

**2005 ANNUAL COMPLIANCE REPORT
OPERATION AND MAINTENANCE
TARA WATER WORKS**

**MUNICIPALITY OF
ARRAN-ELDERSLIE**

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MUNICIPALITY OF ARRAN-ELDERSLIE**

1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2005 Annual Compliance Report is to document the operation and maintenance data for the Tara Water Works for review by the Ministry of the Environment in accordance with O. Reg. 253/05.

Currently, 401 homes, businesses and institutions are connected to the existing water system servicing 841 persons.

The plant was operated by Mr. Scott McLeod, who has a Class II Water Distribution licence, Mr. Trevor Sweiger, Water Distribution 1, Mr. Mark O'Leary who has a Class I Water Distribution Licence under the supervision of Mr. Kyle Snell, Operations Manager and Mr. Kyle Snell, Operations Manager, who has a Class IV licence for Water Treatment and Class III Water Distribution licence. It should be noted that the Tara water system is classified as a Class 2 Water Distribution System.

The operating authority for the plant is:

Municipality of Arran-Elderslie
P.O. Box 170, 1925 County Road #10
Chesley, Ontario
N0G 1L0
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Fax: 519-363-2203

Supervision by: Oweson Water Services (OWS), a division of Oweson Ltd.

In September 2003, a new Certificate of Approval was issued for the water system under the Safe Drinking Water Act.

2.0 DESCRIPTION OF WATER SYSTEM

The majority of the water distribution system comprises cast iron and ductile iron mains that are approximately 40 to 50 years old. Newer water mains within the Clayton Long Subdivision were constructed with Class 150 PVC. There are numerous small diameter polyethylene water mains throughout the former Village.

The Waterworks Consists of:

Pumping Station #2 - 59 Market St.

- S A 254 mm diameter 118.6 m deep drilled ground water well located within the pumphouse (NAD27, UTM Zone 17, 488649E, 4924786N), equipped with a submersible deep well pump, rated at 291 L/min at a TDH of 89.9 m, with a 63 mm diameter discharge line connected to the well pump header in the pumphouse.
- S A well pumphouse at 59 Market Street in the Village of Tara, housing treatment and control facilities, including:
- A pump header and appurtenances, connected to the feeder watermain, including a Neptune positive displacement flow meter with a bypass connection.
 - A chlorination system utilizing sodium hypochlorite, consisting of one (1) 60 litre capacity sodium hypochlorite solution storage tank and two (2) chemical metering pumps (one duty, one stand-by) each rated at 2 L/h with a feed-line discharging into the well pump header at the exit from the pumphouse.

Pumping Station #3 - 213 River Street

- S A 156 mm diameter, 119 m deep drilled groundwater well, located 5 m west of the pumphouse (NAD 27, UTM Zone 17, 488530E, 4924469N), equipped with a submersible deep well pump, rated at 318 L/min at a TDH of 128 m, with a 75 mm diameter discharge line leading to the pumphouse and including a vented watertight galvanized steel enclosure over the well head.
- S A well pumphouse located at 149 River Street, housing treatment and control facilities, including:

- A header and appurtenances, connected to the feeder watermain, including a positive displacement flow meter
- A chlorination system utilizing sodium hypochlorite, consisting of one (1) 60 litre capacity sodium hypochlorite solution storage tank and two (2) chemical metering pumps (one duty, one stand-by) with a feed line discharging into the well pump header at the exit from the pumphouse
- 15 minute chlorine contact storage consisting of a 600 mm diameter oversized watermain of 16.5 m length, connected to the distribution system where the chlorinated water leaves the pumphouse on the west side of the pumphouse.

Well Pumps 3 and 2 alternate the role of the lead pump weekly for topping up the water standpipe for meeting the distribution system water demands.

Water Storage Tank

- S An elevated water storage tank is located on the northern outskirts of Tara (NAD 27, UTM Zone 17, 488235E, 4925380N), having an operating capacity of 284 m³ and a total capacity of 568 m³.

Standby Power

- One (1) 40 kW, power take off (PTO) driven portable generator, located in Chesley, is normally available to operate the pump houses in Tara.

NOTE: Well 1 is located on Matilda Street and was decommissioned due to petroleum odour in the water.

3.0 SUMMARY OF WATER QUALITY MONITORING

3.1 Water Treatment Equipment Operation Monitoring as Per Schedule 7, O.Reg. 253/05

3.1.1 Chlorine Residual POE

In the year 2005 (from January 1, 2005 to December 31, 2005), a total of 730 samples were collected and analyzed for Free Chlorine Residual at the Point of Entry (POE) for treated water. **Table 1** shows the monthly range of free chlorine residual values. It can be seen that no free chlorine residual from either the pumphouse at Well 2 or the pumphouse at Well 3 had a free chlorine residual less than 0.2 mg/L.

The chlorine was also monitored using an online chlorine analyzer. There were two (2) adverse results indicated by the online analyzer. Refer to **Table 7** for AWQI results.

3.1.2 Chlorine Residual Distribution

In the year 2005 (from January 1, 2005 to December 31, 2005), a total of 365 samples were collected in the distribution system. **Table 1** shows that all free chlorine distribution samples were greater than 0.2 mg/L.

3.1.3 Turbidity

The treated water turbidity was measured by both an on-line turbidity analyzer and a portable turbidity analyzer.

3.1.3.1 Portable Turbidity Analyzer

Each time a bacteriological sample was collected from either the raw water or the distribution system, a grab sample was also collected and analyzed for turbidity. It can be seen from **Table 2** that no treated water samples from Well 2 or from Well 3 exceeded the maximum acceptable concentration (MAC) of 1 NTU. It can also be seen from **Table 2** that no distribution sample exceeded the aesthetic objective (AO) of 5 NTU.

3.1.3.2 Online Turbidity Analyzer

The online turbidity analyzer generated two (2) adverse results.

3.2 Microbiological Sampling as Per Schedule 10, O.Reg. 253/05

3.2.1 Distribution System

Schedule 10 of Ontario Regulation 253/05 requires that at least nine (9) distribution samples be collected monthly and tested for E.Coli, Total Coliform and either Heterotrophic Plate Count (HPC) or Background Count. In the year 2005, a total of 110 distribution samples were collected and analyzed for Total Coliform, E.Coli and Background Count. One Background had a count of 210 cfu/100mL on July 4, 2005. Resampling on July 6, 2005 indicated a level of 0 cfu/100mL. The AWQI generated by this incident is recorded in **Table 7**. Refer to **Table 3** for a summary of bacteriological sampling and analysis results, and **Appendix B** for a weekly breakdown.

3.2.2 Raw Water Samples

Schedule 10 of Ontario Regulation 253/05 requires that at least one (1) raw water sample be collected weekly from both Well 2 and Well 3 and tested for E.Coli and Total Coliforms. In the year 2005, a total of 50 samples were collected and analyzed from Well 2 and 50 samples from Well 3. Of the samples collected from both wells, none indicated any Total Coliform counts.

3.2.3 Point of Entry Samples

Schedule 10 of Ontario Regulation 253/05 requires that at least one (1) treated water sample be collected weekly from the Point of Entry at Well 2 and at Well 3. A total of 50 treated water samples were collected from Well 2 and 50 samples were collected from Well 3. All samples were analyzed for Total Coliform, E.Coli and Background Count. All analysis results were found to be safe. Refer to **Table 3** and **Appendix B**. All bacteriological samples were analyzed by SGS Lakefield Research which is an accredited lab..

3.3 Chemical Sampling & Testing as Per Schedule 13, O.Reg. 253/05

3.3.1 Inorganics

Schedule 13-2 of Ontario Regulation 253/05 requires that at least one (1) water sample is taken every 12 months, if the system obtains water from a groundwater supply that has been deemed GUDI. The samples for both Well 2 and Well 3 were collected on December 12, 2005 and submitted to the laboratory for analysis

of inorganics as listed in Schedule 23. All parameters were found to be within compliance. Inorganics are required to be sampled and analyzed again before December 12, 2006. Refer to **Appendix C**.

3.3.2 Lead

Schedule 13-3 of Ontario Regulation 253/05 requires that at least one (1) distribution sample be taken every 12 months from the distribution system and tested for lead. A water sample was collected and analyzed on December 12, 2005. The concentration of lead was found to be 0.0002 mg/L, which is within compliance. This parameter is required to be sampled and analyzed again before December 12, 2006. Refer to **Appendix C**.

3.3.3 Organics

Schedule 13-4 of Ontario Regulation 253/05 requires that at least one (1) water sample is taken every 12 months and tested for organics. This is to include all organic parameters, as per Schedule 24. These samples were collected and analyzed on December 12, 2005, and were all found to be within compliance. Organics are required to be sampled again before December 12, 2006. Refer to **Appendix C**.

3.3.4 Trihalomethanes

Schedule 13-6 of Ontario Regulation 253/05 requires that at least one (1) distribution sample is taken every three (3) months from a point in the distribution system and tested for Trihalomethanes (THMs). In the year 2005, samples were collected during the months of February, May, August and December. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a running annual average. In the year 2005, the average THM was found to be 5.95 µg/L which is within compliance. Please refer to the **Table 4** on the Summary of Trihalomethanes and **Appendix C** for analytical results.

In 2006, THMs should be sampled in February, May, August and December.

Table 4
Summary of Trihalomethanes (THMs)
January 1, 2005 – December 31, 2005
Tara Water Works

Sample Location	Sample Date	Result (µg/L)
Tara Motors	February 28, 2005	1.9
Tower T-1	May 16, 2005	6.2
North End Pump	August 22, 2005	4.8
Tower	December 12, 2005	10.9
Annual Average		5.95

3.3.5 Nitrate & Nitrite

Schedule 13-7 of Ontario Regulation 253/05 requires that at least one (1) water sample is taken every three (3) months and tested for nitrate and nitrite from both Well 2 and Well 3. Samples were collected during the months of February, May, August and December. The analytical results were found to be within compliance. Refer to **Appendix C**.

3.3.6 Sodium

Schedule 13-8 of Ontario Regulation 253/05 requires that at least one (1) water sample is collected every 60 months and tested for sodium. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Acceptable Concentration (MAC) of 200 mg/L for sodium and requires the Medical Officer of Health be notified if the concentration exceeds 20 mg/L. These samples were collected December 12, 2005 and were found to be 15 mg/L and 19.4 mg/L at Well 2 and Well 3 respectively. These are both within compliance. Refer to **Appendix C**.

3.3.7 Fluoride

Schedule 13-9 of Ontario Regulation 253/05 requires that a water sample be collected at least once in every 60 months and tested for fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a MAC of 1.5 mg/L. On November 29, 2004, a sample was collected from both Well 2 and Well 3 for this analysis. Both samples were found to have a concentration of 1.3 mg/L. This is within compliance. Refer to **Appendix C**.

4.0 WATER USAGE

The treated water quantity supplied to the distribution system in 2005 is provided in **Table 5** as follows. A breakdown of the monthly flow provided to the distribution system can be found in **Appendix A** as **Table A-4**.

Table 5
Treated Water Quantity
Municipality of Arran-Elderslie
Tara Water Works
January 1, 2005 to December 31, 2005

Items	Well 2	Well 3	Total
Annual Treated Water Supplied to the Distribution System (m ³)	41,223	110,327	151,550
Average Day Treated* Water Supplied (m ³ /day)	242	351	415
Maximum Day Treated** Water Supplied (m ³ /day)	418**	453**	769

** Max day flows adjusted to twenty four (24) hour period.

From January 1, 2005 to December 31, 2005 151,550 m³ of water was provided to the Tara Distribution System. Of that total, 41,223 m³ came from Well 2 and 110,327 m³ came from Well 3. The entire Tara Water System for 2005 had an average day demand of 415 m³/day, with a maximum day demand of 769 m³/day (July 2005). Well 2 experienced an average day demand of 242 m³ and a maximum day demand of 418 m³ (June 2005) for the 170 days that Well 2 provided water to the Tara Water System. Well 3 experienced an average day demand of 351 m³ with a maximum day demand of 453 m³ (July 2005) for the 314 days that Well 3 provided water to the Tara Water System.

The Tara Water System has a Permit to Take Water (PTTW), which allows for a maximum day withdrawal of 982.0 m³/day from either Well 2 or Well 3 or any combination of Well 2 and Well 3. If both wells are in operation, one well would be the lead pump and the second well would be the lag pump. The combined demand is not to exceed 982 m³/day. Generally, Wells 2 and 3 alternate as lead and lag pumps. The Permit to Take Water was not exceeded.

During the calendar year of 2005, Well 2 required 1171.3 L of Sodium Hypochlorite (NaOCl) to meet the distribution demand with an average dosage of 3.59 mg/L. Well 3 required 2220.3 L of NaOCl with an average dosage of 2.55 mg/L. For the volume of water supplied to the distribution system, the Tara Water

Works as a whole required 3391.6 L of NaOCl with an average dosage of 2.84 mg/L. Both the volume and dosage are reasonable considering the volume of water treated (refer to **Table 6**).

The water meter for Well 2 was rebuilt in August 2005. The water meter for Well 3 was calibrated on September 22, 2005 and was found to be acceptable. Refer to **Appendix I**. The water meters for Well 2 & Well 3 will be calibrated within the one year time frame as required by the CofA. Calibration of all water meters for Wells #2 & 3 will take place by August 9, 2006.

5.0 COMPLIANCE WITH TERMS AND CONDITIONS OF THE CERTIFICATE OF APPROVAL AND O. REG. 170/03

5.1 General

The following summarizes the compliance with regulations/guidelines:

1. Water samples for bacteriological water quality were collected as per Schedule 10 requirements.
2. Sampling for treated water chlorine residual was carried out in compliance with the Regulations via grab samples and also by a continuous analyzer. There were 2 adverse results in 2005. Refer to **Table 7**.
3. Sampling of all of the distribution water samples for chlorine residuals were carried out as per ODWQS. All samples were found to have detectable chlorine residuals in compliance with the Provincial regulations. Please refer to **Table 3** and **Appendix A**.
4. Treated water samples for turbidity analyses were taken via grab samples and also by a continuous analyzer. There were 2 adverse results. Refer to **Table 7**.

Complete monthly data for chlorine residual and turbidity can be found in **Appendix A**. Part III, Form 2 Data in **Appendix H** includes on-line analyzer data.

5. Additional quarterly and annual sampling for treated water samples, as per Schedule 13, was carried out in compliance with the Regulations and no adverse results were found Refer to **Appendix C**.
6. The flow meters at Pumping Station No.2 and No. 3 were checked for accuracy in 2005. Well 3 was found to be accurate within the 5 percent requirement. The flow meter at Pumping Station No. 2 was rebuilt in 2005.
7. The Permit to Take Water was not exceeded in 2005 nor was the Rated Capacity in the CofA..

5.2 Non-Compliance During the Reporting Period

The following **Table 7** documents all noncompliances for the Tara Water System from January 1, 2005 to December 31, 2005.

6.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

The following summarizes water system improvements and routine and preventative maintenance to the Tara water distribution system in 2005.

1. Hydrant #2 on main street and #24 on Whites Avenue were replaced in 2005 with rebuilt Canada Valve hydrants.
2. Well #2 water flow meter was rebuilt and calibrated in August 2005. Well #3 water flow meter was calibrated in September 2005.
3. A new sample station was installed in Whites Avenue at the deadend.
4. A leak detection survey was conducted March 30, 2005 in Tara to try and find a purposed leak in the distribution system.
5. A systematic flush was completed on the Tara water mains starting in April and finishing in May. Periodic flushing was done at different times during the year at deadends, during maintenance and after water main breaks.
6. There were eight (8) new water service hookups in 2005. One on Maria Street, one on Union Street and two on Brook Street. The other four residential water services came from the OC Long Subdivision on Heatherlynn Boulevard.
7. There were six water main breaks on the Tara water system during 2005.
8. The portable standby power was test operated at Well #2 in March 2005.

7.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND PROVINCIAL OFFICER'S ORDERS

The Ministry of the Environment 2005 inspection of the Tara water system was performed on October 17, 2005. The Ministry of the Environment Inspection Report was received on November 28, 2005. The Provincial Officer's Inspection Report, is located in **Appendix D**.

8.0 CONCLUSIONS/RECOMMENDATIONS

1. The water system was generally operated in compliance with the Regulations. The water system should continue to be operated in compliance with O. Reg. 170/03, the Certificate of Approval and the Permit to Take Water.
2. Bacteriological sampling was performed on the Tara Water System as per Schedule 10 of the Regulation. There was one (1) adverse background bacteriological result of 210 cfu/100mL on July 4, 2005. Resampling on July 6, 2005 indicated a level of 0 cfu/100mL.
3. Monthly, quarterly and annual sampling and analyses of chemical parameters were performed on the water system in compliance with Schedule 13 of the Regulation.
4. In 2005, the average day flow for the water system was 415 m³/d. The maximum day flow was 769 m³/d. The maximum day flow for Well 2 was 418 m³/d and for Well 3, it was 453 m³/d. Neither the Permit to Take Water nor the CofA were not exceeded.
5. The water works used 3391.6 L of NaOCl with an average dosage of 2.84 mg/L during 2005.
6. Several improvements were made to the system as well as routine and preventative maintenance, as summarized in **Section 6** of this report. Repairs to the standpipe, several new watermains and upgrades to Well 3 have improved the water quality in the distribution system.
7. All flow meters at Wells #2 & 3 will be calibrated by August 9, 2006.
8. The Ministry of the Environment 2005 Inspection received on November 28, 2005 .

Respectfully submitted:

OWESON WATER SERVICES
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GWA/tah

Appendix A

Flow Data

Appendix B
Bacteriological Sampling and Analysis

Appendix C
Schedule 13 Analysis Results

Appendix D
MOE Inspection Report.

Appendix E
Certificate of Approval

Appendix F
Permit to Take Water

Appendix G
Annual Record of Water Taking

Appendix H

Part III, Form 2 0. Reg 170/03 Annual Report

Appendix I
Water Meter Calibration