East St. Paul Water System
2012 Annual Report

Prepared for:
R.M. of East St. Paul
3021 Bird's Hill Road
East St. Paul, MB R2E 1A7

Prepared by:
Stantec Consulting Ltd.
905 Waverley St.
Winnipeg, MB R3T 5P4

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1.0 Water System

1.1 DESCRIPTION OF WATER SYSTEM

The Rural Municipality of East St. Paul (R.M.) Water System consists of groundwater pumping, chlorination, treated water storage, distribution pumping and distribution piping. Refer to Figure 1.0 for a process flow diagram of the water system.

1.1.1 Groundwater Source

Groundwater is conveyed to the water treatment plant (WTP) using a series wells. Five (5) production wells are located east of the Floodway off Oasis Road in the R.M. of Springfield. Four of these production wells (PW1, PW4, PW5 and PW6) withdraw groundwater from a sand and gravel aquifer at a depth of approximately 24 meters below the existing grade and can provide a combined 18 L/s to the WTP. Water Rights License No. 2007-074 authorizes the withdrawal of 358,000 m^3/yr. at a maximum rate of 20 L/s from these four wells.

The fifth production well (PW8) withdraws groundwater from a bedrock carbonate aquifer at a depth of approximately 43 meters below grade and can provide 20 L/s to the WTP. Water Rights License No. 2005-060 authorizes the withdrawal of 195,000 m^3/yr. at a maximum rate of 20 L/s from this well.

Two meter chambers measure the groundwater withdrawn from each aquifer. There is also a turbidity meter in each meter chamber to monitor the turbidity of the groundwater.

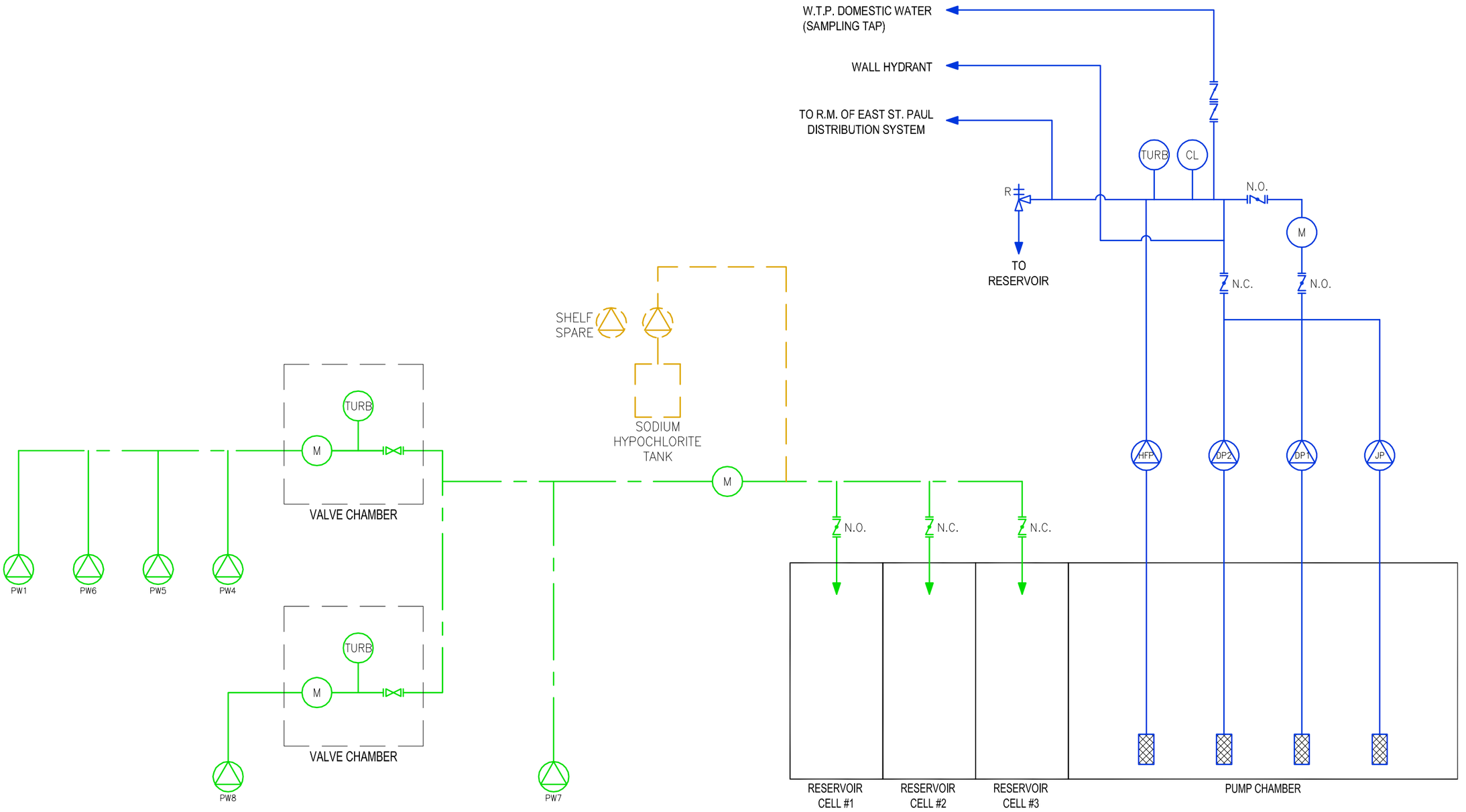
A sixth production well (PW7) is located adjacent the WTP off Wenzel Street in the R.M. of East St. Paul. PW7 withdraws groundwater from the bedrock aquifer and can provide 19 L/s to the WTP. Water Rights License 2009-030 was issued July 16, 2009 and authorizes the withdrawal of 612,000 m^3/yr. at a maximum rate of 11.4 L/s from this well.

1.1.2 Chlorination

The groundwater is chlorinated prior to being discharged to a reservoir for storage. Liquid chlorine (sodium hypochlorite – 12%) is dosed to the groundwater using a chemical feed pump based on flow. The chlorine dose is manually adjusted based on the chlorine residual entering the distribution system.

1.1.3 Treated Water Storage

Treated water is stored in a three cell reservoir. The reservoir buffers the peak instantaneous demands in the distribution system and provides storage for fire protection. The total active storage volume is 2,523 m^3. The estimated retention time at peak flow is 6.1 hours.



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Stantec Consulting Ltd.
905 Waverley St.
Winnipeg MB Canada
R3T 5P4
Tel. 204.489.5900
Fax. 204.453.9012
www.stantec.com

Legend

	RAW WATER
	TREATED WATER
	CHEMICAL FEED
	PUMP
PW	WELL PUMP
JP	JOCKEY PUMP
HFP	HIGH FLOW PUMP
DP	DOMESTIC PUMP
R	RELIEF VALVE
	BUTTERFLY VALVE
	GATE VALVE
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
M	METER
TURB	TURBIDIMETER
CL	CHLORINE ANALYZER
	BACKFLOW PREVENTER

Client/Project
R.M. OF EAST ST. PAUL
WATER SYSTEM

Figure No.
1.0

Title
PROCESS FLOW DIAGRAM

1.1.4 Distribution Pumping

The distribution pumping system is made up of four (4) vertical turbine pumps. Two (2) domestic pumps (DP1 & DP2) each rated at 27 L/s operate based on pressure to meet the varying demands in the distribution system. The jockey pump (JP) rated at 3 L/s is turned on if the distribution system pressure drops below 55 psi, while the high flow pump (HFP) rated at 53 L/s turns on if the pressure drops below 50 psi.

1.1.5 Distribution System

The distribution system is comprised of approximately 33,000 meters of PVC pipe. There are approximately 910 equivalent residential units (ERU) in the distribution system.

1.2 DISINFECTION

Chlorine is used as the primary disinfectant. The Drinking Water Safety Act (DWSA) requires a minimum free chlorine residual entering the distribution system of 0.5 mg/L and a minimum free chlorine residual of 0.1 mg/L in the distribution system. The R.M. continuously measures the chlorine level entering the distribution system using an online analyzer. They also manually measure the chlorine level entering the distribution system on a daily basis and the chlorine level in the distribution system on a biweekly basis. There were no occurrences where there was no daily chlorine residual sample taken.

Table 1.1 – Disinfection Testing Performance

Description	Requirement	Performance
Free Chlorine residual entering the distribution system	≥ 0.5 mg/L	100 %
Frequency of testing daily at WTP	Daily	100 %
Free Chlorine residual in the distribution system	≥ 0.1 mg/L	100 %
Frequency of testing in the distribution system	biweekly	100 %
Report Submission	Monthly	100 %

1.3 SAMPLING, TESTING AND REPORTING

1.3.1 Bacteriological Sampling

While the R.M. is required to sample the raw water entering the WTP, treated water leaving the WTP and treated water in the distribution system on a biweekly basis, the R.M. samples weekly in an effort to be proactive. Samples are sent to ALS Laboratory Group for Total Coliform and E. Coli sampling. Maxxam Analytics also undertook sampling until April 2013, although now samples are only sent to ALS. Sampling results are summarized as follows:

Table 1.2 – Bacteriological Testing Performance

Description	Requirement	Performance
Sampling Frequency	Bi-weekly	100%
Total Coliform	< 1 MPN / 100 mL	100%
E. Coli	< 1 MPN / 100 mL	100%

1.4 CHEMICAL AND RADIOLOGICAL PARAMETERS

The R.M. is required to sample and test for chemical and radiological parameters once every three years. The R.M. undertook a complete chemical analysis of the treated water in 2011. In 2012, the R.M. tested each raw water production well for the chemical and radiological parameters. The sampling results for key parameters related to the Guideline for Canadian Drinking Water Quality (GCDWQ) aesthetic objectives (AO) and the DWSA maximum acceptable concentration (MAC) are summarized in Table 1.3.

Table 1.3 – Raw Water Quality Data Relevant to the DWSA

Parameter	PW 1 (mg/L)	PW 4 (mg/L)	PW 5 (mg/L)	PW 6 (mg/L)	PW 7 (mg/L)	PW 8 (mg/L)	[MAC] / AO (mg/L)
Arsenic	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	[0.01]
Fluoride	0.14	0.16	0.16	0.16	0.15	0.15	[1.5]
Lead	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	[0.01]
Nitrate-N	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	[10]
Uranium	0.00168	0.00222	0.00213	0.00189	0.00295	0.00178	[0.02]
Iron	< 0.1	< 0.1	< 0.1	< 0.1	0.11	<0.1	0.3
Manganese	0.0304	0.001	0.0017	0.0233	< 0.001	0.036	0.05
Hardness	243	240	255	233	304	237	200/500
TDS	266	267	273	252	330	256	500

While not a requirement for a groundwater source not under the direct influence of surface water, the R.M. also undertook quarterly disinfection byproduct testing at the WTP and in the distribution system. Total trihalomethane (TTHM) and bromo-dichloromethane (BDCM) results were less than the DWSA maximum acceptable concentration. The average sampling results at the WTP and at a location in the distribution system are summarized in Table 1.4.

Table 1.4 – Average Disinfection Byproduct Sampling Results

Parameter	WTP (mg/L)	Distribution System (mg/L)	DWSA MAC (mg/L)
Bromo-dichloromethane (BDCM)	0.00505	0.0058	0.016
Total Trihalomethanes (TTHM)	0.0153	0.0174	0.1

1.4.1 Physical Parameter

The R.M. is currently not required to meet any physical limits prescribed in the DWSA.

1.4.2 Microbiological Parameters

As the R.M. uses a groundwater source not under the influence of surface water they are not required to achieve the DWSA prescribed reductions for *Giardia*, *Cryptosproidium*, and viruses.

The R.M is required to meet the DWSA minimum chlorine contact time of 20 minutes. The "Assessment of Water Supply Infrastructure and Water Supply Sources for the R.M. of East St. Paul Public Water System" (Stantec, 2011) identified that the reservoir provided sufficient contact time.

1.5 RECORD KEEPING

The R.M. retains all the testing data and stores one copy at the WTP. Copies of the chlorination data is submitted to the ODW on a monthly basis. Bacteriological testing results are also copied to the regional drinking water officer.

1.6 DRINKING WATER SAFETY ORDERS

There were no drinking water safety orders issued to the R.M. in 2012.

1.7 BOIL WATER ADVISORIES

There was no boil water advisories issued to the R.M. in 2012.

1.8 MAJOR EXPENSES INCURRED

The R.M. completed a number of water system related projects in 2012. Projects completed were as follows:

Raw Water Supply

The R.M. retained Friesen Drillers Ltd. to undertake a hydrogeological study to investigate increasing the raw water supply capacity. Friesen Drillers installed a production well southeast of the intersection of Bray Road and Bird's Hill Road and the production well is currently in the licensing stage.

Distribution System

The R.M. tendered the installation of 1100 meters of 300 mm dia. watermain on Wenzel Road from the WTP, down Camsell Avenue to Bird's Hill Road. The purpose of the work was to improve the reliability of the distribution system by providing a redundant feed from the WTP. Part of this work also included the installation of two hydrants on Pritchard Farm Road. The work was completed by Outdoor Solutions.

Other minor distribution system work included 75 meters of 250 mm dia. watermain extended on Neyedli Drive by JC Paving for a new subdivision and the installation of two hydrants on Pitchard Farm Road by Tri-Core Projects.

Planning

The R.M. initiated the upgrade of the distribution header at the WTP and Stantec Consulting Ltd was retained to undertake the design. The purpose of this project is to:

- Meter the high flow pump that was recently brought into the automatic sequence of operation;
- Upgrade the header capacity in anticipation of the addition of two additional high flow pumps.
- Increase the reliability of the distribution pumping system by adding a redundant pressure transmitter to control the operation of the distribution pumps.

The header upgrade is anticipated to be completed in 2013.

The R.M. also retained Stantec Consulting Ltd. to undertake a Water Treatment Master Plan to assist with planning for future water treatment projects required to accommodate growth in the R.M. The Water Treatment Master Plan is anticipated to be completed in 2013.