

District of Port Hardy
Wastewater Treatment Plants
& Collection System

Operated by
EPCOR Water Services Inc.



Annual Operations Report 2011

MOE Certification ME-00385 & PE-04168





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Overview

Port Hardy is located on the northeastern tip of Vancouver Island, British Columbia. EPCOR operates and maintains the wastewater treatment plants for the District of Port Hardy. There are two major collection areas in the town, each with a wastewater treatment facility. The Airport Wastewater Treatment Plant (AWWTP), built in 1975, is located adjacent to the Transport Canada Airport facility and operates under permit PE-04168. Effluent is discharged into the Queen Charlotte Strait. There are three lift stations located in the AWWTP collection system.

The Tsulquate Wastewater Treatment Plant (TWWTP), originally built in 1972, services the majority of the population of Port Hardy, and has historically operated under permit PE-385. The discharge from this facility is sent into Hardy Bay. There are eight lift stations located in the TWWTP collection system. The plant underwent a major upgrade in 2007 which included the addition of two sequential batch reactors, a new headworks and ultraviolet disinfection (UV). The permit was also updated into a more stringent Operational Certificate (ME-00385).

Permits

The Airport wastewater treatment facility is a Class 2 facility and operates under permit PE-04168.

The Tsulquate wastewater treatment facility is a Class 3 facility as deemed by the Environmental Operators Certification Program (EOCP), certification number 1488. The fully upgraded Tsulquate plant operates under the Ministry of Environments Operating Certificate of ME-00385. The historical permit that applied before the upgrades were completed was PE-385.

Operators

Operator	Title	Certification
Joe Jewell	Foreman	WT III, WWT II, WD II, CCT, CH
Kenn Oliver	Operator	WT III, WWT III, CH
Sean Mercer	Foreman	WD III, CCT
Justin Reusch	Operator	WT II, WWT I, WD I
Roland LeFort	Operator	WWT II
Cory Henschke	Operator	WWT I
Dennis Dugas	Capital Projects	WT III, WD IV, WC I, WWT II, CH
Trevor Kushner	Manager	

WT – Water Treatment, WWT – Wastewater Treatment, WD – Water Distribution, WC – Wastewater Collection, OIT – Operator in Training, CCT – Cross Connection Tester, CH – Chlorine Handler



Tsulquate Wastewater Treatment Plant Highlights

The upgraded Tsulquate wastewater treatment plant (TWWTP) has performed very well since the new SBR trains have been online and the modifications to the extended aeration plant were completed in 2008. The combined average influent flow over the course of 2011 was 2117 m³/day. The design capacity for the entire plant with the SBR trains and the extended aeration train is 2700 m³/d.

Pacificus Biological Services Ltd. conducted the annual receiving waters monitoring in Hardy Bay. The water under the influence of the Tsulquate plant effluent outfall contained acceptable levels for all parameters tested on the day of sampling. These values were comparable to the previous years that these tests were conducted.

Incidents

There was one minor incident at the Tsulquate wastewater plant in July. Operator gathered samples on regular testing day and noted that the effluent was unusually cloudy and slightly greenish. Internal testing indicated that the TSS was 55 ppm and the BOD₅ was 66 ppm. CALA external lab testing indicated that TSS was 40 ppm and below permit limit of 45 ppm.



Airport Wastewater Treatment Plant Highlights

The Airport wastewater treatment plant (AWWTP) continued to produce excellent effluent in 2011. There were no permit violations. The average influent effluent flow was 637 m³/day. The capacity of the plant is 276,000 Imperial Gallons per day (1242 m³/day).

In August, Pacificus Biological Services Ltd. conducted receiving waters monitoring in Queen Charlotte Strait (report attached). The water under the influence of the Airport plant effluent outfall contained acceptable levels for all parameters tested on the day of sampling.

Incidents

There were no incidents in 2011 at the Airport Wastewater Treatment plant with the exception of one violation to the permit regarding the effluent total suspended solids (TSS). On May 5th, the coagulant storage tank at the Port Hardy water treatment plant was cleaned. The chemical precipitate was removed by vacuum truck and disposed of at the Airport Wastewater Treatment plant as recommended by the chemical supplier. Unfortunately, the solids level in the effluent exceeded our permit allowance. These solids are not biological in nature and are an inert substance that does not have an adverse effect on the local receiving waters. However, the permit does not differentiate between inert solids and biological type solids and therefore, this will still be deemed a compliance issue by Ministry of Environment (MOE). The matter was reported and discussed with MOE. We have also spoke with our chemical supplier regarding the incident and have taken corrective measures to assure that this will not happen again.



Collection System

The collection system is operating well considering the age of the infrastructure. The lift stations remain a focus for the maintenance and capital upgrade programs to address aging infrastructure, as identified in the Liquid Waste Management Plan.

Incidents

In April, the Peel Street liftstation overflowed when an electrical fault caused the level indicator to fail and the pumps not to start. The result was the liftstation overflowing into an unnamed stream. Pacificus Biological Services Ltd was retained to oversee the remediation. MOE was contacted regarding the issue.

In August, at the Pioneer liftstation, there was a greywater spill into the Quatse River. The incident was remediated by Pacificus Biological Services Ltd. The assessment and lab testing of the receiving waters indicated that there was no evidence of contamination by way of fecal coliforms or debris.



EFFLUENT QUALITY DATA

Water quality monitoring of the plant has increased substantially for the upgraded TWWTP, partially due to the monitoring requirements identified in the operational certificate and also due to the increased monitoring that is required to meet higher treatment standards. The data presented in this report includes the results from samples sent to an external laboratory, certified to ISO17025 by CALA, as well as the internal testing results for some of the parameters completed onsite. While the internal data is not CALA accredited, it goes through an extensive QA/QC process. It complements the external data in demonstrating treatment performance due to the increased frequency of the internal testing.

The following two tables summarize the key quality parameters for the Tsulquate and Airport Wastewater Treatment Plants. Receiving environment monitoring was also completed.

Table 1 - TWWTP Effluent Quality Summary

Month	Internal Lab							External Lab							
	Flow cubic meters / day		TSS ppm		BOD ppm		# of Tests	TSS ppm		BOD ppm		Ammonia ppm		# of Tests	
	Avg	Max	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max		
January	1419	2431	6	16	3	9	17	6	10	5	5	9.6	9.6	7	
February	2173	3205	8	12	5	9	17	8	10	5	5	3.1	3.1	7	
March	2158	3670	8	16	4	6	18	7	9	5	5	8.7	8.7	11	
April	1861	2947	7	12	4	4	15	6	9	5	5	3.4	3.4	9	
May	1828	2487	8	16	4	7	17	7	8	5	5	8.0	8.0	9	
June	1767	2159	16	52	20	66	17	14	40	5	7	3.3	3.3	11	
July	1970	2520	6	12	5	9	16	8	10	5	5	3.7	3.7	9	
August	1785	2868	9	16	6	9	20	10	10	5	5	5.3	5.3	5	
September	2306	5462	9	20	8	13	16	10	0	6	0	13.2	13.2	1	
October	2109	2935	8	16	8	13	16	9	10	5	5	2.8	2.8	5	
November	2774	9731	9	16	4	8	17	11	17	6	8	5.0	5.0	7	
December	2238	3480	6	12	9	14	19	8	9	5	5	7.6	7.6	8	
	2032				Total Year to Date			205					Total Year to Date		89

Table 2 - AWWTP Effluent Quality Summary

Month	Internal Lab							External Lab							
	Flow cubic meters / day		TSS ppm		BOD ppm		# of Tests	TSS ppm		BOD ppm		Ammonia ppm		# of Tests	
	Avg	Max	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max		
January	648	845	21	32	11	18	17	22	22	17	17	0.8	0.8	3	
February	643	855	22	32	16	26	16	23	23	9	9	0.1	0.1	3	
March	621	5	24	44	19	47	18	30	30	13	13	0.0	0.0	3	
April	559	690	15	28	13	24	15	22	22	17	17	0.5	0.5	3	
May	551	824	42	236	22	46	19	48	110	27	33	3.9	3.9	7	
June	524	587	8	16	9	14	17	12	12	5	5	3.7	3.7	3	
July	568	782	11	20	8	15	16	7	7	5	5	0.1	0.1	3	
August	619	765	10	24	11	13	19	14	14	5	5	0.1	0.1	3	
September	667	1145	15	24	13	14	16	10	10	5	5	0.6	0.6	3	
October	702	865	17	24	14	15	16	33	33	11	11	0.0	0.0	3	
November	799	1145	19	36	13	24	17	29	29	9	9	0.5	0.5	3	
December	742	976	16	24	22	35	18	88	88	10	10	0.3	0.3	3	
	637				Total Year to Date			137					Total Year to Date		28



Table 3 – Permit Limitations

Parameter	Permit Limits	
	AWWTP	TWWTP
BOD5 ppm	<45	<45
Fecal Coliforms CFU/100 ml Geomean Average	n/a	200
pH pH Units	n/a	6.0-9.0
TSS ppm	<60	<45

**RECEIVING ENVIRONMENT WATER SAMPLING
FOR THE TSULQUATE WASTEWATER
TREATMENT PLANT IN HARDY BAY, BC**

October 2011



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Sampling Date: August 10, 2011
Report Submission Date: October 12, 2011

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INTRODUCTION

The District of Port Hardy, through its contracted representative, Epcor Water Services Ltd. (Epcor), is authorized to discharge effluent from the Tsulquate Wastewater Treatment Plant, a municipal secondary wastewater treatment system located on the west side of Hardy Bay. The plant has been operational since June 2007, when effluent discharge commenced from the upgraded plant.

Effluent discharge is authorized under *Operational Certificate ME-00385*, through the provisions of the Environmental Management Act. The Operational Certificate directs the authorized agent (Epcor) on numerous aspects of plant operation, including environmental protocols.

In order to ensure compliance with Operational Certificate ME-00385 for 2011, the Municipal Sewage Regulation (MSR), and CCME standards, Epcor contracted Pacificus Biological Services Ltd. to conduct annual water sampling for 2011 in the receiving environment of the outfall as outlined in the document *Environmental Monitoring Program for the Tsulquate Sewage Treatment Plant* (Pacificus, 2010). As per the MSR Section 27(a) the discharger must “monitor the receiving environment to provide data to assess the potential impact of the discharge and to ensure that the discharge does not or will not cause water quality parameters, outside the Initial Dilution Zone (IDZ), to exceed any known water quality guidelines.”

The following report provides information on the required water sampling conducted during 2011.



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

METHODOLOGY

Effluent monitoring has consisted of water sampling on a pre-determined schedule of once per year at 7 index sites. In June 2007, a pre-operational baseline survey was conducted to establish index sites and record water chemistry parameters which future sampling efforts could be compared against. Pacificus Biological Services Ltd. was contracted to perform regular marine water sampling on the receiving waters at the outfall. The latest phase of sampling took place on August 10, 2011. The water sampling involved measuring the following parameters within the receiving waters environment:

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

Sample Stations

Sample Stations

A total of 7 sample stations were selected for receiving environment monitoring (Figure 2, Table 1).

Station 1

As required by the Municipal Sewage Regulation Section 27,(1),(c) “when conducting a receiving environment monitoring program, provide at least one control sampling station located upstream, upgradient, or outside the influence of the initial dilution zone of the effluent”. This reference station was located approximately 1000 m away from the outfall’s IDZ.

Station 2

Sample station two was located directly above the new outfall terminus.

Stations 3 through 6

Sample stations 3 through 6 were equally spaced on a 100 m radius around the new outfall terminus.

In an effort to be as thorough as possible, an additional site was sampled in the following location:

Station 7

Sample station 7 was located in front of the Tsulquate Reserve within the potential impact zone.

Receiving Environment Water Sampling for Tsulquate Wastewater Treatment Plant in Hardy Bay

Table 1. Sample sites, locations, and depths for the Tsulquate Receiving Waters Monitoring program.

Site #	Location	Depth (meters - 5 depths required per site)				
1(control)	N50°44'.735 W127°29'.202	1.0	13.0	23.0	33.0	43.0
2(terminus)	N50°44'.277 W127°29'.105	1.0	15.0	30.0	45.0	63.0
3	N50°44'.315 W127°29'.044	1.0	9.0	19.0	29.0	39.0
4	N50°44'.301 W127°29'.181	1.0	6.0	11.0	16.0	22.0
5	N50°44'.233 W127°29'.151	1.0	5.0	10.0	15.0	20.0
6	N50°44'.257 W127°29'.030	1.0	6.0	12.0	18.0	25.0
7(beach)	N50°44'.182 W127°29'.466	1.0	N/A Too shallow	N/A Too shallow	N/A Too shallow	N/A Too shallow

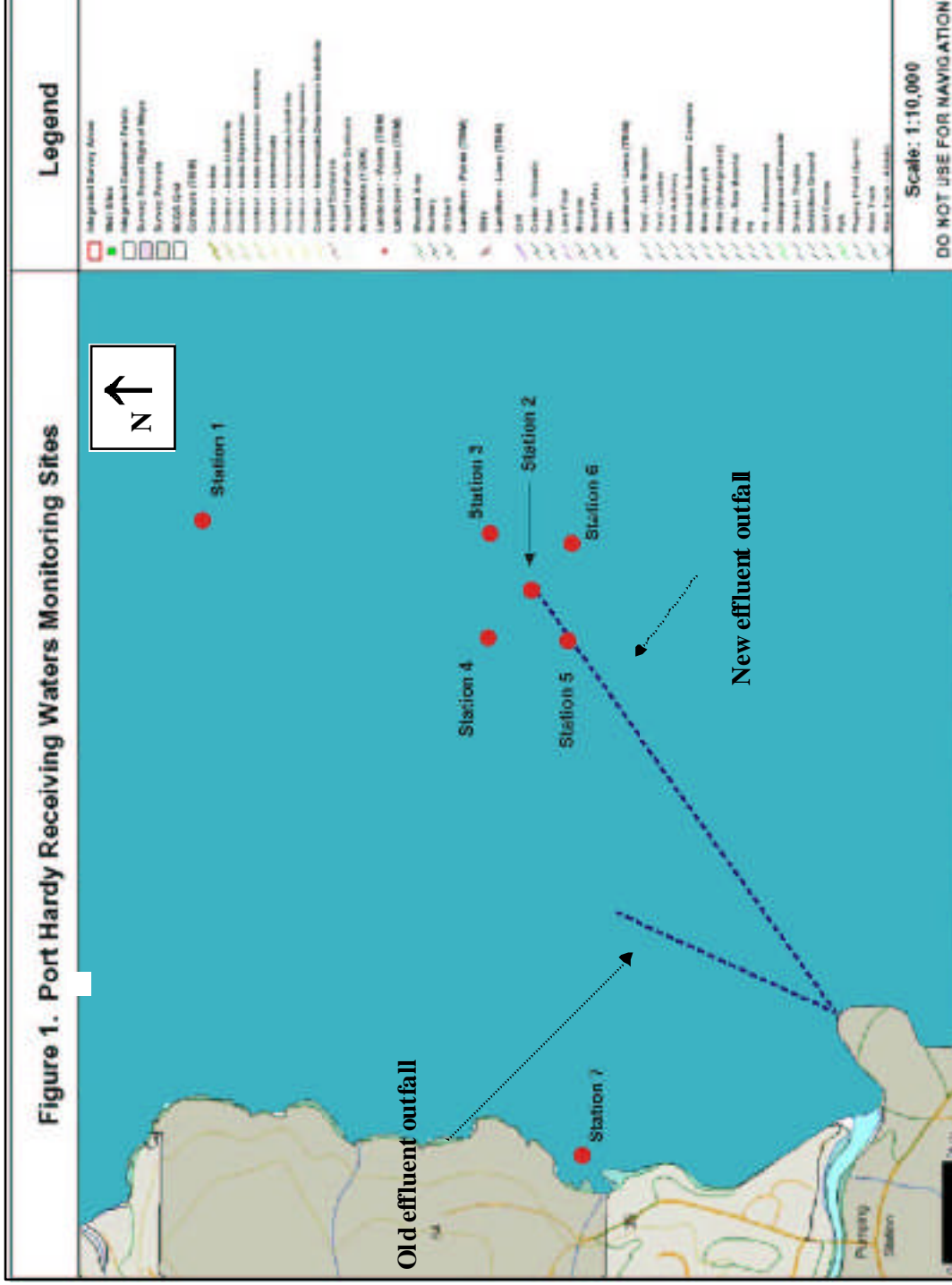


Figure 2. Tzulquate Wastewater Treatment Plant discharge receiving waters sampling locations, Hardy Bay, BC.

Sampling Procedures

Sampling was carried out in accordance with the procedures described in the most recent edition of the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* (2003).

A GPS was used to navigate to each station. Dissolved Oxygen, salinity and temperature readings were taken and recorded in the field using a YSI, model 85 multimeter. Fecal Coliform, Ammonia, Enterococcus, and Total Suspended Solids (TSS) samples were collected using a Van Dorn water sampler and stored in sample containers to be analyzed by North Island Laboratories located in Courtenay, BC. Replicate water samples were collected for 10% of the total samples in order to meet quality control parameters.

Laboratory Test Methods

Fecal coliform concentrations were measured using the *Standard Methods for the Examination of Seawater and Shellfish* (NI Labs, Pers. Comm). 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.

TSS concentrations were measured using the *Standard Methods for the Examination of Water and Wastewater : method 2540* (NI Labs, Pers. Comm). A well-mixed sample was filtered and dried to constant weight. The increase in weight of the filter represented the TSS.

Enterococcus concentrations were measured using the *Standard Methods for the Examination of Water and Wastewater : method 9230* (NI Labs, Pers. Comm). These samples use a liquid and solid culture media to eliminate non-enterococci and non-streptococci through the use of sodium azide, actidione, and 2,3,5-triphenyltetrazolium chloride (TTC).

The detection limits for fecal coliforms, ammonia, Enterococcus and TSS are as follows:

Ammonia	0.002 mg/L
Fecal Coliforms (MF)	2 MPN/100mL
Total Suspended Solids	5 mg/L
Enterococcus	2 MPN/100mL

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

RESULTS

Specific results for the August 10, 2011 sampling at each of the sites are listed in Table 2 for the lab sample results and Table 3 for the field sample results. The receiving waters surrounding the Tsulquate outfall contained acceptable levels of ammonia, fecal coliform, Enterococcus and total suspended solids in the latest phase of sampling and water quality parameters measured in the field were observed to be within parameters for water quality. Sampling did not occur at Site 7 in 2011, the beach site fronting the First Nations reserve, as there was insufficient water depths at the time of sample collection.

CONCLUSION

The August 2011 monitoring of the Tsulquate outfall receiving waters is complete. All samples taken were measured for total ammonia, fecal coliforms and TSS. The maximum acceptable level for total ammonia is 0.19 mg/L, given the salinity, pH and temperature of the waters within the IDZ of the Tsulquate Outfall (Ministry of Land Water and Air Protection, 2001). The highest total ammonia reading found in any of the water samples taken from this area surrounding the Tsulquate outfall was 0.6 mg/L which is well within acceptable limits.

The maximum acceptable levels for fecal coliforms in waters within the IDZ of the Tsulquate Outfall depend upon the usage of the receiving waters. The Tsulquate Outfall discharges into shellfish bearing waters (though it should be noted that Hardy Bay has been closed for shellfish harvest) which allows for a maximum acceptable median fecal coliform count of 14 MPN/100ml with not more than 10% of samples exceeding 43MPN/100ml (Ministry of Water Land and Air Protection, 1999). The median fecal coliform measurement taken was <2 MPN/100ml and 0% of samples exceeded 43 MPN/100ml which is well within acceptable limits.

The maximum acceptable level for TSS within the IDZ is 45mg/L. The highest TSS measurement taken was 60mg/L however a replicate taken at the same location immediately after resulted in a TSS of 16mg/L which is well within acceptable limits. All other samples were also within acceptable limits.

Table 2: Tzulquate wastewater treatment plant receiving waters lab sampling results August 2011.

Sample No	Depth (m)	Fecal Col. CFU/100mL	TSS mg/L	Ammonia mg/L	Enterococcus CFU/100mL
Station 1 (control)	2	<2	13	0.03	<1
	11	<2	12	0.02	<1
	20	<2	22	0.05	<1
	29	<2	20	0.04	<1
	33	<2	23	0.03	<1
Station 2	1	<2	12	0.02	1
	8	<2	15	<0.01	<1
	15	<2	21	0.05	<1
	22	<2	20	0.03	<1
	22 replicate	<2	49	0.04	<1
	26	<2	22	0.04	<1
Station 3	2	<2	17	0.01	<1
	12	<2	20	0.04	<1
	22	<2	18	0.04	<1
	32	<2	16	0.04	<1
	36	2	31	0.04	<1
Station 4	2	<2	19	<0.01	<1
	8	2	18	0.05	<1
	14	<2	15	<0.01	<1
	20	<2	15	0.04	<1
	24	<2	23	0.04	<1
Station 5	1	<2	17	0.04	<1
	7	<2	44	0.05	<1
	14	<2	17	0.04	1
	21	<2	17	0.04	1
	25	<2	60	0.05	8
	25 replicate	<2	16	0.05	<1

Station 6	2	<2	9.5	<0.01	3
	2 replicate	<2	17	0.03	1
	11	<2	19	0.06	<1
	20	<2	22	<0.01	<1
	29	<2	20	0.05	<1
	33	<2	9.5	0.05	<1

Table 3: Tsulquate wastewater treatment plant receiving waters field sampling results August 2011.

Sample No	Depth (m)	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	pH	Temperature °C
Station 1 (control)	1	35.46	112.9	31.0	8.4	11.5
	15	34.5	76.1	31.6	8.3	9.7
Station 2	1	35.67	115.4	31.0	8.4	11.8
	15	34.41	67.0	31.9	8.1	9.3
Station 3	1	36.00	117.7	30.9	8.4	12.2
	15	34.40	69.4	31.9	8.1	9.3
Station 4	1	36.22	121.2	31.0	8.4	12.4
	15	34.38	64.7	31.9	8.1	9.2
Station 5	1	36.40	133.2	31.0	8.5	12.7
	15	34.38	62.4	31.9	8.0	9.2
Station 6	1	36.74	135.2	30.9	8.6	13.2
	15	34.37	64.8	31.9	8.2	9.2

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**RECEIVING ENVIRONMENT WATER SAMPLING
FOR THE AIRPORT WASTEWATER
TREATMENT PLANT IN PORT HARDY, BC**

October 2011



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Sampling Date: August 10, 2011
Report Submission Date: October 12, 2011

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INTRODUCTION

The District of Port Hardy, through its contracted representative, Epcor Water Services Ltd. (Epcor), is authorized to discharge effluent from the Byng Road Sewage Treatment Plant, a municipal secondary wastewater treatment system located in Port Hardy, BC. The plant has been operational since December 1975, when effluent discharge commenced from the plant. The effluent from this plant is pumped to a waste transfer station and marine outfall near the Port Hardy Airport.

Effluent discharge is authorized under *Operational Certificate ME-04168*, through the provisions of the Environmental Management Act. The Operational Certificate directs the authorized agent (Epcor) on numerous aspects of plant operation, including environmental protocols.

In order to ensure compliance with Operational Certificate ME-04168 for 2011, the Municipal Sewage Regulation (MSR), and CCME standards, Epcor contracted Pacificus Biological Services Ltd. to conduct annual water sampling for 2011 in the receiving environment of the outfall as outlined in the document *Environmental Monitoring Program for the Port Hardy Airport Sewage Treatment Plant* (Pacificus, 2010). As per the MSR Section 27,(1),(a) the discharger must “monitor the receiving environment to provide data to assess the potential impact of the discharge and to ensure that the discharge does not or will not cause water quality parameters, outside the Initial Dilution Zone (IDZ), to exceed any known water quality guidelines.”

The following report provides information on the required water sampling conducted during 2011.

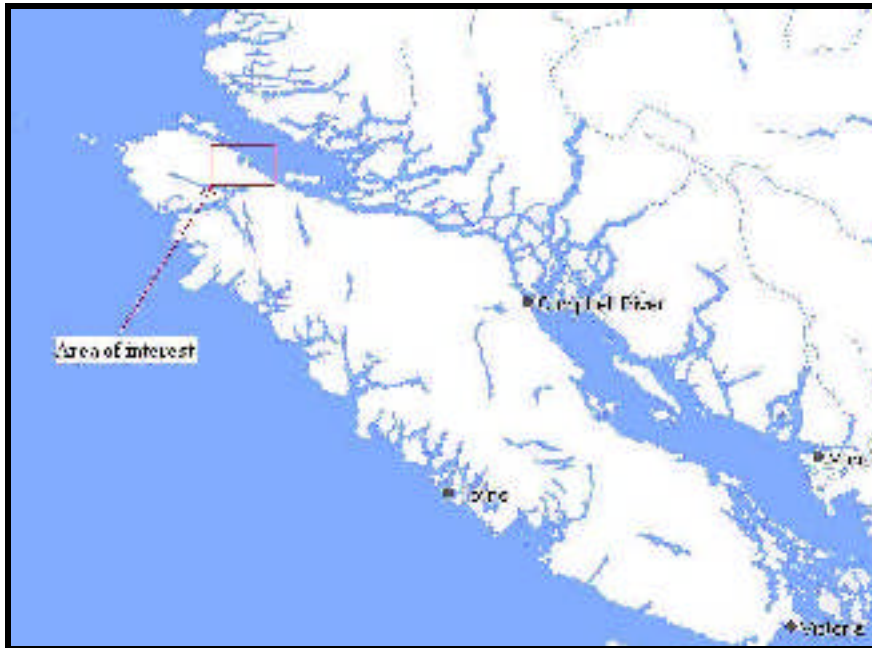


Figure 1: General location of sample sites, near Port Hardy Regional Airport (CYZT), British Columbia.

METHODOLOGY

Effluent monitoring has consisted of water sampling on a pre-determined schedule of once per year between August 1-31 at 7 index sites. Pacificus Biological Services Ltd. was contracted to perform regular marine water sampling on the receiving waters at the outfall. The latest phase of sampling took place on August 11, 2011. The water sampling involved measuring the following parameters within the receiving waters environment:

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

Sample Stations

Sample Stations

A total of 7 sample stations were selected for receiving environment monitoring (Figure 2, Table 1).

The station locations are as follows:

1. **Outfall Terminus**
50° 41.608'N, 127° 22.178'W
2. **50m South of terminus**
50° 41.598'N, 127° 22.183'W
(Within the initial dilution zone from outfall terminus)
3. **50m East of terminus**
50° 41.659'N, 127° 22.039'W
(Within the initial dilution zone from outfall terminus)
4. **50m North of outfall**
50° 41.750'N, 127° 22.185'W
(Within the initial dilution zone from outfall terminus)
5. **50m West of outfall**
50° 41.701'N, 127° 22.330'W
(Within the initial dilution zone from outfall terminus)
6. **Reference**
50° 41.546'N, 127° 21.175'W
(Located outside the initial dilution zone as required by the municipal sewage regulation Part 27(c).
This reference station was located approximately 1000 m away from the outfall's initial dilution zone.)
7. **Near shoreline proximate to outfall**
50° 41.533'N, 127° 22.415'W
(located part way along the outfall line at 20' water depth)

Table 1. Sample sites, locations, and depths for the Airport Receiving Waters Monitoring program.

Site #	Location	Depth (meters – 5 depths required per site)				
1(terminus)	N50°41'.608 W127°22'.178	1.0	5.0	10.0	15.0	19.0
2	N50°41'.598 W127°22'.183	1.0	3.0	6.0	9.0	12.0
3	N50°41'.659 W127°22'.039	1.0	5.0	10.0	15.0	19.0
4	N50°41'.750 W127°22'.185	1.0	5.0	10.0	15.0	20.0
5	N50°41'.701 W127°22'.330	1.0	3.0	6.0	9.0	11.0
6(former breach)	N50°41'.533 W127°22'.415	1.0	N/A Too shallow	N/A Too shallow	N/A Too shallow	N/A Too shallow
7(control)	N50°41'.546 W127°21'.175	1.0	4.0	8.0	12.0	17.0

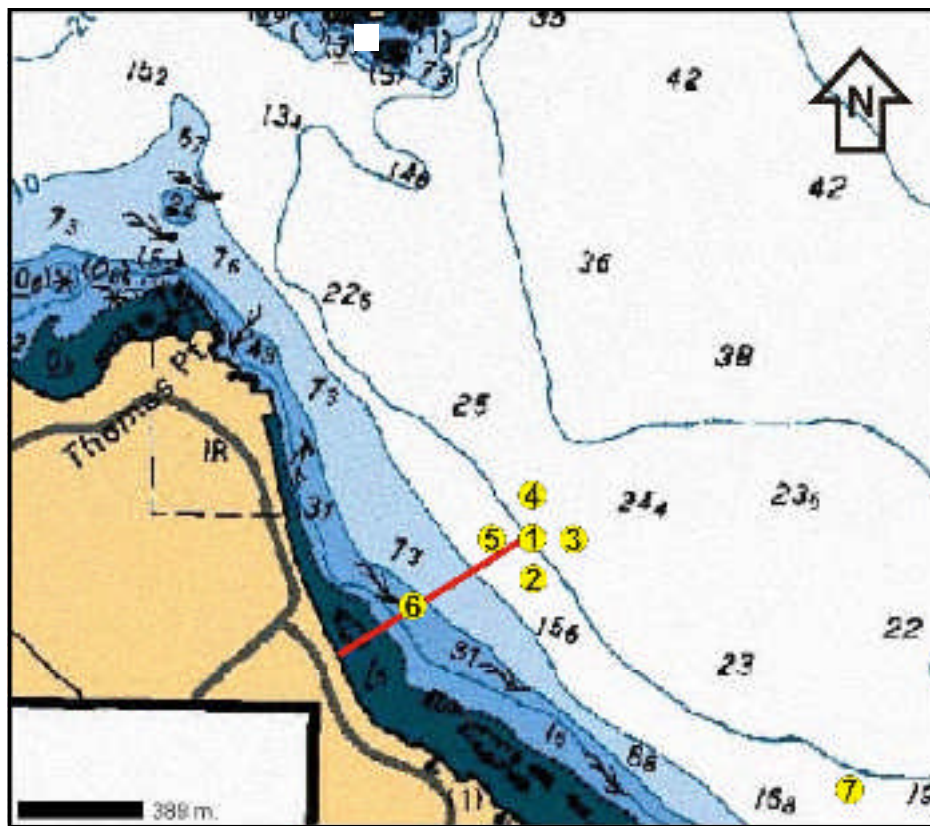


Figure 2. Airport outfall discharge receiving waters sampling locations, Port Hardy, BC.

Sampling Procedures

Sampling was carried out in accordance with the procedures described in the most recent edition of the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* (2003).

A GPS was used to navigate to each station. Dissolved Oxygen, salinity, pH and temperature readings were taken and recorded in the field using a YSI Model 85 multimeter. Fecal Coliform, Ammonia, Enterococcus, and Total Suspended Solids (TSS) samples were collected using a Van Dorn water sampler and stored in sample containers to be analyzed by North Island Laboratories located in Courtenay, BC. Replicate water samples were collected for 10% of the total samples in order to meet quality control parameters.

Laboratory Test Methods

Fecal coliform concentrations were measured using the *Standard Methods for the Examination of Seawater and Shellfish* (NI Labs, Pers. Comm). 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.

TSS concentrations were measured using the *Standard Methods for the Examination of Water and Wastewater : method 2540* (NI Labs, Pers. Comm). A well-mixed sample was filtered and dried to constant weight. The increase in weight of the filter represented the TSS.

Enterococcus concentrations were measured using the *Standard Methods for the Examination of Water and Wastewater : method 9230* (NI Labs, Pers. Comm). These samples use a liquid and solid culture media to eliminate non-enterococci and non-streptococci through the use of sodium azide, actidione, and 2,3,5-triphenyltetrazolium chloride (TTC).

The detection limits for fecal coliforms, ammonia, Enterococcus and TSS are as follows:

Ammonia	0.002 mg/L
Fecal Coliforms (MF)	2 MPN/100mL

Total Suspended Solids	5 mg/L
Enterococcus	2 MPN/100mL

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

RESULTS

Specific results for the August 11, 2011 sampling at each of the sites are listed in Table 2 for the lab sample results and Table 3 for the field sample results. The receiving waters surrounding the Port Hardy Airport outfall contained acceptable levels of ammonia, fecal coliform, Enterococcus and TSS in the latest phase of sampling and water quality parameters measured in the field were observed to be within acceptable limits. Sampling did not occur at Site 6 in 2011, the beach site fronting the airport, as there were insufficient water depths at the time of sample collection.

CONCLUSION

The August 2011 monitoring of the Port Hardy Airport outfall receiving waters is complete. All samples taken were measured for total ammonia, fecal coliforms and TSS. The maximum acceptable level for total ammonia, given the salinity, pH and temperature of the waters within the IDZ of the airport outfall is 0.19mg/L (Ministry of Water, Land and Air Protection, Environmental Protection Division, 2001). The highest total ammonia reading found in any of the water samples taken from the area surrounding the airport outfall was 0.05mg/L which is well within acceptable limits.

The maximum acceptable levels for fecal coliforms in waters within the IDZ of the outfall depend upon the usage of receiving waters. The outfall discharges into shellfish bearing waters which allows for a maximum acceptable median fecal coliform count of 14 MPN/100ml with not more than 10% of samples exceeding 43MPN/100ml (Ministry of Water Land and Air Protection, 1999) the median fecal coliform measurement taken was >2MPN/100ml and 0% of samples exceeded 43MPN.100ml which is well within acceptable limits.

The maximum acceptable level for TSS within the IDZ is 45mg/L. All TSS measurements taken were within acceptable limits with 43mg/L being the highest measurement taken.

Table 2: Airport wastewater treatment plant receiving waters lab sampling results August 2011.

Sample No	Depth (m)	Fecal Col. CFU/100mL	TSS mg/L	Ammonia mg/L	Enterococcus CFU/100mL
Station 1	0.5	<2	23	<0.01	<1
	5	<2	20	<0.01	<1
	10	<2	21	0.05	<1
	15	<2	19	0.04	<1
	15 replicate	<2	25	0.04	<1
	19	<2	30	0.05	<1
Station 2	1	<2	32	0.05	<1
	5	<2	18	0.03	<1
	9	<2	13	0.05	<1
	13	5	25	0.04	1
	17	<2	18	0.04	<1
Station 3	1	<2	20	0.02	<1
	8	<2	24	0.04	<1
	15	<2	29	0.04	<1
	22	<2	20	0.04	<1
	26	<2	35	<0.01	<1
	26 replicate	<2	26	<0.01	1
Station 4	0.5	<2	16	0.03	<1
	7	<2	16	<0.01	<1
	14	<2	21	0.04	<1
	14 replicate	<2	16	0.04	<1
	25	<2	20	0.05	<1
	26	<2	30	0.04	<1
Station 5	1	<2	16	0.02	<1
	5	<2	22	<0.01	<1
	9	<2	38	0.04	<1

Station 5 continued	13	<2	26	0.04	<1
	17	<2	43	0.03	1
Station 7 (control)	1	<2	15	0.02	<1
	7	<2	17	<0.01	<1
	13	<2	24	0.03	<1
	19	<2	21	0.04	<1
	23	<2	17	<0.01	<1

Table 3: Airport wastewater treatment plant receiving waters field sampling results August 2011.

Sample No	Depth (m)	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	pH	Temperature °C
Station 1	1	36.20	126.1	30.9	8.6	12.5
	15	34.28	72.9	31.5	8.3	9.6
Station 2	1	36.33	124.7	30.8	8.5	12.9
	15	34.31	81.5	31.3	8.3	9.8
Station 3	1	36.45	128.2	30.8	8.6	12.9
	15	34.21	77.4	31.4	8.4	9.6
Station 4	1	36.97	126.9	30.9	8.6	13.3
	15	34.24	82.2	31.3	8.1	9.8
Station 5	1	37.03	129.4	30.8	8.6	13.6
	15	34.21	62.4	31.4	8.3	9.6
Station 7 (control)	1	36.56	129.6	30.8	8.6	13.1
	15	34.44	85.0	31.3	8.4	10.0

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May 02, 2011

Sean Mercer
Maintenance Foreman
EPCOR Water Services
INAC Circuit Rider
Port Hardy, BC

Dear Mr. Mercer,

Re: Environmental Monitoring Summary for the Wastewater Spill at the Peel Street Lift Station

On April 8th 2011, EPCOR Utilities Inc. was informed of an overflow of the wet well at the lift station located at the intersection of Peel Street and Beaver Harbour Road (Photo 1). The overflow sludge water drained into an unnamed S3 stream that leads to Beaver Harbour. EPCOR representatives Joe Jewell and Sean Mercer were attending the incident, and followed their Emergency Response Plan. These included notifications to the Kwakiutl First Nation, Vancouver Island Health Authority, the Provincial Emergency Program (PEP) through the Ministry of Environment. As a part of due diligence, Mr. Jewell contacted Pacificus Biological Services Ltd. (Pacificus) in the morning of April 8th, 2011 to carry out environmental management services. The weather at the time of the assessment was overcast and the water temperature was 8°C

EPCOR was notified by a local resident that a spill was present at the Peel Street lift station in the morning of April 8th, 2011. EPCOR crew was immediately sent on site to assess the situation. An estimated spill volume of 100L of grey water was reported to PEP but the actual time and the date of the start of the spill were unknown. Myriam Belisle, BIT, of Pacificus arrived on-site around 10:00. EPCOR representatives had already identified and solved the electrical defect that was at the origin of the overflow. A back-up generator was immediately brought on site to remediate for the defective Smart-UPS through which all electrical system was connected. Upon arrival on site, most of the overflow grey water had been washed down by a water hose from the surface of the wet well and from the lawn (Photo 2). Small hygienic products and big pieces of toilet paper were hand-picked from the lawn.

Only fine toilet paper particles remained on the lawn (Photo 3). EPCOR and Pacificus crews walked downstream of the spill within the adjacent stream and did not observe any residual waste that may have been introduced by the spill. Existing residential refuses (i.e. plastic bags, metal fences, etc) were observed within the affected area. The stream had an average width of 1.5m, a riffle-pool morphology and had a moderate flow at the time of the survey (Photo 4).

The weather during the weekend following the spill included heavy precipitation on both Saturday and Sunday which appeared to be responsible for the flushing of the effluents down the creek.

Water quality testing was conducted on the stream on April 8, April 10 and April 13 2011. Samples were taken from upstream of the initial spill and approximately 20m downstream the Peel street lift station. The following tables examine the water quality testing completed by EPCOR. Samples were tested exclusively for fecal coliforms concentration.

Date of Sample	Fecal Coliforms (CFU/100ml)	
	Site 1- Downstream	Site 2-Upstream
April-8-2011	>20000	>2000
April 10-2011	90	80
April 13-2011	31	8

Downstream of the spill site, flushing and oxygenation of the water within the stream reduced the coliform counts from >20000 CFU/100mL to 31 CFU/100mL. Although these results show a significant reduction in fecal coliform numbers, the coliform level obtained on day 5 following the spill was still considered above the Ministry of Environment water quality guidelines for aquatic life (less than or equal to 14/100ml). At the sample site located upstream of the contamination location, coliform numbers varied from >2000 CFU/100mL to 8CFU/100mL. The contamination level of the upstream sampling on the day of the spill was higher than expected resulting from potential risk of sampling bottle contamination or possible additional and unknown source of contamination upstream.

Historically, this stream has been subjected to periodic surface contamination. Within the stream channel itself, anthropomorphic debris was abundant. Fecal coliforms and other pollutants have been periodically present for several years, as indicated by previous water quality testing (Pacificus, 2010). The marine beach at the mouth of the stream has never been open to shellfish harvesting due to the consistently high levels of fecal coliforms.

It is believed that EPCOR followed their respective Emergency Response procedures and took appropriate action to resolve and manage the wastewater spill. An additional Smart-UPS was installed to replace the defective one at the end of the day on April 8th, 2011 to prevent such event to happen again in the future.

Sincerely,



Myriam Belisle, BIT
Fisheries Biologist
Pacificus Biological Services Ltd.

Reviewed by: Doug McCorquodale, RPBio., Pacificus Biological Consulting Ltd.

Cc. Chrissy Chen, Kwakiutl First Nation, Joe Jewell, EPCOR.



Photo 1. Location of the spill at the Peel Street and Beaver Harbour lift station.



Photo 2. The overflow of the wet well (on this photo) was at the origin of the spill.



Photo 3. Residual grey water and toilet paper fiber remained on the lawn at the area of the spill.



Photo 4. Upstream water sampling site in the unnamed stream adjacent to the spill location.



Photo 5. Downstream water sampling site within the unnamed stream adjacent to the spill location.





September 15, 2011

Trevor Kushner
Operations Manager
EPCOR Water Services Inc.
Port Hardy Operations
V0N 2P0

Re: Accidental Greywater Spill at the Pioneer Lift Station in Port Hardy, BC

Dear Trevor Kushner,

This letter discusses and summarizes the results from an accidental municipal greywater spill which occurred at an unknown time between August 21 and August 25, 2011 at the Pioneer Lift Station (Photo 1) in Port Hardy, BC. Pacificus Biological Services Ltd. (Pacificus) was contacted by EPCOR on August 25, 2011 in regards to the greywater spill and an onsite visit was conducted by Brain McGill, B.Sc. of Pacificus as well as Kris Hagan and Sean Mercer of EPCOR at 15:30 of the same day. Weather on the date of examination was sunny, with a heavy rainfall event occurring the previous Sunday, August 21.

An onsite meeting was conducted in regards to the spill and EPCOR informed Pacificus that an estimated 50-100L of greywater had spilled out of the lift station via an overflow pipe when the pipe failed to engage. The station is inspected by EPCOR once per week, thus the spill could have occurred at anytime following the inspection on August 21. Prior to the site visit, EPCOR informed staff that MoE had already been contacted regarding the spill.

An assessment of the site found that the overflow pipe was dug into the bank downslope from the lift station and the outlet emptied into the Quatse River via a 3m section of vegetated bank and then an 8-10m long side channel composed of small gravel substrate off the mainstem (Photo 2). Greywater was observed to be pooling along the bank at the outlet of the overflow pipe. No other observable impacts to the Quatse River and the surrounding riparian vegetated were noted during the assessment. Inspection of the downstream confluence with the Quatse River showed no visible evidence of contamination, the water appeared clear with no visible evidence of particulate matter or bacterial growth.



Following the site inspection, it was recommended that absorbent pads be used to clean up any remaining grey water found pooling along the bank and within the side channel (Photo 3). Water quality testing was also requested over a period of three days to ensure that there were no lasting impacts from the spill. The onsite biologist remained onsite to ensure that the existing spill material had been sufficiently cleaned up and there was no further grey water entering the system from the Pioneer lift station.

Water quality testing was conducted by EPCOR on the Quatse River on August 26, August 29, and August 31, 2011. Samples were taken at two locations; downstream of the initial spill site and upstream of the site (to be used as a control). Samples were tested exclusively for fecal coliforms concentration. The following table presents the results of the water quality testing completed by EPCOR (Table 1).

Table 1. Results of the fecal coliforms water quality testing performed by EPCOR following the Pioneer lift station grey water spill.

Date of Sample	Fecal Coliforms (CFU/100mL)	
	Site 1 – Upstream	Site 2 - Downstream
August 26, 2011	129	16900
August 29, 2011	20	20
August 31, 2011	20	12

Downstream of the spill site, on the initial water quality sampling date, the concentration of fecal coliforms (16,900 CFU/100ML) was significantly higher than the control site (129 CFU/100ML), indicating the presence of contamination within the Quatse River. Subsequent water quality sampling on August 29 and 31 indicated that the fecal coliforms were naturally flushed from the system and the downstream water quality reached a level concurrent with that of the control.

Following the site inspection and the results of the water quality testing conducted by EPCOR, it appears that the grey water spill from the Pioneer lift station, while increasing the fecal coliforms concentration within the Quatse River for a short period of time, had no lasting impact on the Quatse River system.

If you have any further questions regarding this assessment please don't hesitate to contact the office at (250) 949-9450.

Sincerely,



Christie Morrison, Dipl. Tech.
Pacificus Biological Services Ltd.



Photo 1. Pioneer lift station observed on August 25, 2011 following the events of the grey water spill into the nearby Quatse River.



Photo 2. The side channel, where the outfall pipe for the grey water overflow enters, confluencing the Quatsse River mainstem.



Photo 3. Absorbent spill pads used to clean up any observable grey water.