G3 Regional Water Co-operative Inc.

2018 Annual Water System Monitoring Report

MWSB

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Executive Summary

The annual water system report provides status of system operations and monitoring results for the Co-op Board and other parties with an interest in the system (i.e. Water Use Licensing Section, Manitoba Conservation and Water Stewardship). The primary purpose is to ensure annual reviews of the system status, and potential problems are identified and rectified before becoming a significant issue.

The G3 Regional Water Co-operative water supply system was commissioned in February 2010 with the Rural Municipality (RM) of Gilbert Plains, Town of Gilbert Plains and Town of Grandview as partners. A reverse osmosis (RO) treatment system was selected to provide 28 L/s based on a 20 year projected design period. Raw water is supplied by a production well with a 34 L/s pumping capacity. In 2010, a back-up well was developed to provide additional water supply protection and the existing RM of Gilbert Plains well was abandoned and sealed.

The G3 system is in compliance with both the *Water Rights Act* and *Drinking Water Safety Act (DWSA)*. Raw water is described as being hard and high in iron and manganese concentrations. Also the water supply contains high levels of ammonia that must be removed to prevent chlorine disinfection issues. The treatment system is meeting health-based maximum acceptable concentrations and aesthetic objectives of the Guidelines for Canadian Drinking Water Quality (GCDWQ). Treated water quality results confirm that ammonia is being satisfactorily removed during the treatment process.

Under the *DWSA* regulations, the G3 system is required to develop a Public Annual Report by March 31st of each operating year, an Emergency Response Plan and Compliance plan. Since the operation is in compliance with water quality standards, the Co-op can meet compliance plan requirements by filing a signed "Statement of Compliance" form to the Office of Drinking Water. Also, an infrastructure assessment must be completed by a professional engineer once every five years with the next one due in March 2021.

Two groundwater monitoring wells are equipped with pressure transducers for continuous water level monitoring. Monitoring well MW09-02 is located 400 metres north and MW98-16 is approximately 1500 metres west of the production wells. Pumping activities appear to have no significant impact on water levels. Changes in levels appear to be related to seasonal impacts.

In order to effectively respond to complaints regarding groundwater interference on surrounding private wells from G3 pumping activities, it is recommended that the Co-op Board adopt by resolution, a Groundwater Interference Policy as provided in Appendix G and forward to Water Use Licensing Branch as required under the *Water Rights Act*. In addition, it is recommended that a Source Water Protection Plan be implemented as provided in Section 7.0.

1.0 Introduction

The Manitoba Water Services Board (MWSB) assumed lead role in developing a regional water supply system for the RM of Gilbert Plains and the Towns of Gilbert Plains and Grandview. After consultation with the Municipal Corporations, the G3 Regional Water Co-operative Inc. (Co-op) was formed in 2009. The Board of Directors is comprised of equal representation from three municipal corporations with MWSB as an ex officio member. The Co-op owns the water system and has requested the MWSB to operate the system on their behalf. Recent municipal amalgamations have resulted in two entities – the Municipality of Gilbert Plains (formerly RM and Town of Gilbert Plains) and the Municipality of Grandview (formerly RM and Town of Grandview).

The annual water system report provides status of system operations and monitoring results for the Co-op Board and other parties with an interest in the system (i.e. Water Use Licensing Section, Manitoba Water Stewardship). The primary purpose is to ensure annual reviews of the system status, and potential problems are identified and rectified before becoming a significant issue. Through continued aquifer monitoring, these annual reports will serve as a database to evaluate the potential to increase withdrawal rates if required for future demands.

2.0 Water System Overview

2.1 Regional Supply System

The G3 WTP is located in the NW corner of the former RM of Gilbert Plains on municipal right-of-way (ROW) west of the NW 26-26-23W. The WTP supplies treated water to the RM of Gilbert Plains, Town of Gilbert Plains, Town of Grandview and Municipality of Dauphin. The G3 system shown in Appendix A is comprised of two wells, raw water pipeline, water treatment plant (WTP) and Distribution pipelines to both Towns and Rural Municipalities.

Two 300 mm production wells are located approximately 1 km north of the WTP in ROW west of the NW35-26-23W. Although one well can fully supply the system, a fully equipped and redundant back-up well is required to ensure that supply can be maintained at all times. In case of power failure, emergency genset power at the WTP can operate one well and treatment equipment. The supply wells are occasionally alternated to maintain functionality. An existing 200 mm well adjacent to the WTP was sealed due to artesian conditions and leakage around the well casing. The location of production and monitoring wells are provided in Appendix B.

2.2 Treatment System

The treatment system is comprised of two parallel RO membrane filtration skids, a manganese greensand bypass filter and forced air de-gasifier for carbon dioxide (CO_2) removal and pH adjustment. The treatment system was designed with a membrane by-pass to produce a hardness of approximately 100 mg/L (as $CaCO_3$). Since membranes are capable of removing significant

amount of hardness ions, a percentage of the raw water by-passes the membrane system and is filtered through a 2.1 m diameter manganese greensand pressure filter. Water passing through the pressure filter is blended with membrane permeate to produce the desired water hardness. The membranes reject approximately 20% concentrate to Sulfur Spring Creek which is permitted by Environment Act Licence No. 2853.

Antiscalant is injected in the membrane raw water supply to sequester dissolved minerals and prevent RO membrane fouling. Since membranes remove dissolved minerals, stabilization (pH adjustment) is required to produce a non-corrosive treated water supply. A forced air de-gasifier was designed and installed to stabilize membrane permeate. The de-gasifier removes a significant portion of dissolved CO_2 therefore, minimizing sodium hydroxide chemical usage.

The raw water supply contains ammonia which interferes with chlorine disinfection capability unless removed in the treatment system. Failure to remove ammonia will result in phantom free chlorine readings in the treated water supply. Ammonia is removed through membrane treatment but not typically through a manganese greensand filter. Potassium permanganate is now used instead of previously used sodium hypochlorite as a pre-filter oxidant. There have been no issues with elevated ammonia since the change took place. Sodium hypochlorite is provided to maintain an adequate chlorine residual concentration in the reservoir and distribution.

Treated water is stored in a 1.2 ML 3 cell reinforced concrete reservoir. The reservoir is equipped with ultrasonic level control and monitored with a SCADA system. The SCADA system also has the capability of monitoring and controlling reservoir levels located in the Town of Grandview and Town of Gilbert Plains.

3.0 Water Consumption

The treatment system was designed for peak flows with additional capacity for future expansion. Currently, only one membrane skid is required to meet average demand and therefore the lead skid is alternated daily. However, higher peak demands require both skids to operate together as well. The system design and current operating flow rates are provided in Table 3.1. Figure 3.1 provides a graphic representation of the flow through the treatment system.

Table 3.1 Design and Current Operating Flow Rates

	Design Flow (L/s)	Current (L/s)								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
Raw	34	17	16	15	17	19	19	20	20	19
Skid 1 Permeate	11	12	12	10	12	14	14	15	14.8	13.8
Skid 2 Permeate	11									
Concentrate 1	3	3	3	3	3	3	3	3	3.5	3.5
Concentrate 2	3									
By-Pass	6	2	2	2	2	2	2	2	1.7	1.7

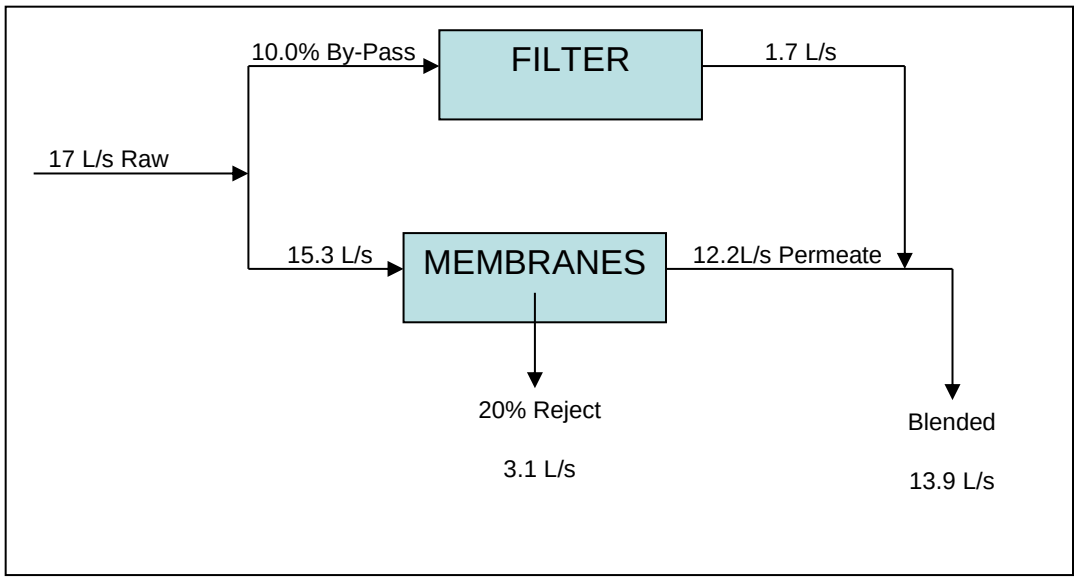


Figure 3.1 Treatment System Flow Diagram Typical Single Skid Values

3.1 Raw Water Demand

Raw water withdrawals and pumping rates are presented in Table 3.2. The Water Licensing Branch - Annual Water Use Report for 2018 is provided in Appendix C.

Table 3.2 - Raw Water Withdrawal

	Unit	Withdrawal								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Demand	m^3	(Feb 25-Jan 1) 246,787	272,000	275,300	279,503	302,421	296,563	317,625	311,794	300,668
Average Day Demand	L/d	796,000	745,000	754,300	765,762	828,551	812,501	870,206	854,230	823,748
Pumping Rate	L/s	17	16	15	17	19	19	20	20	19
Avg. Operating Hours/day	hr/day	13	15	15	15	16.5	16	16	16	16

3.2 Treated Water Demand

Table 3.3 summarizes the treated water demand for the RMs, and both towns. Peak days were observed on October 2nd for the RM of Gilbert Plains with a consumption of 611 m^3, March 26th for the Town of Gilbert Plains with a consumption of 510 m^3, March 21st for the Town of Grandview with a consumption of 803 m^3 and October 2nd for the RM of Dauphin with a consumption of 473 m^3.

Table 3.3.1 - Treated Water Consumption RM of Gilbert Plains

	Unit	**RM of Gilbert Plains**					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
Total Demand	m^3	48,744	53,683	ID	64,114	61,469	53,928
Number of Connections		183	183	183	187	190	194
Average Day	L/d	133,500	147,077	ID	175,655	168,409	147,749
Average Day	L/s	1.85	2.04	ID	2.44	2.34	2.05
Average Day	L/conn/day	730	804	ID	939	886	762
Peak Day	L/d	274,000	ID	ID	599,000	508,000	383,500
Peak Day Factor		2.05	ID	ID	3.41	3.02	2.60
Peak Day	L/s	3.81	ID	ID	8.32	7.06	5.33
Peak Day	L/conn/day	1497	ID	ID	3203	2674	1977

Table 3.3.2 - Treated Water Consumption Town of Gilbert Plains

	Unit	Town of Gilbert Plains					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
Total Demand	m^3	62,766	63,794	ID	58,727	56,900	58,499
Number of Connections		398	398	398	398	398	398
Average Day	L/d	172,000	174,778	ID	160,896	155,890	160,271
Average Day	L/s	2.39	2.43	ID	2.23	2.17	2.23
Average Day	L/conn/day	432	439	ID	404	392	403
Peak Day	L/d	286,000	ID	ID	394,000	314,000	510,000
Peak Day Factor		1.66	ID	ID	2.45	2.01	3.18
Peak Day	L/s	3.97	ID	ID	5.47	4.36	7.08
Peak Day	L/conn/day	719	ID	ID	990	789	1281

Table 3.3.3 - Treated Water Consumption Town of Grandview

	Unit	Town of Grandview					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
Total Demand	m^3	97,461	110,294	ID	105,244	100,793	94,476
Number of Connections		465	469	451	467	471	462
Average Day	L/d	267,000	302,175	ID	288,340	276,145	258,838
Average Day	L/s	3.71	4.20	ID	4.00	3.84	3.59
Average Day	L/conn/day	574	644	ID	617	586	560
Peak Day	L/d	501,000	ID	ID	665,000	485,000	803,000
Peak Day Factor		1.88	ID	ID	2.31	1.76	3.1
Peak Day	L/s	6.96	ID	ID	9.24	6.74	11.15
Peak Day	L/conn/day	1077	ID	ID	1424	1030	1738

Table 3.3.4 - Treated Water Consumption RM of Dauphin

	Unit	RM of Dauphin	
		October 2017	**2018**
Total Demand	m^3	2669	19,255
Number of Connections		84	188
Average Day	L/d	7312	52,752
Average Day	L/s	0.10	0.73
Average Day	L/conn/day	87	281
Peak Day	L/d	80,700	472,600
Peak Day Factor		11.04	8.96
Peak Day	L/s	1.12	6.56
Peak Day	L/conn/day	961	2514

Table 3.3.5 - Treated Water Consumption Totals

	Unit	Totals					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
Total Demand	m^3	208,971	227,771	ID	228,085	221,831	226,042
Number of Connections		1046	1050	1032	1052	1143	1242
Average Day	L/d	572,500	624,030	ID	624,890	607,756	619,293
Average Day	L/s	7.95	8.67	ID	8.68	8.44	8.60
Average Day	L/conn/day	547	594	ID	594	532	499
Peak Day	L/d	1,061,000	ID	ID	1,201,000	1,023,000	1,114,000
Peak Day Factor		1.85	ID	ID	1.92	1.68	1.80
Peak Day	L/s	14.74	ID	ID	16.68	14.21	15.47
Peak Day	L/conn/day	1014	ID	ID	1142	895	897

Note: ID indicates 'Insufficient Data'

The difference between raw and treated water consumption during the operating period from January 2018 to December 2018 is approximately 74,626 m^3. This difference is mainly due to membrane concentrate discharge to Sulphur Spring Creek and in-plant water use such as filter backwash, clean-in-place system, sink and washroom.

4.0 Regulatory Requirements

4.1 Water Rights Act

Water Rights Act Licence No. 2010-107 (Appendix D) stipulates the following conditions:

(a) The maximum rate at which water may be diverted shall not exceed 34 L/s
(b) The total quantity of water diverted in any one year shall not exceed 315 cubic decametres
(c) Water shall not be diverted during any period when water levels measured in the aquifer as measured at:
i. 2010 well more than 39.9 m beneath the surface of the ground
ii. 2009 well more than 41.1 m beneath the surface of the ground.

Raw water consumption data as presented in Table 3.3 indicate that conditions (a) and (b) have not been exceeded. Aquifer monitoring levels are discussed later in section 5.4 and indicate water levels are above the minimum levels required in condition (c).

4.2 Drinking Water Safety Act

The Drinking Water Safety Regulation and *Drinking Water Quality Standards Regulation* under the *Drinking Water Safety Act* were proclaimed in February 2007 to ensure public water systems

provide safe drinking water. These regulations outline: water quality standards; bacteriological and microbial standards; operating licences requirements; disinfection testing and recording; and reporting requirements.

4.2.1 Operating Licence

Operating Licence PWS-11-476 provided in Appendix D outlines terms and conditions under which the water system must be operated to remain in compliance with the *Drinking Water Safety Act* and its supporting regulations.

4.2.2 Water Quality

The Guidelines for Canadian Drinking Water Quality (GCDWQ) provide health-based maximum acceptable concentrations and aesthetic objects for various chemical and physical parameters. Health-Based parameters such as arsenic and nitrates are regulated in Manitoba while parameters such as hardness and iron are not considered a health issue but these aesthetic elements can make water undesirable for various reasons.

Raw Water Quality

The raw water quality characteristics are provided in Table 4.1. The raw water supply is considered hard with high concentrations of iron and manganese. There are no significant health concerns. Hardness or “hard water” is mainly the result of high concentrations of calcium and magnesium in water. It is undesirable as it causes scale to develop in water heaters, pipes and leaves undesirable scum on bathroom fixtures. Also, extra soap is needed to clean or wash with hard water. Iron and manganese can cause stains on laundry and plumbing fixtures and will cause objectionable colour in water. Iron and manganese can also promote the growth of bacteria in distribution systems causing offensive tastes and odours.

Table 4.1 - Raw Water Quality

Parameter	MW 98-16	PW 03-01	PW 09-01				PW 10-02	GCDWQ	
	24/09/02	24/11/09	08/02/10	22/06/10	05/08/10	24/07/13	29/07/10	MAC	AO/OG
Total Alkalinity (as CaCO3)	375	371	385	367	383	377	378		
Bicarbonate (HCO3)	458	452	470	448	467	460	461		
Carbonate(CO3)	<20	<5	<0.60	<5	<0.60	<12	<0.6		
Hydroxide(OH)	<10	<5	<0.40	<5	<0.40	<6.8	<0.4		
Calcium (Ca)	119		146			117	108		
Chloride (Cl)	<10	<9	14.9	13.8	250	6.13	6.09		≤ 250
Iron (Fe)	**1.49**	**2.58**	**3.93**	**3.96**	**3.47**	**3.86**	**3**		≤ 0.3
Manganese (Mn)	**0.431**	**0.276**	**0.175**	**0.177**	**0.160**	**0.167**	**0.146**		≤ 0.05
Potassium (K)	5.18		8.78		7.42	6.87	6.23		
Sodium (Na)	5.36	14.2	66.8	57.9	48.4	37.3	52.9		≤ 200
Sulphate (SO4)	136	118	347	343	260	206	199		≤ 500
Fluoride (F)	0.3	0.44	0.32	0.4	0.12	0.24	0.22	1.5	
Hardness (as CaCO3)	494	410	**600**	**537**	**541**	**478**	**501**		≤ 500
Nitrate-Nitrite	<0.01	<0.2	<0.050	<0.2	<0.050	<0.0051	<0.0071	10	
Ammonia (NH3)					1.23	0.86	0.758		
Total Carbon					101	2.6			
Total Inorganic Carbon					98.5	97.7			
Total Organic Carbon					2.4	2.3			
Sodium Adsorption Ratio			1.19				0.52		
Conductivity (umhos/cm)	870	879	1270	1320	1130	979	982		
Total Dissolved Solids					**846**	669			≤ 500
Langelier Index (4 C)					0.49	0.63	0.97		
Langelier Index (60 C)					1.3	1.4	1.7		
Colour (TCU)			5		10	**42.3**	<5		≤ 15
Turbidity (NTU	39	32	44.3	36	35.9	32.1	36.1		
pH (pH units)	7.24	7.24	7.80	7.26	7.56	7.75	8.06		6.5 – 8.5
Arsenic (As)		0.00819		0.00611	0.0112	0.00779	0.00512	0.01	
Boron (B)		0.115		0.224	0.163	0.167	0.106	5	
Barium (Ba)		0.0382		0.0267	0.0198	0.0227	0.0181	1	
Cadmium (Cd)		<0.0002		<0.0002	<0.00000	<0.00001	<0.000001	0.005	
Chromium (Cr)		<0.001		<0.001	<0.001	<0.001	0.0018	0.05	
Copper (Cu)		<0.0004		0.00318	<0.00020	<0.0002	0.00069		≤ 1.0
Lead (Pb)		<0.0001		0.00019	<0.00009	<0.00009	<0.00009	0.01	
Antimony (Sb)		<0.001		<0.001	<0.0002	<0.0002	<0.0002	0.006	
Selenium (Se)		<0.001		<0.001	<0.001	<0.0010	<0.001	0.01	
Uranium (U)		0.00043		0.00025	0.00019	<0.0002	0.00017	0.02	
Zinc (Zn)		<0.005		0.0215	0.0401	<0.002	<0.002		≤ 5.0

AO= Aesthetic Objective
MAC= Maximum Acceptable Concentration
OG= Operational Guideline
Hardness levels greater than 200 are considered poor but tolerable, while hardness levels greater than 500 are generally considered unacceptable

Treated Water Quality

Treatment is dependent on the raw water source and water quality characteristics in order to meet treated water quality standards. More stringent requirements are placed on surface water sources and groundwater sources under direct influence (GUDI) of surface water. The G3 supply is considered a secure groundwater source (Non-GUDI). A reverse osmosis (RO) membrane treatment system will remove significant amounts of dissolved minerals which will soften the supply and reduce iron and manganese to acceptable concentrations. Treated water quality results are provided in Table 4.2. The G3 Regional Water Co-operative is in compliance with both health-based maximum acceptable concentrations and aesthetic objectives outline in the GCDWQ.

Table 4.2 - Treated Water Quality

Parameter	PW 09-01			GCDWQ	
	10/02/10	05/08/10	24/07/13	MAC	AO/OG
Total Alkalinity (as $CaCO_3$)	94.2	68.7	79		
Bicarbonate (HCO_3)	110	83.8	96		
Carbonate(CO_3)	2.62	<0.60	<12		
Hydroxide(OH)	<0.40	<0.40	<6.8		
Calcium (Ca)	25.1	18.3	22.6		
Chloride (Cl)	9.2	4.87	4.39		≤ 250
Iron (Fe)	0.057	<0.020	0.015		≤ 0.3
Manganese (Mn)	0.0164	0.0006	0.0012		≤ 0.05
Potassium (K)	4.38	1.25	1.58		
Sodium (Na)	33.5	15.8	11.7		≤ 200
Sulphate (SO_4)	54.3	36.7	38.9		≤ 500
Fluoride (F)	<0.10	0.97	0.044	1.5	
Hardness (as $CaCO_3$)	98.4	74.6	89.2		≤ 500
Nitrate-Nitrite	<0.050	<0.050	0.0075	10	
Ammonia (NH_3)		<0.050	<0.010		
Total Carbon		17.5	2		
Total Inorganic Carbon		16.8	19		
Total Organic Carbon		<1.0	2.1		
THMs (mg/L)		0.0035			
Sodium Adsorption Ratio	1.47				
Conductivity (umhos/cm)	338	227	238		
Total Dissolved Solids		165	140		≤ 500
Langelier Index (4 C)	0.22	-0.47	-0.56		
Langelier Index (60 C)	0.99	0.3	0.22		
Colour (TCU)	<5.0	<5.0	<5.0		≤ 15
Turbidity (NTU)	0.49	0.25	0.39		
pH (pH units)	8.49	8.04	7.81		6.5 – 8.5
Arsenic (As)		0.00418	0.0019	0.01	
Boron (B)		0.125	0.137	5	
Barium (Ba)		0.00231	0.00287	1	
Cadmium (Cd)		<0.00001	<0.000010	0.005	
Chromium (Cr)		<0.001	<0.0010	0.05	
Copper (Cu)		0.00155	0.00552		≤ 1.0
Lead (Pb)		<0.00009	<0.000090	0.01	
Antimony (Sb)		<0.0002	<0.00020	0.006	
Selenium (Se)		<0.001	<0.0010	0.01	
Uranium (U)		<0.0001	<0.00010	0.02	
Zinc (Zn)		<0.005	<0.0020		≤ 5.0

AO= Aesthetic Objective
MAC= Maximum Acceptable Concentration
OG= Operational Guideline
Hardness levels greater than 200 are considered poor but tolerable, while hardness levels greater than 500 are generally considered unacceptable

4.2.3 Reporting

The Drinking Water Safety Act regulations require public water systems to produce various types of reports such as: the submission of scheduled test results; events of non-compliance or emergencies; Compliance Plans; Emergency Response Plans; Annual Public Reports; and Public Water System Assessment Reports.

The Office of Drinking Water has released "Operational Guidelines for Monitoring and Reporting of Public and Semi-Public Water Systems". This document outlines operator responsibilities with regard to fulfilling the monitoring and reporting requirements and includes:

1) Disinfection residuals concentrations, testing, recording and reporting
2) Bacteriological sampling, submission, and interpretation
3) Turbidity monitoring for surface water and GUDI supplies
4) Corrective actions reporting
5) Emergency reporting

Compliance Plans

Water systems have until March 1, 2012 (five years from the date the regulations came into force) to comply with water quality standards stated in their operating licence. In instances where a standard is not being met, owners must clearly demonstrate a commitment to meeting the standard by preparing a plan that identifies how and when compliance will be achieved. For water systems serving no more than 5000 individuals, a compliance plan must be submitted within 18 months of the operating licence issue date.

Where a water system owner has no reason to believe that their water system is out of compliance with any of the standards set out in their licence, a "Statement of Compliance" form can be completed. A signed "Statement of Compliance" form will be considered the system's compliance plan for the purposes of the *Drinking Water Quality Standards Regulation*.

The G3 Regional Water Co-operative is in compliance with all water quality standards. As required by regulations, a "Statement of Compliance" was submitted to the Office of Drinking Water on May 16, 2012.

Emergency Response Plans

The Emergency Response Plan (ERP) is a document that provides a step-by-step response to, and recovery from, incidents related to emergency situations. The ability of water utility staff to rapidly respond to an emergency will help prevent unnecessary complications and protect consumers' health and safety.

Section 8(1) of *The Emergency Measures Act* requires local authorities to, among other things, to establish a local emergency response committee, appoint an emergency coordinator and prepare and implement emergency response programs and plans. Section 29(1) of the *Water and Wastewater Facilities Operator Regulation* requires water and wastewater facility owners to have documented emergency response plans. Section 29(2) requires that plans be reviewed at least once every two years, and that all facility operators and maintenance personnel have ready access to it at all times.

The G3 Regional Water Co-operative must complete and submit an Emergency Response Plan by January 1, 2013 as required by Operating Licence No. PWS-11-476. The head operator at G3 Regional Water Co-operative is working together with the Drinking Water Officer to develop an Emergency Response Plan.

Annual Public Reports

Section 32 of the Drinking Water Safety Regulation requires public water systems serving 1000 or more people to produce an annual report regarding the system operating status. The purpose of the Public Water System Annual Report is to promote public transparency with regard to drinking water. The annual public report provides a description of the water system, disinfection methods and residuals, water quality results, corrective actions taken, orders or charges laid, and major expenses to repair, replace, or install equipment.

Water systems must ensure free copies of the report are made available to water users and that the report is posted on an Internet website. Copies should be made available at each of the three municipal government offices. A copy of the report must be sent to the Regional Drinking Water Officer within 3 months (by March 31st) of the end of the operating year. The annual public report for the G3 Regional Water Co-operative was submitted to the Office of Drinking Water in March of 2018 and is available to the public.

Public Water System Assessment Reports

Section 37 of the *Drinking Water Safety Regulation* requires every public water system provider to conduct an infrastructure assessment by a Professional Engineer, licensed to practice and consult in the Province of Manitoba, with applicable experience relating to drinking water supplies. Section 9 of *The Drinking Water Safety Act* requires an infrastructure assessment once in every five-year period.

The objective of the Report is to carry out an onsite evaluation to identify, analyze and mitigate any potential adverse health risks and environmental impacts associated with the Water System in a “source to tap” methodology. It is also to determine whether the Water System’s source, facilities, equipment and operations are effective in producing safe drinking water, and meet the regulations in force under *The Drinking Water Safety Act*. The level of effort and depth of the report should reflect the Water System size, complexity and risks.

For regional systems where supply, treatment and distribution of potable water to separate reservoir/pumping stations and distribution owned by others, a System Assessment Report is required from each Owner of these systems. The Owner of a system receiving water from another system need not include an assessment of that other system, as the Owner of the other system will be responsible for that assessment. Similarly, the Owner of a regional supply system is not responsible for assessing the distribution systems owned by others.

The G3 Regional Water Co-operative had a professional engineer complete an assessment of the system's infrastructure and was submitted to ODW on January 4th, 2019.

4.3 Environment Act

4.3.1 Environment Act Licence

In August 2008, the MWSB submitted a Manitoba Environment Act Class 2 Development Licence Proposal for the construction and operation of the water treatment and supply system. In November 2008, Manitoba Conservation issued Environment Act Licence 2853 (Appendix F) which requires the Licencee (Co-op) to conduct an effluent monitoring program for a period of two years. The effluent monitoring program consists of sampling membrane concentrate, and upstream and downstream of the effluent discharge pipeline outlet on the Sulphur Spring Creek marsh on a quarterly basis for specified parameters shown in Table 4.3

Table 4.3 – Effluent Monitoring Program Results

Parameter	Unit	26-Apr-11		
		Concentrate	Upstream	Downstream
Hardness	mg/L as $CaCO_3$	1720	251	278
Total Dissolved	mg/L	2160	246	272
Iron	mg/L	340	0.19	0.22
Calcium	mg/L	445	60.9	66.5
Magnesium	mg/L	149	24.2	27.1
Manganese	mg/L	8.81	0.0197	0.0889
Sodium	mg/L	122	2.15	3.37
Parameter	Unit	30-Oct-12		
		Concentrate	Concentrate	Concentrate
Hardness	mg/L as $CaCO_3$	243	465	595
Total Dissolved	mg/L	318	464	634
Iron	mg/L	18.4	0.64	0.36
Calcium	mg/L	60	109	135
Magnesium	mg/L	22.7	47.1	62.7
Manganese	mg/L	0.943	0.124	0.0603
Sodium	mg/L	27.5	6.45	14.1
Parameter	Unit	14-Feb-13		
		Concentrate		
Hardness	mg/L as $CaCO_3$	1370	446	472
Total Dissolved	mg/L	1750	463	518
Iron	mg/L	13.4	0.53	0.38
Calcium	mg/L	316	105	107
Magnesium	mg/L	141	49.4	49.8
Manganese	mg/L	0.446	0.168	0.139
Sodium	mg/L	83.2	4.25	6.41

4.3.2 Water & Wastewater Facility Operators Regulation

All water treatment and water distribution facilities in Manitoba must be classified as per the *Water and Wastewater Facility Operators Regulation 77/2003.* Water treatment facilities are classified on a point system based on size, raw water source, complexity of treatment and disinfection, instrumentation, and laboratory control. Water distribution facilities are classified by population served. The G3 WTP has been classified as a Class 2 water treatment facility and Class 1 water distribution facility. Since both Towns are responsible for their own distribution, the G3 distribution is only Class 1.

All water treatment and water distribution facility operators in Manitoba must be certified as per *Water and Wastewater Facility Operators Regulation 77/2003*. Water treatment and

water distribution facility owners are responsible for employing certified operators. The following table outlines the G3 WTP operators and current classification:

Table 4.4 – Operator Classification

Operator	Water Treatment	Water Distribution
Ivan Yakimishen	Class 2	Class 2
Dallas Wilson	Class 1	Class 1

5.0 Groundwater Investigation & Monitoring

5.1 Hydrological Investigations

In 2002, the Prairie Farm Rehabilitation Administration (PFRA) and The Manitoba Water Services Board (MWSB) conducted hydrogeological assessments within the NW corner of the RM of Gilbert Plains and the NE corner of the RM of Grandview. The geological stratigraphy was described as: clay shale overlain by sand and gravel overlain by glacial till. The sand and gravel is a water bearing unit of high transmissivity with a thickness of up to 40 metres. The investigation included the installation of a 125 mm diameter well (MW 98-16) on the SW 34-26-23W.

In 2008, W.L. Gibbons & Associates Inc. (WLG) was retained by MWSB to complete a groundwater supply assessment study for the proposed G3 water supply system. The main purpose was to complete a hydrogeological assessment for potential to extract the required water supply from an aquifer located generally in the area of 26-26-23W, and to provide recommendations for the design and operation of the well system. The report provided the following information:

- The aquifer is considered to be part of a groundwater flow system that consists of recharge in the Duck Mountain Uplands, flow to the southeast off the flanks of the uplands, and discharge to the Valley River Plain.
- Sustainability of the proposed withdrawal from this aquifer has found that even in the absence of recharge for 19 years, the level of drawdown in the aquifer will still be well above the pump intake.
- The evaluation of the information associated with known domestic water wells in the area has found that domestic wells mostly withdraw water from shallower aquifers not directly connected to the project aquifer. Known wells that may withdraw water from the project aquifer are located 2.5 to 3 kms from the well site and are unlikely to be affected or could be mitigated with changes to the pump depth setting or well development.
- The aquifer is located at a depth in excess of 30 metres overlain by an effective aquitard. The potential for environmental effects is therefore limited.

5.2 PW 09-01 Well Installation

In 2009, WLG was retained by MWSB to provide hydrogeological services in association with the upgrades to the G3 Regional Water Co-operative water supply and water treatment system. The overall purpose of this work program was to complete the installation of a production well (PW 09-01) with a target capacity of 34 L/s (450 Igpm) and install an additional monitoring well.

The well was installed in the east road allowance 680 meters south of the NW corner of NW35-26-23W. The stratigraphy encountered consists of 15.8 meters of till followed by 10.4 meters of fine to course sand (designated as the Upper Aquifer). The Upper Aquifer is underlain by 5.8 meters of till followed by 9.1 meters of clay. Fine to coarse sand with gravel layers (designated as the Lower Aquifer) were encountered from a depth of 41.1 meters to 54.6 meters below grade.

The well was constructed with 41.1 meters of nominal 300 mm, schedule 80 PVC casing followed by 12.2 meters of nominal 300 mm, 25 slot stainless steel screen. Filter sand (#30) was placed in the annulus from a depth of 36 meters to the base of the screen at 53.3 meters. The wells were developed and flow capacity tests were completed to establish specific capacity.

The permanent production pump was installed at a depth of 36.6 metres. Subsequent to the initial well capacity tests using a temporary pump, additional well capacity testing was completed using the permanent production pump. The maximum well capacity was rated as approximately 53 L/s (700 Igpm).

5.3 PW 10-02 Back-Up Well Installation

In 2010, WLG was retained by MWSB to complete the installation of a back-up supply well (PW 10-02). PW 10-02 was installed approximately 11 meters south of existing supply well PW 09-01. The well is located approximately 700 meters south of the NW corner of NW35-26-23W. The stratigraphy was very similar to that encountered during the drilling for PW 09-01.

The well was constructed with nominal 305 mm, schedule 80 PVC casing to a depth of 43.0 meters and 9.1 meters of nominal 305 mm telescopic, 25 slot, stainless steel screen. The annulus around the screen was backfilled with #75 filter sand.

A well capacity test was conducted by pumping at a rate of 22.7 L/s (300 Igpm) for a period of 1.0 hour. Based on this test result, the well capacity was rated as approximately 81.0 L/s (1050 Igpm).

5.4 PW 2003-01 Abandonment

The original 200 mm supply well (PW 2003-01) located adjacent to the G3 WTP was abandoned due to the development of two new 300 mm supply wells (PW 2009-01 & PW 2010-02) north of the plant. In November 2010, WLG oversaw well abandonment procedures to prevent further leakage due to artesian conditions.

Well abandonment started with tremie grouting the well screen and casing with cement up to a depth of 33 m below grade. The remainder of the casing to below the pitless unit was backfilled with a combination of cement and granular fill (silty sand). MWSB excavated and removed the pitless unit, and backfilled the excavation with local excavated fill.

5.5 Groundwater Monitoring

WLG stated that proper management of water supplies requires periodic re-evaluation of available information to confirm withdrawal rates are sustainable and/or to determine if withdrawal rates can be increased to meet growing demand. It was recommended to conduct long term groundwater level monitoring to observe how the aquifer responds to recharge and drought events, and long term pumping.

Monitoring well MW 98-16 is located approximately 1500 meters west of the WTP on the SW34-26-23W. The well consists of a 125 mm PVC casing with a stainless steel screen set at a depth of 36.6 to 42.7 meters within the Lower Aquifer. WLG equipped the well with a Solinst Model 3001 LTC Levelogger monitoring groundwater levels on a daily basis.

WLG installed a new monitoring well (MW 09-02) approximately 1200 meters north of the existing WTP. Specifically, the monitoring well is located within municipal road allowance 275 meters south of the NW corner of NW35-26-23W. The monitoring well screen was set in the Lower Aquifer at a depth of 46.9 to 48.5 meters. A locked steel protective cover was installed on this well and a Solinst Model 3001 Levelogger installed to record groundwater levels daily.

5.6 Groundwater Levels

MW 98-16 was equipped with a pressure transducer by PFRA and data from 2006 through 2009 is presented in Figure 5.1. This data represents background water depth levels before the new G3 WTP was brought on-line and increased pumping rates from the new wells.

The older PFRA transducer in MW 98-16 failed to record data after November 2009 and the well was equipped with a new transducer in July 2010. MW 98-16 data for 2013 is shown in Figure 5.2. The collected data for MW 09-02 is presented in Figure 5.3. Note that the G3 WTP came on-line on February 25, 2010. G3 pumping activities appear to have no significant impact on groundwater levels. Changes in levels appear to be related to seasonal impacts.

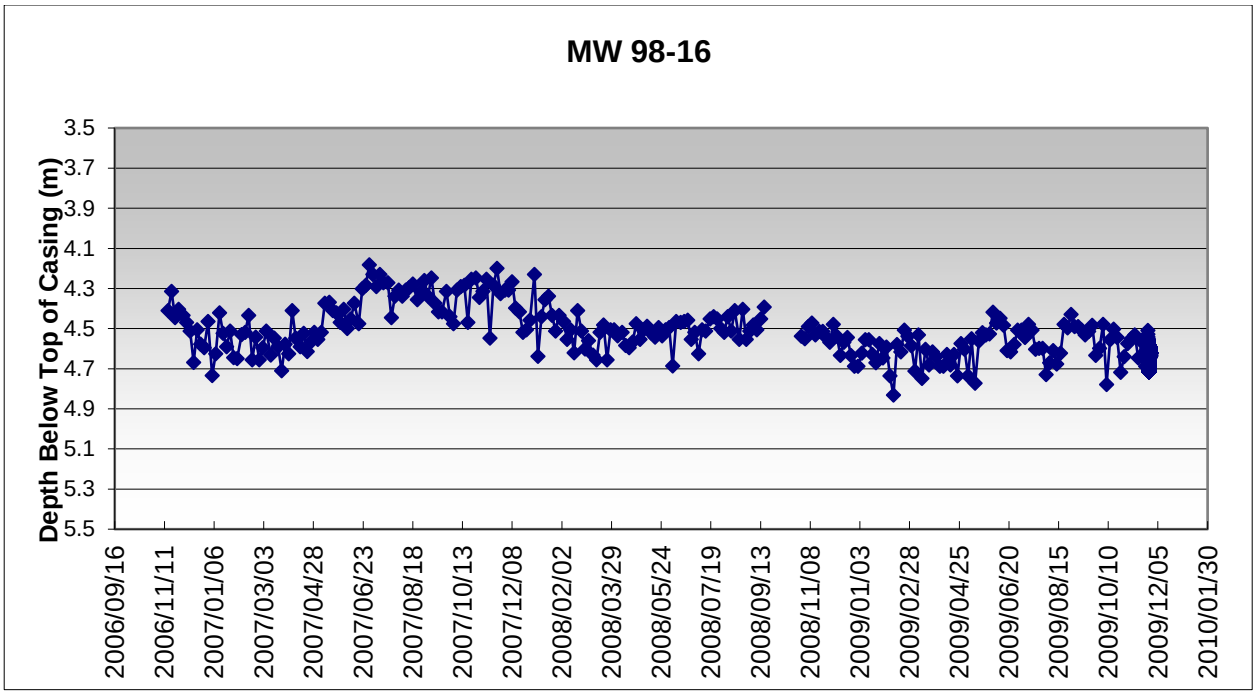


Figure 5.1 – MW 98-16 Background Groundwater Levels (below top of well casing)

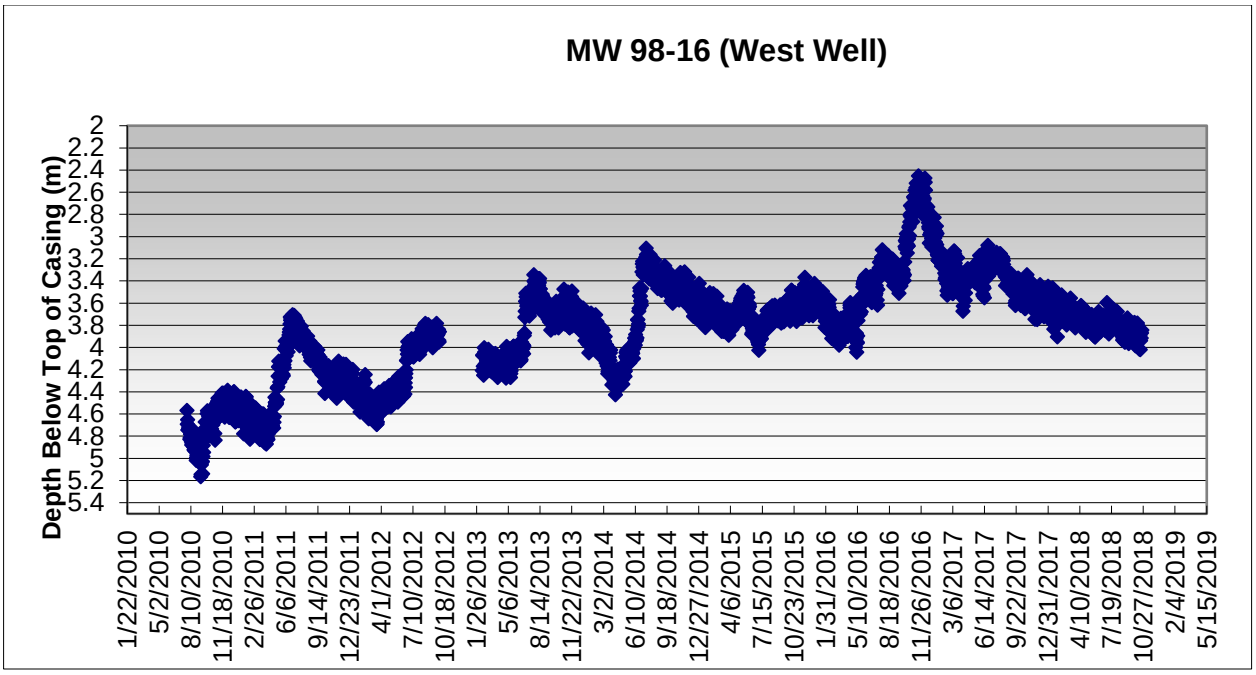


Figure 5.2 – MW 98-16 Groundwater Levels (below top of well casing)

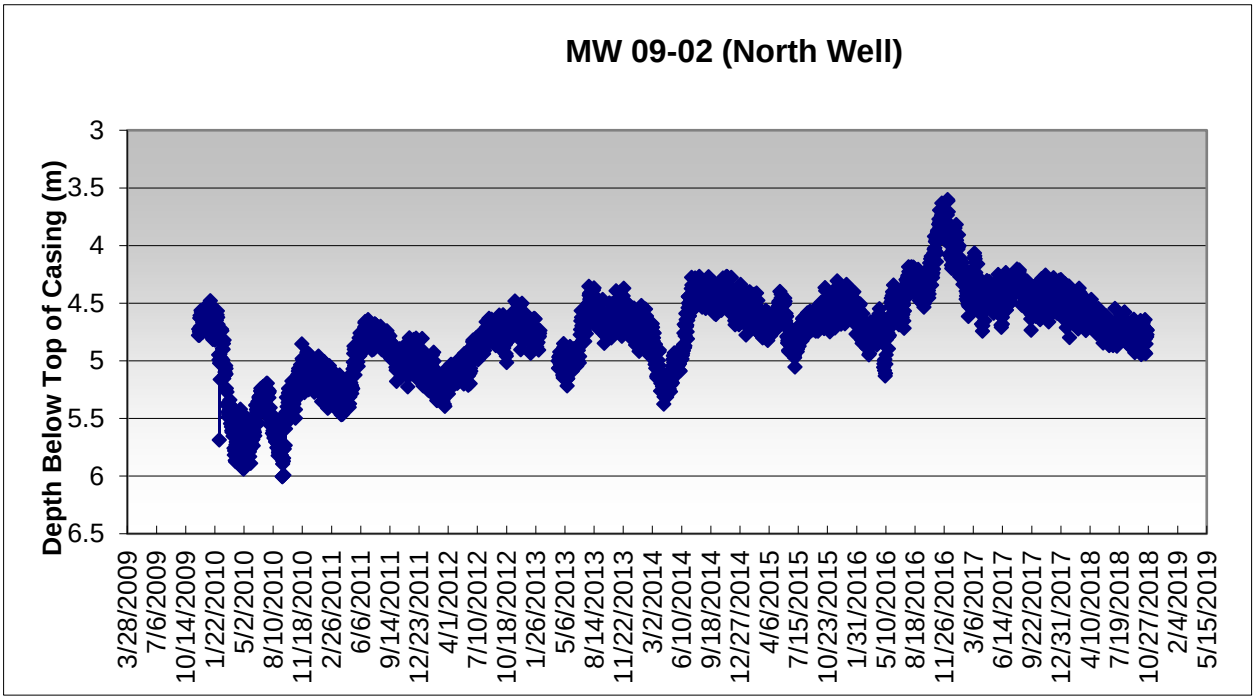


Figure 5.3 – MW 09-02 Groundwater Levels (below top of well casing)

5.7 Precipitation Records

In addition to pumping rates and volumes, it is important to record precipitation when evaluating impacts to groundwater levels. Environment Canada historical weather records are available for various cities/communities across Canada. The closest community with complete precipitation records is Dauphin, Manitoba. Average monthly precipitation data between 1971-2000 is presented in Figure 5.4.

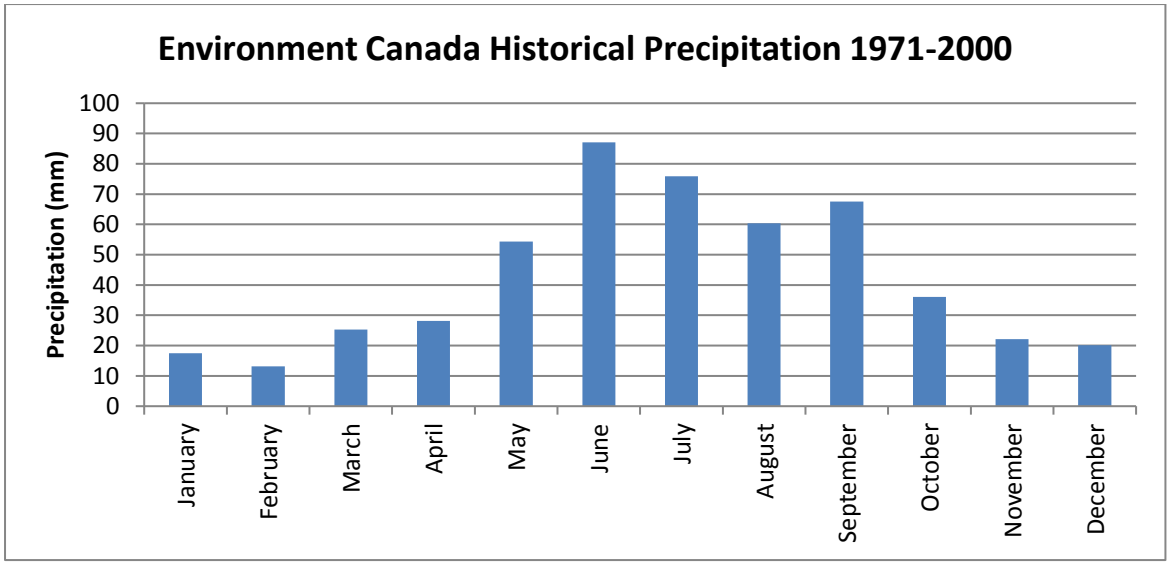


Figure 5.4 - Dauphin Precipitation Records

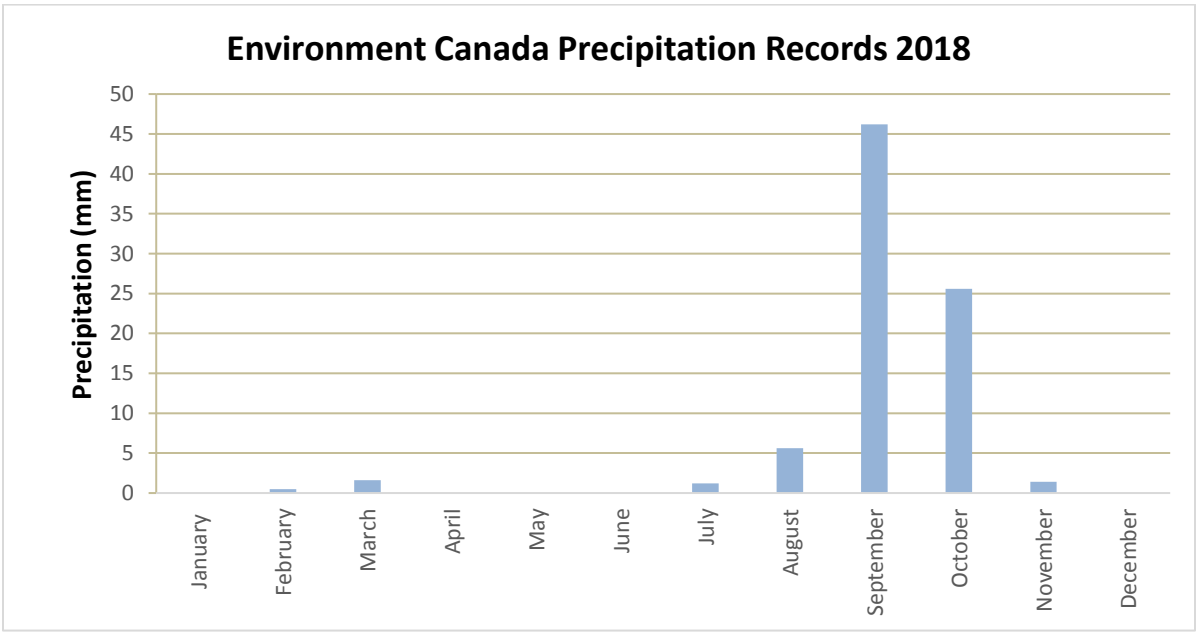


Figure 5.5 – 2018 Dauphin Precipitation Records

5.8 Groundwater Interference Policy

It is recommended that a policy be adopted regarding potential interference from the G3 groundwater pumping activities on private wells to ensure complaints, whether real or perceived, are dealt with fairly and equitably.

The Groundwater Interference Policy is provided in Appendix H and consists of the following elements:

1) Complaint – written complaint containing contact information and the nature of the complaint.
2) Preliminary assessment – to be conducted by MWSB to validate complaint and if necessary supply private owner with potable water.
3) Secondary assessment – If potential for valid complaint, further investigation by hydrogeologist.
4) Notification – If assessment concludes groundwater interference occurred, immediately contact Manitoba Conservation & Water Stewardship, Water Use Licensing Section.
5) Actions – Take measures to temporarily and/or permanently rectify the problem.

6.0 Source Water Protection Plan

Source water protection is one of many barriers used in a multi-barrier approach to ensure safe drinking water. For groundwater supplies, a source water protection plan is often referred to as a wellhead protection plan. However, source water protection planning could involve many of the groundwater users from the same aquifer. The main objective is to protect groundwater drinking supplies from contamination.

The Office of Drinking Water recognizes the Ten States Standards as a technical resource when assessing public water supply systems. The Recommended Standards for Water Works 2007 Edition "Ten States Standards" is a guide to the design and preparation of plans and specifications for public water supply systems. These standards are intended to establish, as far as practical, uniformity of practice among several states and was prepared by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers.

The Ten States Standards recommends a wellhead protection plan for continued protection of the wellhead from sources of contamination as well as continued protection of the well site from potential sources of contamination through ownership, zoning, easements or other acceptable means.

6.1 Main Elements

Manitoba Conservation & Water Stewardship's "Best Practices Manual for Small Drinking Water Systems" identifies four main elements of a wellhead protection plan which are:

1) Identify the Critical Area to Protect
2) Inventory the Potential Contaminants within the Critical Area
3) Develop a Management Strategy Designed to Minimize the Potential of Contamination
4) Regularly Inspect Wellheads

1) Identify the Critical Area to Protect

Critical areas include:

a) Upstream of the groundwater flow which is located northwest of production wells
b) Immediate area of the wellheads

Since the aquifer is confined with approximately 30 m of till and clay overburden, the potential for contamination close to the wellhead is low. Except for unconfined aquifers, protection upstream of the groundwater flow is typically more critical. WLG concluded the aquifer is considered to be part of a groundwater flow system that consists of recharge in the Duck Mountain Uplands, flow to the southeast off the flanks of the uplands, and discharge to the Valley River Plain.

2) Inventory the Potential Contaminants within Critical Area

Potential contaminates include:

a) Agriculture contaminates such as fertilizers, chemicals and petroleum products
b) Agriculture contaminates near abandoned wells
c) Agriculture contaminates near wellhead

The critical area lies northwest of the well site into Uplands of the Duck Mountains. Surface water drains and elevation contours from the Duck Mountains towards the G3 wells is a basic indicator of the groundwater influence area and flow direction (Figure 6.1). Activities within the Duck Mountain Provincial Park are limited as the area is undeveloped consisting of forest.

There is about 5 km of agriculture activity between the wells and Duck Mountains. Figure 6.2 shows this area comprised mainly of low intensity cereal crop and hay land. Agriculture fertilizers, chemicals and petroleum products are potential contaminants in this area however the aquifer is protected with till and clay overburden. Existing wells and particularly abandoned wells can be conduits for contamination directly to the aquifer. However, WLG identified wells within 2 km of the WTP are mostly in an upper aquifer whereas the G3 wells are in a lower aquifer. In addition, wells constructed into the aquifer northwest of G3 are in artesian condition which further reduces contamination potential.

Other sources of contamination may include contaminates from agriculture activities in the immediate area of the wellheads. This issue has been mitigated by installing bentonite around the

well casing at a depth to isolate the lower aquifer from the upper aquifer. In addition, properly mounded wells and installed pitless units provide further protection.

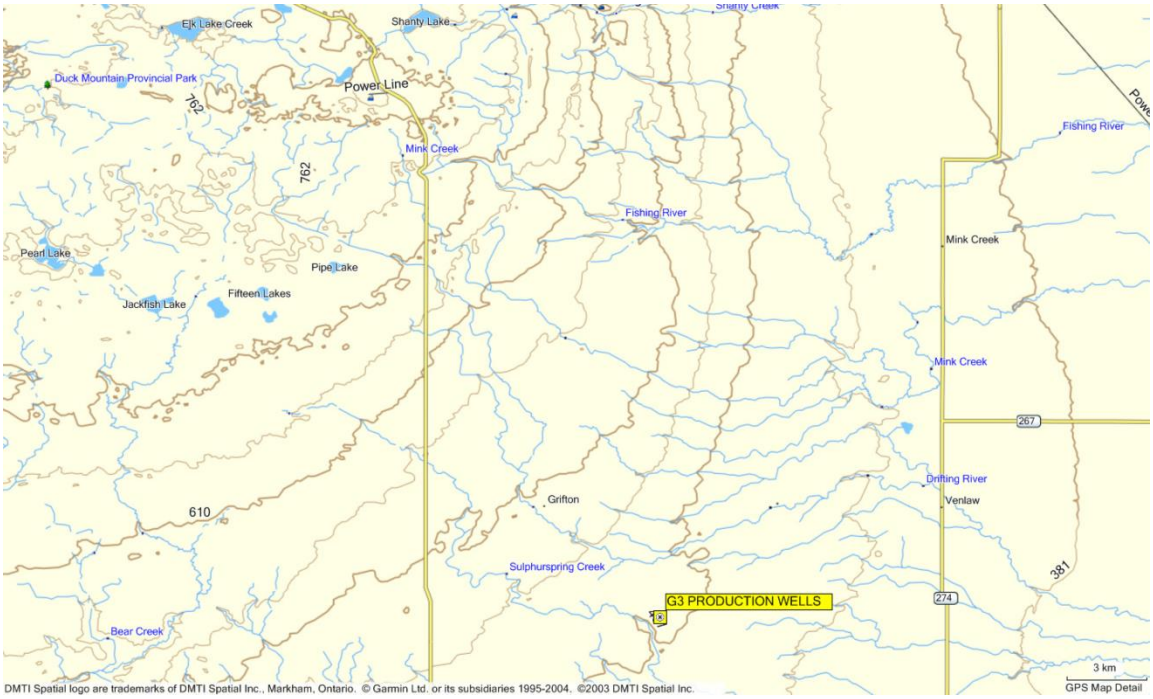


Figure 6.1 Potential G3 Groundwater Recharge Area - NW of Production Wells

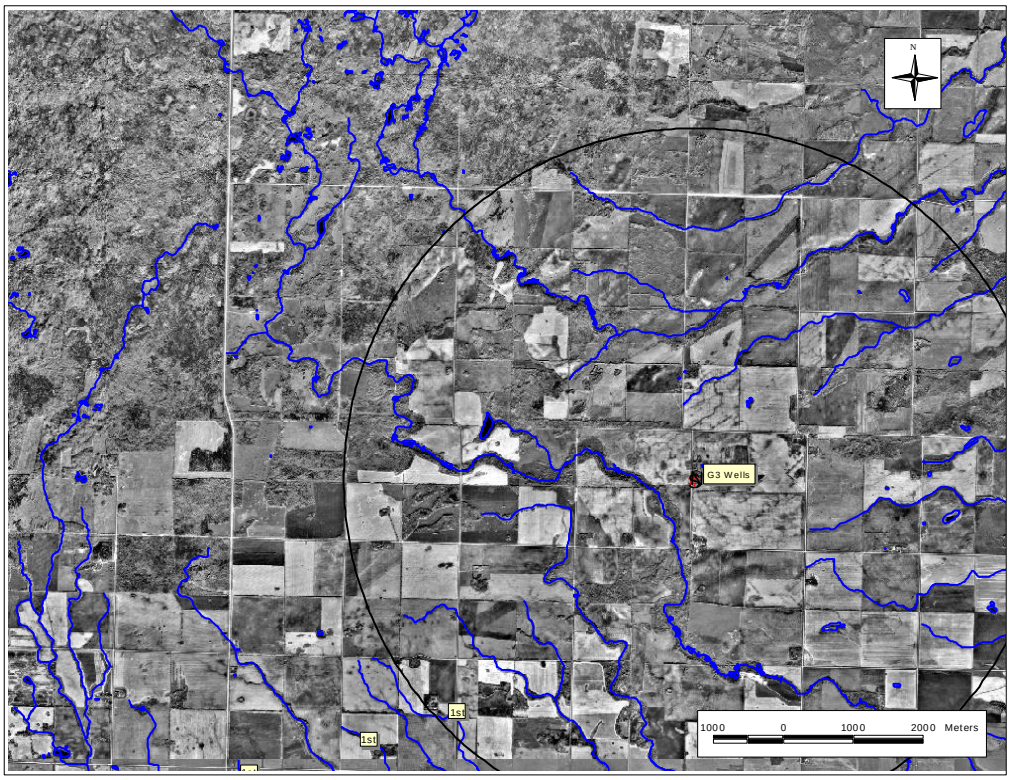


Figure 6.2 Land Use within 5 km Radius of G3 Wells

3) Develop a Management Strategy Designed to Minimize the Potential of Contamination

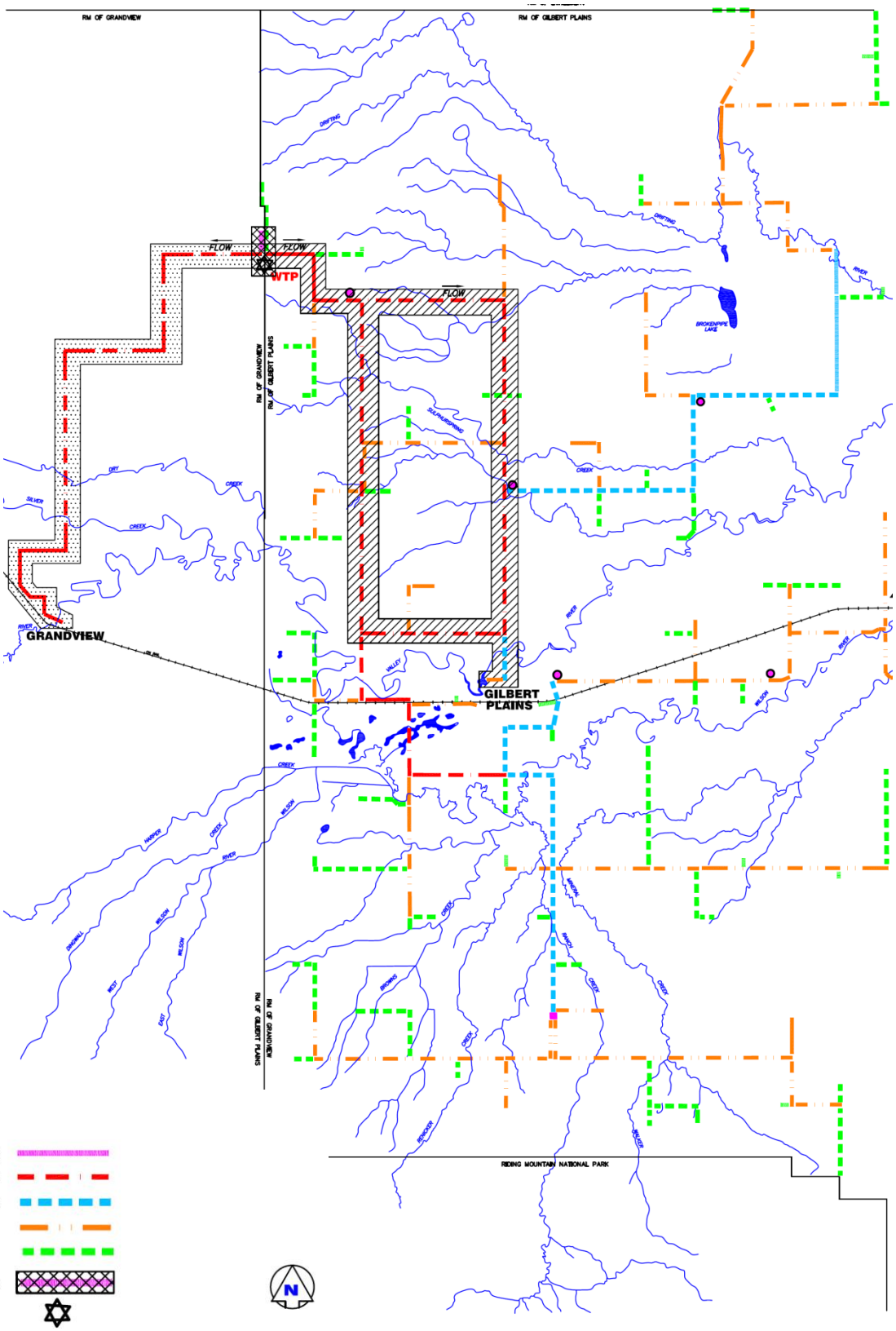
a) Identify privately owned abandoned wells and promote well sealing undertaken by a qualified person.
b) Conduct periodic raw water sampling designed to detect potential contaminates.
c) Maintain and cut vegetation around the production and monitoring wellheads to provide visibility and limit potential damage from agriculture equipment.
d) Prevent surface flooding at the wells by maintaining mounding around the wellheads.
e) Ensure pitless units and monitoring wells are secure from public access.
f) Implement an Emergency Contingency Plan in the event of contamination.

4) Regularly Inspect Wellheads

Periodically inspect wellheads and monitoring wells for damage and wear. Maintain and cut vegetation around well casings. Since the wellheads are located in municipal right-of-way, ensure wellheads are visible and/or marked in winter for safety.

Appendix A

G3 Regional Water Co-op Infrastructure

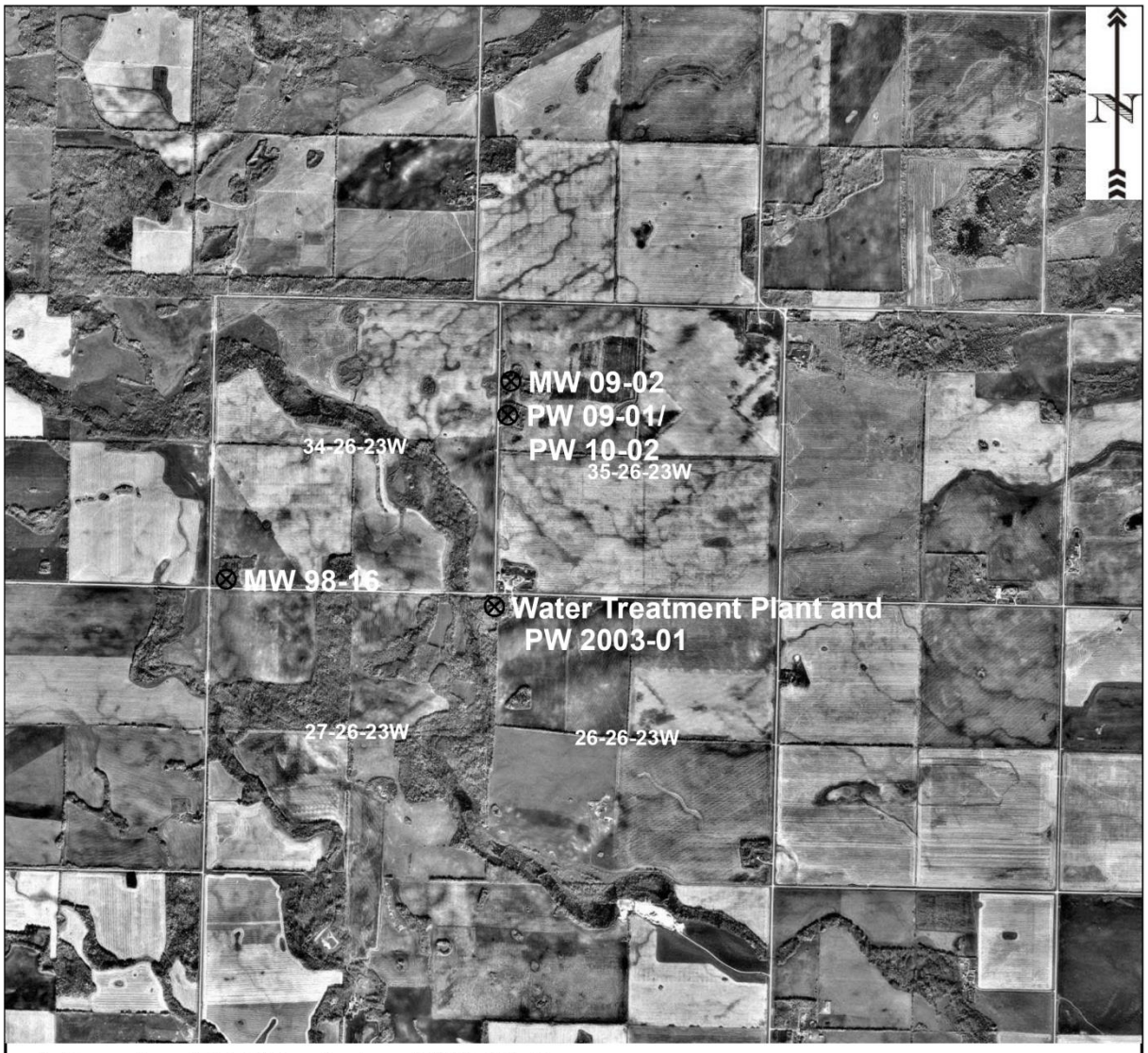


LEGEND

- 200 mm WATER PIPELINE
- 150 mm WATER PIPELINE
- 100 mm WATER PIPELINE
- 75 mm WATER PIPELINE
- 50 mm WATER PIPELINE
- G3 WELL & SUPPLY LINE
- G3 RESERVOIR
- SUPPLY LINE RM/TOWN OF GILBERT PLAINS
- SUPPLY LINE TOWN OF GRANDVIEW
- PRESSURE REDUCING STATION

Appendix B

Production Wells and Monitoring Wells



⊗ Pumping (PW)/Monitoring (MW) Well

0 Meters 1500

G3 Regional Water Cooperative

Site Plan

Figure No. 1

W. L. GIBBONS & ASSOC. INC.
HYDROGEOLOGY - GEOLOGICAL ENGINEERING

Designed By: BW
Approved By: SW
Date: 08/10

Driller's Report

Water Stewardship

WELL LOCATION: QTR. NW SEC. 35 TWP. 216 RGE. 23 E. ☐ W. ☒
R. LOT ___ PARISH approx 150 m N of P
REMARKS ½ mile in east ditch

WELL OWNER: NAME G 3 Regional Water Coop
ADDRESS ___ PHONE ___

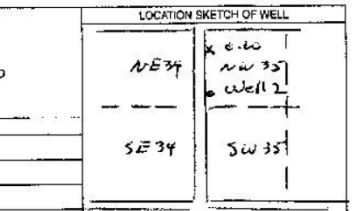
WELL IDENTIFICATION (NO., NAME): Well No. 2 PW 09-01

WELL USE: PRODUCTION ☒ TEST WELL ☐ RECHARGE ☐ OBSERVATION WELL ☐

WATER USE: DOMESTIC ☐ LIVESTOCK ☐ MUNICIPAL ☒ INDUSTRIAL ☐ IRRIGATION ☐
AIR CONDITIONING ☐ OTHER ☐ (Specify) ___

DATE WELL COMPLETED: DAY 11 MONTH Sept. 20 09

LOCATION SKETCH OF WELL



WELL CO-ORDINATES
Y NORTHING / LATITUDE: 0 3 8 8 3 2 1
X EASTING / LONGITUDE: 5 6 8 4 0 1 1 ± 7m

WELL LOG

DEPTH BELOW GROUND IN FEET FROM	TO	DESCRIPTION	WATER RECORD (KIND OF WATER)
0	11	Brown till	
11	52	Grey till ; thin sand @ 35 ft	
52	86	Sand ; fine to coarse	
86	105	Grey till	
105	135	Clay	
135	143	Sand ; fine to medium	
143	179	Sand ; fine to coarse	
		155 - 160 Gravelly layers	
179	190	Sandy clay	

WELL CONSTRUCTION

DEPTH BELOW GROUND LEVEL IN FEET FROM	TO	CASING	OPEN HOLE	PERFORATIONS	GRAVEL PACK	CASING GROUT	PITLESS UNIT	INSIDE DIAMETER INCHES	OUTSIDE DIAMETER INCHES	SCREEN SLOT SIZE NO. OR INCH	TYPE	MATERIAL	MAKE
0	135	X						11.38	12.75		Sched 80	PVC	
135	175			X				10 3/8	11 1/4	25	12" Tel	ww SS	
118	175				X			11 1/4	17		#30	Filter Sand	American Mat.
@	118					X					Hoteplug	Bentonite	
~20	~110					X		12.75	17		Backfill	Mortar Sand	
~16	~20					X		12.75	17		Neat	Cement	
0	~16					X		12.75	17		Backfill	Sand	
											3 set screen guides		
											5-5 baseplate w 3" SS aply + 3x2		BI bushing
													+ 2-inch PVC inside down

TOP OF CASING OR PITLESS UNIT ~2 FEET ABOVE ☒ BELOW ☐ GROUND LEVEL

REMARKS: Develop w air-lift block ; jet + air pump.
Prel. Test : PR 225 IGPM PL . 38.2 ft @ 60 min ; SC = 7.2

PUMPING TEST

DATE OF TEST: DAY ___ MONTH ___ 20 ___
PUMPING ☐ FLOWING ☐ RATE ___ I.G.P.M.
WATER LEVEL BEFORE PUMPING 7.1 FT. ABOVE ☐ BELOW ☒ T.C GRD. LEVEL
WATER LEVEL AT END OF TEST ___ FT. ABOVE ☐ BELOW ☐ GRD. LEVEL
DURATION OF TEST ___ HOURS ___ MINUTES
WATER TEMPERATURE ___ °F
RECOMMENDED PUMPING RATE ___ I.G.P.M.
WITH PUMP INTAKE AT ___ FEET BELOW GROUND LEVEL.

CONTRACTOR

LICENCE NO. ___
NAME Watkins & Argue
ADDRESS Clearwater
DRILL OPERATOR Lee Watkins
AP.
Signature of Contractor

FORM MG-7393 (Rev. 05/06) DRILLING CONTRACTOR'S COPY

Driller's Report

MANITOBA
WATER STEWARDSHIP

WELL LOCATION	QTR. NW SEC. 35 TWP. 26 RGE. 23 W1. R. LOT _____ PARISH _____ REMARKS: 0388322 5684001
WELL OWNER	NAME: G3 Water Cooperative ADDRESS: Gilbert Plains, MB PHONE:
WELL ID.	PW 10-02
WELL USE	Pumping Well
WATER USE	Municipal
DATE	July 29, 2010

Location Sketch of Well

WELL LOG

Depth Below Ground In Feet From	To	DESCRIPTION	Water Record (Kind of Water)
0	11	Brown Till	
11	52	Gray Till	
52	86	Sand	
86	105	Till	
105	130	Clay	
130	180	Sand, fine to coarse	
	180	End of Hole	

WELL CONSTRUCTION

Depth Below Ground Level In Feet From	To	CASING	OPEN HOLE	PERFORATIONS	GRAVEL PACK	CASING GROUT	PITLESS UNIT	INSIDE DIAMETER INCHES	OUTSIDE DIAMETER INCHES	SCREEN SLOT SIZE NO. OR INCH	TYPE	MATERIAL	MAKE
0	141	X						11.4	12.8		Schedule 80	PVC	
141	171			X				10.5	11.4	25	12" Telescopic	Stainless Steel	Johnson
126	171				X						#75	Filter Sand	Unimin
100	126					X					Holeplug	Bentonite	Enviroplug
0	100					X					Backfill	Mortar Sand	

Top Of Casing Or Pitless Adapter: 2 Feet Above X Below ____ Ground Level

Remarks: Approximately 11 meters south of well PW 09-01 and 5 meters east of municipal road edge

PUMPING TEST

Date Of Test: (y/mm/d)	2010/07/29
Pumping / Flowing Rate:	300 I.G.P.M.
Water Level Before Pumping:	11.32 ft. Above ____ Ground / Below X Level
Pumping Level At End Of Test:	39.1 ft. Above ____ Ground / Below X Level
Duration Of Test: (Hrs:Min)	1:00
Water Temperature:	
Conductivity:	
Recommended Pumping Rate: With Pump Intake At:	ft. Below Ground Level

CONTRACTOR

Licence No.:
Name: M & M Drilling
Address: Rivers, MB Phone
Drill Operator:
(Signature of Contractor)

Manitoba Water Stewardship

Driller's Report

WELL LOCATION
QTR. NW SEC. 35 TWP. 26 RGE. 23 E. ☐ W. ☒
R. LOT ____ PARISH ~250 m S of NW corner
REMARKS In ditch

WELL OWNER
NAME G 3 Regional Water Coop
ADDRESS ____ PHONE ____

WELL IDENTIFICATION (NO., NAME) MW09-02

WELL USE: PRODUCTION ☐ TEST WELL ☐ RECHARGE ☐ OBSERVATION WELL ☒

WATER USE: DOMESTIC ☐ LIVESTOCK ☐ MUNICIPAL ☐ INDUSTRIAL ☐ IRRIGATION ☐ AIR CONDITIONING ☐ OTHER ☐ (Specify) ____

DATE WELL COMPLETED DAY 18 MONTH Sept. 20 09

LOCATION SKETCH OF WELL

WELL CO-ORDINATES
Y NORTHING / LATITUDE 6388322
X EASTING / LONGITUDE 568 4418 17m

WELL LOG

DEPTH BELOW GROUND IN FEET FROM	TO	DESCRIPTION	WATER RECORD (KIND OF WATER)
0	10	Brown till	
10	28	Grey till ; thin sand layer	
28	28.5	Coarse Sand (Pocket)	
28.5	102	Grey till	
102	124	Grey clay	
124	133	Grey till	
133	138	Sand	
138	139	Till ?	
139	150	Sand	
150	160	Sand + gravel	

WELL CONSTRUCTION

DEPTH BELOW GROUND LEVEL IN FEET FROM	TO	CASING	OPEN HOLE	PERFORATIONS	GRAVEL PACK	CASING GROUT	PITLESS UNIT	INSIDE DIAMETER INCHES	OUTSIDE DIAMETER INCHES	SCREEN SLOT SIZE NO. OR INCH	TYPE	MATERIAL	MAKE
0	154	X						2			T+C	Steel	
154	159			X				2		15	WW	SS	
					X			2	5		# 30	Filtersand	

TOP OF CASING OR PITLESS UNIT 60 FEET ABOVE ☒ BELOW ☐ GROUND LEVEL

REMARKS:

PUMPING TEST

DATE OF TEST: DAY ____ MONTH ____ 20 ____
PUMPING ☒ FLOWING ☐ RATE 30 I.G.P.M. w air
WATER LEVEL BEFORE PUMPING 157 FT. ABOVE ☐ BELOW ☒ GRD. LEVEL
WATER LEVEL AT END OF TEST ____ FT. ABOVE ☐ BELOW ☐ GRD. LEVEL
DURATION OF TEST ____ HOURS ____ MINUTES
WATER TEMPERATURE ____ °F
RECOMMENDED PUMPING RATE ____ I.G.P.M.

CONTRACTOR

LICENCE NO. ____
NAME Watkins + Argue
ADDRESS Clearwater
DRILL OPERATOR Lee Watkins
Signature of Contractor

Manitoba Conservation

Driller's Report

WELL LOCATION
QTR. SW SEC. 34 TWP. 26 RGE. 23 E. ☐ W. ☒
R. LOT ____ PARISH 260 ft east of ℄ N-S Rd
REMARKS 60 ft N of ℄ EW Road

WELL OWNER
NAME MWSB - R M Gilbert Plains
ADDRESS ____ PHONE ____

WELL IDENTIFICATION (NO., NAME) MW98-16 TH-16 (5-inch Pump test well)

WELL USE PRODUCTION ☐ TEST WELL ☒ RECHARGE ☐ OBSERVATION WELL ☒

WATER USE DOMESTIC ☐ LIVESTOCK ☐ MUNICIPAL ☐ INDUSTRIAL ☐ IRRIGATION ☐
AIR CONDITIONING ☐ OTHER ☐ (Specify) ____

DATE WELL COMPLETED DAY ____ MONTH Sept. 20 12

LOCATION SKETCH OF WELL
See Sketch for 2-inch obs well

WELL LOG

DEPHT BELOW GROUND IN FEET FROM	TO	DESCRIPTION	WATER RECORD (KIND OF WATER)
0	14	Brown till	
14	18	Light grey till	
18	54	Dark grey till	
54	72	Gravel and sand	
72	86	Grey till	
86	87	Gravel	
87	107	Brown till	
107	109	Sand	
109	113	Grey till	
113	119	Sand	
119	120½	Till	
120½	130	Gravel & some sand	taking mud
130	140	Gravel	"
140	150	Till; grey w some gravel layers	

Note: Well will be used as an Observation well.

WELL CONSTRUCTION

DEPHT BELOW GROUND LEVEL IN FEET FROM	TO	CASING	OPEN HOLE	PERFORATIONS	GRAVEL PACK	CASING GROUT	PITLESS UNIT	INSIDE DIAMETER INCHES	OUTSIDE DIAMETER INCHES	SCREEN SLOT SIZE NO. OR INCH	TYPE	MATERIAL	MAKE
0	120	X						5				PVC	
120	140			X				5		18	ww	SS	
~100	140				X			5	8		160-165	Filter	45 bags: 50lb.

TOP OF CASING OR ~~PITLESS UNIT~~ 1.5 FEET ABOVE ☒ BELOW ☐ GROUND LEVEL

REMARKS:
Pump Well for 25 hour test
Coef of Trans 20 to 25,000 IGPD/FT

Field Anal
EC - 650
Hard - 27 gpg
Iron - 2.7 mg/l

Lab analyses @ 2, 12 & 24 hours ; attached

PUMPING TEST
DATE OF TEST: DAY ____ MONTH ____ 20 ____
PUMPING ☒ FLOWING ☐ RATE 100 I.G.P.M.
WATER LEVEL BEFORE PUMPING 9.3 FT. ABOVE ☐ ~~GRD LEVEL~~ TC BELOW ☒
WATER LEVEL AT END OF TEST 50.5 FT. ABOVE ☐ ~~GRD LEVEL~~ TC BELOW ☑
DURATION OF TEST 25 HOURS ____ MINUTES
WATER TEMPERATURE ____ °F
RECOMMENDED PUMPING RATE ____ I.G.P.M.
WITH PUMP INTAKE AT ____ FEET BELOW GROUND LEVEL.

CONTRACTOR
LICENCE NO. ____
NAME Western Drilling
ADDRESS Dauphin
DRILL OPERATOR Wilf Hnatuik.
Signature of Contractor

Appendix C

Annual Water Use Report 2018

Water Stewardship Division
Water Licensing Section
Box 16
200 Saulteaux Crescent
Winnipeg MB R3J 3W3
wateruse@gov.mb.ca

Manitoba
Conservation and Water Stewardship

Annual Water Use Report for 2018___

Pursuant to *The Water Rights Act*

LICENSEE'S NAME: G3 Regional Water Co-operative Inc.	LICENCE NO. 201-107
POST OFFICE ADDRESS	PHONE NO. 204-548-4561

SOURCE OF WATER SUPPLY (CHECK ONE)/ X WELL ☐ SURFACE WATER _____ (Name of River, Creek, etc.) ☐

LOCATION OF PUMP (OR WELL): 1 km North of G3 wtp.

QUARTER	SECTION	TOWNSHIP	RANGE	OR OTHER (SPECIFY)
NW	35	26	23W	

DESIGN PUMPING RATE: LITRES PER SECOND 34_____ OR OTHER (SPECIFY) _____

NOTE 1: QUANTITIES OF WATER IN TABLE BELOW EXPRESSED IN (CHECK ONE)

☐ LITRES ☐ DECAMETRES

X OTHER (SPECIFY): __M3_____

☐

METER READING DECEMBER 31/2017__ 2311983

	JANUARY		FEBRUARY		MARCH		APRIL	
DAY OF MONTH	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION
1	2312827	786	2337299	817	2357327	663	2380017	654
2		857		602		678		857
3		819		877		737		518
4		724		616		727		798
5		823		684		647		640
6		809		755		607		742
7		850		876		621		687
8		960		540		637		753
9		817		666		947		673
10		833		677		443		955
11		693		648		705		570
12		853		658		710		707
13		778		621		700		738
14		839		940		649		681
15		815		705		664		749
16		807		697		775		761
17		710		620		758		650
18		880		649		815		680
19		800		792		540		696
20		763		619		995		729
21		832		1012		1447		784
22		763		371		384		709
23		879		747		740		654
24		870		662		749		794
25		786		769		552		679
26		789		894		1070		806
27		760		759		1054		720
28		268		755		561		810
29		1090				748		830
30		520				607		749
31		699				762		
TOTAL		24472		20028		22690		21773

NOTE2:/

LICENSEE MUST COMPLETE "ANNUAL WATER USE REPORT" FOR EACH CALENDAR YEAR AND FORWARD THE REPORT TO THE WATER LICENSING SECTION AT THE ABOVE ADDRESS NOT LATER THAN FEB. 1 OF THE FOLLOWING YEAR.

2013-01

DAY OF MONTH	MAY		JUNE		JULY		AUGUST	
	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION
1	2401790	829	2427684	984	2456560	699	2484100	935
2		734		677		1138		810
3		819		824		1031		686
4		888		828		819		715
5		746		943		1112		705
6		766		1040		1118		908
7		894		839		867		782
8		974		807		854		910
9		661		1030		1159		814
10		660		931		1166		913
11		765		1062		770		831
12		916		1005		922		895
13		826		1189		969		924
14		811		1173		690		986
15		947		983		803		1142
16		565		1055		920		842
17		1051		996		901		918
18		852		1124		903		988
19		914		1107		793		942
20		812		1115		939		941
21		1032		915		783		715
22		904		1074		746		1165
23		973		780		833		831
24		604		846		773		761
25		811		1042		725		785
26		794		747		1038		658
27		987		1185		709		920
28		1053		999		1107		584
29		820		829		747		981
30		668		747		921		917
31		818				585		801
TOTAL		25894		28876		27540		26705

DAY OF MONTH	SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION
1	2510805	771	2535684	823	2562751	838	2588615	842
2		777		1228		922		908
3		868		1192		761		837
4		750		720		984		957
5		730		750		716		717
6		784		800		862		900
7		857		821		677		845
8		870		839		952		939
9		923		721		804		911
10		871		747		933		905
11		1049		738		798		799
12		956		835		897		887
13		933		987		755		920
14		845		966		847		696
15		704		885		897		982
16		867		909		849		888
17		720		1030		976		952
18		747		812		877		855
19		1188		848		873		904
20		806		748		785		613
21		1016		985		991		1031
22		788		816		795		823
23		728		956		1015		840
24		833		771		827		837
25		387		843		909		790
26		1175		878		771		782
27		589		986		917		887
28		662		975		755		768
29		974		851		1022		855
30		721		890		859		754
31				717				873
TOTAL		24879		27057		25864		26497

2013-01

Appendix D

Water Rights Licence 2010-107

MG-14854 (English)

Licence to Use Water for Municipal Purposes

Manitoba
Manitoba Water Stewardship
Regulatory and Operational Services Division
200 Saulteaux Cresc.
Winnipeg, Manitoba
R3J 3W3

Issued in accordance with the provisions of
The Water Rights Act and regulations made thereunder.

Licence No.: **2010-107**
(Original Lic. No.: 2005-124)
U.T.M.: Zone 14 388321 E
5684011 N

Know all men by these presents that in consideration of and subject to the provisos, conditions and restrictions hereinafter contained, the Minister of Water Stewardship for the Province of Manitoba does by these presents give full right and liberty, leave and licence to **G3 Regional Water Co-operative Inc.** of the **Rural Municipality of Gilbert Plains** in the Province of Manitoba (hereinafter called "the LICENSEE") to divert water from a **sand and gravel** aquifer by means of 2 water wells, pumps, pipeline(s) and other appurtenances (hereinafter called "the WORKS"), located on the following described lands:

the municipal road allowance lying to the West of the Northwest Quarter of Section 35, in Township 26 and Range 23, West of the Principal Meridian in Manitoba,

and more particularly shown on a plan filed in the office of the Executive Director, Regulatory and Operational Services Division, a copy of which plan is hereto attached and marked Exhibit "A" for **municipal** purposes on the following described lands:

the Rural Municipality of Gilbert Plains, the Town of Gilbert Plains and the Town of Grandview.

.

This licence is issued upon the express condition that it shall be subject to the provisions of The Water Rights Act and Regulations and all amendments thereto and, without limiting the generality of the aforesaid, to the following terms and conditions, namely:

1. The water shall be used solely for **municipal** purposes.
2. The WORKS shall be operated in accordance with the terms herein contained.
3. a) The maximum rate at which water may be diverted pursuant hereto shall not exceed **0.034 cubic metres per second (1.2 cubic feet per second)** .

   b) The total quantity of water diverted in any one year shall not exceed **315 cubic decametres (255.37 acre feet)** .
4. Water shall not be diverted during any period when the water level in the aquifer as measured at:

   a) 2010 Well is more than 39.9 metres (141.0 feet) beneath the surface of the ground.
   b) 2009 Well is more than 41.1 metres (135.0 feet) beneath the surface of the ground.
5. The LICENSEE does hereby remise, release and forever discharge Her Majesty the Queen in Right of the Province of Manitoba, of and from all manner of action, causes of action, claims and demands whatsoever which against Her Majesty the LICENSEE ever had, now has or may hereafter have, resulting from the use of water for **municipal** purposes.
6. In the event that the rights of others are infringed upon and/or damage to the property of others is sustained as a result of the operation or maintenance of the WORKS and the rights herein granted, the LICENSEE shall be solely responsible and shall save harmless and fully indemnify Her Majesty the Queen in Right of the Province of Manitoba, from and against any liability to which Her Majesty may become liable by virtue of the issue of this Licence and anything done pursuant hereto.
7. This Licence is not assignable or transferable by the LICENSEE and when no longer required by the LICENSEE this Licence shall be returned to the Executive Director, Regulatory and Operational Services Division, for cancellation on behalf of the Minister.
8. Upon the execution of this Licence the LICENSEE hereby grants the Minister or the Minister's agents the right of ingress and egress to and from the lands on which the WORKS are located for the purpose of inspection of the WORKS and the LICENSEE shall at all times comply with such directions and/or orders that may be given by the Minister or the Minister's agents in writing from time to time with regard to the operation and maintenance of the WORKS.
9. This Licence may be amended, suspended or cancelled by the Minister in accordance with The Water Rights Act by letter addressed to the LICENSEE at **Box 642, Gilbert Plains, MB, R0L 0X0, Canada** and thereafter this Licence shall be determined to be at an end.
10. Notwithstanding anything preceding in this Licence, the LICENSEE must have legal control, by ownership or by rental, lease, or other agreement, of the lands on which the WORKS shall be placed and the water shall be used.
11. This Licence shall expire on March 26, 2026 and this Licence shall become effective only on the date of execution hereof by a person so authorized in the Department of Water Stewardship. The LICENSEE may apply for renewal of this Licence not more than 365 days and not less than 90 days prior to the expiry date.
12. This Licence expires automatically upon the loss of the legal control of any of the lands on which the WORKS are located or on which water is used, unless the Licence is transferred or amended by the Minister upon application for Licence transfer or amendment.

13. The LICENSEE shall keep records of daily and annual water use and shall provide a copy of such records to the Executive Director, Regulatory and Operational Services Division, not later than February 1st of the following year.

14. A flow meter must be installed, positioned to accurately measure instantaneous pumping rate and accumulative withdrawals from the water source.

15. The LICENSEE does hereby agree to correct, to the satisfaction of the Minister, any water supply problems to wells or other forms of supply, which were constructed and operating prior to the date of application for the original Licence (No. 2005-124), and which are partly or wholly attributable, in the opinion of the Minister, to the diversion of water as authorized by this Licence.

16. The LICENSEE shall hold and maintain all other regulatory approvals that may be required and shall comply with all other regulatory requirements for the construction, operation, or maintenance of the WORKS or to divert or use water as provided by this Licence.

In witness whereof I the undersigned hereby agree to accept the aforesaid Licence on the terms and conditions set forth therein and hereby set my hand and seal this _____ day of _____ A.D. 20____.

SIGNED, SEALED AND DELIVERED
in the presence of

_____ } _____ (Seal)
Witness Licensee

Canada, PROVINCE OF MANITOBA To Wit:

I, _____ of the _____

of _____ in the Province of Manitoba, MAKE OATH AND SAY:

1. That I was personally present and did see _____, the within named party, execute the within Instrument.

2. That I know the said _____ and am satisfied that he/she is of the full age of eighteen years.

3. That the said Instrument was executed at _____ aforesaid and that I am subscribing witness thereto.

SWORN BEFORE me at the _____

in the Province of Manitoba this _____ day of _____ A.D. 20____.

_____ } _____
A COMMISSIONER FOR OATHS Witness
in and for the Province of Manitoba

My Commission expires _____

Issued at the City of Winnipeg, in the Province of Manitoba, this ____ day of _____ A.D. 20____.

_____
The Honourable the Minister of Water Stewardship

Appendix E

Operating Licence PWS 11-47

Manitoba
Sustainable Development
Office of Drinking Water
1007 Century Street, Winnipeg, Manitoba R3H 0W4

OPERATING LICENCE FOR A PUBLIC WATER SYSTEM

LICENCE NUMBER: PWS-11-476-01

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

WATER SYSTEM CODE:	71.25
OPERATION ID:	44602
EFFECTIVE DATE:	JANUARY 1, 2016
EXPIRY DATE:	NOVEMBER 30, 2020

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

G-3 REGIONAL WATER CO-OPERATIVE INC.: "THE LICENSEE"

FOR THE OPERATION OF THE **G-3 REGIONAL 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 LICENSES FOR THIS PUBLIC WATER SYSTEM.

Original signed by:

DATE: June 10, 2016

Kim Philip, P.Eng.
Director

Page 1 of 6

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 the ceremonial framed 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.

PWS-11-476-01 *Page 2 of 6*

2. OPERATION - GENERAL

2.1. The Licensee shall operate all water system facilities, control systems and equipment 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 cross-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 have an assessment of the water system infrastructure and water supply sources completed and submitted by a qualified professional engineer, who is not an employee of the water system, in a form satisfactory to the Director by January 1, 2016.

2.5. The Licensee shall have a re-assessment of the water system infrastructure and water supply sources completed and submitted by a qualified professional engineer, who is not an employee of the water system, in a form satisfactory to the Director by March 1, 2021 and every five years thereafter.

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.

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
Fluoride	Less than or equal to 1.5 mg/L
Lead	Less than or equal to 0.01 mg/L in the water distribution system
Nitrate	Less than or equal to 45 mg/L measured as nitrate (10 mg/L measured as nitrogen)
Trichloroethylene	Less than or equal to 0.005 mg/L
Tetrachloroethylene	Less than or equal to 0.03 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)	Continuous sampling of water entering the distribution system following at least 20 minutes of contact time A confirmatory sample to be taken daily at the online chlorine analyzer sampling or effluent point
Free chlorine (distribution system)	At the same time 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
Lead	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) 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 operate equipment capable of continuously monitoring the free chlorine residual at no more than five-minute intervals in water entering the water distribution system following a minimum of 20 minutes of contact time.

PWS-11-476-01 *Page 5 of 6*

5.7. In instances where continuous disinfectant residual monitoring equipment is offline, the Licensee shall ensure that a minimum of four samples per day are tested at the online chlorine analyzer sampling or effluent point using an approved portable analysis unit and that the results are recorded in a form satisfactory to the Director.

5.8. 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 Director 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 F

Environment Act Licence 2853 & Effluent Monitoring

THE ENVIRONMENT ACT
LOI SUR L'ENVIRONNEMENT

Manitoba

LICENCE

Licence No. / Licence n° 2853

Issue Date / Date de délivrance November 5, 2008

In accordance with The Environment Act (C.C.S.M. c. E125) /
Conformément à la Loi sur l'environnement (C.P.L.M. c. E125)

Pursuant to Section 11(1) / Conformément au Paragraphe 11(1)

THIS LICENCE IS ISSUED TO: / CETTE LICENCE EST DONNÉE À :

G3 REGIONAL WATER CO-OPERATIVE INC.; "the Licencee"

for the construction and operation of the Development being a water treatment and supply system for the Towns of Grandview and Gilbert Plains and the Rural Municipality of Gilbert Plains, with a well in SW 34-26-23W and a reverse osmosis water treatment plant located in the R.M. of Gilbert Plains in NW 26-26-23W, with the discharge of reject water to the Sulphurspring Creek marsh, in accordance with the Proposal filed under The Environment Act and dated August 26, 2008, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"as constructed drawings" means engineering drawings complete with all dimensions which indicate all features of the Development as it has actually been built;

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

****A COPY OF THE LICENCE MUST BE KEPT ON SITE AT THE DEVELOPMENT AT ALL TIMES****

G3 Regional Water Co-operative Inc.
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1. The Licencee shall, in addition to any of the following specifications, limits, terms and conditions specified in this Licence, upon the request of the Director:
   a) sample, monitor, analyse or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such duration and at such frequencies as may be specified;
   b) determine the environmental impact associated with the release of any pollutants from the said Development;
   c) conduct specific investigations in response to the data gathered during environmental monitoring programs; or
   d) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, flow rate measurements and such other information as may from time to time be requested.

2. The Licencee shall collect and dispose of all used oil products and other regulated hazardous wastes generated by the machinery used in the construction and operation of the Development in accordance with applicable Manitoba Conservation and legislation requirements.

3. The Licencee shall, prior to the commencement of operation of the Development, receive approval pursuant to The Drinking Water Safety Act for final plans for the Development.

4. The Licencee shall design, construct and operate the Development in accordance with Manitoba Regulations under the Public Health Act and the Drinking Water Safety Act and all operating requirements as recommended by Manitoba Water Stewardship.

5. The Licencee shall properly train or qualify individuals to carry out the operation of the Development pursuant to the requirements of ***Manitoba Regulation 77/2003*** respecting ***Water and Wastewater Facility Operators,*** or any future amendment thereof.

6. The Licencee shall not permit the interconnection of a private water supply system with the Development.

7. The Licencee shall maintain the water supply wells associated with the Development to prevent the contamination of groundwater by surface water:
   a) entering the well casings through the top of the casings; and
   b) entering the well casings through the sides of the casings.

8. The Licencee shall:
   a) prepare "As Constructed" drawings for the Development and shall label the drawings "As Constructed"; and

G3 Regional Water Co-operative Inc.
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b) provide to the Director, within one year of the completion of construction of the Development, two sets of "As Constructed" drawings.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

9. The Licencee shall, during construction of the Development, dispose of non-reusable construction debris at a waste disposal ground operating under the authority of a permit issued under ***Manitoba Regulation 150/91*** respecting ***Waste Disposal Grounds*** or any future amendment thereof, or a Licence issued pursuant to The Environment Act.

10. The Licencee shall, prior to commencing construction of the Development, obtain all necessary approvals from Manitoba Infrastructure and Transportation and the Highway Traffic Board.

11. The Licencee shall notify the Historic Resources Branch not less than one month prior to commencing construction of the Development in any year in which construction occurs, in compliance with the requirements of The Heritage Resources Act. The notification shall include pipeline route locations.

12. The Licencee shall notify the Western Regional Office of Manitoba Conservation in Dauphin not less than two weeks prior to commencing construction of the Development in any year in which construction occurs. The notification shall include the intended starting date of construction and the name of the contractor responsible for the construction.

13. The Licencee shall, during construction and operation of the Development:
    a) immediately report any reportable spills to Manitoba Conservation's Accident Reporting Line at (204) 944-4888; and
    b) provide a follow-up report to the Director on a reportable environmental accident outlining the cause(s) and proposing corrective action to prevent reoccurrence.

14. The Licencee shall, at all times during the construction of the Development, maintain materials to contain and recover spills of fuel and other fluids associated with construction machinery at construction sites.

15. The Licencee shall establish fuel storage and equipment servicing areas for the construction and operation of the Development:
    a) a minimum distance of 100 metres from any waterbody; and
    b) in compliance with the requirements of ***Manitoba Regulation 188/2001*** respecting ***Storage and Handling of Petroleum Products and Allied Products.***

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16. The Licencee shall construct waterway crossings on flowing waterways by augering, tunneling or boring. Open cut crossings on flowing waterways shall not be made unless prior consultation with Manitoba Water Stewardship and Department of Fisheries and Oceans staff has occurred and the prior written approval of the Director has been obtained. Dry or non-flowing (i.e. hydraulically unconnected to downstream flowing water) natural and artificial waterways may be crossed with open cut techniques where approval has been obtained where necessary from the authority responsible for the channel.

17. The Licencee shall, where open cut stream crossing techniques are used on intermittent waterways and artificial drainage channels, minimize disturbance to riparian areas and restore the bottom and banks of the waterways to their original elevations and shapes.

18. The Licencee shall, where open cut stream crossing techniques are used on intermittent waterways and artificial drainage channels, not construct open cut crossings associated with the Development between April 1 and June 15 of any year.

19. The Licencee shall construct open cut stream crossings associated with the Development in accordance with the methodologies described in the October, 2005 publication "Pipeline Associated Watercourse Crossings Third Edition", published by the Canadian Pipeline Water Crossing Committee, and the May, 1996 publication "Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat", published by the Department of Fisheries and Oceans and Manitoba Natural Resources.

20. The Licencee shall not alter local drainage patterns by the construction of the Development, including inflows and outflows from small wetlands adjacent to the route of pipelines.

21. The Licencee shall, during construction of the Development, implement all necessary measures to prevent the erosion of exposed soil into any waterbodies. Construction adjacent to waterbodies shall not occur during high rainfall events.

22. The Licencee shall not, during construction and operation of the Development, remove, destroy or disturb species listed as rare, endangered, or of special concern, or their habitats. These species are listed in ***Manitoba Regulation 25/98***, or any future amendment thereof, respecting ***Threatened, Endangered and Extirpated Species*** and in the federal Species at Risk Act.

23. The Licencee shall not construct the Development in areas likely to provide bird habitat before August 1 of any year. Construction in wetland areas and in riparian zones adjacent to rivers shall not occur before August 15 of any year.

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24. The Licencee shall separate and replace topsoil from backhoe and trenching operations associated with the Development in accordance with the methodology described in Figures 1, 2 and 3 attached to this Licence. This requirement is not applicable where the topsoil has been previously disturbed due to the construction of roads or drains.

25. The Licencee shall revegetate soil exposed during the construction of the Development with native or introduced grasses or legumes. Native species shall be used to revegetate areas where native species existed prior to construction. Revegetation is not required for pipelines installed by chain trenching or ploughing on previously disturbed ground including road allowances.

26. The Licencee shall not release chlorinated water from pipeline testing and startup activities associated with the Development to a surface water body until chlorine level concentrations are equal to or less than 0.1 milligrams per litre. Releases of chlorinated water at higher concentrations may be made to vegetated land or dry waterways, provided that chlorine level concentrations have decayed to 0.1 milligrams per litre or less before the released water reaches any body of surface water.

27. The Licencee shall conduct an effluent monitoring program as described in Clauses 28 to 31 of this Licence, for a period of two years commencing with the operation of the Development. Following this period, the duration of the monitoring program may be extended by the Director if the results, in the opinion of the Director, indicate that a longer monitoring period is appropriate.

28. The Licencee shall, on a quarterly basis for the duration of the effluent monitoring program, collect grab samples at locations approved by the Director in the reverse osmosis concentrate wastewater stream within the water treatment plant and upstream and downstream of the effluent discharge pipeline outlet on the Sulphurspring Creek marsh.

29. The Licencee shall transport the grab samples collected pursuant to Clause 28 of this Licence, to an accredited laboratory for analysis. The samples shall be stored and transported in accordance with procedures specified by Manitoba Water Stewardship to ensure that the samples are suitable for analysis.

30. The Licencee shall, at an accredited laboratory, have the samples collected pursuant to Clause 29 of this Licence, analysed for the following parameters:

G3 Regional Water Co-operative Inc.
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a) hardness as CaCO3;
b) total dissolved solids;
c) iron;
d) calcium;
e) magnesium;
f) manganese; and
g) sodium.

31. The Licencee shall, not more than 30 days after the results of each quarterly analysis are available, submit the results to the Director.

32. The Licencee shall, each winter during the operation of the Development:
a) monitor ice accumulation in Sulphurspring Creek at the effluent discharge pipeline outlet, and
b) take action as may be necessary to prevent flooding on Sulphurspring Creek due to ice accumulation from the operation of the Development.

REVIEW AND REVOCATION

A. Environment Act Licence No. 2597 is hereby rescinded.

B. If, in the opinion of the Director, the Licencee has exceeded or is exceeding or has or is failing to meet the specifications, limits, terms, or conditions set out in this Licence, the Director may, temporarily or permanently, revoke this Licence.

C. If construction of the development has not commenced within three years of the date of this Licence, the Licence is revoked

D. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of The Environment Act.

Tracey Braun, M. Sc.
Director
Environment Act

FILE: 5360.00

G3 WATER CO-OP TREATMENT PLANT

L972884 CONTD....
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Version: FINAL REV.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L972884-1 EFFLUENT WASTE PIT							
Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Hardness (as CaCO3)	2560		0.30	mg/L		31-JAN-11	
Total Dissolved Solids	3690		5.0	mg/L		26-JAN-11	R1879665
Total Metals by ICP-MS							
Calcium (Ca)-Total	596		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Iron (Fe)-Total	11.8		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Magnesium (Mg)-Total	259		0.010	mg/L	27-JAN-11	27-JAN-11	R1889284
Manganese (Mn)-Total	0.722		0.00030	mg/L	27-JAN-11	27-JAN-11	R1889284
Sodium (Na)-Total	219		0.030	mg/L	27-JAN-11	27-JAN-11	R1889284
L972884-2 EFFLUENT DOWNSTREAM							
Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Hardness (as CaCO3)	433		0.30	mg/L		31-JAN-11	
Total Dissolved Solids	512		5.0	mg/L		26-JAN-11	R1879665
Total Metals by ICP-MS							
Calcium (Ca)-Total	102		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Iron (Fe)-Total	2.71		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Magnesium (Mg)-Total	43.1		0.010	mg/L	27-JAN-11	27-JAN-11	R1889284
Manganese (Mn)-Total	0.169		0.00030	mg/L	27-JAN-11	27-JAN-11	R1889284
Sodium (Na)-Total	11.7		0.030	mg/L	27-JAN-11	27-JAN-11	R1889284
L972884-3 EFFLUENT UPSTREAM							
Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Hardness (as CaCO3)	382		0.30	mg/L		31-JAN-11	
Total Dissolved Solids	404		5.0	mg/L		26-JAN-11	R1879665
Total Metals by ICP-MS							
Calcium (Ca)-Total	89.6		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Iron (Fe)-Total	0.57		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Magnesium (Mg)-Total	38.4		0.010	mg/L	27-JAN-11	27-JAN-11	R1889284
Manganese (Mn)-Total	0.149		0.00030	mg/L	27-JAN-11	27-JAN-11	R1889284
Sodium (Na)-Total	3.17		0.030	mg/L	27-JAN-11	27-JAN-11	R1889284

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

G3 CO-OP TREATEMENT PLANT - GILBERT PLAINS WTP - (71.25)

L999260 CONTD....
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Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L999260-3 3) EFFLUENT UPSTREAM							
Sampled By: LLOYD BECKLEY on 26-APR-11 @ 10:00							
Matrix: EFFLUENT WATER							
Total Metals by ICP-MS							
Potassium (K)-Total	2.31		0.10	mg/L	02-MAY-11	02-MAY-11	R2183868
Sodium (Na)-Total	2.15		0.050	mg/L	02-MAY-11	02-MAY-11	R2183868

G3 WATER CO-OP TREATMENT PLANT

L1230594 CONTD....
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Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1230594-1 EFFLUENT @ DISCHARGE							
Sampled By: LLOYD BECKLEY on 29-OCT-12 @ 11:00							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Total Dissolved Solids	318		5.0	mg/L		31-OCT-12	R2466439
Water Softener Suitability							
Hardness - grains/Imperial gallon							
Hardness-grains/IMPgal	17.1		0.010	grn/IMPgal		31-OCT-12	
Hardness - grains/US gallon							
Hardness-grains/USgal	14.2		0.010	grn/USgal		31-OCT-12	
Hardness Calculated							
Hardness (as CaCO3)	243		0.30	mg/L		02-NOV-12	
Total Metals by ICP-MS							
Calcium (Ca)-Total	60.0		0.20	mg/L	01-NOV-12	01-NOV-12	R2467228
Iron (Fe)-Total	18.4		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Magnesium (Mg)-Total	22.7		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
Manganese (Mn)-Total	0.943		0.0010	mg/L	01-NOV-12	01-NOV-12	R2467228
Potassium (K)-Total	4.37		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Sodium (Na)-Total	27.5		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
L1230594-2 EFFLUENT DOWNSTREAM							
Sampled By: LLOYD BECKLEY on 29-OCT-12 @ 11:00							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Total Dissolved Solids	634		5.0	mg/L		31-OCT-12	R2466439
Water Softener Suitability							
Hardness - grains/Imperial gallon							
Hardness-grains/IMPgal	41.8		0.010	grn/IMPgal		31-OCT-12	
Hardness - grains/US gallon							
Hardness-grains/USgal	34.8		0.010	grn/USgal		31-OCT-12	
Hardness Calculated							
Hardness (as CaCO3)	595		0.30	mg/L		02-NOV-12	
Total Metals by ICP-MS							
Calcium (Ca)-Total	135		0.20	mg/L	01-NOV-12	01-NOV-12	R2467228
Iron (Fe)-Total	0.36		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Magnesium (Mg)-Total	62.7		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
Manganese (Mn)-Total	0.0603		0.0010	mg/L	01-NOV-12	01-NOV-12	R2467228
Potassium (K)-Total	7.11		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Sodium (Na)-Total	14.1		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
L1230594-3 EFFLUENT UPSTREAM							
Sampled By: LLOYD BECKLEY on 29-OCT-12 @ 11:00							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Total Dissolved Solids	464		5.0	mg/L		31-OCT-12	R2466439
Water Softener Suitability							
Hardness - grains/Imperial gallon							
Hardness-grains/IMPgal	32.7		0.010	grn/IMPgal		31-OCT-12	
Hardness - grains/US gallon							
Hardness-grains/USgal	27.2		0.010	grn/USgal		31-OCT-12	
Hardness Calculated							
Hardness (as CaCO3)	465		0.30	mg/L		02-NOV-12	
Total Metals by ICP-MS							
Calcium (Ca)-Total	109		0.20	mg/L	01-NOV-12	01-NOV-12	R2467228
Iron (Fe)-Total	0.64		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Magnesium (Mg)-Total	47.1		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
Manganese (Mn)-Total	0.124		0.0010	mg/L	01-NOV-12	01-NOV-12	R2467228

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

G3 WATER CO-OP TREATMENT PLANT

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1230594-3 EFFLUENT UPSTREAM							
Sampled By: LLOYD BECKLEY on 29-OCT-12 @ 11:00							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Potassium (K)-Total	5.62		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Sodium (Na)-Total	6.45		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228

G-3 WATER CO-OP TREATMENT PLANT

L1268522 CONTD....
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Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1268522-1 EFFLUENT @ DISCHARGE							
Sampled By: Ivan Yakimishen on 13-FEB-13 @ 11:00							
Matrix: Effluent							
Miscellaneous Parameters							
Hardness (as CaCO3)	1370		0.30	mg/L		20-FEB-13	
Total Dissolved Solids	1750		5.0	mg/L		14-FEB-13	R2532813
Total Metals by ICP-MS							
Calcium (Ca)-Total	316		0.20	mg/L	19-FEB-13	19-FEB-13	R2536503
Iron (Fe)-Total	13.4		0.10	mg/L	19-FEB-13	19-FEB-13	R2536503
Magnesium (Mg)-Total	141		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
Manganese (Mn)-Total	0.446		0.0010	mg/L	19-FEB-13	19-FEB-13	R2536503
Sodium (Na)-Total	83.2		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
L1268522-2 EFFLUENT DOWNSTREAM							
Sampled By: Ivan Yakimishen on 13-FEB-13 @ 11:00							
Matrix: Effluent							
Miscellaneous Parameters							
Hardness (as CaCO3)	472		0.30	mg/L		20-FEB-13	
Total Dissolved Solids	518		5.0	mg/L		14-FEB-13	R2532813
Total Metals by ICP-MS							
Calcium (Ca)-Total	107		0.20	mg/L	19-FEB-13	19-FEB-13	R2536503
Iron (Fe)-Total	0.38		0.10	mg/L	19-FEB-13	19-FEB-13	R2536503
Magnesium (Mg)-Total	49.8		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
Manganese (Mn)-Total	0.139		0.0010	mg/L	19-FEB-13	19-FEB-13	R2536503
Sodium (Na)-Total	6.41		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
L1268522-3 EFFLUENT UPSTREAM							
Sampled By: Ivan Yakimishen on 13-FEB-13 @ 11:00							
Matrix: Effluent							
Miscellaneous Parameters							
Hardness (as CaCO3)	466		0.30	mg/L		20-FEB-13	
Total Dissolved Solids	463		5.0	mg/L		14-FEB-13	R2532813
Total Metals by ICP-MS							
Calcium (Ca)-Total	105		0.20	mg/L	19-FEB-13	19-FEB-13	R2536503
Iron (Fe)-Total	0.53		0.10	mg/L	19-FEB-13	19-FEB-13	R2536503
Magnesium (Mg)-Total	49.4		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
Manganese (Mn)-Total	0.168		0.0010	mg/L	19-FEB-13	19-FEB-13	R2536503
Sodium (Na)-Total	4.25		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Appendix G

Groundwater Interference Policy

Groundwater Interference Policy
G3 Regional Water Co-operative Inc.

Purpose:

The purpose of the Groundwater Interference Complaint Response Policy is to establish a procedure to deal with complaints of groundwater interference regarding private wells.

The groundwater interference complaint response policy will be invoked if a resident makes a written groundwater interference complaint to the G3 Regional Water Cooperative on the form as set out in Schedule "A" attached to and forming part of this policy.

Any resident contacting Manitoba Conservation or Manitoba Water Stewardship regarding a well water interference complaint should first be referred to the G3 Regional Water Co-operative.

Definitions:

"Groundwater Interference" is defined as a decrease in residential well performance due to factors such as the pumping of the G3 Regional Water Co-operative production well(s) that causes a decrease in well capacity such that the supply of water to the well is temporarily or permanently interrupted.

Procedure:

The procedures for responding to a groundwater interference complaint have been divided into two categories as follows:

1) Preliminary Well Assessment; and
2) Secondary Well Assessment

All complaints shall be in writing and shall be submitted on the Groundwater Interference Complaint Incident Report on the form as set out in Schedule "A" attached to and forming part of this policy. Upon receipt of a written complaint, the preliminary well assessment will be completed by The Manitoba Water Services Board (MWSB) as set out in Schedule "B". Depending on the results of the preliminary assessment, it may be necessary to have an approved private sector Investigating Contractor as listed in Schedule "C" attached to and forming part of this policy complete a more detailed secondary well assessment.

1) **Preliminary Well Assessment**
   a) The MWSB will undertake a well assessment within twenty-four (24) hours of receiving the interference complaint. The initial assessment and discussion with the well owner may conclude that no further action is required on the part of the G3 Regional Water Co-operative.
   b) In the event that MWSB concludes that groundwater interference may have occurred, the following actions will be taken:

i) Immediately offer or provide the resident with a reasonable amount of potable water; and
ii) Contact the G3 Regional Water Co-operative's Investigating Contractor to undertake an investigation to determine the cause of the complaint.

2) **Secondary Well Assessment**

a) In the event that the Investigating Contractor concludes that ground water interference **did not** occur, the resident may be required to pay for the temporary water supply.
b) In the event that the Investigating Contractor concludes that a bona fide groundwater interference may have occurred, the MWSB will complete one of the following actions:
   i) With agreement of the affected resident, continue to deliver water to the resident at no cost; or
   ii) Institute mitigation measures such as lowering the well pump or repairing/replacing the well in order to accommodate the observed interference; or
   iii) Reduce the rate and amount of municipal water taking so as to alleviate the observed interference. This action may not immediately restore water to the private well and it may be necessary to continue action (i) above in the interim.

3) **Documentation**

The groundwater interference complaint incident report should be summarized and as a minimum, documents the following:

a) The location of the complaint (name, address, telephone number);
b) Investigation procedures and results; and
c) Any actions taken to restore water supply

4) **Notification**

Manitoba Water Stewardship must be notified of any bona fide well interference problem as follows:

a) The MWSB must notify Manitoba Water Stewardship, Water Use Licensing Section, by phone and email immediately after the Investigating Contractor has confirmed that a well interference may have occurred.
b) The Groundwater Interference Complaint Incident Report documenting the well interference must be submitted to Manitoba Water Stewardship, Water Use Licensing Section no more than one (1) week after the interference was confirmed.

5) **Updating the Groundwater Interference Complaint Response Policy**

The groundwater interference complaint response policy should be regarded as a living document that is updated whenever there are changes in any of the contact information provided on the Groundwater Interference Complaint Information Sheet as listed in Schedule "C". As a minimum the groundwater interference complaint response policy should be reviewed annually to ensure that the information is up to date.

Schedule "A"
G3 Regional Water Co-operative Inc.
Groundwater Interference Complaint by Private Owner

Name	
Address	
Phone Number	
Date	
Nature of Complaint	
Description of problem(s) and dates when problem occurred:	

Schedule "B"
G3 Regional Water Co-operative Inc.
Groundwater Interference Complaint
Contractor Incident Report

Preliminary Well Assessment	
Assessment completed by:	
Date completed:	
INVESTIGATION **Including investigation procedures, observations and results.**	
ACTIONS TAKEN **By owner or ESP**	

Secondary Well Assessment	
Name of Company	
Contact Person	
Date Completed	

INVESTIGATION
Including investigation procedures, observations and results.

ACTIONS TAKEN
By owner, Investigator, or ESP

COMPLAINT RESOLUTION	
Date Water Supply Temporarily Restored	
Date Water Supply Restored	

NOTIFICATION OF MANITOBA WATER STEWARDSHIP	
Contact Person Notified of Bona Fide Interference	
Date Contacted	

Schedule "C"
G3 Regional Water Co-operative Inc.
Groundwater Interference Complaint
Information Sheet

G3 Regional Water Co-operative	**G3 Regional Water Co-operative Inc.** 114 Main Street North Box 642 Gilbert Plains, MB R0L 0X0 (204) 548-2761
The Manitoba Water Services Board	**The Manitoba Water Services Board** Unit 1A 2010 Currie Boulevard Brandon, MB R7B 4E7 (204) 726-6076
Manitoba Water Stewardship	**Manitoba Conservation and Water Stewardship** Water Use Licensing Section Box 16-200 Saulteaux Crescent Winnipeg, MB R3J 3W3 Office: (204) 945-6474 Fax: (204) 945-7419
Consultant Investigation Contractor:	**W.L. Gibbons & Associates Inc.** 64 St. Andrew Road Winnipeg, MB R2M 3H6 Office: (204) 771-4389
Subcontractor Investigation Subcontractor:	**M & M Drilling** 531-9th Avenue Rivers, MB (204) 328-7112