

## Wastewater Annual Report 2013

MOE Permit Number PE-203



April 10, 2014

## Table of Contents

Table of Contents.....	2
Executive Summary.....	3
Overview.....	4
Permit.....	5
Operators.....	6
Excess Discharge and Overflows .....	7
Infrastructure Value, Deficit and Renewal .....	8
Flow Data Monthly and Historical Trends .....	9
Laboratory Analytical Data .....	10

## Executive Summary

The Wastewater Annual Report is produced in compliance with Section 13 of Waste Discharge Permit PE-00203, issued by the Ministry of Environment to the City of Enderby. Enderby possesses a Class II Wastewater Collections System and a Class III Wastewater Reclamation Facility (WWRP). It provides primary, secondary, and tertiary treatment prior to discharge into the receiving environment.

The WWRP produced excellent quality of effluent in 2013. The average effluent flow was 2,010 m<sup>3</sup> per day, which is a reduction of 155 m<sup>3</sup> per day from the 2012 average. Similarly, the maximum daily flow experienced a reduction from a 2012 high of 5,681 m<sup>3</sup> in a single day to 4,551 m<sup>3</sup> on June 27, 2013.

There were 18 days when the WWRP operated in excess of its discharge limit due to inflow and infiltration during high water. During this period, the quality of effluent remained within permit parameters. The excess flow was reported to the Ministry of Environment. There were no overflow events. By contrast, the daily discharge limits were exceeded from June 18 to July 21 in 2012 due to the 40-year flood event caused by the Shuswap River.

The collection system is operating reasonably well considering the age of the infrastructure. Areas of high inflow and infiltration within the collection system are being investigated for future correction.

As of 2013, the City of Enderby has a Chief Operator (contracted to Corix Utilities), a Systems Operator with Level II Wastewater Treatment certification (on leave for 2013), a Systems Operator with Level I Wastewater Treatment certification, a Lead Hand who has completed Operator-in-Training training and passed the associated examination, and three junior Operators-in-Training.

## Overview

The Wastewater Annual Report is produced in compliance with Section 13 of Waste Discharge Permit PE-00203, issued by the Ministry of Environment to the City of Enderby.

Enderby is located in the North Okanagan Region of British Columbia. It is 4.26 km<sup>2</sup> in size and has a population of 2,932 persons (2011 Census). Enderby possesses a Class II Wastewater Collection System and a Class III Wastewater Reclamation Facility (WWRP). It provides primary, secondary, and tertiary treatment prior to discharge into the receiving environment. The City of Enderby Public Works staff operate the WWRP. Corix Utilities provides Chief Operator oversight and guidance.

The WWRP was built in 1967 and services the majority of the population of the City of Enderby, as well as several customers on the Splitsin reserve. It is located along the bank of the Shuswap River. Effluent from the WWRP is discharged into the Shuswap River. In 2003, the facility was upgraded with the addition of UV disinfection. In 2009, the facility commissioned a new circular clarifier. In 2011, the facility had a centrifuge installed to improve sludge handling.

The WWRP produced excellent quality of effluent in 2013. The average effluent flow was 2,010 m<sup>3</sup> per day, which is a reduction of 155 m<sup>3</sup> per day from the 2012 average. Similarly, the maximum daily flow experienced a reduction from a 2012 high of 5,681 m<sup>3</sup> in a single day to 4,551 m<sup>3</sup> on June 27, 2013.

The collection system consists of 23,750 meters of pipe and 9 lift stations located at: Peacher Crescent; Red Rock Crescent; Princess Street; Meadow Crescent; Brickyard Road; Kate Street; Kildonan Avenue; Riverdale Drive; and McGowan Street.

The collection system is operating reasonably well considering the age of the infrastructure. Areas of high inflow and infiltration within the collection system are being investigated for future correction.

## Permit

In accordance with Permit PE-00203, the City of Enderby is authorized to discharge effluent to the Shuswap River from a municipal sewage plant subject to the following conditions:

1. The maximum authorized rate of discharge is 3,400 m<sup>3</sup> per day.
2. The characteristics of the effluent shall be equivalent or better than:
  - a. 5-day Biochemical Oxygen Demand of 45 mg/L;
  - b. Total Suspended Solids of 60 mg/L;
  - c. Free chlorine residual prior to dechlorination of between 0.5 mg/L and 1.0 mg/L and not less than one hour's contact time at average flow rates;
  - d. Dechlorinated prior to discharge to reduce the free chlorine residual below detectable limits;
  - e. Sludge disposed in a manner authorized by the Regional Waste Manager.
3. Grab samples taken on a daily basis and analysed for free and total chlorine;
4. Grab sample taken on a monthly basis that is analysed for:
  - a. Total Suspended Solids (non-filterable residue), mg/L;
  - b. 5-day Biochemical Oxygen Demand, mg/L;
  - c. Total Phosphorus, Ortho Phosphorus, and Total Dissolved Phosphorus, mg/L;
  - d. Fecal Coliforms, MPN/100 ml;
  - e. Free and Total Chlorine Residual, mg/L.
5. Measure daily flow and record once per day; and
6. Complete an Annual Report.

## Operators

As of December 31, 2013, the City of Enderby has a Chief Operator (contracted to Corix Utilities), a Systems Operator with Wastewater Treatment II, a Systems Operator with Wastewater Treatment I, a Lead Hand who has completed an Operator-in-Training course, and three junior Operators-in-Training. The Systems Operator with Wastewater Treatment II was on leave for all of 2013.

Operator	Position	Certification
Tyrone McCabe (Corix)	Chief Operator	WWT IV
Clayton Castle	Lead Hand	OIT
Ida Arcand	Systems Operator II	WWT II, WT I, WD I
Kevin Walters	Systems Operator I	WWT I, WT I
Jamie Prevost	Utility Operator III	OIT
Robert Hubley	Utility Operator III	OIT
Sheldon Tokairin	Utility Operator III	OIT
WT – Water Treatment, WWT – Wastewater Treatment, WD – Water Distribution, WWC – Wastewater Collection, OIT – Operator in Training		

The City commenced its Chief Operator contract with Corix Utilities in 2012 to comply with certification requirements for operating the WWRP. The City has also identified training targets for staff focusing on wastewater operations. In 2014, the Lead Hand will enroll in Wastewater Collection I.

## Excess Discharge and Overflows

There was one period of excess discharge in 2013. During this period, the quality of effluent remained within permit parameters. The rain events associated with this period were in excess of a five-year return period. There were no overflow events.

1. Heavy rains and high water from June 20 to July 12 caused the WWRP to exceed the daily discharge permit limits of 3,400 m<sup>3</sup> per day on 18 days. The maximum daily discharge was 4,551 m<sup>3</sup> on June 27.

The effluent quality remained high, but the amount of rain and the high groundwater table significantly increased inflow and infiltration, and thus influent to the Wastewater Plant.

By contrast, in 2012, which was subject to a 40-year flood event, the daily discharge exceeded permit limits from June 18 to July 21.

This event was reported to the Ministry of Environment.

Measures are being undertaken to reduce inflow and infiltration in the future. This involved analysing lift station pump activity to determine areas most likely subject to inflow and infiltration. That information will then be used to determine locations needing further investigation by camera. Depending on the nature of the deficiency and the surrounding area, solutions may include cured in place piping (CIPP) and reducing leaks around manholes.

## Infrastructure Value, Deficit and Renewal

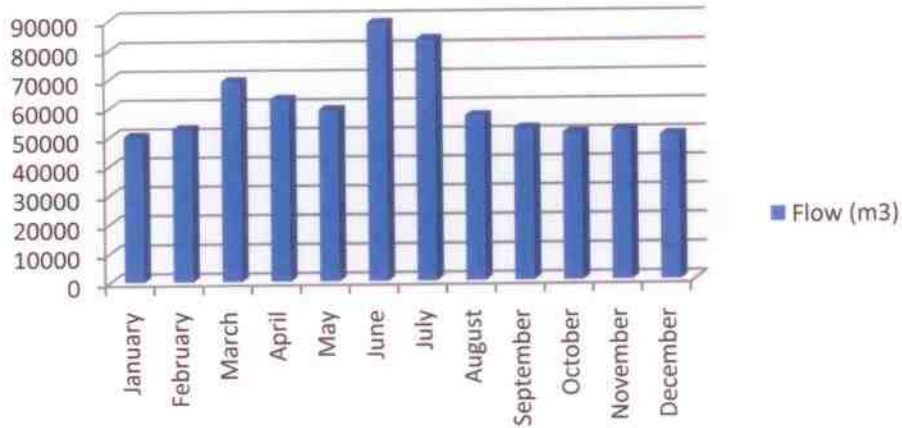
The City of Enderby's wastewater system, inclusive of treatment and collection, has a replacement value of \$29,896,140. The total loss in value to the system, representing the City's infrastructure deficit, is \$15,946,834 or 53% of the total value. The remaining value is \$16,086,325 or 47% of the total value. In 2013, the City contributed \$110,750 to its sewer reserve fund, increasing the balance to \$319,264.

In order to deal with its infrastructure deficit, the City has committed to increasing its sewer revenues by a minimum of 1% per year, which will be invested in recapitalization. While this amount represents a relatively small proportion of the shortfall, it is hoped that the demonstrated commitment to infrastructure renewal and asset management can position the City to partner with senior government on future infrastructure grant programs.

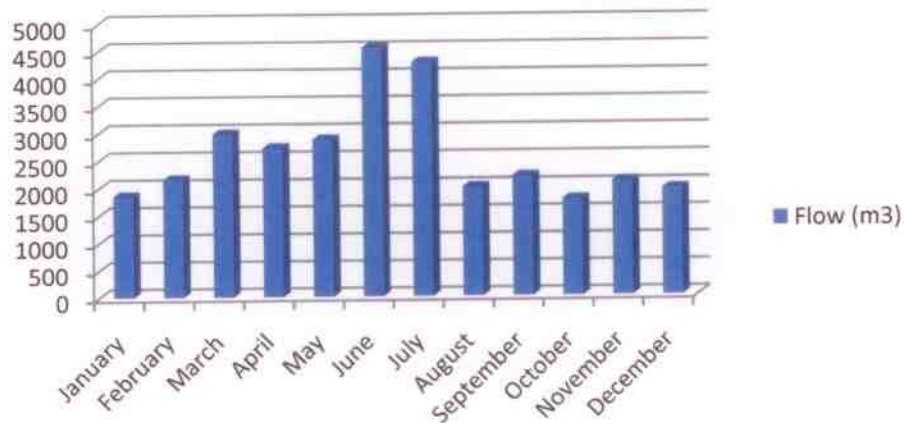


## Flow Data Monthly and Historical Trends

### Total Flow by Month (m3)



### Maximum Daily Flow by Month (m3)



There was a decrease in both the average daily flows and the maximum daily flows in 2013. This is likely explained by the overland flooding in 2012.

All units in m <sup>3</sup>	2013	2012	2011	2010	2009	2008
Average Daily Flow	2010	2165	1954	1690	1787	1725
Maximum Daily Flow	4551	5681	3305	3152	2981	2631

# Laboratory Analytical Data

Test	3-Jan-13	30-Jan-13	26-Feb-13	27-Mar-13	30-Apr-13	28-May-13	25-Jun-13	26-Jul-13	29-Aug-13	26-Sep-13	30-Oct-13	27-Nov-13	17-Dec-13
BOD, 5-day	0	0	0	0	0	0	0	0	0	0	0	0	0
BOD, 5-day Carbonaceous	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical Oxygen Demand	21	28	20	15	16	16	10	16	25	6	22	13	7
Coliforms, Fecal (MPN)	0	0	0	0	0	0	3	0	3	3.6	0	0	0
Coliforms, Total (MPN)	0	0	0	0	0	0	7.3	3.5	15	3.6	0	0	0
Conductivity (EC)	520	507	647	682	597	610	672	506	445	453	453	482	501
E. coli (MPN)	0	0	0	0	0	0	3	0	3	3.6	0	0	0
Nitrogen, Ammonia as N, Total	0.141	0.141	0.056	0.067	0.067	0.045	0.046	0.059	0.699	0.23	0.189	0.082	0.162
Nitrogen, Ammonia as N, Un-ionized													
Nitrogen, Nitrate as N	22.3	22.1	19.7	16.7	20.3	14.3	10.8	17	20.8	25.9	26.4	24.8	24.8
Nitrogen, Nitrate+Nitrite as N	22.3	22.1	19.7	16.7	20.3	14.3	10.8	17	20.8	25.9	26.4	24.8	24.8
Nitrogen, Nitrite as N	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrogen, Organic				2.55									
Nitrogen, Total	24.1	23.1	27	19.4	21.8	15.9	12.6	18.8	25.9	27.8	28.6	27	26.7
Nitrogen, Total Kjeldahl	1.74	1	7.33	2.62	1.59	1.69	1.8	1.85	5.08	1.92	2.12	2.14	1.87
pH	7.02	7	7.34	7.42	7.33	7.33	7.75	7.29	6.54	6.02	4.58	6.79	6.66
Phosphate, Ortho as P			1.12	0.9	1.99	1.55	0.9	2.61	3.03	1.56	2.17	2.12	1.07
Phosphorus, Total Kjeldahl			1.37	1.04	2.28	1.84	1.05	3.04	5.91	4.45	4.25	3.94	3.34
Phosphorus, Total Kjeldahl Dissolved			1.25	0.97	2.02	1.58	0.99	2.77	3.81	1.96	3.82	3.81	1.43
Solids, Total Suspended	2	5	4	1	5	0	1	0	8	2	4	6	4
Solids, Volatile Suspended	2	5	4	2	5	0	1	0	8	2	4	5	4
Temperature					22.9	22.3	21.8	21.7	22.6	22.4	20.1	21.4	21.4
Turbidity	3	3	1.6	1.6	1.5	1.6	1.6	2.3	6	2.8	4.3	1.8	3

\* A value of "0" may also mean less than reportable detection limit.