

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

M09010

January 13, 2015

Mr. Troy Cameron, Assistant Public Works Manager
The Municipality of Northern Bruce Peninsula
56 Lindsay Road 5, RR # 2
Lion's Head, Ontario
N0H 1W0

Mr. Leo-Paul Frigault, Cluster Manager
Ontario Clean Water Agency
PO Box 310
315 George Street
Warton, Ontario
N0H 2T0

**Re: 2015 Annual Report for Lakewood Subdivision Sewage System
Municipality of Northern Bruce Peninsula**

Dear Mr. Cameron & Mr. Frigault,

Darryl M. Robins Consulting Inc. (DMRC) is pleased to provide the following Annual Report for 2015. The following report outlines key elements of the sewage system and provides a brief discussion of the Consultant's observations at the site inspection. Please find attached to this report, the Inspection Report dated December 15, 2015, photos and Table Nos. 1 and 3.

The Ontario Clean Water Agency (OCWA) is the responsible authority for the operation and maintenance duties of the sewage system under contract to the Municipality of Northern Bruce Peninsula (Municipality). OCWA began these duties on July 1, 2009.

Sewage System Capacity:

From the records provided by the Municipality and OCWA as of January 4, 2016, there are currently 37 dwellings connected to the Lakewood Subdivision Sewage System. The original Certificate of Approval specified that each dwelling would be allotted a daily sewage flow of 1,200L/day for a maximum of 48 lots; therefore, the ultimate design daily sewage flow for the sewage system is 57,600L/day. With 37 dwellings online at present, the calculated daily sewage flow should be 44,400L/day.

OCWA has been maintaining records of the readings on the elapsed hour meters of the sewage dosing pumps for the tile field (See Table 1).

A pump test was completed on December 15, 2015 which resulted in the following sewage flow rates for the effluent pumps (See Table 2 below).

Table 2: Pump Test Flow Rates

Pump	Flow Rates (L/min)
1	219.2
2	219.2

During normal operation it appears that the pumps are dosing the tile field with an average volume of approximately 7,623 L/day based on the respective pumping rates determined by the pumping tests conducted by OCWA and DMRC at the site meeting of December 15, 2015. The 2015 pumping rates should be used by OCWA personnel in recording and evaluating flows at the facility. The results from the dosing pump records suggest that the actual sewage flows being received by the system are substantially less than the design and that the sewage system should have sufficient capacity for completion of Phases 1 and 2B of the subdivision. The average daily sewage flow for 2015 (7,623 L/day) is approximately 9% higher than the flows determined for 2014 (7,000 L/day).

The maximum daily sewage flow rate experienced in 2015 was 21,878 L/d which is substantially lower than the calculated daily sewage flows of 44,400 L/d for the 37 dwellings on-line in 2015.

Sampling Results:

OCWA took a sample of the sewage effluent during the 2015 annual inspection. The sample was analyzed by SGS Lakefield Research Limited and the results are shown on Table 3 (attached). The results of the Lakewood Subdivision sewage effluent sampling for the 2015 sampling event indicate that the sewage effluent is within typical values or lower, and there are no adverse results within the parameters tested to suggest unsuitable treatment for discharge to the tile fields.

Physical Conditions of the Sewage System:

DMRC's inspector walked around the tile field and septic tank area during the inspection. Bare spots were observed on the surface of the tile bed. There also appeared to be evidence of rodent infestation. Evidence of turtle nesting was also visible on the north side of the tile bed. There were also signs of erosion on the north side of the tile bed. It is suggested that these areas be top soiled and seeded in the spring. Please refer to the attached photos.

There was no detectable septic odour encountered except within the vicinity of the access opening of the dosing chamber. Both of the two (2) valve stem handles have disintegrated due to corrosion. Please see the attached photo. It is recommended that the valve stems be replaced.

The pump control panel and the dosing chamber appeared to be in good working order. The auto-dialer system was able to "call-out" during the inspection.

The splitter valve chamber was inspected and although the chamber did contain some water, there appears to be no need for concern and the valves are above the water level.

OCWA advised that the annual inspection of the collection system was completed on October 29, 2015 and no major deficiencies were reported.

Annual Report Recommendations:

1. OCWA and the Municipality should replace the effluent discharge control valve stems.
2. The "Dosing Pump Elapsed Time Weekly Record Sheets" provided in the Updated Operations and Maintenance Manual should be used by operations staff. Operators should continue to keep a project-specific journal of their site visits, alarm conditions, maintenance, repairs and observations.
3. Operations staff should continue to monitor the air relief valve at SANMH2. There had been maintenance issues with the air relief valve in the past.

It is the writer's overall opinion that the system is in good working order, and that the housing development within Phases 1 and 2B of the subdivision should continue with regards to the available capacity of the subdivision's existing sewage system.

Should you have any questions or concerns with the above and enclosed, please do not hesitate to contact the writer.

Yours truly,

DARRYL M. ROBINS CONSULTING INC.



Laura Swanson, P.Eng.
Civil-Environmental Engineer

LAS/br
Encl.

Cc: Mr. Bob Hart, CPHI, Public Health Manager, Grey Bruce Health Unit
Mr. John Nichol, Lakewood Subdivision Ratepayer's Association
Mr. David Trombley, OCWA (via email)

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

INSPECTOR'S REPORT:

Project Title:	<u>Lakewood Subdivision</u>	Inspection Date:	<u>Dec. 15, 2015</u>
Inspector:	<u>Laura Swanson, P.Eng</u>	Inspection Time:	<u>10:40 am</u>
Location:	<u>Lakewood Subdivision</u>	File No.:	<u>M09010</u>

- The writer met with Mr. Charles Theriault (Operations, OCWA) on December 15, 2015 at 10:40 am.
- There was only a detectable septic odour encountered when the writer was in the vicinity of the dosing chamber.
- Pumping rate tests were conducted on the effluent pumps at this inspection. Each pump ran for four (4) minutes. Ms. Swanson recorded the readings and completed the calculations in the office. The resulting effluent pump rates were calculated to be:

Pump No. 1:	219.2 L/min
Pump No. 2:	219.2 L/min
- The writer observed the elapsed time meters at Pump No. 1 and 2 in operation during trials of dosing cycles at the site meeting. The elapsed time meter readings were noted at:

Pump No. 1	807.02 Hrs
Pump No. 2	656.52 Hrs
- Mr. Theriault advised that the only high level alarms had been the result of power surges. A test on the high level alarm was conducted at the site meeting. The alarm beacon and high level alarm light on the control box appeared to be in satisfactory working condition. OCWA reported that the alarm call was received on the designated phone numbers.

Station telephone number: 519-793-4434

The alarm dialer will call out for the following conditions:

- a) Pump Failure
- b) High Level Alarm
- c) Power Failure

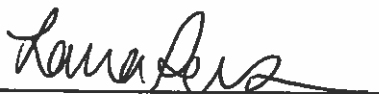
The current alarm call-out protocol is as follows:

1. OCWA Northern Bruce Peninsula Operator On-call cell phone 519-372-4807
2. Lion' Head Water Treatment Plant 519-793-6900
3. Wiarton Water Treatment Plant 519-534-1610

- OCWA had arranged for Scott's Septic Service to be onsite and they pumped out the dosing chamber to the approximate low level depth. The tank appeared to be in satisfactory condition. It was noted that there did not appear to be any sludge at the bottom of the dosing chamber.
- The septic tank was inspected. The tank appeared to be full. Mr. Theriault advised that they (OCWA and Scott's Septic Service) had checked the depth of sludge in the bottom of the septic tank before the writer arrived. He advised that little sludge was noted. Pumping out the septic tank did not appear to be required.
- The discharge control valve stems (dosing chamber) that control discharge to the tile fields were not operable, the handles are rusted and in poor condition.
- An inspection of the splitter valve chamber to the tile fields was conducted. There were no deficiencies noted. The chamber did contain some water, but the valves were above the water level. The water was clear and was assumed to be from infiltration. A poly-seal (bowl) had been installed.
- The control panel, enclosure and associated equipment appeared to be in good condition and operating normally.
- OCWA identified that the annual inspection of the maintenance holes had been completed and the maintenance holes are in satisfactory condition. OCWA agreed to provide the inspection report.
- Digital photos of the existing conditions of the sewage system were taken and are saved under the project file number at Darryl M. Robins Consulting Inc.
- Mr. Theriault took samples of the sewage effluent from the dosing chamber at the facility for lab analysis.
- The writer walked over the tile field looking for any signs of vandalism, rodent infestation, erosion or breakouts. Bare spots were observed on the surface of the tile bed. There appeared to be evidence of rodent infestation and turtle nesting on the north side of the tile bed. There were also signs of erosion on the north side of the tile bed. It is suggested that these areas be top soiled and seeded in the spring. Please refer to the attached photos.

Report finalized on January 6, 2016.

DARRYL M. ROBINS CONSULTING INC.



Laura Swanson, P.Eng
Civil – Environmental Engineer

TABLE 3
 LAB ANALYSIS RESULTS OF SEPTIC TANK EFFLUENT
 LAKEWOOD SUBDIVISION SEWAGE SYSTEM
 2015 ANNUAL INSPECTION REPORT

Date	BOD mg/L	Total Suspended Solids mg/L	pH pH units	Nitrate mg/L	Ammonia (N) Total mg/L	Total Kjeldahl Nitrogen mg/L	Phosphorus Total mg/L
May 30/03	155	76	7.38	0.2	58.8	75.8	10.7
Sept. 7/04	82	22	7.35	0.1	62.4	70.9	9.88
Sept. 19/05	53	44	7.41	<0.1	63.9	75.5	10.6
Sept. 22/06	93	90	7.47	0.1	63.4	74.6	9.65
Nov. 26/07	64	18	7.7	<0.1	59.1	67.4	9.49
Nov. 18/08	81	32	8.12	0.1	68.5	71.1	9.6
Nov. 24/09	62	44	N/A	<0.05	74.5	73.9	9.59
Oct. 19/10	74	23	7.77	<0.06	69.9	66.3	10.1
Nov. 15/11	74	10	7.85	<0.05	63.1	63.7	8.85
Oct. 16/12	89	98	8.00	<0.05	68.5	70.3	10.2
Nov. 1/13	46	26	7.88	<0.06	76.2	84	10.4
Nov. 17/14	57	18	7.49	<0.06	60.8	70.1	8.55
Dec. 15/15	72	19	7.59	<0.06	64.6	67	8.59
Typical Concentration Range for Septic Effluent	140 to 200	50 to 100				40 to 100	5 to 15

- Typical concentration range for septic tank effluent was obtained from the USEPA On-Site Wastewater Treatment Systems Manual
- Lab Analysis Conducted by Caduceon Environmental Laboratories Inc (2003-2008)
- Lab Analysis Conducted by SGS Lakefield Research (2009-2014)

N/A - sample parameter result not provided

TABLE 1
DOSING PUMP RECORDS
(ELAPSED TIME METER READINGS)
LAKEWOOD SUBDIVISION
NOVEMBER 14, 2014 - DECEMBER 15, 2015

DATE	PUMP NO. 1						PUMP NO. 2						COMBINED AVERAGE DAILY FLOW (L/d)	OPERATOR'S NOTES
	TIME	Time (dec)	RECORDED RUN TIME (hrs)	ELAPSED PUMP TIME (hrs)	VOLUME PUMPED (L)	AVERAGE DAILY FLOW (L/d)	RECORDED RUN TIME (hrs)	ELAPSED PUMP TIME (hrs)	VOLUME PUMPED (L)	AVERAGE DAILY FLOW (L/d)				
14-Nov-14	09:35:00	9.58	698.82	1.00	13,155	3,274	551.41	1.05	13,812	4.02	3,338	6,713	OK	
18-Nov-14	10:00:00	10.00	699.82	1.00	13,155	3,274	552.46	1.05	13,812	4.02	3,321	7,444	OK	
20-Nov-14	09:30:00	9.50	700.35	0.53	6,972	3,523	553.05	0.59	7,761	1.98	3,921	7,444	OK	
27-Nov-14	10:00:00	10.00	702.61	2.26	29,729	4,234	555.19	2.14	28,151	7.02	4,010	8,244	OK	
02-Dec-14	10:50:00	10.83	704.02	1.41	18,548	3,684	556.52	1.33	17,496	5.03	3,475	7,159	OK	
09-Dec-14	10:06:00	10.10	705.71	1.69	22,231	3,190	558.24	1.72	22,626	6.97	3,246	6,426	OK	
16-Dec-14	12:52:00	12.87	707.22	1.51	19,864	2,792	560.04	1.80	23,578	7.12	3,328	6,119	OK	
23-Dec-14	09:50:00	9.83	709.19	1.97	25,915	3,770	561.76	1.72	22,628	6.87	3,292	7,062	OK	
29-Dec-14	13:55:00	13.92	711.40	2.21	29,072	4,712	564.05	2.29	30,124	6.17	4,882	9,594	OK	
09-Jan-15	10:17:00	10.28	714.53	3.13	41,174	3,795	567.13	3.08	40,516	10.85	3,735	7,500	OK	
13-Jan-15	10:14:00	10.23	715.27	0.74	9,734	2,535	568.12	0.99	13,023	4.00	3,257	5,692	OK	
20-Jan-15	11:55:00	11.92	716.55	1.38	18,153	2,568	569.44	1.32	17,364	7.07	2,456	5,024	OK	
27-Jan-15	11:19:00	11.32	717.79	1.14	14,996	2,150	570.56	1.12	14,733	6.98	2,112	4,262	OK	
03-Feb-15	11:08:00	11.13	719.31	1.52	19,995	2,600	571.86	1.30	17,101	6.99	2,446	5,305	OK	
10-Feb-15	09:16:00	9.27	720.45	1.14	14,996	2,166	572.94	1.08	14,207	6.92	2,052	4,219	OK	
18-Feb-15	12:15:00	12.25	722.34	1.88	24,862	3,060	574.91	1.97	25,915	8.12	3,190	6,250	OK	
26-Feb-15	09:37:00	9.62	723.67	1.33	17,496	2,217	576.00	1.09	14,339	7.89	1,817	4,035	OK	
03-Mar-15	10:05:00	10.08	724.61	0.94	12,365	2,452	578.92	0.92	12,102	5.02	2,411	4,875	OK	
10-Mar-15	09:00:00	9.00	726.16	1.55	20,390	2,932	578.37	1.45	19,074	6.95	2,743	5,674	OK	
17-Mar-15	13:15:00	13.25	727.87	1.71	22,494	3,134	580.03	1.66	21,837	7.18	3,043	6,177	OK	
24-Mar-15	10:23:00	10.38	729.24	1.37	18,022	2,619	581.47	1.44	18,943	6.88	2,753	5,372	OK	
02-Apr-15	10:15:00	10.25	731.31	2.07	27,230	3,027	583.04	1.57	20,653	8.99	2,296	5,324	OK	
09-Apr-15	10:55:00	10.92	733.07	1.76	23,152	3,294	584.89	1.85	24,336	7.03	3,463	6,157	OK	
15-Apr-15	09:45:00	9.75	735.08	2.01	26,441	3,804	586.65	1.76	23,152	6.95	3,331	7,134	OK	
22-Apr-15	08:40:00	8.67	736.01	0.93	12,234	1,799	587.56	0.91	11,971	6.95	1,721	3,480	OK	
30-Apr-15	08:40:00	8.67	737.83	1.82	23,941	3,420	589.20	1.64	21,574	7.00	3,082	6,502	CHECKED ALARMS	
08-May-15	08:15:00	8.25	739.77	1.94	25,520	3,197	591.11	1.91	25,125	7.98	3,148	6,344	OK	
14-May-15	13:50:00	13.83	741.34	1.57	20,653	3,314	592.67	1.56	20,521	6.23	3,293	6,006	OK	
22-May-15	10:15:00	10.25	743.88	2.54	33,413	4,177	595.50	2.83	37,228	8.00	4,653	8,830	OK	
28-May-15	10:45:00	10.75	747.18	1.72	22,626	3,223	598.38	1.67	21,988	7.02	2,721	6,352	OK	
4-Jun-15	10:55:00	10.92	749.18	2.00	26,309	3,755	600.27	1.89	24,862	7.01	3,548	7,303	OK	
11-Jun-15	08:50:00	8.83	751.54	2.36	31,045	3,923	602.77	2.50	32,887	7.91	4,156	8,079	OK	
23-Jun-15	14:05:00	14.08	753.09	1.55	20,390	4,22	604.12	1.35	17,799	4,209	17,799	9,043	OK	
3-Jun-15	08:50:00	8.83	755.43	3.34	42,936	9,78	607.52	3.40	44,726	9,78	4,573	9,065	OK	
9-Jun-15	12:50:00	12.83	758.71	2.28	29,993	6,17	609.50	1.98	26,046	6,17	4,224	9,087	OK	
16-Jun-15	13:36:00	13.80	761.35	2.65	34,860	7,03	612.07	2.57	33,807	7,03	4,608	9,765	OK	
23-Jun-15	15:40:00	15.67	766.14	2.61	28,546	6,87	614.40	2.33	30,650	6,87	4,461	8,616	OK	
30-Jun-15	08:27:00	8.45	768.82	2.88	35,294	7,22	616.66	2.46	32,360	7,22	4,485	9,243	OK	
7-Jul-15	12:50:00	12.83	770.45	1.63	21,442	2,18	621.64	2.00	26,309	2,18	12,054	21,878	OK	
14-Jul-15	10:15:00	10.25	773.06	2.61	34,334	6,89	624.12	2.48	32,624	6,89	4,733	9,715	OK	
28-Aug-15	14:00:00	14.00	777.13	4.07	53,539	10,16	627.73	3,61	47,488	10,16	4,676	9,947	OK	
4-Sep-15	13:25:00	13.42	779.14	2.01	26,441	6,98	629.83	2,10	27,625	6,98	3,960	7,751	OK	
9-Sep-15	13:08:00	13.13	781.12	1.98	26,046	4,99	631.61	1,78	23,415	4,99	4,694	9,916	OK	
18-Sep-15	08:20:00	8.33	783.31	2,19	28,809	8,80	633.70	2,09	27,493	8,80	3,124	6,398	OK	
23-Sep-15	10:56:00	10.93	784.79	1,48	19,469	5,11	635.14	1,44	18,943	5,11	3,708	7,519	OK	
2-Oct-15	09:47:00	9,78	787.15	2,36	31,045	6,95	637.46	2,32	30,519	6,95	3,409	6,877	OK	
9-Oct-15	09:08:00	9,13	789.00	1,95	24,336	6,97	639.37	1,91	25,125	6,97	3,603	7,093	OK	
14-Oct-15	11:31:00	11,52	791.65	2,65	34,860	5,10	640.93	1,56	20,521	5,10	4,024	10,861	OK	
23-Oct-15	08:47:00	8,78	792.97	1,32	17,364	1,954	642.98	2,05	26,967	8,89	3,035	4,989	OK	
29-Oct-15	15:31:00	15,52	794.71	1,74	22,889	6,28	644.78	1,80	23,678	6,28	3,770	7,415	OK	
3-Nov-15	09:30:00	9,50	796.14	1,43	18,811	4,96	646.39	1,61	21,179	4,96	4,772	8,066	OK	
10-Nov-15	11:10:00	11,17	797.85	1,71	22,494	6,79	647.85	1,46	19,206	6,79	2,828	6,140	OK	
17-Nov-15	11:10:00	11,17	799.74	1,99	24,862	7,06	649.94	2,09	27,493	7,06	2,870	7,406	OK	
24-Nov-15	12:36:00	12,60	801.69	1,95	25,652	7,06	651.48	1,54	20,258	7,06	2,870	6,503	OK	
1-Dec-15	11:05:00	11,08	803.48	1,79	23,547	4,048	653.33	1,85	24,336	4,048	6,01	1,183	OK	
8-Dec-15	11:23:00	11,38	805.09	1,51	21,179	3,020	654.91	1,58	20,794	3,020	2,964	5,984	OK	
15-Dec-15	10:27:00	10,45	806.94	1,85	24,336	6,96	656.45	1,54	20,258	6,96	2,910	6,406	OK	

PUMP 1
YEARLY AVERAGE DAILY FLOW:
MAX. DAILY FLOW RATE:

3,632 L/d
9,824 L/d

PUMP 2
YEARLY AVERAGE DAILY FLOW:
MAX. DAILY FLOW RATE:

3,550 L/d
12,054 L/d

COMBINED AVERAGE DAILY FLOW RATE:
COMBINED MAXIMUM DAILY FLOW RATE:
ASSUMED ERRONEOUS READINGS

7,180 L/d
21,878 L/d

0

PUMPING TEST FLOW RATES:
PUMP #1: 219.2 L/min
PUMP #2: 219.2 L/min
(NOV 1, 2013)

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

Dec 15, 2015

Lakewood Subdivision – Sewage System

Photo ID: IMG_20151215-114217: Potential Rodent Opening



Photo ID IMG_20151215-114437: Erosion at the north side of the tile bed



Photo ID IMG_20151215-114645: Discharge Control Valve Stems (Dosing Chamber)



Photo ID IMG_20151215-113223: Splitter Valve Chamber

