

6.4(a)



Gamsby and Mannerow
ENGINEERS



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February 5, 2014

Our File: 1921024'S DEPARTMENT

FEB 11 2014

Township of Puslinch

Township of Puslinch
RR3, 7404 Wellington Road 34
Guelph, ON N1H 6H9

Attention: Ms. Karen Landry
CAO/Clerk

TO	
Copy	
Please Handle	
For Your Information	
Council Agenda	March 5/13
File	

Re: Mini Lakes Wastewater Treatment
Plant Effluent Monitoring Report,
4th Quarter (2013)

Dear Ms. Landry:

We have reviewed the "Mini Lakes Mobile Home Community Quarterly Monitoring Program – 4th Quarter 2013" report, as submitted by Stantec Consulting Limited on January 30, 2014. We are pleased to provide our comments for your consideration.

The following table summarizes the average effluent quality for the fourth quarter (Q4) (column 2), the year to date (YTD) average (column 3), the 12-month rolling average (column 4), the previous YTD average (2012) (column 5) and the MOE Certificate of Approval (C of A) compliance limits (column 6).

1	2	3	4	5	6
Parameters (mg/L)	Q4 Avg., (Oct. 1 to Dec. 31, 2013)	YTD Avg., (Jan. 1 to Dec. 31, 2013)	Twelve-Month Rolling Avg., (Jan. 1, 2013 to Dec. 31, 2013) ^a	Previous YTD Avg. (Jan. 1 to Dec. 31, 2012)	Compliance Limit
CBOD ₅ ^b	17.0	12.9	12.9	11.5	20.0
TSS ^c	17.0 ^f	16.0	16.0	15.0	20.0
TP ^d	0.47	0.42	0.42	0.43	1.0
NO ₃ ^e	3.7	4.8	4.8	4.7	5.0

- a. Condition 3.1 of the MOE C of A, average is defined as "any twelve (12) consecutive calendar months"
- b. CBOD₅ = 5 day Carbonaceous Biological Oxygen Demand
- c. TSS = Total Suspended Solids
- d. TP = Total Phosphorous
- e. NO₃ = Nitrate
- f. Note: Discrepancy compared to Table 1 in Stantec report due to Dec, 27, 2013 TSS results reported as <10 mg/L. Results were interpreted by G&M as 10 mg/L for purposes of calculating averages. Results were interpreted by Stantec as 0 mg/L for purposes of calculating averages.

people engineering environments

Gamsby and Mannerow Limited · Guelph, Owen Sound, Listowel, Kitchener, Exeter

650 Woodlawn Rd W., Block C, Unit 2, Guelph, ON N1K 1B8 519-824-8150 fax 519-824-8089 www.gamsby.com

The MOE C of A requires that plant effluent be sampled and analyzed on a monthly basis for each of the parameters defined above. Plant effluent was sampled monthly for all parameters during this quarter and on four additional occasions for only nitrate/nitrite.

Effluent CBOD₅

The average CBOD₅ effluent concentration for this quarter was 17.0 mg/L. This is below the C of A compliance limit of 20.0 mg/L for this parameter. Effluent CBOD₅ concentrations exceeded the compliance limit on one sampling occasion during this quarter. The twelve month rolling average for this parameter is in compliance at 12.9 mg/L, demonstrating that the plant is generally performing well with respect to CBOD₅.

Effluent TSS

The average TSS effluent concentration for this quarter was 17.0 mg/L. This is below the C of A compliance limit of 20.0 mg/L for this parameter. Effluent TSS concentrations exceeded the compliance limit on one sampling occasion this quarter. The twelve month rolling average for this parameter remains below the compliance limit at 16.0 mg/L, demonstrating that the plant is performing acceptably with respect to TSS.

Effluent TP

The average TP effluent concentration for this quarter was 0.47 mg/L. This is below the C of A compliance limit of 1.0 mg/L for this parameter. Effluent TP concentrations were below the compliance limit on all three sampling occasions this quarter. The twelve month rolling average for this parameter is in compliance at 0.42 mg/L, demonstrating that the plant is performing well with respect to TP.

Effluent NO₃

The average effluent NO₃ concentration for this quarter was 3.7 mg/L which is below the C of A compliance limit of 5.0 mg/L for this parameter. Effluent NO₃ concentrations were below the compliance limit on six of seven sampling occasions this quarter. The twelve month rolling average is 4.8 mg/L, which is below the compliance limit.

On December 6, 2012 Stantec applied on behalf of Mini Lakes for an amendment to the Environmental Compliance Approval (ECA) to undertake proposed plant improvements and re-rate the plant based to revise the nitrate limit upwards to 8.0 mg/L. It is acknowledged that the ECA amendment process can be quite lengthy. Stantec has indicated that approval and construction of the proposed upgrades is expected to occur no earlier than spring of 2014 due to delays in the ECA process. An update on the approval process and anticipated schedule should be provided in the next monitoring report.

Average Sewage Flows

The average daily sewage flow rate to the plant ranged between 88.5 m³/d and 104.9 m³/d during this quarter. This is well below the plant's design capacity of 216 m³/d. The estimated number of occupied homes ranged between 220 and 235 this quarter, which represents 75 to 80% of units in the current Draft Plan of Subdivision application.



The estimated average daily flow per home ranged between 402 L/d and 449 L/d, below the design average daily flow per home of 540 L/d and within the range of normal seasonal fluctuations for this system.

We trust this is sufficient for your requirements. If you have any questions please call.

Yours truly,

GAMSBY AND MANNEROW LIMITED

Per:



Amanda Pepping, P.Eng.

AP/

cc: Ms. Dianne Paron, Mini Lakes Residents Association
Ms. Lynnette Armour, Ministry of the Environment – Guelph District Office
Mr. Stan Denhoed, Harden Environmental Services Ltd.
Mr. Miles McCormick, Stantec Consulting Ltd.
Mr. Steve Conway, Gamsby and Mannerow Ltd.



6.4(b)



Stantec Consulting Ltd.
49 Frederick Street
Kitchener ON N2H 6M7
Tel: (519) 579-4410
Fax: (519) 579-6733

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FEB 03 2014

Township of Puslinch

January 30, 2014
File: 1611 07544/31

Attention: Ms. Karen Landry, CAO/Clerk
Township of Puslinch
R.R. #4
County Road 34 Aberfoyle
Guelph, ON N1H 6H9

Dear Ms. Landry,

**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 4th Quarter 2013**

CLERK'S DEPARTMENT	
TO	N.L.
Copy	K.P. - Gamsky & Mannerow
Please Handle	<input checked="" type="checkbox"/> they're review.
For Your Information	
Council Agenda	
File	

Please find enclosed the wastewater treatment plant effluent results for Mini Lakes Mobile Home Community, provided in Table 1 (attached). These results are provided in accordance with the Operation and Maintenance Agreement between the Mini Lakes Residents Association and The Township of Puslinch, and the Certificate of Approval (CofA) for the sewage system. This letter represents the fourth quarter reporting for 2013.

As shown on Table 1, plant effluent has been sampled and analyzed on nine (9) occasions for this quarter (three full sets and six nitrate/nitrite samples).

The average carbonaceous biochemical oxygen demand (CBOD₅) concentration for the quarter is 17.0 mg/L, which is below the compliance limit of 20 mg/L. CBOD₅ values were below the compliance limit on two of three sampling occasions this quarter, with the one exceedance being 27.0 mg/L on November 22 deemed to be within typical variances. The annual and 12-month rolling average for CBOD₅ is 12.9 mg/L. Overall, the plant is deemed to be performing well with respect to CBOD₅.

The average TSS concentration for the quarter is 13.7 mg/L, which is well below the compliance limit of 20 mg/L. TSS values were below the compliance limit on two of three sampling occasions this quarter, with the one exceedance being 27.0 mg/L on November 22 deemed to be within typical variances. The annual and 12-month rolling average for TSS is 12.9 mg/L. Overall, the plant is deemed to be performing well with respect to TSS.

The average total phosphorus (TP) concentration for the quarter is 0.5 mg/L, which is well below the compliance limit of 1.0 mg/L. TP values were below the compliance limit on all three sampling occasions this quarter. The annual and 12-month rolling average for TP is 0.4 mg/L. Overall, the plant is deemed to be performing very well with respect to TP.

The average nitrate concentration for the quarter is 3.7 mg/L, which is below the compliance limit of 5.0 mg/L. Nitrate values were below the compliance limit on six of seven sampling occasions this quarter. The annual and 12-month rolling average for nitrate is 4.8 mg/L, which is again below the compliance limit due to improved summer and fall performance this year.



**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 4th Quarter 2013**

Since it has been shown that consistent denitrification is difficult to achieve, operations staff need to continue close monitoring and maintenance of the denitrification process. General measures required to maintain denitrification and phosphorus removal include, but are not limited to:

- Recording of sludge depths on a weekly or more frequent basis, and prompt sludge removal (as necessary) in all clarifiers and the effluent pump chamber.
- Regular denitrification media maintenance cleanings and removal of floatable material from the denitrification chambers.
- Use of the RBC feed-forward valves to the maximum extent possible to improve soluble carbon availability and lower dissolved oxygen in the denitrification zone.
- Daily inspections and regular cleaning of all clarifier weirs.
- Balancing of chemical dosing flows; conceptual plans have been prepared and reviewed by AWC for new chemical dosing facilities in accordance with the existing CofA.

The recommended long term plan is to provide better sludge management by partitioning the existing primary clarifier into two chambers, one for primary clarification and sludge storage, and the second for primary effluent polishing. This will resolve issues with sludge carryover and washout, and allow much greater flexibility in recirculating sludge and effluent in order to optimize nitrogen removal. Current issues with sludge carryover are related to the buildup of sludge in the primary clarifier and washout during high flow events. Additionally, operations staff indicated that the return sludge is deposited at the discharge end, contributing to excessive buildup prior to the rotating biological contactor trains, and thus there is a higher potential for carryover. There is also no weir/baffle assembly in this clarifier to prevent sludge from entering the clarifier overflow. The proposed upgrades are as follows:

- Primary clarifier upgrades including:
 - a partition wall separating the chamber into two compartments, an inlet and sludge storage compartment having a working volume of 73 m³ and a primary effluent compartment having a working volume of 23 m³.
 - an inlet baffle plate.
 - an outlet weir box and baffle plate.
 - extension of all sludge recirculation piping to inlet chamber.
- Denitrification inlet modifications to allow crossover between trains for redundancy and option to run on one RBC train and two tertiary trains.
- One new effluent pump and piping for effluent recirculation to primary clarifier inlet.
- New chemical building as previously approved.

Implementation of these upgrades will be difficult and complex due to the need to bypass the clarifier during installation using an offline tank; however, these upgrades would improve the operational efficiency of the plant, resistance to upsets (e.g., denitrification media plugging), and provide savings related to reduced sludge haulage. These upgrades will require an amendment to the current approval. Stantec has applied on behalf of Mini Lakes for an amended Environmental Compliance Approval (ECA) as of



**Reference: Mini Lakes Mobile Home Community
 Quarterly Monitoring Program – 4th Quarter 2013**

December 6, 2012 and we expect approval and construction to begin no earlier than spring of 2014 due to delays in the ECA. With the approval amendment, we also propose to re-rate the wastewater treatment plant based on the current Draft Plan of Subdivision and subsequently revise the nitrate limit upwards to 8.0 mg/L based on lower long term projected nitrate loadings than originally designed.

It must be noted that these plans are ongoing and subject to approval and financial resources, though Mini Lakes already has approval and funding in place for the chemical building upgrades. MLRA is committed to resolving this situation, and additional monitoring of initial repairs to the denitrification media system will continue in the near term.

Results for dissolved oxygen (DO) this quarter are above optimal values at an average of 6.7 mg/L, where the objective is to be below 2 mg/L to ensure reliable denitrification. An assessment of historic nitrate data appears to show more of a correlation between seasonal temperature variation and nitrate reduction than DO concentration; however, low DO levels are generally necessary for efficient denitrification.

The remaining parameters shown on Table 1 have been sampled in accordance with the CofA; however, they do not have compliance limits. The results for these additional parameters are deemed to be acceptable and are reasonable for this type of wastewater treatment plant. Results for effluent *E.coli* this quarter show an average of 97,667 CFU/100 mL. Results for pH this quarter are consistent with expected values at an average of 7.1.

With respect to wastewater flows this quarter, the average flow per unit estimate is approximately 433 L/unit/day. This is slightly higher than the average per unit flow over the past three (3) years of approximately 400 L/unit/day; however, this is expected during the fourth quarter when infiltration and inflow is higher, coupled with declining occupancies. The design average is 540 L/unit/day and the maximum daily design flow is 800 L/unit/day. Estimated per unit flows have not exceeded the daily design basis this quarter. The average day flow was only 45.8% of the design average day flow of 216 m³/d this quarter, and the maximum day flow never exceeded the wastewater treatment plant maximum day design flow of 320 m³/d. Based on these trends and the fact that the development as a whole is approximately 65% built out based on original design (and 90% based on current Draft Plan of Subdivision application for 292 total units), it is our opinion that infiltration and inflow are not an issue at this time. The average daily flows for each month, and the corresponding estimated number of occupied homes, is given below.

Table 2: Sewage Flow Volumes

Month (2013)	Average Daily Flow (L/d)	Maximum Daily Flow (L/d)	Estimated Number of Occupied Homes	Estimated Flow per Unit (L/d)
October	104,901	141,830	235	446
November	103,198	136,130	230	449
December	88,534	135,380	220	402



January 30, 2014
Ms. Karen Landry, CAO/Clerk
Page 4 of 4

**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 4th Quarter 2013**

In addition to the monitoring requirements for the wastewater treatment plant, surface water and groundwater have been monitored for the development. Please find attached the letter report from CH2M Hill Canada Limited outlining the subsurface and groundwater monitoring results.

We trust this meets with your requirements. Should you have any questions, please contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Miles MacCormack, P. Eng.
Project Manager, Water
Tel: (519) 585-7499
Fax: (519) 579-8806
miles.maccormack@stantec.com

Attachment

- c. Ms. Dianne Paron, Mini Lakes Residents Associated (letter only)
- Ms. Lynn Zettle, Region Business Banking Centre (letter only)
- Mr. Ed McGurk, CH2M Hill Canada Limited (letter only)
- Ms. Amanda Pepping, Gamsby and Mannerow Limited (attachment) *- To review .*
- Ms. Lynnette Armour, Ministry of the Environment - Guelph District Office (attachment)

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Groundwater Science Corp.

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OCT 17 2013

Township of Puslinch

328 Daleview Place, Waterloo, ON N2L 5M5 Phone: (519) 746-6916 Email: apentney@rogers.com

Email Report

CLERK'S DEPARTMENT	
TO	S.D. - No comment
Copy	Reviewing Annual Report
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For Your Information	Comment
Council Agenda	Mar 5/14
File	

To: Colin Evans, CBM From: Andrew Pentney
 Email: CREvans@vcsmc.com Pages: 2
 Phone: (416) 423-1300 Date: October 17, 2013
 Re: Puslinch Pit – Licence No. 17600 CC: MNR, Township of Puslinch,
 September 2013 Monitoring Report Harrington McAvan Ltd.

This Report summarizes the results of the groundwater monitoring program for the CBM Puslinch Pit as per the Hydrogeological Recommendations of the current Pit Licence.

Below Water Table Extraction

CBM reports that no below water gravel extraction occurred at the site in September 2013.

Water Level Monitoring and Threshold Status

During non-extraction periods water level measurements are obtained by CBM on a monthly basis. The reported April to September water level measurements, compared to threshold values, are summarized as follows:

Location	Threshold (mAMSL)	Measured Water Level Elevation (mAMSL)					
		Apr 16	May 15	June 19	July 23	Aug 28	Sept 19
MP1	-	306.82	306.94	306.96	306.97	306.85	306.77
MP2	-	306.29	306.45	306.47	306.50	306.39	306.28
MP3	305.27	306.34	306.42	306.44	306.46	306.33	306.23
MP4	305.27	306.25	306.45	306.48	306.49	306.39	306.27
MP7	-	306.49	306.70	306.71	306.71	306.58	306.51
North Pond	305.64	306.89	307.04	307.05	307.07	306.96	306.91
South Pond	305.34	306.39	306.58	306.61	306.63	306.52	306.45

As indicated by the measurements, there were no threshold exceedances observed and no Action Response in September 2013.

There is no current "Declared Low Water Condition" reported for Mill Creek and streamflow rates are currently shown to be within "Normal Summer Lowflow", as shown on the GRCA Low Water Response web site.

The monitoring program is proceeding as per the Licence requirements, and monthly summaries will continue to be provided during the operational season.

October 17, 2013

If you have any questions or require further information please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Andrew Pentney". The signature is written in a cursive style with a large, sweeping initial 'A'.

Andrew Pentney, P. Geo.
Hydrogeologist

6.5(b)



Groundwater Science Corp

CLERK'S DEPARTMENT	
TO	S.D.
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328 Daleview Place,
Waterloo, ON N2L 5M5
Phone: (519) 746-6916
Email: apentney@rogers.com

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NOV 12 2013

Email Report

Township of Puslinch

To: Colin Evans, CBM From: Andrew Pentney

Email: CREvans@vcsmc.com Pages: 2

Phone: (416) 423-1300 Date: November 11, 2013

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		May 15	June 19	July 23	Aug 28	Sept 19	Oct 28
MP1	-	306.94	306.96	306.97	306.85	306.77	306.79
MP2	-	306.45	306.47	306.50	306.39	306.28	306.28
MP3	305.27	306.42	306.44	306.46	306.33	306.23	306.23
MP4	305.27	306.45	306.48	306.49	306.39	306.27	306.28
MP7	-	306.70	306.71	306.71	306.58	306.51	306.47
North Pond	305.64	307.04	307.05	307.07	306.96	306.91	306.86
South Pond	305.34	306.58	306.61	306.63	306.52	306.45	306.42

As indicated by the measurements, there were no threshold exceedances observed and no Action Response in October 2013.

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November 11, 2013

If you have any questions or require further information please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Andrew Pentney". The signature is written in a cursive style with a long, sweeping tail on the final letter.

Andrew Pentney, P.Ge.
Hydrogeologist

Members of Puslinch Council:

In 1999, a group of volunteers started raising funds and building the Puslinch Community Garden. This garden was meant as a lasting legacy to honor the 150th birthday and the Millennium. The garden opened on a glorious July 1st, 2000 with a rousing spontaneous rendition of Oh Canada! It has been home to many wonderful events, including carol sings, Art in the Park, Music in the Park as well as weddings. It is a wonderful place just to sit and enjoy on a sunny day.

The arbor, the entrance to the garden, was deemed unsafe and was taken down in 2013. The Garden Committee would like to re-establish this arbour and are willing to invest time and money to this project. We also have the support of the Optimist Club of Puslinch who are also interested in helping with this project.

We are proposing that the arbour be erected this spring. We are hopeful that Council will give us permission to go forward with this worthy project.

Thank you

Puslinch Garden Committee

Contact person

Judy Siefert 519-267-0432