



DRINKING WATER SYSTEM ANNUAL REPORT

Reporting Period: January 1st to December 31st, 2016 (year)

Water System DUNCAN WATER SYSTEM

Water System Owner City of Duncan

Primary Contact Name (Operator or Manager) Lucas Pitts

Phone Number (Operator or Manager) 850-746-5321

E-mail (Operator or Manager) lucas@duncan.ca

DESCRIBE YOUR WATER SUPPLY SYSTEM

What is the Source(s) of Raw Water?

Deep Well Shallow Well Surface Water Other

If other, specify details: _____

Does the Drinking Water System have Primary Disinfection? Yes No

Chlorination Ultraviolet Light Ozone Other

If other, specify details: _____

Does the Drinking Water System have Secondary Disinfection? Yes No

Chlorination Other

If other, specify details: Emergency chlorination

Does the Drinking Water System have Filtration? Yes No

Check all boxes that apply

Cartridge Filter(s) Carbon Filter Sand Filtration Reverse Osmosis Other

If other, specify details: _____

PUBLIC REPORTING

Emergency Response & Contingency Plan (ERCP)

Is your ERCP up to Date? Yes No

How do you Inform the System Users of the ERCP?

Hand Delivered Bulletin Board Newspaper Utility Bill Insert Website

Other (specify details) Contacting the City of Duncan

Drinking Water System Annual Report

How do you Inform the System Users of the Annual Report?

Hand Delivered Bulletin Board Newspaper Utility Bill Insert Website

Other (specify details) _____



COMPLIANCE WITH OPERATING PERMIT

List the conditions of your Operating Permit (Contact the DWO for a copy if needed):

Refer to 'Permit to Operate' for Premise 1310819 (Appendix A)

Are you in compliance with your Operating Permit?

Yes

No

BACTERIOLOGICAL TESTING AND DRINKING WATER PROTECTION REGULATION WATER QUALITY STANDARDS

How many bacteriological samples were collected during this reporting period?

150

What is the minimum required sampling frequency for this system? (#samples/month)

bi-monthly

Additional sampling details:

Was the minimum required sampling frequency achieved?

Yes

No

Comments:

Bacteriological summary attached to this report?

Yes

No

If no, how do the users of the system view the results?

WATER QUALITY STANDARDS FOR POTABLE WATER

Parameter:

Standard:

Did this system meet standard?

Escherichia coli (for all samples)

No detectable Escherichia coli per 100ml

Yes

No

Total Coliform Bacteria (if only 1 sample collected in a 30 day period)

No detectable total coliform bacteria per 100ml

Yes

No

Total Coliform Bacteria (if more than 1 sample collected in a 30 day period)

No more than 10% of samples contain total coliform bacteria, and No sample has more than 10 total coliform bacteria per 100ml

Yes

No

If the system did not meet any of above Drinking Water Protection Regulation standards, record the results in the table below; attach additional sheets if necessary.

Date	TC/100ml	E.coli/100ml	Reason	Corrective Action

CHEMICAL SAMPLING COMPLETED DURING THIS REPORTING PERIOD

Was any chemical sampling conducted during reporting period? Yes No

If no, when were the last chemical samples conducted for this system? (date) Don't know

If yes, attach a list of the chemical results

If any water samples did not meet the Guidelines for Canadian Drinking Water Quality, record the results in the table below; attach additional sheets if necessary.

Next scheduled full chemical test (date)

September 2017 (June 2017 just completed; sampling quarterly)

Parameter	Result	Corrective Action / Treatment / Comments

ADDITIONAL TESTING

Does the system have analyzers for continuous monitoring? Yes No

If yes, check all boxes that apply:

Chlorine Turbidity Other (details)

only chlorinated during water main flushing & in an emergency.

Are the results available on request? Yes

If any additional testing or sampling was conducted, record results in the table below; attach additional sheets if necessary.

Additional Testing & Reason for Sampling	Corrective Action Taken

WATER QUALITY COMPLAINTS

Were there any water quality complaints in this reporting period? (e.g. taste, odour, colour etc.) Yes No

If yes, complete the table below; attach additional sheets if necessary.

Date	Water Quality Complaint	Corrective Action / Treatment



OPERATIONAL PROBLEMS

Were there any operational problems during this reporting period? (e.g. insufficient water supply, malfunction of disinfection equipment, line breaks, elevated turbidity etc.).

Yes

No

If yes, complete the table below; attach additional sheets if necessary.

Incident Date	Type of Operational Problem	Corrective Action Taken
---------------	-----------------------------	-------------------------

Jan 14, Feb 10, Apr 25, May 12, May 17, May 27, Aug 13, Aug 19, Aug 26, Oct 3, Nov 28, Dec 6, Dec 7, Dec 8, Dec 19, Dec 28 & Dec 29, 2017-	main breaks, repaired & flushed.	
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MAJOR UPGRADES/REPAIRS & EXPENSES

Were there any major upgrades/repairs or any major costs incurred during this reporting period?

Yes

No

If yes, complete the table below; attach additional sheets if necessary.

Major Upgrades/Expenses	Details
Improvements required by DWO	
Additions/changes to system	Emergency Chlorination System finished.
Purchase or install new equipment	standby generator Well #3/Flow meter well #2
Equipment repair or replacement	
Annual maintenance of system	
Specialist report	
Other	Second Street water main upgrade

FUTURE IMPROVEMENTS

Are there any plans for future improvements?

Yes

No

If yes, complete the table below; attach additional sheets if necessary.

Future Upgrades or Improvements	Estimated Date of Completion
Sycamore / Rosewood / Brier water main upgrades	2017
Upland watermain upgrades	2017
Seine water main upgrades	2017

Click here to enter a date.

DATE COMPLETED: June 30, 2017

COMPLETED BY: Kevin Massingham
Nicole Downer

Your P.O. #: 42833
Your C.O.C. #: 512091-01-01, 513284-01-01

Attention: Lucas Pitts

City of Duncan (Public Works)
Public Works Yard
PO Box 820
1091 Marchmont Street
Duncan, BC
Canada V9L 3Y2

Report Date: 2016/12/23
Report #: R2322175
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: 86B0892

Received: 2016/12/19, 15:29

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	2	2016/12/13	2016/12/13	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	2	N/A	2016/12/13	BBY6SOP-00011	SM 22 4500-Cl- E m
True Colour (Single Wavelength) (1)	2	N/A	2016/12/15	VIC SOP-00010	Based on SM-2120 C
Carbon (DOC) - unfiltered/unpreserved (2)	2	N/A	2016/12/14	BBY6SOP-00003	SM 22 5310 C m
Conductance - water (1)	2	N/A	2016/12/13	BBY6SOP-00026	SM-2510B
Fluoride	2	N/A	2016/12/13	BBY6SOP-00048	SM 22 4500-F C m
Iron Bacteria (1)	2	N/A	2016/12/12	VIC SOP-00114	SM 22 9240 m
Sulphide (as H ₂ S) Calculation - total	2	N/A	2016/12/21	BBY6SOP-00006	SM 22 4500-S2-D m
Hardness Total (calculated as CaCO ₃)	2	N/A	2016/12/14	BBY WI-00033	Auto Calc
Mercury (Total) by CVAF	2	2016/12/14	2016/12/14	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Heterotropic Plate Count Water Mem. Filt (1)	2	N/A	2016/12/12	BBY4 SOP-00003	Based on SM-9215
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	N/A	2016/12/14	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total)	2	N/A	2016/12/13	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Nitrogen (Total)	2	2016/12/14	2016/12/15	BBY6SOP-00016	SM 22 4500-N C m
Ammonia-N (Preserved)	2	N/A	2016/12/14	BBY6SOP-00009	SM 22 4500-NH3- G m
Nitrate + Nitrite (N)	2	N/A	2016/12/13	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA	2	N/A	2016/12/13	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N)	2	N/A	2016/12/15	BBY6SOP-00010	SM 22 4500-NO3 I m
Nitrogen (Organic) (Cal. TKN, NH ₄ ,N/N)	2	N/A	2016/12/16	BBY WI-00033	Auto Calc
pH Water (1, 3)	2	N/A	2016/12/13	BBY6SOP-00026	SM-4500H+B
Sat. pH and Langelier Index (@ 4.4C)	2	N/A	2016/12/14	BBY WI-00033	Auto Calc
Sat. pH and Langelier Index (@ 60C)	2	N/A	2016/12/14	BBY WI-00033	Auto Calc
Sulphate by Automated Colourimetry	2	N/A	2016/12/13	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate Reducing Bacteria (1)	2	N/A	2016/12/12	VIC SOP-00114	SM 22 9240 m
Sulphide - total	2	N/A	2016/12/21	BBY6SOP-00006	SM 22 4500-S2- D m
Total Dissolved Solids (Filt. Residue) (1)	2	N/A	2016/12/15	VIC SOP-00008	Based on SM 2540C
Total Coliform & E.Coli by MF-Chromocult (1)	2	N/A	2016/12/12	VIC SOP 00112	Based on SM-9222
Carbon (Total Organic) (4)	2	N/A	2016/12/14	BBY6SOP-00003	SM 22 5310 C m
Turbidity (1)	2	N/A	2016/12/15	VIC SOP-00011	Based on SM - 2130

Your P.O. #: 42833
Your C.O.C. #: 512091-01-01, 513284-01-01

Attention: Lucas Pitts
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PO Box 820
1091 Marchmont Street
Duncan, BC
Canada V9L 3Y2

Report Date: 2016/12/23
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6B0892

Received: 2016/12/19, 15:29

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.

- (1) This test was performed by Maxxam Victoria
- (2) DOC present in the sample should be considered as non-purgeable DOC.
- (3) 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.
- (4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key



Maxxam
23 Dec 2016 14:58:32

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

Debbie Nordbruget, Project Manager

Email: DNordbruget@maxxam.ca

Phone# (250)385-6112

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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 Job #: B6B0892
 Report Date: 2016/12/23

City of Duncan (Public Works)
 Your P.O. #: 42833

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID					QG0668		QG0669		
Sampling Date					2016/12/12 09:00		2016/12/12 08:30		
COC Number					512091-01-01		512091-01-01		
	UNITS	MAC	AO	OG	WELL #2	QC Batch	WELL #4	RDL	QC Batch
ANIONS									
Nitrite (N)	mg/L	1	-	-	<0.0050	8504289	<0.0050	0.0050	8504289
Calculated Parameters									
Total Hardness (CaCO3)	mg/L	-	-	-	23.8	8500679	24.9	0.50	8500679
Nitrate (N)	mg/L	10	-	-	0.122	8500685	0.200	0.020	8500685
Misc. Inorganics									
Fluoride (F)	mg/L	1.5	-	-	0.021	8502572	0.020	0.010	8502572
Dissolved Organic Carbon (C)	mg/L	-	-	-	0.55	8503322	0.68	0.50	8503322
Alkalinity (Total as CaCO3)	mg/L	-	-	-	24.4	8501788	27.7	0.5	8501811
Total Organic Carbon (C)	mg/L	-	-	-	<0.50	8503328	<0.50	0.50	8503328
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<0.5	8501788	<0.5	0.5	8501811
Bicarbonate (HCO3)	mg/L	-	-	-	29.8	8501788	33.8	0.5	8501811
Carbonate (CO3)	mg/L	-	-	-	<0.5	8501788	<0.5	0.5	8501811
Hydroxide (OH)	mg/L	-	-	-	<0.5	8501788	<0.5	0.5	8501811
Anions									
Dissolved Sulphate (SO4)	mg/L	-	500	-	3.89	8503210	2.25	0.50	8503210
Dissolved Chloride (Cl)	mg/L	-	250	-	2.5	8503199	2.1	0.50	8503199
MISCELLANEOUS									
True Colour	Col. Unit	-	15	-	<5	8508016	<5	5	8508016
Nutrients									
Total Organic Nitrogen (N)	mg/L	-	-	-	<0.020	8501238	<0.020	0.020	8501238
Total Ammonia (N)	mg/L	-	-	-	0.023	8503090	0.031	0.0050	8503090
Nitrate plus Nitrite (N)	mg/L	-	-	-	0.122	8504288	0.200	0.020	8504288
Total Nitrogen (N)	mg/L	-	-	-	0.135	8503654	0.219	0.020	8503654
Physical Properties									
Conductivity	uS/cm	-	-	-	63	8501810	67	1	8501790
pH	pH	-	6.5:8.5	-	7.2	8501809	7.2		8501791
Physical Properties									
Total Dissolved Solids	mg/L	-	500	-	34	8502172	36	10	8502172
Turbidity	NTU	see remark	see remark	see remark	<0.1	8506638	<0.1	0.1	8506638
No Fill	No Exceedance								
Grey	Exceeds 1 criteria policy/level								
Black	Exceeds both criteria/levels								
RDL = Reportable Detection Limit									

Maxxam Job #: 86B0892
Report Date: 2016/12/23

City of Duncan (Public Works)
Your P.O. #: 42833

MERCURY BY COLD VAPOR (WATER)

Maxxam ID			QG0668		QG0669		
Sampling Date			2016/12/12 09:00		2016/12/12 08:30		
COC Number			512091-01-01		512091-01-01		
	UNITS	MAC	WELL #2	RDL	WELL #4	RDL	QC Batch

Elements							
Total Mercury (Hg)	ug/L	1	0.130 (1)	0.020	<0.010	0.010	8503457
No Fill	No Exceedance						
Grey	Exceeds 1 criteria policy/level						
Black	Exceeds both criteria/levels						
RDL = Reportable Detection Limit							
(1) RDL raised due to sample matrix interference. Sample dilution required.							

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID					QG0668	QG0669		
Sampling Date					2016/12/12 09:00	2016/12/12 08:30		
COC Number					512091-01-01	512091-01-01		
	UNITS	MAC	AO	OG	WELL #2	WELL #4	RDL	QC Batch
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	-	-	100	<3.0	<3.0	3.0	8502292
Total Antimony (Sb)	ug/L	6	-	-	<0.50	<0.50	0.50	8502292
Total Arsenic (As)	ug/L	10	-	-	<0.10	<0.10	0.10	8502292
Total Barium (Ba)	ug/L	1000	-	-	4.9	5.7	1.0	8502292
Total Beryllium (Be)	ug/L	-	-	-	<0.10	<0.10	0.10	8502292
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	<1.0	1.0	8502292
Total Boron (B)	ug/L	5000	-	-	<50	<50	50	8502292
Total Cadmium (Cd)	ug/L	5	-	-	0.623	0.611	0.010	8502292
Total Chromium (Cr)	ug/L	50	-	-	<1.0	<1.0	1.0	8502292
Total Cobalt (Co)	ug/L	-	-	-	<0.50	<0.50	0.50	8502292
Total Copper (Cu)	ug/L	-	1000	-	17.4	3.89	0.20	8502292
Total Iron (Fe)	ug/L	-	300	-	<5.0	<5.0	5.0	8502292
Total Lead (Pb)	ug/L	10	-	-	5.34	4.36	0.20	8502292
Total Manganese (Mn)	ug/L	-	50	-	<1.0	<1.0	1.0	8502292
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	<1.0	1.0	8502292
Total Nickel (Ni)	ug/L	-	-	-	<1.0	<1.0	1.0	8502292
Total Selenium (Se)	ug/L	50	-	-	<0.10	<0.10	0.10	8502292
Total Silicon (Si)	ug/L	-	-	-	2710	2910	100	8502292
Total Silver (Ag)	ug/L	-	-	-	0.512	0.486	0.020	8502292
Total Strontium (Sr)	ug/L	-	-	-	29.9	30.2	1.0	8502292
Total Thallium (Tl)	ug/L	-	-	-	1.92	1.84	0.050	8502292
Total Tin (Sn)	ug/L	-	-	-	<5.0	<5.0	5.0	8502292
Total Titanium (Ti)	ug/L	-	-	-	<5.0	<5.0	5.0	8502292
Total Uranium (U)	ug/L	20	-	-	<0.10	<0.10	0.10	8502292
Total Vanadium (V)	ug/L	-	-	-	<5.0	<5.0	5.0	8502292
Total Zinc (Zn)	ug/L	-	5000	-	452000	439000	5.0	8502292
Total Zirconium (Zr)	ug/L	-	-	-	<0.50	<0.50	0.50	8502292
Total Calcium (Ca)	mg/L	-	-	-	8.02	8.30	0.050	8501116
Total Magnesium (Mg)	mg/L	-	-	-	0.923	1.00	0.050	8501116
Total Potassium (K)	mg/L	-	-	-	0.238	0.245	0.050	8501116
Total Sodium (Na)	mg/L	-	200	-	2.21	2.20	0.050	8501116
Total Sulphur (S)	mg/L	-	-	-	<3.0	<3.0	3.0	8501116
No Fill	No Exceedance							
Grey	Exceeds 1 criteria policy/level							
Black	Exceeds both criteria/levels							
RDL = Reportable Detection Limit								

Maxxam Job #: 86B0892
Report Date: 2016/12/23

City of Duncan (Public Works)
Your P.O. #: 42833

MICROBIOLOGY (WATER)

Maxxam ID			QG0668	QG0669		
Sampling Date			2016/12/12 09:00	2016/12/12 08:30		
COC Number			512091-01-01	512091-01-01		
	UNITS	MAC	WELL #2	WELL #4	RDL	QC Batch
Microbiological Param.						
Heterotrophic Plate Count	CFU/mL	-	4	<1	1	8504134
Iron Bacteria	CFU/mL	-	<25	<25	25	8512858
Sulphate reducing bacteria	CFU/mL	-	<75	<75	75	8512903
Total Coliforms	CFU/100mL	<1	<1	<1	1	8503310
E. coli	CFU/100mL	<1	<1	<1	1	8503310
No Fill	No Exceedance					
Grey	Exceeds 1 criteria policy/level					
Black	Exceeds both criteria/levels					
RDL = Reportable Detection Limit						

Maxxam Job #: B680892
Report Date: 2016/12/23

City of Duncan (Public Works)
Your P.O. #: 42833

CALCULATED PARAMETERS (WATER)

Maxxam ID		QG0668	QG0669	
Sampling Date		2016/12/12 09:00	2016/12/12 08:30	
COC Number		512091-01-01	512091-01-01	
	UNITS	WELL #2	WELL #4	QC Batch
Parameter				
Langelier Index (@ 4.4C)	N/A	-2.41	-2.28	8501240
Langelier Index (@ 60C)	N/A	-1.37	-1.24	8501242
Saturation pH (@ 4.4C)	N/A	9.56	9.49	8501240
Saturation pH (@ 60C)	N/A	8.52	8.45	8501242

Maxxam Job #: 8680892
Report Date: 2016/12/23

City of Duncan (Public Works)
Your P.O. #: 42833

MISCELLANEOUS (WATER)

Maxxam ID			QH1723	QH1724		
Sampling Date			2016/12/19 10:35	2016/12/19 11:00		
COC Number			513284-01-01	513284-01-01		
	UNITS	AO	WELL #2 SULPHIDE RE-TEST	WELL #4 SULPHIDE RE-TEST	RDL	QC Batch
MISCELLANEOUS						
Total Sulphide	mg/L	0.05	0.0092	0.0114	0.0050	8509872
Total Sulphide (as H2S)	mg/L	0.05	0.010	0.012	0.0050	8507797
No Fill	No Exceedance					
Grey	Exceeds 1 criteria policy/level					
Black	Exceeds both criteria/levels					
RDL = Reportable Detection Limit						

Maxxam Job #: B6B0892
Report Date: 2016/12/23

City of Duncan (Public Works)
Your P.O. #: 42833

GENERAL COMMENTS

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

Package 1	16.0°C
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The sulphide bottles received for both Well #2 and Well #4 were underpreserved, therefore the sulphide portion of these samples will be recollected and submitted at a later date.

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.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8501788	Alkalinity (PP as CaCO3)	2016/12/13					<0.5	mg/L	NC	20
8501788	Alkalinity (Total as CaCO3)	2016/12/13	NC	80 - 120	89	80 - 120	<0.5	mg/L	3.0	20
8501788	Bicarbonate (HCO3)	2016/12/13					<0.5	mg/L	3.0	20
8501788	Carbonate (CO3)	2016/12/13					<0.5	mg/L	NC	20
8501788	Hydroxide (OH)	2016/12/13					<0.5	mg/L	NC	20
8501790	Conductivity	2016/12/13			103	90 - 110	<1	uS/cm	1.2	20
8501791	pH	2016/12/13			101	95 - 104			0	N/A
8501809	pH	2016/12/13			101	96 - 104			0.56	N/A
8501810	Conductivity	2016/12/13			103	90 - 110	<1	uS/cm	1.7	20
8501811	Alkalinity (PP as CaCO3)	2016/12/13					<0.5	mg/L	NC	20
8501811	Alkalinity (Total as CaCO3)	2016/12/13			88	80 - 120	<0.5	mg/L	0.32	20
8501811	Bicarbonate (HCO3)	2016/12/13					<0.5	mg/L	0.32	20
8501811	Carbonate (CO3)	2016/12/13					<0.5	mg/L	NC	20
8501811	Hydroxide (OH)	2016/12/13					<0.5	mg/L	NC	20
8502172	Total Dissolved Solids	2016/12/15			98	80 - 120	<10	mg/L	NC	20
8502292	Total Aluminum (Al)	2016/12/13	109	80 - 120	112	80 - 120	<3.0	ug/L		
8502292	Total Antimony (Sb)	2016/12/13	97	80 - 120	98	80 - 120	<0.50	ug/L		
8502292	Total Arsenic (As)	2016/12/13	100	80 - 120	100	80 - 120	<0.10	ug/L		
8502292	Total Barium (Ba)	2016/12/13	94	80 - 120	97	80 - 120	<1.0	ug/L		
8502292	Total Beryllium (Be)	2016/12/13	103	80 - 120	96	80 - 120	<0.10	ug/L		
8502292	Total Bismuth (Bi)	2016/12/13	97	80 - 120	98	80 - 120	<1.0	ug/L		
8502292	Total Boron (B)	2016/12/13	98	80 - 120	98	80 - 120	<50	ug/L		
8502292	Total Cadmium (Cd)	2016/12/13	97	80 - 120	96	80 - 120	<0.010	ug/L		
8502292	Total Chromium (Cr)	2016/12/13	99	80 - 120	101	80 - 120	<1.0	ug/L		
8502292	Total Cobalt (Co)	2016/12/13	97	80 - 120	102	80 - 120	<0.50	ug/L		
8502292	Total Copper (Cu)	2016/12/13	NC	80 - 120	102	80 - 120	<0.20	ug/L		
8502292	Total Iron (Fe)	2016/12/13	98	80 - 120	101	80 - 120	<5.0	ug/L		
8502292	Total Lead (Pb)	2016/12/14	NC	80 - 120	95	80 - 120	<0.20	ug/L	1.4	20
8502292	Total Manganese (Mn)	2016/12/13	NC	80 - 120	102	80 - 120	<1.0	ug/L		
8502292	Total Molybdenum (Mo)	2016/12/13	98	80 - 120	95	80 - 120	<1.0	ug/L		
8502292	Total Nickel (Ni)	2016/12/13	98	80 - 120	103	80 - 120	<1.0	ug/L		
8502292	Total Selenium (Se)	2016/12/13	98	80 - 120	97	80 - 120	<0.10	ug/L		

QUALITY ASSURANCE REPORT (CONT'D)

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8502292	Total Silicon (Si)	2016/12/13					<100	ug/L		
8502292	Total Silver (Ag)	2016/12/13	98	80 - 120	102	80 - 120	<0.020	ug/L		
8502292	Total Strontium (Sr)	2016/12/13	NC	80 - 120	91	80 - 120	<1.0	ug/L		
8502292	Total Thallium (Tl)	2016/12/13	96	80 - 120	97	80 - 120	<0.050	ug/L		
8502292	Total Tin (Sn)	2016/12/13	NC	80 - 120	98	80 - 120	<5.0	ug/L		
8502292	Total Titanium (Ti)	2016/12/13	95	80 - 120	92	80 - 120	<5.0	ug/L		
8502292	Total Uranium (U)	2016/12/13	92	80 - 120	92	80 - 120	<0.10	ug/L		
8502292	Total Vanadium (V)	2016/12/13	97	80 - 120	100	80 - 120	<5.0	ug/L		
8502292	Total Zinc (Zn)	2016/12/13	NC	80 - 120	97	80 - 120	<5.0	ug/L		
8502292	Total Zirconium (Zr)	2016/12/13					<0.50	ug/L		
8502572	Fluoride (F)	2016/12/13	NC	80 - 120	98	80 - 120	0.011, RDL=0.010	mg/L	0	20
8503090	Total Ammonia (N)	2016/12/14	NC	80 - 120	103	80 - 120	<0.0050	mg/L	2.6	20
8503199	Dissolved Chloride (Cl)	2016/12/13	NC	80 - 120	97	80 - 120	<0.50	mg/L	2.3	20
8503210	Dissolved Sulphate (SO4)	2016/12/13	NC	80 - 120	91	80 - 120	<0.50	mg/L	0.83	20
8503322	Dissolved Organic Carbon (C)	2016/12/14	101	80 - 120	108	80 - 120	<0.50	mg/L	NC	20
8503328	Total Organic Carbon (C)	2016/12/14	102	80 - 120	109	80 - 120	<0.50	mg/L	7.1	20
8503457	Total Mercury (Hg)	2016/12/14	96	80 - 120	97	80 - 120	<0.010	ug/L	NC	20
8503654	Total Nitrogen (N)	2016/12/15	NC	80 - 120	102	80 - 120	<0.020	mg/L		
8504134	Heterotrophic Plate Count	2016/12/12							NC	N/A
8504288	Nitrate plus Nitrite (N)	2016/12/13	101	80 - 120	102	80 - 120	<0.020	mg/L	NC	25
8504289	Nitrite (N)	2016/12/13	95	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20
8506638	Turbidity	2016/12/15			97	80 - 120	<0.1	NTU	NC	20
8508016	True Colour	2016/12/15			90	80 - 120	<5	Col. Unit	NC	10

Maxxam Job #: 8680892
Report Date: 2016/12/23

QUALITY ASSURANCE REPORT (CONT'D)

City of Duncan (Public Works)
Your P.O. #: 42833

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8509872	Total Sulphide	2016/12/21	94	80 - 120	102	80 - 120	0.0054, RDL=0.0050	mg/L	NC	20

N/A = Not Applicable

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 spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2X that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: 86B0892
Report Date: 2016/12/23

City of Duncan (Public Works)
Your P.O. #: 42833

VALIDATION SIGNATURE PAGE

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



David Nadler, AASc, Victoria Operations Manager



Rob Reinert, B.Sc., 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.

Chain Of Custody Record

INVOICE TO: _____

Report Information: Occasion # B50072
 Project # P.O. #
 Project Name Chain Of Custody Record
 Site #
 Sampled By

Company Name #5537 City of Dunsmuir (Public Works)
 Contact Name Accounts Payable Tamara Allum
 Address PO Box 820 1091 Maremont Street
 Dunsmuir BC V9L 3Y2
 Phone (250) 749-6126 x Fax (250) 749-6129 x
 Email tamara@dunsmuir.ca

Company Name Lucas Piles
 Contact Name
 Address
 Phone (250) 749-5321 x3
 Email lucas@dunsmuir.ca

Project Information: Maxxam Job # B50072
 Bottle Order #
 Chain Of Custody Record
 Project Manager
 Customer Reference

Regulatory Criteria:
 CSR
 COMIL
 RC Water Quality
 Other

Special Instructions: ANALYSIS REQUESTED (PACKAGE BE SPECIFIC)

Turnaround Time (TAT) Required:
 Please Specify (Hours/Minutes/Seconds) or (Days/Hours/Minutes)

Regular (Standard) TAT:
 (Not to apply if Rush TAT is not selected)
 Standard TAT = 6-7 Working days for most tests.
 Please note: Standard TAT for certain tests such as SOD and Dichlorophenols are 3-5 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
 # of bottles
 Comments

Sample Description	Sample Location/Identification	Date Sampled	Time Sampled	Matrix	VHA PACKAGE OF ANALYSIS	Carbon (DOC)	Unfiltered/unpreserved	Is Job Used and Not Submitted	Date (YYYYMMDD)	Time	Signature	Temperature (°C) on Receipt	Custody Seal intact on Receipt?
1	WELL #2	2016 12/12	9:11 AM		X	X			16/12/12	11:41	J. Williams	16, 16, 16	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2	WELL #4	2016 12/12	8:30		X	X							
3													
4													
5													
6													
7													
8													
9													
10													

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TEST DELAYS.
 Maxxam Analytica International Corporation of Maxxam Analytica

* RELINQUISHED BY (Signature/Print): City of Dunsmuir
 Date (YYYYMMDD): 16/12/12
 Time: 11:41
 Signature: J. Williams
 Temperature (°C) on Receipt: 16, 16, 16
 Custody Seal intact on Receipt? Yes No

Chain Of Custody Record

Company Name: **City of Duncan (Public Works)**
 Contact Name: **Accounts Payable Tamara Allum**
 Address: **PO Box 820 1001 Marchmont Street**
Duncan BC V9L 3Y2
 Phone: **(250) 748-6128 x** Fax: **(250) 748-6128 x**
 Email: **tamara@cityofduncan.ca**

Company Name: **Lucan Pitts**
 Contact Name: **Lucan Pitts**
 Address: **Lucan Pitts**
 Phone: **(250) 748-5321 x3** Fax:
 Email: **lucan@cityofduncan.ca**

Project Information:
 Project ID: **558072**
 Quotation #: **PO 1**
 Project Name: **Chain Of Custody Record**
 Sampled By: **Supriya - tel**

Turnaround Time (TAT) Request: **1 DAY** **2 Day** **3 Day**

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Mark	Notes Field Filled? (Y/N)	Supriya - tel	Date (YYMMDD)	Time	# Jobs used and not submitted	Temp (C) on Receipt	Classy Seal Intact on Receipt?
1	WELL #2	12/19	10:35		X		12/19	15:29		19/10	<input type="checkbox"/>
2	WELL #4	12/19	11:00		X		12/19	15:29			<input type="checkbox"/>
3											<input type="checkbox"/>
4											<input type="checkbox"/>
5											<input type="checkbox"/>
6											<input type="checkbox"/>
7											<input type="checkbox"/>
8											<input type="checkbox"/>
9											<input type="checkbox"/>
10											<input type="checkbox"/>

REGULATORY CRITERIA:
 GDR
 CCE
 DQ Water Quality
 Other

REGULAR (STANDARD) TAT:
 (to be applied if not specified)
 Standard TAT = 5-7 Working days for most tests.
 Please note: Standard TAT for certain tests such as BOD and Dissolved Oxygen are > 7 days - contact your Project Manager for details.

JOB SPECIFIC RUSH TAT (if applies to these submissions):
 1 DAY 2 Day 3 Day Days Required:
 Rush Confirmation Number: _____
 TAT Below: _____
 Comments: _____

RECEIVED BY: **KEN'S / TAMARA**
 RECEIVED BY: **SARITA / SHARON**

RECEIVED BY: **City of Duncan**

IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN EXHAUSTIVE CHAIN OF CUSTODY MAY RESULT IN A FINAL TAT DELAY.

City of Duncan (Public Works)

Maxxam Job Number: B6B0892

Report Date: 2016/12/23

Your P.O. #: 42833

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID					QG0668	
Sampling Date					2016/12/12 09:00	
COC Number					512091-01-01	
	UNITS	MAC	AO	OG	WELL #2	QC Batch
ANIONS						
Nitrite (N)	mg/L	1	-	-	<0.0050	8504289
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	-	-	-	23.8	8500679
Nitrate (N)	mg/L	10	-	-	0.122	8500685
Misc. Inorganics						
Fluoride (F)	mg/L	1.5	-	-	0.021	8502572
Dissolved Organic Carbon (C)	mg/L	-	-	-	0.55	8503322
Alkalinity (Total as CaCO3)	mg/L	-	-	-	24.4	8501788
Total Organic Carbon (C)	mg/L	-	-	-	<0.50	8503328
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<0.5	8501788
Bicarbonate (HCO3)	mg/L	-	-	-	29.8	8501788
Carbonate (CO3)	mg/L	-	-	-	<0.5	8501788
Hydroxide (OH)	mg/L	-	-	-	<0.5	8501788
Anions						
Dissolved Sulphate (SO4)	mg/L	-	500	-	3.89	8503210
Dissolved Chloride (Cl)	mg/L	-	250	-	2.5	8503199
MISCELLANEOUS						
True Colour	Col. Unit	-	15	-	<5	8508016
Nutrients						
Total Organic Nitrogen (N)	mg/L	-	-	-	<0.020	8501238
Total Ammonia (N)	mg/L	-	-	-	0.023	8503090
Nitrate plus Nitrite (N)	mg/L	-	-	-	0.122	8504288
Total Nitrogen (N)	mg/L	-	-	-	0.135	8503654
Physical Properties						
Conductivity	uS/cm	-	-	-	63	8501810
pH	pH	-	6.5:8.5	-	7.2	8501809
Physical Properties						
Total Dissolved Solids	mg/L	-	500	-	34	8502172
Turbidity	NTU	see remark	see remark	see remark	<0.1	8506638

No Fill

No Exceedance

Grey

Exceeds 1 criteria policy/level

Black

Exceeds both criteria/levels

RDL = Reportable Detection Limit

Results relate only to the items tested.

QG0669		
2016/12/12 08:30		
512091-01-01		
WELL #4	RDL	QC Batch
<0.0050	0.0050	8504289
24.9	0.50	8500679
0.200	0.020	8500685
0.020	0.010	8502572
0.68	0.50	8503322
27.7	0.5	8501811
<0.50	0.50	8503328
<0.5	0.5	8501811
33.8	0.5	8501811
<0.5	0.5	8501811
<0.5	0.5	8501811
2.25	0.50	8503210
2.1	0.50	8503199
<5	5	8508016
<0.020	0.020	8501238
0.031	0.0050	8503090
0.200	0.020	8504288
0.219	0.020	8503654
67	1	8501790
7.2		8501791
36	10	8502172
<0.1	0.1	8506638