



**East St. Paul Water System
2009 Annual Report**



Stantec

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**EAST ST. PAUL WATER SYSTEM
2009 ANNUAL REPORT**

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**EAST ST. PAUL WATER SYSTEM
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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 m³/yr. at a maximum rate of 11.4 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 m³/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Two meter chambers measure the groundwater withdrawn from each aquifer.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.

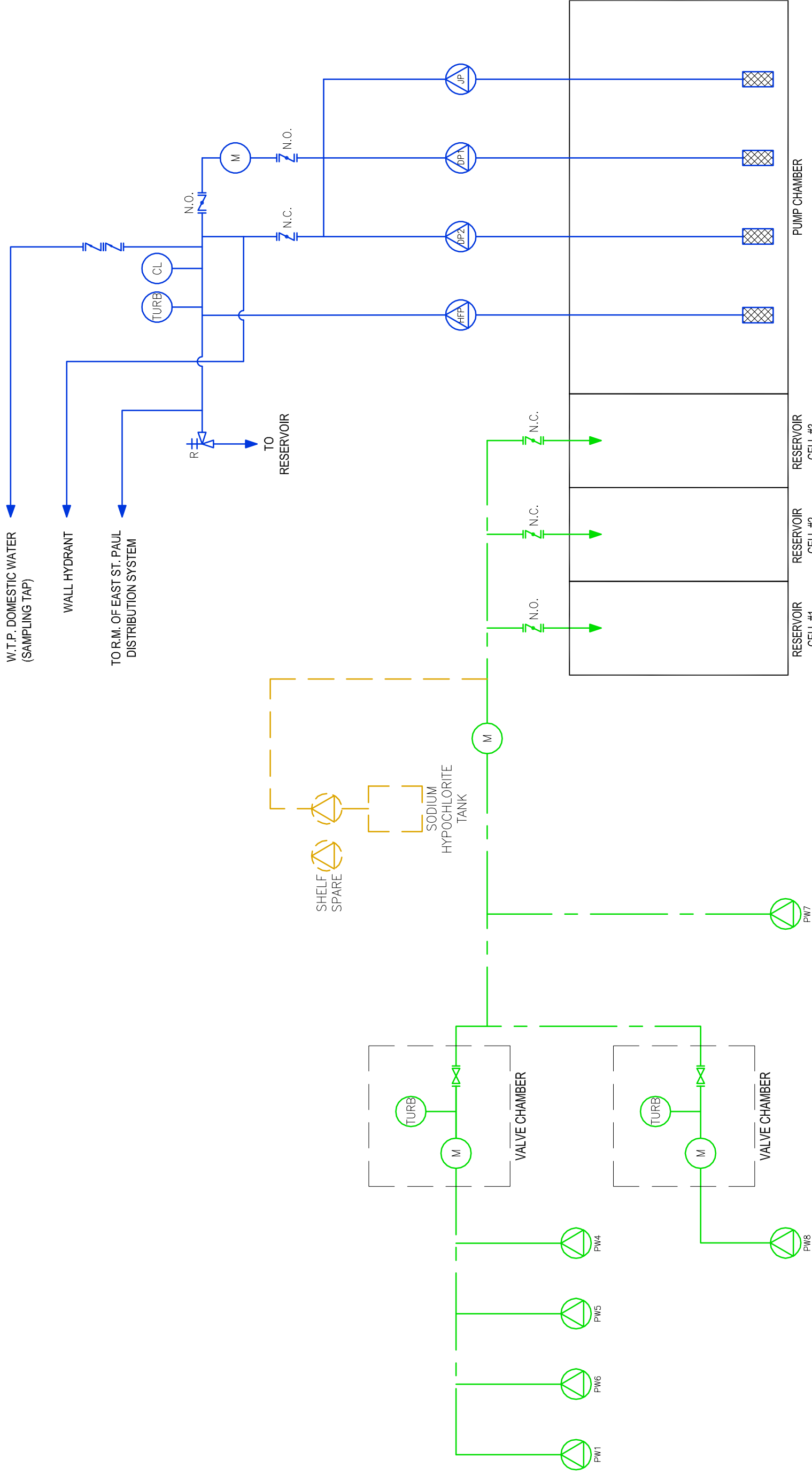
A sixth production well (PW7) is located adjacent the WTP off Wenzel Street in the R.M. of East St. Paul. PW7 withdraws groundwater from the bedrock aquifer and can provide 19 L/s to the WTP. Water Rights License 2009-030 was issued July 16, 2009 and authorizes the withdrawal of 612,000 m³/yr. at a maximum rate of 19 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 Class 3 fire protection. The total effective storage volume is 2,415,000 L. The estimated retention time at peak hourly flow is 6.1 hours.



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Legend

- RAW WATER
- TREATED WATER
- CHEMICAL FEED

- ⊗ PUMP
- PW WELL PUMP
- JP JOCKEY PUMP
- HFP HIGH FLOW PUMP
- DP DOMESTIC PUMP

- ⊥ R RELIEF VALVE
- ⊥ N.O. BUTTERFLY VALVE
- ⊥ N.C. GATE VALVE
- N.C. NORMALLY CLOSED
- N.O. NORMALLY OPEN

- ⊗ METER
- TURB TURBIDIMETER
- ⊗ CL CHLORINE ANALYZER
- ⊥ N.O. BACKFLOW PREVENTER

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

Figure No. _____
 Title **1.0**
PROCESS FLOW DIAGRAM

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1.1.4 Distribution Pumping

The distribution pumping system is made up of four (4) vertical turbine pumps. A jockey pump (JP) rated at 3 L/s operates continually to meet low flow demands. Two (2) domestic pumps (DP1 & DP2) each rated for 27 L/s operate based on pressure to meet the varying demands in the distribution system. A high flow pump (HFP) rated at 53 L/s only operates under high flow conditions, such as a fire.

1.1.5 Distribution System

The distribution system is comprised of approximately 32,000 meters of PVC pipe. There are approximately 857 services 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 measure the chlorine level entering the distribution system on a daily basis and the chlorine level in the distribution system on a weekly basis. There was one occurrence (April 15, 2009) 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	99.7 %
Frequency of testing daily at WTP	Daily	99.7 %
Free Chlorine residual in the distribution system	≥ 0.1 mg/L	100 %
Frequency of testing in the distribution system	Weekly	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 and Maxxam Analytics (formerly CanTest Ltd.) for Total Coliform and E. Coli sampling. Sampling results are summarized as follows:

Table 1.2 – Bacteriological Testing Performance

Description	Requirement	Performance
Sampling Frequency	Weekly	100%
Total Coliform	< 1 MPN / 100 mL	96%
E. Coli	< 1 MPN / 100 mL	100%

There were two occurrences where the laboratory sampling results indicated that total coliform was detected in the distribution system. On January 7, 2009 the total coliform result indicated 62 MPN/100 mL, while on July 29, 2009 the total coliform result was 1 MPN/100 mL. In both instances total coliform was not detected when re-sampled.

1.4 CHEMICAL AND RADIOLOGICAL PARAMETERS

The R.M. is required to sample and test for chemical and radiological parameters once every three years. In an effort to be proactive for water related issues, the R.M. samples every year. For 2009 the R.M. sampled each production well and tested for routine water quality parameters and extractable metals. As can be seen in Table 1.3 the production wells are within the maximum acceptable concentration outlined in the DWSA for the identified parameters.

Table 1.3 – Production Well Water Quality Data Relevant to the DWSA

Parameter	Sampling Result (mg/L)						DWSA MAC (mg/L)
	PW1	PW4	PW5	PW6	PW7	PW8	
Arsenic	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.01
Fluoride	0.32	0.34	0.37	0.39	0.41	0.33	1.5
Lead	0.0127	0.00191	0.00101	0.00062	0.00271	0.00241	0.01
Nitrate-N *	0.071	0.064	0.122	0.00148	0.096	0.052	10
Uranium	0.00076	0.00189	0.00174	< 0.005	0.00237	0.00082	0.02

* Sampling result is for Nitrate + Nitrite – Nitrogen, while the DWSA requirement is only for Nitrate – Nitrogen

While not a requirement for a groundwater source not under the direct influence of surface water, the R.M. also conducted total trihalomethane (TTHM) testing in the distribution system at three times during the year. TTHM and BDCM results were less than the DWSA maximum acceptable concentration. The average sampling results are summarized in Table 1.4.

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Table 1.4 – Average TTHM Sampling Results

Parameter	Sampling Result (mg/L)	DWSA MAC (mg/L)
Bromo-dichloromethane (BDCM)	0.0045	0.016
Total Trihalomethanes (TTHM)	0.031	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*, *Cryptosporidium*, and viruses.

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. Maxxam Analytics also copies the ODW on the bacteriological sampling results on a bi-weekly basis.

1.6 DRINKING WATER SAFETY ORDERS

There were no drinking water safety orders issued to the R.M. in 2009.

1.7 BOIL WATER ADVISORIES

There was no boil water advisories issued to the R.M. in 2009.

1.8 MAJOR EXPENSES INCURRED

The R.M. did not incur any major expenses for the water system in 2009.