

2005
Annual Compliance Report
OPERATION AND MAINTENANCE
OF
SUNSITE ESTATES WATER SYSTEM
TOWNSHIP OF ASSIGNACK

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1.0 INTRODUCTION

The Sunsite Estates water system (hereinafter called Sunsite Estates), is owned by the Township of Assiginack and located on Manitoulin Island, in Georgian Bay. Sunsite Estates is a residential subdivision located approximately 10 km north of Manitowaning.

The Sunsite Estates water treatment system was constructed in 1973 and receives its raw water from Manitowaning Bay. The facility meets the definition of a “Small Municipal, Residential Drinking Water System” serving the community. The Township of Assiginack retained the services of Oweson Water Services (OWS), a division of Oweson Limited, to operate this facility, which includes the preparation of the Annual Compliance Report. The Water Works number for Sunsite Estates is 220008471.

The objective of this report is to comply with the mandatory requirements for an Annual Report under Section 11.0 and a Summary Report under Schedule 22 of Ontario Regulation 253/05. The annual report covers the period from January 1, 2005 to December 31, 2005.

The report, which outlines the recommendations that the Owner/Operating Authority should undertake to comply with the Regulations and continue to provide a safe drinking water quality to the community, includes the following:

- Brief description of the water treatment system
- Summary of the reports and notices submitted to the Ministry of the Environment (MOE)
- Summary of the treated water quality monitoring
- Summary of chemicals used
- Summary of water usage
- Summary of any corrective actions for adverse results
- Water treatment system repairs and improvements on the water treatment system

2.0 DESCRIPTION OF WATER WORKS

The Sunsite Estates water works consists of a water intake located approximately 150 m from the shore, a pumphouse with a low lift submersible pump at a rated capacity of 1.6 L/sec, on the shore of Manitowaning Bay. The treatment plant is located approximately 100 m north of Fourth Avenue and East of Peggy Parkway.

Treatment consists of one (1) pressure sand filter rated at a design flow of 150 m³/d, and a disinfection system consisting of two (2) chemical metering pumps (one duty and one standby). The clear well has a usable volume of 75 m³ and is equipped with float levels to control the submersible low lift pump rated at 1.6 L/s. The submersible filter backwash pump has a capacity of 4.55 L/s. The filter backwash is discharged to a catchbasin, which is directed to a drainage ditch 100 m from the facility. Four (4) pressure tanks, with three (3) in service, helps cushion the starts and stops cycle of the high lift pump. A pressure switch controls the high lift pump operation. The high lift pump has a capacity of 4.55 L/s.

The facility has raw water and treated water sampling taps and chlorine and turbidity analyzers to monitor the treated water at the Point Of Entry (POE). The water treatment facility has two (2) flow meters installed, one measuring the influent flow to the reservoir and the other measuring the filter by-pass flow. A 25 kW portable and manually controlled diesel engine standby power generator set is provided in the facility.

The only chemical used in this facility is 12% sodium hypochlorite (NSF60 approved) for disinfection which is injected upstream of the reservoir. The injection of sodium hypochlorite is in conjunction with the operation of high lift pump operation. Refer to **Figure 1** for schematic process flow diagram.

The Ministry of the Environment has issued a Certificate of Approval for this facility on August 22, 2005, which is enclosed in **Appendix A**. A Permit to Take Water (O1-P-5028) was also issued by the Ministry of the Environment on July 26, 2001, which specifies that the rate of taking shall not exceed a maximum of 114 L/min. This Permit is valid up to August 4, 2006 and is enclosed in **Appendix B**.

3.0 LIST OF REPORTS AND NOTICES SUBMITTED TO DIRECTOR - MINISTRY OF THE ENVIRONMENT

Table 1 shows all reports and notices that were submitted to the Ministry of Environment between January 1, 2005 and December 31, 2005.

TABLE 1
List of Reports and Notices Submitted
to the Ministry of the Environment
January 1, 2005 to December 31, 2005
Sunsite Estates Water System

Title of Report or Notice	Date of Submission
AWQI 56946	July 17, 2005
Part II, Form 2	February 28, 2006

Starting January 1, 2004, Henderson Paddon & Associates Limited and subsequently Oweson Water Services began operation of this facility. Refer to **Appendix G** for various correspondence with the MOE.

Part III, Form 2 entitled Annual Report is submitted electronically to the MOE. Refer to **Appendix F**.

4.0 SUMMARY OF WATER QUALITY MONITORING

4.1 Water Treatment Equipment Operation Monitoring as per Schedule 7, O. Reg. 253/05

4.1.1 Chlorine Residual - POE

In the year 2005 (from January 1, 2005 to December 31, 2005), a total of 365 samples were collected and analyzed for free chlorine residual at the Point of Entry treatment. **Table 2** below shows the monthly minimum and maximum free chlorine residual values. The chlorine residual values are recorded from both online and handheld chlorine analyzers. The chlorine residuals ranged from a low of 0.73 mg/L to a high of 2.03 mg/L.

Table 2
Summary of Water Quality - Free Chlorine (POE)
January 1, 2005 to December 31, 2005
Sunsite Estates Water System

Date	No. of Samples	Chlorine Residual (mg/L) (online)	
		Minimum (mg/L)	Maximum (mg/L)
January	31	0.91	1.21
February	28	0.99	2.01
March	31	0.82	1.49
April	30	0.96	2.03
May	31	0.99	1.23
June	30	0.85	1.28
July	31	0.73	1.65
August	31	1.08	1.49
September	30	0.95	1.29
October	31	0.98	1.30
November	30	0.99	1.29
December	31	1.08	1.28
Total	365		
Min. (mg/L)		0.73	
Max. (mg/L)			2.03

4.1.2 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 3** below shows the monthly minimum and maximum residual chlorine values. The chlorine residuals ranged from a minimum of 0.55 mg/L to a maximum of 2.01 mg/L.

Table 3
Summary of Water Quality - Free Chlorine (Distribution)
January 1, 2005 to December 31, 2005
Sunsite Estates Water System

Month	No. of Samples	Minimum (mg/L)	Maximum (mg/L)
January	31	0.83	1.13
February	28	0.90	2.01
March	31	0.72	1.33
April	30	0.74	1.73
May	31	0.80	1.16
June	30	0.55	1.23
July	31	0.82	1.67
August	31	0.97	1.35
September	30	0.83	1.21
October	31	0.81	1.09
November	30	0.88	1.14
December	31	0.62	1.11
Total	365		
Min. (mg/L)		0.55	
Max. (mg/L)			2.01
Avg. (mg/L)			

4.1.3 Turbidity

At the Sunsite Estates Water Treatment Plant, the treated turbidity was measured by an online turbidity analyzer and a portable turbidity analyzer as well. From January 2005 until December 2005, one (1) raw water grab sample was collected every day and analyzed for turbidity. **Table 4** below shows the minimum and maximum turbidity values for raw water, treated water and distribution samples.

Table 4
Summary of Water Quality - Turbidity (NTU)
January 1, 2005 to December 31, 2005
Sunsite Estates Water System

Month	Raw Result			POE Result			Distribution Result		
	#	Min.	Max.	#	Min.	Max.	#	Min.	Max.
January	31	0.26	0.68	31	0.20	0.42	31	0.22	0.30
February	28	0.22	0.65	28	0.16	0.28	28	0.19	0.28
March	31	0.20	0.49	31	0.15	0.21	31	0.14	0.22
April	30	0.20	0.99	30	0.18	0.40	30	0.18	0.37
May	31	0.30	1.06	31	0.17	0.40	31	0.20	0.31
June	30	0.24	0.55	30	0.16	0.24	30	0.17	0.28
July	31	0.29	5.64	31	0.14	0.66	31	0.17	0.38
August	31	0.61	2.46	31	0.21	0.35	31	0.19	0.40
September	30	0.58	1.17	30	0.22	0.28	30	0.17	0.32
October	31	0.47	1.29	31	0.21	0.27	31	0.18	0.30
November	30	0.42	1.62	30	0.21	0.42	30	0.20	0.52
December	31	0.35	2.50	31	0.26	0.75	31	0.28	0.74
Total	365			365			365		
Min. (mg/L)		0.20			0.14			0.14	
Max. (mg/L)			5.64			0.75			0.74

Both the online turbidity analyzer and the portable turbidity analyzer values were considered for the treated water turbidity to determine the minimum and maximum values. The turbidity for the treated water ranged from a minimum of 0.14 NTU to a maximum of 0.75 NTU, and for the turbidity sampled from the distribution system ranged from 0.14 NTU to 0.74 NTU.

The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Acceptable Concentration (MAC) of 1 NTU for treated water leaving the POE and an Aesthetic Objective (AO) of 5.0 NTU for treated water in the distribution system.

4.2 Microbiological Sampling as per Schedule 11, O. Reg. 253/05

4.2.1 Distribution System

Schedule 11 of Ontario Regulation 253/05 requires that at least one (1) distribution sample be collected weekly and tested for E.Coli, total coliform and Heterotrophic Plate Count (HPC). In the year 2005, a total of 115 distribution samples were collected and analyzed for total coliform and E.Coli. A total of 61 distribution samples were collected and analyzed for HPC. No exceedances on these parameters were observed in the results. **Table 10** enclosed in **Appendix C** shows the weekly microbiological water quality results for the year 2005.

4.2.2 Raw Water Samples

Schedule 11 of Ontario Regulation 253/05 further requires that at least one (1) raw water sample be collected every month and tested for E.Coli and total coliforms. In the year 2005, a total of 51 raw water samples were collected and tested for total coliform and E.Coli. Refer to **Table 10** in **Appendix C**.

4.2.3 Point of Entry Samples

Even though Ontario Regulation 253/05 does not specify or require microbiological analysis of treated water collected from the Point of Entry, a total of 56 samples were collected and analyzed for total coliform, E.Coli, and 54 for HPC. The Operating Authority believes the system is best served by collecting these samples. All were within compliance. Refer to **Table 10** in **Appendix C**.

Microbiological sampling results for the distribution, raw and treated water are summarized in **Table 5**. All results were analysed by SGS Lakefield Research, which is an accredited laboratory.

TABLE 5
Summary of Water Quality: Microbiological
Sunsite Estates Water System

Water Type	Total No. of Samples	Total Coliform Examination Results		E.Coli Examination Results		HPC Examination Results		
		>0	0	>0	0	Total No. of Samples	≥500	<500
		Adv.	Safe	Adv.	Safe		Adv.	Safe
Distribution Water	115	0	115	0	115	61	0	61
Raw Water	51	38	13	8	43	0	-	-
Point of Entry Water	56	0	56	0	56	54	0	54

E.Coli Escherichia coli (fecal coliform)

HPC Heterotrophic Plate Count

4.3 Chemical Sampling and Testing as per Schedule 13 of O. Reg. 253/05

4.3.1 Inorganics

Schedule 13.2 of Ontario Regulation 253/05 requires that at least one water sample is taken every 12 months, if the system obtains water from a raw water supply that is surface water. Since Sunsite Estates receives its raw water from Manitowaning Bay (surface water), a treated water sample was collected on April 18, 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 before April 18, 2006. Refer to **Appendix D**.

4.3.2 Lead

Schedule 13-3 of Ontario Regulation 253/05 requires that at least (1) one distribution sample be taken every 12 months and tested for lead. A water sample was collected from the Sunsite Estates Water Distribution System on April 18, 2005 and found to have a concentration of 0.2 µg/L, which is within compliance. This parameter is required to be sampled and analyzed before April 18, 2006. Refer to **Appendix D**.

4.3.3 Organics

Schedule 13-4 of Ontario Regulation 253/054 requires that at least one (1) water sample is taken every 12 months and tested for organics if the raw water source is surface water. All organic parameters, as per Schedule 24, were sampled and analyzed on April 18, 2005 and were found to be within compliance. Organics are required to be sampled again before April 18, 2006. Refer to **Appendix D**.

4.3.4 Trihalomethanes (THMs)

Schedule 13-6 of Ontario Regulation 253/05 requires that at least one (1) distribution sample is taken every three (3) months and tested for Trihalomethanes (THMs). In the year 2005, samples were collected during the months of January, April, July and October. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and is expressed as a running annual average. In the year 2005, the average THM was found to be 28 µg/L which is within compliance. Please refer to the **Table 6** below on the Summary of Trihalomethanes and **Appendix D** for analytical results.

Table 6
Summary of Trihalomethanes (THMs)
January 1, 2005 – December 31, 2005
Sunsite Estates Water System

Sample Location	Sample Date	Result (µg/L)
56-Fourth Ave.	January 19, 2005	24
70 Moggy Pkwy	January 19, 2005	28
56-Fourth Ave	April 19, 2005	23
98 Moggy Pkwy	July 15, 2005	33
70 Moggy Pkwy	October 12, 2005	33
Annual Average		28

In 2006, THMS should be sampled and analysed in January, April, July and October.

4.3.5 Nitrate and 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. Samples were collected during the months of January, April, July and October. The analytical results were found to be in compliance. Refer to **Appendix D**. In 2006, nitrate and nitrite should be collected in January, April, July and October.

4.3.6 Sodium

Schedule 13-8 of Ontario Regulation 253/054 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. On February 9, 2005, a sodium sample was collected and found to have a concentration of 6.39 mg/L, which is within compliance. Sodium should be collected and analyzed again by February 9, 2010.

4.3.7 Fluoride

Schedule 13-9 of Ontario Regulation 253/05 requires that a water sample be collected at least once every 60 months and tested for fluoride. The ODWQS have set a MAC of 1.5 mg/L for fluoride. On February 9, 2005, fluoride was sampled and found to have a concentration of 0.06 mg/L which is within compliance. Fluoride should be sampled and analyzed again before February 9, 2010.

4.4 Sampling as per the C of A

4.4.1 Total Suspended Solids

As per the Certificate of Approval (C of A), the filter backwash is sampled and analyzed for Total Suspended Solids (TSS). The Annual Average TSS concentration should not exceed 25 mg/L. **Table 7** below shows the summary of Total Suspended Solids (composite) for the filter backwash TSS. The Annual Average for 2005 was 42 mg/L.

As an interim measure, until the new WTP has been commissioned, the Operator is initiating a backwash more frequently at a lower pressure loss through the filter. This has met with moderate success and is not a long term solution.

Table 7
Summary of Suspended Solids (Composite)
January 1, 2005 to December 31, 2005
Sunsite Estates Water System

Date	Suspended Solids (Composite) (mg/L)
January 17, 2005	40
February 21, 2005	20
March 14, 2005	19
April 11, 2005	32
May 18, 2005	18
June 13, 2005	24
July 11, 2005	25
August 15, 2005	62
September 12, 2005	152
October 17, 2005	78
November 14, 2005	<2
December 11, 2005	28
Annual Average	42

All analyses were performed by SGS Lakefield Research, which is an accredited laboratory.

5.0 WATER USAGE

The Certificate of Approval issued by the Ministry of the Environment specifies that the drinking water system has a rated capacity of 1.74 L/s or 150 m³/day. **Table 8** below shows the monthly summary of water usage for the year 2005 observed from the flow meter readings installed at this facility. This table also includes monthly average day and maximum day flows. From the table, it can be seen that the maximum day volume did not exceed the rated capacity as specified in the Certificate of Approval. The maximum day volume occurred in July and was observed to be 110.3 m³ which is up slightly from 2004. This was likely the result of increased flushing of the distribution system.

Table 8
Summary of Water Usage
January 1, 2005 to December 31, 2005
Sunsite Estate Water System

Month	Quantity of Water (m ³)	Average Day (m ³)	Minimum Day (m ³)	Maximum Day (m ³)
January	802	25.9	17.0	39.4
February	720	25.7	16.5	39.3
March	794	25.6	15.4	36.4
April	812	27.1	14.7	36.9
May	1,121	36.2	19.4	63.9
June	1,364	45.5	23.2	85.6
July	2,017	65.1	37.7	110.3
August	1,771	57.1	23.0	78.0
September	1,462	48.7	19.5	89.0
October	921	29.7	17.3	40.1
November	947	31.6	19.0	72.0
December	918	29.6	18.7	41.0
Total (m³)	13,648			
Average Day (m³)		37.3		
Minimum Day			14.7	
Maximum Day (m³)				110.3

The water meter was calibrated in June 2005 and was found to be underestimating the flow. As a result a new Neptune totalizer was ordered and installed in August. Refer to the Calibration Report prepared by R&R

Instrumentation Services Inc. found in **Appendix H**. The new water meter should be calibrated again by June 2006.

6.0 MONTHLY MONITORING OF CHEMICALS

The only chemical used in the Sunsite Estates Water System is sodium hypochlorite (NaOCl) for disinfection which is NSF 60 approved. Refer to Appendix E.

Table 9 below shows the monthly summary of disinfectant chemical used and the average monthly dosage applied.

Table 9
Summary of Disinfectant Chemical Used
January 1, 2005 to December 31, 2005
Sunsite Estate Water System

Month	Volume of NaOCl used (Litres)	Average Dosage Applied (mg/L)	Flow
January	128	20.27	802
February	79	13.85	720
March	91	14.46	794
April	89	13.88	812
May	145	27.30	1,121
June	152	14.12	1,363
July	204	12.86	2,017
August	172	12.31	1,771
September	142	12.30	1,462
October	96	13.17	921
November	97	13.05	947
December	86	11.82	918
Total	1,480		13,648
Average		13.76	

In 2005 the total volume of sodium hypochlorite used was 1,480 L with an average dosage of 13.76 mg/L. This is higher than the industry standard.

7.0 COMPLIANCE OF WATER SYSTEM

Turbidity levels were found to be within compliance.

Free chlorine levels were within compliance.

On July 17, 2005 there was a written notice to the MOE and MOH (AWQI 56946) regarding an air blockage in the intake. As a temporary measure, until the blockage could be removed, a portable pump was set up and pumped water directly from the bay to the low lift pumping station. To remove the blockage, a private contractor experienced with blocked intakes was utilized. The low lift pumping station was drawn down, the bell mouth of the intake pipe was removed and a swabb was pushed through the intake pipe via a higher pressure hose with the assistance of the fire department. A large bubble of trapped air was released and the flow through the intake returned to normal.

An additional (spare) swabb was purchased by the Township and the operator, Public Works Department and the Fire Department have been trained on this procedure.

8.0 WATER TREATMENT SYSTEM IMPROVEMENTS AND REPAIRS

The flow meter was calibrated on June 24, 2005 and the unit was found to be underestimating the flow. A new totalizer was ordered in June, arrived July 30 and was installed the first week of August.

The GenSet was test run monthly and was found to be working properly.

The continuity of the spare pump was checked monthly and it was found to be normal.

The facility was inspected on October 25, 2005 and no Provincial Officers Orders were issued.

9.0 CONCLUSIONS

1. In the year 2005, no adverses for turbidity, chlorine or microbiological parameters were reported, it can be concluded that the operation of the water works was in compliance with the Certificate of Approval and Regulations.
2. The filter backwash is monitored for TSS monthly as required by the previous Certificate of Approval. The annual average was 42 mg/L.
3. The 2005 average demand was 37.3 m³/day which is higher then 2004 which was 30.82 m³/day but reasonable considering the number of service connections.
4. In 2005, the maximum day demand was 110.3 m³/day which occurred in July. This is up from 2004 when the max day was 87.70 m³/day.
5. The only treatment chemical used in the system was sodium hypochlorite. In 2005, a total of 1480 L was used with an average dosage of 13.76 mg/L.
6. Calibration and routine preventive maintenance was performed in the water system.
7. The water meter was calibrated in June 2005 and the totalizer was found to be underestimating the flow. It was replaced.
8. All bacteriological sampling and testing exceeded the requirements of Schedule 11 as per O. Reg. 253/05.
9. All chemical sampling and testing were performed as per Schedule 13 of O. Reg. 253/05 and were found to be within compliance.
10. The PTTW expires August 4, 2006.
11. The intake became air blocked in July.

10.0 RECOMMENDATIONS

1. The Owner shall ensure that all users of the system are aware that an Annual Report was prepared and available for public review free of charge.
2. The water meter should be calibrated in June 2006.
3. The Owner shall have one (1) spare low lift, one (1) spare high lift and one (1) spare backwash pump each on standby in the event of failure of the duty high lift, low lift and backwash pumps.
4. All bacteriological and chemical sampling should be completed as per Schedules 11 and 13 respectively of O. Reg. 253/05.
5. The Township of Assiginack should submit an application for the renewal of the Permit to Take Water.
6. The pressure filter should be taken off line and the filter media inspected.
7. TSS monitoring should include a grab sample for free chlorine and the frequency reduced from monthly to quarterly.
8. The standard operating practice of swabbing the intake should be rehearsed annually. Both the Public Works Department and the Fire Department should participate in the training exercise led by the Operator In Charge (OIC).

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GWA/TD/tah

REFERENCE

1. Ontario Ministry of the Environment, Ontario Regulation 170/03 under the Safe Drinking Water Act, 2002 and as amended to O. Reg. 253/05.
2. Certificate of Approval
3. Permit to Take Water
4. Inspection Report.

Appendix A
Certificate of Approval

Appendix B
Permit to Take Water

Appendix C

Weekly Summary of Water Quality – Bacteriological

Appendix D

Chemical Sampling and Testing Results

Appendix E

NSF 60

Appendix F
Part III Form 2

Appendix G

Selected MOE Correspondence

Appendix H

Water Meter Calibration Report