Hanover MUNICIPALITY

Adam Freiling
Senior Regional Drinking Water Officer
Office of Drinking Water
Conservation and Water Stewardship
Unit B – 284 Reimer Avenue
Steinbach, MB R5G 0R5

March 1, 2024

Mr. Freiling,

Re: 2023 Grunthal Public Water System Report

Please find attached our annual Public Water System Report for the Community of Grunthal.

This report was posted on our website at **www.hanovermb.ca** on March 10, 2024 and hard copies were made available from our R.M.'s office at 28 Westland Drive in Mitchell, Manitoba. We notified residents that this report is available through our Facebook page.

If you have any questions or concerns, please contact Rob Driedger.

Sincerely,

Rob Driedger, C.E.T.
Manager of Engineering & Utilities
Phone: 204-346-7121
E-Mail: rob.driedger@hanovermb.ca

Grunthal Public Water System
Annual Report

2023

Rural Municipality of Hanover
March 1, 2024

Public Water System Annual Report

LUD of Grunthal – 2023

March 1, 2024

Name of Public Water System: Grunthal Public Water System

Name of legal owner: The Rural Municipality of Hanover

Contact: Rob Driedger, C.E.T., Manager of Engineering & Utilities
Phone: (204) 346-7121
E-Mail: rob.driedger@hanovermb.ca

Website: www.hanovermb.ca

Water Systems Emergency #: (204) 326-4488

Name of Operators: Barry Broesky, Utility Operator, Class II
Phone: (204) 371-0484
E-Mail: barry.broesky@hanovermb.ca

Rob Friesen, Utility Operator, Class II
Phone: (204) 371-8236
E-Mail: rob.friesen@hanovermb.ca

Table of Contents

Introduction

The 2023 Annual Report for the Grunthal Public Water Systems ability to produce safe potable water and to meet Provincial regulations.

1. Description of Water System

The Grunthal Water Treatment Plant provides potable drinking water to approximately 2125 residents within the community. Treated water produced at the water plant meets all health and aesthetic objectives as set forth in the Guidelines for *Canadian Drinking Water Quality.*

1.1 Water Supply Source

The Grunthal Water Treatment Plant receives groundwater from one main drilled well as a well as a back-up well. Both wells draw from a water source at roughly 80 feet to 90 feet below the ground surface. Then main well in use at the time produces water at approximately 11.9 liters per second and this raw water is pumped to the water treatment plant reservoir. The raw water does contain some iron that it picks up in the rock aquifer but these metals do not pose any health concerns.

1.2 Intake Structures

Not applicable.

1.3 Water Treatment Process

As the raw water enters the water treatment plant it is immediately treated with Chlorine for disinfection along with HIB-5, which is an iron sequester which keeps any iron particles from settling out of the water causing staining in the piping. Once treated, the water is then stored in a 295.5 m^3 reservoir and a 1,195.62 m^3 reservoir from where it can then be distributed throughout the watermain system.

1.4 Distribution System

Treated water from the reservoir is pumped through the mains into the distribution system via three 20hp variable drive duty pumps. The duty pumps distribute the water at pressures of around 60psi through 150mm and 200mm watermains throughout the community. The watermains currently consists of either an AC or poly high density pipe construction.

1.5 Storage Reservoirs

As indicated above the storage reservoirs include a 295.5 m^3 and 1,195.62 m^3 reservoir that are above ground reservoirs.

1.6 Number of Connections, Population Served and Types of Water Users

There are approximately 629 water connections with the Grunthal Menno Home and Carleton Hatcheries being the largest users to date. Estimated population use is about 2125 people.

1.7 Classification and Certification

The Grunthal Water Treatment Plant is classified as a Class 1 Water Treatment Facility and is currently operated by two utility operators with certification under the Environmental Act's Water and Wasterwater Facility Operators Regulation. *(See Appendix A – Operator Certification)*

In addition the plant is regulated under license number PWS-09-325-02 and complies with The Drinking Water Safety Act.

2. Disinfection System in Use

2.1 Type of Disinfection System Used

The Grunthal Water Treatment Plant disinfects by adding 12% sodium hypochlorite solution to the water via a chlorinator pump.

2.2 Equipment Redundancy and Monitoring Requirements

As required by the *Drinking Water Safety Act*, the Grunthal Public Water System ensures continuous disinfection as maintained at the plant by keeping stock of all spare parts required for the chlorinator. In addition, a complete spare chlorinator is kept at the plant.

Disinfectant residuals are monitored daily at the water treatment plant and periodically in the distribution system and recorded on the appropriate monitoring forms. Monthly chlorination report forms are sent to the regional Drinking Water Officer at the end of each month.

2.3 Disinfectant Residual Overall Performance Results

For 2023, the Grunthal Public Water System was compliant in the audited time period.

3. List of Water Quality Standards

The Province of Manitoba has adopted a number of water quality standards from the *Guidelines for Canadian Drinking Water Quality,* developed by Health Canada. The parameters are health-based and they express the maximum acceptable concentration for a groundwater supply source. Concentration values in excess constitute a health-related issue and require corrective actions. The 2023 results for the Grunthal Public Water System are summarized in the following table.

SOURCE	PARAMETER	STANDARD	FREQUENCY	TEST RESULTS
GROUND WATER	**TC & EC***	No TC of EC	Bi-Weekly	100%
	Disinfectant	WTP (>0.5 mg/l)	Daily	100%
		Distribution (0.1 mg/l)	Bi-Weekly	100%
	Lead	0.01 mg/l	As per instructions of the Drinking Water Officer	>0.050 µg/l Raw 0.070 µg/l Treated
	Arsenic	0.01 mg/l	One Raw and One Treated water sample once every three years	0.36 µg/l Raw 0.40 µg/l Treated
	Benzene	.005 mg/l		>.00050 mg/l Raw
	Fluoride	1.5 mg/l		.180mg/l Raw .169 mg/l Treated
	Nitrate	As Nitrate: 45 mg/l		>0.0010 mg/L
		As Nitrogen: 10 mg/l		.0839mg/l Raw .0.0956mg/L Treated
	Trichloroethylene	0.005 mg/l		<0.00050 mg/L
	Tetrachloroethylene	0.03 mg/l		≤0.00050 mg/L
	Uranium	0.02 mg/l		0.737 µg/L Raw 0.793 µg/L Treated
	Ethylbenzene	<0.00050 mg/l		<0.00050 mg/L
	Manganese	20 - 120 µg/L		44.8 µg/L
	Nitrite	1 mg/L		<0.0010 mg/L
	Toluene	0.024 mg/L		<0.00050 mg/L
	Total Xylenes	0.02 mg/L		<0.00050 mg/L

**Bacterial Testing: We test the raw water (untreated well water, the treated water leaving the treatment facility and the water in the distribution system within the Town of Grunthal, every two weeks (bi-weekly) for the presence of Total Coliform (TC) and E. Coli (EC) bacteria. If these bacteria are present in the water, it is an indication that disease-causing organisms mays also be present.*

4. **Water System Failures and Corrective Actions in 2023**

   No failure to report

5. **Additional Records Required**

   None

6. **Drinking Water Safety Order on your System and Actions Taken in Response**

   None

7. **Warnings Issues or Charges Laid on the System in Accordance with the Drinking Water Safety Act**

   None

8. **Major Expenses Incurred in 2023**

   Pump rebuild and check valve replacement

9. **Future System Expansion and/or Increased Population**
   In 2023, there is a new development constructed in the NW corner of the community.

10. **Appendix**
    a. Operators Certification
    b. Testing Summary
    c. Analyses
    d. Operating License for Public Water System
    e. *Disinfection Reports*

Appendix A

Operators Certification

Water and Wastewater Facility Operators Certification Program

This is to certify

Barry A. Broesky

has qualified as a

Water Treatment	*Class II*
Water Distribution	*Class II*
Wastewater Treatment	*Class II*
Wastewater Collection	*Class II*

Operator

in accordance with the Water and Wastewater Facility Operators Regulation under *The Environment Act.*

Dated at Winnipeg, Manitoba **this** 7th **day of** April 2020.

Certificate No.: 2009-312
Expires: 2025 April 7
Operator ID: 00107

S. Koivu

Director
Manitoba Conservation and Climate

Manitoba

Water and Wastewater Facility Operators Certification Program

This is to certify

Robert J. Friesen

has qualified as a

Water Treatment	*Class II*
Water Distribution	*Class II*
Wastewater Treatment	*Class II*
Wastewater Collection	*Class II*

Operator

in accordance with the Water and Wastewater Facility Operators Regulation under *The Environment Act.*

Dated at Winnipeg, Manitoba this 9th day of December 2020.

Certificate No.: 2015-260
Expires: 2025 December 9
Operator ID: 02505

S. Kailey

Director
Manitoba Conservation and Climate

Certificate is the property of Manitoba Conservation and Climate and must be surrendered upon request.

Manitoba

Appendix B

Testing Summary

	Sample				Field Tests			Microbiological Tests	
	Sample Type Name	Name	Sampling Date	ALS ID	chlorine, free, field mg/L	chlorine, total, field mg/L	Temperature, as received °C	Coliforms, Escherichia coli [E. coli] MPN/100mL	Coliforms, total MPN/100mL
L2744779-1 (1)	Water	GRUNTHAL 1 - RAW	10-01-2023	L2744779-1			10.4	0	0
L2744779-2 (1)	Water	GRUNTHAL 2 - TREATED	10-01-2023	L2744779-2			10.4	0	0
L2744779-3 (1)	Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD RD	10-01-2023	L2744779-3	0.800	1.17	10.4	0	0
L2745667-1 (1)	Water	GRUNTHAL 1 - RAW	24-01-2023	L2745667-1			8.8	0	0
L2745667-2 (1)	Water	GRUNTHAL 2 - TREATED	24-01-2023	L2745667-2			8.8	0	0
L2745667-3 (1)	Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD RD	24-01-2023	L2745667-3	1.12	1.40	8.8	0	0
L2746621-1 (1)	Water	GRUNTHAL 1 - RAW	07-02-2023	L2746621-1			8.6	0	0
L2746621-2 (1)	Water	GRUNTHAL 2 - TREATED	07-02-2023	L2746621-2			8.6	0	0
L2746621-3 (1)	Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD DR.	07-02-2023	L2746621-3	0.350	0.420	8.6	0	0
L2747553-1 (1)	Water	GRUNTHAL 1 - RAW	21-02-2023	L2747553-1			6.6	0	0
L2747553-2 (1)	Water	GRUNTHAL 2 - TREATED	21-02-2023	L2747553-2			6.6	0	0
L2747553-3 (1)	Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD DRIVE	21-02-2023	L2747553-3	0.660	0.900	6.6	0	0
L2748563-1 (1)	Water	GRUNTHAL 1 - RAW	07-03-2023	L2748563-1			12.8	0	0
L2748563-2 (1)	Water	GRUNTHAL 2 - TREATED	07-03-2023	L2748563-2			12.8	0	0
L2748563-3 (1)	Water	GRUNTHAL 3 - DISTRIBUTION @	07-03-2023	L2748563-3	0.750	1.00	12.8	0	0
L2749304-1 (1)	Water	GRUNTHAL 1 - RAW	21-03-2023	L2749304-1			13.1	0	0
L2749304-2 (1)	Water	GRUNTHAL 2 - TREATED	21-03-2023	L2749304-2			13.1	0	0
L2749304-3 (1)	Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD RD	21-03-2023	L2749304-3	0.840	1.11	13.1	0	0
WP2304114-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	04-04-2023	WP2304114-001			9.4	<1	<1
WP2304114-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	04-04-2023	WP2304114-002			9.4	<1	<1
WP2304114-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood drive	04-04-2023	WP2304114-003	0.93	0.99	9.4	<1	<1
WP2305368-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	18-04-2023	WP2305368-001			11.9	<1	<1
WP2305368-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	18-04-2023	WP2305368-002			11.9	<1	<1
WP2305368-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Drive	18-04-2023	WP2305368-003	0.90	0.93	11.9	<1	<1
WP2306681-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	02-05-2023	WP2306681-001			17.6	<1	<1
WP2306681-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	02-05-2023	WP2306681-002			17.6	<1	<1
WP2306681-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD	02-05-2023	WP2306681-003	0.48	0.92	17.6	<1	<1
WP2308444-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	16-05-2023	WP2308444-001			17.9	<1	<1
WP2308444-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	16-05-2023	WP2308444-002			17.9	<1	<1
WP2308444-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD DR	16-05-2023	WP2308444-003	0.97	1.16	17.9	<1	<1
WP2310120-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	30-05-2023	WP2310120-001			20.4	<1	<1
WP2310120-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	30-05-2023	WP2310120-002			20.4	<1	<1
WP2310120-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @	30-05-2023	WP2310120-003	0.81	1.07	20.4	<1	<1
WP2311904-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	13-06-2023	WP2311904-001			15.8	<1	<1
WP2311904-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	13-06-2023	WP2311904-002			15.8	<1	<1
WP2311904-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD DRIVE	13-06-2023	WP2311904-003	0.90	1.19	15.8	<1	<1
WP2313568-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	27-06-2023	WP2313568-001			20.4	<1	<1
WP2313568-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	27-06-2023	WP2313568-002			20.4	<1	<1
WP2313568-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @	27-06-2023	WP2313568-003	0.83	1.10	20.4	<1	<1
WP2315145-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	11-07-2023	WP2315145-001			20	<1	<1
WP2315145-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	11-07-2023	WP2315145-002			20	<1	<1
WP2315145-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Rd	11-07-2023	WP2315145-003	0.64	0.80	20	<1	<1
WP2316955-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	25-07-2023	WP2316955-001			21.6	<1	<1
WP2316955-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	25-07-2023	WP2316955-002			21.6	<1	<1
WP2316955-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @	25-07-2023	WP2316955-003	1.05	1.43	21.6	<1	<1
WP2318625-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	08-08-2023	WP2318625-001			16.9	<1	<1
WP2318625-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	08-08-2023	WP2318625-002			16.9	<1	<1
WP2318625-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Dr	08-08-2023	WP2318625-003	0.65	0.80	16.9	<1	<1
WP2320488-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	22-08-2023	WP2320488-001			16.3	<1	<1
WP2320488-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	22-08-2023	WP2320488-002			16.3	<1	<1
WP2320488-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ 5-30 BIRCH ST	22-08-2023	WP2320488-003	0.93	1.21	16.3	<1	<1
WP2322124-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	05-09-2023	WP2322124-001			17.8	<1	<1
WP2322124-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	05-09-2023	WP2322124-002			17.8	<1	<1
WP2322124-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD DRIVE	05-09-2023	WP2322124-003	0.79	0.97	17.8	<1	<1
WP2323806-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	19-09-2023	WP2323806-001			20.1	<1	<1
WP2323806-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	19-09-2023	WP2323806-002			20.1	<1	<1
WP2323806-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Drive	19-09-2023	WP2323806-003	0.72	1.06	20.1	<1	<1
WP2325373-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	03-10-2023	WP2325373-001			15.7	<1	<1
WP2325373-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	03-10-2023	WP2325373-002			15.7	<1	<1
WP2325373-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD DRIVE	03-10-2023	WP2325373-003	0.62	0.66	15.7	<1	<1
WP2326784-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	17-10-2023	WP2326784-001			17	<1	<1
WP2326784-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	17-10-2023	WP2326784-002			17	<1	<1
WP2326784-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @	17-10-2023	WP2326784-003	0.53	0.76	17	<1	<1
WP2328250-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	31-10-2023	WP2328250-001			10	<1	<1
WP2328250-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	31-10-2023	WP2328250-002			10	<1	<1
WP2328250-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD RD	31-10-2023	WP2328250-003	0.61	0.71	10	<1	<1
WP2329704-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	14-11-2023	WP2329704-001			10.4	<1	<1
WP2329704-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	14-11-2023	WP2329704-002			10.4	<1	<1
WP2329704-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Drive	14-11-2023	WP2329704-003	0.69	0.85	10.4	<1	<1
WP2331078-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	28-11-2023	WP2331078-001			16.1	<1	<1
WP2331078-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	28-11-2023	WP2331078-002			16.1	<1	<1
WP2331078-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Drive	28-11-2023	WP2331078-003	0.73	1.01	16.1	<1	<1
WP2332406-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	12-12-2023	WP2332406-001			10.9	<1	<1
WP2332406-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	12-12-2023	WP2332406-002			10.9	<1	<1
WP2332406-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ COTTONWOOD RD	12-12-2023	WP2332406-003	0.65	0.99	10.9	<1	<1

WP2333461-001 (1)	Water/Drinking Water	GRUNTHAL 1 - RAW	27-12-2023	WP2333461-001			11.5	<1	<1
WP2333461-002 (1)	Water/Drinking Water	GRUNTHAL 2 - TREATED	27-12-2023	WP2333461-002			11.5	<1	<1
WP2333461-003 (1)	Water/Drinking Water	GRUNTHAL 3 - DISTRIBUTION @ Cottonwood Rd	27-12-2023	WP2333461-003	0.87	1.26	11.5	<1	<1

Appendix C

Analyses

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2320502**	Page	: 1 of 6
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Sarah Belisle	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 945 5776	Telephone	: +1 204 255 9720
Project	: PWS - 86.00	Date Samples Received	: 23-Aug-2023 10:09
PO	: ----	Date Analysis Commenced	: 23-Aug-2023
C-O-C number	: ----	Issue Date	: 30-Aug-2023 08:03
Sampler	: ----		
Site	: 6700		
Quote number	: WTP Chemistry		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gerry Vera	Analyst	Organics, Winnipeg, Manitoba
Lee McTavish		Inorganics, Winnipeg, Manitoba
Lee McTavish		Metals, Winnipeg, Manitoba
Matthew Bouch		Inorganics, Winnipeg, Manitoba

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	GRUNTHAL 1 - RAW WELL 1	GRUNTHAL 1 - RAW WELL 2 - BACKUP	GRUNTHAL 2 - TREATED	GRUNTHAL 3 - DISTRIBUTION MID-POINT 5-30 BIRCH STREET	----	----	----
				Sampling date/time	22-Aug-2023 11:15	22-Aug-2023 11:30	22-Aug-2023 01:45	22-Aug-2023 13:30	----	----	----
				Sub-Matrix	Water	Water	Water	Water	----	----	----
					WP2320502-001	WP2320502-002	WP2320502-003	WP2320502-004	--------	--------	--------
Physical Tests											
Absorbance, UV (@ 254nm)	----	E404/WP			0.0460	0.0280	0.0380	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/WP	mg/L		364	308	363	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/WP			<1.0	<1.0	<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/WP	mg/L		<1.0	<1.0	<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WP			364	308	363	----	----	----	----
Colour, true	----	E329/WP	CU		<5.0	<5.0	<5.0	----	----	----	----
Conductivity	----	E100/WP			770	728	788	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WP	mg/L		400	382	398	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/WP			0.731	0.643	0.800	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/WP	-		1.49	1.40	1.56	----	----	----	----
pH	----	E108/WP			7.91	7.92	7.99	----	----	----	----
Solids, total dissolved [TDS]	----	E162-L/WP	mg/L		457	446	472	----	----	----	----
Turbidity	----	E121/WP			3.36	17.6	1.48	----	----	----	----
pH, saturation (@ 4°C)	----	EC105A/WP	pH units		7.18	7.28	7.19	----	----	----	----
Transmittance, UV (@ 254nm)	----	E404/WP			89.9	93.8	91.6	----	----	----	----
pH, saturation (@ 60°C)	----	EC105A/WP	pH units		6.42	6.52	6.43	----	----	----	----
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E303/WP			0.667	0.304	0.025	----	----	----	----
Bromide	24959-67-9	E235.Br-L/WP	mg/L		<0.050	0.120	<0.050	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/WP			19.9	42.1	27.2	----	----	----	----
Fluoride	16984-48-8	E235.F/WP	mg/L		0.180	0.094	0.169	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/WP			0.0839	<0.0050	0.0956	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/WP	mg/L		<0.0010	<0.0010	<0.0010	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WP			45.3	35.3	45.3	----	----	----	----
Organic / Inorganic Carbon											

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	GRUNTHAL 1 - RAW WELL 1	GRUNTHAL 1 - RAW WELL 2 - BACKUP	GRUNTHAL 2 - TREATED	GRUNTHAL 3 - DISTRIBUTION MID-POINT 5-30 BIRCH STREET	----	----	----
				Sampling date/time	22-Aug-2023 11:15	22-Aug-2023 11:30	22-Aug-2023 01:45	22-Aug-2023 13:30	----	----	----
				Sub-Matrix	Water	Water	Water	Water	----	----	----
					WP2320502-001	WP2320502-002	WP2320502-003	WP2320502-004	--------	--------	--------
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/WP	mg/L		2.92	1.84	3.09	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/WP			2.52	2.00	2.43	----	----	----	----
Ion Balance											
Anion sum	----	EC101A/WP	meq/L		8.79	8.08	8.98	----	----	----	----
Cation sum (total)	----	EC101A/WP			9.16	8.31	9.32	----	----	----	----
Ion balance (cations/anions)	----	EC101A/WP	%		104	103	104	----	----	----	----
Ion balance (APHA)	----	EC101A/WP			2.06	1.40	1.86	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/WP	µg/L		<3.0	<3.0	<3.0	<3.0	----	----	----
Antimony, total	7440-36-0	E420/WP			<0.10	<0.10	<0.10	<0.10	----	----	----
Arsenic, total	7440-38-2	E420/WP	µg/L		0.36	0.22	0.40	0.37	----	----	----
Barium, total	7440-39-3	E420/WP			382	229	376	363	----	----	----
Beryllium, total	7440-41-7	E420/WP	µg/L		<0.020	<0.020	<0.020	<0.020	----	----	----
Bismuth, total	7440-69-9	E420/WP			<0.050	<0.050	<0.050	<0.050	----	----	----
Boron, total	7440-42-8	E420/WP	µg/L		78	36	82	83	----	----	----
Cadmium, total	7440-43-9	E420/WP			<0.0050	<0.0050	<0.0050	<0.0050	----	----	----
Calcium, total	7440-70-2	E420/WP	µg/L		93600	87700	92300	91500	----	----	----
Cesium, total	7440-46-2	E420/WP			<0.010	<0.010	<0.010	<0.010	----	----	----
Chromium, total	7440-47-3	E420/WP	µg/L		<0.50	<0.50	<0.50	<0.50	----	----	----
Cobalt, total	7440-48-4	E420/WP			0.22	<0.10	0.21	0.16	----	----	----
Copper, total	7440-50-8	E420/WP	µg/L		<0.50	0.84	4.24	6.48	----	----	----
Iron, total	7439-89-6	E420/WP			495	1480	370	223	----	----	----
Lead, total	7439-92-1	E420/WP	µg/L		<0.050	<0.050	0.070	0.124	----	----	----
Lithium, total	7439-93-2	E420/WP			17.8	11.7	17.2	17.6	----	----	----
Magnesium, total	7439-95-4	E420/WP	µg/L		40500	39600	40600	39900	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	GRUNTHAL 1 - RAW WELL 1	GRUNTHAL 1 - RAW WELL 2 - BACKUP	GRUNTHAL 2 - TREATED	GRUNTHAL 3 - DISTRIBUTION MID-POINT 5-30 BIRCH STREET	----	----	----
				Sampling date/time	22-Aug-2023 11:15	22-Aug-2023 11:30	22-Aug-2023 01:45	22-Aug-2023 13:30	----	----	----
				Sub-Matrix	Water	Water	Water	Water	----	----	----
					WP2320502-001	WP2320502-002	WP2320502-003	WP2320502-004	--------	--------	--------
Total Metals											
Manganese, total	7439-96-5	E420/WP	µg/L		67.8	83.3	44.8	35.9	----	----	----
Molybdenum, total	7439-98-7	E420/WP	µg/L		0.742	0.879	0.739	0.750	----	----	----
Nickel, total	7440-02-0	E420/WP	µg/L		<0.50	<0.50	<0.50	<0.50	----	----	----
Phosphorus, total	7723-14-0	E420/WP	µg/L		66	71	693	629	----	----	----
Potassium, total	7440-09-7	E420/WP	µg/L		4380	3020	4250	4190	----	----	----
Rubidium, total	7440-17-7	E420/WP	µg/L		2.07	1.56	2.02	1.88	----	----	----
Selenium, total	7782-49-2	E420/WP	µg/L		0.129	0.134	0.118	0.108	----	----	----
Silicon, total	7440-21-3	E420/WP	µg/L		9730	10300	9520	9360	----	----	----
Silver, total	7440-22-4	E420/WP	µg/L		<0.010	<0.010	<0.010	<0.010	----	----	----
Sodium, total	7440-23-5	E420/WP	µg/L		22500	12000	28700	28100	----	----	----
Strontium, total	7440-24-6	E420/WP	µg/L		571	269	554	556	----	----	----
Sulfur, total	7704-34-9	E420/WP	µg/L		16800	12500	16500	16700	----	----	----
Tellurium, total	13494-80-9	E420/WP	µg/L		<0.20	0.35	<0.20	<0.20	----	----	----
Thallium, total	7440-28-0	E420/WP	µg/L		<0.010	<0.010	<0.010	<0.010	----	----	----
Thorium, total	7440-29-1	E420/WP	µg/L		<0.10	<0.10	<0.10	<0.10	----	----	----
Tin, total	7440-31-5	E420/WP	µg/L		<0.10	<0.10	<0.10	<0.10	----	----	----
Titanium, total	7440-32-6	E420/WP	µg/L		<0.30	<0.30	<0.30	<0.30	----	----	----
Tungsten, total	7440-33-7	E420/WP	µg/L		<0.10	<0.10	<0.10	<0.10	----	----	----
Uranium, total	7440-61-1	E420/WP	µg/L		0.737	0.023	0.793	0.765	----	----	----
Vanadium, total	7440-62-2	E420/WP	µg/L		<0.50	<0.50	<0.50	<0.50	----	----	----
Zinc, total	7440-66-6	E420/WP	µg/L		<3.0	<3.0	<3.0	4.0	----	----	----
Zirconium, total	7440-67-7	E420/WP	µg/L		<0.20	<0.20	<0.20	<0.20	----	----	----
Volatile Organic Compounds											
Benzene	71-43-2	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
Bromodichloromethane	75-27-4	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
Bromoform	75-25-2	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	GRUNTHAL 1 - RAW WELL 1	GRUNTHAL 1 - RAW WELL 2 - BACKUP	GRUNTHAL 2 - TREATED	GRUNTHAL 3 - DISTRIBUTION MID-POINT 5-30 BIRCH STREET	----	----	----
				Sampling date/time	22-Aug-2023 11:15	22-Aug-2023 11:30	22-Aug-2023 01:45	22-Aug-2023 13:30	----	----	----
				Sub-Matrix	Water	Water	Water	Water	----	----	----
					WP2320502-001	WP2320502-002	WP2320502-003	WP2320502-004	--------	--------	--------
Volatile Organic Compounds											
Chloroform	67-66-3	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
Dibromochloromethane	124-48-1	E611D/WP			<0.00050	<0.00050	----	----	----	----	----
Dichloromethane	75-09-2	E611D/WP	mg/L		<0.0010	<0.0010	----	----	----	----	----
Ethylbenzene	100-41-4	E611D/WP			<0.00050	<0.00050	----	----	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
Tetrachloroethylene	127-18-4	E611D/WP			<0.00050	<0.00050	----	----	----	----	----
Toluene	108-88-3	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
Trichloroethane, 1,1,1-	71-55-6	E611D/WP			<0.00050	<0.00050	----	----	----	----	----
Trichloroethane, 1,1,2-	79-00-5	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
Trichloroethylene	79-01-6	E611D/WP			<0.00050	<0.00050	----	----	----	----	----
Xylene, m+p-	179601-23-1	E611D/WP	mg/L		<0.00040	<0.00040	----	----	----	----	----
Xylene, o-	95-47-6	E611D/WP			<0.00030	<0.00030	----	----	----	----	----
Xylenes, total	1330-20-7	E611D/WP	mg/L		<0.00050	<0.00050	----	----	----	----	----
BTEX, total	----	E611D/WP			<0.0010	<0.0010	----	----	----	----	----
Volatile Organic Compounds Surrogates											
Bromofluorobenzene, 4-	460-00-4	E611D/WP	%		87.8	91.2	----	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611D/WP			102	104	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**WP2320502**	Page	: 1 of 14
Client	:**Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	:Sarah Belisle	Account Manager	: Sheriza Rajack-Ahamed
Address	:14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:----	Telephone	: +1 204 255 9720
Project	:PWS - 86.00	Date Samples Received	: 23-Aug-2023 10:09
PO	:----	Issue Date	: 30-Aug-2023 08:04
C-O-C number	:----		
Sampler	:----		
Site	:6700		
Quote number	:WTP Chemistry		
No. of samples received	:4		
No. of samples analysed	:4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) GRUNTHAL 1 - RAW WELL 1	E303	22-Aug-2023	24-Aug-2023	28 days	2 days	✓	24-Aug-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) GRUNTHAL 1 - RAW WELL 2 - BACKUP	E303	22-Aug-2023	24-Aug-2023	28 days	2 days	✓	24-Aug-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) GRUNTHAL 2 - TREATED	E303	22-Aug-2023	24-Aug-2023	28 days	2 days	✓	24-Aug-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE GRUNTHAL 1 - RAW WELL 1	E235.Br-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE GRUNTHAL 1 - RAW WELL 2 - BACKUP	E235.Br-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE GRUNTHAL 2 - TREATED	E235.Br-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE GRUNTHAL 1 - RAW WELL 1	E235.Cl-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E235.Cl-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
GRUNTHAL 2 - TREATED	E235.Cl-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E235.F	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E235.F	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
GRUNTHAL 2 - TREATED	E235.F	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E235.NO3-L	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E235.NO3-L	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
GRUNTHAL 2 - TREATED	E235.NO3-L	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E235.NO2-L	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E235.NO2-L	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
GRUNTHAL 2 - TREATED	E235.NO2-L	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E235.SO4	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E235.SO4	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
GRUNTHAL 2 - TREATED	E235.SO4	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved)										
GRUNTHAL 1 - RAW WELL 1	E358-L	22-Aug-2023	24-Aug-2023	3 days	2 days	✓	25-Aug-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved)										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E358-L	22-Aug-2023	24-Aug-2023	3 days	2 days	✓	25-Aug-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved)										
GRUNTHAL 2 - TREATED	E358-L	22-Aug-2023	24-Aug-2023	3 days	2 days	✓	25-Aug-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
GRUNTHAL 1 - RAW WELL 1	E355-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E355-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
GRUNTHAL 2 - TREATED	E355-L	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E290	22-Aug-2023	23-Aug-2023	14 days	1 days	✓	23-Aug-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E290	22-Aug-2023	23-Aug-2023	14 days	1 days	✓	23-Aug-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
GRUNTHAL 2 - TREATED	E290	22-Aug-2023	23-Aug-2023	14 days	2 days	✓	23-Aug-2023	14 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E329	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E329	22-Aug-2023	23-Aug-2023	3 days	1 days	✓	23-Aug-2023	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
GRUNTHAL 2 - TREATED	E329	22-Aug-2023	23-Aug-2023	3 days	2 days	✓	23-Aug-2023	3 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E100	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE GRUNTHAL 1 - RAW WELL 2 - BACKUP	E100	22-Aug-2023	23-Aug-2023	28 days	1 days	✓	23-Aug-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE GRUNTHAL 2 - TREATED	E100	22-Aug-2023	23-Aug-2023	28 days	2 days	✓	23-Aug-2023	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE GRUNTHAL 1 - RAW WELL 1	E108	22-Aug-2023	23-Aug-2023	0.25 hrs	31 hrs	× EHTR-FM	23-Aug-2023	0.25 hrs	31 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE GRUNTHAL 1 - RAW WELL 2 - BACKUP	E108	22-Aug-2023	23-Aug-2023	0.25 hrs	31 hrs	× EHTR-FM	23-Aug-2023	0.25 hrs	31 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE GRUNTHAL 2 - TREATED	E108	22-Aug-2023	23-Aug-2023	0.25 hrs	41 hrs	× EHTR-FM	23-Aug-2023	0.25 hrs	41 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE GRUNTHAL 1 - RAW WELL 1	E162-L	22-Aug-2023	----	----	----		24-Aug-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE GRUNTHAL 1 - RAW WELL 2 - BACKUP	E162-L	22-Aug-2023	----	----	----		24-Aug-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE GRUNTHAL 2 - TREATED	E162-L	22-Aug-2023	----	----	----		24-Aug-2023	7 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE GRUNTHAL 1 - RAW WELL 1	E121	22-Aug-2023	----	----	----		23-Aug-2023	3 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Turbidity by Nephelometry										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E121	22-Aug-2023	----	----	----		23-Aug-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
GRUNTHAL 2 - TREATED	E121	22-Aug-2023	----	----	----		23-Aug-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
GRUNTHAL 1 - RAW WELL 1	E404	22-Aug-2023	----	----	----		23-Aug-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E404	22-Aug-2023	----	----	----		23-Aug-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
GRUNTHAL 2 - TREATED	E404	22-Aug-2023	----	----	----		23-Aug-2023	3 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
GRUNTHAL 1 - RAW WELL 1	E420	22-Aug-2023	25-Aug-2023	180 days	3 days	✓	25-Aug-2023	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E420	22-Aug-2023	25-Aug-2023	180 days	3 days	✓	25-Aug-2023	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
GRUNTHAL 2 - TREATED	E420	22-Aug-2023	25-Aug-2023	180 days	3 days	✓	25-Aug-2023	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
GRUNTHAL 3 - DISTRIBUTION MID-POINT 5-30 BIRCH STREET	E420	22-Aug-2023	25-Aug-2023	180 days	3 days	✓	25-Aug-2023	180 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate)										
GRUNTHAL 1 - RAW WELL 1	E611D	22-Aug-2023	24-Aug-2023	14 days	2 days	✓	24-Aug-2023	14 days	2 days	✓
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate)										
GRUNTHAL 1 - RAW WELL 2 - BACKUP	E611D	22-Aug-2023	24-Aug-2023	14 days	2 days	✓	24-Aug-2023	14 days	2 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1100911	1	10	10.0	5.0	✓
Ammonia in Water by Colour	E303	1101546	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1100141	0	5	0.0	5.0	×
Chloride in Water by IC (Low Level)	E235.Cl-L	1100142	0	9	0.0	5.0	×
Colour (True) by Spectrometer (5 CU)	E329	1099662	1	10	10.0	5.0	✓
Conductivity in Water	E100	1100910	1	11	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1100971	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1100140	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1100143	0	5	0.0	5.0	×
Nitrite in Water by IC (Low Level)	E235.NO2-L	1100144	0	5	0.0	5.0	×
pH by Meter	E108	1100912	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1100145	1	13	7.6	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1099960	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1103447	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1099628	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	1099544	1	6	16.6	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1099673	1	17	5.8	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1101590	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1100911	1	10	10.0	5.0	✓
Ammonia in Water by Colour	E303	1101546	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1100141	1	5	20.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1100142	1	9	11.1	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1099662	1	10	10.0	5.0	✓
Conductivity in Water	E100	1100910	1	11	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1100971	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1100140	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1100143	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1100144	1	5	20.0	5.0	✓
pH by Meter	E108	1100912	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1100145	1	13	7.6	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1099960	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1103447	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1099628	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	1099544	1	6	16.6	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1099673	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1101590	1	11	9.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1100911	1	10	10.0	5.0	✓
Ammonia in Water by Colour	E303	1101546	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1100141	1	5	20.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1100142	1	9	11.1	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1099662	1	10	10.0	5.0	✓
Conductivity in Water	E100	1100910	1	11	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1100971	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1100140	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1100143	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1100144	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1100145	1	13	7.6	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1099960	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1103447	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1099628	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	1099544	1	6	16.6	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1099673	1	17	5.8	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1101590	1	11	9.0	5.0	✓
Matrix Spikes (MS)							
Ammonia in Water by Colour	E303	1101546	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1100141	0	5	0.0	5.0	×
Chloride in Water by IC (Low Level)	E235.Cl-L	1100142	0	9	0.0	5.0	×
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1100971	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1100140	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1100143	0	5	0.0	5.0	×
Nitrite in Water by IC (Low Level)	E235.NO2-L	1100144	0	5	0.0	5.0	×
Sulfate in Water by IC	E235.SO4	1100145	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1103447	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1099628	1	10	10.0	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1101590	1	11	9.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Winnipeg	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Winnipeg	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Winnipeg	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry (Low Level)	E162-L ALS Environmental - Winnipeg	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC (Low Level)	E235.Cl-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Winnipeg	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia in Water by Colour	E303 ALS Environmental - Winnipeg	Water	APHA 4500 NH3-NITROGEN (AMMONIA)	This analysis is carried out using procedures adapted from APHA Method 4500 NH3 "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Winnipeg	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
UV Absorbance and Transmittance by Spectrometry	E404 ALS Environmental - Winnipeg	Water	APHA 5910 B (mod)	UV Absorbance is determined by first filtering a sample through a 0.45 micron filter, followed by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Winnipeg	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
VOCs (Eastern Canada List) by Headspace GC-MS	E611D ALS Environmental - Winnipeg	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Winnipeg	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Total Metals	EC101A ALS Environmental - Winnipeg	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Winnipeg	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Winnipeg	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Winnipeg	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Winnipeg	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.

QUALITY CONTROL REPORT

Work Order	:**WP2320502**	Page	: 1 of 14
Client	:Manitoba Conservation & Climate	Laboratory	:ALS Environmental - Winnipeg
Contact	:Sarah Belisle	Account Manager	:Sheriza Rajack-Ahamed
Address	:104.00 - Kleefeld- PWS 28 Westland Drive Mitchell MB Canada R5G 2N9	Address	:1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	:+1 204 255 9720
Project	:PWS - 86.00	Date Samples Received	:23-Aug-2023 10:09
PO	:----	Date Analysis Commenced	:23-Aug-2023
C-O-C number	:----	Issue Date	:30-Aug-2023 08:03
Sampler	:---- ----		
Site	:6700		
Quote number	:WTP Chemistry		
No. of samples received	:4		
No. of samples analysed	:4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gerry Vera	Analyst	Winnipeg Organics, Winnipeg, Manitoba
Lee McTavish		Winnipeg Inorganics, Winnipeg, Manitoba
Lee McTavish		Winnipeg Metals, Winnipeg, Manitoba
Matthew Bouch		Winnipeg Inorganics, Winnipeg, Manitoba

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1099544)											
WP2320502-003	GRUNTHAL 2 - TREATED	Turbidity	----	E121	0.10	NTU	1.48	1.33	10.7%	15%	----
Physical Tests (QC Lot: 1099662)											
WP2320448-001	Anonymous	Colour, true	----	E329	5.0	CU	24.3	25.1	0.8	Diff <2x LOR	----
Physical Tests (QC Lot: 1099673)											
WP2320256-001	Anonymous	Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm	0.0560	0.0560	0.00%	20%	----
Physical Tests (QC Lot: 1099960)											
WP2320427-001	Anonymous	Solids, total dissolved [TDS]	----	E162-L	3.0	mg/L	317	316	0.158%	20%	----
Physical Tests (QC Lot: 1100910)											
WP2320427-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	550	551	0.182%	10%	----
Physical Tests (QC Lot: 1100911)											
WP2320427-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	343	348	1.39%	20%	----
Physical Tests (QC Lot: 1100912)											
WP2320427-001	Anonymous	pH	----	E108	0.10	pH units	8.49	8.48	0.118%	4%	----
Anions and Nutrients (QC Lot: 1100140)											
WP2320521-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.130	0.126	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1100145)											
WP2320521-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	25.9	26.0	0.331%	20%	----
Anions and Nutrients (QC Lot: 1101546)											
WP2320448-002	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1099628)											
WP2320500-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	4.99	4.72	0.28	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1100971)											
WP2320502-001	GRUNTHAL 1 - RAW WELL 1	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.92	2.60	0.32	Diff <2x LOR	----
Total Metals (QC Lot: 1103447)											
WP2320502-001	GRUNTHAL 1 - RAW WELL 1	Aluminum, total	7429-90-5	E420	0.0030	mg/L	<3.0 µg/L	<0.0030	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.36 µg/L	0.00038	0.00002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	382 µg/L	0.376	1.37%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 1103447) - continued											
WP2320502-001	GRUNTHAL 1 - RAW WELL 1	Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	78 µg/L	0.079	0.001	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	93600 µg/L	90.8	3.10%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.22 µg/L	0.00021	0.000004	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	495 µg/L	0.478	3.36%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	17.8 µg/L	0.0176	0.947%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	40500 µg/L	41.0	1.23%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	67.8 µg/L	0.0651	4.14%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.742 µg/L	0.000742	0.0162%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	66 µg/L	0.069	0.004	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	4380 µg/L	4.25	2.99%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	2.07 µg/L	0.00200	3.24%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.129 µg/L	0.000126	0.000003	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	9730 µg/L	9.42	3.25%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	22500 µg/L	23.0	2.47%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	571 µg/L	0.547	4.39%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	16800 µg/L	16.6	1.03%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.737 µg/L	0.000766	3.88%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<3.0 µg/L	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 1101590)											
WP2320256-001	Anonymous	Benzene	71-43-2	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611D	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.00040 mg/L	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611D	0.30	µg/L	<0.00030 mg/L	<0.30	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1099544)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1099662)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 1099673)						
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1099960)						
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	<3.0	----
Physical Tests (QCLot: 1100910)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1100911)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 1100140)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1100141)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1100142)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 1100143)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1100144)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1100145)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1101546)						
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	<0.010	----
Organic / Inorganic Carbon (QCLot: 1099628)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1100971)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1103447)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1103447) - continued						
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1103447) - continued						
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Volatile Organic Compounds (QCLot: 1101590)						
Benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611D	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
Dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611D	1	µg/L	<1.0	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1099544)									
Turbidity	----	E121	0.1	NTU	200 NTU	103	85.0	115	----
Physical Tests (QCLot: 1099662)									
Colour, true	----	E329	5	CU	250 CU	98.4	85.0	115	----
Physical Tests (QCLot: 1099673)									
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	0.463 AU/cm	102	85.0	115	----
Physical Tests (QCLot: 1099960)									
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	1000 mg/L	95.8	85.0	115	----
Physical Tests (QCLot: 1100910)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1100911)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	100 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1100912)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1100140)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1100141)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	97.6	85.0	115	----
Anions and Nutrients (QCLot: 1100142)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1100143)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1100144)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 1100145)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1101546)									
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	0.25 mg/L	97.7	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1099628)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1100971)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1100971) - continued									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Total Metals (QCLot: 1103447)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	93.4	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.5	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	102	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	99.7	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	95.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	81.6	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	106	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	105	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	95.4	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	97.6	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	94.3	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.0	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	99.8	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.3	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	91.7	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.4	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	94.8	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	104	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1103447) - continued									
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	97.3	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	99.6	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	105	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	95.5	80.0	120	----
Volatile Organic Compounds (QCLot: 1101590)									
Benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	89.6	70.0	130	----
Bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	80.5	70.0	130	----
Bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	75.9	70.0	130	----
Chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	86.6	70.0	130	----
Dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	78.8	70.0	130	----
Dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	82.2	70.0	130	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	92.8	70.0	130	----
Toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	97.2	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	94.9	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	85.6	70.0	130	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	88.8	70.0	130	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	105	70.0	130	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	93.1	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1100140)										
WP2320521-001	Anonymous	Fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1100145)										
WP2320521-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1101546)										
WP2320448-002	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.214 mg/L	0.25 mg/L	85.8	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1099628)										
WP2320500-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	4.88 mg/L	5 mg/L	97.5	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1100971)										
WP2320502-002	GRUNTHAL 1 - RAW WELL 2 - BACKUP	Carbon, dissolved organic [DOC]	----	E358-L	5.10 mg/L	5 mg/L	102	70.0	130	----
Total Metals (QCLot: 1103447)										
WP2320502-001	GRUNTHAL 1 - RAW WELL 1	Aluminum, total	7429-90-5	E420	0.210 mg/L	0.2 mg/L	105	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00960 mg/L	0.01 mg/L	96.0	70.0	130	----
		Boron, total	7440-42-8	E420	0.100 mg/L	0.1 mg/L	99.7	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00392 mg/L	0.004 mg/L	98.0	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Copper, total	7440-50-8	E420	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		Iron, total	7439-89-6	E420	2.04 mg/L	2 mg/L	102	70.0	130	----
		Lead, total	7439-92-1	E420	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0892 mg/L	0.1 mg/L	89.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1103447) - continued										
WP2320502-001	GRUNTHAL 1 - RAW WELL 1	Nickel, total	7440-02-0	E420	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.5 mg/L	10 mg/L	105	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, total	7440-21-3	E420	8.50 mg/L	10 mg/L	85.0	70.0	130	----
		Silver, total	7440-22-4	E420	0.00392 mg/L	0.004 mg/L	98.0	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	19.0 mg/L	20 mg/L	95.2	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0352 mg/L	0.04 mg/L	88.1	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00386 mg/L	0.004 mg/L	96.6	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		Tin, total	7440-31-5	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0425 mg/L	0.04 mg/L	106	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00384 mg/L	0.004 mg/L	96.0	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.107 mg/L	0.1 mg/L	107	70.0	130	----
		Zinc, total	7440-66-6	E420	0.376 mg/L	0.4 mg/L	94.0	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0434 mg/L	0.04 mg/L	108	70.0	130	----
Volatile Organic Compounds (QCLot: 1101590)										
WP2320256-001	Anonymous	Benzene	71-43-2	E611D	92.6 µg/L	100 µg/L	92.6	60.0	140	----
		Bromodichloromethane	75-27-4	E611D	84.7 µg/L	100 µg/L	84.7	60.0	140	----
		Bromoform	75-25-2	E611D	79.0 µg/L	100 µg/L	79.0	60.0	140	----
		Chloroform	67-66-3	E611D	89.1 µg/L	100 µg/L	89.1	60.0	140	----
		Dibromochloromethane	124-48-1	E611D	82.1 µg/L	100 µg/L	82.1	60.0	140	----
		Dichloromethane	75-09-2	E611D	85.4 µg/L	100 µg/L	85.4	60.0	140	----
		Ethylbenzene	100-41-4	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	103 µg/L	100 µg/L	103	60.0	140	----
		Tetrachloroethylene	127-18-4	E611D	91.0 µg/L	100 µg/L	91.0	60.0	140	----
		Toluene	108-88-3	E611D	96.9 µg/L	100 µg/L	96.9	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611D	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611D	88.7 µg/L	100 µg/L	88.7	60.0	140	----
		Trichloroethylene	79-01-6	E611D	90.7 µg/L	100 µg/L	90.7	60.0	140	----
		Xylene, m+p-	179601-23-1	E611D	210 µg/L	200 µg/L	105	60.0	140	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1101590) - continued										
WP2320256-001	Anonymous	Xylene, o-	95-47-6	E611D	94.7 µg/L	100 µg/L	94.7	60.0	140	----

Manitoba
Environment, Climate and Parks
Office of Drinking Water
1007 Century Street, Winnipeg, Manitoba,
Canada R3H 0W4

Chain of Custody (COC)
Manitoba Drinking Water Systems

Regular Service (default):	☒ Regular Service (is 5-7 Days):
Unless otherwise requested	☐ 1 Day, rush / priority ☐ 2 Day, rush / priority ☐ 3 Day, rush / priority

Report to Operator (email PDF):
Contact: Barry Broesky
Address: 28 Westland Drive, Mitchell, MB R5G 2N9
Phone: (204) 371-0484
Email: barry.broesky@hanovermb.ca; rob.friesen@hanovermb.ca; rob.driedger@hanovermb.ca

Report to Owner (email PDF):
Contact: Rob Driedger
Address: 28 Westland Drive, Mitchell, MB R5G 2N9
Phone: (204) 346-7121
Email: rob.driedger@hanovermb.ca

Email PDF copy to:
DWO: Sarah Belisle
DWO Address: Unit B-284 Reimer Ave., Steinbach, MB R5G
DWO Phone: (204) 371-5065
DWO Email: Sarah.Belisle@gov.mb.ca
Additional Email: Joern.Muenster@gov.mb.ca; Melanie.Betsill@gov.mb.ca;

If an update in Owner or Operator contact information is required, please contact your Drinking Water Officer

Client / Project Information:	Lab:	Account:	Agency Code: 382	Report Type: EMS (Lab-MWS)	Project: DWQ-C

Operation Name:	GRUNTHAL - PWS
Operation Code:	86.00
Operation ID:	6700
Sampled by:	Rob Friesen

Expected Sample Time: **February-2023**

Please record Free & Total Chlorine residuals for Distribution By-product Sampling

DO NOT COPY or RE-USE this form. Sample Number are unique to the Office of Drinking Water and provided by Drinking Water Officer.

Sample Number	Station Number	Sample Identification	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Sample Date dd-mmm-yyyy	Sample Time hh:mm	Sample Matrix	Sample Type	MB-CH-PWS-V2013	MB-MET-T-CCMS	MB-VOC-PWS-V2013	# of Containers
2302SB5001	MB05OED021	Grunthal 1 - Raw Well 1			22-Aug-2023	11:15	6	1	X		X	6
2302SB5002	MB05OED021	Grunthal 1 - Raw Well 2 - backup			22-Aug-2023	11:30	6	1	X		X	6
2302SB5003	MB05OED022	Grunthal 2 - Treated			22-Aug-2023	11:45	10	1	X			4
2302SB5004	MB05OED023	Grunthal 3 - Distribution mid-point 5-30 Birch Street	0.93	1.21	22-Aug-2023	1:30	9	1		X		1

Environmental Division
Winnipeg
Work Order Reference
WP2320502
Telephone : +1 204 255 9720

Failure to complete all portions of this form may delay analysis.
Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.
For ALL other testing, please use Laboratory specific forms.

Sample Matrix: 6-Raw Water, 9-Distributed Wat
Sample Type: 1-Grab Sample

Relinquished By:		Date & Time		Validated By (lab use only):	Date &
				Sample Condition (lab use only)	
Received By: (lab use only)	JB	Date & Time: (lab use only)	AUG 23 2023 10:09	Temperature 15.6	Samples Received in Good Condi

Appendix D

Operating License for Public Water System

Manitoba
Environment and Climate
Office of Drinking Water
Box 19 – 14 Fultz Boulevard, Winnipeg, Manitoba R3Y 0L6

OPERATING LICENCE FOR A PUBLIC WATER SYSTEM

LICENCE NUMBER: PWS-09-325-03

THE DRINKING WATER SAFETY ACT CHAPTER D101, C.C.S.M.

WATER SYSTEM CODE:	**86.00**
OPERATION ID:	**6700**
EFFECTIVE DATE:	**JUNE 1, 2023**
EXPIRY DATE:	**MAY 31, 2028**

IN ACCORDANCE WITH THE DRINKING WATER SAFETY ACT, THIS OPERATING LICENCE IS ISSUED PURSUANT TO SUBSECTION 8(1) TO:

RURAL MUNICIPALITY OF HANOVER: "THE LICENSEE"

FOR THE OPERATION OF THE **GRUNTHAL PUBLIC WATER SYSTEM**, WHICH INCLUDES SECURE WELLS, TREATMENT FACILITIES, WATER STORAGE RESERVOIRS, AND DISTRIBUTION LINES, SUBJECT TO THE ATTACHED TERMS AND CONDITIONS.

THIS LICENCE DOES NOT AFFECT THE LICENSEE'S OBLIGATIONS WITH RESPECT TO COMPLIANCE WITH ALL APPLICABLE MUNICIPAL, PROVINCIAL, AND FEDERAL LEGISLATION. THIS LICENCE SUPERSEDES ALL PREVIOUS LICENCES FOR THIS PUBLIC WATER SYSTEM.

Digitally signed by Sacha Janzen
Date: 2023.09.19 09:43:59 -05'00'

DATE: September 19, 2023

Sacha Janzen
A/Director, Office of Drinking Water

TERMS AND CONDITIONS

1. GENERAL

1.1. The Licensee shall operate the public water system in accordance with all applicable requirements of The Drinking Water Safety Act and its regulations, and the requirements of this licence. In the event that specific terms and conditions of this licence imposed under the authority of subsection 8(3) of the Act exceed the general requirements of the Act and regulations, the specific requirements of this licence shall apply.

1.2. The Licensee shall obtain approval from the Office of Drinking Water prior to making any significant alterations to the water source, the water treatment process, the water storage facilities, or the water distribution system.

1.3. This licence may be amended by the director where, in the opinion of the director, an amendment is necessary and the amendment will not negatively impact the safety of water obtained from the water system, or effective environmental management.

1.4. The Licensee may request an amendment to this licence by submitting an amendment application to the Office of Drinking Water.

1.5. This licence may be suspended or cancelled by the director for any of the reasons identified in Section 11 of Manitoba Regulation 40/2007, Drinking Water Safety Regulation or due to a failure to comply with any term or condition of this licence.

1.6. The Licensee shall provide written notice to the Office of Drinking Water of any change in ownership of the water system within seven days of the transfer of ownership.

1.7. The Licensee shall provide written notice to the Office of Drinking Water of any changes in the operational status of the water system, such as a permanent cessation of service, or changing the length of service from year-round to seasonal or the opposite.

1.8. The director of the Office of Drinking Water, medical officer of health or drinking water officer may enter any water system facility as necessary to carry out the provisions of The Drinking Water Safety Act and its regulations.

1.9. The Licensee shall post a copy of the first page of this licence at the water treatment facility.

1.10. The Licensee shall keep a copy of this licence in its entirety at a location established by the drinking water officer and ensure all operators are familiar with its terms and conditions.

1.11. The Licensee shall apply for renewal of this licence at least 60 days prior to its expiry.

2. OPERATION - GENERAL

2.1. The Licensee shall operate all water system facilities, control systems, equipment, any reservoirs/cisterns and/or distribution lines as efficiently as possible, inspect them on a regular basis, maintain them in good working order, and ensure that the water system is protected from the risks associated with contamination.

2.2. The Licensee shall ensure that all chemicals and components that may come into contact with potable water are certified safe for potable water use through AWWA Standards, ANSI/NSF Standard 60 or 61, Health Canada, or other standards acceptable to the director.

2.3. No alternate water source shall be brought into service without the consent of the drinking water officer and the maintenance of adequate cross connection control between the alternate source and the primary source.

2.4. The Licensee shall follow the requirements as specified in *Operational Guideline ODW-OG-02 Seasonal Water Systems Start-up Shut-down Procedures* for any portion(s) of the distribution system that operate on a seasonal basis.

2.5. The Licensee shall have re-assessments of the water system infrastructure and water supply sources completed by a qualified person, who is not an employee of the water system, in accordance with assessment checklist GW by March 1, 2025, and every five years thereafter. The Licensee may instead have the assessment completed by a qualified professional engineer, who is not an employee of the water system, in accordance with terms of reference for engineering assessments.

2.6. The Licensee shall, upon request from the Office of Drinking Water, submit or re-submit a compliance plan, in a form satisfactory to the director, to address any non-compliance issues identified at the time.

3. OPERATION – EMERGENCIES

3.1. The Licensee shall ensure that disinfection is undertaken following construction, repair or maintenance activities on the water system, in accordance with applicable AWWA standards, or Manitoba Water Services Board specifications, or any other standards approved by the director. A copy of all associated test results must be kept available for review by the Office of Drinking Water for a minimum of 24 months.

3.2. The Licensee shall ensure that all equipment used for disinfection is maintained in effective working order and keep available for immediate use all spare parts and chemical supplies as may be necessary to ensure continuous disinfection, including a spare disinfection unit, if necessary.

3.3. The Licensee shall immediately notify the Office of Drinking Water of any condition that may affect the ability of the water system to produce or deliver safe drinking water including but not limited to treatment upsets or bypass conditions, contamination of the source water or treated water, a disinfection system failure, or a distribution system failure.

3.4. If a medical officer of health, the director of the Office of Drinking Water, or a drinking water officer issues a water advisory on the water system, the Licensee shall provide notice of the advisory to all water users in accordance with the advisory notification plan or by a method acceptable to the issuer.

4. WATER QUALITY/TREATMENT STANDARDS

4.1. The Licensee shall operate the water system in a manner that achieves the water quality/treatment standards specified in Table 1, as determined through the monitoring requirements specified in Table 2:

Table 1: Water Quality/Treatment Standards

Parameter	Quality Standard
Total coliform	Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water
E. coli	Less than one *E. coli* bacteria detectable per 100 mL in all treated and distributed water
Chlorine Residual	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system
Arsenic	Less than or equal to 0.01 mg/L
Benzene	Less than or equal to 0.005 mg/L
Ethylbenzene	Less than or equal to 0.14 mg/L
Fluoride	Less than or equal to 1.5 mg/L
Lead	Less than or equal to 0.005 mg/L based on a sample(s) collected at a cold water tap or other appropriate location where water may be used for drinking or food preparation
Manganese	Less than or equal to 0.12 mg/L
Nitrate	Less than or equal to 45 mg/L measured as nitrate (10 mg/L measured as nitrogen)
Nitrite	Less than or equal to 3 mg/L measured as nitrite (1 mg/L measured as nitrogen)
Trichloroethylene	Less than or equal to 0.005 mg/L
Tetrachloroethylene	Less than or equal to 0.01 mg/L
Toluene	Less than or equal to 0.06 mg/L
Total Xylenes	Less than or equal to 0.09 mg/L
Uranium	Less than or equal to 0.02 mg/L

4.2. If a bacteriological standard is not met, the Licensee shall immediately undertake the applicable corrective actions as listed in "Schedule A" of Manitoba Regulation 41/2007, Drinking Water Quality Standards Regulation.

4.3. If a microbial, chemical, radiological, or physical standard is not met, the Licensee shall immediately undertake the applicable corrective actions specified in "Schedule C" of Manitoba Regulation 41/2007, the Drinking Water Quality Standards Regulation.

4.4. The Licensee shall maintain in effective working order chlorination and treated water storage equipment and controls designed to achieve a minimum of 20 minutes of chlorine contact time prior to water entering the distribution system.

5. WATER QUALITY MONITORING

5.1. The Licensee shall ensure monitoring is completed as set out in Table 2.

Table 2: Monitoring Schedule

Parameter	Monitoring Requirement
Bacteriological (total coliform and *E. coli*)	Biweekly sampling program with each set of samples consisting of one raw, one treated, and a minimum of one distribution sample Consecutive sample sets to be separated by at least 12 days
Free Chlorine (treated water)	One sample per day of water entering the distribution system following at least 20 minutes of contact time
Free Chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling
Total Chlorine (treated water)	One sample per day of water entering the distribution system following at least 20 minutes of contact time
Total Chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling
General Chemistry (parameter list provided by Office of Drinking Water)	One raw and one treated water sample once every three years
Total Metals (distribution system)	One sample taken at the same time(s) as general chemistry sampling at a mid-point in the distribution system
Lead	As per the instructions of the drinking water officer
Manganese	Monitoring included in the general chemistry and total metals analysis
Other Parameters	As per the instructions of the drinking water officer

5.2. The Licensee shall ensure that an accredited laboratory, as specified in section 35 of Manitoba Regulation 40/2007 the Drinking Water Safety Regulation, undertake the following analysis required in Table 2:

a) bacteriological (total coliform and *E. coli*)
b) general chemistry
c) manganese
d) total metals
e) any other parameter required by the drinking water officer

and that all samples are collected, handled, and submitted in a manner that is satisfactory to the accredited laboratory.

5.3. The Licensee shall ensure that parameters listed in Table 2 but not specified in clause 5.2 are measured utilizing certified water quality monitoring equipment and methods approved by the latest edition of *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, the American Water Works Association and the Water Environment Federation.

5.4. The Licensee shall ensure that raw water samples are taken on an alternating basis in instances where more than one water supply source is used.

5.5. The Licensee shall ensure that all water quality monitoring equipment is properly maintained and calibrated by a qualified person according to manufacturer recommendations and that records are maintained to that effect.

5.6. The Licensee shall ensure that sampling within the distribution system takes place at varied locations acceptable to the drinking water officer.

6. RECORD-KEEPING AND REPORTING

6.1. The Licensee shall maintain in a secure location all construction drawings for the life of the water system components.

6.2. The Licensee shall retain in chronological order for a minimum of 24 months all information specified in subsection 34(2) of Manitoba Regulation 40/2007, Drinking Water Safety Regulation.

6.3. The Licensee shall ensure the information identified in clause 6.2 is available for inspection by any member of the public during normal business hours at the office of the water supplier or at a location convenient to the users of the system.

6.4. The Licensee shall record disinfectant residual measurements on the monthly disinfection report or other forms satisfactory to the director.

6.5. The Licensee shall keep one copy of all monthly report forms required in this licence, and forward the original copy to the drinking water officer within seven days after the end of each calendar month.

6.6. The Licensee shall record all distribution system measurements specified in *Table 2: Monitoring Schedule* on the chain of custody form (laboratory submission form) which accompanies the bacteriological sample bottles to the laboratory.

6.7. The Licensee shall ensure that water metering devices at the water treatment plant or storage reservoir are maintained in good working order and that flow meter readings are recorded on a daily basis and such records are made available for inspection by a drinking water officer.

6.8. The Licensee shall submit an annual report to the director by March 31st of each year on the operation of the water system in the immediately preceding calendar year. The report shall include the information as set out in subsection 32(2) of Manitoba Regulation 40/2007, Drinking Water Safety Regulation.

6.9. The Licensee shall inform the public, in a form satisfactory to the director, when an annual report has been prepared and identify how a free copy can be obtained.

6.10. The Licensee shall make a copy of each annual report available to the public at no charge on an internet website within two weeks of the issuance of the report, unless otherwise approved by the director. The annual report shall remain available to the public for at least one year.

6.11. The Licensee shall maintain and submit an advisory notification plan to the drinking water officer by May 1st of each year. The plan must include a detailed description of communication tools and methods to be used to notify the public of a drinking water emergency, considering key contacts, fan-outs, critical customers, susceptible or difficult-to-reach sub-groups, and template notices where applicable.

Appendix E

Disinfection Reports

Manitoba

Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: JANUARY Year: 2023 Type of Measurement Device: ELECTRONIC

Operator-in-charge (Print): BARRY BROESKY Other Operators (Print): ROB FRIESEN

Daily Consumption Units: m^3 STEPH DUVAL

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	10:00	R.F.	0.51	0.73	790
2	9:30	R.F.	0.70	0.98	755
3	8:00	B.B.	1.17	1.61	799
4	6:15	B.B.	0.82	1.18	768
5	8:00	B.B.	1.15	1.56	874
6	8:15	B.B.	1.04	1.53	851
7	7:45	B.B.	1.12	1.52	789
8	8:30	B.B.	1.06	1.48	852
9	8:00	B.B.	1.04	1.49	814
10	8:00	B.B.	0.62	0.86	854
11	5:45	B.B.	0.87	1.21	754
12	9:00	R.F.	1.11	1.51	961
13	10:00	R.F.	1.18	1.59	886
14	9:45	R.F.	0.52	0.79	818
15	6:45	R.F.	0.53	0.88	732
16	8:15	B.B.	0.51	0.84	891

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	8:30	B.B.	1.04	1.46	850
18	6:00	B.B.	1.13	1.51	756
19	7:30	B.B.	0.79	1.18	902
20	7:00	B.B.	0.56	0.90	845
21	8:00	B.B.	0.70	1.09	811
22	10:15	B.B.	1.22	1.64	1030
23	7:30	B.B.	1.18	1.66	743
24	6:45	B.B.	1.23	1.55	827
25	5:45	B.B.	1.08	1.51	823
26	7:45	B.B.	0.96	1.37	936
27	6:45	B.B.	0.68	1.04	774
28	6:30	R.F.	0.54	0.72	779
29	6:30	R.F.	0.70	0.84	768
30	8:00	B.B.	1.32	1.75	815
31	8:00	B.B.	0.83	1.25	767
				Total Monthly Consumption	24,816

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
10	9:15	B.B.	COTTONWOOD RD.	0.80	1.17
24	10:00	B.B.	COTTONWOOD RD.	1.12	1.40

Submitted by (Print): BARRY BROESKY Signature: [signature]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: FEBRUARY Year: 2023 Type of Measurement Device: ELECTRONIC

Operator-in-charge (Print): BARRY BROESKY Other Operators (Print): ROB FRIESEN

Daily Consumption Units: m^3 STEPH DUVAL

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	5:45	B.B.	1.01	1.41	727
2	7:45	B.B	0.92	1.33	850
3	8:00	B.B.	0.84	1.19	784
4	7:15	B.B.	0.81	1.20	739
5	9:45	B.B.	0.83	1.25	867
6	7:00	R.F.	0.66	0.85	677
7	7:30	R.F.	0.52	0.67	843
8	6:00	R.F.	0.53	0.69	777
9	7:30	R.F.	0.59	0.73	863
10	8:00	R.F.	0.50	0.76	846
11	8:30	R.F.	0.69	0.93	779
12	7:00	R.F.	0.69	0.95	731
13	8:15	B.B.	0.77	1.06	841
14	8:15	B.B	0.71	1.04	791
15	8:15	B.B	0.65	0.87	783
16	8:00	B.B.	0.76	1.03	791

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	8:30	B.B	0.75	1.17	803
18	7:00	B.B.	0.71	1.06	721
19	11:00	B.B.	0.81	1.17	921
20	8:00	B.B.	0.79	1.10	649
21	7:30	R.F.	0.77	1.14	792
22	7:30	R.F.	0.78	1.07	796
23	7:30	S.D.	0.82	1.11	794
24	7:30	R.F.	0.77	0.94	801
25	10:00	R.F.	0.85	1.17	888
26	6:30	R.F.	0.82	1.20	888
27	7:15	S.D.	0.77	1.14	824
28	9:00	S.D.	0.83	1.18	883
29	~~9:00~~	~~S.D.~~			
30					
31					
				Total Monthly Consumption	22,249

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
7	10:00	R.F.	COTTONWOOD RD.	0.35	0.42
21	10:00	R.F.	Cottonwood Drive	0.66	0.90

Submitted by (Print): BARRY BROESKY Signature: [signature]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: Gruntal Water System Code: 86.0

Month: March Year: 2023 Type of Measurement Device: Electronic

Operator-in-charge (Print): Rob Friesen Other Operators (Print): Barry Brovsky

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	9:00	S.D.	0.90	1.21	794
2	7:00	B.B.	0.93	1.23	745
3	8:00	B.B.	0.78	1.20	853
4	7:30	B.B.	0.80	1.12	798
5	10:30	B.B.	0.83	1.16	895
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	7:30	R.F.	0.93	1.26	801
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]30	R.F.	1.15	1.51	784
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	10:30	R.F.	1.15	1.43	922
12	6:30	R.F.	0.98	1.23	612
13	8:00	B.B.	0.91	1.27	847
14	7:45	B.B.	0.94	1.26	818
15	8:15	B.B.	0.95	1.32	870
16	7:00	B.B.	0.90	1.23	785

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	8:45	B.B.	0.82	1.27	897
18	7:30	B.B.	0.91	1.31	761
19	10:00	B.B.	0.91	1.23	926
20	8:15	B.B.	0.87	1.24	751
21	8:30	B.B.	0.88	1.21	839
22	8:30	R.F.	0.87	1.17	547
23	8:30	R.F.	0.81	1.13	811
24	8:30	R.F.	0.80	1.10	824
25	6:45	R.F.	0.84	1.13	766
26	6:45	R.F.	0.93	1.15	808
27	8:00	B.B.	0.64	1.08	876
28	7:45	B.B.	0.85	1.08	822
29	8:00	B.B.	0.87	1.21	847
30	9.00	R.F.	0.88	1.07	847
31	8:45	B.B.	0.68	1.03	832
				Total Monthly Consumption	25,353

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
7	[illegible]	R.F.	Cottonwood Rd	0.75	1.00
21	9:30	B.B.	COTTONWOOD RD.	0.84	1.11

Submitted by (Print): Rob Friesen Signature: [signature]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Monthly Chlorination Report

Water System Name: Grunthal Water System Code: 860

Month: April Year: 2023 Type of Measurement Device: Electronic

Operator-in-charge (Print): Rob Friesen Other Operators (Print): Barry Broesky

Steph Duval

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	8:00	B.B.	0.86	1.21	804
2	10:00	B.B.	0.84	1.19	891
3	7:30	R.F.	0.82	1.05	721
4	7:30	R.F.	0.78	0.98	865
5	8:30	R.F.	0.89	1.10	858
6	8:30	R.F.	0.76	0.99	878
7	9:30	R.F.	0.68	0.91	865
8	11:30	R.F.	0.96	1.03	899
9	6:00	R.F.	0.87	1.12	620
10	8:00	B.B.	0.75	1.06	896
11	8:00	B.B.	0.62	0.89	882
12	8:00	B.B.	0.63	0.92	875
13	8:00	B.B.	0.73	0.97	853
14	8:45	B.B.	0.71	1.06	913
15	5:30	B.B.	0.69	0.86	724
16	11:30	B.B.	0.72	1.01	1054

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	6:00	R.F.	0.76	1.04	615
18	7:30	R.F.	0.50	0.71	903
19	7:30	R.F.	0.63	0.82	844
20	7:30	R.F.	1.14	1.48	815
21	7:30	R.F.	1.22	1.24	832
22	10:00	R.F.	1.31	1.51	945
23	7:00	R.F.	1.29	1.68	707
24	8:15	B.B.	1.16	1.58	896
25	8:00	B.B.	1.03	1.35	859
26	7:45	B.B.	0.99	1.27	843
27	8:00	B.B.	0.87	1.19	840
28	7:00	B.B.	0.86	1.28	825
29	7:00	B.B.	0.91	1.26	877
30	8:30	B.B.	0.68	1.05	886
31					
				Total Monthly Consumption	25,267

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
4	10:00	R.F.	Cottonwood Drive	0.93	0.99
18	10:00	R.F.	Cottonwood Drive	0.90	0.93

Submitted by (Print): Rob Friesen Signature:

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: Grunthal Water System Code: 86.0

Month: May Year: 2023 Type of Measurement Device: Electronic

Operator-in-charge (Print): Rob Friesen Other Operators (Print): Barry Broesky

Steph Duval

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	8:00	R.F.	0.68	0.74	816
2	8:00	R.F.	0.56	1.00	863
3	7:30	R.F.	0.76	1.07	818
4	7:30	R.F.	0.95	1.08	876
5	7:30	R.F.	1.01	1.21	886
6	6:30	R.F.	0.87	1.12	822
7	8:30	R.F.	0.83	1.06	937
8	7:00	B.B.	0.79	1.08	791
9	7:30	B.B.	0.88	1.14	908
10	7:30	B.B.	0.79	1.08	877
11	7:30	B.B.	0.76	1.04	961
12	7:00	B.B.	0.85	1.20	873
13	6:30	B.B.	1.00	1.38	876
14	9:45	B.B.	0.95	1.34	1053
15	7:30	R.F.	1.13	1.38	817
16	7:15	R.F.	1.08	1.30	943

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	7:45	R.F.	1.03	1.23	946
18	7:30	R.F.	0.92	1.16	953
19	7:30	R.F.	1.08	1.31	958
20	7:00	R.F.	0.60	0.63	908
21	7:00	R.F.	0.88	1.11	921
22	7:00	R.F.	1.15	1.45	911
23	6:00	B.B.	1.23	1.67	1010
24	8:00	B.B.	0.82	1.17	1113
25	8:00	B.B.	1.10	1.55	1042
26	8:00	B.B.	1.22	1.65	1095
27	8:00	B.B.	1.11	1.22	1058
28	11:00	B.B.	0.95	1.08	1202
29	7:15	R.F.	1.02	1.09	900
30	7:30	R.F.	0.73	1.06	995
31	7:30	R.F.	0.81	1.08	1027
				Total Monthly Consumption	29,156

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
2	10:00	R.F.	Cottonwood Drive	0.48	0.92
16	9:30	R.F.	Cottonwood Drive	0.97	1.16
30	9:30	R.F.	Cottonwood Drive	0.81	1.07

Submitted by (Print): Rob Friesen Signature: [signature]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: JUNE Year: 2023 Type of Measurement Device: ELECTRONIC

Operator-in-charge (Print): BARRY BROESKY Other Operators (Print): ROB FRIESEN

STEPH DUVAL

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	7:30	R.F.	0.92	1.17	999
2	7:15	R.F.	0.77	1.11	1024
3	9:45	R.F.	0.85	1.02	1249
4	7:00	R.F.	0.76	0.98	947
5	7:00	B.B.	0.77	1.04	962
6	8:00	B.B.	0.70	0.98	1172
7	8:00	B.B.	0.70	1.05	1173
8	8:00	B.B.	0.62	0.90	999
9	7:15	B.B.	0.65	0.97	1054
10	7:30	B.B.	0.66	0.99	1007
11	10:30	B.B.	1.00	1.31	1197
12	7:30	R.F.	1.09	1.38	943
13	7:30	R.F.	1.04	1.23	1181
14	7:45	R.F.	0.95	1.25	1176
15	7:15	R.F.	0.81	1.27	1073
16	8:30	R.F.	0.81	1.14	1192

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	9:45	R.F.	0.93	1.18	1176
18	6:30	R.F.	0.74	1.02	908
19	8:30	B.B.	0.81	1.15	1105
20	8:15	B.B.	0.82	1.17	1114
21	8:00	B.B.	0.65	0.97	1047
22	8:15	B.B.	0.74	1.07	1084
23	8:15	B.B.	0.68	1.01	857
24	7:00	B.B.	0.64	0.98	812
25	8:00	B.B.	0.71	1.06	862
26	7:30	R.F.	0.72	0.93	858
27	7:30	R.F.	0.87	1.13	979
28	7:30	R.F.	0.75	0.98	890
29	7:30	R.F.	0.73	0.98	881
30	7:30	B.B.	0.69	0.90	848
31					
				Total Monthly Consumption	30,764

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
13	10:00	R.F.	Cottonwood Drive	0.90	1.19
27	10:00	R.F.	Cottonwood Drive	0.83	1.10

Submitted by (Print): BARRY BROESKY Signature:

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: Grunthal Water System Code: 86.0

Month: July Year: 2023 Type of Measurement Device: Electronic

Operator-in-charge (Print): Rob Friesen Other Operators (Print): Barry Braesky, Steph Dueck

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw Treated No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	7:15	B.B.	0.73	1.01	916
2	10:00	B.B.	0.69	0.99	1039
3	8:00	B.B.	0.62	0.96	828
4	7:30	B.B.	0.59	0.86	895
5	6:30	B.B.	0.68	1.01	874
6	9:00	B.B.	0.67	0.94	1052
7	9:30	B.B.	0.87	1.25	1029
8	8:00	B.B.	0.85	1.19	779
9	10:30	B.B.	0.63	1.07	982
10	8:15	R.F.	0.65	0.94	800
11	7:15	R.F.	0.56	0.80	816
12	7:45	R.F.	0.61	0.78	913
13	7:30	R.F.	0.72	0.94	887
14	7:30	R.F.	0.62	0.80	913
15	10:00	R.F.	0.75	1.09	1133
16	6:30	R.F.	0.74	0.96	746

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	7:30	R.F.	0.61	0.90	823
18	7:30	R.F.	0.70	0.99	847
19	5:45	R.F.	0.54	0.75	774
20	7:00	R.F.	0.95	1.27	887
21	8:00	R.F.	1.20	1.58	1078
22	7:00	R.F.	1.10	1.45	903
23	7:00	R.F.	1.12	1.43	821
24	8:30	R.F.	1.08	1.44	900
25	7:00	R.F.	1.07	1.43	991
26	6:00	R.F.	1.05	1.32	777
27	7:45	R.F.	0.97	1.31	933
28	9:00	R.F.	0.97	1.19	932
29	10:00	R.F.	0.98	1.30	921
30	6:30	R.F.	0.74	1.00	743
31	7:30	R.F.	0.62	0.81	914
				Total Monthly Consumption	27,846

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
11	11:30	R.F.	Cottonwood Rd.	0.64	0.80
25	1:30	R.F.	Cottonwood Rd.	1.05	1.43

Submitted by (Print): Rob Friesen Signature:

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: AUGUST Year: 2023 Type of Measurement Device: ELECTRONIC

Operator-in-charge (Print): BARRY BROESKY Other Operators (Print): ROB FRIESEN

STEPH DUVAL

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	7:00	R.F.	0.50	0.73	932
2	6:00	R.F.	0.64	0.93	1107
3	8:00	B.B.	0.66	1.01	1105
4	8:30	B.B.	0.60	0.90	949
5	7:30	B.B.	0.74	0.96	942
6	9:45	B.B.	0.88	1.25	995
7	8:00	B.B.	1.15	1.43	790
8	7:00	B.B.	0.74	1.07	933
9	6:30	B.B.	0.69	1.04	1025
10	7:30	B.B.	1.34	1.69	1073
11	8:00	B.B.	1.23	1.72	991
12	6:45	B.B.	1.13	1.56	778
13	9:45	B.B.	0.90	1.21	931
14	7:15	B.B.	0.90	1.33	743
15	6:45	B.B.	1.01	1.38	904
16	7:00	B.B.	1.27	1.90	988

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	6:45	B.B.	1.27	1.77	912
18	6:45	B.B.	0.89	1.11	976
19	9:15	R.F.	1.32	1.75	1156
20	7:00	R.F.	1.27	1.57	822
21	9:00	R.F.	1.01	1.28	933
22	8:00	R.F.	0.95	1.40	830
23	7:15	R.F.	0.95	1.31	806
24	7:15	R.F.	0.95	1.24	865
25	7:15	R.F.	0.92	1.25	858
26	10:00	R.F.	0.80	1.13	934
27	7:00	R.F.	0.88	1.11	709
28	7:00	B.B.	0.75	1.02	889
29	8:00	B.B.	0.73	1.09	968
30	8:00	B.B.	0.77	1.06	921
31	8:45	B.B.	0.87	1.27	1031
				Total Monthly Consumption	28,796

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
8	10:45	B.B.	COTTONWOOD RD.	0.65	0.80
22	13:30	R.F.	5-30 BIRCH ST.	0.93	1.21

Submitted by (Print): BARRY BROESKY Signature:

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PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: SEPTEMBER Year: 2023 Type of Measurement Device: ELECTRONIC

Operator-in-charge (Print): BARRY BROESKY Other Operators (Print): ROB FRIESEN

Daily Consumption Units: m^3 STEPH DUVAL

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	8:30	B.B.	0.87	1.36	948
2	7:15	B.B.	0.98	1.41	999
3	9:00	B.B.	0.71	1.05	1113
4	8:15	B.B.	0.81	1.21	930
5	8.15	R.F.	1.02	1.43	1103
6	5:45	R.F.	0.52	0.77	888
7	8:15	R.F	0.60	0.88	1077
8	7:15	R.F.	0.54	0.76	853
9	10.15	R.F.	0.51	0.76	986
10	7:30	R.F.	0.70	0.92	715
11	8:00	B.B.	0.89	1.31	881
12	9:00	B.B.	1.17	1.69	900
13	7:00	B.B.	0.91	1.39	782
14	8:00	B.B.	1.04	1.46	982
15	8:15	B.B.	1.05	1.34	898
16	8:00	B.B.	0.87	1.26	845

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	10:00	B.B.	0.86	1.14	911
18	7:30	R.F.	0.85	1.22	753
19	7:00	R.F.	0.82	1.24	897
20	8:00	R.F.	0.65	0.91	916
21	8:00	R.F	0.82	1.06	1055
22	8:00	R.F	0.50	0.56	1125
23	10:00	R.F.	0.69	0.92	936
24	7:00	R.F.	0.72	0.97	730
25	8:00	B.B.	0.73	0.89	883
26	8:00	B.B.	0.72	1.09	836
27	8:00	B.B.	0.73	1.07	941
28	7:45	B.B.	0.74	1.11	887
29	8:30	B.B.	0.72	1.08	906
30	8:00	B.B.	0.74	1.14	816
31					
				Total Monthly Consumption	27,492

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
5	11:00	R.F.	COTTONWOOD RD.	0.79	0.97
19	11:45	RF	COTTONWOOD RD.	0.72	1.06

Submitted by (Print): BARRY BROESKY Signature:

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PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: OCTOBER Year: 2023 Type of Measurement Device: Electronic

Operator-in-charge (Print): Rob Friesen Other Operators (Print): BARRY BROECKY

STEPH DUVAL

Daily Consumption Units: m^3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	8:00	B.B.	0.71	1.05	840
2	7:90	R.F.	0.74	1.15	829
3	7:30	R.F.	0.69	0.97	838
4	8:30	R.F.	0.78	1.06	~~8745~~836
5	8:30	R.F.	0.74	1.11	893
6	9:30	R.F.	0.78	1.10	899
7	10:30	R.F.	0.77	0.84	895
8	7:00	R.F.	0.77	1.10	726
9	9:30	R.F.	0.72	1.06	934
10	8:00	B.B.	0.78	1.03	800
11	7:00	B.B.	0.71	1.01	834
12	7:45	B.B.	0.72	1.06	896
13	8:30	B.B.	0.66	0.96	905
14	7:00	B.B.	0.66	1.01	780
15	10:00	B.B.	0.70	1.01	967
16	7:30	R.F.	0.75	1.03	743

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	6:30	R.F.	0.73	1.00	807
18	8:00	R.F.	0.71	1.00	916
19	8:00	R.F.	0.81	1.11	1020
20	8:00	R.F.	0.79	1.01	962
21	8:30	R.F.	0.79	0.90	780
22	11:00	R.F.	0.71	0.78	874
23	7:00	B.B.	0.69	0.97	665
24	8:00	B.B.	0.65	0.99	828
25	5:15	B.B.	0.78	1.10	712
26	8:45	B.B.	0.85	1.22	923
27	8:30	B.B.	0.85	1.21	790
28	8:30	B.B.	0.83	1.20	778
29	10:15	B.B.	0.78	1.17	852
30	8:30	R.F.	0.51	0.76	730
31	7:30	R.F.	0.69	0.93	776
				Total Monthly Consumption	26,042

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
03	11:00	R.F.	Cottonwood Drive	0.61	0.66
17	11:15	B.B.	COTTONWOOD RD.	0.53	0.76
31	10:30	R.F.	Cottonwood Rd.	0.61	0.71

Submitted by (Print): Rob Friesen Signature:

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PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: Grunthal Water System Code: 86.0

Month: November Year: 2023 Type of Measurement Device: Electronic

Operator-in-charge (Print): Rob Friesen Other Operators (Print): Barry Broesky

Daily Consumption Units: m3

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	7:30	R.F.	0.93	1.24	805
2	7:00	R.F.	0.93	1.23	805
3	7:30	R.F.	0.93	1.27	807
4	10:30	R.F.	0.74	1.03	901
5	12:00	R.F.	0.82	1.08	914
6	7:00	B.B.	0.82	1.11	599
7	8:30	B.B.	0.74	1.09	870
8	8:15	B.B	0.77	1.09	805
9	8:00	B.B	0.68	1.08	805
10	7:00	B.B.	0.76	1.13	782
11	7:45	B.B.	0.77	1.14	885
12	9:15	B.B.	0.77	1.15	870
13	7:30	B.B.	0.72	1.14	718
14	7:30	R.F.	0.77	0.88	847
15	7:30	R.F.	0.83	1.12	802
16	7:30	R.F.	1.04	1.42	805

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	7:30	R.F.	1.12	1.42	814
18	9:45	R.F.	1.29	1.61	888
19	12:09	R.F.	1.23	1.72	904
20	7:00	B.B.	0.97	1.40	618
21	8:00	B.B	1.03	1.43	851
22	6:30	B.B.	1.03	1.47	759
23	8:00	B.B	0.98	1.42	890
24	9:00	B.B.	1.01	1.50	872
25	8:00	B.B.	0.96	1.40	778
26	9:45	B.B.	0.87	1.27	899
27	7:30	R.F.	0.89	1.24	763
28	7:30	R.F.	0.85	1.01	863
29	7:30	R.F.	0.91	1.21	844
30	7:30	R.F.	0.86	1.21	852
31					
				Total Monthly Consumption	24565

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
14	11:00	RF	Cottonwood Drive	0.69	0.85
28	11:00	R.F.	Cottonwood Drive	0.73	1.01

Submitted by (Print): Rob Friesen Signature:

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Monthly Chlorination Report

Water System Name: GRUNTHAL Water System Code: 86.0

Month: DECEMBER Year: 2023 Type of Measurement Device: ELECTRONIC

Operator-in-charge (Print): BARRY BROESKY Other Operators (Print): ROB FRIESEN

Daily Consumption Units: m^3 STEPH DUVAL

Flow Meter for Daily Consumption: (circle choice) Raw (Treated) No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1	7:30	R.F.	0.79	1.13	863
2	9:30	R.F.	0.76	1.23	905
3	1:00	R.F.	0.89	0.92	998
4	8:00	B.B.	0.95	1.07	675
5	7:45	B.B.	0.79	1.17	904
6	8:00	B.B.	0.85	1.23	880
7	8:15	B.B.	0.63	0.97	888
8	8:15	B.B.	0.81	1.19	865
9	8:30	B.B.	0.83	1.19	857
10	10:15	B.B.	0.77	1.13	926
11	7:30	R.F.	0.84	1.20	754
12	7:30	R.F.	0.63	0.79	880
13	8:00	R.F.	0.83	0.88	907
14	8:30	R.F.	0.788	0.90 ~~2~~	856 ~~8~~
15	8:30	R.F.	0.83	1.03	885
16	10:30	R.F.	0.84	1.11	937

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	7:00	R.F.	0.85	1.26	733
18	8:00	B.B.	0.66	1.02	908
19	8:00	B.B.	0.53	0.86	952
20	8:00	B.B.	0.62	0.96	955
21	7:45	B.B.	0.61	0.86	905
22	8:30	R.F.	0.86	1.11	952
23	10:30	R.F.	0.69	0.86	1009
24	6:30	R.F.	0.53	0.68	778
25	9:30	R.F.	0.67	0.73	963
26	9:30	R.F.	1.06	1.07	850
27	8:30	B.B.	1.02	1.36	859
28	8:30	B.B.	0.92	1.32	925
29	9:00	B.B.	1.09	1.56	939
30	8:00	B.B.	1.01	1.65	859
31	10:00	B.B.	0.92	1.39	1022
				Total Monthly Consumption	27,589

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total
12	10:15	B.B.	COTTONWOOD RD.	0.65	0.99
27	10:30	B.B.	COTTONWOOD RD.	0.87	1.26

Submitted by (Print): BARRY BROESKY Signature:

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