Village of Cumberland Drinking Water 2015 Annual Report

Reporting Period:	2015
Operating Permit Number:	1414314
Drinking Water System Owner:	Corporation of the Village of Cumberland
Drinking Water System Contact:	
Name:	Kevin Fitzgerald
Phone No:	(250) 336-2291 Cell: 250-792-1593
Email:	publicworks@cumberland.ca

1. Microbiological testing completed during this reporting period:

a) bacteriological results attached to this report. ☐ None detected

b) adverse bacteriological results: ☒ Listed in table below:

Adverse Results:

Date	Site #	Total Coliform	E.Coli	Reason	Corrective Action
Jan/13/2015	1	8		high turbidity	
Jan/13/2015	2	6		high turbidity	
Sept/15/2015	2	1		high turbidity	
Oct/13/2015	3	45.3	1	Gas chlorination disruption and high turbidity	Boil water advisory / flushed and resampled

2. Chemical results for this reporting period:

a) most recent chemical analysis attached to this report.

b) chemical parameters listed in *The Guidelines for Canadian Drinking Water Quality (GCDWQ)* are: ☒ all within the GCDWQ

☐ above the GCDWQ and are listed below:

Parameters above the Guidelines:

Parameter	Result	Max. Acceptable Concentration	Aesthetic Objective	Treatment/Corrective Action

3. Summarize additional testing and sampling carried out in accordance with the requirement of a Water Source approval, Written Order or as per the conditions of your *Operating Permit.*

- ☐ no additional testing
- ☒ additional testing listed below:

Additional testing:

Description of parameter & reason for sampling	Health parameter or non-health related parameter	Corrective action necessary (YIN?)	Corrective action taken
Bromodichlorometha ne ug/l (mac 16)		N	
Maximum 1 for turbidity		N	
Requested by V.I.H.A			

4. Water Quality Complaints:

During the course of the year, the water system:

- ☐ did not receive water quality complaints (ie taste, odour, colour, etc)
- ☒ received water quality complaints and are listed below:

Water Quality Complaints:

Date	Water Quality Complaint	Corrective action taken
Jan/13/2015	**cloudy water in bathtub**	**None/caused by contractor flushing hydrant**

5. Adverse results: Total number of adverse results during this reporting period for insufficient water supply, malfunction of disinfection equipment or elevated turbidity:

- ☐ No adverse results
- ☒ Adverse results listed below:

Adverse Results

Incident date	Corrective action	Corrected by
Oct/13/2015	**Raised gas chlorination zero point for low flows**	**Kevin Fitzgerald & Mark Springford**

6. **Description of the system:**

Sources of raw water:

- ☒ Groundwater
- ☒ Surface water
- ☐ Other (specify): _____

Does the drinking water system have disinfection? ☐Yes ☐No Disinfection methods (check boxes that apply):

- ☒ Chlorination
- ☐ Ultraviolet light
- ☐ Ozonation
- ☐ Other (specify): _____

Does the drinking water system have treatment? ☐Yes ☒No treatment type (check boxes that apply):

- ☐ Particulate cartridge filters
- ☐ Membrane filtration
- ☐ Carbon filter
- ☐ Sand filtration
- ☐ Reverse osmosis
- ☐ Other (specify): _____

7. Major expenses incurred during the period covered by the report:

To purchase or install required equipment:	
To repair equipment:	
To replace equipment:	New chlorine residual monitor ($5,632.25)
To complete annual maintenance of system: *(system flushing, replacement of carbon filters, etc)*	Two new autoflush units ($4354.15 each) Replacement of a section of watermain (3rd. to 6th.street) at a cost of $171,972.34
To complete specialist report (specify):	Tetra Tech (EBA) Dam Breach Study. Completed in Feb.2016 ($60,000) Copy of document is attached. The Village is also reviewing its long range water supply options, and has engaged Koers Engineering at a cost of approx. $70,000.

8. Further communication with users:

a) Indicate how you notified system users that your annual report is available, and is free of charge:

- ☐ hand delivered
- ☒ public access/notice via web
- ☒ public access/notice via government office
- ☐ public access/notice via newspaper
- ☐ public access/notice via bill stuffier
- ☐ public access/notice via other method (specify):

_____

b) Improvements or remedial actions required by the Drinking Water Officer:

- ☐ no action required
- ☒ drinking Water Officer inspection report attached to report
- ☒ actions required by Drinking Water Officer listed below:

Improvements/Remedial Action

Required Action	Completion Date
THM and turbidity results included in report	Feb. 2016
Revisions to watershed management plan in progress	April 2016
First water user is 1 Km. from injection point. At a flow rate of 30 lps. (which is high.) The waterline is twinned after injection and travels to town in two separate 12 inch diameter lines. As the attached chart indicates the contact time would be approximately 40 minutes.	

c) Future water system improvements:

- ☐ no improvements planned
- ☒ improvements listed below:

Future Improvements

Future plans	Planned Completion Date
Replace watermain (2nd. to Carlisle Lane) and (Hope Road to Wellington Street via Cumberland Road, this would include looping the end of Wellington to Hope)	2016/17

d) Emergency Response Plan can be accessed by:

- ☐ posting on web
- ☐ posting at nearest government office
- ☒ contacting water system owner
- ☒ Other (specify) Rachel Parker (250-336-2291)

Diameter Velocity & Flow Rate *Ultra* Calculator

Scroll to the bottom for instructions

Search

powered by Google™

Do you want to solve for:

- ○ **Pipe Diameter**
- ◉ **Velocity**
- ○ **Flow Rate**

Chlorine injection is 1,000 meters from 1st user

1,000 ÷ 24.669 = 40.53 min.

DIAMETER 12 Inches

VELOCITY 24.669 Meters Per Minute

FLOW RATE 30 liter / second

CALCULATE

41.115	Centimeters Per Second
2.4669e+3	Centimeters Per Minute
1.4801e+5	Centimeters Per Hour
1.3489	Feet Per Second
80.935	Feet Per Minute
4.8561e+3	Feet Per Hour
16.187	Inches Per Second
971.22	Inches Per Minute
5.8273e+4	Inches Per Hour
4.1115e-4	Kilometers Per Second
0.024669	Kilometers Per Minute

Chlorinator is 1 km. From 1st water user.

1.4801	Kilometers Per Hour
0.41115	Meters Per Second
24.669	Meters Per Minute
1.4801e+3	Meters Per Hour
2.5548e-4	Miles Per Second
0.015329	Miles Per Minute
0.91972	Miles Per Hour
411.15	Millimeters Per Second
2.4669e+4	Millimeters Per Minute
1.4801e+6	Millimeters Per Hour
0.44964	Yards Per Second
26.978	Yards Per Minute
1.6187e+3	Yards Per Hour

1) Pipe Diameter = $\sqrt{\frac{4 \cdot \text{flow rate}}{\pi \cdot \text{velocity}}}$

2) Velocity = $\frac{4 \cdot \text{flow rate}}{\pi \cdot (\text{pipe diameter})^2}$

3) Flow Rate = $\frac{1}{4} \cdot \pi \cdot (\text{pipe diameter})^2 \cdot \text{velocity}$

INSTRUCTIONS

This *ultra* calculator is special by allowing you to choose among a great variety of units (6 for diameter and 24 *each* for velocity and flow rate). Unlike other calculators, you are NOT confined to inputting diameter in inches, velocity in miles per hour, etc. making this calculator quite versatile.

1) Water is flowing at 36 inches per second and at a rate of 1.0472 cubic feet per second. What is the pipe diameter?

TETRA TECH EBA

OQM | Organizational Quality Management Program

February 16, 2016

ISSUED FOR USE
FILE: 704-ENG.VENG03045-01
Via Email: rcrisfield@cumberland.ca

The Village of Cumberland
P.O. Box 340
2673 Dunsmuir Avenue
Cumberland BC, V0R 1S0

Attention: Mr. Rob Crisfield
Manager of Operations

Subject: Cumberland Dams
Consequence Classification

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech EBA) submitted a revised Dam Breach Study to the Village of Cumberland (the Village) in September 2015. The revision was deemed necessary after a site visit showed that the available contour data incorrectly resulted in flows being directed out of Cumberland Creek and into an unnamed creek to the north.

Subsequently, Mr. Bob Patrick of Tetra Tech EBA and Mr. Rob Crisfield of the Village met with Mr. John Baldwin, of the BC Ministry of Forest, Lands and Natural Resource Operations, the Dam Safety Officer responsible for the Cumberland Dams, on January 13, 2016.

During this discussion, Mr. Baldwin raised the need to be careful in interpreting the inundation data due to the accuracy of the contour data used for the models. In the upland area 20 m elevation contours were available and near the Village 2 m elevation contours. It was agreed that the depths of flood water shown were indications only, and should not be accepted as definitive.

Mr. Baldwin also suggested that, due to the many unknowns regarding the future need for some of the dam structures, a risk management strategy would be appropriate. The next step in this would be a detailed look at the consequence classification of all the dams. The recently (2015) issued 'Downstream Consequence of Failure Classification, Interpretation Guideline for Dam Safety Officers' from the BC Ministry of Forest, Lands and Natural Resource Operations was a suggested reference.

This report summarizes the review completed to update the consequence classifications for the six Cumberland dams, which include:

- Stevens Lake;
- Hamilton Lake;
- Cumberland No. 1;
- Cumberland No. 2;
- Henderson Lake; and
- Allan Lake.

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#1 - 4376 Boban Drive
Nanaimo, BC V9T 6A7 CANADA
Tel 250.756.2256 Fax 250.756.2686

2.0 DOCUMENT REVIEW

Subsequent to the January 13th meeting, Mr. Patrick reviewed the Dam Breach Study and the Ministry Guidelines in preparation for meeting with the Village. Two significant items were identified:

- The Dam Breach Study assumed three, 2 m wide by 3 m high culverts under Comox Lake Road. There is, in fact, one 2.4 m wide by 3.4 m high culvert. This will impact the flow depths / velocities in the area upstream and downstream of the culvert. This will be discussed further in a subsequent section.
- The loss of a community water supply is considered to be a High consequence if it is the only source. The Village currently has three sources; the Cumberland Creek Dams, Allan Lake Dam, and a groundwater well. Therefore the loss of one source would be considered Low or Significant, depending on the remediation selected.

3.0 JANUARY 26, 2016 MEETING

A meeting was convened at the Village office to review the consequence classification of each dam. This meeting was attended by Mr. Patrick of Tetra Tech EBA, as well as Messrs. Rob Crisfield, Kevin Fitzgerald and Mike Williamson of the Village; Mr. Crisfield is the Manager of Operations; Mr. Fitzgerald is a Village foreman and responsible for the operation of the dams, and Mr. Williamson, the Fire Chief, was born and raised in Cumberland and is very familiar with the area.

During the meeting, each of the potential consequence categories was described by Mr. Patrick and discussed, then a judgement made for each consequence as it related to each of the six dams. The following section summarizes the potential losses discussed and resulting consequence classifications determined.

4.0 CONSEQUENCE CLASSIFICATION

4.1 Environmental Values

"Loss or deterioration of: fisheries habitat; wildlife habitat; or rare or endangered species".

Streamkeepers have carried out some work in the creek downstream of the Comox Lake Road culvert. The flows in this reach due to a breach were judged not to cause more deterioration / loss than natural flood events.

A search of the BC Conservation Data Base revealed no red - or blue - listed species identified in these watersheds.

Based on the above findings, it was judged that a dam breach would have minimal short term (Low) to no significant (Significant) impact on environmental values. It is noted that the flows from a breach of Stevens Lake, Cumberland No.2 and Allan Lake are significantly higher than those from the other dams. This is why there is some range in the consequence classifications.

4.2 Cultural Values

"Loss or deterioration of unique landscapes or sites of cultural significance".

It was agreed during discussions that there were no unique landscapes along Cumberland or Perserverance Creeks.

The Village staff was not aware of any First Nations interest in these watersheds.

The flooding could impact the location of the former Chinatown. However, all the salvageable relics have been recovered and moved elsewhere.

Therefore, it was judged that this would be Low consequence for all dam breaches.

4.3 INFRASTRUCTURE

"Economic losses affecting infrastructure, public transportation or services, commercial activities, or residential areas".

The Village owns or is responsible for the upkeep of all land and infrastructure (i.e., Forest Service Roads) that might be impacted by flooding.

Infrastructure within the potential inundation zone includes:

- The dams and appurtenant structures;
- The Forest Service Road crossings; and
- The Comox Lake Road crossing.

As discussed previously, as the Village has three water supplies, loss of one has much less impact than if they were dependant on only a single source. Therefore, it is judged that the consequence would be Low to Significant depending on what decision was made regarding remediation.

The Forest Service Road crossings are simple bridges or culverts and repair would not have a significant cost, nor take very long, therefore this is judged to be Low consequence.

There is a potential (as discussed in a later section) that Comox Lake Road could be damaged or washed out. It was judged that this would be considered a low economic loss or Significant classification. (Note: Using the 2000 Dam Safety Regulation and 2.5% inflation, Significant would be a cost exceeding $150,000).

It is noted that there are two residences in the inundation zone. Both of these are 'squatters' and do not own the property. The impact on these properties will be discussed in a later section.

4.4 Recreational and Social Values

"The public reaction to the possible loss of recreational and aesthetic aspects of reservoirs".

This is not an issue in Cumberland as watershed users are accustomed to flood events and it was judged this would be a Low consequence.

4.5 Potential for Future Development

"The consequence classification should reflect future downstream development".

It is understood that there is no potential for development in the downstream areas due to topography and land ownership. Therefore this was judged to be a Low consequence.

4.6 Loss of Life / Population at Risk

"Population at Risk in the inundated area provides an indication of the number of people exposed to the hazard.

Loss of Life is the potential for loss of life other than through unforeseeable misadventure".

The Cumberland Creek and Perserverance Creek watersheds are utilized by hikers, mountain bikers and ATV users. These users would all be considered temporary and exposed to the hazard only where trails / roads cross the creeks, therefore they have very limited exposure. It was also discussed that these users would be considered 'knowledgeable' in that they spend time in the west coast rain forest and are therefore aware of the flashy nature of the creeks and the hazard they represent.

Another set of users includes the Village staff and Forest company employees. Again, their exposure would be limited to creek crossings and these people are very aware of the hazards associated with creeks on the west coast. It is noted that the Forest Service Roads are gated and signed so vehicle access is restricted.

It was judged that the potential for loss of life would be non-existent to Low for above users.

There are two houses in / near the inundation zone, the Southern house with one resident and the Kelly house with two occupants. Each of these properties was visited (Patrick and Williamson) after the meeting on January 27, 2016. In each case, the house is well (100 m plus) away from Perserverance Creek and well (5 m plus) above the invert elevation. The area between the properties and the creek is heavily treed.

The inundation maps show maximum water depth in the creek of less than 3 m adjacent to these houses. Given that the highest water scenario at the Comox Lake Road crossing would be overtopping of the road, it was estimated that 2 m should be added to the depth, due to back water effects of the culvert restricting flow.

It is judged that these properties were unlikely to be flooded. However, if they did the flood water would be very slow moving (due to the distance from the main channel and the forest) and unlikely to carry large debris. Therefore it was judged that there is no potential for loss of life at these properties.

A lengthy discussion was held regarding the potential for the Comox Lake Road to wash out and someone drive into the channel. There are approximately 20 houses on the lake side of the crossing, plus significant visitor traffic during the summer.

The channel widens and flattens upstream of the culvert, therefore much of the energy (e.g., velocity) of the flood would dissipate. However, if a significant volume (i.e., Stevens Lake, Cumberland No.2, or Allan Lake failure) was experienced, the culvert would be unlikely to handle the flow and overtopping / washing out could occur.

The crossing is in a 50 km / hour speed zone with good visibility from the approaches. This would help to mitigate potential loss of life. However, it was judged that a low loss of life potential could not be ruled out for larger floods, resulting in a Significant classification for these events.

It was noted that a simple water level transducer and warning system could be installed at this crossing, which would reduce the consequence to Low.

5.0 SUMMARY

The following table, Table 1, summarizes the classifications for all the dams as discussed in previous sections.

Table 1 – Dam Consequence Classifications

Dam	Environmental Values	Cultural Values	Infrastructure	Recreational & Social Values	Potential for Future Development	Loss of Life	Previous Classification (2015)	Consequence Classification
Stevens Lake	Significant [1]	Low	Significant [2]	Low	Low	Significant [3]	High	Significant
Hamilton Lake	Low	Low	Low	Low	Low	Low	Low	Low
Cumberland No.2	Low	Low	Significant [2]	Low	Low	Significant [3]	Very High	Significant
Cumberland No.1	Low	Low	Low	Low	Low	Low	Significant	Low
Henderson Lake	Low	Low	Low	Low	Low	Low	High	Low
Allan Lake	Low	Low	Low – Significant [4]	Low	Low	Significant [3]	High	Significant

[1] Would likely result in turbidity in Comox Lake
[2] Would likely be rebuilt
[3] May wash out culvert crossing on Comox Lake Road
[4] Would depend on whether it was rebuilt

It is noted that the consequence classifications presented in Table 1 are quite different from those provided in the Dam Breach study. This is largely a result of looking more closely at the potential for loss of life and the ability of the Village to switch to one of the other water supplies.

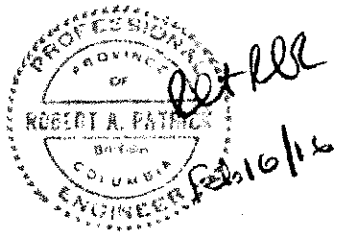
6.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of The Village of Cumberland and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than The Village of Cumberland, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA's Services Agreement. Tetra Tech EBA's General Conditions are provided in Appendix A of this report.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech EBA Inc.



Prepared by:
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/dr

Attachments: Tetra Tech EBA's General Conditions

APPENDIX A
TETRA TECH EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of Tetra Tech EBA's Client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA's Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Tetra Tech EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. Tetra Tech EBA's instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, Tetra Tech EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. Tetra Tech EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of testholes and/or soil/rock exposures. Stratigraphy is known only at the locations of the testhole or exposure. Actual geology and stratigraphy between testholes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. Tetra Tech EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

13.0 SAMPLES

Tetra Tech EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

14.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

Maxxam
A Bureau Veritas Group Company

THM TEST
MARCH 2015 #1 OF 4

Success Through Science®

Your C.O.C. #: G094144

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2015/03/31
Report #: R1838260
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B524850
Received: 2015/03/27, 09:45

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
VOCs, VH, F1, LH in Water by HS GC/MS (1)	1	2015/03/30	2015/03/30	BBY8SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Vancouver

Encryption Key

Sydney Morgan Strelau
31 Mar 2015 15:44:07 -07:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sydney Morgan Strelau, Customer Service Representative
Email: SMorganStrelau@maxxam.ca
Phone# (604)639-2609

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B524850
Report Date: 2015/03/31

VILLAGE OF CUMBERLAND

TRIHALOMETHANES (THM) IN WATER

Maxxam ID			LY5738	
Sampling Date			2015/03/27 09:46	
COC Number			G094144	
	Units	MAC	SITE #1	RDL
Volatiles				
Chloroform	ug/L	-	17	1.0
Chlorodibromomethane	ug/L	-	<1.0	1.0
Bromodichloromethane	ug/L	**16**	<1.0	1.0
Bromoform	ug/L	-	<1.0	1.0
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	-	108	
4-Bromofluorobenzene (sur.)	%	-	94	
D4-1,2-Dichloroethane (sur.)	%	-	104	
RDL = Reportable Detection Limit				

THM # 2 OF 4

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your C.O.C. #: G097614

Attention: MARK SPRINGFORD
VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2015/06/09
Report #: R1973069
Version: 2R

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B545681
Received: 2015/06/02, 09:25

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
VOCs, VH, F1, LH in Water by HS GC/MS	1	2015/06/07	2015/06/07	BBY8SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Sydney Morgan Strelau
09 Jun 2015 12:43:22 -07:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Sydney Morgan Strelau, Customer Service Representative
Email: SMorganStrelau@maxxam.ca
Phone# (604) 639-2609

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

VILLAGE OF CUMBERLAND

Maxxam Job #: B545681
Report Date: 2015/06/09

TRIHALOMETHANES (THM) IN WATER

Maxxam ID			MJ0582	
Sampling Date			2015/06/02 09:00	
COC Number			G097614	
	UNITS	**MAC**	**SITE #1**	**RDL**
Volatiles				
Chloroform	ug/L	-	12	1.0
Chlorodibromomethane	ug/L	-	<1.0	1.0
Bromodichloromethane	ug/L	**16**	<1.0	1.0
Bromoform	ug/L	-	<1.0	1.0
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	-	101	
4-Bromofluorobenzene (sur.)	%	-	96	
D4-1,2-Dichloroethane (sur.)	%	-	102	

RDL = Reportable Detection Limit

Maxxam
A Bureau Veritas Group Company

THM 3RD QUARTER 2015

Success Through Science®

Your C.O.C. #: G097810

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2015/09/15
Report #: R2041394
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B578196
Received: 2015/09/09, 09:30

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
VOCs, VH, F1, LH in Water by HS GC/MS (1)	1	2015/09/10	2015/09/11	BBY8SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Vancouver

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Tanya Eugine, M.Sc., Project Manager
Email: TEugine@maxxam.ca
Phone# (604)639-2609

==========

Maxxam Job #: B578196
Report Date: 2015/09/15

VILLAGE OF CUMBERLAND

TRIHALOMETHANES (THM) IN WATER

Maxxam ID			NB9957	
Sampling Date			2015/09/09 09:00	
COC Number			G097810	
	UNITS	MAC	SITE #1	RDL
Volatiles				
Chloroform	ug/L	-	27	1.0
Chlorodibromomethane	ug/L	-	<1.0	1.0
Bromodichloromethane	ug/L	**16**	1.3	1.0
Bromoform	ug/L	-	<1.0	1.0
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	-	102	
4-Bromofluorobenzene (sur.)	%	-	93	
D4-1,2-Dichloroethane (sur.)	%	-	94	
RDL = Reportable Detection Limit				

Maxxam Job #: B578196
Report Date: 2015/09/15

VILLAGE OF CUMBERLAND

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Data Validation Coordinator

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

THM TEST #4

Success Through Science®

Your P.O. #: 15-1114
Your Project #: DRINKING WATER
Site Location: SITE # 1
Your C.O.C. #: 08411303

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2015/12/10
Report #: R2093991
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5A8896
Received: 2015/12/08, 09:15

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Field Residual Chlorine (1)	1	N/A	2015/12/10		
VOCs, VH, F1, LH in Water by HS GC/MS (1)	1	2015/12/09	2015/12/10	BBY8SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Vancouver

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Tanya Eugine, M.Sc., Project Manager
Email: TEugine@maxxam.ca
Phone# (604)639-2609

This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B5A8896
Report Date: 2015/12/10

VILLAGE OF CUMBERLAND
Client Project #: DRINKING WATER
Site Location: SITE # 1
Your P.O. #: 15-1114
Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF DRINKING WATER

Maxxam ID		NU3965
Sampling Date		2015/12/08 09:00
COC Number		08411303
	UNITS	**SITE #1**
Field Parameters		
Field Residual Chlorine	mg/l	0.76

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B5A8896
Report Date: 2015/12/10

VILLAGE OF CUMBERLAND
Client Project #: DRINKING WATER
Site Location: SITE # 1
Your P.O. #: 15-1114
Sampler Initials: MS

TRIHALOMETHANES (THM) IN WATER

Maxxam ID			NU3965	
Sampling Date			2015/12/08 09:00	
COC Number			08411303	
	UNITS	MAC	SITE #1	RDL
Volatiles				
Chloroform	ug/L	-	38	1.0
Chlorodibromomethane	ug/L	-	<1.0	1.0
Bromodichloromethane	ug/L	16	<1.0	1.0
Bromoform	ug/L	-	<1.0	1.0
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	-	98	
4-Bromofluorobenzene (sur.)	%	-	99	
D4-1,2-Dichloroethane (sur.)	%	-	112	
RDL = Reportable Detection Limit				

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B5A8896
Report Date: 2015/12/10

VILLAGE OF CUMBERLAND
Client Project #: DRINKING WATER
Site Location: SITE # 1
Your P.O. #: 15-1114
Sampler Initials: MS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Data Validation Coordinator

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Water Sample Range Report

Island Health

Facility Name: VILLAGE OF CUMBERLAND WATER SUPPLY
Facility Type: DWT
Date Range: Jan 1 2015 to Dec 31 2015
Date Created: Jan 11 2016

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
Plan 1930 Royston/Cumb Road, Private Lab - Royston Meter, Dist. site, No Regular Sampling				
4634 Cumberland Road, Private Lab - J&K Rental, Dist. site, No Regular Sampling				
3607 Small Road, Site #5 - 3607 Small Road, Dist. site, Monthly				
	05-Jan-2015	L1.0	L1.0	
	13-Jan-2015	L1	L1	
	10-Feb-2015	L1	L1	
	23-Feb-2015	L1	L1	
	11-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	13-Apr-2015	L1	L1	
	12-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	01-Jun-2015	L1	L1	
	14-Jul-2015	L1	L1	
	20-Jul-2015	L1	L1	
	12-Aug-2015	A		
	31-Aug-2015	L1	L1	
	08-Sep-2015	L1	L1	
	15-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	
	16-Oct-2015	L1	L1	
	26-Oct-2015	L1	L1	
	16-Nov-2015	L1	L1	
	15-Dec-2015	L1	L1	
	15-Dec-2015	L1	L1	
	Total Positive:	0	0	0

3190 Royston Road, Site #4 - 3190 Royston Road, Dist. site, Monthly				
	13-Jan-2015	L1	L1	
	10-Feb-2015	L1	L1	
	16-Feb-2015	L1	L1	
	11-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	07-Apr-2015	L1	L1	
	12-May-2015	L1	L1	
	25-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	13-Jul-2015	L1	L1	
	14-Jul-2015	L1	L1	
	12-Aug-2015	L1	L1	
	31-Aug-2015	L1	L1	
	15-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	
	16-Oct-2015	L1	L1	
	19-Oct-2015	L1	L1	
	16-Nov-2015	L1	L1	
	07-Dec-2015	L1	L1	
	15-Dec-2015	L1	L1	
	Total Positive:	**0**	**0**	**0**
4700 Cumberland Road, Site #3 - 4700 Cumberland Road, Dist. site, Monthly				
	13-Jan-2015	L1	L1	
	10-Feb-2015	L1	L1	
	10-Feb-2015	L1	L1	
	11-Mar-2015	L1	L1	
	30-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	12-May-2015	L1	L1	
	20-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	07-Jul-2015	L1	L1	
	14-Jul-2015	L1	L1	
	12-Aug-2015	L1	L1	
	24-Aug-2015	L1	L1	
	15-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	
	13-Oct-2015	45.3	1.0	
	14-Oct-2015	L1	L1	
	15-Oct-2015	L1	L1	
	16-Nov-2015	L1	L1	
	15-Dec-2015	L1	L1	
	Total Positive:	**1**	**1**	**0**

2040 Derwent, Site #1 - 2040 Derwent , Dist. site, Monthly				
	13-Jan-2015	8	L1	
	19-Jan-2015	L1	L1	
	19-Jan-2015	L1.0	L1.0	
	26-Jan-2015	L1.0	L1.0	
	10-Feb-2015	L1	L1	
	11-Mar-2015	L1	L1	
	16-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	04-May-2015	L1	L1	
	12-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	22-Jun-2015	L1	L1	
	14-Jul-2015	L1	L1	
	12-Aug-2015	L1	L1	
	12-Aug-2015	L1	L1	
	15-Sep-2015	L1	L1	
	28-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	
	16-Oct-2015	L1	L1	
	16-Nov-2015	L1	L1	
	16-Nov-2015	L1	L1	
	01-Dec-2015	L1	L1	
	15-Dec-2015	L1	L1	
	Total Positive:	**1**	**0**	**0**
3328 Second Street, Site #2 - 3328 Second Street, Dist. site, Monthly				
	13-Jan-2015	6	L1	
	19-Jan-2015	C		
	19-Jan-2015	L1.0	L1.0	
	02-Feb-2015	L1	L1	
	10-Feb-2015	L1	L1	
	11-Mar-2015	L1	L1	
	24-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	11-May-2015	L1	L1	
	12-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	29-Jun-2015	L1	L1	
	14-Jul-2015	L1	L1	
	12-Aug-2015	L1	L1	
	18-Aug-2015	L1	L1	
	15-Sep-2015	1	L1	
	18-Sep-2015	**1.0**	**L1**	
	21-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	
	05-Oct-2015	L1	L1	
	16-Oct-2015	L1	L1	

	16-Nov-2015	L1	L1	
	23-Nov-2015	L1	L1	
	30-Nov-2015	L1	L1	
	15-Dec-2015	L1	L1	
	Total Positive:	**3**	**0**	**0**
2563 Kendall Ave, Site #6 - 2563 Kendall Ave, Dist, site, Monthly				
	12-Jan-2015	L1.0	L1.0	
	13-Jan-2015	L1	L1	
	10-Feb-2015	L1	L1	
	02-Mar-2015	L1	L1	
	11-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	20-Apr-2015	L1	L1	
	12-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	08-Jun-2015	L1	L1	
	14-Jul-2015	L1	L1	
	28-Jul-2015	L1	L1	
	12-Aug-2015	L1	L1	
	15-Sep-2015	L1	L1	
	15-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	
	16-Oct-2015	L1	L1	
	03-Nov-2015	L1	L1	
	16-Nov-2015	L1	L1	
	15-Dec-2015	L1	L1	
	29-Dec-2015	L1	L1	
	Total Positive:	**0**	**0**	**0**
, Site #7 - 2476 Dunsmuir Avenue, Dist, site, Monthly				
	13-Jan-2015	L1	L1	
	19-Jan-2015	L1.0	L1.0	
	20-Jan-2015	L1	L1	
	10-Feb-2015	L1	L1	
	09-Mar-2015	L1	L1	
	11-Mar-2015	L1	L1	
	07-Apr-2015	L1	L1	
	27-Apr-2015	L1	L1	
	12-May-2015	L1	L1	
	01-Jun-2015	L1	L1	
	15-Jun-2015	L1	L1	
	14-Jul-2015	L1	L1	
	04-Aug-2015	L1	L1	
	12-Aug-2015	L1	L1	
	15-Sep-2015	L1	L1	
	21-Sep-2015	L1	L1	
	05-Oct-2015	L1	L1	

16-Oct-2015	L1	L1	
10-Nov-2015	L1	L1	
16-Nov-2015	L1	L1	
15-Dec-2015	L1	L1	
21-Dec-2015	L1	L1	
Total Positive:	**0**	**0**	**0**

Result Values: **E - estimated** **L - less than** **G - greater than**

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

and

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

Samples that contain total coliform:	5	3.27% of total
Samples that contain e. coli:	1	0.65% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of positive samples in last 30 days:	0/10	
Total number of samples:	153	

Comments:

Environmental Health Officer
Jan 11 2016

FOR FURTHER INFORMATION PLEASE CALL: Chen, Christine (250) 331-8518 Comox Valley Office

Operator

Village of Cumberland
PO Box 340
Cumberland, BC
V0R 1S0

(250) 336-2291

Water Sample Range Report

Island Health

Facility Name: VILLAGE OF CUMBERLAND WATER SUPPLY
Facility Type: DWT
Date Range: Jan 1 2015 to Dec 31 2015
Date Created: Jan 11 2016

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
Cumberland, Site #8 - Source Well #36425, Source site, Monthly				
	25-Feb-2015	L1	L1	
	24-Mar-2015	L1	L1	
	15-Apr-2015	L1	L1	
	20-May-2015	L1	L1	
	17-Jun-2015	L1	L1	
	21-Jul-2015	L1	L1	
	12-Aug-2015	L1	L1	
	16-Sep-2015	L1	L1	
	13-Oct-2015	L1	L1	
	24-Nov-2015	OG	OG	
	Total Positive:	**0**	**0**	**0**

Result Values: **E - estimated** **L - less than** **G - greater than**

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
and
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

Samples that contain total coliform:	0	0.00% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of positive samples in last 30 days:	0/0	
Total number of samples:	10	

Comments:

Environmental Health Officer
Jan 11 2016

FOR FURTHER INFORMATION PLEASE CALL: Chen, Christine (250) 331-8518 Comox Valley Office

Operator

Village of Cumberland
PO Box 340
Cumberland, BC
V0R 1S0

(250) 336-2291

Water Sample Range Report

Island Health

Facility Name: VILLAGE OF CUMBERLAND WATER SUPPLY
Facility Type: DWT
Date Range: Jan 1 2015 to Dec 31 2015
Date Created: Jan 11 2016

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
District Lot 25, Nelson Land District, Private Lab - Henderson Lake Raw, Source site, No Regular Sampling				
Allen Lake, Nelson Land District, Private Lab - Allen Lake Raw Source, Source site, No Regular Sampling				
Chlorine Station, Chlorine Station Raw Water, Source site, Monthly				
	13-Jan-2015	38.9	L1	
	23-Feb-2015	68.3	L1	
	24-Mar-2015	119.8	L1	
	15-Apr-2015	261.3	L1	
	20-May-2015	178.5	1.0	
	17-Jun-2015	172.2	1.0	
	21-Jul-2015	410.6	7.4	
	12-Aug-2015	35.0	L1	
	16-Sep-2015	261.3	L1	
	13-Oct-2015	285.1	5.2	
	24-Nov-2015	150.0	2.0	
	29-Dec-2015	63.1	L1	
	Total Positive:	12	5	0

Result Values: E - estimated L - less than G - greater than

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
and
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

Samples that contain total coliform:	12	100.00% of total
Samples that contain e. coli:	5	41.67% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of positive samples in last 30 days:	1/1	
Total number of samples:	12	

Comments:

Environmental Health Officer
Jan 11 2016

FOR FURTHER INFORMATION PLEASE CALL: Chen, Christine (250) 331-8518 Comox Valley Office

Operator

Village of Cumberland
PO Box 340
Cumberland, BC
V0R 1S0

(250) 336-2291

DRINKING WATER SYSTEM INSPECTION REPORT

Vancouver Island health authority

Health Protection

SYSTEM NAME: Village of Cumberland

ADDRESS: 2673 Dunsmuir Ave., Cumberland

OPERATOR: Village of Cumberland

E.H.O. NAME: Christine Chen

POSTAL CODE:

SYSTEM NUMBER: 1414314

INSPECTION DATE (DMY): 01DEC2015

TIME SPENT(Hrs. - nearest 1/4): 3.5

SYSTEM TYPE(CHECK One)

☐ > 20,000 (DWP) ☐ 10,001 - 20,000 (DWM) ☒ 301 - 10,000(DWT) ☐ 15 - 300(DWC) ☐ 2 - 14(DWS)
☐ 1 - SERVES PUBLIC (DWQ) ☐ 1 HAULER (DWH)

TYPE OF INSPECTION

☐ INITIAL ☒ ROUTINE
☐ COMPLAINT ☐ FOLLOW-UP

CRITICAL HAZARD

These items relate to Public Health Safety & **MUST RECEIVE IMMEDIATE ATTENTION**

Microbiological Contamination of Raw Water Supply Due to:

COPY

☐ 301 Flood
☐ 302 Sewage
☐ 303 Industrial
☐ 304 Agriculture
☐ 305 Other (Specify) _____
☐ 306 Chemical Contamination of Raw Water Suply
☐ 307 Contamination of Finished Water - Reservoir
☐ 308 Contamination of Finished Water - Mains
☐ 309 Cross-Connection
☐ 310 Use of Unapproved Source
☐ 311 Interruption of Treatment
☐ 312 Inadequate Treatment
☐ 313 Other (Specify) _____

POSTED
DEC 10 2015
JA

SANITATION & MAINTENANCE

These items must be corrected within a designated time period

RECEIVED
DEC 1 8
PW
4900-01

☐ 314 Improper Maintenance of Distribution Sytsem
☐ 315 Improper or No Disinfection of New or Repaired Main
☐ 316 Source Unprotected and Subject to Contamination
☐ 317 Inadequate or Improper Construction of Water Works
☐ 318 Inadequate Microbiological Analysis Data
☐ 319 Inadequate Chemical Analysis Data
☐ 320 Interruption of Treatment
☐ 321 Inadequate Treatment
☒ 322 Emergency Response Plan
☒ 323 Other (Specify) ① Terms and Conditions ② CT value.

CODE	FINDINGS AND ACTIONS REQUIRED
C	Joint source to tap inspection conducted in presence with Drinking Water Consultant. Met with Manager of Operations to review System design and operation. Site visit and inspection conducted with water utility operator. • Well source offline due to maintenance of chlorinator • New HACH chlorine meter installed at gas chlorination room (Nov 27, 15). • VCADA and manual testing program in place. • Bacteriological and chemical sampling program in place. Sampling frequency adequate. • Adequate TOCP trained operators. • 2014 annual report available. Please incorporate turbidity data and THM testing on next annual report.
322	2014 Emergency Response Plan available. Please incorporate: └ response procedure for turbidity event in unfiltered drinking water (Outstanding – refer to NOV 18, 14 inspection report)

At the time of inspection this system has a hazard rating of ☐ HIGH ☒ MODERATE ☐ LOW ☐ Issue Permit ☐ Conditions of Permit

FOLLOW UP ☐ VISIT ☐ PHONE Date / /

RECEIVED BY: mail to operator

PRINT NAME:

E.H.O.:

VANCOUVER ISLAND health authority

Health Protection

INSPECTION REPORT

REFERENCE #

NAME Village of Cumberland

DATE Dec 01, 15.

ADDRESS 2673 Dunsmuir Ave. Cumberland CITY

LICENCE # 1414314.

POSTAL CODE TELEPHONE MANAGER

Re

CODE	REMARKS	CORRECTION DATE
	└ contact information of commercial and high risk facilities (ie. bulk water customer, food facilities, residential cares, schools, child cares, etc.).	
323 (1)	Outstanding Terms and conditions (refer to Sept 20, 2015 treatment specification on permit conditions). └ include response measures and implementation dates on watershed protection plan.	
323 (2)	Ensure adequate CT value is achieved before reaching first water user. Please revisit contact time and submit calculation to our office for review.	

POSTED
DEC 10 2015
JA

Received By: mail to operator

Printed Name:

Inspected By:

Printed Name: Christine Chen

Maxxam
A Bureau Veritas Group Company

TOTAL CHEMICAL TREATED WATER ANALYSIS 2015

Success Through Science®

Your Project #: ANNUAL TREATED WATER
Site Location: SITE #1
Your C.O.C. #: WI000907

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2016/01/13
Report #: R2115077
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B601061
Received: 2016/01/07, 09:30

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	1	2016/01/08	2016/01/09	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry (1)	1	N/A	2016/01/08	BBY6SOP-00011	SM 22 4500-Cl- G m
Colour (True) by Kone Lab (1)	1	N/A	2016/01/09	BBY6SOP-00057	SM 22 2120 C m
Coliforms & E.coli by Quantitray (MPN)	1	N/A	2016/01/07	CTYSOP-00002	Based on SM-9223
Conductance - water (1)	1	N/A	2016/01/09	BBY6SOP-00026	SM 22 2510 B m
Fluoride (1)	1	N/A	2016/01/08	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3) (1)	1	N/A	2016/01/08	BBY7SOP-00002	EPA 6020a R1 m
Mercury (Total) by CVAF (1)	1	2016/01/13	2016/01/13	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2016/01/08	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total) (1)	1	N/A	2016/01/08	BBY7SOP-00002	EPA 6020A R1 m
Nitrate + Nitrite (N) (1)	1	N/A	2016/01/08	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA (1)	1	N/A	2016/01/08	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N) (1)	1	N/A	2016/01/08	BBY6SOP-00010	SM 22 4500-NO3 I m
pH Water (1, 2)	1	N/A	2016/01/09	BBY6SOP-00026	SM 22 4500-H+ B m
Sulphate by Automated Colourimetry (1)	1	N/A	2016/01/08	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue) (1)	1	2016/01/08	2016/01/11	BBY6SOP-00033	SM 22 2540 C m
Total Trihalomethanes Calculation (1)	1	N/A	2016/01/11	BBY WI-00033	BC MOE Lab Method
Turbidity (1)	1	N/A	2016/01/08	BBY6SOP-00027	SM 22 2130 B m
VOCs, VH, F1, LH in Water by HS GC/MS (1)	1	2016/01/08	2016/01/11	BBY8SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam
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Success Through Science®

Your Project #: ANNUAL TREATED WATER
Site Location: SITE #1
Your C.O.C. #: WI000907

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2016/01/13
Report #: R2115077
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B601061
Received: 2016/01/07, 09:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Tanya Eugine, M.Sc., Project Manager
Email: TEugine@maxxam.ca
Phone# (604)639-2609

==========

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Maxxam Job #: B601061
Report Date: 2016/01/13

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL TREATED WATER
Site Location: SITE #1

RESULTS OF CHEMICAL ANALYSES OF DRINKING WATER

Maxxam ID					NX8552	
Sampling Date					2016/01/07 08:55	
COC Number					WI000907	
	UNITS	MAC	AO	OG	SITE #1 ANNUAL	RDL
ANIONS						
Nitrite (N)	mg/L	1	-	-	<0.0050	0.0050
Calculated Parameters						
Nitrate (N)	mg/L	10	-	-	<0.020	0.020
Misc. Inorganics						
Fluoride (F)	mg/L	1.5	-	-	0.013	0.010
Alkalinity (Total as CaCO3)	mg/L	-	-	-	8.43	0.50
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<0.50	0.50
Bicarbonate (HCO3)	mg/L	-	-	-	10.3	0.50
Carbonate (CO3)	mg/L	-	-	-	<0.50	0.50
Hydroxide (OH)	mg/L	-	-	-	<0.50	0.50
Anions						
Dissolved Sulphate (SO4)	mg/L	-	500	-	<0.50	0.50
Dissolved Chloride (Cl)	mg/L	-	250	-	1.9	0.50
MISCELLANEOUS						
True Colour	Col. Unit	-	15	-	24.0	5.0
Nutrients						
Nitrate plus Nitrite (N)	mg/L	-	-	-	<0.020	0.020
Physical Properties						
Conductivity	uS/cm	-	-	-	26.4	1.0
pH	pH	-	6.5:8.5	-	7.22	N/A
Physical Properties						
Total Dissolved Solids	mg/L	-	500	-	18	10
Turbidity	NTU	see remark	see remark	see remark	0.95	0.10
Volatiles						
Total Trihalomethanes	ug/L	100	-	-	33	1.0
Microbiological Param.						
Total Coliforms	MPN/100mL	<1	-	-	<1	1
E. coli	MPN/100mL	<1	-	-	<1	1

RDL = Reportable Detection Limit
N/A = Not Applicable

Maxxam Job #: B601061
Report Date: 2016/01/13

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL TREATED WATER
Site Location: SITE #1

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					NX8552	
Sampling Date					2016/01/07 08:55	
COC Number					WI000907	
	UNITS	MAC	AO	OG	SITE #1 ANNUAL	RDL
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	-	-	-	9.69	0.50
Elements						
Total Mercury (Hg)	ug/L	**1**	-	-	<0.010	0.010
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	-	-	100	59.0	3.0
Total Antimony (Sb)	ug/L	**6**	-	-	<0.50	0.50
Total Arsenic (As)	ug/L	**10**	-	-	<0.10	0.10
Total Barium (Ba)	ug/L	**1000**	-	-	<1.0	1.0
Total Beryllium (Be)	ug/L	-	-	-	<0.10	0.10
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	1.0
Total Boron (B)	ug/L	**5000**	-	-	<50	50
Total Cadmium (Cd)	ug/L	**5**	-	-	<0.010	0.010
Total Chromium (Cr)	ug/L	**50**	-	-	<1.0	1.0
Total Cobalt (Co)	ug/L	-	-	-	<0.50	0.50
Total Copper (Cu)	ug/L	-	1000	-	11.4	0.20
Total Iron (Fe)	ug/L	-	300	-	205	5.0
Total Lead (Pb)	ug/L	**10**	-	-	0.68	0.20
Total Manganese (Mn)	ug/L	-	50	-	15.6	1.0
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	1.0
Total Nickel (Ni)	ug/L	-	-	-	<1.0	1.0
Total Selenium (Se)	ug/L	**50**	-	-	<0.10	0.10
Total Silicon (Si)	ug/L	-	-	-	3030	100
Total Silver (Ag)	ug/L	-	-	-	<0.020	0.020
Total Strontium (Sr)	ug/L	-	-	-	6.1	1.0
Total Thallium (Tl)	ug/L	-	-	-	<0.050	0.050
Total Tin (Sn)	ug/L	-	-	-	<5.0	5.0
Total Titanium (Ti)	ug/L	-	-	-	<5.0	5.0
Total Uranium (U)	ug/L	**20**	-	-	<0.10	0.10
Total Vanadium (V)	ug/L	-	-	-	<5.0	5.0
Total Zinc (Zn)	ug/L	-	5000	-	14.6	5.0
Total Zirconium (Zr)	ug/L	-	-	-	<0.50	0.50
Total Calcium (Ca)	mg/L	-	-	-	2.57	0.050
Total Magnesium (Mg)	mg/L	-	-	-	0.792	0.050
Total Potassium (K)	mg/L	-	-	-	0.065	0.050
RDL = Reportable Detection Limit						

Maxxam Job #: B601061
Report Date: 2016/01/13

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL TREATED WATER
Site Location: SITE #1

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					NX8552	
Sampling Date					2016/01/07 08:55	
COC Number					WI000907	
	UNITS	MAC	AO	OG	SITE #1 ANNUAL	RDL
Total Sodium (Na)	mg/L	-	200	-	0.916	0.050
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0
RDL = Reportable Detection Limit						

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Maxxam Job #: B601061
Report Date: 2016/01/13

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL TREATED WATER
Site Location: SITE #1

TRIHALOMETHANES (THM) IN WATER

Maxxam ID		NX8552	
Sampling Date		2016/01/07 08:55	
COC Number		WI000907	
	UNITS	SITE #1 ANNUAL	RDL
Volatiles			
Chloroform	ug/L	33	1.0
Chlorodibromomethane	ug/L	<1.0	1.0
Bromodichloromethane	ug/L	<1.0	1.0
Bromoform	ug/L	<1.0	1.0
Surrogate Recovery (%)			
1,4-Difluorobenzene (sur.)	%	99	
4-Bromofluorobenzene (sur.)	%	95	
D4-1,2-Dichloroethane (sur.)	%	100	
RDL = Reportable Detection Limit			

Maxxam Job #: B601061
Report Date: 2016/01/13

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL TREATED WATER
Site Location: SITE #1

GENERAL COMMENTS

MAC,AO,OG: The guidelines that have been included in this report have been taken from the Canadian Drinking Water Quality Summary Table, October 2014.

Criteria A = Maximum Acceptable Concentration (MAC) / Criteria B = Aesthetic Objectives (AO) / Criteria C = Operational Guidance Values (OG)
It is recommended to consult these guidelines when interpreting your data since there are non-numerical guidelines that are not included on this report.

Turbidity Guidelines:
1. Chemically assisted filtration: less than or equal to 0.3 NTU in 95% of the measurements or 95% of the time each month. Shall not exceed 1.0 NTU at any time.
2. Slow sand / diatomaceous earth filtration: less than or equal to 1.0 NTU in 95% of the measurements or 95% of the time each month. Shall not exceed 3.0 NTU at any time.
3. Membrane filtration: less than or equal to 0.1 NTU in 99% of the measurements made or at least 99% of the time each calendar month. Shall not exceed 0.3 NTU at any time.

Results relate only to the items tested.

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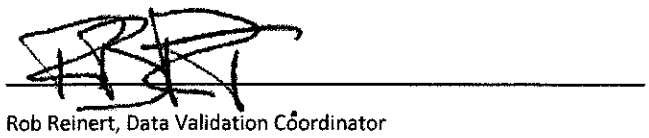
Maxxam Job #: B601061
Report Date: 2016/01/13

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL TREATED WATER
Site Location: SITE #1

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, Data Validation Coordinator

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CHLORINE

Month Dec. 2015 ~~2010~~

SCALE 114 USE

			RESIDUAL READER	TURBIDITY
1	108	6	1.48	.26
2	99	9	1.67	.28
3	91	8	1.32	.30
4	83	8	1.53	.36
5				
6				
7	60	23	1.55	.37
8	53	7	1.61	.34
9	43	10	1.47	.33
10	35	8	1.60	.58
11	25	10	1.52	.59
12	/	/	/	/
13	/	/	/	/
14	3	22	1.54	.49
15	147	6	1.40	.46
16	141	6	1.46	.55
17	137	4	1.48	.57
18	130	7	1.50	.49
19				
20				
21	109	21	1.40	.48
22	98	11	1.40	.52
23	90	8	1.52	.51
24	82	8	1.52	.44
25				
26				
27	60	22	1.36	.50
28				
29	38	22	1.15	.39
30	29	9	1.45	.40
31	21	8	1.37	.49

CHLORINE

Month Nov. 2015

2010

SCALE 29 USE

			RESIDUAL READER	TURBIDITY
1				
2	4	25	1.09	.19
3	148	6	.83	.16
4	141	7	1.04	.17
5	138	3	1.07	.16
6	134	4	1.14	.13
7	/	/	/	/
8	/	/	/	/
9	115	19	.91	.17
10	112	3	1.17	.22
11	\	\	(	\
12	97	15	1.15	.16
13	90	7	1.14	.24
14				
15				
16	73	17	1.16	.17
17	63	10	1.15	.19
18	57	6	1.21	.18
19	50	7	1.16	.20
20	42	8	1.13	.25
21				
22				
23	18	24	1.07	.24
24	8	10	1.07	.24
25	0	8	.49	.24
26	143	7	—	.19
27	135	8	—	.30
28				
29				
30	114	21	1.55	.25
31				

CHLORINE

Month Oct. /15 2010

SCALE 30 USE

			RESIDUAL READER	TURBIDITY
1	29	1	.009	.19
2	25	4	—	.22
3			—	
4			—	
5	10	15		
6	5	5	.83	.24
7	01/149	6	.71	.14
8	144	5	.38	.13
9	140	4	.42	.14
10	/	/	/	/
11	/	/	/	/
12	/	/	/	/
13	126	14	.39	.19
14	124	2	.31	.20
15	120	4	.84	.10
16	118	2	.93	.09
17				
18				
19	97	21	Turb .28	.92 Residual
20	90	7	Turb .17	.79
21	84	6	Turb .17	.83
22	79	5	Turb .18	.88
23	74	5	Turb .18	.86
24	/	/	/	/
25	/	/	/	/
26	55	19	.73	.95
27	50	5	.78	.20
28	41	9	.98	.21
29	35	6	.96	.18
30	29	6	.93	.31
31				

CHLORINE

Month SEPT 2015 ~~2016~~

SCALE 143 LBS USE

			RESIDUAL READER	TURBIDITY
1	140	3	.26	.29
2	139	1	.13	.20
3	134	5	1.17	.30
4	130	4	.56	.28
5	\	\	\	\
6				
7				
8	118	12	.72	.32
9	112	6	.77	.29
10	110	2	.25	.23
11	106	4	.65	.30
12	\	\	\	\
13				
14	97	9	.71	.25
15	93	4	.38	.16
16	89	4	.58	.25
17	84	5	.36	.23
18	79	5	.28	.19
19	\	\	\	\
20				
21	72	7	.73	.20
22	65	7	.73	.34
23	61	4	.46	.24
24	56	5	.52	.18
25	54	2	—	.18
26	~~61~~	~~4~~		
27				
28	40	14	.81	.19
29	35	5	.83	.21
30	30	5	.66	.20
31				

25th - raised chlorine dial to 8.5

CHLORINE

Month AUG 2015

SCALE 150 LBS

		USE	RESIDUAL READER	TURBIDITY
1				
2				
3				
4	127	23	~~1.32~~ 1.25	.32
5	121	6	—	—
6	115	6	1.21	.23
7	109	6	.45	.25
8	~~94~~		~~1.09~~	~~.21~~
9				
10	98	11	.19	.5
11	92	6	1.49	.37
12	88	4	1.42	.33
13	80	8	1.47	.27
14				
15				
16				
17	58	22	1.47	.21
18	54	4	.86	.24
19	47	7	.96	.21
20	42	5	.96	.24
21	38	4	.98	.26
22	~~20~~	/	/	/
23				
24	20	18	.88	.22
25	14	6	.15	.21
26	10	4	1.02	.35
27	5	5	.32	.23
28	0 / NEW BOTTLE 150	5	.34	.22
29	/	/	/	/
30				
31	143	7	.54	.24

CHLORINE

Month July 2015 2010

SCALE 35 USE

			RESIDUAL READER	TURBIDITY
1	—	—	—	—
2	19	16	.83	.26
3	8	11	.81	.32
4				
5				
6	141	17	.59	.25
7	137	4	.77	.35
8	133	4	.69	.32
9	125	8	.68	.29
10	120	5	.70	.35
11				
12				
13	108	12	.47	.64
14	103	5	.12	.24
15	95	8	1.21	.29
16	89	6	1.21	.40
17	84	5	.11	.26
18	\	\	\	\
19	\	\	\	\
20	66	18	1.26	.27
21	60	6	1.21	.53
22	55	5	1.17	.30
23	50	5	1.08	.85
24	44	6	.22	.30
25	\	\	\	\
26	\	\	\	\
27	29	15	.96	.31
28	25	4	1.20	.40
29	16	9	1.25	.33
30	8	8	1.35	.30
31	0	8	1.21	.36

raised chlorine to 8

NEW BOTTLE 150 LBS

CHLORINE

Month June 2015

SCALE 90

		USE	RESIDUAL READER	TURBIDITY
1	67	23	.89	.21
2	63	4	.24	.11
3	60	3	.62	.22
4	57	3	.29	.12
5	52	5	.84	.32
6				
7				
8	30	22	.88	.28
9	26	4	.91	.40
10	17	9	.89	.24
11	9	8	.87	.46
12	1	8	.78	.19
13	\	\	\	\
14				
15	132	19	.83	.34
16	124	8	.86	.25
17	118	6	.86	.21
18	112	6	.98	.17
19	107	5	.90	.34
22	91	16	.87	.27
23	83	8	.79	.37
24	76	7	.82	.24
25	69	7	.88	.25
26	62	7	.91	.24
25	\	\	\	\
26				
27				
28				
29	41	21	.83	.25
30	35	6	.83	.26
31				

CHLORINE

Month MAY 2015

SCALE 50 LBS USE

			RESIDUAL READER	TURBIDITY	
1	47	3	1.34	.13	
2					
3					
4	40	7	.75	1.84	Flushing
5	37	3	.34	.14	
6	33	4	.26	.25	
7	27	6	.10	.15	
8	25	2	.13	.20	
9					
10					
11	15	10	.15	.16	
12	13	2	.15	.40	
13	5	8	.14	.17	
14	2	3	—	.10	
15	0	2	—	.20	
16					
17					
18					
19	145	5	—	.18	
20	140	5	—	.20	
21	132	8	—	.17	
22	129	3	—	.22	
23					
24					
25	117	12	—	.17	
26	109	8	CALIBRATE NEW ANALYZER	.12	
27	102	7	1.17	.23	
28	94	8	.93	.20	
29	90	4	.82	.28	
30					
31					

CHLORINE

Month April ~~2016~~ 2015

	SCALE 144	USE	RESIDUAL READER	TURBIDITY
1	139	5	.40	.12
2	132	7	.25	.20
4	127	5	.73	.09
5				
6				
7	119	8	.76	.09
8	117	2	.83	.09
9	114	3	.91	.09
10	110	4	.13	.08
11	/	/	/	/
12	/	/	/	/
13	104	6	.86	.10
14	99	5	.71	.09
15	95	4	.48	.48
16	92	3	.24	.08
17	90	2	.20	.13
18	/	/	/	/
19	/	/	/	/
20	80	10	.52	.11
21	76	4	.12	.30
22	73	3	.14	.29
23	71	2	.10	.42
24	69	2	.31	.14
25				
26				
27	59	10	.35	.11
28	56	3	.13	.76
29	53	3	.91	.18
30	50	3	.20	.17
31				

CHLORINE

Month Mar. 2015 2010

	SCALE 69	USE	RESIDUAL READER	TURBIDITY
1			~~1.21~~	~~.11~~
2	61	8	1.21	.11
3	57	4	—	.07
4	55	2	.28	.06
5	54	1	~~.11~~ .11	.06
6	49	5	.12	.05
7				
8				
9	44	5	1.05	.08
10	40	3	.72	.07
11	39	2	.65	.09
12	35	4	.74	.07
13	31	4	.81	.08
14	/	/	/	/
15				
16	24	7	.67	.14
17	20	4	.67	.09
18	19	1	.65	.10
19	16	3	.65	.09
20	13	3	1.02	.13
21	/	/	/	/
22				
23	4	9	.61	.13
24	0	4	.11	.14
25	0 SCALE OUT OF WHACK		.12	.16
26	0		.06	.10
27	0	—	.11	.11
28				
29		switched bottles		
30	148	2	—	.19
31	144	4	.15	.20

CHLORINE

Month Feb. 2015 2010

SCALE 138 USE

			RESIDUAL READER	TURBIDITY
1				
2	130	8	.56	.16
3	128	2	.60	.14
4	127	2	.56	.13
5	124	3	.51	.16
6	121	3	.49	.65
7				
8				
9				
10	111	10	.36	.41
11	109	2	.20	.79
12	108	1	.73	.17
13	104	4	.75	.19
14				
15				
16	95	9	.78	.17
17	92	3	.80	.16
18	90	2	.82	.17
19	89	1	.63	.08
20	86	3	1.12	.07
21				
22				
23	75	11	.76	.08
24	74	1	.92	.10
25	72	2	.84	.07
26	70	2	.90	.08
27	69	1	.82	.08
28				
29				
30				
31				

CHLORINE

Month Jan. 2015

2010

SCALE 132

		USE	RESIDUAL READER	TURBIDITY
1				
2	125	7	.84	.66
3	"	"		
4			"	"
5	106	~~24~~ 19	.83	.91
6	99	7	.84	.67
7	94	5	.80	.69
8	89	5	.84	.67
9	84	5	.87	.70
10	~~—~~		~~.88~~	~~.73~~
11				
12	69	15	.88	.63
13	62	7	.89	.69
14	58	4	.85	.63
15	50	8	.87	.59
16	46	4	.86	.66
17				
18	/	/	/	/
19	32	14	.85	67
20	28	4	.92	.55
21	20 ~~15~~	~~10~~ 8	.88	.54
22	~~8~~ 15	~~10~~ 5	.96	.64
23			.66	.49
24				
25				
26	5	10	—	.35
27	2	3	.68	.14
28	147	6	.51	.18
29	143	4	.57	.14
30	138	5	.62	.15
31				