2008

GROUNDWATER RESOURCE PROTECTION PLAN

RESORT MUNICIPALITY OF WHISTLER

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DECEMBER 2008

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1 Introduction

1.1 Background

The Resort Municipality of Whistler (RMOW) is a year-round destination resort located in the Coastal Mountains of British Columbia. Because Whistler is a resort, with visitor numbers largely influenced by seasonal weather conditions, the RMOW has an extremely variable population that changes dramatically. The population that is served by the RMOW water utility can vary from the baseline resident population of 9,600 during poor weather or shoulder season periods, up to 50,000 or more during a peak-season event.

The RMOW water utility is committed to a program of continuing improvement. The major improvement effort at this time is a shift toward the increased use of new, safe, reliable groundwater supply sources. At this time, approximately 46% of the potable drinking water for the Resort Community comes from 12 groundwater supply wells drawing from aquifers lying within the RMOW municipal boundaries. The remaining amount is supplied from various surface water sources. The proportion of groundwater use within the utility will change significantly with the commissioning of two new groundwater supply sources in the near future.

1.2 Whistler 2020

"*Whistler 2020"* is the Resort Municipality of Whistler's primary guiding policy document. This all-encompassing community planning statement addresses the many facets of maintaining a healthy resort community, in a sustainable manner. The "*Whistler 2020"* summary "Descriptions of Success" are attached as Appendix "C". As can be seen from the section headed "Water", our commitment to provide excellence in water quality is clearly ingrained in our community direction.

> *Excerpt from "Whistler 2020" – Descriptions Of Success*
>
> *"Whistler's potable water supply system delivers water of excellent quality, which meets or exceeds all relevant health standards, and meets benchmark aesthetic standards whenever possible".*

1.3 Objectives and Scope

This Groundwater Resource Protection Plan ("the Plan") provides the framework for the initialisation of a program of measures that will lead to enhanced protection of the quantity and quality of groundwater used within our Resort Community. The primary objectives of this plan are to ensure that exposure to unacceptable concentrations of contaminants in drinking water are minimised, to implement procedures and policies that will support the long-term sustainability of the groundwater resource, and to maintain public confidence in Whistler's drinking water quality.

Protection of groundwater resources will be achieved by identifying existing pollution risks within well protection areas (WPAs). The potential for future contamination will be minimized by recommending one or more management options to address those risks. Those options may include amendments to our community planning processes, raising public awareness and fostering community support regarding the need for stewardship of groundwater resources, preparation of contingency plans to ensure appropriate response to any potential contamination events, and ongoing monitoring within the WPA.

This Plan is intended to be a "living" document, evolving to reflect policy changes, input from stakeholders, new information on aquifer conditions or contamination events, and new or planned activities within the WPAs. To facilitate stakeholder involvement, a Planning Team will be formed to guide the execution of the elements of this Plan. This Plan provides the framework that will assemble the Planning Team, and it will set in motion the required mechanisms and processes that will trigger the implementation of the many components of a complete groundwater resource protection system. When formed, the Planning Team will provide input to the RMOW on the ongoing implementation and the annual review and amendments to this Plan.

1.4 Council's Commitment of Support

At the Special Council Meeting of June 19th, 2008, Council directed staff to complete this Plan. This Plan represents the fulfilment of that commitment to Council, and the Community.

> *Excerpt from the Special Council Meeting of June 19th, 2008:*
>
> *"That Council direct staff to complete the Community-Wide Aquifer Protection Plan and submit it for approval to the Drinking Water Officer, as required under the conditions of our Waterworks Operating Permit, pursuant to the Drinking Water Protection Act, within six months of this resolution".*

1.5 Plan Framework

Preparation of this Plan has generally followed methods recommended in the "Well Protection Toolkit" developed by the Province of British Columbia in 2000 as a guide to assist water purveyors and communities on how to develop and implement a well protection plan. Following that general framework, this Plan has been organised into the following sections:

Section 1	Introduction
Section 2	Wellhead Protection Areas
Section 3	Groundwater Pollution Areas of Concern
Section 4	Proposed Management Options
Section 5	Contingency and Spill Response Plans
Section 6	Water Quality Monitoring
Section 7	Planning Team – Terms of Reference and Procedures
Section 8	Implementation Schedule

Throughout this Plan, you will notice text boxes that identify the tasks to be completed, and the projected completion time-line. The completion time-line is expressed in quarters, with the year of completion below the quarter. These tasks are summarized in Section 8.

2 Well Protection Areas

2.1 Introduction

In the context of this Plan, the term "Well Protection Area" (WPA) refers to the area that should be managed and protected from potential contamination to ensure protection of water quality and long-term sustainability of the groundwater supply. The process of determining the extents of the WPAs involved an evaluation of the properties of the aquifer from which the supply wells extract groundwater, in some cases estimating the capture zone and time-of-travel for groundwater within the aquifer to reach the well(s), and then designating an overall area to be protected on the basis of this information.

The WPA's identified in this section, have been determined using a vast amount of acquired information and study within our community. Piteau Associates, working on behalf of the RMOW, is currently working to complete the document entitled "Capture Zone Assessment and Survey of Potential Groundwater Pollution Hazards for Whistler B.C.". That document will contain the supporting information related to the establishment of the WPAs identified in this Plan.

Task No.	***Description***	***Completion***
1	*Complete the report entitled "Capture Zone Assessment and Survey of Potential Groundwater Pollution Hazards for Whistler B.C."*	*Q-1 2009*

2.2 Aquifers and Wells

Aquifers from which RMOW supply wells draw groundwater are depicted on Fig. 1. These aquifers comprise complex and locally variable post-glacial alluvial fans and valley fill sediments. The locations of these production wells are also depicted on Fig. 1. Completed Well Assessment Forms are included with Appendix 'D', and well details are summarised in Table 1 below. Including new wells expected to come on line in the near future, Whistler utilises 14 wells drawing from five aquifers.

Location	Date Drilled	Casing Diameter (mm)	Screen Interval (m)	Static Level[(1)] (m bgl)	Rated Well Capacity (L/s)	Surface Installation[(2)]	MWLAP Aquifer No.
Emerald Estates							
• W201-1	1979	200	11.6 - 14.9	6.06	14.2	UC	390
• W201-2	1999	200	16.5 - 18.9	4.72	10.7	PA	"
• W201-3	2000	300	8.9 - 15.2	2.21	31.6	PA	"
Alpine Meadows							
• W202	1979	250	10 - 19.5	4.6	34.7	PH	388
• W210	1994	200	14.3 - 18.9	3.8	22.1	PH	"
• W213	1999	200	42.1 - 46.6	flowing	18.9	PA	"
Whistler Community (Village)							
• W205-1	1978	200	23.0 - 28.0	11.6	27.0	PA	387
• W205-2	1980	250	16.3 - 21.3	7.2	37.9+	PA	"
• W205-3	1982	300	14.4 - 17.6	7.2	20.5	PA	"
• W211	2000	250	15.8 - 18.8	6.9	18.0	PA	"
Rainbow Park							
•W218 (note 3)	2007	400	24.0 – 28.7	flowing	74	PA	N/A
Function Junction							
• W212-1	2000	400	10.6 – 19.8	4.54	41	PA	395
• W212-2	1999	200	13.9 – 18.6	4.2	33	PH	395
• W217 (note 3)	2008	400	17.4 – 20.4	8.60	74	PA	395

1 Static water level as reported on well log, expressed in metres below ground level.
2 UC = Underground chamber; PA = Pitless adapter; PH = Pump house.
3 Operating permit pending – not in operation at this time.

Table 1 – Summary of RMOW Water Supply Wells

The Van West Waterworks Utility services the community of Function Junction from two wells (1-79 and 3-96) near Miller Creek Road in Function Junction. Although recommendations for well and aquifer protection planning included in this report are to some degree protective of the Van West wells at Function Junction, these wells are not covered within this Plan.

2.3 Recommended Well Protection Areas

Based on their current understanding of the five aquifers that are utilised as sources of potable water at Whistler, Piteau Associates have recommended the extent of WPAs. These are depicted on Fig. 1. In all cases the recommended protection areas cover more land than suggested by well

capture zone calculations. This conservatism reflects the uncertainty inherent in groundwater capture zone estimation methods, and the need to provide a high degree of public protection. For wells at Alpine Meadows, Emerald Estates, and Function Junction, the WPAs encompass the entire developed areas. The RMOW's Official Community Plan (OCP) includes a Well Protection Areas map that will be updated to match the mapping prepared by Piteau Associates.

Task No.	***Description***	***Completion***
2	*Prepare an amending bylaw to the OCP that will replace the existing mapping with the revised information.*	*Q-4 2009*

3 Groundwater Pollution Areas of Concern

3.1 Inventory of Potential Contamination Sources

On behalf of the RMOW, Piteau Associates identified potential groundwater pollution areas of concern within the entire Whistler area. This survey involved reviewing current and historic maps and aerial photographs, historic information, government databases, phone books and municipal directories (current and historic), interviewing senior RMOW staff and long-time Whistler residents.

Land uses and potential groundwater pollution areas of concern are depicted on Figures 1 and 2, and are summarised in Appendix 'A'. In total, some 60 areas of concern were identified. Most of these relate to potential point source hazards relating to past or present land use, including fuel storage and dispensing at gas stations, heliports, and a seaplane base, automotive services, industrial activities (e.g., paving, concrete manufacture), dry cleaning, and wood processing. Other potential sources are associated with Highway 99 (spills and road salt), CN Rail (spills), golf courses, the wastewater treatment plant, and former landfills. As Whistler is chiefly a resort community, potential problems often associated with agriculture (e.g., nitrates) and heavy industry are absent.

Task No.	***Description***	***Completion***
3	*Identify potential groundwater pollution areas of concern within the WPAs*	*Completed*

3.2 Assessment of Potential Risk Factors

The RMOW retained Piteau Associates to conduct an inventory and assess each potential groundwater pollution area of concern qualitatively in terms of the degree of risk to RMOW's supply wells. Risk was considered as "the possibility of a person being exposed to unacceptable amounts of a contaminant in drinking water". Hazard is the potential harm that can result from human exposure to a contaminant in the drinking water and exposure potential is the likelihood

that individuals consuming the groundwater will be exposed to contaminants of concern. For risk to exist, both hazard and exposure potential must be present.

The two key elements used to evaluate the magnitude of the risk were 1) the characteristics of the hazard and 2) the exposure potential. To prioritise the areas of concern, relative risk was evaluated on a qualitative basis, taking into account the amount of contaminant present (or potentially present) and storage practices, proximity to WPA(s), contaminant mobility, and aquifer vulnerability. Based on this analysis, each of the potential groundwater pollution areas of concern has been assigned a relative risk with respect to the RMOW supply wells. These are indicated in Appendix 'A'.

Task No.	***Description***	***Completion***
4	*Evaluate the risk from each of the land uses identified in the Inventory exercise.*	*Completed – See Appendix 'A'*

4 Proposed Management Options

4.1 Objectives

Options for preventing and responding to groundwater contamination at Whistler fall into the basic categories of preventing future groundwater pollution, and management of historic and/or recent contamination risks. Prevention includes measures to promote public stewardship of groundwater resources and controlling activities within WPAs to minimise the potential for future contamination. Where feasible, elimination of problems such as improperly abandoned wells (which could represent a means for introduction of contaminants to an aquifer) should also be implemented. In cases where groundwater contamination is, or may be, present due to activities in the past, risk management strategies may be needed to protect the groundwater quality. Both types of management options are included in this Plan.

4.2 Raising Public Awareness

Involvement from the community is an important component of the Plan. The objectives of this Plan include promoting stewardship at a "grass-roots" level, and to solicit public input with respect to the Plan. One of the first tasks for the Planning Team will be to assist in the development of the Community Consultation component of the Plan. If significant new information or opposition to elements of the plan are encountered throughout the Public Consultation process, staff will return to Council with that information, and request direction. The following options for the Community Consultation efforts may be considered by the Planning Team, and then presented to Council for consideration:

4.2.1 Public Meetings and Open Houses

One or more public meetings/open houses will be hosted by the RMOW. The purpose of these sessions will be to allow the public to view the various materials and provide input. Notices for these meetings will be in the local newspapers and posted on the RMOW website.

4.2.2 Internet Distribution

This Plan will be made available on the RMOW website. The public will be invited to provide comments at that site.

4.2.3 Signage Plan

The RMOW will post signs with information on groundwater resources at conspicuous locations within WPAs.

Task No.	***Description***	***Completion***
5	*Development of the Community Consultation Plan*	*Q-4 2009*

4.3 Remediation of Decommissioned Wells

Test wells, piezometers, and monitoring wells that have not been properly decommissioned represent a future groundwater contamination risk, as they are conduits through which potential contaminants could be introduced directly into an aquifer. The *Groundwater Protection Regulation* (GWPR) requires that water wells, test wells, and monitoring wells that are not in use be decommissioned in accordance with prescribed methods.

Upon discovery of a well that should be decommissioned, the RMOW will either undertake the work (in the case that it is under care and control of RMOW), or assist the authorities in communicating with the responsible parties (the land owners) to encourage them to undertake appropriate measures to correct the deficiency. In the case where voluntary compliance with the requirement to decommission the well is not forthcoming on a timely basis, the RMOW may advise the Ministry of Environment who are authorised to enforce the requirements of the GWPR.

Task No.	***Description***	***Completion***
6	*Identification of test wells, piezometers and monitoring wells that require decommissioning.*	*Q-1 2009*
7	*Prepare a workplan for elements that require decommissioning, and incorporate it into the Municipal budgeting process.*	*Q-3 2009*
8	*Assist the Province in the development of a communication strategy for privately controlled wells requiring decommissioning.*	*Q-3 2009*

4.4 Legislative Considerations

Provincial laws and regulations were reviewed during the preparation of this Plan to gain an understanding of roles and responsibilities of the various stakeholder agencies. In addition, opportunities to incorporate elements of this Plan into municipal bylaws were considered. The results of that review are discussed below.

4.5 Provincial Regulations

Mechanisms for compelling property owners to assess and remediate contaminated sites are incorporated in the *Waste Management Act* (WMA) and the *Contaminated Site Regulation* (CSR). Through the submission of Site Profiles, as required by the CSR, property owners are required to identify historical land uses that may be of concern, as a condition for obtaining permits for development, rezoning, subdivision, removal of soil from commercial/industrial sites, demolition of buildings used for commercial/industrial activities, as well as other prescribed activities. If contamination is present at levels exceeding amounts prescribed in the CSR, the Province requires that either a remedial plan must be approved and implemented, a risk-based solution achieved, or the site must be remediated, before permits will be issued. However, for sites where there is evidence of impact (or imminent impact), on human health and/or the environment, the Director of Waste Management (Provincial Official) may order the owner/responsible person to conduct site investigations, and may issue a remediation order or pollution abatement order to any responsible person, completely independent of any Municipal permitting process.

The RMOW will continue to participate in the Site Profile process established by the CSR. Information obtained through this process will be used in the periodic updates to this Plan. If needed to respond to a case of known or imminent groundwater contamination, the RMOW will assist the provincial government in their efforts to compel responsible persons to address groundwater contamination issues.

Section 25 of the *Drinking Water Protection Act* empowers a Drinking Water Officer (DWO) to order persons whose actions or omissions result in, or significantly contribute to, a drinking water health hazard or risk, to conduct studies, undertake corrective measures, and perform a wide variety of other remedial actions. Where appropriate to respond to a known or imminent

groundwater contamination, the RMOW will work with the DWO to address ongoing groundwater contamination issues within WPAs.

Task No.	***Description***	***Completion***
9	*Continue to support the Province and Vancouver Coastal Health with groundwater protection matters.*	*Ongoing*

4.6 Municipal Bylaws and Policies

Local governments in British Columbia have, at their disposal, a range of legislative tools that can be utilised, in consultation with the Province, to develop a comprehensive approach to the protection of our local groundwater resources. As appropriate, the RMOW will develop new bylaws to promote stewardship and protection of groundwater resources at Whistler. Collaboration with various agencies in the Provincial Government is a critical element as the Province is ultimately the regulator of groundwater resources, water utilities, and pollution control measures.

4.7 Waterworks and Sewerage Area Bylaws – Requirement to Connect

Existing RMOW bylaws require that all properties within established waterworks and sewerage areas be connected to RMOW sewer and water utilities. These bylaws, originally targeted at ensuring the viability of the municipal utilities, will be reviewed to ensure that the established areas are updated/revised to ensure the new sewerage and waterworks areas capture all existing and reasonably foreseeable development areas. This will ensure that private water supply wells, specifically those of significant capacity, cannot be constructed within WPAs. In addition, it will provide guidance to the Province when considering permit applications for discharge of wastewater effluents, and other incompatible activities. These revisions can also provide guidance and information to the Province when considering applications from third parties to extract significant quantities of groundwater from the identified Well Protection Areas.

Task No.	***Description***	***Completion***
10	*Review Waterworks and Sewerage Area Bylaws and draft the required mapping and text amendments.*	*Q-2 2010*
11	*Seek Council approval of the above-mentioned amendments.*	*Q-3 2010*

4.8 Official Community Plan

The RMOW's Official Community Plan (OCP) is the primary policy document that contains the guiding principals for our community. Aquifer areas are currently recognised in our existing OCP but the related statements in that document are very general and do not give focussed guidance to our community with regard to how particular types of development may conflict with the protection of groundwater resources (refer to Section 4.12.4 of the OCP). Concurrently with the mapping amendment needed to update the WPA areas in the OCP, and other legislative amendments discussed below, text revisions to the OCP will be brought forward to Council that will give more detailed guidance pertaining to the principals of protecting our groundwater resources. These amendments may include:

i. Policy statements related to transportation corridors in the vicinity of WPAs.

ii. Recognition that some types of community development in the WPAs should be discouraged or regulated particularly those that may involve activities that may be incompatible with the groundwater resources.

iii. Establishment of a Development Permit Area over the WPAs, that will set out additional regulations for any proposed development in those areas. The regulations associated with this Development Permit Area may include:
   - A requirement that the proposed development applicant will submit an analysis by a qualified professional that will identify any potential threat to groundwater resources resulting from the proposed development.

- If threats are identified, an acceptable Local Aquifer Protection Plan (LAPP) must be prepared for that development and a commitment from the applicant to adhere to the LAPP obtained.

Task No.	***Description***	***Completion***
12	*Complete mapping amendment to identify the newly identified WPAs.*	*Complete*
13	*Compose revised text for the OCP that will support the objectives of the Plan.*	*Q-3 2010*
14	*Conduct consultation with the public, as directed by Council.*	*Q-4 2010*
15	*Return to Council with the results of the Consultation, and seek approval of the amendments*	*Q-1 2011*
16	*Seek Council approval of the above-mentioned amendments.*	*Q-1 2011*

4.9 Zoning Regulations

The regulation of land use is accomplished through Council's ability to set land use regulations within the community. Land use regulations can be considered that will prohibit certain types of development within WPAs. This type of amendment will involve significant consultation with Council and the community.

Task No.	***Description***	***Completion***
17	*Compose revised text for the Zoning Bylaw that will support the objectives of the Plan.*	*Q-3 2010*
18	*Request Council input with respect to the above-mentioned amendments.*	*Q-1 2011*
19	*Conduct consultation with the public, as directed by Council.*	*Q-1 2011*
20	*Return to Council with the results of the Consultation, and seek approval of the amendments*	*Q-2 2011*

5 Contingency and Spill Response Plans

5.1 Objectives

Emergencies such as spills of hazardous liquids on the railway or roadways, or breaching of sewage main, could potentially result in significant impacts to groundwater resources if they occur within WPAs. This Plan therefore recognises that a review of the current RMOW Water System Emergency Response Plan is required, and sets out a timeline for completion of those revisions. Contingency plans are also required to address the scenario where unacceptable contaminant concentrations are discovered in groundwater from a supply well. This Plan also sets out the process whereby the Contingency Plans will be developed, reviewed by the Planning Team, and adopted.

5.2 Spill Response

The *Spill Reporting Regulation* of the *Environmental Management Act* requires a person who has possession, charge or control of a substance that is spilled, to immediately report the spill to the Provincial Emergency Program (PEP) by telephoning 1-800-663-3456 if the quantity released is in excess of an amount prescribed in the regulation. Furthermore, the person is required to take all reasonable and practical action while having due regard for the safety of the public and of himself or herself, to stop, contain and minimize the effects of the spill.

The Planning Team will review the RMOW Water System Emergency Response Plan and consideration will be given to inclusion of the following elements:

- If the spill did occur in a WPA, as appropriate, immediately suspend or limit usage of wells nearest the spill site pending a review of potential effects to the aquifer and well water quality.

- If the spill is the result of a rail incident, CN Rail will be responsible for responding. Similarly, if on the highway or local roads, response to the spill will be the responsibility product owner and/or transport company. As soon as practically possible, the RMOW will ensure that the responsible party and responders are aware that the spill has occurred within a WPA, and will monitor the spill response efforts.

- In instances where the RMOW considers spill response efforts by others to be insufficient to protect the groundwater resource, it will advise the responsible parties and the PEP. If it considers that additional measures have not been implemented within a reasonable amount of time, the RMOW may initiate additional measures independently. This may be achieved by retaining an emergency response contractor, local subcontractors, and/or RMOW forces.

- Following appropriate review and assessment by the RMOW and our consulting professionals, the municipal production wells potentially affected by the spill may be put back into service. Where directed by the DWO, the RMOW will conduct additional monitoring of the well and water quality, or work with the responsible parties to ensure that sufficient data is collected.

- If a spill is the result of a release from RMOW operations or damaged or malfunctioning RMOW infrastructure (e.g., sewage release), the RMOW will respond. If this has occurred within a WPA, as appropriate, usage of wells nearest the spill site would be immediately suspended or limited by the RMOW pending a preliminary review of potential affects to the aquifer and well water quality by a Qualified Professional. Following appropriate review and/or assessment, the wells potentially affected may be put back into service. Where directed by the DWO, the RMOW will, with the assistance of our consulting professionals, conduct additional monitoring of the well and water quality.

Task No.	***Description***	***Completion***
21	*The Planning Team will review and revise the RMOW Water System Emergency Response Plan in consultation with internal and external agencies.*	*Q-3 2010*
22	*Seek Council approval of the revised Water System Emergency Response Plan, if Council approval is deemed necessary.*	*Q-1 2011*

5.3 Aquifer Contamination Response Plan

An Aquifer Contamination Response Plan will be authored in consultation with the Planning Team that will provide for procedures, contact information, and contingencies, in the event that contamination is detected in the testing results. This Planning Team will consider including the following elements in the detailed Aquifer Contamination Response Plan:

5.3.1 Response Planning For Water Supply Wells

The RMOW will monitor groundwater from operating municipal wells in accordance with the monitoring schedule described in Section 6, and if needed, will also conduct additional monitoring required as the result of a spill. All chemical and bacteriological analyses results will be transmitted to a third-party service (WaterTrax) who is responsible for storing the data and comparing the analyses results to maximum available concentrations and/or aesthetic objectives recommended by Health Canada. In the event that a parameter is out of compliance, the RMOW and the Drinking Water Officer are immediately informed. Upon being informed of a non-compliant analysis result, the RMOW will, in consultation with the DWO, respond as follows:

- If one or more non-compliant parameters exceed health-based maximum allowable concentration(s), operation of the well where the sample was obtained will be immediately suspended pending review of the result by the Drinking Water Officer. Following completion of appropriate review, retesting, and/or remedial work, the well may be put back into service. Where prescribed by the Drinking Water Officer, the RMOW will conduct additional monitoring of the well and water quality.

- If the non-compliant parameter exceeds an aesthetic based maximum allowable concentration; the RMOW will consult the DWO and solicit the opinion of professional consultants. Where in the opinion of the DWO, it is acceptable to continue use of the well, the RMOW will conduct additional monitoring of the well and water quality as directed by the DWO.

5.3.2 Response Planning For Monitoring Wells

The RMOW monitors groundwater quality at monitoring wells at various points within aquifers to provide "early" indications of changes to the groundwater characteristics. As needed, monitoring will also be conducted at existing or new monitoring wells required in response to an incident such as a spill, as dictated by the above-described Spill Response Plan. All chemical analyses results will be transmitted directly to the RMOW. Upon receipt, the RMOW will compare results of these water quality analyses to maximum allowable concentrations recommended by Health Canada. If one or more parameters exceed health-based maximum allowable concentration(s), advice will be sought from the DWO and RMOW professional consultants.

Task No.	***Description***	***Completion***
23	*The Planning Team will develop the detailed Aquifer Contamination Response Plan in consultation with internal and external agencies.*	*Q-3 2010*
24	*Seek Council approval of the Aquifer Contamination Response Plan, if Council approval is deemed necessary.*	*Q-1 2011*

6 Water Quality Monitoring

6.1 Objectives

This Plan includes water quality monitoring to assess water quality in the WPAs, and verify that contaminants of concern are not present at unacceptable levels in the groundwater pumped from wells. The data will also provide the RMOW and planning team with an indication on the effectiveness of various management strategies to limit the potential for groundwater contamination.

6.2 Monitoring Schedule

Table 2 details the monitoring schedules incorporated into this Plan. The schedule specifies monitoring locations, parameters to be analysed, and frequency of analysis. These are in accordance with recommendations provided by Piteau Associates, with supporting information to be provided in the soon-to-be-completed document entitled "Capture Zone Assessment and Survey of Potential Groundwater Pollution Hazards for Whistler B.C.". This schedule may be modified in the future if recommended by the RMOW's consulting professional.

6.3 Sampling Procedures

Groundwater sampling procedures, record-keeping and quality assurance measures, are summarised in Appendix 'B'. Generally, groundwater samples shall be taken by trained Utility Operators, who are familiar with the procedure.

6.4 Review and Reporting

As described previously, all chemical and bacteriological analyses results for groundwater from RMOW wells is automatically transmitted to a third-party service (WaterTrax) who is responsible for storing the data and comparing the analyses results to maximum allowable concentrations and/or aesthetic objectives recommended by Health Canada. In the event that a parameter is out of compliance, the RMOW and the Drinking Water Officer will be informed immediately.

Analysis Parameter(s)	Village				Function Junction							Alpine Meadows			Emerald Estates			Rainbow Park
	W205-1	W205-2	W205-3	W211	W212-1	W217	MW06-1	MW06-2	MW06-3	MW07-1	New Monitoring Well (note 5)	W202	W210	W213	W201-1	W201-2	W201-3	W218
Basic Potability(1)	1	1	1	1	1	1						1	1	1	1	1	1	1
Total Coliform and E.Coli bacteria	24	24	24	24	24	24					2	24	24	24	24	24	24	24
TDS, nitrate, ammonia						24[4]	1	1	1	1	2							
Benzene, Toluene, Ethylbenzene & Xylenes + VPH + MTBE	2	2	2	2								1	1	1				
Volatile Organic Compounds (VOC) + VPH + MTBE					1	1	1	1	1	1	1				1	1	1	1
Polycyclic aromatic hydrocarbons (PAH)	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Open characterization scan for organics															O	O	O	1
Pesticide/Herbicide Scan					1	1		1							O	O	O	1
Anion scan + metals							1	1	1	1	2							

1. Includes physical parameters (pH, EC, turbidity, TDS, hardness, colour), alkalinity, anions, nitrate/nitrite, ammonia, and metals.
2. "1" denotes one sample per year, "2" denotes twice per year (every six months), and "24" denotes two times per month.
3. "O" denotes one time only.
4. Additional sampling of groundwater from W217 for evidence of Groundwater Under the Direct Influence also required in accordance with construction/operating permits.
5. Monitoring well MW09-1 is required under the construction/operating permit for W217 and is scheduled to be constructed in 2009.

Table 2 – Groundwater Monitoring Schedule

Analysis results for samples from monitoring wells may be delivered directly to RMOW or to a consultant groundwater specialist, and may not be otherwise captured in the WaterTrax system. This Plan provides for the creation of a procedure that will ensure that these results will be reviewed and compared to maximum allowable concentrations recommended by Health Canada as soon as possible, and treated with the seriousness of source water supply sample results. If one or more of the parameters exceed health-based maximum allowable concentration(s), the result must be brought to the attention of the DWO, and if deemed necessary, the RMOW may seek the advice of professional consultants, to assist with evaluation of the potential source and magnitude of risk. If deemed necessary by the DWO, alterations to the monitoring schedule may be initiated. If deemed necessary by the RMOW and our consulting professionals, in consultation

with the DWO, elements of the Aquifer Containment Response Plan (See Section 5.3) may be activated.

All chemical and bacteriological data collected from RMOW production wells and monitoring wells will be summarized in the Annual Drinking Water Report prepared by the RMOW. Data from this report will be analyzed for trends in water quality to allow the RMOW to take further actions if recommended by our consulting professionals.

Task No.	***Description***	***Completion***
25	*Develop a comprehensive Monitoring Schedule for supply sources and monitoring wells*	*Complete – See Table 2*
26	*Develop Groundwater Sampling Procedures*	*Complete – See Appendix 'B'*
27	*Develop a procedure to identify and report parameter concentrations that exceed acceptable levels, in Monitoring Wells.*	*Q-3 2009*
28	*Amend the Annual Drinking Water Report to include results from Table 2 – Groundwater Monitoring Schedule.*	*Complete*

7 Planning Team – Terms of Reference and Procedures

7.1 Objectives

To facilitate community involvement, this Plan includes the formation of a Planning Team to monitor and guide the Groundwater Resource Protection activities in Whistler. The objectives of the Planning Team will be to review ongoing well protection activities undertaken by the RMOW, and to assess whether the Plan is achieving its goals. Where appropriate, the Planning Team will make recommendations with respect to changes to the Plan or associated procedures.

7.2 Membership and Organisation

The Planning Team will be led by one or more representatives from the RMOW. Other members may include Environmental Health or Drinking Water Officers (e.g., EHO or DWO), representatives of the local business and/or Chamber of Commerce, outdoor recreation groups, private water purveyors (i.e., Van West), community groups, and various provincial ministries.

7.3 Funding

The RMOW will provide a venue for meetings, record and disseminate minutes of meetings, and provide other materials needed to facilitate the activities of the Planning Team. With the exception of employees of the RMOW (and/or their consultants), the RMOW will offer no direct compensation to members of the Planning Team.

7.4 Evaluation of the Plan

The Planning Team will meet on an annual basis, or as appropriate, to review the Plan and make recommendations to the RMOW with respect to changes to the Plan. The Terms of Reference for the Planning Team will include:

- Assisting in the review of the various bylaws, plans, procedures and policies outlined in this Plan;
- Reviewing RMOW efforts to promote public awareness regarding stewardship of groundwater resources at Whistler;

- Providing advice to staff regarding proposed future activities or developments within WPAs to ensure that the objectives of this Plan are adhered to;
- Receiving summary reports from RMOW staff related to periodic testing of the groundwater quality, and reviewing RMOW responses to anomalous or unacceptable results;
- Reviewing summary reports from RMOW staff related to incidents in WPAs ;
- Reviewing community input with respect to the Plan; and
- Making recommendations to the RMOW with respect to changes to the Plan and/or associated groundwater protection issues.

Task No.	***Description***	***Completion***
29	*Assemble and conduct the initial meeting of the Planning Team*	*Q-3 2009*
30	*Conduct Annual Meetings of the Planning Team*	*Ongoing*

8 Implementation Schedule

This Plan contains various elements, some that are already complete, and some that will necessitate significant community consultation. Other elements, such as bylaws, policies, and procedures, will require Council approval, with other elements being ongoing tasks. The significant elements of this Plan are presented throughout the body of this Plan in the task boxes within each section. They are presented again below in a consolidated manner.

Table 3 – Consolidated Task List

Task No.	***Description***	***Completion***
1	*Complete the report entitled "Capture Zone Assessment and Survey of Potential Groundwater Pollution Hazards for Whistler B.C."*	*Q-1 2009*
2	*Prepare an amending bylaw to the OCP that will replace the existing mapping with the revised information.*	*Q-4 2009*
3	*Identify potential groundwater pollution areas of concern within the WPAs.*	*Completed*
4	*Evaluate the risk from each of the land uses identified in the Inventory exercise.*	*Completed – See Appendix 'A'*
5	*Development of the Community Consultation Plan.*	*Q-4 2009*
6	*Identification of test wells, piezometers and monitoring wells that require decommissioning.*	*Q-1 2009*
7	*Prepare a workplan for elements that require decommissioning, and incorporate it into the Municipal budget process.*	*Q-3 2009*
8	*Assist the Province in the Development of a communication strategy for privately controlled wells requiring decommissioning.*	*Q-3 2009*
9	*Continue to support the Province and Vancouver Coastal Health with groundwater protection matters.*	*Ongoing*

Table 3 – Consolidated Task List (continued)

Task No.	***Description***	***Completion***
10	*Review Waterworks and Sewerage Area Bylaws and draft the required mapping and text amendments.*	*Q-2 2010*
11	*Seek Council approval of the above-mentioned amendments.*	*Q-3 2010*
12	*Complete mapping amendment to identify the newly identified WPAs.*	*Complete*
13	*Compose revised text for the OCP that will support the objectives of the Plan.*	*Q-3 2010*
14	*Conduct consultation with the public, as directed by Council.*	*Q-4 2010*
15	*Return to Council with the results of the Consultation, and seek approval of the amendments.*	*Q-1 2011*
16	*Seek Council approval of the above-mentioned amendments.*	*Q-1 2011*
17	*Compose revised text for the Zoning Bylaw that will support the objectives of the Plan.*	*Q-3 2010*
18	*Request Council input with respect to the above-mentioned amendments.*	*Q-1 2011*
19	*Conduct consultation with the public, as directed by Council.*	*Q-1 2011*
20	*Return to Council with the results of the Consultation, and seek approval of the amendments.*	*Q-2 2011*
21	*The Planning Team will review and revise the RMOW Water System Emergency Response Plan in consultation with internal and external agencies.*	*Q-3 2010*
22	*Seek Council approval of the revised Water System Emergency Response Plan, if Council approval is deemed necessary.*	*Q-1 2011*

Table 3 – Consolidated Task List (continued)

Task No.	***Description***	***Completion***
23	*The Planning Team will develop the detailed Aquifer Contamination Response Plan in consultation with internal and external agencies.*	*Q-3 2010*
24	*Seek Council approval of the Aquifer Contamination Response Plan, if Council approval is deemed necessary.*	*Q-1 2011*
25	*Develop a comprehensive Monitoring Schedule for supply sources and monitoring wells.*	*Complete – See Table 2*
26	*Develop Groundwater Sampling Procedures.*	*Complete – See Appendix 'B'*
27	*Develop a procedure to identify and report parameter concentrations that exceed acceptable levels, in Monitoring Wells.*	*Q-3 2009*
28	*Amend the Annual Drinking Water Report to include results from Table 2 – Groundwater Monitoring Schedule.*	*Complete*
29	*Assemble and conduct the initial meeting of the Planning Team.*	*Q-3 2009*
30	*Conduct Annual Meetings of the Planning Team.*	*Ongoing*

DWG. NUMBER: K:/2482/cadd/2482-029.Dwg (Fig 1)

EMERALD ESTATES
ALPINE MEADOWS
RAINBOW PARK
FUNCTION JUNCTION
CREEKSIDE
WHISTLER VILLAGE
AREA SHOWN IN FIG. 2
Green Lake
Alta Lake
Lost Lake
391 IIIC (9)
389 IIIC (12)
388 IIB (12)
389 IIIC (10)
392 IIIC (10)
387 IIB (12)
394 IIIB (8)
395 IB (12)
393 IB (12)
UC

Legend

- RMOW Well Location
- Private Well Location
- RECOMMENDED WELL PROTECTION AREA

Potential Point Source Groundwater Area of Concern:

- 7

Potential Linear Groundwater Area of Concern:

- Railway
- Highway 99

Aquifer Classifications:

387 IIB (12)
- MOE Priority Ranking
- Vulnerability Class
- Development Class
- Aquifer Number

UC — Vulnerability Class

Unconsolidated Aquifer Vulnerability:

- High Vulnerability (highly vulnerable to contamination from surface sources)
- Moderate Vulnerability (moderately vulnerable to contamination from surface sources)
- Low Vulnerability (not very vulnerable to contamination from surface sources)
- Unclassified

Bedrock Aquifer Vulnerability:

- Low Vulnerability

500 0 500
Scale in Metres

NOTES:

1. MAPPING AND AQUIFER VULNERABILITY RATING BY MINISTRY OF ENVIRONMENT.
2. SEE APPENDIX A FOR DESCRIPTION OF GROUNDWATER AREAS OF CONCERN.

WHISTLER

AQUIFERS AT WHISTLER, WELL PROTECTION AREAS AND AREAS OF CONCERN

BY:	APPROVED:	DATE:		FIG:
		DEC. 08		1

DWG. NUMBER: K:\2482\cadd\2482-028.dwg (Fig 2)

FUNCTION JUNCTION
COMMERICAL/INDUSTRIAL
CENTRE

VAN WEST
2-92

VAN WEST
1-79

VAN WEST
3-96

MW07-1

MW06-1

SPRING CK.
TEST WELL
4-01

ALPHA CK. WELL
("ZEN WELL")
2-92

MILLAR CREEK

MW06-2

W212-1
TEST WELL
1-99

W212-2 (NOT IN USE)

TW06-3

ALPHA LK. ROAD

HWY 99

CN RAIL

HIGHWAY 99

TW06-1

MW06-3

TW07-1

TW06-2

RMOW
2-90

RMOW
1-76

TW07-2

W217

WASTE WATER
TREATMENT
PLANT

CHEAKAMUS RIVER

CHEAKAMUS LAKE ROAD

OLYMPIC ATHLETES VILLAGE

1 2/53 3 4 5 6 7 8 9 10 26 27 37/55 45/54

LEGEND

- WATER WELL OR TEST WELL
- RMOW SUPPLY WELL
- PLANNED MONITORING WELL
- EXISTING MONITORING WELL
- 27 POTENTIAL POINT SOURCE GROUNDWATER AREA OF CONCERN (SEE APPENDIX A)
- WELL PROTECTION AREA

NOTE

1. ALL LOCATIONS APPROXIMATE.

0 100 200 300 400 500m

SCALE 1:7500

WHISTLER

WELL PROTECTION AREA AND AREAS OF CONCERN AT FUNCTION JUNCTION

BY:	APPROVED:	DATE:		FIG:
		DEC. 08		2

APPENDIX A

APPENDIX A

SUMMARY OF POTENTIAL GROUNDWATER AREAS OF CONCERN AT WHISTLER

MAP ID	SOURCE ACTIVITY	OWNER/ OPERATOR CONTACT INFO	POTENTIAL CONTAMINANTS	STORAGE PRACTICES & ESTIMATED QUANTITIES	DATE	SPATIAL REFERENCE	COMMENTS	PRIORITY RANKING	WITHIN WELL PROTECTION AREA	PROPOSED MANAGEMENT OPTION
1	Concrete Plant	Cardinal Concrete 604-932-3814	PHCs, metals, solvents	Diesel AST (2,500L)	1973 to Present	1310 Alpha Lk Rd (Function Junction)	Hydrocarbon spill at Cardinal Concrete in July 2007.	medium	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
2	Auto Repair/ Snow Dumping	Mountain Paint and Supply 604-938-1213	PHCs VOCs, metals	Paint Solvent Quantities not available	1993 to Present	110-1055 Millar Ck Rd (Function Junction)	Special waste temporarily stored on site in October 2003. Contained 3 - 5.5% oils and hydraulic fluid. (See #53)	low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
3	Vehicle Repair/ Snow Dumping	Coastal Mountain Excavations 604-932-5469	PHCs Metals, glycols, salt	Waste Oil AST (1500L) Road Salt (40 tonnes)	1983 to Present	1015 & 1045 Millar Ck Rd (Function Junction)	$50m^3$ of diesel contaminated soil removed from the ground on April 29, 2003. Soil was stockpiled on site prior to transfer to approved facility. Contamination was related to leakage of diesel from an AST.	low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
4	Dry Cleaning	Dual Mountain Cleaners 604-932-3400	VOCs (perchlorethylene, trichlorethylene, cis 1,2 di-chlorethylene, vinyl chloride)	PCE (250 L)	1990 to Present	3-1380 Alpha Lk Rd (Function Junction)	Previously located at 101-2011 Innsbruck (Creekside)	high	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
5	Auto Repair	Newman Automotive	PHCs Metals, glycols		2001 to 2003	6-1208 Alpha Lk Rd (Function Junction)		medium	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
6	Auto Repair	Autopro & Local Automotive Co Ltd 604-932-5760	PHCs Metals, glycols	Waste Oil UST (3750L) Coolant Drum (200L)	1992 to Present	1090 Millar Ck Rd (Function Junction)		low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
7	Auto Repair	Sea to Sky Automotive	PHCs Metals, glycols		2001 to 2003	3-1040 Millar Ck Rd (Function Junction)		low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
8	Auto Service	Mountain Motors & Wireless 604-938-1999	PHCs Metals, glycols	Waste Oil AST (1000L) Coolant Drum (200L)	2002 to Present	1216-A Alpha Lk Rd (Function Junction)		low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
9	Auto Repair Auto Painting	SMD Automotive 604-932-5347	PHCs Metals, glycols	Waste Oil AST's (2000L) Coolant Drums (800L) Solvent Pails (100L)	2001 to 2003	1209 Alpha Lk Rd (Function Junction)	Previously located at Husky Station (Creekside)	medium	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
10	Machine Shop	Proteck Industries 604-932-6848	PHCs Metals, glycols	Waste Oil (200L) Solvent (80 L)	1990 to Present	1337 Alpha Lk Rd (Function Junction)		high	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
11	Gas Station/ Auto Repair/ Waste Oil Storage	Petro Canada	PHCs, MTBE, glycols, metals	UST's present	1968 to Present	2010 London Lane (Creekside)	Significant groundwater contamination with PHCs, remediation underway	low	No	n/a
12	Gas Station/ Auto Repair/ Waste Oil Storage	Husky	PHCs, MTBE, Glycols, metals	UST's present	1972 to Present	2101 Lake Placid Rd (Creekside)	Notice of independent remediation in September 2002 indicates PHCs contaminated soil removed from site.	medium	No	n/a
13	Machine Repair & Maintenance	Alta Engineering & Contracting Services	PHCs		1982 to 1985	2000 Lake Placid Rd (Creekside)	1978-1982- 4 Tyrol Cres	medium	No	n/a
14	Fuel Storage	Whistler- Blackcomb Temporary Fuel Storage for World Cup	PHCs, MTBE,	Former AST's	Mid to Late 1990's	End of Nordic Drive (Creekside)	Documented Spills (Remediated) 100L diesel (Soil Remediated) 29 tonnes Waste Oil Contaminated Soil was removed (both in 1998)	medium	No	n/a
15	Heliport	Okanagan Helicopters	PHCs	Former AST	1981 to 1983	2290 London Lane (Creekside)		medium	No	n/a
16	Dry-cleaning	Dual Mountain Cleaners	VOCs (perchlorethylene, trichlorethylene, cis 1,2 di-chlorethylene, vinyl chloride)		1984 to 1990	101-2011 Innsbruck (Creekside)	moved to Function Junction in 1990	high	No	n/a
17	Fuel Storage	Whistler- Blackcomb Blackcomb Valley Shop	PHCs	UST removed in 2003 Waste Oil Drums Solvent Drums	1982 to present	4553 Blackcomb Way (near Whistler Village)	Known soil & possibly groundwater contamination present, detailed site investigation underway	low	Yes (Village)	Monitor for PCOCs at wells
18	Impound Lot	RMOW	PHCs Metals		1992 to present	Parking Lot 4B (Village)		low	Yes (Village)	Monitor for PCOCs at wells
19	Snow Dumping	RMOW	PHCs Metals		1992 to present	Parking Lot 4B (Village)		low	No	Monitor for PCOCs at wells
20	Heliport	Okanagan Helicopters	PHCs		1986 to 1994	Top of Glacier Rd (Where sign shop is) (Village)		low	Yes (Village)	Monitor for PCOCs at wells
	Former Alta Lk.	Alta Lk/ RMOW	Metals, nutrients (ammonia,		1962	Lower Village West	Most of landfill material removed			

APPENDIX A

SUMMARY OF POTENTIAL GROUNDWATER AREAS OF CONCERN AT WHISTLER

MAP ID	SOURCE ACTIVITY	OWNER/ OPERATOR CONTACT INFO	POTENTIAL CONTAMINANTS	STORAGE PRACTICES & ESTIMATED QUANTITIES	DATE	SPATIAL REFERENCE	COMMENTS	PRIORITY RANKING	WITHIN WELL PROTECTION AREA	PROPOSED MANAGEMENT OPTION
22	Automobile parking	Day Skier Parking Lot Intrawest	PHCs Metals, glycols		1981 to Present	Blackcomb Way		medium	Yes (Village)	Monitor for PCOCs at wells
23	Heliport	Tasman Helicopters	PHCs		1981 to 1987	Across Hwy 99 from Meadow Parks Sports Centre (Alpine Meadows area)		low	Yes (Alpine)	Monitor for PCOCs at wells
24	Arena/ Pool	Meadow Park Sports Centre	Brine Ammonia	350L Liquid Chlorine Secondary Containment	1995 to Present	8107 Camino Drive (Alpine Meadows area)		low	Yes (Alpine)	Monitor for PCOCs at wells
25	Landfill		Metals, nutrients (ammonia, nitrate), PHCs, VOCs, other	unknown	Early to Mid 1990's	Emerald Estates		medium	Yes (Emerald Estates)	Monitor for PCOCs at wells
26	RMOW Municipal Landfill	RMOW	could include metals, nutrients, PHCs, VOCs, etc.		1975 to Present	1401 Cheakamus Lk Rd (Function Junction)		low	No	n/a
27	RMOW Waste water treatment plant	RMOW	Bacteria, viruses, other pathogens, PHCs	Ferrous Chloride AST (40 000L) Chlorine Gas (3 tonnes) Sulphur Dioxide Gas (3 tonnes) Small Amounts of Laboratory Chemicals Diesel AST (4000L)	1987 to Present	1001 Hwy 99 (Function Junction)	This site was also previously used as the RMOW Works Yard. Approximately 9 years ago a furnace oil UST was removed from the site. No soil impacts were noted.	high	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
28	Industrial Equipment Storage and Maintenance	Sabre Excavating/ Barney's Automotive	Glycols, metals, PHCs		1950 to Present	Mons Crossing	Site was previously occupied by Valleau Logging, and other various industrial activities.	low	No	n/a
29	RMOW Works Yard	RMOW	PHCs Glycols, metals Road Salts	UST's AST's	1990 to Present	8001 Hwy 99	Fertilizers, lime, road salt also stored on site	low	No	n/a
30	Rainbow Substation	BC Hydro	PHCs PCB's Roundup, Girlon 4		?? to Present	Adjacent to RMOW Works Yard (between Village & Mons)	Located adjacent to RMOW Works Yard (8001 Hwy 99) Herbicides applied annually Insulation oil in transformers, no fuel storage on site.	low	No	n/a
31	Capilano Highways Yard	Main Road Howe Sound Contracting (Current occupants of site)	PHCs road salt	Diesel AST- unknown volume Road Salt (100m^3) MgCl (6000L)	?? to Present	3000 Hwy 99 (between Creekside & Village)	Fuel Storage/ vehicle maintenance	low	No	n/a
32	RMOW Recycling Facility	RMOW	Metals		199? to Present	8001 Hwy 99 (between Village & Mons)	Small amounts of batteries stored on site (removed regularly)	low	No	n/a
33	Old Ski Rainbow site	Ski Rainbow	PHCs, Glycols, metals		196? to 198?	8900 Hwy 99 (Alpine Meadows area)	Site has been used for various industrial activities (mechanics etc.)	low	No	n/a
34	Manufacturing Railway Ties	Rainbow Lumber Co.	PHCs PAH compounds (creosote)		1945 to mid 60's	South end of Alta Lake	Some equipment/ debris still on site.	low	No	n/a
35	Wood Processing	Lost Lake Mill	PHCs		Early 1940's	North end of Lost Lake		low	No	n/a
36	Sawmill	Jaswan Singh Lumber Co	PHCs		1936 to 1945	End of Lormier Rd (Alpine Meadows area)		low	No	n/a
37	Dry Cleaning	Sky Blue Laundry and Dry Cleaning Ltd.	VOCs (perchlorethylene, trichlorethylene, cis 1,2 di-chlorethylene, vinyl chloride)		1985 to 1990	2272 Alpha Lk Rd (Function Junction)	Only listing is 1985	high	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
38	Auto Service	Alpine Meadows Discount Rainbow Towing	PHCs Glycols, metals		1978 to 1983	8194 Parkwood (Alpine Meadows area)		low	Yes (Alpine)	Monitor for PCOCs at wells
39	Aggregate Supply	Alpha Lake Aggregates	PHCs, Metals		1978 to 1982	8545 Drifter Way		low	Yes (Alpine)	Monitor for PCOCs at wells
40	Auto Repair	Jackson Bros Towing	PHCs Glycols, metals		1977 to 1981	Valley Drive (Alpine Meadows area)		low	Yes (Alpine)	Monitor for PCOCs at wells
41	Golf Course Operations	Nicklaus North Golf Course	PHCs Roundup, Killex Nutrients (Fertilizer)	2 AST's Present (gas/ diesel) <18L Roundup/ Killex used per year	1995 to Present	8080 Nicklaus North Blvd	Fuel Stored at 8070 Mons Rd	low	No	n/a

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MAP ID	SOURCE ACTIVITY	OWNER/ OPERATOR CONTACT INFO	POTENTIAL CONTAMINANTS	STORAGE PRACTICES & ESTIMATED QUANTITIES	DATE	SPATIAL REFERENCE	COMMENTS	PRIORITY RANKING	WITHIN WELL PROTECTION AREA	PROPOSED MANAGEMENT OPTION
43	Chateau Whistler Golf Course	Chateau Whistler Golf Course 1-877-238-2092	PHCs Fertilizers/ Herbicides Killex, Roundup	2 AST's Present (gas/ diesel) Spot applications of Roundup/ Killex (small amounts)	?? to Present	4612 Blackcomb Way		low	No	n/a
44	Seaplane Base	Seaplane Base	PHCs		?? to Present	south side of Green Lake		low	No	n/a
45	Diesel Spill	Forestland Industries (formerly Malloch and Mosley)	PHCs	1500L diesel spill in 1992 200L absorbed, 30m^3 contaminated soil removed	February 20 1992	BC MOE Site ID 1480 (Function Junction)	Spill on Millar Creek Rd Contaminated soil relocated immediately to landfill	low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
46	Paving Contractor	Black Tusk Paving	PHCs	unknown	1978 to 1979	5 Pine Tree Place (Emerald Estates)		low	Yes (Emerald)	Monitor for PCOCs at wells
47	Heliport	Corporate Helicopters Pacific Helicopters	PHCs	unknown	1980 to 1983	9007 Summerlane (Emerald Estates)	Listed in directory search (can't confirm location)	low	Yes (Emerald)	Monitor for PCOCs at wells
48	Sawmill/ Logging Camp	Parkhurst Mill	PHCs		1923 to 1966	Across Green Lake from Emerald Estates		low	No	n/a
49	Cemetery	Whistler Cemetery	Metals (mercury, arsenic), formaldehyde		?? to Present	Alta Lake Road at 21 Mile Creek		low	Yes (Rainbow Park PW08-1)	Monitor for PCOCs at wells
50	Paint Sales	Whistler Hardware	PHCs, metals, non-chlorinated solvents	Paint (100L in 1L cans) Solvent (20L in 1L jugs)	1982 to Present	4305 Skiers Approach (Village)		low	Yes (Village)	Monitor for PCOCs at wells
51	BC Hydro Spill	BC Hydro	PHCs	500L of Transformer Oil (<2ppm PCB) Spilled on March 24, 2003	March 24 2003	Creekside		medium	No	n/a
52	Train wreck		Unknown		?	1 km southwest of Function Junction	Railcar hulks from historic derailment	low	No	n/a
53	Fuel Storage/ Bus Maintenance	Whistler Transit 604-932-4020	PHCs Metals, glycols	Diesel? Waste Oil AST (15 000/ 800L) Waste Oil Drums (200L) Coolant Drum (200L)	1993 to Present	101-1055 Millar Ck Rd	Special waste temporarily stored on site in October 2003. Contained 3 - 5.5% oils and hydraulic fluid.	low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
54	Logging Operations	Malloch and Mosley (Most Recent Operators)	PHCs		1960? to 1985	Millar Ck Rd		medium	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
55	Auto Service	Jensen Automotive	PHCs Metals, glycols		1983 to 1984	3-2274 Alpha Lk Rd		low	Yes (Function Junction)	Monitor for PCOCs at wells and monitoring wells
Not in Map Area	Blackcomb and Whistler Alpine Shops and Fuel Depots	Intrawest	PHCs	UST's AST's	66/80 to Present		Small amounts of waste oil, antifreeze and hydraulic oil	low	No	n/a
Linear Source	Railway	CN Rail	Hazardous materials from derailments, spills, etc.		Mid 1940's Present		Other than #52, no derailments or spills have occurred in Whistler area. Herbicides/ pesticides not applied along railway	high	Yes (Function Junction, Rainbow Park)	Shut off wells potentially impacted by spill, monitor CN spill response (see Secton 5.1)
Linear Source	HIGHWAY 99		Road salt, metals PHCs from spills and runoff		Early 1960's to Present		No known major spills have occurred on HWY 99 in Whistler area Herbicides/ pesticides not applied along Hwy 99.	high	Yes (Function Junction, Alpine Estates, Emerald Estates)	Monitor wells and monitoring wells for PCOCs (road salt). If spill occurs on highway, shut off potentially impacted wells & monitor response (see Section 5.1)
Area Source	Residential Lawn and Garden Care		Fertilizers/ Herbicides	High nitrogen fertilizers applied in most areas, spot applications of Killex and Roundup.	1960's to Present	Residential Areas		low	Yes (all)	Monitor for PCOCs at wells and monitoring wells
Area Source	Sewage disposal to on-site disposal fields at Emerald Estates		Bacteria, nitrates, other pathogens		Early 80's to Recent	Area Source	On-site sewage disposal recently phased out.	low	Yes (Emerald Estates)	Continue monitoring wells for PCOCs including bacteria & nitrates

APPENDIX B

PROCEDURES FOR WEEKLY H2O SAMPLES

IN THE OFFICE

- Choose WEEK 1 or WEEK 2 alternating from the previous week, and photocopy the results form for the correct week
- Collect requisition forms corresponding to the sample sites for WEEK 1 or WEEK 2
- Match the Water Trax labels for each of the sample sites with the corresponding requisition form

In addition to paperwork you will need:

- 20 or so plastic 200ml. bacteriological sample bottles (sealed)
- pH meter
- thermometer
- Cl2 residual analyzer (check powder pillows)
- a mini torch for disinfection
- a brass utility hand pump for draining Kupferle sample stations
- bags and elastics to wrap up the samples
- a cooler and ice packs to store samples
- portable turbidimeter (2100P)

IN THE FIELD

NOTE: THERE ARE FOUR TYPES OF SAMPLING SITES

- Kupferle sampling stations with drain (green box)
- Copper goosenecks within a building
- Electrical box with hose bibs
- Grab samples at the intakes

Upon arriving at any sampling site start by running sample port while filling out the requisition form with:

- Sampler's Name
- Date/Time Collected
- Fill out the label on the 200ml. bacteriological sample bottle with site name and RMOW plus your initials

Guidelines for running time of water source before sampling

Distribution system – run tap for 3-5 min or more depending on temperature (colder is better!)
Wellheads – run well for at least 5 min. and run the sample site tap long enough to clear the still water in the line
Surface Water – hold bottle near base, plunge into source turning mouth upstream, or push bottle horizontally away from you

Upon finishing at any sampling site be sure to fill out the requisition form with:

- Free Cl2 Residual
- PH value
- Turbidity value

- Record the temperature on the results form

NOTE: WHEN FINISHED AT ANY WELL OR PUMP SITES, RETURN HOA SWITCHES TO NORMAL POSITION AND CHECK PANELS, BEING SURE TO CLEAR ANY PUMP FAULTS ETC.

Kupferle sampling stations:

- Unlock cover
- Disinfect with the mini torch the spout of the sample station
- Open valve enough to flush water through so you are getting your sample from the mainline (2-3 min should be sufficient but may take up to 10 min)
- Using thermometer, test the temperature (this will help to indicate if you are at the main – colder is better!)
- Using pH meter, test the pH (waiting until the meter has completely stabilized)
- Fill turbidity sample cell to the white line and test for turbidity using the portable turbidimeter
- Fill Cl2 sample cells to the white line (10ml.) and test for Cl2 with the residual analyzer (be sure to rinse cells thoroughly)
- Fill the plastic 200ml. Bacteriological sample bottles to the 200ml. mark on the bottle being careful not to overfill or splash around the rim of the bottle (this may cause a false positive in the results)
- Package sample bottle and paperwork into a bag and put into the cooler with the ice packs
- Close valve, pump out the small copper line with the brass utility hand pump, and lock up the sampling station when done

Copper goosenecks within a municipal building:

- Enter building being sure to disarm the alarm panel
- Locate and disinfect the copper gooseneck with the mini torch
- Open valve enough to flush water through so you are getting your sample from the mainline (it may take longer with the gooseneck design as the line is smaller)
- Using thermometer, test the temperature (this will help to indicate if you are at the main – colder is better!)
- Using pH meter, test the pH (waiting until the meter has completely stabilized)
- Fill turbidity sample cell to the white line and test for turbidity using the portable turbidimeter
- Fill Cl2 sample cells to the white line (10ml.) and test for Cl2 with the residual analyzer (be sure to rinse cells thoroughly)
- Fill the plastic 200ml. bacteriological sample bottles to the 200ml. mark on the bottle being careful not to overfill or splash around the rim of the bottle (this may cause a false positive in the results)
- Shut off the gooseneck valve when you are done
- Package sample bottle and paperwork into a bag and put into the cooler with the ice packs
- Lock and alarm the station

Electrical boxes with hose bibs:

- Unlock electrical box on the outside of the building (you need a special key for these boxes)
- Disinfect with a mini torch the copper spout in the sampling site
- Open hose bib and flush water (may take 10-15min. as these sites as they are connected to the water lines inside the heated building)
- Using thermometer, test the temperature (this will help to indicate if you are at the main – colder is better!)

- Using pH meter, test the pH (waiting until the meter has completely stabilized)
- Fill turbidity sample cell to the white line and test for turbidity using the portable turbidimeter
- Fill Cl2 sample cells to the white line (10ml.) and test for Cl2 with the residual analyzer (be sure to rinse cells thoroughly)
- Fill the plastic 200ml. Bacteriological sample bottles to the 200ml. mark on the bottle being careful not to overfill or splash around the rim of the bottle (this may cause a false positive in the results)
- Package sample bottle and paperwork into a bag and put into the cooler with the ice packs
- Shut down the hose bib and lock up the electrical box

Grab samples at the intakes:

- Unlock building being sure to disarm the alarm panel
- At 21 Mile creek intake, the sample site is off the ladder on the left side when you walk into the screen room
- At Alpine intake the sample site is in the second gallery right beside the screen
- At Blackcomb intake the sample site is off the ladder right at the intake weir
- Using thermometer, test the temperature
- Using the pH meter, test the pH
- Fill the plastic 200ml. bacteriological sample bottle to the 200ml. mark, being sure not to overfill or splash around the rim of the bottle
- Observe what the feeding Cl2 is in the chlorine room and record that number on the results form for the corresponding site
- Observe what the turbidity reading is on the stationary turbidimeter in the control room
- Package sample bottle and paperwork into a bag and put into the cooler with the ice packs
- Lock and alarm the station when done

Once all sampling and testing has been done at all sampling sites:

- Drop off all of the packaged bacteriological samples at the Whistler Health care centre, in the upstairs offices, by 14:15pm
- From there, the samples are picked up and delivered by Loomis
- Back at the office update Water Trax with the new data collected
- One week later, download the results through Medinet, view the results, and record them on the weekly water report

APPENDIX C

Descriptions of Success – All Strategies –

The description of success defines what success will look like within each strategy area by the year 2020. These statements guide task force and community-wide action planning as Whistler moves toward continued success and sustainability in the future.

Arts, Culture & Heritage

In 2020, Whistler is renowned for world-class arts, cultural and heritage opportunities that have become a part of Whistler's spirit and community life. They are creative, authentic and diverse, sustainable, accessible and affordable to both residents and visitors. By this time:

1. The community is passionate about arts, culture and heritage, which have become a part of Whistler's spirit and community life, and alive with creative energy and aesthetic appreciation
2. A range of authentic and creative arts, cultural and heritage opportunities are meaningful, accessible and financially affordable to residents and visitors
3. Arts, cultural and heritage opportunities attract visitors and contribute to the experience and local economy
4. Whistler's people and history, the natural environment and First Nations culture are retained, celebrated and reflected through authentic and diverse offerings
5. Local and regional heritage, culture and community spirit are shared locally and beyond Whistler
6. Arts, culture and heritage, and their local creators and contributors, are appreciated and supported as cornerstones of the resort community's health, vitality and economic prosperity
7. Whistler is renowned for world-class arts, cultural and heritage opportunities and has become a magnet for international artists who come here to perform, create, teach and be inspired
8. There is a physical and organizational focal point for the diversity of arts, culture and heritage activities that spread throughout the community
9. Ecologically harmful substances and practices are replaced with more sustainable alternatives

Built Environment

In 2020, Whistler's built environment is vibrant, reflects the community's character, contributes to individual health and wellbeing, and is moving toward its identified sustainability objectives. By this time:

1. Limits to growth are understood and respected
2. The built environment is attractive and vibrant, reflecting the resort community's character, protecting viewscapes and evoking a dynamic sense of place
3. Visitors and residents can readily immerse themselves in nature, free from noise and light pollution
4. To maintain vibrancy, Whistler Village is the core of the resort community
5. Community spaces encourage personal interaction and shared activities
6. The built environment is safe and accessible for people of all abilities, anticipating and accommodating wellbeing needs and satisfying visitor expectations
7. Continuous encroachment on nature is avoided
8. Residents live, work and play in relatively compact, mixed-use neighborhoods that reflect Whistler's character and are close to appropriate green space, transit, trails, amenities and services
9. Building design, construction and operation is characterized by efficiency, durability and flexibility for changing and long-term uses
10. The new and renovated built environment has transitioned towards sustainable management of energy and materials
11. Landscaped areas consist of native plant species that eliminate the need for watering and chemical use
12. Streamlined policies, regulations and programs have helped to efficiently and effectively achieve green development
13. Building ownership is structured to continually encourage transition toward a flexible and improved built environment over time
14. Whistler's green building sector contributes to the local economy
15. Smart growth policies and initiatives contribute to the financial health of the community
16. Whistler is globally recognized as a centre of excellence in sustainable community development

Economic

In 2020, Whistler has a healthy and unique tourism economy that provides a quality of life, which attracts and retains community members. By this time:

1. Whistler has a diversified and year-round tourism economy
2. The Whistler economy provides opportunities for achieving competitive return on invested capital
3. Whistler's tourism economy is progressive and ensures the highest and best use of limited financial, social and natural resources in the long-term
4. Whistler proactively seizes economic opportunities that are compatible with tourism, and effectively adapts to changing external conditions
5. Locally owned and operated businesses thrive and are encouraged as an essential component of a healthy business mix
6. Whistler holds competitive advantage in the destination resort marketplace as a result of its vibrancy and unique character, products and services
7. Products and services that offer high net value to users drive Whistler's economic activities
8. A skilled workforce supports the local economy, and the local economy supports the skilled workforce
9. Physical and social infrastructure attract and support work and investment
10. Whistler's core accommodation base and long-term investments made in the community are protected
11. Effective partnerships with government and tourism organizations support economic health
12. The Whistler community shares resources and works together to compete in the destination resort market
13. Whistler is an integral part of the region's economy and works collaboratively with stakeholders

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Energy

In 2020, Whistler's energy system is reliable, flexible and moving toward our sustainability objectives. By this time:

1. Whistler's energy system is supplied by a mix of sources that are local and regional wherever possible
2. Whistler's energy system maximizes economic opportunities within the energy sector, and optimizes a balance between increasing energy efficiency and generating new supply
3. The energy system is continuously moving towards a state whereby a build up of emissions and waste into air, land and water is eliminated
4. The energy system is continuously moving towards a state whereby the net physical impact to land and water ecosystems is eliminated
5. Community energy needs are met reliably and equitably
6. Whistler's energy system is transitioning to renewable energy sources
7. Energy is generated, distributed, and used efficiently, through market transformation, design, and appropriate end uses
8. Residents, businesses and visitors understand energy issues
9. Whistler's actions will positively influence other communities' and stakeholders' movement toward sustainability

Finance

In 2020, Whistler lives within its financial means and has the appropriate financial tools to meet the current and future needs of the resort community. By this time:

1. Whistler lives within its financial means
2. The resort community effectively and efficiently balances its costs and expenditures
3. The cost of maintaining the resort community is shared
4. Resort community partners work together to identify shared spending priorities, share resources, and leverage funds and financing opportunities
5. Resort community partners align their financial planning
6. Senior levels of government recognize the value of the resort community and support its success
7. Whistler has a healthy economy that generates revenue to contribute to the resort's funding base
8. Financial principles, practices and tools employed by both the public and private sectors encourage behaviour that moves Whistler toward success and sustainability
9. The long-term consequences of decisions are carefully considered
10. Common evaluation criteria are used to assess actions and spending priorities, ensuring that all resource allocations strategically move Whistler toward its vision

Health & Social

In 2020, Whistler organizations work together to meet the physical, mental, spiritual, cultural and social needs of community members and visitors. By this time:

1. Community members and visitors maintain and improve their physical, mental, spiritual and social health through prevention and treatment services
2. Community members and visitors learn about and enjoy experiences with other cultures and generations through activities and events
3. Community members understand and respect diverse views and are encouraged to do so through a variety of initiatives
4. Chemical-free, organically-grown food produced in the Sea-to-Sky Corridor is available year-round at a price affordable to community members
5. Community members and visitors are civil and law abiding, and they respect each other's physical space and emotional boundaries
6. Community members eat healthy food, exercise and engage in leisure and other stress relieving activities that assist in preventing illness and they avoid the abusive use of substances that evidence indicates have negative effects on physical and mental health
7. The resort community is safe for both visitors and residents, and is prepared for potentially unavoidable emergency events
8. Whistler is accessible and inclusive for community members and visitors with disabilities
9. Whistler organizations and stakeholders work together to meet the health and social needs of community members and visitors
10. Community members accept responsibility for their own health, and that of other members of the community, by participating in the activities identified in this description of success

Learning

In 2020, Whistler has developed and facilitated learning opportunities that enable personal and professional development and that help to achieve Whistler's vision.
By this time:

1. Diverse, affordable and accessible lifelong learning opportunities exist to meet the community's needs
2. A learning culture is nurtured and promoted locally and regionally through diverse formal and informal opportunities and leverages Whistler's international stature
3. The early learning needs of children in the resort community are met
4. A high quality kindergarten through post-secondary education system offers a diversity of programs that meet the needs and expectations of the community
5. Residents and visitors have many opportunities to actively learn about the resort community, the natural environment and First Nations culture
6. Opportunities exist within developed and recreational areas for people to learn about the natural environment
7. Learning opportunities contribute to the local economy and attract visitors to the resort community for learning vacations
8. Learning opportunities foster collaboration, trust and community engagement and build the community's capacity for achieving Whistler's vision of success and sustainability for future generations

Materials & Solid Waste

In 2020, Whistler's material flows are managed in comprehensive, convenient and upstream way, and the resort community is well on its way to embracing the concept of a 'zero waste' society. In the future:

1. The resort community is clean and well maintained
2. Whistler offers the same or higher quality service using less materials than in the past
3. Whistler is using durable materials that are less environmentally harmful, preferring recycled, natural and sustainably harvested materials, and plentiful metals
4. The resort community is 'closing the loop' by providing appropriate and convenient opportunities for reducing, reusing and recycling materials
5. Whistler is well on its way to achieving its 'zero waste' goal
6. Increased business performance and economic opportunities are being realized as a result of smart materials management
7. The community is committed to providing infrastructure capable of continually decreasing our residual wastes
8. Local businesses, residents and visitors are knowledgeable about material flows, and demonstrate a strong ethic of responsibility and stewardship toward resources and materials
9. Substances and chemicals that are harmful to human health are being eliminated, replaced, or managed in a way that they do not disperse in nature
10. Partnerships are developed such that collective procurement choices favour companies and suppliers that are consistent with our identified materials and solid waste values

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Natural Areas

In 2020, Whistler protects and, where possible, restores ecosystem integrity and biodiversity in all critical natural areas, and also protects and restores natural features within Whistler's developed and recreational areas. By this time:

1. An ecologically functioning and viable network of critical natural areas is protected and, where possible restored
2. Use of critical natural areas is avoided and use of surrounding areas is limited to ensure ecosystem integrity
3. Indigenous biodiversity is maintained
4. The protected natural areas of the Corridor include a full spectrum of locally representative ecosystems
5. Backcountry areas are protected from overuse and degradation
6. A policy of no net habitat loss is followed, and no further loss is preferred
7. Developed and recreation areas are designed and managed to protect as much of the natural environment within and around them as possible
8. Community members and visitors act as stewards of the natural environment
9. Continual learning about natural areas and species informs appropriate restoration and protection efforts
10. Corridor partners adopt Natural Areas Strategies consistent with the intent of this document
11. Natural systems guide management approaches

Partnership

In 2020, Whistler partners and stakeholders work together to effectively and efficiently achieve Whistler2020 and partner objectives. By this time:

1. Residents, taxpayers, business and local government hold a shared vision for the resort community and work in partnership to achieve that vision
2. Decisions consider the community's values as well as short and long-term social, economic and environmental consequences
3. Partners work together to achieve mutual benefit
4. Partners participate in policy making and other decisions at various levels of government where relevant
5. Trust is established and maintained among Whistler Partners and stakeholders
6. Stakeholders work together on decisions that affect them and collaborate with neighbouring municipalities and First Nations
7. Partners support each other and live up to the agreements established within partnerships
8. Partners work toward aligned budgeting processes that leverage limited resources for increased effectiveness and efficiency
9. Partners meaningfully engage stakeholders and practice 'good governance' guided by Whistler's Partnership Principles

Recreation & Leisure

In 2020, recreation and leisure opportunities in Whistler are innovative, meet diverse resident and visitor needs, and are moving toward sustainability. By this time:

1. Residents and visitors of all ages and abilities enjoy activities year-round that encourage healthy living, learning and a sense of community
2. Recreation and leisure are part of the Whistler lifestyle and all community members are able and encouraged to participate
3. Visitors are aware of and have access to a variety of recreation and leisure offerings at a range of price points
4. The resort community is globally recognized as a leader in innovative recreation products and services
5. Recreational experiences reflect an appropriate balance between adventure, challenge and safety, and exist within the comfortable carrying capacity of the amenity
6. Quality recreation and leisure activities are delivered with exceptional service
7. Local and regional stakeholders use a collaborative and comprehensive approach to developing amenities and offerings, and to resolving user conflicts
8. Recreation and leisure infrastructure and practices minimize the degradation of natural areas and are transitioning toward sustainable use of energy and materials
9. Recreation and leisure is a core contributor to the Whistler economy
10. The cost of amenities is covered within the resort community's financial means and is equitably shared among stakeholders

Resident Affordability

In 2020, residents are able to afford the time, products and services that enable them to enjoy the lifestyle that Whistler has to offer. At this time:

1. Income and innovative benefits help make it affordable to live and play in Whistler
2. Residents have access to affordable goods and services that meet their needs
3. Diverse and affordable opportunities for recreation, leisure, arts and culture exist
4. A buy-local culture helps to circulate wealth within Whistler and the region
5. Products and services offered to meet residents' needs move continuously toward meeting our sustainability objectives

Resident Housing

In 2020, Whistler has an inventory of housing that is affordable and sustainable, supporting a diverse and vibrant local population. In the future:

1. Resident restricted housing is affordable for permanent and short-term residents, through innovative and effective policy and financial models
2. Effective financial and legal tools exist to develop and manage resent restricted housing affordability in perpetuity
3. The planned flexibility within neighbourhood design, housing form, and housing tenure enables the adaptability to meet changing housing needs and future affordability considerations
4. Whistler has a sufficient quantity and appropriate mix of quality housing to meet the needs of diverse residents (Target: 75% of Whistler employees live in the resort community)
5. Residents enjoy housing in mixed-use neighbourhoods that are intensive, vibrant and include a range of housing forms
6. Housing has been developed close to transit, pedestrian and bicycle routes, and amenities and services to reduce auto dependency
7. Housing is healthy and livable, and housing design, construction and operations are evolving toward sustainable and efficient energy and materials management
8. Developed areas are designed and managed to be sensitive to the surrounding environment

Transportation

In 2020, transportation to, from and within Whistler is convenient, safe, seamless, and affordable. By this time:

1. Whistler policy, planning and development prioritizes preferred methods of transportation in the following order: 1. pedestrian, bicycle and other-non-motorized means, 2. transit and movement of goods, 3. private automobile (HOV, and leading low-impact technologies), 4. private automobile (SOV, traditional technology)
2. Transportation alternatives and options are developed, promoted and supported so that inter-community mobility minimizes the negative impacts of traditional modes of travel
3. The convenience and seamlessness of the alternative transportation system to, from and within Whistler ensures usage rates continue to rise
4. Whistler's transportation system is transitioning toward renewable energy sources, improving air quality, and maintaining ecosystem integrity
5. Whistler's local and regional transportation systems minimize encroachment on nature
6. Regional partnerships enhance the journey to the resort as part of the experience
7. Residents, businesses and visitors are increasingly aware of the importance and benefits of alternative transportation choices
8. The transportation system efficiently meets both the short- and long-term needs of all users
9. Whistler's transportation system is safe and enjoyable
10. The transportation systems to, from and within the resort community are accessible and offer affordable travel options

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Visitor Experience

In 2020, Whistler has maintained its sense of place, and continuously renews the visitor experience to consistently meet and exceed expectations.
By this time:

1. Visitors feel genuinely welcome
2. Communication, travel and services are accessible, seamless and convenient at all phases of visitors' trips, from prior to departure until after returning home
3. Community members' passion for Whistler inspires visitors, and interaction among the two groups creates memorable experiences
4. Community members and organizations work collectively to ensure exceptional experiences that exceed visitor expectations
5. Whistler proactively anticipates market trends
6. Visitors perceive Whistler products, services and activities to be excellent value
7. A diverse range of year-round activities is developed and offered
8. Visitors choose Whistler to actively participate in recreation, learning, and cultural opportunities
9. The resort community's authentic sense of place and engaging, innovative and renewed offerings attract visitors time and time again
10. The resort is comfortable, functional, safe, clean and well-maintained
11. A comfortable carrying capacity of the resort, its amenities, and the surrounding natural environment is respected
12. The visitor experience is based on practices and systems that efficiently use sustainable materials and energy

Water

In 2020, Whistler's water resources provide a dependable supply of healthy water to meet the long-term needs of people, other species, and nature. In the future:

1. Whistler's potable water supply system delivers water of excellent quality, which meets or exceeds all relevant health standards, and meets benchmark aesthetic standards whenever possible
2. Water supply is distributed reliably, equitably and affordably – and is managed proactively within the context of effective and efficient emergency preparedness
3. Residents and visitors are educated about, and encouraged to protect and conserve natural water resources
4. All potable water is used sparingly and only used to meet appropriate needs
5. Wastewater and bio-solids are readily assimilated in nature
6. Water supply, wastewater management and flood control infrastructure minimize energy requirements, and favour sustainably managed materials and resources
7. Watershed-based management approaches and policies guide and integrate overlapping land and resource values including (but not limited to) development, infrastructure, forests, habitat, recreation, fisheries and aquifers
8. Effective stormwater management and flood control measures are in place, and replicate natural hydrological systems and functions as much as possible
9. Flood control systems are maintained at a high level of emergency preparedness, where risks are managed proactively, effectively, and efficiently
10. With respect to water resources, capital and long-term costs are managed in a financially prudent and fiscally responsible manner
11. Potable water supply source protection is optimized within a multi-barrier approach
12. Healthy streams, rivers, lakes and wetlands support thriving populations of fish, wildlife and aquatic invertebrate

Whistler's **Sustainability Objectives** are to:

Reduce and eventually eliminate the RMOW's contributions to **systematic increases in concentrations of substances from the Earth's crust** (e.g. by increasing energy efficiency),

Reduce and eventually eliminate the RMOW's contributions to **systematic increases in concentrations of substances produced by society** (e.g. through 100% recycling),

Reduce and eventually eliminate the RMOW's contributions to **systematic physical degradation of nature** (e.g. by purchasing certified wood), and

and in that society people are not subject to conditions that systematically…

Reduce and eventually eliminate our contribution to **systematically undermining the ability of others to meet their basic human needs.** (e.g. by purchasing FairTrade).

13.

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APPENDIX D

Appendix 1.3 Well Assessment Form

EMERALD W201-1

BRITISH COLUMBIA — Ministry of Health and Ministry Responsible for Seniors; Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: EMERALD ESTATES W201-1

LEGAL DESCRIPTION OF WELL LOCATION: 9225 HWY 99 (BTWN EMERALD PARK & EMERALD DRIVE)

WATER SYSTEM LEGAL ADDRESS: EMERALD ESTATES.

LATITUDE / LONGITUDE: 50° 09' 33 7" / 122° 55' 36.6"

HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from _____ map (specify scale)

UTM COORDINATES

HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 2

DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) No

NUMBER OF CONNECTIONS: Maximum _____ Actual _____

POPULATION SERVED

WATER USE: ☒ domestic ☐ irrigation ☐ commercial ☐ industrial other (specify) _____

WIN NO.: 803

EMS NO.: 802.

WELL TAG NO.: 00002

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW

WELL OPERATOR'S PHONE NO.: (604) 932 5535

WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER BC

WELL OWNER: as above

WELL OWNER'S PHONE NO.: ( )

WELL OWNER'S ADDRESS: "

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: DRILL WELL ENTERPRISES, 4994 Polkey Road, Duncan, BC

POSTAL CODE: V9L 4T8

DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1979 08 –

WELL-DRILLER'S TELEPHONE NO.: (604) 746 5268

DATE OF LAST RECONSTRUCTION (YYYY MM DD):

TYPE OF WELL: ☐ drilled ☒ dug ☐ other (specify) _____

METHOD OF DRILLING: ☐ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify) _____

WELL LOG AVAILABLE? ☒ yes (attach) ☐ no

DEPTH OF WELL: 20.7 m or _____ ft.

DIAMETER OF WELL: _____ m or 8 in.

SCREEN LENGTH: 3.3 m or _____ ft.

DEPTH TO TOP OF SCREEN: 11.6 m or _____ ft.

WELL CAPACITY: 14.2 L/s or _____ Igpm

LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells): —

YIELD OF WATER-BEARING FRACTION(S): — L/s or — Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☒ other (specify) UC ☐ none

SURFACE SANITARY SEAL: grouted to 4.6 m or _____ ft. ☐ no surface seal ☐ pitless adapter

AVERAGE PUMPING RATE: _____ L/s or _____ Igpm

HOW WAS PUMPING RATE DETERMINED? n/a

DEPTH OF INTAKE SETTING: _____ m or _____ ft.

PUMP AGE

ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal

HOW WAS VOLUME PUMPED DETERMINED? n/a

PUMPING CAPACITY: 14.2 L/s or _____ Igpm

ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)

TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____

STORAGE CAPACITY: _____ L or _____ Igal

COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☑ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

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UC = Underground Chamber

Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: _____ m or _____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 6.06 m or _____ ft.	HOW WAS WATER LEVEL MEASURED? ☐ well log ☐ wetted tape ☐ probe ☐ transducer
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? _____ m or _____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify)	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes (specify) _____ ☐ no
WELLHEAD ELEVATION (height above mean sea level): 640 m or _____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map (specify scale and contour interval) ☐ other (specify) _____	
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): —	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: — m or — ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: — m or — ft.
		HOW LATERALLY EXTENSIVE IS CONFINING LAYER? —

IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER: EMERALD ESTATES	AQUIFER CLASSIFICATION NUMBER (from MoELP): 390	AQUIFER CLASSIFICATION (from MoELP): IB (12)

TYPE OF AQUIFER ☒ unconsolidated, unconfined ☐ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☐ yes How many? 1 ☐ no	ANNUAL RAINFALL: 1229 m or _____ in.
AQUIFER TRANSMISSIVITY: _____ m^2/d or _____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☐ from pumping test ☐ from specific capacity ☐ other (specify) _____	
HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☐ other (specify)	

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Pitcau Report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? AUGUST 1979	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☐ yes — Why? _____ ☐ no
3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

3 occurences of total coliforms (May-Jun 1995, Jun 1996)
3 occurences of elevated turbidity (89, '95, '96)
1 occurence of elevated iron (Jun 1996)

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☒ yes ☐ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY?	biweekly analysis for coliform bacteria, annual analysis for potability, quarterly analysis for TOC and HPC bacteria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE?	☐ yes ☒ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS?	☐ yes ☒ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes ☐ no		

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

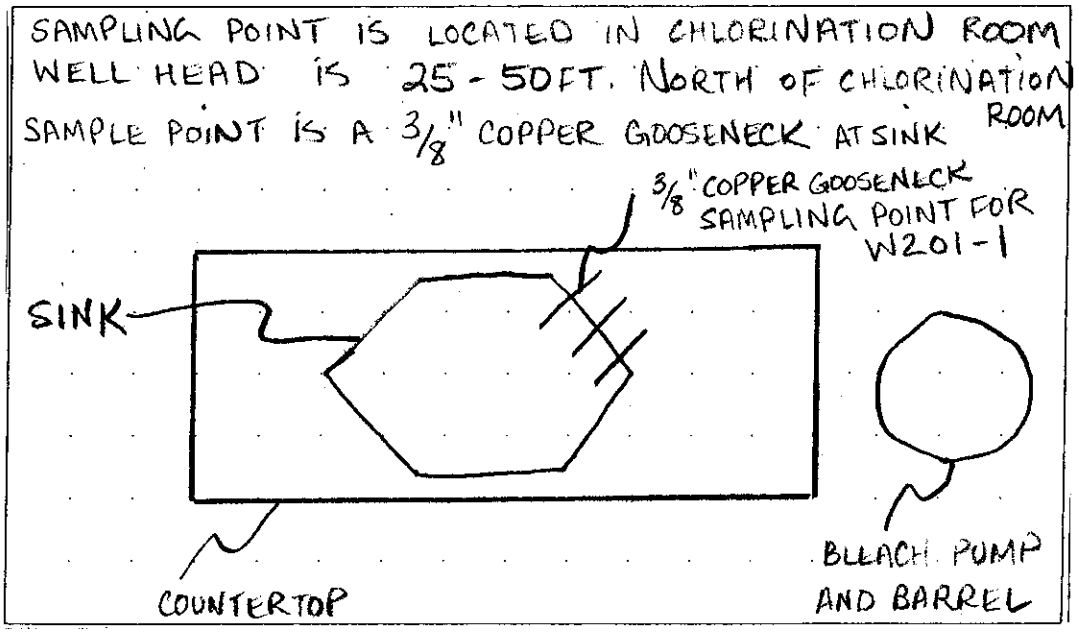
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG[1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	total coliforms present in May-Jun 1995, Jun 1996		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	elevated turbidity	1.1 - 6.85 NTU	Dec 89, May 95, Jun 96.
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)			
Metals* Calcium, iron, magnesium, manganese, sodium	elevated Iron	0.6	Jun 96

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? [X] yes [ ] no | IF YES, TYPE OF TREATMENT [X] disinfection [ ] filtration [ ] carbon filter [ ] air stripper [ ] water softener [ ] other (specify) _____

PURPOSE OF TREATMENT: disinfection of drinking water supply.

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm	Free Chlorine 0.30 ppm
WHAT IS THE RESIDUAL LEVEL OF TREATMENT?		
IS THERE ANY WATER STORAGE IN THE SYSTEM? [X] yes [ ] no	IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? [X] before [ ] after	
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm	Free Chlorine 0.20 ppm
IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)?	Total Chlorine — ppm	Free Chlorine — ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify) —	WHERE ARE CHEMICALS STORED? —	
IS THERE PROPER STORAGE FOR THESE CHEMICALS? [ ] yes [ ] no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL? separate building for chemicals.	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		
Calculated Fixed Radius	(1-year travel time)*	*see Pitcau
	(5-year travel time)*	report - Dec 2003
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? [ ] yes (identify on map) [ ] no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? [ ] yes (identify on map) [ ] no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage (specify)					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas		✓			unofficial dump e well head
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare		✓			
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit (specify)					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	[ ] upgrade [ ] downgrade [ ] same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

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RESORT MUNICIPALITY OF WHISTLER - EMERALD ESTATES WELL 1-79

Location: On the west side of Highway 99, in the Emerald Estates Subdivision on the west side of Green Lake opposite Parkhurst. EE Well 1-79 is located immediately above the highway between Emerald Park and Emerald Drive.

Contractor: Drillwell Enterprises Ltd.

Date of Installation: August 1979.

Driller's Litholog:

0.0 - 9.1 m (0 - 30 ft)	very coarse gravel
9.1 - 10.7 m (30 - 35 ft)	coarse sand and medium gravel
10.7 - 16.2 m (35 - 52 ft)	coarse gravel
16.2 - 19.8 m (52 - 65 ft)	fine sand
19.8 - 20.7 m (65 - 68 ft)	green-coloured bedrock.

Static Water Level: 6.06 m (19.89 ft) below the well casing stickup of 0.85 m (2.80 ft) above ground, prior to the start of the pumping test on August 9, 1979; 4.47 m (14.68 ft) below ground, prior to the start of the pumping test of Well 2-99 on November 24, 1999.

Diameter: 200 mm (8"); 250 mm (10") diameter surface casing extends to 4.6 m (15 ft), with the annular opening between the well and surface casings filled with grout.

Well Completion: Emerald Estates Well 1-79 is completed with a 3.35 m (11 ft) long well screen assembly containing a K-type packer at the top at 11.6 m (38 ft) and 3.0 m (10 ft) of 200 mm (8") nominal diameter Johnson stainless steel well screen with 5.08 mm (0.200") slots. The bottom of the well screen assembly, which is set from 11.6 to 14.9 m (38 to 49 ft), is closed with a bail bottom.

Well Performance: Constant-rate pumping at 13.57 *l*ps (215 USgpm) on August 9, 1979, caused maximum drawdown of 4.07 m (13.36 ft), giving a specific capacity of 3.33 *l*ps/m (16.1 USgpm/ft).

Well Capacity: Following installation, the capacity of Emerald Estates Well 1-79 was rated at 13.9 to 14.2 *l*ps (220 to 225 USgpm), based on the August 1979 pumping test results and the usual 30% factor of safety on the drawdown.

Appendix 1.3 Well Assessment Form

201-2

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: EMERALD W201-2	LEGAL DESCRIPTION OF WELL LOCATION: W. side Hwy 99 near Emerald Drive
WATER SYSTEM LEGAL ADDRESS: Emerald Estates 9225 Hwy 99	
LATITUDE / LONGITUDE: 50° 09' 34.6" / 122° 55' 36.5"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from 1:2000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 2 — DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) No
NUMBER OF CONNECTIONS Maximum _____ Actual _____ — POPULATION SERVED	WATER USE ☒ domestic ☐ irrigation ☐ commercial ☐ industrial other (specify) _____
WIN NO.: 802 — EMS NO.: 803 — WELL TAG NO.: 80582	

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. | EMS NO. = MoELP's site number for the water chemistry on their database. | BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER	
WELL OWNER	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: COLUMBIA WATER WELLS (1986) LTD. 25188 - 52nd Ave. Aldergrove, BC	POSTAL CODE: V4W 1G2 — WELL-DRILLER'S TELEPHONE NO.: (604) 857 0008
	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1999 09 —
	DATE OF LAST RECONSTRUCTION (YYYY MM DD): 2001 06 —

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify) _____ — METHOD OF DRILLING: ☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other (specify) _____ — WELL LOG AVAILABLE? ☐ yes (attach) ☐ no

DEPTH OF WELL	DIAMETER OF WELL	SCREEN LENGTH	DEPTH TO TOP OF SCREEN
19.6 m or _____ ft.	_____ m or 10 in.	2.4 m or _____ ft.	16.5 m or _____ ft.

WELL CAPACITY	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):	YIELD OF WATER-BEARING FRACTION(S)
10.7 L/s or _____ Igpm	—	— L/s or — Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☑ other (specify) pitless ad. ☐ none — SURFACE SANITARY SEAL: grouted to 4.7 m or _____ ft. ☐ no surface seal ☑ pitless adapter

AVERAGE PUMPING RATE	HOW WAS PUMPING RATE DETERMINED?	DEPTH OF INTAKE SETTING	PUMP AGE
_____ L/s or _____ Igpm	n/a	_____ m or _____ ft.	

ANNUAL VOLUME OF WATER PUMPED	HOW WAS VOLUME PUMPED DETERMINED?
_____ L or _____ Igal	n/a
PUMPING CAPACITY: 10.7 L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)

TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____ — STORAGE CAPACITY: _____ L or _____ Igal — COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: _____ m or _____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 4.72 m or _____ ft.	HOW WAS WATER LEVEL MEASURED? ☐ well log ☐ wetted tape ☒ probe ☐ transducer
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? _____ m or _____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes *(specify)* _____ ☐ no
WELLHEAD ELEVATION (height above mean sea level): 640 m or _____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* _____	
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): —	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: _____ m or _____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: _____ m or _____ ft.
HOW LATERALLY EXTENSIVE IS CONFINING LAYER?		
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER: EMERALD ESTATES	AQUIFER CLASSIFICATION NUMBER (from MoELP): 390
AQUIFER CLASSIFICATION (from MoELP): IB (12)		
TYPE OF AQUIFER ☒ unconsolidated, unconfined ☐ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☑ yes How many? 1 ☐ no	ANNUAL RAINFALL: 129 m or _____ in.
AQUIFER TRANSMISSIVITY: _____ m^2/d or _____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☐ from pumping test ☐ from specific capacity ☐ other *(specify)* _____	
HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☐ other *(specify)*	

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau Report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? AUGUST 1979

2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☐ yes — Why? _____ ☐ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know

IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes	☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED? ☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes	☒ no	IF YES, WHAT ARE THEY? biweekly analysis for coliform bactria, annual analysis for potability quarterly analysis for TOC and HPC bactria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE?	☐ yes	☐ no	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS?	☐ yes	☐ no	
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes	☐ no	

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

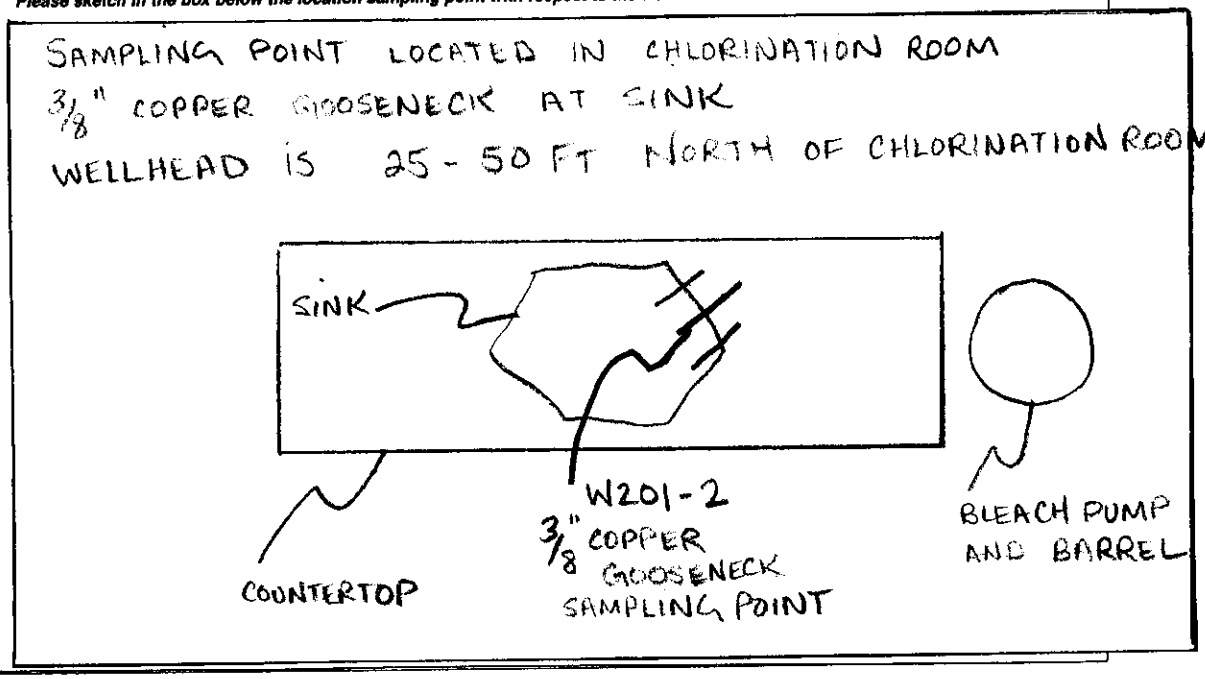
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG[1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	elevated turbidity	1.3-23 NTU	
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	elevated aluminum / iron	Al = 0.33 Fe = 0.389	> AO not > MAC

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? [X] yes [ ] no | IF YES, TYPE OF TREATMENT [X] disinfection [ ] filtration [ ] carbon filter [ ] air stripper [ ] water softener [ ] other (specify) _____

PURPOSE OF TREATMENT: disinfection of drinking water supply.

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED? Total Chlorine _____ ppm | Free Chlorine 0.30 ppm

WHAT IS THE RESIDUAL LEVEL OF TREATMENT?

IS THERE ANY WATER STORAGE IN THE SYSTEM? [X] yes [ ] no

IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? [X] before [ ] after

WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM? Total Chlorine _____ ppm | Free Chlorine 0.20 ppm

IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm | Free Chlorine _____ ppm

WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify) —

WHERE ARE CHEMICALS STORED? —

IS THERE PROPER STORAGE FOR THESE CHEMICALS? [ ] yes [ ] no

IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL? separate building for chemicals

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)

*attach calculation sheets	RADIUS (m)
Arbitrary Fixed Radius	see Pitcairn Report Dec. 2003
Calculated Fixed Radius (1-year travel time)*	
Calculated Fixed Radius (5-year travel time)*	
Calculated Fixed Radius (10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? [ ] yes (identify on map) [ ] no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? [ ] yes (identify on map) [ ] no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see 201-1

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas		✓			
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare		✓			
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK _____ m or _____ ft.

GRADIENT TO SEPTIC FIELD [ ] upgrade [ ] downgrade [ ] same grade _____ % _____ %

DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS: COMMUNITY SYSTEM | SYSTEM PER LOT

RESORT MUNICIPALITY OF WHISTLER - EMERALD ESTATES WELL NO. 2-99

W201-2

Location: On the west side of Highway 99, in the Emerald Estates Subdivision on the west side of Green Lake opposite Parkhurst. Well No. 2-99 is located approximately 50 m (165±1 ft) north of Well No. 1-79.

Contractor: Columbia Water Wells (1986) Ltd.

Date of Installation: September to November 1999.

Driller's Litholog:

0.0 - 3.7 m (0 - 12 ft)	cobbles and boulders, some coarse gravel
3.7 - 6.1 m (12 - 20 ft)	cobbles and coarse gravel; tight
6.1 - 8.5 m (20 - 28 ft)	coarse gravel, sand and cobbles; gravel is broken
8.5 - 11.6 m (28 - 38 ft)	coarse gravel, coarse sand and cobbles (casing driving a little easier)
11.6 - 14.6 m (38 - 48 ft)	coarse gravel, coarse sand and cobbles; gravel is angular and sharp
14.6 - 15.8 m (48 - 52 ft)	coarse gravel with more coarse sand, loose; making water, silty grey wash
15.8 - 17.1 m (52 - 56 ft)	coarse gravel with more coarse to fine sand and coarse sharp angular gravel; brown wash and tighter
17.1 - 19.5 m (56 - 64 ft)	coarse gravel, coarse to fine sand and cobbles with more round gravel, loose; more water
19.5 - 20.1 m (64 - 66 ft)	brown fine to medium sand; rusty wash
20.1 - 20.4 m (66 - 67 ft)	fine to medium sand containing some stones
at 20.4 m (at 67 ft)	green-coloured bedrock.

Static Water Level: 4.72 m (15.50 ft), referenced to ground on November 24, 1999.

Diameter: 250 mm (10"), with a 0.6 m (2.1 ft) stickup above ground; a bentonite surface seal around the well casing extends from surface to 4.7 m (15.4 ft).

Completion: EE Well No. 2-99 is completed with an 3.6 m (11.9 ft) long assembly of Johnson stainless steel, 250 mm (10") nominal diameter (telescopic) screen, as follows:

at top at 16.0 m (52.6 ft)	K-type packer and 0.3 m (1 ft) of "O" wind, of total length 0.46 m (1.5 ft)
2.4 m (8 ft) of	5.08 mm (0.200") slot screen
0.6 m (2 ft) of	blank pipe
at bottom at 19.6 m (64.3 ft)	flat steel plate.

Appendix 1.3 Well Assessment Form

201-3

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: EMERALD ESTATES W201-3

LEGAL DESCRIPTION OF WELL LOCATION: NORTHEAST OF 201-1

WATER SYSTEM LEGAL ADDRESS: EMERALD ESTATES. 9225 Hwy. 99.

LATITUDE / LONGITUDE: 50°9'39.7" / 122°55'35.7"

HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from 1:2000 map (specify scale)

UTM COORDINATES

HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM?

DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe)

NUMBER OF CONNECTIONS: Maximum _____ Actual _____

POPULATION SERVED

WATER USE: ☒ domestic ☐ irrigation ☐ commercial ☐ industrial ☐ other (specify) _____

WIN NO.

EMS NO.: UNKNOWN

WELL TAG NO.

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW

WELL OPERATOR'S PHONE NO.: (604) 932 5535

WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER

WELL OWNER: as above

WELL OWNER'S PHONE NO.: ( )

WELL OWNER'S ADDRESS

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: FIELD DRILLING CONTRACTORS Box 841, 25320 Fraser Highway Aldergrove BC

POSTAL CODE: V4W 2V1

WELL-DRILLER'S TELEPHONE NO.: (604)857 2266

DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 2000 | 10 | 20

DATE OF LAST RECONSTRUCTION (YYYY MM DD)

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify) _____

METHOD OF DRILLING: ☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other (specify) _____

WELL LOG AVAILABLE? ☒ yes (attach) ☐ no

DEPTH OF WELL: 15.2 m or _____ ft.

DIAMETER OF WELL: _____ m or 12 in.

SCREEN LENGTH: 6.3 m or _____ ft.

DEPTH TO TOP OF SCREEN: 8.9 m or _____ ft.

WELL CAPACITY: 31.6 L/s or _____ Igpm

LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):

YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☒ other (specify) PITLESS ADAPTER ☐ none

SURFACE SANITARY SEAL: grouted to 4.0 m or _____ ft. ☐ no surface seal ☑ pitless adapter

AVERAGE PUMPING RATE: _____ L/s or _____ Igpm

HOW WAS PUMPING RATE DETERMINED? n/a

DEPTH OF INTAKE SETTING: _____ m or _____ ft.

PUMP AGE

ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal

HOW WAS VOLUME PUMPED DETERMINED? n/a

PUMPING CAPACITY: 31.6 L/s or _____ Igpm

ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)

TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____

STORAGE CAPACITY: _____ L or _____ Igal

COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL	DEPTH TO NON-PUMPING WATER LEVEL	HOW WAS WATER LEVEL MEASURED?
_____ m or _____ ft.	2.21 m or _____ ft.	☐ well log ☐ wetted tape ☒ probe ☐ transducer

IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW?	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE?
— m or — ft.	—	☐ yes *(specify)* — ☐ no

WELLHEAD ELEVATION (height above mean sea level)	HOW WAS ELEVATION DETERMINED?
640 m or _____ ft.	☐ survey ☐ altimeter ☒ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* _____

TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till)	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG	THICKNESS OF CONFINING LAYER FROM WELL LOG	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
—	____ m or ____ ft.	____ m or ____ ft.	—

IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER?	NAME OF AQUIFER	AQUIFER CLASSIFICATION NUMBER (from MoELP)	AQUIFER CLASSIFICATION (from MoELP)
☒ yes ☐ no	EMERALD ESTATES		II B (12)

TYPE OF AQUIFER	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL?	ANNUAL RAINFALL
☒ unconsolidated, unconfined ☐ unconsolidated, confined ☐ bedrock	☐ yes How many? _____ ☑ no	1229 m or _____ in.

AQUIFER TRANSMISSIVITY	HOW WAS TRANSMISSIVITY DETERMINED?
1615 m^2/d or _____ igpd/ft.	☒ from pumping test ☐ from specific capacity ☐ other *(specify)* _____

HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED?
	☐ from well water levels ☐ from topography ☐ other *(specify)*

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE?	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED?
AUGUST 1979	☐ yes — Why? _____ ☒ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS?	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?
☐ yes ☒ no ☐ don't know	

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY?	biweekly analysis for coliform bacteria annual analysis for potability quarterly analysis for TOC and HPC bacteria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes ☐ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes ☐ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes ☐ no		

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

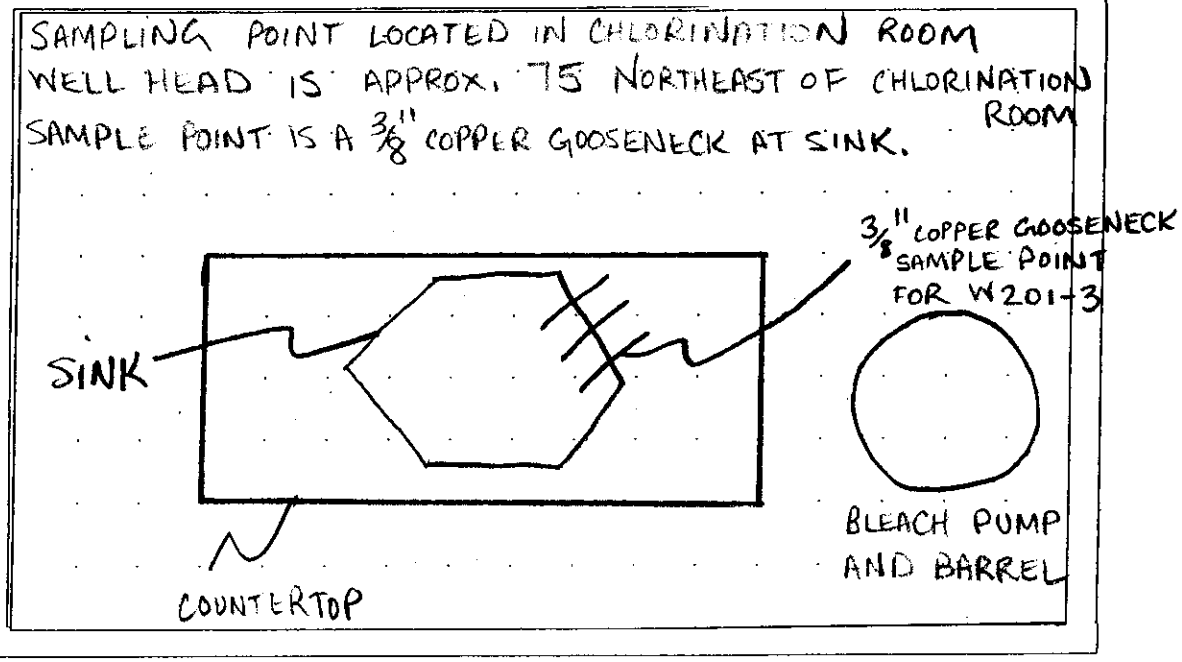
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	NONE		
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	NONE		

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☒ yes ☐ no | IF YES, TYPE OF TREATMENT ☒ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT: disinfection of drinking water supply.

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine: _____ ppm	Free Chlorine: 0.35 ppm
WHAT IS THE RESIDUAL LEVEL OF TREATMENT?		
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no		IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☒ before ☐ after
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine: _____ ppm	Free Chlorine: 0.20 ppm
IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)?	Total Chlorine: — ppm	Free Chlorine: — ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify) —		WHERE ARE CHEMICALS STORED? —
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL? separate building from wellhead area.	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)

*attach calculation sheets	RADIUS (m)
Arbitrary Fixed Radius	see Pitcau
Calculated Fixed Radius (1-year travel time)*	report
Calculated Fixed Radius (5-year travel time)*	Dec. 2003
Calculated Fixed Radius (10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see W201-1

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas		✓			
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare		✓			
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

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W201-3

PROJECT: RMOW - Emerald Estates	CASING STICKUP: 1.5 ft (0.46 m)	WELL NO: EE No. 3-00
PHCL PROJECT NO: R711110	STATIC WATER LEVEL: 7.25 ft (2.21 m)	PUMPING TEST: Yes
LOCATION: Green Lake, Whistler	COMPLETION DEPTH: 50 ft (15.2 m)	WATER ANALYSIS: Yes

DEPTH	DESCRIPTION	DEPTH (ft)	SYMBOL	WELL DATA	REMARKS
ft m	Ground Surface	0			
0 0	***Gravel and Sand*** 0 to 5.0 ft (0 to 1.5 m) - containing small boulders	-5			12" (300 mm) diameter well casing stickup = 2 ft (0.6 m).
5	***Sand*** 5 to 14 ft (1.5 to 4.3 m) - brown, containing gravel and small boulders; dry	-14			Static water level = 7.25 ft on 10/15/00; 6.80 ft (2.07 m) on 10/31/00, prior to capacity testing.
10	***Gravel*** 14 to 40 ft (4.3 to 12.2 m) - coarse, sandy; sand is medium to coarse and gravel is 0.75 to 2" (20 to 50 mm), with some cobbles to 4" (100 mm)				13 ft (4.0 m) of 16" (400 mm) diameter surface casing was withdrawn during placement of a surface seal of bentonite grout.
15 5					
20					
25					
30					Top of 12" to 10" (300 to 250 mm) K-type reducing packer = 29.3 ft (8.9 m).
35 10					2 ft (0.6 m) of 0.020" (0.508 mm) slot screen.
					8 ft (2.4 m) of 0.250" (6.350 mm) slot screen, exposed from 31 to 40 ft (9.4 to 12.2 m)
40	***Rock (boulder?)*** 40 to 43.5 ft (12.2 to 13.3 m) - green, with trace of quartz	-40			
		-44			
45	***Boulder*** 43.5 to 45 ft (13.3 to 13.7 m) - granite, with thin seam of gravel at 13.7 m	-45			10 ft (3.0 m) length of 10" (250 mm) pipe to accommodate pump below well screen.
50 15	***Rock (Boulder?)*** 45 to 56 ft (13.7 to 17.1 m) - dark green with a trace of quartz	-56			Flat steel plate at bottom of well screen = 50 ft (15.2 m).
55		-58			
60	***Clayey-silt*** 56 to 58 ft (17.1 to 17.7 m) - grey, very firm	-62			Screen is Johnson stainless steel, continuous wire-wound; note that the casing shoe extends to 9.4 m, exposing only 0.3 m (1 ft) of the 0.6 m (2 ft) long 0.508 mm (0.020") slot screen at the top of the assembly.
65 20	***Rock (boulder?)*** 58 to 62 ft (17.7 to 18.9 m) - grey-green				
70					

CONTRACTOR: Field Drilling Contractors	DATE: 10/20/00	**PACIFIC HYDROLOGY CONSULTANTS LTD.** Consulting Hydrogeologists Suite 201, 1537 West 8th Avenue VANCOUVER, B.C. Canada V6J 1T5 Telephone: (604) 730-6990
DRILLING METHOD: Cable Tool	BY: cp	
PAGE: 1 of 1	FIGURE: 3	

Appendix 1.3 Well Assessment Form

VILLAGE W205-1

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: WHISTLER VILLAGE W205-1	LEGAL DESCRIPTION OF WELL LOCATION: DAY SKIER PARKING LOT 1
WATER SYSTEM LEGAL ADDRESS: RMOW	4490 BLACKCOMB WAY.
LATITUDE / LONGITUDE: 50° 06' 53.5" / 122° 57' 10.1"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from 1:5000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 3 — DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) 21 MILE CREEK BLACKCOMB CREEK
NUMBER OF CONNECTIONS Maximum _____ Actual _____ — POPULATION SERVED	WATER USE ☒ domestic ☐ irrigation ☒ commercial ☐ industrial other (specify) _____
WIN NO. 811	EMS NO. 811 — WELL TAG NO. 40531

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. | EMS NO. = MoELP's site number for the water chemistry on their database. | BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☒ no | Emergency supply ☐ yes ☒ no | Metered ☐ yes ☒ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER	
WELL OWNER: as above	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS:	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: Nor-West Drilling 4501 - 232nd Street Langley, BC	POSTAL CODE: V3A 4R8 — WELL-DRILLER'S TELEPHONE NO.: (604) 534-4108
	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1978
	DATE OF LAST RECONSTRUCTION (YYYY MM DD): 1979

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify) _____	METHOD OF DRILLING: ☐ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify) _____		WELL LOG AVAILABLE? ☐ yes (attach) ☐ no
DEPTH OF WELL: 29.9 m or _____ ft.	DIAMETER OF WELL: _____ m or 8 in.	SCREEN LENGTH: 5 m or _____ ft.	DEPTH TO TOP OF SCREEN: 23 m or _____ ft.
WELL CAPACITY: 27.0 L/s or _____ Igpm	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):		YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm
WELLHEAD ENCLOSURE: ☐ pump house ☒ manhole ☐ other (specify) _____ ☐ none	SURFACE SANITARY SEAL: grouted to _____ m or _____ ft. ☑ no surface seal ☐ pitless adapter		
AVERAGE PUMPING RATE: _____ L/s or _____ Igpm	HOW WAS PUMPING RATE DETERMINED?	DEPTH OF INTAKE SETTING: _____ m or _____ ft.	PUMP AGE
ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal	HOW WAS VOLUME PUMPED DETERMINED?		
PUMPING CAPACITY: _____ L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)		
TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____		STORAGE CAPACITY: _____ L or _____ Igal	COMMON INLET OR OUTLET? ☐ yes ☐ no
ATTACHED INFORMATION: ☑ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data		*NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).*	

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 11.6 m or ____ ft.	HOW WAS WATER LEVEL MEASURED? ☐ well log ☐ wetted tape ☒ probe ☐ transducer	
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? — m or — ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify) —	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes (specify) — ☐ no	
WELLHEAD ELEVATION (height above mean sea level): 670 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map (specify scale and contour interval) ☐ other (specify)		
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): Silt, sand and gravel	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: 0 m or ____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: 15 m or ____ ft.	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☑ yes ☐ no	NAME OF AQUIFER: FITZSIMMONS CK. 387	AQUIFER CLASSIFICATION NUMBER (from MoELP): 387	AQUIFER CLASSIFICATION (from MoELP): IIB (12)
TYPE OF AQUIFER: ☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☒ yes How many? 1 ☐ no	ANNUAL RAINFALL: 1229 m or ____ in.	
AQUIFER TRANSMISSIVITY: 3796 m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☒ from pumping test ☐ from specific capacity ☐ other (specify)		
HYDRAULIC GRADIENT: 0.11%	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☒ other (specify) cross section		

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

See Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? September 1978

2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☑ yes — Why? well redeveloped to restore yield ☐ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know

IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY? bi-weekly analysis for coliform bacteria. Annual analysis for potability. quarterly analysis for TOC and HPC bacteria	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes ☐ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes ☐ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes ☐ no		

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

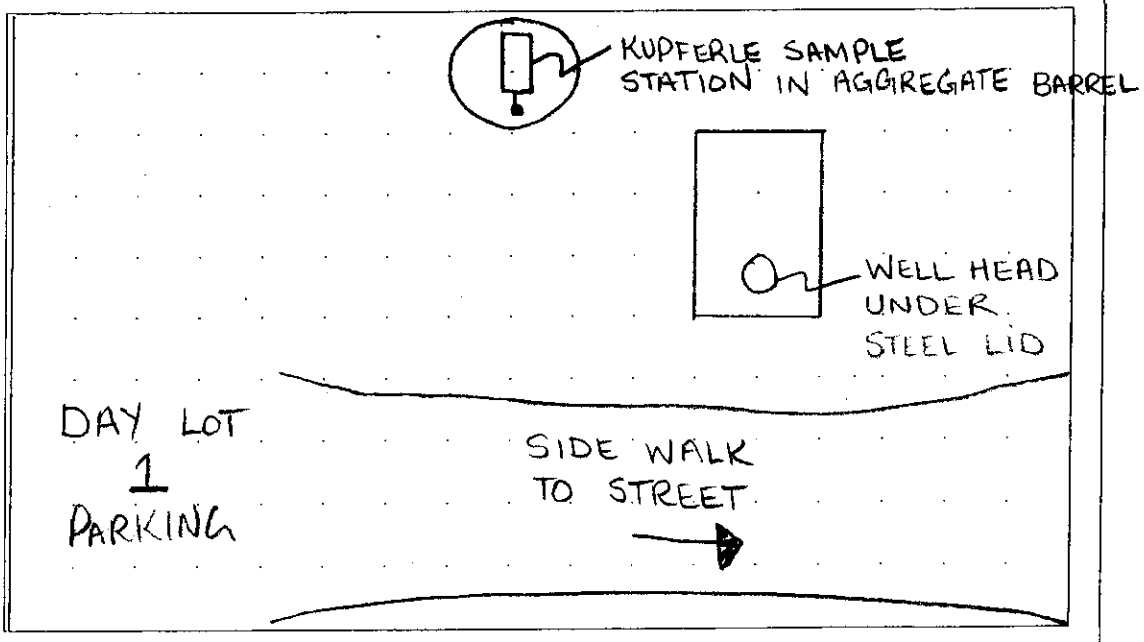
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	turbidity in excess of MAC	1.35 - 2.1 NTU	Sep 1995, Dec 1996
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	Fe in excess of AO Pb in excess of MAC	0.338-0.42 0.031	Sep 1995, Dec 2000 Sep. 1978

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☒ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT: —

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine: — ppm	Free Chlorine: — ppm	WHAT IS THE RESIDUAL LEVEL OF TREATMENT? —
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no			IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine: _____ ppm	Free Chlorine: _____ ppm	IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine: _____ ppm; Free Chlorine: _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify)			WHERE ARE CHEMICALS STORED?
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no			IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL? —

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		see Pitcau
Calculated Fixed Radius	(1-year travel time)*	repor'
	(5-year travel time)*	Dec. 2003
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage (specify)					
Injection wells					
Abandoned wells		✓			
Landfills, dumps, disposal areas					
Commercial/industrial sites		✓			
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit (specify)					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

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Appendix 1.3 Well Assessment Form

VILLAGE 205-2

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: WHISTLER VILLAGE W205-2	LEGAL DESCRIPTION OF WELL LOCATION: Between Day Skier Lots 2 & 3
WATER SYSTEM LEGAL ADDRESS: RMOW 4490 BLACKCOMB WAY.	
LATITUDE / LONGITUDE: 50° 06' 59.6" / 122° 57' 08.7"	HOW WERE LOCATION COORDINATES DETERMINED? ☒ GPS _____ (specify accuracy) ☐ survey ☐ digitized from _____ map (specify scale)
UTM COORDINATES: —	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 3
	DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) Yes 21 MILE CREEK BLACKCOMB CREEK
NUMBER OF CONNECTIONS: Maximum _____ Actual _____	POPULATION SERVED
WATER USE: ☒ domestic ☐ irrigation ☐ commercial ☐ industrial other (specify) _____	
WIN NO.: 810	EMS NO.: 810
WELL TAG NO.: 45930	

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. | EMS NO. = MoELP's site number for the water chemistry on their database. | BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER, B.C.	
WELL OWNER: as above	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS:	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: Drillwell Enterprises 4994 Pokey Road Duncan, BC	POSTAL CODE: V9L 4T8
WELL-DRILLER'S TELEPHONE NO.: (250) 746 5268	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1980 08 28
	DATE OF LAST RECONSTRUCTION (YYYY MM DD):

TYPE OF WELL: ☑ drilled ☐ dug ☐ other (specify) _____	METHOD OF DRILLING: ☐ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify) N/A	WELL LOG AVAILABLE? ☑ yes (attach) ☐ no
DEPTH OF WELL: 29.9 m or _____ ft.	DIAMETER OF WELL: _____ m or 10 in.	SCREEN LENGTH: 5.0 m or _____ ft.
DEPTH TO TOP OF SCREEN: 16.3 m or _____ ft.		
WELL CAPACITY: 37.9 + L/s or _____ Igpm	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):	YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm
WELLHEAD ENCLOSURE: ☐ pump house ☒ manhole ☐ other (specify) _____ ☐ none	SURFACE SANITARY SEAL: grouted to _____ m or _____ ft. ☐ no surface seal ☐ pitless adapter	
AVERAGE PUMPING RATE: 22 L/s or _____ Igpm	HOW WAS PUMPING RATE DETERMINED? Flow meter	DEPTH OF INTAKE SETTING: _____ m or _____ ft. / PUMP AGE
ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal	HOW WAS VOLUME PUMPED DETERMINED? N/A	
PUMPING CAPACITY: 22 L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)	
TYPE OF STORAGE: ☐ tank(s) ☑ reservoir ☐ other (specify) _____	STORAGE CAPACITY: _____ L or _____ Igal	COMMON INLET OR OUTLET? ☐ yes ☐ no
ATTACHED INFORMATION: ☑ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data	*NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).*	

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL	DEPTH TO NON-PUMPING WATER LEVEL	HOW WAS WATER LEVEL MEASURED?
_____ m or _____ ft.	7.2 m or _____ ft.	☑ well log ☐ wetted tape ☐ probe ☐ transducer

IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW?	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify)	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE?
— m or — ft.	—	☐ yes (specify) — ☐ no

WELLHEAD ELEVATION (height above mean sea level)	HOW WAS ELEVATION DETERMINED?
670 m or _____ ft.	☐ survey ☐ altimeter ☒ topographic ☐ map (specify scale and contour interval) ☐ other (specify)

TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till)	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG	THICKNESS OF CONFINING LAYER FROM WELL LOG	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
silt, sand and gravel	0 m or ___ ft.	12 m or ___ ft.	

IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER?	NAME OF AQUIFER	AQUIFER CLASSIFICATION NUMBER (from MoELP)	AQUIFER CLASSIFICATION (from MoELP)
☒ yes ☐ no	FITZSIMMONS CK	387	11B (12)

TYPE OF AQUIFER	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL?	ANNUAL RAINFALL
☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	☒ yes How many? 3 ☐ no	1229 m or _____ in.

AQUIFER TRANSMISSIVITY	HOW WAS TRANSMISSIVITY DETERMINED?
9253 m^2/d or _____ Igpd/ft.	☒ from pumping test ☐ from specific capacity ☐ other (specify)

HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED?
0.11 %	☑ from well water levels ☐ from topography ☐ other (specify)

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE?	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED?
September 1978	☑ yes — Why? redeveloped to restore yield ☐ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS?	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?
☐ yes ☒ no ☐ don't know	

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes	☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED? ☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes	☒ no	IF YES, WHAT ARE THEY? Biweekly analysis for coliform bacteria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes	☐ no	Annual analysis for potability
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes	☐ no	quarterly analysis for TOC and HPC bacteria
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes	☐ no	

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

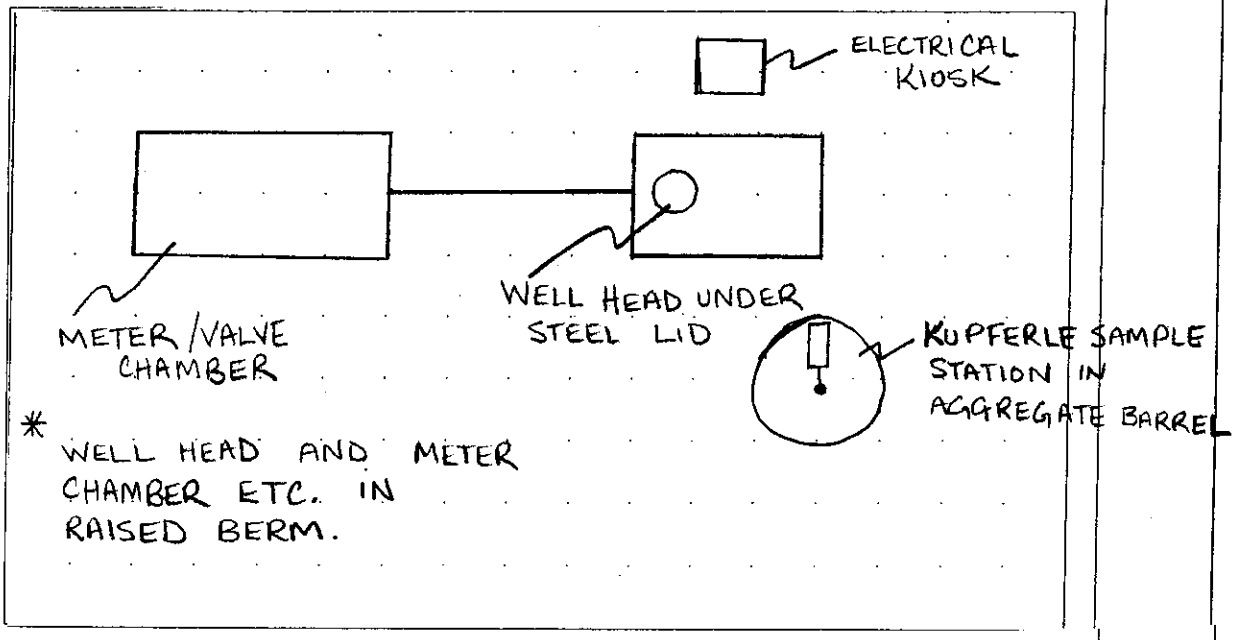
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	NONE		
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	NONE		

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☒ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other *(specify)* _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm	Free Chlorine _____ ppm
WHAT IS THE RESIDUAL LEVEL OF TREATMENT?		
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☑ yes ☐ no	IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after	
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm	Free Chlorine _____ ppm
IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)?	Total Chlorine _____ ppm	Free Chlorine _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? *(specify)*	WHERE ARE CHEMICALS STORED?	
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		see Pitcan
Calculated Fixed Radius	(1-year travel time)*	report
	(5-year travel time)*	Dec 2003
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see W205-1

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

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Appendix 1.3 Well Assessment Form

VILLAGE 205-3

BRITISH COLUMBIA — Ministry of Health and Ministry Responsible for Seniors; Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: WHISTLER VILLAGE W205-3

LEGAL DESCRIPTION OF WELL LOCATION: Between DAY SKIER LOT 3 & SKATE PARK

WATER SYSTEM LEGAL ADDRESS: RMOW 4490 BLACKCOMB WAY.

LATITUDE / LONGITUDE: 50°06' 59.61" / 122° 53' 08.3"

HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☐ digitized from _____ map (specify scale)

UTM COORDINATES

HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 3

DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) 21 MILE CREEK / BLACKCOMB CREEK. other (specify)

NUMBER OF CONNECTIONS: Maximum _____ Actual _____

POPULATION SERVED

WATER USE: ☐ domestic ☐ irrigation ☐ commercial ☐ industrial _____

WIN NO.: 809

EMS NO.: 809

WELL TAG NO.: 80578

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☑ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☐ yes ☑ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW

WELL OPERATOR'S PHONE NO.: (604) 932 5536

WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER

WELL OWNER: as above

WELL OWNER'S PHONE NO.: ( )

WELL OWNER'S ADDRESS

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: UNKNOWN

POSTAL CODE

WELL-DRILLER'S TELEPHONE NO.: ( )

DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1982

DATE OF LAST RECONSTRUCTION (YYYY MM DD)

TYPE OF WELL: ☐ drilled ☐ dug ☐ other (specify) _____

METHOD OF DRILLING: ☐ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify) _____

WELL LOG AVAILABLE? ☒ yes (attach) ☐ no

DEPTH OF WELL: 27.4 m or _____ ft.

DIAMETER OF WELL: 0.3 m or _____ in.

SCREEN LENGTH: 3.2 m or _____ ft.

DEPTH TO TOP OF SCREEN: 14.4 m or _____ ft.

WELL CAPACITY: 20.5 L/s or _____ Igpm

LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):

YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☑ manhole ☐ other (specify) _____ ☐ none

SURFACE SANITARY SEAL: grouted to _____ m or _____ ft. ☑ no surface seal ☐ pitless adapter

AVERAGE PUMPING RATE: 19 L/s or _____ Igpm

HOW WAS PUMPING RATE DETERMINED?

DEPTH OF INTAKE SETTING: _____ m or _____ ft.

PUMP AGE

ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal

HOW WAS VOLUME PUMPED DETERMINED? flow meter

PUMPING CAPACITY: 19 L/s or _____ Igpm

ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)

TYPE OF STORAGE: ☐ tank(s) ☑ reservoir ☐ other (specify) _____

STORAGE CAPACITY: _____ L or _____ Igal

COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 7.2 m or ____ ft.	HOW WAS WATER LEVEL MEASURED? ☑ well log ☐ wetted tape ☐ probe ☐ transducer
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? ____ m or ____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes *(specify)* ____ ☐ no

WELLHEAD ELEVATION (height above mean sea level): 670 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* ____		
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): Silt, sand and gravel	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: 0 m or ____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: 12 m or ____ ft.	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER: FITZSIMMONS Ck	AQUIFER CLASSIFICATION NUMBER (from MoELP): 387	AQUIFER CLASSIFICATION (from MoELP): 11B(12)

TYPE OF AQUIFER ☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☑ yes How many? 0 ☑ no	ANNUAL RAINFALL: 1229 m or ____ in.	
AQUIFER TRANSMISSIVITY: 3120 m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☒ from pumping test ☐ from specific capacity ☐ other *(specify)* ____		
HYDRAULIC GRADIENT: 0.11 %	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☒ other *(specify)* cross section		

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? September 1978	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☑ yes — Why? redeveloped to restore yield ☐ no
3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY?	Biweekly analysis for coliform bacteria. Annual analysis for potability quarterly analysis for TOC and HPC bacteria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes ☐ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes ☐ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes ☐ no		

Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

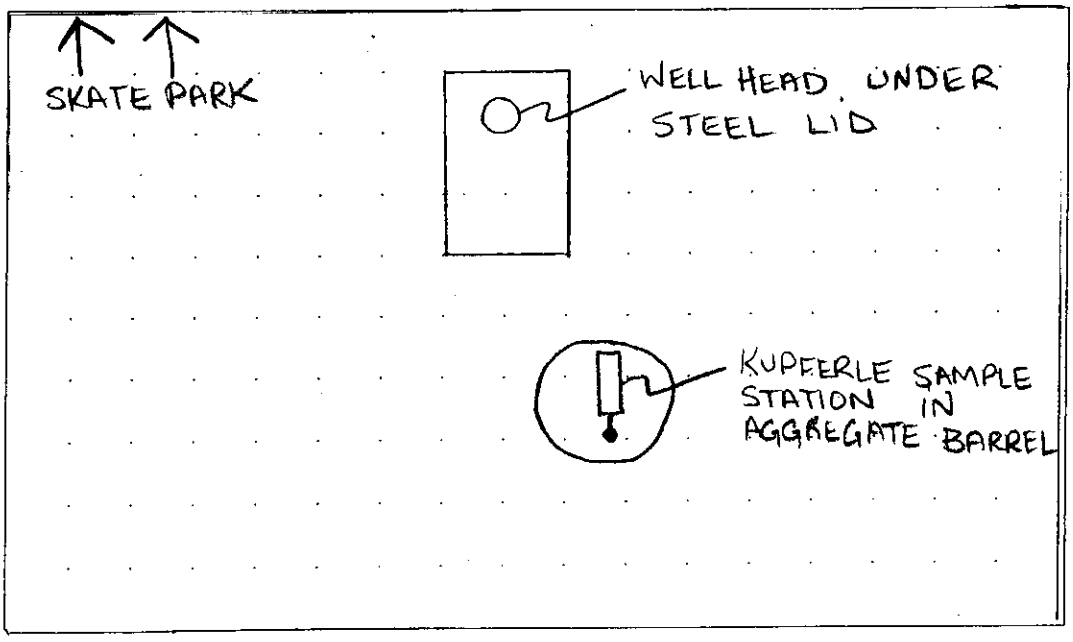
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	turbidity > MAC	1.38 – 2.00 NTU	May 96, Jan 00, Dec 02
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	elevated Fe > AO	0.79 – 0.94 mg/L	Dec 89, May 96

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



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Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☒ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm	Free Chlorine _____ ppm	WHAT IS THE RESIDUAL LEVEL OF TREATMENT?
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no			IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm	Free Chlorine _____ ppm	IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm Free Chlorine _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify)			WHERE ARE CHEMICALS STORED?
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no			IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)	
*attach calculation sheets	RADIUS (m)
Arbitrary Fixed Radius	see Pitcairn
Calculated Fixed Radius (1-year travel time)*	report Dec 2003
Calculated Fixed Radius (5-year travel time)*	
Calculated Fixed Radius (10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see W205-1

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage (specify)					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit (specify)					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

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Appendix 1.3 Well Assessment Form

W 211

BRITISH COLUMBIA — Ministry of Health and Ministry Responsible for Seniors; Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: WHISTLER VILLAGE W211

LEGAL DESCRIPTION OF WELL LOCATION: SOUTHEAST CORNER OF LOT 5028

WATER SYSTEM LEGAL ADDRESS: RMOW 4325 BLACKCOMB WAY. 4330 BLACKCOMB WAY.

LATITUDE / LONGITUDE: 50° 6' 59.3" / 122° 57' 8.2"

HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from 1:5000 map (specify scale)

UTM COORDINATES

HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM?

DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe)

NUMBER OF CONNECTIONS: Maximum _____ Actual _____

POPULATION SERVED

WATER USE: ☑ domestic ☐ irrigation ☑ commercial ☐ industrial other (specify) _____

WIN NO.: N/A

EMS NO.: UNKNOWN

WELL TAG NO.: N/A

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW — WELL OPERATOR'S PHONE NO.: (604) 932 5535

WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER

WELL OWNER: as above — WELL OWNER'S PHONE NO.: ( )

WELL OWNER'S ADDRESS:

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: FIELD DRILLING CONTRACTORS, Box 841, 25320 Fraser Highway, Aldergrove, BC

POSTAL CODE: V4W 2V1

WELL-DRILLER'S TELEPHONE NO.: (604) 857-2266

DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 2000 06 27

DATE OF LAST RECONSTRUCTION (YYYY MM DD):

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify) _____

METHOD OF DRILLING: ☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other (specify) _____

WELL LOG AVAILABLE? ☒ yes (attach) ☐ no

DEPTH OF WELL: 20.1 m or _____ ft.

DIAMETER OF WELL: _____ m or 10 in.

SCREEN LENGTH: 3 m or _____ ft.

DEPTH TO TOP OF SCREEN: 15.8 m or _____ ft.

WELL CAPACITY: 18.0 L/s or _____ Igpm

LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells): —

YIELD OF WATER-BEARING FRACTION(S): — L/s or — Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☒ other (specify) PITLESS ADAPTER ☐ none

SURFACE SANITARY SEAL: grouted to 6.1 m or _____ ft. ☐ no surface seal ☐ pitless adapter

AVERAGE PUMPING RATE: 12.1 L/s or _____ Igpm

HOW WAS PUMPING RATE DETERMINED? flow meter

DEPTH OF INTAKE SETTING: _____ m or _____ ft.

PUMP AGE

ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal

HOW WAS VOLUME PUMPED DETERMINED?

PUMPING CAPACITY: 12.1 L/s or _____ Igpm

ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify) flow meter

TYPE OF STORAGE: ☐ tank(s) ☑ reservoir ☐ other (specify) _____

STORAGE CAPACITY: _____ L or _____ Igal

COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 6.9 m or ____ ft.	HOW WAS WATER LEVEL MEASURED? ☑ well log ☐ wetted tape ☐ probe ☐ transducer
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? ____ m or ____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify)	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes (specify) ____ ☐ no
WELLHEAD ELEVATION (height above mean sea level): 670 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map (specify scale and contour interval) ☐ other (specify) ____	
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): silt, sand and gravel	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: 0 m or ____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: 11 m or ____ ft.	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER: FITZSIMMONS CK. 387	AQUIFER CLASSIFICATION NUMBER (from MoELP): 387	AQUIFER CLASSIFICATION (from MoELP): IIB (12)
TYPE OF AQUIFER: ☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☒ yes How many? 3 ☐ no	ANNUAL RAINFALL: 1229 m or ____ in.	
AQUIFER TRANSMISSIVITY: 1532 m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☒ from pumping test ☐ from specific capacity ☐ other (specify) ____		
HYDRAULIC GRADIENT: 0.11 %	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☒ other (specify) cross section		

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau report (Dec 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? September 1978	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☑ yes — Why? redeveloped to restore yield ☐ no
3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes	☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED? ☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes	☒ no	IF YES, WHAT ARE THEY? Biweekly analysis for coliform bacteria. Annual analysis for potability quarterly analysis for TOC and HPC bacteria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes	☐ no	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes	☐ no	
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes	☐ no	

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

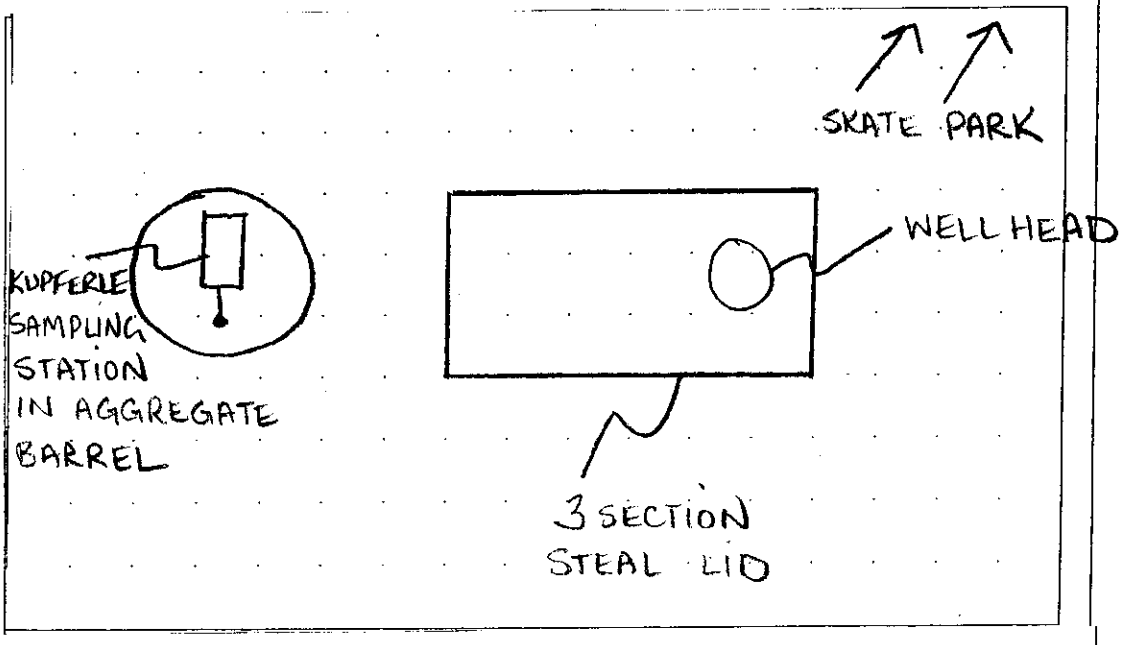
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	turbidity >MAC	1.00 - 1.80	Jul 00, Dec 01
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	NONE		

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



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Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☒ no

IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED? Total Chlorine _____ ppm Free Chlorine _____ ppm

WHAT IS THE RESIDUAL LEVEL OF TREATMENT?

IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no

IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after

WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM? Total Chlorine _____ ppm Free Chlorine _____ ppm

IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm Free Chlorine _____ ppm

WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify)

WHERE ARE CHEMICALS STORED?

IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no

IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)

*attach calculation sheets	RADIUS (m)
Arbitrary Fixed Radius	see Pitea.
Calculated Fixed Radius (1-year travel time)*	report Dec. 2003
Calculated Fixed Radius (5-year travel time)*	
Calculated Fixed Radius (10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see W205-1

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK _____ m or _____ ft.

GRADIENT TO SEPTIC FIELD ☐ upgrade ☐ downgrade ☐ same grade _____ % _____ %

DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS COMMUNITY SYSTEM _____ SYSTEM PER LOT _____

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W211

PROJECT: RMOW - Whistler Village	CASING STICKUP: 2 ft (0.6 m)	WELL NO: 4-06
PHCL PROJECT NO: R711109	STATIC WATER LEVEL: 22.70 ft (6.92 m)	PUMPING TEST: Yes
LOCATION: Southeast Corner of Lot 5028	COMPLETION DEPTH: 66 ft (20.1 m)	WATER ANALYSIS: Yes

DEPTH	DESCRIPTION	DEPTH (ft)	SYMBOL	WELL DATA	REMARKS
ft m	Ground Surface	0			10" (250 mm) diameter well casing stickup = 2 ft (0.6 m).
0 0	***Clay, Sand and Gravel*** 0 to 17 ft (0 to 5.2 m) - brown				20 ft (6.1 m) of 12" (300 mm) diameter surface casing was withdrawn during placement of a surface seal of bentonite grout.
15 5		-17			
20	***Clay*** 17 to 30 ft (5.2 to 9.1 m) - brown, gravelly, very compact				Static water level on July 4, 2000 = 22.7 ft (6.92 m), referenced to ground level.
30 10		-30			
35	***Clay*** 30 to 37 ft (9.1 to 11.3 m) - gravelly, sandy	-37			
40	***Sand and Gravel*** 37 to 51 ft (11.3 to 15.5 m) - trace of clay				10" casing shoe at 51 ft (15.5 m).
50 15		-51			Top of 10 to 8" (250 to 200 mm) reducing K-type packer, and 2 ft (0.6 m) long riser pipe, at top of 17.75 ft (5.4 m) long well screen assembly = 48.25 ft (14.7 m).
55	***Gravel*** 51 to 62 ft (15.5 to 18.9 m) - with sand				10 ft (3.0 m) of 0.150" (3.81 mm) slot Johnson stainless steel screen exposed from 51.7 to 61.7 ft (15.8 to 18.8 m).
60		-62			
65 20	***Sand*** 62 to 69 ft (18.9 to 21.0 m) - brown, trace of gravel, with more gravel from 19.5 to 20.1 m (64 to 66 ft)	-69			4.3 ft (1.3 m) long blank pipe. Flat steel plate at bottom of well screen assembly = 66 ft (20.1 m).
70	***Sand*** 69 to 73 ft (21.0 to 22.3 m) - silty, with gravel	-73 -74			
75	***Clay*** 73 to 74 ft (22.3 to 22.6 m) - grey, with silt				Note that the i.d. of the 8" (200 mm) nominal diameter (telescopic) well screen = 6.6" (168 mm).
80					

CONTRACTOR: Field Drilling Contractors	DATE: 06/27/00
DRILLING METHOD: Cable Tool	BY: cp
PAGE: 1 of 1	FIGURE: 3

PACIFIC HYDROLOGY CONSULTANTS LTD.
Consulting Hydrogeologists
Suite 201, 1537 West 8th Avenue
VANCOUVER, B.C. Canada V6J 1T5
Telephone: (604) 730-6990

Appendix 1.3 Well Assessment Form

W202

BRITISH COLUMBIA — Ministry of Health and Ministry Responsible for Seniors; Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: Alpine Meadows W202	LEGAL DESCRIPTION OF WELL LOCATION: 8801 Hwy 99
WATER SYSTEM LEGAL ADDRESS:	
LATITUDE / LONGITUDE: 50° 09' 01" / 122° 57' 43.5"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☐ digitized from 1:20,000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 2 — DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) Yes - Agnew Creek
NUMBER OF CONNECTIONS: Maximum _____ Actual 750	POPULATION SERVED — WATER USE: ☑ domestic ☑ irrigation ☐ commercial ☐ industrial ☐ other (specify) _____
WIN NO.: 804	EMS NO.: 804 — WELL TAG NO.: 41389

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no — Back-up supply ☐ yes ☐ no — Emergency supply ☐ yes ☐ no — Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER	
WELL OWNER: same as above	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS:	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: DRILLWELL ENTERPRISES 4994 Polkey Road Duncan, BC	POSTAL CODE: V9L 4T8 — WELL-DRILLER'S TELEPHONE NO.: (250) 746-5268
	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1979 — DATE OF LAST RECONSTRUCTION (YYYY MM DD): 2003

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify) _____	METHOD OF DRILLING: N/A ☐ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify) _____		WELL LOG AVAILABLE? ☒ yes (attach) ☐ no
DEPTH OF WELL: 21.3 m or _____ ft.	DIAMETER OF WELL: .250 m or _____ in.	SCREEN LENGTH: 9.5 m or _____ ft.	DEPTH TO TOP OF SCREEN: 10.0 m or _____ ft.
WELL CAPACITY: 34.7 L/s or _____ Igpm	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):		YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm
WELLHEAD ENCLOSURE: ☒ pump house ☐ manhole ☐ other (specify) _____ ☐ none	SURFACE SANITARY SEAL: N/A grouted to _____ m or _____ ft. ☐ no surface seal ☐ pitless adapter		
AVERAGE PUMPING RATE: N/A _____ L/s or _____ Igpm	HOW WAS PUMPING RATE DETERMINED?	DEPTH OF INTAKE SETTING: _____ m or _____ ft.	PUMP AGE
ANNUAL VOLUME OF WATER PUMPED: N/A _____ L or _____ Igal	HOW WAS VOLUME PUMPED DETERMINED?		
PUMPING CAPACITY: N/A _____ L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)		
TYPE OF STORAGE: ☐ tank(s) ☑ reservoir ☐ other (specify) _____	STORAGE CAPACITY: _____ L or _____ Igal	COMMON INLET OR OUTLET? ☐ yes ☐ no	
ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data	*NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).*		

Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 4.6 m or ____ ft.	HOW WAS WATER LEVEL MEASURED? ☑ well log ☐ wetted tape ☐ probe ☐ transducer	
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? ____ m or ____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes *(specify)* ____ ☐ no	
WELLHEAD ELEVATION (height above mean sea level): 645 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☑ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* ____		
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): SILT / CLAY	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: ____ m or 8 ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: ____ m or 37 ft.	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☑ yes ☐ no	NAME OF AQUIFER: MINTEEN MILE CK 388	AQUIFER CLASSIFICATION NUMBER (from MoELP): 388	AQUIFER CLASSIFICATION (from MoELP): IIB (12)
TYPE OF AQUIFER: ☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☑ yes How many? 2 ☐ no	ANNUAL RAINFALL: 1229 m or ____ in.	
AQUIFER TRANSMISSIVITY: n/a ____ m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☐ from pumping test ☐ from specific capacity ☐ other *(specify)* ____		
HYDRAULIC GRADIENT: 0.018 (1.8%)	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☑ from well water levels ☐ from topography ☐ other *(specify)*		

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau report (Dec. 2003).

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1. HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? 1979.

2. HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☑ yes — Why? redeveloped - reduced efficiency ☐ no

3. IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know

IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4. BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☑ yes ☐ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY?	biweekly bacteriological (coliform) analysis
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes ☐ no		quarterly analysis for TOC and HPC bacteria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS?	☐ yes ☒ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes ☐ no		annual analysis for potability

Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

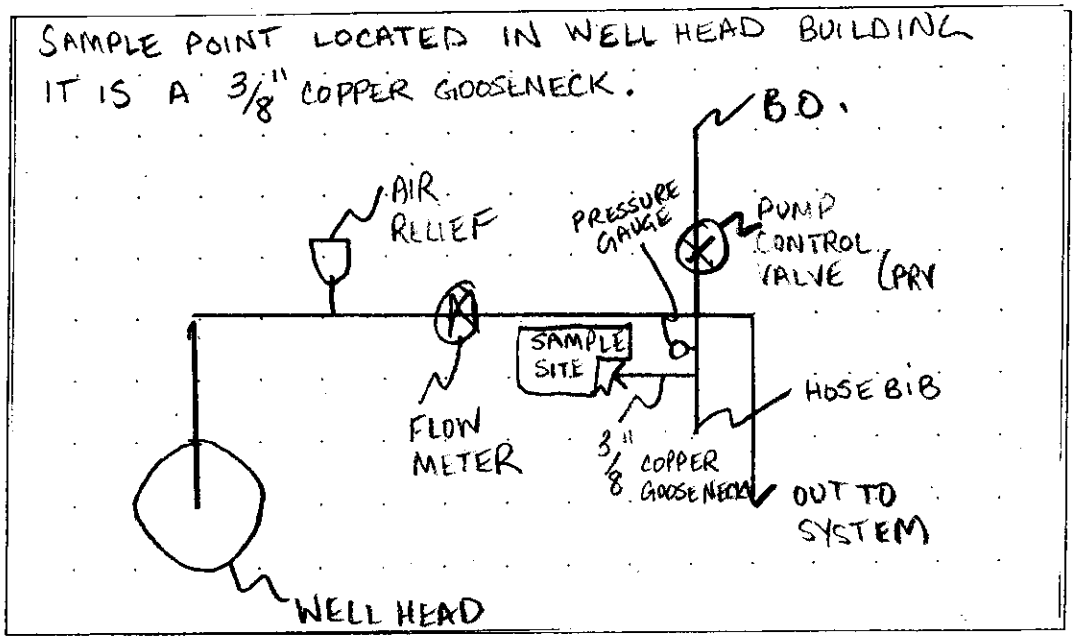
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG[1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	Total coliforms 7/29/03 8/26/03 9/03/03 10/07/03	2 counts/100mL 140 " 2 " 3 "	none
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	NONE		
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	NONE		

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☒ no

IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED? Total Chlorine _____ ppm Free Chlorine _____ ppm

WHAT IS THE RESIDUAL LEVEL OF TREATMENT?

IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no

IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after

WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM? Total Chlorine _____ ppm Free Chlorine _____ ppm

IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm Free Chlorine _____ ppm

WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify)

WHERE ARE CHEMICALS STORED?

IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no

IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)

*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		See Piteau Report - Dec 2003
Calculated Fixed Radius	(1-year travel time)*	
	(5-year travel time)*	
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m

Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☑ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☑ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells		✓			test wells
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare		✓			
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK N/A _____ m or _____ ft.

GRADIENT TO SEPTIC FIELD ☐ upgrade ☐ downgrade ☐ same grade _____ % _____ % N/A

DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS

COMMUNITY SYSTEM

SYSTEM PER LOT

W202

BRITISH COLUMBIA

Well Tag Number 000000041389

Owner: MUNICIPALITY OF WHIS

Address: NEAR NINETEEN MILE CK

Area:

WELL LOCATION:
NEW WESTMINSTER Land District
District Lot 1756 Plan Lot
Township Section Range
Indian Reserve Meridian Block
Quarter
Island
BCGS Number (NAD 27) 092J016312 Well 1

Well Use Unknown Well Use
Construction Method Drilled
Diameter 10.0 inches
Well Depth 70.0 feet
Elevation 0
Bedrock Depth 61 feet
Screen from 32 to 64 feet
Slot Size 1 Slot Size 2
Slot Size 3 Slot Size 4

Construction Date 19790101

Driller Drillwell Enterprises
License Number

PRODUCTION DATA AT TIME OF DRILLI
Well Yield 351 USGM
Artesian Flow
Static Level 15 feet

Water Utility
Lithology Info Flag Y
Pump Test Info Flag Y
File Info Flag
Sieve Info Flag
Screen Info Flag
Water Chemistry Info Flag Y
Field Chemistry Info Flag
Site Info (SEAM)
Other Info Flag

GENERAL REMARKS:

From	0	To	1 Ft.	river silt
From	1	To	8 Ft.	coarse gravel
From	8	To	45 Ft.	silty coarse sand and medium gravel
From	45	To	57 Ft.	clay
From	57	To	61 Ft.	gravel
From	61	To	67 Ft.	bedrock, soft
From	67	To	70 Ft.	solid bedrock, drill open

7 rows selected.

W202

Date entered to WELL

Appendix 1.3 Well Assessment Form

W210

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME	LEGAL DESCRIPTION OF WELL LOCATION
ALPINE MEADOWS W210	8010 Alpine Way.
WATER SYSTEM LEGAL ADDRESS	
LATITUDE / LONGITUDE 50° 08' 55.5" 122° 57' 37.5"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☐ digitized from 1:20,000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 2 / DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) Yes - Agnew Creek
NUMBER OF CONNECTIONS Maximum _____ Actual 750	POPULATION SERVED / WATER USE ☑ domestic ☑ irrigation ☐ commercial ☐ industrial ☐ other (specify)

WIN NO.	EMS NO.	WELL TAG NO.
805	805	80580

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR	WELL OPERATOR'S PHONE NO.
RMOW	(604) 932 5535
WELL OPERATOR'S ADDRESS	
4325 BLACKCOMB WAY	
WELL OWNER	WELL OWNER'S PHONE NO.
	( )
WELL OWNER'S ADDRESS	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS	POSTAL CODE / DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD)
COLUMBIA WATER WELLS 25188 - 52nd Avenue Aldergrove, BC	V4W 1G2 / 1994 08 26
	WELL-DRILLER'S TELEPHONE NO. (604) 857-0008 / DATE OF LAST RECONSTRUCTION (YYYY MM DD) 1997 09 14

TYPE OF WELL	METHOD OF DRILLING	WELL LOG AVAILABLE?
☒ drilled ☐ dug ☐ other (specify)	☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other (specify)	☒ yes (attach) ☐ no

DEPTH OF WELL	DIAMETER OF WELL	SCREEN LENGTH	DEPTH TO TOP OF SCREEN
23.2 m or _____ ft.	_____ m or 8 in.	4.6 m or — ft.	14.3 m or — ft.

WELL CAPACITY	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):	YIELD OF WATER-BEARING FRACTION(S)
22.1 L/s or — Igpm	—	— L/s or — Igpm

WELLHEAD ENCLOSURE	SURFACE SANITARY SEAL
☒ pump house ☐ manhole ☐ other (specify) _____ ☐ none	N/A grouted to _____ m or _____ ft. ☐ no surface seal ☐ pitless adapter

AVERAGE PUMPING RATE	HOW WAS PUMPING RATE DETERMINED?	DEPTH OF INTAKE SETTING	PUMP AGE
_____ L/s or _____ Igpm		_____ m or _____ ft.	

ANNUAL VOLUME OF WATER PUMPED	HOW WAS VOLUME PUMPED DETERMINED?
_____ L or _____ Igal	
PUMPING CAPACITY	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)
_____ L/s or _____ Igpm	

TYPE OF STORAGE	STORAGE CAPACITY	COMMON INLET OR OUTLET?
☐ tank(s) ☐ reservoir ☐ other (specify) _____	_____ L or _____ Igal	☐ yes ☐ no

ATTACHED INFORMATION	NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).
☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data	

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see report entitled "Test Production Well at Site C for proposed Whistler Secondary School". MacLeod Geotechnical Ltd. 09/23/1994 (RMOW RPT NO. GR 48).

Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 3.8 m or ____ ft.	HOW WAS WATER LEVEL MEASURED? ☒ well log ☐ wetted tape ☐ probe ☐ transducer
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? ____ m or ____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify)	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes (specify) ____ ☐ no
WELLHEAD ELEVATION (height above mean sea level): 645.5 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☐ topographic ☐ map (specify scale and contour interval) ☒ other (specify) well log	
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till): SILTY SAND	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG: 0 m or ____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG: 9 m or ____ ft.	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER: Ninteen Mile Creek 388	AQUIFER CLASSIFICATION NUMBER (from MoELP): 388	AQUIFER CLASSIFICATION (from MoELP): II B (12)
TYPE OF AQUIFER: ☐ unconsolidated, unconfined ☐ unconsolidated, confined ☒ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☒ yes How many? 2 ☐ no	ANNUAL RAINFALL: 1229 m or ____ in.	
AQUIFER TRANSMISSIVITY: 620 m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☑ from pumping test ☐ from specific capacity ☐ other (specify) ____	
HYDRAULIC GRADIENT: 0.018 (1.8%)	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☑ from well water levels ☐ from topography ☐ other (specify)	

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

See Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? 1979	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☑ yes — Why? redeveloped to maintain yield ☐ no
3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY?	Bi weekly analysis for bacteriological
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes ☐ no		Annual analysis for potability
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes ☐ no		quarterly analysis for TOC and HPC bactria
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes ☐ no		

Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

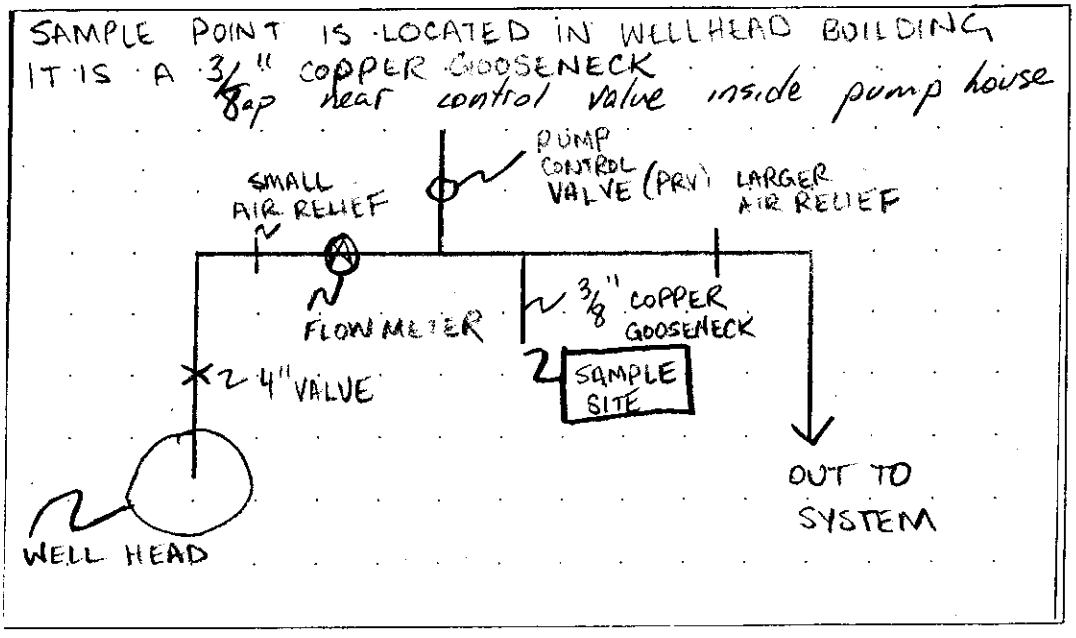
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	NONE		
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	NONE		

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☑ no

IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED? Total Chlorine _____ ppm Free Chlorine _____ ppm

WHAT IS THE RESIDUAL LEVEL OF TREATMENT?

IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no

IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after

WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM? Total Chlorine _____ ppm Free Chlorine _____ ppm

IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm Free Chlorine _____ ppm

WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify)

WHERE ARE CHEMICALS STORED?

IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no

IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)

*attach calculation sheets	RADIUS (m)
Arbitrary Fixed Radius	see Pitcau
Calculated Fixed Radius (1-year travel time)*	report
Calculated Fixed Radius (5-year travel time)*	Dec. 2003
Calculated Fixed Radius (10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m

Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see W202.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage (specify)					
Injection wells					
Abandoned wells		✓			test wells
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare		✓			
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit (specify)					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK _____ m or _____ ft.

GRADIENT TO SEPTIC FIELD ☐ upgrade ☐ downgrade ☐ same grade _____ % _____ %

DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS

COMMUNITY SYSTEM

SYSTEM PER LOT

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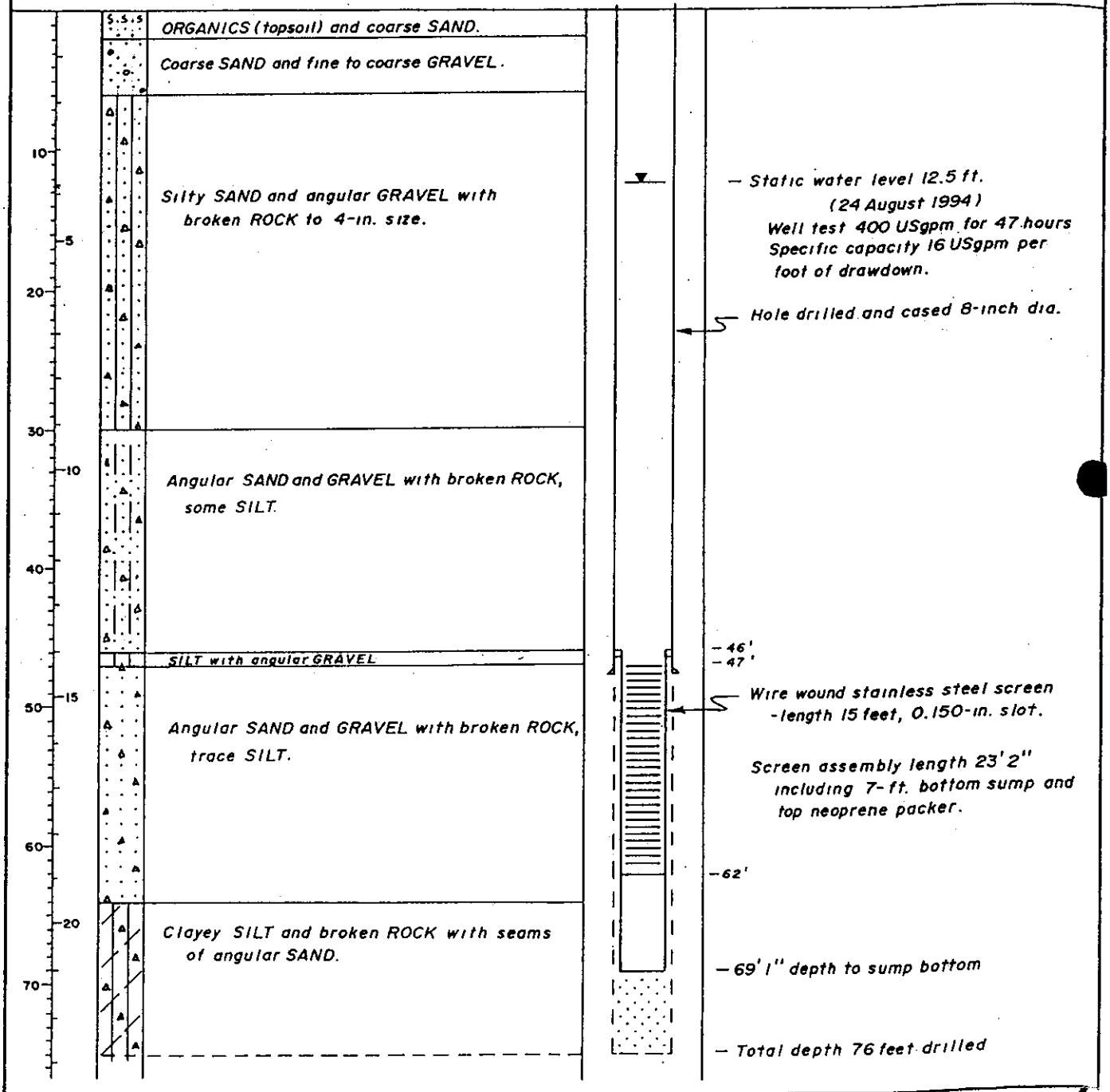
W210

DRILLHOLE NO. TEST WELL - SITE C

LOCATION SCHOOL ACCESS ROAD, ACROSS HWY. 99 FROM ALPINE WAY

EQUIPMENT CABLE TOOL DRILL - B.E. 22W

GROUND ELEVATION 645.5 m ± (GEODETIC)



SCHOOL DISTRICT NO. 48	MACLEOD GEOTECHNICAL LTD. WEST VANCOUVER B.C.			
WHISTLER SECONDARY SCHOOL	LOG OF DRILLHOLE: TEST WELL	DATE: 26 AUG 94	BY: HWR	JOB: 069
		SHEET: 1 OF 1	DRAWING: 069-G202	

Appendix 1.3 Well Assessment Form

W213

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: ALPINE MEADOWS W213	LEGAL DESCRIPTION OF WELL LOCATION: 8170 CAMINO DR.
WATER SYSTEM LEGAL ADDRESS:	
LATITUDE / LONGITUDE: 50°8'37.7" / 122°57'33.1"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from 1:4000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 2 — DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) Yes - Agnew Creek
NUMBER OF CONNECTIONS: Maximum _____ Actual 750	POPULATION SERVED — WATER USE: ☑ domestic ☑ irrigation ☐ commercial ☐ industrial ☐ other (specify) _____
WIN NO.	EMS NO. UNKNOWN — WELL TAG NO. 80581

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. | EMS NO. = MoELP's site number for the water chemistry on their database. | BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER	
WELL OWNER	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: COLUMBIA WATER WELLS (1986). 25188 - 52nd Avenue Aldergrove, BC	POSTAL CODE: V4W 1G2 — WELL-DRILLER'S TELEPHONE NO.: (604) 857 0008
	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1999 10 06 — DATE OF LAST RECONSTRUCTION (YYYY MM DD): 2003

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify)	METHOD OF DRILLING: ☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other (specify)		WELL LOG AVAILABLE? ☒ yes (attach) ☐ no
DEPTH OF WELL: 46.7 m or _____ ft.	DIAMETER OF WELL: _____ m or 8 in.	SCREEN LENGTH: 4.5 m or _____ ft.	DEPTH TO TOP OF SCREEN: 42.1 m or _____ ft.
WELL CAPACITY: 18.9 L/s or _____ Igpm	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):		YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm
WELLHEAD ENCLOSURE: ☐ pump house ☑ manhole ☐ other (specify) _____ ☐ none	SURFACE SANITARY SEAL: grouted to 24.0 m or _____ ft. ☐ no surface seal ☒ pitless adapter		
AVERAGE PUMPING RATE: _____ L/s or _____ Igpm	HOW WAS PUMPING RATE DETERMINED?	DEPTH OF INTAKE SETTING: _____ m or _____ ft.	PUMP AGE
ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal	HOW WAS VOLUME PUMPED DETERMINED?		
PUMPING CAPACITY: _____ L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)		
TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____		STORAGE CAPACITY: _____ L or _____ Igal	COMMON INLET OR OUTLET? ☐ yes ☐ no
ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data	NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).		

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Appendix 1.3 Well Assessment Form (continued)

* artesian flowing well

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: — m or — ft.	HOW WAS WATER LEVEL MEASURED? ☐ well log ☐ wetted tape ☐ probe ☐ transducer	
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? ____ m or ____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify) 384s	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes (specify) ____ ☒ no	
WELLHEAD ELEVATION (height above mean sea level) 650 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map (specify scale and contour interval) ☐ other (specify) ____		
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till) silt	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG 0 m or ____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG 43 m or ____ ft.	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER NINETEEN MILE CK.	AQUIFER CLASSIFICATION NUMBER (from MoELP) 388	AQUIFER CLASSIFICATION (from MoELP) IIB (12)
TYPE OF AQUIFER ☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☒ yes How many? 2 ☐ no	ANNUAL RAINFALL 1229 m or ____ in.	
AQUIFER TRANSMISSIVITY 600 m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☑ from pumping test ☐ from specific capacity ☐ other (specify) ____		
HYDRAULIC GRADIENT N/A	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☐ other (specify)		

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

See Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE? 1978

2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☑ yes — Why? redeveloped - high turbidity ☐ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☒ no ☐ don't know

IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes	☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED? ☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes	☒ no	IF YES, WHAT ARE THEY? Biweekly coliform monitoring
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes	☐ no	Annual analysis for potability
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes	☐ no	quarterly analysis for TOC & HPC bacteria
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☐ yes	☒ no	

see report entitled "Completion Report, 1999 Groundwater Exploration in North Whistler". Pacific Hydrology Consultants Ltd. Feb 15, 2000.

Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

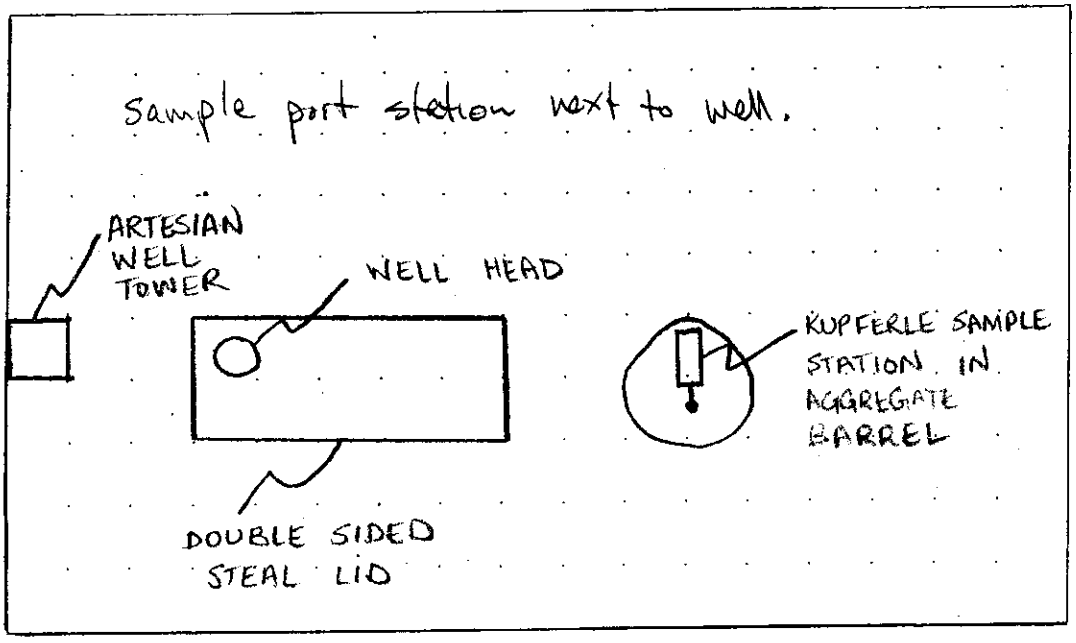
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	NONE		
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	NONE		NO

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☑ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other (specify) _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm	Free Chlorine _____ ppm
WHAT IS THE RESIDUAL LEVEL OF TREATMENT?		
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☒ yes ☐ no	IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after	
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm	Free Chlorine _____ ppm
IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)?	Total Chlorine _____ ppm	Free Chlorine _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify)	WHERE ARE CHEMICALS STORED?	
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		see Phase 1 report Dec. 2003
Calculated Fixed Radius	(1-year travel time)*	145
	(5-year travel time)*	325
	(10-year travel time)*	460

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes (identify on map) ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells				✓	test wells
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare			✓		
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course			✓		Nicklaus North
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

W213

PROJECT: North Whistler Groundwater Evaluation	CASING STICKUP: 0.6 m (2 ft)	WELL NO: TW1-99
PHCL PROJECT NO: R711106	STATIC WATER LEVEL: Flowing	PUMPING TEST: 11/26/99
LOCATION: Meadow Park Recreation Centre	COMPLETION DEPTH: 46.7 m (153.25 ft)	WATER ANALYSIS:. Yes

Depth (ft / m)	Description	Depth (ft)	Symbol	Well Data	Remarks
0 / 0	Ground Surface	0			
	Sand Fill(?), brown, containing stones				200 mm (8") diameter well casing stickup = 0.6 m (2 ft).
5	Soil, brown, silty, sandy, containing wood, peat and broken stones	-10			Bentonite grout surface seal, placed as 24 m (79 ft) of 250 mm (10") diameter casing recovered.
10	Clay, grey, thick	-15			
15 / 5	Silt, grey, packed, containing wood	-20			
20		-25			
25	Silt, dark, packed, containing wood	-30			
30	Peat and Wood, some grey silt	-35			
35 / 10	Silt, grey, containing wood and peat	-40			11/26/99 - natural artesian flow of 60 USgpm (50 igpm; 3.8 lps).
40		-45			
45		-50			
50 / 15	Silt, grey, traces of peat and some wood	-55			
55	Silt, darker grey	-60			
60		-65			
65 / 20		-70			
70		-75			
75	Silt, brown, firm with seams of brown sand and stones; making water	-80			
80 / 25	Silt, grey, containing seams of stones and gritty sand	-85			
85		-90			
90		-95			
95	Silt, grey, containing some wood	-100			
100 / 30		-105			
105		-110			
110	Silt, grey, containing seams of coarse sand and wood	-115			
115 / 35		-120			
120	Sand, fine, packed, silty; fairly tight	-125			
125	Silt, grey and wood, some fine silty sand	-130			K-type packer and 0.6 m (2 ft) of riser pipe = 42.0 m (137.75 ft).
130 / 40	Sand, grey, packed, silty, fine, traces of gritty sand; tight	-135			
135	Gravel, grey, silty, coarse; sharp silty wash	-140			3.0 m (10 ft) of 3.81 mm (0.150") slot, 200 mm nominal diameter (telescopic) Johnson stainless steel well screen.
140	Sand, grey, silty, coarse, broken gravel	-145			
145	Silt, grey, packed, broken gravel and sharp cobbles; tight	-150			
150 / 45	Broken Rock, green and grey brown; making more water	-155			Flat steel plate at bottom of well screen assembly = 46.7 m (153.25 ft).
155		-160			
160	Bedrock, solid	-165			
165 / 50		-170			
170					

CONTRACTOR: CWW (1986) Ltd.	DATE: 10/06/99
DRILLING METHOD: Cable Tool	BY: cp
PAGE: 1 of 1	FIGURE: 3

PACIFIC HYDROLOGY CONSULTANTS LTD.
Consulting Hydrogeologists
Suite 201, 1537 West 8th Avenue
VANCOUVER, B.C. Canada V6J 1T5
Telephone: (604) 730-6990

FUNCTION JUNCTION W212-1

Appendix 1.3 Well Assessment Form

BRITISH COLUMBIA — Ministry of Health and Ministry Responsible for Seniors; Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: FUNCTION JUNCTION W212-1	LEGAL DESCRIPTION OF WELL LOCATION: RMOW's Re use it Centr
WATER SYSTEM LEGAL ADDRESS: RMOW	1005 LYNHAM RD.
LATITUDE / LONGITUDE: 50° 5' 14" / 123° 2' 10"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☑ digitized from 1:10000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? 1 — DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) 21 MILE CK / BLACKCOMB CK.
NUMBER OF CONNECTIONS: Maximum _____ Actual _____	POPULATION SERVED — WATER USE: ☑ domestic ☐ irrigation ☐ commercial ☐ industrial other (specify) _____
WIN NO.: N/A	EMS NO.: N/A — WELL TAG NO.: N/A

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. | EMS NO. = MoELP's site number for the water chemistry on their database. | BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER	
WELL OWNER: as above	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: FIELD DRILLING CONTRACTORS, BOX 841 25320 FRASER HIGHWAY, ALDERGROVE, BC	POSTAL CODE: V4W 2V1 — WELL-DRILLER'S TELEPHONE NO.: (604) 857 2266
	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 2000 10 — DATE OF LAST RECONSTRUCTION:

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify)	METHOD OF DRILLING: ☐ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify)		WELL LOG AVAILABLE? ☐ yes (attach) ☐ no
DEPTH OF WELL: 19.8 m or _____ ft.	DIAMETER OF WELL: _____ m or 16 in.	SCREEN LENGTH: 9.2 m or _____ ft.	DEPTH TO TOP OF SCREEN: 10.6 m or _____ ft.
WELL CAPACITY: 41 L/s or _____ Igpm	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):		YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm
WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☒ other (specify) PITLESS ADAPTER ☐ none	SURFACE SANITARY SEAL: grouted to _____ m or _____ ft. ☑ no surface seal ☐ pitless adapter		
AVERAGE PUMPING RATE: _____ L/s or _____ Igpm	HOW WAS PUMPING RATE DETERMINED? n/a	DEPTH OF INTAKE SETTING: _____ m or _____ ft.	PUMP AGE
ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal	HOW WAS VOLUME PUMPED DETERMINED? n/a		
PUMPING CAPACITY: 41 L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)		
TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____	STORAGE CAPACITY: _____ L or _____ Igal		COMMON INLET OR OUTLET? ☐ yes ☐ no
ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data	*NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).*		

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL: ____ m or ____ ft.	DEPTH TO NON-PUMPING WATER LEVEL: 4.54 m or ____ ft.	HOW WAS WATER LEVEL MEASURED? ☐ well log ☐ wetted tape ☒ probe ☐ transducer
IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW? ____ m or ____ ft.	HOW IS PRESSURE HEAD AND FLOW MEASURED? (specify)	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE? ☐ yes (specify) ____ ☐ no
WELLHEAD ELEVATION (height above mean sea level): 600 m or ____ ft.	HOW WAS ELEVATION DETERMINED? ☐ survey ☐ altimeter ☒ topographic ☐ map (specify scale and contour interval) ☐ other (specify) ____	
TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till)	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG ____ m or ____ ft.	THICKNESS OF CONFINING LAYER FROM WELL LOG ____ m or ____ ft.
		HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER? ☒ yes ☐ no	NAME OF AQUIFER: Alpha Lk @ Sprout	AQUIFER CLASSIFICATION NUMBER (from MoELP): 395
		AQUIFER CLASSIFICATION (from MoELP): IB (12)
TYPE OF AQUIFER ☒ unconsolidated, unconfined ☐ unconsolidated, confined ☐ bedrock	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL? ☒ yes How many? 1 ☐ no	ANNUAL RAINFALL: 1229 m or ____ in.
AQUIFER TRANSMISSIVITY: ____ m^2/d or ____ Igpd/ft.	HOW WAS TRANSMISSIVITY DETERMINED? ☐ from pumping test ☐ from specific capacity ☐ other (specify) ____	
HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED? ☐ from well water levels ☐ from topography ☐ other (specify)	

See Dec 03 rpt.

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

see Piteau report (Dec. 2003)

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE?

2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED? ☐ yes — Why? ____ ☐ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS? ☐ yes ☐ no ☐ don't know

IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

Fe, Mn in exceedence of AO
Al, turbidity in excess of MAC (one occurence).

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes	☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED? ☒ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes	☒ no	IF YES, WHAT ARE THEY? Biweekly analysis for coliform bactria. Annual analysis for potability. quarterly analysis for TOC and HPC bactria
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE? N/A	☐ yes	☐ no	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS? N/A	☐ yes	☐ no	
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☒ yes	☐ no	

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Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

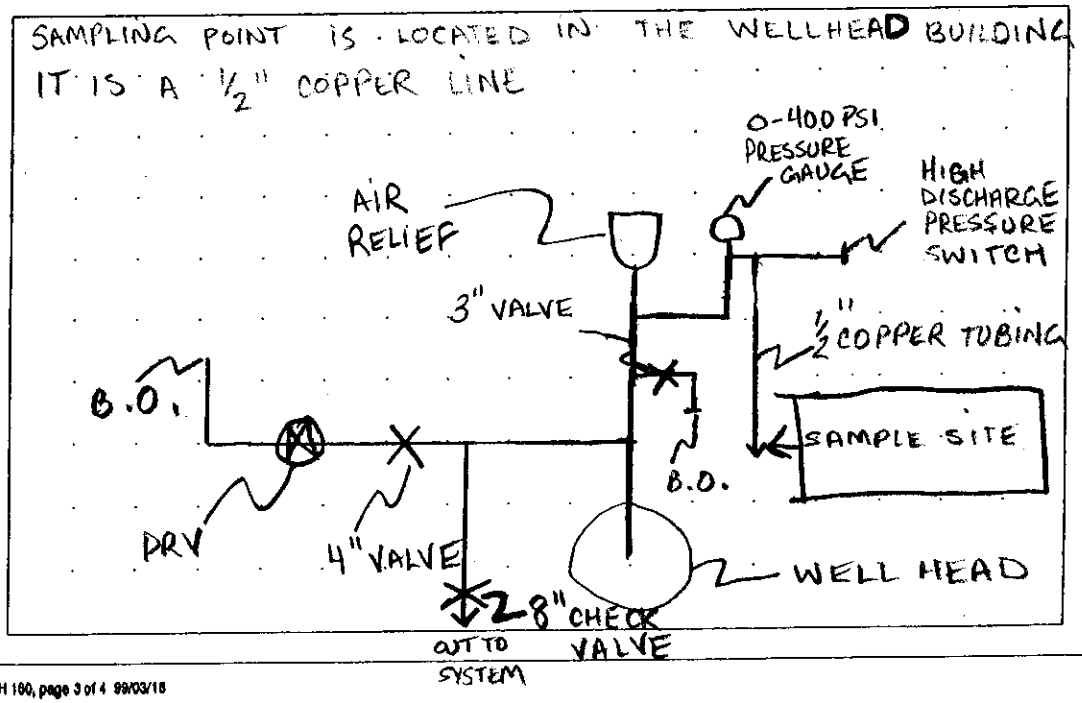
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG[1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	NONE		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	NONE		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	NONE	1.09 NTU	turbidity in excess May '02
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	NONE		
Metals* Calcium, iron, magnesium, manganese, sodium	elevated Fe, Mn	0.42 0.445 - 2.76 0.05 - 0.06	March 2002 Al > MAC Fe > AO Mn > AO

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? [X] yes [ ] no | IF YES, TYPE OF TREATMENT [X] disinfection [ ] filtration [ ] carbon filter [ ] air stripper [ ] water softener [ ] other (specify) _____

PURPOSE OF TREATMENT: disinfection of drinking water supply.

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED? Total Chlorine _____ ppm | Free Chlorine 0.35 ppm

WHAT IS THE RESIDUAL LEVEL OF TREATMENT?

IS THERE ANY WATER STORAGE IN THE SYSTEM? [X] yes [ ] no

IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? [ ] before [ ] after

WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM? Total Chlorine _____ ppm | Free Chlorine 0.20 ppm

IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine — ppm | Free Chlorine — ppm

WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? (specify): N/A

WHERE ARE CHEMICALS STORED? N/A

IS THERE PROPER STORAGE FOR THESE CHEMICALS? [ ] yes [ ] no

IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL? 2 SEPARATE BUILDINGS

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)

*attach calculation sheets	RADIUS (m)
Arbitrary Fixed Radius	see Pitcan report Dec. 2003
Calculated Fixed Radius (1-year travel time)*	
Calculated Fixed Radius (5-year travel time)*	
Calculated Fixed Radius (10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? [ ] yes (identify on map) [ ] no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? [ ] yes (identify on map) [ ] no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage (specify)		✓			Industrial Activities
Injection wells					
Abandoned wells		✓			test wells
Landfills, dumps, disposal areas					
Commercial/industrial sites		✓			
Known hazardous materials clean-up site		✓			
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					possibly (not sure)
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit (specify)					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK _____ m or _____ ft.

GRADIENT TO SEPTIC FIELD [ ] upgrade [ ] downgrade [ ] same grade _____ % _____ %

DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS: COMMUNITY SYSTEM | SYSTEM PER LOT

W212-1

INTRAWEST CORPORATION - SPRING CREEK PRODUCTION WELL NO. 3-00

Location: RMoW's Re-Use-It Centre, directly northwest of the intersection of Highway 99 and Alpha Lake Road, in the Function Junction area of South Whistler.

Contractor: Field Drilling Contractors Ltd. Date of Installation: October 2000.

Driller's Litholog:

0.0 - 2.7 m (0 - 9 ft)	sand containing gravel and wood
2.7 - 5.8 m (9 - 19 ft)	brown, fine to medium, sand, trace of gravel
5.8 - 8.5 m (19 - 28 ft)	gravel, very coarse, very dense (compact)
8.5 - 8.8 m (28 - 29 ft)	coarse sand, with gravel up to 50 mm (2"); water-bearing, very red wash
8.8 - 11.6 m (29 - 38 ft)	very coarse gravel up to small boulders, with less than 10% under 13 mm (½"); too coarse to drive and bail but looser than above 8.8 m
11.6 - 12.8 m (38 - 42 ft)	brown, very loose, very coarse sand
12.8 - 13.4 m (42 - 44 ft)	fine to medium sand to very coarse gravel too large to bail
13.4 - 16.8 m (44 - 55 ft)	medium to coarse sand, trace of 25 to 50 mm (1 to 2") gravel
16.8 - 18.6 m (55 - 61 ft)	brown, fine to medium sand containing silt layers
18.6 - 18.9 m (61 - 62 ft)	very sandy silt
18.9 - 19.8 m (62 - 65 ft)	compact silt, trace of sand (drilled open hole).

Static water level: 4.54 m (14.90 ft), referenced to ground, on November 2, 2000, below a datum of 0.67 m (2.2 ft) above ground, prior to the start of test pumping.

Diameter: 400 mm (16"), with a wall thickness of 9.52 mm (0.375") and stickup of 0.6 m (2 ft); 4.1 m (13.6 ft) of 500 mm (20") diameter surface casing recovered during placement of a surface seal of bentonite grout.

Completion: Spring Creek Production Well No. 3-00 (PW No. 3-00) is completed with a 9.2 m (30' 3") long well screen assembly set from 10.6 to 19.8 m (34.75 to 65 ft). The assembly contains 350 mm (14") pipe-size diameter Johnson stainless steel well screen, with an i.d. of 333 mm (13⅛") and o.d. of 356 mm (14"), and blank pipe, as follows:

at top at 10.6 m (34.75 ft)	400 to 350 mm (16 to 14") reducing K-type packer and 0.3 m (1 ft) long riser pipe ("O" wind), 0.5 m (1.5 ft) long
0.6 m (2 ft) of	6.35 mm (0.250") slot screen
1.2 m (4 ft) of	2.03 mm (0.080") slot screen
2.1 m (6.9 ft) of	356 mm (14") diameter pipe from 12.9 to 15.0 m (42.2 to 49.2 ft)
1.5 m (5 ft) of	1.27 mm (0.050") slot screen
1.8 m (6 ft) of	0.51 mm (0.020") slot screen
1.5 m (4.8 ft) of	356 mm (14") diameter pipe
at bottom at 19.8 m (65 ft)	flat steel plate.

Measurements are below ground at the time of well completion.

Appendix 1.3 Well Assessment Form

FUNCTION JUNCTION
W212-2

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: FUNCTION JUNCTION W212-2	LEGAL DESCRIPTION OF WELL LOCATION:
WATER SYSTEM LEGAL ADDRESS: RMOW's re-use it centre	
LATITUDE / LONGITUDE: 50° 5' 14.10" / 123° 2' 10.2"	HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☑ digitized from 1:10 000 map (specify scale)
UTM COORDINATES	HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM? / DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe)
NUMBER OF CONNECTIONS: Maximum _____ Actual _____	POPULATION SERVED / WATER USE: ☑ domestic ☐ irrigation ☐ commercial ☐ industrial other (specify) _____
WIN NO.: N/A	EMS NO.: N/A / WELL TAG NO.: 80269

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification. EMS NO. = MoELP's site number for the water chemistry on their database. BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☐ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW	WELL OPERATOR'S PHONE NO.: (604) 932 5535
WELL OPERATOR'S ADDRESS: 4325 BLACKCOMB WAY, WHISTLER	
WELL OWNER: as above	WELL OWNER'S PHONE NO.: ( )
WELL OWNER'S ADDRESS:	

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: COLUMBIA WATER WELLS (1986). 25188 - 52nd Avenue Aldergrove, BC	POSTAL CODE: V4W 1G2 / WELL-DRILLER'S TELEPHONE NO.: (604) 857 0008
	DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 1999 11 16 / DATE OF LAST RECONSTRUCTION (YYYY MM DD):

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify)	METHOD OF DRILLING: ☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other (specify)		WELL LOG AVAILABLE? ☒ yes (attach) ☐ no
DEPTH OF WELL: _____ m or 61.0 ft.	DIAMETER OF WELL: _____ m or 8 in.	SCREEN LENGTH: 4.7 m or _____ ft.	DEPTH TO TOP OF SCREEN: 13.9 m or _____ ft.
WELL CAPACITY: 33 L/s or _____ Igpm	LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells): —		YIELD OF WATER-BEARING FRACTION(S): — L/s or — Igpm
WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☐ other (specify) ☐ none	SURFACE SANITARY SEAL: grouted to 3.8 m or _____ ft. ☐ no surface seal ☐ pitless adapter		
AVERAGE PUMPING RATE: _____ L/s or _____ Igpm	HOW WAS PUMPING RATE DETERMINED? N/A - not in operation yet	DEPTH OF INTAKE SETTING: _____ m or _____ ft.	PUMP AGE
ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal	HOW WAS VOLUME PUMPED DETERMINED?		
PUMPING CAPACITY: 33 L/s or _____ Igpm	ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)		
TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify)		STORAGE CAPACITY: _____ L or _____ Igal	COMMON INLET OR OUTLET? ☐ yes ☐ no
ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data	NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).		

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Appendix 1.3 Well Assessment Form (continued)

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL	DEPTH TO NON-PUMPING WATER LEVEL	HOW WAS WATER LEVEL MEASURED?
_____ m or _____ ft.	4.2 m or — ft.	☐ well log ☐ wetted tape ☒ probe ☐ transducer

IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW?	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE?
_____ m or _____ ft.		☐ yes *(specify)* _____ ☐ no

WELLHEAD ELEVATION (height above mean sea level)	HOW WAS ELEVATION DETERMINED?
600 m or _____ ft.	☐ survey ☐ altimeter ☒ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* _____

TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till)	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG	THICKNESS OF CONFINING LAYER FROM WELL LOG	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
SILTY SAND	0 m or ____ ft.	____ m or 13 ft.	

IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER?	NAME OF AQUIFER	AQUIFER CLASSIFICATION NUMBER (from MoELP)	AQUIFER CLASSIFICATION (from MoELP)
☒ yes ☐ no	ALPHA LK @ SPROUT	395	I B (12)

TYPE OF AQUIFER	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL?	ANNUAL RAINFALL
☒ unconsolidated, unconfined ☐ unconsolidated, confined ☐ bedrock	☒ yes How many? 1 ☐ no	1229 m or _____ in.

AQUIFER TRANSMISSIVITY	HOW WAS TRANSMISSIVITY DETERMINED?
_____ m^2/d or _____ Igpd/ft.	☐ from pumping test ☐ from specific capacity ☐ other *(specify)* _____
HYDRAULIC GRADIENT	**HOW WAS HYDRAULIC GRADIENT DETERMINED?**
	☐ from well water levels ☐ from topography ☐ other *(specify)*

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

See Piteau report (Dec. 2003)

See Piteau Dec 2003 rpt

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE?	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED?
	☐ yes — Why? _____ ☒ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS?	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?
☐ yes ☐ no ☐ don't know	

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☒ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☐ yes ☒ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☒ no	IF YES, WHAT ARE THEY?	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE?	☐ yes ☒ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS?	☐ yes ☒ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☐ yes ☒ no		

Appendix 1.3 Well Assessment Form (continued)

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

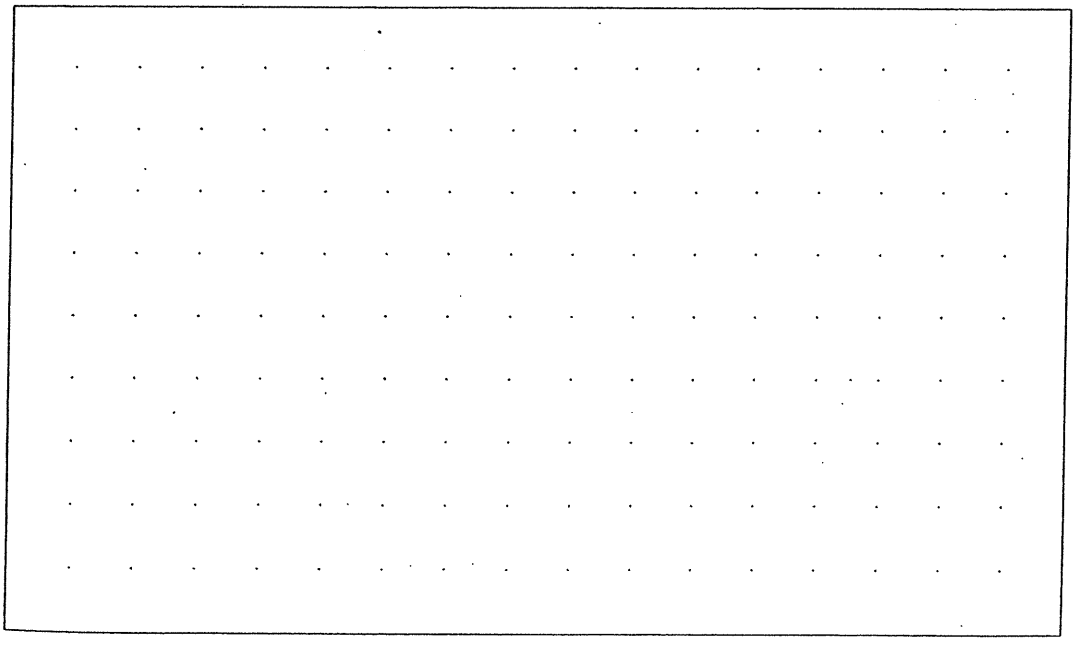
Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers	N/A		
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform	N/A		
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity	N/A		
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)	N/A		
Metals* Calcium, iron, magnesium, manganese, sodium	N/A		

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.



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Appendix 1.3 Well Assessment Form (continued)

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☐ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other *(specify)* _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm / Free Chlorine _____ ppm	WHAT IS THE RESIDUAL LEVEL OF TREATMENT?
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☐ yes ☐ no		IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm / Free Chlorine _____ ppm	IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm / Free Chlorine _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? *(specify)*		WHERE ARE CHEMICALS STORED?
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		see Pitcairn
Calculated Fixed Radius	(1-year travel time)*	report
	(5-year travel time)*	Dec. 2003
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone. see W212-1

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

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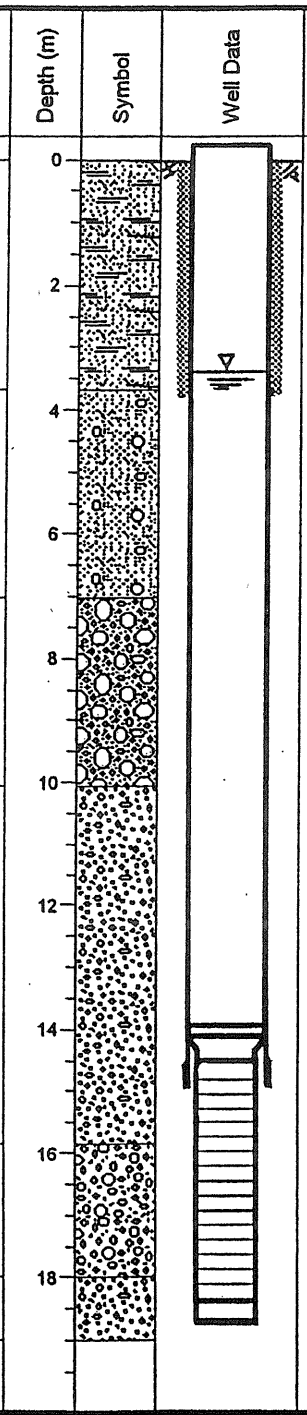
PROJECT: Intrawest Corporation - Spring Creek	CASING STICKUP: 2.0 ft (0.61 m)	WELL NO: TW 2-99 W212-2
PHCL PROJECT NO: I705102	STATIC WATER LEVEL: 11.47 ft (3.496 m)	PUMPING TEST: Yes
LOCATION: RMoW's Re-Use-It Site	COMPLETION DEPTH: 61.0 ft (18.6 m)	WATER ANALYSIS: Yes

Depth (ft / m)	Description
0 / 0	Ground Surface
0 – 4 / 0 – 1.2	***Sand*** (0 to 3.7 m) - brown, silty, containing wood; less wood and lighter in colour below 6 ft (1.8 m)
12 – 14 / 4 – 4.3	***Sand*** (3.7 to 7.0 m) - light brown, silty, containing some stones
24 – 26 / 7.3 – 7.9	***Cobbles, coarse gravel and sand*** (7.0 to 10.1 m)
32 – 34 / 9.8 – 10.4	***Sand*** (10.1 to 15.8 m) - coarse, and fine gravel
52 – 54 / 15.8 – 16.5	***Gravel*** (15.8 to 18.0 m) - coarse to fine, and coarse sand
58 – 60 / 17.7 – 18.3	***Sand*** (18.0 to 18.9 m) - coarse, stoney, rusty



Remarks

8" (200 mm) diameter casing stickup = 2.0 ft (0.61 m).

Static water level on November 29, 1999, = 11.47 ft (3.496 m) below ground.

Grout surface seal was placed as 12.5 ft (3.8 m) of 10" (250 mm) diameter surface casing was recovered.

8" casing shoe is at 50 ft (15.2 m).

Type K packer and riser pipe, 2.5 ft (0.76 m) long, at top of well screen assembly = 45.75 ft (13.9 m).

Well screen is 8" (200 mm) nominal diameter (telescopic) Johnson stainless steel, with 5 ft (1.5 m) of 0.150" (3.81 mm) slot over 5 ft of 0.200" (5.08 mm) slot; screen is exposed to the aquifer between 48 and 58 ft (14.6 and 17.7 m).

Bottom of assembly, at 61.0 ft (18.6 m), and which is closed with a flat steel plate, includes 2 ft (0.6 m) of pipe.

CONTRACTOR: CWW (1986) Ltd.	DATE: 11/16/99
DRILLING METHOD: Cable Tool	BY: cp
PAGE: 1 of 1	FIGURE: 4

PACIFIC HYDROLOGY CONSULTANTS LTD.
Consulting Hydrogeologists
Suite 201, 1537 West 8th Avenue
VANCOUVER, B.C. Canada V6J 1T5
Telephone: (604) 730-6990

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: Cheakamus Crossing W217

LEGAL DESCRIPTION OF WELL LOCATION:

WATER SYSTEM LEGAL ADDRESS:

LATITUDE / LONGITUDE: 50° 5' 7.3" N / 123° 2' 16.6" W

HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ (specify accuracy) ☐ survey ☒ digitized from Google Earth map (specify scale)

UTM COORDINATES:

HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM?

DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? (describe) NO

NUMBER OF CONNECTIONS: Maximum _____ Actual _____

POPULATION SERVED:

WATER USE: ☐ domestic ☐ irrigation ☐ commercial ☐ industrial other (specify) _____

WIN NO. 23194

EMS NO.

WELL TAG NO.

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification.

EMS NO. = MoELP's site number for the water chemistry on their database.

BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☐ yes ☐ no | Emergency supply ☐ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW

WELL OPERATOR'S PHONE NO.: (604) 932-5535

WELL OPERATOR'S ADDRESS: 4325 Blackcomb Way, Whistler, BC

WELL OWNER: -as above-

WELL OWNER'S PHONE NO.: ( )

WELL OWNER'S ADDRESS:

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: Field Drilling Contractors Ltd. Box 841, 25320 Fraser Highway Aldergrove, B.C.

POSTAL CODE: V4W 2Y1

WELL-DRILLER'S TELEPHONE NO.: (604) 857-2266

DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 06 04 06

DATE OF LAST RECONSTRUCTION (YYYY MM DD):

TYPE OF WELL: ☒ drilled ☐ dug ☐ other (specify) _____

METHOD OF DRILLING: ☒ rotary ☐ cable tool ☐ driven ☐ jetted ☐ other (specify) _____

WELL LOG AVAILABLE? ☒ yes (attach) ☐ no

DEPTH OF WELL: 20.7 m or _____ ft.

DIAMETER OF WELL: _____ m or _____ in.

SCREEN LENGTH: _____ m or _____ ft.

DEPTH TO TOP OF SCREEN: _____ m or _____ ft.

WELL CAPACITY: 74 L/s or _____ Igpm

LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):

YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☐ other (specify) _____ ☒ none

SURFACE SANITARY SEAL: grouted to 5.2 m or _____ ft. ☐ no surface seal ☒ pitless adapter

AVERAGE PUMPING RATE: _____ L/s or _____ Igpm

HOW WAS PUMPING RATE DETERMINED?

DEPTH OF INTAKE SETTING: _____ m or _____ ft.

PUMP AGE:

ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal

HOW WAS VOLUME PUMPED DETERMINED?

PUMPING CAPACITY: _____ L/s or _____ Igpm

ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? (specify)

TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other (specify) _____

STORAGE CAPACITY: _____ L or _____ Igal

COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL	DEPTH TO NON-PUMPING WATER LEVEL	HOW WAS WATER LEVEL MEASURED?
_____ m or _____ ft.	8.8 m or _____ ft.	☐ well log ☐ wetted tape ☒ probe ☐ transducer

IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW?	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE?
_____ m or _____ ft.		☐ yes *(specify)* _____ ☐ no

WELLHEAD ELEVATION (height above mean sea level)	HOW WAS ELEVATION DETERMINED?
605 m or _____ ft.	☒ survey ☐ altimeter ☐ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* _____

TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till)	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG	THICKNESS OF CONFINING LAYER FROM WELL LOG	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
N/A	____ m or ____ ft.	____ m or ____ ft.	

IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER?	NAME OF AQUIFER	AQUIFER CLASSIFICATION NUMBER (from MoELP)	AQUIFER CLASSIFICATION (from MoELP)
☐ yes ☐ no			

TYPE OF AQUIFER	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL./MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL?	ANNUAL RAINFALL
☐ unconsolidated, unconfined ☐ unconsolidated, confined ☐ bedrock	☐ yes How many? _____ ☐ no	_____ m or _____ in.

AQUIFER TRANSMISSIVITY	HOW WAS TRANSMISSIVITY DETERMINED?
3110 m^2/d or _____ Igpd/ft.	☐ from pumping test ☐ from specific capacity ☐ other *(specify)* _____

HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED?
1 to 3%	☒ from well water levels ☐ from topography ☐ other *(specify)*

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE?	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED?
new	☐ yes — Why? _____ ☐ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS?	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?
☐ yes ☒ no ☐ don't know	

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☐ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☐ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☐ no	IF YES, WHAT ARE THEY?	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE?	☐ yes ☐ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS?	☐ yes ☐ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☐ yes ☐ no		

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers			
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform			
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity			
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)			
Metals* Calcium, iron, magnesium, manganese, sodium			

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☐ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other *(specify)* _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm; Free Chlorine _____ ppm	WHAT IS THE RESIDUAL LEVEL OF TREATMENT?
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☐ yes ☐ no		IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm; Free Chlorine _____ ppm	IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm; Free Chlorine _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? *(specify)*		WHERE ARE CHEMICALS STORED?
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		
Calculated Fixed Radius	(1-year travel time)*	
	(5-year travel time)*	
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS
VANCOUVER LIMA

Well Number: W217

Location: Function Junction, Whistler B.C

Client: Resort Municipality of Whistler

Project Number: 2858

Drilling Contractor: Field Drilling Contractors Ltd

Logged By: M.Kehoe

Drilling Method: Dual Air Rotary

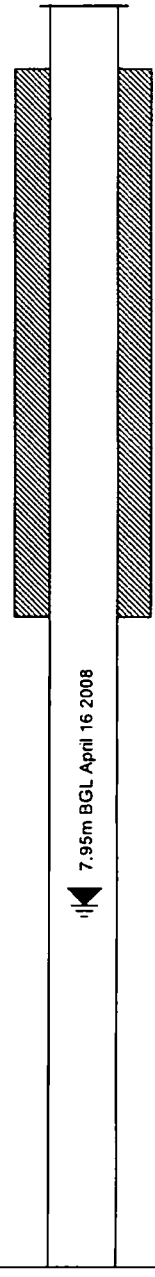
Borehole Diameter: 406mm (16")

Drilling Date: March 4-6, 2008

Well I.D. Plate: 23194

Depth Below Ground Surface	Depth (mbGL)	Lithologic Description	Lithology	Remarks
	0.00	Ground Surface		0.6m stick-up
	0.30	**SAND** Dark brown, fine to coarse grained sand, some gravel and silt. Organic matter (roots and wood). wet/frozen		
	0.76	**BOULDER** Brown-grey granitic boulder, brown medium to coarse grained sand, some fine grained silt, dry.		
	2.44	**COBBLES** Brown, coarse grained cobbles, fine to medium grained sand, dry.		0.51m (20") Surface casing installed to 5.2m bgl. Removed during installation of bentonite seal.
	3.35	**SAND** Brown- tan, medium to coarse grained sand, some gravel, well sorted, moist.		
	4.88	**SAND and GRAVEL** Brown, medium to coarse grained, well rounded, moist.		
	5.49	**SILTY SAND and GRAVEL** Brown, fine to coarse grained, moist.		
	6.40	**BOULDER** Brown-grey granitic boulder.		
	8.53	**SAND and GRAVEL** Brown, medium to coarse grained, rounded, moist.		406mm (16") diameter steel casing, wall thickness 9.5mm (0.375")
	9.75	**BOULDER** Brown-grey granitic boulder.		
		SAND and GRAVEL Brown, medium to coarse grained sand and gravel, rounded, wet.		

Constructed Well



Depth Below Ground Surface	Depth (mbGL)	Lithologic Description	Lithology	Remarks	Constructed Well
38					
39	12				
40	12.19				
41	12.50	**SAND and GRAVEL** Brown, coarse gravel and medium to coarse sand, poorly sorted, wet.			
42					
43	13	**SILTY SAND and GRAVEL** Light brown, fine to coarse grained silty sand, some coarse, angular cobbles and gravel, wet.			
44					
45					
46	14				
47					
48					
49	14.94				
50	15	**SAND and GRAVEL** Brown, medium to coarse grained sand, coarse angular gravel, some silt, wet.			
51					
52					
53	16				
54	16.46				
55		**GRAVEL and SAND** Brown, very coarse, angular to rounded, some cobbles, wet.		Telescopic Well Screen Assembly Installed from 16.5m to 20.4m Exposed from 17.4m to 20.4m Screen Interval: 16.5 - 17.4m: K-packer and Riser 17.4 - 20.4m: 6.35mm (0.250") openings 20.4m: Plate bottom with bail Screen Inner Diameter: 333mm (13.1") Screen Outer Diameter: 356mm (14.0")	K-Packer Riser 304 Stainless steel wire wound well screen
56	17				
57					
58					
59	18				
60					
61					
62	18.90				
63	19	**GRAVEL and SAND** Brown, coarse gravel, medium to coarse sand, silty brown wash.			
64					
65					
66	20				
67	20.42				Plate bottom with bail formation back-fill
68	20.73	**BEDROCK** Dry			
69	21				
70					
71					
72	22				
73					
74					
75	23				
76					
77					

BRITISH COLUMBIA Ministry of Health and Ministry Responsible for Seniors | Ministry of Environment, Lands and Parks

WELL ASSESSMENT FORM

TO BE USED WITH THE WELL PROTECTION TOOLKIT.

IMPORTANT! Please complete one form for each ground water source used in your water system. Fill in available information. If missing information, it may be advisable to contact the Ministry of Environment, Lands and Parks' Groundwater Section [(250) 387-1115], or the local driller who drilled the well, to assist. Photocopy this form as necessary.

PART I: WELL SYSTEM INFORMATION (Refer to Step 1)

WATER SYSTEM LEGAL NAME: RAINBOW PARK W218

LEGAL DESCRIPTION OF WELL LOCATION:

WATER SYSTEM LEGAL ADDRESS:

LATITUDE / LONGITUDE: 50° 7' 23.3" N / 122° 58' 48" W

HOW WERE LOCATION COORDINATES DETERMINED? ☐ GPS _____ *(specify accuracy)* ☐ survey ☒ digitized from Google Earth *map (specify scale)*

UTM COORDINATES:

HOW MANY OTHER WELLS MAKE UP THE WATER SYSTEM?

DOES THE WATER SYSTEM ALSO USE A SURFACE WATER SOURCE? *(describe)*

NUMBER OF CONNECTIONS: Maximum _____ Actual _____

POPULATION SERVED:

WATER USE: ☒ domestic ☐ irrigation ☐ commercial ☐ industrial other *(specify)* _____

WIN NO.: 14952

EMS NO.:

WELL TAG NO.:

Contact your local Ministry of Environment, Lands and Parks office or local Health Unit for the following information:

WIN NO. = MoELP's metal tag affixed to the well for on-site identification.

EMS NO. = MoELP's site number for the water chemistry on their database.

BC WELL TAG NO. = MoELP's computer number for the well.

Bulk supply ☒ yes ☐ no | Back-up supply ☒ yes ☐ no | Emergency supply ☒ yes ☐ no | Metered ☒ yes ☐ no

WELL OWNER / OPERATOR INFORMATION

WELL OPERATOR: RMOW

WELL OPERATOR'S PHONE NO.: (604) 932-5535

WELL OPERATOR'S ADDRESS: 4325 Blackcomb Way, Whistler, BC

WELL OWNER: AS ABOVE

WELL OWNER'S PHONE NO.: ( )

WELL OWNER'S ADDRESS:

PART II: WELL CONSTRUCTION INFORMATION (Refer to Step 1)

WELL-DRILLER'S NAME, COMPANY AND ADDRESS: Columbia Water Wells (1986) Ltd, 25188 - 52nd Street, Aldergrove, BC

POSTAL CODE: V4W 1G2

WELL-DRILLER'S TELEPHONE NO.: (604) 857-0008

DATE WELL ORIGINALLY CONSTRUCTED (YYYY MM DD): 07 06 07

DATE OF LAST RECONSTRUCTION (YYYY MM DD):

TYPE OF WELL: ☒ drilled ☐ dug ☐ other *(specify)* _____

METHOD OF DRILLING: ☐ rotary ☒ cable tool ☐ driven ☐ jetted ☐ other *(specify)* _____

WELL LOG AVAILABLE? ☒ yes *(attach)* ☐ no

DEPTH OF WELL: 29.6 m or _____ ft.

DIAMETER OF WELL: 0.406 m or 16 in.

SCREEN LENGTH: 4.7 m or _____ ft.

DEPTH TO TOP OF SCREEN: 24.0 m or _____ ft.

WELL CAPACITY: 74 L/s or _____ Igpm

LOCATION OF WATER-BEARING FRACTION(S) (for bedrock wells):

YIELD OF WATER-BEARING FRACTION(S): _____ L/s or _____ Igpm

WELLHEAD ENCLOSURE: ☐ pump house ☐ manhole ☐ other *(specify)* _____ ☒ none

SURFACE SANITARY SEAL: grouted to 5.5 m or _____ ft. ☐ no surface seal ☒ pitless adapter

AVERAGE PUMPING RATE: _____ L/s or _____ Igpm

HOW WAS PUMPING RATE DETERMINED?

DEPTH OF INTAKE SETTING: _____ m or _____ ft.

PUMP AGE:

ANNUAL VOLUME OF WATER PUMPED: _____ L or _____ Igal

HOW WAS VOLUME PUMPED DETERMINED?

PUMPING CAPACITY: _____ L/s or _____ Igpm

ANY CHANGES OR REPAIRS MADE TO THE PUMPING EQUIPMENT? *(specify)*

TYPE OF STORAGE: ☐ tank(s) ☐ reservoir ☐ other *(specify)* _____

STORAGE CAPACITY: _____ L or _____ Igal

COMMON INLET OR OUTLET? ☐ yes ☐ no

ATTACHED INFORMATION: ☒ well log ☐ drawings ☐ reports ☐ pump test data ☐ water quality data

NOTE: If no well log is available, please attach any other records documenting well construction (i.e., "as built" drawings, engineering reports).

PART III: HYDROGEOLOGIC INFORMATION (Refer to Steps 1 and 2)

DEPTH TO PUMPING WATER LEVEL	DEPTH TO NON-PUMPING WATER LEVEL	HOW WAS WATER LEVEL MEASURED?
_____ m or _____ ft.	_____ m or _____ ft.	☐ well log ☐ wetted tape ☐ probe ☐ transducer

IF WELL IS FLOWING, WHAT IS THE ARTESIAN PRESSURE HEAD AND FLOW?	HOW IS PRESSURE HEAD AND FLOW MEASURED? *(specify)*	IF SOURCE IS A FLOWING WELL OR SPRING, IS THERE A STORAGE IMPOUNDMENT OR RESERVOIR ASSOCIATED WITH THIS SOURCE?
2 m or _____ ft.	manometer	☐ yes *(specify)* _____ ☒ no

WELLHEAD ELEVATION (height above mean sea level)	HOW WAS ELEVATION DETERMINED?
690 m or _____ ft.	☒ survey ☐ altimeter ☐ topographic ☐ map *(specify scale and contour interval)* ☐ other *(specify)* _____

TYPE OF CONFINING LAYER FROM WELL LOG (e.g., clay, till)	LOCATION OF CONFINING LAYER AT DEPTH FROM WELL LOG	THICKNESS OF CONFINING LAYER FROM WELL LOG	HOW LATERALLY EXTENSIVE IS CONFINING LAYER?
SILT	0 m or _____ ft.	23.8 m or _____ ft.	

IS YOUR WELL ASSOCIATED WITH A KNOWN AQUIFER?	NAME OF AQUIFER	AQUIFER CLASSIFICATION NUMBER (from MoELP)	AQUIFER CLASSIFICATION (from MoELP)
☐ yes ☒ no			

TYPE OF AQUIFER	ARE THERE OTHER HIGH-CAPACITY WELLS, 30 L/s OR 500 GAL/MIN. (agricultural, municipal and/or industrial), LOCATED WITHIN A 300-m RADIUS OF THE COMMUNITY WELL?	ANNUAL RAINFALL
☐ unconsolidated, unconfined ☒ unconsolidated, confined ☐ bedrock	☐ yes How many? _____ ☒ no	1.229 m or _____ in.

AQUIFER TRANSMISSIVITY	HOW WAS TRANSMISSIVITY DETERMINED?
276 m^2/d or _____ Igpd/ft.	☒ from pumping test ☐ from specific capacity ☐ other *(specify)* _____

HYDRAULIC GRADIENT	HOW WAS HYDRAULIC GRADIENT DETERMINED?
6%	☒ from well water levels ☐ from topography ☐ other *(specify)*

PLEASE IDENTIFY OR DESCRIBE ADDITIONAL HYDROLOGIC OR GEOGRAPHIC CONDITIONS THAT YOU BELIEVE MAY AFFECT THE SHAPE OF THE CAPTURE ZONE FOR THIS SOURCE. WHERE POSSIBLE, REFERENCE THEM TO LOCATIONS ON THE MAP PRODUCED IN PART IV.

PART IV: ASSESSMENT OF WATER QUALITY (Refer to Step 1)

1 HOW LONG HAS THE WATER SYSTEM BEEN IN EXISTENCE?	2 HAS YOUR WELL EVER BEEN DEEPENED, CLEANED, NEW WELL CONSTRUCTED?
it is new	☐ yes — Why? _____ ☒ no

3 IN THIS TIME, HAVE THERE BEEN ANY WATER QUALITY PROBLEMS?	IF YES, WHEN AND WHAT WAS THE CAUSE OF THESE PREVIOUS PROBLEMS (i.e., drought, pump failure, plugging, increased usage, interference, contamination)?
☐ yes ☒ no ☐ don't know	

IF CONTAMINATION: • WHAT WATER QUALITY CHANGES WERE APPARENT (i.e., taste, colour, turbidity, other)? • WHAT ACTION WAS TAKEN TO OVERCOME THIS PROBLEM? • WHAT WERE THE EFFECTS OF THIS ACTION?

4 BACTERIAL CONTAMINATION

ANY BACTERIAL DETECTION(S) IN THE PAST 3 YEARS BASED ON SOURCE-MONITORING RECORDS?	☐ yes ☐ no	HAVE THERE BEEN SAMPLING PROTOCOLS OR QA/QC ESTABLISHED?	☐ yes ☐ no
HAS SOURCE (IN PAST 3 YEARS) HAD A BACTERIOLOGICAL CONTAMINATION PROBLEM FOUND IN DISTRIBUTION SAMPLES THAT WAS ATTRIBUTED TO THE SOURCE?	☐ yes ☐ no	IF YES, WHAT ARE THEY?	
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO THE SOURCE?	☐ yes ☐ no		
WAS THE BACTERIOLOGICAL CONTAMINATION DUE TO CROSS-CONNECTIONS?	☐ yes ☐ no		
IS THE WELL AVAILABLE FOR DIRECT SAMPLING?	☐ yes ☐ no		

SOURCE-SPECIFIC WATER QUALITY RECORDS **(Refer to Step 1)**

Please indicate the occurrence of any test results in the last 10 years that meet the following conditions:

PARAMETER	RECURRING PROBLEMS	TEST RESULTS	EXCEEDENCES OF CDWQG [1]
Bacteriological Total/Faecal Coliforms Background Heterotrophic plate counts Iron and Sulphate Reducers			
Disinfection by-products Bromodichloromethane Dibromochloromethane Chloroform			
Physical Parameters pH, colour, alkalinity, specific conductance, hardness, total dissolved solids, total organic carbon, turbidity			
Inorganic Parameters Nitrates, fluoride, sulfate, sulphide, ammonia, chloride, nitrite, nitrogen (organic)			
Metals* Calcium, iron, magnesium, manganese, sodium			

[1] Canadian Drinking Water Quality Guidelines, 6th edition

* A metal scan is usually performed every 3 years at least, and includes aluminum, arsenic, barium, cadmium, chromium, copper, lead, molybdenum, nickel, phosphorus, silver and zinc.

Please sketch in the box below the location sampling point with respect to the well.

PART V: WATER TREATMENT INFORMATION (Refer to Step 1)

IS THIS SOURCE TREATED? ☐ yes ☐ no | IF YES, TYPE OF TREATMENT ☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ water softener ☐ other *(specify)* _____

PURPOSE OF TREATMENT

IF SOURCE IS CHLORINATED, IS A CHLORINE RESIDUAL MAINTAINED?	Total Chlorine _____ ppm / Free Chlorine _____ ppm	WHAT IS THE RESIDUAL LEVEL OF TREATMENT?
IS THERE ANY WATER STORAGE IN THE SYSTEM? ☐ yes ☐ no		IS THE WATER TREATMENT BEFORE OR AFTER THE STORAGE UNIT? ☐ before ☐ after
WHAT IS THE TOTAL AND FREE CHLORINE IN THE DISTRIBUTION SYSTEM?	Total Chlorine _____ ppm / Free Chlorine _____ ppm	IS THERE ANY ADDITIONAL CHLORINE ADDED AFTER THE SOURCE (rechlorination)? Total Chlorine _____ ppm / Free Chlorine _____ ppm
WHAT TYPE OF CHEMICALS ARE USED IN THIS PROCESS? *(specify)*		WHERE ARE CHEMICALS STORED?
IS THERE PROPER STORAGE FOR THESE CHEMICALS? ☐ yes ☐ no	IF STORED IN PUMP HOUSE, HOW ARE CHEMICALS ISOLATED FROM THE WELL?	

PART VI: MAPPING THE CAPTURE ZONE TO YOUR COMMUNITY WELL (Refer to Step 2)

A map (1:5000 to 1:20,000 are typical scales) will be needed to complete this section. Multiple wells in the same area can be plotted on one map.

CIRCULAR CAPTURE ZONE (refer to Appendix 2.1)		
*attach calculation sheets		RADIUS (m)
Arbitrary Fixed Radius		
Calculated Fixed Radius	(1-year travel time)*	
	(5-year travel time)*	
	(10-year travel time)*	

PARABOLIC CAPTURE ZONE (refer to Appendix 2.2)*

Downgradient distance _____ m | Width of capture zone _____ m

Is there a river, lake, pond, stream or other obvious surface water body within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

Is there a stormwater and/or wastewater facility, treatment lagoon or holding pond located within the 6-month time of travel boundary? ☐ yes *(identify on map)* ☐ no

PART VII: SOURCE SURVEY (Refer to Step 3)

4 REGIONAL SOURCES OF RISK TO GROUND WATER

Please indicate if any of the following potential sources of contamination within the capture zone.

ACTIVITY	T.O.T. NOT SPECIFIED	1-YEAR	5-YEAR	10-YEAR	COMMENTS
Chemical Storage *(specify)*					
Injection wells					
Abandoned wells					
Landfills, dumps, disposal areas					
Commercial/industrial sites					
Known hazardous materials clean-up site					
Household hazardous waste					
Population density > 2 houses per hectare					
On-site sewage treatment					
Wastewater treatment facility					
Sites used for land application of waste					
Golf course					
Dairy or beef farms					
Poultry barns					
Hobby farms					
Fields: vegetables, hay, fruit *(specify)*					
Mining operations					
Gravel pits					

** Mark and identify on map any of the potential sources listed above which are located within the capture zone boundary.

SEPTIC FIELD SETBACK	GRADIENT TO SEPTIC FIELD	DENSITY OF ON-SITE SEWAGE DISPOSAL SYSTEMS	
	☐ upgrade ☐ downgrade ☐ same grade	COMMUNITY SYSTEM	SYSTEM PER LOT
_____ m or _____ ft.	_____ % _____ %		

PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS
VANCOUVER LIMA

Drillhole Number: W218
Well Tag No.: 14952
Project: Rainbow Park Production Well Construction
Location: Rainbow Park, Whistler, B.C.
Project Number: 2848
Logged By: Bob Franks / D.Tiplady
Borehole Diameter: 406mm (16")

Client: Resort Municipality of Whistler
Coordinates: E N
Ground Elevation: 639m ASL (approx)

Depth Below Ground Surface (ft / m)	Elevation (maSL)	Lithologic Description	Depth (mbg)	Lithology	Remarks	Constructed Well
-3 ft	0.0	Ground Surface	0.0		Casing stick-up = 0.8 m	Welded Cap Plate
		Silty Sand Brown silty sand, wood & peat			Well flowing at > 6 L/s	
7	-2.7		2.7			Bentonite Seal
		Silty Peat Lighter brown silty wash in peat, wood + stones			0.51m (20") Surface Casing installed to 5.5 mbgl (18"). Removed during installation of bentonite seal.	
17						
	-8.2		8.2			406mm (16") Steel casing, wall thickness = 9.5mm (0.375")
27		**Silty Sand** Wood, silty sand + peat				
10 m	-10.4		10.4			
	-11.0	**Silty Sand** Silty sand, f gravel, wood	11.0			
37		**Gravel** F-c gravel, silty wash, wood				
	-13.4		13.4			
		Gravel F-c gravel, brown silt, wood				
47	-15.2		15.2			

Drilling Contractor: Columbia Water Wells (1986) Ltd.
Drilling Method: Cable Tool
Drilling Started: May 18th, 2007
Drilling Ended: June 8th, 2007

PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS
VANCOUVER LIMA

Drillhole Number: W218
Project: Rainbow Park Production Well Construction
Location: Rainbow Park, Whistler, B.C.

Depth Below Ground Surface	Elevation	Lithologic Description	Depth (mbg)	Lithology	Remarks	Constructed Well
60	15.8	**Silty Gravel** F-c gravel, packed silt, wood, peat	15.8			
		Silt Packed silt, wood				
70	21.3	**Silty Sand** Silty sand	21.3			
	22.6	**Silt** Brown silt	22.6			
	23.8	**Silty Gravel** F-c stoney gravel, packed silty wash, wood	23.8			23.7m K-packer
80	25.0	**Silty Sandy Gravel** F-c gravel + c sand, brown silt wash, wood	25.0		Telescopic Well Screen Assembly Type 304 stainless steel continous slot Installed from 23.7 - 28.7m Exposed from 24.0 - 28.7m Screen interval: 23.7 - 24.0m (77'8"-78'8"): K-packer 24.0 - 24.3m (78'8"-79'8"): Blank 24.3 - 24.9m (79'8"-81'8"): 3.81mm (0.150") slot 24.9 - 28.0m (81'8"-92'0"): 6.35mm (0.250") slot 28.0 - 28.7m (92'0"-94'0"): 0.25mm (0.010") slot Screen Inner Diameter: 336.5mm (13.250") Screen Outer Diamter: 354.4mm (13.954")	
	26.2	**Silty Sandy Gravel** C gravel + c sand, brown silty wash, wood	26.2			
90	28.0	**Gravel** C gravel + silty sand wash	28.0			28.7m Bail Bottom Sloughed
	29.0	**Silt** Grey packed silt	29.0			
	29.6	End of Hole	29.6			
100						