2011 GROUNDWATER MONITORING PROGRAM
BULK FERTILIZER PLANT
TRANSCANADA HIGHWAY 1
AUSTIN, MANITOBA

Submitted to:

Portage la Prairie Consumers Co-operative Limited
PO Box 70
Portage la Prairie, Manitoba R8A 1M9

Attention: Mr. Kevin Dales, General Manager

Submitted by:

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440 Dovercourt Drive
Winnipeg, Manitoba
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25 November 2011

AMEC Project No: WX0547611

EXECUTIVE SUMMARY

AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC) is pleased to provide this report presenting the results of the 07 and 09 September 2011 groundwater monitoring program completed at the Portage la Prairie Consumers Co-operative Limited's (Co-op) bulk fertilizer plant near Austin, Manitoba (the Site).

The program included the monitoring of thirteen (13) groundwater monitoring wells for determination of groundwater levels, monitoring of field parameters using low flow sampling procedures, and collection of groundwater samples for laboratory analysis. The completion of a hydraulic conductivity test was conducted on one monitoring well.

Groundwater levels measured in the monitoring wells ranged between 1.52 m below ground level (bgl) in TH24 and 3.0 m bgl in TH6. Groundwater flow direction based on the monitoring program was indeterminate.

Field parameters in the new monitoring wells measured during the groundwater monitoring event are summarized as follows:

- ORP levels ranged from 3.7 mV (TH3) to 259.2 mV (TH1).
- DO levels ranged from 0.12 mg/L (TH3) to 0.88 mg/L (TH7).
- EC values ranged from 714 µS /cm (TH7) to 9235 µS /cm (TH1).
- pH values ranged from 5.46 (TH1) to 6.93 (TH7).

Eleven (11) groundwater samples, including one field duplicate, were submitted for laboratory analysis for general nutrient parameters.

Concentrations of nitrate-nitrogen above maximum acceptable concentrations for drinking water guidelines were observed in TH1, TH3, TH5, TH9, TH13, and TH14. Concentrations of nitrite-nitrogen above maximum acceptable concentrations for drinking water guidelines were observed in TH1, TH5, and TH14. Nitrate-nitrogen, nitrite-nitrogen, and ammonia concentrations appear to be increasing across the Site when compared to previous monitoring results, most notably in TH1, TH5, TH9, TH13 and TH14. The increase is likely occurring from minor spills associated with the loading and unloading activities of fertilizers at the Site.

A CCME NCSCS score of 44.6 was generated for the Site classifying the site as a Class N – Not a Priority for Action.

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1.0 INTRODUCTION

AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC), is pleased to provide this report presenting the results of the 07 and 09 September 2011 groundwater monitoring program completed at the Portage la Prairie Consumers Co-operative Limited's (Co-op) bulk fertilizer plant near Austin, Manitoba (the Site).

The location of the Site and surrounding land use are shown on Figures 1 and 2 (Appendix A).

2.0 SCOPE OF WORK

The scope of the work for the groundwater monitoring program included the following:

- Conduct a groundwater monitoring program of all groundwater monitoring wells (13 in total) that includes:
    - Determination of groundwater levels.
    - Determination of dissolved oxygen levels (DO), oxidation/reduction potential (ORP), electrical conductivity (EC), pH, and temperature.
    - Collection of groundwater samples for full nutrient package analysis
    - Determination of field measurements and collection of groundwater samples to be completed by low flow techniques.
    - Conduct a level survey of all wells.

- Prepare a report summarizing results of field and laboratory analysis, as well as any relevant conclusions and recommendations.
- Complete a Canadian Council of Ministers of the Environment (CCME) National Classification System for Contaminated Site (NCSCS) checklist for the site; and
- Under separate cover, provide formal recommendation for future activities as required.

The above activities were conducted in accordance with AMEC's 2011 scope of work for the Site with the following exceptions:

- Field measurements were not determined and samples were not collected for TH6 as there was an insufficient volume of water in the well
- Field measurements were not determined for TH14 as there was an insufficient volume of water in the well
- TH16 was destroyed
- TH20 was blocked at 1.6 m and therefore could not be monitored

A survey of surrounding land uses was also conducted as part of AMEC's Site visit. The purpose of the survey was to identify specific land uses (i.e. agricultural, residential, commercial or industrial) adjacent to the Site to establish the applicable soil and groundwater use criteria. The surrounding land uses are shown on Figure 2 (Appendix A) and outlined in Table 1 (Appendix B).

Based on previous work conducted by AMEC at the Site, CCME Protection of Community Water Supplies, which is an adaptation of the Health Canada's Guidelines for Canadian Drinking Water Quality, were determined to be applicable to the Site.

3.0 BACKGROUND

The subject property is located along Highway No. 1, east of Austin, Manitoba (herein referred to as the 'Site'). According to the information supplied to AMEC, the Site is a bulk fertilizer and chemical facility.

A Phase II ESA completed AMEC in 2002 identified fertilizer (Nitrate-N & Ammonia) impacted soils and groundwater. Historically, the highest concentrations of the identified fertilizers in groundwater were in monitoring wells TH1, TH3, and TH5. These monitoring wells are located in the vicinity of the loading pads, ammonia tanks and unloading pads respectively. Concentrations above the applicable guidelines criteria were present across the southeastern portion of the site.

In 2003, a High Pressure Nutrient Injection system (HPNI) program was installed, however it was concluded that this process did not allow for continued management of potential rebound and reoccurring spills. As such, in 2005 a groundwater recirculation and amendment system involving the use of horizontal wells was constructed. Unfortunately, due to plugging and/or damage to the horizontal wells, this system has been rendered non operational. Interpretation of laboratory and field data for each monitoring year since 2002 inclusive of 2007 indicates that seasonal precipitation results in an increase in dissolved nutrients. However, it appears that the application of carbohydrates during the peak fertilizer season substantially reduces those concentrations by August.

4.0 INVESTIGATIVE METHODOLOGY

4.1 HAZARD ASSESSMENT

Prior to the start of the monitoring program, AMEC completed a site specific health and safety checklist to identify such items as hazard identification, project health and safety requirements, work site classification and decontamination procedures for monitoring and personnel protective equipment. The safety documentation is included in Appendix C.

4.2 MONITORING PROGRAM

The AMEC groundwater monitoring program was completed on 07 and 09 September 2011. The program included monitoring of all accessible monitoring wells. The groundwater monitoring program included the following:

- Determination of groundwater levels;

- Monitoring of field parameters using low flow sampling procedures(dissolved oxygen levels (DO), oxidation/reduction potential (ORP), electrical conductivity (EC), pH and temperature);
- Hydraulic conductivity testing on one selected well;
- Collection of groundwater samples for laboratory analysis; and
- Completion of a monitoring well inspection checklist.

Dissolved oxygen (DO) electrical conductivity (EC), oxidation/reduction potential (ORP), pH and temperature were measured with an YSI 556 MPS Multi parameter meter.

The low flow sampling methodology involved the continuous collection of groundwater from the central depth of the well screen via a peristaltic pump at a flow between 100 and 500 ml/min, dependant on the site-specific hydrogeology of the Site. The objective of the methodology was to access groundwater flow from the soils surrounding the well screen while isolating the overlying stagnant well casing water. The groundwater was pumped through a low flow cell, where the multi parameter meter was employed to continuously measure the above referenced parameters. The measurements continued until the readings stabilized, indicating that formation groundwater was being accessed. Sampling of the groundwater was conducted following the stabilization of the parameter measurements.

The groundwater samples were placed in clean certified bottles provided by the laboratory and stored in an insulated cooler while on Site and during transport to the laboratory. The field protocols and QA/QC procedures utilized by AMEC during Site monitoring were in accordance with standard industry protocols.

One hydraulic conductivity test was performed using the falling head methodology, which included recording the static water level in the well, inserting a slug comprised of a disposable bailer filled with distilled water (approximately 750 ml) and monitoring the rate of recovery of the water level using a water level meter over specific time frequencies. The hydraulic conductivity test was analyzed using the Hvorslev methodology.

The condition of all the monitoring wells was noted as part of the groundwater monitoring program. The monitoring well inspection checklist is included in Appendix D.

4.3 LABORATORY ANALYSIS

Eleven (11) groundwater samples, including one field duplicate, were submitted for laboratory analysis at AMEC's laboratory in Edmonton, Alberta. All samples were analyzed for general nutrient parameters to aid in the assessment of future soil/groundwater management planning. The Canadian Association Laboratory Accreditation Inc. (CALA) has accredited AMEC's labs for testing including petroleum hydrocarbon parameters in accordance with the International Standard ISO/IEC 17025. The laboratory QA/QC is provided in Appendix E along with the certificates of analysis.

4.4 SITE CLASSIFICATION

The Canadian Council of Ministers of the Environment (CCME) National Classification System for Contaminated Site (NCSCS) checklist was completed to qualitatively derive a ranking score to evaluate the potential human health risks due to residual fertilizer impacts in the subsurface soil and groundwater. The NCSCS uses a scoring system which is evaluated using existing or available information on the Sites characteristics, contaminants and location. The completion of the NCSCS was undertaken in compliance with CCME (2008). The results are summarized in Section 6.2 and Appendix F.

5.0 ASSESSMENT CRITERIA

5.1 GENERAL

Environmental assessment in Manitoba is based on the assessment criteria as produced by the Canadian Council of Ministers of the Environment (CCME). In addition, water quality standards, objectives, and guidelines for surface water and groundwater in Manitoba have been proposed by Manitoba Conservation, Water Quality Management Section (MC).

Based on AMEC's review, the site and neighbouring properties have a high sensitivity ranking for groundwater, given the subsurface conditions and that near surface groundwater is used for domestic purposes. The area of the Site is identified as a hazard area on the Provincial groundwater pollution hazard maps.

A water well survey was conducted of Manitoba Conservation's water well database (GW Drill) as part of the groundwater monitoring program. The survey included an area within 500 m of the Site. A total of four shallow domestic wells were noted within this area. The water well records are included in Appendix G.

As such, AMEC determined that CCME Protection of Community Water Supplies, which is an adaptation of the Health Canada Guidelines for Drinking Water Quality, is applicable to the Site.

The applicable guideline values are outlined in Table 2 (Appendix B).

6.0 ASSESSMENT RESULTS

6.1 GROUNDWATER CONDITIONS

6.1.1 Site Hydrogeology

The results of the Site monitoring program conducted on 07 and 09 September 2011 are summarized in Table 3 (Appendix B). The locations of the monitoring wells are shown on Figure 3 (Appendix A).

Based on the monitoring event, the following comments are offered:

<u>Groundwater Levels</u>

Groundwater levels measured in the monitoring wells ranged between 1.52 m below ground level (bgl) in TH24 and 3.0 m bgl in TH6. Groundwater flow direction based on the monitoring program was indeterminate. See Figure 4 in Appendix A for the Groundwater Contour Plan and Figure 5 in Appendix A for the Groundwater Elevation and Flow Direction.

Hydraulic Conductivity Testing

Hydraulic conductivity testing was conducted on monitoring well TH8 which is screened in the silty clay material below the sand layer just below ground surface. The test result indicates a hydraulic conductivity value of 7.37×10^{-6} cm/sec for the confining layer below the surface sand layer. The results of the hydraulic conductivity test are included in Appendix H.

Field Parameters

Field parameters in the new monitoring wells measured during the groundwater monitoring event are summarized as follows:

- ORP levels ranged from 3.7 mV (TH3) to 259.2 mV (TH1).
- DO levels ranged from 0.12 mg/L (TH3) to 0.88 mg/L (TH7).
- EC values ranged from 714 µS /cm (TH7) to 9235 µS /cm (TH1).
- pH values ranged from 5.46 (TH1) to 6.93 (TH7).

6.1.2 Laboratory Results

Eleven (11) groundwater samples, including one field duplicate, were submitted for general nutrient parameters.

The results of the nutrient analyses conducted on the groundwater samples are summarized on Figure 5 (Appendix A) and in Table 4 (Appendix B). Cumulative results are shown in Appendix I. Copies of the detailed analytical reports are provided in Appendix E.

Concentrations of nitrate-nitrogen above maximum acceptable concentrations for drinking water guidelines were observed in TH1, TH3, TH5, TH9, TH13, and TH14. Concentrations of nitrite-nitrogen above maximum acceptable concentrations for drinking water guidelines were observed in TH1, TH5, and TH14. Nitrate-nitrogen, nitrite-nitrogen, and ammonia concentrations appear to be increasing across the Site when compared to previous monitoring results, most notably in TH1, TH5, TH9, TH13 and TH14. The increase is likely occurring from minor spills associated with the loading and unloading activities of fertilizers at the Site.

6.2 SITE CLASSIFICATION

A CCME NCSCS score of 44.6 was generated for the Site classifying the site as a Class N – Not a Priority for Action.

7.0 SUMMARY

The AMEC groundwater monitoring program was completed on 07 and 09 September 2011. The program included monitoring of thirteen (13) groundwater monitoring wells for determination of groundwater levels, monitoring of field parameters using low flow sampling procedures, and collection of groundwater samples for laboratory analysis. The completion of a hydraulic conductivity test was conducted on one monitoring well.

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A CCME NCSCS score of 44.6 was generated for the Site classifying the site as a Class N – Not a Priority for Action.

8.0 CLOSURE

The American Society for Testing and Materials Standard of Practice notes that no environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in the connection with a property. Performance of a standardized environmental site assessment protocol is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property, given reasonable limits of time and costs. The findings of this investigation are based on the interpretation of data from a limited number of monitoring wells and analytical results pertaining to specific samples. The evaluation and interpretations do not preclude the existence of chemical substances other than those identified herein, or the possibility that contamination levels can vary between the areas of the investigation.

This report has been prepared for the exclusive use of Portage la Prairie Consumers Co-operative Limited and their agent for specific application to the property identified in this report. The environmental assessment was conducted in accordance with generally accepted assessment practices. No other warranty, expressed or implied, is made. The general conditions of this report are specified in Appendix J.

We trust that this report meets your present requirements. Please contact our office if you have any questions or if we can be of further assistance.

Respectively submitted,
AMEC Environment & Infrastructure,
a division of AMEC Americas Limited

FOR Kris Plantz
Environmental Technologist

Karen Timlick, B.Sc
Environmental Scientist
Project Manager

Reviewed by:

Michael Bertram, P.Eng.
Senior Environmental Engineer

REFERENCES

Federal-Provincial-Territorial Committee on Drinking Water (CDW). Guidelines for Canadian Drinking Water Quality - Published by Health Canada (May 2008, updated December 2010).

Canadian Council of Ministers of the Environment (CCME). Canadian Environmental Quality Guidelines (EQG), 1999 (revised 2010).

APPENDIX A

FIGURES

No. 62

R.M. OF NORTH NORFOLK

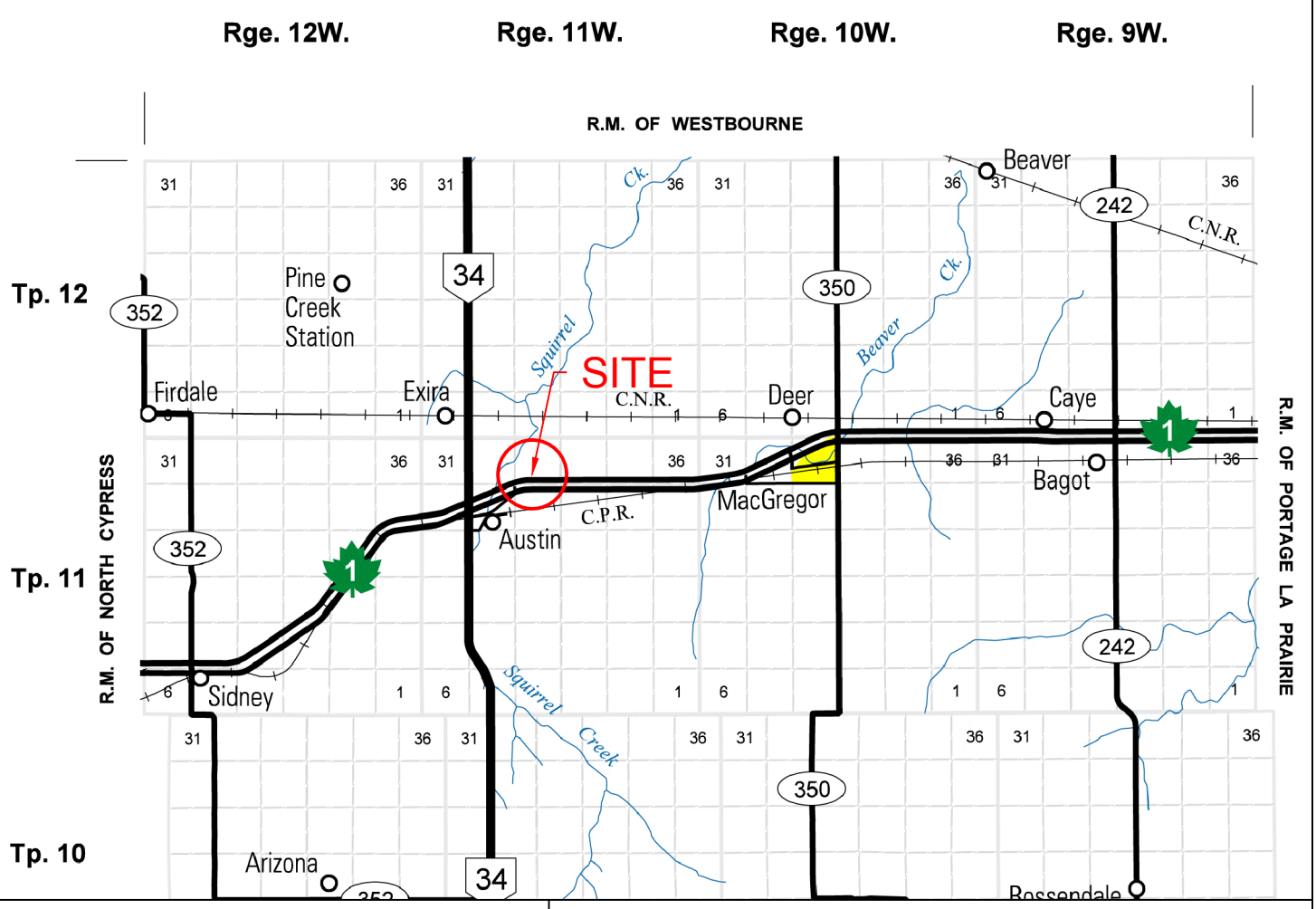
MAP REVISED:-

MANITOBA
TRANSPORTATION AND GOVERNMENT SERVICES
HIGHWAY PLANNING AND DESIGN BRANCH
DRAFTING SECTION
WINNIPEG
JULY 2002

0 5
SCALE IN KILOMETRES

LEGEND

TRANS-CANADA HIGHWAY 1
PROVINCIAL TRUNK HIGHWAYS 34
PROVINCIAL ROADS 242
ACCESS ROADS .....
RAILWAYS .....



amec
ENVIRONMENT AND INFRASTRUCTURE

PORTAGE LA PRAIRIE CONSUMERS CO-OPERATIVE LIMITED

SITE LOCATION PLAN
2011 GROUNDWATER MONITORING REPORT

AUSTIN, MANITOBA

DRAWN: MD	SCALE: NTS	DATE: OCT. 2011	PROJECT NO: WX0547611	FIGURE: 1

amec
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440 DOVERCOURT DRIVE
WINNIPEG, MANITOBA R3Y 1N4
PHONE: 204.488.2997 FAX:204.489.8261

CLIENT:

PORTAGE LA PRAIRIE CONSUMERS CO-OPERATIVE LIMITED

LEGEND

PROPERTY LINE

NOTE: SITE FEATURE LOCATIONS ARE APPROXIMATE

N

NO.	REVISION	DATE	BY

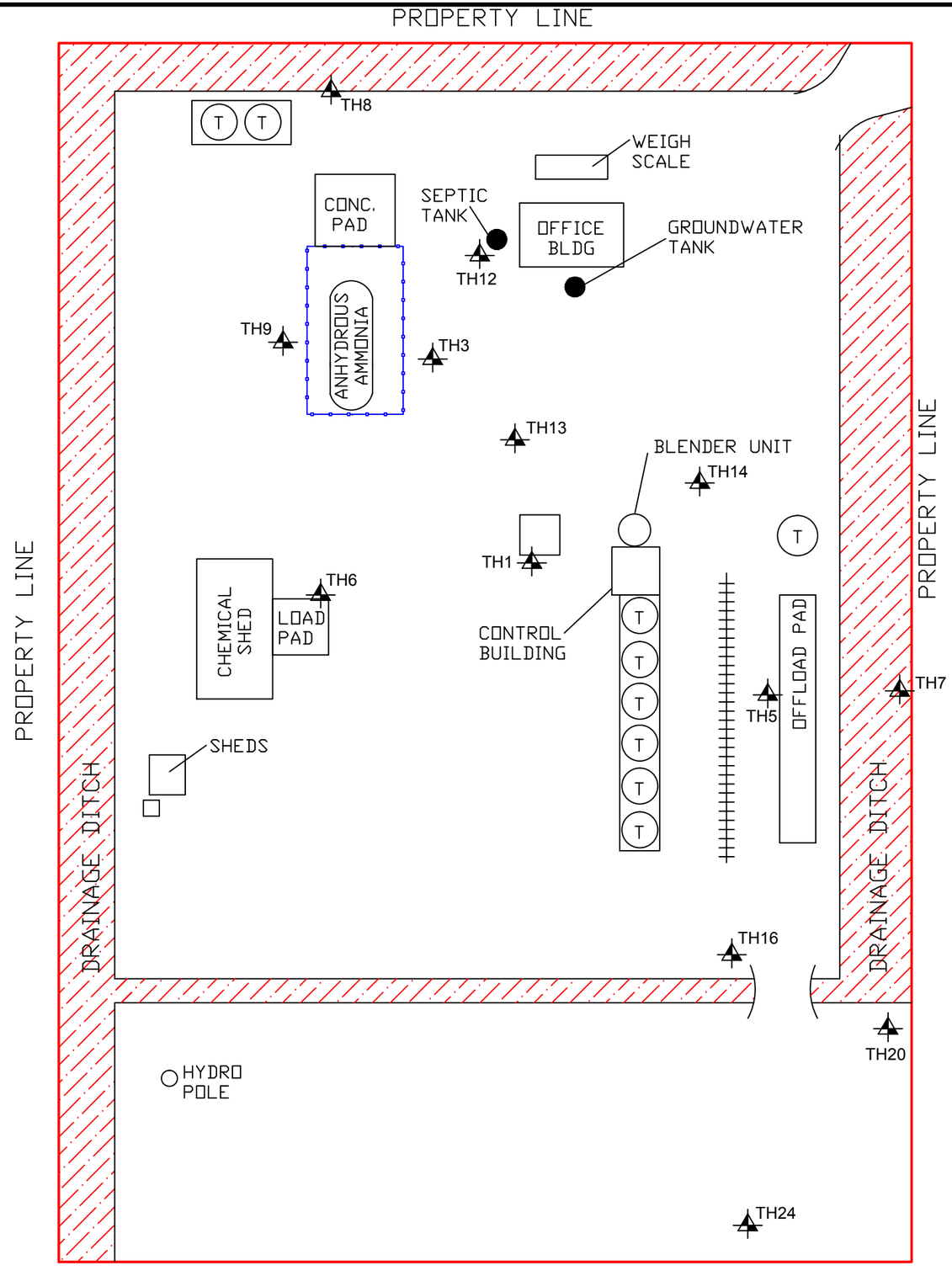
GROUNDWATER MONITORING PROGRAM

AUSTIN, MANITOBA

SITE AND SURROUNDING LAND USE

SCALE:	AS SHOWN	FIGURE 2
DATE:	OCTOBER 2011	
DRAWN BY:	MD	
PROJECT NO.:	WX0547611	

P:\Jobs\5000's\5400's\547611 Austin GW Monitoring\DRAWING



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CLIENT:

PORTAGE LA PRAIRIE CONSUMERS CO-OPERATIVE LIMITED

LEGEND

PROPERTY LINE

T GRANULAR FERTILIZER STORAGE TANK

MONITORING WELL

NOTE: SITE FEATURE LOCATIONS ARE APPROXIMATE

N

NO.	REVISION	DATE	BY

GROUNDWATER MONITORING PROGRAM

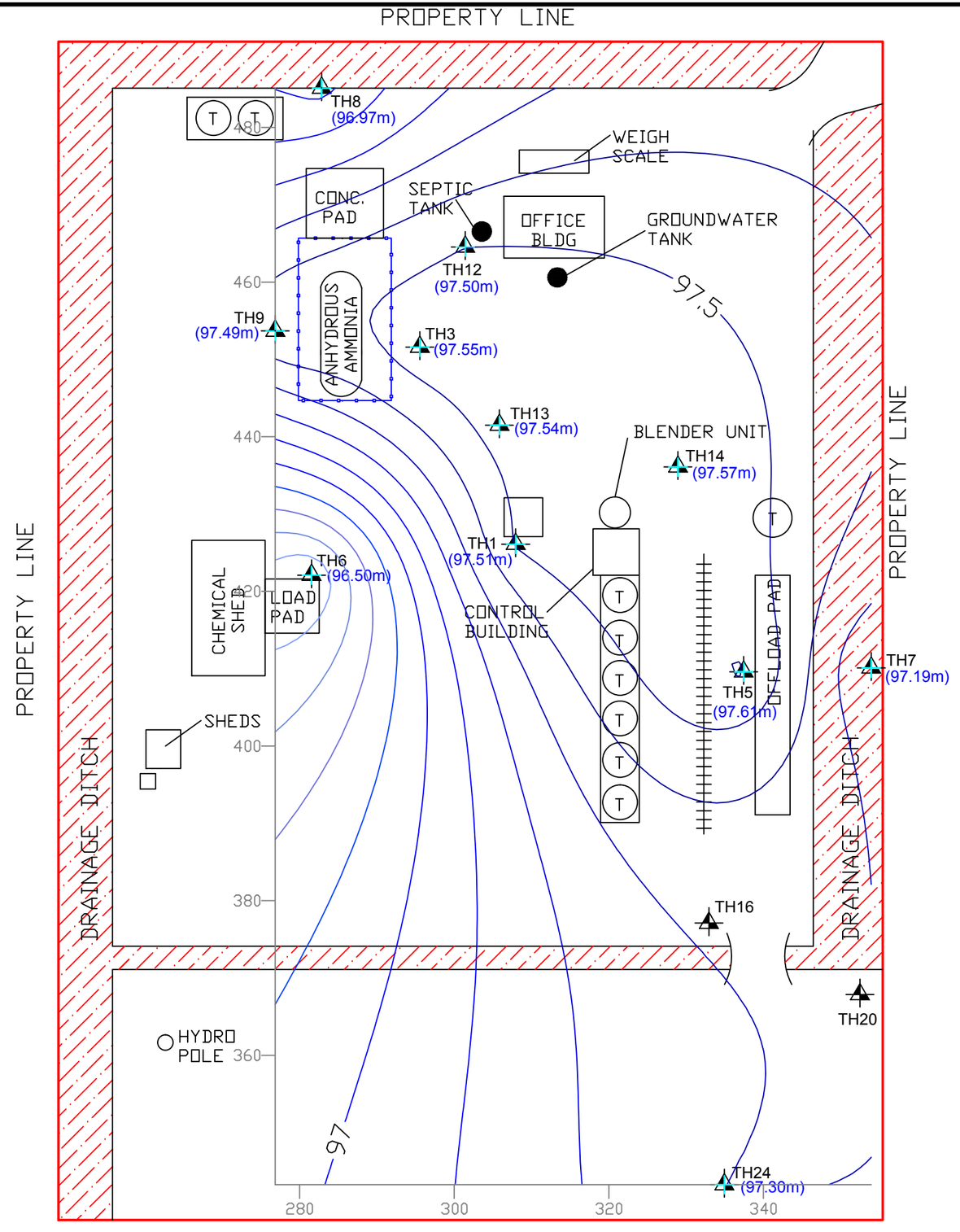
AUSTIN, MANITOBA

MONITORING WELL LOCATION PLAN

SCALE:	AS SHOWN
DATE:	OCTOBER 2011
DRAWN BY:	MD
PROJECT NO.:	WX0547611

FIGURE 3

P:\Jobs\5000's\5400's\547611 Austin GW Monitoring\DRAWING



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CLIENT:

PORTAGE LA PRAIRIE CONSUMERS CO-OPERATIVE LIMITED

LEGEND

- PROPERTY LINE
- (T) GRANULAR FERTILIZER STORAGE TANK
- MONITORING WELL

NOTE: SITE FEATURE LOCATIONS ARE APPROXIMATE

N

NO.	REVISION	DATE	BY

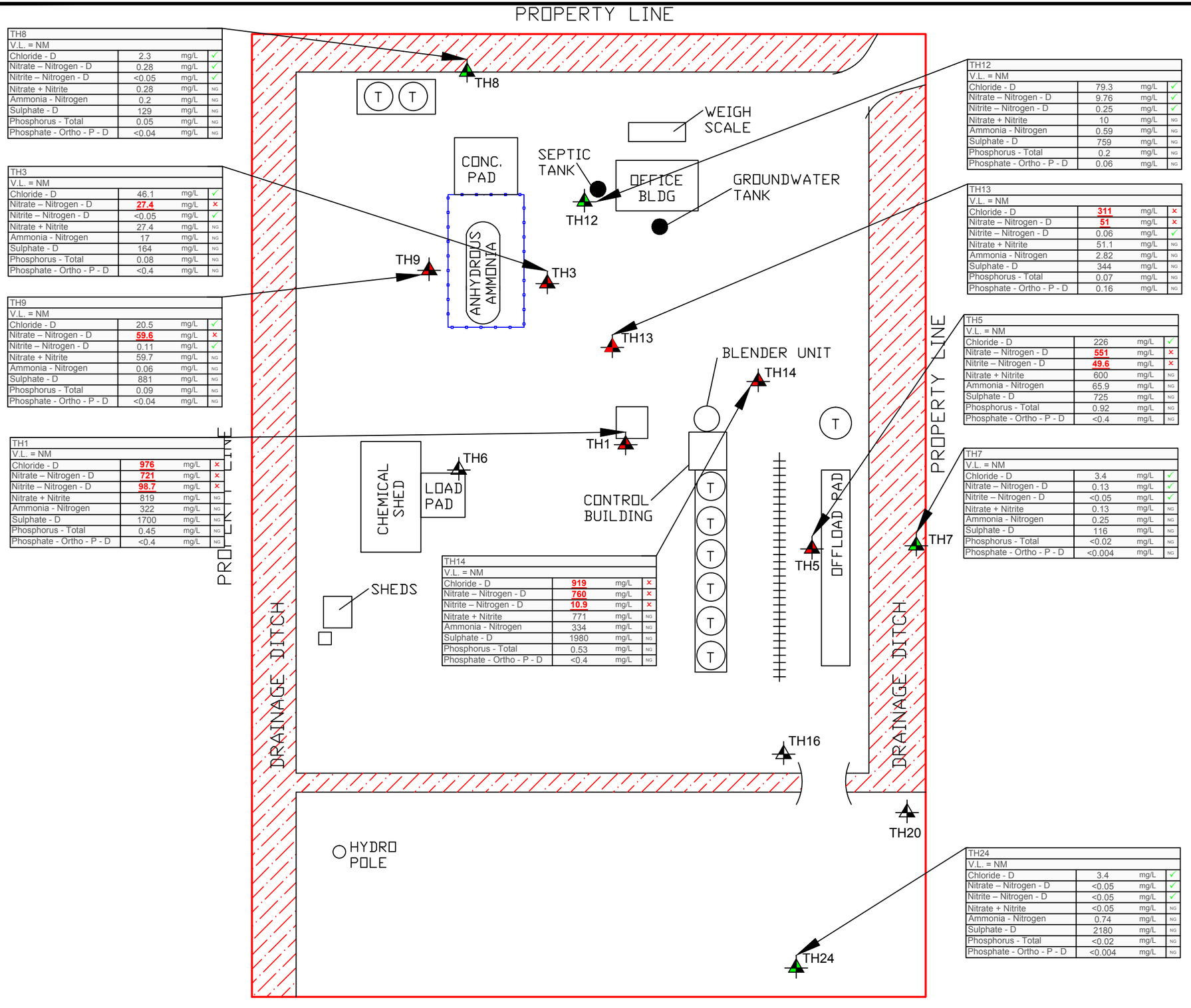
GROUNDWATER MONITORING PROGRAM

AUSTIN, MANITOBA

GROUNDWATER CONTOUR AND ELEVATION PLAN

SCALE:	AS SHOWN
DATE:	OCTOBER 2011
DRAWN BY:	MD
PROJECT NO.:	WX0547611

FIGURE 4



TH8			
V.L. = NM			
Chloride - D	2.3	mg/L	✓
Nitrate – Nitrogen - D	0.28	mg/L	✓
Nitrite – Nitrogen - D	<0.05	mg/L	✓
Nitrate + Nitrite	0.28	mg/L	NG
Ammonia - Nitrogen	0.2	mg/L	NG
Sulphate - D	129	mg/L	NG
Phosphorus - Total	0.05	mg/L	NG
Phosphate - Ortho - P - D	<0.04	mg/L	NG

TH3			
V.L. = NM			
Chloride - D	46.1	mg/L	✓
Nitrate – Nitrogen - D	**27.4**	mg/L	×
Nitrite – Nitrogen - D	<0.05	mg/L	✓
Nitrate + Nitrite	27.4	mg/L	NG
Ammonia - Nitrogen	17	mg/L	NG
Sulphate - D	164	mg/L	NG
Phosphorus - Total	0.08	mg/L	NG
Phosphate - Ortho - P - D	<0.4	mg/L	NG

TH9			
V.L. = NM			
Chloride - D	20.5	mg/L	✓
Nitrate – Nitrogen - D	**59.6**	mg/L	×
Nitrite – Nitrogen - D	0.11	mg/L	✓
Nitrate + Nitrite	59.7	mg/L	NG
Ammonia - Nitrogen	0.06	mg/L	NG
Sulphate - D	881	mg/L	NG
Phosphorus - Total	0.09	mg/L	NG
Phosphate - Ortho - P - D	<0.04	mg/L	NG

TH1			
V.L. = NM			
Chloride - D	**976**	mg/L	×
Nitrate – Nitrogen - D	**721**	mg/L	×
Nitrite – Nitrogen - D	**98.7**	mg/L	×
Nitrate + Nitrite	819	mg/L	NG
Ammonia - Nitrogen	322	mg/L	NG
Sulphate - D	1700	mg/L	NG
Phosphorus - Total	0.45	mg/L	NG
Phosphate - Ortho - P - D	<0.4	mg/L	NG

TH14			
V.L. = NM			
Chloride - D	**919**	mg/L	×
Nitrate – Nitrogen - D	**760**	mg/L	×
Nitrite – Nitrogen - D	**10.9**	mg/L	×
Nitrate + Nitrite	771	mg/L	NG
Ammonia - Nitrogen	334	mg/L	NG
Sulphate - D	1980	mg/L	NG
Phosphorus - Total	0.53	mg/L	NG
Phosphate - Ortho - P - D	<0.4	mg/L	NG

TH12			
V.L. = NM			
Chloride - D	79.3	mg/L	✓
Nitrate – Nitrogen - D	9.76	mg/L	✓
Nitrite – Nitrogen - D	0.25	mg/L	✓
Nitrate + Nitrite	10	mg/L	NG
Ammonia - Nitrogen	0.59	mg/L	NG
Sulphate - D	759	mg/L	NG
Phosphorus - Total	0.2	mg/L	NG
Phosphate - Ortho - P - D	0.06	mg/L	NG

TH13			
V.L. = NM			
Chloride - D	**311**	mg/L	×
Nitrate – Nitrogen - D	**51**	mg/L	×
Nitrite – Nitrogen - D	0.06	mg/L	✓
Nitrate + Nitrite	51.1	mg/L	NG
Ammonia - Nitrogen	2.82	mg/L	NG
Sulphate - D	344	mg/L	NG
Phosphorus - Total	0.07	mg/L	NG
Phosphate - Ortho - P - D	0.16	mg/L	NG

TH5			
V.L. = NM			
Chloride - D	226	mg/L	✓
Nitrate – Nitrogen - D	**551**	mg/L	×
Nitrite – Nitrogen - D	**49.6**	mg/L	×
Nitrate + Nitrite	600	mg/L	NG
Ammonia - Nitrogen	65.9	mg/L	NG
Sulphate - D	725	mg/L	NG
Phosphorus - Total	0.92	mg/L	NG
Phosphate - Ortho - P - D	<0.4	mg/L	NG

TH7			
V.L. = NM			
Chloride - D	3.4	mg/L	✓
Nitrate – Nitrogen - D	0.13	mg/L	✓
Nitrite – Nitrogen - D	<0.05	mg/L	✓
Nitrate + Nitrite	0.13	mg/L	NG
Ammonia - Nitrogen	0.25	mg/L	NG
Sulphate - D	116	mg/L	NG
Phosphorus - Total	<0.02	mg/L	NG
Phosphate - Ortho - P - D	<0.004	mg/L	NG

TH24			
V.L. = NM			
Chloride - D	3.4	mg/L	✓
Nitrate – Nitrogen - D	<0.05	mg/L	✓
Nitrite – Nitrogen - D	<0.05	mg/L	✓
Nitrate + Nitrite	<0.05	mg/L	NG
Ammonia - Nitrogen	0.74	mg/L	NG
Sulphate - D	2180	mg/L	NG
Phosphorus - Total	<0.02	mg/L	NG
Phosphate - Ortho - P - D	<0.004	mg/L	NG

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CLIENT:

PORTAGE LA PRAIRIE CONSUMERS CO-OPERATIVE LIMITED

LEGEND

- PROPERTY LINE
- (T) GRANULAR FERTILIZER STORAGE TANK
- MONITORING WELL
- BELOW CRITERIA
- ABOVE CRITERIA

GUIDELINE		
Chloride - D	<250	mg/L
Nitrate – Nitrogen - D	10	mg/L
Nitrite – Nitrogen - D	3.2	mg/L
Nitrate + Nitrite	NG	mg/L
Ammonia - Nitrogen	NG	mg/L
Sulphate - D	NG	mg/L
Phosphorus - Total	NG	mg/L
Phosphate - Ortho - P - D	NG	mg/L

NOTE: SITE FEATURE LOCATIONS ARE APPROXIMATE

N

NO.	REVISION	DATE	BY

GROUNDWATER MONITORING PROGRAM

AUSTIN, MANITOBA

GROUNDWATER ANALYTICAL RESULTS (NUTRIENTS)

SCALE:	AS SHOWN
DATE:	OCTOBER 2011
DRAWN BY:	MD
PROJECT NO.:	WX0547611

FIGURE 5

P:\Jobs\5000's\5400's\547611 Austin GW Monitoring\DRAWING

APPENDIX B

TABLES

TABLE 5: CUMULATIVE GROUNDWATER ANALYTICAL RESULTS (NUTRIENTS)		
Direction	Land Use	Approx. Distance (m)
Site	Active fertilizer facility - Austin Co-Op	
North	Agricultural land	Adjacent
East	Gravel road and associated drainage ditches followed by agricultural land	Adjacent
South	Trans- Canada Highway (# 1) and associated drainage ditches followed by agricultural land.	Adjacent
West	Agricultural land	Adjacent

TABLE 2: ASSESSMENT CRITERIA	
Parameter	**Guideline[1]**
T-Dissolved Solids 180°C (mg/L)	≤ 500[AO]
Calcium - D (mg/L)	NG
Magnesium - D (mg/L)	NG
Potassium - D (mg/L)	NG
Sodium - D (mg/L)	≤ 200[AO]
Bicarbonate - D (mg/L)	NG
Sulphate - D (mg/L)	NG
Chloride - D (mg/L)	≤ 250[AO]
Nitrate – Nitrogen - D (mg/L)	10[MAC]
Nitrite – Nitrogen - D (mg/L)	3.2[MAC]
Nitrate + Nitrite	NG
Carbon (Total Organic) (mg/L)	NG
Phosphate - Ortho - P - D (mg/L)	NG
Ammonia - Nitrogen (mg/L)	NG
Chemical Oxygen Demand (mg/L)	NG
Iron - D (mg/L)	≤ 0.3[AO]
Iron - Total (mg/L)	≤ 0.3[AO]
Manganese - D (mg/L)	≤ 0.05[AO]
pH @ 25°C (pH units)	6.5 TO 8.5
Phosphorus - Total (mg/L)	NG
Acidity as CaCO3 (mg/L)	NG

TABLE 3: MONITORING WELL DATA

Monitor Well No.	Date (dd-mmm-yy)	TOP Elevation (m)	Ground Elevation (m)	Depth to Water (m B.TOP)	Depth to Water from Ground Level (mbgl)	Ground Water Elevation (m)	DO (mg/L)	EC (µS/cm)	pH	ORP (mV)	Temp (^{o}C)
TH1	7-Sep-11	99.530	99.560	2.02	2.05	97.510	10.2*	9235	5.46	259.2	13.55
TH3	9-Sep-11	99.260	99.315	1.71	1.76	97.550	0.12	1876	6.57	3.7	14.31
TH5	9-Sep-11	99.130	99.155	1.52	1.55	97.610	0.23	5156	6.66	172.8	14.24
TH6	9-Sep-11	99.475	99.490	2.98	3.00	96.495	Insufficient water for stabilization				
TH7	9-Sep-11	100.000	99.080	2.81	1.89	97.190	0.88	714	6.93	116.7	11.56
TH8	9-Sep-11	100.135	98.910	3.17	1.95	96.965	0.81	746	6.84	141.3	13.18
TH9	9-Sep-11	99.145	99.210	1.66	1.73	97.485	0.42	2161	6.7	188.2	14.66
TH12	9-Sep-11	99.305	99.380	1.81	1.89	97.495	0.69	2119	NM	151.3	17.77
TH13	9-Sep-11	99.245	99.365	1.71	1.83	97.535	0.84	2784	6.47	190.7	18.83
TH14	9-Sep-11	99.155	99.200	1.59	1.64	97.565	Insufficient water for stabilization				
TH16	9-Sep-11	Destroyed									
TH20	9-Sep-11	99.865	98.910	Blocked at 1.62 m below grade							
TH24	7-Sep-11	100.31	98.82	3.01	1.52	97.300	0.33	2686	6.6	26.4	10.02

Notes:

- m - meters
- m B.TOP - meters below top of pipe
- mbgl - meters below ground level
- ppm_v - parts per million combustible vapour
- LNAPL - light non-aqueous phase liquids
- mm - millimeters
- DO - dissolved oxygen
- EC - electrical conductivity
- ORP - oxidation/reduction potential
- mg/L - milligrams per litre
- µS/cm - milliSiemens per centimetre
- mV - millivolts
- ND - not detected
- * - DO reading may be inaccurate due to high volume of sediment in groundwater

APPENDIX C

SAFETY DOCUMENTATION

Emergency Contact List

Purpose: To provide AMEC field staff and subcontractors with the correct contact and emergency information.
Procedure: To be completed and distributed prior to field work.

Project Number: WX05477611

Project Name: AUSTIN CO-OP

Site Location & Name: NORTH OF PTH # 1, EAST OF AUSTIN, MB.

Prime Contractor: AMEC

Agency	Phone Number	Location
Ambulance	911	
Fire Department	911	AUSTIN + DISTRICT FIRE DEPT.
Police	911 857-8767, 834-2131	PORTAGE, CARBERRY
Environmental Hotline – Spill Reporting	(204) 944-4888	Manitoba Conservation
MB Labour Workplace Accident Reporting	(204) 945-3446 1-800-282-8069 (204) 945-0581 (after hrs)	General Switchboard
Nearest Hospital	MACGREGOR H.C. 685-2850	87 GRAFTON ST.S, MACGREGOR
Telephone – Onsite	(204) 793-2169	Amanda Crawley
– Offsite	(204) 488-2997	AMEC Office
AMEC Project Manager	Office (204) 488-2997 Cell 232-9587	K. TIMLICK
AMEC Safety Officer	(204) 488-2997 / (204) 793-9077	Patrick Campbell
Client Contact	(306) 244-3119	
Site Contact	(204) 856-2127	KEVIN DALES
Contractor	—	—

Location of First Aid facilities: AMEC Vehicle

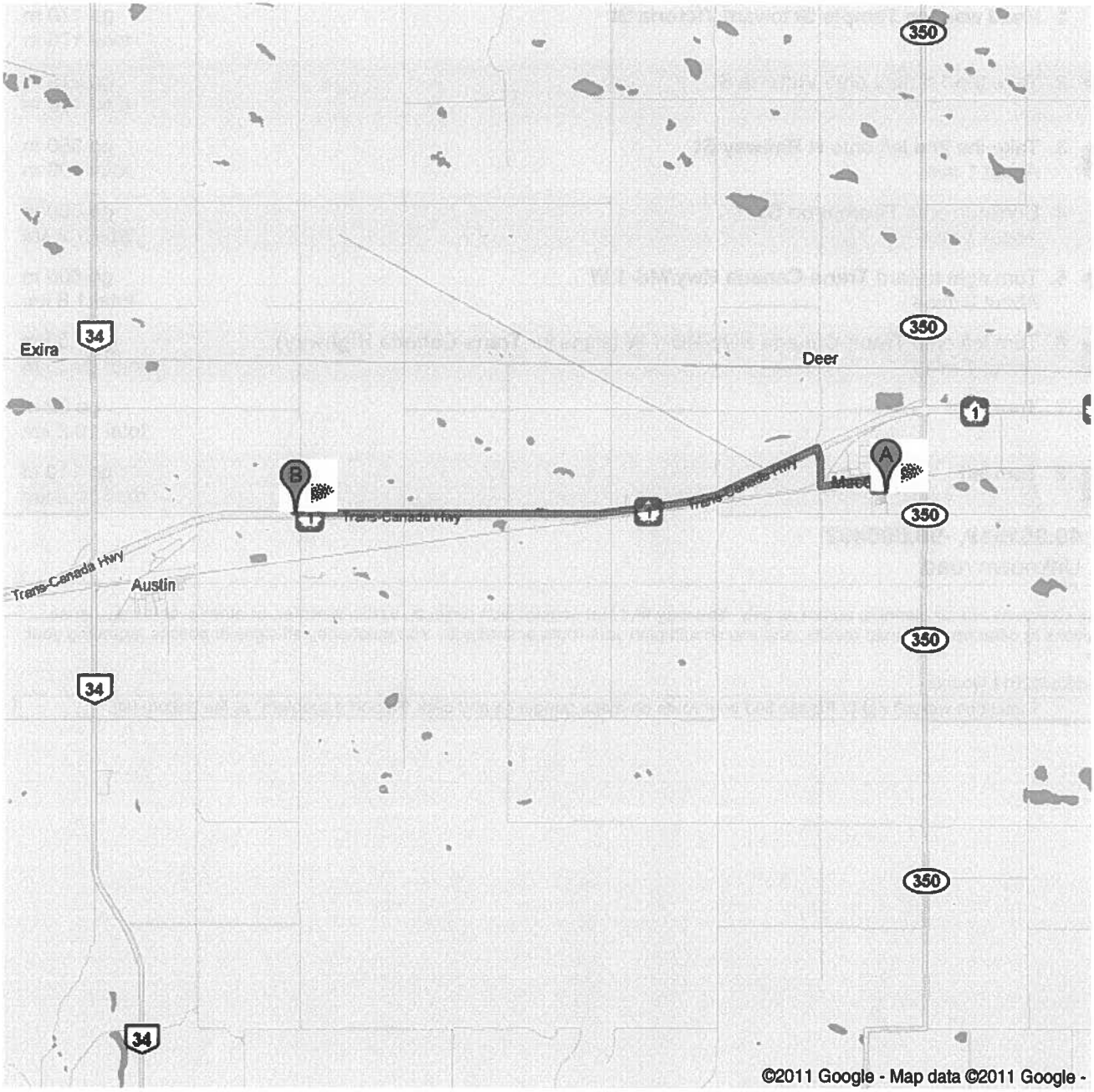
First Aiders on-site (names): Amanda Crawley

Emergency Procedures (note specific emergency signals, evacuation procedures, etc:

-call in prior to and upon completion of work day (working alone policy)

Google maps Canada

Directions to 49.961519, -98.905492
Unknown road
10.3 km – about **13 mins**



Project Health & Safety Checklist

Purpose: This checklist is to identify health & safety concerns and requirements associated with a specific field project and to ensure safe work practices.

Procedure: **This form must be completed by the project manager and signed by field personnel prior to field work.**

PART 1 - Project Identification

1.1 Project: AUSTIN, MB

1.2 Client: CO-OP

1.3 Job Number: WX0547611 Task: _____ 1.4 Project Manager: K. TIMLICK

1.5 ☑ Field Work - complete Parts 2, 3, 4 & 5 and submit form
☐ No Field Work (office-type work only) - complete Part 6 and submit form
☐ **International Travel** - complete this form as indicated at left and prepare project-specific Health & Safety Plan

1.6 Name of Site and Location: NORTH OF HWY #2, EAST OF AUSTIN

1.7 Site Health & Safety Coordinator: Amanda Crawley
Client Health & Safety Coordinator: K. TIMLICK

1.8 Type of Field Work (check all appropriate categories):

☐ Sampling or Monitoring:
- ☐ Air
- ☑ Groundwater
- ☐ Hazardous Waste
- ☐ Sediments
- ☐ Sludge
- ☐ Sewage
- ☐ Solid Waste
- ☐ Stack
- ☐ Soil

☐ Sampling or Monitoring (con't):
- ☐ Surface Water
- ☐ Flora or Fauna
- ☐ Other (specify) _____
- ☐ Asbestos Abatement
- ☐ Borehole Drilling
- ☐ Test Pits
- ☐ Facility Inspection

- ☐ Contractor Supervision
- ☐ Other (specify) _____
- ☐ Industrial Site
- ☐ Construction Site
- ☐ Decommissioning Site
- ☐ Wilderness Site
- ☐ Remediation Site
- ☑ Other (specify) SEE 1.9

1.9 Site Description and Background: ACTIVE FERTILIZER SITE

PART 2 - Hazard Identification

Identify all hazards that may be encountered in the field.

2.1 **Chemical Hazards** (check all appropriate categories): ☐ N/A

(a) Type of Agent:
- ☐ Dust Type: _____
- ☐ Heavy Metals
- ☐ Asbestos
- ☐ PCBs
- ☐ H_2S
- ☐ Aromatic Hydrocarbons (e.g. BTEX)
- ☐ Solvents
- ☐ Halogenated Organic Compounds
- ☑ Pesticides/Herbicides
- ☑ Acids or Caustics PRESERVE
- ☐ Poisonous Materials
- ☐ Other (specify) _____

(b) Physical State:
- ☐ Solid
- ☑ Liquid
- ☑ Dissolved (e.g., BTEX in water)
- ☐ Gas
- ☐ Vapour

(c) Hazard Type:
- ☐ Fire/Explosion
  If yes:
  Flash Point: _____
  LEL: _____
- ☑ Toxic
- ☑ Irritant/Sensitizer
- ☐ Dangerously Reactive
- ☐ Infectious
- ☐ Corrosive
  pH:
- ☐ Other (specify): _____

Incompatible Materials: _____

(d) Routes of Exposure:
- ☑ Inhalation
- ☐ Ingestion
- ☑ Eye Contact
- ☑ Skin Contact
- ☐ Skin Absorption

(e) Are MSDSs available for any of the subject materials? ☑ Yes ☐ No (check Canadian Centre of OH&S database; www.ccohs.ca, user name - AMEC (must be in capitals), password - EARTH221 (must be in capitals)).
(If yes, review with field personnel.)

Job / Task Hazard Assessment

Purpose: To be used as a supplement to the "Project Hazard Assessment Checklist" or to address any changes that may occur on site as the job proceeds.
Procedure: To be completed as required. Add to Daily Tail Gate Meeting discussion.

Job Name: Austin, MB CO-OP

Completed by: Amanda Crawley Date: 6 September 2011

Reviewed by: Karen Tinlicle Date: 6 September 2011

Approved by: Date:

Task / Job	Equipment / Material Used	Potential for Accidents or Hazards	Prevention Measures
Monitor	Wrench/Hammer/Screwdriver	Pinch/Cut/Crush	Leather Gloves
	Moving Vehicles	Pinch/Crush/Collision	Vest/Pylons/Truck Hazards
Sampling	Low flow pump	Chemical Splash/Pinch	Gloves/Goggles
	Vials/Ambers	Broken Glass	Packing Materials
	Outdoor conditions	Sunburn, heat exhaustion/stroke	Sunscreen, water, AC breaks
	Nomex required	Heat exhaustion/heat rash	Water, AC breaks (w/o Nomex)
	Extended work hours	Fatigue, driver fatigue	Call pm if necessary

Notes or Comments:

APPENDIX D

MONITORING WELL INSPECTION CHECKLIST

Monitor Well Inspection Checklist

Section A

Site: AUSTIN CO-OP
Address: _____

Consultant: A. CRAWLEY
Consultant Job ID: ENV. TECH

Section B:

Monitor Well	Onsite	Offsite	Well Condition		Description of Well Condition (If Unsatisfactory)
			Satisfactory	Unsatisfactory	Examples include, no lid/bolt/pin, bent device, protruding cover, damaged concrete
TH1	✓			✓	NEED TO: CUT DOWN PVC, NEW PVC CAP
TH14	✓		✓		
TH24	✓		✓		
TH16	✓				COULD NOT LOCATE
TH20	✓			✓	BLOCKED WITH SILT
TH7	✓		✓		
TH5	✓			✓	NEED TO: CUT DOW PVC, NEW PVC CAP, NEW METAL CASING + LID
TH12	✓		✓		REPLACED BOLT (A.C.)
TH13	✓		✓		
TH9	✓		✓		
TH3	✓			✓	NEED TO: CUT DOWN PVC, NEW METAL CASING + LID
TH6	✓		✓	✓	NEED TO: CUT DOWN PVC, NEW PVC CAP NEW METAL CASING + LID
REPAIRS 09/09/11					
TH5					REPAIRED AC - pushed down PVC, new casing/lid
TH1					REPAIRED AC - removed PVC PIECE, NEW PVC CAP
TH3					REPAIRED AC PUSHED DOWN PVC FOUND CASING, NEW LID

Section C
Inspection Requirements Reviewed

Consultant: _____
Date: _____

Section D
Field Work

Inspection Completed By: _____
Inspection Date: _____

NOTE: Observed damage must be reported to FCL within 7 Calender Days. Reporting should be completed as soon as practicaily possible if a significant safety/environmental risk is identified.

Well Condition Options - Acceptable, Repairs Needed, Repaired, Destroyed

APPENDIX E

LABORATORY RESULTS

5667 - 70 Street
Edmonton, Alberta
Canada T6B 3P6
Tel: (780) 436-2152
Fax: (780) 377-3600

ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Date Received: 2011/09/13
Report Date: 2011/09/22

Water Analysis

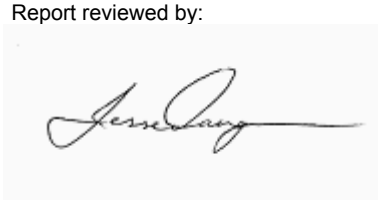
Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: MDL	11-13024 TH1 2011-09-07 00:00	11-13024-D TH1 Lab Duplicate	11-13025 TH14 2011-09-07 00:00	11-13026 TH24 2011-09-09 00:00	11-13027 TH7 2011-09-09 00:00
RC	2011/09/13	Phosphate-Ortho-P-D	mg/L (ppm)	APHA 4110	0.04	*<0.4	---	*<0.4	< 0.04	< 0.04
JO	2011/09/14	T-Dissolved Solids180°C	mg/L (ppm)	APHA 2540 C	4	9712	---	10600	3564	616
BM	2011/09/15	Calcium -D	mg/L (ppm)	APHA 3120 B	0.5	1040	---	1110	501	124
BM	2011/09/15	Magnesium -D	mg/L (ppm)	APHA 3120 B	0.5	608	---	578	261	50.4
BM	2011/09/15	Potassium -D	mg/L (ppm)	APHA 3120 B	0.5	258	---	498	14.1	6.1
BM	2011/09/15	Sodium -D	mg/L (ppm)	APHA 3120 B	0.5	73.2	---	56.1	161	16.6
RC	2011/09/13	Bicarbonate-D	mg/L (ppm)	APHA 2320	1	1300	---	1490	523	509
RC	2011/09/13	Chloride-D	mg/L (ppm)	APHA 4110	0.1	976	---	919	3.4	3.4
RC	2011/09/13	Sulphate-D	mg/L (ppm)	APHA 4110	0.5	1700	---	1980	2180	116
RC	2011/09/13	Conductivity @ 25°C	mS/cm	APHA 2510 B	0.001	11.3	---	11.3	3.58	0.946
RC	2011/09/13	pH @ 25°C	pH units	APHA 4500H	0.01	7.30	---	7.49	7.46	7.76
RC	2011/09/13	Sodium Adsorption Ratio (SAR)		Calculation	0.10	0.45	---	0.34	1.45	0.32
RC	2011/09/13	Nitrate-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	721	---	760	< 0.05	0.13
RC	2011/09/13	Nitrite-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	98.7	---	10.9	< 0.05	< 0.05
RC	2011/09/13	Nitrate + Nitrite	mg/L (ppm)	Calculation	0.05	819	---	771	< 0.05	0.13

* MDL adjusted due to sample matrix interference.
All Analytical results pertain to samples analyzed as received.
APHA: Standard Method for the Examination of Water and Wastewater, 2005. 21st Ed. American Public Health Association.
MDL - Method Detection Limit

Report reviewed by:



Jesse Dang, B.Sc.
Manager
Laboratory Services

Charlene Rollheiser
Director of QA/QC
Laboratory Services

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Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: Client ID: Sample Date: MDL	11-13028 TH5 2011-09-09 00:00	11-13028-D TH5 Lab Duplicate	11-13029 TH12 2011-09-09 00:00	11-13030 TH13 2011-09-09 00:00	11-13031 TH9 2011-09-09 00:00
RC	2011/09/13	Phosphate-Ortho-P-D	mg/L (ppm)	APHA 4110	0.04	*<0.4	*<0.4	0.06	0.16	< 0.04
JO	2011/09/14	T-Dissolved Solids180°C	mg/L (ppm)	APHA 2540 C	4	5156	5308	2044	2636	2340
BM	2011/09/15	Calcium -D	mg/L (ppm)	APHA 3120 B	0.5	663	660	341	380	359
BM	2011/09/15	Magnesium -D	mg/L (ppm)	APHA 3120 B	0.5	375	376	149	163	179
BM	2011/09/15	Potassium -D	mg/L (ppm)	APHA 3120 B	0.5	93.4	93.9	3.5	3.7	3.8
BM	2011/09/15	Sodium -D	mg/L (ppm)	APHA 3120 B	0.5	41.2	40.4	50.5	49.1	69.3
RC	2011/09/13	Bicarbonate-D	mg/L (ppm)	APHA 2320	1	848	851	803	1070	734
RC	2011/09/13	Chloride-D	mg/L (ppm)	APHA 4110	0.1	226	223	79.3	311	20.5
RC	2011/09/13	Sulphate-D	mg/L (ppm)	APHA 4110	0.5	725	718	759	344	881
RC	2011/09/13	Conductivity @ 25°C	mS/cm	APHA 2510 B	0.001	6.16	6.13	2.39	3.04	2.58
RC	2011/09/13	pH @ 25°C	pH units	APHA 4500H	0.01	7.54	7.53	7.58	7.43	7.60
RC	2011/09/13	Sodium Adsorption Ratio (SAR)		Calculation	0.10	0.32	0.31	0.57	0.53	0.75
RC	2011/09/13	Nitrate-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	551	548	9.76	51.0	59.6
RC	2011/09/13	Nitrite-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	49.6	49.7	0.25	0.06	0.11
RC	2011/09/13	Nitrate + Nitrite	mg/L (ppm)	Calculation	0.05	600	598	10.0	51.1	59.7

* MDL adjusted due to sample matrix interference.
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MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Charlene Rollheiser
Director of QA/QC
Laboratory Services

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Fax: (780) 377-3600

ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Date Received: 2011/09/13
Report Date: 2011/09/22

Water Analysis

Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / MDL	11-13032 TH3 2011-09-09 00:00	11-13033 TH8 2011-09-09 00:00	11-13034 DUP1 2011-09-07 00:00
RC	2011/09/13	Phosphate-Ortho-P-D	mg/L (ppm)	APHA 4110	0.04	< 0.04	< 0.04	*<0.4
JO	2011/09/14	T-Dissolved Solids180°C	mg/L (ppm)	APHA 2540 C	4	1636	620	9500
BM	2011/09/15	Calcium -D	mg/L (ppm)	APHA 3120 B	0.5	275	130	1070
BM	2011/09/15	Magnesium -D	mg/L (ppm)	APHA 3120 B	0.5	121	37.1	620
BM	2011/09/15	Potassium -D	mg/L (ppm)	APHA 3120 B	0.5	9.9	5.8	265
BM	2011/09/15	Sodium -D	mg/L (ppm)	APHA 3120 B	0.5	30.1	19.6	74.1
RC	2011/09/13	Bicarbonate-D	mg/L (ppm)	APHA 2320	1	1300	490	1320
RC	2011/09/13	Chloride-D	mg/L (ppm)	APHA 4110	0.1	46.1	2.3	1000
RC	2011/09/13	Sulphate-D	mg/L (ppm)	APHA 4110	0.5	164	129	1880
RC	2011/09/13	Conductivity @ 25°C	mS/cm	APHA 2510 B	0.001	2.26	0.943	11.2
RC	2011/09/13	pH @ 25°C	pH units	APHA 4500H	0.01	7.44	7.73	7.37
RC	2011/09/13	Sodium Adsorption Ratio (SAR)		Calculation	0.10	0.38	0.39	0.45
RC	2011/09/13	Nitrate-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	27.4	0.28	707
RC	2011/09/13	Nitrite-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	< 0.05	< 0.05	90.9
RC	2011/09/13	Nitrate + Nitrite	mg/L (ppm)	Calculation	0.05	27.4	0.28	798

* MDL adjusted due to sample matrix interference.
All Analytical results pertain to samples analyzed as received.
APHA: Standard Method for the Examination of Water and Wastewater, 2005. 21st Ed. American Public Health Association.
MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Charlene Rollheiser
Director of QA/QC
Laboratory Services

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Tel: (780) 436-2152
Fax: (780) 377-3600

ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Date Received: 2011/09/13
Report Date: 2011/09/22

Water Analysis

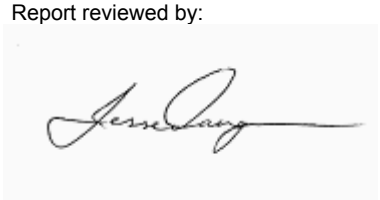
Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / MDL	11-13024 TH1 2011-09-07 00:00	11-13024-D TH1 Lab Duplicate	11-13025 TH14 2011-09-07 00:00	11-13026 TH24 2011-09-09 00:00	11-13027 TH7 2011-09-09 00:00
JO	2011/09/15	Ammonia - Nitrogen	mg/L (ppm)	APHA 4500NH3-G	0.02	322	319	334	0.74	0.25
BM	2011/09/14	Carbon (Total Organic)	mg/L (ppm)	APHA 5310 B	0.1	28.3	---	146	4.9	2.8
JO	2011/09/15	Chemical Oxygen Demand (COD)	mg/L (ppm)	APHA 5220-d	20	377	320	614	35	< 20
BM	2011/09/16	Phosphorus-T	mg/L (ppm)	APHA 3030 E/3120 B	0.02	0.45	---	0.53	< 0.02	< 0.02
BM	2011/09/16	Iron-T	mg/L (ppm)	APHA 3030 E/3120 B	0.01	0.68	---	2.27	5.49	0.27
BM	2011/09/15	Iron-D	mg/L (ppm)	APHA 3120 B	0.01	< 0.01	---	0.02	3.80	0.02
RC	2011/09/15	Acidity as CaCO3	mg/L (ppm)	APHA 2310B	1	- 989	---	- 1110	- 438	- 430
BM	2011/09/15	Manganese-D	mg/L (ppm)	APHA 3120 B	0.01	3.31	---	5.06	1.70	0.48

Acidity - the absolute of a negative value should be equivalent to alkalinity value.
All Analytical results pertain to samples analyzed as received.
APHA: Standard Method for the Examination of Water and Wastewater, 2005. 21st Ed. American Public Health Association.
MDL - Method Detection Limit

Report reviewed by:



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Date Received: 2011/09/13
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Water Analysis

Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / MDL	11-13028 TH5 2011-09-09 00:00	11-13028-D TH5 Lab Duplicate	11-13029 TH12 2011-09-09 00:00	11-13030 TH13 2011-09-09 00:00	11-13031 TH9 2011-09-09 00:00
JO	2011/09/15	Ammonia - Nitrogen	mg/L (ppm)	APHA 4500NH3-G	0.02	65.9	---	0.59	2.82	0.06
BM	2011/09/14	Carbon (Total Organic)	mg/L (ppm)	APHA 5310 B	0.1	22.5	21.7	6.7	35.7	15.1
JO	2011/09/15	Chemical Oxygen Demand (COD)	mg/L (ppm)	APHA 5220-d	20	109	---	25	108	46
BM	2011/09/16	Phosphorus-T	mg/L (ppm)	APHA 3030 E/3120 B	0.02	0.92	0.91	0.20	0.07	0.09
BM	2011/09/16	Iron-T	mg/L (ppm)	APHA 3030 E/3120 B	0.01	0.16	0.15	3.57	0.19	0.09
BM	2011/09/15	Iron-D	mg/L (ppm)	APHA 3120 B	0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
RC	2011/09/15	Acidity as CaCO3	mg/L (ppm)	APHA 2310B	1	- 693	- 700	- 649	- 892	- 634
BM	2011/09/15	Manganese-D	mg/L (ppm)	APHA 3120 B	0.01	1.36	1.36	0.21	3.91	0.12

Acidity - the absolute of a negative value should be equivalent to alkalinity value.
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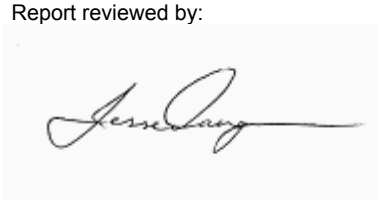
APHA: Standard Method for the Examination of Water and Wastewater, 2005. 21st Ed. American Public Health Association.
MDL - Method Detection Limit

Report reviewed by:



Jesse Dang, B.Sc.
Manager
Laboratory Services

Charlene Rollheiser
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5667 - 70 Street
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ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Date Received: 2011/09/13
Report Date: 2011/09/22

Water Analysis

Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / MDL	11-13032 TH3 2011-09-09 00:00	11-13033 TH8 2011-09-09 00:00	11-13034 DUP1 2011-09-07 00:00
JO	2011/09/15	Ammonia - Nitrogen	mg/L (ppm)	APHA 4500NH3-G	0.02	17.0	0.20	318
BM	2011/09/14	Carbon (Total Organic)	mg/L (ppm)	APHA 5310 B	0.1	26.9	3.9	29.2
JO	2011/09/15	Chemical Oxygen Demand (COD)	mg/L (ppm)	APHA 5220-d	20	85	< 20	280
BM	2011/09/16	Phosphorus-T	mg/L (ppm)	APHA 3030 E/3120 B	0.02	0.08	0.05	0.42
BM	2011/09/16	Iron-T	mg/L (ppm)	APHA 3030 E/3120 B	0.01	10.6	1.15	0.38
BM	2011/09/15	Iron-D	mg/L (ppm)	APHA 3120 B	0.01	4.46	0.04	< 0.01
RC	2011/09/15	Acidity as CaCO3	mg/L (ppm)	APHA 2310B	1	- 1030	- 414	- 982
BM	2011/09/15	Manganese-D	mg/L (ppm)	APHA 3120 B	0.01	2.09	0.39	3.36

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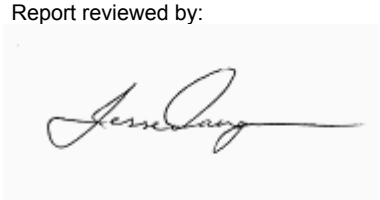

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Fax: (780) 377-3600

ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Report Date: 2011/09/22

Quality Control Standard

Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	MDL	Analyzed Value	Advisory Range	Target Value	Reference No.
RC	2011/09/13	Phosphate-Ortho-P-D	mg/L (ppm)	APHA 4110	0.03	8.71	7.2-8.8	8.00	CC-Anion-112B
JO	2011/09/14	T-Dissolved Solids180°C	mg/L (ppm)	APHA 2540-B	4	644	577 - 977	777.00	C2-SLD02006
BM	2011/09/15	Calcium -D	mg/L (ppm)	APHA 3120 B	0.5	39.5	33.8-41.3	37.50	QCP-QCS (CCV-Cats)
BM	2011/09/15	Magnesium -D	mg/L (ppm)	APHA 3120 B	0.5	39.1	33.8-41.3	37.50	QCP-QCS (CCV-Cats)
BM	2011/09/15	Potassium -D	mg/L (ppm)	APHA 3120 B	0.5	43.7	38.3-46.8	42.50	QCP-QCS (CCV-Cats)
BM	2011/09/15	Sodium -D	mg/L (ppm)	APHA 3120 B	0.5	39.1	33.8-41.3	37.50	QCP-QCS (CCV-Cats)
RC	2011/09/13	Chloride-D	mg/L (ppm)	APHA 4110	0.1	4.3	3.6-4.4	4.00	CC-Anion-112B
RC	2011/09/13	Sulphate-D	mg/L (ppm)	APHA 4110	0.5	27.2	25.2-30.8	28.00	CC-Anion-112B
RC	2011/09/13	Conductivity @ 25°C	mS/cm	APHA 2510 B	0.001	2.75	2.54-2.94	2.79	CC-EC-0.02M-37
RC	2011/09/13	pH @ 25°C	---	APHA 4500H	0.01	6.00	5.94-6.06	6.00	CC-pH-157
RC	2011/09/13	Nitrate-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	1.75	1.44-1.76	1.60	CC-Anion-112B
RC	2011/09/13	Nitrite-Nitrogen-D	mg/L (ppm)	APHA 4110	0.05	0.59	0.54-0.66	0.60	CC-Anion-112B

* MDL adjusted due to sample matrix interference.

All Analytical results pertain to samples analyzed as received.

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Report reviewed by:

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ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Report Date: 2011/09/22

Quality Control Standard

Attention: Timlick, Karen

Project No. WX0547611 **File No.:** EC-61776

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	MDL	Analyzed Value	Advisory Range	Target Value	Reference No.
JO	2011/09/15	Ammonia - Nitrogen	mg/L (ppm)	APHA 4500NH3-G	0.02	0.89	0.702-1.052	0.86	NH3SC-001
BM	2011/09/14	Carbon (Total Organic)	mg/L (ppm)	APHA 5310-B	0.1	38.2	33.1-42.6	37.90	DMD-TOC-83-Mid
JO	2011/09/15	Chemical Oxygen Demand (COD)	mg/L (ppm)	APHA 5220-D	20	367	326.4 - 425.5	376.20	QC-HR_Low- D2-DMD01073
BM	2011/09/16	Phosphorus-T	mg/L (ppm)	APHA 3120 B	0.02	5.29	4.50-5.50	5.00	QCP-QCS (CCV-Cats)
BM	2011/09/16	Iron-T	mg/L (ppm)	APHA 3120 B	0.01	1.05	0.90-1.10	1.00	QCP-QCS (CCV-Cats)
BM	2011/09/15	Iron-D	mg/L (ppm)	APHA 3120 B	0.01	1.07	0.90-1.10	1.00	QCP-QCS (CCV-Cats)
BM	2011/09/15	Manganese-D	mg/L (ppm)	APHA 3120 B	0.01	1.04	0.90-1.10	1.00	QCP-QCS (CCV-Cats)

Acidity - the absolute of a negative value should be equivalent to alkalinity value.

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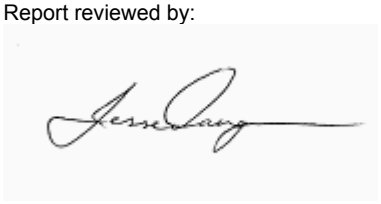

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APPENDIX F

NCSCS SCORING

CCME National Classification System (2008, 2010 v 1.2)
Score Summary

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	4	2
2. Chemical Hazard	4	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	2	---
5. Modifying Factors	0	1
Raw Total Score	14	3
Raw Total Score (Known + Potential)	17	
Adjusted Total Score (Raw Total / 40 *33)	**14.0**	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	0	---
3. Soil	12	---
4. Vapour	0	---
5. Sediment Movement	---	6
6. Modifying Factors	---	2
Raw Total Score	24	8
Raw Total Score (Known + Potential)	32	
Adjusted Total Score (Raw Total / 64 * 33)	**16.5**	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B Potential		
a. Land Use		3
b. Accessibility		0
c. Exposure Route		
i. Direct Contact		3
ii. Inhalation		1
iii. Ingestion		7
2. Human Receptors Modifying Factors	0	---
Raw Total Human Score	0	14
Raw Total Human Score (Known + Potential)	14	
Adjusted Total Human Score	14.0	(maximum 22)
3. Ecological Receptors		
A. Known Impact	0	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	---	5
Raw Total Ecological Score	0	5
Raw Total Ecological Score (Known + Potential)	5	
Adjusted Total Ecological Score	5.0	(maximum 18)
5. Other Receptors	0	0
Total Other Receptors Score (Known + Potential)	0	
Total Exposure Score (Human + Ecological + Other)	**19.0**	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	**14.0**	(max 34)

Site Score

Test Site

Site Letter Grade	**A**
Certainty Percentage	**75%**
% Responses that are "Do Not Know"	**7%**
Total NCSCS Score for site	**44.6**
Site Classification Category	**3**

Site Classification Categories*:

Class 1 - High Priority for Action (Total NCS Score >70)
Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
Class N - Not a Priority for Action (Total NCS Score <37)
Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

APPENDIX G

WATER WELL RECORDS

LOCATION: NW28-11-11W

Well_PID: 51081
Owner: GAWRYLUR AND SONS
Driller: Paddock Drilling Ltd.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic
UTMX: 505657.649
UTMY: 5533811.58
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1984 Nov 07

WELL LOG

From (ft.)	To (ft.)	Log
0	3.5	SAND; FINE BROWN
3.5	5.0	CLAY; SANDY, BROWN
5.0	9.0	SAND; DIRTY, BROWN
9.0	15.0	SAND; FINE BROWN
15.0	20.0	SAND; FINE, CLAYEY, BROWN
20.0	20.5	CLAY; SOFT, STICKY
20.5	25.0	SAND AND GRAVEL; SOME CLAY, STONY NEAR BOTTOM, COARSE
25.0	39.0	SHALE; BLACK SOFT, SLIPPERY

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	39.0	casing	30.00			CORRUGATED	GALVANIZED
19.0	39.0	perforations				PERF. PIPE	
0	39.0	gravel pack					WASHED S.

Top of Casing: 1.0 ft. below ground

PUMPING TEST

Date: 1984 Nov 07
Pumping Rate: 8.0 Imp. gallons/minute
Water level before pumping: 21.0 ft. below ground
Pumping level at end of test: ?? ft. below ground
Test duration: 1 hours, minutes
Water temperature: ?? degrees F

LOCATION: NW33-11-11W

Well_PID: 135693
Owner: TOM LOWE
Driller: Paddock Drilling Ltd.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic
UTMX: 505654.67
UTMY: 5535453.27
Accuracy XY:
UTMZ:
Accuracy Z:
Date Completed: 2005 Sep 14

WELL LOG

From (ft.)	To (ft.)	Log
0	0.5	TOPSOIL
0.5	17.0	SILTY BROWN CLAY
17.0	30.0	SILTY GREY CLAY
30.0	35.0	GREY SILTY SAND
35.0	40.0	SILTY GREY CLAY

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	8.0	CASING	30.00			CORRUGATED	FIBERGLASS
8.0	39.0	GRAVEL PACK	30.00		0.040	SAW CUT	FIBERGLASS
8.0	39.0	GRAVEL PACK					WASHED SAND
7.0	9.0	CASING GROUT					BENTONITE
0	7.0	GRAVEL PACK					WASHED SAND

Top of Casing: 1.0 ft. above ground

PUMPING TEST

Date: 2005 Sep 14
Pumping Rate: 1.0 Imp. gallons/minute
Water level before pumping: 9.0 ft. below ground
Pumping level at end of test: 37.0 ft. below ground
Test duration: 1 hours, minutes
Water temperature: ?? degrees F

REMARKS

PUMP TEST IS RECOVERY

LOCATION: NW33-11-11W

Well_PID: 24423
Owner: P KLASSEN
Driller: ASSINIBOINE DRILLING LTD.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic,Livestock
UTMX: 505654.67
UTMY: 5535453.27
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1975 Nov 05

WELL LOG

From (ft.)	To (ft.)	Log
0	9.0	SAND
9.0	12.0	SANDY CLAY

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	12.0	casing grout	42.00	50.00			CONCRETE

Top of Casing: ft. below ground

No pump test data for this well.

LOCATION: SE33-11-11W

Well_PID: 38681
Owner: A DUNCAN
Driller: ASSINIBOINE DRILLING CO. LTD.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic
UTMX: 506459.989
UTMY: 5534646.38
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1980 Apr 11

WELL LOG

From (ft.)	To (ft.)	Log
0	8.0	YELLOW CLAY
8.0	30.0	BLUE SILT WATER SATURATED

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	30.0	casing	42.00			CORRUGATED	GALVANIZED
12.0	30.0	gravel pack					

Top of Casing: 1.0 ft. below ground

No pump test data for this well.

APPENDIX H

HYDRAULIC CONDUCTIVITY RESULTS

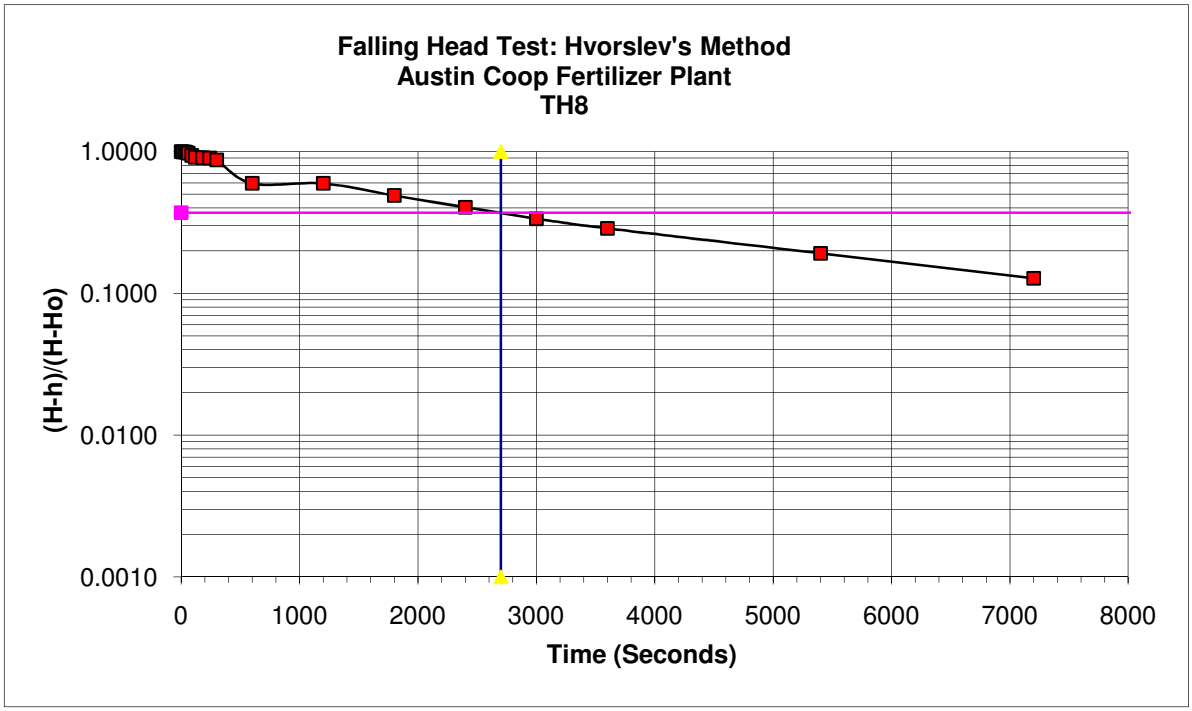
HYDRAULIC CONDUCTIVITY TESTS
FALLING HEAD TEST USING HVORSLEV'S METHOD

PROJECT: Austin Coop Fertilizer Plant
Highway 1 near Austin, MB

PIEZOMETER DETAILS

Identification:	TH8
Top of Screen (m)	6.1
Bottom of Screen (m)	9.1
Length of Screen (m):	3
Radius of Pipe (m):	0.025
Radius of Sand Pack (m):	0.075
Static Water Level (m):	1.945
Water Level After Slug (m):	1.475

Elapsed Time			Calculated Elapsed Time (seconds)	Measured h (m)	(H-h)/(H-Ho)
Hours	Minutes				
		0	0	1.475	1.0000
		0.1675	10	1.477	0.9957
		0.5	30	1.479	0.9915
		0.75	45	1.483	0.9830
		1	60	1.487	0.9745
		1.5	90	1.505	0.9362
		2	120	1.517	0.9106
		3	180	1.519	0.9064
		4	240	1.522	0.9000
		5	300	1.535	0.8723
		10	600	1.590	0.5957
		20	1200	1.665	0.5957
		30	1800	1.715	0.4894
		40	2400	1.755	0.4043
		50	3000	1.787	0.3362
		60	3600	1.810	0.2872
	1	30	5400	1.855	0.1915
	2	0	7200	1.885	0.1277
			19000		
			0		0.37
			10000		0.37
			20000		0.37
			2700		1
			2700		0.001



CALCULATION OF HYDRAULIC CONDUCTIVITY

L	7.155 m	L=	screen length below initial
To	2700 s		groundwater level

k **7.37E-08 m/s**

k **7.37E-06 cm/s**

APPENDIX I

CUMULATIVE GROUNDWATER MONITORING SUMMARY

TABLE 5: CUMULATIVE GROUNDWATER ANALYTICAL RESULTS (NUTRIENTS)

Parameter	TH1	DUP1 (TH1)	TH3	TH5	TH7	TH8	TH9	TH12	TH13	TH14	TH24	Guideline[1]
Calcium - D (mg/L)	1040	1070	275	663	124	130	359	341	380	1110	501	NG
Magnesium - D (mg/L)	608	620	121	375	50.4	37.1	179	149	163	578	261	NG
Potassium - D (mg/L)	258	265	9.9	93.4	6.1	5.8	3.8	3.5	3.7	498	14.1	NG
Sodium - D (mg/L)	73.2	74.1	30.1	41.2	16.6	19.6	69.3	50.5	49.1	56.1	161	≤ 200[AO]
Bicarbonate - D (mg/L)	1300	1320	1300	848	509	490	734	803	1070	1490	523	NG
Chloride - D (mg/L)	976	1000	46.1	226	3.4	2.3	20.5	79.3	311	919	3.4	≤ 250[AO]
Nitrate – Nitrogen - D (mg/L)	721	707	27.4	551	0.13	0.28	59.6	9.76	51	760	<0.05	10
Nitrite – Nitrogen - D (mg/L)	98.7	90.9	<0.05	49.6	<0.05	<0.05	0.11	0.25	0.06	10.9	<0.05	3.2
Nitrate + Nitrite	819	798	27.4	600	0.13	0.28	59.7	10	51.1	771	<0.05	NG
Ammonia - Nitrogen (mg/L)	322	318	17	65.9	0.25	0.2	0.06	0.59	2.82	334	0.74	NG
Sulphate - D (mg/L)	1700	1880	164	725	116	129	881	759	344	1980	2180	NG
Phosphorus - Total (mg/L)	0.45	0.42	0.08	0.92	<0.02	0.05	0.09	0.2	0.07	0.53	<0.02	NG
Phosphate - Ortho - P - D (mg/L)	<0.4	<0.4	<0.04	<0.4	<0.004	<0.04	<0.04	0.06	0.16	<0.4	<0.004	NG
Chemical Oxygen Demand (mg/L)	377	280	85	109	<20	<20	46	25	108	614	35	NG
Carbon (Total Organic) (mg/L)	28.3	29.2	26.9	22.5	2.8	3.9	15.1	6.7	35.7	146	4.9	NG
T-Dissolved Solids 180°C (mg/L)	9712	9500	1636	5156	616	620	2340	2044	2636	10600	3564	≤ 500[AO]
Iron - D (mg/L)	<0.01	<0.01	4.46	<0.01	0.02	0.04	<0.01	<0.01	0.02	0.02	3.8	≤ 0.3[AO]
Iron - Total (mg/L)	0.68	0.38	10.6	0.16	0.27	1.15	0.09	3.57	0.19	2.27	5.49	≤ 0.3[AO]
Manganese - D (mg/L)	3.31	3.36	2.09	1.36	0.48	0.39	0.12	0.21	3.91	5.06	1.7	≤ 0.05[AO]
pH @ 25°C (pH units)	7.3	7.37	7.44	7.54	7.76	7.73	7.6	7.58	7.43	7.49	7.46	6.5 TO 8.5
Acidity as CaCO3 (mg/L)	-989	-982	-1030	-693	-430	-414	-634	-649	-892	-1110	-438	NG
Conductivity @ 25°C (mS/cm)	11.3	11.2	2.26	6.16	0.946	0.943	2.58	2.39	3.04	11.3	3.58	NG
Sodium Adsorption Ratio (SAR)	0.45	0.45	0.38	0.32	0.32	0.39	0.75	0.57	0.53	0.34	1.45	NG

Notes:

- < - less than the analytical detection limit
- Nutrient results are not compared to any guideline values.
- See laboratory report for detection limits, testing protocols and QA/QC procedures. Laboratory analysis was performed by AMEC Laboratory in Edmonton.
- [1]Federal-Provincial-Territorial Committee on Drinking Water (CDW) Guidelines for Canadian Drinking Water Quality - Published by Health Canada (updated December 2010)

MONITOR WELL DATA

TABLE 5: CUMULATIVE GROUNDWATER ANALYTICAL RESULTS (NUTRIENTS)

Monitoring Well ID	Construction Information				Monitoring Date	Field Parameters									Laboratory Analytical Results														
	TOP Elev.	Ground Elev.	Depth of Well	Screen Interval		Ground water Depth Below TOP	Ground water Depth Below Grade	Ground water Elev.	DO (mg/L)	EC	pH	ORP	Temp.	Field Nitrate	Field Nitrite	Nitrate-N (NO3) Dissolved	Nitrite-N (NO2) Dissolved	Nitrate+ Nitrite-N Dissolved	Ammonia (NH3) Dissolved	Total Kjeldahl Nitrogen	Sulphate (SO4) Dissolved	Total Phosphorous	Potassium Total	Ortho Phosphorous Soluble as P	Biological Oxygen Demand (BOD)	Chemical Oxygen Demand (COD)	Total Organic Carbon	Total Suspended Solids	Total Dissolved Solids	Colour	Turbidity
	m	m	m	m	dd-mmm-yyyy	m	m	m	mg/L	mS		mV	°C	mg/L	Y/N	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Colour units	NTU
TH1	99.90	99.87	4.6	0.8 - 4.6	19 Jul 2002	4.18	4.15	95.72		1.56				0-10		1.73	0.08	1.81	0.32											
					17 Oct 2002	1.84	1.81	98.06		2.1				50-100		34.5	0.14	34.64	0.08											
					16 Jun 2003	1.28	1.25	98.62	1.94	6.1			3.7	250-500		688	13.3	701.3	5.1						2	122	13	22400	7380	20	10000
					22 Jul 2003	1.68	1.65	98.22	5.83				6.5	250-500		424	26.9	450.9	2.5						<2	84	12	1760	6210	25	830
					12 Nov 2003	1.98	1.95	97.92	1.1	6.44			8	250-500		402	2.61	404.61	45.5						9	247	46	19500	4660	25	120
					16 Jun 2005	0.573	0.54	99.33						>500	Y	824	39.7	863	136											
	99.81	99.93			2-Nov-05	1.77	1.89	98.16	0.67	5.8	7.2		9.7	>500	Y	418	28.4	447	81.5		1030	3.56	76.2	0.867		66	80					
					10-May-06	Unable to monitor - well blocked at approx. 1.2 m below grade																									
					3-Aug-06																										
					10-Aug-07	1.87	1.84	97.94		Not Monitored - well bent				>500	Y	506	94.8	600	88.1	53.7	1090	1.56	83.0	<2.00			15.2				
	99.53	99.56			7-Sep-11	2.02	2.05	97.51	10.2*	9.235	5.46	259.2	13.55			721	98.7	819	322		1700	0.45		<0.4		377	28.3		9712		
TH3	99.71	99.74	4.6	0.8 - 4.6	19-Jul-02	1.58	1.61	98.13		5.19				250-500		389	27.6	416.6	0.05											
					17 Oct 2002	1.75	1.78	97.96		4.9				>500																
					16 Jun 2003	1.48	1.51	98.23	0.69	1.7			5.5			168	<0.05	168	0.4						2	17	7	344	2840	15	190
					22 Jul 2003	1.01	1.04	98.70	9.76				10.3	250-500		135	32.3	167.3	2						618	1090	322	893	4250	200	500
					03 Sep 2003	1.76	1.79	97.95						250-500		237	31.7	268.7							<2	66	17	180	3800	30	77
					12 Nov 2003	1.88	1.91	97.83	0.45	4.65			8.7	250-500		226	13.9	239.9	<0.1												
					16 Jun 2005	0.61	0.64	99.10						>500	Y	112	9.45	122	36.3											
	99.62	99.71			2-Nov-05	1.66	1.75	97.96	0.56	2.90	7.1		10.1	>500	Y	94.4	44	138	41.2		800	1.12	15	0.037		340	61					
					10-May-06	1.7	1.79	97.92	2.72		7.5	131	3.6	250-500	Y	23.4	13.8	37.2	44.2	49.8		0.326		<0.001		570	188					
					3-Aug-06	1.7	1.79	97.92																							
					10-Aug-07	1.58	1.67	98.04	1.65	1.77	6.7	91	9.0	>500	Y	62.6	0.87	63.5	10.7	9.7	541	0.47	9.6	<0.2			13.5				
	99.26	99.32			9-Sep-11	1.71	1.76	97.55	0.12	1.876	6.57	3.7	14.31			27.4	<0.05	27.4	17		164	0.08		<0.04		85	26.9		1636		
TH5	99.40	99.60	6.1	0.8 - 4.6	19-Jul-02	1.41	1.61	97.99		2.38				50-100		56.8	0.02	56.82	0.03											
					17 Oct 2002	1.68	1.88	97.72		3				100-250		140	0.12	140.12												
					16 Jun 2003	0.9	1.10	98.50		1.8			5.4	50-100		99.69	<0.05	99.6	10.7						27	31	12	564	1770	30	360
					22 Jul 2003	1.85	2.05	97.55	6.46				7.8	250-500		172	0.16	172.46	9.4						<2	24	6	51	2480	20	28
					03 Sep 2003	1.65	1.85	97.75						250-500		173	1.01	174.01												
					12 Nov 2003	1.64	1.84	97.76	0.45	2.62			8.9	100-250		151	1.61	152.61	2.1						<2	17	4	292	2000	15	150
					16 Jun 2005	0.336	0.54	99.06						100-250	Y	56.5	57.3	0.82	0.06											
	99.88	99.85			2-Nov-05	1.53	1.50	98.35	1.45	2.5	7.4		9.2	50-100	N	124	0.38	124	0.1		657	0.339	5.1	0.032		48	101					
					10-May-06	1.3	1.27	98.58	4.11		7.5	148	4.0	250-500	Y	160	2.78	163	2.77	6.3		1.72		0.785		52	19					
					3-Aug-06	1.74	1.71	98.14																							
					10-Aug-07	1.73	1.70	98.15	2.4	2.65	7.0	76.2	8.5	>500	N	270	0.29	270	2.33	<0.2	408	1.41	9.6	<0.2			9.7				
	99.13	99.16			9-Sep-11	1.52	1.55	97.61	0.23	5.156	6.66	172.8	14.24			551	49.6	600	65.9		725	0.92		<0.4		109	22.5		5156		
TH6	99.30	99.90	6.1	0.8 - 4.6	19-Jul-02	1.76	2.36	97.54		1.8				25-Oct		2.87	0.92	3.79	0.05											
					17 Oct 2002	1.89	2.49	97.41		2.1				0-10																
					16 Jun 2003	1.94	2.54	97.36	0	1.1			3.7	50-100		112	<0.05	112	0.3						<2	27	10	193	1680	30	95
					22 Jul 2003	2.11	2.71	97.19	2.3				6.9	25-50		9.28	<0.05	9.28	0.1						<2	28	7	794	1600	5	300
					12 Nov 2003	2.13	2.73	97.17	0.4	1.79			7.8	25-Oct		8.32	<0.05	8.32	<0.1						<2	22	6	458	1510	10	180
					16 Jun 2005	0.888	1.49	98.41						0	Y															
	99.82	99.85			2-Nov-05	1.835	1.87	97.99	1.21	1.8	7.2		9.8	0	N	5.41	0.03	5.44	0.02			1.07	11.3	0.007		17	22					
					10-May-06	2.1	2.13	97.72	3.87		7.8	152	2.9	10-25	N	4.37	0.02	4.39	0.083	6.5		4.86		0.015		320	12					
					3-Aug-06																										
					10-Aug-07	1.85	1.88	97.97	2.24	1.40	7.2	87.4	7.9	10-25	N																	
	99.48	99.49			9-Sep-11	2.98	3.00	96.50	Insufficient water for stabilization																						
TH7	100.4	99.46	9.1	6.1 - 9.1	19-Jul-02																										
					17 Oct 2002	2.83	2.83	96.63		1.4				0-10		0.5	0.01	0.51	0.38											
					16 Jun 2003	2.75	2.75	96.71	0.9	0.6			5.5	0-10		0.06	<0.05	0.06	<0.1						2	10	3	13	760	5	6
					22 Jul 2003	3.15	3.15	96.31	0.56				6.8	0-10		0.06	<0.05	0.06	0.2						<2	11	3	12	676	5	8
					12 Nov 2003	3.62	3.62	95.84	0.5	0.9			8	0-10		0.12	<0.05	0.12	<0.1						<2	8	3	20	596	5	15
					16 Jun 2005	2.548	2.55	96.91						0	Y	0.05	0.05	<0.01	0.17											
	100.67	99.79			2-Nov-05	2.61	1.73	97.73	2.27	0.9	7.6		9.6	0	N	0.27	0.01	0.29	0.14			0.124	5.6	0.018		<8	14					
					10-May-06	2.5	1.62	97.84	0.68		7.5	162	6.5	ND	N	0.5	0.03	0.528	0.106	0.8		0.315		0.015		<8	8					
					3-Aug-06	3.01	2.13	97.33																							
					10-Aug-07	2.8	1.92	97.54	1.82	0.66	7.0	68.1	6.0	0	N																	
	100.00	99.08			9-Sep-11	2.81	1.89	97.19	0.88	0.714	6.93	116.7	11.56			0.13	<0.05	0.13	0.25		116	<0.02		<0.004		<20	2.8		616		
TH8	100.40	99.3	9.1	6.1 - 9.1	19-Jul-02																										
					17 Oct 2002	3.41	2.31	96.99		1				0-10																
					16 Jun 2003	3.23	2.13	97.17	0.4	0.6			4	0-10		0.12	<0.05	0.12	<0.1											
					22 Jul 2003	3.38	2.28	97.02						0-10		0.1	<0.05	0.1	0.1						2	15	4	10	715	10	6
					12 Nov 2003	4.15	3.05	96.25	1.2	0.96			6.4	0-10		0.1	<0.05	0.1	<0.1						3	14	4	61	628	5	27
					16 Jun 2005	2.647	1.55	97.75						0	Y										<2	14	4	9	616	5	15
	100.58	99.72			2-Nov-05	2.98	2.12	97.60	1.14	0.9	6.8		10.4	0	N	0.23	0.02	0.25	0.23			0.835	12.7	0.002		31	14					
					10-May-06	2.7	1.84	97.88	0.54		7.5	81	6.1	ND	N	0.04	<0.01	0.04	0.241	1.3		0.879		<0.001		41	9					
					3-Aug-06	1.94	1.08	98.64																							
					10-Aug-07	2.99	2.13	97.59	2.86	0.63	7.1	56.4	6.3	0	N																	
	100.14	98.91			9-Sep-11	3.17	1.95	96.97	0.81	0.746	6.84	141.3	13.18			0.28	<0.05	0.28	0.2		129	0.05		<0.04		<20	3.9		620		
TH9	97.54	99.64	3.0	0.8 - 3.0	19-Jul-02																										
					17 Oct 2002	2.16	4.26	95.38		1.7				25-50		21.5	0.03	21.53												
					16 Jun 2003	1.25	3.35	96.29	0	0.8			4.3			16.8	0.14	16.94	<0.1						<2	26	8	93	1100	15	52
					22 Jul 2003	1.77	3.87	95.77	8.53				10.3	25-50		21.9	<0.05	21.9	<0.1						<2	47	9	589	1160	5	340
					12 Nov 2003	1.69	3.79	95.85	0.6	1.23			8.5	25-Oct		16.1	0.1	16.2	<0.1						4	84	8	691	896	15	840
					16 Jun 2005	0.674	2.77	96.87						10	Y															
	99.49	99.57			2-Nov-05	1.56	1.64	97.93	0.59	1.5	7.2		10.4			20	0.02	20.1	0.14		374	2.21	7	0.1		110	15					
					10-May-06	1.3	1.38	98.19	3.2		7.0	99	3.7	25-50	N	12.4	0.09	12.5	0.39	8.2		3.22		0.057		170	19					
					3-Aug-06	1.42	1.50	98.07																							
					10-Aug-07	1.48	1.56	98.01	1.72	1.64	7.0	103.2	12.5	100-250	Y																	
	99.15	99.21			9-Sep-11	1.66	1.73	97.49	0.42	2.161	6.7	188.2	14.66			59.6	0.11	59.7	0.06		881	0.09		<0.04		46	15.1		2340		
TH12	99.71	99.83	3.0	0.8 - 3.0	19-Jul-02																										
					17 Oct 2002	1.78	1.9	97.93		1.7				25-50		18.2	0.02	18.22												
					16 Jun 2003	1.63	1.75	98.08	1.96	0.6			5.5			11.2	0.11	11.31	0.5						2	120	6	6740	770	5	6400
					22 Jul 2003	1.35	1.47	98.36						25-50		12.9	0.21	13.11	0.2						3	67	10	1450	796	10	3000
					12 Nov 2003	2.15	2.27	97.56	3.4	0.97			7.6	0-10		9.34	23.3	32.64	<0.1						3	249	5	6400	704	5	330
					16 Jun 2005	0.694	0.814	99.016						250-500	Y															
	99.69	99.75			2-Nov-05	1.74	1.8	97.95	1.21				10.5			18.2	0.01	18.2	0.04		401	2	12.2	0.008		38	11					
					10-May-06	1.5	1.56	98.19	3.18		7.25	108	2.5	50-100	N	20.9	0.27	21.2	0.025	1.1		0.385		<.001		13	9					

	99.09	99.75			3-Aug-06	1.75	1.81	97.94																					
					10-Aug-07	1.71	1.77	97.98	2.74	1.17	6.9	79.7	13.4	25-50	Y																
	99.31	99.38			9-Sep-11	1.81	1.885	97.495	0.69	2.119	NM	151.3	17.77			9.76	0.25	10	0.59		759	0.2		0.06		25	6.7		2044		
					19-Jul-02																									
					17 Oct 2002	1.58	1.73	98.00		1.4				25-50		21.2	0.03	21.23	0.03											
	99.58	99.73			16 Jun 2003	1.37	1.52	98.21	3.75	0.8			6.5	0-10		9.99	0.13	10.12	<0.1						2	19	7	75	855	20	44
					22 Jul 2003	1.47	1.62	98.11	7.05				11	0-10		<0.05	<0.05	0	0.1						489	656	124	313	1450	400	220
					12 Nov 2003	1.76	1.91	97.82	1.5	2.18			8	0-10		<0.05	<0.05	0	<0.1						693	761	293	2100	1660	200	350
TH13			3.0	0.8 - 3.0	16 Jun 2005	0.574	0.724	99.01						0	Y															
					2-Nov-05	1.64	1.77	97.98	0.79	2	6.9		9.8	0	N	0.04	0.03	0.07	0.93		44		9.6	0.005		720	48				
	99.62	99.75			10-May-06	1.4	1.53	98.22	1.23		7.8	111	2	ND	N	0.04	<0.01	0.04	0.003	4.4		0.537		<.001		76	14				
					3-Aug-06	1.74	1.87	97.88																							
					10-Aug-07	1.59	1.72	98.03	1.21	1.56	6.6	-130.0	11.6	0-10	N																
	99.25	99.37			9-Sep-11	1.71	1.83	97.54	0.84	2.784	6.47	190.7	18.83			51	0.06	51.1	2.82		344	0.07		0.16		108	35.7		2636		
					19-Jul-02																									
					17 Oct 2002	1.72	1.81	97.88		5.9				250-500		376	55	431	33											
	99.60	99.69			16 Jun 2003	0.88	0.97	98.72	0.21	3.3			5.5	250-500		302	102	404	64.4						14	206	11	313	4450	25	360
					22 Jul 2003	1.61	1.7	97.99	7.71				10.9	250-500		481	176	657	44.9						9	272	12	1070	6000	30	750
					12 Nov 2003	1.84	1.93	97.76	7.2	4.99			8.8	250-500		209	25.9	234.9	10.1						14	283	25	3320	3600	35	750
TH14			3.0	0.8 - 3.0	16 Jun 2005	0.375	0.465	99.23						500	Y															
					2-Nov-05	1.56	1.59	97.98	0.46				8.8			0.02	0.04	0.06	14.2		31		85.2	0.004		1000	70				
	99.54	99.57			10-May-06	1.3	1.33	98.24	1.76		7.5	180	1.9	250-500	Y	92.2	11.6	104	45.8	94.2		4.14		0.006		360	87				
					3-Aug-06	1.7	1.73	97.84																							
					10-Aug-07	1.61	1.64	97.93	Insufficient water					>500	Y	452	82.9	535				Insufficient water									
	99.16	99.20			7-Sep-11	1.59	1.635	97.565	Insufficient water for stabilization							760	10.9	771	334		1980	0.53		<0.4		614	146		10600		
					19-Jul-02																									
					17 Oct 2002	2.15	2.26	97.2		1.2				10-25		8	<0.01	8	0.04											
	99.35	99.46			16 Jun 2003	0.81	0.92	98.54	1.43	1.1			6	50-100		30.1	<0.05	30.1	<0.1						3	20	8	79	1220	15	50
					22 Jul 2003	1.46	1.57	97.89	4.9				9.5	50-100		33.4	<0.05	33.4	0.3						3	38	9	359	1240	10	200
					12 Nov 2003	1.46	1.57	97.89	2.7	1.33			7.6	0-10		NS	NS		0.2						<2	28	5				
TH16			3.0	0.8 - 3.0	16 Jun 2005	0.28	0.39	99.07						100-250	Y	21.9	23.4	1.46	3.11											
					2-Nov-05	1.37	1.46	98.28	0.84				9.2			4.32	0.01	4.33	0.05		412	1.71	77.7	0.018		480	12				
	99.65	99.74			10-May-06									100-250	Y	34.6	0.01	34.6	0.163	38.3		9.61		0.015		1000	11				
					3-Aug-06																										
					10-Aug-07	Well blocked at 0.73m																									
					9-Sep-11	Destroyed																									
					19-Jul-02																									
					17 Oct 2002	dry		dry																						
	100.20	99.33			16 Jun 2003	1.84	0.97	98.36	2.65	0.7			5.6	0-10		3.46	<0.05	3.46	<0.1						3	13	3	73	700	5	44
					22 Jul 2003	2.36	2.45	97.84						0-10		3.6	<0.05	3.6	0.2						<2	15	3	44	732	5	33
					12 Nov 2003	2.54	2.63	97.66	3.8	1.15			8.4	0-10		3.17	<0.05	3.17	<0.1						<2	10	3	96	812	5	63
TH20			3.0	0.8 - 3.0	16 Jun 2005	2.48	2.56	97.73						0	Y															
					2-Nov-05	2.23	1.36	98.29	4.49	1.6	7.4		9.3	0	N	1.22	<0.01	1.22	0.03		417	0.204	3.9	0.013		<8	14				
	100.52	99.65			10-May-06	Well blocked with sand/silt at 1.8m. Material removed and well sampled once partially recovered.								10-25	N	0.35	<0.01	0.352	0.008	1.2		0.486		<.001		24	9				
					3-Aug-06	2.62	1.75	97.90																							
					10-Aug-07	2.39	1.52	98.13	Insufficient water					0	N																
	99.87	98.91			9-Sep-11	Blocked at 1.62 m below grade																									
					19-Jul-02																									
					17 Oct 2002	2.54	1.46	97.76		3.1				0-10																
	100.30	99.22			16 Jun 2003	2.38	1.30	97.92	5.47	1.9			6	0-10		0.18	<0.05	0.18	0.4						2	15	4	13	2540	10	7
					22 Jul 2003	2.59	1.51	97.71	0.76				6.7	0-10		0.1	<0.05	0.1	0.4						2	15	4	12	3340	5	22
					12 Nov 2003	3.43	2.35	96.87	0.95	3.35			8.2	0-10		0.34	<0.05	0.34	<0.1						<2	17	6	25	3460	5	30
TH24			9.1	6.1 - 9.1	16 Jun 2005	2.00	0.92	98.30						0	Y															
					2-Nov-05	2.39	1.42	98.17	1.85	3.3	7.2		9.5	0	N	0.91	<0.01	0.91	0.05			0.18	14	0.03		<8	14				
	100.56	99.59			10-May-06	2.3	1.33	98.26	0.43		7.3	165	6.8	ND	N	0.25	0.02	0.264	0.339	1.1		0.319		<.001		14	10				
					3-Aug-06	2.8	1.83	97.76																							
					10-Aug-07	2.68	1.71	97.88	2.01	2.37	6.9	75.4	6.2	50-100	N																
	100.31	98.82			7-Sep-11	3.01	1.52	97.30	0.33	2.686	6.6	26.4	10.02			<0.05	<0.05	<0.05	0.74		2180	<0.02		<0.004		35	4.9		3564		

Notes:

- TOP - Top of Pipe (well casing)
- Blank cells indicate parameter not measured or analysed.
- < - less than the analytical detection limit.
- **Bold and Underlined** text indicates analytical parameter equal to or exceeding applicable criteria
- Yellow highlighted text indicates most recent monitoring event
- See laboratory report for detection limits, testing protocols and QA/QC procedures. Laboratory analysis performed by AMEC's Edmonton Laboratory.

APPENDIX J

STATEMENT OF GENERAL CONDITIONS

AMEC Environment and Infrastructure, A Division of AMEC Americas Limited
STATEMENT OF GENERAL CONDITIONS - ENVIRONMENTAL SERVICES

1. STANDARD OF CARE - In the performance of professional services, AMEC uses that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same or similar localities. No warranty, either express or implied, is made or intended by this Agreement or by furnishing oral or written reports of the findings. AMEC is to be liable only for damage proximately caused by the negligence of AMEC. The CLIENT recognizes that subsurface conditions may vary from those encountered at the location where borings, surveys or explorations are made by AMEC and that the data, interpretations and recommendation of AMEC are based solely on the information available to him. AMEC will not be responsible for the interpretation by others of the information developed.

2. SITE INFORMATION - The CLIENT has agreed to make available to AMEC all relevant information and documents under his control regarding past, present and proposed conditions of the site. The information shall include, but not be limited to, plot plans, topographic surveys, hydrologic data and previous soil and geologic data including borings, field or laboratory tests and written reports. The CLIENT shall immediately transmit to AMEC any new information that becomes available or any change in plans. The CLIENT also ensured uninterrupted site access for AMEC throughout performance of this Agreement.

AMEC agrees to include a review of all historical information obtained by the CLIENT or provided by the Client to assist in the investigation of the Site unless and except to the extent that such a review is limited or excluded from the scope of work to be performed by AMEC.

3. FULL DISCLOSURE - The CLIENT acknowledges that in order for AMEC to properly advise and assist the CLIENT in respect of the investigation of the Site, AMEC has relied upon full disclosure by the CLIENT of all matters pertinent to an investigation of the Site.

4. DELAYS AND INTERRUPTIONS - Should AMEC have been delayed or interrupted by others in the performance of its services or be required to perform additional services as a result of any delay or interruption caused by others, AMEC shall be equitably compensated by the CLIENT for all costs, charges and expenses which it may incur as a result of such delay or interruption and any such additional services to be performed and any and all consequences resulting from such delay or interruption.

5. USE OF WORK PRODUCT - AMEC agrees to provide to the CLIENT interim reports outlining the progress of the investigation of the Site on a periodic basis and a final comprehensive report upon the completion of the investigation of the Site.

6. COMPLETE REPORT - This document being a part of the Report is of a summary nature and is not intended to stand alone without reference to the instructions given to AMEC by the CLIENT, communications between AMEC and the CLIENT, and to any other reports, writings or documents prepared by AMEC for the CLIENT relative to the specific Site described herein, all of which constitute the Report. Wherever the word “Report” is used herein, it shall refer to any and all of the documents referred to herein.

In order to properly understand the suggestions, recommendations and opinions expressed herein, reference must be made to the whole of the Report. AMEC cannot be responsible for use by any part of portions of the report without reference to the whole report.

7. LIMITATIONS ON SCOPE OF INVESTIGATION AND WARRANTY DISCLAIMER
There is no warranty, expressed or implied, by AMEC that:
a) The investigation shall uncover all potential contaminants, including asbestos, on the Site; or
b) The Site will be entirely free of all Targeted Contaminants or other contaminants as a result of any cleanup work undertaken on the Site, since it is not possible, even with exhaustive sampling, testing and analysis, to document all potential contaminants on the Site.

Classification and identification of soils, rocks, geological units, contaminated materials and contaminant quantities have been based on commonly accepted practices in environmental consulting practice in this area.

The CLIENT acknowledges that:

a) The investigation findings are based solely on the information generated as a result of the specific scope of the investigation authorized by the CLIENT;
b) any assessment regarding the presence of contamination of the Site is based on the interpretation of conditions determined at specific sampling locations and depths and that conditions may vary between sampling locations;
c) there can be no assurance that isolated pockets of contaminants are not located on the Site;
d) any assessment is also dependent on and limited by the accuracy of the analytical data generated by the sample analyses;
e) any assessment is also limited by the scientific possibility of determining the presence of contaminants for which scientific analyses have been conducted; and
f) the analytical parameters selected are limited to those outlined in the CLIENT's authorized scope of investigation (in the absence of any evidence of potential contamination sources on the Site, which may warrant expanding the analytical parameters).

8. REMEDIATION COST ESTIMATES - Estimates of remediation costs can only be based on the specific information generated and the technical limitations of the investigation authorized by the CLIENT. Accordingly, estimated costs for remediation only represent the cost to clean up known contaminants that have been identified during the course of the investigation. As remediation of a Site is often an iterative exercise, estimated costs for remediation should only be interpreted to cover the first stage of any Site remediation until such time as verification samples indicate that the Site has been fully remediated and AMEC shall therefore not be liable for the accuracy of any estimates of remediation costs provided.

9. CONTROL OF WORK AND JOBSITE SAFETY - AMEC is only responsible for the activities of its employees on the jobsite. The presence of AMEC personnel on the Site shall not be construed in any way to relieve the CLIENT or any contractors on Site from their responsibilities for Site safety. The CLIENT undertakes to inform AMEC of all hazardous conditions, or possible hazardous conditions which are known to him. The CLIENT also recognizes that the activities of AMEC may uncover previously unknown hazardous materials and that such a discovery may result in the necessity to undertake emergency procedures to protect AMEC employees as well as the public at large and the environment in general. The CLIENT also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the CLIENT agrees that notification to such bodies by AMEC will not be a cause of action or dispute.

10. LIMITATION OF RESPONSIBILITY

Limitation of Liability - The CLIENT has agrees that, notwithstanding any other provision negotiated as part of AMEC's contract, the total liability of AMEC, its officers, directors and employees for liabilities, claims, judgments, demands and causes of action arising under or related to this Agreement, whether based in contract or tort, shall be limited to the total compensation actually paid to AMEC for the services hereunder or $50,000, whichever is less. All claims by the CLIENT shall be deemed relinquished unless filed within one (1) year after substantial completion of the services hereunder.

No Special or Consequential Damages - CLIENT and AMEC agree that to the fullest extent permitted by law that AMEC shall not be responsible for any consequential, incidental or indirect damages.

Indemnification - Because CLIENT owns and/or operates the site where work is being performed, CLIENT has and shall retain all responsibility and liability associated with the environmental conditions at the site. Unless specifically identified elsewhere, CLIENT'S responsibility and liability includes the handling and disposal of any samples or hazardous materials generated on the site as a result of AMEC's performance hereunder. To the fullest extent permitted by law, the CLIENT agrees to defend, indemnify and hold AMEC, its agents, subcontractors, and employees harmless from and against any and all claims, defense costs, including attorney's fees, damages, and other liabilities arising out of or in any way related to CONSULTANT's reports or recommendations concerning this Agreement, AMEC's presence on the project property, or the presence, release, or threatened release of asbestos, hazardous substances, or pollutants on or from the project property; provided that the CLIENT shall not indemnify AMEC against liability for damages to the extent caused by the negligence or intentional misconduct of AMEC, its agents, subcontractors, or employees.