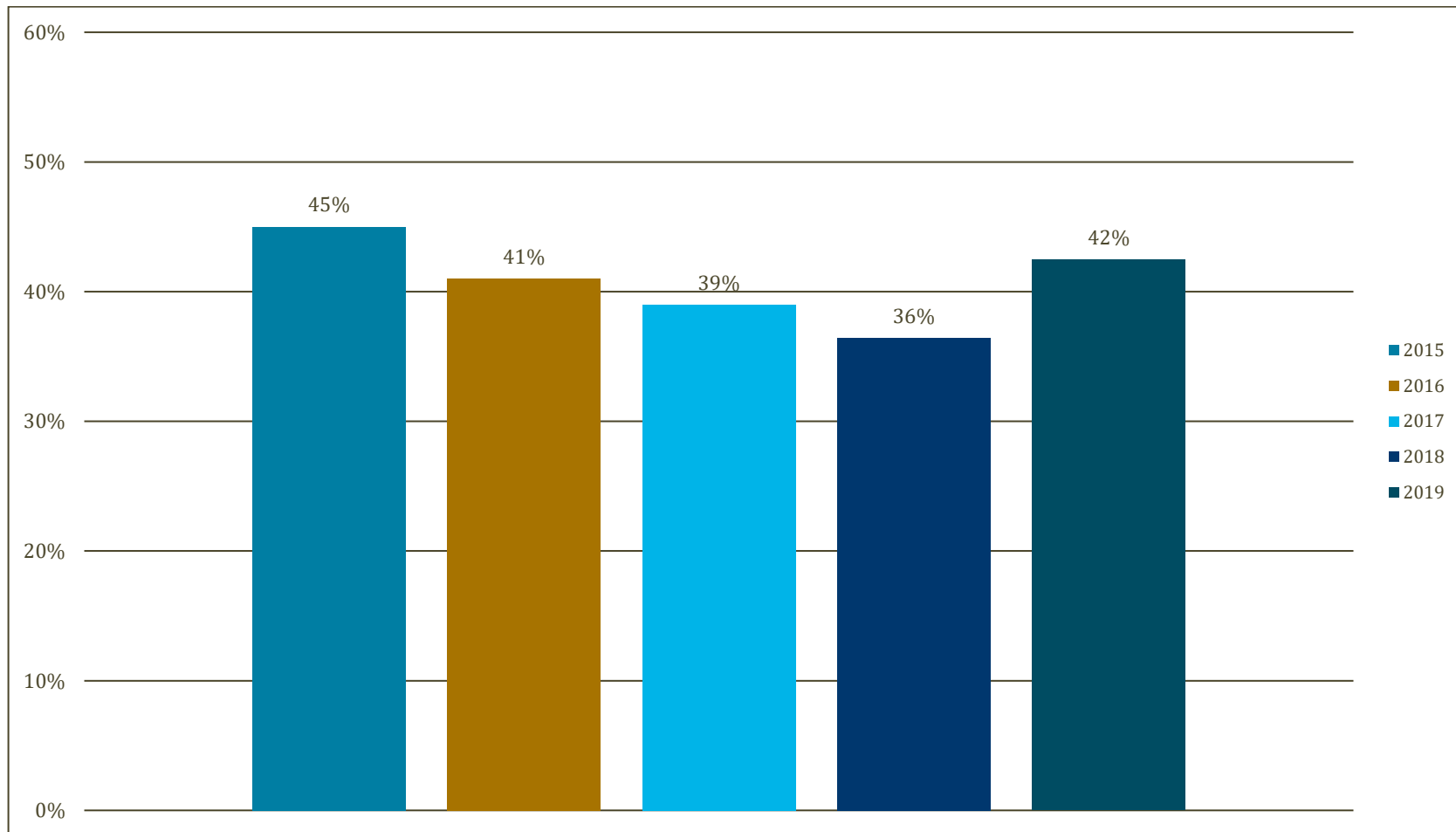


Figure 3 Surface Water Percentage (%) of Total Water Consumption 2015-2019

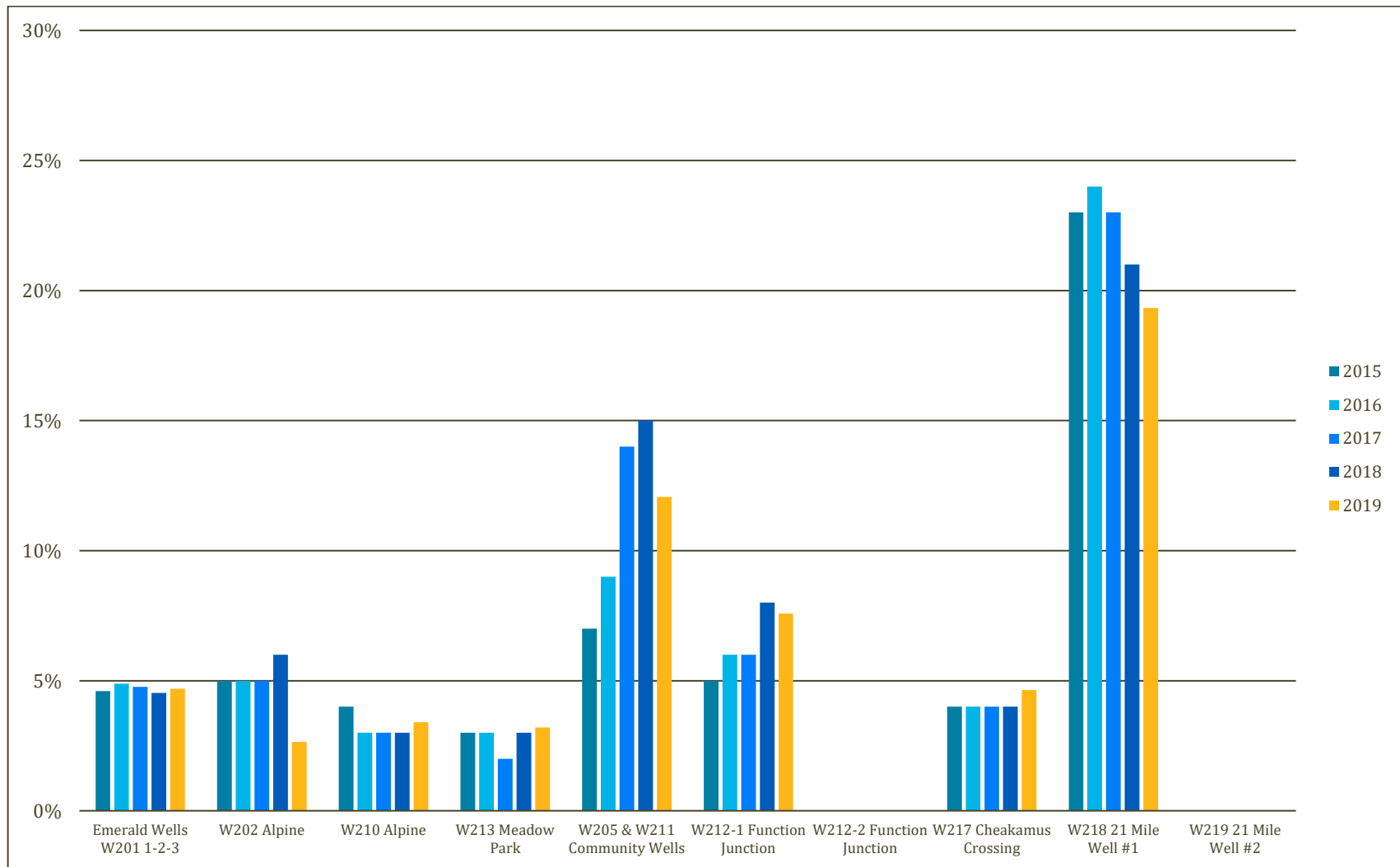


Figure 4 Ground Water Percentage (%) of Total Water Consumption 2015-2019

Annual Water Sampling Results

Table 8.1 Annual Water Sampling Results 2019

			R231	R232	W201-1	W201-2	W201-3	W202	W205-1	W205-2	W205-3
Test Parameter	GCDWQ Standard	Units	10-24-2019	10-24-2019	2019-10-30	2019-10-30	2019-10-30	2019-10-31	2019-11-27	2019-11-27	2019-11-27
Aluminum	< 0.1	mg/L	0.0665	0.0645	< 0.0050	0.0214	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Antimony	0.006	mg/L	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Arsenic	0.01	mg/L	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Barium	1	mg/L	0.0063	0.0088	0.0102	0.0067	0.0072	0.0130	0.0235	0.0555	0.0190
Boron	5	mg/L	< 0.0050	< 0.0050	0.0164	0.0121	0.0099	< 0.0050	0.0108	0.0158	0.0100
Cadmium	0.005	mg/L	< 0.000010	< 0.000010	0.000010	0.000010	< 0.000010	< 0.000010	0.000012	0.000032	< 0.000010
Calcium	-	mg/L	3.73	9.38	22.3	22.9	21.3	12.1	57.9	112	46.9
Chloride	250	mg/L	0.20	0.15	10.7	6.78	13.1	2.07	39.0	106	29.3
Chromium	0.05	mg/L	< 0.00050	< 0.00050	0.00290	< 0.00050	0.00148	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Cobalt	-	mg/L	< 0.10	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Colour	≤ 15	TCU	8.9	6.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Conductivity	-	µS/cm	24.8	54.8	173	155	171	81.7	399	814	328
Copper	≤ 1	mg/L	0.00067	0.00066	0.00063	0.00111	0.00098	0.0167	0.0116	0.00988	0.0140
Fluoride	1.5	mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Hardness CaCO ₃	-	mg/L	10.1	24.7	59.6	60.9	56.8	32.0	150	290	122
Iron	0.3	mg/L	0.034	0.036	0.014	0.043	0.019	< 0.010	< 0.010	0.010	< 0.010
Lead	0.01	mg/L	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	0.00100	< 0.00020	0.00210	0.00048
Magnesium	-	mg/L	0.186	0.291	0.973	0.880	0.833	0.406	1.29	2.49	1.04
Manganese	0.05	mg/L	0.00104	0.00096	0.00039	0.00091	0.00028	0.00023	0.00023	0.00130	0.00039
Mercury	1	µg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nitrate	10	mg/L	< 0.010	0.015	0.190	0.079	0.072	0.097	0.275	0.672	0.176
Nitrite	1	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
pH	7.0 - 10.5	-	7.57	7.65	7.07	7.22	6.98	6.70	6.48	6.43	6.51
Potassium	-	mg/L	0.30	0.32	0.81	0.56	0.45	0.51	1.33	2.24	1.01
Selenium	0.01	mg/L	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Sodium	200	mg/L	0.64	0.87	11.9	6.82	10.2	1.92	16.9	49.6	15.2
Sulphate	500	mg/L	2.3	3.9	12.9	11.8	12.3	11.4	82.6	137	62.9
Turbidity	1	NTU	0.31	0.41	< 0.10	< 0.10	< 0.10	0.19	< 0.10	< 0.10	0.13
Uranium	0.02	mg/L	0.000054	0.000030	0.000024	0.000020	0.000022	< 0.000020	0.000031	0.000095	0.000035
Zinc	5	mg/L	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	0.0200	0.0087	0.0123	< 0.0040

Table 10.2 Annual Water Sampling Results 2019

			W210	W211	W212-1				W212-2	W213
Test Parameter	GCDWQ Standard	Units	2019-11-21	2019-11-27	2019-03-14	2019-06-12	2019-09-24	2019-11-25	2019-12-04	2019-10-31
Aluminum	< 0.1	mg/L	< 0.0050	< 0.0050				< 0.0050	0.0534	< 0.0050
Antimony	0.006	mg/L	< 0.00020	< 0.00020				< 0.00020	< 0.00020	< 0.00020
Arsenic	0.01	mg/L	< 0.00050	< 0.00050				< 0.00050	< 0.00050	< 0.00050
Barium	1	mg/L	0.0159	0.0153				0.0293	0.0231	0.0315
Boron	5	mg/L	0.0172	0.0114				0.0114	0.0120	< 0.0050
Cadmium	0.005	mg/L	< 0.000010	0.000011				0.000023	0.000067	0.000011
Calcium	-	mg/L	11.7	43.4				12.5	16.2	38.1
Chloride	250	mg/L	0.54	10.6				33.4	52.7	11.2
Chromium	0.05	mg/L	< 0.00050	< 0.00050				< 0.00050	< 0.00050	< 0.00050
Cobalt	-	mg/L	< 0.00010	< 0.00010				< 0.00010	0.10	< 0.00010
Colour	≤ 15	TCU	< 5.0	< 5.0				< 5.0	< 5.0	< 5.0
Conductivity	-	µS/cm	74.8	264				200	296	252
Copper	≤ 1	mg/L	0.00073	0.00359				0.00118	0.0176	0.0113
Fluoride	1.5	mg/L	< 0.10	< 0.10				< 0.10	< 0.10	< 0.10
Hardness CaCO ₃	-	mg/L	31.2	113				38.9	52.2	99.7
Iron	0.3	mg/L	< 0.010	< 0.010	0.10700	0.10000	0.14300	0.139	0.289	0.015
Lead	0.01	mg/L	< 0.00020	0.00036				0.00039	0.00197	0.00050
Magnesium	-	mg/L	0.467	1.07				1.88	2.83	1.06
Manganese	0.05	mg/L	< 0.00020	0.00100		0.06720	0.06680	0.0662	1.15	0.00084
Mercury	1	µg/L	< 0.010	< 0.010				< 0.010	< 0.010	< 0.010
Nitrate	10	mg/L	0.024	0.030				0.051	0.018	0.177
Nitrite	1	mg/L	< 0.010	< 0.010				< 0.010	< 0.010	< 0.010
pH	7.0 - 10.5	-	7.11	6.49				6.44		6.84
Potassium	-	mg/L	0.56	0.92				2.00	3.06	1.30
Selenium	0.01	mg/L	< 0.00050	< 0.00050				< 0.00050	< 0.00050	< 0.00050
Sodium	200	mg/L	1.40	6.86				23.4	35.2	5.33
Sulphate	500	mg/L	11.0	71.9				11.2	6.7	65.2
Turbidity	1	NTU	< 0.10	< 0.10				0.29	0.74	0.28
Uranium	0.02	mg/L	< 0.000020	0.000021				< 0.000020	0.000070	0.000031
Zinc	5	mg/L	0.0041	< 0.0040				< 0.0040	0.0270	0.0118

Table 10.3 Annual Water Sampling Results 2019

Test Parameter	GCDWQ Standard	Units	W217	W218	W219	
			2019-10-31	2019-10-31	2019-05-29	2019-11-21
Aluminum	< 0.1	mg/L	0.006500	< 0.0050	< 0.0050	< 0.0050
Antimony	0.006	mg/L	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Arsenic	0.01	mg/L	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Barium	1	mg/L	0.0169	0.0153	0.0116	0.0104
Boron	5	mg/L	0.0052	0.0100	< 0.0050	0.0176
Cadmium	0.005	mg/L	0.00001	< 0.000010	0.000016	0.000035
Calcium	-	mg/L	12.300000	12.3	10.7	10.7
Chloride	250	mg/L	5.900000	1.68	2.49	0.94
Chromium	0.05	mg/L	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Cobalt	-	mg/L	0.001000	< 0.10	< 0.00010	< 0.00010
Colour	≤ 15	TCU	< 5.0	< 5.0	< 5.0	< 5.0
Conductivity	-	μS/cm	98	90.0	84.1	74.6
Copper	≤ 1	mg/L	0.001270	0.00254	0.00304	0.00155
Fluoride	1.5	mg/L	< 0.10	< 0.10	< 0.10	< 0.10
Hardness CaCO ₃	-	mg/L	34.0	34.0	29.8	29.7
Iron	0.3	mg/L	< 0.010	< 0.010	0.019	< 0.010
Lead	0.01	mg/L	< 0.0020	0.00020	< 0.00020	< 0.00020
Magnesium	-	mg/L	0.783	0.761	0.764	0.726
Manganese	0.05	mg/L	0.0021	0.00027	0.00112	0.00055
Mercury	1	μg/L	< 0.010	< 0.010	< 0.000010	< 0.000010
Nitrate	10	mg/L	0.112	0.032	0.032	0.028
Nitrite	1	mg/L	< 0.010	< 0.010	< 0.010	< 0.010
pH	7.0 - 10.5	-	6.37	6.51		
Potassium	-	mg/L	0.82	0.85	0.94	0.91
Selenium	0.01	mg/L	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Sodium	200	mg/L	4.04	2.13	2.00	1.94
Sulphate	500	mg/L	10.5	22.1	16.0	16.1
Turbidity	1	NTU	0.18	< 0.10	0.16	< 0.10
Uranium	0.02	mg/L	0.000030	< 0.000020	< 0.000020	< 0.000020
Zinc	5	mg/L	< 4.0	< 0.0040	< 0.0040	< 0.0040

Annual pH Sampling Results

Table 11 Annual pH Sampling Results

Water Sample Location	Raw or Treated	Water System	# Samples	pH		
				Min	Max	Avg
W201-1 – SS409	Raw	Emerald	21	6.54	12.4	7.07
W201-2 – SS410	Raw	Emerald	20	6.75	11.7	7.22
W201-3 – SS411	Raw	Emerald	19	6.84	7.21	6.98
9225 Lakeshore Drive - S131 - SS4039	Treated	Emerald	21	6.75	7.33	6.96
9525 Emerald Drive – P290	Treated	Emerald	21	6.81	7.27	7.01
Alpine Meadows 8319 Mountainview Dr.- P245 - SS412	Treated	Whistler Main	22	6.45	7.23	6.97
Alpine Meadows 8330 Rainbow Dr.- S101 - SS421	Treated	Whistler Main	11	6.72	7.14	6.89
Alta Vista 3333 Carleton Way - S104 - SS459	Treated	Whistler Main	10	6.27	7.74	6.83
Athlete's Village 1300 Mount Fee Rd. SS491	Treated	Whistler Main	12	6.4	6.82	6.58
Athlete's Village 1010 Janes Lake Rd. P278, SS495	Treated	Whistler Main	11	6.41	6.69	6.59
Blackcomb Benchlands 4700 Glacier Dr. - P256 - SS441	Treated	Whistler Main	9	6.48	7.36	6.71
Function Junction Aquifer 1397 Alpha Lake Road - SS500	Treated	Whistler Main	21	6.15	7.37	6.46
Function Junction Aquifer 1092 Millar Creek Road S107 – SS803	Treated	Whistler Main	21	6.15	7.37	6.46
Millar's Pond 2773 Cheakamus Way S121 - SS477	Treated	Whistler Main	11	6.36	6.98	6.65
Nicklaus North 8407 Golden Bear Pl. P266/S123 - SS424	Treated	Whistler Main	10	6.49	7.59	6.93
Nordic Estates 2642 Whistler Road P264 - SS462	Treated	Whistler Main	12	6.51	7.57	7.05
Rainbow 8925 Hwy. 99 - S137 – SS494	Treated	Whistler Main	10	6.25	7.23	6.74
Rainbow 8522 Ashleigh McIvor Drive – P283 – SS496	Treated	Whistler Main	11	6.53	7.44	7.05
Spring Creek 1559 Spring Creek Road. P273/S132 - SS480	Treated	Whistler Main	11	6.25	7.74	6.75
Spruce Grove 7314 Blackcomb Way P267/S126 - SS427	Treated	Whistler Main	11	6.47	7.63	7
Stonebridge 5483 Stonebridge Dr. P275 - SS488	Treated	Whistler Main	10	6.53	7.59	6.84

Sunridge Plateau 3840 Sunridge Drive P265 - SS456	Treated	Whistler Main	11	6.67	7.74	7.25
Tapley's Farm 6671 Crabapple Dr. S103 - SS433	Treated	Whistler Main	11	6.54	7.74	7.25
Twin Lake / Tamarisk 1300 Block Alta Lake Rd. SS482	Treated	Whistler Main	11	6.38	7.26	6.63
Upper Taluswood 2400 Taluswood Pl. P270 - SS465	Treated	Whistler Main	21	6.5	7.56	6.91
Whistler Cay Heights 6295 Palmer Dr. Snowflake Prk SS#430	Treated	Whistler Main	11	6.48	7.73	6.95
Whistler Creek 2149 Lake Placid Rd - S106 - SS471	Treated	Whistler Main	12	6.27	8.21	6.98
Whistler Creek 2601 Gondola Way - R228 SS474	Treated	Whistler Main	10	6.3	7.5	6.54
Whistler Village 4297 Mountain Square - Mountain Ln - SS453	Treated	Whistler Main	12	6.34	7.81	7.01
Whistler Village 4335 Main Street - Main St. - SS450	Treated	Whistler Main	9	6.11	7.46	6.7
19 Mile Ck Aquifer; Well No. W202 SS418	Raw	Whistler Main	11	6.44	6.91	6.7
19 Mile Ck Aquifer; Well No. W210 SS419	Raw	Whistler Main	11	6.98	7.24	7.11
19 Mile Ck Aquifer; Well No. W213 SS420	Raw	Whistler Main	11	6.68	7.26	6.84
21 Mile Creek; R-231 SS#436	Raw	Whistler Main	16	7.04	8.17	7.57
Alta Lake Aquifer, Well No. W218 SS498	Raw	Whistler Main	9	6.13	6.7	6.51
Athlete's Village Aquifer, W217	Raw	Whistler Main	10	6.04	6.57	6.37
Fitzsimmons Creek Aquifer, W205-1 SS444	Raw	Whistler Main	10	6.28	6.55	6.48
Fitzsimmons Creek Aquifer, W205-2 SS445	Raw	Whistler Main	10	6.24	6.58	6.43
Fitzsimmons Creek Aquifer, W205-3 SS446	Raw	Whistler Main	10	6.38	6.64	6.51
Fitzsimmons Creek Aquifer, W211 SS447	Raw	Whistler Main	9	6.23	6.7	6.49
Function Junction Aquifer W212-1 SS483	Raw	Whistler Main	10	6.3	6.75	6.44

APPENDIX B –EMERGENCY RESPONSE AND CONTINGENCY PLAN

Water Systems Emergency Response and Contingency Plan

Resort Municipality of Whistler 2018



1 Executive Summary

The Drinking Water Protection Regulation (B.C. Reg. 200/2003) requires all purveyors of water systems to have an emergency response and contingency plan which can be referred to in case of an emergency which might cause a disruption in service or present a threat to the health of people drawing water from the system. This Water System Emergency Response Plan fulfills this requirement.

The Water System Emergency Response Plan details the plan of action for staff to prepare for and respond to emergency situations and disruptions in service to the water system. The Plan provides staff with an understanding of the resources available to them, instructions on when to open the Emergency Operations Centre (EOC) and identifies external resources that can be called upon if required.

The plan outlines Utilities emergency procedures for potentially hazardous situations such as, extended loss of BC Hydro electrical supply, failure of SCADA system, failure of disinfection system, primary water main failure, bacteriological contamination of the distribution system, utilities building fire, water source high turbidity readings and spills or chemical/ biological contamination.

This plan follows a standardized emergency management concept known as the Incident Command System for managing and coordinating emergency responses. The plan will be available to RMOW Utilities staff and management, the RMOW Emergency Program Coordinator, the RMOW Communication's Officer and the Vancouver Coastal Health Drinking Water Officer.

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1.1 Emergency Response & Contingency Plan

Purpose of the Plan

The RMOW is responsible for providing adequate supplies of clean potable water to its residents. In addition, the municipality maintains water storage volumes in the reservoirs for the provision of fire-fighting for dwellings/structures within the developed areas of the Whistler. Disruptions in water quality and delivery may result from emergencies such as natural disasters (such as, floods, forest fires and/or earthquakes), accidents, or intentional acts. The municipality maintains effective response and recovery practices in the event of an emergency through Emergency planning and coordinated communication planning.

This ERCP was prepared in accordance with Section 13 of the Drinking Water Protection Regulation (BC Reg. 200/2003). The document summarizes possible emergencies, staff roles and responsibilities, and the procedures that are in place to effectively and adequately respond to emergencies that significantly threaten the municipal water distribution system.

The ERCP is intended to guide municipal management, staff, and response agencies in the best practices in the event of an emergency. These practices include:

- Early response guidelines;
- Ensuring that the highest levels of water quality and public health are maintained;
- Ensuring the highest levels of safety for employees and first responders;
- Ensuring that adequate water levels are maintained for fighting fires;
- Safeguarding of drinking water distribution infrastructure;
- Restoring normal water system operations as soon as possible;
- Protecting the environment from potential impacts associated with system operation during emergency event response.

Emergency Response and Contingency Plans must be accessible to every staff member and must be readily available in an emergency. A copy of this plan must also be sent to the Drinking Water Officer and be updated at least once a year to reflect changes in personnel, contact information, and system operation. A synopsis or summary of this plan must be available for public access.

Steps undertaken in an Emergency

1. **Assess the situation.** Can the situation be remedied as part of normal operations, or will the emergency response plan be initiated? Is there a possible threat to drinking water quality? Consult with Drinking Water Officer.
2. **Protective life and limb.** Evacuation may take precedence over repairs. Do not attempt to respond to an emergency or undertake repairs until it is safe to do so.

3. **Reduce the potential for further damage or threat to water quality.** The threat may be removed; parts of the system may be shut down.
4. **Inform the public.** Public notices may be issued to prevent further contamination or threat to public health.
5. **Perform repairs based on priority.** Priority is determined by the Supervisor in conjunction with VCH.
6. **Return system to normal levels of operation.** Evaluate the situation as the water system returns to normal. Do not remove any public advisories until the water is declared safe to drink, but provide updates on a regular basis to keep the public informed.
7. **Evaluate plan and emergency response.** During and after operations, note communications gaps, operational difficulties, or anything that affected the utility's ability to restore services to normal levels.
8. **Revise plan if necessary.** Make changes to the plan, and be sure to update it after any improvements or changes to the system, including changes in personnel.

Every water system has key components that are essential to its continued operation.

These include:

1. **Administration** – personnel, records, emergency plans, computers, SCADA system.
2. **Source** – watershed, wellhead area.
3. **Intakes** – pumps and pump houses, intake structures.
4. **Transmission** – pumps, piping and valves.
5. **Storage** – reservoirs, standpipes, pump stations.
6. **Treatment** – chlorination, stations, filtration plants, other treatment
7. **Distribution** – piping, pumps, valves, hydrants.
8. **Facilities and equipment** – buildings or warehouses, works yards, spare parts, vehicles and construction equipment, etc.
9. **Communications** – phone system, radio, computers and e-mail, signals transmission from reservoirs or pump stations.

1.2 Roles and Responsibilities

Operators

The RMOW Utilities Department Operators are the personnel most likely to discover a situation that may present a threat to the municipal water supply; Utilities is most likely to receive calls from residents about tastes, odours, lack of pressure and/or other indications of a problem in the water system. When responding

to a potential emergency situation the operators are required to notify the Chief Operator and Supervisor as soon as possible.

Utilities Supervisor

Once apprised of the potential emergency situation by operations staff, the Utilities Supervisor (Acting: **Wayne Dennien**) must decide if there is a potential threat to the drinking water supply; and whether the necessary response falls under normal operating procedures or if additional staff and/or contractor resources will be required to contain the situation. If public notification is required or extraordinary measures are implemented, the Supervisor will contact the Utilities Group Manager (Acting: Chris Wike). The Supervisor will also contact the Utilities Group Manager if the situation exceeds the capacity of the operations department and other departments or agencies are required for assistance. The Supervisor will also monitor general operating conditions, weather conditions, maintain a safe working environment, and ensure that staff has appropriate equipment and necessary resources to effectively respond to the emergency.

Utilities Group Manager

If the Supervisor has indicated a potential threat to the drinking water supply (either quality or quantity) the Utilities Group Manager will determine the next steps which may include:

- Determining the emergency level and evaluating whether or not it exceeds the utility departments capacity to respond effectively and if so, notify the General Manager of Infrastructure Services. The RMOW Emergency Operations Centre Activation Flowchart is provided in Appendix C.
- Contacting the Drinking Water Officer and working with them to issue the necessary public notifications.
- Authorizing the contact of priority water users to make them aware of the possibility of a problem with the water quantity or quality, in order for them to initiate their own emergency response plans.
- Coordinate with the Utilities Supervisor to ensure that the response team have all the appropriate equipment and training in order to respond to the emergency situation.

Drinking Water Officer

The Drinking Water Protection Regulation (BC Reg. 200/2003) and the Drinking Water Protection Act give the Drinking Water Officer (DWO) significant authority over removing potential and real threats to drinking water supplies. The DWO must be informed of anything that may present a potential threat to drinking water quality.

During an emergency, the DWO and other health authority staff can provide advice about public notification and assistance with monitoring water quality and outbreaks of waterborne disease. It is assumed that the RMOW Communications Department will take the lead role as spokesperson for media enquiries and releases. Sample public notification templates are provided in Appendix B.

1.3 Emergency Situations

Defining Emergency Levels

In this plan there are three categories of severity with different response actions, the category of severity for each emergency situation can be used to determine appropriate response actions.

- **Alert Condition:** considered to be routine emergencies, such as distribution line breaks, short power outages, and minor mechanical issues.
- **Emergency Condition:** more significant emergencies. These types of emergencies usually require the issuing of a Boil or Do Not Use Water Advisory Notice to protect the public.
- **Disaster Conditions:** emergency situations that have a significant impact on the system. These are serious emergencies and require immediate notification of the Utilities Group Manager. If deemed necessary the Utilities Group Manager will contact the General Manager to activate the RMOW Emergency Operations Centre (EOC).

Vandalism/Security Issues

If vandalism occurs or there are security concerns at any facility that threaten drinking water quality:

1. Determine the Emergency Level.
2. Contact the facility concerned to alert regarding the vandalism / security issue
3. Contact the RCMP
4. Contact the Supervisor, Utilities Group Manager and advise the Drinking Water Officer or Medical Health Officer
5. If the Utilities Group Manager and the DWO agree there is a threat to drinking water quality, issue “Boil Water” alerts for suspected microbiological contamination or “Do Not Drink the Water” alert for suspected chemical or unknown contamination.
6. Implement appropriate measures for cleaning / decontaminating facilities
7. Do not remove the public advisories until instructed by the Drinking Water Officer
8. Complete a post-incident response report

NOTE: Notify the Drinking Water Officer or Medical Health Officer of any vandalism or deliberate acts of contamination to any part of the water system.

The Drinking Water Protection Act prohibits any person from introducing anything into domestic water source, a well recharge zone, or an area adjacent to a drinking water source that will or is likely to result in a health hazard related to drinking water or destroying, damaging, or tampering with any part of a domestic water system if that would limit the use of the water system on the basis that there may be a risk of a health hazard.

Spills or Chemical/Biological Contamination

When an Operator or Supervisor reports a spill or chemical/biological contamination that may threaten drinking water quality:

1. Determine the Emergency Level.
2. Immediately notify the Supervisor and Utilities Group Manager.
3. Assess nature of contaminant, soil and weather conditions to determine best course of action to address the spill situation. Deploy appropriate remedial action, which may include hydro-excavation to remove contaminants as soon as possible.
4. Contact the Drinking Water Officer or Medical Health Officer and divide level of risk.
5. Contact the **Spill Reporting Centre: 1-800-663-3456**
6. Utilities Group Manager to issue a “Do Not Drink the Water” alert for the affected part of system. Arrange for trucked / bottled water if necessary.
7. If spill enters or is near a fish-bearing stream, contact the Department of Fisheries and Oceans and the BC Ministry of Environment.
8. If the spill is near a well(s), have monitoring wells installed to monitor contaminant plum and take action to mitigate impacts of spill on aquifer. Contact a hydro geologist for assistance. Review wellhead protection plan.
9. If a reservoir is contaminated, it must be drained, cleaned, disinfected, refilled and disinfected a second time. Re-sample the water. Flush and disinfect any downstream piping.
10. Confirm water quality is acceptable to Drinking Water Officer before removing public notices.

If a sample analyzed by the British Columbia Centre for Disease Control tests positive for chemical/biological Contamination:

1. Utilities personnel and Drinking Water Office will be notified via an alert from the laboratory.
2. All outstanding samples will be examined immediately.
3. Repeat samples will be collected immediately.
4. Chlorine residual for the sample will be reviewed to determine if a localized loss of disinfectant residual has occurred.
5. Utilities staff will determine if an interruption of source water disinfection occurred.
6. Utilities staff will determine if localized flushing and/or temporary increase in disinfectant residual dosage is warranted.
7. Turbidity, pH, and temperature values for the affected sample will be reviewed to determine other possible factors which may have contributed to the event.

8. The need for a Boil Water Advisory will be evaluated, and if deemed necessary the RMOW will carry out various means to inform the public.
9. The municipality will coordinate with the Drinking Water Officer on the extent of the Boil Water Advisory.
10. Confirm water quality is acceptable to Drinking Water Officer before removing public notices.
11. Complete a post-incident report.

Floods

Floods may affect water sources by depositing debris and silt in the water or by contaminating wells with surface water. In addition, facilities and equipment may be damaged or rendered inoperable by flood waters. Staff may not be able to gain access to some facilities due to high water.

In the event of a major flood mostly likely the EOC would be activated:

1. Utilities Supervisor assesses the situation and determines the level of emergency.
2. Utilities Supervisor confirms which facilities are functional and accessible.
3. When confirmed that a well is flooded, notify the Utilities Group Manager and the DWO, who will assume it has been contaminated by untreated surface water and will issue a “Boil Water” alert. If chemical storage or application occurred in the vicinity, issue a “Do Not Drink the Water” alert.
4. If there are damaged facilities and lack of water, issue a “Water Use Restriction” Order.
5. Once flood waters have receded, have affected facilities checked for structural integrity. Contact a structural engineer for assistance.
6. Implement appropriate measures for cleaning/ decontaminating facilities.
7. Have water quality in affected wells tested and do not remove public notices until instructed by the drinking water officer.
8. Consider flood proofing affected facilities and ensure wells are sealed and flood proofed.
9. Complete a post-incident response report.

Earthquakes

Earthquakes can be particularly destructive to both above ground and underground infrastructure. Pipes and well casings can be bent, twisted, or sheared off completely. Reservoirs or storage tanks can be damaged by water sloshing back and forth or by weakening of their foundations or structure. Soils with high water content can liquefy and damage buildings and underground pipes; other types of soils tend to compact, causing similar damage. Unstable slopes may slide, sending debris into a water course or across an access road. Earthquakes often cause ruptured gas mains and fires, so increased demand can be placed on a water system that is under stress. Because many other agencies will be involved it will be essential to coordinate all efforts to most effectively deal with the situation.

In the event of an Earthquake most likely the EOC would be activated.

1. Utilities Supervisor assesses the situation and determines the level of emergency.

2. Utilities Supervisor confirms which facilities are functional and accessible, which may be damaged and whether water quality is affected.
3. Maintain liaison with DWO and, if necessary, issue public alerts and provide bottled/trucked water if possible.
4. Contact the Fire Department and Emergency Operations Centre as required.
5. If there are damaged facilities and lack of water, issue a Water Use Restriction Order.
6. If there is potential for backflow into the system, assume it has been contaminated by untreated surface water and issue a Boil Water Advisory. If chemical storage or application occurred in the vicinity, issue a Do Not Drink Water Advisory.
7. If surface sources are degraded by landslide, switch to alternate sources.
8. If wells are destroyed, switch to backup sources and investigate locations for new wells.
9. Contact a structural engineer for assistance in assessing significant damage to facilities.
10. Make a damage assessment, prepare a plan to begin repairs and identify a schedule to resume normal operations.
11. Have water quality in affected wells tested and do not remove public notices until instructed by the drinking water officer.
12. Complete a post-incident response report.

Wildfires

During a forest fire reservoirs, pump stations or other facilities may be damaged or destroyed by fire. Increased demands may be placed on the system, disrupting normal operations. Chemicals used in fire suppression may enter water courses and the distribution system. The hydrology of a watershed changes after a forest fire, so source waters may become more turbid or coloured. Long term effects may include stream flow alteration and excessive algal growth.

In the event of a Wildfire most likely the EOC would be activated.

1. Report wildfire to **BC Wildfire Service, 1-800-663-5555 or *5555 from a cell phone.**
2. Utilities Supervisor assesses the situation and determines the level of emergency
3. Request regular status information on the situation and possible water contamination
4. If possible, isolate threatened facilities and switch to backup sources to maintain system pressure and supply.
5. If fire suppression activities occur, contact BC Forest Service and Fire Department to determine nature of suppressants used.
6. If surface waters are affected by fire suppressants, issue a Do Not Drink the Water Advisory or apply appropriate treatment approved by the drinking water officer to render the water safe to drink.

7. If long-term impacts to surface waters occur, consider finding alternate sources or installing treatment.
8. If wells are destroyed, switch to backup sources and investigate locations for new wells.
9. Provide bottled / trucked water if required / possible.
10. Once danger of fire has passed, contact a structural engineer for assistance in assessing significant damage to facilities.
11. Make a damage assessment, prepare a plan to begin repairs and identify a schedule to resume normal operations.
12. Have water quality in affected wells tested and do not remove public notices until instructed by the drinking water officer.
13. Complete a post-incident response report.

1.4 Public Notification

There are numerous emergency situations that could trigger the RMOW to advise the public to limit their water use. For example the flooding of a well, a backflow incident, or reservoir contamination could result in a Boil Water Advisory or a Do Not Use Advisory (sample notices provided in Appendix D). In some cases boiling the water may render it safe, and in other cases the public may be advised to not use the water at all. In a situation where public health is at risk from a contaminated water supply the responsibility falls to the Drinking Water Officer, who will assist the RMOW and provide recommendations on the steps required to mitigate the threat and restore the municipal water system to a safe level.

NOTE: *The information stated here are guidelines only, the Drinking Water Officer has the authority to undertake actions at variance with the guidelines where necessary.*

“Boil Water” Advisory

The RMOW will administer a Boil Water Advisory when there is a significant enough public health threat posed by the water quality in the distribution system that can effectively be mitigated through sufficient water boiling. Precautionary boil water advisories are issued routinely to buildings affected by any water system maintenance work that has the potential to contaminate the water.

If it is suspected that the water supply is contaminated with pathogenic micro-organisms or volatile chemicals (that can be safely evaporated), then the RMOW will notify and consult with the Drinking Water Officer to issue a Boil Water Advisory. It is possible to make water contaminated by microbiological contaminants safe by bringing the water up to a rolling boil **and** maintaining a rolling boil for **at least** two minutes. While a boil water advisory is in effect the water may safely be used for laundry, and for bathing or showering as long as no water is swallowed. The water should **not** be used for cooking, food preparation, or brushing teeth without first being boiled.

“Do Not Drink Water” Advisory

The RMOW will administer a Do Not Drink Advisory when there is a significant public health threat posed by ingesting contaminated water from the drinking water supply, and the nature of the threat is one that cannot be effectively mitigated by a Boil Water Advisory. The RMOW will notify the Drinking Water Officer and issue a Do Not Drink Water Advisory as soon as possible after discovering the threat.

Residents are instructed not to drink water or use it for cooking, food preparation, brushing teeth, or bathing. In this situation bottled/trucked water will be provided to residents.

[“Do Not Use Water” Advisory](#)

The RMOW will administer a Do Not Drink Advisory when a significant public health threat exists in relation to the water supply system and the threat cannot be adequately addressed by a Do Not Drink Advisory or a Boil Water Advisory. If this threat level is reached the RMOW will notify the Drinking Water Officer and issue a Do Not Use Water Advisory to notify the public to not drink the water or use it for any domestic purpose. Under these conditions bottled/trucked water is provided to residents by the RMOW.

If the contaminant is unknown, confirmed, or suspected to be a toxic chemical or mineral, then boiling is not recommended as it may have a concentrating effect on the substance rather than making the water safe. Chemical contaminants may have various negative health effects including skin irritation and respiratory problems, and should be avoided as much as possible. Under a Do Not Use Water Advisory distribution water should not be used for drinking, cooking, food preparation, bathing or brushing teeth.

[Public Premises Notice](#)

Due to its unique nature as a resort municipality, the RMOW has numerous restaurants, hotels, and other public establishments. The locations of these public facilities are documented by the RMOW as part of the Drinking Water Protection Regulation, but it is the responsibility of the owner of the public premises to notify the public of any drinking water advisories either verbally and/or by posting a sign at every sink and drinking water source accessible to the public.

It is important to ensure that public premises such as hotels, inns, restaurants, bars, convention centres and sports facilities are made aware of current advisories that effect the water quality so signage can be posted and appropriate action taken. It is the responsibility of the RMOW to post easily visible signs/notices at public water fountains located within municipal owned public facilities.

1.5 Appendix A – Contact List

Resort Municipality of Whistler Emergency Contacts						
First Name	Last Name	Position	24 Hour Contact	Office Phone	Cell Phone	E-mail
Wayne	Dennien	(Acting) Utilities Superintendent		604-935-8314	604-932-7610	wdennien@whistler.ca
Bill	Harvey	Utilities Chief Operator - Water		604-935-8317	604-935-5903	bharvey@whistler.ca
Jenny	James	Utilities Chief Operator – Waste Water		604-935-8322	604-935-4832	jjames@whistler.ca
Scott	Morphet	Utilities Foreman – Equipment Operations		604-935-8316	604-905-8944	smorphet@whistler.ca
		On-call Operator	604-905-8725			
		Back-up Operator	604-935-9472			
		After-Hours Answering Service	604-935-8320			
Chris	Wike	(Acting) Utilities Group Manager		604-935-8321		cwike@whistler.ca
Erin	Marriner	Emergency Program Coordinator		604-935-8473		emarriner@whistler.ca
Michele	Comeau	Communications Manager		604-935-8152		mcomeau@whistler.ca
James	Hallisey	Infrastructure Services General Manager		604-935-8196		jhallisey@whistler.ca

Vancouver Coastal Health Authority Emergency Contacts						
First Name	Last Name	Position	Office Phone	Cell Phone	Home Phone	E-mail
Dan	Glover	Drinking Water Officer	604-815-6846	604-815-3128	604-414-4005	Dan.glover@vch.ca
James	Whalen	Back-up Health Contact, Drinking Water Officer	604-935-5318	604-698-5422		James.whelen@vch.ca
Phil	Muirhead	2 nd Back-up Contact Drinking Water Specialist, DWO	604-983-6756	604-306-2717		Phil.muirhead@vch.ca
Jon	Choi	(Acting) Manager	604-983-6813			Jonathon.choi@vch.ca
Mark	Ritson	Manager HP	604-983-6751	604-219-7359		Mark.ritson@vch.ca
Dr. Geoff	McKee	Medical Health Officer	604-983-6715	604-842-2357		Geoff.mckee@vch.ca

1.6 Appendix B – RMOW Notices



RESORT MUNICIPALITY OF WHISTLER BOIL WATER NOTICE

Coliform exceedance in _____ water
(Name of Water Distribution System)

BOIL YOUR WATER BEFORE USING

Bring tap water to a rolling boil, boil for one minute, and cool before using. Boiled or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, and preparing food until further notice.

This Boil Water Notice applies to _____
(Describe area or attach map)

Bottled/trucked water will be available at the following locations: _____
(Insert locations)

What Happened?

Regular monitoring showed a violation for total coliform bacteria in your drinking water. During _____ (month) _____ (year), _____ (number or percentage) of the samples taken tested positive, including _____ repeat sample(s) taken on _____ (date).

Coliform bacteria are naturally present in the environment and are used as an indicator that potentially harmful microbes may be present. Harmful microbes in drinking water can cause diarrhea, cramps, nausea, headaches, or other symptoms and may pose a special health risk for infants, some elderly, and people with severely compromised immune systems. But these symptoms are not just caused by microbes in drinking water. If you experience any of these symptoms and they persist, you should seek medical advice.

What is being done? _____

(Describe corrective actions)

It is likely that you will need to boil water for the next _____ days _____ hours until the problem is fixed. You will be informed when tests show that you no longer need to boil your water.

For more information, please contact: _____ at the RMOW on _____
(Name of person) (Phone number)
or the _____ at 804-935-XXXX.

Visit www.whistler.ca for further updates or listen to FM 102.1 / FM 101.5

Please share this information with other people who drink this water, especially anyone who may not get this notice directly (for example, people in strata buildings, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

Water System Facility #: _____ Date distributed: _____



RESORT MUNICIPALITY OF WHISTLER
BOIL WATER NOTICE

E. coli bacteria found in _____ water
(Name of Water Distribution System)

BOIL YOUR WATER BEFORE USING

Bring tap water to a rolling boil, boil for one minute, and cool before using. Boiled or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, and preparing food until further notice.

This Boil Water Notice applies to _____
(Describe area or attach map)

Bottled/trucked water will be available at the following locations: _____
(Insert locations)

What Happened?

E. coli bacteria were found in the drinking water on _____ (date).
The RMOW considers any confirmed *E. coli* positive sample as a public health hazard and a violation of drinking water standards.

The presence of Escherichia coli (E. coli) bacteria indicates that the water may be contaminated with human or animal wastes. Harmful microbes in these wastes, including E. coli, can cause diarrhea, cramps, nausea, headaches, or other symptoms. These may pose a special health risk for infants, some elderly, and people with severely compromised immune systems. But these symptoms are not just caused by harmful microbes in drinking water. If you experience any of these symptoms and they persist, you should seek medical advice.

What is being done? _____

(Describe corrective actions)

It is likely that you will need to boil water for the next _____ days _____ hours until the problem is fixed. You will be informed when tests show that you no longer need to boil your water.

For more information, please contact: _____ at the RMOW on _____
(Name of person) (Phone number)
or the _____ at 804-935-XXXX.

Visit www.whistler.ca for further updates or listen to FM 102.1 / FM 101.5

Please share this information with other people who drink this water, especially anyone who may not get this notice directly (for example, people in strata buildings, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

Water System Facility #: _____ Date distributed: _____



RESORT MUNICIPALITY OF WHISTLER
DO NOT USE WATER NOTICE

_____ contamination in _____ water
(Name of Water Distribution System)

DO NOT USE WATER

Do not use tap water. The water issue cannot be addressed by boiling water. Trucked or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, preparing food, bathing and all domestic use until further notice.

This Do Not Use Water Notice applies to _____.
(Describe area or attach map)

Bottled/trucked water will be available at the following locations: _____.
(Insert locations)

What Happened?

_____ was found in the drinking water on _____ (date)
The RMOW considers any _____ positive sample as a public health hazard and a violation of drinking water standards.

Details of the contaminant: _____
Potential adverse health effects from drinking the water (e.g. diarrhea): _____
Population affected including subpopulations which may be particularly vulnerable (e.g. may pose a special health risk for infants, some elderly, and people with severely compromised immune systems): _____
If you experience any of these symptoms and they persist, you should seek medical advice.

What is being done? _____

(Describe corrective actions)

It is likely that you will need to BOTTLED / TRUCKED water for the next _____ days _____ hours until the problem is fixed. You will be informed when tests show that you no longer need to do this.

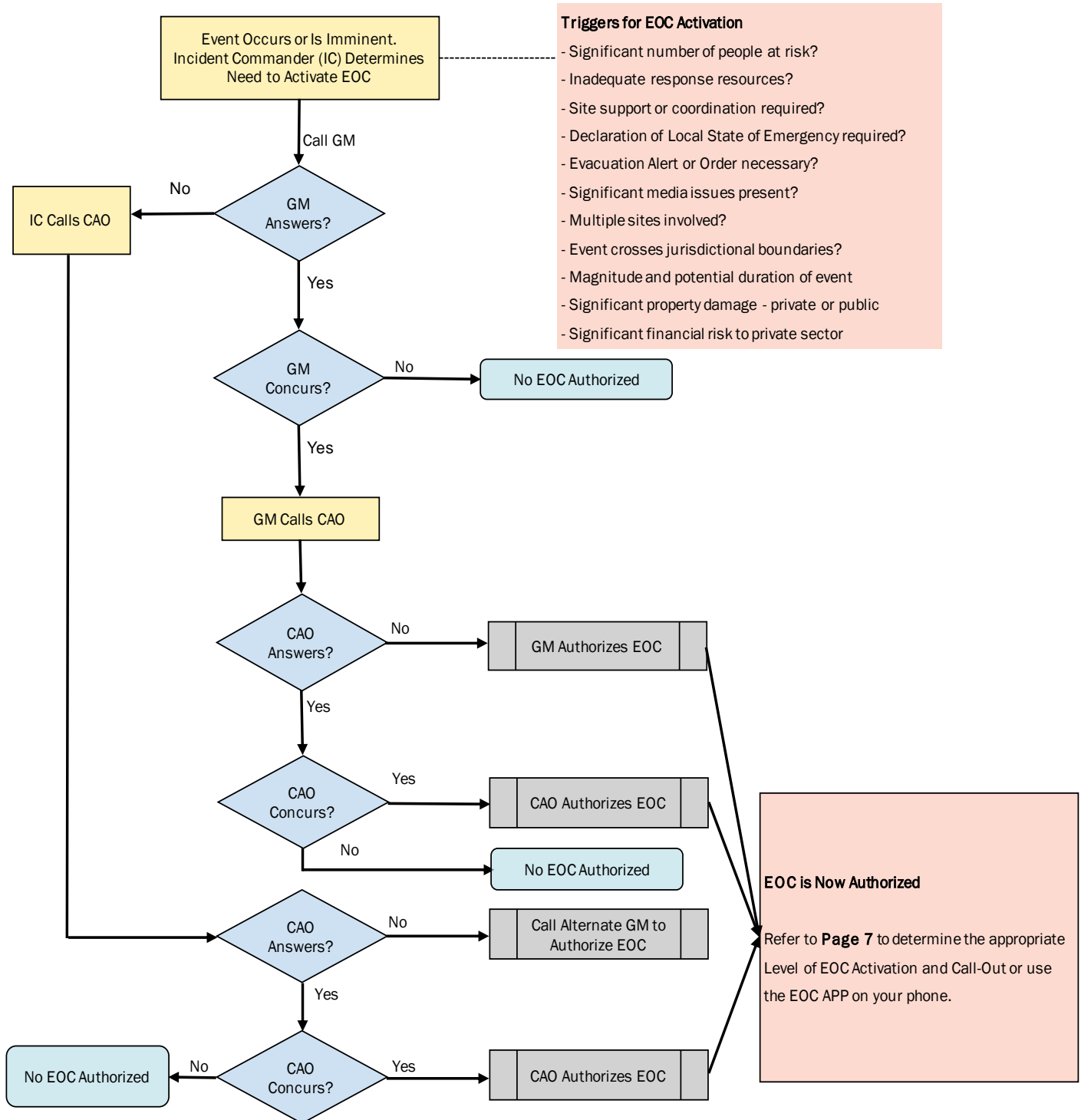
For more information, please contact: _____ at the RMOW on _____
(Name of person) (Phone number)
or the _____ at 604-935-XXXX.

Visit www.whistler.ca for further updates or listen to FM 102.1 / FM 101.5

Please share this information with other people who drink this water, especially anyone who may not get this notice directly (for example, people in strata buildings, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

Water System Facility #: _____ Date distributed: _____

1.7 Appendix C – Emergency Operations Centre Activation



1.8 Appendix D - Watermain Break Response



Watermain Break Responses – Guidelines for DWO's in VCH

Type 1 Break	Type 2 Break	Type 3 Break
Controlled pipe repair	Controlled pipe repair	Uncontrolled pipe repair
Positive pressure maintained during break	Positive pressure maintained during break	Loss of pressure at break site/possible local depressurization adjacent to the break (<20 psi)
Pressure maintained during repair (full shutdown is not needed)	Pressure maintained until controlled shutdown (shutdown after the repair site is secured against soil/water contamination)	Partial or uncontrolled shutdown
No signs of contamination intrusion	No signs of contamination intrusion	Possible contamination intrusion (muddy water entering the pipe or leaking sewer pipe in the trench)
Procedure	Procedure	Procedure
Notify the DWO if necessary, see Note 1	Notify the DWO if necessary, see Note 1	Notify the DWO If necessary, see Note 1
Excavate to below break	Excavate to below break	Excavate to below break
Maintain trench water level below break	Maintain trench water level below break	Maintain trench water level below break

Repair under pressure	Controlled shutdown for repair	Uncontrolled shutdown for repair
		Isolate section of pipe in which the break is located with all service connections shut off
Clean and disinfect repair site by spraying or swabbing with minimum 1% chlorine solution	Clean and disinfect repair site by spraying or swabbing with minimum 1% chlorine solution	Clean and disinfect repair site by spraying or swabbing with minimum 1% chlorine solution
Disinfect repair parts by spraying or swabbing with minimum 1% chlorine solution	Disinfect repair parts by spraying or swabbing with minimum 1% chlorine solution	Disinfect repair parts by spraying or swabbing with minimum 1% chlorine solution
Flush to obtain three volumes of water turnover (and until flushed water is visually clear)	Scour flush (at 3 ft/s) to obtain three volumes of water turnover (and until flushed water is visually clear)	Scour flush (at 3 ft/s) to obtain three volumes of water turnover (and until flushed water is visually clear)
		Follow disinfection procedures for new pipe installation, if possible. Alternatively, keep chlorine residual of 4 mg/L for at least 16 hours or 300 mg/L for 15 minutes, then flush
Check residual chlorine level until typical levels are restored	Check residual chlorine level until typical levels are restored	Check residual chlorine level until typical levels are restored
		Check with bacteriological testing (DWO to decide if service may be restored before results), see Note 2

Return watermain to service	Return watermain to service	Return watermain to service
No bacteriological samples	Check with bacteriological testing (no need to wait for results), see Note 2	Instruct customers to flush premise plumbing upon return to service
No BWN	No BWN	BWN if area of depressurization is larger than the treated area

APPENDIX C – PERMITS TO OPERATE A WATER SUPPLY SYSTEM



HEALTH PROTECTION

PERMIT TO OPERATE

A Water Supply System

Purveyor: Resort Municipality Of Whistler
Facility Name: RMOW Community Water System

Conditions of Permit

Minimum bacteriology sampling frequency is 25 per month (distribution).
Update and implement the Source Water Protection Plans (ground water and surface water).
Implement your Cross-Connection Control Program.
Maintain the uni-directional flushing program annually.
Review the Emergency Response Plan and update at least annually.
Blackcomb Creek source may not be used without prior authorization from VCH.

July 1, 1992
Effective Date
March 18, 2019
Revised Date


Drinking Water Officer

This permit must be displayed in a conspicuous place and is not transferable.

HEALTH PROTECTION

PERMIT TO OPERATE

A Water Supply System

Purveyor: Resort Municipality Of Whistler
Facility Name: RMOW - Emerald Estates Water System

Conditions of Permit

Maintain FAC level at 0.4 ppm minimum post reservoir.
Update and implement the Ground Water Resource Protection Plan.
Minimum bacteriology sampling frequency is 4 per month (distribution).
Implement the Cross-Connection Control Program.
Maintain the Uni-Directional Flushing Program.
Review the Emergency Response Plan and update annually.
Obtain P. Eng. sign-off by July 01, 2019 on UV treatment system installed.

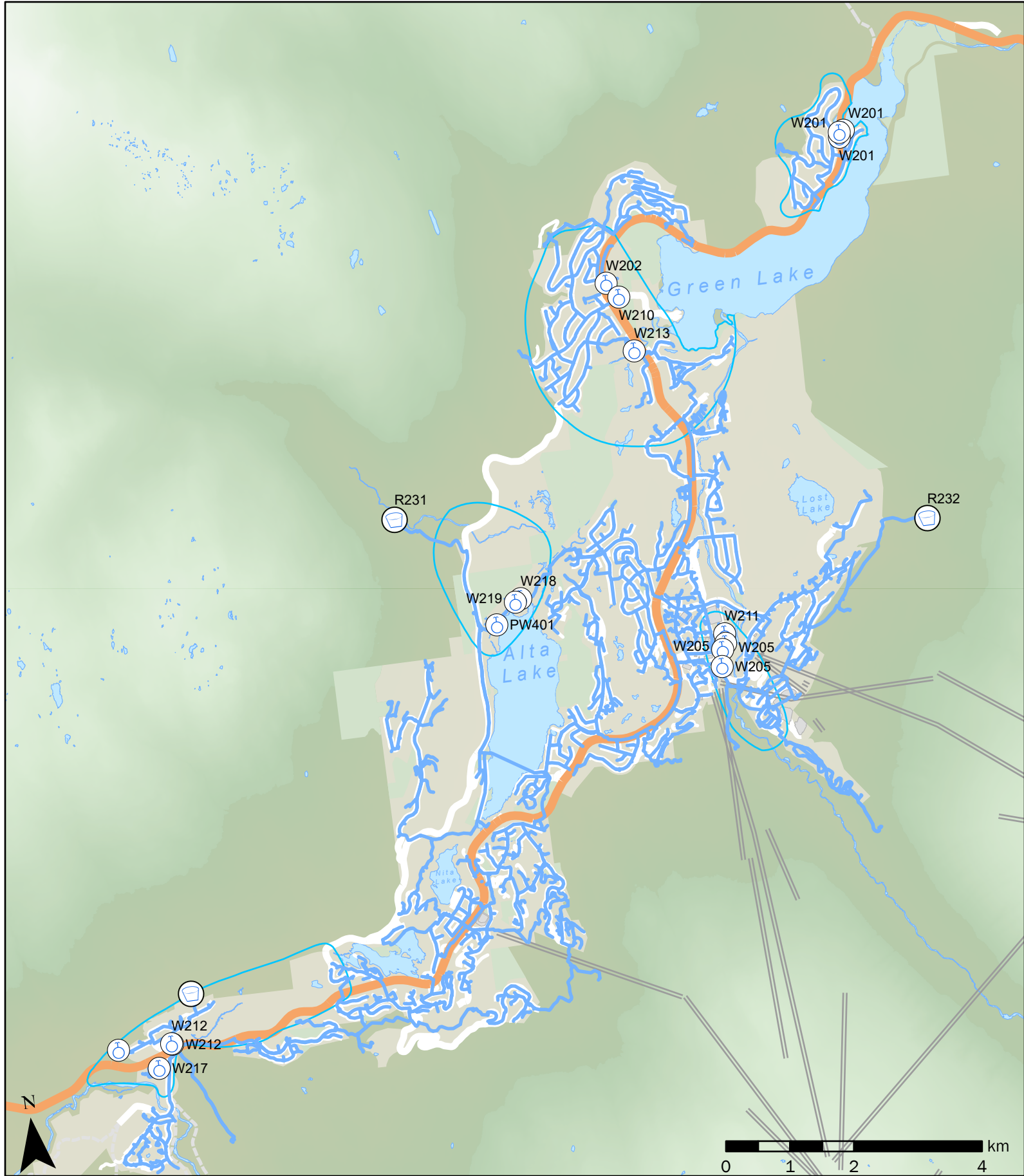
July 1, 1992
Effective Date
March 18, 2019
Revised Date







Drinking Water Officer

This permit must be displayed in a conspicuous place and is not transferable.

APPENDIX D – MAPS OF WATER SYSTEM





-  Water Intakes
-  Water Production Wells
-  Water Well Protection Areas
-  Water Main

RMOW Groundwater Wells, Well Protection Areas and Surface Water Intakes

Map prepared for the 2019 Annual Drinking Water Report June 2020





-  Water Sampling Stations
-  Water Main

RMOW Water Sampling Stations

Map prepared for the 2019 Annual Drinking Water Report June 2020

