DISTRICT OF SOOKE
WASTEWATER TREATMENT
AND COLLECTION SYSTEM

OPERATED BY
EPCOR WATER SERVICES INC.

2013 ANNUAL REPORT
REGISTRATION 17300

Table of Contents

INTRODUCTION

The Sooke wastewater collection and treatment system is owned by the District of Sooke and operated by EPCOR Water Services Inc. (EPCOR). The system services the core area of Sooke.

The system consists of:

- 51 km of collection system piping
- 515 manholes
- 7 pump lift stations (Sooke Road, West Coast Road, Helgesen Road, Sunriver, Prestige Hotel, Mariner's Village and Treatment Plant)
- A wastewater secondary treatment plant with disinfection
- A marine discharge through a 1.7 km long, 30m deep outfall

The treatment plant uses a Sequencing Batch Reactor (SBR) treatment process with UV disinfection to provide secondary wastewater treatment. Plant treatment removes over 95% of the total suspended solids and high levels of other contaminants, providing significant environmental benefits to the District of Sooke and the receiving waters.

The treatment plant has a design capacity of 3,000 m^3/day (annual average daily flow), and a peak wet weather flow capacity of 6,900 m^3/day. The plant is expandable by an additional 3,000 m^3/day (average daily flow).

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 connections began in January 2006 and continued throughout 2006 and 2007, with the majority completed by December 2006. Additional connections have continued since that time for new construction in the specified sewer area.

Table 1: Acronyms

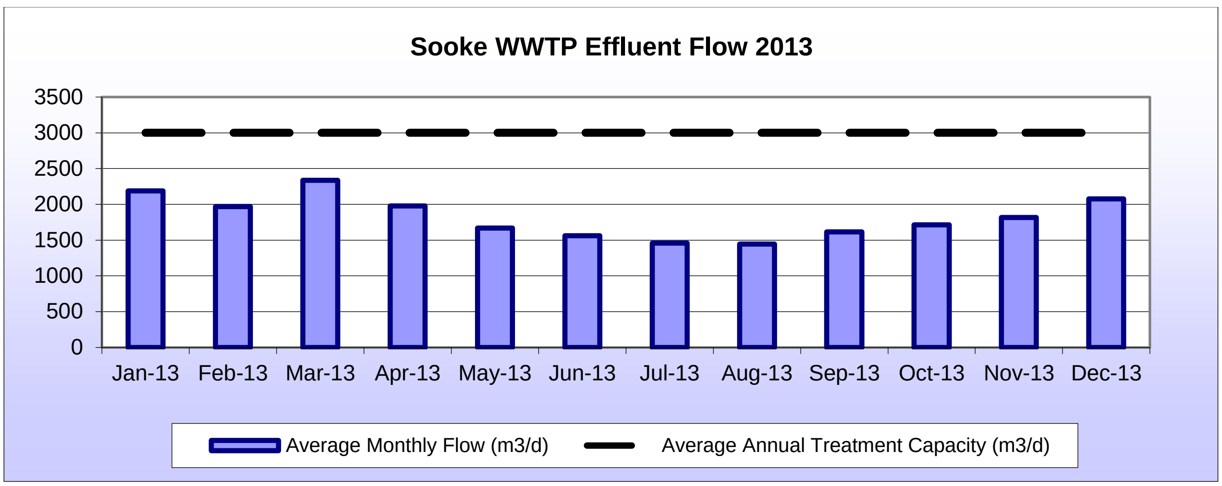
Acronyms /Abbreviations	Description
ATS	Automatic Transfer Switch
AVE or AVG	Average
BC EOCP	British Columbia Environmental Operators Certification Program
BOD	Biochemical Oxygen Demand
CBOD	Carbonaceous Biochemical Oxygen Demand
CFU/100mL	Colony Forming Units Per 100 milliliters
COD	Chemical Oxygen Demand
FC	Fecal Coliforms
HMI	Human Machine Interface
IC	Inspection Chamber
I/I	Inflow & infiltration
LIT	Level Indicator Transmitter
m3/day	Cubic meters per day (flow)
mg/L	Milligram per liter
MSR	Municipal Sewage Regulation
MWR	Municipal Wastewater Regulation
NH3	Ammonia
OC	Operational Certificate
PLC	Programmable Logic Controller
Q	Yearly quarter
SBR	Sequencing Batch Reactor
SCADA	Supervisory Control and Data Acquisition (system)
SSA	Specified Sewer Area
TSS	Total Suspended Solids
WWC	Wastewater Collection System
WSER	Wastewater Systems Effluent Regulations
WWTP	Wastewater Treatment Plant

OVERVIEW

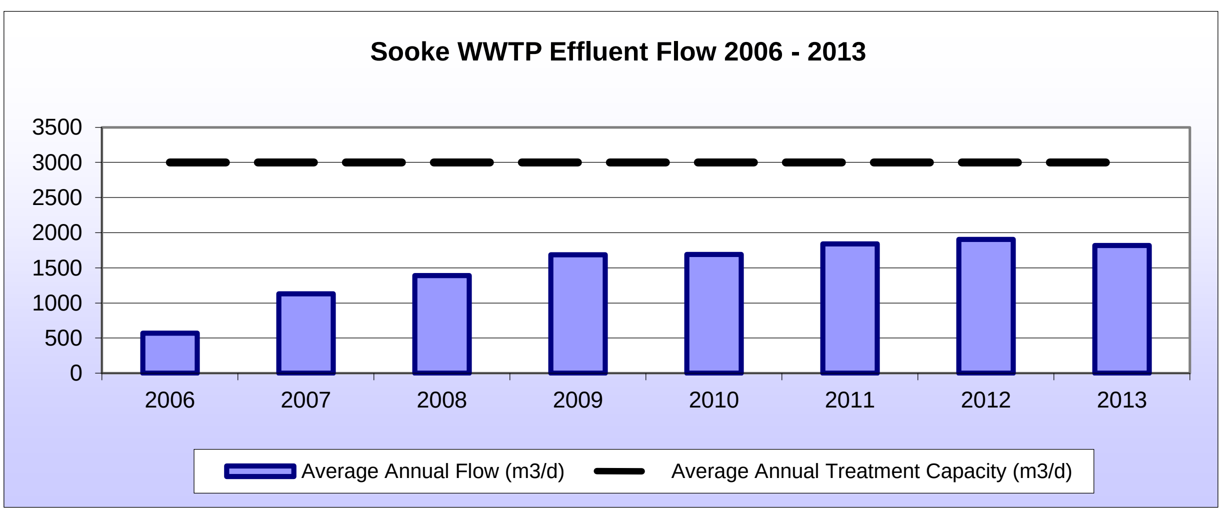
Plant Flow

The annual average effluent flow treated in the plant during 2013 was 1,818 m^3/day. Graph 1 summarizes the monthly average flows during the year compared to the plant design capacity (annual average flow). Graph 2 summarizes the average annual flow through the plant each year since 2006. The flow has gradually increased each year as new connections are made to the sewer system.

Graph 1: WWTP Effluent Flow 2013



Graph 2: WWTP Effluent Flow 2006 - 2013

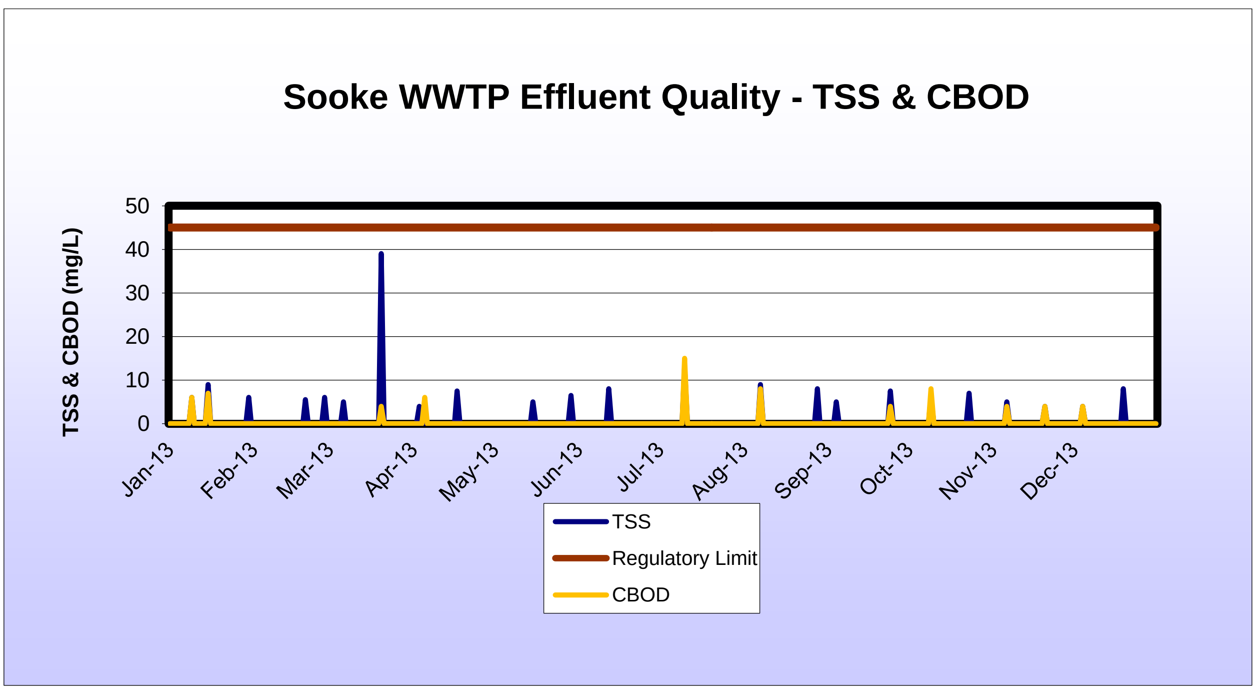


Plant Performance

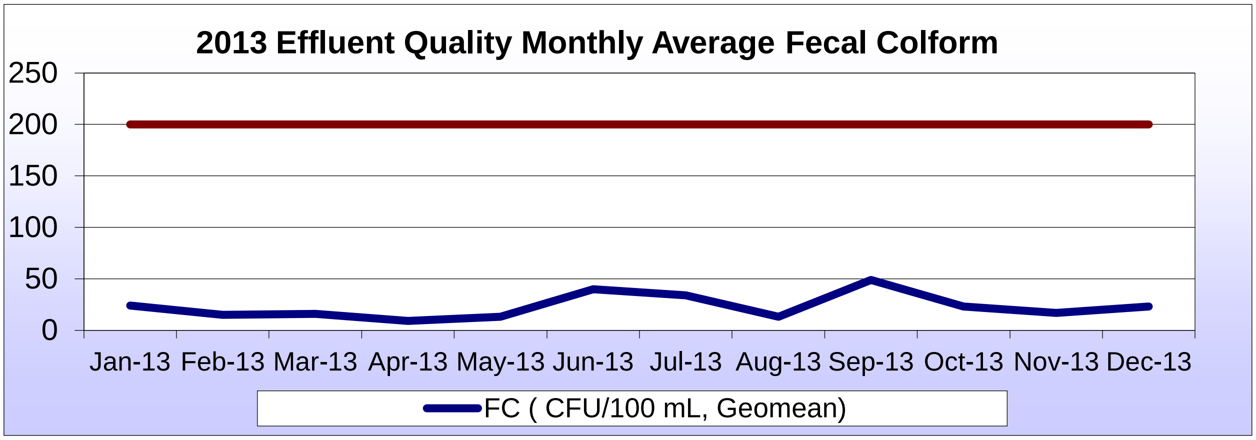
The wastewater treatment plant is performing very well. Three of the important parameters monitored at the plant are total suspended solids (TSS), carbonaceous biochemical oxygen demand (CBOD) and fecal coliforms (FC).

Graphs 3 and 4 summarizes the external and internal lab test results for TSS and the external lab results for CBOD and FC in the plant effluent compared to the regulatory standards. The TSS, CBOD and FC in the plant effluent were consistently better than the regulatory requirements throughout the year. Further information on the performance of the plant throughout the year is contained in the Operations section of this report.

Graph 3: WWTP Effluent Quality -TSS & BOD



Graph 4: WWTP Effluent Quality - FC



OPERATIONS

Certification

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

Table 2 summarizes the operators working at the Sooke WWTP in 2013 and their certifications.

Table 2– Operator Certification

Name	Position	Qualifications
Dan Skidmore	Operations Manager	BC EOCP Certified: Level II Wastewater Treatment & Level III Wastewater Collection System Operator
Shawn Pearson	Lead Operator	BC EOCP Certified: Level II Wastewater Treatment & Level I Wastewater Collection System Operator
Chris Miller	Operator	BC EOCP Level III Wastewater Treatment & Level I Wastewater Collection

Water Quality Standards & Results

The District of Sooke Liquid Waste Management Plan was approved by the Ministry of Environment in May 2011. Contained in the approved plan is a proposed Operational Certificate (OC). The OC provides more extensive standards and guidelines for the operation of the wastewater treatment plant than is contained in the plant registration, the Municipal Waste Regulations (MWR) and the federal Wastewater Systems Effluent Regulations (WSER) (in effect January 2013).

To ensure compliance with the new WSER that came into effect January 1, 2013, the plant is operating as a nitrifying plant to ensure the TSS and CBOD limits are met. The nitrifying treatment process is proving to be very successful with excellent effluent quality in both basins. One of the key elements when considering a nitrification process was ammonia removal. Positive results are now being observed daily as ammonia is almost entirely removed from effluent before being discharged into the receiving waters.

Table 3 summarizes the regulatory requirements defined in the Federal Wastewater Systems Effluent Regulations, the Provincial Municipal Wastewater Regulations and the Proposed Operational Certificate from the approved Liquid Waste Management Plan.

Table 4 summarizes the water quality results and other key operational data from the treatment plant in 2013. More detailed water quality information is contained in Appendices 1 and 2.

Appendices 3 and 4 contain the Receiving Environment Monitoring report from 2013. The water quality around the discharge point of the outfall continues to be very good.

Table 3 – Summary of Regulatory Requirements

*<200 CFU/100 mL on a geometric mean on the last 5 samples in 30 days at the edge of the dilution zone for recreational water use and

Parameters or Description	WSER		MWR		Proposed OC	
	Limits	Frequency	Limits	Frequency	Limits	Frequency
Ammonia-Nitrogen			NA	Quarterly (Grab)	NA	Quarterly (grab)
Ammonia (un-ionized) as N at 15^0C (Federal WSER)	<1.25 mg/L	Monthly	NA	NA	NA	NA
CBOD	≤25 mg/L (Quarterly Average)	Monthly (Grab)	≤45 mg/L	Monthly (Grab)	≤45 mg/L	Monthly (Grab)
Fecal Coliforms	NA		<200 CFU/100 ml * Geometric Mean	5 samples GM/ 30 days	NA	6 x / year
Enterococci	NA		NA	NA	NA	6 x / year
pH			6.0 - 9.0		6.0 - 9.0	Monthly (Grab)
Receiving Environment Testing			Required	Yearly	As per Receiving Environment Monitoring Plan	Annually, between August1 and August31
Operator Certification			Required notification to regulator when there is a change in operator with the highest certification level in the plant	NA	Required notification to regulator when there is a change in operator with the highest certification level in the plant	NA
Reports, Annual			As requested by Director	As requested by Director	1/year	Within 120 days of calendar Year
Reports, General	Quarterly	Within 45 days after the end of the quarter	Data submission 2 times per year		Quarterly	Within 31 days of quarter ends
Flow Measurement		Daily Total			NA	Daily Total
Flow, Average			To be determined	2/week	3,000 m^3/day	2/week
Flow, Maximum			To be determined	2/week	6,900 m^3/day	2/week
Total Phosphorus			NA	Quarterly (Grab)	Not Required	NA
Effluent TSS	≤25 mg/L (Quarterly Average)	Monthly (Grab)	≤ 45 mg/L (Monthly Average)	Monthly (Grab)	≤ 45 mg/L (Monthly Average)	Monthly (Grab)
Post of Outfall Sign			Required		Erect sign above High water Mark.	NA
Out fall Inspection			Required	Every 5 years	Required	Every 5 years. Next Due 2018
Biosolids Management			NA		Shall be transported to an approved receiving facility	NA

<14 CFU/100 mL for shellfish bearing waters. ** All regulated tests are conducted by an ISO 17025 accredited laboratory. ***Un-ionized testing only required from January1, 2013 to July 1, 2014. ****Acute Lethality is not required based on average daily volume deposited (<2500m^3), WSER Section 11(1)

Table 4 - Sooke WWTP 2013 Water Quality Summary

	Influent			Effluent															Bio Solids Shipped	
	CBOD mg/L	TSS mg/L	NH3-N mg/L	Flow m^3/day			CBOD mg/L			TSS mg/L			Un-Ionized NH3-N mg/L			FC CFU/100mL			Kg	# of Loads
	Ave	Ave	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Geo Mean		
Regulatory Limit					≤14400	≤3000		≤45**	≤25 *		≤45**	≤25 *		<1.25				<200		
January [1]	135	149	24	1654	4654	2187	5	7	6	4	12	7	0.0026	0.0097	0.0062	<10	110	24	50800	5
February	234	275	nt	1743	2435	1969	<4	<4	<4	4	7	6	<0.05	<0.05	<0.05	6	50	15	55830	6
March	329	224	33	1828	3380	2337	4	4	4	<2	39	12	<0.05	<0.05	<0.05	3	90	16	45600	5
April	nt	212	39	1695	2717	1979	<4	<4	<4	<2	10	5	<0.05	<0.05	<0.05	2	106	9	59510	5
May	151	271	42	1523	2006	1667	<4	<4	<4	4	9	6	<0.05	<0.05	<0.05	4	138	13	57350	6
June	161	230	41	1395	1941	1559	<4	<4	<4	<2	8	5	<0.05	<0.05	<0.05	8	1650	40	67340	7
July	114	255	35	1331	1708	1457	<4	15	7	3	23	8	<0.05	<0.05	<0.05	4	14800	34	29030	3
August	213	243	44	1353	1601	1445	<4	8	5	6	12	9	<0.05	<0.05	<0.05	<2	94	13	54650	6
September	227	382	42	1356	2843	1615	<4	4	4	4	8	6	<0.05	<0.05	<0.05	<2	480	49	69850	7
October	129	180	41	1406	2534	1713	8	8	8	4	8	7	<0.05	<0.05	<0.05	4	4020	23	41619	4
November	108	218	30	1444	3061	1817	<4	<4	<4	3	6	5	<0.05	<0.05	<0.05	4	46	17	51600	5
December	110	188	30	1683	2942	2075	<4	<4	<4	4	10	6	<0.05	<0.05	<0.05	4	102	23	78020	8
Total																			661199	67
Annual	174	235	36	1331	4654	1818	<4	15	5	<2	39	7	0.0026	<0.05	<0.05	<2	14800	22	55100	6

* WSER-Quarterly Average, ** MWR, unionized ammonia tests & calculation provided by ISO 17025 certified lab ([1] Jan. calculation only), nt = not tested

Operations, Maintenance & Improvements

Ongoing operations and maintenance activities and improvements occurred throughout the year. Highlights of those activities are included below.

TREATMENT PLANT

Biosolids

Biosolids extracted by the centrifuge dewatering /solids separation process were trucked to the Hartland Landfill for disposal under Control Waste Permit #2013-028. . During 2013, on average, approximately 53,657 tonnes of bio-solids per month were taken to the landfill. 67 loads and a total of 661,199 kg were hauled for the year. Grit, greaseballs and screenings from the headworks building were hauled under CWP #2013-029. There were 12 bins hauled, totalling 9,460 kg.

Operations

The treatment plant performed very well even when being challenged by several different conditions through the year. The TSS, CBOD and FC design standards were met throughout the year.
Contractors were on-site in January to assist with repair and maintenance items including replacing a faulty level transmitter on SBR#1, replacing a centrifuge controller, changing the centrifuge auger gearbox and replacing the actuator drive on SBR#2 aeration valve.

On January 1, several call-out alarms occurred and it was found that the fire panel in the administration building was failing and needing replacement. This work was completed and several heat and smoke detectors were also replaced throughout the plant.

On January 24 the influent channel in the headworks was cleaned and on January 25 all lamp sleeves in the UV channel were washed down.

To ensure compliance with the new federal wastewater systems effluent regulations that came into effect January 1, 2013, the plant will continue to be operated as a nitrifying plant to ensure the TSS and CBOD limits are met. The facility identification report is being prepared for submission and additional sampling for CBOD and unionized ammonia are now being done regularly

An operator from EPCOR Britannia was on site for two weeks in March and a week in July to work for the Sooke Wastewater Operation.

An electrical contractor was called on May 7 to troubleshoot an aeration valve issue. It was determined to be an intermittent electrical connection problem. Also on May 7, the contractor load-banked the on-site generator and completed preventative maintenance blower motor meggering.

In the headworks building, on May 20, a wear strip in the grit classifier came loose and became tangled in the machine. The grit-classifier operated on three out of four wear strips until a new one was fabricated and installed on May 24.

Gas sensor heads were replaced in the headworks building. H_2S and methane monitor sensors were calibrated and the entire system was tested. The audible horn was not operating correctly and the issue was resolved in June.

On June 9 and 10, Seaparc Leisure Complex drained its swimming pools into the collection system causing high flows to the treatment plant and triggering "decanter park" operation (a safety control implemented to prevent UV channel flooding). Microscopic observations revealed that necessary bacteria had been destroyed as a result of higher than normal levels of chlorine in the wastewater. Alkalinity and pH were also adversely affected. These negative impacts on treatment process resulted in deterioration of effluent quality from SBR #2. Although effluent testing indicated that total suspended solids were higher than normal, results were well within regulatory limits. Consultations with an EPCOR operations specialist were conducted to confirm that the ongoing control measures in place will be effective to correct the chlorine toxic shock. A chemical (sodium thiosulphate) used to neutralize chlorine will be used by Seaparc in the future to prevent similar problems.

The aeration valve actuator in SBR#2 malfunctioned due to an intermittent electrical connector problem. Further problems were experienced in June which required additional troubleshooting. A faulty micro-switch was found, replaced and the unit is currently operating correctly. A spare actuator for standby has been re-conditioned, tested and shelved as part of spare parts inventory.
In July and October, tours of the treatment plant were conducted for District of Sooke employees.

On September 16 decanter #1 VFD failed, and as a result, process had to be stopped as aeration could not continue in that basin. All influent was routed through SBR#2 while a replacement VFD was sourced and installed. The isolated basin was fed molasses and sugar to provide food for the bacteria during the period that it was without influent. When it was put back online September 20, it produced good quality effluent immediately

In October, all of the air diffuser membranes were replaced in SBR #2 as part of an asset renewal project. Air headers and diffusers disperse air into the basins for the treatment process and have manufacturer's life expectancy of five years. This work was done on schedule and on budget. SBR#1 and Digester #2 will have all diffuser membranes replaced in the next two years to ensure treatment quality is maintained.

On December 4, an operator travelled to the White Rock location for confined space entry training. A mobile audiometric testing facility was on site at the Sooke location to complete annual employee hearing tests.

An EPCOR safety advisor was on site to administer Hazard Recognition testing on December10.

On December 24, operations saw deteriorating effluent quality and sludge settling characteristics. Operators responded quickly to reduce sludge volume and increase aeration. Positive results were observed within 24 hours and there were no adverse effects on the receiving environment.

Also on December 24 the polymer system feed line connection leaked four liters of polymer on centrifuge room floor causing an extreme slip hazard. Operators dealt with the polymer spill according to the emergency response procedure for a polymer spill.

LIFT STATIONS

Regular maintenance was conducted at the stations throughout the year including inspections, wet well cleaning, generator run tests, annual generator servicing and load tests and annual pump inspections and servicing.

An excavation company was commissioned to remove a piece of damaged pipe at the Sooke Road lift station on January 7. A specialized contractor fabricated a new piece, which was installed on January 11.

At Helgesen Road lift station, pump #2 showed signs of not keeping up to the inflow into the wetwell. A contractor was needed to pull the pump and helped replace both swing discs in the check valves.

Throughout the month February, the Operations Procedures were updated to include Mariner's Village lift station site and mechanical information. This also ensured the operating plan was updated for compliance with MWR.

On March 7, the dial-outs, Hi float, generator running, vent fan and 120V AC power were tested at Mariner's Village lift station. The generator ATS was not functioning properly and an electrical contractor found a microswitch on the motor that drives the ATS switch was malfunctioning. A replacement microswitch was installed and tested OK.

On March 5 the operators completed preventative maintenance at four lift stations (Sooke Road,West Coast Road, Helegesen Road, Sunriver). The work included inspecting ATS, LIT, floats, dialers, generator starts/warm up and valve exercising.

On April 4, an operator and electrical contractor performed a confined space entry in order to troubleshoot and repair a malfunctioning flow meter at the West Coast Road lift station. It was confirmed that the local SCADA and treatment plant SCADA functioned properly.

Annual wetwell cleaning was done March 26 at the Sunriver, Sooke Road, Helgesen and West Coast Road liftstations. Residents were notified about noise, as the work requires a vacuum truck. The annual cleaning ensures that the lift station operates efficiently and odours are kept under control.

Annual genset servicing was completed at all the lift stations in April, as per the preventative maintenance plan. On April 10, a coolant leak was found in the generator engine at the Prestige Hotel lift station. A coolant hose had cracked and leaked coolant at the connection to the inline heater (which had burnt itself out). The service contractor was able to provide parts and repair the engine coolant hose the following day. The coolant heater was replaced April 12, putting the generator back in service.

Annual pump inspections were completed at all lift stations, as per the preventative maintenance plan. Helgesen Road lift station had debris in both impellors but the pumps were in good shape. At Sooke Road lift station, it was found that both pumps wear rings are beginning to show wear, but repairs are not necessary until next year's annual inspection. Both pumps at the Prestige Hotel lift station required work as seals have allowed water into the upper oil cavity. Seal kits were replaced and both pumps are back in service. The Sooke Road lift station had "PLC faults" occurring, triggering dial-out alarms, which would return to "normal" status in less than one minute. An EPCOR SCADA specialist was consulted to consider lengthening the delay time to five minutes before latching dialer to prevent additional nuisance alarms and call-outs.

Through routine checks, a small leak was noticed at Sooke Road lift station, in the discharge forcemain and a coupling was tightened to stop the leak. A damaged level transducer was replaced with a new unit at Helgesen Road lift station.

On September 22 there was a high level alarm at Prestige Hotel lift station. Troubleshooting was performed as pump #1 was not pumping as per design. It was removed and underwent impellor adjustments. The pump was reinstalled and tests proved the pump was working to specifications.

Monitoring of Helgesen Road lift station on October 7 showed excessive pump starts and a failed check valve was suspected. On October 8, a swing disc in check valve #2 was replaced.

On October 14, the carbon was changed in the odour control equipment at the Sooke Road lift station.

Troubleshooting on October 21 revealed a faulty battery at the gen-set for Sooke Road lift station and the battery was subsequently replaced.

On October 21 pump #2 over-temperature sensor triggered an alarm at Sunriver lift station. A contractor was called out to make the necessary repairs.

The October 22 power outage affected the Sooke Road and Helgesen Road lift stations. The gen-sets started and operators monitored the lift stations until grid power was restored.

On November 6, EPCOR employees met with the District of Sooke to discuss landscaping beautification at Sooke Road lift station.

All lift stations stand-by power generators had their monthly checks on November7.

Telus replaced all aging communication routers on November19. Telus also repaired the phone line for back-up dialers at Helgesen Road and Sooke Road lift stations.

On December 30, Sooke Road pump #2 was pulled as further troubleshooting revealed inaccurate fault code. The VFD was not damaged and a pump inspection revealed construction material stuck in the impeller. Electrical testing indicated the pump motor was damaged and the pump was shipped to a contractor shop for a rebuild.

COLLECTION SYSTEM

On January 2, a call was received from the District of Sooke about questionable looking water being pumped out of a basement. Although the overflow occurred on private property, EPCOR's emergency response plan was implemented which included a thorough incident report, call to PEP and testing of the wastewater that overflowed in proximity to Throup Stream. Environment Canada deemed there was no risk to any shellfish harvesting operations.

Upon a request from the District of Sooke, EPCOR operators attended a private property that had a storm water drainage deficiency left over from when the original connection was made to the sewer main by the original contractor. EPCOR commissioned an excavation crew to make the appropriate connection for the drain pipe.

On March 2, an operator responded to an overflowing IC. A plumber was contracted to remove the obstruction and the resident's sanitary service was restored.

The Sooke River Campground was connected to the Phillips Road force main on May 6.

On October 10, an operator responded after hours to clear a blocked inspection chamber at a private residence.

Inflow and Infiltration (I/I)

Infiltration and Inflow allowance (I/ I) is a typical allowance which is factored into sanitary sewer systems at design. It represents infiltration of unwanted stormwater into the sanitary sewer system which is an unavoidable occurrence, regardless of the age of the system. Stormwater infiltrates the system via a number of points, such as manholes (manhole lids have lifting holes which allow stormwater in), potential cross connections (homeowners may incorrectly connect their home drainage infrastructure into the sanitary service), lift station hatches and pipe joints, manhole walls, or pipes. New systems typically have low I/ I values, but these values increase as the system ages. EPCOR has a systematic program of identifying new and significant sources of I/I and minimize this flow from the collection and treatment stream.

During the year, the inflow and infiltration investigation program was ongoing to monitor the system for I/I sources. A few sources of I/I have been addressed since the system has been operational; including stormwater system cross connections and pipes that had been damaged from construction activities since the system was installed.

Maintenance

Continuous and ongoing maintenance of the treatment plant and lift station equipment was conducted throughout the year. Equipment inspections, preventative maintenance and repairs were completed. These activities included the following:

- Backup power generator monthly run tests and annual load testing
- Lift station inspections and annual maintenance
- DO probe calibrations and maintenance
- Oil changes for rotating equipment such as digester blowers, SBR blowers, SBR decanter gearboxes
- Monthly rotating equipment maintenance
- Regular greasing schedules for all rotating equipment
- Upgrades to communication systems
- Digester blower belt changes
- Annual maintenance of UV bulbs and channel

Basic Service work and repairs, outside of the Asset Renewal Fund, included:

- Infra-red imaging of lift station pump connections, BC Hydro feeder, control circuitry and PLC terminals
- Gas alarm calibration in the headworks building
- Centrifuge auger gear drive
- Troubleshoot faulty LIT
- SBR#1 level sensor
- Fire alarm panel replacement
- Commissioning fume hood flow monitor
- Replacement of buried cord at Sunriver
- Mariner's Village generator transfer switch
- Repair of flow meter at plant
- Replacement UPS at Sooke Rd and in control room
- Sooke Road pump repairs
- Annual loadbanking - 7 lift station generators
- Follow up work: Prestige coolant system repair and replacement of plant oil pressure sending unit
- Centrifuge vibration repair
- Annual pump inspections
- Annual wetwell cleaning
- Rebuild of both pumps at Prestige(defects found at inspection)
- Gas alarm/horn system

- Cooling fan in frequency drive
- Auger gear box
- Repair wiring gas detection sensor
- Backflow Preventers & Annual Fire Equipment Inspection
- Supply & install electrical solonoid and supply spare
- Check faulty level sensor for Helesen Road LS
- VFD SBR Decanter #1
- Spare pressure transducer
- Check pumps at Helgesen & Sunriver
- VFD Sludge Pump #1
- Repair streetlights at Sooke Rd & Helgesen Road LS
- Sunriver pump#2 repair
- Odour control equip/new carbon Sooke Road
- Fuel tanks filled in all standby generators

The completed Asset Renewal Works included the following:

- SBR#2 aeration valve actuator replacement
- SBR#1 blower replacement
- UV control panel replacement
- Wastewater Treatment Plant forcemain pipe repair
- Sooke Road Lift Station pipe repair
- Outfall (Dive) Inspection

Audits & Inspections

As part of EPCOR's commitment to quality, there are a variety of audits and inspections that are conducted as a regular part of the operations.

The Sooke Fire Department performed the annual inspection of the treatment plant on March 21. The operation was deemed to be in good shape and there were no deficiencies to report.

On June 24 and 25, Quality Assurance Specialists from EPCOR were onsite on for the annual internal laboratory audit. This audit is to ensure laboratory tests and procedures are being conducted as per EPCOR's Standard Operating Procedures (SOPs) and laboratory equipment is assessed to verify accuracy.

Western Canada Fire Protection performed the annual testing of all backflow preventers at the treatment plant on August 12. They also completed all fire equipment testing, including fire extinguishers, emergency lighting and alarms.

EPCOR's Health and Safety Specialists were onsite twice in 2013 for training and assessment visits. Review of safety performance, hazard analysis, ERP review, annual respirator fit testing, and reviews of personal protection equipment were completed.

CUSTOMER SERVICE

Customer Inquiries

EPCOR operates a customer service phone line to address concerns and answer question for the public. In 2013, a total of 39 new inquiries were received (summarized in Table 5).

Table 5– 2013 Customer Calls

Customer Query Types	Comments	Year-To-Date
Odour	• Report of odour at Sooke Road Lift Station (1) • Report of odour from manhole (1) • Report of odour from plant (1) • Odours from private properties/ internal plumbing issues (6)	9
Pump	• Inquiries about pump alarm/repairs (9)	9
Connection	• Inquiries regarding connecting to collection system (4) • Inquiry about connection specs (1)	5
General	• Reports of broken IC lids (7) • Report of overflow on private property (1) • Report of improper drain on private property(1) • Inquiry about community investment (1) • Inquiry about any issues living next to the WWTP (1) • Inquiry about sanitary flow & rezoning his property(1) • Inquiry about potable water delivery (1) • Report of garbage at lift station (1) • Report of issue with neighbor's connection to sewer (1) • Report of suspicious vehicles in plant driveway when plant closed (1)	16
TOTAL		**39**

Community Involvement

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

A highlight of 2013 was EPCOR's grant to Sooke Region Food CHI, a non-profit society aiming to foster awareness of the importance of local food production, support local food production and encourage food production opportunities to residents who may not have the resources to grow their own food. The program is strongly aligned with EPCOR's goals to contribute to the quality of life in the community it serves and was selected from many applicants due to these principles. Funding from EPCOR's Community Essentials Council (ECEC) in 2011 supported initial development of the garden. The grant in 2013 will help with the final stages to complete the project, including draining a portion of the area to maximize land use and allow more food to be grown.

In 2013, EPCOR supported the community of Sooke with continued annual support to the:

- Sooke Salmon Enhancement Society
- Sooke Branch of Royal Canadian Legion Poppy Campaign
- Sooke Harbourside Lions
- Sooke Chamber of Commerce
- Sooke Santa Parade

EPCOR also participated in the:

- Sooke Rotary Spring Fair
- 8th Annual Consultants' Invitational Fishing Derby

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APPENDICES

1. Monthly Data Summary

2. Sooke Outfall August 2013 - Environmental Monitoring Report

JANUARY 2013 MONTHLY DATA

		INFLUENT							SBR 1 EFFLUENT														SBR 2 EFFLUENT													
		IN HOUSE			EXTERNAL				IN HOUSE				EXTERNAL										IN HOUSE				EXTERNAL									
	Effluent flow	pH	TSS	COD	COD	BOD	TSS	NH_{3-N}	pH	TSS	COD	Cal-culated Un-ionized NH3-	COD	TSS	BOD	CBOD	NH_{3-N}	Temp	pH	NH3-N (unionized)*	PO_4	FC	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	BOD	CBOD	NH_{3-N}	Temp	pH	NH3-N (unionized)*	PO_4	FC
Jan.	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L		CFU/100 mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L		CFU/100 mL
1	1957																																			
2	1734	7.5	174	456					6.6	9	47												7.0	7	11											
3	1989																																			
4	1887	7.6		458					6.8	10																										
5	1925																																			
6	2004																																			
7	2452	7.9		810					6.8	5																										
8	3256																																			
9	4654	7.4	46	206	291	70	91	10	6.6	4	47		38	4	<4		5					80	6.5	9	44		46	8	6		6					70
10	3221																																			
11	2874	7.4		301					6.7	6	17												6.8													
12	2448																																			
13	2303																																			
14	2034	7.6	194	476					6.7		89												6.8	14	33											
15	2044				406	200	202	37	6.7	3			48	6	7	7	12				0.482	14		2			56	12	7	5	14				0.546	110
16	2120	7.8	160	269					6.5	4	19												6.5													
17	1988																																			
18	1796	7.8	222	434					6.5	4													6.7	7												
19	1888																																			
20	1938																																			
21	1816	7.2	442	206					6.8	4												106	6.8	9												10
22	1965																																			
23	1800	7.9	312	524					6.6	10	25											30	6.7	6	47											<10
24	1739																																			
25	1654	7.9		547					6.5	5	36												6.7	7												
26	1838																																			
27	1949																																			
28	2043	7.7		619					6.4	8													6.7	10												
29	2224																																			
30	2177	7.6	123	549	437	136	154	26	6.4	6	54	0.0026	48	6	4		0.35					<10	6.6	4	25	0.0097	55	6	4		9					20
31	2082																																			
Min	1654	7.2	46	206	291	70	91	10	6.4	3	17	0.0026	38	4	<4	7	0.35				0.482	<10	6.5	2	11	0.0097	46	6	4	5	6				0.546	<10
Max	4654	7.9	442	810	437	200	202	37	6.8	10	89	0.0026	48	6	7	7	12				0.482	106	7.0	14	47	0.0097	56	12	7	5	14				0.546	110
Avg	2187	7.6	209	450	378	135	149	24	6.6	6	42	0.0026	45	5	6	7	6				0.482	28	6.7	7	32	0.0097	52	9	6	5	10				0.546	24

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

FEBRUARY 2013 MONTHLY DATA

		INFLUENT							SBR 1 EFFLUENT													SBR 2 EFFLUENT												
		IN HOUSE			EXTERNAL				IN HOUSE				EXTERNAL									IN HOUSE				EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	BOD	TSS	NH3-N	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	BOD	CBOD	NH3-N	Temp	pH	NH3-N (un-ionized)*	FC	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	BOD	CBOD	NH3-N	Temp	pH	NH3-N (un-ionized)*	FC
Feb.	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/100 mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/100 mL
1	1970	7.8		483					6.4	7												6.6	5											
2	1977																																	
3	2154																																	
4	2013	7.6		602					6.3	4												6.6	12											
5	1892																				10													20
6	2067	7.6	216	529					6.4	5	41											6.6	10	55										
7	1910																																	
8	1863	7.7		733					6.9	4												6.9	15											
9	1822																																	
10	1772																																	
11	2044	7.6		436					6.5	3												6.7	12											
12	1856																																	
13	1754	7.7	251	527					6.5	4	22										30	6.6	10	25										10
14	1801																																	
15	1841	7.7		575					6.5	4												6.4	9											
16	1761																																	
17	1870																																	
18	1932	7.8		649					6.5	4												6.6	8											
19	1832																																	
20	1777	7.8	337	749	488		310		6.4	4	71	0.0027	41	4			2				12	6.5	8	94	0.0066	54	7			4				50
21	1743																																	
22	2108	7.8		471					6.3	8												6.6	7											
23	2435																																	
24	2285																																	
25	2290	7.8		433					6.3	7												6.4	5											
26	2168																																	
27	2108	7.6	247	812	552	234	240		6.4	6	46	0.0008	42	6	<4	<4	1	25	6.49	<0.05	12	6.5	6	80	0.0017	54	6	<4	<4	2	25	6.65	<0.05	6
28	2075																																	
Min	1743	7.6	216	433	488	234	240		6.3	3	22	0.0008	41	4	<4	<4	1	25	6.49	<0.05	10	6.4	5	25	0.0017	54	6	<4	<4	2	25	6.65	<0.05	6
Max	2435	7.8	337	812	552	234	310		6.9	8	71	0.0027	42	6	<4	<4	2	25	6.49	<0.05	30	6.9	15	94	0.0066	54	7	<4	<4	4	25	6.65	<0.05	50
Avg	1969	7.7	263	583	520	234	275		6.5	5	45	0.0017	41.5	5	<4	<4	1	25	6.49	<0.05	14	6.6	9	64	0.0042	54	7	<4	<4	3	25	6.65	<0.05	16

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

MARCH 2013 MONTHLY DATA

		INFLUENT										SBR 1 EFFLUENT														SBR 2 EFFLUENT													
		IN HOUSE			EXTERNAL							IN HOUSE				EXTERNAL										IN HOUSE				EXTERNAL									
	Effluent flows	pH	TSS	COD	COD	BOD	TSS	NH_3	Conductivity	Surfactants		pH	TSS	COD	Calculated Un-ionized NH3	COD	TSS	CBOD	NH_3	NH3 (unionized)*	Temp	pH	PO_4	Enterococci	FC	pH	TSS	COD	Calculated Un-ionized NH3	COD	TSS	CBOD	NH_3	NH3 (unionized)*	Temp	pH	PO_4	Enterococci	FC
Mar.	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm at 25 C	mg/L		mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L		CFU/100 mL		mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L		CFU/100 mL
1	2590	7.8		412							6.3	5													6.3	6												
2	2551																																					
3	2450																																					
4	2280	7.9		750							6.4	6													6.5	6												
5	2179																																					
6	2099	7.9	264	448	342	329	284	38.6			6.5	<4	48		29	4	4	3		25	6.90			10	6.5	10	14		40	6	4	4						30
7	2049																																					
8	1905	7.8		548							6.5	<4														9												
9	1909																																					
10	1951																																					
11	1955	7.9		572							6.5	<4													6.5	<4												
12	2960																																					
13	3380			381								7	14											24		<4	17											8
14	3032																																					
15	2697	7.7	137	326							6.4	4	15												6.4	<4												
16	2558																																					
17	2530																																					
18	2478	7.7		358							6.4	<4													6.5	<4												
19	2451																																					
20	2412	7.8	142	376	377		164	27.5	591	2.3	6.5	<4	22	0.0010	54	<2	4	1	<0.05	25	6.25	2.610	P*	90	6.5	5	184	0.0028	39	39	4	2	<0.05	25	6.18	2.210	N*	46
21	2708																																					
22	2782	7.6		280							6.3	<4													6.4	<4												
23	2417																																					
24	2278																																					
25	2095	7.8		440							6.4	<4													6.5	<4												
26	2075																																					
27	2048																							3														6
28	2009	7.8	340	503							6.4	<4	34												6.5	<4	21											
29	1879																																					
30	1828																																					
31	1914	7.5		372							6.1	<4													6.5	<4												
Min	1828	7.5	137	280	342	329	164	27.5	591	2.3	6.1	<4	14	0.0010	29	<2	4	1	<0.05	25	6.25	2.610	na	3	6.3	<4	14	0.0028	39	6	4	2	<0.05	25	6.18	2.210	na	6
Max	3380	7.9	340	750	377	329	284	38.6	591	2.3	6.5	7	48	0.0010	54	4	4	3	<0.05	25	6.90	2.610	na	90	6.5	10	184	0.0028	40	39	4	4	<0.05	25	6.18	2.210	na	46
Avg	2337	7.7	221	444	360	329	224	33.1	591	2.3	6.4	4	27	0.0010	41.5	3	4	2	<0.05	25	6.58	2.610	na	16	6.4	3	59	0.0028	40	23	4	3	<0.05	25	6.18	2.210	na	17

*P=Present, N=Not Present

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

APRIL 2013 MONTHLY DATA

		INFLUENT						SBR 1 EFFLUENT												SBR 2 EFFLUENT											
		IN HOUSE			EXTERNAL			IN HOUSE				EXTERNAL								IN HOUSE				EXTERNAL							
	Effluent flows	pH	TSS	COD	COD	TSS	NH_3	pH	TSS	COD	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH_3	Temp	pH	NH3 (unionized)*	FC	pH	TSS	COD	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH_3	Temp	pH	NH3 (unionized)*	FC
April	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	o C			CFU /100mL		mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	o C			CFU/ 100mL
1	1869																														
2	1868																														
3	1881	7.7	220	447	439	212	39	6.4	<4	46		29	4		<1				2	6.4	<4	54		30	<2		<1				6
4	1719																														
5	1751	8.0		670				6.5	<4											6.5	<4										
6	1793																														
7	1921																														
8	1873	7.8		652				6.1	<4											6.5	<4										
9	1695																														
10	1996	7.7	241	747				6.4	<4	41									8	6.3	4	37									6
11	2070																														
12	2040	7.8		560				6.5	<4											6.4	4										
13	2717																														
14	2569																														
15	2274	7.7		497				6.5	6											6.5	6										
16	2033																														
17	2183	7.6	204	312				6.5	8	33	0.0026		10	<4	2	25	6.53	<0.05	106	6.5	8	34	0.0012		5	<4	1	25	6.56	<0.05	22
18	2022																														
19	2007	7.6		514				6.4	9											6.4	8										
20	1979																														
21	2043																														
22	1891	7.7		695				6.4	8											6.4	10										
23	1995							6.7	7											6.5	9										
24	1913	8.0	263	380				6.4	8	54									16	6.5	8	62									10
25	1893			419				6.5	8											6.5	11										
26	1754	7.7		573				6.6	7											6.5	8										
27	1829																														
28	1862																														
29	2017	7.8		501				6.5	6											6.6	7										
30	1914																														
Min	1695	7.6	204	312	439	212	39	6.1	<4	33	0.0026	29	4	<4	<1	25	6.53	<0.05	2	6.3	4	34	0.0012	30	<2	<4	<1	25	6.56	<0.05	6
Max	2717	8.0	263	747	439	212	39	6.7	9	54	0.0026	29	10	<4	2	25	6.53	<0.05	106	6.6	11	62	0.0012	30	5	<4	1	25	6.56	<0.05	22
AVG	1979	7.8	232	536	439	212	39	6.4	6	44	0.0026	29	7	<4	1	25	6.53	<0.05	13	6.5	7	47	0.0012	30	4	<4	1	25	6.56	<0.05	9

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

SOOKE WASTEWATER AND COLLECTION SYSTEM

ANNUAL REPORT 2013

MAY 2013 MONTHLY DATA

		INFLUENT							SBR 1 EFFLUENT														SBR 2 EFFLUENT													
		IN HOUSE			EXTERNAL				IN HOUSE				EXTERNAL										IN HOUSE				EXTERNAL									
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH_3	pH	TSS	COD	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH_3	Temp	pH	NH3 (unionized)*	PO_4	*Enter-ococci*	FC	pH	TSS	COD	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH_3	Temp	pH	NH3 (unionized)*	PO_4	*Enter-ococci*	FC
May	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	mg/L	CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	mg/L	CFU/ 100mL	CFU/ 100mL
1	2006	7.8	259	873					6.4	7	23											32	6.4	4	41											10
2	1693																																			
3	1662	7.9		777					6.4	8													6.4	6												
4	1687																																			
5	1740																																			
6	1657	7.7		651					6.6	9													6.8	5												
7	1668																																			
8	1626																																			
9	1651	7.6	294	641					6.7	8	39											4	6.9	6	44											138
10	1523	7.5		605					6.6	5													6.4	5												
11	1547																																			
12	1569																																			
13	1878		297							<4																										
14	1730																																			
15	1675	7.5	253	595	646		272	38	6.4	6	42	0.0001	48	6	<4	0.1	15	7.04	<0.05	4.54		330	6.5	4	52	0.0019	45	4	<4	1.2	15	7.18	<0.05	2.74		4
16	1784																																			
17	1682	7.9		505					6.5	6													6.5	9												
18	1538																																			
19	1542																																			
20	1782	7.3		599					6.4	6													6.4	9												
21	1660																																			
22	1677	7.6	308	269					6.4	4	46											2	6.5	14	56											18
23	1641																																			
24	1579	7.9		897					6.4	<4													6.4	14												
25	1531																																			
26	1679																																			
27	1682	8.2		735					6.4	6													6.5	14												
28	1701																																			
29	1578	7.8	318	554		151	270	47	6.4	7	71		50	4	<4	0.2					7	18	6.5	14	94		66	9	<4	1.3					6	4
30	1624																																			
31	1691	7.7		817					6.4	4													6.5	12												
Min	1523	7.3	253	269	646	151	270	38	6.4	<4	23	0.0001	48	4	<4	0.1	15	7.04	<0.05	4.54	7	2	6.4	4	41	0.0019	45	4	<4	1.2	15	7.18	<0.05	2.74	6	4
Max	2006	8.2	318	897	646	151	272	47	6.7	9	71	0.0001	50	6	<4	0.2	15	7.04	<0.05	4.54	7	330	6.9	14	94	0.0019	66	9	<4	1.3	15	7.18	<0.05	2.74	6	138
AVG	1667	7.7	288	655	646	151	271	42	6.5	6	44	0.0001	49	5	<4	0.1	15	7.04	<0.05	4.54	7	17	6.5	9	57	0.0019	56	7	<4	1.3	15	7.18	<0.05	2.74	6	13

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

JUNE 2013 MONTHLY DATA

		INFLUENT										SBR 1 EFFLUENT													SBR 2 EFFLUENT												
		IN HOUSE			EXTERNAL						IN HOUSE				EXTERNAL									IN HOUSE				EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	Conductivity	Surfactants	pH	TSS	COD	Calculated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	Enterococci	FC	pH	TSS	COD	Calculated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	Enterococci	FC
June	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm at 25 C	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		CFU/ 100mL	CFU/ 100mL
1	1511																																			
2	1623																																			
3	1637	7.7		1030							6.5	3												6.7	10											
4	1665																																			
5	1533	7.6	340	728							6.5	4	58											6.3	14	68										
6	1559																						16													34
7	1529	7.8		689							6.5	3												6.7	14											
8	1574																																			
9	1817																																			
10	1941	7.9		513							6.7	4												6.8	12											
11	1502																																			
12	1562	7.6	275	528		161	230	41	645	2.55	6.5	3	39	0.0017	34	<2	<4	0.23	<0.05	15	6.38	1	8	7.0	12	85	0.0356	56	8	<4	9.55	<0.05	15	6.59	1	8
13	1438																																			
14	1490	7.4		577							6.4	2												6.5	16											
15	1516																																			
16	1545																																			
17	1612	7.7		961							6.5	2												6.5	13											
18	1489																																			
19	1527	7.8	191	512							6.4	3	51										12	6.4	28											77
20	1395																																			
21	1398	7.3		795							6.5	6												6.4	28											
22	1509																																			
23	1712																																			
24	1475	7.3		778							6.7	5												7.0	31											
25	1514																																			
26	1567	7.9	289	660							6.7	6	60										120	6.7	32											1650
27	1526																																			
28	1602	7.7	274	747							6.5	6												6.6	32											
29	1521																																			
30	1492																																			
Min	1395	7.3	191	512		161	230	41	645	2.55	6.4	2	39	0.0017	34	<2	<4	0.23	<0.05	15	6.38	1	8	6.3	10	68	0.0356	56	8	<4	9.55	<0.05	15	6.59	1	8
Max	1941	7.9	340	1030		161	230	41	645	2.55	6.7	6	60	0.0017	34	<2	<4	0.23	<0.05	15	6.38	1	120	7.0	32	85	0.0356	56	8	<4	9.55	<0.05	15	6.59	1	1650
AVG	1559	7.6	274	710		161	230	41	645	2.55	6.5	4	52	0.0017	34	<2	<4	0.23	<0.05	15	6.38	1	21	6.6	20	77	0.0356	56	8	<4	9.55	<0.05	15	6.59	1	77

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

JULY 2013 MONTHLY DATA

		INFLUENT							SBR 1 EFFLUENT												SBR 2 EFFLUENT											
		IN HOUSE			EXTERNAL				IN HOUSE			EXTERNAL									IN HOUSE			EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH_3	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3 (un-ionized)*	Temp	pH	PO_4	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3 (un-ionized)*	Temp	pH	PO_4	FC
July	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL
1	1510	7.4		378					6.5	4											6.6	<4										
2	1708																															
3	1520	7.8	280	542					6.6	<4	47									20	6.7	38	144									14800
4	1452																															
5	1413	7.8		921					6.5	4											6.7	37										
6	1432																															
7	1486																															
8	1601	7.6		564					6.9	4											6.9	34										
9	1543																															
10	1448	7.6	207	737		74	262	35	6.7	4	84		3	<4	0.32	<0.05	15	6.55	2.87	8	6.9	28	103		23	15	0.12	<0.05	15	6.49	1.55	70
11	1356																					24										
12	1331	7.6		713					6.5	4											6.6	16										
13	1410																															
14	1458																															
15	1526	7.9		800					6.5	4											6.7	5										
16	1492																															
17	1442	7.8		900					6.6	7										12	6.7	5	66									18
18	1480																															
19	1370	7.7		607					6.6	<4											6.6	<4										
20	1396																															
21	1463																															
22	1492	7.6		821					6.6	4											6.6	<4										
23	1395																															
24	1445	7.6	292	304	406	154	248		6.7	<4	81	49	<2	<4	0.72					12	6.8	<4	64	50	<2	<4	0.07					4
25	1394																															
26	1438	8.0		753					6.5	4											6.7	<4										
27	1407																															
28	1444																															
29	1449	7.8		713					6.6	<4											6.7	5										
30	1489																															
31	1367	7.6	290	424					6.6	5	48									194	6.7	9										6
Min	1331	7.4	207	304	406	74	248	35	6.5	<4	47	49	<2	<4	0.32	<0.05	15	6.55	2.87	8	6.6	<4	64	50	<2	<4	0.07	<0.05	15	6.49	1.55	4
Max	1708	8.0	292	921	406	154	262	35	6.9	7	84	49	3	<4	0.72	<0.05	15	6.55	2.87	194	6.9	38	144	50	23	15	0.12	<0.05	15	6.49	1.55	14800
AVG	1457	7.7	267	656	406	114	255	35	6.6	5	65	49	3	<4	0.52	<0.05	15	6.55	2.87	21	6.7	14	94	50	12.5	9.5	0.10	<0.05	15	6.49	1.55	54

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

District of Sooke

AUGUST 2013 MONTHLY DATA

		INFLUENT							SBR 1 EFFLUENT													SBR 2 EFFLUENT												
		IN HOUSE			EXTERNAL				IN HOUSE				EXTERNAL									IN HOUSE				EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3 (un-ionized)*	Temp	pH	Enter-ococci	FC	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3 (un-ionized)*	Temp	pH	Enter-ococci	FC
Aug.	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		CFU/ 100mL	CFU/ 100mL
1	1363																																	
2	1428	7.6		704					6.6	4												6.7	22											
3	1410																																	
4	1371																																	
5	1583	7.4		549					6.5	4												6.6	20											
6	1424																																	
7	1583	7.7	308	890	886	172	310	46	6.7	6	32	0.00012	51	6	<4	0.42	<0.05	15	6.33		40	6.7	17	71	0.00013	95	12	8	0.45	<0.05	15	6.33		<10
8	1456																																	
9	1515	8.0		555					6.5	8										100		6.9	12										20000	
10	1388																																	
11	1478																																	
12	1493	7.7		813					6.6	8												6.6	7											
13	1438																																	
14	1414	7.7	315	916					6.6	11	33										94	6.7	6	37										<2
15	1406																																	
16	1454	7.8		940					6.5	10												6.6	6											
17	1363																																	
18	1410																																	
19	1510	7.6		810					6.5	6												6.6	8											
20	1353																																	
21	1362	7.6	302	903					6.4	4	13											6.6	9											
22	1447									6																								
23	1423	7.7		425					6.4	5												6.5	8											
24	1379																																	
25	1430																																	
26	1499								6.5	8												6.5	10											
27	1449	7.5		797																														
28	1524	7.8	212	497	513	253	176	42	6.5	<4	49		59	8	<4	0.18		15	6.52		4	6.6	7	58		63	8	<4	0.24		15	6.44		60
29	1601	7.6		874																														
30	1449								6.4	12												6.5	13											
31	1389																																	
Min	1353	7.4	212	425	513	172	176	42	6.4	<4	13	0.00012	51	6	<4	0.18	<0.05	15	6.33	100	4	6.5	6	37	0.00013	63	8	<4	0.24	<0.05	15	6.33	20000	<2
Max	1601	8.0	315	940	886	253	310	46	6.7	12	49	0.00012	59	8	<4	0.42	<0.05	15	6.52	100	94	6.9	22	71	0.00013	95	12	8	0.45	<0.05	15	6.44	20000	60
AVG	1445	7.7	284	744	700	213	243	44	6.5	7	32	0.00012	55	7	<4	0.30	<0.05	15	6.43	100	25	6.6	11	55	0.00013	79	10	6	0.35	<0.05	15	6.39	20000	7

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

SEPTEMBER 2013 MONTHLY DATA

		INFLUENT							SBR 1 EFFLUENT															SBR 2 EFFLUENT													
		IN HOUSE			EXTERNAL				IN HOUSE				EXTERNAL										IN HOUSE				EXTERNAL									
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	pH	TSS	COD	Calculated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	*Enterococci*	FC	pH	TSS	COD	Calculated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	*Enterococci*	FC
Sept	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL	CFU/ 100mL
1	1397																																			
2	1661	7.5		691					6.5	10													6.6	5												
3	1579																																			
4	1501	7.7	398	920	926	266	468	39	6.7	10	33	<0.02	68	6	<4	0.30	<0.05	15	8.11	4.17	46	460	6.9		31	<0.02	50	4	<4	0.10	<0.05	15	6.53	6.27	<1	<2
5	1545																																			
6	1356	7.5		786					6.6	11													6.9	5												
7	1395																																			
8	1524																																			
9	1535	7.5	371	980					6.7	7	37												6.7	6	42											
10	1445																																			
11	1470	7.6	315	529					6.7	4	23											480	7.0	<4												84
12	1510																																			
13	1490	7.8	397	798					6.5	5	50												6.6	<4	39											
14	1436																																			
15	1532																																			
16	1396	7.5	429	584					6.5	14	58												6.7	11	59											
17	1465																																			
18	1475	7.7	381	618																			6.7	9												2
19	1415																																			
20	1471	7.7	394	600																			6.7	5												
21	1446																																			
22	1622																																			
23	1688	7.6	503	798					6.8	10													6.7	8	58											
24	1514	7.8	287	734	730	187	295	45	6.9	9	56	<0.02	56	8	4	1.00		15	6.40			120	6.9	9	43	<0.02	45	7	<4	0.11		15	6.43			148
25	2313																																			
26	1499																																			
27	1434	7.8		691					6.8	11																										
28	1924																																			
29	2579																																			
30	2843	7.8		431					6.8	7	43																									
Min	1356	7.5	287	431	730	187	295	39	6.5	4	23	<0.02	56	6	<4	0.30	<0.05	15	6.40	4.17	46	120	6.6	<4	31	<0.02	45	4	<4	0.10	<0.05	15	6.43	6.27	<1	<2
Max	2843	7.8	503	980	926	266	468	45	6.9	14	58	<0.02	68	8	4	1.00	<0.05	15	8.11	4.17	46	480	7.0	11	59	<0.02	50	7	<4	0.11	<0.05	15	6.53	6.27	<1	148
AVG	1615	7.7	386	705	828	227	382	42	6.7	9	43	<0.02	62	7	4	0.65	<0.05	15	7.26	4.17	46	298	6.8	7	45	<0.02	48	6	<4	0.11	<0.05	15	6.48	6.27	<1	13

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

OCTOBER 2013 MONTHLY DATA

		INFLUENT										SBR 1 EFFLUENT													SBR 2 EFFLUENT												
		IN HOUSE			EXTERNAL							IN HOUSE			EXTERNAL										IN HOUSE			EXTERNAL									
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	PO_4	Conductivity	Surfactants	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	*Enterococci*	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	*Enterococci*	FC
Oct	m3/day		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm at 25° C	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL	CFU/ 100mL
1	2534																																				
2	2442	7.8	168	423								6.8	8	13										4020													
3	1487																																				
4	2024	8.0	212	411								6.5	<4	18											6.6	4	11										
5	1927																																				
6	1945																																				
7	1873	7.5		702								6.6	4												6.5	6											
8	1802																																				
9	1725	7.4	203	513	511	170	168	35	7.00	438	2.02	6.6	4	34	70	4	8	0.75	<0.05	15	6.37	2.40		18	6.7	7	27	52	8	8	0.29	<0.05	15	6.28	1.54		14
10	1685																																				
11	1669	7.7		673								6.5	<4												6.6	6											
12	1787																																				
13	1781																																				
14	1751	7.4		439								6.6	4												6.6	6											
15	1750																																				
16	1784	7.8	216	606								6.5	<4	18									21	4	6.6	4	45									8	6
17	1651																																				
18	1537	7.7	122	508								6.5	4	5											6.5	6	32										
19	1583																																				
20	1654																																				
21	1499	7.5	170	475								6.6	<4	19											6.6	<4	40										
22	1409																																				
23	1578	7.8	206	708	794	88	191	47				6.9	<4	48	103	6		0.14			6.64			4	6.9	4	46	76	8		0.50			6.49			44
24	1430																																				
25	1579	7.7	242	788								6.6	4	47											6.6	4	43										
26	1534																																				
27	1562																																				
28	1644	7.7	270	590								6.7	4	26											6.7	<4	37										
29	1509																																				
30	1406	8.0	400	928								6.7	4	19										6	6.6	5	34										62
31	1556																																				
Min	1406	7.4	122	411	511	88	168	35	7.00	438	2.02	6.5	<4	5	70	4	8	0.14	<0.05	15	6.37	2.40	21	4	6.5	<4	11	52	8	8	0.29	<0.05	15	6.28	1.54	8	6
Max	2534	8.0	400	928	794	170	191	47	7.00	438	2.02	6.9	8	48	103	6	8	0.75	<0.05	15	6.64	2.40	21	4020	6.9	7	46	76	8	8	0.50	<0.05	15	6.49	1.54	8	62
AVG	1713	7.7	221	597	653	129	180	41	7.00	438	2.02	6.6	5	25	87	5	8	0.45	<0.05	15	6.51	2.40	21	23	6.6	5	35	64	8	8	0.40	<0.05	15	6.39	1.54	8	22

* Ammonia (unionized) as N at 15°C

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

NOVEMBER 2013 MONTHLY DATA

		INFLUENT								SBR 1 EFFLUENT												SBR 2 EFFLUENT											
		IN HOUSE			EXTERNAL					IN HOUSE			EXTERNAL									IN HOUSE			EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH_3	PO_4	pH	TSS	COD	COD	TSS	CBOD	NH_3	NH3 (unionized)*	Temp	pH	PO_4	FC	pH	TSS	COD	COD	TSS	CBOD	NH_3	NH3 (unionized)*	Temp	pH	PO_4	FC
Nov	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL
1	1469	7.7	363	821						6.6	6	13										6.6	6	45									
2	1803																																
3	1779																																
4	1630	7.8	310	508						6.6	<4	8										6.7	5	9									
5	1444																																
6	1505	7.9	280	538	775	175	258	38	9.30	6.6	<4		60	4	<4	0.60	<0.05	15	6.39	1.87	20	6.8	<4	3	10	6	<4	0.12	<0.05	15	6.40	3.40	22
7	1645																																
8	1840	7.9	200	545						6.6	5											6.6	<4										
9	1699																																
10	1663																																
11	1717	7.8	275	614						6.5	6											6.6	4										
12	1715																																
13	1640	7.9	320	654						6.6	7	37									46	6.7	4	44									12
14	1627																																
15	1911	7.8	340	760						6.6	7											6.6	5										
16	1855																																
17	1933																																
18	2229	7.8	215	500						6.7	5											6.6	8										
19	3061																																
20	2559	7.4	47	193	210	41	177	21		6.6	<4	66	27	5	<4	1.68					18	6.8	<4	102	13	3	<4	0.65					4
21	2030																																
22	1884	7.7	230	567						6.5	4											6.6	<4										
23	1866																																
24	1845																																
25	1800	7.7	423	884						6.6	<4											6.7	4										
26	1738																																
27	1885	7.7	348	703						6.6	5	81									40	6.7	6	67									34
28	1583																																
29	1489	7.7	255	598						6.6	5											6.7	4										
30	1665																																
Min	1444	7.4	47	193	210	41	177	21	9.30	6.5	<4	8	27	4	<4	0.60	<0.05	15	6.39	1.87	18	6.6	<4	3	10	3	<4	0.12	<0.05	15	6.40	3.40	4
Max	3061	7.9	423	884	775	175	258	38	9.30	6.7	7	81	60	5	<4	1.68	<0.05	15	6.39	1.87	46	6.8	8	102	13	6	<4	0.65	<0.05	15	6.40	3.40	34
AVG	1817	7.8	277	607	493	108	218	30	9.30	6.6	5	41	44	5	<4	1.14	<0.05	15	6.39	1.87	29	6.7	5	45	12	5	<4	0.39	<0.05	15	6.40	3.40	14

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

DECEMBER 2013 MONTHLY DATA

		INFLUENT								SBR 1 EFFLUENT												SBR 2 EFFLUENT											
		IN HOUSE			EXTERNAL					IN HOUSE			EXTERNAL									IN HOUSE			EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	PO_4	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	FC
Dec.	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	o C		mg/L	CFU/ 100mL
1	2865																																
2	2942	7.6	130	324						6.7	5											6.6	6										
3	2353																																
4	2184	7.8	160	474	540	110	180	27.4		6.6	6	62	27	4	<4	0.55	<0.05	15	6.61	3.00	8	6.6	5	86	15	4	<4	1.85	<0.05	15	6.60	3.01	4
5	1954																																
6	1920	7.8	235	413						6.8	6											6.6	6										
7	1889																																
8	1899																																
9	1801	7.6	275	821						6.6	7											6.4	8										
10	1723																																
11	1788	7.7	215	418						6.6	8	98									26	6.6	6	80									102
12	1841																																
13	1683	7.8	230	672						6.6	10											6.5	8										
14	1851																																
15	1945																																
16	1997	7.7	165	543						6.7	8											6.6	7										
17	1909																																
18	1908																																
19	1795	7.6	350	499	392		196	32.4	6.2	6.8	8	19	37	6		4.88		15	6.64	2.9	36	6.6	12	17	55	10		2.06		15	6.54	2.2	44
20	1996																																
21	2200																																
22	2229																																
23	2229	7.7	135	346						6.8	9											6.8	11										
24	2678		155	508																													
25	2200																																
26	2100																																
27	2292	7.6	140	243						6.8	16	50																					
28	2152																					6.8	11	43									
29	2009																																
30	1950	7.8	190	297						6.7	8	29										6.6	13	33									
31	2032																																
Min	1683	7.6	130	243	392	110	180	27.4	6.2	6.6	5	19	27	4	<4	0.55	<0.05	15	6.61	2.90	8	6.4	5	17	15	4	<4	1.85	<0.05	15	6.54	2.20	4
Max	2942	7.8	350	821	540	110	196	32.4	6.2	6.8	16	98	37	6	<4	4.88	<0.05	15	6.64	3.00	36	6.8	13	86	55	10	<4	2.06	<0.05	15	6.60	3.01	102
AVG	2075	7.7	198	463	466	110	188	29.9	6.2	6.7	8	52	32	5	<4	2.72	<0.05	15	6.63	2.95	20	6.6	9	52	35	7	<4	1.96	<0.05	15	6.57	2.61	26

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

	Sample Date	Jul 10, 2013	Oct.9, 2013	
	Sample Time	08:00	07:45	
	Sample Location			
	Sample Description	Influent	Influent	
	Matrix	Water	Water	
Analyte	**Units**	**Results**	**Results**	Nominal Detection Limit
Metals Total				
Calcium	mg/L	14.2	14.5	0.05
Iron	mg/L	0.150	0.240	0.01
Magnesium	mg/L	4.54	5.28	0.05
Manganese	mg/L	0.0383	0.0355	0.005
Potassium	mg/L	17.6	12.4	0.1
Silicon	mg/L	3.42	4.19	0.05
Sulfur	mg/L	7.1	8.0	0.1
Sodium	mg/L	39.1	30.2	0.02
Titanium	mg/L	0.0027	0.0230	0.001
Aluminum	mg/L	0.119	0.14	0.005
Antimony	mg/L	<0.0002	<0.001	0.0002
Arsenic	mg/L	0.0003	<0.001	0.0002
Barium	mg/L	0.014	0.008	0.001
Beryllium	mg/L	<0.00004	<0.0002	0.00004
Bismuth	mg/L	<0.0010	No data	0.001
Boron	mg/L	0.124	0.07	0.004
Cadmium	mg/L	0.00006	<0.0004	0.00001
Chromium	mg/L	0.0007	<0.002	0.0004
Cobalt	mg/L	0.00033	0.0004	0.00002
Copper	mg/L	0.039	0.054	0.001
Lead	mg/L	0.0012	0.0017	0.0001
Lithium	mg/L	0.008	<0.005	0.001
Molybdenum	mg/L	0.0003	0.0007	0.0001
Nickel	mg/L	0.002	<0.005	0.001
Selenium	mg/L	<0.0006	<0.003	0.0006
Silver	mg/L	0.00003	<0.0002	0.00001
Strontium	mg/L	0.035	0.043	0.001
Tellurium	mg/L	<0.0001	No data	0.0001
Thallium	mg/L	<0.00001	<0.00005	0.00001
Thorium	mg/L	<0.0004	<0.0020	0.0004
Tin	mg/L	0.0007	0.0010	0.0001
Uranium	mg/L	<0.0004	<0.002	0.0004
Vanadium	mg/L	0.0003	0.00062	0.0001
Zinc	mg/L	0.083	0.095	0.001
Zirconium	mg/L	0.0017	0.0021	0.0001

WATER SAMPLING FOR THE EPCOR WASTEWATER TREATMENT PLANT OUTFALL IN SOOKE BAY

September 2013

Pacificus Biological Services Ltd

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info@pacificus.ca www.pacificus.ca

Water Sampling for the Epcor Wastewater Treatment Plant Outfall in Sooke Bay

Sampling Date: August 20, 2013
Report Submission Date: October 29, 2013

Prepared for:

EPCOR WATER SERVICES
7113 West Coast Rd
Sooke, BC

Prepared by:

PACIFICUS BIOLOGICAL SERVICES LTD.
P.O. Box 2760
Port Hardy, B.C.
V0N 2P0

TABLE OF CONTENTS

INTRODUCTION

In 2005, Epcor Water Services was contracted to construct a wastewater treatment facility and outfall to accommodate present and future population growth in the municipality of Sooke. The facility discharges into Sooke Bay, which is located approximately 35 km east of Victoria on the southwest coast of Vancouver Island, British Columbia (Figures 1 & 2). The facility began operations in December 2005. In order to ensure compliance with the Municipal Sewage Regulation (MSR), and CCME standards, Epcor contracted Pacificus Biological Services Ltd. to conduct annual water sampling for 2013 in the receiving environment of the outfall.

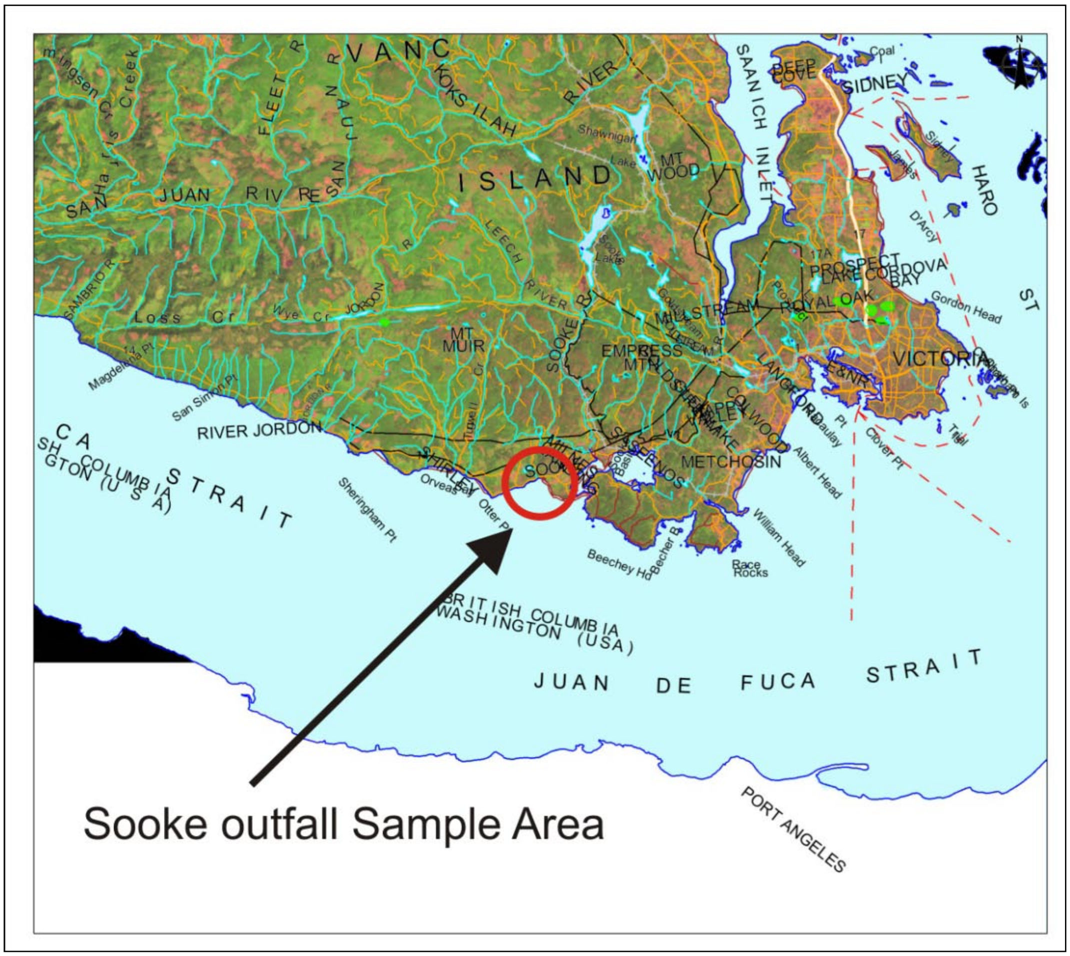

Figure 1: General location of sample sites, Sooke Bay, British Columbia

Figure 2: Aerial view of Sooke Bay outlining location of wastewater outfall with reference to Sooke and the Epcor Office.

Effluent monitoring has consisted of water sampling at 4 index sites. In October 2005, a pre-operational baseline survey was conducted to establish index sites and record water chemistry parameters which future sampling efforts could be compared against. The latest phase of sampling took place on August 20, 2013. The water sampling involved measuring the following parameters within the receiving waters environment:

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

METHODOLOGY

Four index sampling sites were determined by Epcor and provincial ministry staff (Figure 3). The four index sites were sampled before wastewater discharge commenced in 2005, and subsequently at regular intervals. The site locations are as follows:

1. **Location of outfall diffuser** *48° 21' 15"N,* *123° 46' 21"W*

2. **100m North of outfall** *48° 21' 17"N,* *123° 46' 17"W*
   (Initial dilution zone 100m from outfall diffuser)

3. **100m South of outfall** *48° 21' 13"N,* *123° 46' 24"W*
   (Initial dilution zone 100m from outfall diffuser)

4. **300m towards shore** *48° 21' 22"N,* *123° 46' 11"W*
   (300m away from the outfall diffuser towards shore)

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 be trapped, if a pycnocline is present. 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. found that the water profile data displayed homogeneity of the water column in Sooke Bay, indicating that the water is fully-mixed (unstratified) throughout the year. On the date that the latest phase of sampling occurred (August 20, 2013) the weather was sunny with fog and no wind. The water column was measured to be unstratified at the time of sampling; therefore, only one set of samples were gathered from each site at a depth of 2m.

Daniel Williams, RPBio, located the sample sites using a handheld Garmin GPS (with pre-recorded sample site waypoints) and gathered water samples from a depth of 2m. Dissolved Oxygen (DO), conductivity, salinity, pH and temperature readings were taken and recorded in the field using a YSI Model 85 handheld multi parameter testing instrument.

Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Ammonia (N) and Fecal Coliform parameters were submitted to Maxxam Laboratory in Victoria on the same date as collection. Samples for each of these parameters were gathered and transported in sealed and sterilized sample jars. Sampling completed for the Sooke Bay project 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*. In addition to the 4 site samples, duplicate samples at one site (Site 4) were collected for lab analysis in order to meet quality assurance/ quality control targets.

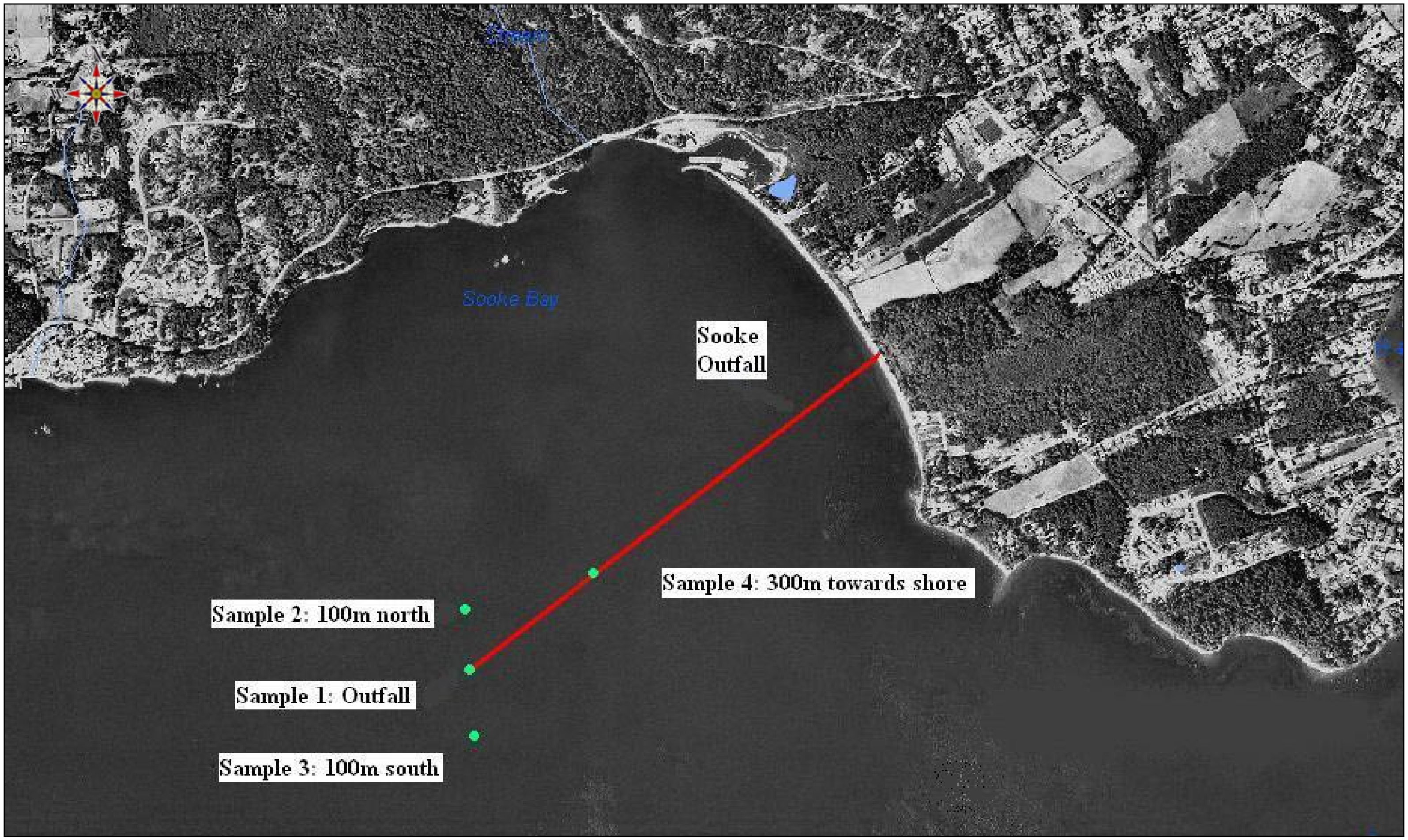

Figure 3: Sooke Bay receiving water-sampling locations (approximate).

TEST METHODS

Ammonia in Water

Analysis was performed using Flow Injection Analysis where the aqueous sample is injected into a carrier stream which merges a sodium hydroxide stream. Gaseous ammonia is formed, which diffuses through a gas permeable membrane into an indicator stream. This indicator stream is comprised of a mixture of acid-base indicators, which will react with the ammonia gas; resulting in a colour shift which is measured photometrically at 590nm.

Conventional Parameters

Analyses were performed at Maxxam'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", (2007 Edition) and "Standard Methods for the Examination of Water and Wastewater", 21st Edition (1998). Analysis was performed at Maxxam Laboratory.

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

BOD	5 mg/L
Ammonia	0.005 mg/L
Fecal Coliforms	1 CFU/100mL
Total Suspended Solids	5 mg/L

Please contact Pacificus Biological Services Ltd. if more detailed information is required with respect to sampling methodologies and procedures.

All testing completed for the Receiving Waters Monitoring in Sooke Bay was 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 the August 20, 2013 sampling at each of the sites are listed in Table 1. A comparison of historic measurements (from the baseline in October 2005 until October 2012) at each of the index sites are listed in Tables 2, 3, 4 and 5. The receiving waters surrounding the Sooke outfall contained levels of ammonia, BOD and fecal coliforms within guideline limits during the latest phase of sampling.

CONCLUSION

The 2013 environmental monitoring of the Sooke outfall receiving waters is complete. Ammonia, BOD, TSS and fecal coliform levels were within acceptable ranges and no concerns were identified as a result of this monitoring event. An analysis of the duplicate sample documented that quality control targets were achieved.

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Table 1: Water sampling results from the Epcor Sooke outfall August 20, 2013.

Sample No	Depth (m)	pH	Cond (uS/cm)	D.Oxygen	Salinity (ppt)	Temperature °C	Fecal Col. Col/100mL	Bio. Oxygen Demand mg/L	Total Susp. Solid mg/L	Ammonia - N mg/L
# 1 Outfall	2	7.8	33.29	57.4% 5.39 mg/L	30.5	9.6	< 1	< 5	12	0.042
# 2 100m north of outfall	2	7.8	33.37	58.1% 5.45 mg/L	30.5	9.7	< 1	< 5	14	0.031
# 3 100m south of outfall	2	7.8	33.29	57.7% 5.38 mg/L	30.5	9.6	< 1	< 5	6	0.035
# 4 300m south of outfall	2	7.8	33.31	55.7% 5.26 mg/L	30.5	9.6	< 1	< 5	7	0.046

Table 2: Historic data from Sooke Outfall water samples October 2005 – May 2007.

Date	Sample #	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
October 2005 BASELINE	#1 Outfall	2	8.1	33.91	66%	30.7	9.9	2	<5.0	22	no data
		12	7.8	34.41	65.70%	31.6	9.6	2	<5.0	16	no data
	#2 100m north of outfall	2	8	33.7	66%	30.5	9.8	<2	<5.0	16	no data
		12	7.7	34.39	65.50%	31.8	9.6	<2	<5.0	15	no data
	#3 100m south of outfall	2	8.1	33.85	68%	30.6	9.9	5	<5.0	18	no data
		12	7.9	34.32	65.80%	31.7	9.5	<2	<5.0	22	no data
	#4 300m south of outfall	2	8	33.8	66%	30.5	9.9	<2	<5.0	17	no data
		12	7.6	34	66%	31.7	9.5	<2	<5.0	17	no data
	#5 Sook Harbour	2	8.1	34.2	67%	30.8	9.8	<2	no data	no data	no data
		12	7.8	34.5	66%	31.8	9.7	<2	<5.0	15	no data
April 2006	# 1 Outfall	2	8	32.98	9.75	30.4	9.4	<1	<5.0	38	<0.002
		9	7.9	33.04	9.22	30.7	9	<1	<5.0	23	0.042
	# 2 100m north of outfall	2	8.1	31.87	9.74	30.1	9.5	<1	<5.0	21	<0.002
		9	8	33.67	9.31	31.1	9.1	1	<5.0	32	0.056
	# 3 100m south of outfall	2	8.1	32.8	9.74	30.2	9.7	<1	<5.0	21	<0.002
		9	8.1	15.3	9.9	30.6	9.9	<1	<5.0	18	<0.002
	# 4 300m south of outfall	2	8.1	32.87	9.77	30.2	9.5	<1	<5.0	12	0.027
		9	8	18.95	9.87	30.9	9.2	<1	<5.0	43	<0.002
September 2006	# 1 Outfall	2	8.3	35.5	65.8	30.7	10.8	<1	<5.0	18	0.023
		12	7.9	35.29	63.5	31.7	10.5	45	<5.0	20	0.023
	# 2 100m north of outfall	2	7.9	35.56	66	30.6	10.8	4	<5.0	23	0.02
		12	7.8	35.34	60.7	31.8	10.5	39	<5.0	21	0.018
	# 3 100m south of outfall	2	7.8	35.48	63.1	30.5	10.7	104	<5.0	18	0.018
		12	7.8	35.39	60.1	31.2	10.5	36	<5.0	18	0.016
	# 4 300m south of outfall	2	7.8	35.59	63.6	31.1	10.9	56	<5.0	17	0.022
		12	7.8	35.38	59.4	31.8	10.5	52	<5.0	29	0.016
January 2007	# 1 Outfall	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
	# 2 100m north of 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
	# 3 100m south 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
	# 4 300m 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
May 2007	# 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

Table 3: Historic data from Sooke Outfall water samples September 2007 – October 2009.

Date	Sample #	Depth (m)	pH	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	Temperature °C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
September 2007	# 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	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	8.8	<1	<5.0	9	0.04
	# 4 300m south of outfall	2	7.5	33.69	52.8	31.9	8.7	<1	<5.0	8	0.04
March 2008	# 1 Outfall	2	7.9	47.31	102.9	30.4	7.1	<1	<5.0	13	0.04
	# 2 100m north of outfall	2	7.7	46.14	115.4	30.6	7.4	<1	<5.0	16	0.03
	# 3 100m south of outfall	2	8	49.22	116.5	30.1	7.4	<1	<5.0	14	0.03
	# 4 300m south of outfall	2	7.7	50.11	109.6	30.1	7.5	<1	<5.0	20	0.05
October 2008	# 1 Outfall	2	8.3	34.4	50.4	32.3	8.9	<1	<5	<1	0.02
	# 2 100m north of outfall	2	8.3	34.4	50.1	32.3	8.9	1	<5	6	<.0.01
	# 3 100m south of outfall	2	8.3	34.4	52.8	32.3	8.9	2	<5	2	<0.01
	# 4 300m south of outfall	2	8.3	34.38	56.1	32	9.1	1	<5	<1	0.01
March 2009	Outfall	2 m	7.8	32.20	82.1% 8.12 mg/L	31.6	7.0	1.0	6.0	< 5	0.02
	100m North of Outfall	8 m	7.8	32.15	83.8% 8.44 mg/L	31.6	7.0	1.0	9.0	< 5	0.02
		2 m	7.5	32.18	85.20% 8.39 mg/L	31.6	7.0				
	100m South of Outfall	2 m	8.0	32.22	80.6% 7.95 mg/L	31.6	7.0	1.0	10.0	< 5	0.02
	300m towards shoreline from Outfall	2 m	7.8	32.34	81.2% 7.97 mg/L	31.8	7.0	1.0	9.0	< 5	0.02
October 2009	# 1 Outfall	2	8.0	34.4	69.5	31.9	9.3	<1	<5	<1	0.06
	# 2 100m north of outfall	2	8.0	34.7	63.4	32.2	9.2	2	<5	<1	0.06
	# 3 100m south of outfall	2	8.0	34.7	63.5	32.1	9.3	<1	<5	5	0.05
	# 4 300m towards shoreline from outfall	2	8.0	34.7	63.5	32.2	9.2	<1	<5	<1	0.05

Table 4: Historic data from Sooke Outfall water samples April 2010 – June 2012.

Date	Sample #	Depth (m)	pH	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	Temperature °C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
April 2010	# 1 Outfall	2	8.5	33.37	99% 8.5 mg/L	31.2	8.9	2	< 5	< 1	0.01
		12	8.5	33.24	105% 9.9 mg/L	30.8	9.1	< 1	< 5	< 1	0.03
	# 2 100m north of outfall	2	8.5	33.15	120% 13.1 mg/L	30.8	9.1	< 1	< 5	< 1	0.08
		12	8.5	33.16	121% 11.3 mg/L	30.8	9.1	< 1	< 5	< 1	0.02
	# 3 100m south of outfall	2	8.5	33.27	96% 9.0 mg/L	30.9	9.0	< 1	< 5	< 1	0.01
		12	8.5	33.26	95% 9.0 mg/L	30.9	9.1	< 1	< 5	< 1	0.02
	# 4 300m south of outfall	2	8.5	33.25	97% 9.1 mg/L	30.8	9.2	< 1	< 5	< 1	0.05
		12	8.5	33.2	94% 9.0 mg/L	30.8	9.1	< 1	< 5	< 1	0.04
October 2010	# 1 Outfall	2	7.5	34.23	90.0% 8.69 mg/L	31.4	9.6	< 1	< 5	3	0.09
	# 2 100m north of outfall	2	7.5	34.28	77.2% 7.18 mg/L	31.4	9.6	< 1	< 5	2	0.09
	# 3 100m south of outfall	2	7.5	34.3	78.2% 7.45 mg/L	31.4	9.7	< 1	< 5	8	0.10
	# 4 300m towards shoreline from outfall	2	7.5	34.24	72.4% 6.73 mg/L	31.4	9.6	< 1	< 5	5	0.10
May 2011	# 1 Outfall	2	7.9	32.84	% 7.53 mg/L	30.8	8.6	< 1	< 5	162	0.02
	# 2 100m north of outfall	2	7.9	32.83	78.9% 7.54 mg/L	30.8	8.7	< 1	< 5	62	0.03
	# 3 100m south of outfall	2	7.9	32.82	78.9% 7.54 mg/L	30.8	8.6	< 1	< 5	29	0.02
	# 4 300m towards shoreline from outfall	2	7.9	32.76	80.5% 7.74 mg/L	30.7	8.7	< 1	< 5	80	0.02
September 2011	# 1 Outfall	2	8.07	34.29	54.9% 5.12mg/L	31.6	9.5	10	< 5	74	0.04
	# 2 100m north of outfall	2	8.05	34.32	55.2% 5.15 mg/L	31.6	9.5	11	< 5	112	0.04
	# 3 100m south of outfall	2	8.03	34.00	55.0% 5.14 mg/L	31.3	9.5	9	< 5	101	0.07
	# 4 300m towards shoreline from outfall	2	8.08	34.33	54.7% 5.10 mg/L	31.6	9.5	9	< 5	160	0.06
June 2012	# 1 Outfall	2	7.91	33.46	68.9% 6.55mg/L	31.3	8.9	<1	< 5	<5	0.024
	# 2 100m north of outfall	2	7.87	33.57	140.5% 13.73 mg/L	31.6	8.6	1	< 5	10	0.034
	# 3 100m south of outfall	2	8.02	33.64	81.3% 7.76mg/L	31.7	8.7	<1	< 5	6	0.058
	# 4 300m towards shoreline from outfall	2	8.05	33.64	73.6% 7.00mg/L	31.6	8.7	<1	< 5	5	0.077

Table 5: Historic data from Sooke Outfall water samples October 2012.

Date	Sample #	Depth (m)	pH	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	Temperature °C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
October 2012	# 1 Outfall	2	7.55	34.34	68.8% 6.49mg/L	32.35	8.7	1	< 5	29	0.054
	# 2 100m north of outfall	2	7.58	34.33	68.4% 6.46 mg/L	32.28	8.8	<1	< 5	121	0.024
	# 3 100m south of outfall	2	7.54	34.33	72.5% 6.84 mg/L	32.24	8.7	<1	< 5	14	0.032
	# 4 300m towards shoreline from outfall	2	7.67	34.31	69.6% 6.56 mg/L	32.24	8.8	1	< 5	270	0.026