Public Water System Annual Report

-2012-

Name of the Public Water System: **G3 Regional Water Co-op**

Name of the Legal Owner: **G3 Regional Water Co-operative Inc.**

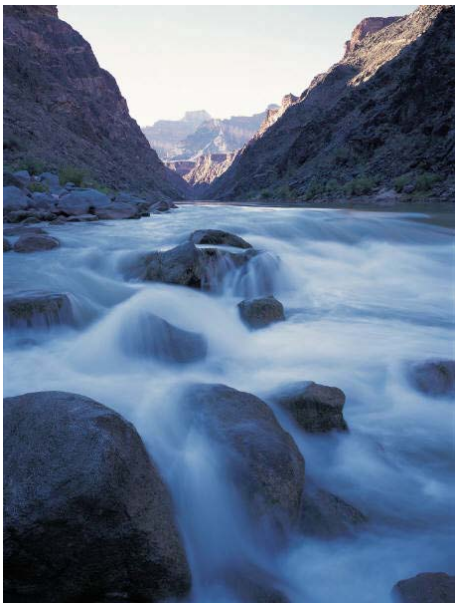
Contact Person: **Janice Lagoski**

Phone: **(204) 548-2761**

Emergency number: **(204) 648-4714**

Name of Operator: **Mr. Lloyd Beckley**

Phone during business hours: **(204) 648-4714**



Date Prepared: April 2013

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Janice Lagoski
Secretary Treasurer
G3 Regional
Water Co-op Inc.

Table of Contents

1. Introduction:

The 2012 G3 Regional Water Co-op Annual Report summarizes the water utility's ability to provide safe potable water and comply with provincial regulations.

2. Description of the Water System

The G3 Water Co-op provides potable drinking water to a population of approximately 2500 residents. No corrective actions or emergency reporting was required. Full results have been attached in section 3.

The G3 Regional Co-op water system consists of two wells, raw water pipeline, a water treatment plant (WTP), and a network of distribution pipelines.

2.1. Water Supply Source

The G3 Regional Water Co-op receives its raw water supply from two 300 mm groundwater wells. The wells are located approximately 1 km north of the WTP on municipal right-of-way west of the NW 26-26-23 W. One well can fully supply the system, however a fully equipped and redundant back-up well is provided to ensure supply can be maintained at all times.

The system provides treated water to the Towns of Gilbert Plains and Grandview and the Rural Municipality of Gilbert Plains.

2.2 Water Treatment Process

The treatment system is comprised of two parallel RO membrane filtration skids, a manganese greensand bypass filter and forced air degasifier 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 Sulfurspring Creek which is permitted by Environment Act Licence No. 2853. The treatment system ensures that the water meets the *Guidelines for Canadian Drinking Water Quality* and the *Drinking Water Safety Act.*

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 degasifier was designed and installed to stabilize membrane permeate. The degasifier

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. Ammonia is removed through membrane treatment but not typically through a manganese greensand filter. Using sodium hypochlorite (chlorine) before the manganese greensand filter consumes the ammonia. Additional chlorine for disinfection is provided to maintain an adequate chlorine residual concentration in the reservoir.

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.

The water treatment process is designed to reduce iron and manganese concentrations, and reduce hardness to an acceptable level. A schematic of the water treatment process can be found in Appendix B.

Iron and manganese are metals that cause laundry and plumbing fixture staining problems, and can build up in the distribution pipes and cause reduced flow. Calcium carbonate causes hardness in water which diminishes the ability of the water to react with soap and form lather. Hardness also forms scale deposits in kettles and hot water tanks which can reduce the life expectancy of these appliances.

2.3 Classification and Certification

The G3 Treatment Plant is a Class 2 water treatment facility and the water distribution is classified as Class 1 water distribution. The facility classifications are used to determine certification requirements for the water system operators.

3. List of Water Quality Standards

The Province of Manitoba has adopted a number of water quality standards from the Health Canada *Guidelines for Canadian Drinking Water Quality*. The health-based parameters express the maximum acceptable concentrations for drinking water. Concentration values in excess of the guidelines constitute a health-related issue and require corrective actions. All health based parameters were within the limits for 2012 for the G3 Regional Water System. Public water systems are required to

monitor chlorine levels and undertake regular bacterial testing. The 2012 results for the G3 Regional Water Co-op are as follows:

3.1 Water Quality Standards

Water Quality Standards		Percent Compliance	Corrective Action Forms
Bacterial			
E. coli	Less than one E. coli bacteria detectable per 100mL in all treated water	**100%**	
Total coliform	Less than one total coliform bacteria detectable per 100mL in all treated water	**100%**	
E. coli	Less than one E. coli bacteria detectable per 100mL in all distributed water	**100%**	
Total coliform	Less than one total coliform bacteria detectable per 100mL in all distributed water	**100%**	
Comments:	The public water system has met the bacterial water quality standard for 2012.		
Disinfection			
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	**100%**	
	A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system	**100%**	
Comments:	The public water system has met the disinfection standard for 2012.		
Chemical			
Arsenic	Less than or equal to 0.01 mg/L		**0.00418**
Fluoride	Less than or equal to 1.5 mg/L		**0.12**
Nitrate	Less than or equal to 10 mg/L measured as nitrogen		**<0.05**
Uranium	Less than or equal to 0.02 mg/L		**0.000090**
Benzene	Less than or equal to 0.005 mg/L		**<0.005**
Trichloroethylene	Less than or equal to 0.005 mg/L		**<0.005**
Tetrachloroethylene	Less than or equal to 0.03 mg/L		**<0.005**
Comments:	The values reported are in mg/l from 2010. The 2010 report indicated that the treated water met all health related guidelines.		

3.2 Monitoring Requirements

Monitoring Requirements		Percent Compliance
Bacterial		
Total coliform and E. coli	Bi-weekly sampling program with each set of samples consisting of one raw, one treated sample	**100%**
	Consecutive sample sets must be separated by at least 12 days	**100%**
Comments:	The public water system has met the bacteriological sampling requirement for 2012.	
Disinfection		
Free chlorine (treated water)	One sample per day of water entering the distribution system following at least twenty minutes of contact time	**100%**
	Continuous sampling of water entering the distribution system following at least twenty minutes of contact time	**100%**
Free chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling	**100%**
Total chlorine (treated water)	One sample per day of water entering the distribution system following at least twenty minutes of contact time	**100%**
Total chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling	**100%**
Comments:	The public water system has met the disinfection monitoring requirement for 2012.	
Physical		
Chemistry		
General chemistry (to include arsenic, fluoride, nitrate, and uranium)	One raw and one treated water sample once every three years	**Sampled by the ODW in 2010**
Benzene, trichloroethylene, and tetrachloroethylene	One treated sample every three years	**Sampled by the ODW in 2010**

Lead	As per the instructions of the Drinking Water Officer	
Comments:	The Office of Drinking Water submitted water samples for chemical analysis in 2010. As a groundwater source, a chemical analysis is only required every 3 years. The next chemical analysis will be required in 2013. This action is considered to fulfill the general chemistry monitoring requirement outlined in Table 2 of the Operating Licence.	

Reporting Requirements		
Disinfection	Submit original monthly disinfection report forms within seven days after the end of each calendar month	**100%**
Corrective Actions	Submit original corrective action report for minor exceedences as described in the most recent version of the Office of Drinking Water "Operational Guidelines for Public and Semi-public Water Systems", along with the monthly disinfection, or turbidity report form	**100%**
Emergency	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 treatment upsets or bypass conditions, contamination of the source water or treated water, a filtration or disinfection system failure, or a distribution system failure	**NA**
Comments:	The information submitted to the Office of Drinking Water indicates that no corrective action reports or emergency reporting was required.	

4. Water System Incidents and Corrective Actions

There were no major water system incidents in 2012. There were no corrective actions or emergency reporting required.

5. Drinking Water Safety Orders, Warnings, and Charges

There were no Drinking Water Safety Orders or warnings issued, nor were any charges laid on the system.

6. Major Expenses Incurred

There were no major expenses for the G3 Regional Water System in 2012.

7. Future System Expansion

There are no immediate plans for expansion of the system.

Appendix A

Results of Water Chemistry, Bacterial and Chlorine Residual Analysis[1]

[1] Obtained from Office of Drinking Water

Collection Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	HPC
03-Jan-12	G-3 1-RAW	0	0	0	0	<10
03-Jan-12	G-3 2-TTD	0	0	1.17	1.4	<10
16-Jan-12	G-3 1-RAW	0	0	0	0	<10
16-Jan-12	G-3 2-TTD	0	0	0.96	1.1	<10
30-Jan-12	G-3 1-RAW	0	0	0	0	<10
30-Jan-12	G-3 2-TTD	0	0	1.04	1.13	<10
13-Feb-12	G-3 1-RAW	0	0	0	0	<10
13-Feb-12	G-3 2-TTD	0	0	0.96	1.11	<10
27-Feb-12	G-3 1-RAW	0	0	0	0	<10
27-Feb-12	G-3 2-TTD	0	0	0.93	1.13	<10
13-Mar-12	G-3 1-RAW	0	0	0	0	<10
13-Mar-12	G-3 2-TTD	0	0	0.79	0.83	<10
27-Mar-12	G-3 2-TTD	0	0	1.73	2	<10
27-Mar-12	G-3 1-RAW	0	0	0	0	<10
10-Apr-12	G-3 1-RAW	0	0	0	0	<10
10-Apr-12	G-3 2-TTD	0	0	0.92	1.14	<10
23-Apr-12	G3 1 - RAW	0	0	NR	NR	<10
23-Apr-12	G3 2 - TREATED	0	0	NR	NR	<10
07-May-12	G3 2 - TREATED	0	0	0.890	1.09	NR
07-May-12	G3 1 - RAW	0	0	NR	NR	NR
22-May-12	G3 1 - RAW	0	0	NR	NR	NR
22-May-12	G3 2 - TREATED	0	0	1.13	1.38	NR
04-Jun-12	G3 2 - TREATED	0	0	0.830	1.03	NR
04-Jun-12	G3 1 - RAW	0	0	NR	NR	NR
18-Jun-12	G3 2 - TREATED	0	0	1.07	1.34	NR
18-Jun-12	G3 1 - RAW	0	0	NR	NR	NR
03-Jul-12	G3 2 - TREATED	0	0	1.03	1.28	NR
03-Jul-12	G3 1 - RAW	0	0	NR	NR	NR
16-Jul-12	G3 1 - RAW	0	0	NR	NR	NR
16-Jul-12	G3 2 - TREATED	0	0	0.890	1.11	NR
30-Jul-12	G3 1 - RAW	0	0			
30-Jul-12	G3 2 - TREATED	0	0	1.01	1.29	
13-Aug-12	G3 1 - RAW	0	0			
13-Aug-12	G3 2 - TREATED	0	0	0.730	0.900	
27-Aug-12	G3 2 - TREATED	0	0	0.960	1.20	
27-Aug-12	G3 1 - RAW	0	0			
10-Sep-12	G3 1 - RAW	0	0			
10-Sep-12	G3 2 - TREATED	0	0	0.980	1.20	
24-Sep-12	G3 1 - RAW	0	0			
24-Sep-12	G3 2 - TREATED	0	0	0.760	0.960	
09-Oct-12	G3 1 - RAW	0	0			
09-Oct-12	G3 2 - TREATED	0	0	0.750	0.920	
22-Oct-12	G3 1 - RAW	0	0			
22-Oct-12	G3 2 - TREATED	0	0	0.910	0.960	
05-Nov-12	G3 1 - RAW	0	0			
05-Nov-12	G3 2 - TREATED	0	0	1.14	1.38	
19-Nov-12	G3 2 - TREATED	0	0	0.890	1.09	
19-Nov-12	G3 1 - RAW	0	0			
04-Dec-12	G3 1 - RAW	0	0			
04-Dec-12	G3 2 - TREATED	0	0	0.960	1.18	
17-Dec-12	G3 1 - RAW	0	0			
17-Dec-12	G3 2 - TREATED	0	0	0.990	1.27	
02-Jan-13	G3 2 - TREATED	0	0	0.890	1.06	
02-Jan-13	G3 1 - RAW	0	0			

Water Chemistry

ALS Environmental

ANALYTICAL REPORT

Physical Tests (WATER)

				ALS ID	L917104-1	L917104-2
				Sampled Date	05-AUG-10	05-AUG-10
				Sampled Time	10:30	10:30
				Sample ID	G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Color, True	T.C.U.	15	-		10.0	<5.0
Conductivity	umhos/cm	-	-		1130	227
Langelier Index (4 C)	No Unit	-	-		0.49	-0.47
Langelier Index (60 C)	No Unit	-	-		1.3	0.30
pH	pH units	6.5-8.5	-		7.56	8.04
Total Dissolved Solids	mg/L	500	-		846	165
Turbidity	NTU	-	-		35.9	0.25

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Anions and Nutrients (WATER)

				ALS ID	L917104-1	L917104-2
				Sampled Date	05-AUG-10	05-AUG-10
				Sampled Time	10:30	10:30
				Sample ID	G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Alkalinity, Total (as CaCO3)	mg/L	-	-		383	68.7
Ammonia (NH3) - Dissolved	mg/L	-	-		1.23	<0.050
Bicarbonate (HCO3)	mg/L	-	-		467	83.8
Carbonate (CO3)	mg/L	-	-		<0.60	<0.60
Chloride (Cl) - Dissolved	mg/L	250	-		8.95	4.87
Fluoride (F) - Dissolved	mg/L	-	1.5		0.12	0.97
Hardness (as CaCO3)	mg/L	-	-		541	74.6
Hydroxide (OH)	mg/L	-	-		<0.40	<0.40
Ion Balance	%	-	-		98.4	95.1
Nitrate+Nitrite-N - Dissolved	mg/L	-	10		<0.050	<0.050
Total Kjeldahl Nitrogen	mg/L	-	-		1.46	<0.20
TDS (Calculated)	mg/L	500	-		739	126
Sulphate (SO4) - Dissolved	mg/L	500	-		260	36.7

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)
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Organic / Inorganic Carbon (WATER)

				ALS ID	L917104-1	L917104-2
				Sampled Date	05-AUG-10	05-AUG-10
				Sampled Time	10:30	10:30
				Sample ID	G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Total Carbon	mg/L	-	-		101	17.5
Total Inorganic Carbon	mg/L	-	-		98.5	16.8
Total Organic Carbon	mg/L	-	-		2.4	<1.0

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)
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Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.

Total Metals (WATER)

		ALS ID		L917104-1	L917104-2
		Sampled Date		05-AUG-10	05-AUG-10
		Sampled Time		10:30	10:30
		Sample ID		G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Aluminum (Al)-Total	mg/L	0.1	-	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L	-	0.006	<0.00020	<0.00020
Arsenic (As)-Total	mg/L	-	0.01	0.0112	0.00418
Barium (Ba)-Total	mg/L	-	1	0.0198	0.00231
Beryllium (Be)-Total	mg/L	-	-	<0.00020	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	<0.00020	<0.00020
Boron (B)-Total	mg/L	-	5	0.163	0.125
Cadmium (Cd)-Total	mg/L	-	0.005	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	135	18.3
Cesium (Cs)-Total	mg/L	-	-	<0.00010	<0.00010
Chromium (Cr)-Total	mg/L	-	0.05	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	-	-	<0.00020	<0.00020
Copper (Cu)-Total	mg/L	1	-	<0.00020	0.00155
Iron (Fe)-Total	mg/L	0.3	-	3.47	<0.020
Lead (Pb)-Total	mg/L	-	0.01	<0.000090	<0.000090
Lithium (Li)-Total	mg/L	-	-	0.0523	0.0098
Magnesium (Mg)-Total	mg/L	-	-	49.5	7.03
Manganese (Mn)-Total	mg/L	0.05	-	0.160	0.00060
Molybdenum (Mo)-Total	mg/L	-	-	0.00380	0.00047
Nickel (Ni)-Total	mg/L	-	-	<0.0020	<0.0020
Phosphorus (P)-Total	mg/L	-	-	<0.20	<0.20
Potassium (K)-Total	mg/L	-	-	7.42	1.25
Rubidium (Rb)-Total	mg/L	-	-	0.00190	0.00042
Selenium (Se)-Total	mg/L	-	0.01	<0.0010	<0.0010
Silicon (Si)-Total	mg/L	-	-	13.4	3.22
Silver (Ag)-Total	mg/L	-	-	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	200	-	48.4	15.8
Strontium (Sr)-Total	mg/L	-	-	0.551	0.0767
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.00010	<0.00010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.00123	<0.00020

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Total Metals (WATER)

				ALS ID	L917104-1	L917104-2
				Sampled Date	05-AUG-10	05-AUG-10
				Sampled Time	10:30	10:30
				Sample ID	**G3 1 - RAW**	**G3 2 - TREATED**
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Tungsten (W)-Total	mg/L	-	-		<0.0010	<0.0010
Uranium (U)-Total	mg/L	-	0.02		0.00019	<0.00010
Vanadium (V)-Total	mg/L	-	-		0.00506	0.00075
Zinc (Zn)-Total	mg/L	5	-		0.0401	<0.0050
Zirconium (Zr)-Total	mg/L	-	-		<0.00040	<0.00040

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Volatile Organic Compounds (WATER)

				ALS ID	L917104-1
				Sampled Date	05-AUG-10
				Sampled Time	10:30
				Sample ID	**G3 1 - RAW**
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Benzene	ug/L	-	5		<0.50
1,1-Dichloroethylene	ug/L	-	14		<0.50
Dichloromethane	ug/L	-	50		<0.50
Ethyl Benzene	ug/L	2.4	-		<0.50
MTBE	ug/L	-	15		<0.50
Tetrachloroethylene	ug/L	-	30		<0.50
Toluene	ug/L	24	-		<0.50
1,1,1-Trichloroethane	ug/L	-	-		<0.50
1,1,2-Trichloroethane	ug/L	-	-		<0.50
Trichloroethylene	ug/L	-	5		<0.50
o-Xylene	ug/L	-	-		<0.50
m+p-Xylenes	ug/L	-	-		<1.0
Xylenes (Total)	ug/L	300	-		<1.5

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Trihalomethanes (WATER)

				ALS ID	L917104-2
				Sampled Date	05-AUG-10
				Sampled Time	10:30
				Sample ID	**G3 2 - TREATED**
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Bromodichloromethane	mg/L	-	0.016		0.00089
Bromoform	mg/L	-	-		<0.00050
Chlorodibromomethane	mg/L	-	-		<0.00050
Chloroform	mg/L	-	-		0.00263
THMs	mg/L	-	0.1		0.0035

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
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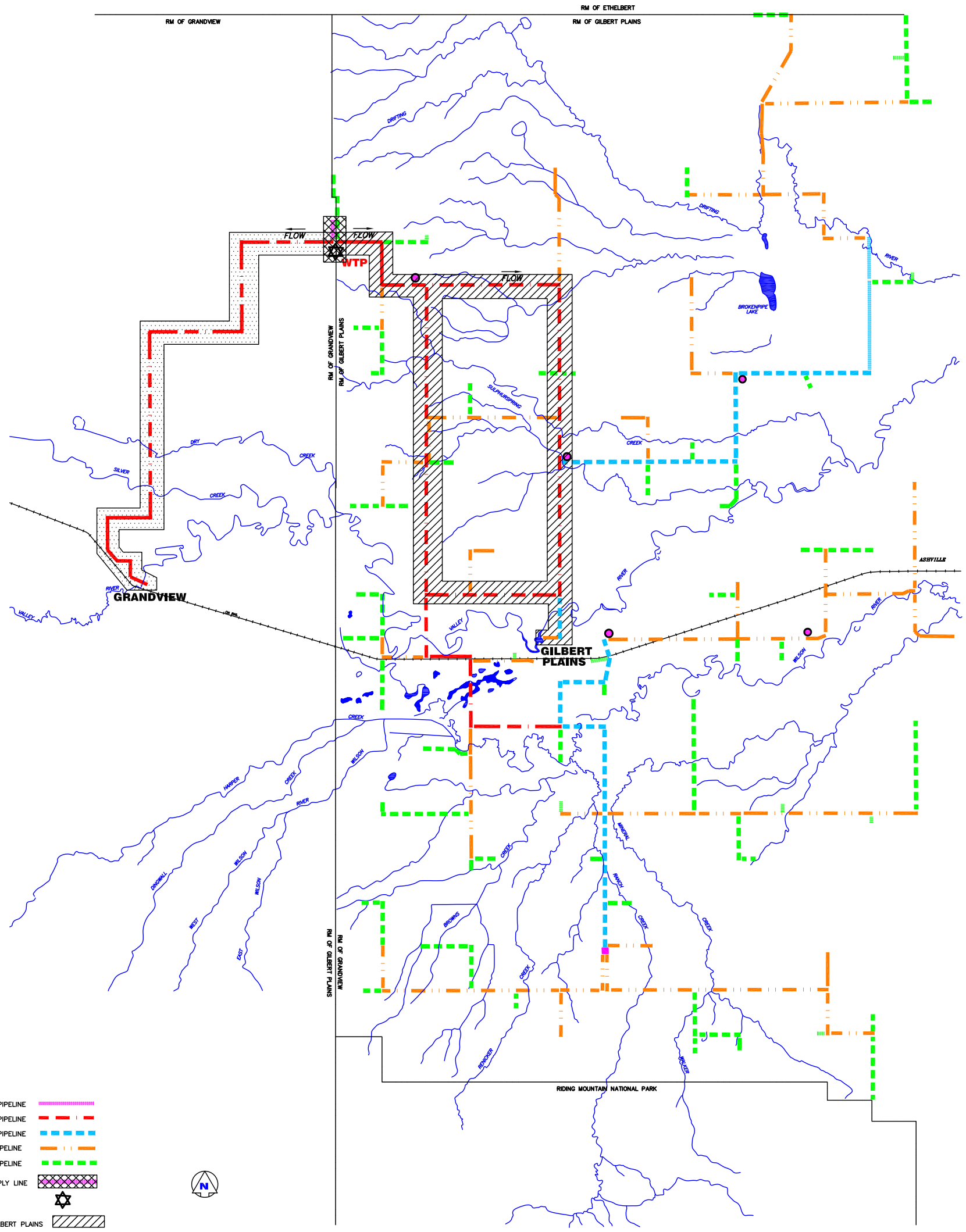
Appendix B

Water Treatment Plant Process Diagram

Pipeline Schematic



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

N

1 .5 0 1 2 3 4 5 6 7 KILOMETERS

1 0 1 2 3 4 5 MILES

SURVEYED	BOOK NUMBER
DRAWN	R. NASON
DESIGNED	
CHECKED	R. FOREMAN
REVIEWED	

PROVINCE OF MANITOBA

THE MANITOBA WATER SERVICES BOARD

MANITOBA INFRASTRUCTURE & TRANSPORTATION

SUBMITTED — CHIEF ENGINEER — DATE

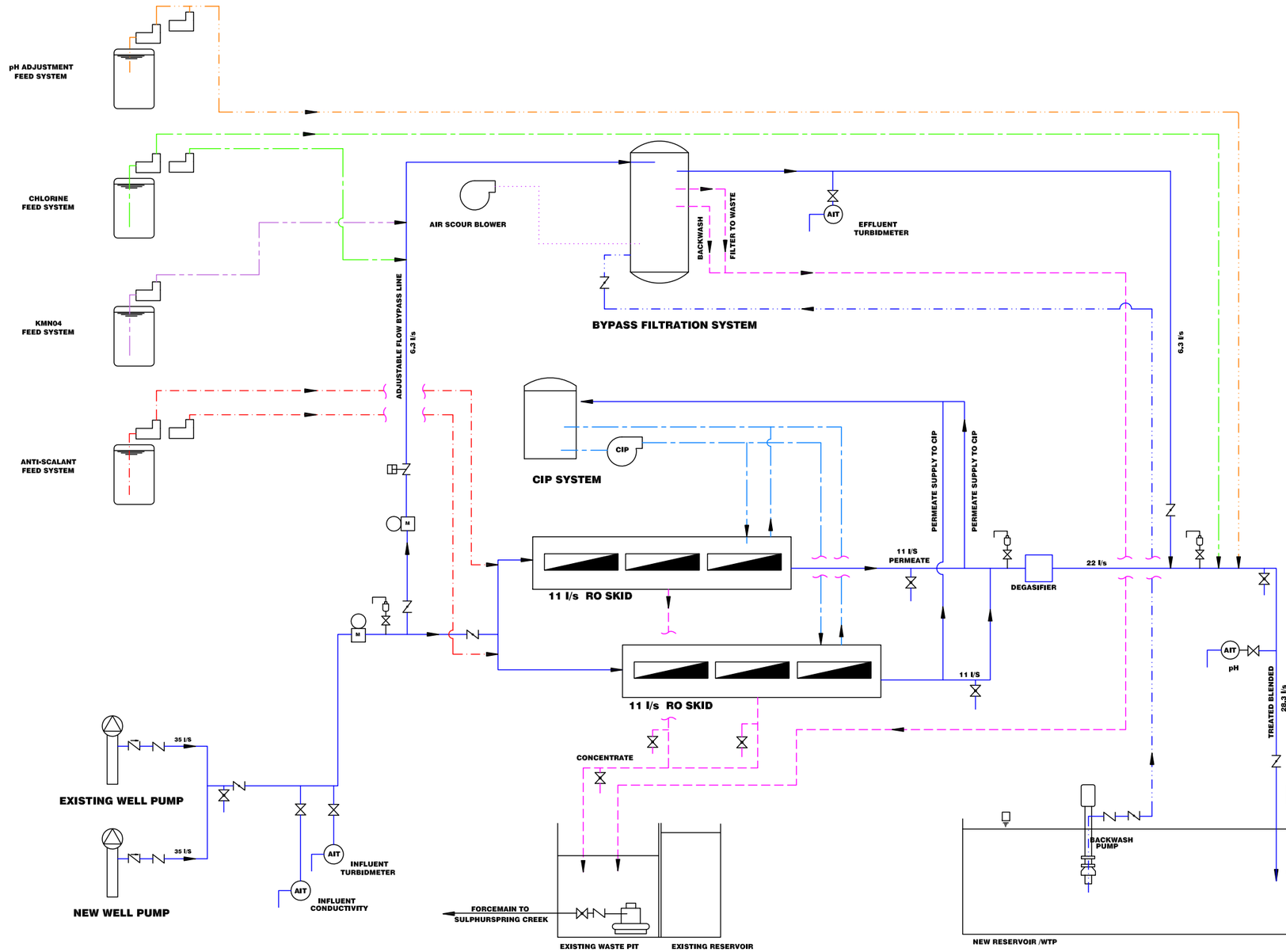
APPROVED — GENERAL MANAGER — DATE

G3 REGIONAL

WATER PIPELINES

OCTOBER 2009

SCALE	DATE	PROJECT NUMBER	REVISION	SHEET
	09-10-27			1 OF 1



LEGEND

PIPING AND MISCELLANEOUS EQUIPMENT

- WATER FLOW WITH DIRECTION
- PROCESS WASTE WITH DIRECTION
- CHLORINE LINE
- ANTI SCALANT LINE
- KMnO4 LINE
- pH ADJUSTMENT LINE
- AIR

- GATE VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- BACKFLOW PREVENTER
- METERING PUMP
- MAGNETIC WATER METER
- LEVEL DETECTOR
- AIR/VACUUM c/w ISOLATION VALVE
- GENERIC ACTUATOR

PROVINCE OF MANITOBA

THE MANITOBA WATER SERVICES BOARD

MANITOBA INFRASTRUCTURE & TRANSPORTATION

G3 WATER TREATMENT PLANT

WTP SCHEMATIC

DRAWN	CHECKED	DATE	SCALE	DRAWING NO.	FILE NO.
R. NASON	T. PARSONS	10-12-12	NTS	1 OF 1	