Golder Associates Ltd.

500 - 4260 Still Creek Drive
Burnaby, British Columbia V5C 6C6
Telephone 604-296-4200
Fax 604-298-5253

Doc No. 317 Rev. 1
August 16, 2007 06-1122-186

Meadowbank Mining Corporation
Suite 950, One Bentall Centre
505 Burrard Street
Vancouver, BC
V7X 1M4

Attention: Ms. Louise Grondin

**RE: MEADOWBANK GOLD PROJECT -
2006 BASELINE GROUND WATER QUALITY**

Dear Ms. Grondin:

1.0 INTRODUCTION

The following technical memorandum provides an assessment of the quality of groundwater sampled from monitoring wells at the Meadowbank Gold Project (the Project) in 2006, and a comparison to data from previous years. Since 2003, seven groundwater monitoring wells have been installed at the Project, to evaluate the baseline groundwater quality in the Project area, at the Goose Island and Portage pits, and underneath the Tailings Storage Facility (TSF) in the North Arm of Second Portage Lake. Groundwater flow and quality data obtained from these areas have been used as input into the water quality model for the site. The Nunavut Impact Review Board (NIRB) requested follow-up groundwater quality monitoring to support water quality predictions completed in 2005 (Golder, 2005).

2.0 SITE CONDITIONS

The Goose Island and Portage pits will be developed in areas of thawed permafrost (talik) underneath Third Portage Lake, while the tailings are proposed to be deposited over a talik in the basin of the North arm of Second Portage Lake. Groundwater monitoring

data was used to predict the quality of water accumulating in the pits during operation, and to evaluate baseline groundwater quality underneath the TSF before tailing deposition. To this end, groundwater monitoring wells have been installed to sample talik water in these areas, in each of the three main lithologies that will be encountered in the Goose Island and Portage pits, namely Iron Formation (IF), Intermediate Volcanic (IV) and Ultramafic (UM) rock. No groundwater monitoring wells have been installed at the Vault deposit, as the Vault pit will be developed in continuous permafrost or in a talik that does not extend down through the permafrost (referred to as a "closed talik"). Four of the seven wells were installed in 2003: MW03-01, MW03-02, MW03-03, and MW03-04. During subsequent sampling events, it was discovered that three of these wells (MW03-02, MW03-03, and MW03-04) developed internal damage, likely due to freezing, rendering them inoperable (Golder, 2004a and 2004b).

In 2006, three additional wells (MW06-05, MW06-06, and MW06-07) were installed to replace the damaged wells. Table 2-1 (below) summarizes the installation information for the first four wells and the three additional new wells.

Table 2-1: Meadowbank Groundwater Monitoring Well Installation Information

Well ID	Lithology	Approximate Length of Well (m)	Well Angle (degrees)	Depth of Screen Zone Along Well (m)	True Vertical Depth of Screen Zone (m)	Installation Year	Operable?
MW03-01	UM	200	-50	185 – 200	142 – 154	2003	Yes
MW03-02	IF	180	-54	165 – 180	134 – 146	2003	No
MW03-03	IV	150	-49	135 – 150	102 – 113	2003	No
MW03-04	IV	200	-61	185 – 200	161 – 174	2003	No
MW06-05	IV	180	-55	165 – 180	135.2 – 147.4	2006	No
MW06-06	IF	180	-54	165 – 180	133.5 – 145.6	2006	Yes
MW06-07	QTZ/IV	212	-60	197 – 212	170.6 – 183.6	2006	Yes

Each of the three operable groundwater monitoring wells (MW03-01, MW06-06, and MW06-07) were sampled in 2006. During purging of well MW06-05, an obstruction developed in the well which prevented taking a water sample from the well.

2.1 Drilling Method and Well Installations

Boreholes for the replacement wells were drilled in the same manner as the original four wells. Drilling was completed via the standard HQ diamond coring technique, using water from Third Portage Lake for MW06-05 and MW06-06, and from Second Portage Lake for MW06-07. Drilling water was heated and circulated to prevent freezing. The core from each borehole was recovered and rock geology was logged to confirm the targeted lithology of the screened interval for each monitor well.

The configuration of the replacement wells (location, depth, orientation and position of screened interval) is similar to that of the old wells to facilitate comparison of groundwater quality data between monitoring years. The well construction materials utilized were also similar to those used previously. Given the fragility of the PVC well constructions in the permafrost environment of Meadowbank, consideration was given to utilizing more robust construction materials such as stainless steel, which is considerably heavier and more expensive than PVC. Nevertheless, PVC was selected as the material of choice for the following reasons:

- Short life span of the wells. Wells installed within the footprint of the pits will be destroyed shortly after operation is initiated. Should the project go ahead, the wells would be replaced with more permanent and robust structures which would be located outside the outline of the first years of pit operation.

- Economics and relative ease of installation. The use of lighter PVC equipment allowed for conventional means of transportation of the material to site and well installation using standard equipment available at the site.

The wells were constructed of 42 mm outer diameter Schedule 80 PVC riser pipe installed in the open boreholes. At the bottom of each well, a 15-m section of Schedule 80, No. 10, slotted PVC was installed. Self-regulating heater cables were attached to the outside of each well, along the portion of the well that penetrated through the permafrost. Heater cables were connected to copper wires and to a power source (diesel generators) that was energized to thaw the groundwater inside the well prior to removing water for well development and sampling.

The well screens were surrounded by 20 m to 27 m long sand pack and a 15 m to 20 m layer of bentonite grout was placed above the top of each sand pack. The annulus between the PVC and the borehole walls above the grout seal was left open. Figures A-1

to A-3 in Appendix I provide the installation details for each of the wells installed in 2006.

2.2 Well Development and Sampling

Three groundwater samples were collected in 2006, from monitoring wells MW03-01, MW06-06, and MW06-07. Prior to sampling, the permafrost around each of these wells was thawed by energizing the heater cables attached to the wells. New wells installed in 2006 were developed first, to remove fluids from the vicinity of the wells that were introduced during drilling. All of the wells were then purged, to remove standing water inside the wells and provide fresh groundwater for sampling. Development and purging was conducted using compressed air through flexible 5/8" OD High Density Polyethylene (HDPE) WaTerra® tubing. Groundwater was continually airlifted from the wells until electrical conductivity and pH readings stabilized (values remaining within 10% for three consecutive readings). Field parameter readings and descriptions of water clarity and colour observed during well purging are included in Appendix II.

Groundwater was sampled immediately after the wells were purged using a Solinst® stainless steel Double Valve Pump (DVP) and ¼" Low Density Polyethylene (LDPE) tubing. Nitrogen gas was used to evacuate water that entered the sampler unit, to minimize alteration of groundwater chemistry. Water samples were collected using guideline procedures provided by the USEPA (2002). Indicator parameters (conductivity, pH) were measured during well development, purging and sampling. Groundwater samples were collected in clean, laboratory-supplied containers. Where required, preservatives were added to the sample bottles prior to sample collection, to minimize chemical alteration during transport to the laboratory. Samples analyzed for dissolved metals were filtered through a 45 μm inline filter. A new filter was used for each groundwater sample.

2.3 Analyses

2.3.1 Field Parameters

Measurements of groundwater temperature, pH, electrical conductivity, total dissolved solids (TDS), and dissolved oxygen were obtained in the field during development and sampling. In addition, alkalinity was measured during sampling. Groundwater sampling data sheets are included in Appendix II.

2.3.2 Laboratory Parameters

All groundwater samples were stored in coolers with ice packs and shipped to the CANTEST laboratory in Winnipeg for chemical analyses. These analyses included: pH, conductivity, alkalinity (total, bicarbonate, carbonate, and hydroxide), hardness, total suspended solids (TSS), major anions (including sulphate, chloride and fluoride), total metals, dissolved metals, and nutrients (nitrate, nitrite, ammonia nitrogen, TKN, and total phosphate). Samples were collected under strict Chain-of-Custody (COC) procedures to ensure that samples were not compromised during shipping to CANTEST. Copies of the COC forms are included in Appendix III.

2.4 Comparative Guidelines

Metal concentrations in groundwater were compared to the Metal Mining Effluent Regulations (MMER; DFO, 2002) since water accumulating in the pits will be pumped to the stormwater attenuation ponds, and the water from these ponds will be monitored prior to discharge to Third Portage Lake. For consistency with the previous report, groundwater quality was also compared to the Canadian Council of Ministers of the Environment's (CCME) Canadian Environmental Quality Guidelines (CEQG, updated 2003) for the protection of freshwater aquatic life. This comparison is qualitative only as groundwater in the pit will not be discharged directly to the environment. Guidelines for metals are defined for total rather than dissolved phases in both the CEQG and MMER.

2.5 Quality Assurance/Quality Control

Guideline procedures provided by the USEPA (2002) were followed to ensure that the samples collected from the wells were representative of water flowing through the targeted rock formations. These procedures included the following:

- measurement of field parameters at selected intervals until three stable readings (within 10% of each other) were acquired;
- minimizing the exposure of the sampled water to the atmosphere;
- using compressed, inert gas (nitrogen) to evacuate samples;
- conducting in-situ measurements of sensitive chemical parameters (pH, conductivity, dissolved oxygen, alkalinity, where applicable);

- keeping the samples refrigerated on ice from the time of collection until shipment to the laboratory; and,

- shipping the samples to the laboratory in temperature-regulated coolers within the specified sample holding times.

Upon collection of each sample, standard chain of custody procedures were adhered to.

Field duplicate (FD) samples were collected for each groundwater sample. The relative percent difference (RPD) was calculated for each pair of FD samples, and each set of results was compared for reproducibility. For results greater than or equal to five times the method detection limit (MDL), a water quality objective of 20% RPD or less was established as per USEPA recommended methods (USEPA, 1994). Where one or both results of the duplicate pair were less than 5 times the MDL, a margin of +/- MDL was considered acceptable.

3.0 RESULTS

3.1 Well Conditions

The following provides a summary of the physical conditions observed at the groundwater monitoring wells in 2006. Wells MW03-02, MW03-03, and MW03-04 were not monitored in 2006.

3.1.1 UM Well MW03-01

This well was installed in Ultramafic (UM) rock. Groundwater purged from this well was clear, relatively free of sediment, and the well pipe was in good working condition. This well was sampled twice in 2006. Approximately 3 well volumes (defined as the volume of water in the piezometer relative to the regional groundwater table) were purged from this well over 4 days prior to the first sampling event. An additional 4 well volumes were purged over 3 days prior to the second sampling event. The sample intake point was positioned above the screened interval (of 185 m to 200 m depth), at a depth of 165 m.

3.1.2 IV Well MW06-05

This well was installed in Intermediate Volcanic (IV) rock. Groundwater purged from this well was very silty. Approximately 53 well volumes were purged from this well over

2 days in an attempt to clarify the groundwater. During development, a fissure is believed to have developed in the PVC pipe and the well became obstructed at approximately 58 m depth after development. This well was not sampled, since the sampling equipment could not be lowered past the obstruction.

3.1.3 IF Well MW06-06

This well was installed in Iron Formation (IF) rock. Contrary to instruction by Golder personnel, a small amount of calcium chloride was introduced into MW06-06 during a drill repair. Consequently, this well was extensively developed prior to sampling in an effort to remove the calcium chloride. Samples of the purge water were obtained during this process to document the progression of water quality. Approximately 24 well volumes were removed from this well over 3 days, prior to sampling. The sample intake point was positioned above the screened interval (165 m to 180 m depth), at a depth of 160 m.

3.1.4 Tailings Storage Facility Well MW06-07

This well was installed in layered Intermediate Volcanic (IV) and quartzite (QTZ) rock. Approximately 65 well volumes were purged from this well over 3 days to clarify the silty groundwater initially recovered (groundwater eventually did clarify). The sample intake point was positioned above the screened interval (198 m to 212 m depth), at a depth of 110 m.

3.2 Water Quality

All of the groundwater quality results obtained in 2003, 2004, and 2006 are presented in Table 3-1. Since no specific criteria exist for groundwater quality, results are compared with the CEQG for freshwater aquatic life and MMER guidelines for discussion purposes only. None of the groundwater quality results exceed the MMER, although some results exceed the CEQG.

Table 3-2 presents a summary of the annual average concentrations of conductivity, sodium, and chloride from each well.

Table 3-2: Summary of Parameters Related to Salinity

Location	Monitoring Well	Lithology	Sampling Year	Conductivity (uS/cm)	Sodium (mg/L)	Chloride (mg/L)
Goose Island	MW03-01	UM	2003	1855	21	624
			2004	2500	327	845
			2006	460	28	65
	MW03-02	IF	2003	660	6	5
			2004	1104	90	255
	MW06-06	IF	2006	1306	57	318
Average within Goose Island Pit				**1314**	**88**	**352**
North Portage	MW03-03	Portage IV	2003	350	17	50
			2004	627	32	121
Average within Portage Pit				**489**	**24**	**86**
Average within Goose Island and Portage Pit				**1108**	**72**	**285**
Second Portage Lake	MW03-04	Portage IV	2003	410	53	13
	MW06-07	QTZ/Portage IV	2006	440	8	33
Average within Tailings Storage Facility				**425**	**30**	**23**

Notes: all concentrations shown are annual averages
n/s = not sampled

Figure 3-1 is a trilinear plot (Piper plot) showing general trends in the major ion chemistry of groundwater for the different lithologies. Lake water quality is also shown for comparison (Azimuth, 2003). Lake water quality has a fairly consistent chemical signature while the chemistry of groundwater shows distinct signatures for each lithology. Groundwater generally plots away from the signature of lake water, although groundwater from two of the IV wells (MW03-03 and TSF well MW06-07) is chemically similar to that of lake water.

3.2.1 UM Well MW03-01

A total of three samples were collected from UM well MW03-01 during two sampling events in 2006. Two of these samples (one of which was a field duplicate) were collected during the first sampling event, and the remaining sample was collected during the second sampling event.

The chemistry of groundwater at MW03-01 has considerably stabilized in 2006. By the end of the second round of sampling of this well in 2006, a total of 11.5 well volumes of water have been removed since its installation in 2003, providing further confidence in the results of the 2006 monitoring round. The chemical signature is closer to that of natural groundwater, having a higher proportion of carbonate alkalinity while conductivity and the concentration of total and most dissolved constituent concentrations are lower than in previous years. Dilution from external sources is not considered as no water was introduced into the well since drilling.

In 2006, the field conductivity of samples collected from MW03-01 ranged from 382 to 538 uS/cm, significantly lower than those reported in 2003 to 2004 (ranged from 1855 to 2500 uS/cm. Calculated TDS concentrations were also lower in 2006, ranging from 125 to 292 mg/L, as compared to 793 to 1335 mg/L in 2003 to 2004.

The chloride-sodium ratios in samples collected from MW03-01 in 2006 (2.2 to 2.4) are similar to that of 2004 (2.6), and significantly lower than that of 2003 (28 to 31). In 2004, this discrepancy was due to a significantly higher sodium concentration relative to the 2003 sodium concentrations (327 mg/L in 2004, versus 20 and 22 mg/L in 2003). In 2006, this discrepancy is more due to significantly lower chloride concentrations (33.7 to 128 mg/L in 2006, versus 621 to 845 mg/L in 2003 to 2004). The concentrations of some other major cations (*i.e.*, calcium and magnesium) are also lower, while other major anions (*i.e.*, sulphate and bicarbonate) are higher.

Concentrations of dissolved aluminium (0.3 mg/L), dissolved chromium (0.0012 mg/L), and dissolved iron (0.84 and 0.85 mg/L) in the samples collected from MW03-01 during the first 2006 sampling event exceed the applicable CEQG (0.001/0.0089 mg/L for chromium, 0.1 mg/L for aluminium, and 0.3 mg/L for iron). Concentrations of dissolved fluoride (0.16 to 0.17 mg/L) in the samples collected during both 2006 sampling events also exceed the applicable CEQG (0.12 mg/L). Concentrations of some total metals also exceed the CEQG. Total metal concentrations in groundwater samples are a reflection of total suspended solids (TSS).

In 2006, the dissolved concentrations of most metals of environmental interest were generally lower than in 2003 and 2004, with the exception of dissolved iron and chromium which are slightly higher and exceed CEQG in 2006.

3.2.2 IF Well MW06-06 (replacement well for MW03-02)

Two samples were collected from IF well MW06-06 in 2006, one of which was a field duplicate. This well replaces IF well MW03-02. A small amount of calcium chloride was introduced into this well prior to development, however the low calcium levels measured while it was being purged, and the large volume of purge water removed from this well (24 well volumes) suggest that the bulk of the calcium chloride was removed prior to sampling. The water collected from this well was clear, relatively free of sediments. The high purge volume, clarity of the well water and good duplicate reproducibility offer high confidence that the water quality is representative of the intersected formation groundwater.

The field conductivity of the samples collected from MW06-06 was 1306 uS/cm. This is similar to the field conductivity of the sample collected from MW03-02 in 2004, which was 1104 mg/L. Calculated TDS concentrations are similar in samples collected from these two wells, ranging from 588 to 678 mg/L in the samples from MW06-06, and 499 to 500 mg/L in the samples collected from MW03-02.

The chloride-sodium ratios in samples collected from MW06-06 (5.2 to 5.9) are higher than the chloride-sodium ratios in both samples from MW03-02 (2.8 in 2004 and 0.9 in 2003). In the case of the MW06-06 ratio compared to the MW03-02 ratio from 2004, this is due to lower sodium concentrations (55.9 to 58.2 mg/L in the MW06-06 samples versus 89.5 mg/L in the MW03-02 sample). In the case of the MW06-06 chloride-sodium ratio compared to the MW03-02 ratio from 2003, this is due to significantly higher chloride concentrations (304 to 331 mg/L in the MW06-06 samples versus 5.4 mg/L in the MW03-02 sample). The chloride concentrations in the MW06-06 and 2004 MW03-02 samples are similar (304 to 331 mg/L in the MW06-06 samples versus 251 to 259 mg/L in the MW03-02 samples). The sodium concentrations in the MW06-06 samples are higher than in the 2003 MW03-02 samples (55.9 to 58.2 mg/L in the MW06-06 samples versus 6.29 mg/L in the MW03-02 sample. The concentrations of other major cations (*i.e.,* calcium, magnesium, potassium) do not differ appreciably between samples from the different wells and sampling events, however, the concentrations of the other major anions (*i.e.,* bicarbonate and sulphate) do show some differences, as bicarbonate in the MW06-06 samples and MW03-02 samples from 2004 are lower than the MW03-02 samples from 2003 (50.8 to 60.9 mg/L versus 125 mg/L), and the sulphate concentrations in the MW06-06 samples are higher than the MW03-02 samples from 2004 (56 to 65.1 mg/L versus 38.2 to 38.4 mg/L), and much lower than the MW03-02 samples from 2003 (56 to 65.1 mg/L versus 263 mg/L).

Concentrations of dissolved fluoride (0.55 and 0.63 mg/L) in samples collected from MW06-06 exceed the applicable CEQG (0.12 mg/L). Dissolved concentrations of most metals of environmental interest were generally lower in samples collected from MW06-06 as compared to samples collected from MW03-02, resulting in a fewer number of CEQG exceedances in the MW06-06 samples.

3.2.3 QTZ/IV Well MW06-07 in Tailings Storage Facility (replacement well for MW03-04)

Two samples were collected from MW06-07 in 2006, one of which was a field duplicate. This well replaces MW03-04, sampled only in 2003.

A very large volume of water was removed from this well to clarify the groundwater (65 well volumes). Based on the clarity and intensity of the purge, there is a high confidence that the water quality from this well is representative of the formation groundwater.

The concentration of dissolved major ions and trace metals are generally lower than they were in 2003 at well MW03-04. The field conductivity of the samples collected from MW06-07 was 440 uS/cm. This is similar to the field conductivity of the samples collected from MW03-04, which range from 370 – 450 uS/cm. TDS concentrations were also similar in samples collected from these two wells, ranging from 162 to 172 mg/L in the samples from MW06-07 as compared to 154 mg/L in the sample collected from MW03-04.

The chloride-sodium ratios in samples collected from MW06-07 (both 4.3) are higher than the ratio in the MW03-04 sample (0.25). This is due to higher chloride concentrations (33.3 to 33.5 mg/L in the MW06-07 samples versus 13.4 mg/L in the MW03-04 sample), and significantly lower sodium concentrations (7.7 to 7.8 mg/L in the MW06-07 samples versus 52.9 mg/L in the MW03-04 sample). Some other major ions (*i.e.,* calcium and magnesium) are higher in the MW06-07 samples as compared to the MW03-04 sample, while other major ions (*i.e.,* potassium and sulphate) are lower.

Concentrations of dissolved copper (0.005 and 0.008 mg/L) and dissolved fluoride (0.2 mg/L in one sample) in samples collected from MW06-07 exceed the applicable CEQG (0.003 for copper and 0.12 mg/L for fluoride).

Dissolved concentrations of most metals of environmental interest were generally lower in the samples collected from MW06-07 as compared to the sample collected from

MW03-04, resulting in a fewer number of dissolved metal CEQG exceedances in the MW06-07 samples.

3.3 Quality Assurance/Quality Control

Duplicate pairs of samples were collected at each sampled monitoring well in 2006, and analyzed for the same set of parameters. Table 3-3 presents the RPD values calculated from these duplicate results. The results indicate that the large majority of analytical results have adequate precision, as the difference between duplicate pairs is generally less than 20%. Exceptions to this in samples from MW06-06 include: total suspended solids (55% RPD), total aluminium (21% RPD), total copper (133% RPD), total nickel (35% RPD), and dissolved manganese (67% RPD); in samples from MW06-07: dissolved copper (46% RPD) and dissolved fluoride (58% RPD). All other RPD values that are greater than 20% for monitoring wells sampled in 2006 should be disregarded, as they correspond to results that less than 5 times the MDL. In these cases, a margin of +/- MDL is considered acceptable, and has been complied with.

The database of groundwater chemistry data obtained to date is considered adequate for the purpose of evaluating the load of dissolved metals from groundwater since dissolved metal concentrations showed good correlation between data sets. It is also considered adequate to predict the salinity and major ion concentration of groundwater inflow into pits during operation. Groundwater salinity and the concentration of major ions were modelled at various time steps during operation to simulate upwelling of brackish water into the open pits (Golder, 2007e). The estimates are based on the depth profile of TDS and chloride concentration for the Meadowbank site together with data from deep groundwater wells at other sites. For the purposed of pit inflow groundwater quality predictions the Meadowbank site data considered the ratios of TDS to chloride and sodium, as well as other major ions at all wells. This method, together with the high-confidence dataset obtained in 2006, minimizes the possible effects of dilution on measured groundwater salinity.

4.0 CONCLUSION

Groundwater samples were obtained from each of the major lithologies found at the Goose Island and Portage deposits at the Meadowbank Project in Nunavut in 2006. Four new wells were installed in 2006 as part of a commitment to Nunavut Impact Review Board (NIRB) to replace inoperable wells. One of these wells became inoperable shortly after installation and could not be sampled. Two previous sampling events took place in 2003 and 2004, respectively (Golder, 2004a and 2004b).

All of the groundwater samples collected during all of the sampling events met the MMER criteria. However, most groundwater samples show one or more exceedances to a limited number of freshwater CEQG, including: aluminium, arsenic, chromium, copper, fluoride, iron, lead, molybdenum, silver, and zinc. Comparison to CEQG is qualitative only as groundwater will not be discharged directly to Second or Third Portage Lake. Groundwater that will accumulate in the pit during operation, if any, will be pumped to the attenuation pond and be monitored before discharge.

Constituent concentrations in groundwater and the number of CEQG exceedances in samples from each lithology were generally lower in 2006 compared to previous years, with few exceptions. The conductivity of groundwater samples from each lithology was similar in 2006 as compared to previous years, with the exception of MW03-01 which showed lower conductivity values in 2006. The high rate of development, clarity of groundwater samples and good reproducibility of duplicate results convey high confidence that the water samples obtained adequately represent formation groundwater.

Yours very truly,

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

Preeti Anand, B.Sc.,
Scientist

Reviewed by:

ORIGINAL SIGNED BY

Valerie Bertrand, M.A.Sc., P.Geol. (NWT, NU)
Senior Geochemist

ORIGINAL SIGNED BY

Don Chorley, M.Sc., P. Geol. (NWT, NU)
Principal

PA/VB/DC/cm/mrb
Attachments
O:\Final\2006\1413\06-1413-089\317 Rev. 1 Let 16aug_07\317 Rev. 1 Let-16aug_07 Meadowbank-2006 Baseline Groundwater Quality.Doc

REFERENCES

Azimuth Consulting Group Inc., 2003. Baseline Aquatic Environment Assessment Report – Meadowbank Study Area Lakes, Nunavut. Report prepared for Cumberland Resources Ltd., March 2003.

Canadian Council of Ministers of the Environment, 2003. Canadian Environmental Quality Guidelines for the Protection of Freshwater Aquatic Life.

Cumberland Resources Ltd., 2005. Meadowbank Gold Project Baseline Physical Ecosystem Report. October 2005.

Golder Associates Ltd., 2004a. Meadowbank Baseline Groundwater Quality. April 26, 2004.

Golder Associates Ltd., 2004b. Meadowbank 2004 Baseline Groundwater Quality. October 19, 2004.

Golder Associates Ltd., 2005. Report on Mine Site Water Quality Predictions, Meadowbank Gold Project, Nunavut. October 2005.

Golder Associates Ltd., 2007e. Updated Predictions of Brackish Water Upwelling in Open Pits with Mining Rate of 8500 tpd, Meadowbank Project, Nunavut. July 27, 2007.

Metal Mining Effluent Regulations (MMER) SOR/2002-222, June 6, 2002.

USEPA, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, DC, February 1994.

USEPA, 2002. Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. Ground water Forum Issue Paper. EPA 542-S-02-001.

Table 3-1
Groundwater Quality Results
Meadowbank Project
Cumberland Resources Ltd.

		Canadian Water Quality Guideline (Aquatic Life)[6]	Metal Mine Effluent Regulation[7]	Ultramafic Rock							Iron Formation Rock					
				Goose Island UM MW03-01							Goose Island IF MW03-02				Goose Island IF MW06-06	
Laboratory sample number		(CEQG)	(MMER)	9755-2	9755-3	9044-01	9044-02	12393-01	12393-02	12395-01	9756-03	9043-01	9043-01	9043-02	12567-01	12567-02
Date				07-Sep-03	07-Sep-03	Aug-7-04	Aug-7-04	Aug-8-06	Aug-8-06	Aug-14-06	28-Sep-03	Jul 31-04	Jul 31-04	Jul 31-04	24-Aug-06	24-Aug-06
QA/QC					FD		FD		FD				Decant [8]	FD		FD
FIELD PARAMETERS																
Depth of Screen Midpoint (m)				150	150	150	-	150	150	150	143	143	143	143	173	173
Temperature (oC)				11.7	11.7	8	-	7.7	-	9.9	3.5	12	-	-	12.4	-
pH (s.u.)		**6.5 - 9.0**	6.0-9.5	7.36	7.36	8.03	-	7.93	-	7.58	7.68	7.19	-	-	7.59	-
Conductivity (uS/cm)				1855	1855	2500	-	382	-	538	660	1104	-	-	1306	-
Redox (mV)				-	-	119	-	-	-	-	8.2	32	-	-	-	-
Dissolved Oxygen (mg/L)		**5.5 - 9.5**		**2.0**	**2.0**	**2.0**	**-**	8.6	-	**4.8**	**0.8**	7.0	-	-	**1.15**	-
Alkalinity (mg/L as CaCO3)				19 - 22	19 - 22	27	-	33.9	-	48.8	96 - 100	51	-	-	46.3	-
TDS (mg/L)				-	-	-	-	193	-	405	-	-	-	-	650	-
Clarity				minor silt	minor silt	clear	-	clear	clear	clear	clear	silty	clear	silty	clear	clear
LABORATORY PARAMETERS																
Calculated TDS (mg/L)				793	793	1335	-	125	125	292	500	499	-		588	678
pH (s.u.)		**6.5 - 9.0**	6.0-9.5	7.24	7.30	7.46	-	-	-	7.36	7.04	7.25	-	7.34	7.33	7.29
Conductivity (uS/cm)				-	-	2900	-	-	-	634	-	1270	-	1280	1210	1200
Total Alkalinity CaCO3 (mg/L)				30	30	27.3	-	-	-	51	103	41.6	-	42.9	49.9	49.9
Bicarbonate Alkalinity HCO3 (mg/L)				36.6	36.6	33.3	-	-	-	62.2	125	50.8	-	52.4	60.9	60.9
Carbonate Alkalinity CO3 (mg/L)				< 0.5	< 0.5	< 0.5	-	-	-	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5
Hydroxide Alkalinity OH (mg/L)				< 0.5	< 0.5	< 0.5	-	-	-	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5
Dissolved Sulphate SO4 (mg/L)				15.6	15.8	15.9	-	42.8	43.1	51.1	263	38.4	-	38.2	65.1	56
Hardness CaCO3 (mg/L)				262*	267*	380	-	75.9	77.3	150	290	308	-	-	345	347
Hardness (Total) CaCO3 (mg/L)				318*	388*	391	-	82	81.6	148	316	313	292	-	326	316
Total Suspended Solids				-	-	13	-	-	-	4	-	96	-	90	16	28
Water Type				Ca-Cl	Ca-Cl	Na + K-Na-Cl	-	Ca-Na-Mg-Cl-SO4-HCO3	Ca-Na-Mg-Cl-SO4	Na-Ca-Mg-Cl	Ca-Mg-SO4-HCO3	Na + K-Na-Ca-Mg-Cl	Na + K-Na-Ca-Mg-Cl	-	Ca-Na-Cl	Ca-Na-Cl
Total Metals (mg/L)																
Aluminum[1]	Al	**0.005 - 0.1**		**4.16**	**1.2**	**0.25**	**-**	**0.4**	**0.48**	**0.13**	**1.07**	**2.31**	**0.37**	-	**0.16**	**0.13**
Antimony	Sb			<0.001	<0.001	0.0004	-	<0.0002	<0.0002	< 0.001	<0.001	0.0003	0.0002	-	<0.001	<0.001
Arsenic	As	**0.005**	0.5	<0.001	**0.017**	0.004	-	0.0005	0.0006	0.002	0.002	0.0038	0.002	-	0.003	0.003
Barium	Ba			0.18	0.2	0.301	-	0.027	0.028	0.052	0.028	0.096	0.076	-	0.024	0.024
Beryllium	Be			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	< 0.0002	-	<0.001	<0.001
Bismuth	Bi			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	< 0.0002	-	<0.001	<0.001
Boron	B			0.59	1.07	2.43	-	0.11	0.11	0.27	0.06	0.97	0.87	-	0.36	0.31
Cadmium[3]	Cd	**0.064-0.107** #		0.00024	0.00037	<0.00004	-	<0.00004	<0.00004	< 0.0002	<0.0002	0.00018	0.0001	-	<0.0002	<0.0002
Calcium	Ca			72	87.1	95.4	-	19.1	19.1	33.4	68.3	74.7	72.5	-	89.3	86.1
Chromium[2]	Cr	**0.001 / 0.0089**		**0.049**	**0.32**	**0.004**	**-**	**0.0017**	**0.0021**	< 0.001	**0.003**	**0.008**	**0.0012**	-	<0.001	<0.001
Cobalt	Co			0.004	0.016	0.0009	-	0.0005	0.0005	< 0.001	0.004	0.0072	0.0045	-	0.002	0.002
Copper[3]	Cu	**0.002 - 0.004**	0.3	**0.044**	**0.071**	0.0035	-	0.0022	0.002	< 0.001	**0.004**	**0.007**	0.002	-	0.001	**0.005**
Iron	Fe	**0.3**		**6.05**	**10.7**	**1.14**	**-**	**1.02**	**1.11**	**1.1**	**2.96**	**4.72**	**0.68**	-	**0.57**	**0.57**
Lead[3]	Pb	**0.001 - 0.007**	0.2	**0.013**	**0.03**	0.0025	-	0.0015	0.0013	< 0.001	0.002	0.0035	0.0005	-	<0.001	<0.001
Lithium	Li			0.025	0.031	0.04	-	0.0031	0.0032	0.006	0.021	0.021	0.017	-	0.029	0.028
Magnesium	Mg			33.2	41.5	37.1	-	8.29	8.2	15.6	35.2	30.7	27	-	25	24.5
Manganese	Mn			0.073	0.72	0.415	-	0.309	0.304	0.93	1.04	0.517	0.417	-	0.41	0.43
Mercury	Hg	**0.000004**		-	-	<0.00002	-	<0.00002	<0.00002	< 0.00002	<0.00002	< 0.00002	< 0.00002	-	<0.00002	<0.00002
Molybdenum	Mo	**0.073**		<0.0005	0.011	0.0083	-	0.013	0.013	0.012	0.022	0.015	0.013	-	0.0087	0.009
Nickel[3]	Ni	**0.025 - 0.15**	0.5	0.056	0.13	0.0045	-	0.002	0.0022	< 0.001	0.008	0.017	0.011	-	0.007	0.01
Phosphorus	P			0.069	0.075	0.16	-	<0.03	<0.03	< 0.15	0.19	0.34	0.09	-	1.2	1.2
Potassium	K			7.31	9.1	9.13	-	3.63	3.68	6.1	5.94	7.8	6.9	-	6.7	6.5
Selenium	Se	**0.001**		<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	< 0.0002	-	<0.001	<0.001
Silicon	SiO2			0.4	4.12	5.07	-	2.31	2.71	2.7	10.7	13.8	7.57	-	4.7	4.6
Silver	Ag	**0.00010**		**0.0064**	**0.011**	**0.00028**	**-**	<0.00005	<0.00005	< 0.00025	<0.0001	**0.00067**	**0.00016**	-	<0.00025	<0.00025
Sodium	Na			22	25	357	-	16	15.9	50.5	6.81	91.9	84.9	-	59	55.9
Strontium	Sr			0.68	0.79	1.56	-	0.119	0.12	0.28	0.26	0.759	0.691	-	0.75	0.72
Tellurium	Te			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	< 0.0002	-	<0.001	<0.001
Thallium	Tl	**0.0008**		<0.0001	<0.0001	<0.00002	-	<0.00002	<0.00002	< 0.0001	<0.0001	0.00006	< 0.00002	-	<0.0001	<0.0001
Thorium	Th			<0.0005	0.0038	<0.0001	-	0.0005	0.0006	< 0.0005	0.0007	< 0.0001	< 0.0001	-	<0.0005	<0.0005
Tin	Sn			<0.001	0.002	0.0009	-	<0.0002	<0.0002	< 0.001	<0.001	0.0003	< 0.0002	-	<0.001	<0.001
Titanium	Ti			0.01	0.22	0.01	-	0.024	0.029	0.006	0.063	0.158	0.02	-	0.005	0.005
Uranium	U			0.0012	0.0017	0.0003	-	0.0006	0.0006	< 0.0005	0.0084	0.002	0.0013	-	0.0018	0.0018
Vanadium	V			<0.001	0.029	0.0004	-	0.0007	0.0008	< 0.001	0.002	0.0039	0.0006	-	0.002	0.002
Zinc	Zn	**0.03**	0.5	**0.063**	**0.087**	0.007	-	0.005	0.005	< 0.005	0.014	**0.042**	0.015	-	<0.005	<0.005
Zirconium	Zr			<0.0010	<0.0010	<0.002	-	<0.002	<0.002	< 0.01	<0.0010	< 0.002	< 0.002	-	<0.01	<0.01
Dissolved Metals (mg/L)																
Aluminum[1]	Al	**0.005 - 0.1**		0.051	0.011	0.005	-	**0.3**	**0.3**	< 0.005	**0.47**	0.019	-	-	<0.005	<0.005
Antimony	Sb			<0.001	<0.001	0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	0.0003	-	-	<0.001	<0.001
Arsenic	As	**0.0050**	0.5	<0.001	0.003	0.0038	-	0.0005	0.0005	0.0030	0.002	0.0020	-	-	0.002	0.002
Barium	Ba			0.12	0.13	0.3	-	0.025	0.025	0.051	0.023	0.086	-	-	0.018	0.019
Beryllium	Be			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	-	-	<0.001	<0.001
Bismuth	Bi			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	-	-	<0.001	<0.001
Boron	B			0.53	1.03	2.39	-	0.1	0.1	0.27	0.06	0.94	-	-	0.37	0.44
Cadmium[3]	Cd	**0.064-0.107** #		0.00007	0.00012	<0.00004	-	<0.00004	<0.00004	< 0.0002	<0.0002	0.00016	-	-	<0.0002	<0.0002
Calcium	Ca			65.6	67	94.2	-	17.6	17.9	33.7	63.1	73.5	-	-	87.1	85.3
Chromium[2]	Cr	**0.001 / 0.0089**		<0.001	<0.001	0.0002	-	**0.0012**	**0.0012**	< 0.001	**0.001**	0.0004	-	-	<0.001	<0.001
Cobalt	Co			0.001	0.001	0.0008	-	0.0004	0.0004	< 0.001	0.004	0.0060	-	-	<0.001	<0.001
Copper[3]	Cu	**0.002 - 0.004**	0.3	0.002	0.002	0.0004	-	0.0016	0.0016	< 0.001	**0.004**	0.0014	-	-	0.001	<0.001
Iron	Fe	**0.3**		<0.05	0.07	0.08	-	**0.84**	**0.85**	0.2	**1.91**	0.05	-	-	<0.05	<0.05
Lead[3]	Pb	**0.001 - 0.007**	0.2	<0.001	<0.001	<0.0002	-	0.0014	0.0012	< 0.001	0.001	< 0.0002	-	-	<0.001	<0.001
Lithium	Li			0.017	0.017	0.033	-	0.0028	0.0027	0.005	0.019	0.016	-	-	0.028	0.025
Magnesium	Mg			23.4	24.3	35.1	-	7.76	7.92	16.1	32.1	30.2	-	-	24.0	23.6
Manganese	Mn			0.06	0.28	0.381	-	0.286	0.293	0.980	0.96	0.492	-	-	0.006	0.003
Mercury	Hg	**0.000004**		-	-	<0.00002	-	<0.00002	<0.00002	< 0.00002	<0.00002	< 0.02	-	-	<0.00002	<0.00002
Molybdenum	Mo	**0.073**		<0.0005	0.0057	0.008	-	0.012	0.012	0.013	0.018	0.014	-	-	0.0081	0.0069
Nickel[3]	Ni	**0.025 - 0.15**	0.5	0.006	0.005	0.0026	-	0.0019	0.0019	< 0.001	0.007	0.012	-	-	0.005	0.004
Phosphorus	P			0.1	0.15	0.04	-	<0.03	<0.03	< 0.15	0.16	< 0.03	-	-	0.9	0.8
Potassium	K			5.71	5.95	8.56	-	3.27	3.28	6.1	5.36	7.43	-	-	6.6	5.8
Selenium	Se	**0.001**		<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	-	-	<0.001	<0.001
Silicon	SiO2			0.32	3.27	3.89	-	1.96	1.98	2.50	7.98	5.88	-	-	4.1	3.8
Silver	Ag	**0.0001**		<0.0001	<0.0001	<0.00005	-	<0.00005	<0.00005	< 0.00025	<0.0001	< 0.00005	-	-	<0.00025	<0.00025
Sodium	Na			20	22	327.0	-	15.0	15.6	52.5	6.29	89.5	-	-	58.2	55.9
Strontium	Sr			0.58	0.59	1.46	-	0.111	0.114	0.29	0.24	0.736	-	-	0.72	0.76
Tellurium	Te			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	-	-	<0.001	<0.001
Thallium	Tl	**0.0008**		<0.0001	<0.0001	<0.00002	-	<0.00002	<0.00002	< 0.0001	<0.0001	< 0.00002	-	-	<0.0001	<0.0001
Thorium	Th			<0.0005	<0.0005	<0.0001	-	0.0004	0.0004	< 0.0005	<0.0005	< 0.0001	-	-	<0.0005	<0.0005
Tin	Sn			<0.001	<0.001	<0.0002	-	<0.0002	<0.0002	< 0.001	<0.001	< 0.0002	-	-	<0.001	<0.001
Titanium	Ti			<0.001	<0.001	0.0003	-	0.019	0.018	< 0.001	0.024	0.0008	-	-	<0.001	<0.001
Uranium	U			0.0006	0.0006	0.0003	-	0.0006	0.0006	< 0.0005	0.0077	0.0013	-	-	0.0016	0.0014
Vanadium	V			<0.001	<0.001	<0.0002	-	0.0006	0.0006	< 0.001	<0.001	< 0.0002	-	-	0.001	0.001
Zinc	Zn	**0.03**	0.5	0.006	<0.005	0.002	-	0.005	0.005	< 0.005	0.012	0.029	-	-	<0.005	<0.005
Zirconium	Zr			<0.0010	<0.0010	<0.002	-	<0.002	<0.002	< 0.01	<0.0010	< 0.002	-	-	<0.01	<0.01
Dissolved Anions (mg/L)																
Dissolved Fluoride[4]	F	**0.12**		< 0.05	< 0.05	**0.12**	**-**	**0.16**	**0.17**	**0.16**	**0.35**	**0.6**	**-**	**0.57**	**0.55**	**0.63**
Dissolved Chloride	Cl			626	621	845	-	34.7	33.7	128	5.4	251	-	259	304	331
Nutrients (mg/L)																
Nitrate and Nitrite	NO3 + NO2			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.05	< 0.05	-	< 0.05	-	-
Dissolved Nitrate[5]	NO3			-	-	< 0.05	-	< 0.05	< 0.05	< 0.1	< 0.05	< 0.05	-	< 0.05	< 0.25	< 0.25
Nitrite	NO2	**0.060**		-	-	-	-	0.003	0.004	0.002	0.005	0.006	-	0.007	0.005	0.004
Ammonia Nitrogen	N			0.38	0.37	-	-	0.21	0.19	-	0.19	0.07	-	0.05	-	-
Total Kjeldahl Nitrogen	N			0.7	0.6	0.3	0.5	0.3	0.3	-	-	0.4	-	-	0.6	0.6
Total Phosphorus	P			0.07	0.08	0.05	0.05	0.04	0.04	-	0.10	0.23	-	0.25	-	-
Cyanide (mg/L)																
Total	CN		1.0	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-
Free	CN			-	-	<0.1	-	-	-	-	-	<0.1	-	-	-	-

NOTES:
1. Freshwater Aquatic Life Guideline is pH, calcium and DOC dependent. Exceedances identified apply pH criterion.
2. Freshwater Aquatic Life Guideline for chromium depends on valence of chromium ion (Cr(III) = 0.0089 mg/L, Cr(VI) = 0.001 mg/L).
3. Freshwater Aquatic Life Guideline is hardness dependent.
4. Freshwater Aquatic Life Guideline listed for inorganic fluorides.
5. CEQG stipulates that concentrations that stimulate weed growth should be avoided.
6. CEQG (2003 update) Freshwater Guidelines and Criteria are based o**total** metal concentrations
7. Maximum authorized monthly mean concentration (based o**total** concentration) (June 6, 2002)
8. Sample decanted off of 9043-01 due to high TSS and reanalysed for total metals
9. Values in italics indicate detection limit is above standard

Range is site specific
< = Less than the analytical detection limit
- = Not analyzed
* Hardness calculated from calcium and magnesium concentrations
** Laboratory measured values
FD = Field Duplicate

Table 3-1
Groundwater Quality Results
Meadowbank Project
Cumberland Resources Ltd.

Laboratory sample number / Date / QA/QC		Canadian Water Quality Guideline (Aquatic Life)[6] (CEQG)	Metal Mine Effluent Regulation[7] (MMER)	Intermediate Volcanic Rock – North Portage IV MW03-03			Intermediate Volcanic – Second Portage Arm (tailings disposal area) IV MW03-04	QTZ / IV MW06-07		Field Blank	Method Detection Limit
				9756-02 25-Sep-03	9045-01 Aug-9-04	9045-02 Aug-9-04 FD	9756-01 18-Sep-03	12568-01 30-Aug-06	12568-02 30-Aug-06 FD	9045-03 Aug-9-04	
FIELD PARAMETERS											
Depth of Screen Midpoint (m)				111	111	111	169	205	205	-	-
Temperature (oC)				2.2	10.3	-	3.3	5	5	-	-
pH (s.u.)		**6.5 - 9.0**	6.0-9.5	8.63	7.77	-	7.67	8	8	-	-
Conductivity (uS/cm)				350	627	-	370 - 450	440	440	-	-
Redox (mV)				79.9	3	-	-	-	-	-	-
Dissolved Oxygen (mg/L)		**5.5 - 9.5**		**1.0**	**1.5**	-	-	8	8	-	-
Alkalinity (mg/L as CaCO3)				87	102	-	-	84	84	-	-
TDS (mg/L)				-	-	-	-	220	220	-	-
Clarity				clear	clear	-	cloudy	clear	clear	clear	-
LABORATORY PARAMETERS											
Calculated TDS (mg/L)				254	239		154	172**	162**		-
pH (s.u.)		**6.5 - 9.0**	6.0-9.5	7.83	7.96	-	-	8	7.57	5.81	-
Conductivity (uS/cm)				-	640	-		281	285	1	-
Total Alkalinity CaCO3 (mg/L)				93.8	133	-	-	89	89	4.2	1
Bicarbonate Alkalinity HCO3 (mg/L)				114	162	-	-	108	108	5.1	0.5
Carbonate Alkalinity CO3 (mg/L)				< 0.5	< 0.5	-	-	< 0.5	< 0.5	< 0.5	0.5
Hydroxide Alkalinity OH (mg/L)				< 0.5	< 0.5	-	-	< 0.5	< 0.5	< 0.5	0.5
Dissolved Sulphate SO4 (mg/L)				26.6	6.2	-	63.8	4	3.76	< 0.5	0.5
Hardness CaCO3 (mg/L)				136	210	-	53	106	107	-	1
Hardness (Total) CaCO3 (mg/L)				144	216	-	-	124	128	0.3	1
Total Suspended Solids				-	1	-	-	11	11	< 1	1
Water Type				Mg-Ca-Na + K-HCO3-Cl	Ca-Mg-Na + K-Na-Cl-HCO3	-	Na + K-Na-SO4-HCO3	Ca-Mg-HCO3-Cl	Ca-Mg-HCO3-Cl	-	-
Total Metals (mg/L)											
Aluminum[1]	Al	**0.005 - 0.1**		0.018	**0.12**	-	-	**1.08**	**1.06**	0.002	0.005
Antimony	Sb			0.002	0.0002	-	-	< 0.001	< 0.001	< 0.0002	0.001
Arsenic	As	**0.005**	0.5	0.004	**0.015**	-	-	0.001	0.002	< 0.0002	0.001
Barium	Ba			0.02	0.05	-	-	0.11	0.11	< 0.0002	0.001
Beryllium	Be			<0.001	< 0.0002	-	-	< 0.001	< 0.001	< 0.0002	0.001
Bismuth	Bi			<0.001	< 0.0002	-	-	< 0.001	< 0.001	< 0.0002	0.001
Boron	B			0.09	0.19	-	-	< 0.05	< 0.05	< 0.01	0.05
Cadmium[3]	Cd	**0.064-0.107** #		<0.0002	0.00006	-	-	< 0.0002	< 0.0002	< 0.00004	0.0002
Calcium	Ca			28	47.7	-	-	34.9	36.4	0.1	0.05
Chromium[2]	Cr	**0.001 / 0.0089**		<0.001	**0.001**	-	-	**0.006**	**0.005**	< 0.0002	0.001
Cobalt	Co			<0.001	0.0004	-	-	0.001	0.001	< 0.0002	0.001
Copper[3]	Cu	**0.002 - 0.004**	0.3	<0.001	0.0014	-	-	**0.011**	**0.011**	0.0004	0.001
Iron	Fe	**0.3**		<0.05	**0.46**	-	-	**1.50**	**1.58**	< 0.01	0.05
Lead[3]	Pb	**0.001 - 0.007**	0.2	0.001	0.0006	-	-	0.001	0.001	< 0.0002	0.001
Lithium	Li			0.007	0.0092	-	-	0.004	0.004	< 0.0002	0.001
Magnesium	Mg			18	23.5	-	-	8.81	9.04	< 0.01	0.05
Manganese	Mn			0.11	0.131	-	-	0.073	0.074	0.0003	0.001
Mercury	Hg	**0.000004**		<0.00002	< 0.00002	-	-	< 0.00002	< 0.00002	< 0.00002	0.00002
Molybdenum	Mo	**0.073**		0.056	**0.093**	-	-	0.0050	0.0048	0.0002	0.0005
Nickel[3]	Ni	**0.025 - 0.15**	0.5	0.003	0.0024	-	-	0.005	0.005	< 0.0002	0.001
Phosphorus	P			0.07	0.08	-	-	0.4	0.4	0.04	0.01
Potassium	K			3.51	2.65	-	-	2.7	2.8	< 0.02	0.01
Selenium	Se	**0.001**		<0.001	< 0.0002	-	-	< 0.001	< 0.001	< 0.0002	0.001
Silicon	SiO2			3.78	5.96	-	-	5	5	0.08	0.05
Silver	Ag	**0.00010**		<0.0001	**0.00010**	-	-	**0.00090**	**0.00090**	< 0.00005	0.00010
Sodium	Na			17.6	33.6	-	-	8.85	9.12	0.03	0.05
Strontium	Sr			0.26	0.581	-	-	0.23	0.24	< 0.0002	0.001
Tellurium	Te			<0.001	< 0.0002	-	-	< 0.001	< 0.001	< 0.0002	0.001
Thallium	Tl	**0.0008**		<0.0001	< 0.00002	-	-	< 0.0001	< 0.0001	< 0.00002	0.0001
Thorium	Th			<0.0005	< 0.0001	-	-	< 0.0005	< 0.0005	< 0.0001	0.0005
Tin	Sn			<0.001	< 0.0002	-	-	< 0.001	< 0.001	< 0.0002	0.001
Titanium	Ti			<0.001	0.0045	-	-	0.032	0.031	< 0.0002	0.001
Uranium	U			0.012	0.0088	-	-	0.0095	0.0097	< 0.0001	0.0005
Vanadium	V			<0.001	0.0002	-	-	0.002	0.002	< 0.0002	0.001
Zinc	Zn	**0.03**	0.5	<0.005	0.006	-	-	0.006	0.006	0.004	0.005
Zirconium	Zr			<0.0010	< 0.002	-	-	< 0.01	< 0.01	< 0.002	0.001
Dissolved Metals (mg/L)											
Aluminum[1]	Al	**0.005 - 0.1**		0.018	0.006	-	**0.72**	0.040	0.042	-	0.005
Antimony	Sb			0.002	< 0.0002	-	0.001	< 0.001	< 0.001	-	0.001
Arsenic	As	**0.0050**	0.5	0.004	**0.0130**	-	**0.007**	< 0.001	0.0010	-	0.0010
Barium	Ba			0.018	0.048	-	0.03	0.086	0.086	-	0.001
Beryllium	Be			<0.001	< 0.0002	-	<0.001	< 0.001	< 0.001	-	0.001
Bismuth	Bi			<0.001	< 0.0002	-	<0.001	< 0.001	< 0.001	-	0.001
Boron	B			0.08	0.17	-	<0.05	< 0.05	< 0.05	-	0.05
Cadmium[3]	Cd	**0.064-0.107** #		<0.0002	0.00004	-	<0.0002	< 0.0002	< 0.0002	-	0.0002
Calcium	Ca			26.3	47.1	-	15	31	31.5	-	0.05
Chromium[2]	Cr	**0.001 / 0.0089**		<0.001	0.0003	-	<0.001	< 0.001	< 0.001	-	0.001
Cobalt	Co			<0.001	0.0003	-	0.003	< 0.001	< 0.001	-	0.0010
Copper[3]	Cu	**0.002 - 0.004**	0.3	<0.001	0.0002	-	**0.006**	**0.005**	**0.008**	-	0.001
Iron	Fe	**0.3**		<0.05	< 0.01	-	**0.55**	< 0.05	0.05	-	0.05
Lead[3]	Pb	**0.001 - 0.007**	0.2	<0.001	< 0.0002	-	**0.006**	< 0.001	< 0.001	-	0.001
Lithium	Li			0.007	0.0081	-	0.015	0.002	0.002	-	0.001
Magnesium	Mg			17.1	22.4	-	3.81	6.83	6.92	-	0.05
Manganese	Mn			0.1	0.130	-	0.049	0.032	0.032	-	0.001
Mercury	Hg	**0.000004**		<0.00002	< 0.02	-	<0.00002	< 0.00002	< 0.00002	-	0.00002
Molybdenum	Mo	**0.073**		0.052	**0.090**	-	0.024	0.004	0.004	-	0.001
Nickel[3]	Ni	**0.025 - 0.15**	0.5	0.003	0.0018	-	0.003	0.002	0.002	-	0.001
Phosphorus	P			0.07	< 0.03	-	5.58	0.3	0.3	-	0.01
Potassium	K			3.33	2.64	-	5.44	2.3	2.3	-	0.01
Selenium	Se	**0.001**		<0.001	< 0.0002	-	<0.001	< 0.001	< 0.001	-	0.001
Silicon	SiO2			3.62	5.70	-	10.2	2.70	2.70	-	0.05
Silver	Ag	**0.0001**		<0.0001	< 0.00005	-	<0.0001	< 0.00025	< 0.00025	-	0.0001
Sodium	Na			16.5	32.0	-	52.9	7.7	7.8	-	0.1
Strontium	Sr			0.24	0.556	-	0.14	0.2	0.2	-	0.001
Tellurium	Te			<0.001	< 0.0002	-	<0.001	< 0.001	< 0.001	-	0.001
Thallium	Tl	**0.0008**		<0.0001	< 0.00002	-	<0.0001	< 0.0001	< 0.0001	-	0.0001
Thorium	Th			<0.0005	< 0.0001	-	<0.0005	< 0.0005	< 0.0005	-	0.0005
Tin	Sn			<0.001	< 0.0002	-	<0.001	< 0.001	< 0.001	-	0.001
Titanium	Ti			<0.001	0.0003	-	0.003	< 0.001	< 0.001	-	0.001
Uranium	U			0.012	0.0087	-	0.013	0.008	0.008	-	0.0005
Vanadium	V			<0.001	< 0.0002	-	<0.001	< 0.001	< 0.001	-	0.001
Zinc	Zn	**0.03**	0.5	<0.005	0.004	-	0.022	< 0.005	< 0.005	-	0.005
Zirconium	Zr			<0.0010	< 0.002	-	<0.0010	< 0.01	< 0.01	-	0.001
Dissolved Anions (mg/L)											
Dissolved Fluoride[4]	F	**0.12**		**0.46**	**0.38**	-	**0.34**	**0.20**	0.11	< 0.05	0.05
Dissolved Chloride	Cl			50.4	121	-	13.4	33.3	33.5	< 0.2	0.2
Nutrients (mg/L)											
Nitrate and Nitrite	NO3 + NO2			0.15	< 0.05	< 0.01	< 0.05	-	-	< 0.05	0.01 / 0.05
Dissolved Nitrate[5]	NO3			0.15	< 0.05	-	< 0.05	0.12	0.12	< 0.05	0.05
Nitrite	NO2	**0.060**		0.003	< 0.002	-	0.004	0.003	0.003	< 0.002	0.002
Ammonia Nitrogen	N			0.08	-	-	-	-	-	-	0.01
Total Kjeldahl Nitrogen	N			-	0.2	0.2	-	-	-	< 0.2	0.2
Total Phosphorus	P			0.07	0.05	0.10	-	-	-	< 0.02	0.02
Cyanide (mg/L)											
Total	CN		1.0	-	<0.01	<0.01	-	-	-	<0.01	-
Free	CN			-	<0.1	<0.1	-	-	-	<0.1	-

NOTES:
1. Freshwater Aquatic Life Guideline is pH, calcium and DOC dependent. Exceedances identified apply pH criterion.
2. Freshwater Aquatic Life Guideline for chromium depends on valence of chromium ion (Cr(III) = 0.0089 mg/L, Cr(VI) = 0.001 mg/L).
3. Freshwater Aquatic Life Guideline is hardness dependent.
4. Freshwater Aquatic Life Guideline listed for inorganic fluorides.
5. CEQG stipulates that concentrations that stimulate weed growth should be avoided.
6. CEQG (2003 update) Freshwater Guidelines and Criteria are based o**total** metal concentrations
7. Maximum authorized monthly mean concentration (based o**total** concentration) (June 6, 2002)
8. Sample decanted off of 9043-01 due to high TSS and reanalysed for total metals
9. Values in italics indicate detection limit is above standard

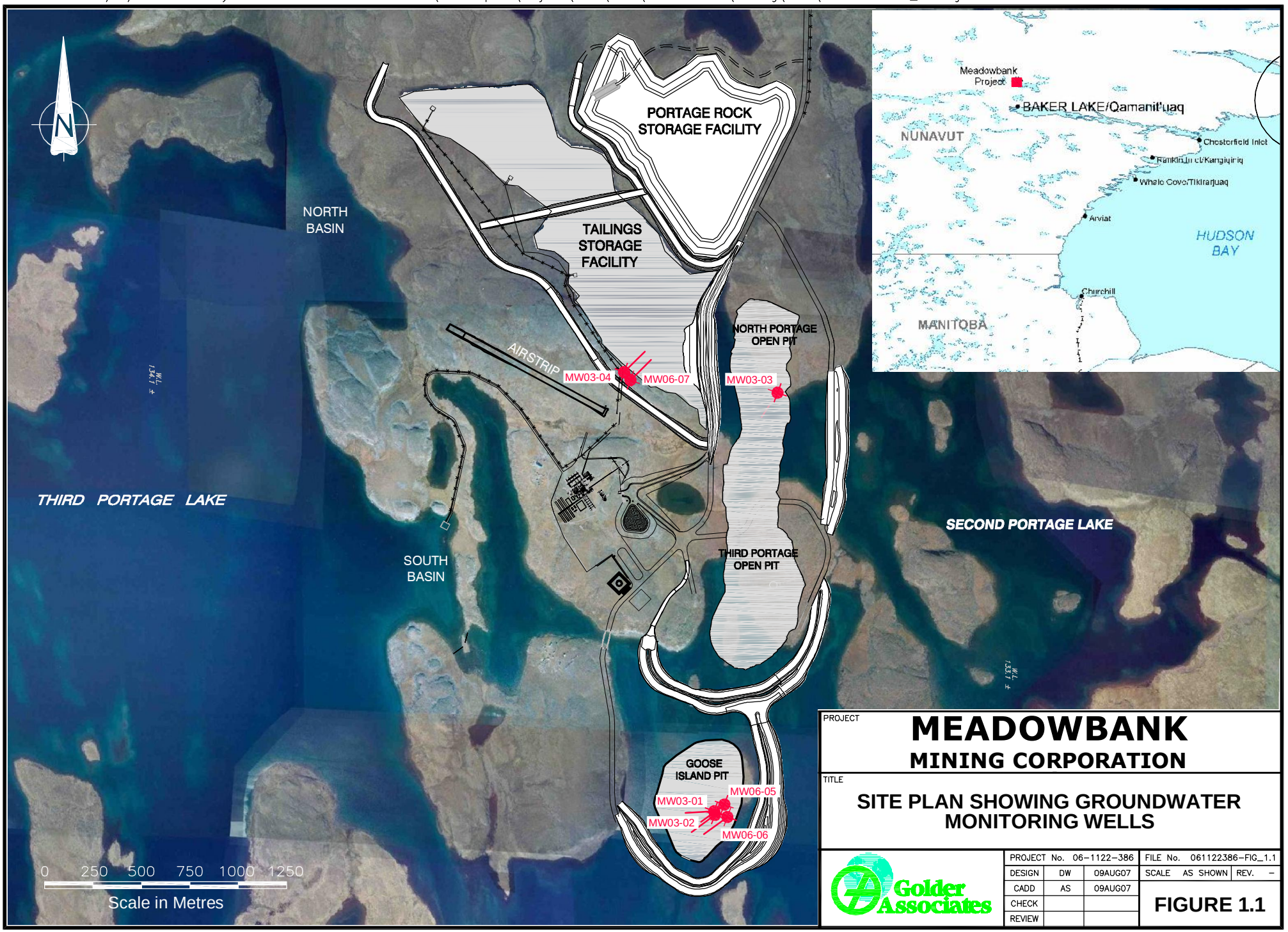
Range is site specific
< = less than the analytical detection limit.
- = not analyzed.
* Hardness calculated from calcium and magnesium concentrations
** Laboratory measured values.
FD= Field Duplicate

Table 3-3
QA/QC of Groundwater Quality Results
Meadowbank Project
Cumberland Resources Ltd.

		Goose Island UM MW03-01		RPD (%)	Goose Island IF MW06-06		RPD (%)	Second Portage Arm (tailings disposal area) QTZ / IV MW06-07		RPD (%)	Method Detection Limit
Laboratory sample number		12393-01	12393-02		12567-01	12567-02		12568-01	12568-02		
Date		Aug-8-06	Aug-8-06		24-Aug-06	24-Aug-06		30-Aug-06	30-Aug-06		
QA/QC			FD			FD			FD		
LABORATORY PARAMETERS											
Calculated TDS (mg/L)		125	125	0	588	678	14	172**	162**	6	-
pH (s.u.)		-	-	-	7.33	7.29	1	8	7.57	0	-
Conductivity (uS/cm)		-	-	-	1210	1200	1	281	285	1	-
Total Alkalinity CaCO3 (mg/L)		-	-	-	49.9	49.9	0	89	89	0	1
Bicarbonate Alkalinity HCO3 (mg/L)		-	-	-	60.9	60.9	0	108	108	0	0.5
Carbonate Alkalinity CO3 (mg/L)		-	-	-	< 0.5	< 0.5	-	< 0.5	< 0.5	-	0.5
Hydroxide Alkalinity OH (mg/L)		-	-	-	< 0.5	< 0.5	-	< 0.5	< 0.5	-	0.5
Dissolved Sulphate SO4 (mg/L)		42.8	43.1	1	65.1	56	15	4	3.76	0	0.5
Hardness CaCO3 (mg/L)		75.9	77.3	2	345	347	1	106	107	1	1
Hardness (Total) CaCO3 (mg/L)		82	81.6	0	326	316	3	124	128	3	1
Total Suspended Solids		-	-	-	16	28	**55**	11	11	0	1
Total Metals (mg/L)											
Aluminum	Al	0.4	0.48	18	0.16	0.13	**21**	1.08	1.06	2	0.005
Antimony	Sb	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Arsenic	As	0.0005	0.0006	18	0.003	0.003	0	0.001	0.002	67*	0.001
Barium	Ba	0.027	0.028	4	0.024	0.024	0	0.11	0.11	0	0.001
Beryllium	Be	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Bismuth	Bi	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Boron	B	0.11	0.11	0	0.36	0.31	15	< 0.05	< 0.05	-	0.05
Cadmium	Cd	<0.00004	<0.00004	-	<0.0002	<0.0002	-	< 0.0002	< 0.0002	-	0.0002
Calcium	Ca	19.1	19.1	0	89.3	86.1	4	34.9	36.4	4	0.05
Chromium	Cr	0.0017	0.0021	21*	<0.001	<0.001	-	0.006	0.005	18	0.001
Cobalt	Co	0.0005	0.0005	0	0.002	0.002	0	0.001	0.001	0	0.001
Copper	Cu	0.0022	0.002	10	0.001	0.005	**133**	0.011	0.011	0	0.001
Iron	Fe	1.02	1.11	8	0.57	0.57	0	1.50	1.58	5	0.05
Lead	Pb	0.0015	0.0013	14	<0.001	<0.001	-	0.001	0.001	0	0.001
Lithium	Li	0.0031	0.0032	3	0.029	0.028	4	0.004	0.004	0	0.001
Magnesium	Mg	8.29	8.2	1	25	24.5	2	8.81	9.04	3	0.05
Manganese	Mn	0.309	0.304	2	0.41	0.43	5	0.073	0.074	1	0.001
Mercury	Hg	<0.00002	<0.00002	-	<0.00002	<0.00002	-	< 0.00002	< 0.00002	-	0.00002
Molybdenum	Mo	0.013	0.013	0	0.0087	0.009	3	0.0050	0.0048	4	0.0005
Nickel	Ni	0.002	0.0022	10	0.007	0.01	**35**	0.005	0.005	0	0.001
Phosphorus	P	<0.03	<0.03	-	1.2	1.2	0	0.4	0.4	0	0.01
Potassium	K	3.63	3.68	1	6.7	6.5	3	2.7	2.8	4	0.01
Selenium	Se	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Silicon	SiO2	2.31	2.71	16	4.7	4.6	2	5	5	4	0.05
Silver	Ag	<0.00005	<0.00005	-	<0.00025	<0.00025	-	0.00090	0.00090	0	0.00010
Sodium	Na	16	15.9	1	59	55.9	5	8.85	9.12	3	0.05
Strontium	Sr	0.119	0.12	1	0.75	0.72	4	0.23	0.24	4	0.001
Tellurium	Te	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Thallium	Tl	<0.00002	<0.00002	-	<0.0001	<0.0001	-	< 0.0001	< 0.0001	-	0.0001
Thorium	Th	0.0005	0.0006	18	<0.0005	<0.0005	-	< 0.0005	< 0.0005	-	0.0005
Tin	Sn	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Titanium	Ti	0.024	0.029	19	0.005	0.005	0	0.032	0.031	3	0.001
Uranium	U	0.0006	0.0006	0	0.0018	0.0018	0	0.0095	0.0097	2	0.0005
Vanadium	V	0.0007	0.0008	13	0.002	0.002	0	0.002	0.002	0	0.001
Zinc	Zn	0.005	0.005	0	<0.005	<0.005	-	0.006	0.006	0	0.005
Zirconium	Zr	<0.002	<0.002	-	<0.01	<0.01	-	< 0.01	< 0.01	-	0.001
Dissolved Metals (mg/L)											
Aluminum	Al	0.3	0.3	0	<0.005	<0.005	-	0.040	0.042	5	0.005
Antimony	Sb	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Arsenic	As	0.0005	0.0005	0	0.002	0.002	0	< 0.001	0.0010	-	0.0010
Barium	Ba	0.025	0.025	0	0.018	0.019	5	0.086	0.086	0	0.001
Beryllium	Be	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Bismuth	Bi	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Boron	B	0.1	0.1	0	0.37	0.44	17	< 0.05	< 0.05	-	0.05
Cadmium	Cd	<0.00004	<0.00004	-	<0.0002	<0.0002	-	< 0.0002	< 0.0002	-	0.0002
Calcium	Ca	17.6	17.9	2	87.1	85.3	2	31	31.5	1	0.05
Chromium	Cr	0.0012	0.0012	0	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Cobalt	Co	0.0004	0.0004	0	<0.001	<0.001	-	< 0.001	< 0.001	-	0.0010
Copper	Cu	0.0016	0.0016	0	0.001	<0.001	-	0.005	0.008	**46**	0.001
Iron	Fe	0.84	0.85	1	<0.05	<0.05	-	< 0.05	0.05	-	0.05
Lead	Pb	0.0014	0.0012	15	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Lithium	Li	0.0028	0.0027	4	0.028	0.025	11	0.002	0.002	0	0.001
Magnesium	Mg	7.76	7.92	2	24.0	23.6	2	6.83	6.92	1	0.05
Manganese	Mn	0.286	0.293	2	0.006	0.003	**67**	0.032	0.032	0	0.001
Mercury	Hg	<0.00002	<0.00002	-	<0.00002	<0.00002	-	< 0.00002	< 0.00002	-	0.00002
Molybdenum	Mo	0.012	0.012	0	0.0081	0.0069	16	0.004	0.004	5	0.001
Nickel	Ni	0.0019	0.0019	0	0.005	0.004	22*	0.002	0.002	0	0.001
Phosphorus	P	<0.03	<0.03	-	0.9	0.8	12	0.3	0.3	0	0.01
Potassium	K	3.27	3.28	0	6.6	5.8	13	2.3	2.3	0	0.01
Selenium	Se	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Silicon	SiO2	1.96	1.98	1	4.1	3.8	8	2.70	2.70	0	0.05
Silver	Ag	<0.00005	<0.00005	-	<0.00025	<0.00025	-	< 0.00025	< 0.00025	-	0.0001
Sodium	Na	15.0	15.6	4	58.2	55.9	4	7.7	7.8	2	0.1
Strontium	Sr	0.111	0.114	3	0.72	0.76	5	0.2	0.2	5	0.001
Tellurium	Te	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Thallium	Tl	<0.00002	<0.00002	-	<0.0001	<0.0001	-	< 0.0001	< 0.0001	-	0.0001
Thorium	Th	0.0004	0.0004	0	<0.0005	<0.0005	-	< 0.0005	< 0.0005	-	0.0005
Tin	Sn	<0.0002	<0.0002	-	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Titanium	Ti	0.019	0.018	5	<0.001	<0.001	-	< 0.001	< 0.001	-	0.001
Uranium	U	0.0006	0.0006	0	0.0016	0.0014	13	0.008	0.008	1	0.0005
Vanadium	V	0.0006	0.0006	0	0.001	0.001	0	< 0.001	< 0.001	-	0.001
Zinc	Zn	0.005	0.005	0	<0.005	<0.005	-	< 0.005	< 0.005	-	0.005
Zirconium	Zr	<0.002	<0.002	-	<0.01	<0.01	-	< 0.01	< 0.01	-	0.001
Dissolved Anions (mg/L)											
Dissolved Fluoride	F	0.16	0.17	6	0.55	0.63	14	0.20	0.11	**58**	0.05
Dissolved Chloride	Cl	34.7	33.7	3	304	331	9	33.3	33.5	1	0.2
Nutrients (mg/L)											
Nitrate and Nitrite	NO3 + NO2	< 0.01	< 0.01	-	-	-	-	-	-	-	0.01 / 0.05
Dissolved Nitrate	NO3	< 0.05	< 0.05	-	< 0.25	< 0.25	-	0.12	0.12	0	0.05
Nitrite	NO2	0.003	0.004	29*	0.005	0.004	22*	0.003	0.003	0	0.002
Ammonia Nitrogen	N	0.21	0.19	10	-	-	-	-	-	-	0.01
Total Kjeldahl Nitrogen	N	0.3	0.3	0	0.6	0.6	0	-	-	-	0.2
Total Phosphorus	P	0.04	0.04	0	-	-	-	-	-	-	0.02

NOTES:
< = Less than the analytical detection limit
- = Not analyzed.
* RPD considered acceptable since one or more results are less than five times the method detection limit
** Laboratory measured values
FD = Field Duplicate

REVISION DATE: 07/08/09 03:55PM By: ASalvador CADD FILE: N:\Bur-Graphics\Projects\2006\1122\06-1122-386\Drafting\1000\061122386-FIG_1.1.dwg



PROJECT

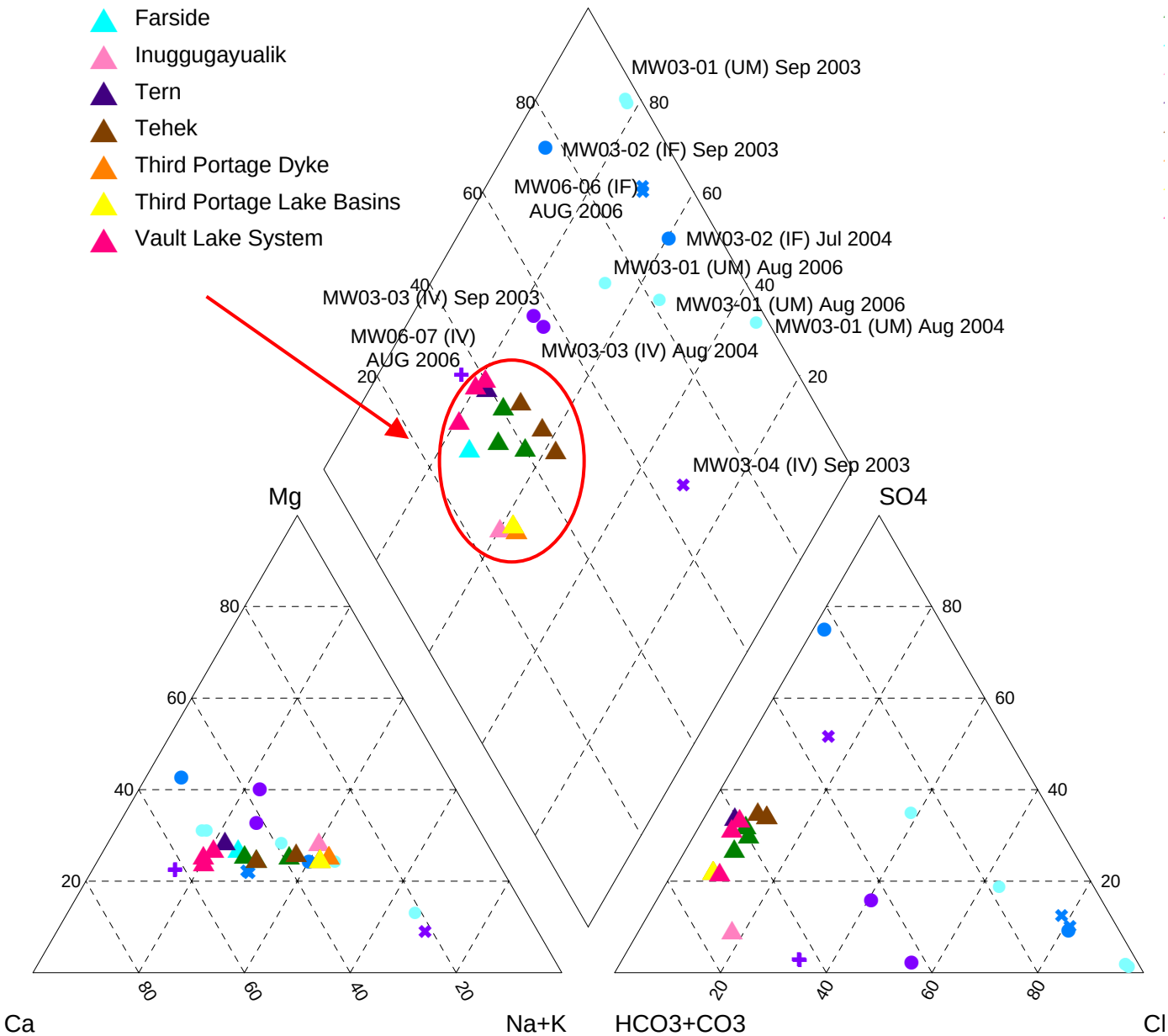
MEADOWBANK
MINING CORPORATION

TITLE

SITE PLAN SHOWING GROUNDWATER MONITORING WELLS

Golder Associates

PROJECT No. 06-1122-386			FILE No. 061122386-FIG_1.1	
DESIGN	DW	09AUG07	SCALE AS SHOWN	REV. –
CADD	AS	09AUG07	FIGURE 1.1	
CHECK				
REVIEW				



Groundwater Samples:

- MW03-01 (UM)
- MW03-02 (IF)
- MW03-03 (IV)
- MW03-04 (IV Tailings)
- MW06-06 (IF)
- MW06-07 (IV)

PROJECT

MEADOWBANK
MINING CORPORATION

TITLE

TRILINEAR PLOT OF LAKE AND GROUNDWATER SAMPLES

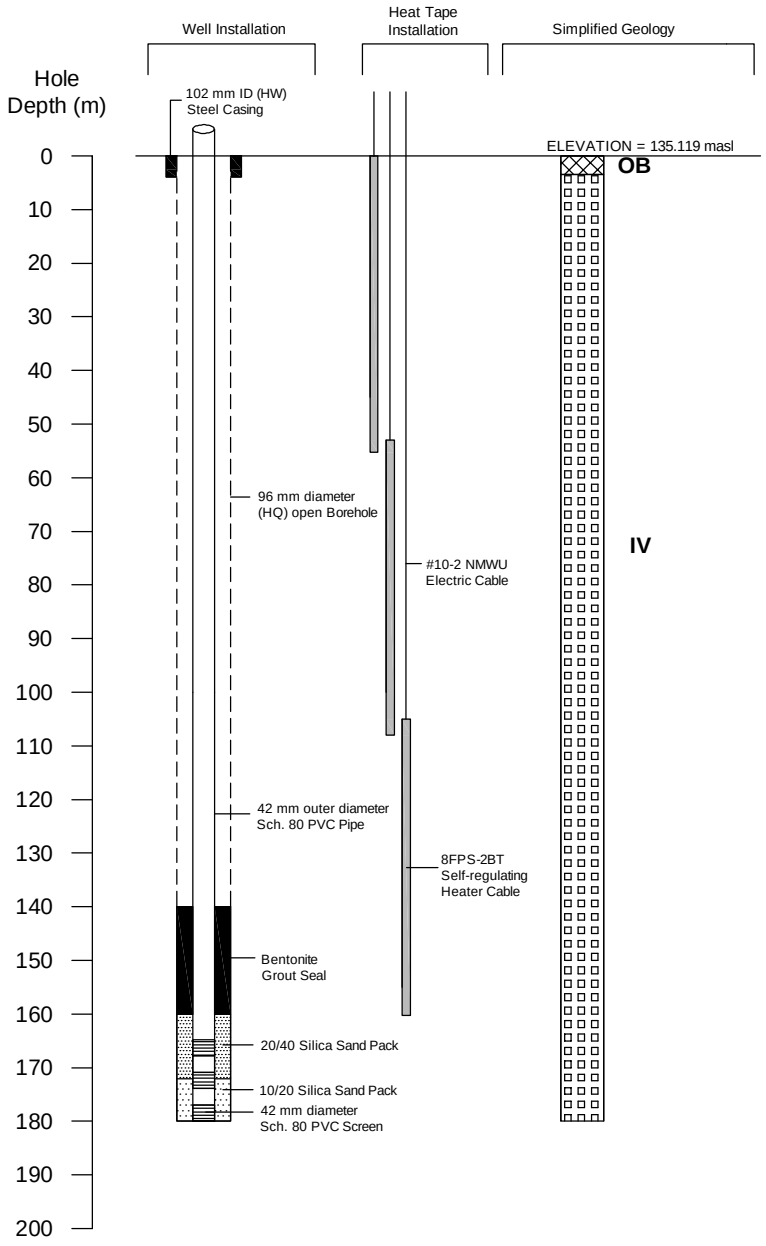
Golder Associates

PROJECT No.	06-1122-186		FILE No.	----	
DESIGN	LL	16OCT06	SCALE	N/A	REV.
CADD	LL	16OCT06	FIGURE 3-1		
CHECK		30OCT06			
REVIEW					

O:\Active_2006\1122\06-1122-186 Meadowbank Geochemistry\Aquachem analysis 2004-2006\All Data Trilinear Plot 2004_2006_LL

APPENDIX I

MONITORING WELL INSTALLATION DETAILS AND GEOLOGICAL LOGS



PIEZOMETER COMPLETION DETAILS

Location: Goose Island
Date Installed: 7-Aug-06
Drilling Method: Diamond Drill
Inclination (degrees): -54.939
UTM NAD83 Zone 14 Northing: 7212220.998
UTM NAD83 Zone 14 Easting: 638753.954
UTM NAD83 Zone 14 Azimuth: 215.447
Mine Grid Northing: -1225.636
Mine Grid Easting: 122.014
Mine Grid Azimuth: 195.367
Collar Elevation (top of pipe): 135.119 masl

LITHOLOGIC UNIT LEGEND

	OV	Overburden
	IV	Intermediate Volcanics
	IF	Iron Formation
	UM	Ultramafic
	QTZ	Quartzite

NOTES

masl = metres above sea level
EOH = End of Borehole

1. This figure is to be analyzed in conjunction with the accompanying report.
2. All depths are measured in metres along the dip of the borehole.
3. The borehole was drilled with HQ diamond drilling equipment immediately prior to installation, open hole diameter roughly 96.3 mm.
4. Monitoring well was constructed with Schedule 80 PVC pipe, 42.2 mm Outer Diameter (OD) and 31.9 mm Inner Diameter (ID).
5. Heat Trace Tape and connecting electrical cables were affixed to the outside of the PVC with conductive aluminum tape.

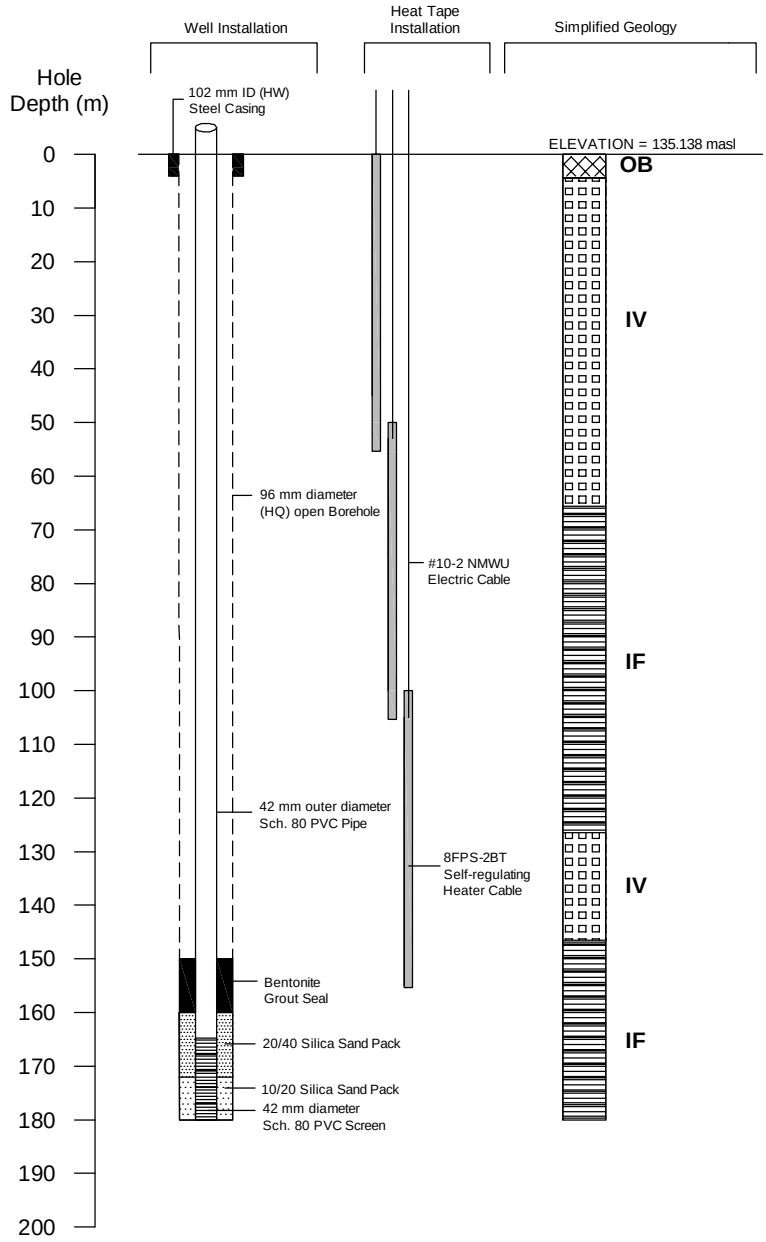
PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
MONITORING WELL COMPLETION DETAILS MW06-05

Golder Associates

PROJECT No. 06-1122-186			FILE No.	
DESIGN	JY	31OCT06	SCALE N.T.S.	REV. A
CADD	NV	31OCT06		
CHECK				
REVIEW				

FIGURE A-1



PIEZOMETER COMPLETION DETAILS

Location: Goose Island
Date Installed: 20-Aug-06
Drilling Method: Diamond Drill
Inclination (degrees): -54.452
UTM NAD83 Zone 14 Northing: 7212221.317
UTM NAD83 Zone 14 Easting: 638754.276
UTM NAD83 Zone 14 Azimuth: 232.013
Mine Grid Northing: -1225.226
Mine Grid Easting: 122.207
Mine Grid Azimuth: 211.933
Collar Elevation (top of pipe): 135.138 masl

LITHOLOGIC UNIT LEGEND

	OV	Overburden
	IV	Intermediate Volcanics
	IF	Iron Formation
	UM	Ultramafic
	QTZ	Quartzite

NOTES

masl = metres above sea level
EOH = End of Borehole

1. This figure is to be analyzed in conjunction with the accompanying report.
2. All depths are measured in metres along the dip of the borehole.
3. The borehole was drilled with HQ diamond drilling equipment immediately prior to installation, open hole diameter roughly 96.3 mm.
4. Monitoring well was constructed with Schedule 80 PVC pipe, 42.2 mm Outer Diameter (OD) and 31.9 mm Inner Diameter (ID).
5. Heat Trace Tape and connecting electrical cables were affixed to the outside of the PVC with conductive aluminum tape.

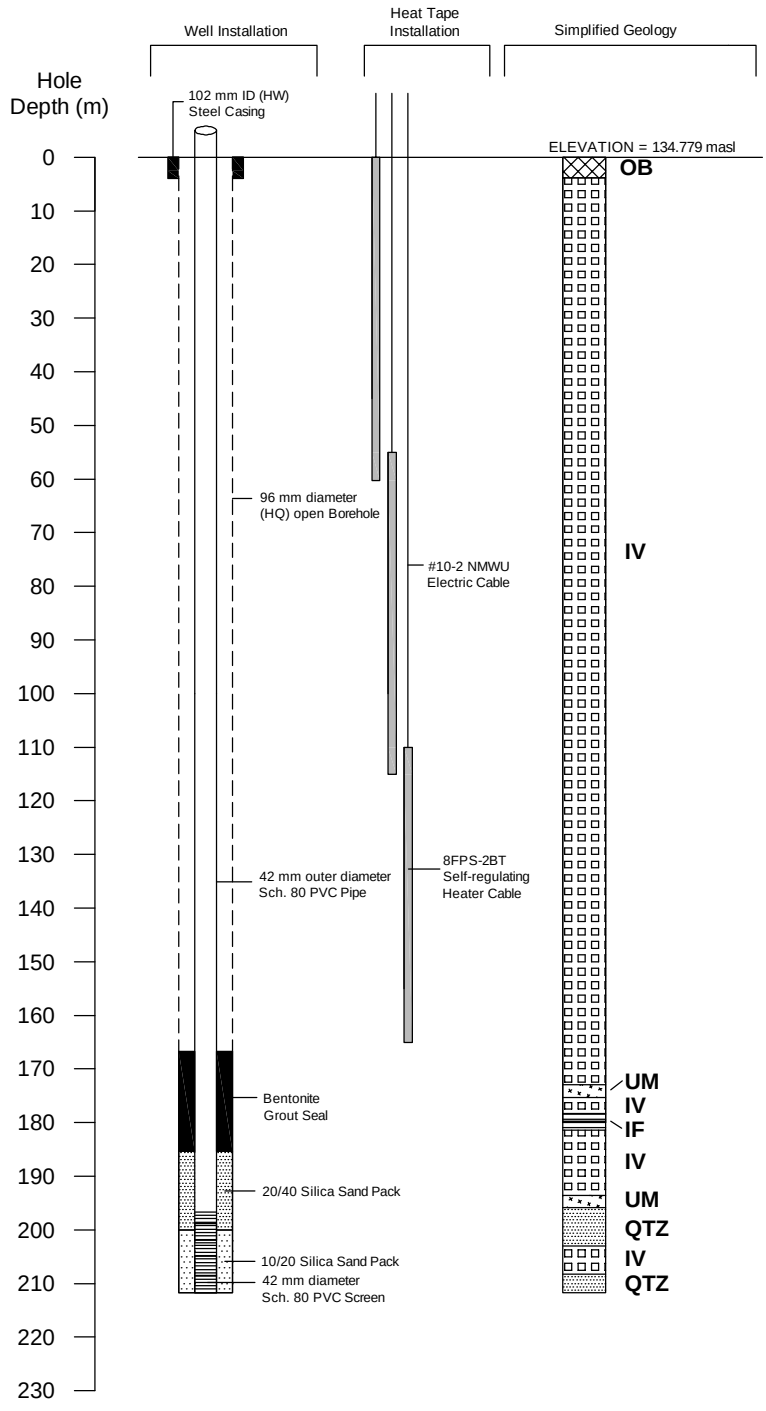
PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
MONITORING WELL COMPLETION DETAILS
MW06-06

Golder Associates

PROJECT No. 06-1122-186			FILE No.	
DESIGN	JY	31OCT06	SCALE N.T.S.	REV. A
CADD	NV	31OCT06		
CHECK				
REVIEW				

FIGURE A-2



PIEZOMETER COMPLETION DETAILS

Location: Goose Island
Date Installed: 25-Aug-06
Drilling Method: Diamond Drill
Inclination (degrees): -60.342
UTM NAD83 Zone 14 Northing: 7212114.525
UTM NAD83 Zone 14 Easting: 639399.363
UTM NAD83 Zone 14 Azimuth: 83.660
Mine Grid Northing: -1104.007
Mine Grid Easting: 764.864
Mine Grid Azimuth: 63.580
Collar Elevation (top of pipe): 134.779 masl

LITHOLOGIC UNIT LEGEND

	OV	Overburden
	IV	Intermediate Volcanics
	IF	Iron Formation
	UM	Ultramafic
	QTZ	Quartzite

NOTES

masl = metres above sea level
EOH = End of Borehole

1. This figure is to be analyzed in conjunction with the accompanying report.
2. All depths are measured in metres along the dip of the borehole.
3. The borehole was drilled with HQ diamond drilling equipment immediately prior to installation, open hole diameter roughly 96.3 mm.
4. Monitoring well was constructed with Schedule 80 PVC pipe, 42.2 mm Outer Diameter (OD) and 31.9 mm Inner Diameter (ID).
5. Heat Trace Tape and connecting electrical cables were affixed to the outside of the PVC with conductive aluminum tape.

PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
MONITORING WELL COMPLETION DETAILS MW06-07

Golder Associates

PROJECT No. 06-1122-186			FILE No.	
DESIGN	JY	31OCT06	SCALE N.T.S.	REV. A
CADD	NV	31OCT06	FIGURE A-3	
CHECK				
REVIEW				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT
DRILL LOG COVER SHEET

Diamond Drill Hole: MW-06-05
Deposit / Zone: Goose Island
Section: N/A

DRILL HOLE CO-ORDINATES

	X	Y	Z
UTM NAD83 Zone 14	638753.954	7212220.998	135.119
Local Grid	122.014	-1225.636	135.119

Casing	6m
Depth	180m

Logged By:	J.A. Palmer
Date Started:	2-Aug-06
Date Completed:	5-Aug-06

Purpose of Hole:	Monitoring (Water) Well on Goose Island; Target rock formation = IV
	HQ rock core; quick logged only.

DOWN HOLE SURVEYS

Depth	Dip	Az Mag	Az UTM	Az Local	Type	Comments
0	-54.9		215.447	195.367	Survey	Top of Casing
27	-55.0	235.6			Reflex	
78	-55.2	276.3			Reflex	
129	-54.5	310.8			Reflex	
180	-52.2	339.0			Reflex	

Az UTM = Az Mag - 4.5°

Az MB Main local = Az UTM - 20.08°

Az Vault local = Az UTM - 46.89°

Az PDF local = Az UTM + 11.62°

SUMMARY / COMMENTS

For downhole surveys use surveyed collar az due to influence of IF

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.:	MW-06-05	Co-ordinates: (MB grid: -1225.636N/122.014E), (UTM Z14:7212220.998N/638753.954E)	Date Started: August 2, 2006
Total Depth:	180m	Azimuth: (MB grid: 195.367°), (UTM Z14: 215.447°)	Date Finished: August 5, 2006
Casing:	6.0m	Plunge: -54.939°	Logged By: J.A. Palmer
Comments:	*Ground Water Monitoring Well (HQ core) on Goose Island. Meterage are accurate; good recovery & good RQD.*		

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
0.00	3.6	OVB ~ granite & IV				
3.60	180.00	IV; bio	3.60	9.00		<1%py, 0.1%po
		Med-drk gry (locally gry-grn), fine-med. Grained, wk-mod foliated.	9.00	14.00		0.1%py [ff, diss, bleb]
		Wk-mod. silicified (~cht) with Mod-Str Biotite alt. Generally ~ <1% qv-ccvn/vts.	17.50	26.00		0.1-3% (local ^5%) py [ff, massive blebs, repl.]
		Ep alt on fractures noted @ 28.75, 29.25, 29.80-30.00m				
		=S0/S1 @ 66 dtca @ 7.05m	26.00	28.00		0.1-0.5%cpy [//foln, diss.]
		=S0/S1 @ 20; S2 @ 155 (30R) dtca @ 12.65m				0.1%py [ff, repl.]
		=S0/S1 @ 15 dtca @ 20.26m	28.00	42.00		0.1%py [ff, repl.]
		=S0(assym fold) @ 10 & 145 (5R) dtca @ 20.45m	48.00	59.00		1-2%py (±0.1%po) [vf diss, clots, ff]
		=S1 @ 15 dtca @ 32.30m	59.00	66.00		1-3%py [diss, clots, repl, ff]
		=S1 @ 20 dtca @ 35.90m	68.50	72.00		1-3%py [clots, repl, diss]
		=S1 @ 15 dtca @ 43.60m				<1%po-py [ff]
		42.00m-67.00m: increased biotite alt; med. grain bio porphyroblasts.	74.00	80.00		1 (local^3%) py [euhedral diss, wisps, clots]
		Chl-calcite (& lesser qtz-chl) vns, vts 56.70-67.00m	80.00	90.00		0.1-1%py [diss, wisps]
		=S1 @ 10 dtca @ 48.25m	90.00	111.00		0.1-1%py [ff, clots]
		=S1 @ 15, S2 @ 120 dtca @ 51.15m (vein conjugate)	111.00	120.00		0.1%py [ff, clots]
		=S0/S1 @ 30 dtca @ 58.40m	120.00	128.00		0.1-0.5%py [diss, ff, clots]
		=S0/S1 @ 40 dtca @ 60.30m (marks Ur of 20cm thick med-coarse grained interval)	128.00	133.00		1-3%py-po {diss, massive blebs, ff]
		67.00m-84.00m: decreased (dissipation) of bio alt & bio porphyroblasts.				0.1(^0.5% local)cpy [ff, repl]
		Gradually finer (fine-med grain) matrix.				
		=S1 @ 35 dtca @ 76.80m				
		=S1 @ 40 dtca @ 78.55m				
		=S0/S1 @ 30 dtca @ 83.75m				
		84.00m-127.60m: Bio alt resumes. Bio porphyroblasts increased; var. size.				
		Amphibole (large 2-5mm crystals); (actinolite?) dom. assoc. with qtz-chl vns @ 84.80-85.00m				
		=S0/S1 @ 55 dtca @ 86.60m				
		=S0/S1 @ 60 dtca @ 88.12m				
		=S0(assym fold nose) @ 40 & 160 dtca @ 93.60m				
		=S0/S1 @ 15 dtca @ 96.20m				
		=S1 @ 10 dtca @ 101.50m				
		=S1 @ 15 dtca @ 114.40m				
		=S1 @ 10 dtca @ 106.35m				
		=S1 @ 20 dtca @ 118.45m				
		=S1 @ 25 dtca @ 128.00m				
		127.60m-133.00m: Attenuated transposition of S1 planes with proto-mylonitic qtz-chl veining.				
		Minor Ep alt on vns and fractures.				
		Half core dia. composed of sub-angular brecciation (cataclastic) @ 131.0-131.40m				
		=S1 @ 20 dtca @130.55m				
		=S1 @25 dtca, S2 @ 45 (120R) dtca @ 132.20m				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.:	MW-06-05	Co-ordinates: (MB grid: -1225.636N/122.014E), (UTM Z14:7212220.998N/638753.954E)	Date Started: August 2, 2006
Total Depth:	180m	Azimuth: (MB grid: 195.367°), (UTM Z14: 215.447°)	Date Finished: August 5, 2006
Casing:	6.0m	Plunge: -54.939°	Logged By: J.A. Palmer
Comments:	*Ground Water Monitoring Well (HQ core) on Goose Island. Meterage are accurate; good recovery & good RQD.*		

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
		133.00m-159.80m: Resumes to classic IV;bio with no attenuation-no protomylonitic texture.	133.00	136.00		3-5% po-py [diss]
		Med-dark gry, fine-med grain, wk-mod foliated. Bio porphyroblastic.	136.00	149.00		0.1%py [diss, ff, clots]
		=S1 @ 10 dtca @ 134.05m	149.00	152.00		1% py [clots, diss.]
		=S1 @ 20 dtca @ 134.35m	152.00	154.00		3-5% py [repl., ff, clots]
		=S1 @ 15 dtca @ 139.70m	156.00	162.00		0.1% py [blebs, ff]
		=S1 @ 20 dtca @ 143.00m	162.00	165.00		3-5% po-py [blebs, ff, diss] (^5% 163.50-164.50m dom assoc. with qtz veins, cht)
		=S1 @ 10 dtca @ 150.20m				
		=S1 @ 25 dtca @ 150.55m				
		=S0/S1 (fold nose) @ 30 & 330 dtca @ 157.95m	165.00	168.00		3% py [repl., ff]
		=S1 @ 30 dtca @ 158.30m	168.00	180.00		0.1% py [diss, //foln, blebs]
		159.80m-163.00m: Still IV;bio. Psuedolapilli (~protomylonitic) and attenuated.	180.00			EOH
		Qtz-chl-cht (~10cm) @ 159.70 withTransposition of S1 planes below 159.80m.				
		Qtz-cht nodules rounded-subrounded; 1-4mm dia. Generally Mod-Str silicified.				
		=S1 @ 15 dtca @ 160.20m				
		=S1 @ 20 dtca, S2 @ 125 (45R) dtca @ 161.30m				
		=S2 (fracture) @ 15 dtca @ 163.00m (Lr of protomylonitic texture)				
		163.00m-168.00m: Returns to classic IV;bio with no attenuation - no protomylonitic texture.				
		Bio porphyroblasts coarser up to 2-3mm dia.				
		Higher mineralized (^5-7% locally) @ 163.5-164.5m dom assoc with qtz vn & cht (~30 cm).				
		Pervasive cc vts/vns, esp. 167.40-168.00m with Ep alt on fractures (167-168m)				
		=FLT/SH/ CCvn (~5cm thick) @ 15 dtca @167.40-168.00m : core is brecciated (dom on Ur);				
		Lr is psuedolapilli (~protomylonitic). Clay/fines present @167.40-167.50m.				
		168.00m-169.00m: IV;bio (psuedolapilli texture) with cht nodules up to 3 mm dia.				
		= S1 @ 20 dtca @ 168.60m				
		169.00m-180.00m: Returns to unattenuated (non-protomylonitic) IV;bio.				
		= S0/S1 (fold nose) @ 25 & 200 dtca @ 173.70m				
180.00		EOH				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.:	MW-06-06	Co-ordinates: (MB grid: -1225.226N/122.207E), (UTM Z14:7212221.317N/638754.276E)	Date Started: August 8, 2006
Total Depth:	180m	Azimuth: (MB grid: 211.933°), (UTM Z14: 232.013°)	Date Finished: August 5, 2006
Casing:	5.5m	Plunge: -54.452°	Logged By: J.A. Palmer
Comments:	*Ground Water Monitoring Well (HQ core) on Goose Island. Meterage are accurate; good recovery & good RQD.*		

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
0.00	4.80	OVB ~ granite & IV				
4.80	65.95	IV; bio	4.80	13.00		^ 1% py as diss, wispy, clot.
		Med-drk gry (locally gry-grn), fine-med. Grained (with some coarse intervals), wk-mod foliated.	13.00	17.00		^3% py as diss, clots, ff.
		Wk-mod sil with mod-str bio alt, ~ 1% qv or cc vn/vts.	17.00	64.00		Tr-1% py as clots, ff, diss.
		Qtz vn (~3cm thick) @ 9.00m. Chl noted in vts @ ~11.85m, chl alt local.				(^3-5% local @ fracs)
		=S1 @ 35 dtca @ 9.45m	64.00	65.95		Tr-1% py as clots, diss. ±
		=F1 (bull white qv ~ 1.5cm thick) @ 50 dtca, F2 (crosscutting vn) @ 140 (25R) @ 12.90m				Tr % po.
		=S1 @ 45 dtca @ 14.0m	65.95	73.00		Tr-1% py as clots, ff, //foln.
		=S1 @ 30 dtca @ 17.90m	73.00	73.60		~15 (^20)% py dom. associated with
		=S1 @ 25 dtca @ 19.00m				vn (~ 5% py in non-vein IF)
		Ep alt on fracs @ 19.24-19.44m	73.60	75.00		5-7% (local) py as //foln, diss.
		Potassic Feldspar present in qtz / F-spar vns/vts.	75.00	76.70		Tr-1% po-py as ff, repl, //foln.
		=F1 (qtz-feldspar vn ~ 6cm thick) @ 20 dtca @ 20.30m	76.70	95.00		5-7% py-po as // foln, diss, repl, ff.
		=S1 @ 25 dtca, S2 @ 120 (160R) dtca @ 25.55m				Dom. Py (~tarnished)
		Cc vts ~ parrallel to ca @ 28.00m - 31.00m	95.00	97.00		10-15% py as diss, ff, repl.
		=S1 @ 20 dtca @ 30.60m	97.00	101.30		3-5% py as //foln, ff, diss.
		=S1 @ 15 dtca @ 31.20m	101.30	102.92		1-3% py-po as //foln, diss, repl.
		=S1 @ 7 dtca, S2 @ 20 dtca @ 36.30m	102.92			Tr-0.5% py as bleb, //foln.
		Ep alt on fracs @ 40 dtca @ 41.00m				
		=S1 @ 5 dtca @ 40.70m				
		=S0/S1 (fold nose) @ 5 & 175 dtca @ 41.00m				
		=S1 @ 10 dtca @ 41.80m				
		Ep alt on fracs @ 30 dtca @ 42.85m				
		=S1 @ 5 dtca, S2 @ 45 (100R) dtca @ 44.00m				
		=S1 @ 15 dtca @ 46.55m				
		Cc & K-Feldspar matrixed breccia (~12 cm thick) @ 48.88-49.00m				
		=F2 (Ccvt/vn) @ 15 dtca; cross-cuts F1 qtz vn (~6 cm thick) with no distinct orientation				
		Cc vn/vt ~ parrallel to ca; 52.00-53.00m				
		=S1 @ 20 dtca @ 54.50m				
		=S1 @ 25 dtca @ 58.55m				
		=F1 (qtz/dolomite vn ~ 7cm thick) @ 20 dtca @ 58.00m				
		Bio porphyroblsts common (2-3 mm dia.) 58.00m-65.95m				
		=S1 @ 25 dtca, S2 (Chl vn) @ 50 dtca (160R) @ 59.10m				
		=S1 @ 20 dtca, S2 (cross-cutting vn/vt) @ 25 dtca (105R) @ 62.20m				
		Lr contact @ ~30 to 40 dtca				
65.95	102.92	IFQM; IVchl				
		Drk grn (IVchl) - black (banded IF); generally fine grained with mod foliation.				
		Presence of large (2-5mm) amphibole (actinolite?), dom. in IVchl bands.				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.:	MW-06-06	Co-ordinates: (MB grid: -1225.226N/122.207E), (UTM Z14:7212221.317N/638754.276E)	Date Started: August 8, 2006
Total Depth:	180m	Azimuth: (MB grid: 211.933°), (UTM Z14: 232.013°)	Date Finished: August 5, 2006
Casing:	5.5m	Plunge: -54.452°	Logged By: J.A. Palmer
Comments:	*Ground Water Monitoring Well (HQ core) on Goose Island. Meterage are accurate; good recovery & good RQD.*		

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
		Fine grained grunerite crystals developed in IF but dom. between bands. Str. Magnetic.				
		=S0/S1 (open folded nose) @ 25 & 165 dtca; S2 @ 35 dtca, @ 67.00m				
		=S0/S1 @ 25 dtca, S2 @ 120 dtca (130R) @ 70.65m				
		=F1 (Cht; chl vn ~ 3cm thick) @ 25 dtca @ 73.35m				
		Str mineralized with ~ 5% py (diss, //foln) in non-vn IF and 20(^25)% py as repl, //foln, ff in vn.				
		=S0/S1 @ 15 dtca @ 74.70m				
		=S0/S1 @ 20 dtca @ 77.80m				
		=S0/S1 @ 25 dtca @ 79.50m				
		=S0/S1 (fold nose seperating IVchl [inside fold] & IF [outside]) @ 25 & 150 dtca @ 81.22m				
		=S0/S1 (fold nose) @ 25 & 150 dtca @ 84.10m				
		=S0/S1 @ 10 dtca @ 84.60m				
		84.60-92.00m: several fold noses with <10 dtca limbs; S0/S1 approx. parrallel to CA				
		=S0/S1 (F1 = Lr of IVchl interbed) @ 18 dtca, S2 @ 130 dtca @ 90.45m				
		=S0/S1 @ 10 dtca @ 94.60m				
		95.00-97.00m: Str folded & crenulate; S0/S1 difficult to read; str mineralized (10-15% py).				
		=S0/S1 @ ~15 dtca @ 98.75m				
		=S0/S1 (F1 = Lr ct of IFQM & Ur ct of IVchl unit) @ ~18 dtca @ 102.92m				
102.92	105.25	102.92-105.25m: IVchl; IFQM				
		Med-drk grn, Med-coarse grained IVchl with porphyroblastic amphibole (<1mm dia)				
		Mod-well foliated with qtz-chl laminated fractures; wk crenulated (local).				
		Generally not silicified whereas IF and IFQM is str silicified.				
		=S0/S1 @ 25 dtca @ 104.00m				
		=S0/S1 (F1 = Lr ct of IVchl) @ 35 dtca @ 105.25m				
105.25	127.20	IFQM				
		As before/above with local IFMQ; IVchl as minor bands 1-3cm thick with fine grunerite				
		bwt cht and mt bands. Up ct approximates Up ct of IF in MW03-02				
		S0,S1 S 20 dtca @ 108.20				
		S0,S1 @ 15, S2 @ 130 (20R0 dtca @ 109.20m				
		S0,S1 @ 7, S2 @ 155 (170R) dtca @ 111.90m				
		S0,S1 @ 7, 175 dtca @ 113.60m, fold nose				
		109.70-110.40: Cht qtz interval with poor floiation and 3-5% py replacement.				
		S0,S1 @ 17 dtca @ 115.50m				
		116.35-117.00: Highly crenulated; S0,S1 not readable				
		S0,S1 @ 15 dtca @ 118.15				
		S0,S1 @ 20, S2 @ 160(150R) dtca @ 119.55m				
		S0,S1 @ 35 dtca @ 122.00m				
		S0,S1 @ 15 dtca , S2 @ 165 dtca @ 124.25m				
		lr ct in broken core.				
127.20	141.35	IVsc				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.:	MW-06-06	Co-ordinates: (MB grid: -1225.226N/122.207E), (UTM Z14:7212221.317N/638754.276E)	Date Started: August 8, 2006
Total Depth:	180m	Azimuth: (MB grid: 211.933°), (UTM Z14: 232.013°)	Date Finished: August 5, 2006
Casing:	5.5m	Plunge: -54.452°	Logged By: J.A. Palmer
Comments:	*Ground Water Monitoring Well (HQ core) on Goose Island. Meterage are accurate; good recovery & good RQD.*		

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
		Yellowish gray green med to coarse grained, wk mod foliated				
		Mod to strong sericitic (bleached) and wk chl matrix.				
		Biotite poryroblastic (generally about 1mm diameter up to 3mm.				
		Cut by several cht vns/qtz chl vns up to 10 cm thick with Kspar in some.				
		Veinlets below 133.30				
		136.21-136.28: qtz veining with potssic alteration w 3% disseminated and agregate py, cts 25				
		136.50-136.80 Cht: interbed with abundant fol parallel py 7-10% v.fine aggregated bands cts 30				
		138.68-139.00: qv minor py wek kspar fol prll lower ct, up ct infolded at 130 degrees				
		S0,S1 @ 25 dtca @ 127,50				
		S0,S1 @ 27 dtca @ 129.10				
141.35	142.97	QV				
		Clear white massive. Sulphide absent. Minor dark chlorite on fractures.				
		Up ct 130(30R), Lr ct 120 (S0,S1;S2)				
142.97	146.80	IVsc;IVcs				
		continuation of 127.20-141.35				
		Bleaching diminishes, chlorite content increasing downhole.				
		Minor veining. Sulphide trace to absent.				
		S0,S1 @ 30, S2 @ 130(20R) dtca @ 145.20, penetrating and spaced cleavage.				
		So,S1 @ 25 dtca @ 146.80, lr ct				
146.80	147.64	IVcs;chl;QV				
		IV 70: QV 30				
		med to dark gray green. Fine grained bio altered.				
		mod to strong chlorite, wk patchy ser, pervasive alteration.				
		Ivcs transitional to IVchl				
		Veining is composite with S1,S2 orientations, fractures				
		Minor pyrite in chl altered quartz adjacent segments.				
		S0, S1 @ 35, S2 @ 150 dtca @ 147,64m kr ctm bedding offsets.				
147.64	151.00	IFQM;IVchl				
		IF 60: IV 40				
		IV: strong chlorite altered 5% biotite porphyrobasts, 2-3mm				
		IF: Chert dominant bands 70% 30%magnetite laminae.				
		weak uniform grunerite alteration of broader bands concentrated on chert margins with				
		thinner bands, 7%				
		sulphide 1-2% py fracture fill in IV, fr fol fill in IF				
		Broad open central fold				
		S0,S1 @ 25, S2 @140 (20R) dtca @ 151.00m bedding, offset, spaced cleavage				
151.00	165.58	IFQM				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.:	MW-06-06	Co-ordinates: (MB grid: -1225.226N/122.207E), (UTM Z14:7212221.317N/638754.276E)	Date Started: August 8, 2006
Total Depth:	180m	Azimuth: (MB grid: 211.933°), (UTM Z14: 232.013°)	Date Finished: August 5, 2006
Casing:	5.5m	Plunge: -54.452°	Logged By: J.A. Palmer
Comments:	*Ground Water Monitoring Well (HQ core) on Goose Island. Meterage are accurate; good recovery & good RQD.*		

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
		Q/M: 60/40				
		Chert dominatn forming 1 cm bands and sub bands interspersed by magnetite laminae,				
		sub bands and lesser 1cm bands				
		Grunerite weak uniform in broader bands peripheral to complete in subbands, occ sparse in Mt ba				
		7% overall				
		Single 1 cm chlorite band drifts out at 53.00m				
		Bedding subparallel to core axis				
		Open folding apparent from periodic closures, noses @ 1545.60,158,00,161,00				
		Sparse vein content <1% S2 parallel 1-3mm				
		sparse sulphide content about 1% overall				
		165.22-165.58 weak becoming mod sil off S2 fabric				
		S0,S1 @ 15, S2 2 140(15) dtca , lr ct 165.18				
		S0,S1 @ @ 20 @ 153.00m; S0,S1 @ 10 dtca @ 156.00m; So,S1 @ 30/160, S2 @ 130(35R)				
		So,S1 @ 30/160, S2 @ 130(35R), S3 @ 80(80R) fold spaced cleavage, offset				
		S0,S1 @ 30 dtca @ 159;S0,S1 @ 20 dtca @ 162.00m; S0,S1 @ 35 dtca @ 165				
		S0,S1 @ 20, S2 @ 140 (10R) @ 165.58, compopsite contact				
165.58	166.35	IVchl;cord				
		Dark green. Very fine fine grained.				
		Strong pervasive chlorite alterationl				
		Biotite rphyroblastic 1-2mm throughout 5-7%				
		Central 2/3 cordierite altered 1-2mm locally 3mm, 7-10%				
		Veining absent. Minor py S1,S2 parallel structures, near lower ct				
		S0,S1 @ 25 dtca @ 166.35m				
166.35	*180.00*	IFQM	166.35	167.08	2-3% py>po	
		Q 60/M 40 Continuation of 151.00-165.58	167.08	168.18	1-2% py>po	
		Regular banding Q>M band width.	168.18	169.80	3-5%py.po	
		Veining minor Q S2 parallel <1%, 2-3mm	169.80	172.00	1% py=po	
		Bedding subparallel to core axis. Periodic open folding.				
		Weak sil 10cm at Up ct				
		Pattern of gruneraite alteration unchnged.				
		S2 as space cleavage and offsts.				
		Sulphides sparse concentrated at time at or near fold closures and at ujper ct with silicification.				
		fold closures 162.77, 172.85				
		s0,S1 @ 15 dtca @ 168.00m				
		S0,S1 @ 10 dtca @ 171.00m				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.: MW06-07	Co-ordinates:	Date Started:	
Total Depth:	Azimuth:	Date Finished:	
Casing:	Plunge:	Logged By:	
Comments:			

METERAGE		LITHOLOGIES, STRUCTURE, ALTERATION	MINERALIZATION			
From	To	Description	From	To	Sample #	Zone/Comments
3.40	24.66	IVcs / IVA (mod-[illegible] sev) - tuffaceous with mostly lapilli sized fragments larger felsic? clasts up to 6-7cm locally in a chloritic fg to vfg groundmass. calcite alt as stringers // S. LC gradational → So?/S1 (cal) @ 75° TCA @ 15.0m				
24.66	32.1	IVcs / FV (pot). (weak-sev) med green fg IV interbedded w orange to red (potassic) felsic? beds. Unit appears compositionally band w the bands < 1cm. LC gradational?				
32.1	74.9	IVcs / IVA med green fg chloritic IV. similar to 3.4-24.66 but potassically altered frags. Still pervasive calcite → So?/S1 (cal) @ 70° TCA @ 39.3m → So?/S1 @ 70° TCA @ 62.5m - LC gradational, marked by disappearance of the large potassic clasts.				
74.9	91.67	IVcs / FV - similar to 24.66m to 32.1m above, although the orange alteration is less prevalent. Unit still appears compositionally banded. More felsic bands are generally pale green in colour → So?/S1 @ 65° TCA @ 83.5m LC // So/S1 @ 60° TCA.				
91.67	110.34	IVcs / IVA (IVLT) green fg chloritic IV w large felsic fragments as above				
110.34	116.8	IVcs / FV - similar to above units; appears compositionally banded 112.20 - 113.0m: broken rubbly core, poss. [illegible] clay gouge. Fault zone? too broken for orientation 115.3 - 116.0m: Another fault? Mod-strong shearing, clay gouge. Possibly // So/S1? @ ~40° TCA.				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.: MW06-07	Co-ordinates:		Date Started:
Total Depth:	Azimuth:		Date Finished:
Casing:	Plunge:		Logged By:
Comments:			

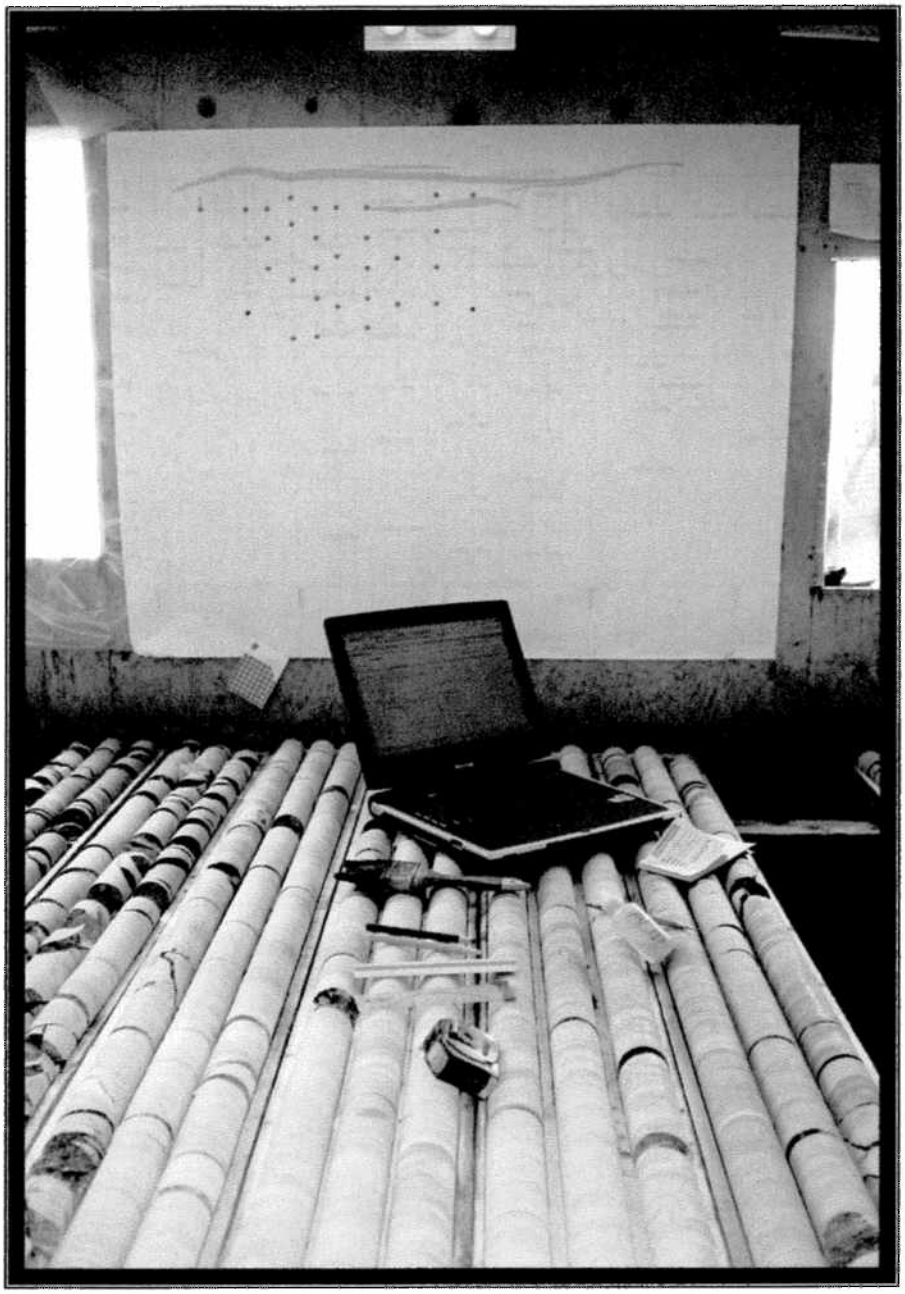
METERAGE From	METERAGE To	LITHOLOGIES, STRUCTURE, ALTERATION Description	MINERALIZATION From	MINERALIZATION To	MINERALIZATION Sample #	MINERALIZATION Zone/Comments
116.8	137.80	IVcs / IVA (IVLT) - similar to 91.67m – 110.34m above. Large felsic (pot. alt'd) clasts; some flattening of clast ⊥ fol. 120.65m - 120.88m: fault. clay gouge, broken, rubbly core possibly oriented @ ~35° TCA L.C. gradational.				
137.8	146.6	IVcs / FV (comp. banding as above) - S? / S1 @ bg. TCA @ 138.5m L.C. gradational.				
146.6	172.55	IVcs (local IVA?). md. green, fg IV local weak potassic alteration and minor to rare) fragments. Pervasive calcite stringers. + S1 (cal) @ 45° @ 165.12m L.C sharp @ 70° TCA.				
172.55	175.70	UMV 173.70 – 175.20m: broken core, local shear // S1 @ 60° TCA L.C undulating @ 70° TCA				
175.70	178.20	IVcs / chert m.g to fg (locally) IV unit w local pot. alt and i. bedded chert bands (< 1cm wide) folded.				
		L.C gradational.				
178.20	181.22	IFOM / IFMG (minor IVchl) fg; thinly laminated; strongly folded near L.C.	181.20	181.22		3-5% py disseminated
181.22	188.46	IVcs / Chert. - as above; numerous 5cm band of IF @ 182-16 - prob. infolded - contacted; chert bands thicker downhole - actually grade.				
188.46	191.64	UMV - grad. contacts - both UC & LC				

CUMBERLAND RESOURCES LTD.

MEADOWBANK PROJECT - DRILL HOLE SUMMARY

Hole No.: MW-06-02	Co-ordinates:		Date Started:
Total Depth:	Azimuth:		Date Finished:
Casing:	Plunge:		Logged By:
Comments:			

METERAGE From	METERAGE To	LITHOLOGIES, STRUCTURE, ALTERATION Description	MINERALIZATION From	To	Sample #	Zone/Comments
191.68	203.84	QTZT.				
		-white, grey, well banded to massive, pale yellow-green felsic ceramy				
		-LC gradational - interbanded.				
		- rad to strong sulph @ 202.2 - 202.2.				
203.84	207.93	IV				
		- fg to vfg - 5-10% irreg qv + py	205.71	206.21	122516	5-8% cg py
		mod to strong py @ 205.2 - 207.2	206.21	206.71	122517	4-6% cg to fg py.
207.93	212.00	QTZT.				
		-as above.				
212.0		EOH.				



CUMBERLAND
RESOURCES LTD.

Meadowbank Gold Project
Logging & Data Protocol
2006

Logging Codes

A list of standard lithology codes and descriptor abbreviations is provided to each person (see attachment A). The codes are an attempt to aid the logger and standardize on-site geological data capture. Please follow the system closely and feel free to suggest new codes where applicable.

Logging Forms

An Excel-based logging template is used by Cumberland to facilitate data manipulation. The log consists of two parts, a header sheet and a consolidated (consol) sheet (see attachments B and C, respectively).

The header sheet is where collar coordinates, collar survey data, down-hole survey data, general purpose of drill hole and other pertinent information will be entered.

Survey Coordinates – these are obtained from the surveyor who will provide a sheet with the survey details for the hole (station #, back sight, etc.) and the results (coordinates, elevation, azimuth and dip) in both UTM and local grid coordinates. The logger will enter all data into the appropriate cells on the header page of the electronic log.

Down Hole Surveys (Sperry Suns) - are read by the logger and entered into the header sheet. Correction factors for UTM and local grid azimuths are provided on the sheet.

The Consol sheet is the comprehensive logging form where all descriptive, structural, alteration, mineralization and sampling information is entered.

Logging

The geologist will enter data directly into the electronic logging forms closely following the format provided in the sample copy (Follow 1to 6 below with attachment D).

Data entry and error free compilation of that data will be the responsibility of the logger.

The logging sheet has several sections including the following highlighted regions:

1. **Meterage and Rock Description:** includes from / to measurements and description.
    - Enter only rock codes with semi-colon on the first line of the description (3 units or less is recommended; FLT, FZ & BX are modifiers **not** rock types thus they never start a rock name). The description should cover colour, grain sizes, bed thickness, foliation intensity, alteration intensity, sulphide abundance and habit, vein occurrences, etc.
    - Structural details are to be grouped as comments at the end of each description and where applicable rotation angles should be recorded.
    - Each unit ends with a lower contact measurement or description.

2. **Geodet Intervals**: sub units within the larger rock interval based on lithologic, alteration or structural features. These need from / to, rock type and contact angles assigned where applicable.
    - All geodet meterages must be consecutive.
    - Enter rock codes with semi-colon & use shrink to fit (**3** units or less is recommended; FLT, FZ & BX are modifiers **not** rock types thus they never start a rock name).
    - The lower contact measurement is entered at the start of the next unit.

Important Note!

❖ ***QA/QC***: Batches of **22** samples will each contain one Blank, one Duplicate & one Standard (different standard values are available). These are randomly inserted within the "22" & vary throughout the sampling process.

3. **Structure:** Bedding, foliation, shear angles with intensity (1, 2 or 3 corresponding to weak, moderate or strong, respectively) and RQD for selected intervals.
4. **Alteration:** Includes coded vein-types with semi-colons & their abundance as well as a variety of alteration minerals. All are recorded with percentages except: SIL (silicification), SER (sericitization) & MT (magnetite) are given a relative strength measurement (scale of 1 to 3).
5. **Minerals:** Includes all sulphide minerals. Pyrite and pyrrhotite are the most common but base metal and other sulphide minerals do occur (Estimated percent composition is taken from the AGI chart, attachment E).
6. **Sampling Information:** Includes sample number, interval length and assay results. Loggers will fill in the sample number, tabulate interval lengths & enter notes where applicable (e.g.: Blank, Dup, Std#, Rep Samp, VG, New Tags, etc.).

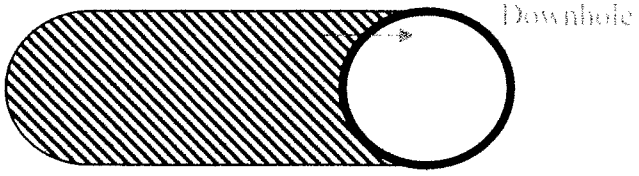
    Maximum sample length is **1.5m** and minimum is **30cm**. Samples are ***not*** taken across lithological contacts and are positioned based on visual sulphide concentration variations.

Structural Measurements

Structural measurements collected down hole may be either single or multiple angles relative to the core axis (0 to 180 dtca; degrees to core axis), with or without rotational measurements (< or = 180R, rotation). See attached diagrams of angular & rotational recording devices (attachment F).

If a single structural feature is measured then the angle, relative to the core axis, is collected and recorded between 0 and 90 degrees.

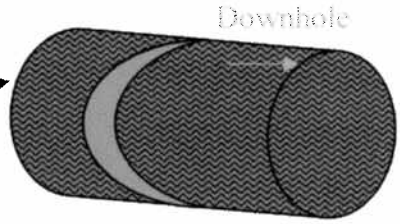
= S0 @ 45dtca @ 4.5m



If two structures with variable angles and coincident apices (i.e.: no rotation) are observed the angles to the core axis recorded will be between 0 and 180 degrees.

= S0 @ 70dtca, S1(ser) @ 80dtca @ 12.62m

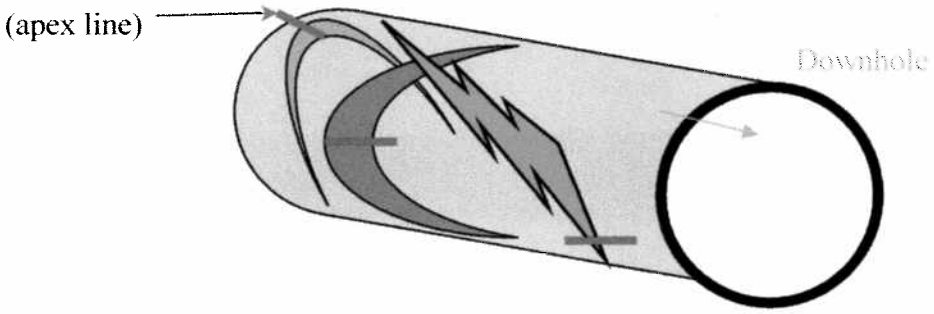
= S1(qvn) @ 85dtca, S2(chl) @ 160dtca @ 20.8m



If two or more structures with varied angles and apices are observed then core axis angles and rotations are recorded. While looking downhole and with the aid of the rotational protractor; set the scale to zero, align the protractor with the apex of the earliest feature and measure in a clockwise direction to the apex of the next oldest feature to be measured, record the rotation (NB: < or = 180R). Next, visually restore the apex of the second feature to the apex of the first feature and record the angle in degrees to core axis, repeat for other structural features.

= S0 @ 70dtca, S1(py) @ 80(70R) @ 30.27m

= S1(po) @ 60dtca, S2(chl) @ 60(90R), F1(qv) @ 155(170R) @ 42.3m



Editing

Data entered into the logging forms should be edited for from / to mistakes, formatting, typos (***SET DICTIONARY*** **to: English, U.K.),** incorrect codes, sampling etc.

Creation of Hard Copy File

A hard copy file is to be made for each drill hole and should include:

- A drill hole cover sheet.
- The most up to date copy of the main logging (Consol sheet).
- All Sperry Sun surveys (or others), stapled to the inside of the file folder.
- A drill hole survey sheet, provided by the surveyors with UTM and local grid coordinates.
- A copy of the geotech data for the hole (regular data only not detail data).

Quick Logs

Initial logging procedure whereby a concise collection of primary drill hole geology, select structural information and sulphide percentages is taken for timely geological data interpretation. Generally a designated person will be assigned this task, however other geologists may be called upon to produce quick logs if necessary (see attachment G).

Plotting

Geologists (*or a designate*) shall plot the 2004 holes by hand or they will be electronically set onto sections, showing all current data. Interpretation and correlation of geological units and structures with adjacent holes may also be required periodically.

Checklist

A complete checklist will be posted that lists all activities associated with the drill program from DDH spotting through to an e-file being sent to Vancouver. All parties involved in the completion of drill tasks will be responsible for keeping this list current (see attachment H).

Additionally you may need to periodically add necessary information to the drill summary sheet (attachment I).

All loggers shall be required to personally keep track of the QA/QC "22's" they use. Two copies of this file are printed so that the splitters and the logger each retain a version. Prior to shipment a logger will personally initial the form confirming that the shipment is ready and meets the required sample protocol detailed above (see attachment J).

Entry of assays *(Designated personnel only)*

Assays will be entered and assay sheets created only after assay results are posted from IPL Labs. Upon receipt, assays will be copied directly into the log consol sheet. This will include all QA/QC results as well as primary assay results.

Creation of Composite, Assay, Geodet and Lith sheets

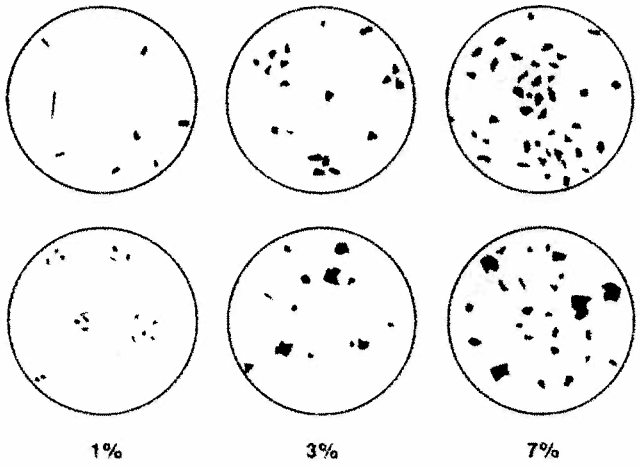
(Designated personnel only)

Once the logger has deemed the consol sheet error free and the certified assay data has been entered the composite, assay, geodet and lith sheets can be completed by cut and paste method from the consol sheet into the appropriate worksheet. Headers for each worksheet are provided in the template.

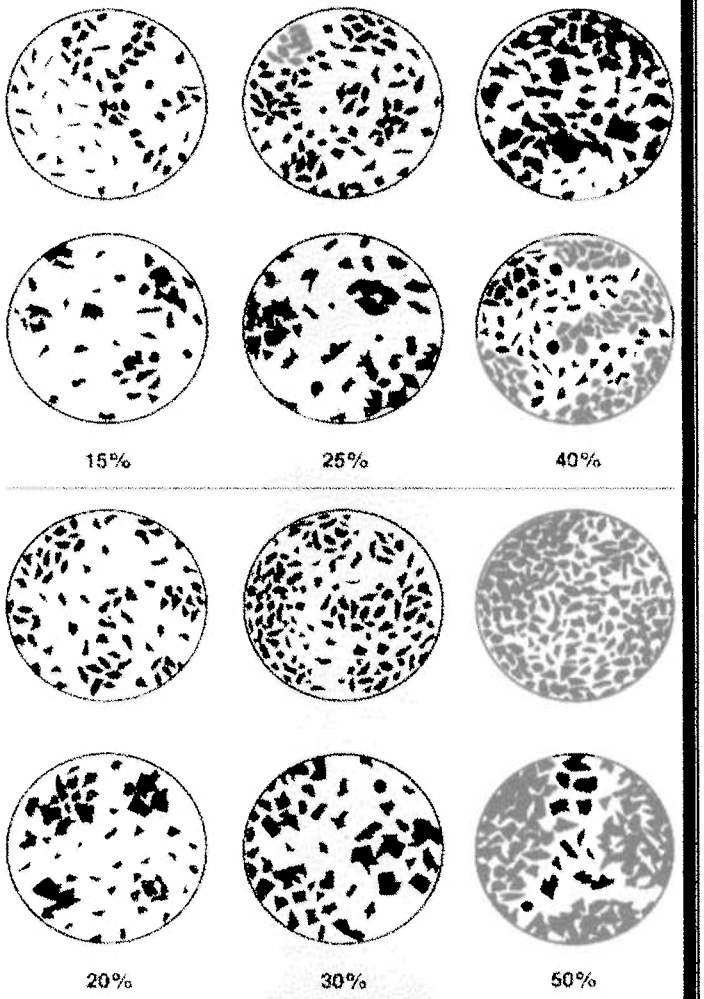
AGI DATA SHEET 23.1

Comparison Chart for Estimating Percentage Composition

Prepared by Richard D. Terry and George V. Chilingar, Allen Hancock Foundation, Los Angeles. Reprinted from *Journal of Sedimentary Petrography*, v. 25, n. 3, p. 229–234, Sept. 1955.



AGI DATA SHEET 23.2



Attachment E

2004 Meadowbank Logging / Mapping Codes

Code	Definition
Rock Types	
BAS	Basalt
CB	Carbonate Mud
Chert	Chert
CPC	Chert Pebble Conglomerate
CGL	Conglomerate
DIAB	Diabase
DIOR	Diorite
FP	Feldspar Porphyry
FQP	Feldspar Quartz Porphyry
FD	Felsic Dyke
FV	Felsic Volcaniclastic (quartz-feldspar) schist
FV tuff	Felsic Volcaniclastic (quartz-feldspar) ash tuff
FVT	Felsic Volcaniclastic (quartz-feldspar) Tuff (>2mm; lapilli)
IVT	Felsic Volcaniclastic (feldspar-quartz) Tuff (>2mm; lapilli)
GB	Gabbro
GR	Granite
GRD	Granodiorite
GWY	Greywacke
IVA	Intermediate Volcaniclastic Agglomerate (polymictic)
IVAT	Intermediate Volcaniclastic Ash Tuff
IVbio	Intermediate Volcaniclastic biotitie schist (unaltered, ~wacke)
IVchl	Intermediate Volcaniclastic chlorite schist
IVcs	Intermediate Volcaniclastic chlorite-sericite schist
IVcs, tuff	Intermediate Volcaniclastic chlorite-sericite tuff
IVcs, bio	Intermediate Volcaniclastic chlorite-sericite, biotite schist (altered)
IVs	Intermediate Volcaniclastic sericite schist
IVs(sil)	Intermediate Volcaniclastic sericite schist w silicification
IVsc	Intermediate Volcaniclastic sericite-chlorite schist
IVsc, tuff	Intermediate Volcaniclastic sericite-chlorite tuff
IVsc, bio	Intermediate Volcaniclastic sericite-chlorite, biotite schist
IFQM	Iron Formation chert-magnetite
IFMQ	Iron Formation magnetite-chert
LAMP	Lamprophyre Dyke
MV	Mafic Volcanic
MZD	Monzodiorite
MYL	Mylonite
OVB	Overburden
QBX	Quartz Breccia
QCCBX	Quartz Calcite Breccia
QCCV	Quartz Calcite Vein
QCBX	Quartz Carbonate Breccia
QCV	Quartz Carbonate Vein
QIVT	Quartz Eye Volcanic Tuff
QFP	Quartz Feldspar Porphyry
QPC	Quartz Pebble Conglomerate
QP	Quartz Porphyry
QV	Quartz Vein
QVBX	Quartz Vein Breccia
QTZT	Quartzite
UMV	Ultramafic Volcanic
UMA	Ultramafic Volcanic Actinolite
UMF	Ultramafic Volcanic Foliated
UMS	Ultramafic Volcanic Serpentinized

Attachment A

2004 Meadowbank Logging / Mapping Codes

Code	Definition
Descriptors	
ab	albite
alt	alteration
altd	altered
amph	amphibole
anast	anastomosing
&	and
ang	angular
ank	ankerite
aph	aphanitic
~	approximately
arg	argillic
aspy	arsenopyrite
assoc	associated
asymm	asymmetrical
@	at
ax pl	axial plane
So	bedding
bio	biotite
bk	black
blch	bleached
bx	breccia
bn	brown
bf	buff
cc	calcite
cal	calcite
cm	centimetre
cpy	chalcopyrite
cht	chert
chl	chlorite
cy	clay
cg	coarse grained
comp	compositional
comp bnd	compositionally banded
conc	concentration
ct	contact
cord	cordierite
cren	crenulated
x-cut	cross cutting
xtls	crystals
dk	dark
dec	decrease
def	deformation
dtca	degrees to core axis
diam	diameter
diss	disseminated
dol	dolomite
dom	dominantly
E.O.H.	end of hole
ep	epidote
esp	especially
est	estimate
euhd	euhedral
FLT	fault
FZ	fault zone
fsp	feldspar
fg	fine grained
fl	fluorite
fol	foliated
foln	foliation

2004 Meadowbank Logging / Mapping Codes

Code	Definition
S1	foliation
fw	footwall
F1	fracture
frac	fracture
ff	fracture fill
frags	fragments
fuch	fuchsite
gal	galena
gnt	garnet
gm	grams
g/t	grams per tonne
gr	granitic
gn	green
gg	green-grey
gy	grey
gru	grunerite
hw	hanging wall
hmc	heavy mineral concentrate
ha	hectare
hem	hematite
hnfls	hornfels
HCl	hydrochloric acid
inc	increase
interbd	interbedded
Fe	iron
Fe-ox	iron oxide
irreg	irregular
JNT	joint
ksp	k-feldspar
kg	kilogram
km	kilometre
lam	laminated
lt	light
limon	limonite
lr	lower
LC	Lower Contact
mag	magnetic
mt	magnetite
mass	massive
med	medium
mg	medium grained
m	metre
mm	millimetre
mod	moderate
mdst	mudstone
musc	muscovite
mylo	mylonitic
or	orange
org	organics
orient	orientation
otc	outcrop
OTW	outwash; glacio-fluvial
//	parallel
ppb	parts per billion
%	percent
pct	percent
pk	pinkish
plag	plagioclase
TLV	polymictic till - locally derived
TLR	polymictic till - regionally derived

Attachment A

2004 Meadowbank Logging / Mapping Codes

Code	Definition
porph	porphyroblast
ppy	porphyry
poss	possible
pot	potassic
pseudo	pseudomorph
ptyg	ptygmatic
py	pyrite
pyx	pyroxene
po	pyrrhotite
q	quartz
qtz	quartz
qbx	quartz breccia
q-eyes	quartz eyes
qvns	quartz veins
qcc	quartz-calcite
qccv	quartz-calcite vein
qc	quartz-carbonate
qcv	quartz-carbonate veins
qchl	quartz-chlorite
qchlv	quartz-chlorite vein
repl	replacement
rep	representative
R	rotation
sd	sand
2nd	secondary
2°	secondary
ser	sericite
serp	serpentine
SH	shear
sil	silicified, siliceous
st	silt
sltst	siltstone
spec	specularite
sph	sphalerite
stkwk	stockwork
str	strong
sbcp	subcrop
subhd	subhedral
subrnd	subrounded
tc	talc
tour	tourmaline
tr	trace
0.1	trace (in geodet)
trem	tremolite
um	ultramafic
^	up to
ur	upper
UC	Upper Contact
vn	vein
vt	veinlet
vns	veins
v	very
vfg	very fine grained
vwk	very weak
VG	visible gold
wac	wacke
wk	weak
wht	white
w	with
YNG	younging

APPENDIX II

GROUNDWATER DEVELOPMENT/PURGING/SAMPLING DATA SHEETS

Groundwater Development and Purging/Sampling Data Sheet

☑ Development 1/2
☐ Purging/Sampling

Well No.	MW03-1	Project No.	06-1122-186-2200
Location:	Goose Island, Meadowbank	Completed By:	JJ
Weather:	sunny, windy	Date:	4-7 Aug 06
Temperature:	12°	Time:	1020

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.598 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 1.25" ~~mm~~

One well volume:
(B-A)*2.0 = ~~___~~ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ~~___~~ litres - for a 38 mm (1.5 inch) diameter well
*0.83 = ~163 L (1.25")

EQUIPMENT LIST

pH and Temp. Meter: Model ~~HANNA 991300~~ Serial No. ~~67992~~ Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model ___ Serial No. ___ Calibration Solution: ___
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule

Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 110 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X (3) = (490) litres
Flow Rate: ~ 8-14 L/hr ~~L/min.~~ Start: 1100 Aug. 4 Finish: 1130 Aug. 7

	Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L)	Remarks
Aug. 4	1115	40	11.4	7.17	460	219	10.15	
	2145	100	10.7	7.29	331	167	14.88	
5	0855	140	8.9	7.21	298	151	14.81	
	1150	160	13.0	7.28	672	332	13.38	
	1500	185	13.2	7.42	345	172	13.03	
	1715	200	9.7	7.33	229	115	14.25	
	2100	240	10.6	7.47	307	154	12.92	
6	0900	300	10.9	7.58	331	165	12.67	
	1050	320	11.2	7.67	324	162	13.01	
	1315	340	8.8	7.46	184	92	13.73	
	1530	360	11.9	7.40	323	161	12.44	
	1745	380	10.8	7.70	340	170	12.89	

Comments:
Odour: ☑ Yes ☐ No If yes slight sulfur odour
Sheen: ☐ Yes ☑ No If yes
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other:

NB: optimal airlift cycles = approx. 1 purge every 2 hrs (20-30 L per purge).

Analysis	Type		Container Size 40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ___
Consumables: ☐ Waterra Tubing ___ ☐ HDPE Tubing ___ ☐ Groundwater Filter ___
☐ Silicon Tubing ___ ☐ D.O. Ampoules ___ ☐ ___

Groundwater Development and Purging/Sampling Data Sheet

☒ Development 2/2
☐ Purging/Sampling

Well No.	MW03-01	Project No.	(See Page 1)
Location:	(See Page 1)	Completed By:	
Weather:		Date:	
Temperature:		Time:	

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B ______ metres
Diameter Standpipe: C ______ mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model ______ Serial No. ______ Calibration Buffers: ☐ 4 ☐ 7 ☐ 10
Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: ______
Dissolved Oxygen Meter: Model ______ Serial No. ______ ☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☒ Peristaltic ☐ Submersible Bailer: ☐ None ☒ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: ______

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 490 litres
Flow Rate: ~ 8 - 14 L/min (TDS) Start: ______ Finish: ______

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ (ppm)	Diss. O2 (mg/L) or %	Remarks
2020	410	11.5	7.81	349	174	13.14	
2245	435	12.0	7.79	361	188	13.08	
Aug 7 1105	490	13.2	7.95	285	142	11.78	end development
							NB: parameters measurement method = airlift ~ 1-2 minutes (until all water evacuated and slowed to trickle, only blowing air), then wait ~ 5 minutes, airlift again = 1-2 L, collect sample for parameters measurement, then ~ 2 hrs till next airlift

Comments:

Odour: ☐ Yes ☒ No If yes ______
Sheen: ☐ Yes ☒ No If yes ______
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______ Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling 1/2

Well No.	MW03-01	Project No.	06-1122-186-2200
Location:	Goose Island	Completed By:	[illegible]
Weather:	Sunny	Date:	17 Aug. 06
Temperature:	~15°C	Time:	1400

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.60 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 1.25" ~~mm~~

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
×0.83 = ~163L 1.25"

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 9130 Serial No. 07992 Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule
Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible N_2 DVP Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: ~150 m.

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min. Start: 1430. Finish: 1900

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS (ppm)	Diss. O_2 (mg/L) or %	Remarks
1458	15	9.7	7.06	1536	772	1.59	well was pre-developed by
1530	30	8.8	6.73	1144	556	1.42	airlifting
1545	40	8.6	6.84	1086	513	1.88	
1630	50	8.6	7.17	1144	580	3.36	↑
1647	65	9.5	7.35	688	341	10.23	~~[illegible]~~
1700	80	9.2	7.63	571	284	12.15	↓
1725	90	9.4	7.61	344	173	8.98	
1750	100	9.5	7.41	335	166	8.82	NB - DVP fell ~10m to 160m level.
1815	110	8.8	7.40	1739	860	1.39	
1850	120	9.1	8.05	353	176	8.50	

Comments:

Odour: ☐ Yes ☑ No If yes ______
Sheen: ☐ Yes ☑ No If yes ______
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		Container Size 40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass		PAGE 2						☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling 2/2

Well No. MW03-01
Location: Goose Island
Weather: Sunny
Temperature: ~17°C

Project No. 06-1122-186
Completed By: JJ/RC
Date: 8 Aug. 06
Time: 1000

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.6 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 1.25" mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
*0.83 = 163 L.

EQUIPMENT LIST

pH and Temp. Meter: Model Hanna 91300 Serial No. 07992
Conductivity Meter: Model ______ Serial No. ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: ______
☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible N_2 DVP
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min.
Start: 1000 Finish: 1330

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS (ppm)	Diss. O_2 (mg/L) or %	Remarks
1025	135	7.8	7.75	333	183	10.89	
1100	145	8.6	7.03	245	122	11.54	
1115	155	7.3	7.18	221	110	11.75	
1135	165	7.0	7.14	246	123	11.94	
1152	175	7.0	7.20	269	132	11.79	
1215	185	6.8	7.23	269	135	11.30	Alkalinity = 0 mg/L $CaCO_3$ P Alk.
1310	205	7.7	7.93	382	193	8.55 ← post-sample	= 339 mg/L $CaCO_3$ Tot (total) Alk.

Comments:

Odour: ☐ Yes ☑ No If yes ______
Sheen: ☐ Yes ☑ No If yes ______
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☑ Plastic	☐ Glass						1+1 (FD)		☐ Yes	☑ No	Raw
Free + Tot. Cyanide	☑ Plastic	☐ Glass				1+1 (FD)				☐ Yes	☑ No	NaOH
Diss. Metals	☑ Plastic	☐ Glass			1+1 (FD)					☑ Yes	☐ No	HNO_3
	☐ Plastic	☐ Glass				1+1 (FD)				☐ Yes	☑ No	HNO_3
	☐ Plastic	☐ Glass				1+1 (FD)				☐ Yes	☑ No	H_2SO_4
	☐ Plastic	☐ Glass				1+1 (FD)				☐ Yes	☑ No	Raw
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

(Container Size: 40 mL – 4 L)

SCN No. 12393-01, -02 (FD)

Consumables: ☐ Waterra Tubing ______ ☐ Silicon Tubing ______ ☐ HDPE Tubing ______ ☐ D.O. Ampoules ______ ☐ Groundwater Filter ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☒ Purging/Sampling

Well No.	MW 03-01	Project No.	06-1122-186 (TASK 2200)
Location:	GOOSE ISLAND	Completed By:	R. CLARKE
Weather:	OVERCAST, SHOWERS	Date:	AUGUST 10, 2006
Temperature:	16°C	Time:	1100 - 1700

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.60 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
*0.83 ≈ 163 L.

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 91300 Serial No. 07992 Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule
Pump: ☐ None ☐ Waterra ☐ Peristaltic ☒ Submersible DVP Bailer: ☒ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165 m (UNLESS OTHERWISE STATED)

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min. Start: 1100 Finish: ______

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox~~ TDS ~~(mV)~~ (ppm)	Diss. O_2 (mg/L) or %	Remarks
1130	20	10.1	7.09	170	85	8.14	SAMPLE DEPTH = 100 m
1230	40	8.3	7.03	213	105	5.66	SAMPLE DEPTH = 160 m
1330	65	7.5	6.93	329	163	6.95	
1430	90	7.5	7.13	305	150	7.65	
1530	115	7.6	7.12	353	181	4.56	
1600	135	10.5	7.88	1062	531	2.43	
1615	140	11.6	7.57	626	313	5.01	
1625	141	11.5	7.35	616	306	5.38	
1630	141.5	10.7	7.74	620	310	5.75	
1640	142	9.8	7.78	742	371	5.57	

Comments:

Odour: ☐ Yes ☒ No If yes ______
Sheen: ☐ Yes ☒ No If yes ______
Turbidity: Clear (I I I) I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______

Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☒ Purging/Sampling 1/2

Well No.: MW 03-01
Location: GOOSE ISLAND
Weather: OVERCAST
Temperature: 15°C

Project No.: 06-1122-186 (TASK 2200)
Completed By: R. CLARKE
Date: AUGUST 11, 2006
Time: 0815 - 1900

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.60 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 53 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
*0.83 ≈ 163 L.

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 9300 Serial No. 07992
Conductivity Meter: Model ______ Serial No. ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227

Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Calibration Solution: ______
☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☐ Peristaltic ☒ Submersible N_2 - DVP.
Bailer: ☒ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min.
Start: 0815 Finish: 1900

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L) or %	Remarks
0815	152	8.1	7.31	360	183	7.45	1min/1min CYCLE (DRIVE/VENT)
0835	160	8.0	7.36	337	168	7.70	↓
0915	175	7.7	7.31	349	174	9.16	
1000	190	9.0	7.68	359	180	10.21	
1110	200	7.8	7.65	508	257	9.97	
1140	210	8.0	7.62	379	191	10.36	
1215	220	8.3	7.39	384	193	9.58	
1245	230	7.8	7.41	394	197	8.14	
1330	240	8.1	7.53	421	212	6.50	1min/5min CYCLE (DRIVE/VENT)
1445	250	6.3	7.71	430	215	4.00	↓
1545	260	8.2	7.47	417	208	6.57	
1640	265	10.0	8.06	534	268	6.70	

Comments:

Odour: ☐ Yes ☒ No If yes ______
Sheen: ☐ Yes ☒ No If yes ______
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______

Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☒ Purging/Sampling 2/2

Well No.	MW 03-01	Project No.	06-1122-186 (TASK 2200)
Location:	GOOSE ISLAND	Completed By:	R. CLARKE
Weather:	OVERCAST	Date:	AUGUST 11, 2006
Temperature:	15°C	Time:	0815 - 1900

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 260 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
*0.83 ≈ 163 L.

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 91300 Serial No. 07992 Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☐ Peristaltic ☒ Submersible N_2-DVP Bailer: ☒ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min. Start: 0815 Finish: 1900

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS (ppm)	Diss. O_2 (mg/L) or %	Remarks
1725	280	10.0	7.70	427	213	5.57	↓
1745	289	10.1	7.74	449	224	5.49	30 sec / 30 sec CYCLE (DRIVE/VENT)
1800	293	9.3	7.76	458	227	5.75	
1815	297	9.8	7.77	443	220	6.09	
1830	300	10.5	7.75	450	224	6.15	
1845	303	10.5	7.77	502	252	6.49	
1900	307	11.1	7.77	511	255	5.91	↓

Comments:
Odour: ☐ Yes ☒ No If yes ______
Sheen: ☐ Yes ☒ No If yes ______
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☒ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

(Container Size spans 40 mL – 4 L)

SCN No. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling 1/2

Well No.	MW 03-01	Project No.	06-1122-186 (TASK 2200)
Location:	GOOSE ISLAND	Completed By:	R. CLARKE
Weather:	PARTLY CLOUDY	Date:	AUGUST 12, 2006
Temperature:	13°C	Time:	1130 - 2100

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.60 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
*0.83 = 163L

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 9/300 Serial No. 07992 Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible N_2 - DVP Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min. Start: 1130 Finish: 2100

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L) or %	Remarks
1130	313	10.3	7.36	854	454	6.41	30sec/90sec CYCLE (DRIVE/VENT)
1200	320	9.5	7.37	460	230	7.52	↓
1230	330	9.4	7.34	357	179	7.80	
1300	340	9.3	7.48	365	182	8.02	
1330	350	8.6	7.42	373	186	8.63	
1400	360	9.1	7.54	394	198	8.66	
1430	370	8.7	7.40	400	200	8.90	
1500	378	8.8	7.58	405	202	9.00	
1530	388	8.6	7.60	418	209	8.92	
1600	398	8.5	7.72	437	218	8.47	
1630	408	8.7	7.41	436	217	8.22	
1700	417	8.7	7.70	455	226	7.27	

Comments:
Odour: ☐ Yes ☑ No If yes ______
Sheen: ☐ Yes ☑ No If yes ______
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling 2/2

Well No.: MW 03-01
Location: GOOSE ISLAND
Weather: PARTLY CLOUDY
Temperature: 13°C
Project No.: 06-1122-186 (TASK 2200)
Completed By: R. CLARKE
Date: AUGUST 12, 2006
Time: 1130 - 2100

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.60 metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
*0.83 = 163 L

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 91300 Serial No. 07992 Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule
Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible N2-DVP Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min. Start: 1130 Finish: 2100

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L) or %	Remarks
1730	424	8.6	7.51	452	226	6.17	30 sec / 90 sec CYCLE (DRIVE/VENT)
1800	433	9.6	7.72	455	227	5.55	↓
1830	439	9.8	7.73	504	253	5.24	
1900	447	9.2	7.72	491	246	4.22	
1930	454	9.1	7.70	469	234	4.08	
2000	460	8.4	7.71	497	247	4.16	
2030	466	8.3	7.64	514	256	3.92	
2100	472	8.1	7.65	505	253	4.22	

Comments:
Odour: ☐ Yes ☑ No If yes ______
Sheen: ☐ Yes ☑ No If yes ______
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ______

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling 1/2

Well No. MW 03-01
Location: GOOSE ISLAND
Weather: PARTLY CLOUDY
Temperature: 13-15°

Project No. 06-1122-186 / 2200
Completed By: R. CLARKE / R. COUTO
Date: AUG 14 2006
Time: 0800 - 1830 (1 of 2)

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B 200 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ____ litres - for a 38 mm (1.5 inch) diameter well
x 0.83 = 163 L

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 91300 Serial No. 07992 Calibration Buffers: ☑4 ☑7 ☐10
Conductivity Meter: Model " Serial No. " Calibration Solution: ____
Dissolved Oxygen Meter: Model 451 550A Serial No. 07227 ☐ D.O. Chemet Ampoule
Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 165 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ____ = ____ litres
Flow Rate: ____ L/min. Start: 0800 Finish: 1830

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~TDS~~ Redox (mV) (PPM)	Diss. O_2 (mg/L) or %	Remarks
0800	484	8.5	7.42	404	202	5.60	(30 sec DRIVE / 90 sec VENT)
0830	492	8.6	7.51	337	169	5.44	
0900	502	8.3	7.51	325	161	5.66	
0930	510	8.3	7.50	323	163	6.59	
1000	519	8.6	7.55	402	201	7.23	
1030	527	8.7	7.51	447	223	7.73	
1100	534	8.7	7.50	461	228	8.10	
1130	543	8.5	7.48	428	212	8.29	
1200	553	8.7	7.46	461	229	8.49	
1230	560	8.8	7.51	457	228	8.01	
1300	569	9.2	7.51	456	227	7.20	
1330	571	8.9	7.53	445	225	6.45	

Comments:
Odour: ☐ Yes ☑ No If yes ____
Sheen: ☐ Yes ☑ No If yes ____
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ____

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☑ Plastic	☐ Glass						1		☐ Yes	☑ No	RAW
	☑ Plastic	☐ Glass				1				☐ Yes	☑ No	~~RAW~~ RAW
	☑ Plastic	☐ Glass				1				☑ Yes	☐ No	HNO_3
	☑ Plastic	☐ Glass				1				☐ Yes	☑ No	HNO_3
	☐ Plastic	☐ Glass				1				☐ Yes	☑ No	H_2SO_4
	☐ Plastic	☐ Glass								☐ Yes	☐ No	~~RAW~~
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. 12395 - 01
Consumables: ☐ Waterra Tubing ____ ☐ HDPE Tubing ____ ☑ Groundwater Filter ____
☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ ____

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling 2/2

Well No. MW 03-01
Location: GOOSE ISLAND
Weather: PARTLY CLOUDY
Temperature: 13-15

Project No. 06-1122-186 / 2200
Completed By: R. CLARKE / K. COEHO
Date: AUG 14 2006
Time: 0800-1830 (2 of 2)

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B ____ metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ____ litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA 91300 Serial No. 07992
Conductivity Meter: Model " Serial No. "
Dissolved Oxygen Meter: Model 451 550 Serial No. 07227

Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: ____
☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible
Sample Intake Depth: 165 m

Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ____ = ____ litres
Flow Rate: ____ L/min.

Start: 0800 Finish: 1830

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~TDS~~ Redox (~~ppm~~ mV)	Diss. O_2 (mg/L) or %	Remarks
1400	578	8.6	7.46	485	241	5.26	(90 sec / 90 sec) → (DRIVE/VENT)
1430	586	8.8	7.55	506	252	4.59	
1500	593	8.7	7.51	503	253	4.21	
1530	603	9.9	7.58	475	235	3.30	
1600	610	9.9	7.55	550	274	3.10	
1630	618	9.9	7.57	565	280	3.16	
1700	623	9.9	7.57	574	286	3.26	
1730	630	9.8	7.58	568	283	3.80	
1800	636	9.5	7.58	598	291	4.20	(1 min - DRIVE / 1 min - VENT)
1830	640	9.9	7.58	538	265	4.82	Field Measurment of Alkalinity Conducted = 48.8 mg/L $CaCO_3$ for pH

Comments:

Odour: ☐ Yes ☑ No If yes ____
Sheen: ☐ Yes ☑ No If yes ____
Turbidity: (Clear) I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ____

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass		See Page 1						☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ____

Consumables: ☐ Waterra Tubing ____ ☐ HDPE Tubing ____ ☐ Groundwater Filter ____
☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ ____

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.	MW 06-5		
Location:	GOOSE ISLAND - MEADOWBANK	Project No.	06-1120-186
Weather:	WINDY, OVERCAST	Completed By:	R [illegible] + R CLARKE
Temperature:	10-12°C	Date:	AUG 27 2006
		Time:	11:40 am

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B ______ metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ——— litres - for a 51 mm (2.0 inch) diameter well
(B-A)*0.8 = ______ litres - for a 33 mm (1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A (NP UFT) Serial No. 07227

Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule

Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: ______ L/min.
Start: 11:44 Finish: 14:34

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %	Remarks
11:44	40	11.3	8.43	777	382	8.81	
11:50	120	9.0	8.91	576	289	14.32	Highly turbid - grey coloured
11:52	160	8.8	9.33	505	251	8.18	
11:55	240	8.0	9.30	482	242	10.39	
[illegible]	280	8.2	8.42	550	245	8.19	
12:07	340	9.3	8.90	490	242	8.84	Water out through casing
12:15	420	10.1	8.72	537	268	9.31	
12:25	460	8.8	8.54	855	426	8.69	
13:17	600	8.7	7.45	928	464	9.07	
13:23	640	8.7	8.02	923	461	8.62	
13:26	740	8.0	8.00	1126	561	8.35	
13:29	800	7.7	8.08	1108	554	8.04	

Comments:

Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII ☒ Very Silty
11:44 am / 13:29
Other: ——

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass										
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass	(SEE PAGE)							☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. ______

Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-5
Location: Goose Island - Meridian Park
Weather: Windy, Overcast
Temperature: 10 - 12 °C

Project No.: 06-1120-186
Completed By: R. Coelho + R. Clarke
Date: Aug 07 2006
Time: 13:33

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B ______ metres
Diameter Standpipe: C 32 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
0.8   32   1.25

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227

Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule

Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres
Flow Rate: 9 L/min.
Start: 11:44 Finish: 14:34

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %	Remarks
13:33	860	7.9	10.41	1034	593	10.28	
13:36	900	7.9	8.76	1126	562	8.33	Increased turbidity
13:38	960	7.9	8.52	1140	572	7.84	Turbidity same as before
13:40	1020	8.2	10.36	1181	591	8.42	
13:46	1060	8.2	8.91	1189	594	7.90	
13:51	1140	8.1	9.38	1199	590	7.87	Water out thru casing @ 1100 L
13:56	1220	8.2	8.91	1199	601	7.99	
1402	1280	8.1	9.07	1218	609	8.00	
1409	1340	8.1	9.04	1212	606	9.57	
1420	1400	8.1	7.97	1185	592	11.98	
1426	1480	8.1	8.78	1099	549	10.10	
1434	1580	8.4	8.65	1205	604	7.98	

1440

Comments:
Odour: ☐ Yes ☑ No If yes —
Sheen: ☐ Yes ☑ No If yes —
Turbidity: Clear IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII Very Silty (13:33, 14)
Other: —

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass										
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass			(SEE PAGE)					☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. ——
Consumables: ☐ Waterra Tubing —— ☐ Silicon Tubing —— ☐ HDPE Tubing —— ☐ D.O. Ampoules —— ☐ Groundwater Filter —— ☐ ——

Groundwater Development and Purging/Sampling Data Sheet

(1 of 7)

☑ Development ☐ Purging/Sampling

Well No. MW 06-6
Location: Grouse Island - Meadowlands
Weather: Cold Windy
Temperature: 10-13°C

Project No. 06-1122-186
Completed By: R Clarke + R Carter
Date: AUG 23 2006
Time: 09:40

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 2.50 metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = — litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.33 = 1.47 litres - for a 38 mm (1.5 inch) diameter well
0.83 1.25

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. —
Conductivity Meter: Model HI 991300 Serial No. —
Dissolved Oxygen Meter: Model YSI 550A Serial No. —
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 us/cm
☐ D.O. Chemet Ampoule

Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 5 = 780 litres
Flow Rate: 1 L/min.
Start: 10:05 Finish: 21:11

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Eh (mV)	Dis. O_2 (mg/L)	Remarks
10:05	2	12.8	5.94	305	164	7.42	Parameters fluctuating (min air inj)
10:50	22	12.6	8.24	68	33	7.08	
11:20	80	12.0	7.66	154	77	9.28	
11:25	140	10.2	8.00	228	112	9.78	Water slightly cloudy (pH reading)
11:28	180	8.3	11.32	1534	768	10.45	Water highly turbid
11:40	220	8.4	10.87	1698	842	11.70	
11:47	260	7.6	11.19	1644	821	10.47	SAMPLE 1 for salt analysis collected
11:55	320	7.3	11.04	1499	749	10.32	
12:01	360	7.3	11.03	1443	725	9.06	
12:09	400	7.1	11.03	1402	698	9.22	
12:55	440	11.6	8.43	750	360	4.57	
13:10	480	10.9	10.13	1148	565	7.70	Parameters fluctuating

Comments:
Odour: ☐ Yes ☑ No If yes —
Sheen: ☐ Yes ☑ No If yes —
Turbidity: Clear (X) |||||||||||||||||||| (X) Very Silty
Other: START 11:25am

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
Salts	☑ Plastic	☐ Glass				1				☐ Yes	☑ No	—
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 12567-03
Consumables: ☐ Waterra Tubing — ☐ HDPE Tubing — ☐ Groundwater Filter —
☐ Silicon Tubing — ☐ D.O. Ampoules — ☐ —

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-6
Location: Goose Island - Meadowbank
Weather: Clear, Windy - Cold
Temperature: 10-12°C
Project No.: 06-1120-186
Completed By: R. Clarke + R. [illegible]
Date: Aug 22 2006
Time: 13:10

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ―― litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.0~~ 0.83 = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ______
Conductivity Meter: Model HI 991300 Serial No. ______
Dissolved Oxygen Meter: Model YSI 550 A Serial No. ______
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 5 = 780 litres
Flow Rate: ______ L/min.
Start: 10:05 Finish: 21:11

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox~~ ORP	Diss. O_2 (mg/L) or %	Remarks
14:15	530	11.9	9.59	1150	575	8.00	
15:33	570	11.1	9.55	1105	485	8.05	
16:12	615	11.4	9.29	1157	570	8.85	
17:02	660	11.4	8.93	1202	596	8.41	
17:45	710	11.3	7.92	1176	586	8.47	
18:06	735	10.8	7.72	1332	666	7.34	
21:11	780	10.2	7.35	19094	923	7.52	Sample 2 collected Parameters fluctuating

Comments:

Odour: ☐ Yes ☑ No If yes ――
Sheen: ☐ Yes ☑ No If yes ――
Turbidity: Clear I I I I I I I M (18:06) I I I I I I I I I I I I I I I I I I I M (14:15) I I Very Silty
Other: ――

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
Salt	☑ Plastic	☐ Glass				1				☐ Yes	☑ No	――
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No.: 12567-03

Consumables: ☐ Waterra Tubing ―― ☐ Silicon Tubing ―― ☐ HDPE Tubing ―― ☐ D.O. Ampoules ―― ☐ Groundwater Filter ―― ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☑ Development ☐ Purging/Sampling

Well No. MW 06-6
Location: GOOSE ISL. - HEADOWBANK
Weather: Clear Cool Sunny
Temperature: 12-15°C
Project No. 06-1122-186
Completed By: R. CLARKE + R. COUTHO
Date: AUG 23 2006
Time:

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 23 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*0.83 = ____ litres - for a 3~~8~~ mm (1~~.5~~ inch) diameter well 1.25

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ____ Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model HI 991300 Serial No. ____ Calibration Solution: 1413 us/cm
Dissolved Oxygen Meter: Model YSI 550A Serial No. ____ ☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 110 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 23 = 3320 litres
Flow Rate: 6 L/min. Start: 10:05 Finish: 20 87

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	[illegible]	Diss. O_2 (mg/L) or %	Remarks
10:05	830	12.0	7.09	1056	542	6.40 ↓	
10:10	880	11.3	7.88	1501	752	9.46 ↓	
10:35	920	10.8	7.55	1462	732	8.23	
11:03	960	10.8	7.43	1377	688	8.85	
1148	1000	10.9	7.64	1448	724	9.40	
1234	1040	12.2	7.90	1433	712	8.08	
1238	1080	11.2	7.75	1426	709	8.40	Air lift nozzle lowered to 145m.
1328	1100	11.2	7.52	1273	634	9.04	
1430	1180	12.2	7.97	1467	436	9.75	
1510	1230	11.0	8.28	1553	775	8.83	
1541	1280	12.0	7.49	1505	756	8.48	
1615	1320	11.9	8.29	1595	799	8.45	Sample 3 for salt analysis collected.

Comments:
Odour: ☐ Yes ☑ No If yes —
Sheen: ☐ Yes ☑ No If yes —
Turbidity: Clear 10:05am X 16:15 Very Silty
Other: —

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
Salt	☑ Plastic	☐ Glass			1					☐ Yes	☑ No	—
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 12567-03
Consumables: ☐ Waterra Tubing — ☐ HDPE Tubing — ☐ Groundwater Filter —
☐ Silicon Tubing — ☐ D.O. Ampoules — ☐ —

(4 of 7)

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-6
Location: Goose Isl - Meadowbank
Weather: clear, sunny, cool
Temperature: 12-15°C
Project No.: 06-1122-186
Completed By: R. Clarke + R. Coelho
Date: AUG 23 2006
Time: 16:20

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*0.88 = ____ litres - for a 33 mm (1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ____
Conductivity Meter: Model HI 991300 Serial No. ____
Dissolved Oxygen Meter: Model YSI 550 A Serial No. ____
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 us/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: ____

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 23 = 3320 litres
Flow Rate: 6 L/min.
Start: 10:05 Finish: 20:37

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	ORP (mV)	Diss. O₂ (mg/L) or %	Remarks
17:15	1380	12.1	9.45	1254	646	8.10	(Air lifting nozzle raised to 110m)
17:20	1420	10.6	10.10	1407	703	7.58	Water increased turbidity
17:24	1460	10.1	10.21	1293	646	7.95	
17:29	1500	8.5	9.69	1152	580	7.72	
17:35	1550	8.2	9.56	1126	562	9.23	
1742	1600	8.2	9.64	1084	542	9.19	
1746	1640	8.0	9.66	1075	534	9.43	
1749	1680	8.0	9.56	1078	535	11.10	
1753	1720	8.3	9.52	1063	580	11.10	Nozzle @ 125 m
1757	1780	8.2	9.33	1010	505	9.65	
1759	1820	8.3	9.10	934	469	9.20	
1803	1840	8.7	8.83	906	452	8.48 / 8.79	

Comments:
Odour: ☐ Yes ☑ No If yes ____
Sheen: ☐ Yes ☑ No If yes ____
Turbidity: Clear [scale] Very Silty — marked at 1803 and 17:15
Other: ____

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass										
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. ____
Consumables: ☐ Waterra Tubing ____ ☐ Silicon Tubing ____ ☐ HDPE Tubing ____ ☐ D.O. Ampoules ____ ☐ Groundwater Filter ____ ☐ ____

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-6
Location: Goose Isl - Meadowbank
Weather: Clear Cool
Temperature: 10-15°C
Project No.: 06-1122-186
Completed By: K. Clarke + K. Osterud
Date: Aug 23 2006
Time: 1808

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B ______ metres
Diameter Standpipe: C ______ mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ______
Conductivity Meter: Model HI 991300 Serial No. ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. ______
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: (see remarks)

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 23 = 3320 litres
Flow Rate: 6 L/min.
Start: 10:05 Finish: 20:34

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %	Remarks
1808	1880	8.6	8.68	872	446	8.64	
1812	1920	8.6	8.39	786	398	8.61	
1816	1960	8.4	8.26	773	386	8.61	
1819	2000	8.4	8.21	776	386	8.12	Sample # collected
1825	2040	8.2	8.07	769	386	8.33	
1828	2080	8.0	8.16	776	388	9.47	
1830	2120	7.8	8.05	781	388	8.67	Nozzle lowered to 13m
1835	2160	7.9	8.19	785	390	8.18	
1839	2200	8.2	8.03	797	391	9.16	
1843	2240	8.3	7.96	866	399	8.37	
1847	2280	8.3	7.95	818	413	8.57	
1851	2320	7.8	7.90	821	409	8.65	
					409	8.12	

Comments:
Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I ⊠ I I I I I I I I Very Silty
Other: ——

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
Salt	☑ Plastic	☐ Glass			1					☐ Yes	☑ No	——
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. 12567-03

Consumables: ☐ Waterra Tubing —— ☐ Silicon Tubing —— ☐ HDPE Tubing —— ☐ D.O. Ampoules —— ☐ Groundwater Filter —— ☐ ——

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-6
Location: Goose Island - Netrowbrue
Weather: Cool Clear, Windy
Temperature: 10-15°C

Project No.: 06-1122-186
Completed By: R. Coelho + K. Clarke
Date: Aug 03 2006
Time: 18:55

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.4~~ = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well
0.83

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ______
Conductivity Meter: Model HI 991300 Serial No. ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. ______

Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule

Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Sample Intake Depth: (see remarks)
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 23 = 3320 litres
Flow Rate: ______ L/min.
Start: 10:05 Finish: 20:37

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ ppm	Diss. O_2 (mg/L)	Remarks
1856	2360	7.9	7.85	827	413	8.38	
1900	2400	7.9	7.86	827	414	8.86	
1902	2440	7.6	7.83	838	422	8.47	
1909	2480	8.4	7.84	857	428	8.49	Nozzle @ 110m
1911	2520	8.2	7.79	881	424	8.43	
1916	2560	8.4	7.85	883	438	8.41	
1920	2600	8.3	7.79	889	444	8.60	
1925	2640	8.0	7.77	896	448	8.30	
1930	2680	8.0	7.75	907	452	8.37	
1933	2720	8.0	7.76	909	454	8.25	
1937	2760	8.0	7.73	922	463	8.90	
1940	2800	7.8	7.72	929	466	8.39	

Comments:

Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear ☒ (1856) IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII Very Silty
Other: —— 1940

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. ______

Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

N:\ADMIN\ENVIROS\Forms and Templates\Field Forms\GW Devel & Purging_Samp Data Sheet.doc

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☐ Purging/Sampling

Well No. MW 06-6
Location: GOOSE ISLAND - MEADOWBANK
Weather: COOL CLEAR WINDY
Temperature: 10-15°C

Project No. 06-1122-186
Completed By: R. OSEHO + R. CLARKE
Date: AUG 23 2006
Time: 19:45

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~3.5~~ 0.33 = ____ litres - for a ~~90~~ 33 mm (~~3.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ____ Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model HI 991300 Serial No. ____ Calibration Solution: 1413 uS/cm
Dissolved Oxygen Meter: Model 451 SDA Serial No. ____ ☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: ____

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 23 / 6 = 3320 litres
Flow Rate: ____ L/min. Start: 10:05 Finish: 20:37

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (µS/cm)	~~Redox (mV)~~	Diss. O_2 (mg/L) ~~(%)~~	Remarks
1945	2840	8.0	7.75	941	470	8.40	
1948	2880	8.0	7.71	951	475	8.51	
1952	2920	8.0	7.70	961	480	8.70	
1959	2980	8.1	7.71	992	495	8.51	
2004	3040	8.1	7.69	1007	503	8.65	
2012	3100	8.0	7.68	1031	515	8.60	
2018	3160	8.2	7.68	1032	516	9.27	
2025	3220	8.2	7.72	1042	520	7.80	Sample 5 (salt only) collected
2037	3320	7.9	7.46	1049	527	8.35	

Comments:
Odour: ☐ Yes ☑ No If yes ____
Sheen: ☐ Yes ☑ No If yes ____
Turbidity: Clear (19:45) ☒ (20:37) Very Silty
Other: ____

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
Salt	☑ Plastic	☐ Glass			1					☐ Yes	☑ No	____
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 12567-03
Consumables: ☐ Waterra Tubing ____ ☐ HDPE Tubing ____ ☐ Groundwater Filter ____
☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ ____

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling

Well No. MW 06-6
Location: GOOSE ISLAND, MEADOWBANK
Weather: WINDY, OVERCAST, COLD
Temperature: 8-10°C
Project No. 06-1122-186
Completed By: R GOELHO + R CLARKE
Date: AUG 24 2006
Time: 12:20 pm

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.1~~ 0.8 = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

TDS + pH and Temp. Meter: Model HI 991300 Serial No. ______
Conductivity Meter: Model HI 991300 Serial No. ______
Dissolved Oxygen Meter: Model YSI 550A Serial No. ______
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible
☐ D.O. Chemet Ampoule
Sample Intake Depth: 160 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 1.1 = 160 litres
Flow Rate: 0.5 L/min.
Start: 12:20 Finish: 17:30

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L) or %	Remarks
12:20	4 (3324)	13.3	6.92	1820	272	7.25	VENT: 1min / DRIVE: 1min
12:45	12 (3332)	12.7	7.15	1045	521	1.66	↓
13:00	20 (3340)	12.6	7.16	1047	522	1.50	
13:30	30 (3350)	12.7	7.24	1047	521	1.36	
14:00	45 (3365)	12.8	7.23	1052	525	1.38	
14:30	60 (3380)	12.8	7.28	1115	559	1.45	
14:45	65 (3385)	12.3	7.64	1100	542	1.54	VENT: 30 sec / DRIVE: 1min
15:00	70 (3390)	12.1	8.07	1558	769	0.40	Pump lowered to screen
15:30	90 (3410)	12.2	7.53	1270	636	1.18	↓
15:50	100 (3420)	12.5	7.62	1301	652	1.29	
16:33	120 (3440)	12.2	7.51	1190	580	1.52	
17:04	140 (3460)	12.2	7.57	1210	603	1.47	VENT: 90 sec / DRIVE: 90

Comments:
Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: (Clear) IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII Very Silty
Other: START/END

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass	(SEE PAGE 2)							☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ______

Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling

Well No. MW 06-6
Location: GOOSE ISLAND, MEADOWBANK
Weather: cloudy, windy
Temperature: 8-10°C

Project No. 06-1122-186
Completed By: R. CUECHO & R. CLARKE
Date: AUG 24 2006
Time: 17:30

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B 180 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*0.8 = ____ litres - for a 33 mm (1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. ____
Conductivity Meter: Model HI 991300 Serial No. ____
Dissolved Oxygen Meter: Model YSI 550A Serial No. ____

Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule

Pump: ☐ None ☐ Waterra ☐ Peristaltic ☑ Submersible
Sample Intake Depth: 160m

Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 1.1 = 160 litres
Flow Rate: 0.5 L/min.
Start: 12:20 pm Finish: 1730

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~TDS~~ (ppm)	Diss. O_2 (mg/L) or %	Remarks
1730	160 (3 Vols)	12.4	7.59	1306	650	1.15	
1735							Samples collected
							Field alkalinity test =
							46.3 mg/L $CaCO_3$

Comments:
Odour: ☐ Yes ☑ No If yes ____
Sheen: ☐ Yes ☑ No If yes ____
Turbidity: Clear ⊗ I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: ____ START/END

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
TDT METALS	☑ Plastic	☐ Glass				1+(FD)				☐ Yes	☑ No	HNO_3
DISS. METALS	☑ Plastic	☐ Glass				1+(FD)				☑ Yes	☐ No	HNO_3
RAW	☑ Plastic	☐ Glass				1+(FD)				☐ Yes	☑ No	____
RAW	☑ Plastic	☐ Glass						1+(FD)		☐ Yes	☑ No	____
TKN, TDT PHOSP	☐ Plastic	☐ Glass				1+(FD)				☐ Yes	☑ No	H_2SO_4
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 12567-01
Consumables: ☐ Waterra Tubing ____ ☐ HDPE Tubing ____ ☑ Groundwater Filter 2
☑ Silicon Tubing 10 cm ☐ D.O. Ampoules ____ ☐ ____

FD = 12567-02

Groundwater Development and Purging/Sampling Data Sheet

☑ Development ☐ Purging/Sampling

Well No. MW 06-7
Location: SECOND PORTAGE LAKE - MEADOWBANK
Weather: WINDY RAINY
Temperature: 8-10°C
Project No. 06-1122-186
Completed By: R. LOECHO + R. CLARKE
Date: AUG 28 2006
Time: 1415

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A 3.085 metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.1~~ 0.8 = 173 litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07990 Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model HI 991300 Serial No. 07992 Calibration Solution: 1413 uS/cm
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227 ☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR LIFT) ☐ Peristaltic ☐ Submersible Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 110 m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 20 / 9.4 = 3400 litres
Flow Rate: ____ L/min.
Start: 15:20 Finish: 21:30

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox~~ (mV)	Diss. O_2 (mg/L) or %	Remarks
1520	20	7.6	7.15	222	102	5.82	
1526	80	7.9	8.71	99	50	9.25	
1529	120	8.6	9.42	414	20-1	7.50	
1532	160	6.0	11.69	1180	593	14.10	
1540	260	4.5	11.32	1189	594	11.09	
1544	240	4.8	11.34	990	495	12.24	
1548	320	4.5	11.08	895	447	12.50	
1554	520	4.4	10.94	826	413	8.92	
1600	600	4.2	10.91	822	405	9.41	
1605	700	4.2	9.55	732	368	9.23	
1613	800	4.9	10.62	670	333	9.04	
1618	900	4.9	10.11	698	349	9.67	

Comments:
Odour: ☐ Yes ☑ No If yes ____
Sheen: ☐ Yes ☑ No If yes ____
Turbidity: Clear |||||||||||||||||||| Very Silty (START 15:32)
Other: ____

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass	SEE PAGE 10							☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ____ Consumables: ☐ Waterra Tubing ____ ☐ HDPE Tubing ____ ☐ Groundwater Filter ____
☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ ____

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-7
Location: Second Portage Lake - Meadowbank
Weather: Windy, Rainy
Temperature: 8-10°C

Project No.: 06-1122-186
Completed By: R. Corcho & K. Clarke
Date: Aug 28 2006
Time: 16:25

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = —— litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1 = 0.8 litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model ______ Serial No. 07227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR-LIFT) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 125m, 110m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 20 = 3400 litres
Flow Rate: 9.4 L/min
Start: 15:20 Finish: 21:30

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ Eh	Diss. O_2 (mg/L) or %	Remarks
16:25	1000	4.8	10.05	700	353	8.97	Nozzle @ 125 m
16:40	1080	5.2	10.18	692	345	9.11	
16:45	1180	5.4	9.50	592	294	8.26	
16:50	1260	4.6	9.97	614	306	8.83	
16:58	1340	4.6	9.81	489	243	9.40	
19:06	1400	7.0	8.22	544	271	11.54	Nozzle @ 110 m
19:13	1480	7.4	9.56	427	215	10.22	
19:17	1540	5.7	8.33	517	260	10.40	
1922	1620	4.1	9.61	274	135	10.51	
1929	1720	3.8	9.41	210	105	13.56	
1934	1800	4.2	9.24	201	102	11.12	
1940	1880	4.0	9.18	209	104	10.50	

Comments:
Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear I I I I I I I I I I I I I I I I I I ⊗ I I I I I I I I I I I I Very Silty
Other: ——

SEE PAGE 10

Analysis	Type		Container Size: 40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ——
Consumables: ☐ Waterra Tubing —— ☐ HDPE Tubing —— ☐ Groundwater Filter ——
☐ Silicon Tubing —— ☐ D.O. Ampoules —— ☐ ——

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-7
Location: Second Portage Lake - Meadowbank
Weather: Windy, Rainy
Temperature: 5-6 °C

Project No.: 06-1122-186
Completed By: R. Cozzolino + R. Clarke
Date: Aug 28 2006
Time: 19:45

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = —— litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.25 = 0.8 litres - for a 33 mm (1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550 A Serial No. 07227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR-LIFT) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 20 = 3400 litres
Flow Rate: 9.4 L/min.
Start: 15:30 Finish: 21:30

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O₂ (mg/L) or %	Remarks
19:46	1980	3.9	9.26	247	123	10.08	
19:51	2080	4.2	9.16	274	136	10.20	
19:59	2200	4.7	9.15	294	146	8.65	
20:05	2280	4.8	9.06	328	164	8.89	
20:13	2380	4.4	8.91	320	160	9.46	
20:21	2480	4.4	8.82	338	170	9.63	
20:28	2580	4.5	8.83	410	207	9.40	
20:37	2700	4.2	8.80	423	210	8.93	
20:44	2800	4.4	8.66	464	233	9.00	
20:49	2900	4.4	8.54	357	179	9.02	
20:57	3000	4.4	8.40	438	216	9.25	
21:05	3100	4.5	8.69	425	213	9.28	

Comments:
Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I ⊗ I I I I I I I I I I I I Very Silty
Other: ——

Analysis	Type		Container Size: 40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SEE PAGE 10

SCN No. ——
Consumables: ☐ Waterra Tubing —— ☐ HDPE Tubing —— ☐ Groundwater Filter ——
☐ Silicon Tubing —— ☐ D.O. Ampoules —— ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.	MW 06-7	Project No.	06-1122-186
Location:	SECOND PORTAGE LAKE - MEADOWBANK	Completed By:	R. COELHO / R. CLARKE
Weather:	WINDY, COOL	Date:	AUG 28 2006
Temperature:	5-6 °C	Time:	21:10

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.0~~ 0.8 = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR-LIFT) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 20 = 3400 litres
Flow Rate: 9.4 L/min.
Start: 15:30 Finish: 21:30

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox~~ (mV)	Diss. O_2 (mg/L) or %	Remarks
21:12	3200	[illegible]	8.62	384	191	9.52	
21:22	3300	4.4	8.60	390	135	8.76	
21:30	3400	4.4	8.60	394	123	7.85	

Comments:
Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear I I I I I I I I I I I I I I I I I I I (M) I I I I I I I I I I Very Silty
Other: ——

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass										
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass				SEE PAGE 10				☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. ——

Consumables: ☐ Waterra Tubing —— ☐ Silicon Tubing —— ☐ HDPE Tubing —— ☐ D.O. Ampoules —— ☐ Groundwater Filter —— ☐ ——

(5 of

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-7
Location: Scomatic Poplar Lake
Weather: Windy cool
Temperature: 6 - 8°C

Project No.: 06-1122-186
Completed By: R. Corlho + R. Clarke
Date: AUG 29 2006
Time: 10.05 am

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ____ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ---- litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.3~~ 0.8 = ____ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (Air-lift) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 32 = 5600 litres
Flow Rate: 12.5 L/min.
Start: 10:12 am Finish: 17 40

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L) or %	Remarks
10:12	3500	8.0	8.36	571	29[illegible]	13.72	
~~10:19~~	~~3600~~	~~[illegible]~~	~~[illegible]~~	—	—	~~[illegible]~~	
10:19	3600	6.0	8.9[illegible]	437	217	11.83	
10:25	3700	[illegible]	[illegible]	27[illegible]	13[illegible]	[illegible]	
10:31	3800	[illegible]	8.[illegible]	26[illegible]	128	13.5[illegible]	
10:36	3900	4.8	[illegible]	2[illegible]3	13[illegible]	13.15	
10:41	4000	4.9	8.80	250	124	[illegible]	
10:46	4100	[illegible]	8.60	241	120	10.75	
10:50	4200	[illegible]	8.68	288	142	12.07	
10:56	4300	4.7	8.69	291	144	9.8[illegible]	
11:00	4400	4.3	8.48	292	14[illegible]	9.21	
11:06	4500	4.6	8.50	316	157	9.76	
						9.51	

Comments:
Odour: ☐ Yes ☑ No If yes ----
Sheen: ☐ Yes ☑ No If yes ----
Turbidity: Clear I I I I I I I I I I I I I ⊠ I I I I I I I I I I I I I I I I Very Silty
Other: ---- [illegible]/11:06

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass										
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

(Container Size columns: 40 mL to 4 L)

SEE PAGE 10

SCN No. ____

Consumables: ☐ Waterra Tubing ____ ☐ HDPE Tubing ____ ☐ Groundwater Filter ____
☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ ____

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.	MW 06-7	Project No.	06-1122-186
Location:	Second Portage Lake	Completed By:	R. Wells? + R. Clarke
Weather:	Windy Cool	Date:	Aug 29 2006
Temperature:	6-8 °C	Time:	11:13 am

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.3~~ 0.8 = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A Serial No. 09227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 uS/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR LIFT) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 32 = 5600 litres
Flow Rate: 12.5 L/min.
Start: 10:12 am Finish: 17:40

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS (ppm)	Diss. O_2 (mg/L) or %	Remarks
11:13	4600	5.1	8.31	316	159	9.09	
11:18	4700	4.8	8.47?	319?	189	9.21?	
11:25	4800	4.7	8.38	289?	194	9.04	
11:33	4900	5.0	8.38	336	168	[illegible]	
11:40	5000	4.8	8.44	351	175	[illegible]	
13:35	5100	9.0	8.14	416	207	13.24	
13:40	5200	6.8	8.40	733	366	10.01	
13:45	5300	4.6	8.60	230	126	12.81	
13:52	5400	4.5	8.80	213	101	11.33	
13:57	5500	4.5?	7.97	202	101	11.09	
14:03	5600	4.7	8.03	219	109	10.52	
14:09	5700	5.0	7.91	252	125	10.50?	

Comments:
Odour: ☐ Yes ☑ No If yes ______
Sheen: ☐ Yes ☑ No If yes ______
Turbidity: Clear I I I I I I I I I I I I I ⊗ I I I I I I I I I I I I I I I I I Very Silty
Other: 11:13 / 14:09

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass	SEE PAGE 10							☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SCN No. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Groundwater Development and Purging/Sampling Data Sheet

(7 8

☑ Development
☐ Purging/Sampling

Well No.	MW 06-7	Project No.	06-1122-186
Location:	SECOND PORTAGE LAKE	Completed By:	K. COELHO
Weather:	WINDY COOL	Date:	AUG 29 2006
Temperature:	5-6 °C	Time:	14:14

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 21.2 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.3~~ 0.8 = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227
Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 us/cm
☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR-LIFT) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 11.0 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 32 = 5600 litres
Flow Rate: 12.5 L/min.
Start: 10:12 Finish: 17:40

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox (mV)~~ TDS ppm	Diss. O_2 (mg/L) or %	Remarks
14:14	5800	5.1	8.04	267	133	10.08	
14:20	5900	4.9	8.14	306	153	10.03	
14:26	6000	4.7	8.13	286	143	8.41	
14:29	6100	4.5	8.10	443	221	8.67	
14:33	6200	4.7	8.11	345	17[illegible]	8.55	(AIR IN CONTINUOUSLY)
14:38	6300	4.9	8.03	368	18[illegible]	8.40	↓
1442	6400	5.0	7.98	399	199	8.05	
1447	6500	5.1	7.97	408	204	8.47	
1452	6600	5.1	8.05	430	214	8.20	
1458	6700	5.1	8.02	442	22[illegible]	8.19	
1505	6800	5.2	8.12	442	220	8.26	
1510	6900	5.1	8.02	44[illegible]	21[illegible]	8.29	

Comments:

Odour: ☐ Yes ☑ No If yes —
Sheen: ☐ Yes ☑ No If yes —
Turbidity: Clear I ⊗ I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: 5800L / 6900L

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass										
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SEE PAGE 10

SCN No. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

(8 of

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No.: MW 06-7
Location: 2nd PORTAGE LAKE, MEADOWBANK
Weather: WINDY, COOL
Temperature: 5-6 °C

Project No.: 06-1122-186
Completed By: R. [illegible] + R. CLARKE
Date: AUG 29 2006
Time: 15:20

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.7~~ 0.8 = ______ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992
Conductivity Meter: Model HI 991300 Serial No. 07992
Dissolved Oxygen Meter: Model YSI 550A Serial No. 07227

Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Calibration Solution: 1413 µS/cm
☐ D.O. Chemet Ampoule

Pump: ☐ None ☑ Waterra (AIR-LIFT) ☐ Peristaltic ☐ Submersible
Sample Intake Depth: 110 m
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 32 = 5600 litres
Flow Rate: 12.5 L/min.
Start: 10:12 Finish: 17:40

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox~~ TDS (mV)	Diss. O_2 (mg/L) or %	Remarks
15:21	7100	5.1	8.03	402	221	8.08	CONTINUOUS AIR-IN FLOW
15:31	7300	5.1	8.02	436	218	8.45	↓
15:45	[illegible]	5.1	8.00	428	214	8.43	
15:57	7700	5.1	8.02	430	215	9.28	
16:10	7900	5.2	8.02	429	[illegible]	8.28	
16:23	8100	5.3	8.04	450	[illegible]	[illegible].89	
16:38	8300	5.3	8.03	442	215	7.00	
16:55	8500	5.2	8.00	444	220	8.09	
17:12	8700	5.4	7.98	423	210	7.71	
17:26	8900	5.4	8.00	444	22[illegible]	9.70	
17:40	9100	5.4	8.00	450	225	9.32	

up
9200

Comments:
Odour: ☐ Yes ☑ No If yes —
Sheen: ☐ Yes ☑ No If yes —
Turbidity: Clear I (I) I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty
Other: — 15:21/17:40

Analysis	Type		Container Size 40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass										
	☐ Plastic	☑ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass	SEE PAGE 10							☐ Yes	☐ No	
	☑ Plastic	☐ Glass								☐ Yes	☑ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
										☐ Yes	☐ No	

SEE PAGE 10

SCN No. ______

Consumables: ☐ Waterra Tubing ______ ☐ HDPE Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

(9 of 10)

Groundwater Development and Purging/Sampling Data Sheet

☑ Development
☐ Purging/Sampling

Well No. MW 06-7
Location: 2nd PORTAGE LAKE, MEADOW BANK
Weather: WINDY, RAIN
Temperature: 4-5°C

Project No. 06-1122-186
Completed By: R. WELHO / K. CLARKE
Date: AUG 30 2006
Time: 9:28 am

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A _____ metres
Depth to Bottom of Well Below Top of Casing: B 21.2 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = _____ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*~~1.5~~ 0.8 = _____ litres - for a ~~38~~ 33 mm (~~1.5~~ 1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter: Model HI 991300 Serial No. 07992 Calibration Buffers: ☑ 4 ☑ 7 ☐ 10
Conductivity Meter: Model HI 991300 Serial No. 07202 Calibration Solution: 1413 uS/cm
Dissolved Oxygen Meter: Model 451 550A Serial No. 07227 ☐ D.O. Chemet Ampoule
Pump: ☐ None ☑ Waterra (AIR-LIFT) ☐ Peristaltic ☐ Submersible Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC
Sample Intake Depth: 110m

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 15/8 = 2600 litres
Flow Rate: _____ L/min. Start: 9:28am Finish: ~~2:11~~ 15:00

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	TDS (mg/L or ppm)	Diss. O_2 (mg/L) or %	Remarks
9:28	9400	3.2	7.93	372	185	14.05	
9:33	9600	3.9	8.01	338	164	9.96	
9:40	9800	4.8	7.97	336	170	8.56	
9:53	10000	5.3	7.98	378	190	8.33	
10:03	10200	5.8	7.97	428	213	8.00	
10:12	10500	5.8	7.99	449	220	8.12	
10:28	10600	5.5	8.00	462	230	8.02	
10:41	10800	5.3	8.01	460	231	8.00	
10:54	11000	5.2	8.03	440	225	8.09	
11:13	11300	5.2	8.02	430	210	9.16	
11:26	11500	5.3	8.01	429	209	9.17	
11:59	12000	5.3	7.60	320	160	9.13	

14.05

Comments:
Odour: ☐ Yes ☑ No If yes _____
Sheen: ☐ Yes ☑ No If yes _____
Turbidity: Clear |M| Very Silty
Other: — START/END

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass	SEE PAGE 10!							☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. _____ Consumables: ☐ Waterra Tubing _____ ☐ HDPE Tubing _____ ☐ Groundwater Filter _____
☐ Silicon Tubing _____ ☐ D.O. Ampoules _____ ☐ _____

Groundwater Development and Purging/Sampling Data Sheet

☐ Development
☑ Purging/Sampling

Well No.	MW 06-7	Project No.	06-1122-186
Location:	2nd PORTAGE LAKE, MEADOWBANK	Completed By:	R. COZZHO - R. CLARKE
Weather:	RAINY, WINDY	Date:	AUG 30 2006
Temperature:	4-5°C	Time:	15:53

MONITORING WELL INFORMATION

Depth to water Below Top of Casing: A ______ metres
Depth to Bottom of Well Below Top of Casing: B 212 metres
Diameter Standpipe: C 33 mm

One well volume:
(B-A)*2.0 = ______ litres - for a 51 mm (2.0 inch) diameter well
(B-A)*0.8 = ______ litres - for a 33 mm (1.25 inch) diameter well

EQUIPMENT LIST

pH and Temp. Meter:	Model HI 991300	Serial No. 07992	Calibration Buffers:	☑ 4 ☑ 7 ☐ 10
Conductivity Meter:	Model HI 991300	Serial No. 07992	Calibration Solution:	1413 uS/cm
Dissolved Oxygen Meter:	Model YSI 550A	Serial No. 07227	☐ D.O. Chemet Ampoule	

Pump: ☐ None ☑ Waterra ☐ Peristaltic ☑ Submersible (DVP)
Sample Intake Depth: ______
Bailer: ☑ None ☐ Stainless Steel ☐ Teflon ☐ PVC

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 1 = 180 litres
Flow Rate: 0.7 L/min.
Start: 16:22 Finish: 21:11

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	~~Redox~~ TDS (~~mV~~ ppm)	Diss. O_2 (mg/L)	Remarks
16:22	20	8.6	7.85	632	314	5.50	
16:54	40	8.8	7.79	334	166	4.57	(90 sec DRIVE / 90 sec VENT)
17:25	60	8.9	7.75	370	186	4.57	↓
17:58	80	9.0	7.74	337	186	7.59	
18:27	100	9.1	7.74	331	170	7.57	
19:10	120	8.9	7.72	321	161	7.77	
19:56	140	9.1	7.73	301	156	7.89	(1 min DRIVE / 1 min VENT)
20:39	160	9.0	7.71	300	150	7.05	↓
21:11	180	9.1	7.71	296	147	7.96	
21:15	→				146	7.97	
							→ SAMPLES COLLECTED
							- Field Alkalinity = 83.7 mg/L of $CaCO_3$

Comments:

Odour: ☐ Yes ☑ No If yes ——
Sheen: ☐ Yes ☑ No If yes ——
Turbidity: Clear ⊗ I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty (START/END)
Other: ——

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
RAW	☑ Plastic	☐ Glass						1+FD		☐ Yes	☑ No	—
RAW	☑ Plastic	☐ Glass				1+FD				☐ Yes	☑ No	—
TKN, TOT. PHOSP	☑ Plastic	☐ Glass				1+FD				☐ Yes	☑ No	H_2SO_4
TOT. METALS	☑ Plastic	☐ Glass				1+FD				☐ Yes	☑ No	HNO_3
DISS METALS	☑ Plastic	☐ Glass				1+FD				☑ Yes	☐ No	HNO_3
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 12568-01
FD 12568-02

Consumables: ☐ Waterra Tubing —— ☐ HDPE Tubing —— ☑ Groundwater Filter 2
☑ Silicon Tubing 0.1 m ☐ D.O. Ampoules —— ☐ ——

APPENDIX III

CHAIN OF CUSTODY FORMS AND LABORATORY REPORTS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

№ 12393 page 1 of 1

Golder Associates
500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 298-6623 Fax (604) 298-5253

Project Number: 06-1122-186-2200		Laboratory Name: CanTest	
Short Title: MEADOWBANK GDH2O SAMPLING		Address: UNIT D-675 Berry St., Winnipeg MB	
Golder Contact: Valerie Bertrand	Golder E-mail Address: vbertrand@golder.com	Telephone/Fax: 204-772-7276/2386	Contact: Marnie Kolach

Office the final reports should be sent to:

- [x] 500-4260 Still Creek Dr. Burnaby, B.C. V5C 6C6 Tel: (604) 298-6623; Fax: (604) 298-5253 attn: Preeti Anand
- [ ] 202 – 2790 Gladwin Road Abbotsford, B.C. V2T 4S8 Tel: (604) 850-8786 Fax: (604) 850-8756
- [ ] 220 – 174 Wilson Street Victoria, B.C. V9A 7N6 Tel: (250) 881-7372 Fax: (250) 881-7470

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over	Related SCN (over)	Number of Containers	Analyses Required: Tot. Metals incl. Hg; Diss. Metals (As, Se, Hg); TSS + Major Ions; Nitrogen Species; Speciated Alkalinity (pH + Cond.); Physical Parameters; Free + Tot. Cyanide; Nutrients; TDS (P, N, TKN, etc.); RUSH	Remarks (over)
12393 - 01	MW03-01	1	160	WATER	8/8/06	1310	D	FDA	12393-02	6		
12393 - 02	MW03-01	1	160	WATER	8/8/06	1310	D	FD	12393-01	6		
- 03												
- 04												
- 05												
- 06												
- 07												
- 08												
- 09												
- 10												
- 11												
- 12												

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 8/8/06	Time: 1900	Received by: Signature / Company
Sample Storage (°C): on ice	Relinquished by: Signature	Company	Date	Time	Received by: Signature / Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) / Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy PINK: Lab Returns with Final Report

Analysis Report

CANTEST®

CANTEST LTD.

Professional
Analytical
Services

4606 Canada Way
Burnaby, B.C.
V5G 1K5

Fax: 604 731 2386

Tel: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Samples

REPORTED TO: Golder Associates Ltd.
32 Steacle Dr
Kanata, ON
K2K 2A9

Att'n: Ms. Valerie Bertrand

CHAIN OF CUSTODY: 12393

NUMBER OF SAMPLES: 2

REPORT DATE: August 24, 2006

DATE SUBMITTED: August 10, 2006

GROUP NUMBER: 70817179

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (20th Edition) and EPA Method 300.0 (Revision 2.1).

Nitrate and Nitrite in Water - was determined based on Method 4500-NO3 F in Standard Methods (20th Edition) and Method X328 in the BC Laboratory Manual (1994 Edition).

Ammonia in Water - analysis was performed based on Standard Methods for the Examination of Water and Wastewater, 19th Ed. (1995); Method 4500-NH3.

Nitrite in Water - was determined based on Method 4500-NO3 B in Standard Methods for the examination of Water and Wastewater (20th Edition) and from the BC Laboratory Methods Manual (2003 Edition).

Total Kjeldahl Nitrogen in Water - was determined based on Method 4500-N in Standard Methods (20th Edition) and Method X325 in the BC Laboratory Manual (1994 Edition).

Total Phosphate in Water - was determined based on Method 4500-P in Standard Methods (20th Edition) and Method X185 in the BC Laboratory Manual (1994 Edition).

Conventional Parameters - analyses were performed using procedures based on those described in "British Columbia Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition), Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" 20th Edition, (1998), published by the American Public Health Association.

(Continued)

CANTEST LTD.

Per: Richard S. Jornitz
Supervisor, Inorganic Testing

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70817179

CANTEST®

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

Dissolved Metals in Water - Samples were filtered in the laboratory and quantitatively determined using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP) and/or Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

TEST RESULTS:

(See following pages)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70817179

CANTEST®

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		12393-01	12393-02		
DATE SAMPLED:		Aug 8/06	Aug 8/06	DETECTION LIMIT	UNITS
CANTEST ID:		608170602	608170609		
Hardness	CaCO3	75.9	77.3	0.2	mg/L
Hardness (Total)	CaCO3	82.0	81.6	0.2	mg/L
Dissolved Fluoride	F	0.16	0.17	0.05	mg/L
Dissolved Chloride	Cl	34.7	33.7	0.2	mg/L
Nitrate and Nitrite	N	<	<	0.01	mg/L
Dissolved Nitrate	N	<	<	0.05	mg/L
Nitrite	N	0.003	0.004	0.002	mg/L
Dissolved Sulphate	SO4	42.8	43.1	0.5	mg/L
Ammonia Nitrogen	N	0.21	0.19	0.01	mg/L
Total Kjeldahl Nitrogen	N	0.3	0.3	0.2	mg/L
Total Phosphorus	P	0.04	0.04	0.02	mg/L as P

mg/L = milligrams per liter
< = Less than detection limit

mg/L as P = milligrams per liter as P

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70817179

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12393-01	12393-01	12393-02	12393-02	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	DISSOLVED	TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 8/06	Aug 8/06	Aug 8/06	Aug 8/06		
CANTEST ID:		608170602	608170602	608170609	608170609		
Aluminum	Al	0.40	0.30	0.48	0.30	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	0.0005	0.0005	0.0006	0.0005	0.0002	mg/L
Barium	Ba	0.027	0.025	0.028	0.025	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	0.11	0.10	0.11	0.10	0.01	mg/L
Cadmium	Cd	<	<	<	<	0.00004	mg/L
Calcium	Ca	19.1	17.6	19.1	17.9	0.01	mg/L
Chromium	Cr	0.0017	0.0012	0.0021	0.0012	0.0002	mg/L
Cobalt	Co	0.0005	0.0004	0.0005	0.0004	0.0002	mg/L
Copper	Cu	0.0022	0.0016	0.0020	0.0016	0.0002	mg/L
Iron	Fe	1.02	0.84	1.11	0.85	0.01	mg/L
Lead	Pb	0.0015	0.0014	0.0013	0.0012	0.0002	mg/L
Lithium	Li	0.0031	0.0028	0.0032	0.0027	0.0002	mg/L
Magnesium	Mg	8.29	7.76	8.20	7.92	0.01	mg/L
Manganese	Mn	0.309	0.286	0.304	0.293	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	0.013	0.012	0.013	0.012	0.0001	mg/L
Nickel	Ni	0.0020	0.0019	0.0022	0.0019	0.0002	mg/L
Phosphorus	P	<	<	<	<	0.03	mg/L
Potassium	K	3.63	3.27	3.68	3.28	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	2.31	1.96	2.71	1.98	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	16.0	15.0	15.9	15.6	0.01	mg/L
Strontium	Sr	0.119	0.111	0.120	0.114	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	0.0005	0.0004	0.0006	0.0004	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70817179

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12393-01	12393-01	12393-02	12393-02		
SAMPLE PREPARATION:		TOTAL	DISSOLVED	TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 8/06	Aug 8/06	Aug 8/06	Aug 8/06		
CANTEST ID:		608170602	608170602	608170609	608170609	DETECTION LIMIT	UNITS
Titanium	Ti	0.024	0.019	0.029	0.018	0.0002	mg/L
Uranium	U	0.0006	0.0006	0.0006	0.0006	0.0001	mg/L
Vanadium	V	0.0007	0.0006	0.0008	0.0006	0.0002	mg/L
Zinc	Zn	0.005	0.005	0.005	0.005	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

Analysis Report

CANTEST®

REPORT ON: Analysis of Water Samples

REPORTED TO: Golder Associates Ltd.
32 Steacie Dr
Kanata, ON
K2K 2A9

Att'n: Ms. Valerie Bertrand

CHAIN OF CUSTODY: 12393

NUMBER OF SAMPLES: 2

REPORT DATE: August 22, 2006

DATE SUBMITTED: August 10, 2006

GROUP NUMBER: 70810091

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (20th Edition) and EPA Method 300.0 (Revision 2.1).

Nitrite in Water - was determined based on Method 4500-NO3 B in Standard Methods for the examination of Water and Wastewater (20th Edition) and from the BC Laboratory Methods Manual (2003 Edition).

Total Dissolved Solids in Water - was determined based on Method 2540 C in Standard Methods (20th Edition).

Conventional Parameters - Winnipeg Laboratory (Unit D-675 Berry Street, Winnipeg, Manitoba R3H 1A7): - Analyses performed at Cantest's Winnipeg facilities follow procedures based on those described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition) and "Standard Methods for the Examination of Water and Wastewater" (20th Edition, 1998).

TEST RESULTS:

(See following pages)

CANTEST LTD.

PER: Marnie Kolach
Project Manager

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 22, 2006

GROUP NUMBER: 70810091

CANTEST®

Conventional Parameters-Winnipeg Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:		12393-01	12393-02	DETECTION LIMIT	UNITS
DATE SAMPLED:		Aug 8/06	Aug 8/06		
CANTEST ID:		608100392	608100401		
pH, Laboratory		7.68	7.89	-	pH units
Conductivity		284	282	1	µS/cm
Total Alkalinity	CaCO3	38.0	38.0	1	mg/L
Bicarbonate Alkalinity	HCO3	46.4	46.4	0.5	mg/L
Carbonate Alkalinity	CO3	<	<	0.5	mg/L
Hydroxide Alkalinity	OH	<	<	0.5	mg/L

µS/cm = microsiemens per centimeter
< = Less than detection limit

mg/L = milligrams per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 22, 2006

GROUP NUMBER: 70810091

CANTEST®

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Total Dissolved Solids	Dissolved Nitrate N	Nitrite N
12393-01	Aug 8/06	608100392	174	<	0.002
12393-02	Aug 8/06	608100401	155	<	0.002
DETECTION LIMIT			10	0.05	0.002
UNITS			mg/L	mg/L	mg/L

mg/L = milligrams per liter
< = Less than detection limit

Golder Associates
500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 298-6623 Fax (604) 298-5253

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

№ 12395 page 1 of 1

Project Number: 06-1122-186-2200	Laboratory Name: CanTest
Short Title: MEADOWBANK GDH2O SAMPLING	Address: Unit D-675 Berry St, Winnipeg, MB
Golder Contact: Valerie Bertrand / Golder E-mail Address: vbertrand @golder.com	Telephone/Fax: 204-772-7276/2386 Contact: Marnie Kolach

Office the final reports should be sent to:

- [X] 500-4260 Still Creek Dr. Burnaby, B.C. V5C 6C6 Tel: (604) 298-6623; Fax: (604) 298-5253
- [ ] 202 – 2790 Gladwin Road Abbotsford, B.C. V2T 4S8 Tel: (604) 850-8786 Fax: (604) 850-8756
- [ ] 220 – 174 Wilson Street Victoria, B.C. V9A 7N6 Tel: (250) 881-7372 Fax: (250) 881-7470

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	TOT. METALS incl. Hg	DISS. METALS incl. Hg	TSS + MAJOR IONS	NITROGEN SPECIES	SPEC. ALK.	PHYS. PARAMETERS	~~[illegible]~~	NUTRIENTS 4	TBS (PNTKN)	RUSH	Remarks (over)
12395 - 01	MW03-01	1	165	WATER	14/8/06	1800	D	–		5											NB – Diss. Met.
- 02																					is Field Filtered
- 03																					+ Preserved
- 04																					w/ HNO_3
- 05																					
- 06																					
- 07																					
- 08																					
- 09																					
- 10																					
- 11																					
- 12																					

Sampler's Signature: [signature]	Relinquished by: Signature [signature]	Company GAL	Date 14/8/06	Time 1945	Received by: Signature	Company
Sample Storage (°C) on ice	Relinquished by: Signature	Company	Date	Time	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:		Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy PINK: Lab Returns with Final Report

Analysis Report

CANTEST®

CANTEST LTD.
Professional Analytical Services

4606 Canada Way
Burnaby, B.C.
V5G 1K5

Fax: 604 731 2386

Tel: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Sample

REPORTED TO: Golder Associates Ltd.
32 Steacie Dr
Kanata, ON
K2K 2A9

Att'n: Ms. Valerie Bertrand

CHAIN OF CUSTODY: 12395
PROJECT NUMBER: 06-1122-186-2200

NUMBER OF SAMPLES: 1

REPORT DATE: August 24, 2006

DATE SUBMITTED: August 16, 2006

GROUP NUMBER: 70816019

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 In Standard Methods (20th Edition) and EPA Method 300.0 (Revision 2.1).

Hardness in Water - was calculated based on Method 2340 B in Standard Methods for the Examination of Water and Wastewater (20th Edition, 1998).

Total Dissolved Solids in Water - was determined based on Method 2540 C in Standard Methods (20th Edition).

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (20th Edition) and Method X332 In the BC Laboratory Manual (1994 Edition).

Conventional Parameters - analyses were performed using procedures based on those described in "British Columbia Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition), Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" 20th Edition, (1998), published by the American Public Health Association.

Conventional Parameters - Winnipeg Laboratory (Unit D-675 Berry Street, Winnipeg, Manitoba R3H 1A7): - Analyses performed at Cantest's Winnipeg facilities follow procedures based on those described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition) and "Standard Methods for the Examination of Water and Wastewater" (20th Edition, 1998).

(Continued)

CANTEST LTD.

Richard S. Jornitz
Supervisor, Inorganic Testing

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70816019

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

Field Filtered Metals in Water - Samples were filtered in the field (e.g. at the time of sampling) and quantitatively determined using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP) and/or Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

TEST RESULTS:

(See following pages)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70816019

CANTEST®

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		12395-01	
DATE SAMPLED:		Aug 14/06	DETECTION LIMIT
CANTEST ID:		608160106	
Hardness	CaCO3	150	1
Hardness (Total)	CaCO3	148	1
Total Dissolved Solids		405	10
Total Suspended Solids		4	1
Dissolved Fluoride	F	0.16	0.1
Dissolved Chloride	Cl	128	0.4
Dissolved Nitrate	N	<	0.1
Dissolved Sulphate	SO4	51.1	1

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70816019

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12395-01	12395-01		
SAMPLE PREPARATION:		TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 14/06	Aug 14/06		
CANTEST ID:		608160106	608160106	DETECTION LIMIT	UNITS
Aluminum	Al	0.13	<	0.005	mg/L
Antimony	Sb	<	<	0.001	mg/L
Arsenic	As	0.002	0.003	0.001	mg/L
Barium	Ba	0.052	0.051	0.001	mg/L
Beryllium	Be	<	<	0.001	mg/L
Bismuth	Bi	<	<	0.001	mg/L
Boron	B	0.27	0.27	0.05	mg/L
Cadmium	Cd	<	<	0.0002	mg/L
Calcium	Ca	33.4	33.7	0.05	mg/L
Chromium	Cr	<	<	0.001	mg/L
Cobalt	Co	<	<	0.001	mg/L
Copper	Cu	<	<	0.001	mg/L
Iron	Fe	1.10	0.20	0.05	mg/L
Lead	Pb	<	<	0.001	mg/L
Lithium	Li	0.006	0.005	0.001	mg/L
Magnesium	Mg	15.6	16.1	0.05	mg/L
Manganese	Mn	0.93	0.98	0.001	mg/L
Mercury	Hg	<	<	0.02	µg/L
Molybdenum	Mo	0.012	0.013	0.0005	mg/L
Nickel	Ni	<	<	0.001	mg/L
Phosphorus	P	<	<	0.15	mg/L
Potassium	K	6.1	6.1	0.1	mg/L
Selenium	Se	<	<	0.001	mg/L
Silicon	Si	2.7	2.5	0.25	mg/L
Silver	Ag	<	<	0.00025	mg/L
Sodium	Na	50.5	52.5	0.05	mg/L
Strontium	Sr	0.28	0.29	0.001	mg/L
Tellurium	Te	<	<	0.001	mg/L
Thallium	Tl	<	<	0.0001	mg/L
Thorium	Th	<	<	0.0005	mg/L
Tin	Sn	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70816019

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12395-01	12395-01		
SAMPLE PREPARATION:		TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 14/06	Aug 14/06		
CANTEST ID:		608160106	608160106	DETECTION LIMIT	UNITS
Titanium	Ti	0.006	<	0.001	mg/L
Uranium	U	<	<	0.0005	mg/L
Vanadium	V	<	<	0.001	mg/L
Zinc	Zn	<	<	0.005	mg/L
Zirconium	Zr	<	<	0.01	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: August 24, 2006

GROUP NUMBER: 70816019

CANTEST®

Conventional Parameters-Winnipeg Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:		12395-01		
DATE SAMPLED:		Aug 14/06	DETECTION LIMIT	UNITS
CANTEST ID:		608160106		
pH, Laboratory		7.36	-	pH units
Conductivity		634	1	µS/cm
Total Alkalinity	CaCO3	51.0	1	mg/L
Bicarbonate Alkalinity	HCO3	62.2	0.5	mg/L
Carbonate Alkalinity	CO3	<	0.5	mg/L
Hydroxide Alkalinity	OH	<	0.5	mg/L
Nitrite	N	0.002	0.002	mg/L

µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
< = Less than detection limit

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

№ 12567 page 1 of 1

Golder Associates
500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 298-6623 Fax (604) 298-5253

Project Number: 06-1122-186-2200		Laboratory Name: CANTEST	
Short Title: MEADOWBANK GRNDWATER SAMPLING		Address: UNIT D - 675 BERRY ST, WINNIPEG, MB	
Golder Contact: VALERIE BERTRAND	Golder E-mail Address: vbertrand @golder.com	Telephone/Fax: 204-772-7276/2386	Contact: MARNIE KOVACH

Office the final reports should be sent to:

- ☑ 500-4260 Still Creek Dr. Burnaby, B.C. V5C 6C6 Tel: (604) 298-6623; Fax: (604) 298-5253 ATTN: PREETI ANAND
- ☐ 202 – 2790 Gladwin Road Abbotsford, B.C. V2T 4S8 Tel: (604) 850-8786 Fax: (604) 850-8756
- ☐ 220 – 174 Wilson Street Victoria, B.C. V9A 7N6 Tel: (250) 881-7372 Fax: (250) 881-7470

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over	Related SCN (over)	Number of Containers	Analyses Required: TOT. METALS (incl. As, Sb)	DISS. METALS (Hg)	TSS + MAJOR IONS	NITROGEN SPECIES	SPECIATED ALKALINITY	PHYSICAL PARAM. (pH, CONDUCTIVITY)	FREE + TOT. CYANIDE	NUTRIENTS (P, N, TKN etc)	TDS	RUSH	Remarks (over)
12567-01	MW06-6	1	160	WATER	24/8/06	17:30	D	FDA	12567-2	5											DISS METALS
12567-02	MW06-6	1	160	WATER	24/8/06	17:30	D	FD	12567-1	5											FIELD FILTERED
12567-03	MW06-6	2	110	WATER	23/8/06	16:00	D	—	—	5											AND PRESERVED
-04																					W/ HNO_3
-05																					
-06																					
-07																					
-08																					
-09																					
-10																					
-11																					
-12																					

Sampler's Signature:	Relinquished by: Signature	Company: GAL	Date: AUG 24 2006	Time: 19:45	Received by: Signature	Company
Sample Storage (°C): ON ICE	Relinquished by: Signature	Company	Date	Time	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:		Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy PINK: Lab Returns with Final Report

Analysis Report

CANTEST®

CANTEST LTD.

Professional
Analytical
Services

4606 Canada Way
Burnaby, B.C.
V5G 1K5

Fax: 604 731 2386

Tel: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Samples

REPORTED TO: Golder Associates Ltd.
32 Steacie Dr
Kanata, ON
K2K 2A9

Att'n: Ms. Valerie Bertrand

CHAIN OF CUSTODY: 12567
PROJECT NUMBER: 06-1122-186-2200

NUMBER OF SAMPLES: 7

REPORT DATE: October 18, 2006

DATE SUBMITTED: August 29, 2006

GROUP NUMBER: 70829070

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (20th Edition) and EPA Method 300.0 (Revision 2.1).

Total Dissolved Solids in Water - was determined based on Method 2540 C in Standard Methods (20th Edition).

Total Kjeldahl Nitrogen in Water - was determined based on Method 4500-N in Standard Methods (20th Edition) and Method X325 in the BC Laboratory Manual (1994 Edition).

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (20th Edition) and Method X332 in the BC Laboratory Manual (1994 Edition).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater", published by the American Public Health Association.

Conventional Parameters - Winnipeg Laboratory (Unit D-675 Berry Street, Winnipeg, Manitoba R3H 1A7): - Analyses performed at Cantest's Winnipeg facilities follow procedures based on those described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition) and "Standard Methods for the Examination of Water and Wastewater" (20th Edition, 1998).

(Continued)

CANTEST LTD.

Greg Sparrow, B.Sc.
Senior Analyst

A/P

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

Dissolved Metals in Water - Samples were filtered in the laboratory and quantitatively determined using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP) and/or Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

COMMENTS:

Samples 608290188 and 608290196 had exceeded holding time at the time of submission for pH, Nitrite and Nitrate. Client requested that the analysis be completed.

TEST RESULTS:

(See following pages)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		12567-01	12567-02	12567-03A	12567-03B	
DATE SAMPLED:		Aug 24/06	Aug 24/06	Aug 23/06	Aug 23/06	DETECTION LIMIT
CANTEST ID:		608290188	608290196	608290206	608290209	
Hardness	CaCO3	-	-	335	319	1
Hardness (Total)	CaCO3	326	316	-	-	1
Total Dissolved Solids		588	678	-	-	10
Total Suspended Solids		16	28	-	-	1
Dissolved Fluoride	F	0.55	0.63	-	-	0.05
Dissolved Chloride	Cl	304	331	233	417	0.2
Dissolved Nitrate	N	<	<	-	-	0.25
Dissolved Sulphate	SO4	65.1	56.0	-	-	0.5
Total Kjeldahl Nitrogen	N	0.6	0.6	-	-	0.2

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		12567-03C	12567-03D	12567-03E	
DATE SAMPLED:		Aug 23/06	Aug 23/06	Aug 23/06	DETECTION LIMIT
CANTEST ID:		608290211	608290212	608290213	
Hardness	$CaCO_3$	142	293	311	1
Dissolved Chloride	Cl	164	312	197	0.2

Results expressed as milligrams per liter (mg/L)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12567-01	12567-01	12567-02	12567-02	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	DISSOLVED	TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 24/06	Aug 24/06	Aug 24/06	Aug 24/06		
CANTEST ID:		608290188	608290188	608290196	608290196		
Aluminum	Al	0.16	<	0.13	<	0.005	mg/L
Antimony	Sb	<	<	<	<	0.001	mg/L
Arsenic	As	0.003	0.002	0.003	0.002	0.001	mg/L
Barium	Ba	0.024	0.018	0.024	0.019	0.001	mg/L
Beryllium	Be	<	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	<	0.001	mg/L
Boron	B	0.36	0.37	0.31	0.44	0.05	mg/L
Cadmium	Cd	<	<	<	<	0.0002	mg/L
Calcium	Ca	89.3	87.1	86.1	85.3	0.05	mg/L
Chromium	Cr	<	<	<	<	0.001	mg/L
Cobalt	Co	0.002	<	0.002	<	0.001	mg/L
Copper	Cu	0.001	0.001	0.005	<	0.001	mg/L
Iron	Fe	0.57	<	0.57	<	0.05	mg/L
Lead	Pb	<	<	<	<	0.001	mg/L
Lithium	Li	0.029	0.028	0.028	0.025	0.001	mg/L
Magnesium	Mg	25.0	24.0	24.5	23.6	0.05	mg/L
Manganese	Mn	0.41	0.006	0.43	0.003	0.001	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	0.0087	0.0081	0.0090	0.0069	0.0005	mg/L
Nickel	Ni	0.007	0.005	0.010	0.004	0.001	mg/L
Phosphorus	P	1.2	0.9	1.2	0.8	0.15	mg/L
Potassium	K	6.7	6.6	6.5	5.8	0.1	mg/L
Selenium	Se	<	<	<	<	0.001	mg/L
Silicon	Si	4.7	4.1	4.6	3.8	0.25	mg/L
Silver	Ag	<	<	<	<	0.00025	mg/L
Sodium	Na	59.0	58.2	55.9	55.9	0.05	mg/L
Strontium	Sr	0.75	0.72	0.72	0.76	0.001	mg/L
Tellurium	Te	<	<	<	<	0.001	mg/L
Thallium	Tl	<	<	<	<	0.0001	mg/L
Thorium	Th	<	<	<	<	0.0005	mg/L
Tin	Sn	<	<	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12567-01	12567-01	12567-02	12567-02		
SAMPLE PREPARATION:		TOTAL	DISSOLVED	TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 24/06	Aug 24/06	Aug 24/06	Aug 24/06	DETECTION LIMIT	UNITS
CANTEST ID:		608290188	608290188	608290196	608290196		
Titanium	Ti	0.005	<	0.005	<	0.001	mg/L
Uranium	U	0.0018	0.0016	0.0018	0.0014	0.0005	mg/L
Vanadium	V	0.002	0.001	0.002	0.001	0.001	mg/L
Zinc	Zn	<	<	<	<	0.005	mg/L
Zirconium	Zr	<	<	<	<	0.01	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:	12567-03A	12567-03B	12567-03C	12567-03D	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:	TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:	Aug 23/06	Aug 23/06	Aug 23/06	Aug 23/06		
CANTEST ID:	608290206	608290209	608290211	608290212		
Calcium Ca	93.7	86.1	40.8	92.8	0.05	mg/L

mg/L = milligrams per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12567-03E		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Aug 23/06	DETECTION LIMIT	UNITS
CANTEST ID:		608290213		
Calcium	Ca	2790	0.05	mg/L

mg/L = milligrams per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Conventional Parameters-Winnipeg Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:		12567-01	12567-02	12567-03A	12567-03B		
DATE SAMPLED:		Aug 24/06	Aug 24/06	Aug 23/06	Aug 23/06	DETECTION LIMIT	UNITS
CANTEST ID:		608290188	608290196	608290206	608290209		
pH, Laboratory		7.33	7.29	7.34	8.23	-	pH units
Conductivity		1210	1200	980	1490	1	µS/cm
Total Alkalinity	CaCO3	49.9	49.9	-	-	1	mg/L
Bicarbonate Alkalinity	HCO3	60.9	60.9	-	-	0.5	mg/L
Carbonate Alkalinity	CO3	<	<	-	-	0.5	mg/L
Hydroxide Alkalinity	OH	<	<	-	-	0.5	mg/L
Nitrite	N	0.005	0.004	-	-	0.002	mg/L

µS/cm = microsiemens per centimeter
< = Less than detection limit

mg/L = milligrams per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Conventional Parameters-Winnipeg Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:	12567-03C	12567-03D	12567-03E		
DATE SAMPLED:	Aug 23/06	Aug 23/06	Aug 23/06	DETECTION LIMIT	UNITS
CANTEST ID:	608290211	608290212	608290213		
pH, Laboratory	7.81	8.25	11.7	-	pH units
Conductivity	729	1120	4900	1	µS/cm

µS/cm = microsiemens per centimeter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
Total Dissolved Solids		Duplicate	4.2	R.P.D.	0	18
Total Suspended Solids		Blank	< 1	mg/L	0	3
		TSS Control Standard (CalVer)	100.0	% Recovery	91	105
		Duplicate	1.0	R.P.D.	0	18
		Duplicate	1.4	R.P.D.	0	18
		Duplicate	2.4	R.P.D.	0	18
		Duplicate	5.9	R.P.D.	0	18
Dissolved Fluoride	F	Dionex Certified Standard	108.0	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	1.8	R.P.D.	0	10
Dissolved Chloride	Cl	Dionex Certified Standard	97.0	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	12
		Duplicate	2.0	R.P.D.	0	12
		Duplicate	2.8	R.P.D.	0	12
Dissolved Nitrate	N	Dionex Certified Standard	102.7	% Recovery	90	110
Dissolved Sulphate	SO4	Dionex Certified Standard	91.3	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.8	R.P.D.	0	10
		Duplicate	0.8	R.P.D.	0	10
		Duplicate	6.1	R.P.D.	0	10
Total Kjeldahl Nitrogen	N	Blank	< 0.2	mg/L	0	0.2
		Spike	101.0	% Recovery	66	124
		Spike	112.0	% Recovery	66	124
		Spike	114.0	% Recovery	66	124
		Spike	118.0	% Recovery	66	124
		Duplicate	0.0	R.P.D.	0	20

(Continued on next page)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Conventional Parameters in Water

Parameter	QC Type	QC Result	Units	Lower Limit	Upper Limit
Total Kjeldahl Nitrogen N	Duplicate	0.0	R.P.D.	0	20
	Duplicate	0.0	R.P.D.	0	20
	Duplicate	0.0	R.P.D.	0	20

mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Conventional Parameters-Winnipeg Laboratory- In Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
pH, Laboratory		pH Calibration Verification	100.3	% Recovery	98	102
		Duplicate	0.1	R.P.D.	0	3
Conductivity		Blank	< 1	uS/cm	0	1
		Calibration Verification	100.0	% Recovery	80	120
		Duplicate	0.0	R.P.D.	0	20
Total Alkalinity	CaCO3	Blank	< 1	mg/L	0	4
		Calibration Verification	93.8	% Recovery	80	120
		Duplicate	0.5	R.P.D.	0	20
Bicarbonate Alkalinity	HCO3	Duplicate	0.4	R.P.D.	0	20
Carbonate Alkalinity	CO3	Duplicate	NC	R.P.D.	0	20
Hydroxide Alkalinity	OH	Duplicate	NC	R.P.D.	0	20
Nitrite	N	Blank	< 0.002	mg/L	0	0.002
		Spike	95.1	% Recovery	80	120
		Calibration Verification	98.6	% Recovery	80	120
		Duplicate	PASS	R.P.D.	0	12

uS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Dissolved Metals Analysis in Water (QC# 85189)

Parameter		Dissolved Blank (mg/L)	Dissolved Blank Limits	Duplicate (R.P.D.) 608290188	Duplicate Limits	Duplicate (R.P.D.) 608290283	Duplicate Limits
Aluminum	Al	0.001	0.015	NC	20	PASS	20
Antimony	Sb	< 0.0002	0.001	NC	20	NC	20
Arsenic	As	< 0.0002	0.001	PASS	20	0	20
Barium	Ba	< 0.0002	0.001	-	-	-	-
Beryllium	Be	< 0.0002	0.001	-	-	-	-
Cadmium	Cd	< 0.00004	0.001	NC	20	NC	20
Calcium	Ca	-	-	2.2	20	2.9	20
Chromium	Cr	< 0.0002	0.001	NC	20	NC	20
Cobalt	Co	< 0.0002	0.001	NC	20	NC	20
Copper	Cu	< 0.0002	0.001	NC	20	NC	20
Lead	Pb	< 0.0002	0.001	NC	20	NC	20
Magnesium	Mg	-	-	2.1	20	4.5	20
Manganese	Mn	< 0.0002	0.001	-	-	-	-
Mercury	Hg	< 0.02	0.05	NC	20	-	-
Molybdenum	Mo	< 0.0001	0.001	0	20	PASS	20
Nickel	Ni	< 0.0002	0.001	PASS	20	NC	20
Potassium	K	< 0.02	0.05	4.6	20	PASS	20
Silver	Ag	< 0.00005	0.001	NC	20	NC	20
Sodium	Na	-	-	3.8	20	3.8	20
Strontium	Sr	< 0.0002	0.001	-	-	-	-
Thallium	Tl	< 0.00002	0.001	NC	20	NC	20
Thorium	Th	< 0.0001	0.0005	NC	20	NC	20
Tin	Sn	< 0.0002	0.005	NC	20	NC	20
Titanium	Ti	< 0.0002	0.001	-	-	-	-
Uranium	U	< 0.0001	0.0005	PASS	20	NC	20
Vanadium	V	< 0.0002	0.001	-	-	-	-
Zinc	Zn	< 0.001	0.01	-	-	-	-
Zirconium	Zr	< 0.002	0.01	-	-	-	-

mg/L = milligrams per liter
Mercury Hg expressed as: ug/L (micrograms per liter)
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Dissolved Metals Analysis in Water (QC# 85189)

Parameter		Duplicate (R.P.D.) 608300483	Duplicate Limits
Calcium	Ca	0	20
Magnesium	Mg	4.2	20
Potassium	K	PASS	20
Sodium	Na	0.6	20

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Total Metals Analysis in Water (QC# 85153)

Parameter		Duplicate (R.P.D.) 608290188	Duplicate Limits	Duplicate (R.P.D.) 608300204	Duplicate Limits	Duplicate (R.P.D.) 608300211	Duplicate Limits
Mercury	Hg	NC	20	NC	20	NC	20

ug/L = micrograms per liter
R.P.D. = Relative Percent Difference
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Total Metals Analysis in Water (QC# 85153)

Parameter		Spike (% Recovery) 608290188	Spike Limits	Spike (% Recovery) 608300204	Spike Limits	Spike (% Recovery) 608300211	Spike Limits
Mercury	Hg	112	70 - 128	105	70 - 128	85	70 - 128

ug/L = micrograms per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Total Metals Analysis in Water (QC# 85169)

Parameter		Duplicate (R.P.D.) 608300239	Duplicate Limits	ICPMS Spike (% Recovery) 608300236	ICPMS Spike Limits	ICPMS Lab Fortified Blank (% Recovery)	ICPMS Lab Fortified Blank Limits
Aluminum	Al	8.5	20	-	-	105	78 - 122
Antimony	Sb	NC	20	91	78 - 118	90	75 - 117
Arsenic	As	NC	20	91	80 - 118	80	72 - 114
Barium	Ba	-	-	-	-	100	81 - 119
Beryllium	Be	-	-	88	79 - 123	95	73 - 115
Boron	B	-	-	-	-	100	92 - 110
Cadmium	Cd	NC	20	93	74 - 124	88	78 - 116
Calcium	Ca	3.4	20	-	-	-	-
Chromium	Cr	NC	20	93	70 - 130	95	83 - 119
Cobalt	Co	NC	20	90	76 - 126	95	85 - 119
Copper	Cu	PASS	20	92	77 - 125	100	85 - 120
Lead	Pb	NC	20	94	77 - 124	100	80 - 116
Magnesium	Mg	3.8	20	-	-	-	-
Manganese	Mn	-	-	92	69 - 131	100	82 - 120
Molybdenum	Mo	NC	20	91	68 - 118	95	82 - 114
Nickel	Ni	NC	20	94	77 - 123	100	78 - 118
Potassium	K	0	20	-	-	-	-
Selenium	Se	-	-	-	-	70	58 - 120
Silver	Ag	NC	20	-	-	95	85 - 117
Sodium	Na	3.6	20	-	-	-	-
Strontium	Sr	-	-	-	-	95	83 - 115
Thallium	Tl	NC	20	92	73 - 123	98	86 - 118
Thorium	Th	NC	20	-	-	-	-
Tin	Sn	NC	20	-	-	-	-
Titanium	Ti	-	-	97	70 - 130	100	79 - 119
Uranium	U	NC	20	89	65 - 133	95	75 - 121
Vanadium	V	-	-	91	75 - 123	95	76 - 118
Zinc	Zn	-	-	-	-	80	64 - 126

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control for Total Metals Analysis in Water (QC# 85169)

Parameter		Total Blank (mg/L)	Total Blank Limits
Aluminum	Al	< 0.001	0.015
Antimony	Sb	< 0.0002	0.001
Arsenic	As	< 0.0002	0.001
Barium	Ba	< 0.0002	0.001
Beryllium	Be	< 0.0002	0.001
Cadmium	Cd	< 0.00004	0.001
Chromium	Cr	< 0.0002	0.001
Cobalt	Co	< 0.0002	0.001
Copper	Cu	< 0.0002	0.001
Lead	Pb	< 0.0002	0.001
Manganese	Mn	< 0.0002	0.001
Molybdenum	Mo	< 0.0001	0.001
Nickel	Ni	< 0.0002	0.001
Potassium	K	< 0.02	0.05
Silver	Ag	< 0.00005	0.001
Strontium	Sr	< 0.0002	0.001
Thallium	Tl	< 0.00002	0.001
Thorium	Th	< 0.0001	0.0005
Tin	Sn	< 0.0002	0.005
Titanium	Ti	< 0.0002	0.001
Uranium	U	< 0.0001	0.0005
Vanadium	V	< 0.0002	0.001
Zinc	Zn	< 0.001	0.01
Zirconium	Zr	< 0.002	0.01

mg/L = milligrams per liter

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

Instrument Quality Control for the PSA Mercury Analyzer-AF (QC# 167177)

QC Type: Calibration Verification

Parameter	% Recovery	Limits
Mercury Hg	104	90 - 110

REPORTED TO: Golder Associates Ltd.

REPORT DATE: October 18, 2006

GROUP NUMBER: 70829070

CANTEST®

Batch Quality Control Frequency Summary

Nitrite in Water-Winnipeg (Batch# 85137)

QC Type	No. Samples
Blank	1
Calibration Verification	1
Duplicate	1
Spike	1

pH Analysis (WPG) (Batch# 85139)

QC Type	No. Samples
Duplicate	1

Conductivity Analysis (WPG) (Batch# 85140)

QC Type	No. Samples
Blank	1
Calibration Verification	1
Duplicate	1

Mercury Water Bromination Prep (Batch# 85153)

QC Type	No. Samples
Duplicate	3
Spike	3

Total Metals Preparation (Batch# 85169)

QC Type	No. Samples
ICPMS Spike	1
ICP Spike Vista ICAP	1
Potassium/Silicon Spike Vista	1
ICPMS Lab Fortified Blank	1
Duplicate	2
Total Blank	2

(Continued on next page)

CANTEST®

Batch Quality Control Frequency Summary

TKN Preparation (Batch# 85187)

QC Type	No. Samples
Blank	1
Duplicate	4
Spike	4

Dissolved Metals Preparation (Batch# 85189)

QC Type	No. Samples
Dissolved Blank	3
Duplicate	4

Water Lab Ion Chromatography (Batch# 85192)

QC Type	No. Samples
Blank	2
Duplicate	4

Water Lab Titration (WPG) (Batch# 85227)

QC Type	No. Samples
Blank	1
Calibration Verification	1
Duplicate	1

Suspended Solids Analysis (Batch# 85285)

QC Type	No. Samples
Blank	1
TSS Control Standard (CalVer)	1
Duplicate	4

(Continued on next page)

CANTEST

Batch Quality Control Frequency Summary

Nitrite in Water-Winnipeg (Batch# 85137)

QC Type	No. Samples
Batch Size	2

pH Analysis (WPG) (Batch# 85139)

QC Type	No. Samples
Batch Size	11

Conductivity Analysis (WPG) (Batch# 85140)

QC Type	No. Samples
Batch Size	9

Mercury Water Bromination Prep (Batch# 85153)

QC Type	No. Samples
Batch Size	32

Total Metals Preparation (Batch# 85169)

QC Type	No. Samples
Batch Size	39

TKN Preparation (Batch# 85187)

QC Type	No. Samples
Batch Size	38

(Continued on next page)

CANTEST®

Batch Quality Control Frequency Summary

Dissolved Metals Preparation (Batch# 85189)

QC Type	No. Samples
Batch Size	31

Water Lab Ion Chromatography (Batch# 85192)

QC Type	No. Samples
Batch Size	39

Water Lab Titration (WPG) (Batch# 85227)

QC Type	No. Samples
Batch Size	13

Suspended Solids Analysis (Batch# 85285)

QC Type	No. Samples
Batch Size	35

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

№ 12568 page 1 of 1

Golder Associates
500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 298-6623 Fax (604) 298-5253

Project Number: 06-1122-186 — 2200	Laboratory Name: CANTEST
Short Title: MEADOWBANK GROUNDWATER SAMPLING	Address: UNIT-D, 675 BERRY ST, WINNIPEG, MB
Golder Contact: VALERIE BERTRAND / Golder E-mail Address: vbertrand @golder.com	Telephone/Fax: (204) 772-7276/2386 / Contact: MARNIE KOLACH

Office the final reports should be sent to:

- ☑ 500-4260 Still Creek Dr., Burnaby, B.C., V5C 6C6, Tel: (604) 298-6623; Fax: (604) 298-5253
- ☐ 202 – 2790 Gladwin Road, Abbotsford, B.C., V2T 4S8, Tel: (604) 850-8786, Fax: (604) 850-8756
- ☐ 220 – 174 Wilson Street, Victoria, B.C., V9A 7N6, Tel: (250) 881-7372, Fax: (250) 881-7470

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over	Related SCN (over)	Number of Containers	Analyses Required: TOT. METALS (incl. As, Sb)	DISS. METALS (incl. As, Sb, Hg)	TSS + MAJOR IONS	NITROGEN SPECIES	SPEC. ALKALINITY	PHYS. PARAMETERS	NUTRIENTS (P, N, TKN)	TDS		RUSH	Remarks (over)
12568 - 01	MW 06-7	1	165	WATER	30/8/06	21:15	D	FDA	12568-02	5											NB: DISS. METALS
12568 - 02	MW 06-7	1	165	WATER	30/8/06	21:15	D	FD	12568-01	5											SAMPLE FIELD
- 03																					FILTERED &
- 04																					PRESERV W/
- 05																					HNO_3
- 06																					
- 07																					
- 08																					
- 09																					
- 10																					
- 11																					
- 12																					

Sampler's Signature:	Relinquished by: Signature	Company: GAL	Date: 30/8/2006	Time: 22:00	Received by: Signature / Company
Sample Storage (°C): ON ICE	Relinquished by: Signature	Company	Date	Time	Received by: Signature / Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) / Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy PINK: Lab Returns with Final Report

Analysis Report

CANTEST

CANTEST LTD.

Professional
Analytical
Services

4606 Canada Way
Burnaby, B.C.
V5G 1K5

Fax: 604 731 2386

Tel: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Samples

REPORTED TO: Golder Associates Ltd.
32 Steacie Dr
Kanata, ON
K2K 2A9

Att'n: Ms. Valerie Bertrand

CHAIN OF CUSTODY: 12568
PROJECT NUMBER: 06-1122-186-2200

NUMBER OF SAMPLES: 2

REPORT DATE: September 14, 2006

DATE SUBMITTED: September 5, 2006

GROUP NUMBER: 70905001

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (20th Edition) and EPA Method 300.0 (Revision 2.1).

Total Dissolved Solids in Water - was determined based on Method 2540 C in Standard Methods (20th Edition).

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (20th Edition) and Method X332 in the BC Laboratory Manual (1994 Edition).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater", published by the American Public Health Association.

Conventional Parameters - Winnipeg Laboratory (Unit D-675 Berry Street, Winnipeg, Manitoba R3H 1A7): - Analyses performed at Cantest's Winnipeg facilities follow procedures based on those described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition) and "Standard Methods for the Examination of Water and Wastewater" (20th Edition, 1998).

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

(Continued)

CANTEST LTD.

Richard S. Jornitz
Supervisor, Inorganic Testing

REPORTED TO: Golder Associates Ltd.

REPORT DATE: September 14, 2006

GROUP NUMBER: 70905001

CANTEST®

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

Dissolved Metals in Water - Samples were filtered in the laboratory and quantitatively determined using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP) and/or Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

COMMENTS:

pH, nitrite and total suspended solids had exceeded holding time at the time of submission for samples 609050002 and 609 05003. Client requested that analysis be completed. Samples received at a temperature of 12.4 degrees Celcius.

TEST RESULTS:

(See following pages)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: September 14, 2006

GROUP NUMBER: 70905001

CANTEST®

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		12568-01	12568-02	
DATE SAMPLED:		Aug 30/06	Aug 30/06	
CANTEST ID:		609050002	609050003	DETECTION LIMIT
Hardness	CaCO3	106	107	1
Hardness (Total)	CaCO3	124	128	1
Total Dissolved Solids		172	162	10
Total Suspended Solids		11	11	1
Dissolved Fluoride	F	0.20	0.11	0.05
Dissolved Chloride	Cl	33.3	33.5	0.2
Dissolved Nitrate	N	0.12	0.12	0.05
Dissolved Sulphate	SO4	3.75	3.76	0.5

Results expressed as milligrams per liter (mg/L)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: September 14, 2006

GROUP NUMBER: 70905001

CANTEST®

Metals Analysis In Water

CLIENT SAMPLE IDENTIFICATION:		12568-01	12568-01	12568-02	12568-02	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	DISSOLVED	TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 30/06	Aug 30/06	Aug 30/06	Aug 30/06		
CANTEST ID:		609050002	609050002	609050003	609050003		
Aluminum	Al	1.08	0.040	1.06	0.042	0.005	mg/L
Antimony	Sb	<	<	<	<	0.001	mg/L
Arsenic	As	0.001	<	0.002	0.001	0.001	mg/L
Barium	Ba	0.11	0.086	0.11	0.086	0.001	mg/L
Beryllium	Be	<	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	<	0.001	mg/L
Boron	B	<	<	<	<	0.05	mg/L
Cadmium	Cd	<	<	<	<	0.0002	mg/L
Calcium	Ca	34.9	31.3	36.4	31.5	0.05	mg/L
Chromium	Cr	0.006	<	0.005	<	0.001	mg/L
Cobalt	Co	0.001	<	0.001	<	0.001	mg/L
Copper	Cu	0.011	0.005	0.011	0.008	0.001	mg/L
Iron	Fe	1.50	<	1.58	0.05	0.05	mg/L
Lead	Pb	0.001	<	0.001	<	0.001	mg/L
Lithium	Li	0.004	0.002	0.004	0.002	0.001	mg/L
Magnesium	Mg	8.81	6.83	9.04	6.92	0.05	mg/L
Manganese	Mn	0.073	0.032	0.074	0.032	0.001	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	0.0050	0.0040	0.0048	0.0042	0.0005	mg/L
Nickel	Ni	0.005	0.002	0.005	0.002	0.001	mg/L
Phosphorus	P	0.4	0.3	0.4	0.3	0.15	mg/L
Potassium	K	2.7	2.3	2.8	2.3	0.1	mg/L
Selenium	Se	<	<	<	<	0.001	mg/L
Silicon	Si	5.2	2.7	5.0	2.7	0.25	mg/L
Silver	Ag	0.0009	<	0.0009	<	0.00025	mg/L
Sodium	Na	8.85	7.68	9.12	7.84	0.05	mg/L
Strontium	Sr	0.23	0.19	0.24	0.20	0.001	mg/L
Tellurium	Te	<	<	<	<	0.001	mg/L
Thallium	Tl	<	<	<	<	0.0001	mg/L
Thorium	Th	<	<	<	<	0.0005	mg/L
Tin	Sn	<	<	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Golder Associates Ltd.

REPORT DATE: September 14, 2006

GROUP NUMBER: 70905001

CANTEST®

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		12568-01	12568-01	12568-02	12568-02		
SAMPLE PREPARATION:		TOTAL	DISSOLVED	TOTAL	DISSOLVED		
DATE SAMPLED:		Aug 30/06	Aug 30/06	Aug 30/06	Aug 30/06	DETECTION LIMIT	UNITS
CANTEST ID:		609050002	609050002	609050003	609050003		
Titanium	Ti	0.032	<	0.031	<	0.001	mg/L
Uranium	U	0.0095	0.0079	0.0097	0.0080	0.0005	mg/L
Vanadium	V	0.002	<	0.002	<	0.001	mg/L
Zinc	Zn	0.006	<	0.006	<	0.005	mg/L
Zirconium	Zr	<	<	<	<	0.01	mg/L

mg/L = milligrams per liter

µg/L = micrograms per liter

< = Less than detection limit

REPORTED TO: Golder Associates Ltd.

REPORT DATE: September 14, 2006

GROUP NUMBER: 70905001

CANTEST®

Conventional Parameters-Winnipeg Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:		12568-01	12568-02	DETECTION LIMIT	UNITS
DATE SAMPLED:		Aug 30/06	Aug 30/06		
CANTEST ID:		609050002	609050003		
pH, Laboratory		7.54	7.57	-	pH units
Conductivity		281	285	1	µS/cm
Total Alkalinity	CaCO3	89.0	89.0	1	mg/L
Bicarbonate Alkalinity	HCO3	108	108	0.5	mg/L
Carbonate Alkalinity	CO3	<	<	0.5	mg/L
Hydroxide Alkalinity	OH	<	<	0.5	mg/L
Nitrite	N	0.003	0.003	0.002	mg/L

µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
< = Less than detection limit