DISTRICT OF SOOKE
WASTEWATER TREATMENT
AND COLLECTION SYSTEM

OPERATED BY
EPCOR WATER SERVICES INC.

2007ANNUAL REPORT

PERMIT NUMBER RE-17300

EPCOR

District of Sooke

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INTRODUCTION

The Sooke wastewater collection and treatment system is owned by the District of Sooke and operated by EPCOR Water Services Inc.

Construction of the Sooke collection system and wastewater treatment plant began in 2004 and the system was commissioned in November 2005. Individual domestic and commercial hook-ups began in January 2006 and continued throughout 2006 and 2007, with the majority completed by December 2006.

The system consists of:

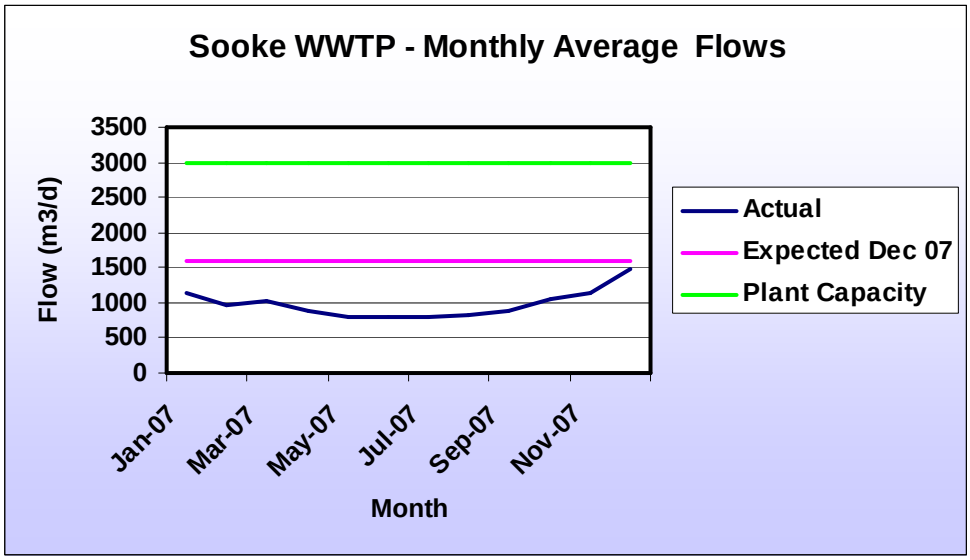
- 34 km of collection system piping
- 4 pump lift stations (Sooke Road, West Coast Road, Helgesen Road & Sun River)
- Secondary wastewater treatment plant with 1.7 km long, 30 m deep outfall
- Sequencing Batch Reactor treatment process with UV disinfection
- Capacity: peak design of 3,000 m^3/day, expandable by an additional 3,000 m^3/day
- Servicing Sooke core area of approximately 5,500 residents

Secondary sewage treatment removes 90% of the total suspended solids and high levels of other contaminants, providing significant environmental benefits to the District of Sooke.

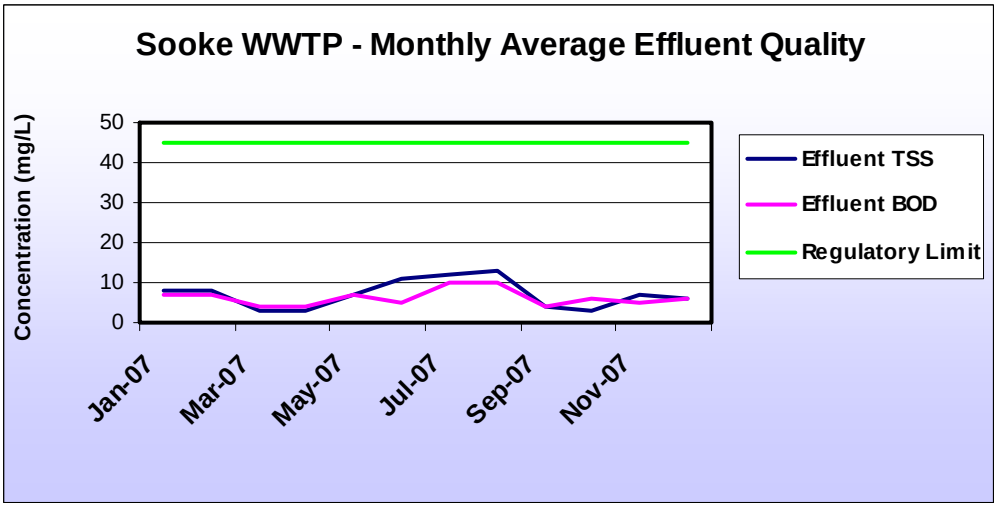
OVERVIEW

The annual average flow treated in the plant in 2007 was 1130 m^3/day; less than the expected flow of 1600 m^3/day at completion of hook-up. The lower than expected flows were due partially to some connections not being completed until 2007. Another major contributing factor is thought to be the water conservation habits of Sooke residents. Most residents are used to living in a home with a private septic system, which encourages more stringent conservation measures than those people used to having a municipal sewer system.

The following figure summarizes the monthly average flows during the year.



The wastewater treatment plant is performing very well. Two of the important parameters monitored at the plant are total suspended solids (TSS) and biochemical oxygen demand (BOD). The following figure summarizes the monthly average TSS and BOD in the plant effluent through the year compared to the regulatory standards. The TSS and BOD in the plant effluent were consistently better than the regulatory requirements throughout the year.



In November, the District of Sooke and EPCOR received a national award for their partnership approach to developing new wastewater infrastructure. The Canadian Council of Public Private Partnerships named the District of Sooke and EPCOR as recipients of the C.W. Chuck Wills Award for the 2007 National Awards for Innovation and Excellence in Public-Private Partnerships. Recognizing project excellence at the municipal level, this award has been handed out only once before.

OPERATIONS

Certification

The wastewater treatment plant is a Class III Wastewater Treatment Plant, Certification # 1358, in accordance with the Environmental Operators Certification Program.

Operators working at the Sooke WWTP in 2007:

Name	Position	Qualifications
John Reynolds	Senior Operator	Class IV MWWT (EOCP) Class III IWWT (EOCP)
Mark Hayes	Operator	Level II WWT (EOCP) Level II WT (EOCP)
Brian Thorburn	Operator (Sept 07)	Class IV WWT (EOCP) Class III WWT (EOCP)
Tami Wetmore	Operations Manager	Level III WWT (AB) Level II WWC (AB) Level IV WT (AB) Level II WD (AB)
WWT- Wastewater Treatment; WWC – Wastewater Collection; WT – Water Treatment; WD – Water Distribution; IWWT – Industrial Wastewater Treatment		

Quality

The table on the following page summarizes the monthly plant quality through the year. Appendix 1 includes the detailed quality data for each month.

Discussions continued with the Ministry of Environment in 2007 regarding the quality parameters contained in the registration for the plant. The registration was submitted in 2002 as required for the grant funding process, which was before the contract for building the plant was awarded in 2004 and the design finalized for the plant. There are three parameters contained in the registration which do not reflect the final design of the plant and need to be updated (flow, fecal coliform concentration and ammonia concentration). This will be done when the Liquid Waste Management Plan is completed and an operational certificate is established for the plant. While waiting for the operational certificate to be finalized, EPCOR uses the provincial Municipal Sewage Regulation (MSR) as guidance for quality parameters.

Receiving environment monitoring around the outfall was conducted in January, May and September. Results continue to be excellent, with most parameters below detection limits. The reports are attached in Appendices 2, 3 and 4.

Toxicity testing was completed in January. The results were 100% survival on a 96 hour LC90 toxicity test.

2007 MONTHLY AVERAGE DATA SHEET

	INFLUENT				EFFLUENT			
MSR Limit	*				45 mg/L	45 mg/L	*	*
	Average Flow (m3/d)	BOD mg/L	TSS mg/L	NH_3 mg/L	BOD mg/L	TSS mg/L	NH_3 mg/L	Fecal Coliform CFU/100mL
January	1298	163	219	26	7	8	11	12
February	1120	180	256	32	8	9	15	50
March	1214	123	184	21	4	3	5	6
April	1017	156	199	31	4	4	0.4	4
May	889	152	190	33	7	7	1.2	15
June	871	228	217	26	4	11	0.2	20
July	939	209	190	39	10	12	2.4	156
August	1011	224	240	43	10	13	0.2	333
September	1098	175	140	38	4	4	0.1	27
October	1198	189	152	43	6	3	0.4	62
November	1278	180	214	16	5	8	5	50
December	1622	139	228	28	6	6	0.8	110
Average	1130	177	202	31	6	3	3	70

NOTES:

Data presented in table is conducted by an external CAEL certified laboratory.

Monthly average reported for fecal coliforms is a geometric mean.

* Limits being clarified with Ministry of Environment.

Operations, Maintenance & Improvements

Ongoing operations and maintenance activities and improvements occurred throughout the year. Some highlights are included below.

Biosolids extracted from the centrifuge are trucked to the Hartland Landfill for disposal under Control Waste Permit # 2006-044. During 2007, on average, 23 tonnes of bio-solids per month were trucked to the landfill.

The polymer feed was optimized throughout the spring to improve centrifuge operation. The final polymer and dose combination achieved much better sludge dewatering results by May.

The Sun River lift station operation was transferred to the District of Sooke/EPCOR in July.

Annual lift station pump maintenance was conducted in July and one faulty pump at Sun River was sent out for repair. All of the lift stations were cleaned before inspections. An unusually high amount of grease was found in the wet wells.

Two additional backflow prevention assemblies were installed on the main water supply lines under the headworks room in August. The installations were completed to be compliant with CRD Water new backflow prevention standards.

The UV Disinfection controller failed on August 2. The UV system was still operational in manual mode while repairs were completed.

The UV bulbs in Bank B were replaced in October.

The standby generators at all four lift stations and at the wastewater treatment plant underwent annual inspections in October. All of the generators are in excellent condition and no problems were discovered.

The first review of the conceptual design of the expansion of the sewer system was completed on December 3. A further refinement of the major design assumptions for zoning and loading factors will be completed, and the draft piping design will be completed in 2008.

Audits & Inspections

A number of internal and external audits and inspections were completed in 2007. Internally, EPCOR quality control staff completed an annual lab audit which included calibration of lab equipment, and a review of procedures and documentation. A combined Health, Safety and Environmental audit was carried out by EPCOR's inspection team. Both audits resulted in positive feedback highlighting existing good practices, with a few relatively straightforward opportunities for improvement, which were resolved immediately.

Externally, CRD Water, the District of Sooke Fire Department and WorkSafe BC carried out inspections on emergency equipment, backflow prevention and workplace practices.

Incidents

The plant experienced upset conditions several times between May and November 2007 which impacted water quality. In each case, the affected basin was removed from service until biological activity was regained. Investigations through the period determined that the plant experienced multiple shocks of toxic material in the plant influent. Through extensive microscope analysis conducted onsite, it was determined that a toxic material was coming into the plant and killing the micro-organisms on a periodic basis. Samples sent to the lab indicated higher than normal metal concentrations during the upset conditions. The source of the dumping and metals is under investigation.

In all but one event, MSR quality standards were met. A high Total Suspended Solids event occurred on June 15 resulting in an effluent quality violation (based on internal lab test results). The incident was reported to PEP (# 700778). In August, the disinfection process did not meet internal target parameters for the month, although MSR limits for fecal coliforms were met. The disinfection process was affected due low Ultra-Violet transmittance (UVT) and high TSS.

An extra round of receiving environment monitoring around the outfall was conducted in late September as a follow up to the toxic shock incidents and the impact on the plant disinfection process. Results from the sampling were within normal quality parameters.

A storm event occurred on November 19th that resulted in a flow of 2290 m3/d being processed through the plant. While this is below the design capacity of the plant (6000 m3/d for peak wet weather conditions), it falls outside the range identified in the registration submission completed by the District in 2002 before the plant design was finalized.

An effluent channel overflow occurred on December 3rd due to extremely high rainfall in excess of 75 mm over a 24 hour period. Hydraulic overloading in the effluent pipe caused water to back up into the UV Channel and overflow, resulting in 5000 litres of treated non-disinfected wastewater overflowing into the grassed ditch. The incident was reported to PEP (# 702409).

Odours

Throughout 2007, odours continued to be noticed at the Sooke Road lift station and a variety of measures have been used to reduce the impact on two neighbouring properties. These odours were primarily due to low flows in the collection system during startup in 2006 creating septic conditions. This condition was gradually minimized in 2007 as the number of homes hooking into the system increased. Odour issues also occurred in 2006 and 2007 from septage dumping incidents when septage from decommissioned septic tanks was dumped into the system rather than being taken to authorized handling facilities. This situation was reduced through education programs for the public and local contractors.

The final remaining source of odours was determined to be from the Sun River forcemain. Due to the long retention time in the forcemain, the wastewater goes septic and causes odours at the Sooke Road Lift Station and then at the West Coast Road Lift Station as the material goes through the system. The high velocity flows from the forcemain also contribute to odours being released from the Sooke Road lift station.

Many odour control measures were started in 2006 and included installation of temporary carbon filters on the lift station vents, modifying lift station ventilation equipment, flushing water at key points throughout the system, adjusting the timing of lift station pump cycles and chemical odour control. These measures were continued in 2007, and were enhanced with the installation of a negative pressure Calgon Carbon Filter system on the ventilation system at the Sooke Road Lift Station and optimization of the chemical treatment systems. These last changes completed in late 2007 have proven effective in greatly reducing the final chronic odour issues at the Sooke Road lift station.

One of the final improvements made to the odour control treatment systems was replacing hydrogen peroxide treatment with Bioxide nitrate treatment late in 2007. A trial of the nitrate based treatment system was completed with an assessment from data collected through hydrogen sulphide monitors suspended in the Sooke Road and West Coast Road lift stations. The change to Bioxide treatment was made due to its ability to reduce odours from the Sun River forcemain at both the Sooke Road and West Coast Road Lift Stations.

Throughout the process of investigating different odour control measures, neighbours affected by the odours from the lift stations were consulted and updated on a regular basis. Issues were resolved successfully with the residents without any escalation to regulatory authorities.

COMMUNITY INVOLVEMENT

EPCOR continues to be committed to investing in communities in numerous ways. These investments include direct contributions and sponsorships, employee volunteerism, and our support as a major contributor to the United Way.

One of the ways EPCOR supports the District of Sooke is by investigating opportunities in the community that provide us with chances to connect with customers. For example, we support annual sponsorships of Canada Day celebrations, Sooke Legion Remembrance Day ceremonies, the Sooke Salmon Enhancement Society fishing derby and Christmas family skate and swim sessions at SEAPARC recreation centre.

In past years we have sponsored the Sooke Philharmonic Orchestra, the Sooke Arts Council, the District of Sooke golf tournament, the Safe Halloween event and the Sooke Volunteer Firemen. For 2007, in additional to our annual sponsorships, we chose to support the Chamber of Commerce Community Awards Gala, the Sooke Fine Arts Show, Sooke Community Arts Council's Art in the Park Event, and the Chamber of Commerce Christmas Tree Lighting

project. As well, we participated in the Sooke Rotary Fair and Auction. EPCOR partnered with the District of Sooke to sponsor the Pump Station Art project, a community art project which will see each of the four pump stations painted by Sooke artists chosen by the Sooke Public Art Committee through a public submission process.

EPCOR's Road to Excellence program recognizes EPCOR's commitment to fostering innovation, creativity, leadership and achieving excellence among youth in its communities across Canada. In 2007 the Road to Excellence program was brought to Sooke and from a field of many eligible, talented youth, awards were presented to Eden Britton for Youth Excellence in Arts and Culture and to the Edward Milne Community School Hockey Academy for Sports Excellence.

CUSTOMER SERVICE

EPCOR operates a customer service phone line to address concerns and answer question for the public. In 2007, a total of 39 calls were received (summarized below). The total number of calls is drastically reduced from the 421 calls received in 2006, due to most customers being connected to the system prior to the original December 31/06 deadline.

2007 Customer Calls	
Construction Query	2
Pump Related Query	3
Service Area Query	2
Financial Query	0
Individual Service Query	8
General Query	8
Complaint*	16
Total	39

- Construction – driveway issues, depth of connection, issues connected to original construction
- Pumps – requests for distribution info, pump specs
- Service Area – information requests re: inclusion in the SSA
- General – info on contractors, permitting, hook-ups, inspections
- Complaints – odours in system, noise from blowers at the WWTP
- Individual Service – location of connection, requests for additional connections

* Note: these were multiple calls from less than a dozen separate callers, many of them stemming from a dredging operation occurring just west of Sooke.

In addition to the customer service line, EPCOR contributed content to the District of Sooke's community newsletters for residents.

EPCOR also participated in two public information sessions in conjunction with the District of Sooke, providing information to homeowners on pumps and care of the system, and gathering information on the public's priorities for extension of the collection system into existing neighbourhoods.

MAJOR MILESTONE DATES

Description	Date	Comments
Collection system design commences	Apr 13, 2004	
Official Project Kick-off Ceremony	Apr 22, 2004	
Outfall design commences	Aug 3, 2004	
Outfall completion	Aug 1, 2005	
Plant construction completion	Nov 4, 2005	Two months ahead of schedule
WWTP began receiving & treating wastewater	Dec 2005	
WWTP Official Opening Ceremony	March 2006	
Commence residential hook-ups	Dec 15, 2006	Ongoing; first hook up two weeks ahead of schedule
Collection system construction	March 31, 2006	Completed three months ahead of schedule

APPENDICES

1. Monthly Data Summary
2. Outfall Monitoring Report - January 2007
3. Outfall Monitoring Report - May 2007
4. Outfall Monitoring Report - September 2007

JANUARY 2007 MONTHLY DATA SHEET

Jan 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limit	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	COD mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0-9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms* #/100 ml	NH_3 * mg/L
1-Jan																
2- Jan	1238	6.7	185	286	360	103	16	10	6.3	9	57	13	50	8	30	7
3- Jan	2297	7.3	124	234	318	145	17	10	6.3	6	51	8	31	7	20	6
4- Jan	1777	7.1	159	376				10	6.3	9	45					
5- Jan	1369	7.4	158	457				10	6.4	9	64					
6- Jan																
7- Jan																
8- Jan	1753	7.4	170	391				10	6.4	6	40					
9-Jan	1365	7.2	152	500	319	120	25	10	6.3	4	28	5	39	5	10	5
10-Jan	1213	7.4	314	498				9	6.6	5	27					
11-Jan	1155	7.5	236	412	395	146	33	9	6.5	5	63	4	33	5	30	8
12-Jan	1106	7.4	272	691				9	6.5	5	49					
13-Jan																
14-Jan																
15-Jan	993	7.8	154	408				9	6.6	4	49					
16-Jan	1036	7.7	351	732	561	241	34	9	6.7	4	43	8	39	6	40	15
17-Jan	904	7.6	295	554				9	6.6	6	39					
18-Jan	1197	7.4	285	627	523	241	36	9	6.5	9	46	7	61	9	30	12
19-Jan	1239	7.5	263	556				9	6.5	8	47					
20-Jan																
21-Jan																
22-Jan	1227	7.5	248	524				9	6.5	9	64					
23-Jan	1638	7.3	174	384	315	127	18	9	6.5	7	56	5	47	7	20	13
24- Jan	1475															
25- Jan	1174	7.3	228	527	439	175	30	9	6.5	6	32	5	49	6	1	15
26- Jan	1286	7.5	247	674				9	6.5	7	59					
27- Jan																
28- Jan																
29- Jan	1097	6.8	119	278	267	99	15	9	6.5	8	63	10	60	8	10	15
30- Jan	1081	7.3	188	415				9	6.5	7	63					
31- Jan	933	7.9	287	439	368	235	33	9	6.6	8	32	10	68	8	1	15
AVG	1298	7.4	219	474	387	163	26	9	6.5	7	48	8	48	7	12	11

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

FEBRUARY 2007 MONTHLY DATA SHEET

Feb 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limit	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	COD mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0-9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms* #/100 ml	NH_3 * mg/L
1-Feb	1035	7.0	360	763				9	6.6	5	64					
2- Feb	944	7.4	202	440				9	6.4	5	34					
3- Feb																
4- Feb																
5- Feb	956	7.4	625	478	457	271	42	10	6.6	8	53	5	65	7	30	19
6- Feb	1010	7.0	519	609				10	6.6	7	32					
7- Feb	940	7.6	228	769	469	221	40	10	6.7	6	72	11	61	8	20	17
8- Feb	898	7.5	224	424				10	6.6	5	48					
9- Feb	976	7.6	295	421				10	6.7	6	64					
10- Feb																
11- Feb																
12- Feb	930	7.4	156	205	355	55	32	11	6.6	7	61	5	76	6	10	19
13- Feb	1099	6.2		874				11	6.6	5	35					
14- Feb	955	7.6	160	320	355	178	37	11	6.6	6	52	11	51	8	30	17
15- Feb	945	7.6	270	327				11	6.6	7	40					
16- Feb	1189	7.4	239	244				10	6.6	8	56					
17- Feb																
18- Feb																
19- Feb	1131	7.5	347	881	646	235	34	11	6.6	7	62	18	62	9	10	14
20- Feb	1856	7.3	126	168				10	6.5	10	55					
21- Feb	1469	6.6	101	344	336	117	20	10	6.4	8	40	10	56	8	40	9
22- Feb	1649	7.2	231	415				10	6.5	7	70					
23- Feb	1243	7.1	329	457				11	6.6	12	54					
24- Feb																
25- Feb																
26- Feb	1092	7.1	186	485	371	246	27	11	6.6	5	46	6	60	9	240	15
27- Feb	1054	7.6	199	499				10	6.5	5	49					
28- Feb	1021	7.3	72	201	159	114	22	11	6.5	5	64	5	54	6	20	12
AVG	1120	7.3	256	466	394	180	32	10	6.6	7	53	9	61	8	50	15

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

MARCH 2007 MONTHLY DATA SHEET

Mar 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limit	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	COD mg/L	BOD mg/L	NH_3 mg/L	Temp ^{o} C	pH 6.0-9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Mar	1190	7.3	130	348				10	6.4	6	43					
2- Mar	1072	6.5	262	501				10	6.4	5	62					
3- Mar																
4- Mar																
5- Mar	961	7.0	434	479	490	178	1	11	6.4	5	79	6	60	4	1	0
6- Mar	1080	7.2	99	288				11	6.4	6	29					
7- Mar	995	7.2	326	583				12	6.3	6	59				6	
8- Mar	1045	7.4		714				11	6.4		55					
9-Mar	1129	7.3		264				11	6.4		76					
10-Mar																
11-Mar																
12- Mar	1150	7.3		227				11	6.3		57					
13- Mar	1338							11							27	
14- Mar	1230							11								
15- Mar	1198	7.3	139	317	310	120	23	11	6.5	3	54	2	60	4	31	7
16- Mar	1197	7.2	144					11	6.4	5						
17- Mar																
18- Mar																
19- Mar	1230	7.3	116	303				11	6.7	6	44				2	
20- Mar	1387	7.1	174	552				11	6.3	7	63					
21- Mar	1194	7.1	245	338	620	70	22	11	6.3	4	61	2	70	4	3	8
22- Mar	1316	7.1	115	344				11	6.3	4	71					
23- Mar	1463	7.4	163					11	6.3	3						
24- Mar																
25- Mar																
26- Mar	1506	7.3	94					11	6.3	3					5	
27- Mar	1475	7.4	156					11	6.3	3						
28- Mar	1198	7.2	260	602	520	173	37	11	6.3	3	39	3	40	4	18	6
29- Mar	1231	7.4	127	199				11	6.2	2	59					
30- Mar	1121	7.2	151	525				12	6.3	3	68					
31- Mar																
AVG	1214	7.2	184	412	485	123	21	11	6.4	4	57	3	58	4	6	5

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

APRIL 2007 MONTHLY DATA SHEET

Apr 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limit	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	COD mg/L	BOD mg/L	NH_3 mg/L	Temp ^oC	pH 6.0 -9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Apr																
2- Apr	1069	6.9	225	658				12	6.2	3	70					
3- Apr	986	7.1	163		280	122	21	12	6.2	2		2	40	4	6	0.7
4- Apr	1099	7.1	127	295				12	6.1	2	54					
5- Apr	1030	7.6	249	477				12	6.1	3	52					
6- Apr																
7- Apr																
8- Apr	1008							13	6.1	3						
9- Apr																
10- Apr	1008	7.6	226	472	240	162	34	13	6.1	5		2	40	4	5	0.4
11- Apr	1059	7.2	145	452				13	6.2	5	48					
12- Apr	1007	7.3	189		380	147	31	13	6.2	5		4	60	4	1	0.2
13- Apr	940	7.0	128	172				13	6.1	5	43					
14- Apr																
15- Apr																
16- Apr	1019	7.5	211	409	440	137	35	13	6.2	5	51	4	80	4	14	0.4
17- Apr	1096	7.1	264	541				13	6.2	6	58					
18- Apr	1027	7.6	235	587		212	36	13	6.3	5	36	6		4	17	0.1
19- Apr	931	6.8	166					13	6.4	8						
20- Apr	1060	7.5	221					13	6.2	4						
21- Apr																
22- Apr																
23- Apr		7.1	200	367				13	6.3	7	49					
24- Apr	1011	7.4	362	376		184	32	13	6.3	3	68	2		4	1	0.5
25- Apr	946	7.6	120	349				14	6.5	4	39					
26- Apr	1014	7.2	204	463				14	6.2	5	60					
27- Apr	893	7.2	252	734				14	6.0	6	71					
28- Apr																
29- Apr																
30- Apr	1119	7.3	98	291				13	6.1	7	38					
AVG	1017	7.3	199	443	335	156	31	13	6.2	5	53	4	55	4	4	0.4

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

MAY 2007 MONTHLY DATA SHEET

May 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limit	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^{o} C	pH 6.0-9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-May	1073	6.8	224	402	192	106	19	14	6.2	13	39	12		4	2	0.2
2- May	1072	7.4	230	542				14	6.2	20	84					
3- May	401	7.3	269	696				13	6.6	31	108					
4- May	824	7.2	166	470				13	6.6	19	50					
5- May																
6- May																
7- May	973	7.0	201	545				14	6.5	15	83					
8- May	1007	7.4	124	287	107	108	25	14	6.3	18	46	12		13	1220	0.1
9-May	881		162	364				14		17	90					
10-May	963	7.8	334	644	358	219	38	14	6.4	16	79	6		12	2000	6.9
11-May	578	7.1	106	182				14	6.4	17	73					
12- May																
13- May																
14- May	959	7.0	131	433				14	6.2	12	85				5	
15- May	942	7.4	258	557	202	200	34	15	6.3	14	75	8		6	12	1.9
16- May	1030	7.2	131	303				15	6.3	20	84				10	
17- May	755	7.5	205	550	162	160	36	15	6.2	18	57	5		6		0.1
18- May	878	7.1	134	376				15	6.2	13	80					
19- May																
20- May	865	7.0	154	403				16	6.2	11	69					
21- May																
22- May	882	7.3	105	370	126	121	41	15	6.3	8		8		10	10	0.0
23- May	880	7.4	229	625				15	6.1	6	53					
24- May	1004	7.6	268	469	244	202	37	15	6.2	4	57	2		4	1	0.0
25- May	1074	7.3	184	488				15	6.2	1	51					
26- May																
27- May																
28- May		7.4	273	288				16	6.1	3	48					
29- May	711	6.9	152	247	128	102	30	16	5.9	2	32	4		4	1	0.1
30- May	910	7.1	122	450				16	5.9	3	71					
31- May	896	7.2	232	442				16	6.1	2	66					
AVG	889	7.2	191	441	190	152	33	15	6.3	12	68	7		7	15	1.2

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

JUNE 2007 MONTHLY DATA SHEET

Jun 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limit	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^{o} C	pH 6.0-9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Jun	1073	7.1	158	365				16	6.2	3	50					
2- Jun																
3- Jun																
4- Jun	926	7.5	266	627				17	6.4	5	101					
5- Jun	910	7.4	200	579	184	195	34	17	6.5	5	92	2		4	8	0.2
6- Jun	591	7.3	242	309				17	6.4	5	66					
7- Jun	1034	7.3	208	595	160	250	36	16	6.3	5	58	2		4	10	0.1
8- Jun	919	7.4	191	583				17	6.4	7	86					
9- Jun																
10- Jun																
11- Jun	1047	7.6	193	392				17	6.4	26	104					
12- Jun	543	7.3	246	572	210	198	31	17	6.4	43	122	34		7	27	0.2
13- Jun	748	7.2	243	455					6.2	35	103					
14- Jun	745	7.4	303	441	262	309	35		6.1	39	76	42		4	680	0.1
15- Jun	831	7.6	160	376				17	6.1	56	105					
16- Jun								17		11						
17- Jun																
18- Jun	888	7.5	291	515				17	6.4	4	52					
19- Jun	922	7.2	286	392	256	240	31	17	6.2	1	41	2		4	64	0.4
20- Jun	886	7.6	213	337				17	6.4	1	12					
21- Jun	792	7.6	233	492	242	192	40	17	6.5	1	45	2		4	2	0.3
22- Jun	923	7.6	243	494				17	6.2	1	48					
23- Jun																
24- Jun																
25- Jun	836	7.2	230	314	176	182	0	17	6.3	1	70	2		4	7	0.2
26- Jun	1009	7.5	281	285				17	6.4	3	42					
27- Jun	724	7.3	250	463	245	260	0	18	6.3	2	37	2		4	17	0.2
28- Jun	879	7.4	251	335				18	6.2	3	48					
29- Jun	1074	7.1	130	265				18	6.3	4	58					
30- Jun																
AVG	871	7.4	229	437	217	228	26	17	6.3	12	67	11		4	20	0.2

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

JULY 2007 MONTHLY DATA SHEET

July 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^{o} C	pH 6.0-9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-July																
2- July	948							20								
3- July	1011	7.1	209	361	142	212	35	20	6.3	21	94	10		10	194	0.1
4- July	867	7.0	258	406	192	196	36	20	6.3	25	104	4		7	94	0.2
5- July	817	7.2	252	257				20	6.3	29	92					
6- July	988	7.4	140	432				20	6.3	28	91					
7- July																
8- July																
9- July	1016	7.3	278	384	210	304	44	19	6.7	19	108	22		31	400	17.2
10- July	1015	7.3	353	795				19	6.6	15	102					
11- July	609	7.5	339	542	252	264	47	20	6.5	14	110	8		6	35	0.1
12- July	907	7.5	315	210				19	6.3	6	62					
13- July	1160	7.5	346	529				19	6.2	6	76					
14- July																
15- July																
16- July	903	7.7	268	393	168	202	40	19				11		4	380	0.1
17- July	752	7.2	192	284				20								
18- July	904	7.6	264	287	216	206	40	20	6.4	32	113	25		7	2000	3.0
19- July	1132	6.8	145	283				20								
20- July	939	7.1	142	250				21	6.3	18	59					
21- July																
22- July																
23- July	1124	7.5	296	294	250	212	40	19	6.2	18	102	13		10	60	0.2
24- July	1029	7.2	185	187				19	6.2	11	67				102	
25- July	1053	7.3	157	264	140	128	37	19	6.2	13	83	10		7	630	0.2
26- July	984	7.7	240	409				19	6.4	11	88					
27- July	957	7.2	211	482				19	6.3	10	67					
28- July																
29- July																
30- July	927	7.2	195	476	142	157	34	19	6.4	6	42	4		4	27	0.1
31- July	619	7.7	351	374				19	6.6	5	47				66	
MIN	609	6.8	140	187	140	128	34	19	6.2	5	42	4		4	27	0.1
MAX	1160	7.7	353	795	252	304	47	21	6.7	32	113	25		31	2000	17.2
AVG	939	7.3	245	376	190	209	39	19	6.4	16	84	12		10	156	2.4

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

AUGUST 2007 MONTHLY DATA SHEET

August 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0–9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Aug	1182	7.3	189	462	202	506	45	20	6.3	4	53	6		13	7	0.3
2- Aug	1036	7.1	222	527												
3- Aug																
4- Aug																
5- Aug																
6- Aug								20	6.4	10	46					
7- Aug	892	7.2	234	286	208	139	39	20	6.4	5	41	10		4	52	0.1
8- Aug	1100	7.0	229	362	234	123	32	20	6.4	3	37	5		4	62	0.0
9- Aug	938	7.1	297	505						1	32					
10- Aug	836		234	469												
11- Aug																
12- Aug								19	6.4	9	62					
13- Aug	905	7.5	287	439	250	164	48	19	6.2	12	67	10		9	210	0.2
14- Aug	1129	7.2	192	353				20	6.5	10	70					
15- Aug	1046	7.1	237	319	232	218	37	20	6.3	10	46	12		7	104	0.2
16- Aug	905	7.4	178	413					6.2	15	68					
17- Aug	1078	7.4	340	382												
18- Aug																
19- Aug								19	6.4	20	63					
20- Aug	954	7.4	193	403	169	158	50	20	6.4	17	78	22		9	1220	0.2
21- Aug	1071	7.3	144	421				19	6.4	23	65					
22- Aug	1249	7.1	341	415	310	283	45	20	6.4	28	70	24		18	1560	0.3
23- Aug	865	7.5	518	326												
24- Aug	1121	7.3	270	391												
25- Aug																
26- Aug		7.3	116													
27- Aug	1007	7.4	370	515	318	197	51	21	6.3	7	50	13		16	8000	0.2
28- Aug	797	7.4	285	305				20	6.2	14	67					
29- Aug	1275	7.1	185	401				20	6.3	15	40					
30- Aug	827	7.1	124	313				19	6.3	16	71					
31- Aug	940	7.4	186	350				19	6.2	1	32				6700	
MIN	797	7.0	116	286	169	123	32	21	6.5	28	78	5		4	7	0.0
MAX	1275	7.5	518	527	318	506	51	20	6.3	12	57	24		18	8000	0.3
AVG	1011	7.3	247	400	240	224	43	19	6.4	16	84	13		10	333	0.2

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

SEPTEMBER 2007 MONTHLY DATA SHEET

Sept 07		Influent						Effluent								
		In-house			External			In-house				External				
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0–9.0	TSS mg/L	COD mg/L	TSS 45 mg/L	COD mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Sept	1244	7.5	306	528												
2- Sept																
3- Sept																
4- Sept	990	7.2	164	335				19	6.5	7	45				154	
5- Sept	951	7.5	210	224	172	175	38	19	6.4	7	50	6		4	450	0.1
6- Sept	1051	7.1	395	273				20	6.5	5	47					
7- Sept	1282	7.1	193	301				19	6.3	4	54					
8- Sept																
9- Sept																
10- Sept	1067	7.4	268	300				19	6.4	3	66				26	
11- Sept	1059	7.9	299	555				20	6.4	1	41				10	
12- Sept	1058		320					20		1						
13- Sept	1265	7.8	399	371				20	6.6	1	60					
14- Sept	1194	7.3	248	183				20	6.4	1	35				10	
15- Sept																
16- Sept																
17- Sept	1014	7.3	202	156	108			19	6.3	3	49	2		4	7	
18- Sept	1239	7.6	207	461				19	6.4	2	45					
19- Sept	1092	8.1	346	404				19	6.4	2	66				4	
20- Sept	1081	7.5	190	215				19	6.3	3	50					
21- Sept	1283	7.6	296	346				19	6.4	2	40					
22- Sept																
23- Sept																
24- Sept	1052	7.2	160	318				19	6.4	4	42				13	
25- Sept	1133	7.5	289	518				19	6.4	4	54				118	
26- Sept	947	7.5	160	365				19	6.3	6	46					
27- Sept	966	7.5	272					19	6.3	6						
28- Sept	991	7.8	199	349				19	6.4	3	40					
29- Sept																
30- Sept																
MIN	947	7.1	160	156	108	175	38	19	6.3	1	35	2		4	4	0.1
MAX	1283	8.1	399	555	172	175	38	20	6.6	7	66	6		4	450	0.1
AVG	1098	7.5	256	345	140	175	38	19	6.4	3	49	4		4	27	0.1

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

OCTOBER 2007 MONTHLY DATA SHEET

Oct 07		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^oC	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Oct	1073	7.5	338	390	53				18	6.3	11	72	1			4960	
2- Oct	1147	7.5	179	284					18	6.5	7	67					
3- Oct	1180	7.7	228	267		40	146	40	18	6.4	8	81		3	8	11000	0.4
4- Oct	1155	7.7	219	398	48				18	6.5	4	76	1				
5- Oct	1173	7.3	212	234					17	6.4	3	40					
6- Oct																	
7- Oct																	
8- Oct																	
9- Oct	1110	7.6	252	350					17	6.7	2	60					
10- Oct	1142	7.3	359			264	231	45	17	6.5	2			2	4	104	0.3
11- Oct	1026	7.8	248	238					17	6.5	1	51				320	
12- Oct	1048	7.8	277	315					17	6.4	1	52					
13- Oct																	
14- Oct																	
15- Oct	1064	7.4	263	454					17	6.4	2	46					
16- Oct	1101	7.4	233	331	50				17	6.6	3	60	2			20	
17- Oct	1045	7.4	177	167	49				17	6.5	3	71	1			10	
18- Oct	1092	7.4	250	218					17	6.5	6	42				25	
19- Oct	1205	7.4	222	192					16	6.3	5	66				11	
20- Oct																	
21- Oct																	
22- Oct	1410	7.4	245	517						6.4	7	51					
23- Oct	1525	6.7	131	244						6.4	3	59					
24- Oct	1428	7.6	226	329	50				16	6.3	6	67	2			4	
25- Oct	1418	7.5	249	161					16	6.4	9	61				21	
26- Oct	1375	7.6	291	278					16	6.3	5	46					
27- Oct																	
28- Oct																	
29- Oct	1206	7.6	291	355	50				16	6.3	6	45	0			6	
30- Oct	1185	7.4	369	275	46				16	6.4	6	64	2				
31- Oct	1240	7.5	232	254	43				16	6.3	8	69	1				
MIN	1026	6.7	131	161	43	40	146	40	16	6.3	1	40	0	2	4	4	0.3
MAX	1525	7.8	369	517	53	264	231	45	18	6.7	11	81	2	3	8	11000	0.4
AVG	1198	7.5	250	298	49	152	189	43	17	6.4	5	59	1	3	6	62	0.4

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

NOVEMBER 2007 MONTHLY DATA SHEET

Nov 07		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^oC	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Nov	1123	7.6	259	340		238	179	0.4	16	6.2	10	44		10	4	15	0.2
2- Nov	1104	7.7	270	288					16	6.5	11	51					
3- Nov																	
4- Nov																	
5- Nov	1161	7.6	263	333					16	6.5	15	75				670	
6- Nov	1209	7.6	310	417	44				16	6.4	18	80	1				
7- Nov	1114	7.6	305	546					16	6.3	18	64				60	
8- Nov	826	7.5	262	258	47				14	6.5	9	72	10				
9- Nov	1060	7.7	268	297	48				14	6.5	16	75	5				
10- Nov																	
11- Nov																	
12- Nov	1354	7.4	158	498					16	6.6	5	72					
13- Nov	1630	7.5	193	430					16		4	45				27	
14- Nov	1542								16	6.3	2	67				20	
15- Nov	1328	7.3	152	339					16	6.3	3	31					
16- Nov	1346	7.6	361	403					15	6.3	4	24					
17- Nov																	
18- Nov																	
19- Nov	2290	7.6		384					14	6.3	4	43					
20- Nov	1148	7.7	267	418					14	6.4	4	49				15	
21- Nov	1179	7.7	201	203	51					6.6	7	56	10				
22- Nov	1189	7.7	234	341	39	190	180	31	13	6.6	6	56	10	5	6	154	10
23- Nov	1331	7.9	222	418					13	6.6	5	55					
24- Nov																	
25- Nov																	
26- Nov	1238	7.8	286	296					13	6.6	9	68					
27- Nov	1313	7.3	256	300	37				13	6.5	5	37	11				
28- Nov	1280	7.6	215	228					13	6.4	4	68					
29- Nov	1221	7.4	263	308	38				13	6.4	6	55	7				
30- Nov	1134	7.5	162	228					13	6.5	5	50					
MIN	826	7.3	152	203	37	190	179	0.4	13	6.2	2	24	1	5	4	15	0.2
MAX	2290	7.9	361	546	51	238	180	31	16	6.6	18	80	11	10	6	670	10
AVG	1278	7.6	245	346	43	214	180	16	15	6.4	8	56	8	8	5	50	5

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

DECEMBER 2007 MONTHLY DATA SHEET

Dec 07		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^oC	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Dec																	
2- Dec																	
3- Dec	1711	7.3	219	92					11	6.4	8						
4- Dec	2650	7.5	115	298		117	73	18	11	6.4	5	41		5	4	55	0.7
5- Dec	1937	7.5	135	213	26				12	6.3	5	21	1			27	
6- Dec	1657	7.4	168	273	30				12	6.2	7	27	2				
7- Dec	1449	7.7	178	215					12	6.4	8	58					
8- Dec																	
9- Dec																	
10- Dec	1429	7.4	240	331	41				12	6.4	5	77	8			240	
11- Dec	1300	7.7	253	326		338	204	37	12	6.5	10	70		6	7	280	0.8
12- Dec	1242	7.6	209	387	46				12	6.5	10	86	10				
13- Dec	1220	7.5	242	466					12	6.4	11	84					
14- Dec	1313	7.5	260	472					12	6.3	13	81					
15- Dec																	
16- Dec																	
17- Dec	1490	7.4	257	339	37				12	6.5	10	82	5			52	
18- Dec	1673	7.3	323	345	39				12	6.3	15	70	4			350	
19- Dec	1522	7.3	214	305					12	6.4	13	79					
20- Dec	1637	7.4	177	216	33				12	6.3	12	70	4				
21- Dec	1668	7.5	263	398					11	6.3	9	53					
22- Dec																	
23- Dec																	
24- Dec	1738	7.4	147	366					11	6.4	12	94					
25- Dec																	
26- Dec																	
27- Dec	1789	7.2	97	256	22				11	6.3	11	98	4				
28- Dec	1764	7.3	109	260					11	6.4	13	67					
29- Dec																	
30- Dec																	
31- Dec	1934	6.6	310	314					10	6.6	6	88					
MIN	1220	6.6	97	92	22	117	73	18	10	6.2	5	21	1	5	4	27	0.7
MAX	2650	7.7	323	472	46	338	204	37	12	6.6	15	98	10	6	7	350	0.8
AVG	1622	7.4	200	309	34	228	139	28	11	6.4	10	69	5	6	6	110	0.8

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

Wastewater Treatment Plant Receiving Waters Monitoring in Sooke Bay

January 2007

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Introduction

Sooke Bay is located approximately 35 km east of Victoria on the southwest coast of Vancouver Island, British Columbia (Figure 1). Epcor Water Services was contracted to construct a new wastewater treatment facility and outfall infrastructure to accommodate present and future population growth in the municipality of Sooke. This newly constructed system began operation in December 2005. To comply with the regulations outlined by the Ministry of Environment; discharge of effluent must be monitored to ensure that the guidelines outlined in the Municipal Sewage Regulation are adhered to.

Pacificus Biological Services was contracted to perform a marine environmental water sampling survey on January 16, 2007. The objectives of this survey were to measure the following within the receiving waters environment:

Parameter
Biological Oxygen Demand
Total Suspended Solids
pH
Ammonia
Conductivity
Dissolved Oxygen
Salinity
Temperature
Fecal Coliforms

Figure 1: General Location of sample sites, Sooke Bay, British Columbia

Methodology

Four sampling points had been determined for the pre-discharge monitoring program by Epcor and provincial ministry staff including (figure 2):

1. One at the outfall location;
2. One at 100m initial dilution zone to north of the outfall diffuser, as required by the Ministry of Sustainable Resource Management;
3. One at 1 00m initial dilution zone to the south of the outfall diffuser, as required by the Ministry of Sustainable Resource Management;
4. One at 300m point toward the shore away from the outfall diffuser, as required by Environment Canada;

Figure 2: Sooke Bay receiving water-sampling locations (approximate).

The acquisition of samples at each sample location was at 2m (to avoid any freshwater floating on the surface) and at 12m (the pycnocline) where a plume would be likely to trap.

A pycnocline is a layer of rapid change in water density with depth. In oceans, changes in water density are mainly caused by changes in water temperature and salinity. A study completed by Komex Environmental and Water Resource Engineering Ltd. states: "The profile data indicate that the water column in Sooke Bay is generally well-mixed (unstratified) throughout the year". At the time of sampling, the water column in Sooke Bay was not stratified, however samples were taken at 12m depth to ensure consistency with respect to sample design.

A Pacificus biologist navigated to the sample sites using a handheld Garmin GPS (with pre-recorded sample site waypoints) and gathered water samples at the appropriate depths using an economy water sampler. Dissolved Oxygen, conductivity, salinity, pH and temperature readings were taken and recorded in the field. A YSI Model 85 handheld multi parameter testing system was used to measure oxygen, conductivity, salinity and temperature.

BOD, TSS, Ammonia and Fecal coliform parameters were stored in sample jars and analyzed by Cantest Laboratories (within 4 hours).

Test Methods

Ammonia in Water

Analysis was performed based on Standard Methods for the Examination of Water and Wastewater, 19th Ed. (1995); Method 4500-NH3.

Conventional Parameters

Analyses performed at Cantest's Victoria facility follow procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual" and "Standard Methods for the Examination of Water and Wastewater".

Microbiological Parameters

Analyses were performed using procedures based on those described in "B.C. Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials (2003 Edition) and "Standard Methods for the Examination of Water and Wastewater", 20th Edition (1998). Analysis was performed at CANTEST Ltd. Victoria Laboratory.

The detection limits for BOD, Fecal Coliforms and TSS are as follows:

BOD	5 mg/L
Ammonia	0.002 mg/L
Fecal Coliforms	2 MPN/100mL
Total Suspended Solids	5 mg/L

Please contact CANTEST Ltd (1-800-865-8566) if you require more information with respect to sampling methodologies and procedures.

Results

Specific results for each of the sites are listed in Table 1. The receiving waters surrounding the Sooke outfall contained acceptable levels of ammonia, BOD, fecal coliform, pH and total suspended solids. Photo 1 represents, in general, the areas designated for sites 1 through 4.

Photo 1: General location of sites 1 through 4

Table 1: Epcor wastewater treatment plant outfall receiving waters sampling results January 16, 2007.

Sample No	Depth (m)	pH	Cond ($_{u}$S/cm)	D.Oxygen %	Salinity (ppt)	Temperature $_{o}$C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
	2	8.3	46.7	75.9	30	7.2	1	<5.0	<1	0.01
	12	7.9	31.4	75.6	30.4	7.3	2	<5.0	4	0.02 <.01
# 1 Outfall										
	2	8	31.52	75.8	30.9	7.1	<1	<5.0	4	<.01
	12	8	31.61	75.6	30.7	7.3	1	<5.0	5	<.01
# 2 100m north of outfall										
	2	8	31.56	78.1	30.8	7.1	<1	<5.0	3	<.01
	12	8	31.59	79.2	30.7	7.3	1	<5.0	3	<.01
# 3 100m south of outfall										
	2	8	31.62	76.9	30.3	7.2	2	<5.0	2	0.01
	12	7.9	31.58	79.3	30.4	7.4	2	<5.0	2	<.01
# 4 300m south of outfall										

Conclusion

The January 2007 environmental monitoring of the Sooke outfall receiving waters is complete. Fecal Coliform concentrations have drastically declined as compared to the September 2006 analysis. Additional monitoring will be required in 6 months time as per government regulations to ensure the plant is operating properly and the oceanic environment is not being negatively impacted.

Reference:

Komex International Ltd. 2005. *Dilution Modelling Report District of Sooke Treated Wastewater Outfall (9).*

Wastewater Treatment Plant Receiving Waters Monitoring in Sooke Bay

May 2007

Prepared for:

Tami Wetmore
Operations Manager
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V0S 1N0

Prepared by:

PACIFICUS
Biological Services Ltd

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Introduction

Sooke Bay is located approximately 35 km east of Victoria on the southwest coast of Vancouver Island, British Columbia (Figure 1). Epcor Water Services was contracted to construct a new wastewater treatment facility and outfall infrastructure to accommodate present and future population growth in the municipality of Sooke. This newly constructed system began operation in December 2005. To comply with the regulations outlined by the Ministry of Environment; discharge of effluent must be monitored to ensure that the guidelines outlined in the Municipal Sewage Regulation are adhered to.

Pacificus Biological Services was contracted to perform a marine environmental water sampling survey on May 10, 2007. The objectives of this survey were to measure the following within the receiving waters environment:

Parameter
Biological Oxygen Demand
Total Suspended Solids
pH
Ammonia
Conductivity
Dissolved Oxygen
Salinity
Temperature
Fecal Coliforms

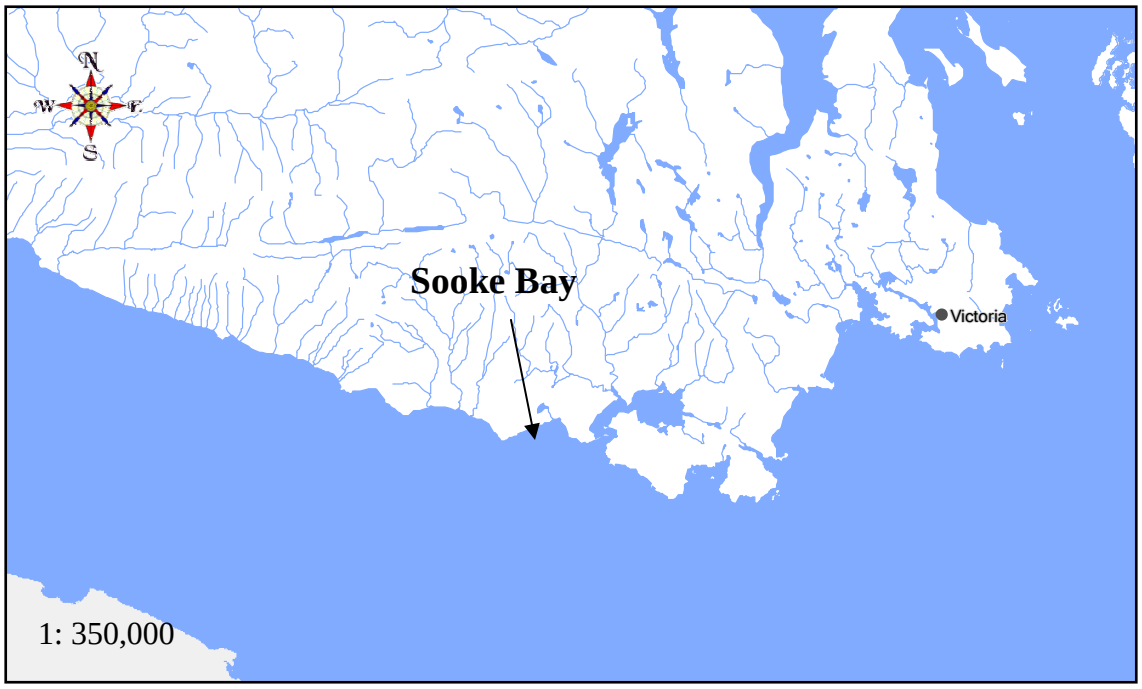

Figure 1: General Location of sample sites, Sooke Bay, British Columbia

Methodology

Four sampling points had been determined for the pre-discharge monitoring program by Epcor and provincial ministry staff including (figure 2):

1. One at the outfall location;
2. One at 100m initial dilution zone to north of the outfall diffuser, as required by the Ministry of Sustainable Resource Management;
3. One at 100m initial dilution zone to the south of the outfall diffuser, as required by the Ministry of Sustainable Resource Management;
4. One at 300m point toward the shore away from the outfall diffuser, as required by Environment Canada;

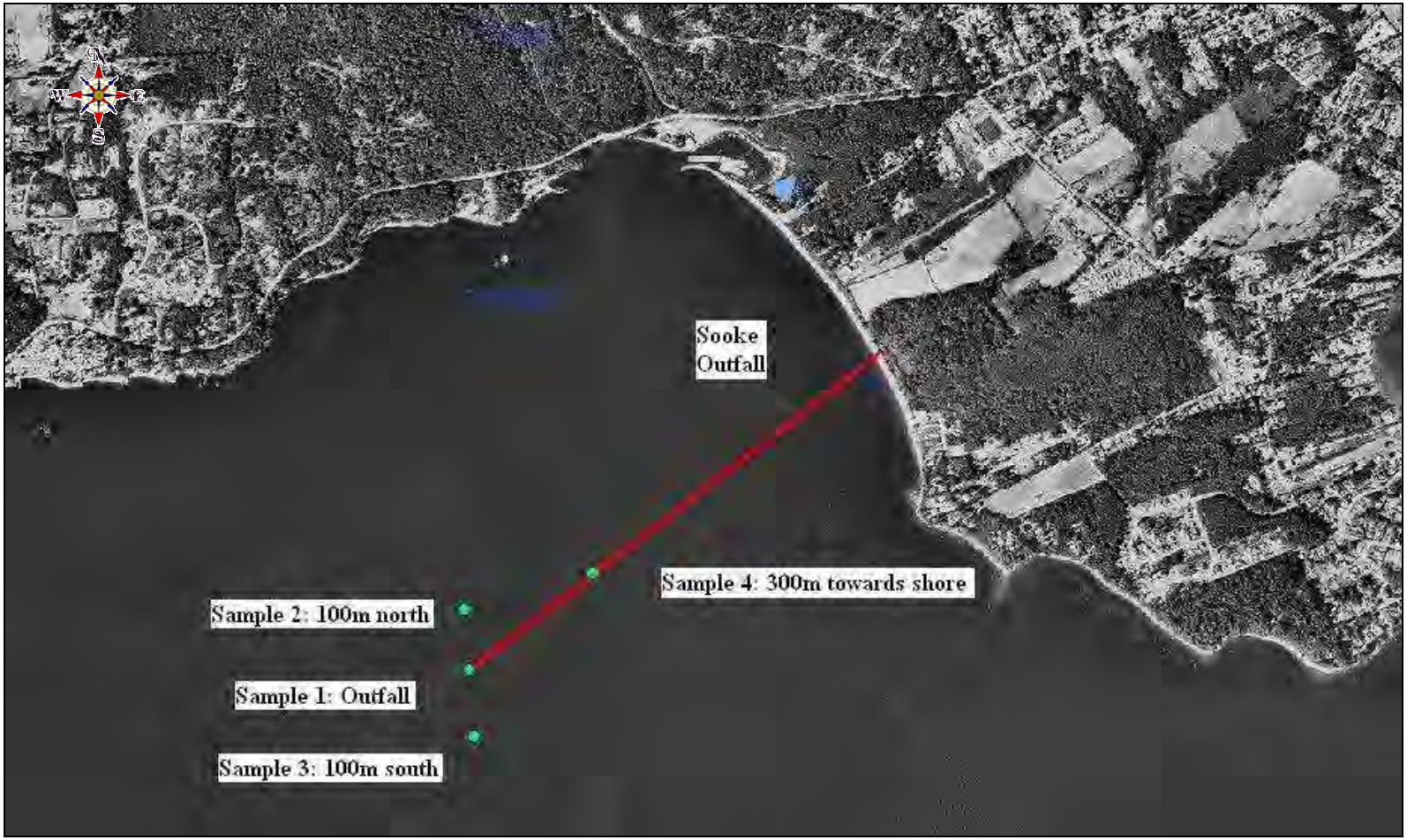

Figure 2: Sooke Bay receiving water-sampling locations (approximate).

The sample design calls for the acquisition of samples at each sample location to be at 2m (to avoid any freshwater floating on the surface) and at the pycnocline where a plume would be likely to trap.

A pycnocline is a layer of rapid change in water density with depth. In oceans, changes in water density are mainly caused by changes in water temperature and salinity. A study completed by Komex Environmental and Water Resource Engineering Ltd. states: "The profile data indicate that the water column in Sooke Bay is generally well-mixed (unstratified) throughout the year". At the time of sampling, the water column in Sooke Bay was not stratified, thus only surface samples were gathered.

A Pacificus biologist navigated to the sample sites using a handheld Garmin GPS (with pre-recorded sample site waypoints) and gathered water samples at the appropriate depths using an economy water sampler. Dissolved Oxygen, conductivity, salinity, pH and temperature readings were taken and recorded in the field. A YSI Model 85 handheld multi parameter testing system was used to measure oxygen, conductivity, salinity and temperature.

BOD, TSS, Ammonia and Fecal coliform parameters were stored in sample jars and analyzed by North Island Laboratories (within 4 hours).

Test Methods

Fecal coliform concentrations were measured using: Standard Methods for the Examination of Seawater and Shellfish. This methodology is used and recommended by Environment Canada. Selected volumes of sample were incubated based on a 5:5:5 MPN table in specific media for 24 hours and examined for gas.

BOD concentrations were measured using: Standard Methods for the Examination of Water and Wastewater :method 5210. A bottle was filled with specific sample dilutions and incubated at a specific temperature for 5 days. The BOD was computed from the difference between the initial dissolved oxygen and the final dissolved oxygen.

TSS concentrations were measured using: Standard Methods for the Examination of Water and Wastewater :method 2540. A well-mixed sample was filtered and dried to

constant weight. The increase in weight of the filter represented the total suspended solids.

The detection limits for BOD, Fecal Coliforms and TSS are as follows:

BOD	5 mg/L
Ammonia	0.002 mg/L
Fecal Coliforms	2 MPN/100mL
Total Suspended Solids	5 mg/L

Please contact North Island Laboratories Ltd (250-338-7786) if you require more information with respect to sampling methodologies and procedures.

Results

Specific results for each of the sites are listed in Table 1. The receiving waters surrounding the Sooke outfall contained acceptable levels of ammonia, BOD, fecal coliform, and total suspended solids. Photo 1 represents, in general, the areas designated for sites 1 through 4.

Photo 1: General location of sites 1 through 4

Table 1: Epcor wastewater treatment plant outfall receiving waters sampling results May 10, 2007.

Sample No	Depth (m)	pH	Cond ($_{u}$S/cm)	D.Oxygen %	Salinity (ppt)	Temperature ^{o}C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
# 1 Outfall	2	8.3	33.84	80.9	31.5	9	<2	<5.0	18	0.01
# 2 100m north of outfall	2	8	33.63	77.3	31.5	8.9	<2	<5.0	11	0.05
# 3 100m south of outfall	2	7.9	33.82	80.9	31.5	9	<2	<5.0	13	0.01
# 4 300m south of outfall	2	8	33.8	83.6	31.6	9	<2	<5.0	24	0.01

Conclusion

The May 2007 environmental monitoring of the Sooke outfall receiving waters is complete. All analyzed parameters are within acceptable ranges. Additional monitoring will be required in 6 months time as per government regulations to ensure the plant is operating properly and the oceanic environment is not being negatively impacted.

Reference:

Komex International Ltd. 2005. *Dilution Modelling Report District of Sooke Treated Wastewater Outfall (9).*

Wastewater Treatment Plant Receiving Waters Monitoring in Sooke Bay

September 2007

Prepared for:

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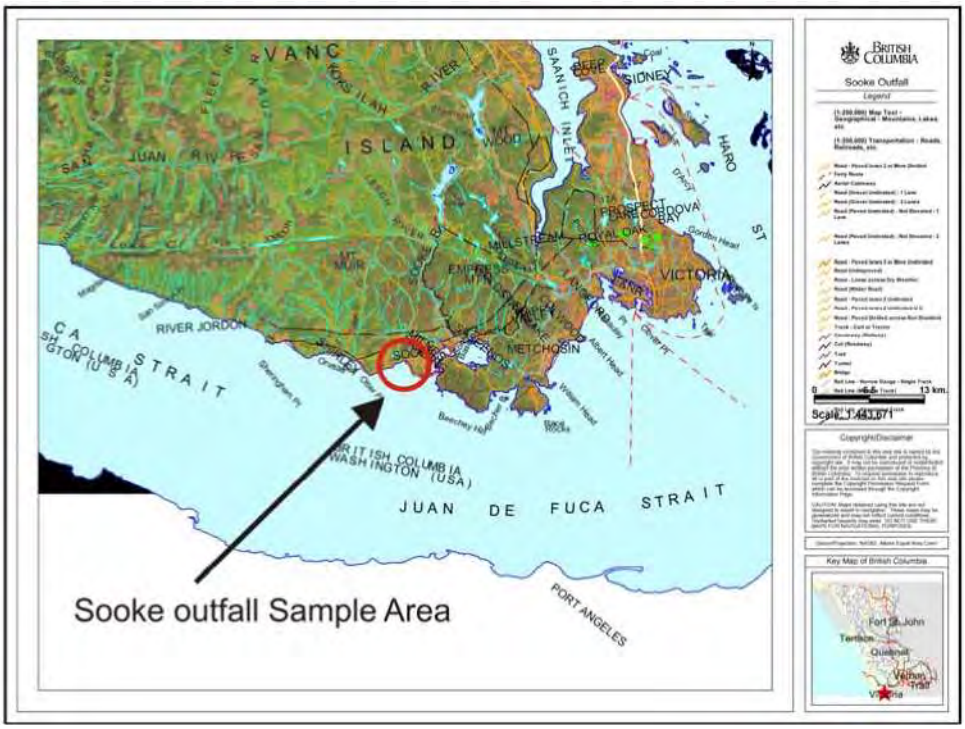
Pacificus Biological Services was contracted to perform a marine environmental water sampling survey on September 29, 2007. The objectives of this survey were to measure the following within the receiving waters environment:

Parameter
Biological Oxygen Demand
Total Suspended Solids
pH
Ammonia
Conductivity
Dissolved Oxygen
Salinity
Temperature
Fecal Coliforms



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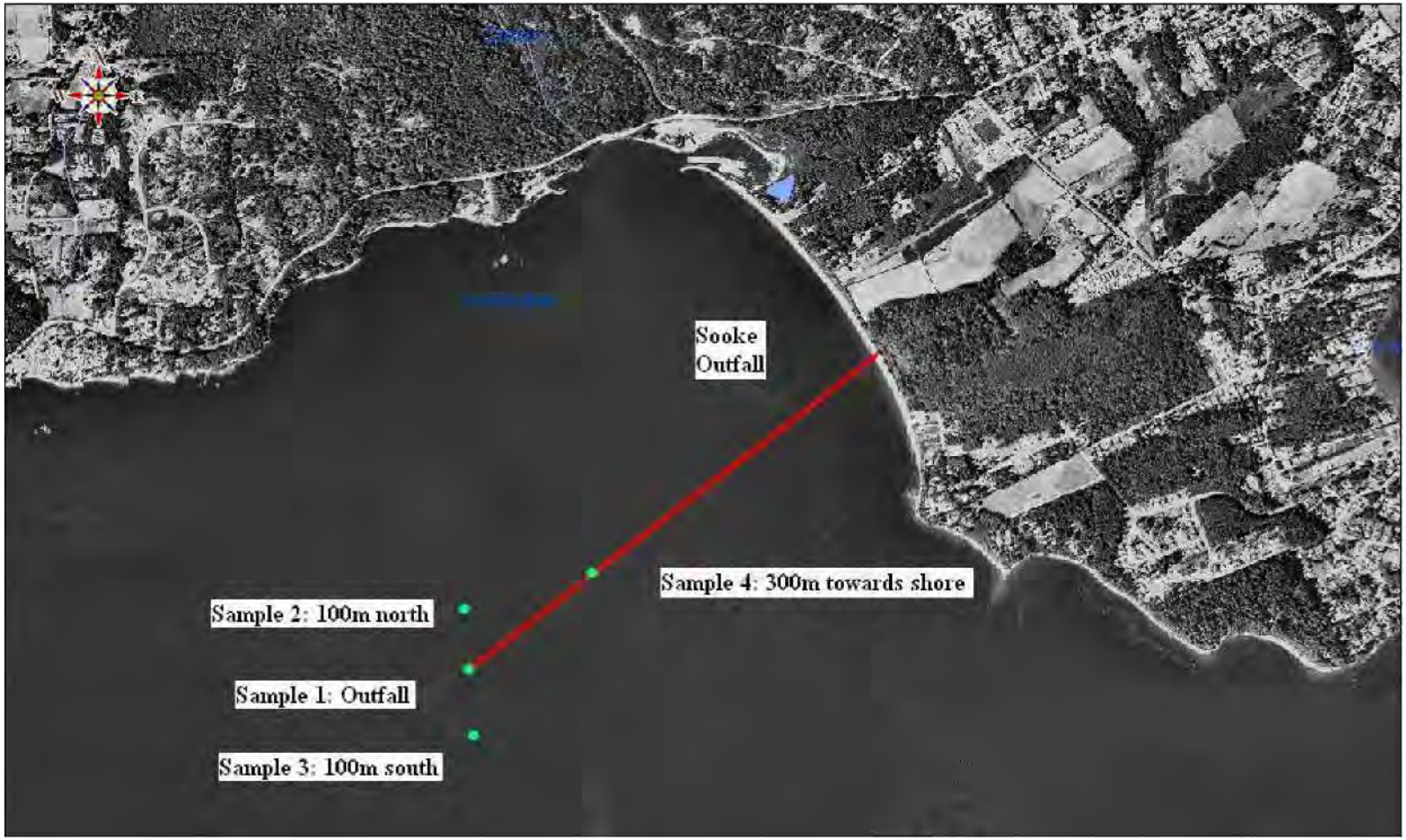

Figure 2: Sooke Bay receiving water-sampling locations (approximate).

The sample design calls for the acquisition of samples at each sample location to be at 2m (to avoid any freshwater floating on the surface) and at the pycnocline where a plume would be likely to trap.

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BOD, TSS, Ammonia and Fecal coliform parameters were stored in sample jars and analyzed by North Island Laboratories (within 4 hours). Sampling completed for the Receiving Waters Monitoring in Sooke Bay is in accordance to methodologies specified by the latest version of the" BC field Sampling Manual for continuous Monitoring plus the collection of Air, Air-Emission, Water, Wastewater, Soil, Sediments and Biological Samples".

Test Methods

Ammonia in Water

Analysis was performed based on Standard Methods for the Examination of Water and Wastewater, 19th Ed. (1995); Method 4500-NH3.

Conventional Parameters

Analyses performed at Cantest’s Victoria facility follow procedures based on those described in the most current editions of “British Columbia Environmental

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aboratory Manual" and "Standard Methods for the Examination of Water and Wastewater".

Microbiological Parameters

Analyses were performed using procedures based on those described in "B.C. Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials (2003 Edition) and "Standard Methods for the Examination of Water and Wastewater", 20th Edition (1998). Analysis was performed at CANTEST Ltd. Victoria Laboratory.

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Ammonia	0.002 mg/L
Fecal Coliforms	2 MPN/100mL
Total Suspended Solids	5 mg/L

Please contact CANTEST Ltd (1-800-865-8566) if you require more information with respect to sampling methodologies and procedures

All testing completed for the Receiving Waters Monitoring in Sooke Bay were carried out using methodologies specified by the latest version of the" BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediments, Biological Materials and Discrete Ambient Air Samples".

Results

Specific results for each of the sites are listed in Table 1. The receiving waters surrounding the Sooke outfall contained acceptable levels of ammonia, BOD, fecal coliform, and total suspended solids. Photo 1 represents, in general, the areas designated for sites 1 through 4.

Photo 1: General location of sites 1 through 4

Table 1: Epcor wastewater treatment plant outfall receiving waters sampling results September 29, 2007.

Sample No	Depth (m)	pH	Cond ($_{m}$S/cm)	D.Oxygen %	Salinity (ppt)	Temperature $_{o}$C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
# 1 Outfall	2	7.9	34.24	52.6	32.1	8.8	<1	<5.0	8	0.04
# 2 100m north of outfall	2	7.6	35.01	52.8	31.8	8.7	<1	<5.0	8	0.05
# 3 100m south of outfall	2	7.8	34.36	52.7	32.0	8.8	<1	<5.0	9	0.04
# 4 300m south of outfall	2	7.6	33.69	52.8	31.9	8.7	2	<5.0	8	0.04

Conclusion

The September 2007 environmental monitoring of the Sooke outfall receiving waters is complete. All analyzed parameters are within acceptable ranges. Additional monitoring will be required in 6 months time as per government regulations to ensure the plant is operating properly and the oceanic environment is not being negatively impacted.

Reference:

Komex International Ltd. 2005. *Dilution Modelling Report District of Sooke Treated Wastewater Outfall (9).*