



Annual Report | WASTEWATER

2012



City of
Campbell
River

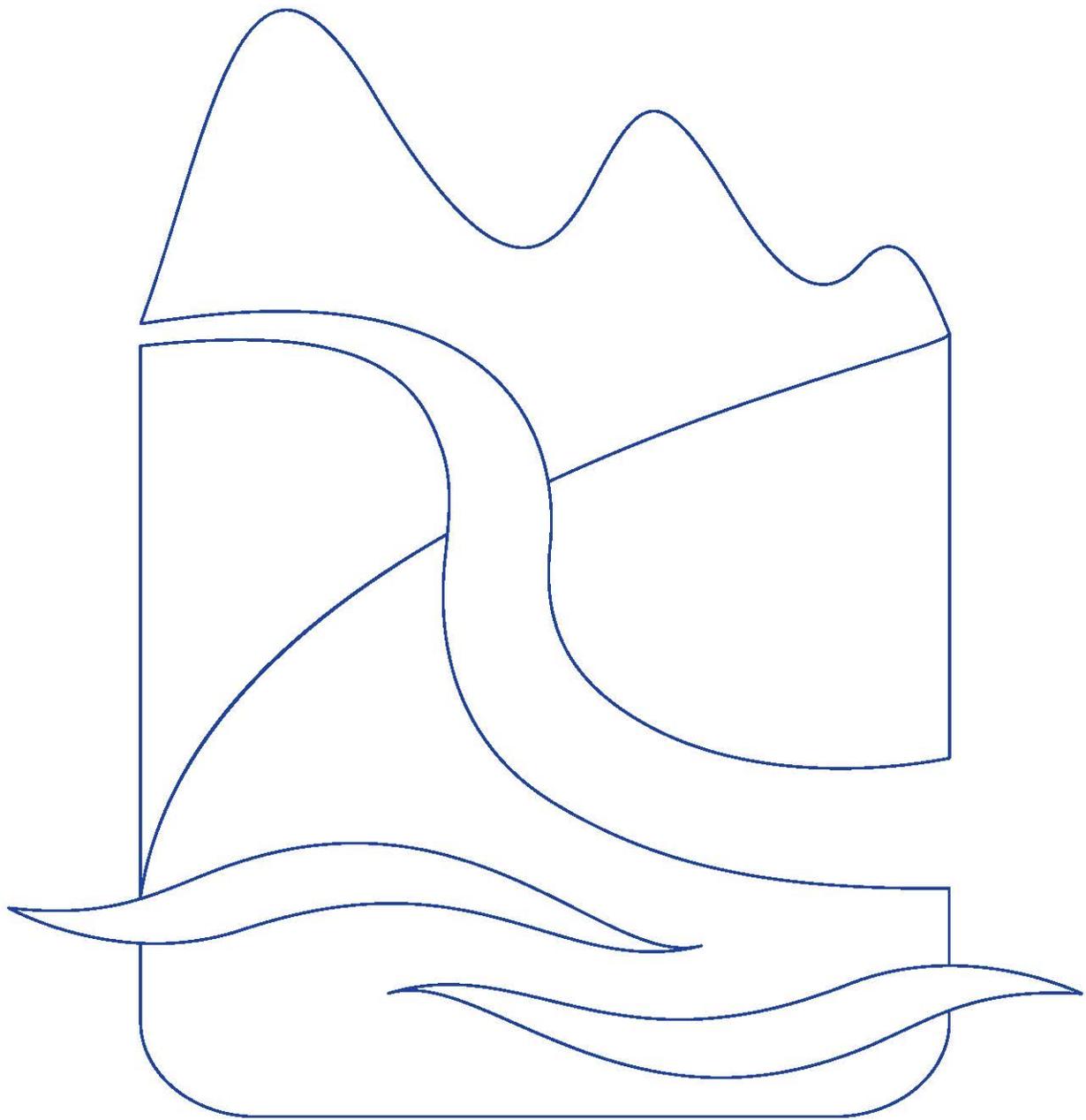


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Introduction

The purpose of this report is to provide information to the public about Campbell River's wastewater operations and to show the commitment of the department to improving public health and safety while protecting the environment. It is also used to review the previous year's accomplishments and helps to demonstrate how the department is meeting the current and future needs of the community. The Annual Report is a working document used by staff to set goals and objectives for the following year.



NVEC Entrance

The Wastewater Department operates with the goal of providing two primary and essential services: the collection of liquid waste, and the treatment of liquid waste. The main purpose of the collection system is to gather the liquid waste from properties and transport it to the treatment facilities. The main purpose of the treatment system is to process liquid waste before discharge to the marine environment. The entire system includes two treatment facilities, fifteen sewage pump stations, and approximately 237 km of pipe.

The Norm Wood Environmental Centre (NVEC) treats liquid waste from the City and three First Nations that are connected to the sanitary system. Sewage is also privately trucked from residential properties in the Strathcona Regional District. The City also operates the Industrial Park Lagoon (IPL) which is a separate system that treats liquid waste from the Industrial Park near Duncan Bay Road.

Wastewater Mission Statement

It is the mission of the wastewater department to operate and maintain the wastewater system in the most efficient and innovative way while protecting the public's health and safety and minimizing the impact on the environment.

2012 Highlights

- ✓ Continued design of the future NVEC upgrades
- ✓ TSS and BOD levels kept well below permitted levels and operating targets
- ✓ Developed 13 hectares of land for the new biosolids application site
- ✓ Conducted CCTV inspections on 30km of pipe
- ✓ Developed a pipe repair and replacement plan from previous CCTV inspections
- ✓ Performed flushing of sanitary mains in the Downtown, Maryland, and Brind'Amour areas
- ✓ Successfully responded to 188 requests for service
- ✓ Initiated a customer service program
- ✓ Maintained a wastewater complaint rate far below the nation median value
- ✓ Showed a reduced cost for hydro at the treatment plant through the use of new blowers installed in 2011

Overview

Guiding Regulations - The provincial government sets guidelines and regulations related to the management of wastewater. As allowed for in the *Environmental Management Act*, the City has an approved *Liquid Waste Management Plan* which authorizes the City to manage its wastewater in accordance with operational certificates. The Ministry of Environment (MOE) oversees the amount, quality and content of the effluent that is returned to the ocean. Campbell River's wastewater department follows a stringent testing and sampling program to ensure effluent meets or exceed the Ministry's requirements. Management of biosolids is guided by regulations set out in the *Organic Matter Recycling Regulations (OMRR)*.



Lift Station #7

Facilities - The Wastewater Department manages the following facilities:

- Norm Wood Environmental Centre (NVEC)
 - Screening Chamber
 - Aeration Blowers
 - Outdoor Oxidation Ditches & Clarifiers
 - Digester
 - Biosolid Storage Basin & Land Application Site
 - Testing Laboratory
 - Card-Lock Sewage Dumping Facility
- Industrial Park Lagoon System
- 15 Lift Stations
- All in ground pipes (approx. 237Km)

Wastewater 2012: The Year in Numbers

- 188 Number of service calls related to the system, due to alarm call-outs or from the public
- 5,408,478 m³: Approximate total volume of wastewater treated in 2012
- 337: Tonnes of biosolids spread onto land, therefore diverted from the landfill
- 29: Number of tropical fish thriving in the fish tank at Norm Wood Environmental Centre, which is filled with effluent water treated at the centre

Chapter 1 - Wastewater Collection

Collection Goals

- To ensure effective management programs are in place to minimize operation, infrastructure and capital costs.
- To conduct operations safely and to ensure there are no negative impacts on the environment

Collection Targets

- To maintain flows to NWEC and the Industrial Park Lagoon below the current operating targets and permitted volumes.

Permitted Flow Volumes and Seasonal Operating Targets (m3/day)			
Norm Wood Environmental Centre	Actual Flow (max)	Operating Target	Permit Limit
October – April	37,180	25,000	41,400
May – September	15,973	15,000	41,400
Industrial Park Lagoon			
October – April	112	100	410
May – September	56	100	410

Collections	2012	Comparison*
Operation Benchmarks		
# of Field FTEs / 100 km Length	0.84	2.40
Total # of Reported Overflows / 100 km Length	0.42	0.72
% of Length CCTV Inspected	12.85%	7.3%
NWEC Peak Day Flow Ratio	1 : 2.52	n/a
IPL Peak Day Flow Ratio	1: 2.56	n/a

*Source: National Water and Wastewater Benchmarking Initiative: 2012 Public Report

Overview

The wastewater collection system is made up of over 237 km of pipe and 15 lift stations. The main purpose of the system is to gather liquid waste from properties and efficiently and safely transport it to the treatment facilities.

The wastewater department is available to respond 24-hours a day, seven days a week, to service calls related to the wastewater system. This involves responding to calls from residents as well as being alerted to emergency issues that take place within the system. Nine out of the 15 lift stations are set up with wireless SCADA technology which allows for remote monitoring and control. All 15 are equipped with telephones that forward an alarm to staff when flow levels or pumps encounter an issue.

CCTV Inspection and Maintenance – Regular inspections are conducted each year in order to maintain the integrity of the collection system. Department staff coordinate with contractors who record video with closed circuit television (CCTV), to inspect the inside of the sanitary sewer pipes. Approximately 30 km of pipe is filmed each year. The contractor provides a report detailing the condition of the pipes and any defects resulting from water infiltration, root growth, sedimentation, and structural decay. CCTV reports are also used to set priorities and guide decisions on the rehabilitation and replacement of sewer mains. This work is completed using trenchless equipment that is placed inside of the pipe and operated remotely from the surface. The cost of repairs is reduced by avoiding large excavations.



NWEC Blowers

Each year staff also flush a portion of the sewer system. This preventative work is to keep pipes clean of grease, gravel and other materials. This reduces odours and the possibility of pipes becoming plugged. In 2012 the crews conducted sewer flushing in the downtown, Maryland, and Brind'Amour areas.

Smoke Testing – Inflow and infiltration of water is kept to a minimum by monitoring and rectifying deficiencies in the City's sanitary collection system. In September of 2012, the wastewater department conducted a smoke testing pilot project over 3km of pipe in the Campbellton and Willis Road areas. The purpose of this test was to detect cross-connections between the storm and sanitary systems. It also identified any pipes that were allowing rain water or ground water to enter the sanitary system.

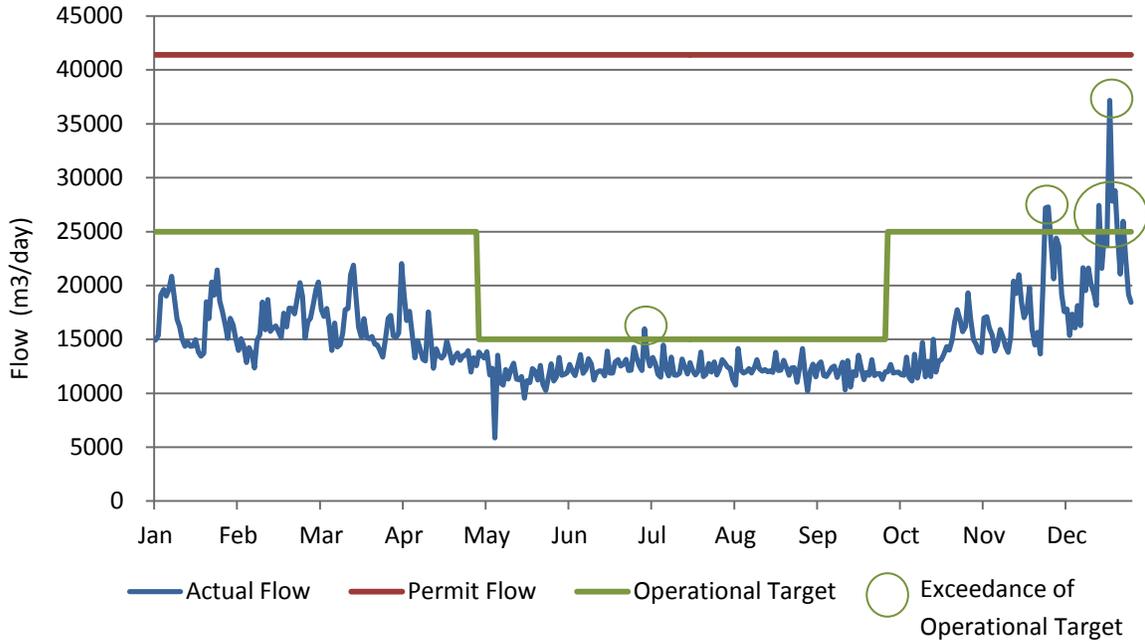
Inflow and infiltration stresses the capacity of the sanitary system, especially during periods of wet weather. Eliminating these deficiencies will help to reduce operating costs and the need for expensive infrastructure upgrades. The pilot smoke test was successful and will be continued as part of the department's annual maintenance program.

Sanitary System Flow – High flows experienced in 2012 exceeded the NWEC's wet season operational target, but remained well within the treatment plant's permit limit. The operational targets are set by the wastewater department and represent the most ideal operating conditions. The NWEC's operational flow target was exceeded 7 times during the year, almost entirely in November and December (*Figure 1.1*).

The highest daily flow for 2012 was recorded on December 23rd. Melting snow, heavy rains, and a major unknown source of inflow resulted in 37,180 cubic metres of wastewater entering the treatment plant from the collection system. Wastewater operators were able to prevent an overflow by utilizing the extra capacity of the gravity sewer system to 'juggle' flows between #7 and #11 lift stations. A large vacuum truck was also used to haul wastewater from lift station #5 and Lift Station #10. The occurrence of peak flows such as this will be minimized through the on-going inflow and infiltration reduction program.

Figure 1.1

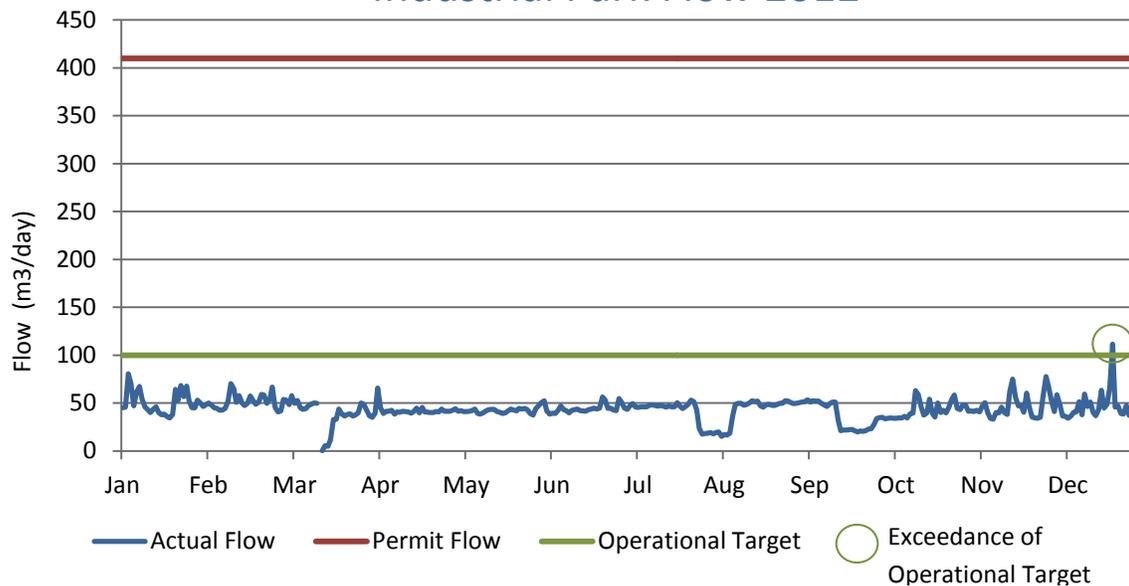
NWEC Flow 2012



Flow in the industrial park system remained fairly consistent throughout the year with expected increases during the wet season. Industrial Park flows stayed below the operational target for the entire year with the exception of December 23rd, which as state above, was a high precipitation event. The average daily flow for 2012 was 44 m³/day. The peak daily flow was 112 m³/day on December 23rd.

Figure 1.2

Industrial Park Flow 2012



Accomplishments in 2012

- ✓ CCTV inspection of 30km of pipe
- ✓ Developed a pipe repair and replacement plan from previous CCTV inspections
- ✓ Performed flushing of sanitary mains in the Downtown, Maryland, and Brind'Amour areas
- ✓ Smoke Test Pilot Project

Objectives for 2013

- Develop an Emergency Response Plan for the wastewater system
- Evaluate staffing needs and act on outstanding vacancies
- Complete a condition assessment of lift stations and develop an upgrade plan
- Complete approximately 1650 metres of pipe rehabilitation via grouting.
- Smoke test another section of the sanitary collection system
- CCTV pipe inspections
- Continue with flushing program
- Perform manhole inspections
- Update Cartegraph and Facility Pack to include all sewer infrastructure, CCTV video and maintenance information

Chapter 2 - Wastewater Treatment

Treatment Goals

- To remain compliant with all requirements of the Operational Certificates.

Treatment Targets

- To meet the City's treatment discharge targets for TSS and BOD at NWECC and the Industrial Park Lagoon.

Permitted Effluent BOD/TSS Limits and Seasonal Operating Targets (mg/l)			
Norm Wood Environmental Centre	Actual	Operating Target	Permit Limit
October – April	15	30	BOD – 45 TSS – 45
May – September	9	20	
Industrial Park Lagoon			
October – April	6	10	BOD – 45 TSS – 45
May – September	7	10	

Wastewater Treatment Benchmarks	2012	2011	Comparison*
Operations			
kg of BOD Discharged to the Environment per Capita	1.59	-	0.87
% of Design AAF Capacity Utilized	63%	-	71%
Effluent Quality			Target
BOD/TSS Permit Violations	0	4	0

*Source: National Water and Wastewater Benchmarking Initiative: 2012 Public Report

Overview

The Campbell River wastewater department operates two treatment facilities. The primary facility is the Norm Wood Environmental Centre (NWECC) located in the north part of Campbell River. At this site, treatment consists of screening and biological nutrient removal (BNR). The second facility is a facultative lagoon system located at the Middle Point Industrial Park. It collects liquid waste from properties in the Industrial Park.

After the wastewater is treated, the final effluent—essentially water—is discharged to the ocean via two separate outfall pipes (one for NWECC and one for the industrial lagoon). Solids that are removed from the liquid waste stream



NWECC Blowers

(biosolids) are spread on the grounds surrounding NWECC through an innovative land application process.

Effluent Quality – The Ministry of Environment regulates the amount, quality and content of effluent that is returned to the environment. In 2012, the wastewater department met the requirements for BOD and TSS levels with no violations. This was the first year with no violations in all 17 years the NWECC has been in operation. This is due to operational improvements that were made to the treatment process which reduced the amount of TSS and BOD in the effluent during high flow events. The Industrial Park Lagoon was also free of violations in 2012.

Figure 2.1

NWECC Average monthly effluent BODs/TSS

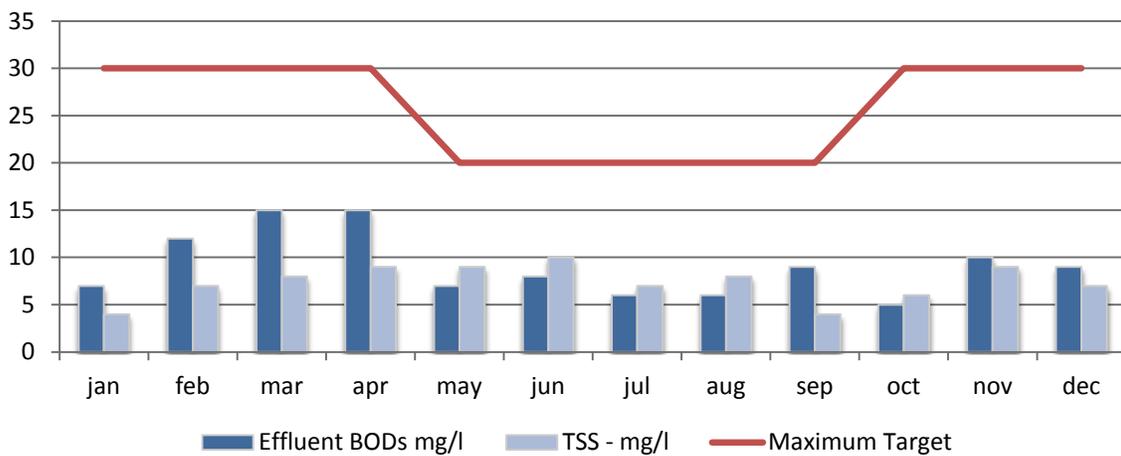
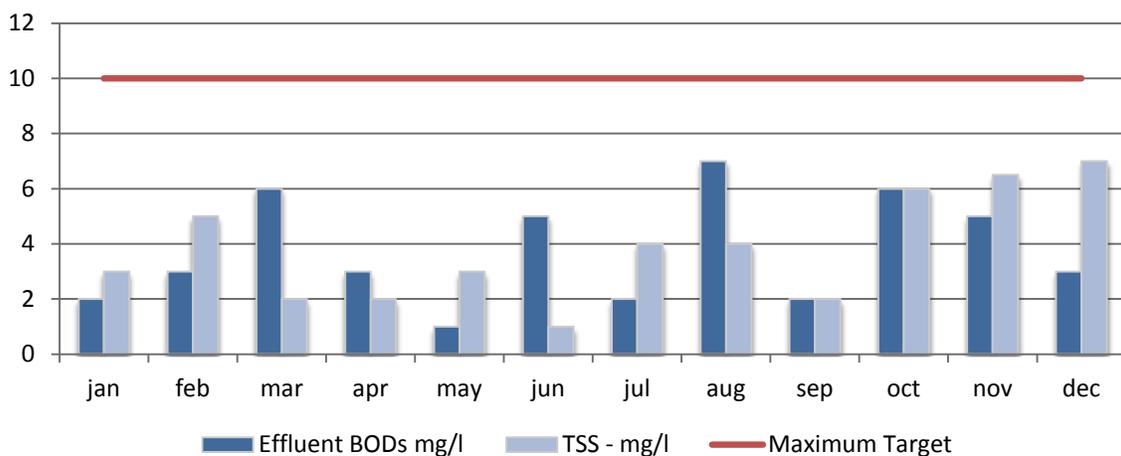


Figure 2.2

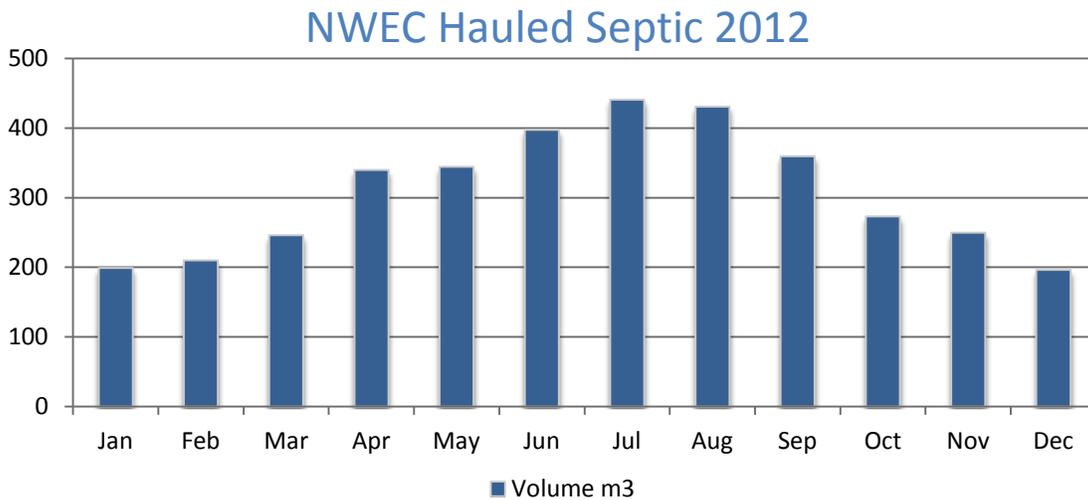
Industrial Park Average Monthly Effluent BODs



Managing Wastewater From Others – The Campbell River wastewater department also accepts liquid waste from neighbouring communities. In some cases this involves managing the collection and treatment through service agreements, in others it involves accepting and treating wastewater that is hauled via truck to NWECC. In 2012, the City accepted and treated waste from three local First Nations bands whose sewers are connected directly to the City’s sanitary collection system. The City also accepted 3,690 m³ of hauled septage that originated outside of City boundaries.

Hauled septage is accepted year-round at NWECC, but increases significantly in the spring and summer months. The increase is related to the seasonal operation of campgrounds and lodges, and the fact that proactive homeowners tend to empty their septic tanks prior to the wet season.

Figure 2.3



Biosolids Management – Biosolids are the final product remaining from the liquid waste stream after wastewater is treated. It is a humus-like material that is rich in nutrients such as nitrogen and phosphorus, two nutrients that are vital to healthy productive soil. Since 2003, Campbell River has been “recycling” biosolids by applying them to land adjacent to NWECC. This process is managed in accordance with a Land Application Plan, prepared by a Professional Agrologist, to ensure compliance with the *Organic Matter Recycling Regulations (OMRR)*. Regular soil and water tests are conducted to ensure that the guidelines set out by the OMRR are met. The soil tests look at levels of eleven heavy metals as well as fecal coliform and various forms of nitrogen including nitrates. These results are considered along with biosolids analysis to determine an appropriate application rate in future years. Soil samples, on the original application site, had shown a steady increase in copper concentration

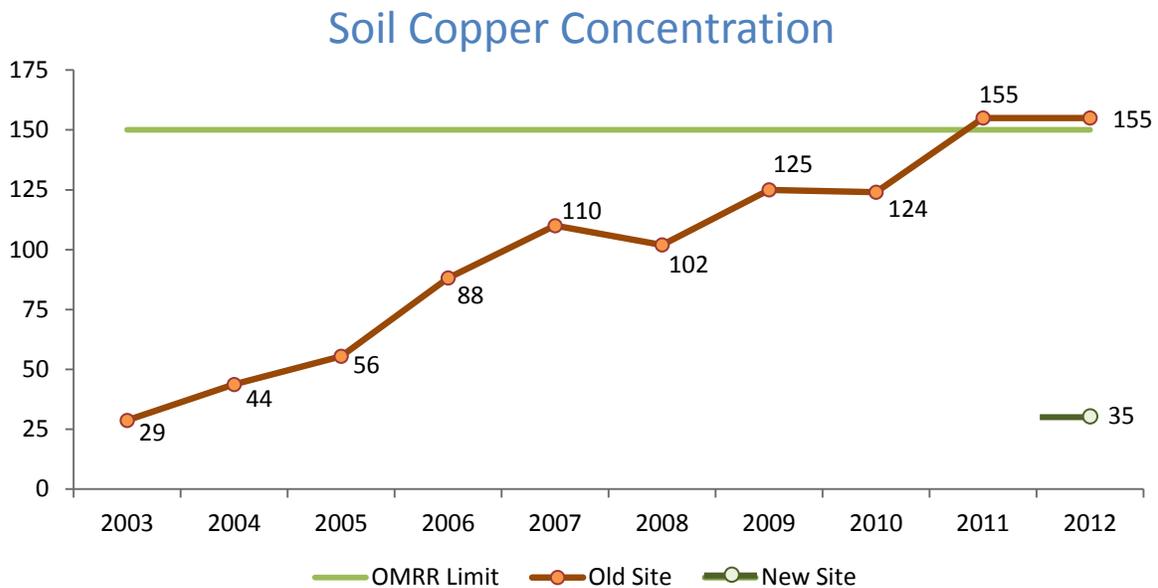


New Biosolids Application Site

since application began in 2003, which is to be expected with biosolids application. The post application soil sample for 2011 confirmed that the copper concentration was slightly above the OMRR limit and the site was retired. It was seeded with perennial grasses which can potentially be used for production of hay, although other crops are being considered that will make beneficial use of the rich soil that now exists on the site. Well water samples indicate that biosolid application has had little or no impact to surface or ground water.

In 2012, a new 13 hectare application site was developed on land immediately south of the original site. A pivot irrigation system pumps biosolids directly from the biobasin onto the field. This site was seeded with barley. The grain captures nutrients, prevents winter erosion and improves the general condition of the soil over time.

Figure 2.4



Accomplishments in 2012

- ✓ Continued design of future NWECC upgrades
- ✓ TSS and BOD levels kept well below operating targets
- ✓ Draining and maintenance of oxidation ditch #2
- ✓ Developed 13ha of land for the new biosolids application site:
 - Repositioned the pivot irrigation system for the new site
 - Began application of biosolids to new area and seeded area for winter
 - Established monitoring program for the new site

Objectives for 2013

- Construction of new clarifier, pump station and electrical upgrades at NWECC
- Review service agreements with all wastewater treatment clients
- Develop an Emergency Response Plan for the wastewater system

- Evaluate crops for the original biosolids site that will be as cost-neutral as possible to maintain
- Further develop maintenance plan for NWECC and review resourcing needs
- Complete design for phase 2 upgrade at NWECC – headworks and sani-dump.
- Add NWECC to Cartegraph Facility Pack

Chapter 3 - Customer Service

Customer Service Goals

- To meet customer expectations

Customer Service Targets

- Respond to all requests for service in a timely and responsible manner

Service Ratios	2012	2011	Comparison
Service Load per Full Time Employee			
Service Requests	33.69	44.8	-
Customer Accounts	2,499	2,482	414**
Complaints per 1000 People Served			
Sewer Operations Complaint Rate	0.29	0.58	-
Customer Service Complaint Rate	0.03	0.00	-
Total Wastewater Complaint Rate	0.32	0.58	2.85*
Service Requests per 1000 People Served			
Public Service Request Rate	1.31	3.21	-
Internal Service Request Rate	4.71	4.81	-
Total Service Request Rate	6.03	8.02	-

*Source: National Water and Wastewater Benchmarking Initiative: 2012 Public Report. Canada.

**Source: AWWA, Benchmarking Performance Indicators for Water and Wastewater Utilities, 2007

Overview

The wastewater department is available to respond to service calls related to the wastewater system 24 hours a day, seven days a week. This involves responding to calls from anyone who relies on the system, including all customers in the City of Campbell River plus adjacent First Nations communities where wastewater is managed through servicing agreements.

To ensure a timely response to calls, staff use radio and/or cell phone to receive calls from the Dogwood Operations Centre or through the Fire Hall dispatch. Calls are logged and tracked so that appropriate follow up can take place.

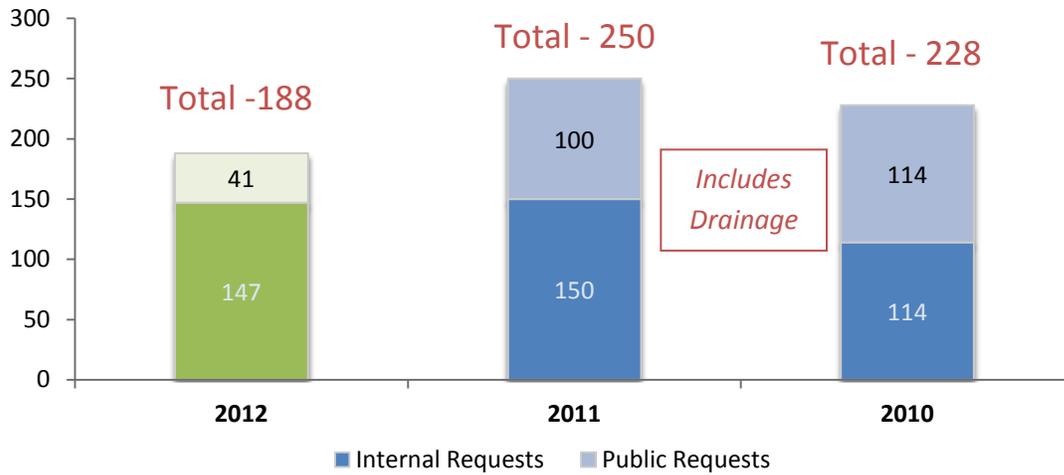
Service Load – In 2012, the number of service requests completed by the Wastewater department totaled 188. This is down significantly from 2011 in which 250 service requests were completed. The transfer of drainage calls from the wastewater department to the roads department in 2012 accounts for this difference almost entirely.



Old Bio-solids application site

Figure 3.1

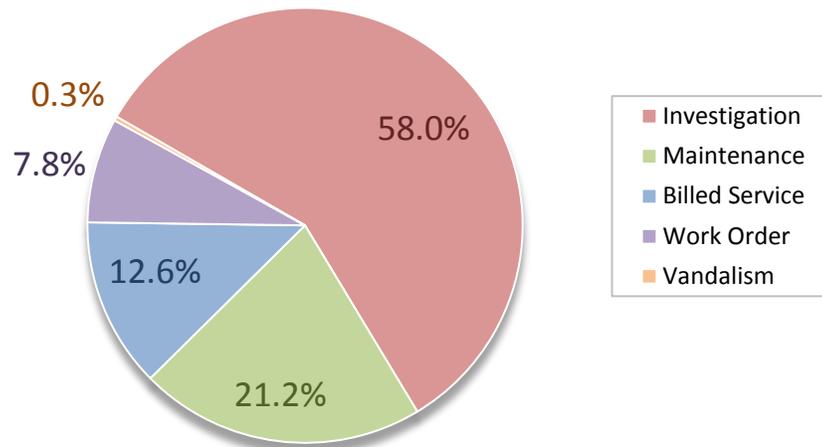
Service Requests per Year



Fifty-eight percent of service requests were investigations of issues reported internally and by the public, 12.6% were for billed services where all costs for work were recovered, 21.2% were for regular maintenance items, and 7.8% were for work done for contractors or under service contracts.

Figure 3.2

Service Requests by Category



Complaints – The Wastewater department received only 10 complaints in 2012 – almost half the number received in 2011. With a complaint rate of 0.32 per 1000 people served, the City is far below the national average of 2.85. Complaints are divided into two sub categories: Sewer Operations Complaints and Customer Service Complaints. Sewer Operation Complaints include reports of foul odours, sewer overflows, blockages, and sani-station malfunctions. Only complaints which are the responsibility of the City have been included in this total. Customer Service Complaints include only those which result from a customer being dissatisfied with work the City has performed. Only 1 of the 10 complaints was regarding customer service. The wastewater

department always addresses the source of these complaints and takes action to prevent them in the future.

Accomplishments in 2012

- ✓ Successfully responded to 188 requests for service
- ✓ Initiated a customer service program
- ✓ Maintained a wastewater complaint rate far below the nation median value

Objectives for 2013

- Revise client service call system to include data that tracks time spent per call
- Create online database of service calls to facilitate analysis of service call type
- Begin analysis of service call types to improve resource management
- Modifications to City website to make information easier for customers to find

Chapter 4 - Finance

Finance Goals

To ensure City of Campbell River wastewater operations are efficient and financially sustainable to minimize cost to customers, and ensure wastewater rates are adequate to cover the cost of operations and capital upgrades.

Finance Benchmarks

Cost Ratios	2012	Comparison
Account Based Cost Ratios		
Cost of Operation, Maintenance and Treatment per Customer Account	\$ 151.10	\$ 283.00*
Expense Ratios		
Cost of Operation and Maintenance per m3	\$ 0.26	\$ 0.42*
Cost of Treatment per m3	\$ 0.13	\$ 0.27*
Total Cost per m3	\$ 0.39	\$ 0.69
Revenue Ratios		
Metered Sewer Revenue per m3	\$ 0.68	-
Annual Flat Rate Account Fee (including parcel tax)	\$ 304.00	-

*Source: AWWA, *Benchmarking Performance Indicators for Water and Wastewater Utilities, 2007*

Account-Based Cost Ratios - In comparison to an AWWA survey of similar sized municipalities, the average cost of operations in Campbell River is less than the median reported cost in relation to the number of customer accounts.

Expense Ratios - In 2012, the City treated a total of 5,424,652 cubic meters of wastewater and on average it cost \$0.39 to collect and treat each cubic metre of wastewater.

Revenue Ratios - The City of Campbell River charges its metered water customers \$0.68 per m3. Unmetered customers are charged an annual flat fee of \$304.00.

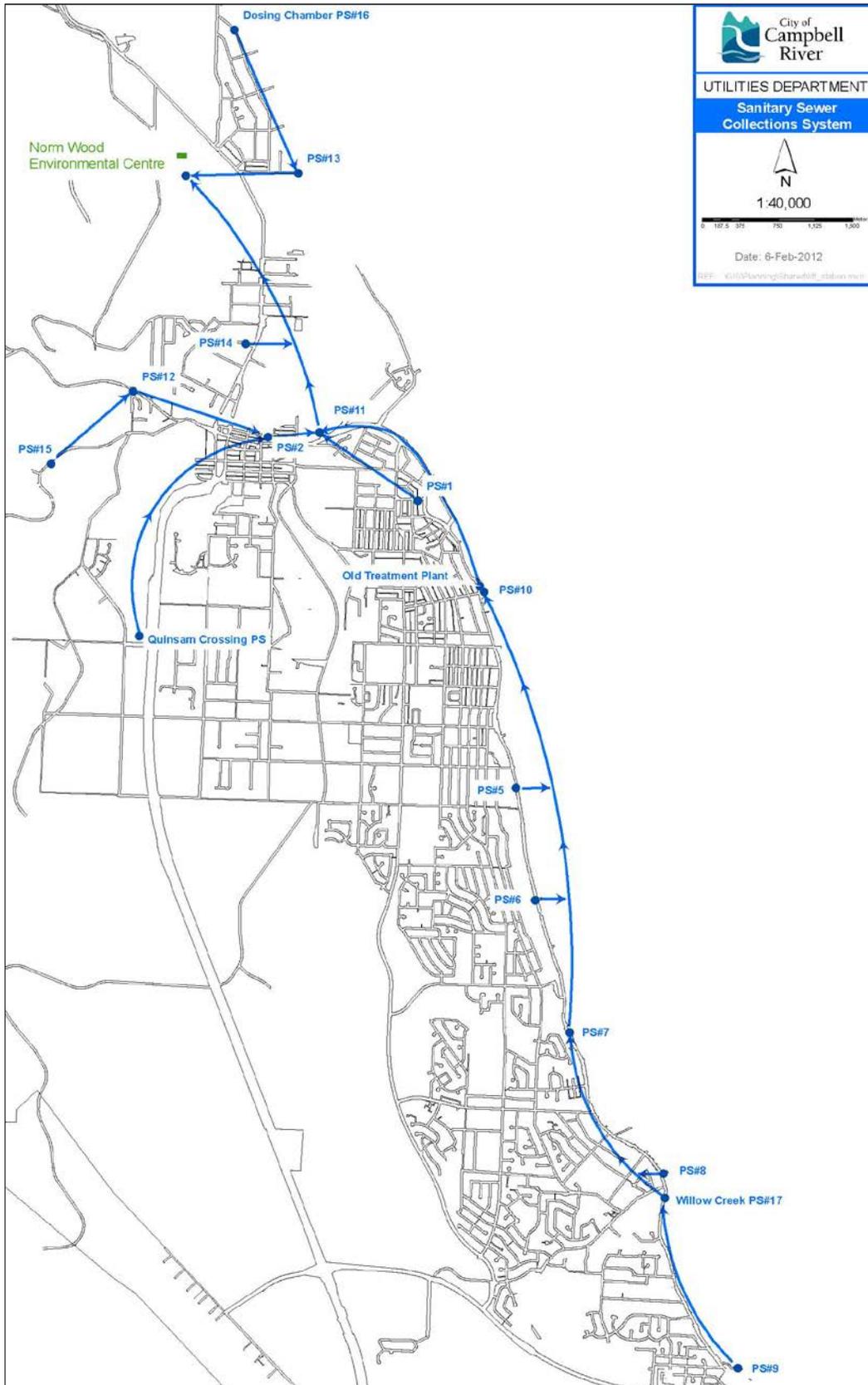
2012 Accomplishments

- ✓ Showed a reduced cost for hydro through the installation of new blowers

2013 Objectives

- Continue to look for new and innovative ways to reduce operating costs while maintaining an appropriate level of service

Appendix 1 – Map of Lift Station Locations



Appendix 2 – Target and Benchmark Details

Benchmark/Target	Method	Data Source
Sewer Collections		
Operations		
Collections System Staffing	# of Field FTEs / 100 km Length	Cartegraph Database
Reported Overflow Rate	Total # of Reported Overflows / 100 km Length	Cartegraph Database
% of Length CCTV Inspected	Total Length of Pipe Inspected / Total Length of Pipe	Wastewater Department Records
Wastewater Treatment		
Operations		
% of Design AAF Capacity Utilized	(Total Volume Treated / Days of Year) / Designed Flow Capacity	NWEC Daily Datasheet
kg of BOD Discharged to the Environment per Capita	Kg of BOD Discharged / Population Served	NWEC Daily Datasheet
Effluent Quality		
BOD/TSS Permit Violations	Operating Permit Limit	NWEC Daily Datasheet
Customer Service		
Service Load per Full Time Employee		
Service Requests	Total Service Requests / Number of FTE	Cartegraphe Database
Customer Accounts	Customer Accounts / Number of FTE	Cartegraphe Database
Complaints per 1000 People Served		
Sewer Complaint Rate	Total Sewer Complaints / (Population / 1000)	Cartegraphe Database
Customer Service Complaint Rate	Customer Service Complaints / (Population / 1000)	Cartegraphe Database
Service Request Rates per 1000 People Served		
Public Service Request Rate	Wastewater Public Requests / (Population / 1000)	Cartegraphe Database
Internal Service Request Rate	Wastewater Internal Requests / (Population / 1000)	Cartegraphe Database
Total Service Request Rate	Total Requests / (Population / 1000)	Cartegraphe Database
Cost Ratios		
Account Based Cost Ratios		
Cost of O&M per Customer Account	Total Annual O&M Expenses / Customer Accounts	Vadim
Expense Ratios		

Cost of Operations per m3	$(\text{Operations Cost} - \text{Treatment Cost}) / \text{Total Annual Water Consumption}$	Vadim
Cost of Treatment per m3	$\text{Total Treatment Cost} / \text{Total Annual Water Consumption}$	Vadim
Cost of Infrastructure Renewal Budget per m3	$\text{Approved Capital Budget} / \text{Total Annual Water Consumption}$	Vadim
Total Cost per m3	$(\text{O\&M Cost} + \text{Approved Capital Budget}) / \text{Total Annual Water Consumption}$	Vadim
Revenue Ratios		
Metered Water Revenue per m3	$\text{Total Metered Water Sales} \times \text{Metered Water Rate}$	Tempest, Finance Department
Annual Flat Rate Account Revenue per Average m3	$(\text{Flute Rate Accounts} \times \text{Flat Rate Fee}) / \text{Non-metered Water Consumption}$	Finance Department
Annual Flat Rate Account Fee	Set Value	Finance Department

