



BAYSHORE VILLAGE SEWAGE WORKS

2019 Annual Performance Report

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APPENDICES

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1 INTRODUCTION

The Bayshore Village sewage works serves the Bayshore Village residential community, consisting of 343 lots located on Lots 21 and 26, Concession VI, as well as 29 lots on Southview Drive, and in the future, 10 lots on Block H. A total of 340 lots were connected in 2019, serving an estimated population of 884 residents (based on the Township of Ramara's average population of 2.6 people per dwelling).

The information herein summarizes to the best of our knowledge the characteristics, performance and operation of the Bayshore Village sewage works during 2019, based on data supplied by the Township of Ramara operators.

2 APPROVALS

The Bayshore Village sewage system was originally constructed under Certificate of Approval No. 3-0304-77-006, dated June 1, 1977. It was upgraded under C of A No. 3-1337-81-827, dated November 25, 1982, and amended by notices dated June 6, 1985, July 7, 1992, April 18, 1994 and November 1, 1995.

The system currently operates under Certificate of Approval No. 3-1337-81-968 issued July 17, 1996, and amended by a notice dated October 4, 1996. It identifies an average daily flow rated capacity of 399 m³/day.

Effluent from the lagoons is sprayed over two irrigation fields at a maximum irrigation rate of 55 m³/ha/day from May 18 to September 28 of each calendar year. The spray irrigation season can be extended each year to October 28 upon written request.

3 DESCRIPTION OF SEWAGE WORKS

The Bayshore Village Sewage Works consist of a gravity collection system with a satellite sewage pumping station, a main sewage pumping station discharging to a two-cell waste stabilization pond, and an effluent spray irrigation system.

3.1 SEWAGE PUMPING STATIONS

Two pumping stations serve the Bayshore Village development. The West Sewage Pumping Station serves those areas west of Sandlewood Trail and Lavender Court, comprising approximately 30% of the development. It houses two submersible pumps, each with a capacity of 14.8 L/s (195 gpm) discharging via a 100 mm forcemain to MH 34 located on the north leg of Bayshore Drive.

The East Sewage Pumping Station serves the entire development. Two 16.7 L/s (220 gpm) submersible pumps convey sewage via a 150 mm forcemain to the stabilization ponds. The forcemain is equipped with a magnetic flowmeter to measure raw sewage flows to the lagoons.

3.2 SEWAGE TREATMENT

The treatment system consists of two facultative waste stabilization ponds, located 2.5 km north of the community on Sideroad 20, on Lot 21, Concession 7. Raw sewage is pumped to Cell B (Small Lagoon) from where it flows by gravity to Cell A (Large Lagoon).

The effective volume (excluding freeboard and sludge storage) of the Small Lagoon was estimated at 30,000 m³ when lagoon level and sludge measurements were taken early in 2014. The effective volume of the Large Lagoon was estimated at 110,000 m³ when the lagoons were re-lined with imported clay in 1995.

Small Lagoon: 30,000 m³
Large Lagoon: 110,000 m³
Total: 140,000 m³

3.3 SPRAY IRRIGATION

The lagoon effluent is disposed by spray irrigation on two fields adjacent to the lagoons. The South Field covers an area of 23 ha immediately north of the lagoons on Lot 21, Concession 7. The North Field has an area of 18.6 ha, and is located just north of the South Field, north of Concession Rd. 8 on Lot 22, Concession 8. The Township uses approximately 14 ha in the South Field and 12 ha in the North Field for effluent spray irrigation. The remainder of the land is treed or low-lying.

Effluent is drawn from a concrete sump in the Large Lagoon via a 250 mm diameter pipe to the pump house. The pipe is equipped with a rotating self-cleaning strainer.

A 3 m by 3.6 m wood frame building houses a Berkeley 132 L/s effluent pump with variable speed drive, a pressure reducing valve, and magnetic flow meter on a 300 mm diameter discharge line.

The spray irrigation fields are equipped with above-ground irrigation piping and sprinklers. The South Field has 4,066 m of 75 mm to 300 mm PVC piping, with 146 sprinklers. The North Field is connected by 634 m of 250 mm piping, and has approximately 3,560 m of 75 mm to 200 mm piping and 148 sprinklers.

3.4 SPRAY IRRIGATION OPERATION

The typical spray irrigation season is 134 days from May 18 to September 28 each year.

The basic method of operation of the spray irrigation system is as follows:

- The spray irrigation piping, including the piping across Wainman's Creek, and the spray nozzles are installed and pressure tested in May.
- The spray irrigation fields are inspected daily to determine whether conditions are favourable for spray irrigation. Spray irrigation is carried out only when there is good weather (i.e., no rain and wind velocity less than 15 km/hr), no ponding of surface water on site, and sufficiently dry soils.
- If spraying is possible, the operator starts the effluent pump. A further inspection of the field is made to verify that sprinkler heads are operational. If problems are found such as broken pipes, clogged sprinkler heads, surface ponding, and aerosol drift, then the spray operation is modified, discontinued or repaired as required.

The effluent spray irrigation system is operated in such manner that the rate of application does not exceed the average effluent application rate of 55 m³/ha/day.

During periods when the fields are left to dry, the grass is cut to promote evapotranspiration. The operating staff maintain daily record sheets of the spray irrigation operation.

4 PERFORMANCE

4.1 MEASURED SEWAGE FLOWS

A magnetic flow meter is installed at the East Pumping Station to measure raw sewage flows. Operators record the flow meter readings multiple times each week and estimate the amount of flow for each day from the previous reading. There is a magnetic flow meter on the discharge line to the spray fields. Operators record the flow meter readings when the spray fields are in operation. Raw sewage flows measured by the magmeter in the East Pumping Station are summarized in Table 1.

Bayshore Village generated sewage at an average daily flow (ADF) of 374 m³/day, which is less than the average daily flow rated capacity of 399 m³/day. The average per capita sewage generation rate was 423 L/cap/day, 0.9% more than in 2018.

Table 1: 2019 Monthly Raw Sewage Flows

Month	Total Pumped (m ³)	Average Daily Flow (m ³)
January	10,759	347
February	8,240	294
March	13,206	426
April	17,219	574
May	13,289	429
June	11,901	397
July	9,175	296
August	7,520	243
September	7,596	253
October	9,302	300
November	11,528	384
December	12,765	412
Annual	136,671	374

The high seasonal sewage flow pattern and the significantly higher sewage flows continue to indicate there are significant contributions of inflow and infiltration into the sewer system during wet weather events. The Township's program to inspect sump pump connections, service laterals, and manholes has identified and corrected a number of illegal connections as well as deficiencies in service laterals. This inspection program will continue in 2020 in order to control inflow and infiltration and ensure sump pumps are not reconnected to the sanitary sewers.

Table 2 presents a summary of historical annual sewage flows and sewage generation rates.

Table 2: Historical Sewage Flows and Generation Rates

Year	No. of Connections	ADF (m ³ /day)	Sewage Generation Rate (L/cap/day)
2006	288	321	430
2007	288	305	408
2008	304	366	463
2009	306	396	497
2010	306	361	453
2011	307	322	403
2012	318	259	313
2013	319	315	379
2014	319	334	402
2015	320	338	406
2016	322	358	428
2017	328	387	454
2018	335	365	419
2019	340	374	423
3-YR average		375	432

4.2 SYSTEM RESERVE CAPACITY

In accordance with Ministry Procedure D-5-1 and utilizing the previous three years of historical flow data, the reserve capacity is calculated by the following formula:

$$\text{Reserve Capacity} = \text{Design Flow} - \text{Committed Flow}$$

- The design flow is equal to the maximum permissible flow approved by the Certificate of Approval of 399 m³/day, and the committed flow is equal to the total expected flow by the existing and proposed connections based on the previous 3-year ADF.

The built-out service area of the Bayshore Village Sewage Work has a total of 382 equivalent units at a population of density of 2.6 for a committed population of 993. Applying the three-year average sewage generation rate of 432 L/cap/day to this committed population yields a projection of 429 m³/day of sewage at full build out, which exceeds the system's rated capacity by 30 m³/day. This means the system has no Reserve Capacity.

Environmental Services began an inspection program in 2019 for illegal sump pump connections and private sewer laterals for leaks, in order to reduce inflow and infiltration and generate needed spare system capacity.

4.3 SEWAGE AND EFFLUENT QUALITY

4.3.1 Raw Sewage Quality

The raw sewage characteristics are similar to those observed in previous years. Raw sewage quality is summarized in Table 3. Laboratory results are available upon request.

4.3.2 Effluent Quality

As required by the Certificate of Approval, grab samples from each lagoon were taken on May 8, 2019 prior to the start of the spray irrigation season. Samples were also taken October 9, 2019 at the end of the spray irrigation season. The laboratory results are summarized in Table 4 and are available upon request.

There are no effluent limits or objectives in the Certificate of Approval.

Table 3: Raw Sewage Concentrations

Date	Biochemical Oxygen Demand BOD ₅ (mg/L)	Total Suspended Solids TSS (mg/L)	Phosphorus (total reactive) (mg/L)	Total Kjeldahl Nitrogen TKN (mg/L)
January	82	69	0.44	16.5
February	136	166	1.14	18.9
March	55	44	0.82	12.8
April	51	63	0.30	9.7
May	59	72	1.67	22.3
June	66	65	1.24	15.5
July	113	169	1.44	49.2
August	271	207	1.88	65.6
September	185	210	1.29	44.3
October	127	124	0.93	34.6
November	128	180	1.24	30.7
December	71	166	0.70	20.3
AVERAGE	112	123	1.09	28.4

Table 4: Lagoon Content Characteristics

Parameter	Large Lagoon (Cell A)		Small Lagoon (Cell B)	
	May	Oct	May	Oct
BOD ₅ (mg/L)	12	12	15	71
Total Suspended Solids (mg/L)	23	13	30	26
Total Phosphorus (mg/L)	0.84	1.2	1.26	3.03
TKN (mg/L)	3.6	3.9	11	23.8
TAN (mg/L)	2.1	0.1	8.5	17

4.4 SLUDGE ACCUMULATION

The estimated sludge volume in the Small Lagoon was 2,370 m³ based on measurements taken in 2013, and the estimated sludge volume in the Large Lagoon was 4,980 m³ based on measurements taken in 2014. The current sludge accumulation does not warrant removal at this time.

4.5 EFFLUENT SPRAY IRRIGATION

Effluent spray irrigation was conducted between June 17 and September 10, 2019. Daily records of spray irrigation are kept which indicate the weather conditions, which fields were utilized, and the volume of effluent applied. A total effluent volume of 88,997 m³ was applied to approximately 26 ha in the north and south fields over 44 days, resulting in an average application rate of 77.8 m³/ha/day, which exceeds the Certificate of Approval limit of 55 m³/ha/day.

4.6 SPRAY IRRIGATION MONITORING RESULTS

Groundwater, surface water and soil samples were taken from the following locations:

- groundwater in six boreholes in and around the north and south fields;
- Wainman’s Creek upstream and downstream of the spray fields; and,
- soils in the north and south spray fields.

Samples were taken:

- In May, before the start of the spray irrigation season;
- In August, during spraying; and,
- In October, after spraying was completed.

Results are compiled in Tables 5, 6 and 7. A copy of the laboratory results and the locations of the sampling points are filed and available upon request.

Groundwater quality, as shown in Table 5, was compared with the Ontario Drinking Water Standards, Objectives and Guidelines (ODWS). Chloride concentrations ranged from 6 mg/L to 140 mg/L and were similar to levels measured in the past five years. The higher chloride concentrations were measured at the monitoring locations closest to the road. Concentrations of nitrogen, including TKN and TAN, were mostly undetectable during and after the spray irrigation season, indicating the spray irrigation had little effect on the groundwater. Nitrate levels were very low.

Wainman's Creek sampling results shown in Table 6 show very consistent water quality between the upstream and downstream sampling locations, indicating no impact from the spray irrigation operation.

Table 5: Groundwater Monitoring

Location and Parameters	Sampling Date		
	May 07	Aug 14	Oct 09
1-1 (East South Field)			
TKN (mg/L)	<0.5	<0.5	1.3
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	<0.06	0.25	<0.06
TAN (mg/L)	<0.1	<0.1	<0.1
Total Phosphorus (mg/L)	0.04	0.04	0.04
Diss. Organic Carbon (mg/L)	2	2	3
Chloride (mg/L)	110	120	120
1-3 (South Field)			
TKN (mg/L)	0.8	0.7	1.5
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	<0.06	0.15	0.18
TAN (mg/L)	0.6	0.1	<0.1
Total Phosphorus (mg/L)	0.15	0.12	0.05
Diss. Organic Carbon (mg/L)	2	1	4
Chloride (mg/L)	110	80	140
1-4 (North Field)			
TKN (mg/L)	<0.5	0.6	1.3
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	<0.06	<0.06	<0.06
TAN (mg/L)	<0.1	0.1	<0.1
Total Phosphorus (mg/L)	<0.03	0.04	0.05
Diss. Organic Carbon (mg/L)	1	3	1
Chloride (mg/L)	6	9	6
1-5 (North Field)			
TKN (mg/L)	<0.5	<0.5	1.2
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	<0.06	<0.06	0.28
TAN (mg/L)	<0.1	0.1	0.1
Total Phosphorus (mg/L)	0.36	0.07	0.06

Diss. Organic Carbon (mg/L)	2	3	2
Chloride (mg/L)	9	7	10
1-7 (North Field)			
TKN (mg/L)	<0.5	2.5	10.5
Nitrite (mg/L)	0.07	0.07	0.14
Nitrate (mg/L)	0.09	0.10	<0.06
TAN (mg/L)	0.2	1.8	9
Total Phosphorus (mg/L)	0.28	0.39	1.13
Diss. Organic Carbon (mg/L)	6	9	16
Chloride (mg/L)	64	59	30
1-1 (West North Field)			
TKN (mg/L)	<0.5	0.6	1.6
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	0.12	<0.06	<0.06
TAN (mg/L)	<0.1	<0.1	<0.1
Total Phosphorus (mg/L)	<0.03	0.21	0.21
Diss. Organic Carbon (mg/L)	2	2	3
Chloride (mg/L)	67	90	110

Table 6: Surface Water Monitoring

Location and Parameters	Sampling Date		
	May 07	Aug 14	Oct 09
Wainman's Creek (Upstream)			
BOD5 (mg/L)	<4	4	<4
Total Suspended Solids (mg/L)	6	5	4
pH	7.86	7.69	8.2
Total Kjeldahl Nitrogen (as N mg/L)	0.7	1.4	1.2
Ammonia+Ammonium (N) (as N mg/L)	<0.1	0.2	<0.1
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	1.23	<0.06	<0.06
Nitrite + Nitrate (mg/L)	1.23	<0.06	<0.06
Phosphorus (total) (mg/L)	0.016	0.05	0.037
E.coli (cfu/100mL)	116	22	16
Total Coliforms (cfu/100mL)	400	540	2400
Wainman's Creek (Downstream)			
BOD5 (mg/L)	<4	<4	<4
Total Suspended Solids (mg/L)	6	5	4
pH	7.93	7.8	8.05
Total Kjeldahl Nitrogen (as N mg/L)	<0.5	1.2	1.6
Ammonia+Ammonium (N) (as N mg/L)	<0.1	0.2	<0.1
Nitrite (mg/L)	<0.03	<0.03	<0.03
Nitrate (mg/L)	1.19	<0.06	<0.06
Nitrite + Nitrate (mg/L)	1.19	<0.06	<0.06
Phosphorus (total) (mg/L)	0.019	0.048	0.044
E.coli (cfu/100mL)	88	50	84
Total Coliforms (cfu/100mL)	88	280	460

Table 7: Soil Core Sample Monitoring

Location and Parameters	Sampling Date		
	May 07	Aug 14	Oct 09
North Field Upper			
pH	6.02	5.74	6.16
Conductivity (µS/cm)	62	58	124
Chloride (µg/g)	18	13	22
Nitrate + Nitrite as N (µg/g)	<0.2	<0.2	0.7
TKN (µg/g)	0.13	0.14	0.06
TAN (µg/g)	<0.01	<0.01	<0.01
Total Organic Carbon (µg/g)	2.2	2.6	1.5
Phosphorus (µg/g)	290	480	120
Sodium (µg/g)	260	440	400
North Field Lower			
pH	7.31	7.54	7.36
Conductivity (µS/cm)	146	256	201
Chloride (µg/g)	6.4	46	7.2
Nitrate + Nitrite as N (µg/g)	0.3	7.7	8.3
TKN (µg/g)	0.15	0.10	0.17
TAN (µg/g)	<0.01	<0.01	<0.01
Total Organic Carbon (µg/g)	1.9	2.6	3.4
Phosphorus (µg/g)	580	780	740
Sodium (µg/g)	440	742	460
South Field			
pH	7.20	6.80	6.53
Conductivity (µS/cm)	111	57	149
Chloride (µg/g)	3.2	7.2	31
Nitrate + Nitrite as N (µg/g)	<0.2	0.2	3.5
TKN (µg/g)	0.20	0.32	0.23
TAN (µg/g)	<0.01	<0.01	<0.01
Total Organic Carbon (µg/g)	3.7	7.3	5.6
Total Phosphorus (µg/g)	610	2200	1100
Sodium (µg/g)	190	160	430

5 SYSTEM REPAIRS AND UPGRADES

In addition to regular maintenance, power failures and minor repairs were handled as they occurred without any problems reported.

Raw sewage and effluent flow meters were calibrated by SCG Flowmetrix in June, 2019.

6 OPERATORS LICENSING AND TRAINING

Seven experienced Township Operators share responsibility for the operation and maintenance of the Bayshore Village Sewage Works. Their current sewage works licensing status is summarized in Table 8 below.

Table 8: Operator Licensing Summary

Operator	ID No.	Licence	Licence No.	Expiry Date
Dave Readman	900-02096	Wastewater Collection Facility II	13814	February 28, 2023
		Wastewater Treatment Facility II	13682	April 30, 2022
Donald O'Connell	900-17830	Wastewater Treatment Facility II	70061	March 31, 2023
Rob Smith	900-18962	Wastewater Collection Facility II	69640	July 31, 2022
		Wastewater Treatment Facility I	68906	February 28, 2021
Nicholas Leroux	900-55885	Wastewater Collection Facility II	51578	May 31, 2022
		Wastewater Treatment Facility II	69847	May 31, 2021
Kenneth Duffy	900-10961	Wastewater Treatment Facility I	13819	July 31, 2021
Joe Foley	900-70749	Wastewater Collection Facility I	102784	Oct 31, 2021
		Wastewater Treatment Facility I	87953	March 31, 2021
Kyle Readman	900-74830	Wastewater Collection Facility OIT	OT85260	June 30, 2020
		Wastewater Treatment Facility OIT	OT85211	June 30, 2020

7 SUMMARY AND RECOMMENDATIONS

The Bayshore Village Sewage Works did not operate in full compliance with the Certificate of Approval in 2019. Condition 1.2 of the Certificate of Approval states that the effluent spray irrigation system shall operate in such a manner that the average rate of effluent application to the approved fields does not exceed the application rate of 55m³/ha/day. The prescribed spray season is 134 days from May 18 to September 28 each year. The spray irrigation system operated for only 44 days, which resulted in an average application rate of 77.8 m³/ha/day, which exceeds the Certificate of Approval limit of 55 m³/ha/day.

The lagoons treated an average of 374 m³/day of raw sewage, and operated at 94% of the system's rated capacity. Groundwater, surface water and soil characteristics were monitored and were not found to be adversely impacted by the spray irrigation operation.

Significantly higher sewage flows (relative to water consumption) in Bayshore Village indicates there are sources of inflow and infiltration into the sewer system. Control of inflow and infiltration into the sanitary sewer system continues to be a priority. Currently over 50% of flow to the wastewater treatment site can be attributed to some form of infiltration.

It should be noted that at the three-year average sewage generation rate, the wastewater treatment system does not have sufficient capacity to service the entire subdivision.

In order to investigate the sources of inflow/infiltration, fog testing was completed in October, 2018, sewer main and lateral inspections via camera were completed in May, 2019 and door to door sump pump inspections took place between April and May, 2019.

The Township of Ramara has undertaken a Class Environmental Assessment Study to find the most appropriate solution for the disposal of the effluent from the sewage treatment lagoons. The study has been carried out in accordance with the planning and design process for a Schedule B project as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document. A Notice of Completion of the Class EA Study was issued October 11, 2017. The Class EA Study concluded the preferred approach is two-phased:

- Short-term: Establish an additional spray irrigation field to provide spare capacity to allow a reduction in spray irrigation rate and frequency.
- Long-term: Discontinue spray irrigation and upgrade the sewage works with a tertiary treatment facility to reduce phosphorus and disinfect the effluent, and discharge to Wainman's Creek.

The Ministry's view, as per their response received November 21, 2018, is that the EA process for this project is not complete. It is the Ministry's view that further work must be done to verify the feasibility of the preferred short-term solution prior to its implementation.

It was noted in the inspection report, dated October 19, 2018, that the Ministry strongly recommends developing a contingency plan for exceedance of rated capacity, as well as potentially restricting or suspending further development within the subdivision until these issues have been addressed.

Appendix A
Certificate of Approval



Ontario

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

AMENDMENT TO CERTIFICATE OF APPROVAL SEWAGE NUMBER 3-1337-81-968 Page 1 of 2

NOTICE

OCT 06 1996

52-22650

Township of Ramara Box 130, Highway 12 Brechin, Ontario L0K 1B0

TOWNSHIP OF RAMARA

You are hereby notified that the approval issued under Certificate of Approval No. 3-1337-81-968 dated July 17, 1996 for the upgrading of the sewage treatment (lagoons) and disposal system (by means of spray irrigation on the North Field and the South Field) serving the Community of Bayshore Village, in the Township of Ramara, is hereby amended as follows:

the operating season of the spray irrigation system (i.e., from May 18 to September 28) for the disposal of the lagoon effluent on the spray irrigation fields (North Field and South Field) each year, as stipulated in Condition No. 1.3 of the Certificate, is hereby extended to October 28 for the 1996 spray season.

Reason

The reason for the extension of the spray season is to allow for the reduction of the lagoon effluent level in order to facilitate their use for the forthcoming season and to prevent the possibility of an overflow from the lagoons in the spring of 1997.

This Notice shall constitute part of the approval issued under Certificate of Approval No. 3-1337-81-968 dated July 17, 1996.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter O.40, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 101 of the Ontario Water Resources Act provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

- 3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the sewage works are located;

And the Notice should be signed and dated by the appellant.



Ontario

Ministry of
Environment
and Energy

Min. re de
l'Environnement
et de l'Énergie

AMENDMENT TO CERTIFICATE OF APPROVAL

SEWAGE

NUMBER 5-1537-81-968

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This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario.
M4V 1N3

AND

The Director,
Section 53, Ontario Water Resources Act,
Ministry of Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act:

DATED AT TORONTO this 4th day of October, 1996.

THIS IS A TRUE COPY OF THE
ORIGINAL CERTIFICATE MAILED

ON Oct. 7/96

(Signed)

M. Dhalla, P. Eng.,
Director,
Section 53,
Ontario Water Resources Act.

HV/ba

- Attn:
- Francis B. Mangan, Clerk, Twp. of Ramara
 - District Manager, MOEE Barrie District Office
 - Mr. S. Blakey, P.Eng., Totten, Sims, Hubicki Associates



Ontario

Ministry of Environment and Energy

Min. ère de l'Environnement et de l'Énergie

RECEIVED

JUL 24 1996

TOTTEN, SIMS, HUBICKI ASSOCIATES
WHITBY, ONTARIO

CERTIFICATE OF APPROVAL

SEWAGE

NUMBER 3-1337-81-968

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TOWNSHIP OF RAMARA
Box 130, (Hwy. 12)
Brechin, Ontario
L0K 1B0

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

upgrading of the existing sanitary sewage treatment and disposal system serving the community of Bayshore Village in the Township of Ramara, located on Lot 21, Concession 7 in the Mara part of the Township of Ramara, consisting of a two-cell sewage lagoon and a spray irrigation field (the South Field), originally constructed under the Certificate of Approval No. 3-0304-77-006, dated June 1, 1977, and subsequently upgraded under the Certificate of Approval No. 3-1337-61-827 dated November 25, 1982, as amended by Notices dated June 6, 1985, July 7, 1992, April 18, 1994, and November 1, 1995, involving establishment of an additional spray irrigation field (the North Field) on Lot 22, Concession 8 in the Mara part of the Township of Ramara, with the existing and proposed facilities consisting of the following:

Sewage Lagoon

a sewage stabilization and storage lagoon system consisting of two (2) cells operated in series, as follows:

- a clay lined settling cell (Cell "B"), receiving sewage from the Village via an existing forcemain in Sideroad 20, having a total area of 1.6 ha, a total depth of 3.1 m (including a 0.3 m sludge storage bottom dead zone and a 0.66 m freeboard), and an effective storage capacity of 21,600 m³, including a cell bottom forcemain inlet structure with a 200 mm diameter valved connection (valve normally open) to the forcemain in Sideroad 20, a 250 mm diameter valved cell outlet pipe to the below described storage cell (Cell "A"), and a 300 mm diameter cell overflow pipe to Cell "A" with a rip-rap berm protection at both (Cell "B" and Cell "A") ends of the pipe;
- a clay lined storage cell (Cell "A"), receiving settled sewage from the above-described Cell "B", having a total area of 6.2 ha, a total depth of 3.1 m (including a 0.3 m sludge storage bottom dead zone and a 0.66 m freeboard), and an effective storage capacity of 109,925 m³, including a cell bottom forcemain inlet structure with a 200 mm diameter valved connection (valve normally closed) to the forcemain in Sideroad 20, and a 1.5 m deep reinforced concrete lagoon effluent intake sump in the bottom of the cell, having walls extending 0.3 m above the bottom of the cell with stop log guides for extension of the walls up to 0.6 m above the bottom of the cell;



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Effluent Spray Irrigation System

a lagoon effluent pumping station consisting of a 3.0 x 3.6 m wood frame building located adjacent to the lagoon, housing one (1) 75 hp electric motor driven centrifugal sewage pump rated at 132 L/s at a TDH of 38. m with a 250 mm diameter suction pipe to the above-described lagoon effluent intake sump in Cell "A" with a self-cleaning rotating intake strainer, and a 300 mm diameter discharge pipe to the below-described South Field effluent distribution system, equipped with a magnetic flowmeter;

a 23.0 ha effluent spray irrigation field (South Field), located immediately to the north and east of the above described sewage lagoon, consisting of four (4) spray irrigation sites equipped with independently operated systems of sprinkler heads serviced by dedicated systems of distribution mains and laterals with valved connections to the above-described pumping station's discharge pipe, with the individual spray irrigation sites sized as follows:

- Site A1: 65,293 m²
- Site B2: 26,855 m²
- Site C2: 36,506 m²
- Site C3: 11,382 m²

an 18.6 ha effluent spray irrigation field (North Field), located northwest of the above-described South Field, consisting of three (3) spray irrigation sites equipped with independently operated systems of sprinkler heads serviced by dedicated systems of distribution mains and laterals with valved connections to an approximately 630 m long 250 mm diameter transmission forcemain from the above-described pumping station's discharge pipe at the north end of the South Field, with the individual spray irrigation sites sized as follows:

- Site B1: 37,643 m²
- Site C1: 65,564 m²
- Site D1: 16,312 m²

all in accordance with application for approval dated April 10, 1996, and supporting documentation prepared by Totten Sims Hubicki Associates, Consulting Engineers.

DEFINITIONS

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

- (1) "certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the Ontario Water Resources Act, and includes any schedules;
- (2) "Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Ontario Water Resources Act.



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- (3) "Ministry" means the Ontario Ministry of Environment and Energy;
- (4) "Regional Director" means the Regional Director of the Mid-Ontario Region of the Ministry;
- (5) "District Manager" means the District Manager of the Barrie District Office of the Ministry's Mid-Ontario Region;
- (6) "Owner" means the Corporation of the Township of Ramara;
- (7) "works" means the sewage works described in the Owner's application to this certificate and in the supporting documentation referred to herein to the extent approved by this certificate;
- (8) "sewage treatment plant" means the entire sewage treatment system including the effluent disposal facilities;
- (9) "grab sample" means an individual sample of at least 1000 millilitre collected in the appropriate container at a randomly selected time over a period of time not exceeding 15 minutes;
- (10) "average daily flow" means the cumulative total sewage flow to the sewage works during a particular calendar year divided by the number of days within that year during which sewage was flowing to the sewage works;
- (11) "average effluent application rate" means the total volume of effluent applied to a spray irrigation field during a particular spray irrigation season divided by the number of days within that season during which effluent was actually applied to that field;
- (12) "spray irrigation season" means the period of time starting on the first and ending on the last day of application of effluent to the spray irrigation field(s) during a particular calendar year;
- (13) "BOD₅" means five day carbonaceous biochemical oxygen demand measured on an unfiltered sample;

TERMS AND CONDITIONS

You are hereby notified that this approval is issued subject to the following terms and conditions outlined below:

1. PERFORMANCE

- 1.1 The Owner shall ensure that the flow of sewage into the sewage treatment plant does not exceed the average daily flow of 399 m³/d for any period of time greater than one (1) calendar year.



- 1.2 The owner shall ensure that the effluent spray irrigation system is operated in such a manner that the average rate of effluent application to any of the approved spray irrigation fields does not exceed the average effluent application rate of 55 m³/ha/day.
- 1.3 The Owner shall ensure that the effluent spray irrigation system is only operated during frost free periods between May 18 and September 28. Should it be necessary to operate the system prior to May 18 or after September 28 of any year, the Owner shall obtain a prior written approval for such an extended operation from the District Manager on a case-by-case basis.
- 1.4 The Owner shall ensure that the effluent spray irrigation system is operated in a manner that precludes the sprayed effluent ponding, run-off, and aerosol drift beyond the limits of the approved spray irrigation fields at all times.
- 1.5 Any diversion of sewage from any portion of the sewage works is prohibited, except where it is unavoidable in preventing loss of life, danger to public health, personal injury or severe property damage.

2. MONITORING AND RECORDING

- 2.1 The Owner shall ensure that the following monitoring program is carried out upon commencement of operation of the works:
 - (a) Daily quantities of sewage being conveyed to the sewage treatment plant and the lagoon effluent being disposed of by spray irrigation onto individual spray irrigation fields shall be measured or estimated, and recorded.
 - (b) Samples of raw sewage, lagoon effluent ahead of the spray irrigation system, groundwater in monitoring wells within and around the spray irrigation fields, surface water in the Wainmans Creek up-stream and down-stream of the spray irrigation fields, and the soil within the spray irrigation fields shall be collected at locations satisfactory to the District Manager and analyzed for at least the following parameters at the indicated minimum frequencies:

<u>Raw Sewage Parameter</u>	<u>Type of Sample</u>	<u>Minimum Frequency</u>
BOD ₅	grab	monthly
Suspended Solids	grab	monthly
Total Phosphorus	grab	monthly
Total Kjeldahl Nitrogen	grab	monthly



<u>Lagoon Effluent Parameter</u>	<u>Type of Sample</u>	<u>Minimum Frequency</u>
BOD ₅	grab	annually*
Suspended Solids	grab	annually*
Total Phosphorus	grab	annually*
Total Kjeldahl Nitrogen	grab	annually*
(Ammonia + Ammonium) Nitrogen	grab	annually*

* The annual sampling of the lagoon effluent shall take place at the beginning of each spray irrigation season.

<u>Surface Water Parameter</u>	<u>Type of Sample</u>	<u>Minimum Frequency</u>
BOD ₅	grab	3 per season**
Suspended Solids	grab	3 per season**
Total Phosphorus	grab	3 per season**
Total Kjeldahl Nitrogen	grab	3 per season**
(Ammonia + Ammonium) Nitrogen	grab	3 per season**
Nitrates	grab	3 per season**
Nitrites	grab	3 per season**
pH	grab	3 per season**
Temperature	grab	3 per season**

** The surface water sampling shall take place prior to, in the middle, and after each spray irrigation season, provided that there is flow in the stream.

<u>Soil Parameter</u>	<u>Type of Sample</u>	<u>Minimum Frequency</u>
Total Organic Carbon	core	annually***
Total Phosphorus	core	annually***
Total Kjeldahl Nitrogen	core	annually***
Ammonia + Ammonium Nitrogen	core	annually***
Nitrite + Nitrate Nitrogen	core	annually***
Chlorides	core	annually***
Sodium	core	annually***
Conductivity	core	annually***
pH	core	annually***

*** The annual soil sampling shall take place prior to each spray irrigation season.

(c) The sampling and analyses required by clause (b) above shall be performed in accordance with the Ministry's Policy No. 08-06; "Protocol for the Sampling and Analysis of Industrial - Municipal Wastewater", Ministry of Environment, July 1993; or as described in "Standard Methods for Examination of Water and Wastewater", 17th Edition, 1990, as amended from time to time by more recently published editions.



2.2 The Owner shall retain for a minimum of three years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this certificate.

2.3 Following review of any of the analytical results required by Condition 2.1 or any of the reports required by Condition 4.1 of this certificate, the District Manager may alter the frequencies and locations of sampling and parameters for analysis required by Condition 2.1 if, he/she considers it necessary for proper assessment of the operation of the sewage treatment plant and its impact on the environment or if he/she is requested to do so by the Owner and considers it acceptable by the evidence of information submitted in support of the request.

3. OPERATION AND MAINTENANCE

3.1 The Owner should ensure that the application of effluent to individual irrigation sites within the approved spray irrigation field(s) and rotation of the irrigation sites is carried out in a manner that maximizes evapotranspiration and allows the soil to dry out periodically.

3.2 The Owner should ensure that whenever ponding or run-off of sprayed effluent occurs, the application of effluent to the affected area of the spray irrigation field is immediately terminated, and adequate time is allowed before resumption of the application of effluent to that area for the area to dry to a degree that would preclude immediate recurrence of ponding or run-off.

3.3 The Owner should ensure that no effluent application to the spray irrigation fields takes place during rainfall, when the ground is saturated, and when the wind velocity exceeds 15 km/hr.

3.4 The Owner shall provide and maintain:

- a) permanent fences around the entire spray irrigation fields, and
- b) suitably posted signs at all points of access to all spray irrigation fields, indicating that treated sewage effluent is being used to irrigate the field and that trespassing is prohibited.

3.5 Based on the performance requirements and operational objectives stipulated above in Conditions 1.1 through 1.4 and 3.1 through 3.3, the Owner shall prepare an operations manual within six (6) months of commissioning of the sewage works and keep it up to date. Upon request, the Owner shall make the manual available for inspection by the Ministry personnel and furnish a copy to the Ministry.



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- 3.6 The Owner shall prepare and make available for inspection by Ministry personnel upon request, a complete set of drawings within one (1) year of substantial completion of the sewage works. The drawings shall show the sewage works as constructed at that time.
- 3.7 A complete set of the record drawings, incorporating any amendments made from time to time, shall be kept by the Owner at the site of the sewage works for as long as the sewage works are kept in operation.
- 3.8 In order to prevent or minimize any unacceptable liquid discharges and gas and odour emissions into the natural environment, the Owner shall ensure that contingency plans and procedures are established and adequate equipment and material are available for dealing with emergency and upset conditions including equipment breakdowns at the sewage works, flooding, overflows of raw and partly treated sewage and spills of sludge into or out of the sewage works. The Owner shall establish notification procedures to be used to contact the District Manager and other relevant authorities in the case of an emergency and upset conditions.
- 3.9 The Owner shall establish procedures for receiving and responding to complaints including a reporting system which records what steps were taken to determine the cause of complaint and the corrective measures taken to alleviate the cause and prevent its reoccurrence.
- 3.10 The Owner shall provide for the overall operation of the sewage treatment plant with an operator who holds a licence that is applicable to that type of facility and that is of the same class as or higher than the class of the facility in accordance with Ontario Regulation 435/93.

4. REPORTING

- 4.1 One week prior to the start up of the operation of the works, the Owner shall notify the District Manager (in writing) of the pending start up date.
- 4.2 The Owner shall prepare, and upon request, submit to the District Manager annual performance reports for the sewage treatment plant. The first such report shall cover the period from the commencement of operation of the sewage works to the end of the calendar year and shall be prepared within the following ninety (90) calendar days. Each subsequent annual report shall be prepared within ninety (90) calendar days following the completion of the calendar year being reported upon. The reports shall contain the following information in a format acceptable to the District Manager:
 - (a) a summary of all monitoring data, including an overview of the success and adequacy of the sewage treatment program;



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- (b) a tabulation of all monitoring and analytical results obtained during the reporting period, including sampling/monitoring location and date;
- (c) a record of the operation of the spray irrigation system, including dates and hours of operation, irrigation areas utilized, rates of effluent application, and volumes of effluent applied;
- (d) an account of any environmental and operating problems encountered at the site and the mitigative measures taken during the reporting period.

The reasons for the imposition of these terms and conditions are as follows:

1. Conditions 1.1 through 1.4 are included to ensure that the flow of sewage to the treatment plant, and the times, manner and rates of effluent application to the spray irrigation fields are within the approved treatment capacity of the works.
2. Conditions 2.1 through 2.2 relating to monitoring and recording the quality and quantity of the effluent from the sewage treatment plant on a continual basis are required to enable the Owner to evaluate the performance of the works and to ensure that it is operated and maintained at a level which is consistent with the design objectives and other requirements of this certificate.
3. Conditions 3.1 through 3.10 are included to ensure that the works will be operated, maintained, funded, staffed and equipped in a manner enabling compliance with the terms and conditions of this certificate, such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.
4. Conditions 4.1 through 4.2 are included to ensure that all pertinent information is available for the evaluation of the performance of the sewage works.

This Certificate revokes and supersedes Certificate of Approval No. 3-1337-81-827 dated November 25, 1982, as amended by Notices dated June 6, 1985, July 7, 1992, April 18, 1994, and November 1, 1995.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter O.40, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 101 of the Ontario Water Resources Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.



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The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the sewage works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario.
M4V 1N3

AND

The Director,
Section 53, Ontario Water Resources Act
Ministry of Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 17th day of July, 1996.

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE MAILED

ON July 19, 1996

(Signed)

[Signature]
D.F. Carr, P. Eng.,
Director,
Section 53,
Ontario Water Resources Act.

MT/nk

Attn: -F.B. Mangan, Clerk, Township of Ramara
cc: -District Manager, MOEE Barrie District Office
-S. Blakey, P. Eng., Totten Sims Hubicki Associates