

December 4, 2017

School District 68 (Nanaimo-Ladysmith)
395 Wakesiah Road
Nanaimo, BC V9R 3K6

ISSUED FOR USE
FILE: 704-ENW.VENW03140-01
Via Email: BHackwood@sd68.bc.ca

Attention: Brian Hackwood, Maintenance Manager

Subject: Domestic Water Testing (Lead) Inventory – Pauline Haarer Elementary

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained School District 68 Nanaimo-Ladysmith (SD 68) to conduct a domestic water testing inventory at Pauline Haarer Elementary located in SD 68. Tetra Tech understands that the BC Ministry of Education has issued a directive to protect drinking water. The directive requires that a systematic investigation of public drinking water supplies at select schools in the District be undertaken. The investigation is based on procedures set forth by the Vancouver Island Health Authority (VIHA), modified per Health Canada guidelines, to ascertain risk and mitigation.

Tetra Tech understands that the sampling schedule, collection, testing and reporting of results needs to be completed by December 22, 2017 in order to allow sufficient time for SD 68 to implement mitigation measures prior to its deadline of March 31, 2018.

Carrie McVeigh, of SD 68, provided Tetra Tech with authorization to proceed with the inventory on October 24, 2017.

2.0 METHODOLOGY

Tetra Tech completed the domestic water testing inventory program at Pauline Haarer Elementary on November 6th, 2017. The 2017 sampling program was conducted as per the protocols established during the 2016 program. The methodologies employed during the field program are detailed in the following subsections.

2.1 Sampling Locations

Tetra Tech reviewed plans for the facility prior to commencing the field work to identify potential sampling locations. The facility was then assessed in the field and sampling locations were selected based on the probability of human consumption at a location. The sampling locations included one point that was closest to the location where the water supply enters the building, one that is the furthest point from where the water supply enters the building and from points where human consumption of water occurred or was reasonably likely to occur. The sampling locations for Pauline Haarer Elementary are shown on the attached Figure 1.

Drinking fountains and kitchen sinks were all considered to have a high probability of human consumption of water and were always sampled. Sinks with visible evidence of human consumption of water, such as water bottles, cups, or electric kettles were also considered to have a high probability of human consumption of water and were sampled. Although classroom sinks were considered to have a moderate probability of human consumption of water, only representative samples were collected as per the direction of SD 68 Maintenance Manager, Mr. Brian Hackwood.

Classroom laboratory and art room sinks, where present, were considered to have a low probability of human consumption of water so only representative samples were collected. Finally, washrooms and utility sinks, unless there was other evidence of human consumption of water (such as an electric kettle) were considered to be a low probability of human consumption of water and only representative samples were collected.

2.2 Drinking Water Sampling

Sampling was conducted in the early hours of Monday, November 6th, 2017 in order collect water samples representative of an approximate worse-case scenario of water that had remained in contact with the school's plumbing over the course of a weekend. Two samples were collected at each sample location; the first collected immediately prior to any water line flushing (0 second sample); the second collected after thirty seconds of water line flushing (30 second sample).

The process for the sequence of analysis for a sample location is as follows:

- Only the pre-flush (0 second) sample is initially submitted for laboratory analysis;
- If the analytical result exceeds the *Guidelines for Canadian Drinking Water Quality* (GCDQG) Maximum Allowable Concentration (MAC), the 30 second sample would be submitted for further analysis;
- If the 30 second sample analytical result exceeds the GCDQG MAC, additional samples would be collected after flushing with cold water for 2 minutes and 5 minutes at a subsequent sampling event and both samples submitted for analysis.

Water samples were collected directly from the sample point into clean, labeled, new laboratory-supplied containers pre-charged with preservative for total lead. Sampling personnel wore new nitrile gloves prior to collecting each sample. Samples were kept in a cooler with ice after collection until being brought back to Tetra Tech's Nanaimo office, where samples not immediately submitted to the laboratory were stored in refrigerated conditions.

2.3 Analytical Testing

Maxxam is a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples using British Columbia Ministry of Environment (MOE)-approved procedures. All water samples submitted were analyzed for total lead.

2.4 Quality Assurance / Quality Control

During the sampling program, Tetra Tech implemented a Quality Assurance/Quality Control (QA/QC) program to ensure the integrity of the sampling methodology and analytical testing. The QA/QC program adhered to Tetra Tech's in-house Quality Management System (QMS), which was designed to generate representative samples, minimize the potential for cross-contamination between sampling locations and samples, and reduce the potential for systematic bias.

The QA/QC program included the following tasks:

- Recording the results of field activities in the field concurrently with the activities;
- Use of clean, new sampling gloves at each sampling location;
- Placing samples into new, labeled laboratory-supplied containers;
- Transporting samples to Maxxam in chilled coolers using chain-of-custody procedures;

- Using a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples using MOE-approved procedures;
- Independently verifying the sample concentrations flagged by Maxxam as being greater than Health Canada guidelines by uploading laboratory results using ESdat, an environmental data management software, to minimize transcription errors; and
- Conducting a review of this report by a qualified senior Tetra Tech professional to ensure that the report meets Tetra Tech technical and reporting requirements.

Laboratory Quality Assurance / Quality Control Program

Water samples were submitted to Maxxam, a CALA accredited laboratory. Laboratory testing was conducted using methods outlined in the British Columbia Environmental Laboratory Manual. Laboratory QA/QC reports are attached to the laboratory reports presented in Appendix B. Samples included in the QA/QC reports consist of laboratory batches and will include random samples from the lab report and potentially other projects to complete a batch.

The Laboratories will note any sample deficiencies, such as unacceptable headspace, broken jars or bottles, etc. As well, the laboratory will measure the temperature of samples received by the laboratory in Burnaby. Additionally, the laboratory will use five different methods for checking the quality of sample analytical results, these include:

Laboratory Duplicate – Relative Percent Difference (RPD)

A second aliquot is obtained from a randomly chosen sample. The aliquot is processed and the results expressed as the RPD between the two results. The purpose of the laboratory duplicate is to evaluate analytical precision and sample homogeneity. Generally, a laboratory duplicate is performed for each facility.

3.0 ASSESSMENT STANDARDS

As per the guidance from the Vancouver Island Health Authority (VIHA), Tetra Tech compared the sample analytical results to the *Guidelines for Canadian Drinking Water Quality* (GCDQG) published by Health Canada, February 2017. The guidelines list a Maximum Acceptable Concentration (MAC) for lead of 0.010 mg/L (10 µg/L). The MAC for lead is based on chronic effects and is intended to apply to average concentrations in water consumed for extended periods. No immediately toxic concentration for lead is listed, however exposure to lead should nevertheless be kept to a minimum.

4.0 ANALYTICAL RESULTS

Tetra Tech collected water samples from Pauline Haarer Elementary on November 6th, 2017. A total of 13 sample locations were identified; two samples were collected at each location (i.e., 0 second sample and 30 second sample). Thirteen pre-flush (0 second) samples were submitted for laboratory analysis of total lead.

Sampling locations are shown on Figure 1. Laboratory testing results for Pauline Haarer Elementary are summarized in the table below. The complete laboratory certificate is provided as Appendix B with Pauline Haarer results found on included on pages 4-6 and 11-12.

Table 1: Laboratory Testing Results

Sample ID	Sample Date	MAC	Total Lead (µg/L)
0 Second Samples			
PH#01-0s	11/06/2017	10 µg/L	2.25
PH#02-0s	11/06/2017		2.02
PH#03-0s	11/06/2017		5.13
PH#04-0s	11/06/2017		2.58
PH#05-0s	11/06/2017		0.23
PH#06-0s	11/06/2017		0.72
PH#07-0s	11/06/2017		2.33
PH#08-0s	11/06/2017		0.60
DUP#2-0s*	11/06/2017		0.33
PH#09-0s	11/06/2017		5.29
PH#10-0s	11/06/2017		2.35
PH#11-0s	11/06/2017		0.26
PH#12-0s	11/06/2017		5.28
PH#13-0s	11/06/2017	1.44	
*duplicate sample DUP02-0s was collected at PH#08-0s			

All thirteen pre-flush (0 second) samples contained concentrations of total lead less than the GCDQG MAC of 10 µg/L (0.010 mg/L).

5.0 DISCUSSION AND RECOMMENDATIONS

Tetra Tech’s sampling program was based upon guidance from the Ministry of Health, found in the document *Guidance on Controlling Corrosion in Drinking Water Distribution Systems* (2009). The rationale is that for each sampling point, if the pre-flush (0 second) sample (Tier 1) contained elevated lead concentrations, it could indicate that the faucet or fittings are the likely be the source of lead. If a subsequent 30 second flush sample (Tier 2) contained elevated lead concentrations, the source of the lead would likely be the piping (plumbing) leading to the faucet; whereas low lead concentrations in the 30 second sample would further indicate that the source was likely the faucet and fittings. Finally, a 5 minute flush sample (if required) should be drawing water directly from the water supply piping within the building and would indicate if flushing is feasible for lowering the lead concentration in water within the building.

The Health Canada guidance recommend that Tier 2 sampling (30 second samples) take place when Tier 1 sampling identifies more than 10% of sites with lead concentrations above the MAC, and then only at the 10% of sampling sites with the highest lead concentration. Rather, Tetra Tech ran every 30 second sample for locations where the 0 second sample was above the MAC to show that flushing was adequate to lower the lead concentration in the drinking water at each point of concern.

The guidance from the Ministry of Health recommended that samples be collected after the sampling points had been stagnant for a minimum of 8 hours but not longer than 24 hours in order to simulate the worst case daily scenario for lead in drinking water consumption. Based on guidance from VIHA, SD 68 directed Tetra Tech to collect samples Monday mornings prior to any staff or students arriving at the facilities in order to simulate a worst-case scenario for stagnant water. As such, lead concentrations reported represent what could be expected following a weekend and would likely be lower on subsequent weekday mornings.

All pre-flush (0 second) samples collected at Pauline Haarer Elementary contained concentrations of lead below the GCDQG MAC indicating that lead sources in the supply water to this facility is not a concern.

During sample collection, Tetra Tech noted signage throughout the facility stating “Water Quality – First thing in the morning... Run the water for two minutes before drinking. Throughout the day... Let the water run until it is cold before drinking.” Despite the fact the analytical results indicate that all possible drinking locations at Pauline Haarer Elementary had low lead concentrations, Tetra Tech recommends that this signage be maintained at each point where drinking water could be consumed and that this procedure continues to be followed as it promotes drinking water safety awareness.

6.0 SUMMARY AND CONCLUSIONS

All pre-flush (0 second) samples collected at Pauline Haarer contained concentrations of total lead below the GCDQG MAC of 10µg/L (0.010 mg/L).

Tetra Tech recommends that SD 68 continue with its ongoing procedure of conducting a 2 minute flush at each drinking water consumption point each morning; and running taps/faucets until cold prior to consuming water. Tetra Tech noted signage at most drinking water consumption points stating “Water Quality – First thing in the morning... Run the water for two minutes before drinking. Throughout the day... Let the water run until it is cold before drinking.”

Tetra Tech recommends that the facility be inspected on a routine basis to ensure that the above noted signage is present and in good condition at each point where drinking water could be consumed. Tetra Tech further recommends that a bulletin be provided to staff summarizing the drinking water quality results at the facility and reminding them of the above procedure. Staff should then instruct students and visitors in the drinking water procedure.

7.0 CLOSURE

This report has been prepared based on the scope of work and for the use of School District 68, which includes distribution as required for the purposes for which this assessment was commissioned. The assessment has been carried out in accordance with generally accepted professional practice. No other warranty is made, either express or implied. Professional judgment has been applied in developing the recommendations in this report.

This report was prepared by personnel with professional experience in investigations of this nature and who specifically conducted the investigations at this Site. Reference should be made to the 'Geoenvironmental Report – Limitations on the Use of this Report' attached in Appendix A that forms a part of this report.

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

Respectfully submitted,
Tetra Tech Canada Inc.



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/dr

Attachments: Figure 1 - Pauline Haarer Elementary Sample Locations
Appendix A - Limitations on the Use of this Document
Appendix B - Laboratory Report

FIGURES

Figure 1 Pauline Haarer Elementary Sample Locations



ENCLOSED SPACES

Ceiling Hatches

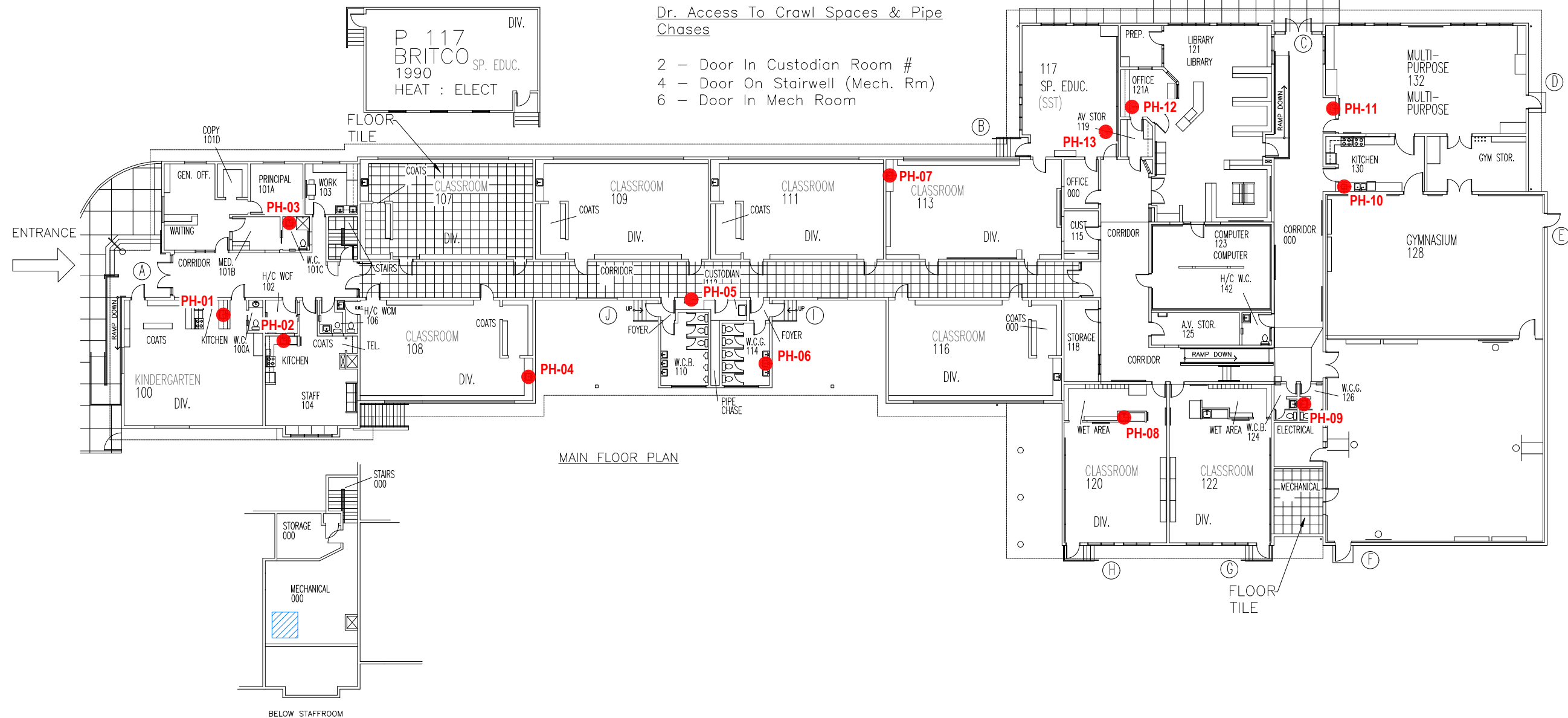
- 1 - Custodian Room #
- 3 - Custodian Room #
- 5 - Corridor Outside Classroom #001

Dr. Access To Crawl Spaces & Pipe Chases

- 2 - Door In Custodian Room #
- 4 - Door On Stairwell (Mech. Rm)
- 6 - Door In Mech Room

Roof Access

Ladder To Roof - Inside Storage Rm #1138



MAIN FLOOR PLAN

BELOW STAFFROOM

Q:\Edmonton\Drafting\PROJECTS\704-ENW\VENW03140-01\Acad\ENW\VENW03140-01\Figure 1.dwg [FIGURE 1] December 04, 2017 - 11:25:50 am (BY: DAS, DEBASHIS)

NOTES:

- 1) BASE DRAWING IS PROVIDED BY CLIENT
- 2) DRAWING NOT TO SCALE

LEGEND:

- WATER ENTRY POINT
- SAMPLE LOCATION

CLIENT

School District 68

**DOMESTIC WATER TESTING (LEAD) INVENTORY
PAULINE HAARER ELEMENTARY
400 CAMPBELL STREET, NANAIMO, BC**

PAULINE HAARER ELEMENTARY SAMPLE LOCATIONS



PROJECT NO. ENW.VENW03140-01	DWN DBD	CKD SW	REV 0
OFFICE EDM	DATE December 2017		

Figure 1

APPENDIX A

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

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Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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

1.3 STANDARD OF CARE

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consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

LABORATORY REPORT

Your Project #: ENW.VENW03140-01

Attention: Shawneen Walker

TETRA TECH CANADA INC.
#1 - 4376 BOBAN DRIVE
NANAIMO, BC
Canada V9T 6A7

Your C.O.C. #: 540307-01-01, 540307-02-01, 540307-05-01, 540307-04-01

Report Date: 2017/11/30
Report #: R2484553
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B799079

Received: 2017/11/07, 08:50

Sample Matrix: DRINKING WATER
Samples Received: 38

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Elements by CRC ICPMS (total)	37	N/A	2017/11/09 BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total)	1	2017/11/09	2017/11/10 BBY7SOP-00003,	BCLM2005,EPA6020bR2m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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.

Your Project #: ENW.VENW03140-01

Attention:Shawneen Walker

TETRA TECH CANADA INC.
#1 - 4376 BOBAN DRIVE
NANAIMO, BC
Canada V9T 6A7

Your C.O.C. #: 540307-01-01, 540307-02-01, 540307-05-01, 540307-04-01

Report Date: 2017/11/30
Report #: R2484553
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B799079
Received: 2017/11/07, 08:50

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Letitia Prefontaine, B.Sc., Senior Project Manager
Email: LPrefontaine@maxxam.ca
Phone# (604)639-2616
=====

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 #: B799079
Report Date: 2017/11/30

TETRA TECH CANADA INC.
Client Project #: ENW.VENW03140-01
Sampler Initials: SW

ELEMENTS BY ATOMIC SPECTROSCOPY (DRINKING WATER)

Maxxam ID			SK7425		SK7426	SK7427	SK7428	SK7429		
Sampling Date			2017/11/06		2017/11/06	2017/11/06	2017/11/06	2017/11/06		
COC Number			540307-01-01		540307-01-01	540307-01-01	540307-01-01	540307-01-01		
	UNITS	MAC	LS#01-0S	RDL	LS#02-0S	LS#03-0S	LS#04-0S	LS#05-0S	RDL	QC Batch

Total Metals by ICPMS										
Total Lead (Pb)	ug/L	10	32.3	1.0	9.42	1.17	4.68	54.5	0.20	8823586
No Fill	No Exceedance									
Grey	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels									
RDL = Reportable Detection Limit										

Maxxam ID			SK7430		SK7431		SK7432				
Sampling Date			2017/11/06		2017/11/06		2017/11/06				
COC Number			540307-01-01		540307-01-01		540307-01-01				
	UNITS	MAC	LS#06-0S	RDL	QC Batch	LS#07-0S	RDL	QC Batch	LS#08-0S	RDL	QC Batch

Total Metals by ICPMS											
Total Lead (Pb)	ug/L	10	3.37	0.20	8823586	287	1.0	8825449	28.2	0.20	8823586
No Fill	No Exceedance										
Grey	Exceeds 1 criteria policy/level										
Black	Exceeds both criteria/levels										
RDL = Reportable Detection Limit											

Maxxam ID			SK7433	SK7434	SK7436	SK7437	SK7438	SK7439		
Sampling Date			2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06		
COC Number			540307-01-01	540307-01-01	540307-02-01	540307-02-01	540307-02-01	540307-02-01		
	UNITS	MAC	LS#09-0S	LS#10-0S	LS#11-0S	LS#12-0S	LS#13-0S	LS#14-0S	RDL	QC Batch

Total Metals by ICPMS										
Total Lead (Pb)	ug/L	10	32.0	0.92	41.1	111	3.23	0.59	0.20	8823586
No Fill	No Exceedance									
Grey	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels									
RDL = Reportable Detection Limit										

Maxxam ID			SK7440	SK7441	SK7442	SK7443	SK7444	SK7445		
Sampling Date			2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06		
COC Number			540307-02-01	540307-02-01	540307-02-01	540307-02-01	540307-02-01	540307-02-01		
	UNITS	MAC	LS#15-0S	LS#16-0S	LS#17-0S	LS#18-0S	LS#19-0S	LS#20-0S	RDL	QC Batch

Total Metals by ICPMS										
Total Lead (Pb)	ug/L	10	1.06	49.3	48.6	3.28	10.7	3.19	0.20	8823586
No Fill	No Exceedance									
Grey	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels									
RDL = Reportable Detection Limit										

Maxxam Job #: B799079
Report Date: 2017/11/30

TETRA TECH CANADA INC.
Client Project #: ENW.VENW03140-01
Sampler Initials: SW

ELEMENTS BY ATOMIC SPECTROSCOPY (DRINKING WATER)

Maxxam ID			SK7457	SK7458	SK7459	SK7460	SK7461	SK7462		
Sampling Date			2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06		
COC Number			540307-05-01	540307-05-01	540307-05-01	540307-05-01	540307-05-01	540307-05-01		
	UNITS	MAC	PH#01-0S	PH#02-0S	PH#03-0S	PH#04-0S	PH#05-0S	PH#06-0S	RDL	QC Batch

Total Metals by ICPMS										
Total Lead (Pb)	ug/L	10	2.25	2.02	5.13	2.58	0.23	0.72	0.20	8823664

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels
RDL = Reportable Detection Limit	

Maxxam Job #: B799079
Report Date: 2017/11/30

TETRA TECH CANADA INC.
Client Project #: ENW.VENW03140-01
Sampler Initials: SW

ELEMENTS BY ATOMIC SPECTROSCOPY (DRINKING WATER)

Maxxam ID			SK7463	SK7464	SK7465	SK7466	SK7490	SK7491		
Sampling Date			2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06		
COC Number			540307-05-01	540307-05-01	540307-05-01	540307-05-01	540307-04-01	540307-04-01		
	UNITS	MAC	PH#07-0S	PH#08-0S	PH#09-0S	PH#10-0S	PH#11-0S	PH#12-0S	RDL	QC Batch

Total Metals by ICPMS										
Total Lead (Pb)	ug/L	10	2.33	0.60	5.29	2.35	0.26	5.28	0.20	8823664
No Fill	No Exceedance									
Grey	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels									
RDL = Reportable Detection Limit										

Maxxam ID			SK7492	SK7493	SK7494	SK7495	SK7496	SK7497		
Sampling Date			2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06	2017/11/06		
COC Number			540307-04-01	540307-04-01	540307-04-01	540307-04-01	540307-04-01	540307-04-01		
	UNITS	MAC	QG#01-0S	QG#02-0S	DUP#1-0S	DUP#2-0S	QG#04-0S	PH#13-0S	RDL	QC Batch

Total Metals by ICPMS										
Total Lead (Pb)	ug/L	10	208	15.4	1.42	0.33	6.24	1.44	0.20	8823664
No Fill	No Exceedance									
Grey	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels									
RDL = Reportable Detection Limit										

Maxxam Job #: B799079
Report Date: 2017/11/30

TETRA TECH CANADA INC.
Client Project #: ENW.VENW03140-01
Sampler Initials: SW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C
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Version 2: Report reissued with revised sample IDs.

Samples received with incomplete Chain of Custody. Sampling times not provided.

Sample PH#13-0S : Received but not listed on CoC.

MAC: The guidelines that have been included in this report have been taken from the Canadian Drinking Water Quality Summary Table, February 2017.

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.

ELEMENTS BY ATOMIC SPECTROSCOPY (DRINKING WATER) Comments

Matrix Spike Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required

Sample SK7425 [LS#01-0S] Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required

Sample SK7431 [LS#07-0S] Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required

Results relate only to the items tested.

Maxxam Job #: B799079
Report Date: 2017/11/30

QUALITY ASSURANCE REPORT

TETRA TECH CANADA INC.
Client Project #: ENW.VENW03140-01
Sampler Initials: SW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8823586	Total Lead (Pb)	2017/11/09	NC	80 - 120	97	80 - 120	<0.20	ug/L	5.7	20
8823664	Total Lead (Pb)	2017/11/09	99	80 - 120	100	80 - 120	<0.20	ug/L	1.1	20
8825449	Total Lead (Pb)	2017/11/10	93	80 - 120	94	80 - 120	<0.20	ug/L	7.0	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

Maxxam Job #: B799079
Report Date: 2017/11/30

TETRA TECH CANADA INC.
Client Project #: ENW.VENW03140-01
Sampler Initials: SW

VALIDATION SIGNATURE PAGE

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



Andy Lu, Ph.D., P.Chem., Scientific Specialist

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.



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INVOICE TO:

Company Name: #1433 TETRA TECH CANADA INC.
 Contact Name: Shawneen Walker
 Address: #1 - 4376 BOBAN DRIVE
 NANAIMO BC V9T 6A7
 Phone: (250) 756-2256 x Fax: (250) 756-2686 x
 Email: s.walker@tetrattech.com; EBA.Labdata@tetrattech.com

Report Information

Company Name: Shawneen Walker
 Contact Name: Shawneen Walker
 Address:
 Phone: s.walker@tetrattech.com
 Email: s.walker@tetrattech.com; EBA.Labdata@tetrattech.com

Project Information

Quotation #: B71611
 P.O. #:
 Project #: ENW.VENW03140-01
 Project Name:
 Site #:
 Sampled By: S. Walker



Only

Bottle Order #:
 540307
 Project Manager: Letitia Prefontaine

Regulatory Criteria:

CSR
 CCME
 BC Water Quality
 Other _____

Special Instructions:

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Metals Field Filtered ? (Y/N)	Lead	Drinking Water
X		
X		
X		
X		
X		
X		
X		
X		
X		
X		

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT:
 (will be applied if Rush TAT is not specified)
 Standard TAT = 5-7 Working days for most tests.
 Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

1 DAY 2 Day 3 Day Date Required: _____

Rush Confirmation Number: _____ (call lab for #)

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y/N)	Lead	Drinking Water
1	LS#01-05	NW 6/17		Water	X		
2	LS#02-05				X		
3	LS#03-05				X		
4	LS#04-05				X		
5	LS#05-05				X		
6	LS#06-05				X		
7	LS#07-05				X		
8	LS#08-05				X		
9	LS#09-05				X		
10	LS#10-05				X		

* RELINQUISHED BY: (Signature/Print) *Shawneen Walker*

Date: (YY/MM/DD) 17/11/06
 Time: 05:00

RECEIVED BY: (Signature/Print) *Ken Chan*

Date: (YY/MM/DD) 20/11/07
 Time: 05:50

Jars used and not submitted: *MA*

Time Sensitive:
 Temperature (°C) on Receipt: *22.1*

Lab Use Only
 Custody Seal Intact on Receipt? Yes No *NA*

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.
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INVOICE TO:

Company Name: #1433 TETRA TECH CANADA INC.
 Contact Name: Shawneen Walker
 Address: #1 - 4376 BOBAN DRIVE
 NANAIMO BC V9T 6A7
 Phone: (250) 756-2256 x Fax: (250) 756-2686 x
 Email: smwalker@eba.ca; EBA.Labdata@tetratech.com

Report Information

Company Name: Shawneen Walker
 Contact Name: Shawneen Walker
 Address: Shawneen.walker@tetratech.com
 Phone: smwalker@eba.ca; EBA.Labdata@tetratech.com
 Email: smwalker@eba.ca; EBA.Labdata@tetratech.com

Project Information

Quotation #: B71611
 P.O. #: ENW.VENW03140-01
 Project #: ENW.VENW03140-01
 Project Name: _____
 Site #: _____
 Sampled By: _____



B799079_COC

Page 2 of 4
 Bottle Order #: 540307
 Project Manager: Letitia Prefontaine

Regulatory Criteria:

CSR
 CCME
 BC Water Quality
 Other _____

Special Instructions

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
 Please provide advance notice for rush projects

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 Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
 1 DAY 2 Day 3 Day Date Required: _____

Rush Confirmation Number: _____ (call lab for #)

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y/N)	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)									
1	LS#11-05	NOV 6/17		Water	X										
2	LS#12-05				X										
3	LS#13-05				X										
4	LS#14-05				X										
5	LS#15-05				X										
6	LS#16-05				X										
7	LS#17-05				X										
8	LS#18-05				X										
9	LS#19-05				X										
10	LS#20-05				X										

RELINQUISHED BY: (Signature/Print) Shawneen Walker *Walker* **Date: (YY/MM/DD)** 17/11/06 **Time** 05:00

RECEIVED BY: (Signature/Print) KEVIN *Kevin* **Date: (YY/MM/DD)** 20/11/07 **Time** 08:50

jars used and not submitted NA

Lab Use Only
 Time Sensitive Temperature (°C) on Receipt 22.1
 Custody Seal Intact on Cooling Yes No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.
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Page 3 of 4

INVOICE TO:

Company Name: #1433 TETRA TECH CANADA INC.
 Contact Name: Shawneen Walker
 Address: #1 - 4376 BOBAN DRIVE
 NANAIMO BC V9T 6A7
 Phone: (250) 756-2256 x
 Email: smwalker@eba.ca; EBA.Labdata@tetratech.com

Report Information

Company Name: Shawneen Walker
 Contact Name: Shawneen Walker
 Address: Shawneen Walker
 Phone: smwalker@eba.ca; EBA.Labdata@tetratech.com
 Email: smwalker@eba.ca; EBA.Labdata@tetratech.com

Project Information

Quotation #: B71611
 P.O. #: ENW.VENW03140-01
 Project #: ENW.VENW03140-01
 Project Name:
 Site #:
 Sampled By:



Chain Of Custody

Bottle Order #: 540307
 Project Manager: Letitia Prefontaine
 C#540307-05-01

Regulatory Criteria:

CSR
 CCME
 BC Water Quality
 Other _____

Special Instructions:

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

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Job Specific Rush TAT (if applies to entire submission)

1 DAY 2 Day 3 Day Date Required: _____

Rush Confirmation Number: _____ (call lab for #)

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (Y/N)	Lead - Drinking Water	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										# of Bottles	Comments	
1	PH#01-05	NOV 6/07		Water	X														
2	PH#02-05				X														
3	PH#03-05				X														
4	PH#04-05				X														
5	PH#05-05				X														
6	PH#06-05				X														
7	PH#07-05				X														
8	PH#08-05				X														
9	PH#09-05				X														
10	PH#10-05				X														

RELINQUISHED BY: (Signature/Print) Shawneen Walker **Date: (YY/MM/DD)** 11/11/07 **Time:** 05:00

RECEIVED BY: (Signature/Print) KEVIN CHAN **Date: (YY/MM/DD)** 11/14/07 **Time:** 08:50

jars used and not submitted: 1/1

Lab Use Only: Time Signature Temperature (°C) on Receipt: 22.1 Custody Seal Intact on Cooler? Yes No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

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Page 4 of 4

INVOICE TO:

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 Contact Name: Shawneen Walker
 Address: #1 - 4376 BOBAN DRIVE
 NANAIMO BC V9T 6A7
 Phone: (250) 756-2256 x Fax: (250) 756-2686 x
 Email: smwalker@eba.ca; EBA.Labdata@tetratech.com

Report Information

Company Name: Shawneen Walker
 Contact Name: Shawneen Walker
 Address: [Redacted]
 Phone: Shawneen.Walker@tetratech.com
 Email: smwalker@eba.ca; EBA.Labdata@tetratech.com

Project Information

Quotation #: B71611
 P.O. #: [Redacted]
 Project #: ENW.VENW03140-01
 Project Name: [Redacted]
 Site #: [Redacted]
 Sampled By: [Redacted]



Only

Bottle Order #: [Redacted]
 540307
 Project Manager: Letitia Prefontaine

Regulatory Criteria:

CSR
 CCME
 BC Water Quality
 Other: _____

Special Instructions:

[Redacted]

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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Job Specific Rush TAT (if applies to entire submission)

1 DAY 2 Day 3 Day Date Required: _____

Rush Confirmation Number: _____
 (call lab for #)

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (Y/N)	Lead - Drinking Water
1	PH#11-05	NOV 6/07		Water	X	X
2	PH#12-05	↓		↓	X	X
3	QG#01-05	↓		↓	X	X
4	QG#02-05	↓		↓	X	X
5	DUP#1-05	↓		↓	X	X
6	DUP#2-05	↓		↓	X	X
7	QG#04-05	↓		↓	X	X
8						
9						
10						

RELINQUISHED BY: (Signature/Print) *Shawneen Walker* *[Signature]* Date: (YYMMDD) 17/11/06 Time: 05:00

RECEIVED BY: (Signature/Print) *[Signature]* Date: (YYMMDD) 17/11/07 Time: 08:50

jars used and not submitted: *MA*

Time Sensitive: Temperature (C) on Receipt: *2, 2, 1*

Custody Seal intact on Cooler? Yes No *MA*

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White: Maxxam Yellow: Client