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- Groundwater Studies
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File: 1201

January 30, 2013

Township of Puslinch
R.R. 3
Guelph, Ontario
N1H 6H9

Attention: Mrs. Brenda Law, A.M.C.T.

Dear Mrs. Law:

Re: Zoning By-Law Amendment – Puslinch Pit Expansion Part Lot 13, Concession 4, Puslinch Township

We received the response to our comments for the above cited project from Groundwater Science Corp. All of our comments of January 27, 2012 were addressed, they have included both the culvert between the Cox Construction site and the Mast Snyder site and the barrier wall into their revised site plans.

It must be noted on the site plans that despite the potential for the removal of monitoring wells as construction on both sites moves forward, monitoring needs to continue on the east side of the barrier. If the Mast Snyder well BH2 is destroyed, a monitor must be installed in its place to ensure that the barrier wall is operating as designed. There is a significant onus on the operators on the Mast Snyder property to ensure that wetlands and fisheries are not impacted by their extractive operations. Long-term groundwater monitoring on both sides of the barrier is essential to record the hydraulic relationship across the barrier and thus the role of extraction on the Cox property in water level changes.

We note that the barrier has been designed to provide a very specific hydraulic gradient. This led to the hydraulic barrier designed not to be installed to the full depth (i.e. not keyed into underlying silt layer). We also understand that the design accounts for the projected increase in water levels on the Mast Snyder Property. Given that all concerns on the Mast Snyder property revolve around a water level that is too low with



respect to fisheries and wetlands upgradient of the Mast Snyder Pit ponds, we suggest that the design err on the side of restricting more flow than less flow. This may require a deeper barrier or lower design hydraulic conductivity.

It is our opinion that, with appropriate groundwater monitoring and contingencies in place, impacts to the environment will be minimal.

Sincerely,

Harden Environmental Services Ltd.

A handwritten signature in blue ink that reads "Stan Denhoed".

Stan Denhoed, M.Sc., P.Eng.
Senior Hydrogeologist



*Groundwater
Science Corp.*

CC (Stn)

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#13b

**2012 Groundwater Monitoring Report
CBM Puslinch Pit
Licence No. 17600
North Half Lot 26, Con. 1
Township of Puslinch**

Prepared For:

CBM Aggregates Division
7366 McLean Road
Cambridge, Ontario
N3C 2V4

Prepared By:

Andrew Pentney, P.Geo.
Groundwater Science Corp.

January 2013

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1.0 BACKGROUND

CBM operates the Puslinch Pit, located on North Half of Lot 26, Concession 1, Township of Puslinch, County of Wellington, Ontario. The pit was previously known as the Mast Pit, ownership was transferred from Puslinch Quality Aggregates Ltd. to CBM in 2006. The property location is shown on Figures 1 and 2. The pit was issued a Class A Licence (No. 17600) by the Ministry of Natural Resources to include extraction below the water table.

The Licence (Site Plan) conditions specify a groundwater monitoring program as part of the on-going operations at the site. This report summarizes the results of the groundwater monitoring program that has been completed to date, and specifically the results of the monitoring completed in 2012.

The monitoring requirements, methodology, information sharing and monthly summaries associated with the program are outlined in Sections 1.1, 1.2, 1.3 and 1.4. The monitoring results are presented in Section 2 and discussed in Section 3. Recommendations regarding the program are made in Section 4 of this report.

1.1 MONITORING REQUIREMENTS

The Technical Recommendations for Hydrogeology listed on the Site Plan include a specific monitoring, mitigation and reporting plan, as well as Thresholds and an Action Response Plan. The monitoring program conditions associated with the site are summarized in the 2005 Annual Report (dated January 2006), please refer to that report or the Site Plan for specific details.

1.2 MONITORING METHODOLOGY

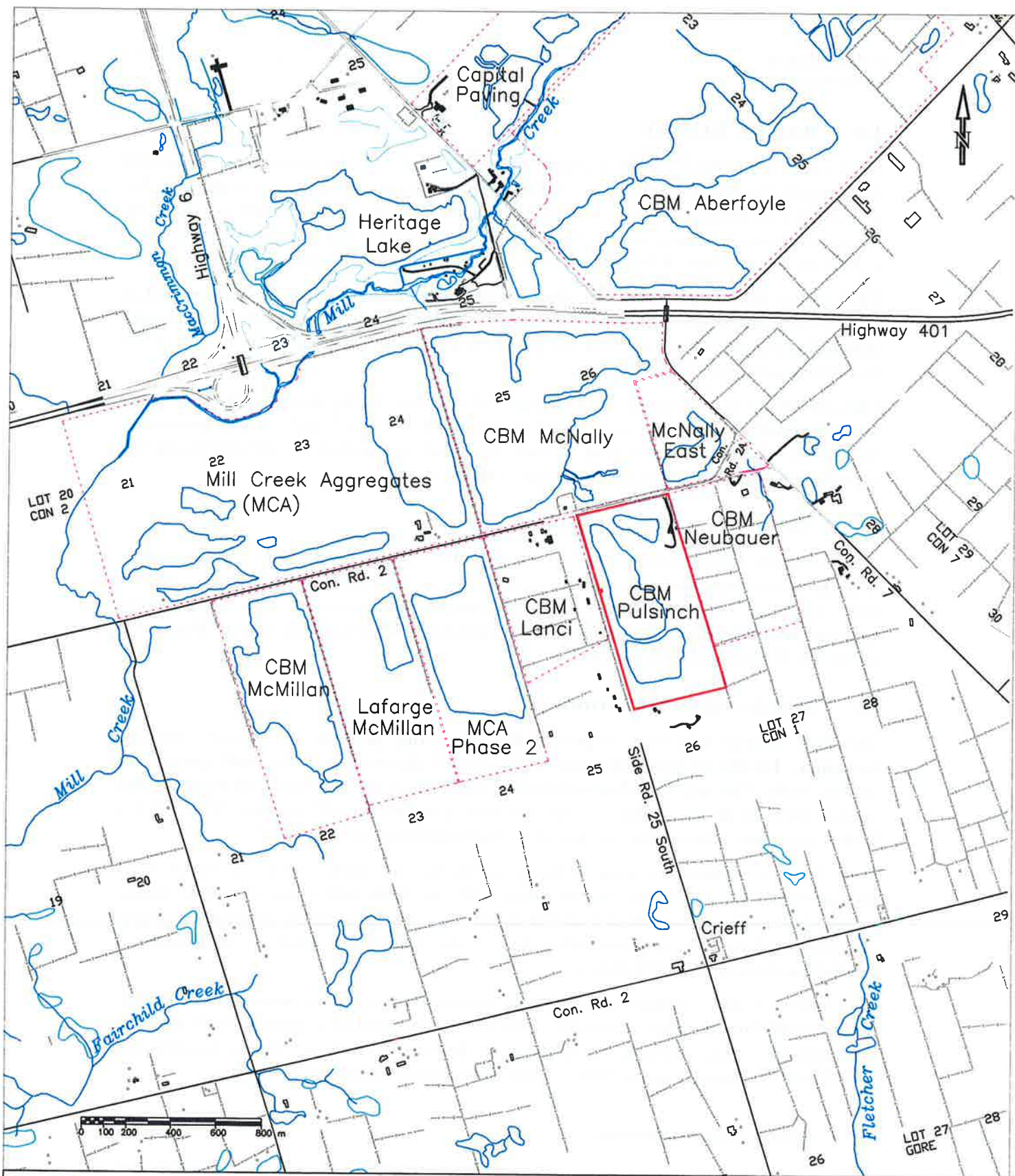
The field methodology used as part of this monitoring program are industry standard techniques for the establishment and monitoring of observation wells, staff gauges and stilling wells. The operator obtained manual water level measurements on a (generally) weekly basis at all accessible on-site monitors from March 20th to June 29th in 2012. Below water extraction at the site began in March and ended in June 2012.

Pond level measurements were obtained at the stilling wells and groundwater level measurements were obtained at monitoring wells as depth below top of well in metres using a Solinst® or Heron Instruments® electronic water level meter. The measurements are considered to be accurate to within about 1 cm. The measurements were recorded in the field and retained for reference.

Summaries of daily climate data (average temperature and total precipitation) for the Waterloo-Wellington (airport) weather station were retrieved on a monthly basis from the Environment Canada website. In addition, the declared Low Water Response status for Mill Creek, as reported on the GRCA website, was reviewed on a regular basis.

1.3 INFORMATION SHARING

At the request of the MNR all historical data for the Puslinch Pit is available to the Mill Creek Cumulative Impact Assessment study. The information is transferred upon request.

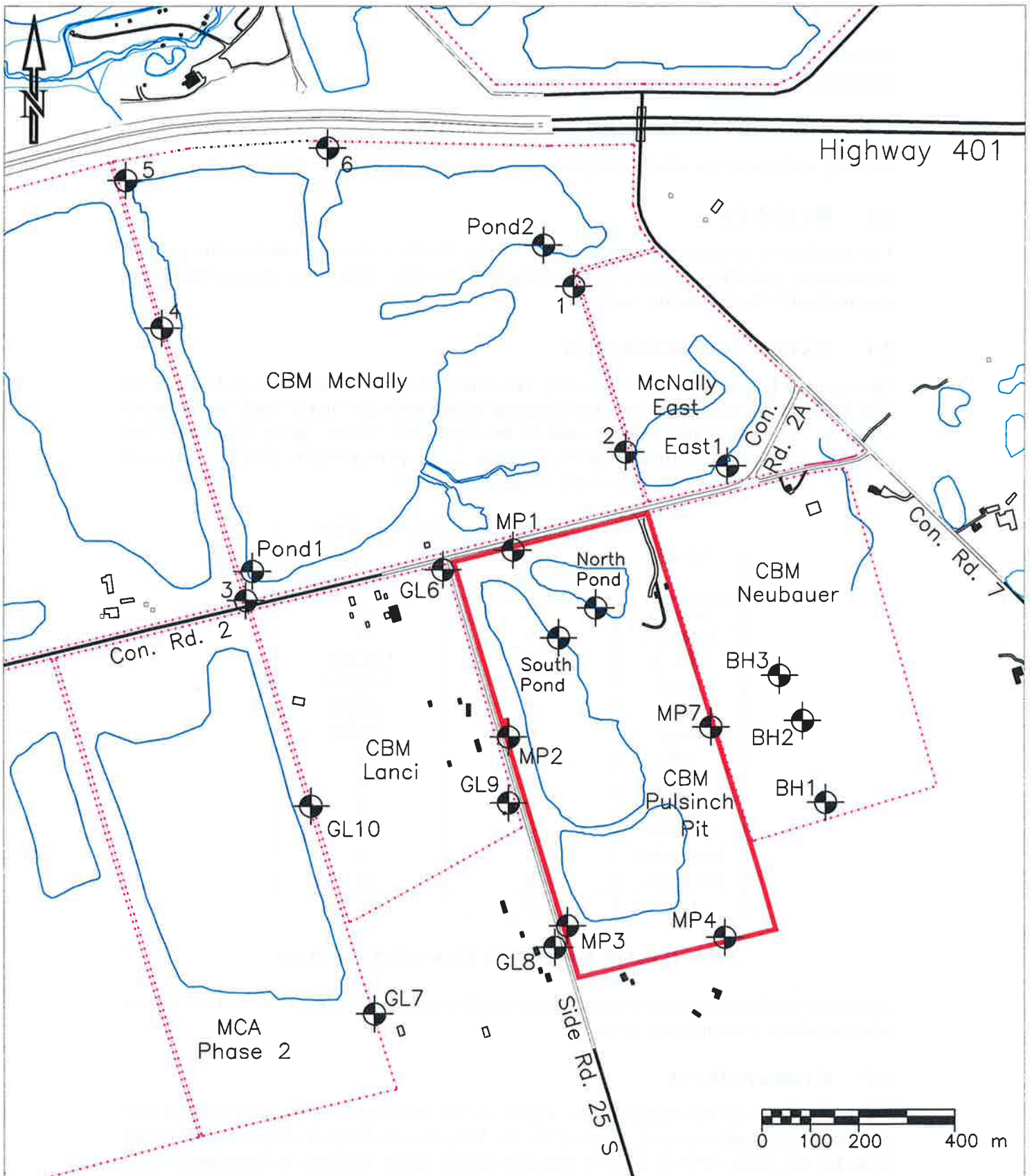


- CBM Puslinch Pit Licence Boundary (approximate)
 - existing or proposed Licence boundaries (approximate)
 - ~ surface water: pond (approximate), creek or swale
 - wetland (OBM mapping)
- modified from :
 1) OBM mapping UNDER LICENSE, WITHOUT PREJUDICE OR ENDORSEMENT, FROM THE QUEEN'S PRINTER OF ONTARIO
 2) Site Plans, Harrington and Hoyle Ltd.
 3) 2010 Air Photo, GRCA

Figure 1: Site Location

CBM Puslinch Pit
 Groundwater Monitoring Program
 2011 Annual Report

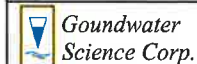
Groundwater Science Corp. Scale: as shown
Date: Feb. 2012



- CBM Puslinch Pit Licence Boundary (approximate)
- existing or proposed Licence boundaries (approximate)
- ~ surface water: pond (approximate), creek or swale
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Figure 2: Local Monitoring Locations
 CBM Puslinch Pit
 Groundwater Monitoring Program
 2011 Annual Report



Scale: as shown
 Date: Feb. 2012

1.4 MONTHLY SUMMARIES

Monthly summaries for operational periods in 2012 are provided in Appendix B.

2.0 RESULTS

The monitoring program as implemented at the Puslinch Pit site satisfies the general information gathering conditions specified on the Site Plan. The data obtained is summarized in the following sections.

2.1 EXTRACTION SUMMARIES

The reported below water table monthly extraction rates are summarized in Table 1. To date below water table extraction has occurred within both the “north” and “south” pond areas. In 2012 extraction was reported to be within the “south” pond area only. The resulting current pond outline is shown in Figure 2. A reported total of 299,265 tonnes of material was excavated from below the water table in 2012.

Month	Tonnes Extracted Below Water Table	
	North Pond	South Pond
January	0	0
February	0	0
March	0	104,651
April	0	108,964
May	0	65,670
June	0	19,980
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
Total	0	299,265

Table 1: Below Water Table Excavation Summary

Aggregate washing operations are no longer conducted at the Puslinch Pit, and the former wash ponds are currently not in use.

2.2 CLIMATE DATA

For comparison to the hydrographs, a plot of the monthly precipitation and 30-year monthly precipitation normal reported for the Waterloo-Wellington Airport (and overall area) for the years 1994 to 2012 is attached to this report. Missing or incomplete 2007 and 2008 data for the station was augmented using data reported for the University of Waterloo weather station (<http://weather.uwaterloo.ca/>). In 2012 the estimated total reported precipitation of 655.5 mm is approximately 252.6 mm below the current 30-yr

mean value of 908.1 mm. As indicated by the graph, below normal precipitation occurred over most months of the year (with the exception of June, September and October). Due to dry conditions the total annual recharge potential in 2012 was lower than “average”.

2.3 WATER LEVEL MONITORING

Water level measurements have been obtained at the stilling wells installed in the north and south ponds; and, at on-site water table monitoring wells MP1, MP2, MP3, MP4 and MP7. The former wash ponds are no longer in use and the south pond has extended next to the former processing area. Measurements of the water table elevation in the area of the former wash ponds are provided by the south pond monitor. Monitoring locations are shown in Figure 2. Installation summaries for the monitors included in this program are given in Table 2.

Monitor	Ground Surface Elevation (mAMSL)	Reference Point Elevation (mAMSL)	Top of Screen Elevation (mAMSL)	Screen Bottom Elevation (mAMSL)
MP1	314.02	314.77	302.94	301.42
MP2	315.77	316.56	303.20	301.68
MP3	316.74	317.50	304.57	303.05
MP4	314.68	315.35	302.36	300.84
MP7	324.11	325.02	306.51	303.51
North Pond	307.96	308.24	n/a	n/a
South Pond	307.09	307.79	n/a	n/a
Note: Elevations are geodetic, as reported by Van Harten Surveying Inc., July 2007				

Table 2: Installation Summaries

Water level measurements obtained to date are summarized in table form in Appendix A. Hydrographs of the monitoring results to date are also included in Appendix A.

The water level monitoring results indicate that 2012 conditions were somewhat similar (seasonal high and low elevations) to that experienced from 2004 to 2006. However, the monitoring data also indicates that overall water table conditions in the area remained higher than those experienced in the extended dry period from 2000 to 2003.

Above average precipitation in late 2011 resulted in moderate recharge over the winter and at spring snowmelt and seasonal high water levels in March 2012. Dry conditions throughout 2012 resulted in below average recharge potential and declining groundwater levels through the remainder of the year. Seasonal low water levels were observed in October 2012 and have remained relatively stable since that time. The significant retention and storage capacity that has been developed in the general area due to below water table extraction likely also results in a capacity to buffer lower than average precipitation for any single year.

The magnitude of groundwater level variation in 2012, from the water table maximum in March to the minimum levels in October/November (± 0.6 to 0.7 m), was also within the typical range for the site based on the historical record.

The monitoring results indicate that the overall pattern of groundwater flow has not changed at the site. Flow directions at the site remains generally to the south to southwest and the groundwater level difference (slope) across the site remained within typical ranges (2012 average 0.56 m MP1 to MP3).

2.4 THRESHOLD, LOW WATER AND RAINFALL RESPONSE

Working Thresholds for the Puslinch Pit, as part of the Groundwater Monitoring Program conditions, have been developed. The thresholds are included in Table 3.

Location	Threshold (mAMSL)
North Pond	305.64
South Pond	305.34
MP3	305.27
MP4	305.27
Note: Elevations are geodetic, as per July 2007 survey	

Table 3: Working Thresholds

There were no threshold exceedences in 2012 at the Puslinch Pit. As part of the Low Water Response status for Mill Creek, if flow volumes within the creek are lower than established “threshold values” then water users (e.g. Permit To Take Water holders) may be asked or required to reduce water usage. However, since CBM has taken over operations, aggregate washing no longer occurs at the Puslinch Pit and water use at the site is minimal.

Overall on-site water levels remained within the historical observed range, therefore no mitigation measures were recommended as a result of the Low Water Response program, due either to precipitation conditions or in response to threshold levels.

3.0 DISCUSSION

The data indicates that the below water table extraction at the Puslinch Pit (including the “equivalent pumping” effect) has had an insignificant effect on the overall groundwater flow system, and, has not resulted in any measurable alteration to the division of water between the Mill Creek and Fletcher Creek subwatersheds. This could be due to a combination of factors, including the presence of the till “ridge”; the “capture” and increased “storage” of precipitation on-site; and/or, the limited potential for flow system impacts (due to below water table extraction) at this location within the regional groundwater setting.

5.0 RECOMMENDATIONS

Based on the results of this monitoring program and the requirements of the Site Plan, the following recommendation is made:

1. The groundwater monitoring program continue in 2013 as per the Site Plan conditions.

Report Prepared By:



Andrew Pentney, B.Sc., P.Geo.
Hydrogeologist, Principal
Groundwater Science Corp.





Groundwater Science Corp.

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January 16, 2013

Colin Evans
Lands Manager,
CBM Aggregates
55 Industrial Street
Toronto, ON
M4G 3W9

Dear Mr. Evans:

**RE: 2012 Groundwater Monitoring Summary,
CBM Neubauer Pit, Licence No. 625284
Part Lot 27, Concession 1, Puslinch Township**

This letter is a summary of the results of the 2012 groundwater monitoring program completed for the above reference property. The pit Licence was issued in December 2011. Site details and monitoring well locations are shown on **Figure 1** (attached).

1.0 Monitoring Program Requirements

The Licence conditions as listed on the Site Plan are summarized as follows:

The following monitoring, mitigation and contingency plan is recommended for the site:

- 1. No subaqueous placement of fine grained material (i.e. silt or clay) shall occur on-site without additional hydrogeological investigation, as outlined in the Mitigation and Contingency Plan.*
- 2. Prior to below water table extraction at the site two new water table monitoring wells shall be installed, one at the east property boundary and one at the south property boundary (BH4 and BH5 respectively).*
- 3. The water level monitoring program shall consist of monthly measurements at BH1, BH2 (until destroyed), BH3 (until destroyed), BH4, BH5, the McNally East monitor "East 1", the Puslinch Pit monitor "MP7", and, the Neubauer Pond monitor (after installation) as accessible. If any of the perimeter monitors are destroyed or damaged they shall be replaced or repaired.*
- 4. During the first year of below water table extraction water level monitoring at perimeter wells shall be completed every two weeks during the extraction period.*
- 5. Monthly monitoring of temperature profiles at the perimeter monitoring wells shall occur for two years prior to below water extraction, with measurements taken at 1 m depth intervals. Once below water table extraction has begun quarterly monitoring of temperature profiles (temperatures obtained at 1 m intervals) in the perimeter monitoring wells shall be completed.*

6. *The monitoring results, and any Mitigation or Contingency Plan measures undertaken during each operational year, shall be summarized in an annual report provided to the Township of Puslinch, GRCA and MNR.*
7. *Trigger Levels, considering existing cross-site hydraulic gradients, shall be developed to the satisfaction of MNR, in consultation with GRCA and the Township of Puslinch as needed, prior to below water table extraction.*
8. *The following Mitigation and Contingency Plan shall be adopted:*
 - ***Initial Trigger Level** exceeded – the Township, GRCA and MNR shall be notified immediately and daily monitoring shall be undertaken.*
 - ***Intermediate Trigger Level** exceeded for seven (7) consecutive days – the Township, GRCA and MNR shall be notified immediately and extraction below the water table shall be reduced 50% until the Neubauer Pond surface water elevation is greater than the **Intermediate Trigger Level** for seven (7) consecutive days.*
 - ***Final Trigger Level** exceeded – the Township, GRCA and MNR shall be notified immediately and extraction below the water table shall cease until the Neubauer Pond surface water elevation is greater than the **Intermediate Trigger Level** for seven (7) consecutive days.*
 - *Additional mitigation measures, such as below water placement of fine-grained material (silt or clay) along the perimeter of the pond, will be evaluated as needed in response to threshold exceedances. No mitigation measures (beyond ceasing below water table extraction) shall be undertaken prior to approval from MNR, in consultation with GRCA and The Township of Puslinch as needed.*

2.0 Site Operations and Monitoring Completed

To date no extraction has occurred at the site. In addition, CBM has indicated that no below water extraction can be expected at the site in the next two years. Monitors BH4 and BH5 were installed and surveyed in July, 2012, copies of the borehole logs are attached to this report. CBM intends to complete the balance of the specific monitoring required prior to, and during, below water table extraction (for example: temperature profile measurements; staff gauge installation; bi-weekly monitoring; and, trigger level development) at the appropriate time with respect to site extraction operations. Monitor installation details are provided in **Table 1**. Note that McNally East monitor “East 1” is also referenced as “HH1” by CBM.

Monitor	Elevations (mAMSL)			
	Ground	Top of Well	Top of Screen	Bottom of Well
BH1	322.29	322.69	300.92	299.40
BH2	327.60	328.15	301.54	300.02
BH3	328.75	329.37	296.17	294.65
BH4	320.03	320.74	308.80	304.23
BH5	317.90	318.69	306.67	302.10
MP7	324.11	325.02	306.51	303.51
East 1 / HH1	309.96	310.76	306.25	303.25
mAMSL = metres above mean sea level (Van Harten Survey July 2007, July 2012)				

Table 1: Monitor Installation Details

Water level data has been collected at the site since 2001. The water level monitoring data collected to date at the site, and as available from adjacent sites, is presented in **Table 2** (attached). Hydrographs of the water level data, showing historical trends since 2001, and the 2012 monitoring results, are also included with this letter.

3.0 Discussion of Monitoring Results

Based on the considerable monitoring record available, baseline conditions are well established for the site. As noted for other monitoring programs in the area, the water table at the site fluctuates in response to seasonal and annual recharge patterns related to climate variation.

Development of Trigger Levels at the site should be based on data collected at both the existing monitors (long-term records) and the future perimeter wells BH4 and BH5 (2 or more years of data).

4.0 Recommendations

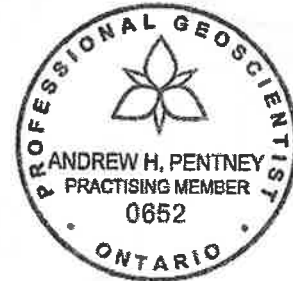
The monitoring program as listed on the Site Plan should continue in 2013.

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

Sincerely,

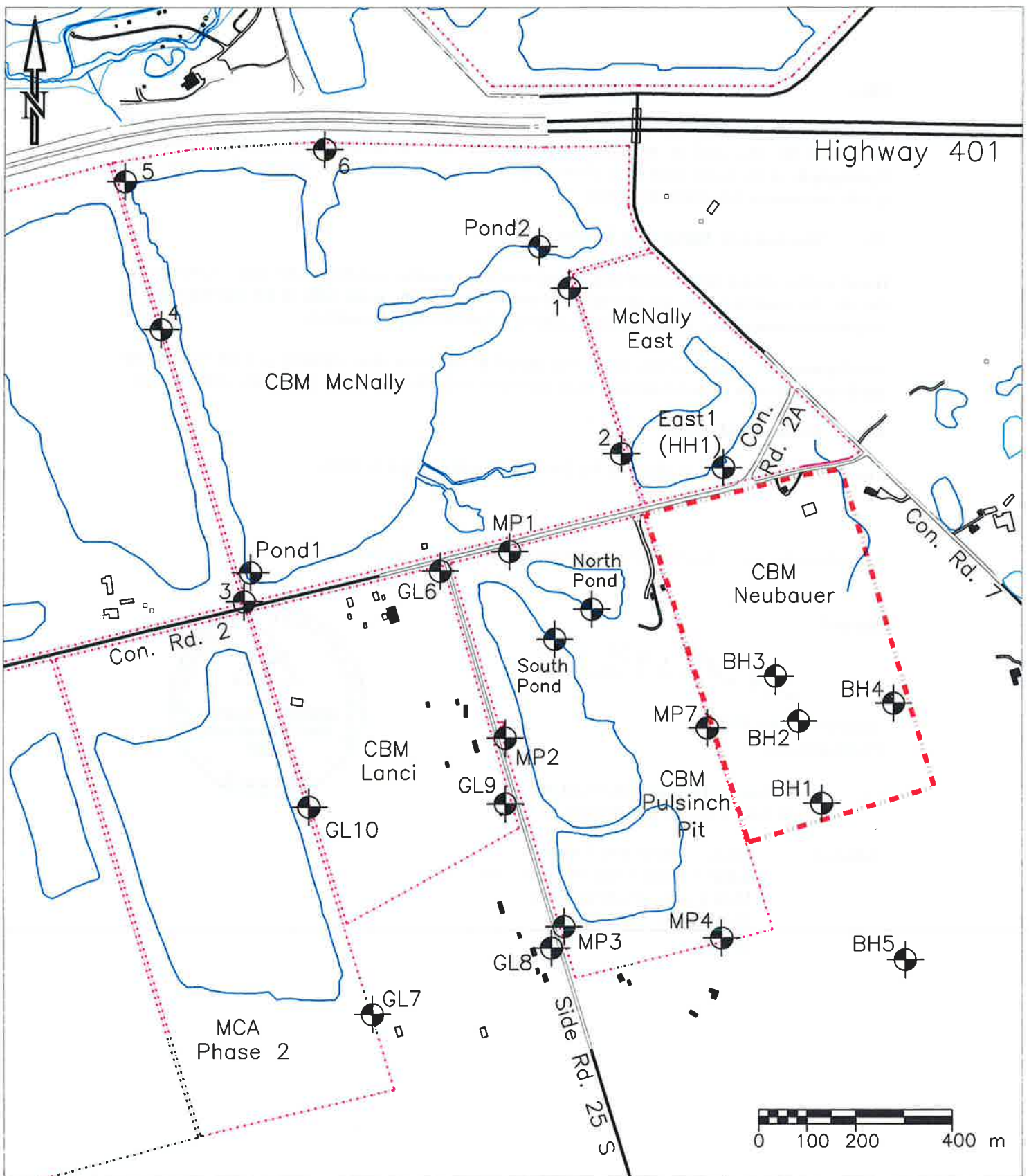


Andrew Pentney, P.Ge.
Hydrogeologist



Cc: Bernie Janssen, Harrington McAvan Ltd.
MNR, GRCA, Township of Puslinch

Attached: Figure 1 Monitoring Locations
Table 2 Water Level Measurements
Hydrograph – Historical Data
Hydrograph – 2012 Data
BH Logs



- CBM Neubauer Pit Licence Boundary (approximate)
- existing Licence boundaries (approximate)
- surface water: pond (approximate), creek or swale
- wetland (OBM mapping)

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 1) OBM mapping UNDER LICENSE, WITHOUT PREJUDICE OR ENDORSEMENT, FROM THE QUEEN'S PRINTER OF ONTARIO
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 3) 2010 Air Photo, GRCA

Figure 1: Local Monitoring Locations
 CBM Neubauer Pit
 Groundwater Monitoring Program
 2012 Annual Report



Scale: as shown
 Date: Jan. 2013



Groundwater Science Corp.

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Waterloo, ON N2J 1L6
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CC *Stu*

H/30L

January 15, 2013

Colin Evans
Lands Manager,
CBM Aggregates
55 Industrial Street
Toronto, ON
M4G 3W9

Dear Mr. Evans:

**RE: 2012 Groundwater Monitoring Summary,
CBM Nigro Pit, Licence No. 20749
Part Lots 11 and 12, Concession 4A, Puslinch Township**

This letter is a summary of the results of the 2012 groundwater monitoring program completed for the above reference property.

The original pit Licence was issued on May 28, 1999. The Licence conditions include quarterly groundwater monitoring at established locations and annual reporting (to be submitted by January 30th). The monitoring report is submitted to the MNR, the MOE and the Township of Puslinch.

1.0 Water Level Monitoring Program

The overall site setting and monitoring locations are shown on Figure 1. The current groundwater monitoring locations include boreholes BH1, BH2-S, BH2-D, BH3, BH4 and BH5, private dug well DW2, drive-point piezometers DP1, DP2, DP3, DP4, DP5 and DP6. Note that private well DW1 has been abandoned (removed) by the owner, and is no longer monitored. At each of these locations a groundwater level is obtained on a routine basis as conditions allow. At drive-point locations within natural ponds a surface water measurement is also obtained (if possible). In addition, surface water flow is monitored at a culvert across Concession 4 Sideroad (SW1).

The monitoring well and drive-point installation details are shown in Table 1. The water level monitoring data is presented in Tables 2 and 3. Hydrographs of the water level data are also presented. Water level data has been collected at the site since October 1997.

2.0 Discussion of Monitoring Results

Water level measurements and surface water flow observations for the year 2012 program were obtained on five occasions (January, February, June, September and December). Extraction at the site occurs intermittently, however no extraction was reported in 2012.

For comparison to the hydrographs, a plot of the monthly precipitation and 30-year monthly precipitation normal reported for the Waterloo-Wellington Airport (and overall area) for the years 1994 to 2012 is attached to this report. Missing or incomplete 2007, 2008 and 2010 (November) data for the station was augmented using data reported for the University of Waterloo weather station (<http://weather.uwaterloo.ca/>). In 2012 the estimated total reported precipitation of 655.5 mm is approximately 252.6 mm below the current 30-yr mean value of 908.1 mm. As indicated by the graph, below normal precipitation occurred over most months of the year (with the exception of June, September and October).

The data gathered to date indicates that groundwater elevations at the site have been maintained within in similar range under varying climate conditions since 1997 (prior to extraction). To date there is no indication that extraction at the site has affected the local water table. Theoretically the reduction in runoff associated with the extraction to date has likely led to additional recharge as compared to the original condition, which would tend to slightly increase local seasonal water table fluctuation and average annual groundwater levels. As illustrated by the hydrographs however, it is likely that the on-going seasonal and annual variation in recharge has a larger influence on local water table elevations, and masks any potential small-scale effect related to the extraction.

The ponds (at DP1, DP2, DP3, or DP4) were dry in the fall of 1998; summer and fall of 1999; fall/winter of 2000; summer/fall/winter of 2001; summer/fall/winter of 2002; summer 2003; fall of 2004; summer/fall of 2005; summer/fall of 2006; and summer/fall of 2007. Although, with the exception of DP2, these ponds held water for all of 2008 due to above normal precipitation that year, in the summer/fall of 2009, 2010, 2011 and 2012 the ponds were again dry. Water levels at the ponds and in the till unit fluctuate according to precipitation inputs, and have generally remained within expected ranges based on pre-extraction (1997/1998) data. There has been no discernible change in water levels at the ponds associated with extraction at the Nigro Pit. In addition, the pond and shallow groundwater levels at DP1 are up to 6 m higher than the water table in the sand and gravel aquifer within the extraction area at BH2-D. Overall, the ponds represent perched systems within the till unit (and with respect to the sand and gravel aquifer at the site) that infiltrate water and contribute to the underlying groundwater system.

Surface water has been observed at SW1 on only 34 (generally spring or fall/winter) of the 137 occasions that measurements have been made at that location since monitoring began in 1999. High flow measurements obtained in March 2004 corresponds to a snowmelt event and does not represent baseflow conditions.

3.0 Proposed Thresholds

The intent of the program is to measure seasonal variation in groundwater levels at the site. The Licence conditions indicate that "after a minimum of two years of data is obtained the seasonal water table variations should be determined and a seasonal low water table recommended for each monitoring location ...". Based on the minimum water table elevations observed the following "thresholds" were proposed in the 2001 Monitoring Report:

<u>Monitor</u>	<u>Threshold (mAMSL)</u>
BH1	323.8
BH2-S	dry and BH2-D is lower than threshold
BH2-D	323.5
BH3	322.5
BH4	320.5
BH5	320.9
DP1	dry and DP2 is lower than threshold
DP2	325.5
DP3	325.4
DP4	329.2
DP5	dry and BH5 is lower than threshold
DP6	324.0
DW2	318.4 at static level (non-use conditions)
SW1	not applicable

In addition, the following comments regarding the threshold values and the "action response plan" were included with the 2001 report recommendations:

Note that no specific season is specified, the lowest water levels observed have occurred either during the fall or winter period of each year monitored. Due to the variability in precipitation during the monitoring period to date, other seasonal norms are not as definable as the minimum observed "natural" water table elevations listed above. Please also note that if seasonal or annual precipitation continues to be low, or decreases, the water table may naturally fall below the thresholds listed above. These thresholds are "indicators", once water levels reach threshold levels more detailed monitoring should be implemented (as per the Licence conditions) and the overall situation should be assessed.

If water table elevations drop below these minimum values, then further investigation will be necessary to determine the cause of the low water levels (as per the Licence conditions). If the cause is determined to be natural then no further action would be necessary. If the cause is determined to be a result of the excavation then mitigation options would be developed at that time in conjunction with the appropriate agencies.

To date no final comment has been received from the review agencies regarding the proposed thresholds and action response plan, and therefore it is unknown if the proposed thresholds and plan (as outlined above) have been accepted by MNR. However, for the purposes of this report, and in order to meet the intent of the monitoring program, the 2012 monitoring results have been compared to the proposed thresholds and action plan.

4.0 Discussion

As indicated by the water level hydrographs and the precipitation graph, the local water table fluctuates in response to monthly and annual rainfall. The lowest water level elevations were observed in January and February 2003, after the extremely dry fall of 2002. Below normal precipitation continued through the winter of 2002/2003. Between 2004 and 2007, with increased precipitation and recharge, groundwater level elevations generally recovered. Very low water table conditions were again observed at some locations during fall 2007 as a result of the extremely dry summer conditions. However the typical "seasonal" water level recovery also occurred during late fall and early winter 2007 and groundwater levels were within seasonal norms by the end of 2007. Although higher water levels observed through 2008 due to above average precipitation, by early summer 2009 water levels at the site were within the "normal" seasonal range and remained so in 2010 and 2011 due to more typical precipitation input patterns. Dry conditions in 2012 resulted in lower recharge volumes and a more moderate spring "peak", however the water table remained within historical ranges despite the lack of precipitation.

The overall water level trends at the site indicate that the extraction activities at the site to date have had no significant influence on groundwater levels. Average groundwater levels at the site remain consistent with historical results. Seasonal maximum groundwater elevations on-site appear to be generally higher from 2001 to 2011, likely due to an overall increase in annual precipitation and on-site recharge due to increased runoff capture. The pattern of groundwater levels across the site has remained consistent over the monitoring period, indicating that local groundwater flow directions and patterns have been maintained.

The monitoring results indicate that the measured water level and water level fluctuation at the ponds adjacent to the site is dependent on precipitation patterns and is not related to groundwater levels or groundwater recharge within the extraction area. In addition, the measured water level elevations indicate that these ponds are perched above the water table within the extraction area and consistent downward gradients exists between the ponds and the underlying sand and gravel aquifer.

The water level at the dug well southwest of the Licenced area has not been adversely affected by the extraction. Groundwater levels and seasonal fluctuation at the dug well is generally consistent with historical values and patterns observed over the entire site.

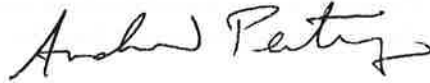
The monitoring results indicate that groundwater levels were above the proposed thresholds at all locations in 2012. Based on the conclusions of the review no threshold response action was recommended.

5.0 Recommendations

Based on the data gathered to date and the Licence stipulations, the monitoring program should continue as required by the Site Plan. In addition, the blockage in monitor BH2-S should be removed.

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

Sincerely,

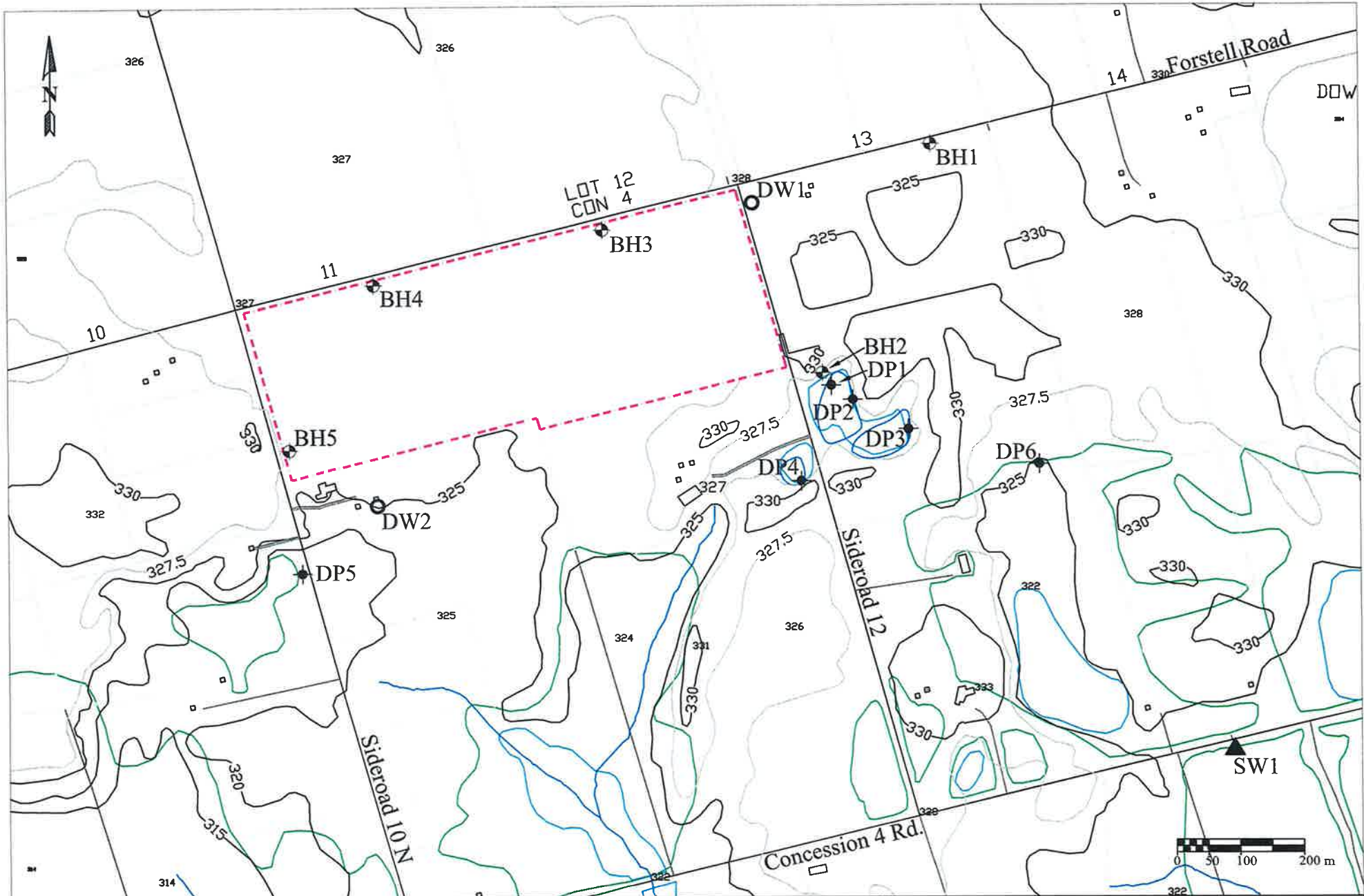


Andrew Pentney, B.Sc., P.Geo.
Hydrogeologist



Cc: Bernie Janssen, Harrington McAvan Ltd.
MNR, MOE, Township of Puslinch

Attached: Figure 1 Site Plan and Monitoring Locations
Table 1 Completion Details
Table 2 Water Level Measurements, Monitoring Wells
Table 3 Water Level Measurements, Pond Piezometers
Table 4 Surface Water Flow Measurements
Water Level Hydrograph, Monitors Surrounding Excavation Area
Precipitation Comparison



scale : as shown
January 2012

- monitoring well
- drive point piezometer
- private well
- surface water location
- Licenced boundary (approx.)
- surface water (pond, creek)
- mapped wetlands
- contour interval as shown

Figure 1: Site and Monitoring Locations

Groundwater Monitoring Program Report
 CBM Nigro Pit, Licence No. 20749
 Part Lots 11, 12, 13, Con. 4, Township of Puslinch

modified from: 1:10,000 OBM Mapping
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