

REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2014



Whiskey Creek Water Service Area

June 2015

REGIONAL DISTRICT OF NANAIMO

Water & Utility Services Department

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Table of Contents

1.	Introduction.....	1
2.	Whiskey Creek Water System	1
2.1	Source Water	1
2.2	Reservoirs	1
2.3	Distribution System.....	1
3.	Water Sampling and Testing Program.....	2
4.	Water Quality - Source Water and Distribution System	2
5.	Water Quality Inquiries and Complaints	2
6.	Water Consumption	3
7.	Maintenance Program.....	3
8.	Water Service Area Projects.....	4
8.1	2014 Completed Studies & Projects.....	4
8.2	2015 Proposed Projects & Upgrades.....	4
9.	Emergency Response Plan.....	4
10.	Cross Connection Control.....	4
11.	Closing	5

Appendix A - Map of Whiskey Creek Water Service Area

Appendix B - Water Quality Testing Results

Appendix C - Emergency Response Plan

1. Introduction

The following annual report describes the Whiskey Creek Water Service Area and summarizes the water quality and production data from 2014. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, the Emergency Response Plan, and the Cross Connection Control Program.

This report is to be submitted to Island Health by the Spring of 2015.

2. Whiskey Creek Water System

The Whiskey Creek water system was constructed in the 1970s and was initially operated by the Subdivision Developer, Westerlea Estates Ltd. The water system is located eight kilometres southwest of Qualicum Beach on the south side of Highway 4. There are 123 residential lots connected to the water system. In January 2012, the ownership and operation of the Whiskey Creek Water District was transferred to the RDN. A map of the Whiskey Creek Water Service Area is provided in Appendix A for reference.

2.1 Source Water

Two water licenses allow surface water to be extracted from nearby Crocker Creek. An emergency backup generator is available in the event of a power failure. Water from Crocker Creek is temporarily stored in a raw water storage pond next to the pumphouse on Hebert Road. Perforated pipe under the bed of the pond carries water into a concrete wet well containing two submersible pumps. These pumps deliver water through a pressure filter to a water storage reservoir. The water is dosed with a polymer upstream of the filter and then chlorinated. Drinking water is pumped into the water system via two booster pumps.

2.2 Reservoirs

One service reservoir (concrete) is present at 979 Poplar Way, and has a capacity of 195 m³ (43,000 imperial gallons).

2.3 Distribution System

The water distribution system in Whiskey Creek is summarized in the table below. There are 9 fire hydrants and 4 flush-outs in the system.

Watermain Material	Length of mains in Whiskey Creek Water Service Area	Prevalence in Water Service Area
<u>Asbestos-concrete:</u>		
100mm or smaller	1,280 m	40%
150mm or larger	1,920 m	60%

3. Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	BC Centre for Disease Control	Total coliforms, E.Coli
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli Temperature, pH, Conductivity Chlorine residual, Salinity, TDS Monthly- Total Iron and Manganese
Quarterly	North Island Labs (now Maxxam)	Trihalomethanes (THMs), Total coliforms, and E.Coli at the reservoir site
Annual Source Water Testing (every Fall)	North Island Labs (now Maxxam)	Complete potability testing of raw source water incl. tannins and lignins
Annual System Water Testing (every Spring)	North Island Labs (now Maxxam)	Complete potability testing of distribution system water incl. tannins, lignins, Giardia, and Cryptosporidium

4. Water Quality - Source Water and Distribution System

Up-to-date water quality reports and lab data are posted monthly on the RDN website at www.rdn.bc.ca in the SERVICES section, under “Water & Utility Services” then “WaterSmart Communities”. Tables of water quality testing results for both the source water and distribution system are provided at the end of this report under Appendix B.

A Boil Water Notice was issued by Island Health in March 2014, and a Boil Water Order was issued in October 2014 due to high turbidity levels and insufficient filtration. The Boil Water Order was lifted on October 29, 2014. In December 2014, the Regional District Water Services staff shut down the water intake from Crocker Creek in response to heavy rainfall. The water contained fine particles that could not be filtered out by the existing filtration system. The RDN subsequently contracted a potable water hauler to fill the water storage reservoir as required.

5. Water Quality Inquiries and Complaints

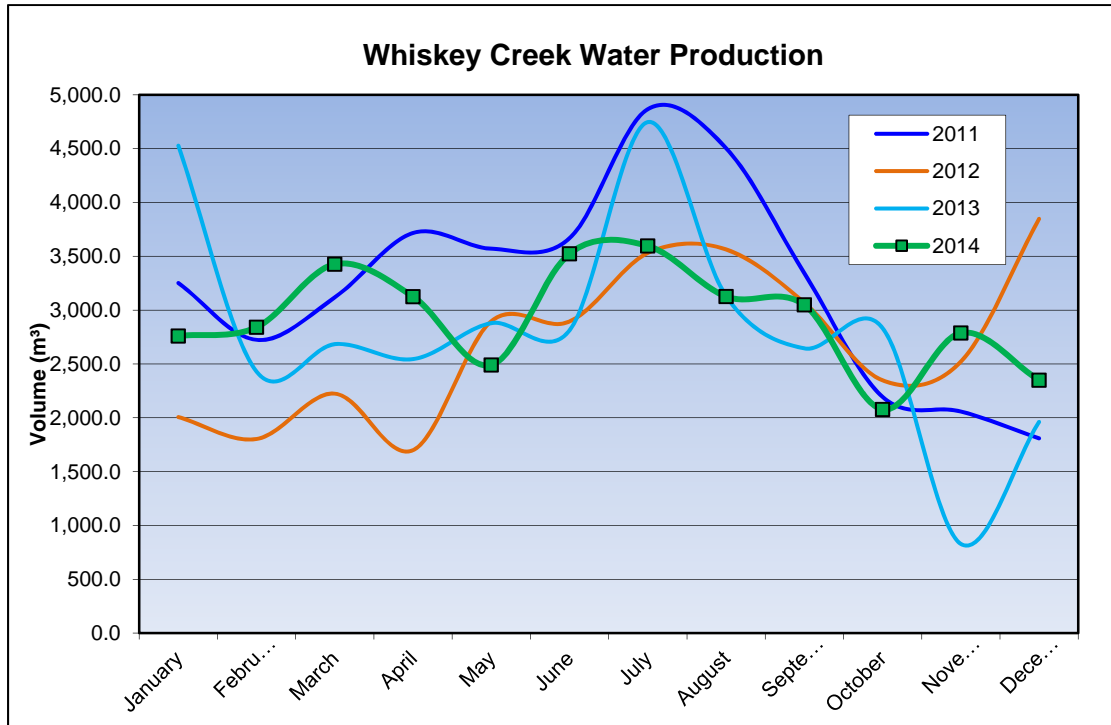
Several inquiries were received from the Whiskey Creek water service area in 2014 and were typically related to the Boil Water Order and to water billing.



Intersection of Britain Blvd and Poplar Way in Whiskey Creek

6. Water Consumption

The monthly water production for the Whiskey Creek Water Service Area for the past 4 years is shown in the chart below. Water production in 2014 was average in comparison to the three previous years.



Consumption

In the Fall/Winter of 2014, the average usage per home in Whiskey Creek was 0.42 cubic metres per day (92 imperial gallons). In the summer, the average water usage was 0.64 cubic metres per day (141 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 206 L/day (based on 2.4 people/household). This consumption is 23% less than the RDN system average of 276 L/day/capita in 2014.

7. Maintenance Program

Daily pump station inspections are carried out to reduce or eliminate the risk of contamination and system failure, and to ensure the consistent application of chlorine for treatment purposes. Watermains are flushed once annually in the Spring. Fire hydrants (9) are serviced once per year (either 'A-level' or 'B-level' maintenance) in the Fall. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

Fire hydrants in the Whiskey Creek water system cannot be relied on for fire insurance purposes due to insufficient supply and capacity for fire flows. Upgrades to water supply volumes and reservoir storage may be required in the future, but would not proceed without community support and financing.

8. Water Service Area Projects

8.1 2014 Completed Studies & Projects

- Completed an Engineering review and estimate of water treatment options to meet 4-3-2-1 requirements;
- Submitted jar tests to Corix for testing (to find most suitable coagulant before filtration);
- Installed an in-line turbidity meter with alarm notification;
- Purchased potable water tank to truck-in water when reservoir is low;
- Authorized several water bill rebates under the RDN Leak Policy;
- Installed an aluminum walkway on the berm at the creek intake;
- Updated the Emergency Response Plan;
- Updated the Standard Operating Procedures;
- Completed annual fire hydrant maintenance;
- Enforced the outdoor sprinkling regulations;
- Carried out a comprehensive water conservation campaign (Team WaterSmart);
- Updated and improved the RDN website at www.rdn.bc.ca;
- Applied a low-flush toilet and rainwater harvesting (rain barrel) incentive;
- Maintained excellent customer complaint and service request response times; and
- Maintained quality control through regular testing and monitoring of the water system.

8.2 2015 Proposed Projects & Upgrades

- Drain and clean the reservoir;
- Retain a hydrogeologist to complete a feasibility review for alternate water supply;
- Utilize jar test results from Corix to determine pilot testing and detailed design of water treatment system, if required;
- Complete a grant application to the Small Communities Fund;
- Update the Emergency Response Plan;
- Continue quality control through regular testing and monitoring of water system;
- Complete additional educational programs; and
- Apply the rainwater harvesting (rain barrel) incentive.

9. Emergency Response Plan

The Regional District Emergency Response Plan (ERP) contains procedures and contact information to efficiently respond to water system emergencies such as contamination of water supply, loss of supply, and pump failure. The ERP was updated in 2014, and copies of the ERP are available on our website, at each RDN office, in each pumphouse, and in each Water Services vehicle. A copy of the ERP is also attached to this report in Appendix C.

10. Cross Connection Control

A formalized Cross Connection Control Program was initiated at the RDN in 2007. Cross connection controls imposed in the Whiskey Creek Water System in 2012 include dual check valves installed at each service connection (123), mandatory fire hydrant use permits, and the

creation of a water supply bylaw noting discontinued service if a threat to the water supply is perceived by staff.

In 2008, a review and comparison of successful Cross Connection control programs in other small Water Service Areas nearby was undertaken. A database of commercial customers in the Regional District of Nanaimo was set-up in order to keep track of the maintenance history of testable backflow prevention assemblies at each site. Three RDN Operations staff achieved Backflow Prevention Tester's certification. Two Operators plan to re-certify their Backflow Prevention Tester certification in 2015.

In 2012, *Regional District of Nanaimo Water Use Regulation Bylaw No. 1654, 2012* was adopted which includes enhanced cross connection control and backflow protection wording. A separate Cross Connection Control bylaw was deemed not to be required.

11. Closing

An annual report for the year 2015 will be prepared and submitted to Island Health in the Spring of 2016. Annual reports are also available on our website at www.rdn.bc.ca in the SERVICES section, under "Water & Utility Services" then "WaterSmart Communities".



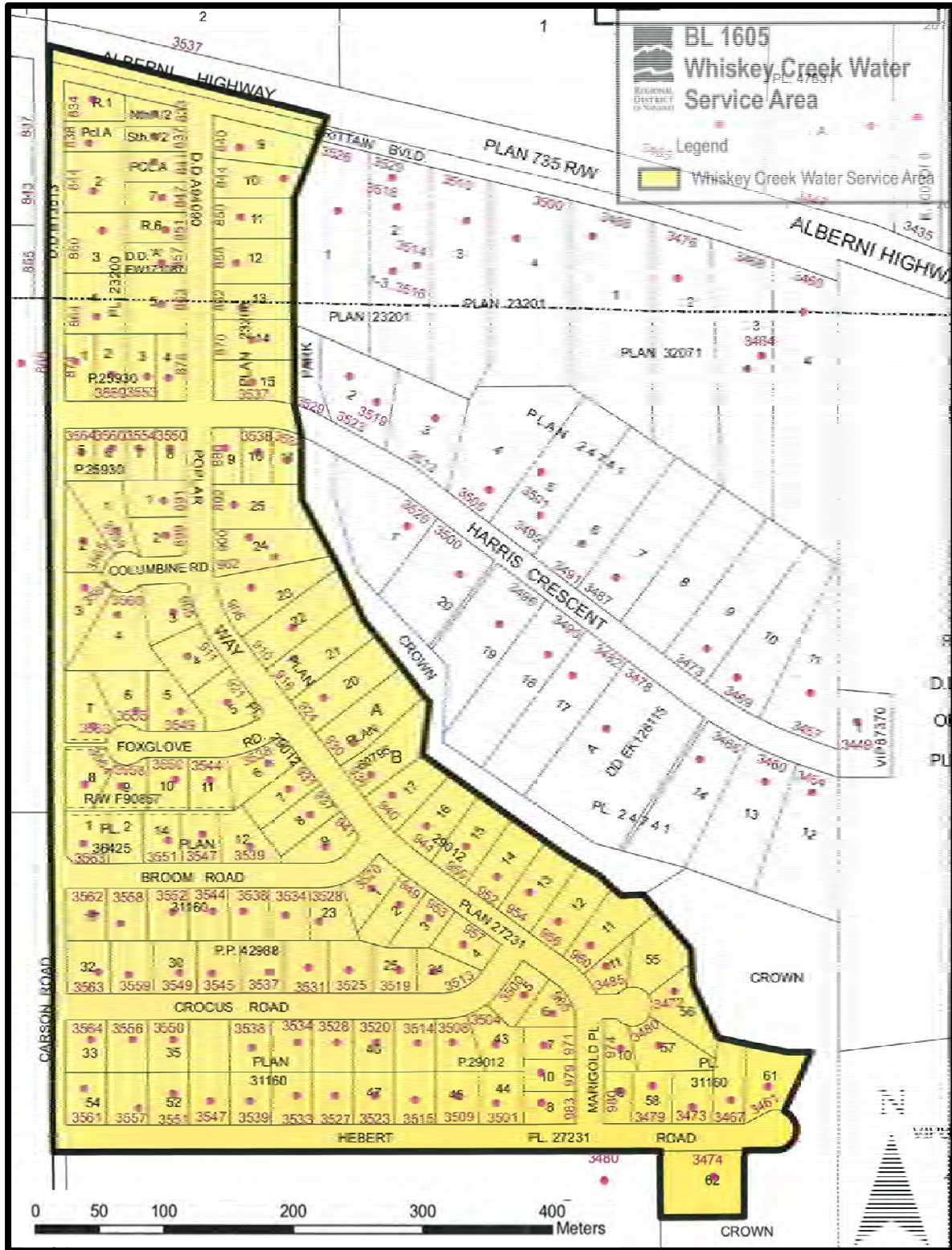
**Water Intake Location
and Pumphouse**

APPENDIX A

MAP OF WHISKEY CREEK

WATER SERVICE AREA

WHISKEY CREEK WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

WHISKEY CREEK WATER SERVICE AREA



Facility Location:

979 Poplar Way
Qualicum Beach

Facility Information:

Facility Type: DWC

Facility Sampling History:

<u>Location</u>	<u>Date</u>	<u>Total Coliform</u>	<u>E. Coli</u>
844 Carson Road, Whiskey Creek BC	27-Jan-2015	L1	L1
3564 Foxglove Road, Whiskey Creek BC	19-Jan-2015	L1	L1
3537 Harris Crescent	12-Jan-2015	L1	L1
3533 Hebert Road, Parksville	7-Jan-2015	L1	L1
844 Carson Road, Whiskey Creek BC	15-Dec-2014	L1	L1
3537 Harris Crescent	9-Dec-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	9-Dec-2014	L1	L1
3533 Hebert Road, Parksville	3-Dec-2014	L1	L1
844 Carson Road, Whiskey Creek BC	24-Nov-2014	L1	L1
3533 Hebert Road, Parksville	18-Nov-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	18-Nov-2014	L1	L1
3537 Harris Crescent	3-Nov-2014	T	T
3533 Hebert Road, Parksville	27-Oct-2014	L1	L1
844 Carson Road, Whiskey Creek BC	20-Oct-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	14-Oct-2014	L1	L1
3537 Harris Crescent	7-Oct-2014	L1	L1
844 Carson Road, Whiskey Creek BC	23-Sep-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	16-Sep-2014	L1	L1
3537 Harris Crescent	9-Sep-2014	L1	L1
3533 Hebert Road, Parksville	3-Sep-2014	L1	L1
844 Carson Road, Whiskey Creek BC	25-Aug-2014	L1	L1
3537 Harris Crescent	19-Aug-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	12-Aug-2014	L1	L1
3537 Harris Crescent	5-Aug-2014	L1	L1
844 Carson Road, Whiskey Creek BC	22-Jul-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	15-Jul-2014	L1	L1
3537 Harris Crescent	7-Jul-2014	L1	L1
3533 Hebert Road, Parksville	2-Jul-2014	L1	L1
844 Carson Road, Whiskey Creek BC	24-Jun-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	16-Jun-2014	L1	L1
3537 Harris Crescent	9-Jun-2014	L1	L1

3533 Hebert Road, Parksville	4-Jun-2014	L1	L1
844 Carson Road, Whiskey Creek BC	26-May-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	21-May-2014	L1	L1
3537 Harris Crescent	13-May-2014	L1	L1
3533 Hebert Road, Parksville	6-May-2014	L1	L1
844 Carson Road, Whiskey Creek BC	29-Apr-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	14-Apr-2014	L1	L1
3537 Harris Crescent	9-Apr-2014	L1	L1
3533 Hebert Road, Parksville	1-Apr-2014	L1	L1
844 Carson Road, Whiskey Creek BC	24-Mar-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	18-Mar-2014	L1	L1
3533 Hebert Road, Parksville	11-Mar-2014	L1	L1
3537 Harris Crescent	11-Mar-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	11-Mar-2014	L1	L1
844 Carson Road, Whiskey Creek BC	11-Mar-2014	L1	L1
3533 Hebert Road, Parksville	10-Mar-2014	L1	L1
3537 Harris Crescent	10-Mar-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	10-Mar-2014	L1	L1
844 Carson Road, Whiskey Creek BC	10-Mar-2014	L1	L1
3533 Hebert Road, Parksville	4-Mar-2014	L1	L1
844 Carson Road, Whiskey Creek BC	26-Feb-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	18-Feb-2014	L1	L1
3537 Harris Crescent	11-Feb-2014	L1	L1
3533 Hebert Road, Parksville	3-Feb-2014	L1	L1
844 Carson Road, Whiskey Creek BC	29-Jan-2014	L1	L1
3564 Foxglove Road, Whiskey Creek BC	20-Jan-2014	L1	L1
3537 Harris Crescent	13-Jan-2014	L1	L1
3533 Hebert Road, Parksville	6-Jan-2014	L1	L1

Interpreting Sample Reports

In VIHA, the results of drinking water sampling are reported using the following coding system:

- L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present
- OG Overgrown - Meaning: Too many background bacteria to give an accurate count
- EST Estimated Count
- A Sample not tested; Too long in transit
- C Sample leaked/broken in transit
- D Sample not tested; No collection date given
- T Sample submitted unsatisfactory. Exceeded 30 hours holding time, please resample.
- NS No sample received with requisition

Whiskey Creek Surface Water Analysis Results

3474 Hebert Road (Crocker Creek)

Canadian Drinking Water Guidelines Package



CDWG=Canadian Drinking Water Guidelines

MAC=Maximum Acceptable Concentration

OG= Operational Guidance Value

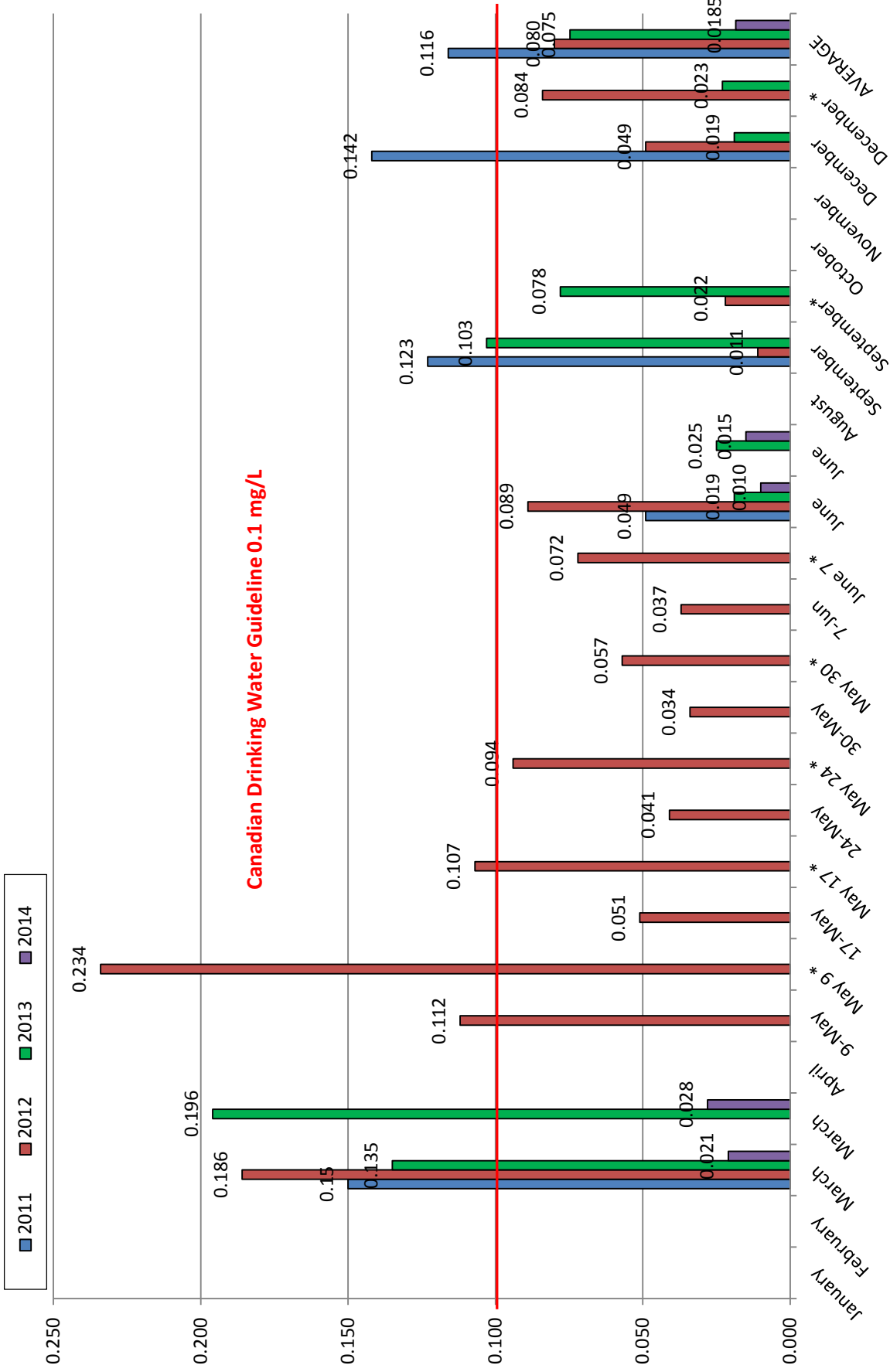
AO=Aesthetic Objective

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameters	Water Quality Guidelines			26-Feb	26-Oct	16-Oct	17-Oct	4-Nov	
	Units	CDWG		2008	2011	2012	2013	2014	
Total Ammonia (N)	mg/L					<0.01	<0.02	<0.02	
Color-Apparent	CU			11	20	83	41	120	
Conductivity	uS/cm			89.7	90.2	91	94	84	
Corrosivity				-1.79					
TDS	mg/L	≤500	AO	66	100	72	52	78	
TOC	mg/L			3.1					
TON	mg/L			0.14					
Total Phosphate	mg/L			<0.02					
Hardness (CaCO ₃)	mg/L	80-100	AO	31	21	43	44	42	
pH	pH units	6.5-8.5	AO	7.32	7.6	7.3	7	7	
Turbidity	NTU's	5	AO	<0.5	<0.5	1	2.2	1.3	
Alkalinity	mg/L			30	40	40	42	36	
Chloride	mg/L	250	AO	6.2	2	2.3	2.6	3	
Fluoride	mg/L	1.5	MAC	<1.0	<0.1	0.08	<0.05	0.05	
Sulfate	mg/L	500	AO	<2.0	1.1	2.2	1.1	1.5	
Nitrate	mg/L	10	MAC	<0.1	0.03	0.19	0.07	0.13	
Nitrite	mg/L	1		<0.1	<0.01	<0.05	<0.05	0.07	
T-Aluminum	mg/L	0.100	OG	0.224	0.021	0.083	0.128	0.145	
T-Antimony	mg/L		MAC	<0.0002	<0.0002	<0.0001	<0.0002	<0.0001	
T-Arsenic	mg/L	0.010	MAC	<0.0002	<0.0002	0.00015	0.0002	0.0002	
T-Barium	mg/L	1.0	MAC	0.001	<0.001	0.00143	0.002	0.00098	
T-Beryllium	mg/L			<0.0001	<0.00004	<0.00005	<0.00004	<0.00005	
T-Bismuth	mg/L			<0.0005	<0.001	<0.0001	<0.0010	<0.0001	
T-Boron	mg/L	5.0	MAC	0.004	<0.005	0.003	<0.005	0.004	
T-Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	0.00002	<0.00001	<0.00001	
T-Calcium	mg/L			8.1	11.4	11.7	11.5	11.9	
T-Chromium	mg/L	0.05	MAC	<0.0005	<0.0004	0.0007	0.0005	0.0009	
T-Cobalt	mg/L			0.0002	0.00002	<0.0001	0.00012	<0.0001	
T-Copper	mg/L	≤1.0	AO	0.001	0.001	0.0044	0.003	0.0112	
T-Iron	mg/L	≤0.3	AO	<0.1	0.047	0.158	0.201	0.227	
T-Lead	mg/L	0.010	MAC	0.0002	0.0006	0.0005	0.0005	0.0006	
T-Lithium	mg/L			<0.001	<0.001	<0.0005	<0.001	<0.0005	
T-Magnesium	mg/L		AO	2.5	3.58	3.43	3.64	3.02	
T-Manganese	mg/L	≤0.05	AO	0.006	<0.005	0.0172	0.031	0.015	
T-Mercury	mg/L	0.001	MAC	<0.0001	<0.00001	<0.0001	<0.00001	<0.00001	
T-Molybdenum	mg/L			<0.001	0.0001	0.00026	0.0001	0.00014	
T-Nickel	mg/L			<0.0005	<0.001	0.0002	<0.001	0.0003	
T-Phosphorus	mg/L				<0.01				
T-Potassium	mg/L			<0.4	<0.1	0.2	0.24	0.1	
T-Selenium	mg/L	0.01	MAC	<0.0002	<0.0006	<0.0001	<0.0006	0.0001	
T-Silicon				6.53	8.07	9.23	8.54	8.44	
T-Silver	mg/L			<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	
T-Sodium	mg/L	≤200	AO	4.9	2.93	2.9	4.62	2.9	
T-Strontium	mg/L			0.02	0.023	0.0243	0.027	0.0261	
T-Sulphur	mg/L			0.4					
T-Thallium	mg/L			0.0014	<0.00001	<0.00001	<0.00001	<0.00001	
T-Tin	mg/L			<0.001	<0.0001	0.0004	<0.0001	0.0004	
T-Titanium	mg/L			0.0014	0.003	0.0049	0.0074	0.0052	
T-Uranium	mg/L	0.02	MAC		<0.0004	<0.00001	<0.0004	<0.00001	
T-Vanadium	mg/L			0.0021	0.0015	0.0029	0.0024	0.0026	
T-Zinc	mg/L	5	AO	0.003	0.004	0.0113	0.009	0.0101	
Total Coliform	cfu/100ml	<1	MAC	<1	>200.5	>200.5ⁱ	>200.5	165.2	
Non-Coliform Background	cfu/100ml	<1	MAC	<1					
E.coli	cfu/100ml	<1	MAC	<1	<1.0	118.4ⁱ	<1.0	34.4	
Total Plate Count	cfu/100ml			<3					
Tannins & Lignins	mg/L	0.400	AO		0.4	1.2	0.5	2.5	
Trihalomethanes	mg/L	0.1	MAC	0.076					

ⁱresults are MPN/100mL (Most Probable Number)

Whiskey Creek Trihalomethanes



* sample collected from 844 Carson

Whiskey Creek Distribution Water Analysis Results

Location: 979 Poplar Way

Canadian Drinking Water Guidelines Package



CDWG=Canadian Drinking Water Guidelines

MAC=Maximum Acceptable Concentration

OG= Operational Guidance Value

AO=Aesthetic Objective

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameters	Water Quality Guidelines			26-Aug	18-May	16-May	5-Jun	13-May	
	Units	CDWG		2009	2011	2012	2013	2014	
Total Ammonia (N)	mg/L					<0.01	0.02	<0.02	
Color-Apparent	CU	≤15	AO	12	22	5	7	<5	
Conductivity	uS		MAC	94.7	99.9	106.1	121	131	
TDS	mg/L	500	AO	84	100	58	94	102	
Hardness (CaCO3)	mg/L	80-100	AO	190	33	39	44	43	
pH	pH units	6.5-8.5	AO	7.6	7.3	7.3	7.0	6.9	
Turbidity	NTU's	5	AO	<0.5	<0.5	0.6	0.6	<0.5	
Alkalinity	mg/L			45	35	36	30	28	
Chloride	mg/L	250	AO	4.6	7.5	9.8	18.3	18.7	
Fluoride	mg/L	1.5	MAC	<1.0	<1.0	<0.05	<0.05	<0.05	
Sulfate	mg/L	≤500	AO	<2.0	<2.0	1.8	3.5	3.2	
Nitrate (N)	mg/L	10	MAC	0.1	<0.1	<0.05	0.08	0.09	
Nitrite (N)	mg/L	1	MAC	<0.1	<0.1	<0.05	<0.05	<0.05	
T-Aluminum	mg/L	0.100	OG	0.192	0.179	0.522	0.756	0.304	
T-Antimony	mg/L	0.006	MAC	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	
T-Arsenic	mg/L	0.010	MAC	0.0002	<0.0002	<0.0002	<0.0002	<0.00025	
T-Barium	mg/L	1.0	MAC	0.001	<0.001	<0.001	0.002	0.00141	
T-Beryllium	mg/L					<0.00004	<0.00004	<0.00025	
T-Boron	mg/L	5.0	MAC	<0.005	<0.005	<0.005	<0.005	<0.010	
T-Bismuth	mg/L					<0.001	<0.0010	<0.0005	
T-Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	
T-Calcium	mg/L			53.3	8.28	10.5	12.4	12	
T-Chromium	mg/L	0.05	MAC	0.0005	0.0004	<0.0004	<0.0004	<0.0025	
T-Cobalt	mg/L					0.00002	0.00003	<0.0005	
T-Copper	mg/L	≤1	AO	0.001	0.008	0.003	0.009	0.01	
T-Iron	mg/L	≤0.3	AO	0.051	0.076	0.032	0.072	0.044	
T-Lead	mg/L	0.010	MAC	0.0003	0.0004	<0.0001	0.0058	0.0014	
T-Lithium	mg/L			<0.001	<0.001	<0.001	<0.001	<0.0025	
T-Magnesium	mg/L		AO	13.4	2.6	3.03	3.27	3.06	
T-Manganese	mg/L	≤0.05	AO	0.0005	0.009	<0.005	0.012	<0.0050	
T-Mercury	mg/L	0.001	MAC	<0.01	<0.00001	<0.00001	<0.00001	<0.00001	
T-Molybdenum	mg/L					<0.0001	<0.0001	<0.00025	
T-Nickel	mg/L			<0.001	<0.001	<0.001	<0.001	<0.0010	
T-Phosphorus	mg/L			0.032	0.013	<0.01			
T-Potassium	mg/L			0.8	0.1	0.2	0.21	<0.5	
T-Selenium	mg/L	0.01	MAC	<0.0006	<0.0006	<0.0006	<0.0006	<0.0005	
T-Silicon	mg/L					8.23	8.49	8.82	
T-Silver	mg/L			<0.00001	<0.00001	<0.00001	<0.00001	<0.00025	
T-Sodium	mg/L	≤200	AO	101	7.78	7.41	8.96	9.4	
T-Strontium	mg/L					0.021	0.026	0.0239	
T-Thallium	mg/L					<0.00001	<0.00001	<0.00005	
T-Tin	mg/L					<0.0001	<0.0001	<0.0005	
T-Titanium	mg/L					<0.001	0.0026	<0.0025	
T-Uranium	mg/L	0.02	MAC	<0.0004	<0.0004	<0.0004	<0.0004	<0.00005	
T-Vanadium	mg/L					0.0014	0.0008	0.0008	
T-Zinc	mg/L	≤5	AO	0.007	0.005	0.001	0.004	0.024	
Total Coliform	cfu/100ml	<1	MAC	<1.0	<1.0	<1	<1.0	<1.0	
Fecal Coliform	cfu/100ml	<1	MAC						
E.coli	cfu/100ml	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Tannins & Lignins	mg/l	0.4	AO	0.1	0.6			<0.1	
Trihalomethanes	mg/l	0.1	MAC				0.019		



Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2014 Monthly Report



Date	Sample Location (Address)	Health Department		In-House									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Dec-14	3533 Hebert	0	0	0	0	9	7.09	1.52	65.8	0.07	139.1	0.02	0.000
9-Dec-14	3564 Foxglove	0	0	0	0	9	7.03	1.25	65.5	0.06	138.4		
9-Dec-14	3537 Harris	0	0	0	0	9	7.01	1.31	63.9	0.06	134.9		
15-Dec-14	844 Carson	0	0	0	0	9	6.92	1.02	85.7	0.08	180.6		
	Average	0	0	0	0	9.0	7.0	1.28	70.2	0.1	148.3	0.02	0
	Maximum	0	0	0	0	9	7.09	1.52	85.7	0.08	180.6	0.02	0
	Minimum	0	0	0	0	9	6.92	1.02	63.85	0.06	134.9	0.02	0

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L

Aesthetic Objective for Manganese is ≤0.05mg/L

*Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.



Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2014 Monthly Report



Date	Sample Location (Address)	Health Department		In-House									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Nov-14	3537 Harris	T	T	0	0	12	7.01	1.15	85.3	0.08	179.6	0.05	0.001
18-Nov-14	3533 Hebert	0	0	0	0	9	6.92	1.45	63.3	0.06	133.9		
18-Nov-14	3564 Foxglove	0	0	0	0	11	6.92	1.38	64.8	0.06	136.7		
24-Nov-14	844 Carson	0	0	0	0	9	6.95	1.16	71.4	0.07	150.7		
	Average	0	0	0	0	10.3	7.0	1.29	71.2	0.1	150.2	0.05	0.001
	Maximum	0	0	0	0	12	7.01	1.45	85.3	0.08	179.6	0.05	0.001
	Minimum	0	0	0	0	9	6.92	1.15	63.3	0.06	133.9	0.05	0.001

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T=Sample not tested. Too long in transit.

Aesthetic Objective for Iron is ≤0.3 mg/L

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Comments:

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
7-Oct-14	3537 Harris	0	0	0	0	14	7.36	1.59	59.4	0.06	125.6	0.00	0.000
14-Oct-14	3564 Foxglove	0	0	0	0	15	7.20	1.43	61.1	0.06	129.2		
20-Oct-14	844 Carson	0	0	0	0	14	7.18	1.11	77.2	0.08	162.9		
27-Oct-14	3533 Hebert	0	0	0	0	12	7.05	1.93	93.5	0.09	196.8		
	Average	0	0	0	0	13.8	7.2	1.52	72.8	0.1	153.6	0.00	0
	Maximum	0	0	0	0	15	7.36	1.93	93.5	0.09	196.8	0	0
	Minimum	0	0	0	0	12	7.05	1.11	59.4	0.06	125.6	0	0

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Sep-14	3533 Hebert	0	0	0	0	18	7.08	1.25	57.3	0.06	121.4	0.02	0.017
9-Sep-14	3537 Harris	0	0	0	0	16	7.26	1.17	56.8	0.06	120.3		
16-Sep-14	3564 Foxglove	0	0	0	0	16	7.34	1.40	58.0	0.06	122.9		
23-Sep-14	844 Carson	0	0	0	0	14	7.04	1.41	61.5	0.04	130.0		
29-Sep-14	3533 Hebert			0	0	15	6.86	1.30	59.4	0.06	125.2		
	Average	0	0	0	0	15.8	7.1	1.31	58.6	0.1	124.0	0.02	0.017
	Maximum	0	0	0	0	18	7.34	1.41	61.5	0.06	130	0.02	0.017
	Minimum	0	0	0	0	14	6.86	1.17	56.8	0.04	120.3	0.02	0.017

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Date	Sample Location (Address)	Health Department		In-House									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Aug-14	3537 Harris	0	0	0	0	18	7.12	1.20	56.3	0.06	119.2	0.04	0.013
11-Aug-14	3564 Foxglove	0	0	0	0	17	7.24	1.31	56.5	0.06	119.5		
19-Aug-14	3533 Harris	0	0	0	0	17	7.07	1.39	58.8	0.06	124.4		
25-Aug-14	844 Carson	0	0	0	0	16	7.33	1.71	58.1	0.06	123.1		
	Average	0	0	0	0	17.0	7.2	1.40	57.4	0.1	121.6	0.04	0.013
	Maximum	0	0	0	0	18	7.33	1.71	58.8	0.06	124.4	0.04	0.013
	Minimum	0	0	0	0	16	7.07	1.2	56.3	0.06	119.2	0.04	0.013

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
2-Jul-14	3533 Hebert	0	0	0	0	17	6.99	1.00	57.1	0.06	120.9	0.05	0.023
7-Jul-14	3537 Harris	0	0	0	0	15	6.92	1.43	59.4	0.06	125.9		
15-Jul-14	3564 Foxglove	0	0	0	0	15	6.96	1.39	58.9	0.06	124.6		
22-Jul-14	844 Carson	0	0	0	0	15	7.15	1.07	58.0	0.06	122.7		
29-Jul-14	3533 Hebert			0	0	16	7.09	1.14	59.7	0.06	126.2		
	Average	0	0	0	0	15.6	7.0	1.21	58.6	0.1	124.1	0.05	0.023
	Maximum	0	0	0	0	17	7.15	1.43	59.7	0.06	126.2	0.05	0.023
	Minimum	0	0	0	0	15	6.92	1	57.1	0.06	120.9	0.05	0.023

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
4-Jun-14	3533 Hebert	0	0	0	0	13	7.16	1.95	64.9	0.06	137.2	0.04	0.027
9-Jun-14	3537 Harris	0	0	0	0	13	7.09	1.08	61.1	0.06	129.2		
16-Jun-14	3564 Foxglove	0	0	0	0	14	7.16	2.40	65.9	0.07	139.3		
24-Jun-14	844 Carson	0	0	0	0	13	7.21	1.43	62.5	0.06	132.0		
	Average	0	0	0	0	13.3	7.2	1.72	63.6	0.1	134.4	0.04	0.027
	Maximum	0	0	0	0	14	7.21	2.4	65.9	0.07	139.3	0.04	0.027
	Minimum	0	0	0	0	13	7.09	1.08	61.1	0.06	129.2	0.04	0.027

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Date	Sample Location (Address)	Health Department		In-House									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-May-14	3533 Hebert	0	0	0	0	9	7.10	1.31	64.8	0.06	137.0	0.02	0.000
13-May-14	3537 Harris	0	0	0	0	12	6.55	0.97	63.1	0.06	133.3		
21-May-14	3564 Foxglove	0	0	0	0	12	7.30	0.95	62.1	0.06	131.2		
26-May-14	844 Carson	0	0	0	0	11	7.23	1.14	65.5	0.06	138.5		
	Average	0	0	0	0	11.0	7.0	1.09	63.9	0.1	135.0	0.02	0
	Maximum	0	0	0	0	12	7.3	1.31	65.5	0.06	138.5	0.02	0
	Minimum	0	0	0	0	9	6.55	0.95	62.1	0.06	131.2	0.02	0

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
1-Apr-14	3533 Hebert	0	0	0	0	9	6.96	1.28	65.5	0.06	138.5	0.03	0.012
9-Apr-14	3537 Harris	0	0			7		1.57					
14-Apr-14	3564 Foxglove	0	0	0	0	9	6.93	1.30	64.2	0.06	135.9		
29-Apr-14	844 Carson	0	0	0	0	9	6.93	1.23	69.5	0.07	147.0		
	Average	0	0	0	0	8.5	6.9	1.35	66.4	0.1	140.5	0.03	0.012
	Maximum	0	0	0	0	9	6.96	1.57	69.5	0.07	147	0.03	0.012
	Minimum	0	0	0	0	7	6.93	1.23	64.2	0.06	135.9	0.03	0.012

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4-Mar-14	3533 Hebert	0	0	0	0	4	6.96	2.06	62.7	0.06	132.6	0.01	0.020
10-Mar-14	3537 Harris	0	0	0	0	6	6.81	1.68	70.6	0.07	149.0		
18-Mar-14	3564 Foxglove	0	0	0	0	6	7.46	1.29	66.8	0.07	141.1		
24-Mar-14	844 Carson	0	0	0	0	7	7.25	1.38	67.4	0.07	142.5		
	Average	0	0	0	0	5.8	7.1	1.60	66.9	0.1	141.3	0.01	0.02
	Maximum	0	0	0	0	7	7.46	2.06	70.6	0.07	149	0.01	0.02
	Minimum	0	0	0	0	4	6.81	1.29	62.7	0.06	132.6	0.01	0.02

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Feb-14	3533 Hebert	0	0	0	0	8	7.19	1.54	62.0	0.06	131.2	0.03	0.018
11-Feb-14	3537 Harris	0	0	0	0	8	7.13	1.06	54.8	0.05	116.1		
18-Feb-14	3564 Foxglove	0	0	0	0	8	7.05	1.10	72.4	0.07	152.7		
26-Feb-14	844 Carson	0	0	0	0	8	6.71	1.44	64.3	0.06	135.2		
	Average	0	0	0	0	8.0	7.0	1.29	63.4	0.1	133.8	0.03	0.018
	Maximum	0	0	0	0	8	7.19	1.54	72.4	0.07	152.7	0.03	0.018
	Minimum	0	0	0	0	8	6.71	1.06	54.8	0.05	116.1	0.03	0.018

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-Jan-14	3533 Hebert	0	0	0	0	8	7.26	1.35	60.5	0.06	127.8	0.03	0.009
13-Jan-14	3537 Harris	0	0	0	0	9	7.17	1.61	68.6	0.07	145.0		
20-Jan-14	3564 Foxglove	0	0	0	0	8	6.67	1.00	66.1	0.07	139.8		
29-Jan-14	844 Carson	0	0	0	0	8	7.22	1.24	65.9	0.07	139.2		
	Average	0	0	0	0	8.3	7.1	1.30	65.3	0.1	138.0	0.03	0.009
	Maximum	0	0	0	0	9	7.26	1.61	68.6	0.07	145	0.03	0.009
	Minimum	0	0	0	0	8	6.67	1	60.5	0.06	127.8	0.03	0.009

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APPENDIX C

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN

REGIONAL DISTRICT
OF NANAIMO

WATER SYSTEMS

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Contents

Prime Responsibilities	1
Emergency Response and Recovery Actions	1
Communication Checklist	2
- RDN Priority Contacts	2
- Key Communication Options	2
Emergency Contact Numbers	3-7
Emergency Response Plans	8
- Contamination of Source (incl. Turbidity events)	8
- Loss of Source	8
- Broken Water Main	9
- Chlorination Failure	9
- Pump Failure	9
- Power Failure	10
- Backflow or Back Siphonage	10
- Bacteria Count (RDN Lab)	10
- Flood Conditions	11
Appendices	
- Boil Water Notice	13
- Boil Water Info for the General Public	14-26
- Boil Water Order	27
- Unfit for Drinking Notice	28
- Service Interruption Notice	29
- Decision Tree for Responding to Turbidity Event	30
Maps-Water Service Areas	
- Nanoose Bay Peninsula	Map 1
- Madrona Pt/Wall Beach Neighbourhood	Map 2
- Fairwinds Neighbourhood	Map 3
- Arbutus Park Neighbourhood	Map 4
- West Bay Neighbourhood	Map 5
- Driftwood Neighbourhood	Map 6
- French Creek	Map 7
- Surfside	Map 8
- San Pareil	Map 9
- Englishman River	Map 10
- Melrose	Map 11
- Decourcey	Map 12
- Whiskey Creek	Map 13
- Descanso Bay Reg. Park	Map 14
- Horne Lake Reg. Park Water System	Map 15
- Rollo McClay Community Park Water System	Map 16

Prime Responsibilities

- Provide safe drinking water.
- Provide potable water for sanitation purposes.
- Provide water for fire suppression.
- Prevent unnecessary loss of stored water.
- Restore the integrity of the entire water system as soon as possible.
- Maintain integrity and quality of supply.

Emergency Response and Recovery Actions

- Analyze the type and severity of the emergency.
- Provide emergency assistance to save lives.
- Reduce the probabilities of additional injuries or damage.
- Provide situational reporting to appropriate agencies as required.
- Perform emergency repairs based on priority demand.
- Return system to normal levels. (recovery)
- Evaluate response and preparedness plan.
- Revise plan as necessary.
- Provide maps, notices, and direction necessary for water recovery.

Communication Checklist

In an emergency it will be important to contact the key people shown below. This will help reduce confusion and assist in ensuring any important messaging is done so correctly and quickly.

IF REQUIRED, CONTACT E.M.B.C. (formerly P.E.P.) or V.I.H.A. BEFORE MAKING THE FOLLOWING CONTACTS AS PER THE EMERGENCY PLANS

RDN Priority Contacts

MANAGER OF WATER SERVICES

MIKE DONNELLY
(250) 390-6560

MGR. REGIONAL & COMMUNITY UTILITIES

RANDY ALEXANDER
(250) 390-6560

COMMUNICATIONS COORDINATOR

ADRIENNE MERCER
(250) 390-4111

EMERGENCY COORDINATOR

JANI DREW
cell (250) 713-2057

Key Communication Options

Management Support

- Contact Electoral Area Director
- Contact the local radio station and provide a brief message if public health and safety are at risk. Follow up with a press release.

Field Staff Support

- Post notices on household front doors.
- Attach warning signs to existing Water Sprinkling Regulation signs in each community.
- Put up roadside signage at the entrance to the community.

Administrative Support

- Provide information message on the RDN web site & social media.
- Review after hours office and voice mail messaging.
- Provide notification to other RDN staff.

Emergency Contact Numbers

Personnel Contacts

<i>Name</i>	<i>Position</i>	<i>Phone / Cell</i>
Dave Welz	Chief Operator	(250) 927-0295
Heather Dorken	Operator III	(250) 927-1452
Brian Hale	Operator III	(250) 951-8354
Randy Stearman	Operator II	(250) 927-1178
Brad Lancaster	Operator II	(250) 927-1849
Lyndon Jaworski	Operator II	(250) 954-8351
Greg Roberts	Operator II	(250) 927-1902
Mike Donnelly	Manager of Water Services	(250) 713-7169
Gerald St. Pierre	Project Engineer, Water Services	(250) 713-6957
Deb Churko	Engineering Technologist	(250) 390-6546
Jack Eubank	Bylaw Officer <i>(Emerg. Coord. Alternate- 24hrs)</i>	(250) 713-4872
Brian Brack	Bylaw Officer <i>(Emerg. Coord. Alternate- 24hrs)</i>	(250) 714-3987

Electoral Area Directors

Electoral Area	Director	Phone	E-mail Address
A	Alec McPherson	722-9472	alecmcpherson@shaw.ca
B	Howard Houle	247-8250	howardhoule@yahoo.ca
C	Maureen Young	754-5896	maureen_young@shaw.ca
E	Bob Rogers	468-9986	bobrogers4areaE@telus.net
F	Julian Fell	248-4296	fjfell.at.rdn@gmail.com
G	Joe Stanhope	248-6401	jstanhope@shaw.ca
H	Bill Veenhof	797-6313	bill.veenhof@shaw.ca

Government Agency Contacts

Ministry of Environment	Nanaimo	(250) 751-3100
Department of Fisheries and Oceans	Nanaimo	(250) 754-0230
Emergency Management BC (E.M.B.C.) and Dangerous Goods Spills (formerly PEP)	Victoria	1-800-663-3456
Island Health Office (VIHA)	Parksville	(250) 947-8222
Island Health Office (VIHA)	Nanaimo	(250) 755-6215
Murray Sexton, Public Health Engineer	Nanaimo	(250) 755-6293
Medical Health Officer	Nanaimo or after hours	(250) 740-6988 1-800-204-6166
City of Parksville Chief Operator, Scott Churko	Parksville	(250) 248-5412 (250) 927-1856 (cell)
Town of Qualicum Beach	Qualicum Beach	(250) 752-6921
District of Lantzville Superintendent, Fred Spears	Lantzville	(250) 390-4006 (250) 713-0980 (cell)
North Cedar Improvement District	Cedar	(250) 722-3711
Islands Trust Organization (Main office)	Gabriola Isl	(250) 247-2063
Trustee Sheila Malcolmson	Gabriola Isl	(250) 247-8078
Trustee Gisele Rudischer	Gabriola Isl	(250) 247-8795

Emergency Services

Hospital	Nanaimo	(250) 754-2141
	Parksville ph.	(250) 248-2332 (Nan hospital)
	Oceanside Ctr	(250) 951-9550
	Gabriola Clinic	(250) 247-9922
Ambulance	Nanaimo	911 or (250) 758-8181
	Parksville	911 or (250) 248-3511
Police	Nanaimo	911 or (250) 754-2345
	Parksville	911 or (250) 248-6111
	Gabriola Isl	911 or (250) 247-8333
Fire Department	Parksville	911 or (250) 248-3242
	Coombs-Hilliers	911 or (250) 752-2144
	Nanoose Bay	911 or (250) 468-7141
	Qualicum Beach	911 or (250) 752-6921
	Cedar	911 or (250) 722-3122
	Gabriola Isl	911 or (250) 247-5601

Priority Services

BC Hydro (Qualicum Beach number)	(250) 752-8012 or
BC Hydro (Power Outages & Electrical Emergencies)	1-888-769-3766
Telus	(250) 811-2323 or
Telus (Paul McGrath cell 248-0983)	(250) 741-7713 or 741-7716
FortisBC (Teresen Gas)	(250) 248-4880
Shaw Cable (Nanaimo)	(250) 754-5571
CP Rail	1-800-716-9132
French Creek Pollution Control Centre	(250) 248-5794
Chlorine Manufacturer (Brentagg)	1-800-661-1830

Community Contacts

District 69 School Board Office	(250) 248-4241
Nanoose Bay School	(250) 468-7414
Nanoose Children's Centre	(250) 468-1784
Nanoose Place	(250) 468-5339
Nanoose Post Office	(250) 468-7722
Canadian Forces Base Nanoose	(250) 756-5021 or 468-5004
	or
Descanso Bay Reg Park Operator- Jim Demler	(250) 468-2260 (MP Stn-24hr)
Horne Lake Reg Park Operator- Bill Woodhouse	(250) 751-5887
	(250) 927-4790

Excavation Services

Shoreline Equipment (Doug Penny)	(250) 468-7759 or 755-9502
Rite on Time Excavation & Trucking (Cody)	(250) 927-1645
Degnen Excavators (Gabriola Isl)	(250) 247-8817

Electrical Contractors

Canem Electric	(250) 468-1887
HPS Power Ltd. (Harvey Sommerfeld)	(250) 954-7463
TC Trades (Tom Frenette)	(250) 756-0077 or 668-0078
Ron Ruckman (Descanso Bay/Gabriola Isl)	(250) 247-0050

Other Services

Plumbing Services (Maci Motor – Pump Repair)	(250) 248-4423
JC Plumbing (Descanso Bay/Gabriola Isl)	(250) 247-7574 or 713-6700
EPCOR (Parksville)	(250) 951-2460
Sand and Gravel (Ozero)	(250) 752-1482
Sand and Gravel (Lussier & Sons)	(250) 468-9994
Sand and Gravel (Porter Wood)	(250) 248-3693
EMCON Road Maintenance (Gabriola Isl)	(250) 247-9420
EMCON (Parksville) After Hours Emerg 1-866-353-3136 or	(250) 248-6212

Other Services

Pump Trucks (Action Tank Service)	(250) 248-3833
Pump Trucks and Toilet Rentals (A-1 Septic)	(250) 248-4438
Portable Washrooms (Coast Toilet Rentals)	(250) 753-7552
Bulk water supply (BC Water Service)	(250) 954-3628
Bottled water supply (Water Pure & Simple)	(250) 752-1373
Island H2O Services	(250) 754-4721
Summer Rain Water Delivery (Gabriola Isl)	(250) 247-9136
Kalicum Drilling	(250) 245-1220
Red Williams (Water Hauling Service)	(250) 947-5197 (Mark)
RDN- Use our own water hauling tank and truck	(250) 248-4914

Suppliers

Four Star Waterworks (piping)	(250) 954-3546
EMCO Water Works	(250) 756-3344
Corix Water Products	(250) 746-8877
Andrew Sheret (Parksville)	(250) 954-9997
Andrew Sheret (Nanaimo)	(250) 758-7383
Hwy Four Rentals (equipment & pumps)	(250) 248-1100
Irritex Pumps and Irrigation – (pumps)	(250) 248-7028
Windsor Plywood (miscellaneous building supplies)	(250) 752-3122
Albertsons Hardware (miscellaneous building supplies)	(250) 248-6888
Robinson Rentals	(250) 753-2465
United Rentals	(250) 758-3911

Media Services

Adrienne Mercer, RDN Communications Coordinator	1-877-607-4111 or 713-1075
Radio Station (CKWV) Nanaimo and Parksville	(250) 758-1131
TV Station (CHEK)	(250) 383-2435
Newspaper (PQ News and The Weekender)	(250) 248-4341
Nanaimo Daily News / Harbour City Star	(250) 729-4212
Gabriola Sounder	(250) 247-9337

Emergency Response Plans

Contamination of Source (Turbidity Events over 1 NTU, Spills, Accidents, Vandalism)

Actions:

- Notify Island Health Officer (VIHA) (Ph. 250-947-8222 or after-hours Medical Health Officer at 1-800-204-6166)
- Shut down pump
- Notify E.M.B.C. (Emergency Management BC) (formerly PEP)
- Notify all users if necessary under direction of Health Unit
- Contact government agencies for advice and assistance
- Contact local media for public service announcements
- Post signs and deliver notices to homes and businesses. (See attached samples)
- Arrange alternate source if necessary – i.e., bottled or bulk water
- Advise RDN supervisory personnel
- Advise local fire dept not to use fire hydrants

Contacts:

- Island Health Office (VIHA)
- E.M.B.C. (Emergency Management BC) (formerly PEP), RCMP
- Ministry of Environment
- All schools and community centers – see “*Priority Contacts*” List
- RCMP if there has been vandalism

Loss of Source (Loss Of Reservoir or Supply Lines)

Actions:

- Ensure pumps are shut off. (To protect pump)
- Notify all users
- Contact government agencies for advice and assistance
- Arrange alternate source – i.e., bottled water, bulk water, storage tank
- Advise RDN supervisory personnel if necessary

Contacts:

- Island Health Office (VIHA) and Ministry of Environment

Emergency Response Plans Cont'd

Broken Water Main

Actions:

- Shut pump off when backflow conditions have been prevented
- Call for repairs as required – i.e. excavator, backhoe
- Notify all users of interruption of service
- Advise Island Health Officer (VIHA)
- Arrange alternate source if necessary
- Advise RDN supervisory personnel

Contacts:

- Island Health Office (VIHA)

Chlorination Failure

Actions:

- Advise Island Health Officer (VIHA)
- Shut off well pumps. Monitor reservoir levels.
- Notify all users to boil water for two minutes or take other disinfection procedures in accordance with recommendations of local health officials
- Post signs or deliver notices if necessary. (See attached samples)
- Arrange chlorinator repairs
- Arrange for alternate disinfection if necessary
- Advise RDN supervisory personnel

Contacts:

- Island Health Office (VIHA)
- Chlorinator manufacturer

Pump Failure

Actions:

- Notify all users of interruption of service
- Call for repairs: pump manufacturer if necessary
- Advise Island Health Officer (VIHA) (if interruption is not short term)
- Arrange alternate source if necessary – bottled or bulk water, etc.
- Advise RDN supervisory personnel if necessary

Contacts:

- Island Health Office (VIHA)

Emergency Response Plans Cont'd

Power Failure

Actions:

- Call BC Hydro. Find out when power will be restored
- Start back-up generator or arrange to get one
- Notify all users about interruption of service if backup not capable of maintaining supply
- Post signs or deliver notices if necessary. (See attached samples)
- Advise Island Health Officer (VIHA)
- Arrange alternate source if necessary – bottled or bulk water, etc.
- Arrange for alternate disinfection at Descanso Bay and Horne Lake Reg Parks
- Advise RDN supervisory personnel

Contacts:

- Island Health Office (VIHA)

Backflow or Back Siphonage

Actions:

- Advise Medical Health Officer at Island Health Office (VIHA)
- Notify all users to boil water for two minutes or take other disinfection procedures in accordance with recommendations of local health officials. (See attached samples)
- Purge and disinfect lines as directed, after corrections have been made
- Post signs or deliver notices if necessary. (See attached samples)
- Advise RDN supervisory personnel

Contacts:

- Island Health Office (VIHA)

Bacteria Count (RDN Lab)

Actions:

- Advise Medical Health Officer Island Health Office (VIHA)
- Follow procedures in accordance with recommendations of local health officials
- Post signs or deliver notices if necessary. (See attached samples)
- Check if UV unit is working at Descanso Bay Reg Park, clean the UV bulb
- Arrange for alternate disinfection at Descanso Bay Reg Park if the UV unit is not working
- Advise RDN supervisory personnel

Contacts:

- Island Health Office (VIHA)

Emergency Response Plans Cont'd

Flood Conditions:

Actions:

- Notify Island Health Officer (VIHA) (Ph. 250-947-8222 or after-hours Medical Health Officer at 1-800-204-6166)
- Notify all users regarding the potential for water contamination, loss of pump, power, etc. Users should be advised to store some drinking water in advance, and to boil any suspect water for two minutes or disinfect with chlorine when flood conditions exist
- Phone government contacts
- Contact local media for public service announcement when customers can not be reached by phone
- Post signs or deliver notices if necessary. (See attached samples)
- Arrange alternate source if possible – i.e. bottled water, bulk hauler or storage tank
- Advise RDN supervisory personnel

Contacts:

- Island Health Office (VIHA), E.M.B.C. (Emergency Management BC) (formerly PEP), and Ministry of Environment

APPENDICES

Boil Water Notice	13
Boil Water Info for the General Public	14-26
Boil Water ORDER	27
Unfit for Drinking Notice	28
Service Interruption Notice	29
Decision Tree for Responding to Turbidity Event	30

SAMPLE

BOIL WATER NOTICE

Effective date: _____

Please note that all water used for domestic purposes (drinking, cooking, etc.) should be boiled before consumption. The boiling should be at a rolling boil and for a minimum of one minute.

RDN Water Services staff are continually monitoring the water supply system and will provide updates as they become available.

Watch for information updates at www.rdn.bc.ca (Water Services) and listen to your local radio station for more information.

This notice will be in effect until further notice.

For further information contact the

**Regional District of Nanaimo at:
1-877-607-4111 or 1-250-390-4111
Water Services Field Office: 1-250-248-4914**

**BOIL WATER NOTICE INFORMATION FOR THE GENERAL PUBLIC
DURING A BOIL WATER NOTICE CAUSED BY:
INADEQUATE DISINFECTION**

This information is provided as a guide to help individuals reduce the risk of becoming ill from ingesting non-potable water. Individuals who follow these guidelines will greatly reduce their chance of becoming ill.

What is a Boil Water Notice?

A Boil Water Notice is a public announcement advising water system users that they should boil their tap water for drinking and other domestic purposes. It is a notice intended to protect the Publics' health from waterborne infectious agents that could be present or are known to be present in the community's drinking water supply.

What is the difference between a Boil Water Notice and a Boil Water Order?

A Boil Water Notice is a notice issued to the public as a health warning. In most cases it is the water supplier who notifies the public.

A Boil Water Order is legal document issued to the water supplier by the Health Authority requiring the water supplier to notify the public of a boil water notice.

What are the health risks during a Boil Water Notice?

The health risks are associated with ingesting water that contains microbiological agents that can cause disease. These pathogenic (disease causing) agents could include *Giardia*, *Cryptosporidia*, *E. coli*, *Campylobacter*, *Salmonella* and *Hepatitis A*. Boiling tap water for one minute is sufficient to destroy pathogens that could be present in the water.

There are numerous factors that influence whether a person becomes ill. First, there must be pathogens present in the water you consume. Not every glass of water is likely to contain pathogens. Even if the water you consume contains pathogens, those pathogens that are present must be viable. That is, they must be in a state where they can cause an illness and they must be present in large enough numbers to cause an illness. The number of pathogens needed to cause illness depends on the type of pathogen present, a person's size, age, and immune status.

The incubation period (time for symptoms to develop) will vary depending on the type of pathogen. For example, Giardia (beaver fever) could take up to four weeks to develop symptoms whereas E. coli could take up to ten days and as little as two days. For more information on waterborne diseases go to the following BC Health File;

<http://www.bchealthguide.org/healthfiles/hfile49a.stm>

Any persons believing that they are ill should see their doctor. Patients are sometimes requested to submit samples for laboratory analysis to assist in waterborne outbreak investigations.

It is important to note that Boil Water Notices are specific to microbiological threats. They are not appropriate to address threats from chemical contamination. Boiling chemically contaminated water will only result in the chemical becoming more concentrated or release the chemical into the air where it could be inhaled.

When there is a threat to a water supply from a chemical contaminated a more appropriate public health notice of "Do Not Drink the Water" would be issued.

What am I trying to kill when I'm boiling the water?

Boiling water is recommended to kill pathogenic microbes that may be present in contaminated water. Bacteria such as *E. coli* and *Salmonella* are killed rapidly at temperatures over 60°C and a temperature of 72.4°C for 1 minute is needed to inactivate cryptosporidium. *Hepatitis A* and *Norovirus* are rapidly inactivated at temperatures above 65°C.

Based on the above information there is no need to boil water for prolonged periods of time. Although heating water to boiling is not needed it is the only end point easily recognized by the public without the use of thermometers. It is therefore recommended that the public bring the water to a rolling boil for one minute to ensure that all pathogens have been inactivated.

One minute should be added to the above boiling times if the water is cloudy or highly colored to ensure proper mixing and that all pathogens have been exposed to the high temperature. When boiling water at altitudes above 2000m (6,500 ft), water should be boiled for 2 minutes.

How can the water become contaminated?

The water can become contaminated in a variety of ways. Some of these include:

- Heavy rainfall can wash contaminants into the water source
- Accidental spills in the water supply
- Breakdown of the disinfection process
- Break in water supply mains
- Vandalism
- Connections within the water system between potable and non-potable piping.

Is it necessary to boil all the water in the home during a boil water notice?

No, it is not necessary to boil all your water. Water used for bathing, showering, laundry, toilet flushing and mopping of floors does not need to be boiled. During bathing, young children should be cautioned against swallowing the bath water or alternatively young children could be sponge bathed.

All other water should be boiled. Simply put, any water that has a chance of being ingested should be boiled. This would include water used for drinking, beverage concentrates, ice cubes, washing fruits and vegetables, or brushing teeth.

Severely immune-compromised individuals should always boil their tap water for the purposes above. See the link to BC Health Files number 56, December 2003.

<http://www.bchealthguide.org/healthfiles/hfile56.stm>.

Infant formulas should always be prepared by using boiled tap water or bottled water that is boiled. See the link to BC Health Files number 69b, May 2006.

<http://www.bchealthguide.org/healthfiles/hfile69b.stm>.

Drinking water for pets including dogs, cats, birds and reptiles should also be boiled.

How should tap water be boiled properly?

Tap water should be boiled for at least one minute. Use any clean pot or kettle. Kettles that have automatic shut offs are acceptable.

How should tap water be boiled properly? (*continued*)

Health Canada suggests that microwave ovens can also be used using microwave-safe containers but cautions against forming superheated water (water heated above its boiling point without the formation of steam). When using microwaves, Health Canada suggests inserting a glass rod, wooden or plastic spoon in the container to prevent forming superheated water.

After boiling, let the water cool by leaving it on the counter or in the refrigerator in covered containers. Once the water is boiled, it can be stored in food grade containers at room temperature or in the refrigerator.

Shaking the water in the container or pouring the water between two containers and/or adding a pinch of salt can bring back flavor after boiling.

Are there alternatives to boiling water?

Yes, there are. Although there are alternatives, not all of them will be feasible or practical in all situations. In part, it will depend on how much water you need and what you need it for. Safe alternatives to boiling water include:

- Using commercially prepared bottled water
- Obtaining water from an approved source that is not on a boil water notice, or
- Using bleach to disinfect small quantities of tap water. See the following chart or website for a guide to using bleach.

<http://www.bchealthguide.org/healthfiles/hfile49b.stm>

Disinfection using unscented household bleach (5% chlorine) works best with warm water. Add bleach to the water, shake or stir for thorough mixing and then let it stand for at least 30 minutes before drinking.

Gallons of water to disinfect (equivalent shown in brackets)	Amount of Household bleach (5%) to add*
1 gal. (4.5 litres)	2 drops (0.18 mL)
2 ½ gal. (10 litres)	5 drops (0.4 mL)
5 gal. (23 litres)	11 drops (0.9 mL)
10 gal. (45 litres)	22 drops (1.8 mL)
22 gal. (100 litres)	¾ teaspoon (4 mL)
45 gal. (205 litres)	1 ½ teaspoons (8 mL)
50 gal. (230 litres)	1 ¾ teaspoons (9 mL)
100 gal. (450 litres)	3 ½ teaspoons (18 mL)
220 gal. (1000 litres)	8 teaspoons (40 mL)
500 gal. (2200 litres)	6 tablespoons (90 mL)
1000 gal. (4550 litres)	6 ½ ounces or 12 tablespoons (180 mL)

A slight chlorine odour should still be noticeable at the end of the 30-minute waiting period if you have added enough bleach. If not, repeat the dosage and allow the water to stand an additional 15 minutes. If the water has too strong a chlorine taste, allow the water to stand exposed to the air for a few hours or pour it from one clean container to another several times.

The disinfection action of bleach depends as much on the waiting time after mixing as to the amount used. The longer the water is left to stand after adding bleach, the more effective the disinfection process will be.

NOTE: Bleach does not work well in killing off *Cryptosporidium* parasites.

The amount of bleach needed to kill *Cryptosporidium* makes the water almost impossible to drink. If *Cryptosporidium* is in the water, boiling is the best way to ensure that the water is safe to drink.

I have my own water treatment device do I still need to boil my water?

If the device is designed to improve taste or reduce odour such as an activated carbon filter the answer is **YES** you should still boil your water.

If the device is designed to improve the chemical quality of the water such as reducing the iron content then the answer is **YES** you should still boil your water.

If the device is designed to improve water that is already potable the answer again is **YES** you should still boil your water.

There are numerous filters on the market designed to remove microorganisms and particulates. Most of these filters are not capable of removing viruses. Therefore, you should boil your water if you have a unit that cannot remove viruses.

If the device is designed to disinfect (destroy pathogens) water such as in an ultraviolet light (UV) disinfection unit you **might not** need to boil your water. There are numerous ultraviolet units; some are designed to disinfect raw water and some are designed to disinfect water that has already been disinfected at a central facility. For example, if the unit is classified by the National Sanitation Foundation (NSF) as meeting NSF Standard 55 Class A, it is designed to disinfect raw water. However, if the water within the distribution system is too turbid or cloudy, even a UV unit meeting NSF Standard 55 Class A may not work properly and you should still boil your water.

Reverse osmosis (RO) units are designed to filter water at the molecular level and should provide water that is free of pathogens. Thus, you **do not** have to boil your water if you have a reverse osmosis water treatment device.

There are many types of units on the market each designed to address specific water quality issues. It is recommended that you check with the unit's manufacturer to know exactly what your unit can do.

Can I purchase water from vending machines?

It depends on how the water is treated. Local vending machines that use local water would only be acceptable if the vending machine can kill pathogens that might be present in the water. Check with the store or manufacturer to see if the unit is capable of providing water that is safe to drink.

Warning signs should be posted on vending units that are not capable of providing safe water. Alternatively, the machine should be turned off.

Are there any people or groups of people at higher risk?

Yes. These people include any individual whose immune system is not fully developed or whose immune system is under stress such as infants, the elderly, immune compromised individuals and individuals already suffering from an illness. For more information go to the following BC Ministry of Health websites:

BC Health File: weakened immune systems

<http://www.bchealthguide.org/healthfiles/hfile56.stm>.

BC Health File: preparing infant formula

<http://www.bchealthguide.org/healthfiles/hfile69b.stm>.

Boil water or provide an alternative safe supply of water that is used for:

- Drinking purposes- This includes all beverage concentrates such as fruit juice and iced tea
- Food preparation- This includes washing of fruits and vegetables
- Food contact surfaces

**Boil water or provide an alternative safe supply of water that is used for:
(continued)**

Food contact surfaces are all those surfaces that food comes into contact with during the food preparation process. These surfaces include counter tops, cutting boards and chopping blocks. Food contact surfaces should be washed with clean water and then sanitized using an acceptable sanitizing agent. Sanitizing agents for food contact surfaces include bleach (12-15 mL of 5% bleach per litre of water), iodophors, quaternary ammonia compounds or hydrogen peroxide (3% solution).

- Oral hygiene (brushing teeth)
- Infant formula; see BC Health File; preparing infant formula at <http://www.bchealthguide.org/healthfiles/hfile69b.stm>.
- Ice making

It is important to note that freezing does not destroy most pathogens. Bacteria and viruses can survive in frozen products for long periods of time. Discard any ice made from contaminated or potentially contaminated water.

Hand washing

Using warm water and soap should be sufficient. Applying a hand sanitizer after washing with tap water would add an extra barrier of protection.

Dishwashing by hand

Dishes washed by hand should be sanitized for two minutes in a separate sink using a bleach solution (2 mL of bleach per litre of water) after the dishes have been washed and rinsed. The dishes should then be left to **air dry** prior to being used. Attempting to wash and sanitize dishes in the same sink at the same time is not recommended because soap, grease and food particles interfere with the sanitizing process.

Mechanical dishwashers

Most residential home-style dishwashers do not provide a high enough temperature to kill all pathogens. Dishwashing units that reach 82 degrees Celsius (180 Fahrenheit) for twelve seconds (or an equivalent time-temperature relationship) during the final rinse cycle will destroy pathogens.

To optimize the disinfection process while using a residential dishwasher you should consider:

1. Using the highest temperature setting possible.
2. Running dishes through the dishwasher twice.
3. Sanitizing dishes afterwards in a sink containing a weak bleach solution (see dishes washed by hand above).
4. Letting the dishes air dry prior to use

Fruit and vegetable washing

Thoroughly wash all produce with potable water especially those that are going to be eaten raw. This is a common sense practice that should be applied even when there is no public boil water notice.

Coffee Machines

Coffee machines usually produce water around 70 to 80 degrees Celsius, which is sufficient to destroy pathogens. However, a sufficient amount of time is needed to ensure that all harmful organisms are destroyed. Therefore, let the coffee stand for at least five minutes before drinking.

Home canning

To be safe, postpone home canning until the boil water notice has been rescinded.

Beer and wine making

To be safe, postpone beer and wine making until the boil water notice has been rescinded.

When will the Boil Water Notice be rescinded?

Only when the water supplier can provide potable water will the Health Authority rescind the Boil Water Notice. Once or more of the following usually achieves confirmation that the water is once again safe to drink.

These include:

- Identifying and fixing the source or sources of the problem,
- Implementing procedures to eliminate or reduce the chance for reoccurrence
- Performing water quality tests
- Flushing and disinfecting distribution lines and water storage facilities

Precautions to consider when the Boil Water Notice is lifted

- Flush all water-using fixtures for 1 minute
- Run cold-water faucets and drinking fountains for 1 minute before using water
- Drain and flush all ice-making machines in your refrigerator
- Run water softeners through a regeneration cycle
- Drain and refill hot water heaters set below 45 deg C (normal setting is 60 deg C)
- Change any pre-treatment filters (under sink style and refrigerator water filters, carbon block, activated carbon, sediment filters, etc.)

Can I speak to a person in Public Health if I have a question about the Boil Water Notice?

Yes you can. For further information contact Island Health Officers at the following locations:

- Victoria
- Nanaimo ph. 250-755-6215
- Parksville ph. 250-947-8222
- Courtenay
- Island Health Office 6475 Metral Drive, Nanaimo, BC
- Island Health Office 249 West Hirst Avenue, Parksville BC

After hours Medical Health Officer on call is 1-800-204-6166.

Additional information can be found at the following BC, Canadian and US websites. These are:

BC Health File; how to disinfect drinking water

<http://www.bchealthguide.org/healthfiles/hfile49b.stm>

BC Health File; weekend immune systems and water-borne infections

<http://www.bchealthguide.org/healthfiles/hfile56.stm>

BC Health File; waterborne disease in BC

<http://www.bchealthguide.org/healthfiles/hfile49a.stm>

BC Health File; cryptosporidiosis

<http://www.bchealthguide.org/healthfiles/hfile48.stm>

BC Health File; giardiasis

<http://www.bchealthguide.org/healthfiles/hfile10.stm>

BC Health File; safely preparing and storing baby formula

<http://www.bchealthguide.org/healthfiles/hfile69b.stm>

US EPA how to boil water and use bleach

<http://www.epa.gov/ogwdw000/faq/emerg.html>

US Centre for Disease Control; preventing cryptosporidiosis infection

<http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/default.htm>

US Centre for Disease Control; Giardia fact sheet

http://www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht_giardiasis.htm#prevention

US Centre for Disease Control; Preventing Cryptosporidium; a guide to water filters & bottled water

http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_crypto_prevent_water.htm

Information sources for developing this package includes

- BC Ministry of Health
- Health Canada
- Alberta Environmental Health
- Washington State Department of Health
- BC Centre for Disease Control
- US EPA (Environmental Protection Agency)
- US Center for Disease Control
- NSF (National Sanitation Foundation)
- DWO (Drinking Water Officer's) Guide

SAMPLE

NOTICE

Boil Water Order

Effective date: _____

Please note that all water used for domestic purposes (drinking, cooking, etc.) should be boiled before consumption. The boiling should be at a rolling boil and for a minimum of two minutes.

RDN Water Services staff are continually monitoring the water supply system and will provide updates as they become available.

Watch for information updates at www.rdn.bc.ca (Water Services) and listen to your local radio station for more information.

This order will be in effect until further notice.

For further information contact the

**Regional District of Nanaimo at:
1-877-607-4111 or 1-250-390-4111
Water Services Field Office: 1-250-248-4914**

SAMPLE

WARNING

**This Water is
Considered
Unfit for Drinking
or Domestic Use**

Effective date: _____

For further information contact the

Regional District of Nanaimo at:

1-877-607-4111 or 1-250-390-4111

Water Services Field Office: 1-250-248-4914

SAMPLE

NOTICE

Water Supply Service Interruption

Effective date: _____

Please be advised that your water service may be interrupted or off for periods during the day.

When service is resumed, the water may be discoloured. This is due to disturbed deposits in the pipes and is not harmful.

This Notice will be in effect until further notice.

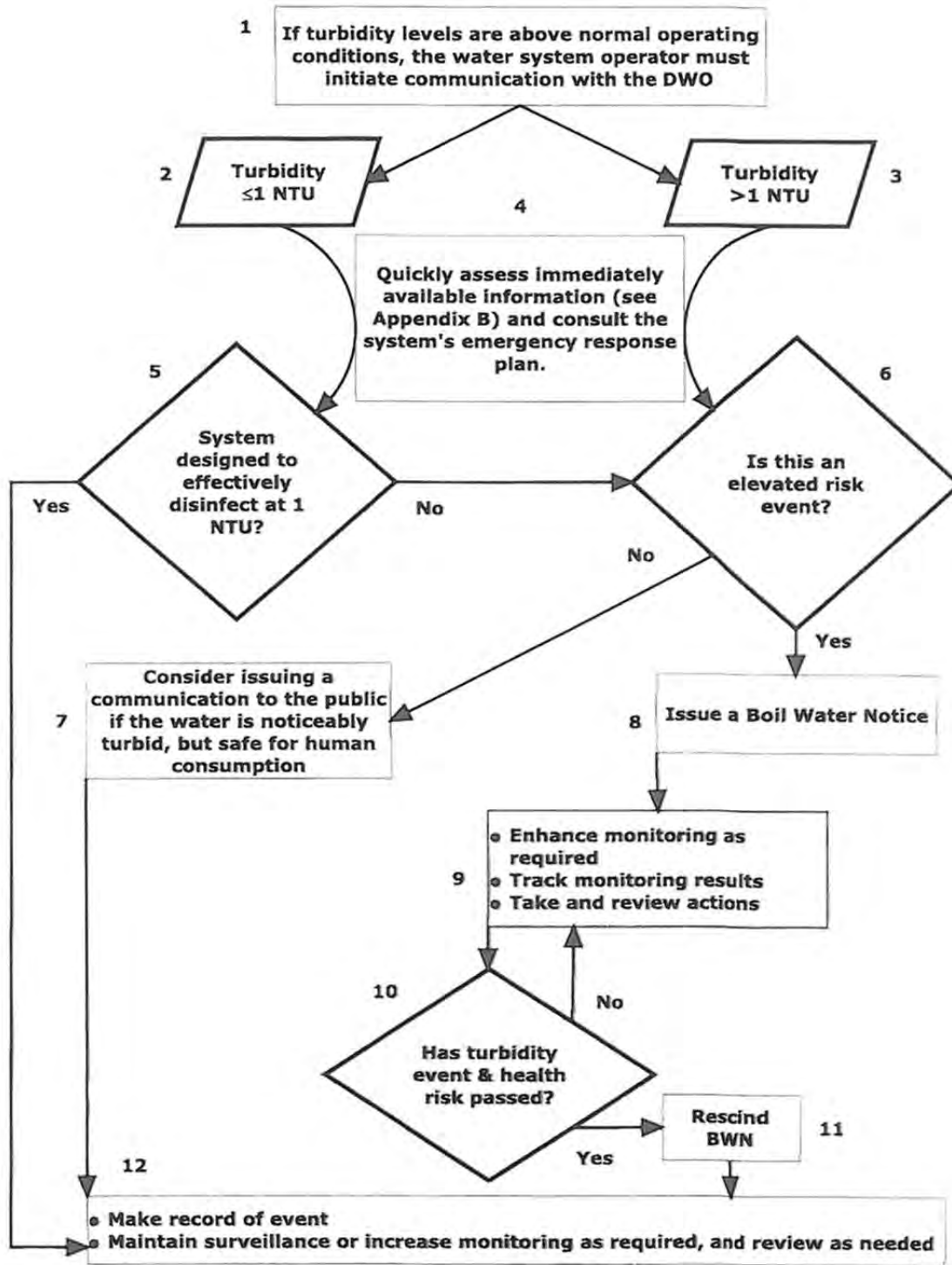
For further information contact the

Regional District of Nanaimo at:

1-877-607-4111 or 1-250-390-4111

Water Services Field Office: 1-250-248-4914

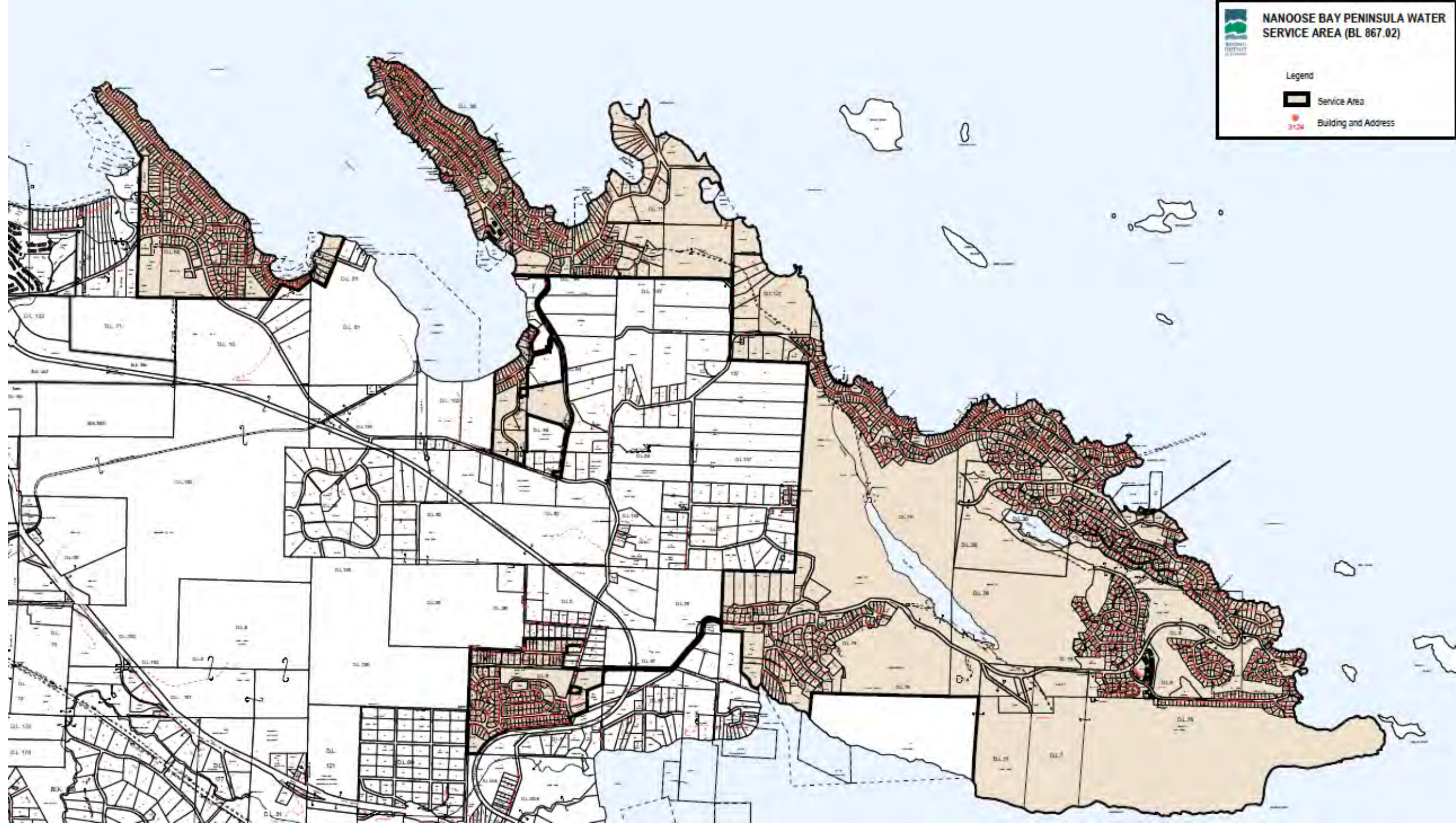
Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water



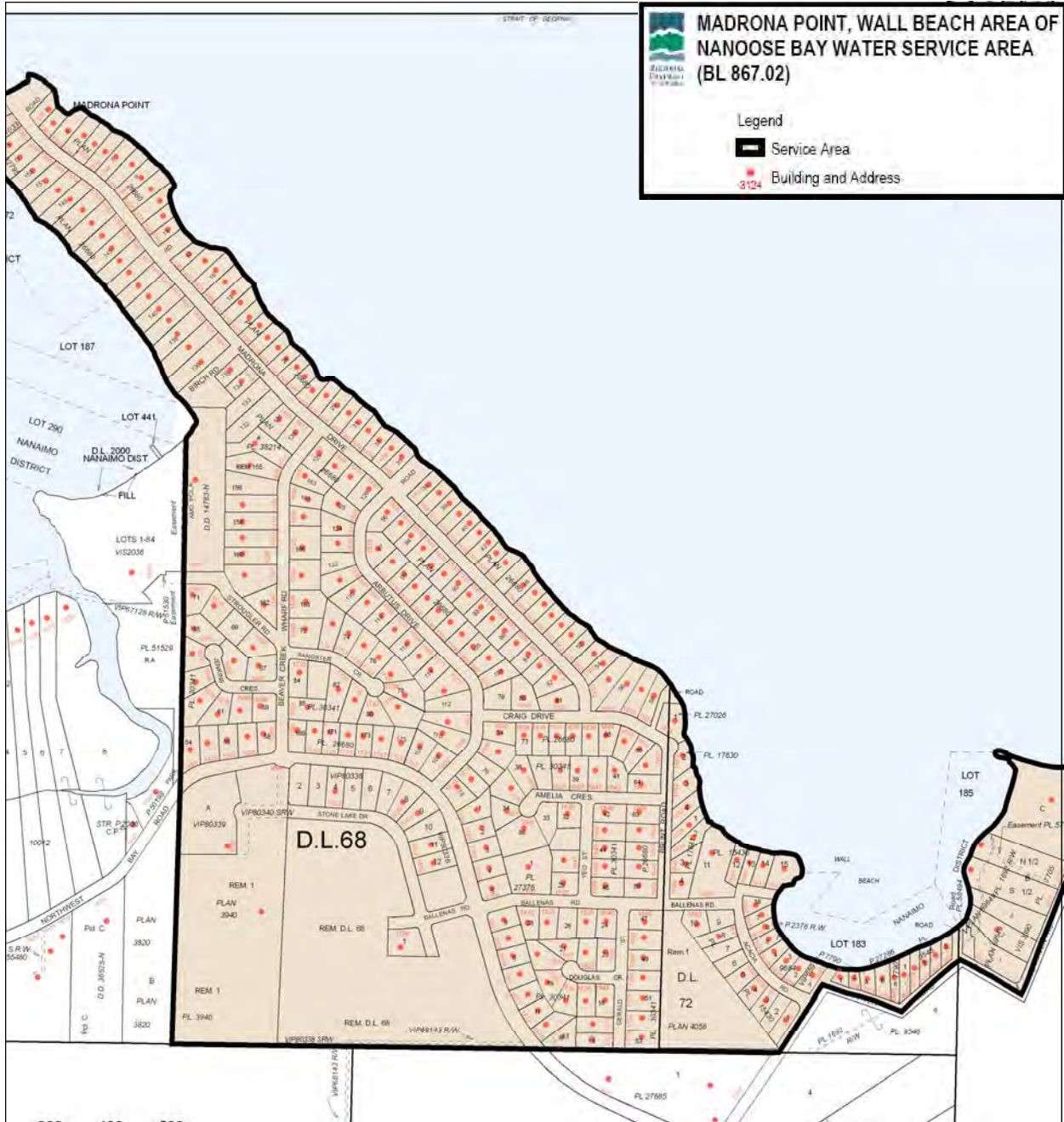
MAPS

Water Service Areas

Nanoose Bay Peninsula Water Service Area	Map 1
Madrona Pt/Wall Beach Neighbourhood	Map 2
Fairwinds Neighbourhood	Map 3
Arbutus Park Neighbourhood	Map 4
West Bay Neighbourhood	Map 5
Driftwood Neighbourhood	Map 6
French Creek Water Service Area	Map 7
Surfside Water Service Area	Map 8
San Pareil Water Service Area	Map 9
Englishman River Water Service Area	Map 10
Melrose Water Service Area	Map 11
Decourcey Water Service Area	Map 12
Whiskey Creek Water Service Area	Map 13
Descanso Bay Reg. Park Water System	Map 14
Horne Lake Reg. Park Water System	Map 15
Rollo McClay Community Park Water System	Map 16



MAP 1 NANOOSE BAY
PENINSULA



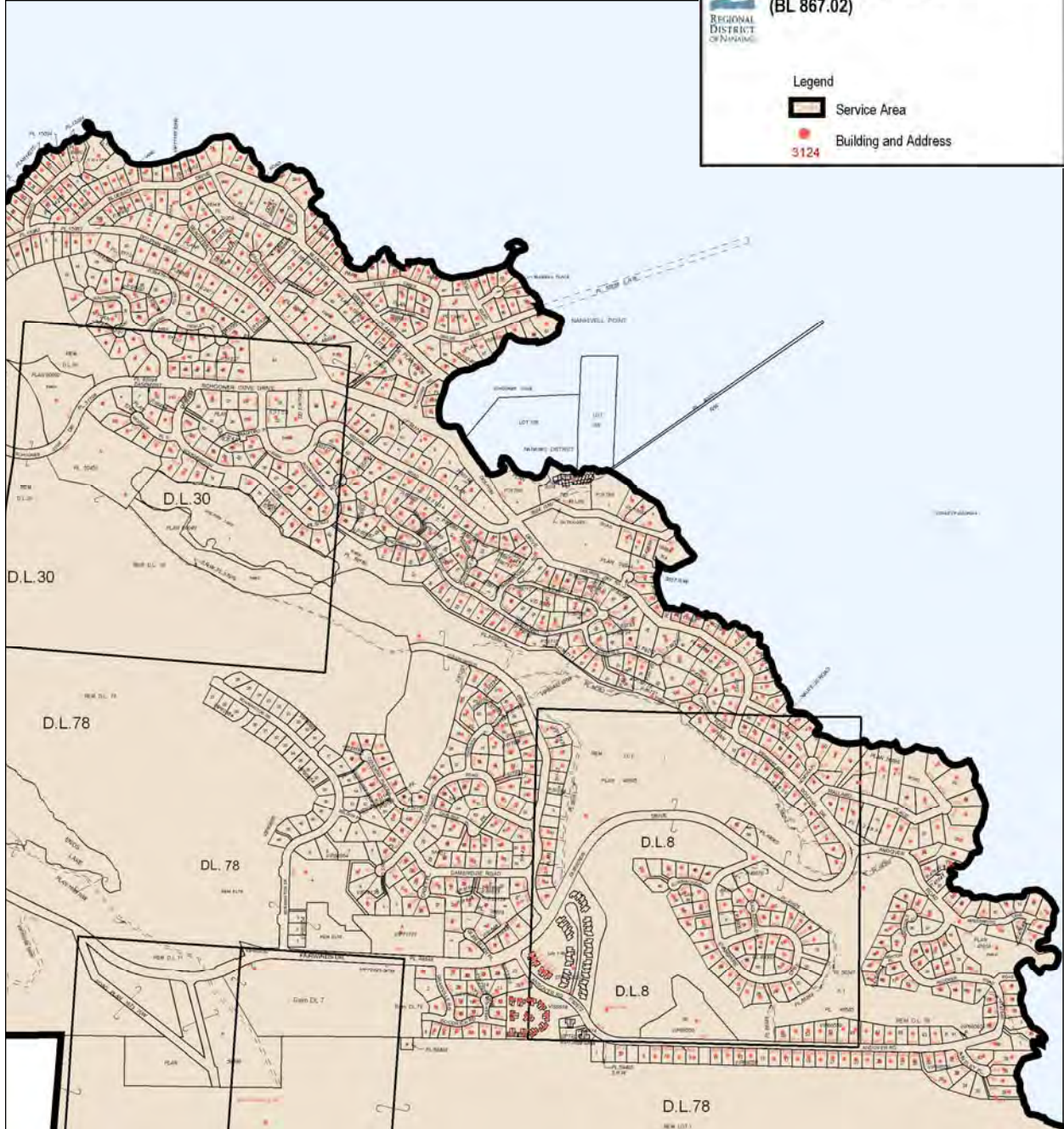


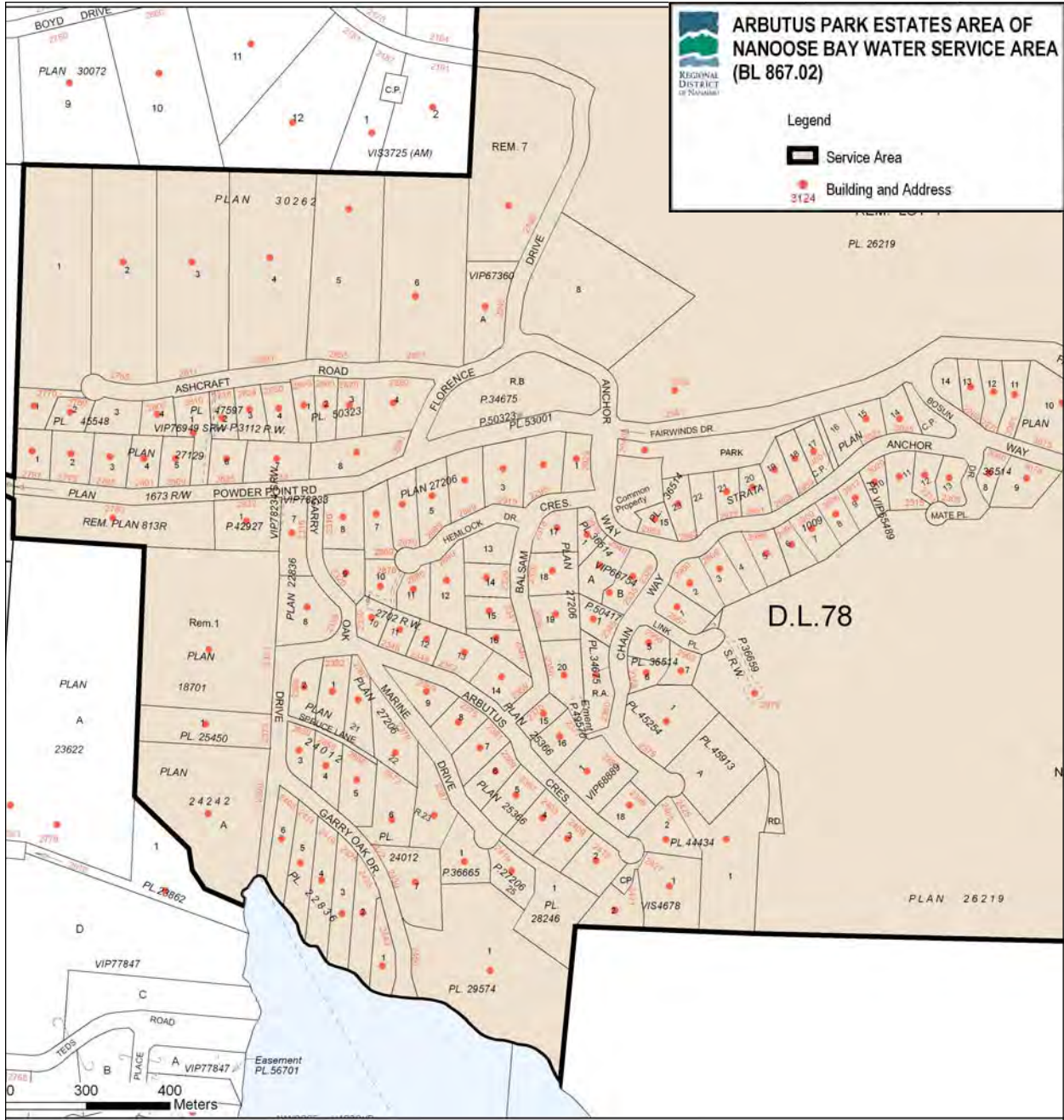
FAIRWINDS AREA OF NANOOSE BAY
WATER SERVICE AREA
(BL 867.02)

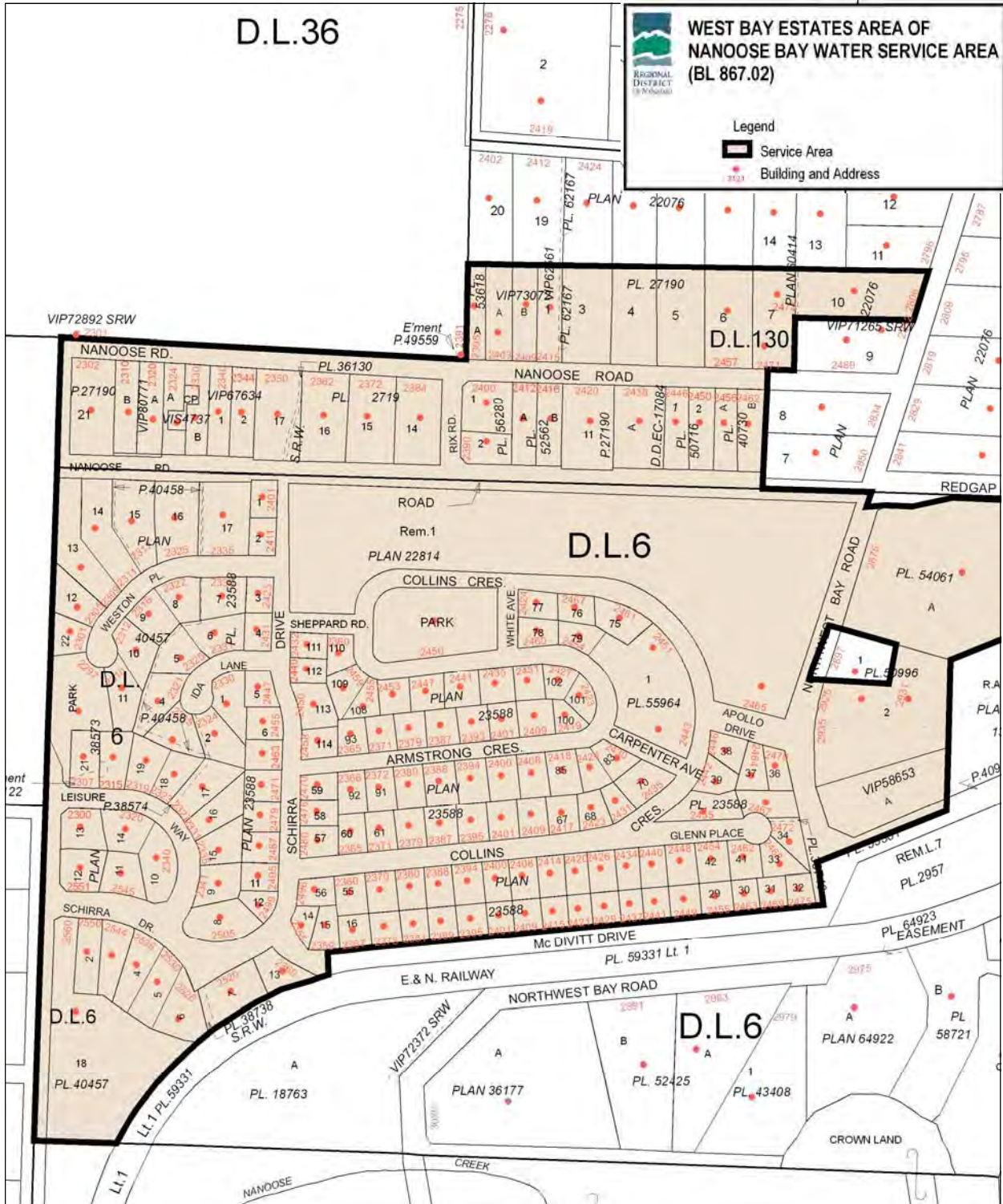
Legend

-  Service Area
-  Building and Address

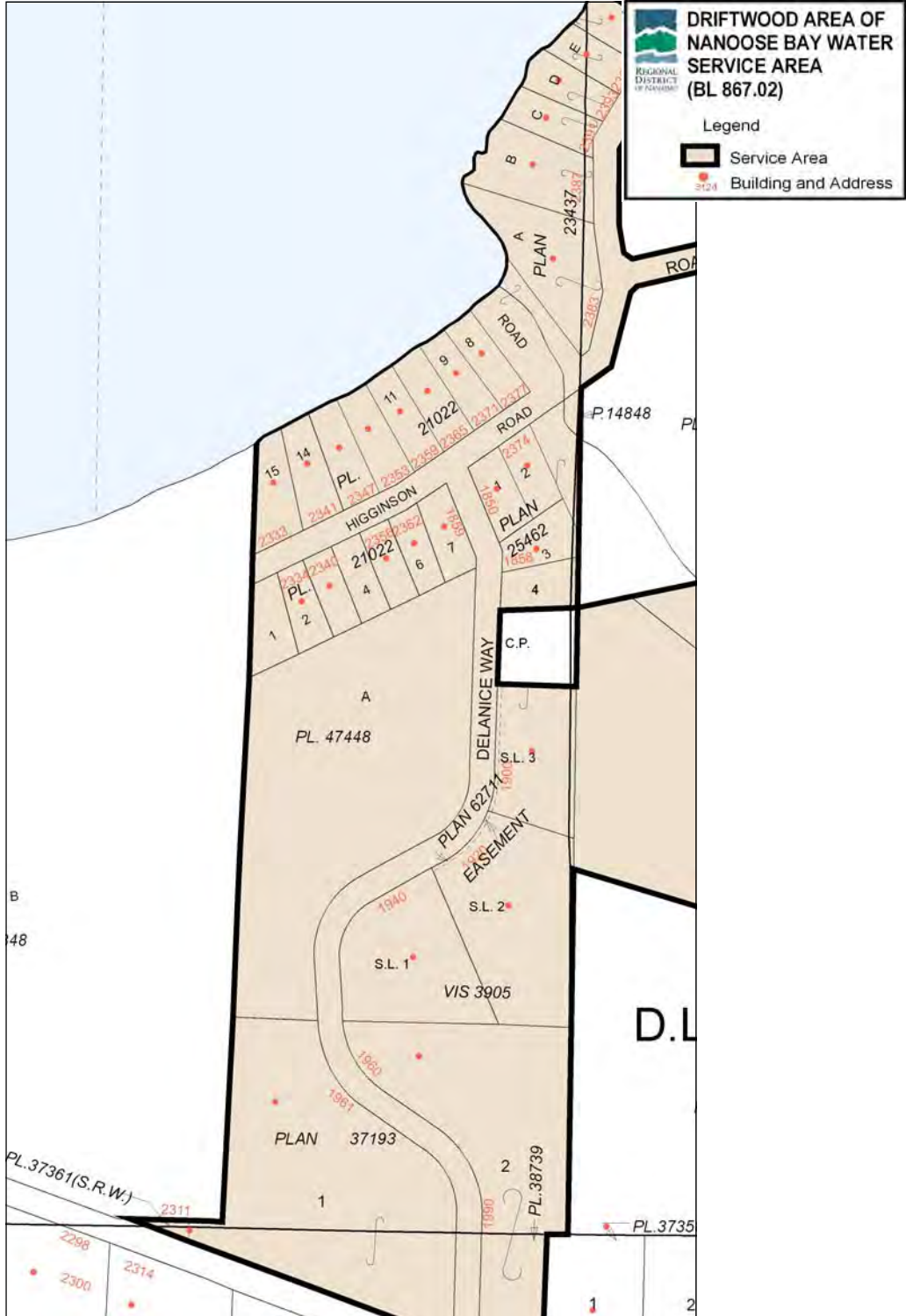
3124



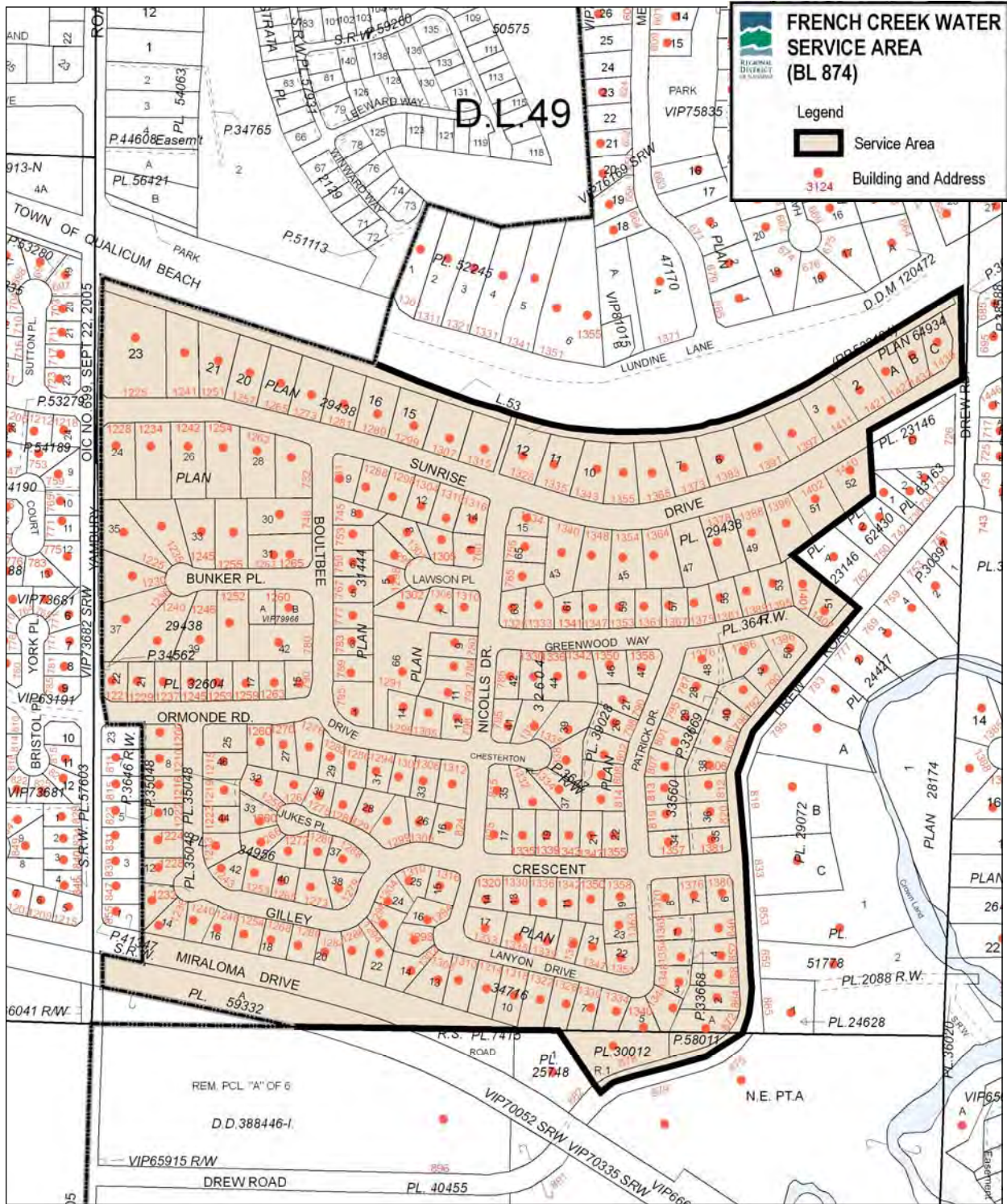




MAP 5 WEST BAY



MAP 6 DRIFTWOOD



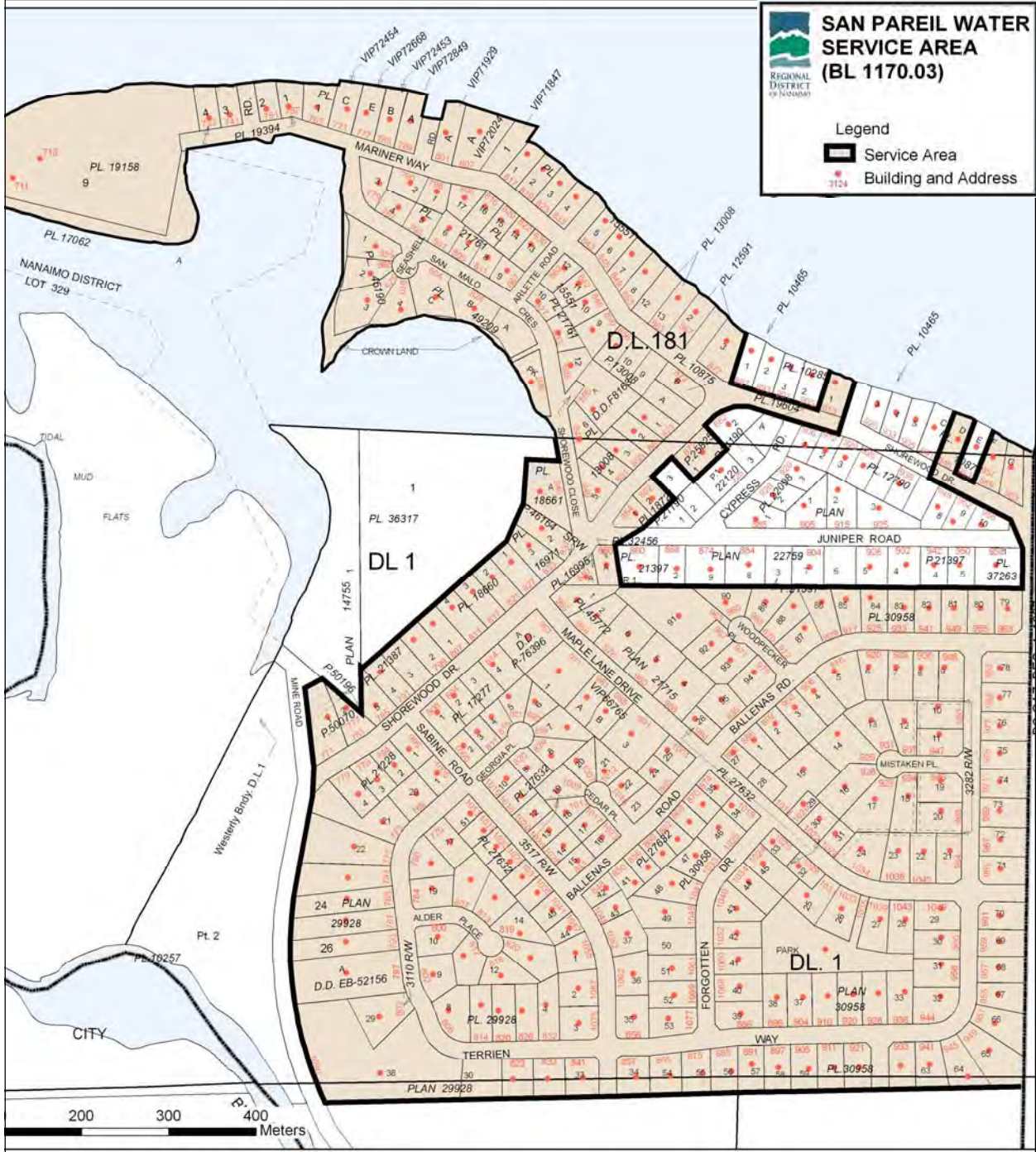
MAP 7 FRENCH CREEK

SURFSIDE PROPERTIES WATER SERVICE AREA (BL 694)

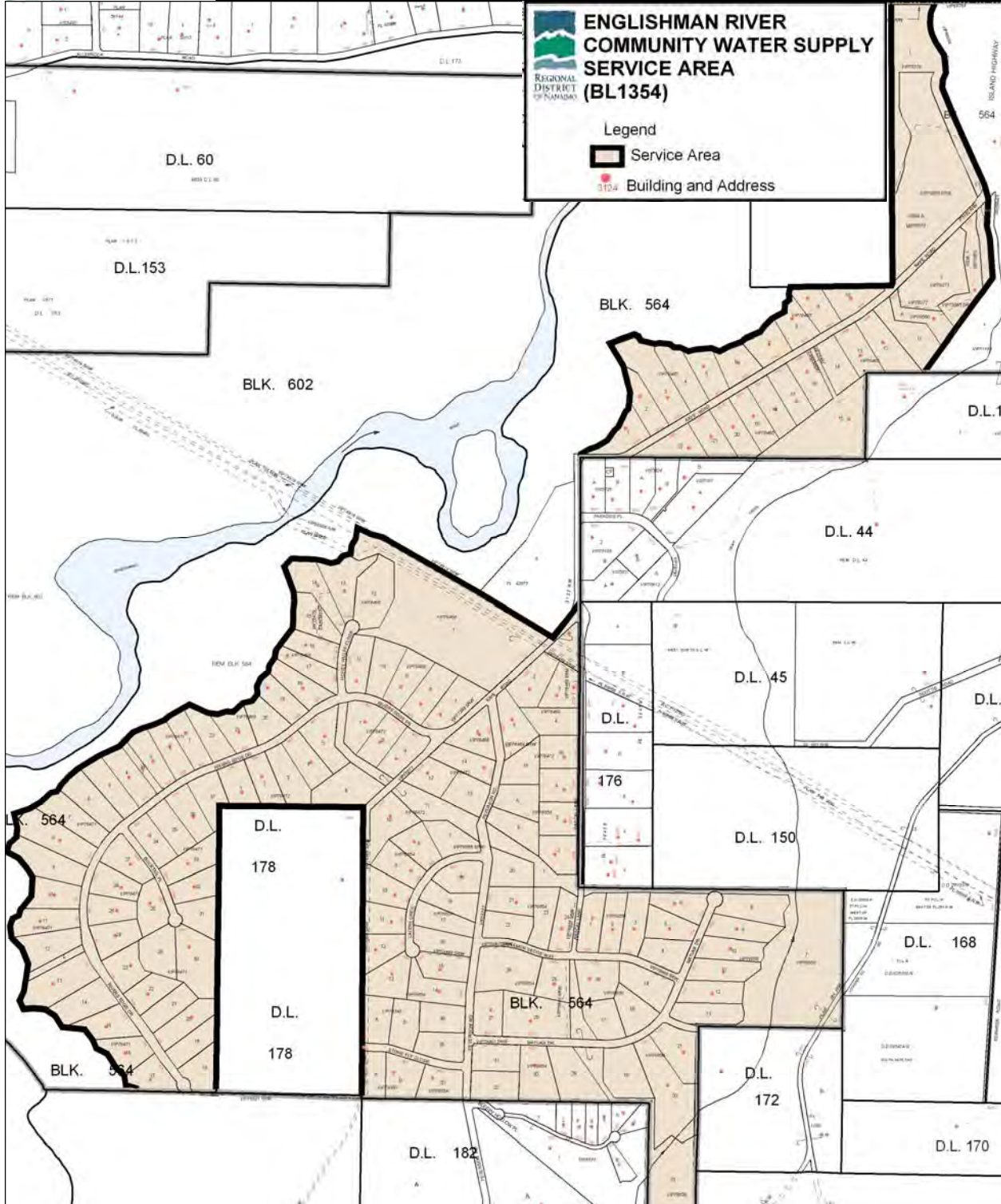
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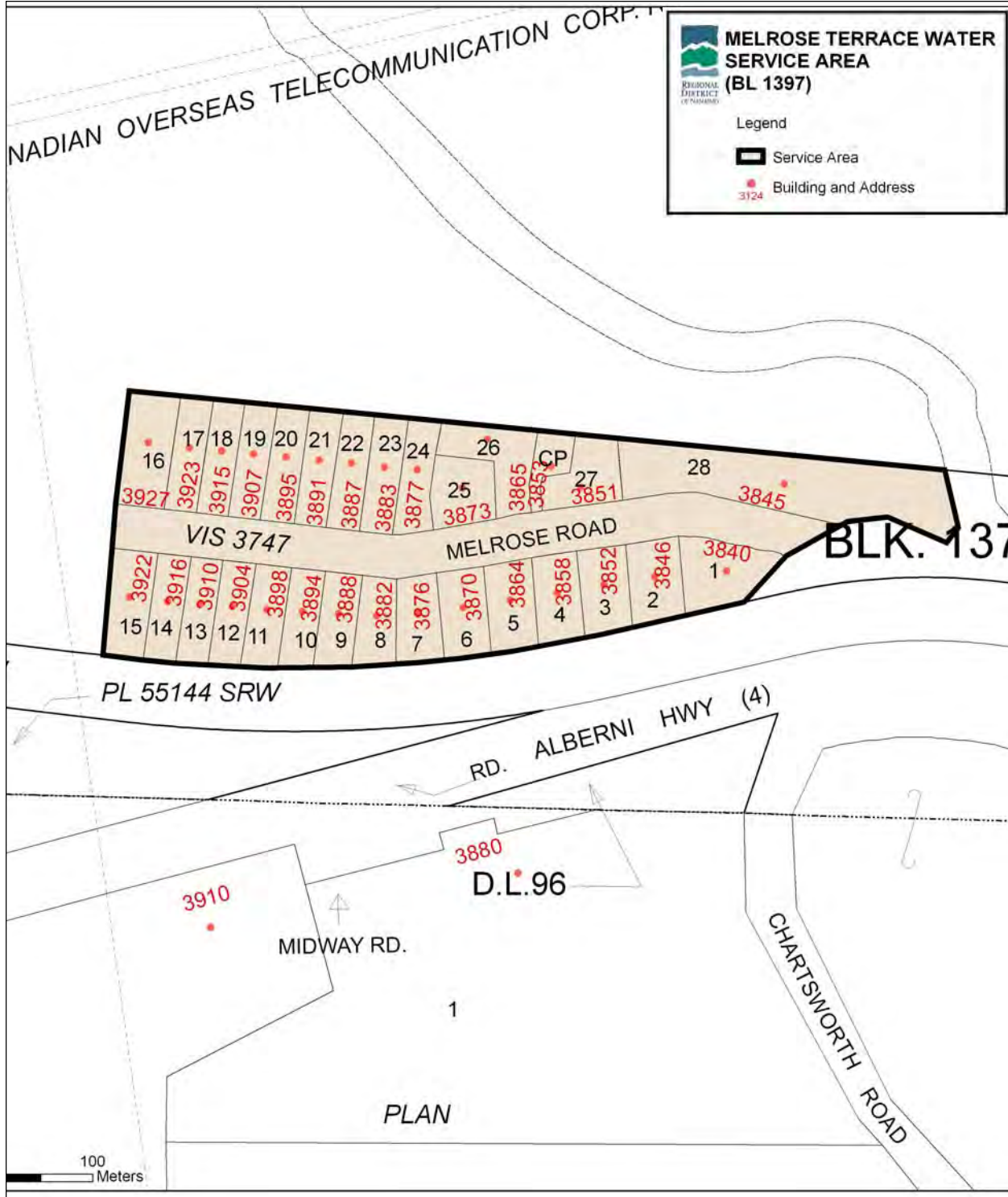
- Service Area
- Building and Address

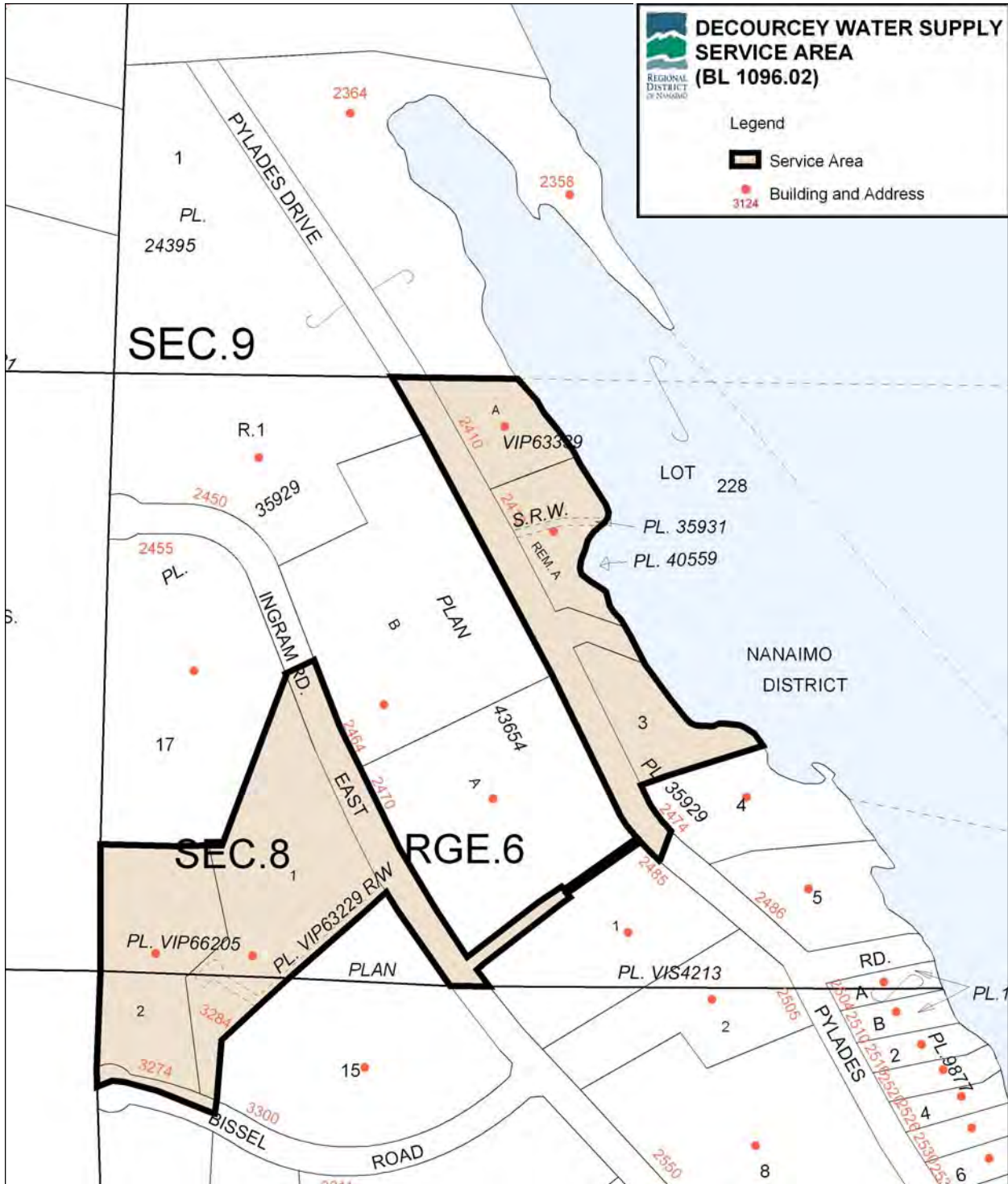




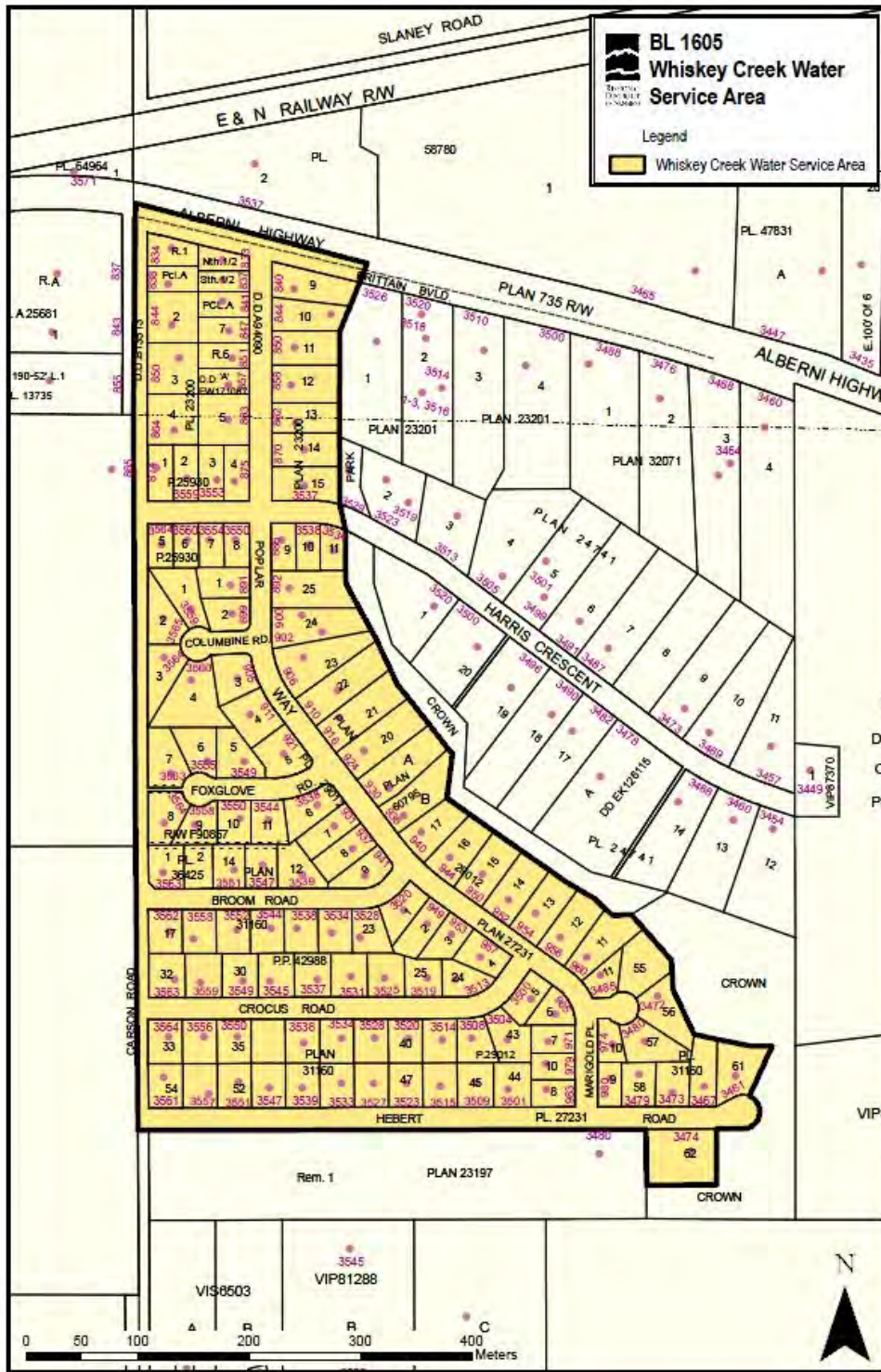
MAP 9 SAN PAREIL







MAP 12 DECOURCEY



MAP 13 WHISKEY CREEK

descanso bay regional park



MAP 14 DESCANSO BAY REG. PARK

horne lake regional park



MAP 15 HORNE LAKE REG. PARK

