DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

M09010

January 22, 2014

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

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

Re: 2013 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 2013. 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 Annual Inspection Summary from November 1, 2013 and Table No.'s 1 and 2.

The Ontario Clean Water Agency (OCWA) is the responsible authority for 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 October 31, 2013, 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).

During normal operation it appears that the pumps are dosing the tile field with an average volume of approximately 7,565 L/day based on the respective pumping rates determined by the pumping tests conducted by OCWA and DMRC at the site meeting of November 1, 2013. These 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 2013 (7,565 L/day) is approximately 10% greater than that determined for 2012 (6,877 L/day).

4844 HIGHWAY NO. 6, MILLER LAKE, ONTARIO, N0H 1Z0
EMAIL: dmrc@dmrconsulting.ca
TELEPHONE: 519-795-7094
FAX: 519-795-7094
TOLL FREE: 1-877-795-7094

The maximum daily sewage flow rate experienced in 2013 was 16,555 L/d which is substantially lower than the calculated daily sewage flows of 44,400 L/d for the 37 dwellings on-line in 2013.

Sampling Results:

OCWA took a sample of the sewage effluent during the 2013 annual inspection. The sample was analyzed by SGS Lakefield Research Limited and the results are shown on Table 2 (attached). The results of the Lakewood Subdivision sewage effluent sampling for the 2013 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 in the tile field. Mr. Mader advised that the Municipality had re-seeded the tile bed in August 2013. It is suggested that the condition of the tile bed be monitored. The Municipality should consider over-seeding the tile bed in the spring of 2014, if the condition does not improve. Signs of erosion were also observed at the north end of the tile bed. This area should be re-established in the spring of 2014.

There was no detectable septic odour encountered unless you were within the vicinity of the access openings. The valves stems can be operated, however they are quite rusty and in poor condition. 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 autodialer 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 30, 2013 and no deficiencies were reported.

OCWA arranged for the dosing chamber to be pumped out at the annual inspection. The condition of the tank was reviewed. It appeared that the dosing chamber is in adequate condition.

Annual Report Recommendations:

1. The "Dosing Pump Elapsed Time Weekly Record Sheets" provided in the Operations and Maintenance Manual originally provided by Henderson Paddon & Associates for recording and collecting data on dosing pump operation should continue to be used by operations staff. Operators should continue to keep a project–specific journal of their site visits, alarm conditions, maintenance, repairs and observations.
2. Operations staff should continue to monitor the air relief valve at SANMH2.
3. The Municipality should update the existing Operations and Maintenance Manual to accurately incorporate the upgraded dosing pump components.
4. OCWA and the Municipality should consider replacing the effluent discharge control valve stems.
5. Continue to monitor the condition of the lawn on the tile bed. Over-seed the bare spots in the spring of 2014 (if required).
6. Re-instate the area of the tile-bed disturbed due to erosion.

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)

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INSPECTOR'S REPORT:

Project Title:	Lakewood Subdivision	**Inspection Date:**	Nov. 1, 2013
Inspector:	Laura Swanson, P.Eng	**Inspection Time:**	9:00 am
Location:	Lakewood Subdivsion	**File No.:**	M09010

- The writer met with Mr. Paul Mader (Operations, OCWA) on November 1, 2013 at 9:00 am.

- There was only detectable septic odour encountered when the reader was in the vicinity of the dosing chamber.

- Pumping rate tests were conducted on the effluent pumps at this inspection. Each pump was run for 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: 167.2 L/min
  Pump No. 2: 243.9 L/min

- Mr. Mader advised that there had been no high level alarms with the sewage system. 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 operator on-call cell phone 519-372-3034
  2. Lion' Head Water Treatment Plant 519-793-6900
  3. Wiarton Water Treatment Plant 519-534-1610

- Mr. Mader advised that the Municipality had topsoiled and seeded the tile bed in August of 2013. The writer walked over the tile field looking for any signs of vandalism, rodent infestation, erosion or breakouts. Bare spots were observed throughout the tile bed. It is suggested that the condition of the tile bed be monitored and re-seeded in the spring if necessary. There were also signs of erosion on the north side of the tile bed. Please refer to the attached photos. This area should be re-established (re-topsoiled and seeded)

4844 HIGHWAY NO. 6, MILLER LAKE, ONTARIO, N0H 1Z0 TELEPHONE: 519-795-7094
E-MAIL: dmrc@dmrconsulting.ca FAX: 519-795-7094

- The discharge control valve stems (dosing chamber) that control discharge to the tile fields were operable, however the handles are rusty 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; the valves were above the water level. The water was clear and expected 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.

- 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. Mader took samples of the sewage effluent from the dosing chamber at the facility for lab analysis.

- Scott's Septic Service arrived on-site to pump out the tanks. The dosing chamber was pump out. The tank appears to be in satisfactory condition. Ryan began to pump out the Septic Tank. The truck filled and Scott Septic Service needed to leave the site to discharge the sewage. It was noted that it would be over an hour before the septic tank would be ready for an inspection. It was agreed that Ms. Swanson would be contacted when the tank was empty for an inspection.

- Mr. Mader received a call because there was a power failure and Mr. Mader checked the control panel.

- Ms. Swanson returned to the site at 11:45am. Mr. Mader advised that he did not want to pump out all the sewage from the septic tank because he wanted to ensure some liquid remains in the system. Scott Septic Service did not have the hose to discharge sewage on-site; so removing the sewage for the inspection and later discharging it back in the septic tank was not an option. A visual inspection was completed of the septic tank. The liquid level was approximately one (1) foot below the top the tank. Mr. Mader advised that he would arrange for a pump out of the septic tanks at next year's annual inspection.

Report finalized on November 5, 2013.

DARRYL M. ROBINS CONSULTING INC.

Laura Swanson, P.Eng
Civil – Environmental Engineer

4844 HIGHWAY NO. 6, MILLER LAKE, ONTARIO, N0H 1Z0 TELEPHONE: 519-795-7094
E-MAIL: dmrc@dmrconsulting.ca FAX: 519-795-7094

TABLE 2
LAB ANALYSIS RESULTS OF SEPTIC TANK EFFLUENT
LAKEWOOD SUBDIVISION SEWAGE SYSTEM
2013 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
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 were 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 (2009-2013)

N/A - sample parameter result not provided

TABLE 1
DOSING PUMP RECORDS
(ELAPSED TIME METER READINGS)
LAKEWOOD SUBDIVISION
OCTOBER 25, 2012 TO OCTOBER 31, 2013

DATE	TIME	Time (dec)	PUMP NO. 1 RECORDED RUN TIME (hrs)	PUMP NO. 1 ELAPSED PUMP TIME (hr)	PUMP NO. 1 VOLUME PUMPED (L)	PUMP NO. 1 ELAPSED TIME (days)	PUMP NO. 1 AVERAGE DAILY FLOW (L/d)	PUMP NO. 2 RECORDED RUN TIME (hrs)	PUMP NO. 2 ELAPSED PUMP TIME (hr)	PUMP NO. 2 VOLUME PUMPED (L)	PUMP NO. 2 ELAPSED TIME (days)	PUMP NO. 2 AVERAGE DAILY FLOW (L/d)	COMBINED AVERAGE DAILY FLOW (L/d)	OPERATOR'S NOTES
25-Oct-12	10:20:00	10.33	457.27					343.15						RSS OK
08-Nov-12	10:15:00	10.25	461.33	4.06	40,723	14.00	2,910	346.13	2.98	43,611	14.00	3,116	6,025	RSS OK
15-Nov-12	07:40:00	7.67	463.37	2.04	20,462	6.89	2,969	347.78	1.65	24,147	6.89	3,503	6,472	RSS OK
22-Nov-12	08:00:00	8.00	468.76	5.39	54,064	7.01	7,708	352.02	4.24	62,050	7.01	8,847	16,555	RSS OK
30-Nov-12	07:45:00	7.75	474.01	5.25	52,660	7.99	6,591	355.81	3.79	55,465	7.99	6,942	13,533	RSS OK
06-Dec-12	10:40:00	10.67	475.88	1.87	18,757	6.12	3,064	357.46	1.65	24,147	6.12	3,945	7,009	RSS OK
13-Dec-12	09:30:00	9.50	477.68	1.80	18,055	6.95	2,597	358.93	1.47	21,513	6.95	3,095	5,692	RSS OK
20-Dec-12	14:00:00	14.00	479.80	2.12	21,264	7.19	2,959	360.55	1.62	23,708	7.19	3,298	6,257	RSS OK
28-Dec-12	09:20:00	9.33	483.82	4.02	40,322	7.81	5,166	363.63	3.08	45,074	7.81	5,775	10,940	RSS OK
03-Jan-13	09:25:00	9.42	486.82	3.00	30,091	6.00	5,012	365.83	2.20	32,196	6.00	5,363	10,375	RSS OK
10-Jan-13	08:00:00	8.00	488.84	2.02	20,261	6.94	2,919	367.62	1.79	26,196	6.94	3,774	6,693	RSS OK
17-Jan-13	12:00:00	12.00	490.79	1.95	19,559	7.17	2,729	369.02	1.40	20,488	7.17	2,859	5,588	RSS OK
24-Jan-13	11:55:00	11.92	492.49	1.70	17,052	7.00	2,437	370.18	1.16	16,976	7.00	2,426	4,864	RSS OK
31-Jan-13	08:00:00	8.00	495.02	2.53	25,377	6.84	3,712	371.97	1.79	26,196	6.84	3,832	7,543	RSS OK
04-Feb-13	11:45:00	11.75	497.07	2.05	20,562	4.16	4,947	373.55	1.58	23,123	4.16	5,563	10,511	RSS OK
14-Feb-13	08:00:00	8.00	500.98	3.91	39,219	9.84	3,984	376.17	2.62	38,342	9.84	3,895	7,879	RSS OK
21-Feb-13	11:20:00	11.33	501.69	0.71	7,122	7.14	998	376.69	0.52	7,610	7.14	1,066	2,064	RSS OK
28-Feb-13	14:10:00	14.17	503.08	1.39	13,942	7.12	1,959	377.96	1.27	18,586	7.12	2,611	4,570	RSS OK
07-Mar-13	14:35:00	14.58	504.79	1.71	17,152	7.02	2,444	379.02	1.06	15,513	7.02	2,211	4,655	RSS OK / Alarm
14-Mar-13	14:50:00	14.83	506.76	1.97	19,760	7.01	2,819	380.52	1.50	21,952	7.01	3,131	5,950	RSS OK
21-Mar-13	12:50:00	12.83	508.48	1.72	17,252	6.92	2,494	382.03	1.51	22,098	6.92	3,195	5,689	RSS OK
28-Mar-13	08:40:00	8.67	510.52	2.04	20,462	6.83	2,997	383.34	1.31	19,171	6.83	2,808	5,806	RSS OK / Alarm
04-Apr-13	07:20:00	7.33	512.62	2.10	21,064	6.94	3,033	385.00	1.66	24,293	6.94	3,498	6,531	RSS OK
11-Apr-13	08:15:00	8.25	515.07	2.45	24,575	7.04	3,492	386.85	1.85	27,074	7.04	3,847	7,338	RSS OK
18-Apr-13	12:35:00	12.58	516.94	1.87	18,757	7.18	2,612	388.78	1.93	28,245	7.18	3,933	6,546	RSS OK / Alarm
25-Apr-13	07:40:00	7.67	519.00	2.06	20,663	6.80	3,041	390.37	1.59	23,269	6.80	3,424	6,465	RSS OK
02-May-13	10:10:00	10.17	521.37	2.37	23,772	7.10	3,346	391.99	1.62	23,708	7.10	3,337	6,683	RSS OK
09-May-13	10:20:00	10.33	523.46	2.09	20,964	7.01	2,992	393.93	1.94	28,391	7.01	4,052	7,044	RSS OK / Alarm
16-May-13	09:00:00	9.00	525.21	1.75	17,553	6.94	2,528	395.61	1.68	24,586	6.94	3,540	6,068	RSS OK
23-May-13	10:22:00	10.37	528.42	3.21	32,198	7.06	4,563	398.02	2.41	35,269	7.06	4,998	9,560	RSS OK
30-May-13	13:30:00	13.50	530.72	2.30	23,070	7.13	3,235	400.09	2.07	30,293	7.13	4,248	7,484	RSS OK / Alarm
07-Jun-13	08:25:00	8.42	533.40	2.68	26,882	7.79	3,452	402.36	2.27	33,220	7.79	4,265	7,717	RSS OK
13-Jun-13	11:14:00	11.23	535.51	2.11	21,164	6.12	3,460	404.11	1.75	25,610	6.12	4,187	7,646	RSS OK
20-Jun-13	10:26:00	10.43	537.70	2.19	21,967	6.97	3,153	405.73	1.62	23,708	6.97	3,403	6,556	RSS OK / Alarm
26-Jun-13	09:10:00	9.17	539.98	2.28	22,869	5.95	3,845	407.37	1.64	24,001	5.95	4,036	7,881	RSS OK
04-Jul-13	10:30:00	10.50	543.82	3.84	38,517	8.06	4,781	410.28	2.91	42,587	8.06	5,287	10,068	RSS OK
11-Jul-13	09:20:00	9.33	546.91	3.09	30,994	6.95	4,459	412.28	2.00	29,269	6.95	4,211	8,669	RSS OK / Alarm
18-Jul-13	08:05:00	8.08	549.61	2.70	27,082	6.95	3,898	414.61	2.33	34,098	6.95	4,908	8,806	RSS OK
25-Jul-13	10:50:00	10.83	552.64	3.03	30,392	7.11	4,272	416.98	2.37	34,684	7.11	4,875	9,147	RSS OK
01-Aug-13	10:40:00	10.67	555.70	3.06	30,693	6.99	4,389	419.34	2.36	34,538	6.99	4,939	9,328	RSS OK
08-Aug-13	10:20:00	10.33	558.84	3.14	31,495	6.99	4,508	421.77	2.43	35,562	6.99	5,090	9,599	RSS OK
15-Aug-13	09:34:00	9.57	561.74	2.90	29,088	6.97	4,175	424.02	2.25	32,928	6.97	4,726	8,900	RSS OK
22-Aug-13	08:40:00	8.67	564.48	2.74	27,483	6.96	3,947	426.01	1.99	29,123	6.96	4,183	8,130	RSS OK / Alarm
29-Aug-13	08:50:00	8.83	567.41	2.93	29,389	7.01	4,194	428.17	2.16	31,611	7.01	4,511	8,706	RSS OK
05-Sep-13	12:00:00	12.00	570.41	3.00	30,091	7.13	4,219	430.47	2.30	33,659	7.13	4,720	8,939	RSS OK
12-Sep-13	12:00:00	12.00	572.76	2.35	23,571	7.00	3,367	432.28	1.81	26,489	7.00	3,784	7,151	RSS OK / Alarm
19-Sep-13	09:20:00	9.33	575.16	2.40	24,073	6.89	3,494	434.23	1.95	28,537	6.89	4,143	7,637	RSS OK
26-Sep-13	10:45:00	10.75	577.31	2.15	21,565	7.06	3,055	436.00	1.77	25,903	7.06	3,670	6,725	RSS OK
03-Oct-13	08:25:00	8.42	579.17	1.86	18,657	6.90	2,703	437.32	1.32	19,318	6.90	2,799	5,501	RSS OK
09-Oct-13	15:45:00	15.75	581.23	2.06	20,663	6.31	3,277	439.07	1.75	25,610	6.31	4,062	7,338	RSS OK / Alarm
16-Oct-13	15:05:00	15.08	583.39	2.16	21,666	6.97	3,107	440.90	1.83	26,781	6.97	3,841	6,949	RSS OK
23-Oct-13	09:30:00	9.50	586.15	2.76	27,684	6.77	4,091	442.81	1.91	27,952	6.77	4,130	8,221	RSS OK / Alarm
29-Oct-13	06:45:00	6.75	587.93	1.78	17,854	5.89	3,034	444.04	1.23	18,000	5.89	3,058	6,092	RSS OK / Alarm
31-Oct-13	11:20:00	11.33	588.65	0.72	7,222	2.19	3,296	444.57	0.53	7,756	2.19	3,540	6,836	RSS OK

PUMPING TEST FLOW RATES: (NOV. 1, 2013)
PUMP #1: 167.2 L/min
PUMP #2: 243.9 L/min

PUMP 1
YEARLY AVERAGE DAILY FLOW: 3,555 L/d
MAX. DAILY FLOW RATE: 7,708 L/d

PUMP 2
YEARLY AVERAGE DAILY FLOW: 4,018 L/d
MAX. DAILY FLOW RATE: 8,847 L/d

COMBINED AVERAGE DAILY FLOW RATE: 7,565 L/d
COMBINED MAXIMUM DAILY FLOW RATE: 16,555 L/d
ASSUMED ERRONEOUS READINGS EXCLUDED FROM CALCULATIONS 0