WorleyParsons
resources & energy

EcoNomics

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION

2011 Groundwater Quality Monitoring

Beverly Channel Monitoring Wells

E00100102

7 September 2011

WorleyParsons Canada Services Ltd.
Suite 705, 10240 - 124 Street
Edmonton, AB T5N 3W6 CANADA
Phone: +1 780 496 9055
Facsimile: +1 780 496 9575
www.worleyparsons.com

PROJECT E00100102 - 2011 GROUNDWATER QUALITY MONITORING

FILE LOC.: EDMONTON

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Issued for review	J. Hrynkiw	J. Kupper	J. Kupper	22-Aug-11		
B	Issued for review	K. Sommerstad	J. Kupper	J. Kupper	07-Jul-11		
0	Issued as final	K. Sommerstad	J. Kupper	J. Kupper	07-Sep-11		

Disclaimer

The information presented in this document was compiled and interpreted exclusively for the purposes stated in Section [1] of the document. WorleyParsons provided this report for Northeast Capital Industrial Association solely for the purpose noted above.

WorleyParsons has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. The information contained in this report is based upon, and limited by, the circumstances and conditions acknowledged herein, and upon information available at the time of its preparation. The information provided by others is believed to be accurate but cannot be guaranteed.

WorleyParsons does not accept any responsibility for the use of this report for any purpose other than that stated in Section [1] and does not accept responsibility to any third party for the use in whole or in part of the contents of this report. Any alternative use, including that by a third party, or any reliance on, or decisions based on this document, is the responsibility of the alternative user or third party.

Any questions concerning the information or its interpretation should be directed to J. Kupper.

CONTENTS

Tables within Text

Tables

Figures within Text

Figures

Appendices

1. INTRODUCTION

1.1 General

The Northeast Capital Industrial Association (NCIA) Beverly Channel Study Area is located within Sturgeon and Strathcona Counties and is comprised of Townships 54, 55, and 56, Ranges 21 and 22, W4M (Figure 1). Groundwater quality monitoring within the Study Area has been conducted since 2006 (Stantec Consulting Ltd. 2006a, 2006b, 2007, 2008, and 2009; and WorleyParsons 2010). The objective of the groundwater monitoring program is to monitor groundwater quality in the Beverly Channel in order to compile baseline groundwater data for use in the development of a long-term monitoring strategy and response plan. The monitoring well network in the Study Area consists of 13 wells placed into the Beverly Channel within the NCIA study area.

1.2 Previous Work

Previous work conducted within the Study Area was described by Stantec Consulting Ltd. (Stantec 2006a, 2006b, 2007, 2008, and 2009; and WorleyParsons 2010) and is summarized as follows:

- Depth to the groundwater surface has historically ranged from approximately 14 to 34 m below ground surface (bgs). Annual groundwater level fluctuation has generally been 1 m or less.
- The lateral groundwater flow gradient within the Beverly Channel has historically ranged from 0.0005 to 0.005 m/m. Groundwater flow velocity has been estimated to vary from 16 to 160 m/year.
- Historically, total dissolved solids (TDS), iron and manganese have exceeded the applied guidelines at several locations within the Study Area.
- Sodium concentrations have historically exceeded the applied guideline at MW-07 and MW-09.
- Chloride concentrations at MW-04 (range of 125 to 200 mg/L; mean of 155 mg/L) are higher than at other locations in the Beverly Channel. These chloride concentrations, nevertheless, are considered to be natural, reflecting the water quality in the underlying bedrock.

1.3 Scope of Work

The main objective of the 2011 program was to conduct annual groundwater quality monitoring. One sampling event was conducted in the spring which included the following tasks:

- Field measurement of depth to groundwater at all monitoring wells;
- Field measurement of electrical conductivity (EC), pH, and temperature for groundwater;
- Sampling of groundwater and submission for laboratory analysis; and
- Preparing a report summarizing the program methodology and results, and providing an analysis of the groundwater data.

2. PHYSICAL SETTING

2.1 Topography and Drainage

The Study Area encompasses residential, agricultural and industrial areas. While local topography varies at each well location, the ground generally slopes toward the North Saskatchewan River, which is located in the northern portion of the Study Area. Surface drainage is expected to be generally toward the North Saskatchewan River or Astotin Creek, which ultimately discharges to the North Saskatchewan River.

2.2 Regional Geology and Hydrogeology

A detailed description of the geology and hydrogeology of the region is provided in Stantec (2006a). A brief summary is provided below.

Regional bedrock geology comprises Late Cretaceous-aged, non-marine, grey thick-bedded sandstone; grey and green mudstone; grey, clayey siltstone; coal beds; and rare intermittent ironstone beds of the Belly River Formation, or marine, dark grey blocky shale and silty shale; greenish glauconitic and grey clayey sandstone; thin concretionary ironstone and bentonitic beds of the Bearpaw Formation (Stein 1976). The Bearpaw Formation has been eroded over most of the Project Area, but seems to be present in the southwest of the project Area. The Bearpaw Formation is generally considered an aquitard. The Horseshoe Canyon Formation is present outside of the Study Area toward the southwest.

Quaternary deposits consisting of pre-glacial, glacial, lacustrine and Aeolian deposited sediments overlie the bedrock. The Beverly Channel is a major pre-glacial valley in the area that consists of buried sand and gravel deposits. The channel is roughly coincident with the present-day North Saskatchewan River Valley. Deposited in fast-flowing braided streams, the sand and gravels of the Beverly Channel form an important regional aquifer in the area.

Clay till is present above the Beverly Channel sand and gravels and clay overlies the clay till. The clay and clay till units provide an effective protective barrier for the Beverly Channel over much of the region. A saturated surficial sand unit may overlie the clay unit in some areas.

Aquifers can be found in the Belly River Formation, the Beverly Channel, and sand lenses in the till and surficial sand and gravel deposits (Stein 1976). Aquifers within the Belly River Formation exhibit TDS ranging from 1,000 to more than 6,000 mg/L (Stein 1976). Areas of high TDS are typically associated with high chloride and/or high sulphate content (Stein 1976).

The Beverly Channel is hydraulically connected to the North Saskatchewan River (Stein 1976). Mineralization in the Beverly Channel generally ranges from less than 500 to 3,000 mg/L TDS. Iron concentration within the Channel can exceed 15 mg/L and iron staining and iron bacteria are common (Stein 1976).

2.3 Groundwater Use

A water well search of the Study Area was conducted in 2010. The Alberta Water Well Information Database indicated that there are 1091 water well records within the Study Area (Appendix 1). The majority of the wells were listed for domestic usage. Where depths were available, the wells were installed between approximately 2 and 1900 m bgs. The existence and location of these water wells has not been field verified.

Groundwater analytical data is available for 258 of the 1091 water well records. Of the 258 records it can be deducted with reasonable confidence that eight wells have been completed within the Beverly Channel and six wells have been completed in the upper bedrock. Table A summarizes the range and mean concentrations calculated from available water well records.

Several water wells were identified as being within the Beverly Channel in Shell Canada Limited's (Shell) Environmental Impact Assessment for the Scotford Upgrader Expansion (Shell 2005). Water well chemistry data were unavailable for most of the water wells.

Table A Select Parameter Concentrations from Available Water Well Records

Parameter	Beverly Channel		Upper Bedrock	
	Range	Mean	Range	Mean
pH	7.3 – 8.5	8.1	7.8 – 8.7	8.0
Chloride (mg/L)	1 – 38	13.5	2 – 901	197
Sulphate (mg/L)	40 – 726	316	5 – 741	193
Iron (mg/L)	0.02 – 4.84	1.24	0.08 – 1.48	0.36
TDS (mg/L)	362 – 1732	975	331 – 2021	1059
Sodium (mg/L)	54 – 417	200	8 – 825	274

Notable differences between the aquifers include chloride, sulphate, and iron concentrations. Within the Beverly Channel chloride concentrations are lower while sulphate and iron are typically higher than in the upper bedrock.

3. FIELD PROGRAM

3.1 Monitoring Network

The monitoring well network consists of 13 existing wells, which have been installed at 13 different locations within the Study Area (Figure 2). Borehole logs of the 13 wells have been compiled by Stantec (2005) and are provided in Appendix 2.

3.2 Groundwater Sampling

Groundwater sampling was conducted according to the WorleyParsons groundwater sampling protocols. The following procedures were followed during sampling of all monitoring wells.

- Prior to sampling, the static groundwater level was measured with an electrical tape. The tape was cleaned by rinsing with distilled water after each reading.
- Wells were purged of standing water using a Grundfos submersible pump. The temperature, pH, and EC of the water were monitored during purging. The wells were purged until these parameters stabilized.
- After purging and field measurements, groundwater samples were collected using the Grundfos pump. Samples were collected in pre-cleaned bottles and vials provided by ALS Laboratory Group (ALS) in Edmonton, Alberta. Samples for dissolved metals, dissolved ammonia, and dissolved organic carbons (DOC) analyses were field-filtered. Preservatives were added to select samples as directed by ALS.
- Groundwater samples were placed in coolers with ice for shipment to ALS.
- Quality assurance/quality control (QA/QC) for the field sampling program consisted of collecting one duplicate sample and one field blank. Both samples were analyzed for major ions/routine potability; benzene, toluene, ethylbenzene, xylenes (BTEX), and petroleum hydrocarbon fraction F1 and F2; and dissolved metals.
- Standard chain-of-custody (COC) protocols were followed.

Measurements of water quality indicator parameters were conducted during the field sampling program. These measurements comprised the following:

- **Temperature and pH:** WTW 3150i pH meter, calibrated using pH 4 and pH 7 buffer solutions.
- **Electrical Conductivity:** WTW 3150i conductivity meter with a Tetracon 325 probe calibrated with standard KCl solution (1,413 µS.cm at 25°C).

QA/QC procedures utilized in the field program are listed below.

- Thorough rinsing with distilled water of all equipment entering a well (e.g. water level probe and Grundfos pump);

- A field blank analyzed for major ions/routine potability; BTEX, and PHC F1 and F2; and dissolved metals.
- A blind duplicate for analysis of major ions/routine potability; BTEX, and PHC F1 and F2; and dissolved metals.
- Storing of samples in ice chests cooled to approximately 4°C.
- Documentation of sample handling, transport, and delivery to the laboratory using appropriate COC procedures and documentation.

Groundwater samples were collected on May 25, and June 2, 7 and 8, 2011. An additional groundwater sample was collected from monitoring well MW-07 on July 28, 2011 (see Section 4.3.1). All groundwater samples were analyzed by ALS, an accredited laboratory pursuant to ISO 17025.

The analytical schedule for each monitoring well is summarized in Table B. Groundwater samples from all monitoring wells were analyzed for the following:

- major ions/routine potability parameters, including alkalinity, bicarbonate, carbonate, calcium, chloride, EC, hydroxide, iron, magnesium, manganese, nitrate-as-nitrogen, nitrite-as-nitrogen, pH, potassium, sodium, sulphate, TDS, and total hardness;
- PHC, including BTEX, PHC F1 and F2; and
- dissolved metals and trace element parameters, including aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, titanium, uranium, vanadium, and zinc.

Table B 2011 Analytical Schedule

Station	Major Ions/Routine Potability	Petroleum Hydrocarbons	Dissolved Metals
MW-01	✓	✓	✓
MW-02	✓	✓	✓
MW-03	✓	✓	✓
MW-04	✓	✓	✓
MW-05	✓	✓	✓
MW-06	✓	✓	✓
MW-07	✓	✓	✓
MW-08	✓	✓	✓

Station	Major Ions/Routine Potability	Petroleum Hydrocarbons	Dissolved Metals
MW-09	✓	✓	✓
MW-10	✓	✓	✓
MW-11	✓	✓	✓
MW-12	✓	✓	✓
MW-13	✓	✓	✓

3.3 Assessment Criteria

Laboratory analytical results were compared to the following guidelines, where applicable:

- Health Canada 2010: Guidelines for Canadian Drinking Water Quality (GCDWQ)

3.4 Data Analysis

Upon completion of the field program, groundwater field measurements and analytical data were tabulated. Tables included summary of historical parameters and minimum, maximum, and mean concentrations for each well. Select parameters were then graphed and utilized for statistical and graphical analysis as described below.

3.4.1 Statistical and Graphical Analysis

A Mann-Kendall test is a non-parametric test of a trend in a data set (Helsel and Hirsch 1992). The test evaluates whether parameter concentrations are rising or falling. Mann-Kendall analysis can be performed only on data sets with more than four sampling points. Sen's Method is used to assess the rate of change (increase or decrease) in a trending data set (Gilbert 1987). Mann-Kendall and Sen's Method analysis were applied to pH, chloride, sulphate, iron, manganese, TDS, and sodium data.

Following completion of the statistical calculations, the data were evaluated and trends were considered potentially significant if:

- The data set contained six or more data points;
- The Mann-Kendall probability was greater than 0.95; and
- Sen's normalized slope (in % change per year) was 10% or greater (either positive or negative).

Trends apparent from visual inspection of the graphical control charts, but not indicated statistically, were also noted.

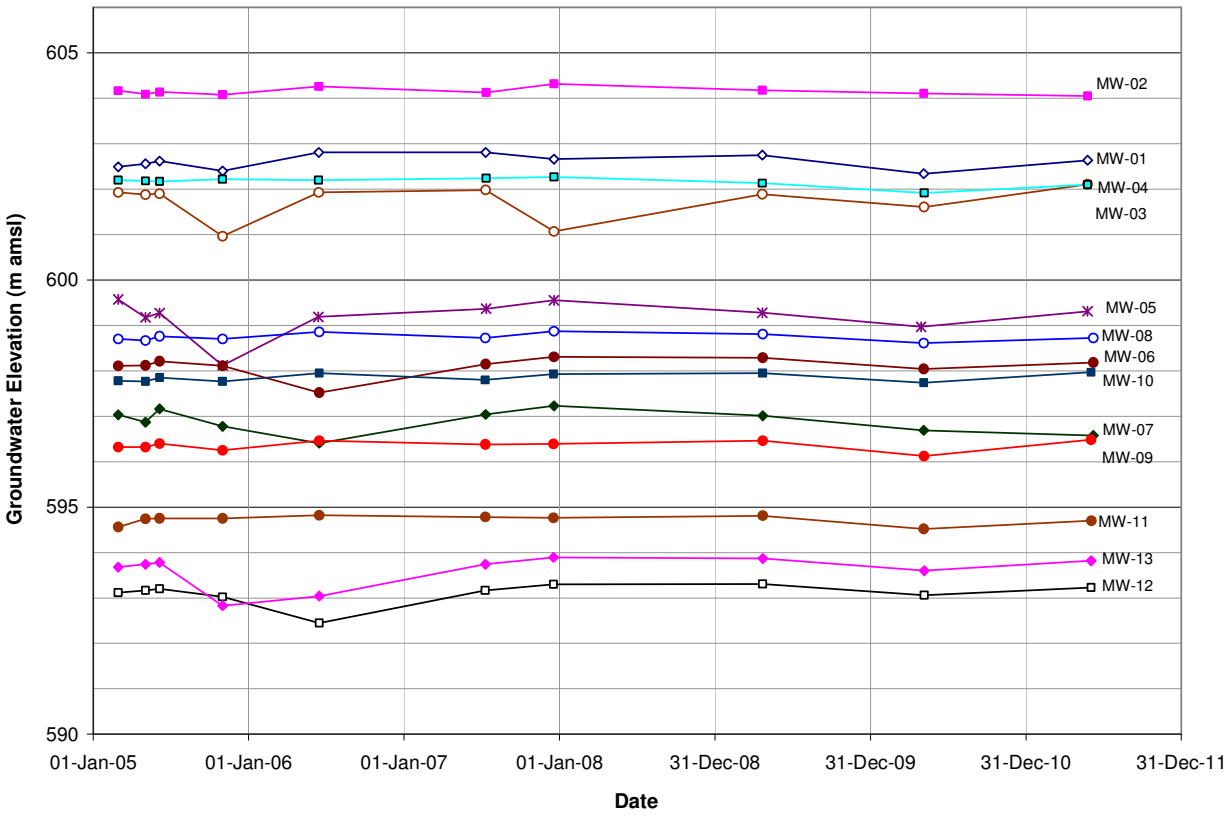
4. 2011 RESULTS

4.1 Groundwater Flow

4.1.1 Groundwater Elevations

Groundwater hydrographs are provided in Appendix 3 and summarized in Figure 4.1 (below). Groundwater surface elevations within the Beverly Channel ranged from 593.23 (MW-12) to 604.05 (MW-02) m above sea level (asl) in 2011 (Table 1).

Figure 4.1 Historical Groundwater Surface Elevation in Beverly Channel Monitoring Wells



The data used to create the above figure are consistent with data provided by Stantec and available on the NCIA website. These data were further confirmed with Stantec (King 2010; personal communication).

4.1.2 Horizontal Groundwater Flow

Groundwater flow in the Beverly Channel was generally to the northwest, toward the North Saskatchewan River (Figure 3). The average lateral hydraulic gradient across the Beverly Channel was approximately 0.0013 m/m. Based on a geometric mean hydraulic conductivity of 2.3 x 10^{-4} m/s, an average hydraulic gradient of 0.0013, and an assumed effective porosity of 0.25, the linear groundwater flow velocity was about 38 m/year, on average.

Groundwater contours were derived utilizing North Saskatchewan River elevations as reported in the Phase II report (Stantec 2005). There may be some bias in the interpreted contours near the river because the river levels were not measured at the same time as the groundwater levels in the Beverly Channel.

4.2 Field-Measured Parameters

Results of the field parameters are presented in Table 2. Groundwater temperatures ranged from 6.6 to 11.1°C; EC values ranged from 741 to 1,762 µS/cm; and pH ranged from 6.95 to 7.73.

4.3 Groundwater Quality

Groundwater analytical data are presented in Tables 3, 4 and 5. Original laboratory analytical data are included in Appendix 4. Hydrochemical control charts and Mann-Kendall analysis are provided in Appendix 5. Statistical tables for each monitoring well including parameter minimum, maximum, mean and count are included in Appendix 6.

4.3.1 Select Inorganic Data

Select inorganic parameter data are presented in Table 3. Results from the May/June 2011 sampling event are summarized as follows:

- Dissolved sulphate exceeded the applied guideline at MW-06 and MW-07.
- Iron concentrations exceeded the applied guideline at all sampling locations except MW-04.
- Manganese concentrations exceeded the applied guideline at all sampling locations.
- TDS concentrations were in excess of the applied guideline at all sampling locations except MW-01 and MW-13.
- Sodium concentrations were above the applied guideline at MW-09.
    - At MW-07, the June 8, 2011 results for bicarbonate, sulphate, sodium, calcium, and TDS were significantly lower than historical values and were not considered representative of actual groundwater conditions. A verification sample was collected on July 28, 2011 and analysed for the same suite of parameters. The analytical results for the verification sample

were consistent with historical values for MW-07 and, consequently, the June 8, 2011 results were deemed outliers (see Section 4.3.4 for details).

- DOC at MW-02, MW-08, and MW-12 were at historical high concentrations; these results should be confirmed during next years sampling event.
- Results for the other inorganic parameters are consistent with historical results.

4.3.2 Petroleum Hydrocarbon Parameters

PHC parameter data are presented in Table 4. PHC were not detected at any of the sampling locations.

4.3.3 Dissolved Metals Parameters

Dissolved metals parameter data are presented in Table 5 and results from the 2011 sampling event are summarized below.

- Dissolved metals and trace elements had concentrations below the applied guidelines at all monitoring wells where guidelines exist.
- Results for dissolved metals and trace elements were consistent with historical results.

4.3.4 Anomalous Results at MW-07

The concentrations for all major cations (calcium, magnesium, sodium, potassium) and anions (bicarbonate, sulphate, chloride), iron and manganese for the June 8, 2011 groundwater sample from monitoring well MW-07 were significantly lower than historical values. As a result, calculated parameters (TDS, alkalinity, hardness) were also lower. Dissolved organic carbon (DOC) concentration, however, was significantly higher than historical values.

The results for the verification sample collected on July 28, 2011 were consistent with historical values, indicating that the June 8, 2011 results are anomalous and likely outliers.

The Dixon Outlier Test was used to confirm whether the June 8, 2011 results were outliers. The Dixon Outlier Test is recommended by the US EPA (2009) for data sets with less than 25 data points. A summary of the Dixon Outlier Test methodology and the results of the test for select routine potability parameters are included in Appendix 7.

The Dixon Outlier Test indicated that, at a 95% confidence level, the June 8, 2011 results for sulphate, bicarbonate, TDS, manganese and DOC are outliers. The June 8, 2011 results for calcium, sodium, magnesium, potassium and chloride could not be statistically considered outliers, even at a 90% confidence level.

Therefore, the June 8, 2011 groundwater quality results for MW-07 are considered anomalous and will not be included in any future statistical analysis, hydrochemical control charts, or data interpretation. These results will be kept in the data tables with proper annotation that the data are anomalous.

4.3.5 Trends and Statistical Analysis

Hydrochemical control charts and Mann-Kendall/Sen's slope analysis are presented in Appendix 6. Results are summarized as follows.

- Chloride levels at MW-05 have statistically increased.
- Chloride levels at MW-08 have statistically decreased.
- The iron concentration at MW-06 has statistically increased, however, the last three results have been stable.

4.4 QA/QC Results Summary

Zeiner (1994) states that the relative percent difference (RPD) between sample and duplicated results should be less than 20 percent. The field duplicate (MW-09) indicated negligible difference between the sample and duplicate results (Table 3, 4, and 5).

Standard Methods (2005) indicates an ion balance or ±10% as a typically acceptable criterion for water with an anion sum between 30 and 800 meq/L. Values outside the commonly acceptable limits may arise for a number of reasons (e.g. analytical interference, unknown constituents, or reporting errors). MW-02, MW-08, and MW-10 showed an ion balance of greater than ±10% in 2011 (Table 3).

A field blank was collected and analyzed for major ions/routine potability, PHC, and dissolved metals. All parameters were below their method detection limits (MDLs) in the field blank, indicating that cross-contamination did not occur during sampling. The pH of the field blank sample was 6.02, which is outside the GCDWQ acceptable range, but within the normal range for ordinary laboratory distilled water (Hem, 1992).

The laboratory blank, replicated and control samples for groundwater analyses were within the acceptable limits.

5. DISCUSSION OF KEY GROUNDWATER QUALITY INDICATORS

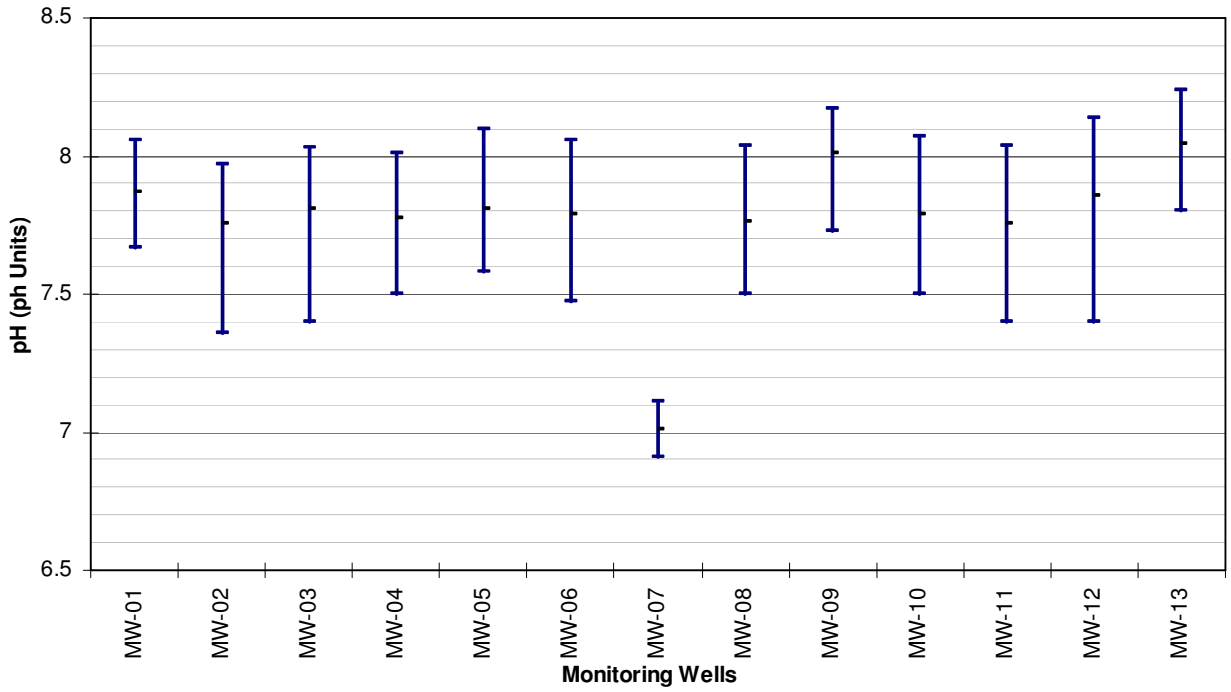
5.1 pH

Hem (1992) indicated that most groundwater in the United States have pH values ranging from about 6.0 to about 8.5, while river water in areas not influenced by pollution reportedly have a pH that ranged between 6.5 and 8.5.

The GCDWQ suggests an acceptable pH range of 6.5 to 8.5 for drinking water (Health Canada 2010). As there are no specific health effects noted on which to base limits for the pH of drinking water, this guideline is an aesthetic objective (AO) rather than a maximum acceptable concentration (MAC). At a pH below 6.5, corrosion effects may become significant in the drinking water supply and distribution system, and at a pH above 8.5, encrustations and scaling may become an issue (Health Canada 1979a).

In the Beverly Channel, since the groundwater sampling began in 2005, groundwater pH values have ranged from 7.2 to 8.2 (Figure 5.1) and are within the range of natural waters as defined by Hem (1992) and within the AO guideline range established by Health Canada (2010).

Figure 5.1 Range of pH in Beverly Channel Monitoring Wells

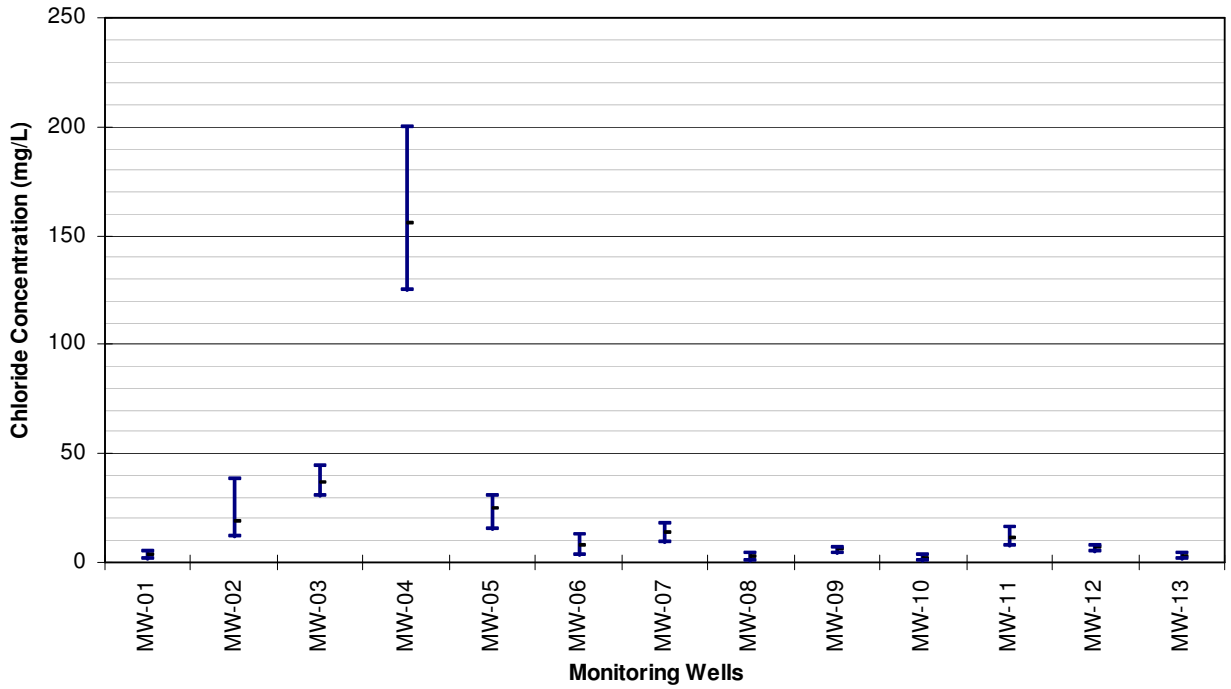


5.2 Chloride

Chloride is an inorganic, non-reactive compound that occurs widely in nature. When introduced into groundwater, chloride is highly mobile and difficult to remove due to its high solubility (Health Canada 1979b). With high mobility, high solubility, and its wide usage in anthropogenic activities, chloride is generally utilized as a tracer, or indicator, of groundwater contamination. Typical anthropogenic uses of chloride include control of ice and snow, effluents from chemical industries, oil well operations, sewage, irrigation drainage, and refuse leachates. Naturally occurring salt deposits also occur throughout Canada (Health Canada 1979b). Chloride concentrations in groundwater are typically less than 50 mg/L in Sturgeon and Strathcona Counties (HCL 2001a and 2001b) but can be naturally elevated in regional discharge areas. Health Canada (2010) suggests an AO guideline of less than or equal to 250 mg/L for chloride to minimize undesirable tastes in beverages. At higher concentrations chloride may cause corrosion in distribution systems as well (Health Canada 1979b).

Chloride concentrations in the Beverly Channel were typically less than 50 mg/L and in several cases less than 10 mg/L (Figure 5.2) Elevated chloride concentrations between 125 mg/L and 200 mg/L were observed at MW-04 and are considered natural, reflecting water quality in bedrock (WorleyParsons 2010). At MW-05, chloride concentration has increased, however, the concentrations remain within the range of naturally occurring groundwater. At MW-08, chloride concentration has statistically decreased.

Figure 5.2 Range of Chloride Concentrations in Beverly Channel Monitoring Wells



5.3 Sulphate

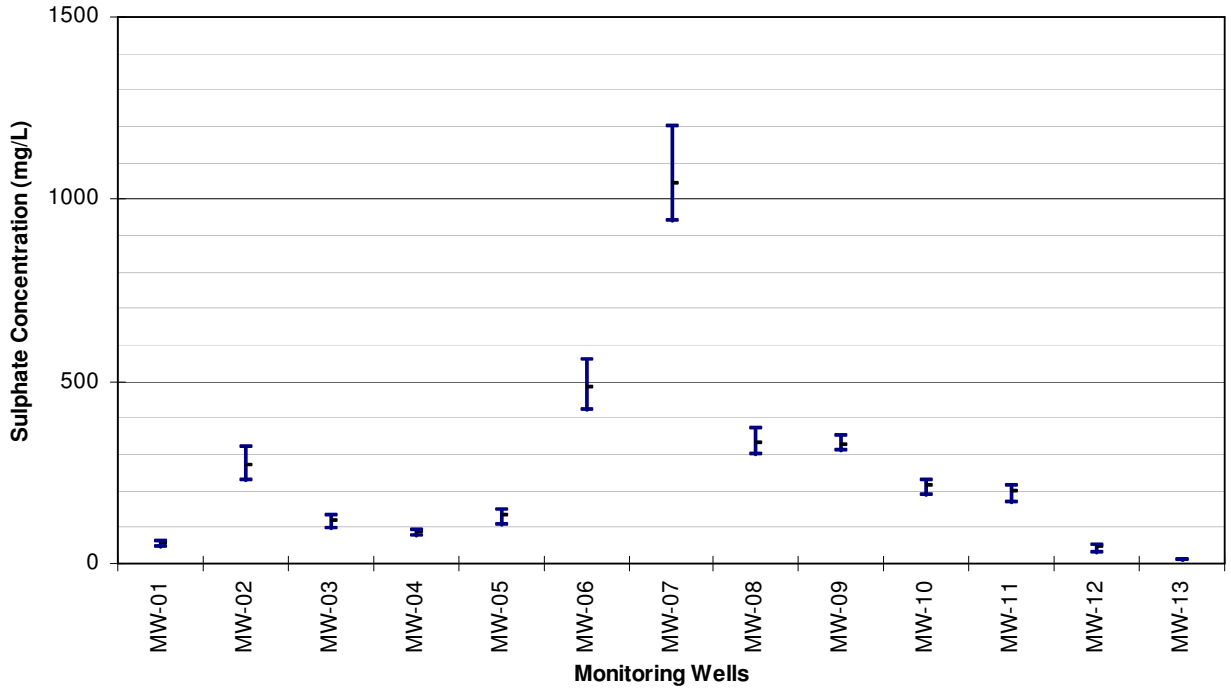
Sources of sulphur that can be found in the natural environment include certain igneous rock minerals and evaporite sediment (e.g. gypsum), volcanic activity, and geothermal water (Hem 1992). Anthropogenic sources of sulphate are mainly introduced by the combustion of fuels and the smelting of ores (Hem 1992). Industrial uses of sulphur, usually in the form of sulphuric acid, include production of fertilizer, manufacturing of chemicals, dyes, glass, paper, soaps, textiles, fungicides, insecticides, astringents and emetics (review by Health Canada 1987).

The GCDWQ for sulphate suggested by Health Canada (2010) is less than or equal to 500 mg/L. This value is an AO based on taste considerations, although there is the possibility of adverse physiological effects at higher concentrations. The lethal dose in humans, in the form of potassium or zinc sulphate, is 45g, making it one of the least toxic anions (Health Canada 1987).

In the Study Area, background sulphate concentrations are generally less than 100 mg/L in the surficial sand deposits, range from 100 mg/L to over 1,000 mg/L in shallow bedrock, and range from less than 1,000 mg/L to over 4,000 mg/L in till and clay deposits (BA Energy 2004; Komex 2006; PCOSI 2006; Shell 2005, 2007; TOTAL 2007).

In the Beverly Channel, sulphate concentrations are generally less than 500 mg/L (Figure 5.3). One monitoring well (MW-07) has sulphate concentrations in the range of 622 to 1,200 mg/L, which is similar to concentrations observed in shallow bedrock.

Figure 5.3 Range of Sulphate Concentrations in Beverly Channel Monitoring Wells



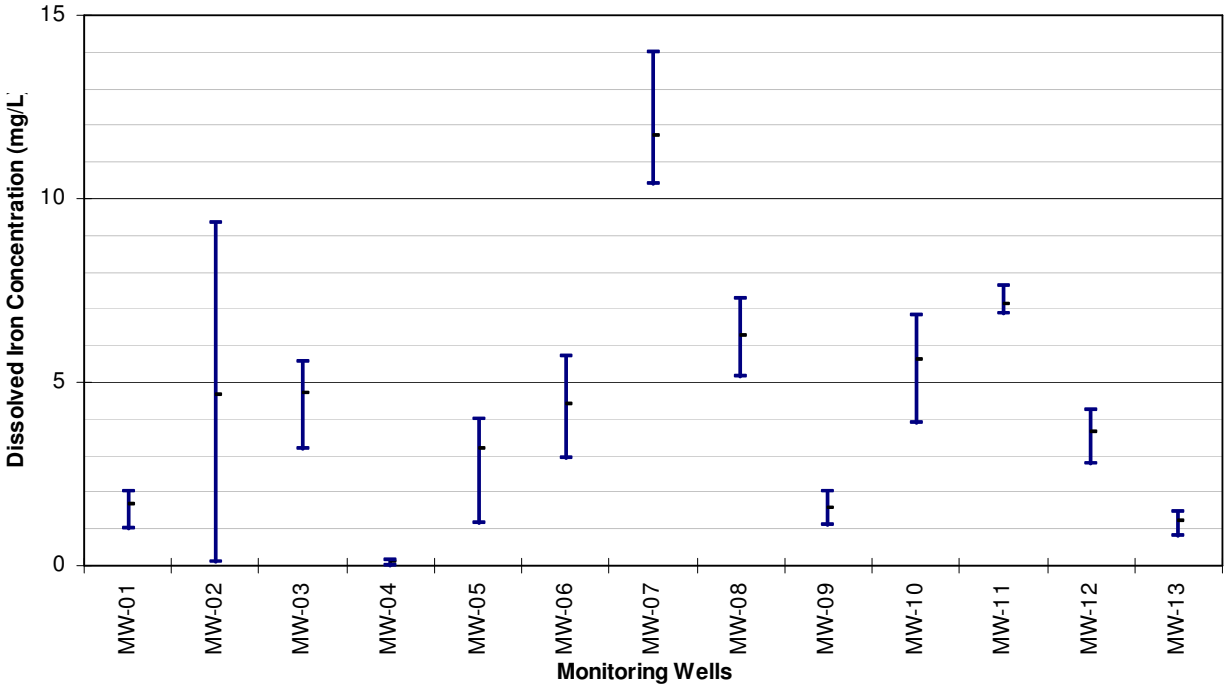
5.4 Dissolved Iron

A number of igneous rock minerals have a relatively high iron content which can act as a source of iron in groundwater. When iron is released into water, it is generally reprecipitated nearby as sedimentary species involving sulphide, carbonate, oxide or oxyhydroxide (Hem 1992). The availability of iron to aqueous solutions is strongly affected by environmental conditions, particularly the oxidation/reduction capacity and pH. Iron is also present in organic wastes, and in plant debris in soils (Hem 1992), which can then be released into groundwater via biodegradation processes. In aerated waters, the concentration of iron in waters is seldom high (Health Canada 1978b)

The AO suggested by Health Canada (2010) for iron in drinking water is less than or equal to 0.3 mg/L. This objective is aimed to minimize objectionable taste and appearance, as well as inefficiency in the distribution system which can result from the precipitation of insoluble hydroxides and the development of slime produced by iron oxidizing bacteria. The reported lethal dose for an adult male is between 14 and 17.5 g (National Academy of Sciences, 1980).

Within the Beverly Channel elevated iron concentrations are generally expected. Stein (1976) indicates that iron concentrations in excess of 15 mg/L are not uncommon. HCL (2001a) reports iron concentrations in excess of 7 mg/L for a Beverly Channel water supply well for the Village of Bruderheim. All iron concentrations in the Beverly Channel monitoring wells were higher than the drinking water guideline, with the exception of MW-04 (Figure 5.4). At MW-06, iron concentrations have statistically increased.

Figure 5.4 Range of Dissolved Iron Concentrations in Beverly Channel Monitoring Wells



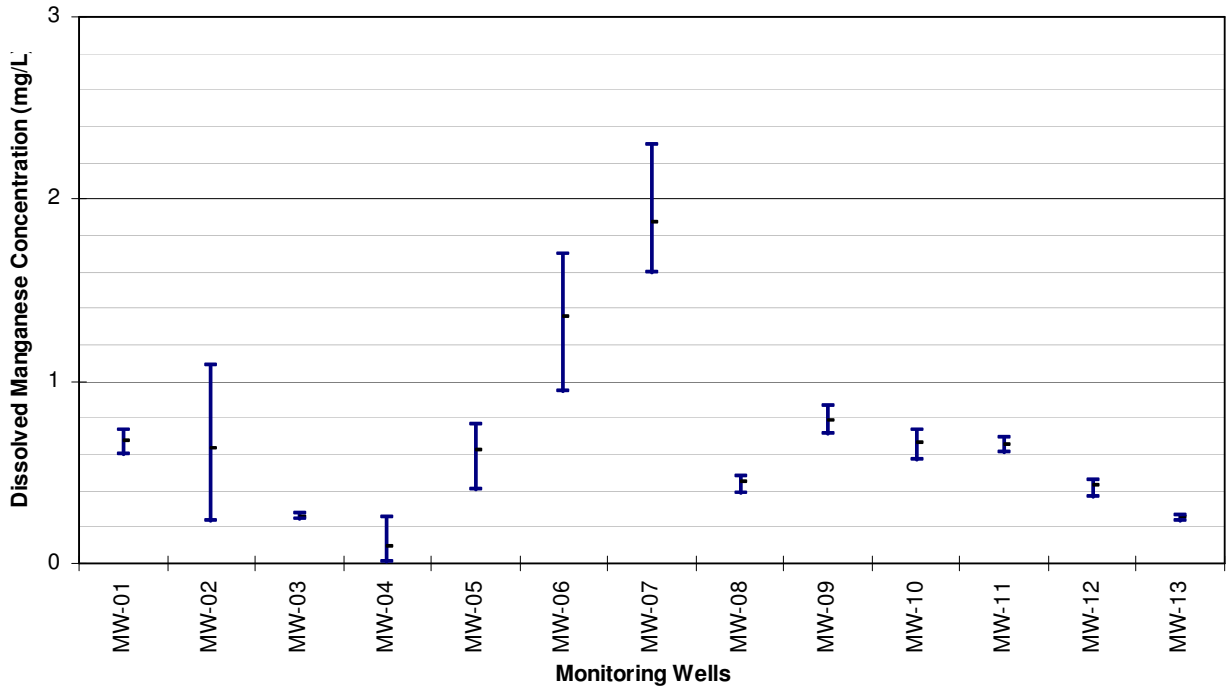
5.5 Dissolved Manganese

Manganese is most often present as a dioxide, carbonate or silicate mineral (Health Canada 1979b), and many igneous and metamorphic minerals contain manganese as a minor constituent (Hem 1992). As was the case for iron, the presence of dissolved manganese in water is dependent on both redox and pH conditions, although it is somewhat more stable toward oxidation than ferrous iron (Hem 1992).

Health Canada (2010) suggests an AO guideline of less than or equal to 0.05 mg/L to minimize staining and undesirable tastes in beverages, as well as the accumulation of microbial growths in distribution systems (black precipitates; Health Canada 1979b). Higher concentrations of manganese are expected to be more prevalent in groundwater than surface water as a result of the higher likelihood of reducing conditions in the subsurface (Health Canada 1979b).

The manganese concentrations in the Beverly Channel (Figure 5.5) are within the combined range of surface water/groundwater from data compiled by Hem (1992). Generally, manganese concentrations may be expected to be higher in the Beverly Channel than in shallower geological units as there is a higher likelihood of reducing conditions with depth. Lowest concentrations of manganese were observed at monitoring well MW-04.

Figure 5.5 Range of Dissolved Manganese Concentrations in Beverly Channel Monitoring Wells



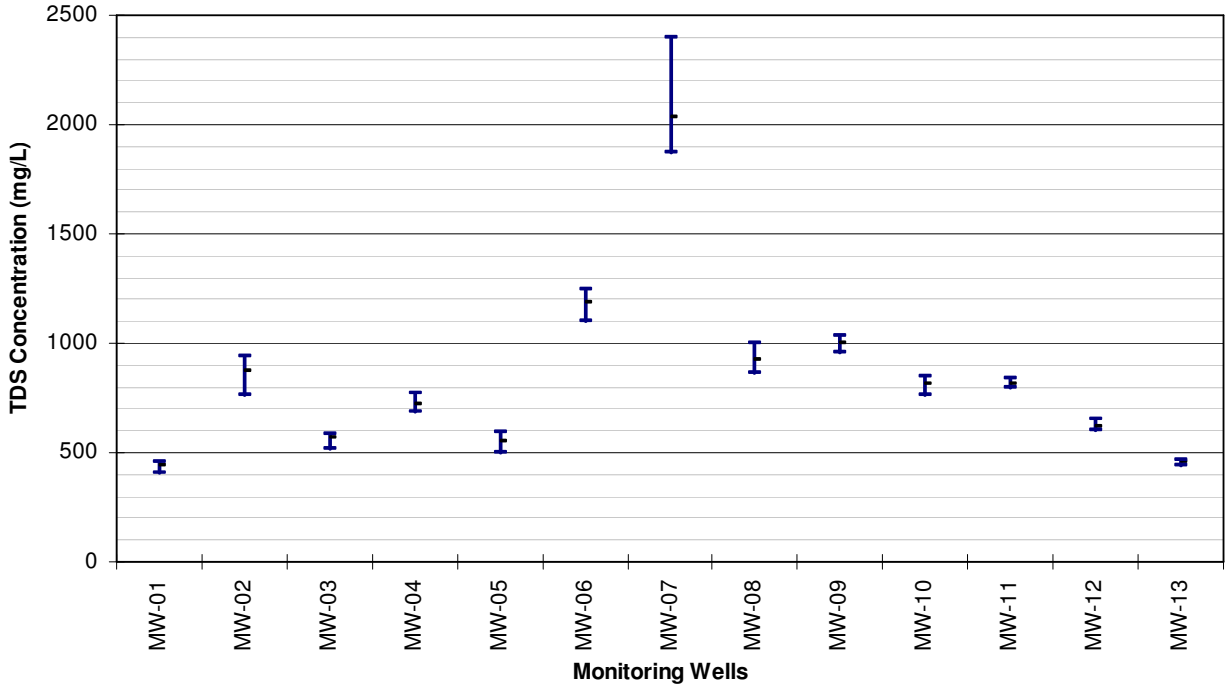
5.6 Total Dissolved Solids

TDS are dissolved constituents which comprise inorganic salts, primarily the major cations and anions used for groundwater characterization, as well as nitrate when introduced by agricultural use, and small amounts of organic matter (Health Canada 1978b). Potential sources of TDS include natural mineral sources, sewage, urban and agricultural runoff and industrial water (Health Canada 1978b). Concentrations of TDS resulting from mineral dissolution vary with the solubility of the minerals present.

Health Canada (2010) suggests an AO of less than or equal to 500 mg/L for TDS to minimize hardness, unpalatability, mineral deposition and corrosion (Health Canada 1978b). Recent data on health affects associated with the ingestion of TDS in drinking water is limited, and the data that are available are unclear; however, some individual components of TDS (e.g., chloride, sodium, nitrates) can affect human health (Health Canada 1978b; as updated 1991).

Mineralization in the Beverly Channel ranged from 410 to 2,400 mg/L (Figure 5.6), with the majority of the monitoring wells showing TDS of less than 1,000 mg/L. This is generally in agreement with TDS values in excess of 1,000 mg/L reported by HCL (2001a; 2001b) for the Beverly Channel. The higher TDS concentration at MW-07 may be related to local groundwater discharge from bedrock. TDS in bedrock is generally in the range of 1,000 to 2,000 mg/L (Stein 1976), but may exceed 3,000 mg/L (HCL 2001a; 2001b).

Figure 5.6 Range of TDS Concentrations in Beverly Channel Monitoring Wells



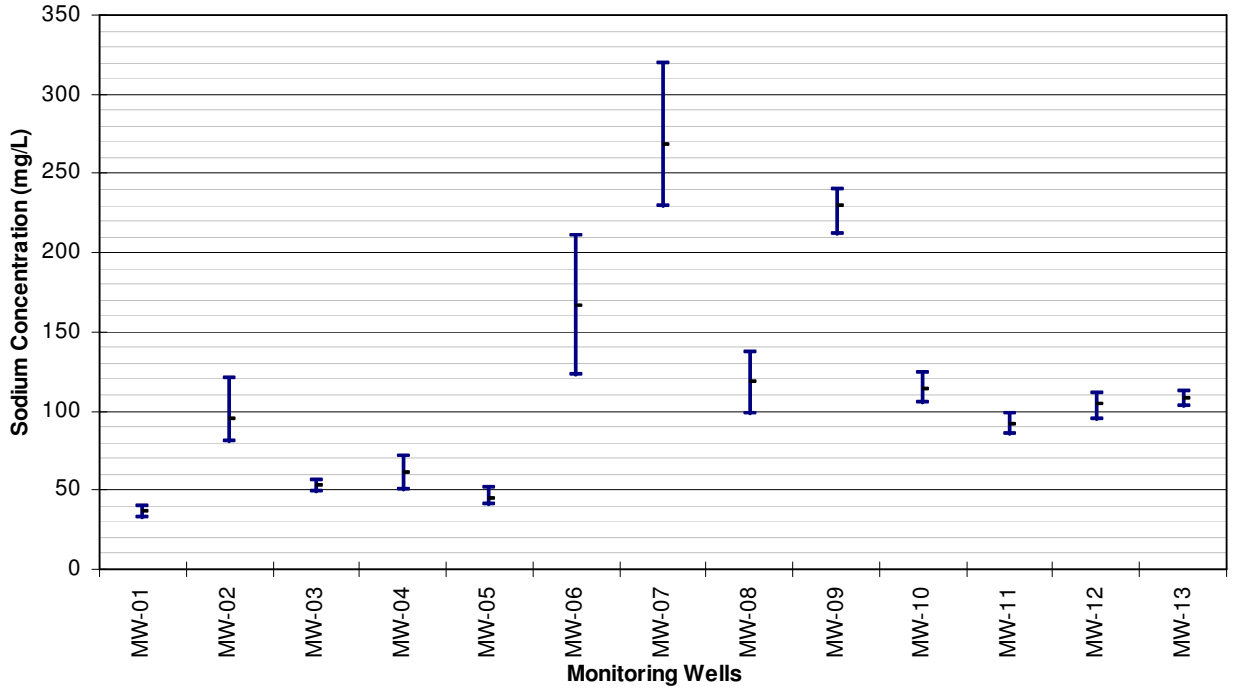
5.7 Sodium

Sodium is sometimes present in feldspar minerals, which can be released into water through weathering, or may be present as readily soluble salts such as those left behind in the uplift of land surface or decline of sea level (Hem 1992). Anthropogenic sources of sodium include the use of salt for de-icing, brine disposal or leakage from oil wells, and water reuse for irrigation purposes (Hem 1992). Other potential anthropogenic sources include sewage and industrial effluents, and the use of sodium compounds for corrosion control and water-softening processes (Health Canada 1979c).

Health Canada (2010) suggests an AO of less than or equal to 200 mg/L for sodium. Because the body has very effective mechanisms to control sodium levels, sodium is not acutely toxic in the normal range of environmental or dietary concentrations (Health Canada 1979d). However, there is a relation in the human body between fluid volume and sodium retention, and changes in sodium intake may result in disturbances such as changes in hypertension, congestive cardiac failure, renal disease, cirrhosis, toxaemia of pregnancy, and Meniere's disease (Health Canada 1979c).

Within the Beverly Channel, sodium concentrations ranged from approximately 30 to 320 mg/L (Figure 5.7). The upper range of sodium concentrations observed at MW-06, MW-07, and MW-09 is outside the range expected for normal groundwater in Canada (with a typical upper range of 130 mg/L), but are well within the range of concentrations of natural waters observed in North America. They might reflect discharge of groundwater from bedrock.

Figure 5.7 Range of Sodium Concentrations in Beverly Channel Monitoring Wells



6. SUMMARY AND RECOMMENDATIONS

Annual groundwater quality monitoring was completed for the Northeast Capital Industrial Association in May/June 2011. Results are summarized as follows:

- Lateral groundwater flow was generally to the north at approximately 38 m/year.
- Chloride concentrations were generally below 50 mg/L and within ranges established by previous monitoring. Elevated chloride concentrations noted at MW-04 are considered natural (WorleyParsons 2010). Statistically increasing chloride concentrations were observed at MW-05. At MW 08, chloride concentration has statistically decreased.
- Iron, manganese, total dissolved solids, and sodium appear to be naturally elevated within the Study Area. Statistically increasing iron was noted at MW-06, however the concentration remains well within naturally occurring ranges (Stein 1976).
- The cause of the elevated sulphate at two monitoring locations (MW-06 and MW-07) is unknown. Elevated concentrations may result from saltwater intrusion, mineral dissolution, and domestic or industrial waste. Due to the absence of industry in the immediate area it is likely that the elevated sulphate is naturally occurring.
- The results from the June 8, 2011 sampling of MW-07 are considered anomalous and will not be included in any future statistical analysis or data interpretation. The results will be kept in the data tables with proper annotation that they are anomalous.
- The elevated chloride concentration observed at MW-04 is likely showing bedrock groundwater quality conditions.

Groundwater data to date has shown that indicator parameter concentrations are generally within natural ranges for groundwater within Sturgeon and Strathcona county. Statistically significant trends were observed for chloride at MW-05 and MW-08 and for dissolved iron at MW-09. The historical high concentrations of DOC at MW-02, MW-08, and MW-12 should be confirmed during next years sampling event.

Recommendations are as follows:

- Consideration should be given to obtaining more representative water levels in the river to assist with interpretation of groundwater contours in the Beverly Channel.
- The analytical schedule should be the same as for 2011 (see Table B).

7. CLOSURE

We trust that this report satisfies your current requirements and provides suitable documentation for your records. If you have any questions or require further details, please contact the undersigned at any time.

Report Prepared by

Jeremy Hrynkiw, B.Sc.
Jr. Hydrogeologist

Ken Sommerstad, B.Sc., Geol.I.T.
Environmental Geologist

Senior Review by

João Küpper, Ph.D., P.Eng.
Principal Hydrogeologist

Prairie Business Unit
Infrastructure & Environment
WorleyParsons Canada Services Ltd.

APEGGA PERMIT TO PRACTICE NO. P0725.

8. REFERENCES

BA Energy Inc. 2004. BA Energy Heartland Upgrader, Project Application and Environmental Impact Assessment. May 2004

Environment Canada. 2010. National Climate Data and Archive. Website accessed on June 28, 2010: http://www.climate.weatheroffice.gc.ca/climate_normals/index_e.html.

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley & Sons Inc. Canada.

Health Canada, 1978a. Iron. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. December 1978, updated November 1987.

Health Canada, 1978b. Total Dissolved Solids (TDS). Guidelines for Canadian Drinking Water Quality: Supporting Documentation. September 1978, updated January 1991.

Health Canada, 1979a. pH. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. May 1979, reprinted 1995.

Health Canada, 1979b. Manganese. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. May 1979, updated November 1987.

Health Canada, 1979c. Sodium. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. May 1979, updated December 1992.

Health Canada, 1987. Sulphate. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. November 1987, updated September 1994.

Health Canada. 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.

Helsel, D.R., and Hirsch, R.M. 1992. Statistical Methods in Water Resources. Elsevier Science Publishing Company Inc. New York, New York.

Hem, John D. 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd Edition. United States Geological Survey Water Supply Paper 2254.

Hydrogeological Consultants Ltd. (HCL). 2001a. Strathcona County, Regional Groundwater Assessment. April 2001.

Hydrogeological Consultants Ltd. (HCL). 2001b. Sturgeon County, Regional Groundwater Assessment. September 2001.

King, D. Hydrogeologist. Stantec Consulting Ltd. Edmonton, AB. Email correspondence. August 5, 2010.

Komex International Ltd. (Komex). 2006. Hydrogeological Assessment, Proposed Upgrader. Report prepared for North West Upgrading Inc. January 2006.

National Academy of Science. 1980. Recommended dietary allowances. 9th edtion. National Academy Press, Washington, DC.

Petro-Canada Oil Sands Inc. (PCOSI). 2006. Application for Approval of the Sturgeon Upgrader. Submitted to Alberta Energy and Utilities Board and Alberta Environment. December 2006. Section 11: Groundwater.

Shell Canada Limited (Shell). 2005. Application for Approval of the Scotford Upgrader Expansion Project. Submitted to Alberta Energy and Utilities Board and Alberta Environment. April 2005. Section 11: Groundwater.

Shell Canada Limited (Shell). 2007. Application for Approval of the Shell Scotford Upgrader 2 Project. Submitted to Alberta Energy and Utilities Board and Alberta Environment. July 2007. Section 11: Groundwater.

Stantec Consulting Ltd. (Stantec). 2006a. Regional Groundwater Quality Study of the Beverly Channel in the Fort Saskatchewan Area – Phase II. Prepared for Northeast Capital Industrial Association (NCIA). October 2006. File 1102-17094. Website accessed March 15, 2010: http://www.ncia.ab.ca/documents/NCIA%20Phase%20II%20Report%20_Final_.pdf.

Stantec Consulting Ltd. (Stantec). 2006b. Spring, 2006 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). November 16, 2006. File 110217444. Website: http://www.ncia.ab.ca/documents/Spring2006GroundwaterUpdateRAWDATA.pdf. Accessed March 15, 2010.

Stantec Consulting Ltd. (Stantec). 2007. Spring, 2007 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). December 11, 2007. File 110217663. Website: http://www.ncia.ab.ca/documents/Spring2007GroundwaterUpdateRAWDATA.pdf. Accessed March 15, 2010.

Stantec Consulting Ltd. (Stantec). 2008. Fall, 2007 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). May 9, 2008. File 110217729. Website: http://www.ncia.ab.ca/documents/PartBFall2007GroundwaterUpdateReportRAWDATA.pdf. Accessed March 15, 2010.

Stantec Consulting Ltd. (Stantec). 2009. Spring, 2009 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). June 1, 2009. File 1102-17990. Website: http://www.ncia.ab.ca/documents/Spring2009GroundwaterUpdateRAWDATA.pdf. Accessed March 15, 2010.

Stein, R. 1976. Hydrogeology of the Edmonton Area (Northeast Segment), Alberta. Alberta Research Council Report 76-1. 21 p.

TOTAL E&P Canada Inc. (TOTAL). 2007. Integrated Application for Approval of the TOTAL Upgrader. Submitted to Alberta Energy and Utilities Board and Alberta Environment. December 2007. Section 7: Groundwater.

US Environmental Protection Agency (EPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. March 2009.

WorleyParsons Canada Services Ltd. 2010. 2010 Groundwater Quality Monitoring – Beverly Channel Monitoring Wells. Project No. E00100101. August, 2010.

Zeiner, S.T. 1994. Realistic Criteria for the Evaluation of Field Duplicate Field Results. Proceedings of Superfund XV, November 29-December 1, 1994. Sheraton Washington Hotel, Washington, D.C.

Tables

WorleyParsons
resources & energy

Table 1

Piezometer Installation Details, Datum/Groundwater Surface Elevations, and Hydraulic Conductivities

PROJECT NO.: E00100102

Monitoring Station	Ground Elevation (m asl)	Datum Elevation (Top of PVC) (m asl)	Stickup (PVC) (m)	Total Depth of Piezometer (m bgs)	Depth Interval of Sand (m bgs)	Date Measured (d-m-y)	Depth To Groundwater (m btoc)	Depth To Groundwater (m bgs)	Groundwater Surface Elevation (m asl)	Hydraulic Conductivity (m/s)	Lithology
MW-01	**617.52**	618.04	0.52	19.80	14.30 - 19.80	7-Mar-05	15.55	15.03	602.49	6.8E-05	Sand and Gravel
						4-May-05	15.48	14.96	602.56		
						6-Jun-05	15.42	14.90	602.62		
						17-Nov-05	15.64	15.12	602.40		
						15-Jun-06	15.23	14.71	602.81		
						12-Jul-07	15.23	14.71	602.81		
						19-Dec-07	15.38	14.86	602.66		
						21-Apr-09	15.29	14.77	602.75		
						5-May-10	15.70	15.18	602.34		
						25-May-11	15.40	14.88	602.64		
MW-02	**630.71**	631.31	0.60	33.80	26.20 - 33.80	7-Mar-05	27.14	26.54	604.17	1.8E-04	Sand and Gravel
						4-May-05	27.22	26.62	604.09		
						6-Jun-05	27.17	26.57	604.14		
						17-Nov-05	27.23	26.63	604.08		
						15-Jun-06	27.05	26.45	604.26		
						13-Jul-07	27.18	26.58	604.13		
						19-Dec-07	26.99	26.39	604.32		
						21-Apr-09	27.13	26.53	604.18		
						5-May-10	27.20	26.60	604.11		
						25-May-11	27.26	26.66	604.05		
MW-03	**623.79**	624.43	0.64	29.60	23.50 - 29.60	8-Mar-05	22.50	21.86	601.93	2.2E-04	Sand and Gravel
						4-May-05	22.55	21.91	601.88		
						6-Jun-05	22.53	21.89	601.90		
						17-Nov-05	23.47	22.83	600.96		
						15-Jun-06	22.50	21.86	601.93		
						12-Jul-07	22.45	21.81	601.98		
						19-Dec-07	23.36	22.72	601.07		
						21-Apr-09	22.54	21.90	601.89		
						6-May-10	22.82	22.18	601.61		
						25-May-11	22.32	21.68	602.11		
MW-04	**620.25**	620.79	0.54	26.20	19.50 - 26.20	8-Mar-05	18.59	18.05	602.20	1.6E-04	Sand and Gravel
						4-May-05	18.61	18.07	602.18		
						6-Jun-05	18.62	18.08	602.17		
						17-Nov-05	18.57	18.03	602.22		
						14-Jun-06	18.59	18.05	602.20		
						13-Jul-07	18.55	18.01	602.24		
						19-Dec-07	18.52	17.98	602.27		
						21-Apr-09	18.66	18.12	602.13		
						6-May-10	18.87	18.33	601.92		
						7-Jun-11	18.70	18.16	602.10		
MW-05	**624.28**	624.89	0.61	31.40	23.20 - 31.40	8-Mar-05	25.32	24.71	599.57	1.8E-04	Gravel
						4-May-05	25.71	25.10	599.18		
						6-Jun-05	25.62	25.01	599.27		
						17-Nov-05	26.77	26.16	598.12		
						14-Jun-06	25.70	25.09	599.19		
						13-Jul-07	25.52	24.91	599.37		
						19-Dec-07	25.34	24.73	599.55		
						21-Apr-09	25.61	25.00	599.28		
						29-Apr-10	25.92	25.31	598.97		
						25-May-11	25.58	24.97	599.31		
MW-06	**629.61**	630.28	0.67	39.00	32.90 - 39.00	8-Mar-05	32.17	31.50	598.11	1.5E-04	Sand and Gravel
						4-May-05	32.16	31.49	598.12		
						6-Jun-05	32.07	31.40	598.21		
						17-Nov-05	32.17	31.50	598.11		
						16-Jun-06	32.76	32.09	597.52		
						12-Jul-07	32.13	31.46	598.15		
						19-Dec-07	31.97	31.30	598.31		
						22-Apr-09	31.99	31.32	598.29		
						5-May-10	32.24	31.57	598.04		
						7-Jun-11	32.10	31.43	598.18		
MW-07	**630.41**	631.01	0.60	43.90	36.30 - 43.90	9-Mar-05	33.98	33.38	597.03	8.9E-04	Sand and Gravel
						4-May-05	34.14	33.54	596.87		
						6-Jun-05	33.85	33.25	597.16		
						17-Nov-05	34.23	33.63	596.78		
						16-Jun-06	34.60	34.00	596.41		
						12-Jul-07	33.97	33.37	597.04		
						19-Dec-07	33.78	33.18	597.23		
						22-Apr-09	34.00	33.40	597.01		
						5-May-10	34.32	33.72	596.69		
						8-Jun-11	34.43	33.83	596.58		
						28-Jul-11	33.80	33.20	597.21		
MW-08	**625.87**	626.44	0.57	33.50	28.70 - 33.50	9-Mar-05	27.74	27.17	598.70	9.5E-04	Gravel
						4-May-05	27.77	27.20	598.67		
						6-Jun-05	27.68	27.11	598.76		
						15-Nov-05	27.74	27.17	598.70		
						16-Jun-06	27.58	27.01	598.86		
						11-Jul-07	27.72	27.15	598.72		
						19-Dec-07	27.57	27.00	598.87		
						22-Apr-09	27.63	27.06	598.81		
						5-May-10	27.83	27.26	598.61		
						7-Jun-11	27.72	27.15	598.72		
MW-09	**624.06**	624.73	0.67	36.60	30.50 - 36.60	9-Mar-05	28.41	27.74	596.32	4.1E-04	Gravel, Sand and Gravel
						4-May-05	28.41	27.74	596.32		
						6-Jun-05	28.33	27.66	596.40		
						17-Nov-05	28.48	27.81	596.25		
						16-Jun-06	28.27	27.60	596.46		
						11-Jul-07	28.35	27.68	596.38		
						18-Dec-07	28.34	27.67	596.39		
						22-Apr-09	28.27	27.60	596.46		
						6-May-10	28.61	27.94	596.12		
						2-Jun-11	28.25	27.58	596.48		
MW-10	**624.06**	624.67	0.61	41.80	31.40 - 41.80	9-Mar-05	26.89	26.28	597.78	2.6E-04	Gravel, Sand and Gravel
						4-May-05	26.90	26.29	597.77		
						6-Jun-05	26.82	26.21	597.85		
						16-Nov-05	26.90	26.29	597.77		
						16-Jun-06	26.72	26.11	597.95		
						11-Jul-07	26.87	26.26	597.80		
						18-Dec-07	26.74	26.13	597.93		
						22-Apr-09	26.72	26.11	597.95		
						5-May-10	26.93	26.32	597.74		
						2-Jun-11	26.70	26.09	597.97		
MW-11	**624.49**	625.16	0.67	44.20	35.10 - 44.20	10-Mar-05	30.60	29.93	594.56	1.5E-04	Sand and Gravel
						4-May-05	30.42	29.75	594.74		
						6-Jun-05	30.41	29.74	594.75		
						16-Nov-05	30.41	29.74	594.75		
						16-Jun-06	30.34	29.67	594.82		
						11-Jul-07	30.38	29.71	594.78		
						18-Dec-07	30.40	29.73	594.76		
						22-Apr-09	30.35	29.68	594.81		
						5-May-10	30.64	29.97	594.52		
						2-Jun-11	30.46	29.79	594.70		
MW-12	**625.46**	626.07	0.61	38.10	33.50 - 38.10	10-Mar-05	32.95	32.34	593.12	1.4E-04	Sand, Sand and Gravel
						4-May-05	32.90	32.29	593.17		
						6-Jun-05	32.87	32.26	593.20		
						16-Nov-05	33.05	32.44	593.02		
						16-Jun-06	33.62	33.01	592.45		

WorleyParsons
resources & energy

Table 1

Piezometer Installation Details, Datum/Groundwater Surface Elevations, and Hydraulic Conductivities

PROJECT NO.: E00100102

Monitoring Station	Ground Elevation (m asl)	Datum Elevation (Top of PVC) (m asl)	Stickup (PVC) (m)	Total Depth of Piezometer (m bgs)	Depth Interval of Sand (m bgs)	Date Measured (d-m-y)	Depth To Groundwater (m btoc)	Depth To Groundwater (m bgs)	Groundwater Surface Elevation (m asl)	Hydraulic Conductivity (m/s)	Lithology
MW-13	**625.65**	626.28	0.63	40.50	36.00 - 40.50	11-Jul-07	32.90	32.29	593.17	N/M	Gravel
						18-Dec-07	32.77	32.16	593.30		
						22-Apr-09	32.76	32.15	593.31		
						6-May-10	33.01	32.40	593.06		
						2-Jun-11	32.84	32.23	593.23		
						10-Mar-05	32.60	31.97	593.68		
						4-May-05	32.54	31.91	593.74		
						6-Jun-05	32.50	31.87	593.78		
						16-Nov-05	33.45	32.82	592.83		
						16-Jun-06	33.24	32.61	593.04		
						11-Jul-07	32.54	31.91	593.74		
						18-Dec-07	32.39	31.76	593.89		
						22-Apr-09	32.41	31.78	593.87		
						6-May-10	32.68	32.05	593.60		
						2-Jun-11	32.46	31.83	593.82		

NOTES:

1. *Data may be entered to the nearest mm, but are reported above to the nearest cm. Apparent rounding errors may occasionally occur in calculated fields (e.g., Groundwater Surface Elevation).*
2. *N/M - Denotes not measured.*
3. *N/A - Denotes not available.*
4. *m asl - Denotes metres above sea level.*
5. *m bgs - Denotes metres below ground surface.*
6. *m btoc - Denotes metres below top of PVC casing.*

WorleyParsons
resources & energy

Table 2

Water Quality Analytical Results: Field-Measured Parameters

PROJECT NO.: E00100102

Monitoring Station	Date (d-m-y)	Temperature (°C)	Electrical Conductivity (at 25°C) (µS/cm)	pH (units)
MW-01	5-May-10	5.6	749	6.95
	25-May-11	7.7	741	7.11
MW-02	5-May-10	4.8	1,306	7.04
	25-May-11	8.3	1,397	7.02
MW-03	6-May-10	6.6	974	7.14
	25-May-11	8.9	976	7.08
MW-04	6-May-10	8.2	1,213	7.14
	7-Jun-11	8.1	1,230	7.12
MW-05	29-Apr-10	7.6	985	7.08
	25-May-11	8.3	1,070	7.06
MW-06	6-May-10	5.7	1,773	7.21
	7-Jun-11	11.1	1,762	7.22
MW-07	5-May-10	7.2	2,640	6.91
(Results confirmed anomalous)	*8-Jun-11*	*6.6*	*1,750*	*7.73*
	28-Jul-11	7.2	2,680	7.11
MW-08	5-May-10	5.4	1,359	7.09
	7-Jun-11	9.0	1,378	7.41
MW-09	6-May-10	6.8	1,538	7.35
	2-Jun-11	9.1	1,548	7.49
MW-10	5-May-10	6.6	1,287	7.11
	25-May-11	9.1	1,192	7.36
MW-11	5-May-10	7.2	1,303	7.06
	3-Jun-11	6.9	1,341	7.42
MW-12	6-May-10	5.1	1,032	7.32
	2-Jun-11	8.7	983	6.95
MW-13	6-May-10	7.0	776	7.53
	2-Jun-11	8.5	841	7.06

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***The June 8, 2011 results from MW-07 are considered anomalous.***

WorleyParsons
resources & energy

Table 3

Water Quality Analytical Results: Indicator Parameters

PROJECT NO.: E00100102

Monitoring Station	Date (d-m-y)	PHYSICAL: EC (µS/cm)	pH (units)	Tot Hard as $CaCO_3$ (mg/L)	Tot Alk as $CaCO_3$ (mg/L)	INDICATORS: Chloride:D (mg/L)	Sulphate:D (mg/L)	Iron:D (mg/L)	Manganese:D (mg/L)	TDS (mg/L)	CATIONS, ANIONS & ION BALANCE: Calcium:D (mg/L)	Magnesium:D (mg/L)	Potassium:D (mg/L)	Sodium:D (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Hydroxide (mg/L)	Fluoride:D (mg/L)	Ion Balance % (%)	ORGANIC: DOC (mg/L)	NITROGEN PARAMETERS: NO_2 as N (mg/L)	NO_3 as N (mg/L)	NO_2+NO_3 as N (mg/L)	PHENOLS: Phenols (mg/L)	METALS: Ortho Phosphate (mg/L)
Canadian Drinking Water AO Guidelines (Health Canada, 2010)		---	6.5 - 8.5	---	---	250	500	0.3	0.05	500	---	---	---	200	---	---	---	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines (Health Canada, 2010)		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	---	---	1	10	10	---	---
MW-01	07-Mar-05	762	7.7	338	364	4	57.4	1.02 [1]	0.605 [1]	442	94.6	24.8	3.1	40	444	<5	<5	0.19	100	3	<0.05	<0.1	<0.1	<0.001	<0.01
	17-Nov-05	760	7.9	347	370	4	61.1	1.67 [1]	0.662 [1]	447	94.8	26.9	2.3	36	451	<5	<5	0.13	97.6	3	<0.05	<0.1	<0.1	<0.001	<0.001
	15-Jun-06	748	8	361	367	4	56.8	1.81 [1]	0.7 [1]	448	99.7	27.3	2.9	37	448	<5	<5	0.14	103	3	<0.05	<0.1	<0.1	<0.001	<0.0001
	12-Jul-07	718	7.8	345	365	3	54.6	1.84 [1]	0.664 [1]	433	95.1	26.1	2.3	33	445	<5	<5	0.13	98.6	3	<0.05	<0.1	<0.1	<0.001	0.005
	19-Dec-07	770	7.8	310	390	2	60	<0.06	0.67 [1]	442	87	23	2.2	34	470	<1	<1	0.2	0.87	2	<0.06	<0.2	<0.2	0.002	0.02
	21-Apr-09	770	7.67	310	370	5	44	<0.06	0.66 [1]	410	84	24	2.4	36	450	<0.5	<0.5	0.14	93	2.3	<0.003	0.003	0.003	0.003	0.003
	05-May-10	762	8.06	363	371	3.46	62	2.02 [1]	0.73 [1]	456	98.6	28.4	---	38.1	453	<5.0	<5.0	0.15	102	3	<0.050	<0.050	<0.071	<0.0010	<0.010
	25-May-11	768	8.04	332	366	3.02	57.1	1.53 [1]	0.675 [1]	432	91.1	25.4	2.68	33.3	446	<5.0	<5.0	0.109	94.9	3.4	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-02	07-Mar-05	1,210	7.7	424	422	13	227	0.275	0.236 [1]	759 [1]	113	34.5	6.8	111	514	<5	<5	0.21	101	8	<0.05	0.1	0.1	<0.001	<0.01
	17-Nov-05	1,400	7.9	523	471	38	270	0.085	0.671 [1]	894 [1]	125	51.3	7.2	120	575	<5	<5	0.11	98.4	6	<0.05	<0.1	<0.1	<0.001	<0.001
	15-Jun-06	1,420	7.9	633	516	23	274	3.19 [1]	1.09 [1]	925 [1]	162	55.4	5.5	95	629	<5	<5	0.09	102	5	<0.05	<0.1	<0.1	<0.001	<0.001
	13-Jul-07	1,360	7.9	609	516	12	263	8.72 [1]	0.841 [1]	880 [1]	154	54.4	4.3	83	630	<5	<5	0.09	98.7	6	<0.05	<0.1	<0.1	0.002	0.002
	19-Dec-07	1,400	7.4	530	540	13	290	<0.06	0.7 [1]	895 [1]	140	46	4.5	83	660	<1	<1	0.1	0.84	5	<0.06	<0.2	<0.2	0.002	0.08
	21-Apr-09	1,400	7.36	500	500	18	230	1.5 [1]	0.53 [1]	810 [1]	130	44	4.4	81	610	<0.5	<0.5	0.08	89	4.1	<0.003	0.005	0.005	0.002	<0.003
	05-May-10	1,290	7.97	589	489	11.6	268	9.35 [1]	0.505 [1]	866 [1]	147	54	---	87.2	597	<5.0	<5.0	0.094	100	5.4	<0.050	<0.050	<0.071	<0.0010	<0.010
	25-May-11	1,500	7.9	563	515	22.3	318	9.25 [1]	0.434 [1]	944 [1]	141	51.3	4.25	97.9	628	<5.0	<5.0	<0.050	89.1	11.3	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-03	07-Mar-05	937	7.4	413	362	31	113	3.19 [1]	0.264 [1]	563 [1]	106	36.1	3.5	56	442	<5	<5	0.14	103	5	<0.05	<0.1	<0.1	<0.001	<0.01
	17-Nov-05	949	7.8	410	365	35	122	4.47 [1]	0.239 [1]	573 [1]	104	36.4	3	54	445	<5	<5	0.1	98.1	4	<0.05	<0.1	<0.1	<0.001	<0.001
	15-Jun-06	943	8	423	360	35	116	4.85 [1]	0.258 [1]	568 [1]	109	36.6	3	52	439	<5	<5	0.1	102	3	<0.05	<0.1	<0.1	<0.001	<0.001
	12-Jul-07	930	8	425	361	36	122	4.89 [1]	0.249 [1]	578 [1]	108	37.7	3	55	440	<5	<5	0.11	102	3	<0.05	<0.1	<0.1	<0.001	0.005
	19-Dec-07	960	7.7	370	380	35	130	<0.06	0.25 [1]	571 [1]	98	32	2.7	49	460	<1	<1	0.1	0.87	3	<0.06	<0.2	<0.2	0.002	0.04
	21-Apr-09	950	7.57	360	350	35	98	<0.06	0.24 [1]	520 [1]	92	32	2.8	51	430	<0.5	<0.5	0.11	95	2.5	<0.003	0.009	0.009	0.003	0.003
	06-May-10	967	8.03	411	357	44.3	124	5.23 [1]	0.253 [1]	579 [1]	104	36.8	---	52.3	435	<5.0	<5.0	0.117	96.4	5.3	<0.050	<0.050	<0.071	<0.0010	<0.010
	02-Jun-11	1,000	7.98	452	355	44.2	120	5.55 [1]	0.277 [1]	588 [1]	115	40.1	3.2	52.7	433	<5.0	<5.0	0.105	105	3.3	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-04	08-Mar-05	1,200	7.5	510	375	137	81.4	0.173	0.152 [1]	694 [1]	142	37.7	9.9	57	458	<5	<5	0.15	98.5	1	<0.05	0.8	0.8	<0.001	<0.01
	17-Nov-05	1,280	7.8	532	368	157	87	0.104	0.053 [1]	726 [1]	147	40	9.5	59	449	<5	<5	0.12	98.2	5	<0.05	1.2	1.2	<0.001	<0.001
(Duplicate)	17-Nov-05	1,290	7.9	533	371	157	89	0.105	0.053 [1]	731 [1]	147	40.4	9.7	60	452	<5	<5	0.12	98.1	4	<0.05	1.2	1.2	<0.001	<0.001
	14-Jun-06	1,280	7.7	543	373	155	86.2	0.005	0.13 [1]	724 [1]	147	42.7	10.2	57	455	<5	<5	0.13	99.4	4	<0.05	0.5	0.5	<0.001	<0.001
	13-Jul-07	1,360	7.9	564	368	190	84.5	<0.005	0.009	774 [1]	154	43.6	10.4	68	449	<5	<5	0.14	99.9	3	<0.05	0.5	0.5	<0.001	<0.001
	19-Dec-07	1,400	7.7	500	380	200	82	<0.06	0.016	763 [1]	140	35	10	71	460	<1	<1	0.1	0.9	3	<0.06	0.6	0.6	0.002	0.04
	21-Apr-09	1,200	7.62	500	370	150	74	<0.06	0.03	690 [1]	140	37	9.4	63	450	<0.5	<0.5	0.14	99	2.8	<0.003	0.4	0.4	<0.002	<0.003
	06-May-10	1,220	8.01	561	385	131	92.1	0.078	0.258 [1]	724 [1]	152	44	---	63.4	470	<5.0	<5.0	0.129	107	3	<0.050	0.09	0.09	<0.0010	<0.010
	07-Jun-11	1,280	7.95	520	395	125	88.9	0.028	0.114 [1]	693 [1]	140	41.3	8.78	50.7	482	<5.0	<5.0	0.119	96.3	3	<0.050	0.264	0.264	<0.0010	<0.010
MW-05	08-Mar-05	831	7.6	353	330	15	105	1.14 [1]	0.402 [1]	499	96.2	27.5	6.1	51	403	<5	<5	0.18	103	5	<0.05	<0.1	<0.1	<0.001	<0.01
	17-Nov-05	881	7.9	370	346	21	115	3.31 [1]	0.531 [1]	522 [1]	98.6	30.1	6.9	43	422	<5	<5	0.11	95.4	4	<0.05	<0.1	<0.1	<0.001	<0.001
	14-Jun-06	902	7.7	405	345	22	124	3.48 [1]	0.583 [1]	545 [1]	107	33.5	7.6	44	421	<5	<5	0.11	101	4	<0.05	<0.1	<0.1	<0.001	<0.001
	13-Jul-07	931	8.1	416	349	25	135	4 [1]	0.682 [1]	563 [1]	110	34.3	7.3	42	426	<5	<5	0.11	98.5	4	<0.05	<0.1	<0.1	0.002	0.004
	19-Dec-07	930	7.6	380	360	22	150	<0.06	0.66 [1]	566 [1]	100	30	7.4	41	440	<1	<1	0.1	0.88	3	<0.06	<0.2	<0.2	<0.001	0.05
	21-Apr-09	960	7.58	430	350	30	130	<0.06	0.72 [1]	570 [1]	120	34	7.6	43	420	<0.5	<0.5	0.12	100	2.5	<0.003	0.007	0.007	0.003	<0.003
	29-Apr-10	969	7.95	451	351	30.6	144	3.39 [1]	0.758 [1]	596 [1]	120	36.7	---	46.1	428	<5.0	<5.0	0.107	103	3.3	<0.050	<0.050	<0.071	<0.0010	<0.010
	25-May-11	990	8.05	397	355	30.9	141	3.82 [1]	0.657 [1]	572 [1]	105	32.7	7.29	41.7	433	<5.0	<5.0	0.075	91.1	4.4	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-06	08-Mar-05	1,580	7.5	670	459	4	451	2.92 [1]	1.32 [1]	1,100 [1]	171	58.9	6.1	138	560	<5	<5	0.18	105	5	<0.05	<0.1	<0.1	<0.001	<0.01
	17-Nov-05	1,780	8	584	526	13	471	2.96 [1]	0.943 [1]	1,220 [1]	148	52	5	211 [1]	641	<5	<5	0.15	101	8	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	1,700	7.7	657	519	10	482	3.58 [1]	1.01 [1]	1,220 [1]	168	57.7	5.5	190	633	<5	<5	0.14	104	7	<0.05	<0.1	<0.1	<0.001	0.001
	12-Jul-07	1,760	7.9	620	522	10	478	4.5 [1]	1.28 [1]	1,200 [1]	157	55.3	4.8	182	637	<5	<5	0.17	99.4	7	<0.05	<0.1	<0.1	<0.001	0.04
	19-Dec-07	1,700	7.7	620	510	3	560 [1]	<0.06	1.5 [1]	1,230 [1]	160	54	5	140	630	<1	<1	0.2	0.85	6	<0.06	<0.2	<0.2	0.002	0.17
	22-Apr-09	1,700	7.47	710	490	6	420	5.7 [1]	1.7 [1]	1,100 [1]	180	62	5.5	150	590	<0.5	<0.5	0.14	110	5.1	<0.003	0.004	0.004	0.003	0.028
	06-May-10	1,770	8.06	625	513	8.45	520 [1]	5.38 [1]	1.39 [1]	1,250 [1]	156	57.1	---	194	626	<5.0	<5.0	0.173	98.8	6.7	<0.050	<0.050	<0.071	<0.0010	<0.010
	07-Jun-11	1,760	7.96	658	494	3.45	501 [1]	5.55 [1]	1.64 [1]	1,150 [1]	164	60.4	5.02	123	603	<5.0	<5.0	0.129	91.3	8	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-07	09-Mar-05	2,680	7.5	1,130	544	13	1,130 [1]	10.4 [1]	1.88 [1]	2,150 [1]	287	100	6.6	287 [1]	664	<5	<5	0.11	102	5	<0.05	0.1	0.1	<0.001	<0.001
	17-Nov-05	2,670	7.7	1,060	546	16	1,010 [1]	10.9 [1]	1.83 [1]	1,990 [1]	270	94.8	5.5	268 [1]	666	<5	<5	0.08	102	6	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	2,530	7.5	1,110	542	15	1,010 [1]	<0.005	1.86 [1]	2,010 [1]	284	96.4	6.2	269 [1]	661	<5	<5	0.07	105	6	<0.05	0.1	0.1	<0.001	<0.001
	12-Jul-07	2,290	7.6	1,010	526	12	940 [1]	10.9 [1]	1.78 [1]	1,870 [1]	257	89.8	4.6	248 [1]	641	<5	<5	0.09	103	6	<0.05	<0.1	<0.1	<0.001	0.01
	19-Dec-07	2,500	7.5	850	540	9	1,000 [1]	<0.06	1.6 [1]	1,890 [1]	220	72	5.1	230 [1]	660	<1	<1	0.1	0.84	6	<0.06	<0.2	<0.2	0.002	0.02
	22-Apr-09	3,000	7.19	1,300	600	18	1,200 [1]	14 [1]	2.3 [1]	2,400 [1]	330	110	6.6	320 [1]	730	<0.5	<0.5	0.08	110	6.6	<0.003	0.004	0.004	0.003	0.008
	05-May-10	2,600	7.9	1,040	538	13.2	1,040 [1]	12.5 [1]	1.9 [1]	2,010 [1]	262	93.5	---	274 [1]	657	<5.0	<5.0	0.135	100	5.8	<0.050	<0.050	<0.071	<0.0010	<0.010
(Results confirmed anomalous)	*08-Jun-11*	*1,900*	*7.69*	*728*	*440*	*8.07*	*622 [1]*	*8.26 [1]*	*1.21 [1]*	*1,330 [1]*	*178*	*68.8*	*4.38*	*189*	*537*	*<5.0*	*<5.0*	*0.116*	*104*	*11.5*	*<0.050*	*<0.050*	*<0.071*	*0.002*	*<0.010*
	28-Jul-11	2,670	7.98	1,000	540	11.8	1,020 [1]	11.7 [1]	1.84 [1]	1,950 [1]	256	87.9	5.55	245 [1]	659	<5.0	<5.0	0.128	95.2	6.3	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-08	09-Mar-05	1,470	7.7	552	486	3	369	5.66 [1]	0.474 [1]	999 [1]	147	45	6	137	593	<5	<5	0.13	98.8	5	<0.05	0.1	0.1	<0.001	<0.001
	15-Nov-05	1,310	7.5	486	450	4	300	5.16 [1]	0.384 [1]	862 [1]	133	37.4	5.2	112	549	<5	<5	0.11	95.9	6	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	1,240	7.7	584	487	3	341	6.97 [1]	0.481 [1]	980 [1]	161	44.2	6.1	132	594	<5	<5	0.09	104	6	<0.05	<0.1	<0.1	<0.001	<0.001
	11-Jul-07	1,390	7.9	551	478	2	316	7.29 [1]	0.454 [1]	918 [1]	150	42.9	5	115	583	<5	<5	0.08	100	7	<0.05	<0.1	<0.1	<0.001	0.003
	19-Dec-07	1,400	7.7	480	520	2	370	<0.06	0.44 [1]	977 [1]	130	36	5.4	120	630	<1	<1	0.1	0.84	5	<0.06	<0.2	<0.2	0.001	0.05
	21-Apr-09	1,400	7.62	530	450	3	300	<0.06	0.45 [1]	880 [1]	150	40	5.6	110	560	<0.5	<0.5	0.11	100	5.3	<0.003	0.007	0.007	0.002	0.016
	05-May-10	1,360	8.04	542	458	1.43	333	7.22 [1]	0.47 [1]	927 [1]	146	43.2	---	122	558	<5.0	<5.0	0.13	101	5.3	<0.050	<0.050	<0.071	<0.0010	<0.010
	07-Jun-11	1,400	7.95	497	463	0.97	320	5.41 [1]	0.411 [1]	876 [1]	136	38.3	5.12	98	565	<5.0	<5.0	0.082	89.8	10.3	<0.050	<0.050	<0.071	0.0016	<0.010

WorleyParsons
resources & energy

Table 3

Water Quality Analytical Results: Indicator Parameters

PROJECT NO.: E00100102

		PHYSICAL				INDICATORS					CATIONS, ANIONS & ION BALANCE									ORGANIC	NITROGEN PARAMETERS			PHENOLS	METALS
Monitoring Station	Date (d-m-y)	EC (µS/cm)	pH (units)	Tot Hard as $CaCO_3$ (mg/L)	Tot Alk as $CaCO_3$ (mg/L)	Chloride:D (mg/L)	Sulphate:D (mg/L)	Iron:D (mg/L)	Manganese:D (mg/L)	TDS (mg/L)	Calcium:D (mg/L)	Magnesium:D (mg/L)	Potassium:D (mg/L)	Sodium:D (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Hydroxide (mg/L)	Fluoride:D (mg/L)	Ion Balance % (%)	DOC (mg/L)	NO_2 as N (mg/L)	NO_3 as N (mg/L)	NO_2+NO_3 as N (mg/L)	Phenols (mg/L)	Ortho Phosphate (mg/L)
Canadian Drinking Water AO Guidelines (Health Canada, 2010)		---	6.5 - 8.5	---	---	250	500	0.3	0.05	500	---	---	---	200	---	---	---	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines (Health Canada, 2010)		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	---	---	1	10	10	---	---
MW-09	09-Mar-05	1,520	7.9	286	513	5	313	**1.11** [1]	**0.714** [1]	**954** [1]	71.6	26	4.2	**226** [1]	626	<5	<5	0.29	93.2	5	<0.05	0.1	0.1	<0.001	<0.001
(Duplicate)	09-Mar-05	1,520	7.9	312	515	5	340	**1.07** [1]	**0.705** [1]	**1,010** [1]	79.1	27.9	4.7	**243** [1]	628	<5	<5	0.29	97.4	5	<0.05	0.1	0.1	<0.001	<0.001
	17-Nov-05	1,550	8.1	344	524	7	312	**1.4** [1]	**0.752** [1]	**984** [1]	92.6	27.3	3.9	**227** [1]	640	<5	<5	0.22	98	6	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	1,520	7.9	359	528	7	316	**1.44** [1]	**0.797** [1]	**1,000** [1]	98.1	27.7	3.9	**231** [1]	644	<5	<5	0.23	99.9	8	<0.05	<0.1	<0.1	<0.001	<0.001
	11-Jul-07	1,530	8.1	351	538	6	322	**1.74** [1]	**0.785** [1]	**1,010** [1]	94.9	27.6	3.3	**231** [1]	656	<5	<5	0.21	97.9	7	<0.05	<0.1	<0.1	<0.001	0.002
	18-Dec-07	1,500	8	300	550	4	350	<0.06	**0.77** [1]	**1,020** [1]	83	22	3.5	**230** [1]	670	<1	<1	0.2	0.86	9	<0.06	<0.2	<0.2	0.002	0.04
	22-Apr-09	1,500	7.73	350	520	6	330	**1.9** [1]	**0.86** [1]	**1,000** [1]	97	27	4.1	**240** [1]	630	<0.5	<0.5	0.22	100	5.5	<0.003	0.005	0.005	0.003	0.028
	06-May-10	1,540	8.17	347	524	5.57	342	**2.04** [1]	**0.828** [1]	**1,030** [1]	93.1	27.8	---	**240** [1]	639	<5.0	<5.0	0.251	98.4	5.6	<0.050	<0.050	<0.071	<0.0010	<0.010
(Duplicate)	06-May-10	1,540	8.17	346	526	5.63	345	**2.03** [1]	**0.832** [1]	**1,040** [1]	93.1	27.6	---	**246** [1]	641	<5.0	<5.0	0.243	99.2	5.5	<0.050	<0.050	<0.071	<0.0010	<0.010
	02-Jun-11	1,580	8.17	322	530	5.84	325	**1.46** [1]	**0.754** [1]	**978** [1]	87.4	25.2	4.09	**212** [1]	646	<5.0	<5.0	<0.050	90	8	<0.050	<0.050	<0.071	<0.0010	<0.010
(Duplicate)	02-Jun-11	1,570	8.22	331	530	5.64	325	**1.29** [1]	**0.773** [1]	**988** [1]	89.5	26	4.16	**220** [1]	646	<5.0	<5.0	<0.050	93	7.1	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-10	09-Mar-05	1,270	7.7	476	514	<1	221	**5.29** [1]	**0.639** [1]	**819** [1]	131	36.1	5.3	117	628	<5	<5	0.18	99.7	5	<0.05	0.1	0.1	<0.001	<0.001
	16-Nov-05	1,260	7.5	467	520	3	222	**5.49** [1]	**0.642** [1]	**814** [1]	129	35.2	5	108	634	<5	<5	0.12	93.8	6	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	1,120	7.7	503	525	2	212	**5.89** [1]	**0.67** [1]	**831** [1]	139	37.8	5.6	119	641	<5	<5	0.13	103	6	<0.05	<0.1	<0.1	<0.001	<0.001
	11-Jul-07	1,270	8	482	533	2	208	**5.93** [1]	**0.656** [1]	**814** [1]	132	36.9	4.7	110	651	<5	<5	0.12	97.2	5	<0.05	<0.1	<0.1	<0.001	0.002
	18-Dec-07	1,300	7.8	410	540	<1	230	<0.06	**0.64** [1]	**822** [1]	120	29	4.8	110	660	<1	<1	0.2	0.84	5	<0.06	<0.2	<0.2	0.002	<0.02
	22-Apr-09	1,300	7.51	490	510	2	190	**5.9** [1]	**0.71** [1]	**800** [1]	140	36	5.6	120	620	<0.5	<0.5	0.14	110	4.7	<0.003	0.005	0.005	0.002	0.003
	05-May-10	1,270	8.07	508	519	0.73	227	**6.8** [1]	**0.735** [1]	**847** [1]	139	39.1	---	124	633	<5.0	<5.0	0.169	104	5.1	<0.050	<0.050	<0.071	<0.0010	<0.010
	02-Jun-11	1,260	8.04	407	497	1.19	206	**3.89** [1]	**0.566** [1]	**759** [1]	113	30.2	5.58	105	607	<5.0	<5.0	<0.050	89.9	6.7	<0.050	<0.050	<0.071	0.0018	<0.010
MW-11	10-Mar-05	1,270	7.7	563	526	8	196	**6.89** [1]	**0.668** [1]	**813** [1]	150	45.8	4.9	92	642	<5	<5	0.14	104	15	<0.05	0.1	0.1	<0.001	<0.001
	16-Nov-05	1,270	7.4	525	536	16	199	**6.95** [1]	**0.628** [1]	**809** [1]	140	42.5	4.5	85	654	<5	<5	0.09	93.4	7	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	1,100	7.7	570	551	11	194	**7.23** [1]	**0.659** [1]	**831** [1]	153	45.7	4.8	92	672	<5	<5	0.09	101	7	<0.05	<0.1	<0.1	<0.001	<0.001
	11-Jul-07	1,280	8	544	542	8	193	**7.15** [1]	**0.632** [1]	**806** [1]	143	45.3	3.9	88	662	<5	<5	0.09	98.6	8	<0.05	<0.1	<0.1	<0.001	0.002
	18-Dec-07	1,300	7.7	480	560	10	210	<0.06	**0.61** [1]	**810** [1]	130	38	4.3	87	680	<1	<1	0.1	0.87	6	<0.06	<0.2	<0.2	0.002	0.05
	22-Apr-09	1,300	7.51	560	530	10	170	**7** [1]	**0.67** [1]	**800** [1]	150	45	4.9	91	640	<0.5	<0.5	0.11	110	5.5	<0.003	0.003	0.003	0.004	0.022
	05-May-10	1,290	8.04	549	533	15.2	212	**7.61** [1]	**0.663** [1]	**840** [1]	144	45.9	---	98.1	650	<5.0	<5.0	0.132	99.1	6	<0.050	<0.050	<0.071	<0.0010	<0.010
	02-Jun-11	1,320	8	561	536	9.69	203	**6.99** [1]	**0.687** [1]	**830** [1]	148	46.4	5.36	96	653	<5.0	<5.0	<0.050	102	6.8	<0.050	<0.050	<0.071	<0.0010	<0.010
MW-12	10-Mar-05	1,000	7.9	354	521	6	45.9	**2.78** [1]	**0.365** [1]	**600** [1]	95.7	27.9	5	106	636	<5	<5	0.13	102	6	<0.05	0.1	0.1	<0.001	<0.001
	16-Nov-05	1,020	7.4	354	584	8	52.5	**3.37** [1]	**0.402** [1]	**651** [1]	94.9	28.5	5.2	111	712	<5	<5	0.07	92.7	7	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	904	7.8	370	549	7	44.2	**3.76** [1]	**0.436** [1]	**621** [1]	100	29.1	5.1	106	669	<5	<5	0.07	100	7	<0.05	<0.1	<0.1	<0.001	<0.001
	11-Jul-07	1,020	8	358	550	7	42.4	**3.77** [1]	**0.422** [1]	**609** [1]	95.4	29.2	4.2	101	670	<5	<5	0.08	97.4	7	<0.05	<0.1	<0.1	<0.001	0.002
	18-Dec-07	1,000	7.8	300	570	5	43	<0.06	**0.4** [1]	**601** [1]	82	23	4.3	99	700	<1	<1	<0.1	0.84	7	<0.06	<0.2	<0.2	0.002	<0.02
	22-Apr-09	1,000	7.66	360	540	8	32	**4.1** [1]	**0.45** [1]	**610** [1]	98	29	4.9	110	650	<0.5	<0.5	0.09	110	6.4	<0.003	0.005	0.005	0.003	0.013
	06-May-10	1,030	8.13	365	547	7.05	46.8	**4.24** [1]	**0.456** [1]	**623** [1]	96.4	30.2	---	109	667	<5.0	<5.0	0.114	100	10.5	<0.050	<0.050	<0.071	<0.0010	<0.010
	02-Jun-11	1,050	8.14	372	543	6.4	44.6	**3.34** [1]	**0.45** [1]	**606** [1]	98.1	30.9	4.86	95.4	662	<5.0	<5.0	0.071	97.9	13.5	<0.050	0.054	<0.071	<0.0010	---
MW-13	10-Mar-05	784	8.1	202	435	2	10.6	**0.818** [1]	**0.263** [1]	460	53.7	16.5	4.2	112	531	<5	<5	0.2	100	4	<0.05	0.1	0.1	<0.001	<0.001
	16-Nov-05	782	7.8	195	440	4	12.5	**1.08** [1]	**0.243** [1]	454	51.2	16.2	3.4	103	537	<5	<5	0.14	92.2	5	<0.05	<0.1	<0.1	<0.001	<0.001
	16-Jun-06	715	8	209	443	4	10.1	**1.19** [1]	**0.256** [1]	470	55.6	17.1	3.9	112	715	541	<5	0.14	99.4	5	<0.05	0.2	0.2	<0.001	<0.001
	11-Jul-07	782	8.2	202	444	2	9.1	**1.26** [1]	**0.252** [1]	456	53	16.9	3.5	105	541	<5	<5	0.13	96.3	5	<0.05	<0.1	<0.1	0.001	0.002
	18-Dec-07	790	8	170	460	2	9	<0.06	**0.25** [1]	457	45	14	3.5	110	560	<1	<1	0.2	0.87	5	<0.06	<0.2	<0.2	<0.001	<0.02
	22-Apr-09	770	7.81	200	430	3	9	**1.3** [1]	**0.26** [1]	460	54	17	3.9	110	520	<0.5	<0.5	0.15	100	4.5	<0.003	0.005	0.005	0.003	0.014
	06-May-10	776	8.22	192	435	2.15	9.54	**1.45** [1]	**0.249** [1]	453	50	16.4	---	110	530	<5.0	<5.0	0.16	97.5	4.1	<0.050	<0.050	<0.071	<0.0010	<0.010
	02-Jun-11	796	8.24	183	434	1.92	9.12	**1.25** [1]	**0.231** [1]	442	48.1	15.3	3.74	103	530	<5.0	<5.0	0.162	92.1	5.2	<0.050	<0.050	<0.071	<0.0010	<0.010
FIELD BLANK	05-May-10	1.07	**6.06** [1]	<1.0	<5.0	<0.50	<0.50	<0.020	<0.0050	<1.0	<0.50	<0.10	---	<0.50	<5.0	<5.0	<5.0	<0.050	Low TDS	<1.0	<0.050	<0.050	<0.071	<0.0010	<0.010
	25-May-11	1.06	**6.02** [1]	<1.0	<5.0	<0.50	<0.50	<0.020	<0.0050	<1.0	<0.50	<0.10	<0.10	<0.50	<5.0	<5.0	<5.0	<0.050	Low TDS	<1.0	<0.050	<0.050	<0.071	<0.0010	<0.010

NOTES:

1. *--- in guideline(s) row denotes no criteria, and in data row(s) indicates parameter not analyzed.*
2. *Boldface numbers indicate values that exceed the detection limit.*
3. *Highlighting indicates parameters above applied guideline/criteria.*
4. *Superscript [1] denotes values exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2010)*
   (Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.).
5. *Superscript [2] denotes values exceeding Canadian Drinking Water MAC Guidelines (Health Canada, 2010)*
   (Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.).
6. *The June 8, 2011 results from MW-07 are confirmed anomalous. They are excluded from statistical analysis, hydrochemical control charts, and data interpretation.*

Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.

NO_2 as N
The CDWQ guideline for NO_2 (10 mg/L) was converted to NO_2 as N (1 mg/L).

NO_3 as N
The CDWQ guideline for NO_3 (45 mg/L) was converted to NO_3 as N (10 mg/L).

NO_2+NO_3 as N
The CDWQ guideline for NO_2+NO_3 (45 mg/L) was converted to NO_2+NO_3 as N (10 mg/L).

WorleyParsons
resources & energy

Table 4

Water Quality Analytical Results: Petroleum Hydrocarbon Parameters

PROJECT NO.: E00100102		BTEX				SELECT HYDROCARBONS		
Monitoring Station	Date (d-m-y)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes-Total (mg/L)	PHC F1 (C_6-C_{10}) (mg/L)	PHC F1 (C_6-C_{10})-BTEX (mg/L)	PHC F2 ($C_{>10}$-C_{16}) (mg/L)
Canadian Drinking Water AO Guidelines (Health Canada, 2010)		---	0.024	0.0024	0.3	---	---	---
Canadian Drinking Water MAC Guidelines (Health Canada, 2010)		0.005	---	---	---	---	---	---
MW-01	07-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	15-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	12-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	21-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	25-May-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-02	07-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	15-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	13-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	21-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	25-May-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-03	07-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	15-Jun-06	<0.0005	0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	12-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	21-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-04	08-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
(Duplicate)	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	14-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	13-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	21-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	07-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-05	08-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	14-Jun-06	<0.0005	0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	13-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	21-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	29-Apr-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	25-May-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-06	08-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	12-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	07-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-07	09-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	12-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	08-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	28-Jul-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-08	09-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	15-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	11-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	19-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	21-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1

WorleyParsons
resources & energy

Table 4

Water Quality Analytical Results: Petroleum Hydrocarbon Parameters

PROJECT NO.: E00100102

Monitoring Station	Date (d-m-y)	BTEX: Benzene (mg/L)	BTEX: Toluene (mg/L)	BTEX: Ethylbenzene (mg/L)	BTEX: Xylenes-Total (mg/L)	SELECT HYDROCARBONS: PHC F1 (C_6-C_{10}) (mg/L)	SELECT HYDROCARBONS: PHC F1 (C_6-C_{10})-BTEX (mg/L)	SELECT HYDROCARBONS: PHC F2 ($C_{>10}$-C_{16}) (mg/L)
Canadian Drinking Water AO Guidelines (Health Canada, 2010)		---	**0.024**	**0.0024**	**0.3**	---	---	---
Canadian Drinking Water MAC Guidelines (Health Canada, 2010)		**0.005**	---	---	---	---	---	---
	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	07-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-09	09-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
(Duplicate)	09-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	17-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	11-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	18-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	0.3
	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
(Duplicate)	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
(Duplicate)	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-10	09-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	11-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	18-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-11	10-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	11-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	18-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-12	10-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	11-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	18-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
MW-13	10-Mar-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Nov-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	16-Jun-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	11-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.05
	18-Dec-07	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	22-Apr-09	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<0.1
	06-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	02-Jun-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
FIELD BLANK	05-May-10	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25
	25-May-11	<0.00050	<0.00075	<0.00050	<0.001	<0.10	<0.10	<0.25

NOTES:

1. *--- in guideline(s) row denotes no criteria, and in data row(s) indicates parameter not analyzed.*
2. *Boldface numbers indicate values that exceed the detection limit.*
3. *Highlighting indicates parameters above applied guideline/criteria.*
4. *Superscript [1] denotes values exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2010)*
   (Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.).
5. *Superscript [2] denotes values exceeding Canadian Drinking Water MAC Guidelines (Health Canada, 2010)*
   (Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.).
6. *The June 8, 2011 results from MW-07 are considered anomalous.*

WorleyParsons
resources & energy

Table 5

Water Quality Analytical Results: Metal Parameters

PROJECT NO.: E00100102

Monitoring Station	Date (d-m-y)	DISSOLVED METALS AND TRACE ELEMENTS																							
		Aluminium:D (mg/L)	Antimony:D (mg/L)	Arsenic:D (mg/L)	Barium:D (mg/L)	Beryllium:D (mg/L)	Bismuth:D (mg/L)	Boron:D (mg/L)	Cadmium:D (mg/L)	Chromium:D (mg/L)	Cobalt:D (mg/L)	Copper:D (mg/L)	Lead:D (mg/L)	Mercury:D (mg/L)	Molybdenum:D (mg/L)	Nickel:D (mg/L)	Selenium:D (mg/L)	Silver:D (mg/L)	Strontium:D (mg/L)	Thallium:D (mg/L)	Tin:D (mg/L)	Titanium:D (mg/L)	Uranium:D (mg/L)	Vanadium:D (mg/L)	Zinc:D (mg/L)
Canadian Drinking Water AO Guidelines (Health Canada, 2010)		**0.1**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**1**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**5**
Canadian Drinking Water MAC Guidelines (Health Canada, 2010)		**---**	**0.006**	**0.01**	**1**	**---**	**---**	**5**	**0.005**	**0.05**	**---**	**---**	**0.01**	**0.001**	**---**	**---**	**0.01**	**---**	**---**	**---**	**---**	**---**	**0.02**	**---**	**---**
MW-01	07-Mar-05	0.02	0.0008	0.0008	0.199	<0.0005	<0.00005	0.053	<0.0001	0.0009	0.0017	<0.0006	0.0004	<0.0001	0.0007	0.0004	<0.0004	<0.0002	0.579	<0.0005	<0.0002	0.0013	0.0026	0.0003	0.004
	17-Nov-05	0.01	0.0005	0.0009	0.143	<0.0005	<0.0001	0.046	<0.0001	<0.0004	0.0015	0.0007	<0.0001	<0.0001	0.0013	0.0012	<0.0004	<0.0002	0.551	<0.0001	<0.0002	0.0012	0.0023	0.0001	<0.002
	15-Jun-06	<0.01	0.0006	0.0009	0.134	<0.0005	<0.00005	0.045	<0.0001	0.0027	0.0008	<0.0006	<0.0001	<0.0001	0.0004	<0.0001	<0.0004	<0.0002	0.554	<0.00005	<0.0002	0.001	0.0022	<0.0001	0.005
	12-Jul-07	<0.01	0.0004	0.0009	0.127	<0.0005	<0.00005	0.054	<0.0001	0.0011	0.0009	<0.0006	<0.0001	<0.0001	0.0009	0.003	0.0005	<0.0002	0.558	<0.00005	<0.0002	0.0008	0.0022	<0.0001	<0.002
	19-Dec-07	<0.001	<0.0002	<0.001	0.11	<0.001	---	0.05	<0.0002	<0.001	0.0009	<0.0002	<0.0002	<0.00005	0.0008	0.0027	<0.001	<0.0001	0.53	<0.0002	<0.001	0.001	0.0024	<0.001	<0.003
	21-Apr-09	<0.001	<0.0002	0.0008	---	<0.001	---	---	<0.000005	<0.001	0.0008	0.0005	<0.0002	0.000001	0.0004	0.0009	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0021	<0.001	<0.003
	05-May-10	<0.0050	<0.00040	0.00095	0.132	<0.00050	---	0.053	<0.00010	<0.0050	0.00088	<0.0010	<0.00010	<0.00010	0.00046	0.0025	<0.00040	<0.00010	---	<0.000050	---	0.00081	0.00209	<0.00010	<0.0020
	25-May-11	0.0051	<0.00040	0.00093	0.147	<0.00050	---	<0.050	<0.00010	<0.0050	0.00084	0.0017	<0.00010	<0.000020	0.00039	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00205	0.00016	0.0074
MW-02	07-Mar-05	0.02	0.001	0.0025	0.204	<0.0005	<0.00005	0.12	<0.0001	0.0013	0.0008	0.0015	0.0004	0.0001	0.0046	<0.0001	0.0008	<0.0002	1.03	<0.0005	<0.0002	0.0012	0.0032	0.0017	0.004
	17-Nov-05	0.03	0.0006	0.0014	0.152	<0.0005	<0.0001	0.189	<0.0001	<0.0004	0.0031	0.0021	<0.0001	<0.0001	0.0148	0.0644	0.0006	<0.0002	1.54	0.00006	<0.0002	0.0015	0.0053	0.0005	<0.002
	15-Jun-06	<0.01	0.0007	0.0024	0.107	<0.0005	0.00005	0.152	<0.0001	0.004	0.0031	0.0011	<0.0001	<0.0001	0.0009	0.0012	0.0005	<0.0002	1.46	<0.00005	<0.0002	0.0012	0.0023	<0.0001	0.1012
	13-Jul-07	<0.01	0.0005	0.0036	0.0749	<0.0005	<0.00005	0.136	<0.0001	<0.0004	0.0032	0.0007	<0.0001	<0.0001	0.0008	0.0055	<0.0004	<0.0002	1.46	<0.00005	<0.0002	0.0011	0.0019	<0.0001	<0.002
	19-Dec-07	<0.001	<0.0002	0.003	0.04	<0.001	---	0.13	<0.0002	0.004	0.0026	0.0005	0.0003	<0.00005	0.0006	0.0046	<0.001	<0.0001	1.3	<0.0002	<0.001	0.002	0.0014	0.002	<0.003
	21-Apr-09	<0.001	<0.0002	0.0038	---	<0.001	---	---	<0.000005	<0.001	0.0017	0.0002	<0.0002	0.000001	0.0005	0.0019	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0014	<0.001	<0.003
	05-May-10	<0.0050	<0.00040	0.00369	0.0544	<0.00050	---	0.144	<0.00010	<0.0050	0.00157	<0.0010	<0.00010	<0.00010	0.00041	0.0043	<0.00040	<0.00010	---	<0.000050	---	0.00104	0.00139	<0.00010	0.0044
	25-May-11	<0.0050	<0.00040	0.00327	0.042	<0.00050	---	0.135	<0.00010	<0.0050	0.001	<0.0010	<0.00010	<0.000020	0.0004	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00114	<0.00010	0.0025
MW-03	07-Mar-05	<0.01	0.0007	0.0012	0.0744	<0.0005	<0.00005	0.128	<0.0001	0.0009	0.0012	<0.0006	<0.0001	<0.0001	0.0008	<0.0001	<0.0004	<0.0002	0.811	<0.0005	<0.0002	0.001	0.0007	<0.0001	0.003
	17-Nov-05	0.01	0.0006	0.0014	0.0418	<0.0005	0.00009	0.119	<0.0001	<0.0004	0.0008	0.0008	<0.0001	<0.0001	0.0015	0.0003	0.0005	<0.0002	0.828	<0.0001	<0.0002	0.0019	0.0007	<0.0001	<0.002
	15-Jun-06	<0.01	0.0006	0.0013	0.0411	<0.00045	<0.00005	0.109	<0.0001	0.0029	0.0008	0.0007	<0.0001	<0.0001	0.0007	<0.0001	0.0005	<0.0002	0.845	<0.00005	<0.0002	0.001	0.0007	<0.0001	0.01
	12-Jul-07	<0.01	0.0004	0.0014	0.0379	<0.0005	<0.00005	0.115	<0.0001	0.0012	0.0008	<0.0006	0.0005	0.00009	0.0029	<0.00001	<0.0002	<0.0002	0.001	0.0007	0.882	<0.00005	0.0002	<0.001	<0.002
	19-Dec-07	<0.001	<0.0002	<0.001	0.03	<0.001	---	0.11	<0.0002	0.002	0.0008	0.0002	0.0002	<0.00005	0.0012	0.0042	<0.001	<0.0001	0.82	<0.0002	<0.001	0.002	0.0006	0.001	<0.003
	21-Apr-09	<0.001	<0.0002	0.0013	---	<0.001	---	---	<0.000005	<0.001	0.0006	0.0007	<0.0002	0.000001	0.0007	0.001	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0006	<0.001	<0.003
	06-May-10	<0.0050	<0.00040	0.00154	0.038	<0.00050	---	0.116	<0.00010	<0.0050	0.00076	<0.0010	<0.00010	<0.00010	0.00079	0.0027	<0.00040	<0.00010	---	<0.000050	---	0.00079	0.00056	0.00036	<0.0020
	02-Jun-11	<0.0050	<0.00040	0.00141	0.0389	<0.00050	---	0.103	<0.00010	<0.0050	0.00061	<0.0010	<0.00010	<0.000020	0.00056	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00058	<0.00010	<0.0020
MW-04	08-Mar-05	<0.01	0.0009	0.0011	0.0737	<0.0005	<0.00005	0.101	<0.0001	0.0018	0.0007	0.0008	0.0002	<0.0001	0.0005	<0.0001	0.0006	<0.0002	0.561	<0.0005	<0.0002	0.0007	0.0029	<0.0001	0.004
	17-Nov-05	<0.01	0.0007	0.0006	0.0809	<0.0005	0.00007	0.093	<0.0001	0.0007	0.0049	0.0012	<0.0001	0.0002	0.003	0.014	0.0009	<0.0002	0.616	<0.0001	<0.0002	0.0004	0.0025	<0.0001	0.029
(Duplicate)	17-Nov-05	0.01	0.0006	0.0007	0.0817	<0.0005	0.00005	0.097	<0.0001	0.0009	0.0051	0.0012	<0.0001	0.0001	0.0028	0.0132	0.0009	<0.0002	0.609	<0.0001	<0.0002	0.0004	0.0026	<0.0001	0.032
	14-Jun-06	<0.01	0.0008	0.0006	0.764	<0.0005	<0.00005	0.092	<0.0001	0.0017	<0.0001	0.0009	<0.0001	<0.0001	0.0005	0.0007	0.001	<0.0002	0.585	<0.00005	<0.0002	0.0003	0.0028	0.0022	0.005
	13-Jul-07	<0.01	<0.0004	0.0008	0.085	<0.0005	<0.00005	0.1	<0.0001	0.0047	0.0001	<0.0006	<0.0001	0.0002	0.0005	0.0042	0.0006	<0.0002	0.59	0.00024	<0.0002	0.0004	0.0027	0.0009	0.005
	19-Dec-07	<0.001	<0.0002	<0.001	0.08	<0.001	---	0.09	<0.0002	0.001	<0.0003	0.0006	0.0002	<0.00005	0.0006	0.0052	<0.001	<0.0001	0.61	<0.0002	<0.001	0.002	0.0023	<0.001	<0.003
	21-Apr-09	<0.001	<0.0002	<0.0002	---	<0.001	---	---	0.000024	<0.001	<0.0003	0.0009	<0.0002	0.000003	0.0004	0.0021	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0029	<0.001	<0.003
	06-May-10	<0.0050	<0.00040	0.00117	0.0843	<0.00050	---	0.098	<0.00010	<0.0050	0.00054	<0.0010	<0.00010	<0.00010	0.00038	0.0047	0.00106	<0.00010	---	<0.000050	---	0.00046	0.00284	0.00072	<0.0020
	07-Jun-11	<0.0050	<0.00040	<0.00040	0.0832	<0.00050	---	0.09	<0.00010	<0.0050	0.00015	<0.0010	<0.00010	<0.000020	0.00038	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00333	<0.00010	<0.0020
MW-05	08-Mar-05	<0.01	0.0008	0.0035	0.0618	<0.0005	<0.00005	0.14	<0.0001	0.0009	0.0008	<0.0006	0.0002	<0.0001	0.0022	<0.0001	0.0004	<0.0002	0.71	<0.0005	<0.0002	0.0008	0.0014	0.0002	0.003
	17-Nov-05	<0.01	0.0005	0.0081	0.0564	<0.0005	0.00006	0.116	<0.0001	<0.0004	0.001	0.0007	<0.0001	<0.0001	0.0029	0.0022	0.0004	<0.0002	0.667	<0.0001	<0.0002	0.0009	0.0008	0.0001	<0.002
	14-Jun-06	<0.01	0.0007	0.0051	0.454	<0.0005	<0.00005	0.081	<0.0001	0.0016	0.0007	0.0006	<0.0001	<0.0001	0.0013	0.0002	<0.0004	<0.0002	0.659	<0.00005	<0.0002	0.0005	0.0007	0.0008	0.004
	13-Jul-07	<0.01	0.0005	0.0018	0.0455	<0.0005	<0.00005	0.052	<0.0001	0.0005	0.0008	0.0009	<0.0001	<0.0001	0.0006	0.0034	0.0005	<0.0002	0.684	<0.00005	<0.0002	0.0006	0.0007	<0.0001	0.005
	19-Dec-07	<0.001	<0.0002	0.001	0.04	<0.001	---	0.06	<0.0002	0.003	0.0007	<0.0002	0.0002	<0.00005	0.0005	0.0029	<0.001	<0.0001	0.63	<0.0002	<0.001	0.002	0.0007	0.001	<0.003
	21-Apr-09	<0.001	<0.0002	0.0014	---	<0.001	---	---	<0.000005	<0.001	0.0007	0.0008	<0.0002	0.000001	0.0006	0.0014	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0007	<0.001	<0.003
	29-Apr-10	<0.0050	0.00052	0.0017	0.0478	<0.00050	---	0.064	<0.00010	<0.0050	0.00082	<0.0010	<0.00010	<0.00010	0.00063	0.0039	0.00086	<0.00010	---	<0.000050	---	0.00088	0.0007	0.00017	0.0025
	25-May-11	<0.0050	<0.00040	0.00159	0.0552	<0.00050	---	0.052	<0.00010	<0.0050	0.00075	<0.0010	<0.00010	<0.000020	0.00042	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00066	<0.00010	<0.0020
MW-06	08-Mar-05	<0.01	0.0009	0.0042	0.071	<0.0005	<0.00005	0.148	<0.0001	0.0035	0.0012	0.0011	0.0004	<0.0001	0.0014	<0.0001	0.0005	<0.0002	1.2	<0.0005	<0.0002	0.0008	0.0023	0.0002	0.004
	17-Nov-05	0.01	0.0005	0.0038	0.0557	<0.0005	0.00006	0.16	<0.0001	<0.0004	0.0012	0.0012	<0.0001	<0.0001	0.0015	0.0004	0.0005	<0.0002	1.26	<0.0001	<0.0002	0.0015	0.0015	0.0001	<0.002
	16-Jun-06	<0.01	0.0009	0.0034	0.0666	<0.0005	<0.00005	0.149	<0.0001	0.0015	0.0007	0.0014	<0.0001	<0.0001	0.0014	<0.0001	0.0007	<0.0002	1.28	<0.0005	<0.0002	0.001	0.0016	<0.001	0.008
	12-Jul-07	<0.01	0.0005	0.0042	0.043	<0.0005	<0.00005	0.159	<0.0001	0.0014	0.0009	0.0014	<0.0001	<0.0001	0.0016	0.006	<0.0004	<0.00021	1.42	<0.0005	<0.0002	0.0014	0.0016	<0.0001	0.003
	19-Dec-07	<0.001	<0.0002	0.003	0.03	<0.001	---	0.13	<0.0002	0.002	0.0008	0.0011	0.0002	<0.00005	0.0012	0.0052	<0.001	<0.0001	1.4	<0.0002	<0.001	0.002	0.0018	0.001	<0.003
	22-Apr-09	<0.001	<0.0002	0.005	---	<0.001	---	---	0.000009	<0.001	0.0004	<0.0002	<0.0002	<0.000001	0.001	0.0015	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0017	<0.001	<0.003
	06-May-10	<0.0050	<0.00040	0.00507	0.0353	<0.00050	---	0.15	<0.00010	<0.0050	0.00052	0.0012	<0.00010	<0.00010	0.00094	0.0039	0.00041	<0.00010	---	<0.000050	---	0.00125	0.00146	0.00016	0.0063
	07-Jun-11	0.0288	<0.00040	0.0057	0.0309	<0.00050	---	0.138	<0.00010	<0.0050	0.00036	<0.0010	<0.00010	<0.000020	0.0008	<0.0020	<0.00040	<0.00010	---	<0.000050	---	0.00063	0.0018	0.00016	<0.0020
MW-07	09-Mar-05	<0.01	0.0008	0.0017	0.0733	<0.0005	<0.00005	0.366	<0.0001	0.0017	0.0026	0.0024	0.0004	<0.0001	0.001	<0.0001	0.0008	<0.0002	2.49	<0.0005	<0.0002	0.0012	0.0018	<0.0001	0.006
	17-Nov-05	<0.01	0.0007	0.0019	0.053	<0.0005	0.00005	0.311	<0.0001	<0.0004	0.002	0.0018	<0.0001	<0.0001	0.001	<0.0001	<0.0004	<0.0002	2.45	<0.0001	<0.0002	0.0009	0.0017	<0.0001	<0.002
	16-Jun-06	<0.01	0.0007	0.0022	0.0543	<0.0005	<0.00005	0.312	<0.0001	0.0018	0.0012	0.0023	<0.0001	<0.0001	0.0008	<0.0001	0.0007	<0.0002	2.58	<0.00005	<0.0002	0.001	0.0017	<0.0001	0.006
	12-Jul-07	<0.01	0.0005	0.0027	0.0596	<0.0005	<0.00005	0.289	<0.0001	0.0011	0.0014	0.0015	<0.0001	<0.0001	0.0012	0.0056	0.0008	<0.0002	2.49	<0.00005	<0.0002	0.0011	0.0016	<0.0001	0.002
	19-Dec-07	<0.001	<0.0002	0.001	0.04	<0.001	---	0.26	<0.0002	0.004	0.0013	0.0016	0.0003	<0.00005	0.0011	0.0059	<0.001	<0.0001	2.2	<0.0002	<0.001	0.002	0.0014	0.002	0.003
	22-Apr-09	<0.001	<0.0002	0.0021	---	<0.001	---	---	0.000016	<0.001	0.0013	0.0007	<0.0002	<0.000001	0.0004	0.0024	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0016	<0.001	<0.003
	05-May-10	<0.0050	<0.00040	0.00361	0.049	<0.00050	---	0.279	<0.00010	<0.0050	0.00128	0.0014	<0.00010	<0.00010	0.00097	0.0056	0.00127	<0.00010	---	<0.000050	---	0.00109	0.00156	<0.00010	0.0057
(Results considered anomalous)	*08-Jun-11*	*<0.0050*	*<0.00040*	*0.0057*	*0.0954*	*<0.00050*	*---*	*0.215*	*<0.00010*	*<0.0050*	*0.00116*	*<0.0010*	*<0.00010*	*<0.000020*	*0.0151*	*0.0021*	*<0.00040*	*<0.00010*	*---*	*0.000071*	*---*	*0.0003*	*0.00138*	*<0.00010*	*0.005*
	28-Jul-11	<0.0050	<0.00040	0.00333	0.0483	<0.00050	---	0.262	<0.00010	<0.0050	0.00092	<0.0010	<0.00010	<0.000020	0.000781	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00152	<0.00010	<0.0030
MW-08	09-Mar-05	<0.01	0.0006	0.0042	0.084	<0.0005	<0.00005	0.244	<0.0001	0.0011	0.0008	0.001	0.0004	<0.0001	0.0012	<0.0001	0.0004	<0.0002	1.4	<0.0005	<0.0002	0.0008	0.0011	<0.0001	0.003
	15-Nov-05	<0.01	0.0005	0.0046	0.115	<0.0005	0.00009	0.184	<0.0001	0.0005	0.0009	0.001	<0.0001	<0.0001	0.0025	<0.0001	0.0005	<0.0002	1.27	<0.0001	<0.0002	0.001	0.0015	<0.0001	<0.002
	16-Jun-06	<0.01	0.0006	0.0044	0.0629	<0.0005	<0.00005	0.206	<0.0001	0.0012	0.0004	0.0011	<0.0001	<0.0001	0.0011	<0.0001	<0.0004	<0.0002	1.45	<0.00005	<0.0002	0.0008	0.0009	<0.0001	0.006
	11-Jul-07	<0.01	0.0005	0.0052	0.0519	<0.0005	<0.00005	0.176	<0.0001	0.0016	0.0005	0.0012	<0.0001	<0.0001	0.0016	0.0031	<0.0004	<0.0002	1.59	<0.00005	<0.0002	0.0012	0.0008	0.0004	0.004
	19-Dec-07	<0.001	<0.0002	0.002	0.03	<0.001	---	0.17	<0.0002	0.003	0.0004	0.0006	0.0002	<0.00005	0.0014	0.0036	<0.001	<0.0001	1.4	<0.0002	<0.001	0.002	0.0008	0.001	<0.003
	21-Apr-09	<0.001	<0.0002	0.0062	---	<0.001	---	---	<0.000005	<0.001	<0.0003	0.0016	<0.0002	<0.000001	0.002	0.0017	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0007	<0.001	<0.003
	05-May-10	<0.0050	<0.00040	0.00672	0.0675	<0.00050	---	0.179	<0.00010	<0.0050	0.00035	<0.0010	<0.00010	<0.00010	0.00168	0.0027	<0.00040	<0.00010	---	<0.000050	---	0.00094	0.00072	0.00017	0.0163
	07-Jun-11	<0.0050	<0.00040	0.00667	0.0614	<0.00050	---	0.18	<0.00010	<0.0050	0.00036	<0.0010	<0.00010	<0.000020	0.00154	0.0025	0.00159	<0.00010	---	<0.000050	---	0.00144	0.0008	0.00018	0.0116
MW-09	09-Mar-05	**0.14** [1]	0.0007	0.0019	0.0608	<0.0005	<0.00005	0.339	<0.0001	0.0016	0.0011	0.001	0.0001	<0.0001	0.0019	0.0002	<0.0004	<0.0002	0.843	<0.0005	<0.0002	0.0058	0.0019	0.0005	0.003
(Duplicate)	09-Mar-05	**0.12** [1]	0.0007	0.0019	0.0616	<0.0005	<0.00005	0.332	<0.0001	0.0012	0.0012	0.001	0.0003	<0.0001	0.0019	0.0002	<0.0004	<0.0002	0.841	<0.0005	<0.0002	0.0059	0.0018	0.0004	0.004

WorleyParsons
resources & energy

Table 5

Water Quality Analytical Results: Metal Parameters

PROJECT NO.: E00100102

Monitoring Station	Date (d-m-y)	Aluminum:D (mg/L)	Antimony:D (mg/L)	Arsenic:D (mg/L)	Barium:D (mg/L)	Beryllium:D (mg/L)	Bismuth:D (mg/L)	Boron:D (mg/L)	Cadmium:D (mg/L)	Chromium:D (mg/L)	Cobalt:D (mg/L)	Copper:D (mg/L)	Lead:D (mg/L)	Mercury:D (mg/L)	Molybdenum:D (mg/L)	Nickel:D (mg/L)	Selenium:D (mg/L)	Silver:D (mg/L)	Strontium:D (mg/L)	Thallium:D (mg/L)	Tin:D (mg/L)	Titanium:D (mg/L)	Uranium:D (mg/L)	Vanadium:D (mg/L)	Zinc:D (mg/L)
DISSOLVED METALS AND TRACE ELEMENTS																									
Canadian Drinking Water AO Guidelines (Health Canada, 2010)		**0.1**	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	---	---	---	---	---	---	---	**5**
Canadian Drinking Water MAC Guidelines (Health Canada, 2010)		---	**0.006**	**0.01**	**1**	---	---	**5**	**0.005**	**0.05**	---	---	**0.01**	**0.001**	---	---	**0.01**	---	---	---	---	---	**0.02**	---	---
	17-Nov-05	0.02	0.0006	0.0018	0.052	<0.0005	<0.0001	0.294	<0.0001	0.0006	0.0023	0.0011	<0.0001	<0.0001	0.0038	0.0087	0.0005	<0.0002	0.869	<0.0001	<0.0002	0.0038	0.0015	0.0002	<0.002
	16-Jun-06	<0.01	0.0006	0.0018	0.0389	<0.0005	<0.00005	0.289	<0.0001	0.0013	0.0011	0.0012	<0.0001	<0.0001	0.0015	<0.0001	<0.0004	<0.0002	0.861	<0.00005	<0.0002	0.0008	0.0014	<0.0001	0.005
	11-Jul-07	<0.01	0.0004	0.002	0.0302	<0.0005	<0.00005	0.26	<0.0001	0.0016	0.0009	0.0008	<0.0001	<0.0001	0.0017	0.003	<0.0004	<0.0002	0.961	<0.00005	<0.0002	0.0009	0.0014	0.0005	<0.002
	18-Dec-07	<0.001	<0.0002	0.002	0.02	<0.001	---	0.26	<0.0002	<0.001	0.0009	0.0008	<0.0002	<0.00005	0.0018	0.0023	<0.001	<0.0001	0.81	<0.0002	<0.001	0.002	0.0014	<0.001	0.003
	22-Apr-09	0.1	<0.0002	0.0023	---	<0.001	---	---	0.000008	<0.001	0.0008	0.0003	<0.0002	<0.000001	0.0016	0.0017	<0.0002	<0.0001	---	<0.0002	<0.001	0.005	0.0012	<0.001	<0.003
	06-May-10	<0.0050	<0.00040	0.00255	0.025	<0.00050	---	0.267	<0.00010	<0.0050	0.00085	<0.0010	<0.00010	<0.00010	0.00158	0.0027	<0.00040	<0.00010	---	<0.000050	---	0.00078	0.00121	<0.00010	<0.0020
(Duplicate)	06-May-10	<0.0050	<0.00040	0.00257	0.0247	<0.00050	---	0.261	<0.00010	<0.0050	0.00086	<0.0010	<0.00010	<0.00010	0.00154	0.0027	<0.00040	<0.00010	---	<0.000050	---	0.00077	0.0012	<0.00010	0.002
	02-Jun-11	<0.0050	<0.00040	0.0028	0.0294	<0.00050	---	0.255	<0.00010	<0.0050	0.00128	<0.0010	<0.00010	<0.000020	0.00156	<0.0020	<0.00040	0.00013	---	<0.000050	---	<0.00030	0.00132	0.00012	0.002
(Duplicate)	02-Jun-11	<0.0050	<0.00040	0.00272	0.0296	<0.00050	---	0.237	<0.00010	<0.0050	0.00126	<0.0010	<0.00010	<0.000020	0.00152	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00128	0.00015	<0.0020
MW-10	09-Mar-05	<0.01	0.0007	0.003	0.0296	<0.0005	<0.00005	0.209	<0.0001	0.0012	0.0003	0.0007	0.0004	<0.0001	0.0009	<0.0001	<0.0004	<0.0002	1.29	<0.0005	<0.0002	0.0008	0.0019	<0.0001	0.003
	16-Nov-05	<0.01	0.0006	0.0037	0.0331	<0.0005	<0.0001	0.202	<0.0001	<0.0004	0.0005	0.0009	<0.0001	<0.0001	0.001	<0.0001	0.0006	<0.0002	1.43	<0.0001	<0.0002	0.0008	0.0015	<0.0001	<0.002
	16-Jun-06	<0.01	0.0006	0.0036	0.0319	<0.0005	<0.00005	0.187	<0.0001	0.0011	0.0003	0.0009	<0.0001	<0.0001	0.0009	<0.0001	<0.0004	<0.0002	1.41	<0.00005	<0.0002	0.0007	0.0014	<0.0001	0.009
	11-Jul-07	<0.01	0.0005	0.0039	0.0291	<0.0005	<0.00005	0.168	<0.0001	0.0015	0.0004	0.0008	<0.0001	<0.0001	0.0009	0.003	<0.0004	<0.0002	1.55	<0.00005	<0.0002	0.0007	0.0013	0.0004	0.015
	18-Dec-07	<0.001	<0.0002	0.002	0.02	<0.001	---	0.16	<0.0002	<0.001	0.0005	0.0006	<0.0002	<0.00005	0.0011	0.0029	<0.001	<0.0001	1.3	<0.0002	<0.001	0.002	0.0014	<0.001	<0.003
	22-Apr-09	<0.001	<0.0002	0.0044	---	<0.001	---	---	0.000007	<0.001	<0.0003	0.0006	<0.0002	<0.000001	0.0009	0.001	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0011	<0.001	<0.003
	05-May-10	<0.0050	<0.00040	0.00459	0.029	<0.00050	---	0.177	<0.00010	<0.0050	0.00044	0.0015	<0.00010	<0.00010	0.00097	0.0029	<0.00040	<0.00010	---	<0.000050	---	0.00083	0.00115	<0.00010	0.0023
	02-Jun-11	<0.0050	<0.00040	0.00287	0.0321	<0.00050	---	0.17	<0.00010	<0.0050	0.00031	<0.0010	<0.00010	<0.000020	0.00481	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00133	0.00021	0.003
MW-11	10-Mar-05	<0.01	0.0008	0.0022	0.0494	<0.0005	<0.00005	0.189	<0.0001	0.0011	0.0006	<0.0006	<0.0001	<0.0001	0.001	<0.0001	<0.0004	<0.0002	1.27	<0.0005	<0.0002	0.0008	0.0012	0.0001	0.004
	16-Nov-05	0.02	0.0006	0.0025	0.0466	<0.0005	0.00008	0.227	<0.0001	0.0006	0.0007	0.0009	<0.0001	<0.0001	0.0009	<0.0001	<0.0004	<0.0002	1.24	<0.0001	<0.0002	0.001	0.0012	<0.0001	<0.002
	16-Jun-06	<0.01	0.0006	0.0022	0.044	<0.0005	<0.00005	0.205	<0.0001	0.0013	0.0003	0.0009	<0.0001	<0.0001	0.0006	<0.0001	0.0004	<0.0002	1.22	<0.00005	<0.0002	0.001	0.0011	<0.0001	0.009
	11-Jul-07	<0.01	0.0004	0.0023	0.0377	<0.0005	<0.00005	0.186	<0.0001	0.0016	0.0004	<0.0006	<0.0001	<0.0001	0.0007	0.0027	<0.0004	<0.0002	1.35	<0.00005	<0.0002	0.0024	0.0011	0.0004	<0.002
	18-Dec-07	<0.001	<0.0002	<0.001	0.03	<0.001	---	0.18	<0.0002	<0.001	0.0006	0.0008	<0.0002	<0.00005	0.001	0.0027	<0.001	<0.0001	1.1	<0.0002	<0.001	0.003	0.0013	<0.001	<0.003
	22-Apr-09	<0.001	<0.0002	0.0024	---	<0.001	---	---	0.000009	<0.001	0.0004	0.0007	<0.0002	0.000001	0.0007	0.0008	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.001	<0.001	<0.003
	05-May-10	<0.0050	<0.00040	0.00259	0.0396	<0.00050	---	0.189	<0.00010	<0.0050	0.00047	<0.0010	<0.00010	<0.00010	0.00072	0.0027	<0.00040	<0.00010	---	<0.000050	---	0.00102	0.001	<0.00010	0.0023
	02-Jun-11	<0.0050	<0.00040	0.00239	0.0423	<0.00050	---	0.199	<0.00010	<0.0050	0.00047	0.0017	<0.00010	<0.000020	0.00061	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00109	0.0001	0.0105
MW-12	10-Mar-05	<0.01	0.0008	0.0022	0.153	<0.0005	<0.00005	0.234	<0.0001	0.0038	0.0008	<0.0006	0.0004	<0.0001	0.0015	<0.0001	<0.0004	<0.0002	0.915	<0.0005	<0.0002	0.0011	0.001	<0.0001	0.01
	16-Nov-05	<0.01	0.0005	0.0026	0.182	<0.0005	0.00006	0.282	<0.0001	<0.0004	0.001	0.0008	<0.0001	<0.0001	0.0013	<0.0001	<0.0004	<0.0002	0.903	<0.0001	<0.0002	0.0008	0.0011	<0.0001	<0.002
	16-Jun-06	<0.01	0.0006	0.0023	0.178	<0.0005	<0.00005	0.251	<0.00012	0.0016	0.0007	<0.0006	<0.0001	<0.0001	0.0012	<0.0001	<0.0004	<0.0002	0.925	<0.00005	<0.0002	0.0008	0.001	<0.0001	0.007
	11-Jul-07	<0.01	0.0005	0.0025	0.146	<0.0005	<0.00005	0.233	<0.001	0.0015	0.0012	<0.0006	<0.0001	<0.0001	0.0017	0.0033	<0.0004	<0.0002	0.972	<0.00005	<0.0002	0.0007	0.0009	0.0004	0.004
	18-Dec-07	<0.001	<0.0002	0.002	0.1	<0.001	---	0.22	<0.0002	<0.001	0.0007	<0.0002	<0.0002	0.00007	0.0014	0.0021	<0.001	<0.0001	0.84	<0.0002	<0.001	0.002	0.0011	<0.001	<0.003
	22-Apr-09	<0.001	<0.0002	0.0026	---	<0.001	---	---	0.000006	<0.001	0.0006	0.0008	<0.0002	0.000001	0.0012	0.0012	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0008	<0.001	<0.003
	06-May-10	<0.0050	<0.00040	0.00285	0.143	<0.00050	---	0.242	<0.00010	<0.0050	0.00065	<0.0010	<0.00010	<0.00010	0.00115	0.0022	<0.00040	<0.00010	---	<0.000050	---	0.00081	0.00083	<0.00010	<0.0020
	02-Jun-11	<0.0050	<0.00040	0.00199	0.13	<0.00050	---	0.244	<0.00010	<0.0050	0.00043	<0.0010	<0.00010	<0.000020	0.00102	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00087	<0.00010	0.0021
MW-13	10-Mar-05	<0.01	0.0008	0.0012	0.389	<0.0005	<0.00005	0.258	<0.0001	0.0048	0.0008	<0.0006	0.0002	<0.0001	0.0023	0.0009	<0.0004	<0.0002	0.57	<0.0005	<0.0002	0.0006	0.0008	<0.0001	0.005
	16-Nov-05	0.07	0.0006	0.0016	0.413	<0.0005	<0.0001	0.301	<0.0001	0.0007	0.0033	0.0007	0.0002	0.0001	0.0027	0.0015	0.0005	<0.0002	0.542	<0.0001	<0.0002	0.0006	0.0009	<0.0001	<0.002
	16-Jun-06	<0.01	0.0006	0.0014	0.424	<0.0005	<0.00005	0.273	<0.0001	0.0011	0.0007	<0.0006	<0.0001	<0.0001	0.0021	<0.0001	<0.0004	<0.0002	0.553	<0.00005	<0.0002	0.0006	0.0008	<0.0001	0.009
	11-Jul-07	<0.01	0.0004	0.0014	0.428	<0.0005	<0.00005	0.246	<0.0001	0.0016	0.0009	<0.0006	<0.0001	<0.0001	0.0023	0.0022	<0.0004	<0.0002	0.58	<0.00005	<0.0002	0.0006	0.0008	0.0004	<0.002
	18-Dec-07	<0.001	<0.0002	0.001	0.29	<0.001	---	0.25	<0.0002	<0.001	0.0009	<0.0002	<0.0002	0.00007	0.0028	0.0016	<0.001	<0.0001	0.5	<0.0002	<0.001	0.002	0.0009	<0.001	<0.003
	22-Apr-09	<0.001	<0.0002	0.0015	---	<0.001	---	---	0.000005	<0.001	0.0007	0.0003	<0.0002	<0.000001	0.0022	0.0012	<0.0002	<0.0001	---	<0.0002	<0.001	<0.001	0.0007	<0.001	<0.003
	06-May-10	<0.0050	<0.00040	0.00162	0.407	<0.00050	---	0.254	<0.00010	<0.0050	0.00092	<0.0010	<0.00010	<0.00010	0.00219	0.0021	<0.00040	<0.00010	---	<0.000050	---	0.0007	0.00069	<0.00010	<0.0020
	02-Jun-11	<0.0050	<0.00040	0.00157	0.411	<0.00050	---	0.265	<0.00010	<0.0050	0.00062	<0.0010	<0.00010	<0.000020	0.00194	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	0.00073	<0.00010	<0.0020
FIELD BLANK	05-May-10	<0.0050	<0.00040	<0.00040	<0.0050	<0.00050	---	<0.050	<0.00010	<0.0050	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	<0.00010	<0.00010	<0.0020
	25-May-11	<0.0050	<0.00040	<0.00040	<0.0050	<0.00050	---	<0.050	<0.00010	<0.0050	<0.00010	<0.0010	<0.00010	<0.000020	<0.00010	<0.0020	<0.00040	<0.00010	---	<0.000050	---	<0.00030	<0.00010	<0.00010	<0.0020

NOTES:

1. *--- in guideline(s) row denotes no criteria, and in data row(s) indicates parameter not analyzed.*
2. *Boldface numbers indicate values that exceed the detection limit.*
3. *Highlighting indicates parameters above applied guideline/criteria.*
4. *Superscript [1] denotes values exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2010)*
   (Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. May 2010.).
5. *Superscript [2] denotes values exceeding Canadian Drinking Water MAC Guidelines (Health Canada, 2010)*
   (Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. May 2010.).
6. *The June 8, 2011 results from MW-07 are considered anomalous. They are excluded from statistical analysis, hydrochemical control charts, and data interpretation.*

Health Canada, 2010. Guidelines for Canadian Drinking Water Quality. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. December 2010.

Aluminum:D

This is an operational guideline, designed to apply only to drinking water treatment plants using aluminum-based coagulates.
The operational guideline value of 0.1 mg/L applies to conventional treatment plants.
The operational guideline value of 0.2 mg/L applies to other types of treatment systems.

Figures

330000 335000 340000 345000 350000 355000 360000 365000 370000 375000 380000 385000

5975000 5970000 5965000 5960000 5955000 5950000 5945000

Twp. 57 Twp. 56 Twp. 55 Twp. 54

BON ACCORD

GIBBONS

STURGEON COUNTY

BRUDERHEIM

LAMONT COUNTY

LAMONT

STRATHCONA COUNTY

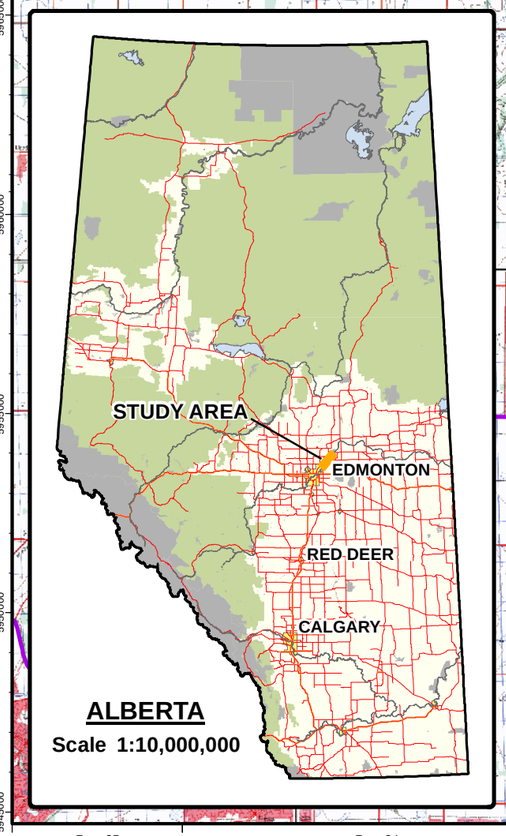
FORT SASKATCHEWAN

EDMONTON

I. D. NO. 13 (ELK ISLAND)

NATIONAL PARK

Rge. 25 Rge. 24 Rge. 23 Rge. 22 Rge. 21 Rge. 20 Rge. 19



ALBERTA

Scale 1:10,000,000

Legend

- Study Area
- County Boundaries

Contour Interval = 10 m or 25 feet
Elevation in feet or metres above mean sea level
MAP SOURCE: NTS Basemap (1:50,000) 83H11, 83H12, 83H13, 83H14, 83H15

N

0 4 8 km

1:150,000

UTM Zone 12 NAD 83

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 BEVERLY CHANNEL GROUNDWATER QUALITY MONITORING

SITE LOCATION MAP

WorleyParsons resources & energy

07-JUL-11 date	L.F. edited by	C.H. drawn by	- app by	PROJECT NUMBER: E00100102	FIGURE: 1

FILE: Q:\E00100102\ArcGIS\MXDs\Site_Location.mxd Issued By: Edmonton GIS

345000 350000 355000 360000 365000 370000 375000

5980000 5975000 5970000 5965000 5960000 5955000 5950000 5945000 5940000

Twp. 58 Twp. 57 Twp. 56 Twp. 55 Twp. 54 Twp. 53

MW-13 MW-12 MW-11 MW-10 MW-09 MW-08 MW-07 MW-06 MW-05 MW-04 MW-03 MW-01 MW-02

Rge. 23 Rge. 22 Rge. 21 Rge. 20

Legend

- Monitoring Well
- Beverly Channel
- Study Area

Image Source: www.geogratis.gc.ca, Dec. 2003

N

0 1 2 3 4 5

Kilometers

1:125,000

NAD 83 UTM Zone 12

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 BEVERLY CHANNEL GROUNDWATER QUALITY MONITORING

MONITORING WELL LOCATIONS

WorleyParsons
resources & energy

07-JUL-11 date	L.F. edited by	C.H. drawn by	. . app by	PROJECT NUMBER: E00100102	FIGURE: 2

FILE: Q:\E00100102\ArcGIS\MXDs\monitoring_wells.mxd Issued By: Edmonton GIS

345000 350000 355000 360000 365000 370000 375000

5980000 5975000 5970000 5965000 5960000 5955000 5950000 5945000 5940000

Twp. 58 Twp. 57 Twp. 56 Twp. 55 Twp. 54 Twp. 53

MW-13 (593.82)
MW-12 (593.23)
MW-11 (594.70)
MW-10 (597.97)
MW-09 (596.48)
MW-08 (598.72)
MW-07 (596.58)
MW-06 (598.18)
MW-05 (599.31)
MW-04 (602.10)
MW-03 (602.11)
MW-02 (604.05)
MW-01 (602.64)

594 595 596 597 598 599 600 601 602 603

Legend

- Monitoring Well
- Groundwater Flow Contours (masl)
- Beverly Channel
- Study Area
- Hydro_Region_AB
- Flow Direction

Image Source: www.geogratis.gc.ca, Dec. 2003

Rge. 23 Rge. 22 Rge. 21 Rge. 20

N

0 1 2 3 4 5

Kilometers

1:125,000

NAD 83 UTM Zone 12

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 BEVERLY CHANNEL GROUNDWATER QUALITY MONITORING

GROUNDWATER SURFACE ELEVATIONS, JUNE 2011

WorleyParsons resources & energy

07-JUL-11	date	L.F.	edited by	C.H.	drawn by	. .	app by

PREPARED SOLELY FOR THE USE OF OUR CLIENT AS SPECIFIED IN THE ACCOMPANYING REPORT. NO REPRESENTATION OF ANY KIND IS MADE TO OTHER PARTIES WITH WHICH WORLEYPARSONS HAS NOT ENTERED INTO A CONTRACT.

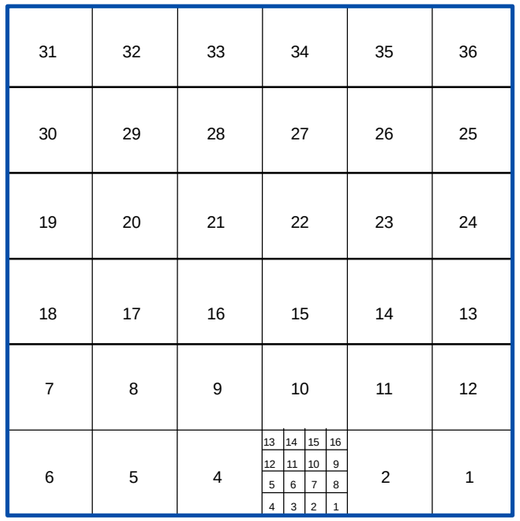
PROJECT NUMBER: E00100102

FIGURE: 3

FILE: Q:\E00100102\ArcGIS\MXDs\gw_flow_contours.mxd Issued By: Edmonton GIS

Appendices

Appendix 1 Water Well Records



Section and LSD Boundary Key

Legend

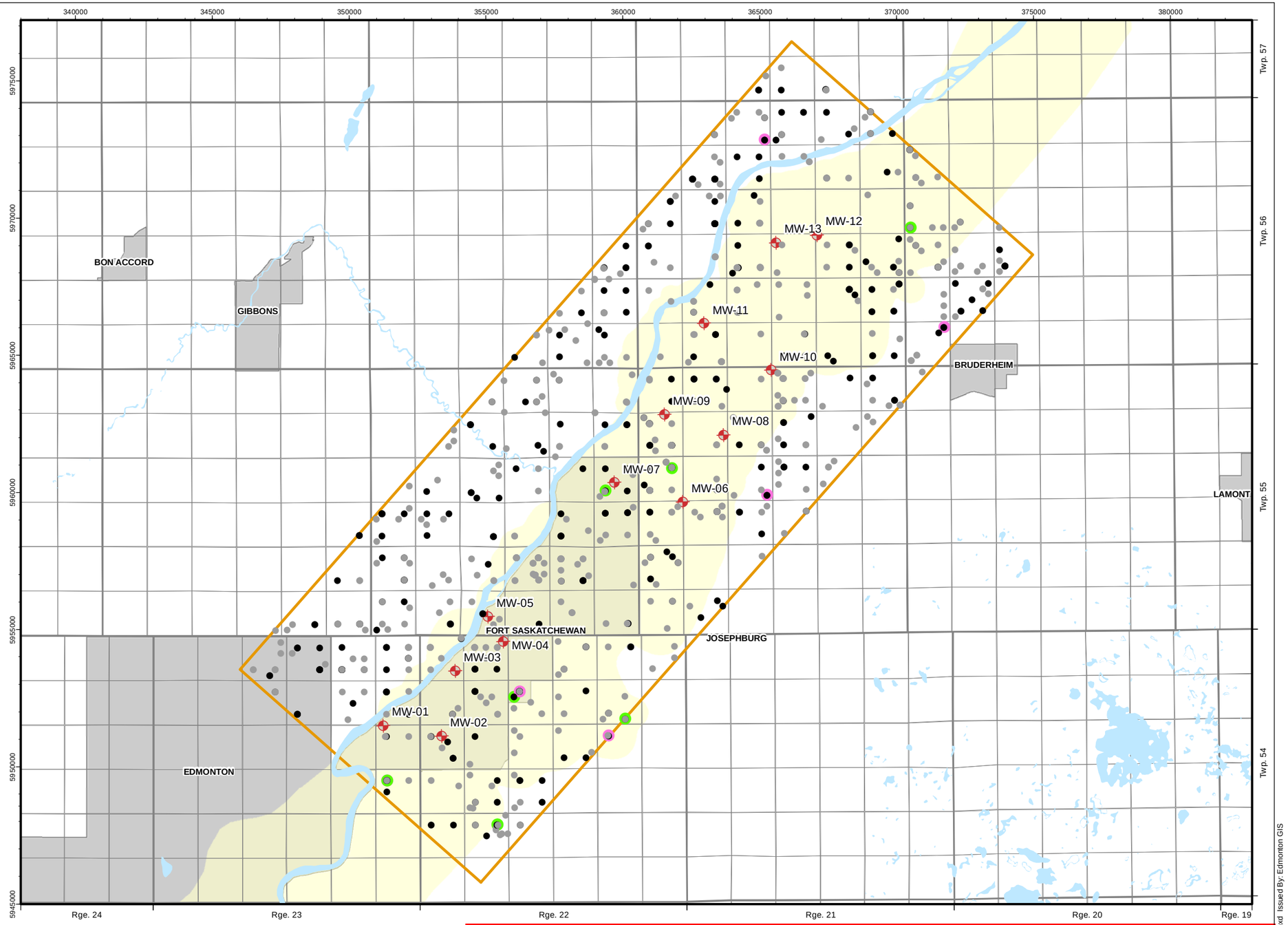
Water Well Records

- Chemistry Exists - Bedrock
- Chemistry Exists - Beverly
- Chemistry Exists
- No Chemistry

NCIA Monitoring Wells

- Monitoring Well

- Study Area
- Beverly Channel
- Lake/River
- City/Town



Note: Well record locations are approximate and should not be used for scaling or real world positioning.

Data Source: Alberta Environment Water Well Database, June 2009

N

0 2.5 5 10

Kilometres

1:150,000

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 BEVERLY CHANNEL GROUNDWATER QUALITY MONITORING

WATER WELL RECORDS WITHIN THE STUDY AREA

WorleyParsons resources & energy

30-JUN-11 date	L.F. edited by	C.H. drawn by	app by	PROJECT NUMBER: E00100102	FIGURE: A1-1

FILE: Q:\E00100102\ArcGIS\MXDs\WW_Search.mxd Issued By: Edmonton GIS

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
1	0261609	10	18	055	22	4	Not Applicable	792.5											11/08/1953		MID-WESTERN #10-18		Oil Exploratory	Unknown	No Chemistry
2	0261824	04	34	055	22	4	Not Applicable	295.7											22/05/1953		IMPERIAL OIL LTD #AO282 4		Oil Exploratory	Unknown	No Chemistry
3	0261198	SE	07	055	22	4	Unknown	1.8													HERDER, H		Chemistry	Hand Dug	Chemistry Exists
4	0263716	16	12	056	21	4	Screen	42.7							34.1	35.7			17/11/1975		BRUDERHEIM, TOWN OF #15-75		Unknown	Unknown	No Chemistry
5	0261734	04	27	055	22	4	Not Applicable	256.3											22/05/1953		IMPERIAL OIL LTD #AO282-6		Oil Exploratory	Unknown	No Chemistry
6	0268139	SE	01	055	23	4																			No Chemistry
7	0042021	13	24	056	21	4															ALTA ENV				No Chemistry
8	0261847	04	36	055	22	4	Not Applicable	299.0											21/05/1953		IMPERIAL OIL LTD		Oil Exploratory	Unknown	No Chemistry
9	0042022	SW	14	056	21	4																			No Chemistry
10	0261829	01	03	056	22	4	Not Applicable	268.2											13/05/1953		IMPERIAL OIL LTD #AO190-173		Oil Exploratory	Unknown	No Chemistry
11	1270077	07	10	055	22	4		21.6							17.1	20.1			25/05/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Drilled	No Chemistry
12	1270081	07	10	055	22	4		29.6							22.3	25.3			27/05/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
13	1270085	07	10	055	22	4		24.7							20.7	23.8			24/06/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
14	1270079	07	10	055	22	4		27.1							20.7	23.8			26/05/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
15	1270082	07	10	055	22	4		28.3							22.6	25.6			28/05/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
16	0261191	SE	07	055	22	4	Cribbed	6.1													HERDER, H	Contamination Investigatio	Chemistry	Hand Dug	Chemistry Exists
17	1270084	07	10	055	22	4		30.5							24.1	27.4			25/06/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
18	1270086	07	10	055	22	4		13.4							10.1	11.6			29/09/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
19	1270083	07	10	055	22	4		28.0							22.6	25.6			23/06/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
20	1270078	07	10	055	22	4		24.7							19.2	22.3			25/05/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Drilled	No Chemistry
21	1270080	07	10	055	22	4		24.4							18.9	21.9			27/05/1998		DOW CHEMICAL CANADA LTD	Contamination Investigatio	New Well	Rotary	No Chemistry
22	0264146	SW	12	056	22	4	Unknown														SERINK, MIKE	Domestic	Chemistry	Unknown	No Chemistry
23	0262070	SE	34	054	23	4	Unknown														THIMER, ERIC	Domestic	Chemistry	Unknown	Chemistry Exists
24	0297082	SE	33	054	23	4	Not Applicable	36.6											21/06/2001	21/06/2001	STRAUSS, HOWARD #1	Domestic	Test Hole-Abandoned	Rotary	No Chemistry
25	0261750	NW	28	055	22	4	Unknown														VAN BOOM, H.	Domestic	Chemistry	Unknown	Chemistry Exists
26	0261610	00	26	054	23	4	Unknown	9.8													KIEL, RUDOLF	Domestic	Chemistry	Unknown	Chemistry Exists
27	0261590	NW	25	054	23	4	Unknown														MURPHY, H	Domestic	Chemistry	Drilled	Chemistry Exists
28	0261563	NW	24	054	23	4	Casing	9.1														Domestic	Chemistry	Unknown	Chemistry Exists
29	0260972	NW	13	054	23	4	Screen	32.0							29.3	32.0			29/05/1979		KIEL, RUDY	Domestic	New Well	Rotary	Chemistry Exists
30	0260922	NW	13	054	23	4	Unknown	82.3													GAVINCHUK, GEORGE	Domestic	Chemistry	Drilled	Chemistry Exists
31	0261009	NE	13	054	23	4	Unknown	12.2											01/01/1935		DAWSON, MAJ.	Domestic	Federal Well Survey	Hand Dug	No Chemistry
32	0262356	NW	35	054	23	4	Unknown	19.8											01/08/1976		L. PETERSON DEV LTD	Domestic	Chemistry	Bored	Chemistry Exists
33	1420006	NE	10	055	22	4		18.3							15.2	18.3			10/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Domestic	New Well	Rotary	No Chemistry
34	0261001	NW	13	054	23	4	Screen	32.0							29.0	32.0			24/04/1980		BERG, AARON	Domestic	New Well	Rotary	No Chemistry
35	0261729	SE	27	055	22	4	Unknown	6.1													BELAIR, R	Domestic	Chemistry	Unknown	Chemistry Exists
36	0264466	01	33	056	21	4	Screen	19.5							17.7	18.9			01/05/1977		KUIPER, A/D	Domestic	New Well	Rotary	Chemistry Exists
37	0264437	SE	32	056	21	4	Casing/Perforated Liner	42.7	36.6	39.6									16/04/1980		YAKIMETES, O J	Domestic	New Well	Rotary	No Chemistry
38	0264424	SE	32	056	21	4	Unknown	27.4													YAKIMETS, O	Domestic	Chemistry	Unknown	Chemistry Exists
39	1690085	NE	36	054	23	4		17.7	12.2	17.4									28/09/1999		NYHUIS, DAVE	Domestic	New Well	Rotary	No Chemistry
40	1795056	NE	08	054	22	4		93.0	67.1	93.0									18/07/2003		SUPINA, NICK	Domestic	New Well	Rotary	No Chemistry
41	1300079	NW	23	054	22	4		42.7	25.0	42.7									24/02/2005		MCEACHERN, MEL	Domestic	New Well	Rotary	No Chemistry
42	1420100	SW	26	055	22	4		30.5											18/01/2005	18/01/2005	NCIA	Domestic	Unknown	Rotary	No Chemistry
43	0262278	SW	35	054	23	4	Unknown	21.3													L. PETERSON DEV LTD	Domestic	Chemistry	Hand Dug	Chemistry Exists
44	0262511	SE	13	055	23	4		13.4													COURCHESNE, RAY	Domestic	Chemistry	Drilled	Chemistry Exists
45	0290926	SE	12	055	23	4	Perforated Casing/Liner	23.8	6.7	9.1	16.2	17.1							20/05/1998		PICHUNYH, JACK	Domestic	New Well	Bored	No Chemistry
46	0261759	SE	01	055	23	4	Open Hole	80.5											20/08/1984		SERNA, VICTOR	Domestic	Dry Hole	Rotary	No Chemistry
47	0261742	SE	01	055	23	4	Unknown														SERNA, VICTOR	Domestic	Chemistry	Unknown	Chemistry Exists
48	0273997	NW	36	054	23	4	Unknown	24.4													BISSON, R	Domestic	Chemistry	Unknown	Chemistry Exists
49	0262305	SW	35	054	23	4	Unknown	31.1													FEDORAK, J	Domestic	Chemistry	Unknown	Chemistry Exists
50	0261646	16	21	055	22	4	Unknown	61.0											18/12/1962		DAMCHUK, J	Domestic	New Well	Rotary	No Chemistry
51	0262397	NE	36	054	23	4	Unknown	12.2													SEVNE, GEORGE	Domestic	Chemistry	Unknown	No Chemistry
52	0261670	04	24	055	22	4	Unknown	4.3													SELTHGATE, G A	Domestic	Federal Well Survey	Hand Dug	No Chemistry
53	0261764	SW	01	055	23	4		24.4													PARADIS, F.	Domestic	Chemistry	Drilled	Chemistry Exists
54	0261757	SE	01	055	23	4	Open Hole	48.8											21/08/1984		SERNA, VICTOR	Domestic	Dry Hole	Rotary	No Chemistry
55	0261752	SE	01	055	23	4	Perforated Casing/Liner	94.5	61.0	94.5									01/09/1984		SERNA, VICTOR	Domestic	New Well	Rotary	Chemistry Exists
56	0261748	SE	01	055	23	4		15.2													SERNA, VICTOR	Domestic	Chemistry	Unknown	Chemistry Exists
57	0261745	SE	01	055	23	4		15.2													SERNA, VICTOR	Domestic	Chemistry	Unknown	Chemistry Exists
58	0261744	SE	01	055	23	4															SERNA, VICTOR	Domestic	Chemistry	Unknown	Chemistry Exists
59	0271736	SW	36	054	23	4	Unknown	39.3													SMITH, B.B.	Domestic	Chemistry	Drilled	Chemistry Exists
60	0267205	SW	01	055	23	4	Perforated Casing/Liner	64.0	57.9	64.0									06/09/1976		ROLF, RON	Domestic	New Well	Rotary	No Chemistry
61	0262385	NW	36	054	23	4	Unknown	20.1													NYHUIS, ALBERT	Domestic	Chemistry	Unknown	Chemistry Exists
62	0261769	SE	02	055	23	4		24.4													PARADIS, NORMAN	Domestic	Chemistry	Unknown	Chemistry Exists
63	0262393	NE	36	054	23	4	Perforated Casing/Liner	13.1											15/08/1986		GAUMONT, EMIL	Domestic	New Well	Bored	No Chemistry
64	0274006	EH	36	054	23	4	Unknown														GAUMONT, E	Domestic	Chemistry	Unknown	Chemistry Exists
65	0262332	SW	35	054	23	4	Casing/Perforated Liner	54.9	42.7	54.9									07/06/1978		HORNES, ALBERT	Domestic	New Well	Rotary	No Chemistry
66	0262324	SW	35	054	23	4	Casing	25.0											09/09/1980		BURAK, FRED	Domestic	New Well	Bored	Chemistry Exists
67	0262314	SW	35	054	23	4	Unknown	30.5													PALTZAT, MARVIN	Domestic	Chemistry	Bored	Chemistry Exists
68	0262296	SW	35	054	23	4	Unknown	25.9													HOFFSTETER, BEN	Domestic	Chemistry	Bored	Chemistry Exists
69	0262292	SW	35	054	23	4	Unknown	42.7													HOFFSTETER, B.	Domestic	Chemistry	Unknown	Chemistry Exists
70	0262285	SW	35	054	23	4	Unknown	36.6													HANES, ALBERT	Domestic	Chemistry	Unknown	Chemistry Exists

WorleyParsons

resources & energy

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
71	0262271	SW	35	054	23	4	Unknown	16.8													L. PETERSON DEV LTD	Domestic	Chemistry	Hand Dug	Chemistry Exists
72	0262369	SE	36	054	23	4	Perforated Casing/Liner	80.5	73.2	79.2									03/11/1977		MAYRHUT, JAMES	Domestic	New Well	Rotary	No Chemistry
73	0260230	NW	28	054	22	4	Perforated Casing/Liner	73.2	67.1	71.9									12/08/1976		ROBERT, VICTOR	Domestic	New Well	Rotary	Chemistry Exists
74	0264491	NE	33	056	21	4	Unknown														LUBEMSKI, K.	Domestic	Chemistry	Unknown	No Chemistry
75	0261654	NE	22	055	22	4	Casing/Perforated Liner	97.5	85.3	97.5									26/11/1981		CNR	Domestic	New Well	Rotary	No Chemistry
76	0160456	NE	34	056	21	4	Not Applicable	12.2													GORGICHUK, DIANA	Domestic	Chemistry	Not Applicable	No Chemistry
77	0289381	SE	09	055	22	4	Casing/Perforated Liner	73.2	61.0	73.2									19/05/1998		NANAKSAR, GURDWARA	Domestic	New Well	Rotary	No Chemistry
78	0261203	SE	07	055	22	4	Not Applicable	82.3											26/08/1974	26/08/1974	JUKASZ, A.	Domestic	Dry Hole-Abandoned	Rotary	No Chemistry
79	0261213	NW	07	055	22	4	Casing	18.3											23/05/1969		CHRISTIANSEN, J.M.	Domestic	New Well	Bored	Chemistry Exists
80	0261151	03	06	055	22	4	Casing	8.2											01/01/1906		LAMOUREUX, A.L.	Domestic	Federal Well Survey	Hand Dug	No Chemistry
81	0264293	SE	05	055	22	4	Unknown														GAUMONT, GILBERTE	Domestic	Chemistry	Unknown	Chemistry Exists
82	0262141	SW	01	055	23	4	Unknown	19.8											10/07/1920		PARDIS, W.	Domestic	Federal Well Survey	Backhoe	No Chemistry
83	0260234	NW	28	054	22	4	Casing/Open Hole	60.0											06/05/1970		PIERCE, E.	Domestic	New Well	Rotary	Chemistry Exists
84	0261726	NW	26	055	22	4	Unknown	54.9											01/01/1963		JIGOLYK, L.	Domestic	Chemistry	Unknown	Chemistry Exists
85	0264921	NE	08	054	22	4	Unknown	10.4													KENNEDY, C.A.	Domestic	Chemistry	Unknown	Chemistry Exists
86	0264908	NE	08	054	22	4	Unknown	54.9													KALISTA, JOE	Domestic	Chemistry	Drilled	Chemistry Exists
87	0260058	NE	08	054	22	4	Casing/Open Hole	11.9											28/05/1986		HESKE, GERRY	Domestic	New Well	Bored	Chemistry Exists
88	0260054	NE	08	054	22	4	Casing	10.1											30/04/1984		KENSON HLDG	Domestic	New Well	Bored	No Chemistry
89	0260046	NE	08	054	22	4	Casing	9.1											28/08/1978		TOMPLINS, D.	Domestic	New Well	Bored	Chemistry Exists
90	0297083	SE	33	054	23	4	Perforated Casing/Liner	36.6	25.9	32.0									22/06/2001		STRAUSS, HOWARD	Domestic	New Well	Rotary	No Chemistry
91	0262468	SW	12	055	23	4	Casing/Open Hole	21.3											01/05/1968		STRAUSS, L.	Domestic	New Well	Rotary	Chemistry Exists
92	0285792	SE	12	055	23	4	Perforated Casing/Liner	21.9	9.8	11.9	18.6	19.5							24/10/1996		PICKUNYK, NICK	Domestic	New Well	Bored	No Chemistry
93	0261771	SE	02	055	23	4	Unknown	22.9													PARADIS, NORMAN	Domestic	Chemistry	Drilled	Chemistry Exists
94	0260366	NW	28	054	22	4	Perforated Casing/Liner	76.8											26/10/1977		SHEPPARD, JOHN	Domestic	New Well	Rotary	No Chemistry
95	0263714	NW	12	056	21	4	Unknown	33.5													GABERT, M.	Domestic	Chemistry	Unknown	Chemistry Exists
96	0263963	NW	16	056	21	4	Unknown	6.7													BLENN	Domestic	Chemistry	Unknown	Chemistry Exists
97	0263910	NE	14	056	21	4	Unknown														SMIBERT, R	Domestic	Chemistry	Unknown	No Chemistry
98	0263887	NE	14	056	21	4	Casing/Open Hole	48.8											17/05/1985		PERCY, G.	Domestic	New Well	Rotary	No Chemistry
99	0263877	NE	14	056	21	4	Casing	13.4											01/08/1972		HODGSON, G	Domestic	New Well	Bored	No Chemistry
100	0263870	NE	14	056	21	4	Unknown	10.7													HODGSON, G A	Domestic	Chemistry	Unknown	Chemistry Exists
101	0263736	SE	13	056	21	4	Unknown	7.9													YOUNG, C.S.	Domestic	Chemistry	Unknown	Chemistry Exists
102	0263707	SW	12	056	21	4	Unknown	61.0													GABERT, M.	Domestic	Chemistry	Unknown	Chemistry Exists
103	0263697	SE	12	056	21	4	Unknown														MIZERA, T.	Domestic	Chemistry	Unknown	Chemistry Exists
104	0263583	15	08	056	21	4	Unknown	11.6													BRODIE, H.L.	Domestic	Chemistry	Unknown	Chemistry Exists
105	0263676	SE	12	056	21	4	Unknown	7.9													ESCH, G	Domestic	Chemistry	Hand Dug	Chemistry Exists
106	0263933	SW	16	056	21	4	Unknown														BOLTON SCHOOL	Domestic	Chemistry	Unknown	Chemistry Exists
107	0263651	NE	11	056	21	4	Perforated Casing/Liner	18.0											20/06/1986		BREIT, E	Domestic	New Well	Backhoe	Chemistry Exists
108	0263645	NE	11	056	21	4	Unknown	36.6													O'BRIEN, N	Domestic	Chemistry	Unknown	Chemistry Exists
109	0263640	NE	11	056	21	4	Screen	43.3							41.1	42.4			17/08/1984		ANDRUCHOW, E	Domestic	New Well	Rotary	Chemistry Exists
110	0263595	NE	11	056	21	4	Screen	64.6													NAURATIL, J	Domestic	Chemistry	Drilled	Chemistry Exists
111	0263633	09	11	056	21	4	Unknown	10.7													NAVRATIL, J	Domestic	Chemistry	Bored	Chemistry Exists
112	0263592	SW	09	056	21	4	Unknown														LECHENKO #3 DRINKING WELL	Domestic	Chemistry	Unknown	Chemistry Exists
113	0152373	WH	08	056	21	4	Open Hole	25.0											26/06/1990		MASCHMEYER, RAY	Domestic	New Well	Rotary	No Chemistry
114	0263579	SW	08	056	21	4	Screen	25.0							22.9	24.4			11/11/1966		MASCHMEYER, R	Domestic	New Well	Rotary	No Chemistry
115	0195146	NW	33	056	21	4	Open Hole	15.2											01/08/1973		PICH, PETER	Domestic	New Well	Bored	No Chemistry
116	0263683	SE	12	056	21	4	Casing/Perforated Liner	91.4	79.2	91.4									05/11/1981		ESCH, G	Domestic	New Well	Rotary	No Chemistry
117	0264148	SE	20	056	21	4	Screen	54.9											01/08/1977		SAWYER, D	Domestic	Chemistry	Drilled	Chemistry Exists
118	0264297	NE	28	056	21	4	Unknown	18.3													SHIPLEY, J.	Domestic	Chemistry	Auger	Chemistry Exists
119	0161790	NW	27	056	21	4	Not Applicable	3.7													JOHNSTON, DAVID	Domestic	Chemistry	Not Applicable	No Chemistry
120	0157041	NE	27	056	21	4	Not Applicable	54.9													EASTWOOD, J.W.	Domestic	Chemistry	Not Applicable	No Chemistry
121	0264277	09	27	056	21	4	Slotted & Open Hole	61.0	50.3	56.4									24/07/1979		RYKMANS, H.	Domestic	New Well	Rotary	No Chemistry
122	0264268	SW	26	056	21	4	Perforated Casing/Liner	17.4	4.6	12.2									31/03/1988		SAWATZKI, W	Domestic	New Well	Bored	No Chemistry
123	0264263	SW	26	056	21	4	Unknown	4.3													SAWATZKY, H	Domestic	Chemistry	Unknown	Chemistry Exists
124	0264258	SE	26	056	21	4	Casing	39.0											12/05/1987		VAN INVEN, F.	Domestic	Unknown	Unknown	No Chemistry
125	0264255	07	25	056	21	4	Casing	14.6											20/08/1984		ESSO RES	Domestic	New Well	Bored	Chemistry Exists
126	0290979	SE	21	056	21	4	Perforated Casing/Liner	18.3	3.7	4.3	13.1	14.3	16.2	16.8					14/07/1998		MARQUARDT, BRENT	Domestic	New Well	Bored	No Chemistry
127	0208911	SE	16	056	21	4	Perforated Casing/Liner	11.9	4.6	11.3									25/09/1992		HENKELMAN, PERCY	Domestic	New Well	Bored	No Chemistry
128	0264190	SE	21	056	21	4	Not Applicable	16.5											12/05/1978		DEBAAN, J	Domestic	New Well-Abandoned	Rotary	No Chemistry
129	0263924	SW	16	056	21	4	Not Applicable														KROPP, L.	Domestic	Spring	Not Applicable	Chemistry Exists
130	0264167	NE	20	056	21	4	Unknown	24.4													FEDORAK, M	Domestic	Chemistry	Unknown	Chemistry Exists
131	0264176	16	20	056	21	4	Unknown												01/01/1921		MYRON, S.	Domestic	Federal Well Survey	Drilled	No Chemistry
132	0263992	SW	19	056	21	4	Casing	18.9											20/06/1984		S V HALF DIAMOND RANCHES	Domestic	New Well	Bored	No Chemistry
133	0263991	SW	19	056	21	4	Unknown	22.9													SMULSKI, J.	Domestic	Chemistry	Unknown	Chemistry Exists
134	0263974	SE	19	056	21	4	Unknown	9.1													CAMPBELL, R	Domestic	Chemistry	Hand Dug	Chemistry Exists
135	0263993	NE	19	056	21	4	Unknown	12.2													ROBINSON, J	Domestic	Chemistry	Unknown	Chemistry Exists
136	0161789	NE	19	056	21	4	Not Applicable	7.6													MELTON, JAMES	Domestic	Chemistry	Not Applicable	No Chemistry
137	0263969	NW	18	056	21	4	Unknown	22.9													VISSCHER, H	Domestic	Chemistry	Unknown	Chemistry Exists
138	0263474	SW	05	056	21	4	Unknown	16.8													REED, D	Domestic	Chemistry	Drilled	Chemistry Exists
139	0264203	SE	21	056	21	4	Screen	57.9							12.8	14.3			12/09/1978		DEBAAN, J	Domestic	New Well	Rotary	No Chemistry
140	0169519	SW	02	057	21	4	Unknown	3.0													SUDAYKO, MIKE	Domestic	Chemistry	Unknown	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
141	1755005	SW	02	057	21	4		18.3	4.0	5.8									22/10/2002		SUDAYKO, MIKE	Domestic	New Well	Bored	No Chemistry
142	0265801	SW	02	057	21	4	Unknown	27.4													MCCULLOUGH, DAVID	Domestic	Chemistry	Hand Dug	Chemistry Exists
143	0264680	SE	36	056	21	4	Cribbed	5.2													RUDKO, W.	Domestic	Chemistry	Unknown	Chemistry Exists
144	0040835	NW	03	057	21	4	Perforated Casing/Liner	18.3	12.2	18.3									22/08/2001		LANE, COLLEEN	Domestic	New Well	Rotary	No Chemistry
145	0265811	SE	04	057	21	4	Screen & Open Hole	30.5							25.0	27.4			03/08/1979		SCHWING, ROMAN	Domestic	New Well	Rotary	Chemistry Exists
146	0162337	09	04	057	21	4	Screen	22.9							16.2	22.3			16/11/1991		LANE, C./EST OF M. PICH#WELL 2	Domestic	New Well	Cable Tool	No Chemistry
147	0265805	SW	03	057	21	4	Unknown	10.4											01/01/1940		LIBBEY, KATHERINE	Domestic	Chemistry	Drilled	Chemistry Exists
148	0265804	SW	02	057	21	4	Unknown	3.0													MCCULLOUGH, DAVE	Domestic	Chemistry	Unknown	Chemistry Exists
149	0263560	SW	08	056	21	4	Casing	48.8											01/04/1973		KOFLUK, D	Domestic	New Well	Rotary	Chemistry Exists
150	0169601	SW	02	057	21	4	Unknown	48.8													SUDAYKO, MIKE	Domestic	Chemistry	Unknown	No Chemistry
151	0091496	SW	06	056	20	4	Unknown	3.0													THORNE, KEITH	Domestic	Chemistry	Unknown	No Chemistry
152	0264699	SW	36	056	21	4	Unknown	7.3													DRABBLE, R.	Domestic	Chemistry	Unknown	Chemistry Exists
153	0264712	NW	36	056	21	4	Cribbed	6.4													MAKOWECKI, A	Domestic	Chemistry	Hand Dug	Chemistry Exists
154	0264707	NW	36	056	21	4	Unknown	9.1													MAKOWECKI, A	Domestic	Chemistry	Drilled	Chemistry Exists
155	0264659	SE	35	056	21	4	Unknown	4.9													SCHILLER, J	Domestic	Chemistry	Auger	Chemistry Exists
156	0264666	NW	35	056	21	4	Unknown	4.3													HESS, R	Domestic	Chemistry	Jet	Chemistry Exists
157	0264630	NW	34	056	21	4	Unknown	24.4													MAHONEY, R.	Domestic	Chemistry	Unknown	Chemistry Exists
158	0261813	SE	33	055	22	4	Unknown	42.7													ALLISON, G	Domestic	Chemistry	Unknown	Chemistry Exists
159	0262057	SE	34	054	23	4	Unknown	29.6													BLOWER, JERRY	Domestic	Chemistry	Bored	Chemistry Exists
160	0264507	04	34	056	21	4	Casing/Perforated Liner	15.2	3.7	4.6									12/06/1985		WOLANSKY, W	Domestic	New Well	Backhoe	Chemistry Exists
161	0265802	SW	02	057	21	4	Casing	74.7											05/10/1981		ROMANIUK, ELI	Domestic	New Well	Rotary	No Chemistry
162	0091566	11	18	056	20	4	Cribbed	14.9											17/06/1979		SERINK, W.	Domestic	New Well	Bored	No Chemistry
163	0263492	NW	05	056	21	4	Casing/Perforated Liner	42.7											12/01/1961	28/02/1974	CHOLOWSKI, R.	Domestic	Old Well-Abandoned	Drilled	No Chemistry
164	0263543	NE	05	056	21	4	Unknown	4.9													CHOLOWSKI, R.	Domestic	Chemistry	Unknown	Chemistry Exists
165	0263525	NE	05	056	21	4	Casing	6.1													CHOLOWSKI, R.	Domestic	Chemistry	Bored	Chemistry Exists
166	0263484	04	05	056	21	4	Casing	8.5											28/01/1970		YARSHUK, P	Domestic	New Well	Bored	No Chemistry
167	0091573	12	19	056	20	4	Cribbed	10.4											01/07/1974		MATTHEWS, BILL	Domestic	New Well	Bored	Chemistry Exists
168	0091572	04	19	056	20	4	Casing/Open Hole	44.2											23/09/1978		SERINK, BILL	Domestic	New Well	Rotary	No Chemistry
169	0224564	SE	18	056	20	4	Screen	42.7							35.4	41.5			09/10/1993		MCLELLAN, ART	Domestic	New Well	Rotary	No Chemistry
170	0091562	SE	18	056	20	4	Casing/Perforated Liner	67.1	61.0	67.1									31/12/1981		MCLELLAN, ARTHUR	Domestic	New Well	Rotary	Chemistry Exists
171	0091561	SE	18	056	20	4	Casing/Perforated Liner	33.5											17/12/1981		MCLELLAN, ARTHUR L.	Domestic	New Well	Cable Tool	No Chemistry
172	0091494	04	06	056	20	4	Unknown	6.1													SAMPERT, T.	Domestic	Federal Well Survey	Hand Dug	No Chemistry
173	0091565	NW	18	056	20	4	Cribbed	12.2													SERINK, W.	Domestic	Chemistry	Bored	Chemistry Exists
174	0091498	NE	06	056	20	4	Unknown	91.4													SCHRAM, GEORGE	Domestic	Chemistry	Unknown	Chemistry Exists
175	0091564	04	18	056	20	4	Unknown														STELTER, A.	Domestic	Federal Well Survey	Hand Dug	No Chemistry
176	0091550	SW	16	056	20	4	Cribbed	6.1													ROSNAU, N.	Domestic	Chemistry	Unknown	Chemistry Exists
177	0091504	SW	08	056	20	4	Unknown	23.8													SCHRAM, ED	Domestic	Chemistry	Unknown	Chemistry Exists
178	0196672	SE	08	056	20	4	Unknown	6.1													ALEXANDER, BOB	Domestic	Chemistry	Unknown	No Chemistry
179	0091507	NE	08	056	20	4	Unknown	5.5													FREY, B.	Domestic	Chemistry	Unknown	No Chemistry
180	0091506	16	08	056	20	4	Casing/Open Hole	75.0											15/11/1961		FREY, BERT W.	Domestic	New Well	Rotary	Chemistry Exists
181	0091508	09	08	056	20	4	Unknown	12.2											01/01/1920		FREY, J.	Domestic	Federal Well Survey	Bored	No Chemistry
182	0091502	09	07	056	20	4	Unknown	9.1													DRIESNER, D.	Domestic	Federal Well Survey	Bored	No Chemistry
183	0262265	SW	35	054	23	4	Unknown	28.3													KJENNER, GEORGE	Domestic	Chemistry	Drilled	Chemistry Exists
184	0091558	SE	18	056	20	4	Cribbed	5.8													MCLELLAN, ARTHUR	Domestic	Chemistry	Unknown	Chemistry Exists
185	0260225	SW	27	054	22	4	Slotted & Open Hole	50.3	33.5	47.2									20/12/1969		SHAREK, TONY	Domestic	New Well	Rotary	No Chemistry
186	0260383	SE	30	054	22	4	Unknown	76.2													KREBS, D.	Domestic	Chemistry	Unknown	Chemistry Exists
187	0260375	NW	29	054	22	4	Unknown	13.7													VLA	Domestic	Chemistry	Hand Dug	Chemistry Exists
188	0290974	SE	28	054	22	4	Casing/Perforated Liner	39.6	33.5	39.6									07/10/1998		ROBERTSON, DALE	Domestic	New Well	Rotary	No Chemistry
189	0260237	NW	28	054	22	4	Casing/Perforated Liner	30.5											19/01/1961		WETZTREN, M.	Domestic	New Well	Cable Tool	Chemistry Exists
190	0260236	NW	28	054	22	4	Casing/Perforated Liner	30.5											07/10/1960		PETROSKI CONTRACTING	Domestic	New Well	Drilled	No Chemistry
191	0260235	NW	28	054	22	4	Screen	30.5											17/09/1959		BOHNET, HANS	Domestic	New Well	Rotary	Chemistry Exists
192	0260233	NW	28	054	22	4	Casing/Perforated Liner	30.5											25/09/1960		STARK, R.	Domestic	New Well	Drilled	No Chemistry
193	0260232	NW	28	054	22	4	Casing/Perforated Liner	27.4											20/08/1960		SNEDSTEAD	Domestic	New Well	Drilled	No Chemistry
194	0262074	SE	34	054	23	4	Unknown	61.0													MARSH, JEROME L	Domestic	Chemistry	Rotary	Chemistry Exists
195	0260369	12	28	054	22	4	Screen & Open Hole	32.3							28.3	29.3			02/07/1959		HAMILTON, CALVIN	Domestic	New Well	Rotary	Chemistry Exists
196	0280645	NW	31	054	22	4	Gravel Pack	10.7											18/09/1980		LAMOUREUX HALL	Domestic	New Well	Bored	No Chemistry
197	0260227	NE	27	054	22	4	Perforated Casing/Liner	61.9	24.4	61.0									11/04/1967		SIMMONS, HECTOR	Domestic	New Well	Rotary	Chemistry Exists
198	0260203	NW	23	054	22	4	Slotted & Open Hole	46.9	22.6	46.0									17/04/1984		MCEACHERN, MEL	Domestic	New Well	Rotary	Chemistry Exists
199	0260194	NW	21	054	22	4	Casing/Perforated Liner	70.1	61.0	68.6									03/04/1985		GRAYMAN, LYLE	Domestic	New Well	Cable Tool	No Chemistry
200	0168181	09	18	054	22	4	Perforated Casing/Liner	9.8	4.9	9.8									21/07/1992		DAKIN, DEXTER	Domestic	New Well	Bored	No Chemistry
201	0260171	SE	16	054	22	4	Casing/Perforated Liner	61.0	54.9	61.0									03/11/1988		BONOWICZ, JOE	Domestic	New Well	Cable Tool	Chemistry Exists
202	0160801	SE	16	054	22	4	Not Applicable	5.5													BONOWICZ, KEN	Domestic	Chemistry	Not Applicable	No Chemistry
203	0260035	NW	08	054	22	4	Casing/Perforated Liner	61.0	48.8	57.9									22/09/1983		CHIMERA, WALTER	Domestic	New Well	Cable Tool	Chemistry Exists
204	0287800	NE	08	054	22	4	Casing/Perforated Liner	82.3	70.1	82.3									11/09/1996		RICE, LYALL	Domestic	New Well	Rotary	No Chemistry
205	0260229	NW	28	054	22	4	Casing/Perforated Liner	47.5											29/02/1960		DAVIS, DON	Domestic	New Well	Rotary	No Chemistry
206	0274184	16	31	054	22	4	Perforated Casing/Liner	14.6											08/05/1989		BANDURA, E	Domestic	New Well	Bored	No Chemistry
207	0261187	09	06	055	22	4	Casing	18.3											01/01/1927		ADAMS, B.S.	Domestic	Federal Well Survey	Drilled	No Chemistry
208	0261154	04	06	055	22	4	Casing	51.8													ZIMA, M	Domestic	Chemistry	Unknown	Chemistry Exists
209	0274248	SE	05	055	22	4	Gravel Pack	12.2											20/06/1985		LAMOUREUX, C	Domestic	New Well	Bored	Chemistry Exists
210	0274171	SE	05	055	22	4	Perforated Casing/Liner	14.9	8.2	12.8									19/08/1991		GILLARD, R	Domestic	New Well	Bored	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
211	0271650	SE	05	055	22	4	Screen	59.4							57.0	58.5			13/07/1978		GODBOUT, ROMEO	Domestic	New Well	Rotary	No Chemistry
212	0264290	SE	05	055	22	4	Unknown	4.3													GODBOUT, VIVIAN	Domestic	Chemistry	Unknown	No Chemistry
213	0261139	SE	05	055	22	4	Casing	11.3											11/05/1959		LAMOUREUX, R	Domestic	New Well	Bored	Chemistry Exists
214	0261133	SE	05	055	22	4	Casing/Open Hole	11.3											14/09/1982		LAMOUREUX, J	Domestic	New Well	Bored	Chemistry Exists
215	0260386	SE	30	054	22	4	Casing	76.2											30/05/1968		KREBS, DON	Domestic	New Well	Rotary	No Chemistry
216	0274249	SE	05	055	22	4	Perforated Casing/Liner	14.6	9.1	12.8									24/03/1988		LAMOUREAX, R.	Domestic	New Well	Bored	No Chemistry
217	0286991	SE	31	054	22	4	Casing/Perforated Liner	16.2	9.8	14.9									27/07/1996		GAUMONT, LARRAINE	Domestic	New Well	Bored	No Chemistry
218	0280651	00	04	055	22	4	Unknown	15.2													FLEMING, E.B.	Domestic	Chemistry	Unknown	Chemistry Exists
219	0261129	00	04	055	22	4	Unknown														LAMOUREUX CHILDRENS HOME	Domestic	Chemistry	Hand Dug	Chemistry Exists
220	0261107	16	31	054	22	4	Unknown	2.7													CAMERON, D.	Domestic	Chemistry	Unknown	Chemistry Exists
221	0156872	SW	01	055	22	4	Not Applicable														THEROUX, CHRIS	Domestic	Chemistry	Not Applicable	No Chemistry
222	0260447	NW	35	054	22	4	Unknown	48.2											01/01/1912		SIMMONS, F.	Domestic	New Well	Drilled	No Chemistry
223	0260425	SW	34	054	22	4	Unknown	45.7													FLEMING, ERNEST	Domestic	Chemistry	Drilled	Chemistry Exists
224	0260441	NE	34	054	22	4	Unknown	57.9													BARTELL, RICHARD	Domestic	Chemistry	Unknown	Chemistry Exists
225	0260397	SE	32	054	22	4	Unknown	24.4													CHOLOWSKI, GERALD	Domestic	Chemistry	Unknown	Chemistry Exists
226	0264915	NE	08	054	22	4	Casing	13.1											08/06/1979		LEVERSEDGE, DAN	Domestic	New Well	Bored	Chemistry Exists
227	0159287	SE	05	055	22	4	Perforated Casing/Liner	14.6	8.2	14.6									10/07/1991		GODBOUT, ROMEO	Domestic	New Well	Bored	No Chemistry
228	0158577	NE	03	056	22	4	Perforated Casing/Liner	64.0	30.5	64.0									06/04/1968		KUGLER, ERIKA	Domestic	New Well	Rotary	No Chemistry
229	0286990	NE	08	054	22	4	Casing/Perforated Liner	85.3	43.9	85.3									07/01/1997		MARSHALL, RANDY	Domestic	New Well	Rotary	No Chemistry
230	0240722	09	08	054	22	4	Perforated Casing/Liner	14.9	4.6	10.7									22/10/1993		MRASEK, DAVID	Domestic	New Well	Bored	No Chemistry
231	0156817	NW	07	054	22	4	Unknown	67.1													ALLEN, GERALD	Domestic	Chemistry	Unknown	No Chemistry
232	0260033	NE	07	054	22	4	Slotted & Open Hole	59.7											01/01/1958		GALLOWAY, K.	Domestic	New Well	Cable Tool	Chemistry Exists
233	0264187	SW	13	056	22	4	Casing	65.5													BLOM, KLAAS	Domestic	Chemistry	Unknown	Chemistry Exists
234	0264184	SW	13	056	22	4	Unknown	76.2													BLOM, BERNARD	Domestic	Chemistry	Drilled	Chemistry Exists
235	0264150	SW	12	056	22	4	Unknown														SERINK, MIKE	Domestic	Chemistry	Unknown	No Chemistry
236	0264151	NW	12	056	22	4	Unknown	22.9											01/05/1968		MINCHOU, CLARENCE	Domestic	New Well	Unknown	Chemistry Exists
237	0240723	09	08	054	22	4	Perforated Casing/Liner	14.9	5.5	11.6									01/10/1993		BALANKO, RON	Domestic	New Well	Bored	No Chemistry
238	0263867	SW	03	056	22	4	Unknown	54.9													MELENKA, ALEX	Domestic	Chemistry	Unknown	Chemistry Exists
239	0241116	10	08	054	22	4	Perforated Casing/Liner	14.9	4.9	12.2									13/05/1994		BOWES, MURRAY	Domestic	New Well	Bored	No Chemistry
240	0263852	SW	02	056	22	4	Unknown	61.0													NOEL, MAURICE	Domestic	Chemistry	Unknown	Chemistry Exists
241	0263854	NW	02	056	22	4	Unknown	36.6													SANK, LLOYD	Domestic	Chemistry	Unknown	Chemistry Exists
242	0261845	NW	35	055	22	4	Casing/Open Hole	51.8							24.4	42.7			12/05/1983		SYVENKY, P.	Domestic	New Well	Rotary	No Chemistry
243	0261830	NW	35	055	22	4	Unknown	49.7													DOSHEWNEK, G	Domestic	Chemistry	Drilled	Chemistry Exists
244	0261823	SH	34	055	22	4	Unknown	9.8													CARROLL, T	Domestic	Chemistry	Unknown	Chemistry Exists
245	0261820	SE	34	055	22	4	Unknown	9.4													JIGOLYK, H.	Domestic	Chemistry	Unknown	Chemistry Exists
246	0261828	NE	34	055	22	4	Casing/Perforated Liner	39.6	27.4	39.6											HOLMES, R	Domestic	New Well	Cable Tool	No Chemistry
247	0261827	NE	34	055	22	4	Unknown	45.7													HOLMES, S	Domestic	Chemistry	Drilled	Chemistry Exists
248	0292191	SE	33	055	22	4	Casing/Perforated Liner	47.2	39.6	45.7									26/04/1999		WESTRA, MARTIN/WESTRALIA FARM	Domestic	New Well	Rotary	No Chemistry
249	0264112	SW	11	056	22	4	Slotted & Open Hole	106.7	14.0	64.0									06/03/1980		BRIGGS, EARL	Domestic	Deepened	Cable Tool	No Chemistry
250	0240644	NE	08	054	22	4	Casing/Perforated Liner	64.0	57.9	64.0									16/03/1994		GETSON, DON	Domestic	New Well	Cable Tool	No Chemistry
251	0261149	SE	06	055	22	4	Casing/Perforated Liner	73.2	43.3	49.4									15/07/1980		BOYCHUK, N	Domestic	New Well	Rotary	No Chemistry
252	0264913	NE	08	054	22	4	Unknown	11.6													SPALLIN, K./L.	Domestic	Chemistry	Drilled	Chemistry Exists
253	0264911	NE	08	054	22	4	Unknown	9.1													ATTEW, ELAINE	Domestic	Chemistry	Bored	Chemistry Exists
254	0264902	NE	08	054	22	4	Casing/Open Hole	79.9											24/06/1970		KENNEDY, CLIFF	Domestic	New Well	Rotary	Chemistry Exists
255	0260052	NE	08	054	22	4	Casing	9.1											27/10/1980		KROENTING, GREG	Domestic	New Well	Bored	Chemistry Exists
256	0260048	NE	08	054	22	4	Perforated Casing/Liner	8.8											06/09/1979		THOME, MIKE	Domestic	New Well	Bored	No Chemistry
257	0260045	NE	08	054	22	4	Casing/Perforated Liner	73.2	45.7	73.2									16/06/1972		KALISTA, M.J.	Domestic	New Well	Cable Tool	Chemistry Exists
258	0260039	NE	08	054	22	4	Casing	8.5											01/04/1971		SWANSON, K.	Domestic	New Well	Bored	No Chemistry
259	0225474	09	08	054	22	4	Perforated Casing/Liner	14.9	6.1	12.2									27/08/1993		CLARK, DARCY	Domestic	New Well	Bored	No Chemistry
260	0260037	NE	08	054	22	4	Casing/Perforated Liner	73.5											01/10/1973		GYDISH, ROBERT	Domestic	New Well	Cable Tool	Chemistry Exists
261	0264923	NE	08	054	22	4	Casing	14.9											11/06/1979		KENNEDY, KEN	Domestic	New Well	Bored	Chemistry Exists
262	0169305	NE	08	054	22	4	Unknown	9.4													DAKIN, DOREEN	Domestic	Chemistry	Unknown	No Chemistry
263	0168267	NE	08	054	22	4	Perforated Casing/Liner	11.3	6.1	11.3									16/07/1992		DORLICH, HELGA	Domestic	New Well	Bored	No Chemistry
264	0167085	NE	08	054	22	4	Unknown	11.6													AMBLER, TERRY D.	Domestic	Chemistry	Unknown	No Chemistry
265	0166298	NE	08	054	22	4	Casing/Perforated Liner	73.2	42.7	72.2									01/06/1992		TAPLEY, CAM	Domestic	New Well	Rotary	No Chemistry
266	0161740	NE	08	054	22	4	Not Applicable	30.5													OSTERLAND, JOYCE	Domestic	Chemistry	Not Applicable	No Chemistry
267	0158533	NE	08	054	22	4	Perforated Casing/Liner	23.2											01/07/1972		OGDEN, WAYNE	Domestic	New Well	Bored	No Chemistry
268	0158532	NE	08	054	22	4	Perforated Casing/Liner	14.0											07/07/1979		MAKUCH, PETER J.	Domestic	New Well	Bored	No Chemistry
269	0168098	16	08	054	22	4	Perforated Casing/Liner	14.6	4.3	9.8									25/06/1992		COOL, NORMAND	Domestic	New Well	Bored	No Chemistry
270	0225468	10	08	054	22	4	Perforated Casing/Liner	14.9	7.3	8.5	10.1	14.6							26/08/1993		HESKE, GERRY	Domestic	New Well	Bored	No Chemistry
271	0260038	NE	08	054	22	4	Casing/Perforated Liner	73.2	47.5	73.2									08/03/1974		RAFUSE, A.J.	Domestic	New Well	Cable Tool	No Chemistry
272	0260906	NW	13	054	23	4	Screen	31.7							28.3	31.7			01/10/1977		OBRADOVICH, VUKSAN	Domestic	New Well	Rotary	Chemistry Exists
273	0261672	NW	24	055	22	4	Unknown	30.5													MAGEE,, K	Domestic	Chemistry	Drilled	Chemistry Exists
274	0261564	NE	24	054	23	4	Casing/Perforated Liner	53.3											16/07/1980		MOLINEUX, RALPH/TABLER, PAUL	Domestic	New Well	Cable Tool	No Chemistry
275	0260903	WH	13	054	23	4	Unknown	3.7													MITHELL, DOUG	Domestic	Chemistry	Unknown	Chemistry Exists
276	0263502	NW	13	054	23	4	Screen	34.1							32.3	33.8			05/05/1981		NISBET, BOB	Domestic	New Well	Rotary	No Chemistry
277	0263489	NW	13	054	23	4	Screen	33.5							30.8	32.3			05/02/1987		DOREJKO, GERRY	Domestic	New Well	Rotary	No Chemistry
278	0260996	NW	13	054	23	4	Unknown	36.6													BERG, AARON	Domestic	Chemistry	Unknown	Chemistry Exists
279	0260987	NW	13	054	23	4	Screen & Open Hole	42.7							29.9	31.4			04/11/1980		MITCHELL, DOUGLAS B.	Domestic	New Well	Rotary	No Chemistry
280	0260980	NW	13	054	23	4	Casing/Open Hole	31.7											04/07/1979		SIGURDSON, HOWARD	Domestic	New Well	Rotary	Chemistry Exists

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
281	0261587	NW	25	054	23	4	Unknown	28.3													ORAM, JAMES M	Domestic	Chemistry	Unknown	Chemistry Exists
282	0260914	NW	13	054	23	4	Unknown	82.3													ELLEFSON, NORM	Domestic	Chemistry	Cable Tool	Chemistry Exists
283	0261588	NW	25	054	23	4	Unknown	12.8													VILLENEUVE, L	Domestic	Chemistry	Hand Dug	Chemistry Exists
284	0231919	NW	13	054	23	4	Screen	31.7							29.3	31.7			20/12/1977		ESQUIRE HOMES LTD/FUNG, DR. G.	Domestic	New Well	Rotary	No Chemistry
285	0150309	SE	29	055	22	4	Perforated Casing/Liner	91.4											25/01/1990		GROOT, DON	Domestic	New Well	Combination	No Chemistry
286	0261737	SE	28	055	22	4	Unknown														SAWCHUK, J	Domestic	Chemistry	Unknown	Chemistry Exists
287	0261746	NW	28	055	22	4	Unknown	30.5													BOHNET, H	Domestic	Chemistry	Drilled	Chemistry Exists
288	0261738	NW	28	055	22	4	Casing/Open Hole	50.9											30/04/1965		GOUTBECK, P.	Domestic	New Well	Rotary	Chemistry Exists
289	0261731	SE	27	055	22	4	Casing/Perforated Liner	96.0	50.3	96.0									14/10/1986		BELAIR, R	Domestic	New Well	Rotary	No Chemistry
290	0261681	NW	25	055	22	4	Unknown	7.6													GAUMONT, M	Domestic	Chemistry	Unknown	Chemistry Exists
291	0261669	SW	24	055	22	4	Unknown	4.6													MAGEE, K	Domestic	Chemistry	Bored	Chemistry Exists
292	0261182	NE	06	055	22	4	Unknown	79.2													ELLIOTT, F	Domestic	Chemistry	Unknown	Chemistry Exists
293	0260948	NW	13	054	23	4	Screen & Open Hole	31.7							29.0	31.4			23/03/1978		PESKLEVIS, ALBERT	Domestic	New Well	Rotary	Chemistry Exists
294	0289102	NE	28	054	23	4	Perforated Casing/Liner	48.8	36.6	45.7									11/07/1997		NORTH COUNTRY CATTLE CO	Domestic	New Well	Rotary	No Chemistry
295	0262113	SE	35	054	23	4	Unknown	76.2													DEVEREUX, J.R.	Domestic	Chemistry	Unknown	Chemistry Exists
296	0262366	00	35	054	23	4	Unknown	16.8													PALZAT, M.	Domestic	Chemistry	Drilled	No Chemistry
297	0264289	NW	28	056	21	4	Unknown	4.6													RESEARCH COUNCIL #6-DRINKING	Domestic	Chemistry	Unknown	Chemistry Exists
298	0262061	SE	34	054	23	4	Casing/Open Hole	22.6											20/06/1975		NEWMAN, NELSON	Domestic	New Well	Bored	Chemistry Exists
299	0264531	SW	34	056	21	4	Slotted & Open Hole	61.0	15.2	24.4									30/03/1974		WOLANSKI, W.	Domestic	New Well	Rotary	Chemistry Exists
300	0165347	SE	34	054	23	4	Unknown	24.4													MOAK, CARL A.	Domestic	Chemistry	Unknown	No Chemistry
301	0262104	NW	34	054	23	4	Casing	24.4													PARADIS, GILBERT	Domestic	Chemistry	Unknown	Chemistry Exists
302	0262083	NW	34	054	23	4	Unknown	76.2													MELNYCHUK, GEORGE G	Domestic	Chemistry	Drilled	Chemistry Exists
303	0261593	NE	25	054	23	4	Unknown	10.1													BYERS, D.H.	Domestic	Chemistry	Unknown	No Chemistry
304	0262011	02	33	054	23	4	Unknown	37.5													STRAUSS, HOWARD	Domestic	Chemistry	Unknown	Chemistry Exists
305	0261657	NE	23	055	22	4	Unknown	20.4													JOHNSTON, GARY	Domestic	Chemistry	Drilled	Chemistry Exists
306	0287802	NE	28	054	23	4	Not Applicable	61.0											10/07/1997	10/07/1997	NORTH COUNTRY CATTLE CO	Domestic	Test Hole-Abandoned	Rotary	No Chemistry
307	0261678	NE	28	054	23	4	Unknown	13.1													PARENTEAU, L	Domestic	Chemistry	Bored	Chemistry Exists
308	0261629	SW	27	054	23	4	Unknown	29.9													FEDORAK, NESTOR	Domestic	Chemistry	Unknown	Chemistry Exists
309	0261619	SW	27	054	23	4	Casing/Perforated Liner	61.0	24.4	61.0									31/05/1978		FYITH, JAMES	Domestic	New Well	Rotary	Chemistry Exists
310	0261615	SW	27	054	23	4	Unknown	24.4													PENNY, STEPHEN	Domestic	Chemistry	Unknown	Chemistry Exists
311	0261598	NW	26	054	23	4	Perforated Casing/Liner	29.0	21.3	27.4									01/06/1969		MCGEACHY, JIM	Domestic	New Well	Rotary	No Chemistry
312	0261605	NE	26	054	23	4	Casing	73.2											07/06/1978		SIMPSON, TOM	Domestic	New Well	Rotary	No Chemistry
313	0261575	SE	25	054	23	4	Unknown	36.0													BARRY, M	Domestic	Chemistry	Drilled	Chemistry Exists
314	0261567	SE	25	054	23	4	Casing	6.4													FT SASK LANDFILL #OBS WELL	Domestic	Chemistry	Unknown	Chemistry Exists
315	0262109	NE	34	054	23	4	Unknown	61.0													MELNYCHUK, GEORGE G	Domestic	Chemistry	Unknown	Chemistry Exists
316	0261368	SE	11	055	22	4	Unknown	73.2													SHEWCHUK, S	Domestic	Chemistry	Unknown	Chemistry Exists
317	0261662	SW	24	055	22	4	Screen	12.2							5.8	7.3			23/07/1966		MCGEE, K.	Domestic	New Well	Rotary	Chemistry Exists
318	0261493	NW	14	055	22	4	Unknown	18.3													TAILLEFER, G	Domestic	Chemistry	Drilled	Chemistry Exists
319	0169284	08	14	055	22	4	Screen	40.5							37.8	39.3			02/10/1992		FEDERATED PIPELINE LTD	Domestic	New Well	Rotary	No Chemistry
320	0261447	NW	13	055	22	4	Unknown	12.2													WOUDENBERG, M.	Domestic	Chemistry	Drilled	Chemistry Exists
321	0261446	NW	13	055	22	4	Unknown	24.4													WOUDENBERG, M.	Domestic	Chemistry	Unknown	Chemistry Exists
322	0261403	SW	11	055	22	4	Unknown	54.9													SHEWCHUK, T	Domestic	Chemistry	Unknown	Chemistry Exists
323	0261398	SE	11	055	22	4	Unknown	27.4													DENNIS, D.	Domestic	Chemistry	Unknown	Chemistry Exists
324	0261396	SE	11	055	22	4	Unknown	64.0													TINDALL, V	Domestic	Chemistry	Unknown	Chemistry Exists
325	0280653	SE	16	055	22	4	Unknown	6.1													RANDON, J.R.	Domestic	Chemistry	Unknown	Chemistry Exists
326	0261376	SE	11	055	22	4	Unknown	61.0													HAREL, C.	Domestic	Chemistry	Unknown	Chemistry Exists
327	0280654	SE	16	055	22	4	Unknown	39.6													RANDON, J.R.	Domestic	Chemistry	Unknown	Chemistry Exists
328	0261357	SE	11	055	22	4	Perforated Casing/Liner	79.2											01/08/1965		TIMNALL, C./V.	Domestic	New Well	Rotary	No Chemistry
329	0261348	SE	11	055	22	4	Casing/Open Hole	36.9							34.4	36.9			27/04/1978		WOUDENBERG, M.	Domestic	New Well	Rotary	No Chemistry
330	0280703	SE	09	055	22	4	Perforated Casing/Liner	17.4	7.6	15.2									26/04/1994		LAMOUREUX, ROBERT	Domestic	New Well	Bored	No Chemistry
331	0261250	10	09	055	22	4	Unknown	19.8													KEITH, D	Domestic	Chemistry	Unknown	Chemistry Exists
332	0261202	SE	07	055	22	4	Cribbed	9.1													HERDER, H	Domestic	Chemistry	Drilled	Chemistry Exists
333	0261225	NE	07	055	22	4	Casing	11.6											21/10/1978		PRINS, W	Domestic	New Well	Bored	No Chemistry
334	0261220	NE	07	055	22	4	Unknown	10.7													PRINS, W	Domestic	Chemistry	Unknown	Chemistry Exists
335	0261147	SW	06	055	22	4	Casing/Open Hole	39.6											01/07/1973		GABERT, B	Domestic	New Well	Cable Tool	No Chemistry
336	0262261	SW	35	054	23	4	Unknown	30.5													GAUMONT, P	Domestic	Chemistry	Unknown	Chemistry Exists
337	0261383	SE	11	055	22	4	Casing/Perforated Liner	121.9	103.6	121.9									20/10/1977		WOUDENBERG, M.	Domestic	New Well	Rotary	No Chemistry
338	0261589	NW	18	055	22	4	Unknown	22.9													CURTIS, R.	Domestic	Chemistry	Unknown	Chemistry Exists
339	0261653	NW	22	055	22	4	Unknown														RIVARD, K	Domestic	Chemistry	Unknown	Chemistry Exists
340	0261639	SW	21	055	22	4	Unknown	7.6													COURCHESNE, L	Domestic	Chemistry	Hand Dug	Chemistry Exists
341	0261635	SW	21	055	22	4	Unknown	11.6													COURCHESNE, L	Domestic	Chemistry	Bored	Chemistry Exists
342	0261652	NE	21	055	22	4	Unknown														GAUMONT, J R	Domestic	Chemistry	Unknown	No Chemistry
343	0261640	03	21	055	22	4	Casing/Perforated Liner	91.4	79.2	91.4									08/04/1986		COURCHESNE, L E	Domestic	New Well	Rotary	Chemistry Exists
344	0261618	01	21	055	22	4	Unknown	10.4													DEMERS,	Domestic	Chemistry	Unknown	Chemistry Exists
345	0261614	SW	20	055	22	4	Unknown	30.5											01/01/1960		CRAIG, R.S.	Domestic	Chemistry	Unknown	Chemistry Exists
346	0156874	00	20	055	22	4	Not Applicable	8.5													LAMOUREUX, JOHN C./CRAIG, RAY	Domestic	Chemistry	Not Applicable	No Chemistry
347	0261468	SW	14	055	22	4	Perforated Casing/Liner	64.0											01/04/1959			Domestic	New Well	Unknown	No Chemistry
348	0261591	NW	18	055	22	4	Unknown	15.2													CURTIS, R.	Domestic	Chemistry	Unknown	Chemistry Exists
349	0264298	NW	06	055	22	4	Unknown	18.3													JESKE, O.	Domestic	Chemistry	Unknown	Chemistry Exists
350	0261586	NW	18	055	22	4	Unknown														CURTIS, R.L.	Domestic	Chemistry	Unknown	Chemistry Exists

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
351	0261578	NW	18	055	22	4	Unknown	9.1													CURTIS, R.	Domestic	Chemistry	Unknown	Chemistry Exists
352	0261556	NW	18	055	22	4	Unknown	8.2													CURTIS, R.	Domestic	Chemistry	Unknown	Chemistry Exists
353	0261606	NE	18	055	22	4	Unknown														ANWEILER, S.	Domestic	Chemistry	Unknown	Chemistry Exists
354	0286113	WH	17	055	22	4	Unknown	22.9											30/04/1968		READNER, HENRY #400-H	Domestic	New Well	Auger	No Chemistry
355	0261513	SW	17	055	22	4	Unknown														GRANT, G.	Domestic	Chemistry	Unknown	Chemistry Exists
356	0261521	NW	17	055	22	4	Unknown	18.3													READNER, H	Domestic	Chemistry	Bored	Chemistry Exists
357	0261530	NE	17	055	22	4	Unknown	115.8													RUSSEL, L	Domestic	Chemistry	Unknown	Chemistry Exists
358	0280657	SE	16	055	22	4	Unknown	7.6													GEM SOD FARMS	Domestic	Chemistry	Hand Dug	Chemistry Exists
359	0261542	SW	18	055	22	4	Unknown	9.1													CURTIS, L	Domestic	Chemistry	Bored	Chemistry Exists
360	0083518	SW	30	055	21	4	Unknown	6.1											12/12/1968		DAYTON, GEORGE	Domestic	Chemistry	Bored	Chemistry Exists
361	0282099	NW	18	055	21	4	Unknown	24.4													MAGEE, KEN	Domestic	Chemistry	Hand Dug	Chemistry Exists
362	0083538	NW	32	055	21	4	Unknown	45.7													PCL BRAUN SIMONS LTD	Domestic	Chemistry	Unknown	Chemistry Exists
363	0083537	NW	32	055	21	4	Unknown	39.6													PCL BRAUN SIMONS LTD	Domestic	Chemistry	Unknown	Chemistry Exists
364	0083536	NW	32	055	21	4	Unknown	39.6													PCL BRAUN SIMONS LTD	Domestic	Chemistry	Unknown	Chemistry Exists
365	0083534	NE	31	055	21	4	Unknown	39.6													PCL BRAUN SIMONS LTD	Domestic	Chemistry	Unknown	Chemistry Exists
366	0193975	SW	30	055	21	4	Unknown	42.7												01/01/2001	G&J TRAILER ENT	Domestic	Chemistry	Unknown	No Chemistry
367	0083552	05	34	055	21	4	Screen	35.1							32.0	35.1			09/02/1986		RADKE, J./ R.	Domestic	New Well	Rotary	No Chemistry
368	0083519	SW	30	055	21	4	Unknown	6.7													DEMEULE, LORETTA	Domestic	Chemistry	Hand Dug	Chemistry Exists
369	0083554	NW	34	055	21	4	Unknown	18.3													PICKARD, WAYNE	Domestic	Chemistry	Drilled	Chemistry Exists
370	0160666	SE	30	055	21	4	Not Applicable	8.5													SOWDEN, HELEN	Domestic	Chemistry	Not Applicable	No Chemistry
371	0083517	SE	30	055	21	4	Unknown	45.7													WOUDENBURG, MARY	Domestic	Chemistry	Unknown	Chemistry Exists
372	0083516	SE	30	055	21	4	Unknown	12.2													WATERS, DEAN	Domestic	Chemistry	Drilled	Chemistry Exists
373	0083513	SE	30	055	21	4	Cribbed	14.3											15/02/1970		BALIMORE, WESLY	Domestic	New Well	Bored	No Chemistry
374	0083512	SE	30	055	21	4	Unknown	9.1													HARBOWAY, M.	Domestic	Chemistry	Hand Dug	Chemistry Exists
375	0083511	SE	30	055	21	4	Unknown	7.6												01/01/2001	DOCKSTEADER, ILEF	Domestic	Chemistry	Hand Dug	Chemistry Exists
376	0083523	SW	30	055	21	4	Unknown	9.1													DEMEULE, N.E.	Domestic	Chemistry	Drilled	Chemistry Exists
377	0083570	SE	36	055	21	4	Unknown	18.3													NAVRATIL, JOHN	Domestic	Chemistry	Bored	Chemistry Exists
378	0263327	SW	02	056	21	4	Unknown	10.7													HALABEY, A	Domestic	Chemistry	Bored	Chemistry Exists
379	0264286	SE	28	056	21	4	Unknown	21.3													BELLAND, R.	Domestic	Chemistry	Drilled	Chemistry Exists
380	0263315	SW	01	056	21	4	Unknown	36.6													OLD, R/C	Domestic	Chemistry	Unknown	Chemistry Exists
381	0263308	SW	01	056	21	4	Casing	14.0													TARON, D.E.	Domestic	Chemistry	Drilled	Chemistry Exists
382	0263303	SE	01	056	21	4	Unknown	12.2													GUENETTE, D	Domestic	Chemistry	Bored	Chemistry Exists
383	0157040	NW	01	056	21	4	Not Applicable	11.0													CHOLOWSKI, TOM	Domestic	Chemistry	Hand Dug	No Chemistry
384	0083549	04	34	055	21	4	Cribbed	12.2											26/08/1975		RADKE, BEN	Domestic	New Well	Bored	No Chemistry
385	0083571	SE	36	055	21	4	Unknown	15.2													WIENS, LORI	Domestic	Chemistry	Unknown	Chemistry Exists
386	0083531	NW	30	055	21	4	Cribbed	12.2											06/02/1970		YARSHUK, PETER	Domestic	New Well	Bored	No Chemistry
387	0083573	NW	36	055	21	4	Unknown	12.2													PROKOPCZAK, DAVID	Domestic	Chemistry	Unknown	Chemistry Exists
388	0083564	NE	35	055	21	4	Unknown	12.8													CHARBONNEAU, MARCEL	Domestic	Chemistry	Drilled	Chemistry Exists
389	0083551	SW	34	055	21	4	Unknown														RADKE	Domestic	Chemistry	Unknown	No Chemistry
390	0083548	SW	34	055	21	4	Unknown	15.2													RADKE, JAMES	Domestic	Chemistry	Drilled	Chemistry Exists
391	0083560	NW	34	055	21	4	Screen	42.7							36.6	42.7			14/08/1989		DAOUST, C.	Domestic	New Well	Rotary	No Chemistry
392	0083556	NW	34	055	21	4	Screen	39.6							34.4	36.0			01/10/1970		FISHER, GEORGE P.	Domestic	New Well	Rotary	No Chemistry
393	0083572	SW	36	055	21	4	Casing/Perforated Liner	39.6	37.8	39.6									07/04/1988		UNITED GRAIN GROWERS LTD	Domestic	New Well	Cable Tool	No Chemistry
394	0083458	NE	19	055	21	4	Unknown	18.3													NYHUIS, ALBERT	Domestic	Chemistry	Hand Dug	Chemistry Exists
395	0083470	NW	22	055	21	4	Unknown	64.0													LARSEN, SVEND	Domestic	Chemistry	Drilled	Chemistry Exists
396	0083473	NE	22	055	21	4	Unknown	18.3													CHERNICHAN, JOHN	Domestic	Chemistry	Bored	Chemistry Exists
397	0083467	NE	21	055	21	4	Unknown	76.2													SCOTFORD HUTTERITE COLONY	Domestic	Chemistry	Unknown	Chemistry Exists
398	0083463	SE	20	055	21	4	Unknown														CNR#SCOTFORD YARD	Domestic	Chemistry	Unknown	No Chemistry
399	0083462	SE	20	055	21	4	Unknown	99.4													CNR#BEAMER SPUR	Domestic	Chemistry	Unknown	Chemistry Exists
400	0083448	NW	19	055	21	4	Unknown	6.1												01/01/2001	BACHLEITNER, CATHY	Domestic	Chemistry	Hand Dug	Chemistry Exists
401	0285789	NW	30	055	21	4	Screen	51.8							46.3	47.9			30/05/1995	01/01/2001	BENFELD, BILL	Domestic	New Well	Rotary	No Chemistry
402	0083460	NE	19	055	21	4	Unknown	9.1													DOIGE, J.F.	Domestic	Chemistry	Unknown	Chemistry Exists
403	0167584	NW	25	055	21	4	Unknown	61.0													PROKOPCZAK, WM	Domestic	Chemistry	Unknown	No Chemistry
404	0083453	NE	19	055	21	4	Unknown	39.0													NEBEL, ROBERT	Domestic	Chemistry	Drilled	Chemistry Exists
405	0083452	NE	19	055	21	4	Unknown	48.8													ENOS, AL	Domestic	Chemistry	Drilled	Chemistry Exists
406	0083450	NE	19	055	21	4	Unknown	61.0													OLSON, FRED	Domestic	Chemistry	Unknown	Chemistry Exists
407	0083449	NE	19	055	21	4	Screen	39.6							36.6	38.1			23/07/1975	01/01/2001	EDE, WILLIAM	Domestic	New Well	Rotary	Chemistry Exists
408	0083455	15	19	055	21	4	Screen	11.6							10.1	11.3			11/05/1978		NEBEL, ROBERT	Domestic	New Well	Rotary	No Chemistry
409	0083447	05	19	055	21	4	Unknown	46.9													DZURNY, EMIL	Domestic	Chemistry	Unknown	Chemistry Exists
410	0083461	NE	19	055	21	4	Unknown	50.3													CAMERON, ED	Domestic	Chemistry	Unknown	Chemistry Exists
411	0280650	SW	28	055	21	4	Unknown	9.1													VISSCHER, D.	Domestic	Chemistry	Unknown	Chemistry Exists
412	0263375	SW	03	056	21	4	Unknown	6.4											01/01/1973		HANNERMAN, R	Domestic	Chemistry	Unknown	Chemistry Exists
413	0083528	NW	30	055	21	4	Unknown	12.2													FRANCOUER, LARRY	Domestic	Chemistry	Drilled	Chemistry Exists
414	0083527	NW	30	055	21	4	Unknown	9.1													BECK, LINDA	Domestic	Chemistry	Unknown	Chemistry Exists
415	0083526	NW	30	055	21	4	Unknown	7.3													FRANCOUER, LARRY	Domestic	Chemistry	Unknown	Chemistry Exists
416	0083524	NW	30	055	21	4	Unknown	6.7													BAKER, I.H.	Domestic	Chemistry	Drilled	Chemistry Exists
417	0083532	13	30	055	21	4	Cribbed	8.5											12/02/1970	01/01/2001	YARSHUK, PETER	Domestic	New Well	Bored	No Chemistry
418	0083471	NW	22	055	21	4	Unknown	54.9													LARSEN, HELEN	Domestic	Chemistry	Unknown	Chemistry Exists
419	0083521	03	30	055	21	4	Cribbed	13.4											02/02/1970		YARSHUK, PETE	Domestic	New Well	Bored	No Chemistry
420	0153167	SE	22	055	21	4	Screen	48.8							41.1	42.7			20/07/1990		POULIN, RODGER	Domestic	New Well	Rotary	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
421	0083506	SE	28	055	21	4	Unknown	24.4													ROYCE, SIDNEY	Domestic	Chemistry	Unknown	No Chemistry
422	0083505	SE	28	055	21	4	Unknown	38.7													ROYCE, SIDNEY	Domestic	Chemistry	Drilled	Chemistry Exists
423	0083501	SW	27	055	21	4	Unknown	67.1													CHIPCHASE, G.	Domestic	Chemistry	Unknown	Chemistry Exists
424	0083500	SW	27	055	21	4	Unknown														CHOLOWSKI, ALBERT	Domestic	Chemistry	Unknown	No Chemistry
425	0083503	NW	27	055	21	4	Unknown	42.7													MILLWARD, DONALD	Domestic	Chemistry	Unknown	Chemistry Exists
426	0083502	NW	27	055	21	4	Unknown	42.7													MILLWARD, DONALD	Domestic	Chemistry	Unknown	Chemistry Exists
427	0238531	NW	30	055	21	4	Perforated Casing/Liner	42.1	36.0	42.1									26/01/1994	01/01/2001	LEUENG, DALE	Domestic	New Well	Rotary	No Chemistry
428	0083520	06	30	055	21	4	Screen	41.1							39.6	41.1			08/08/1984		MOSER, GEORGETTE	Domestic	New Well	Rotary	No Chemistry
429	0083525	NW	30	055	21	4	Unknown	7.3													LINING, DALE	Domestic	Chemistry	Bored	Chemistry Exists
430	0083544	NE	32	055	21	4	Unknown	46.3													VISSCHER, D.	Domestic	Chemistry	Unknown	Chemistry Exists
431	0083533	SE	31	055	21	4	Unknown	41.1													PCL BRAUN SIMONS LTD	Domestic	Chemistry	Unknown	Chemistry Exists
432	0293392	NW	31	055	21	4	Screen	24.4							19.8	21.3			13/09/1999		MCKAY, BRIAN	Domestic	New Well	Rotary	No Chemistry
433	0083522	SW	30	055	21	4	Unknown	10.7													WIEBE, G.	Domestic	Chemistry	Unknown	Chemistry Exists
434	0156871	SE	30	055	21	4	Not Applicable	9.8													HONISCH, VERNON	Domestic	Chemistry	Not Applicable	No Chemistry
435	0083514	SE	30	055	21	4	Unknown	6.1													ORDELL, RICHARD	Domestic	Chemistry	Unknown	Chemistry Exists
436	0261660	SE	24	055	22	4	Unknown	6.1													ESLER, J	Domestic	Chemistry	Hand Dug	Chemistry Exists
437	0083529	NW	30	055	21	4	Cribbed	9.8											30/11/1965		YANCHUK, PETE	Domestic	New Well	Bored	No Chemistry
438	0263842	SE	14	056	21	4	Unknown	3.7													SMART, D	Domestic	Chemistry	Hand Dug	Chemistry Exists
439	0083451	NE	19	055	21	4	Screen	40.2							34.7	40.2			10/10/1981		EDE, W.J.	Domestic	New Well	Rotary	No Chemistry
440	0083439	SW	18	055	21	4	Unknown	45.7													DUECK, MICHAEL	Domestic	Chemistry	Unknown	No Chemistry
441	0083426	NE	17	055	21	4	Unknown	79.2													SCOTFORD HUTTERITE BRETHREN	Domestic	Chemistry	Unknown	Chemistry Exists
442	0083419	NW	16	055	21	4	Unknown	56.4													KREBS, BERNARD	Domestic	Chemistry	Unknown	Chemistry Exists
443	0266031	SE	13	056	22	4	Unknown	12.2													SCHROTER, RON	Domestic	Chemistry	Unknown	Chemistry Exists
444	0264637	NE	34	056	21	4	Perforated Casing/Liner	32.0	26.5	32.0									10/03/1974		ANDERSON, K	Domestic	New Well	Rotary	Chemistry Exists
445	0083510	SE	30	055	21	4	Unknown	9.8													WATERS, DEAN	Domestic	Chemistry	Unknown	Chemistry Exists
446	0091553	12	16	056	20	4	Cribbed	19.5											20/03/1985		NEAVE, JOHN	Domestic	New Well	Bored	Chemistry Exists
447	1130470	NW	34	055	21	4		35.4	29.3	35.4									19/07/2007		HALLS AUTO PARTS	Domestic	New Well	Rotary	No Chemistry
448	1690074	SE	01	055	22	4		59.4	51.8	57.9									13/05/1999		RASMUSSEN, RON	Domestic	New Well	Rotary	No Chemistry
449	1420106	SE	36	055	22	4		12.2											19/01/2005	19/01/2005	NCIA	Domestic	Unknown	Rotary	No Chemistry
450	0297410	SW	30	056	20	4	Not Applicable	85.3	36.6	42.7	48.8	54.9	61.0	67.1					15/05/2000	16/05/2000	SHILOH REBMAN YOUTH CAMP #2	Domestic	New Well	Rotary	No Chemistry
451	0100948	SW	20	056	20	4	Unknown	45.7													WATSON, D.	Domestic	Chemistry	Unknown	No Chemistry
452	0091559	SE	18	056	20	4	Unknown	6.7													MCLELLAN, ARTHUR	Domestic	Chemistry	Hand Dug	Chemistry Exists
453	0083561	NE	34	055	21	4	Screen	30.5							28.3	29.9			05/06/1968		BERG, ALFRED	Domestic	New Well	Rotary	No Chemistry
454	0100944	SW	16	056	20	4	Unknown	93.0													ROSNAU, NEIL	Domestic	Chemistry	Unknown	Chemistry Exists
455	0263883	NE	14	056	21	4	Unknown	11.3													PERCY, G.	Domestic	Chemistry	Bored	Chemistry Exists
456	0100929	SW	08	056	20	4	Unknown	7.9													SCHRAM, ED	Domestic	Chemistry	Hand Dug	Chemistry Exists
457	0297579	SE	21	056	21	4	Perforated Casing/Liner	21.0	13.7	16.8									18/09/2001		MARQUARDT, B.	Domestic	New Well	Bored	No Chemistry
458	0264156	15	20	056	21	4	Unknown	19.8											24/10/1958		FEDORAK, M	Domestic	New Well	Bored	No Chemistry
459	0263996	NE	19	056	21	4	Unknown	8.5													ROBINSON, J	Domestic	Chemistry	Hand Dug	Chemistry Exists
460	0263970	NW	18	056	21	4	Unknown	12.2													VISSCHER, H	Domestic	Chemistry	Unknown	Chemistry Exists
461	0263959	SW	16	056	21	4	Unknown	9.1													MARQUARDT, E	Domestic	Chemistry	Drilled	Chemistry Exists
462	0299631	NW	07	055	21	4	Casing/Perforated Liner	71.0	63.1	69.2									17/05/2001		CHARTRAND, LOUIE/MARY	Domestic	New Well	Rotary	No Chemistry
463	0091554	02	17	056	20	4	Cribbed	34.1											06/05/1981		SAMPERT, RAY	Domestic	New Well	Bored	No Chemistry
464	0261075	SE	01	055	22	4	Unknown														BARR, F	Domestic	Chemistry	Unknown	Chemistry Exists
465	0264304	NE	25	055	22	4	Unknown	61.0													GAUMONT, MICHAEL #2	Domestic	Chemistry	Unknown	Chemistry Exists
466	0261710	NE	25	055	22	4	Casing/Open Hole	76.2													GAUMONT, M	Domestic	New Well	Unknown	Chemistry Exists
467	0261675	NE	24	055	22	4	Casing														FISH & GAME ASSOC	Domestic	Chemistry	Unknown	Chemistry Exists
468	0261453	NE	13	055	22	4	Unknown	7.3													DAWSON, J B	Domestic	Chemistry	Bored	Chemistry Exists
469	0261450	NE	13	055	22	4	Unknown	7.3													MCARTHUR, DOUGLAS	Domestic	Chemistry	Unknown	Chemistry Exists
470	0261449	NE	13	055	22	4	Casing	7.3											01/04/1971		BARON, F.	Domestic	New Well	Bored	No Chemistry
471	0261716	NE	25	055	22	4	Unknown	61.0													GAUMONT, M	Domestic	Chemistry	Unknown	Chemistry Exists
472	0261078	SE	01	055	22	4	Unknown	121.9													BEST, S.	Domestic	Chemistry	Unknown	Chemistry Exists
473	0100931	00	08	056	20	4	Unknown	17.1													INKSTER, COLIN	Domestic	Chemistry	Unknown	Chemistry Exists
474	0261073	SE	01	055	22	4	Unknown														WALLACE, J	Domestic	Chemistry	Unknown	Chemistry Exists
475	0261039	SE	01	055	22	4	Casing/Open Hole	54.9													HANSEN, P E	Domestic	New Well	Unknown	No Chemistry
476	0261032	SE	01	055	22	4	Unknown	45.7													SCHWANDT, E A	Domestic	Chemistry	Unknown	Chemistry Exists
477	0264173	SE	13	056	22	4	Screen	35.1							32.0	35.1			03/11/1989		DUPONT CAN	Domestic	New Well	Rotary	No Chemistry
478	0264163	NE	12	056	22	4	Unknown	76.2													PUCHALIK, NICK	Domestic	Chemistry	Drilled	Chemistry Exists
479	0263334	03	02	056	21	4	Casing/Perforated Liner	118.9											09/07/1965		HALABEY, ALEX	Domestic	New Well	Drilled	Chemistry Exists
480	0261082	SE	01	055	22	4	Unknown														SCHLOSSER, D	Domestic	Chemistry	Unknown	Chemistry Exists
481	0293774	SW	17	056	20	4	Perforated Casing/Liner	85.3	72.2	74.7	77.7	80.8							17/10/1999		SCHRAM, BARRY	Domestic	New Well	Rotary	No Chemistry
482	0297564	SE	18	056	20	4	Not Applicable	67.1											07/10/2000		HELMER, MURIEL/ABNER	Domestic	Old Well-Test	Not Applicable	No Chemistry
483	0297580	NE	21	056	21	4	Perforated Casing/Liner	21.0	13.7	16.8									19/09/2001		LEICHNER, WALTER	Domestic	New Well	Bored	No Chemistry
484	0297411	SW	30	056	20	4	Perforated Casing/Liner	36.6	26.8	32.9									17/05/2000		SHILOH REBMAN YOUTH CAMP #3	Domestic	New Well	Rotary	No Chemistry
485	0297409	SW	30	056	20	4	Not Applicable	82.3											18/05/2000	18/05/2001	SHILOH REBMAN YOUTH CAMP	Domestic	Dry Hole-Abandoned	Rotary	No Chemistry
486	0040488	SE	19	055	21	4	Not Applicable	13.4											02/02/1970		HEARTLAND PROPERTIES	Domestic	Old Well-Abandoned	Not Applicable	No Chemistry
487	0297115	NE	18	056	20	4	Casing/Open Hole	18.3											07/10/2000		MARTIN, BONNIE	Domestic	Old Well-Test	Unknown	No Chemistry
488	0295164	SW	30	056	20	4	Perforated Casing/Liner	37.2	31.1	37.2									18/05/2000		SHILOH REBMAN YOUTH CAMP	Domestic	New Well	Rotary	No Chemistry
489	0293775	SW	17	056	20	4	Not Applicable	123.4											12/10/1999	12/10/1999	SCHRAM, BARRY	Domestic	Dry Hole-Abandoned	Rotary	No Chemistry
490	0100930	SE	08	056	20	4	Unknown	9.1													KRAUSE, F.	Domestic	Chemistry	Unknown	Chemistry Exists

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
491	0100947	SW	20	056	20	4	Unknown	45.7													BETTAC, E.	Domestic	Chemistry	Unknown	Chemistry Exists
492	0100946	SW	16	056	20	4	Cribbed	28.7											18/10/1977		ROSNAU, WESLEY	Domestic	New Well	Bored	Chemistry Exists
493	0100945	SW	16	056	20	4	Unknown	24.7													BOWES, GEORGE	Domestic	Chemistry	Unknown	Chemistry Exists
494	0100943	SW	16	056	20	4	Casing/Perforated Liner	62.5	56.4	62.5									01/11/1973		ROSNAU, NEIL	Domestic	New Well	Cable Tool	Chemistry Exists
495	0090354	SE	27	055	21	4	Slotted & Open Hole	54.9	39.0	42.7									01/08/1972		CHOLOWSKI, ALBERT	Domestic	New Well	Rotary	No Chemistry
496	0100932	NE	08	056	20	4	Cribbed	19.5											14/07/1973		INKSTER, COLIN	Domestic	New Well	Bored	No Chemistry
497	0263380	NE	03	056	21	4	Unknown	39.6													VELTMAN, H	Domestic	Chemistry	Unknown	Chemistry Exists
498	0294342	SE	21	056	21	4	Perforated Casing/Liner	24.4	10.1	12.5	15.5	20.1	23.2	23.5					08/08/1998		SOOREE, DICK	Domestic	New Well	Bored	No Chemistry
499	0083379	15	07	055	21	4	Unknown	81.1													GEISLINGER, W.	Domestic	Chemistry	Unknown	Chemistry Exists
500	0264305	SE	29	056	21	4	Casing	54.9													PACHALUCK, P.	Domestic	Chemistry	Unknown	Chemistry Exists
501	0083372	SW	07	055	21	4	Unknown	39.6													NEWMAN, WILBERT	Domestic	Chemistry	Drilled	Chemistry Exists
502	0083376	NW	07	055	21	4	Unknown	9.1													FINCH, EDWARD	Domestic	Chemistry	Drilled	Chemistry Exists
503	0083375	NW	07	055	21	4	Casing/Perforated Liner	54.9	48.8	54.9									12/09/1987		FINCH, E.	Domestic	New Well	Cable Tool	No Chemistry
504	0264343	SE	29	056	21	4	Casing	7.6											15/08/1963		SMULSKI, J.	Domestic	New Well	Backhoe	No Chemistry
505	0274956	NE	05	055	21	4	Casing/Open Hole	41.1											05/09/1978		PICKETT, J	Domestic	New Well	Rotary	Chemistry Exists
506	0264347	SE	29	056	21	4	Unknown	76.2													KALISVAART, J/T	Domestic	Chemistry	Drilled	Chemistry Exists
507	0264368	SE	29	056	21	4	Unknown	14.0													PUCHALIK, P.	Domestic	Chemistry	Unknown	Chemistry Exists
508	0264384	SW	29	056	21	4	Casing	9.8													PUCHALIK, S.	Domestic	Chemistry	Unknown	Chemistry Exists
509	0083383	NE	09	055	21	4	Unknown														EDE, W.	Domestic	Chemistry	Unknown	No Chemistry
510	0264386	SW	29	056	21	4	Casing	7.3											24/09/1958		PUCHALIK, S.	Domestic	New Well	Bored	Chemistry Exists
511	0083377	NE	07	055	21	4	Unknown	9.1													ENGLISH, LESLIE	Domestic	Chemistry	Unknown	Chemistry Exists
512	0264392	SW	29	056	21	4	Unknown														PUCHALIK, S.#PUMPHOUSE WELL	Domestic	Chemistry	Unknown	Chemistry Exists
513	0264393	SW	29	056	21	4	Casing	13.7													PUCHALIK, S.	Domestic	Chemistry	Unknown	Chemistry Exists
514	0083363	06	05	055	21	4	Unknown	35.1													WESTMAN, F.W.	Domestic	Chemistry	Drilled	Chemistry Exists
515	0083365	09	05	055	21	4	Cribbed	4.3													PICKETT, JACK	Domestic	Chemistry	Unknown	Chemistry Exists
516	0083364	12	05	055	21	4	Unknown	24.4											01/01/1920		COATTA, E.J.	Domestic	Federal Well Survey	Bored	No Chemistry
517	0083368	NE	06	055	21	4	Unknown	18.3													SCHNEIDER, EARL A.	Domestic	Chemistry	Bored	Chemistry Exists
518	0083374	12	07	055	21	4	Unknown	24.4											01/01/1920		THORNE, A.	Domestic	Federal Well Survey	Drilled	No Chemistry
519	0083373	09	07	055	21	4	Unknown	30.5													MELTON, OTIS	Domestic	Chemistry	Drilled	Chemistry Exists
520	0083440	NW	18	055	21	4	Unknown	5.5													MAGEE, GARY	Domestic	Chemistry	Unknown	Chemistry Exists
521	0083367	NW	06	055	21	4	Casing/Open Hole	64.0											03/08/1979		GAUF, ROD	Domestic	New Well	Rotary	No Chemistry
522	0264385	SW	29	056	21	4	Unknown														PUCHALIK, S.	Domestic	Chemistry	Unknown	Chemistry Exists
523	0285787	NE	17	055	21	4	Screen	18.6							12.2	18.3			04/06/1996		HUTTERIAN BRETHREN	Domestic	New Well	Rotary	No Chemistry
524	0156870	NW	16	055	21	4	Not Applicable	74.7													KREBS, BERNARD L.	Domestic	Chemistry	Rotary	Chemistry Exists
525	0083425	NE	17	055	21	4	Casing/Perforated Liner	82.3	70.1	82.3									17/08/1983		SCOTFORD COLONY	Domestic	New Well	Rotary	No Chemistry
526	0264396	NE	29	056	21	4	Unknown														SAUNDERS, P	Domestic	Chemistry	Unknown	No Chemistry
527	0083423	11	17	055	21	4	Screen	21.3							20.1	21.3			09/04/1985		CNR	Domestic	New Well	Rotary	No Chemistry
528	0083417	SW	15	055	21	4	Casing/Perforated Liner	54.9	48.8	54.9									08/06/1989		WHELAN, JAMES	Domestic	New Well	Rotary	No Chemistry
529	0154895	NW	16	055	21	4	Casing/Perforated Liner	48.8	42.7	48.8									13/10/1990		KREBS, BERNARD L.	Domestic	New Well	Rotary	No Chemistry
530	0083428	NE	17	055	21	4	Unknown	36.6													SCOTFORD COLONY	Domestic	Chemistry	Unknown	Chemistry Exists
531	0264357	SE	29	056	21	4	Casing/Open Hole	74.7											02/09/1961		PUCHALIK, P.	Domestic	Deepened	Drilled	Chemistry Exists
532	0083418	NE	15	055	21	4	Unknown	91.4													ANWEILER, SAL	Domestic	Chemistry	Unknown	Chemistry Exists
533	0083656	SE	16	055	21	4	Unknown	48.2													RIETVELD, LEENDERT	Domestic	Chemistry	Drilled	Chemistry Exists
534	0264494	09	33	056	21	4	Casing/Open Hole	23.5											16/08/1961		SCURRY RAINBOW OIL LTD	Domestic & Industrial	New Well	Rotary	Chemistry Exists
535	0260034	NW	08	054	22	4	Unknown	47.2											01/01/1925		ARBS, E.	Domestic & Stock	New Well	Drilled	No Chemistry
536	0299620	SW	33	054	23	4	Casing/Perforated Liner	54.9	29.9	32.6	35.7	51.8							23/03/2002		HAZELAAR, HARVEY	Domestic & Stock	New Well	Rotary	No Chemistry
537	0260223	SW	26	054	22	4	Casing/Perforated Liner	61.0	47.9	61.0									04/10/1984		GALLOWAY, ED	Domestic & Stock	New Well	Cable Tool	No Chemistry
538	0083535	01	32	055	21	4	Unknown														MOHR, G.P.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
539	0260068	NW	09	054	22	4	Unknown	30.5													MCEACHERN, J.	Domestic & Stock	Chemistry	Drilled	No Chemistry
540	0261392	08	11	055	22	4	Casing	61.0											01/01/1921		MAGEE, K	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
541	0263732	SE	13	056	21	4	Casing/Open Hole	42.1													WAGNER, J	Domestic & Stock	New Well	Cable Tool	No Chemistry
542	0261728	01	27	055	22	4	Casing	4.6													BELAIR, E C	Domestic & Stock	Chemistry	Hand Dug	Chemistry Exists
543	0264170	02	13	056	22	4	Unknown	10.7											01/01/1916		BERWICK, C.D.	Domestic & Stock	New Well	Hand Dug	No Chemistry
544	0261429	01	12	055	22	4	Casing	32.3											01/01/1922		BRICKRIDGE, A	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
545	0083378	09	07	055	21	4	Unknown	12.2													MAGEE, H.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
546	0261778	09	29	055	22	4	Casing	22.9											01/01/1931		LANGLOIS, G R	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
547	0083433	NE	17	055	21	4	Casing/Perforated Liner	109.7	91.4	109.7									19/03/1986		SCOTFORD COLONY	Domestic & Stock	Deepened	Rotary	No Chemistry
548	0264301	SE	22	055	22	4	Perforated Casing/Liner	14.3											25/06/1985		GODBOUT, N.	Domestic & Stock	New Well	Bored	No Chemistry
549	0263820	SW	13	056	21	4	Perforated Casing/Liner	47.2	35.1	47.2									09/05/1988		PROCHNAU, E.	Domestic & Stock	New Well	Rotary	No Chemistry
550	0262076	08	34	054	23	4	Casing	18.3											01/01/1928		PARRIDY, C.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
551	0262348	SW	35	054	23	4	Casing/Perforated Liner	42.7	30.5	42.7									26/09/1988		HANES, ALBERT	Domestic & Stock	New Well	Rotary	No Chemistry
552	0262130	SE	35	054	23	4	Casing/Perforated Liner	79.2	67.1	79.2									22/11/1988		DEVEREUX, W	Domestic & Stock	New Well	Rotary	No Chemistry
553	0083563	04	35	055	21	4	Unknown	30.5											01/01/1926		BERG, R.	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
554	0261886	09	01	056	21	4	Unknown	4.6													SCHULTZ, E	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
555	0280646	NE	36	054	23	4	Perforated Casing/Liner	14.3											19/10/1987		LAMOUREUX, JIM	Domestic & Stock	New Well	Bored	No Chemistry
556	0083420	NE	16	055	21	4	Casing/Open Hole	51.8											23/04/1965		MOHR, GUS	Domestic & Stock	New Well	Jet	No Chemistry
557	0231536	SW	02	055	23	4	Perforated Casing/Liner	67.1	57.9	64.0									09/08/1993		ARNDT, PETER	Domestic & Stock	New Well	Rotary	No Chemistry
558	0260224	10	26	054	22	4	Casing	30.2											01/01/1930		BETHIEL, A.	Domestic & Stock	New Well	Drilled	No Chemistry
559	0262102	12	34	054	23	4	Unknown	35.1											01/01/1921		SPEER, C.R.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
560	0263735	08	13	056	21	4	Unknown	4.9											01/01/1927		WAGNER, J	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
561	0262018	SW	33	054	23	4	Not Applicable	45.7											02/11/1988	02/11/1988	STRAUSS, HOWARD #TEST HOLE 2	Domestic & Stock	Test Hole	Rotary	No Chemistry
562	0262005	SE	33	054	23	4	Not Applicable	42.7											03/11/1988	03/11/1988	STRAUSS, HOWARD #TEST HOLE	Domestic & Stock	Test Hole	Rotary	No Chemistry
563	0261595	03	26	054	23	4	Unknown	4.9													PODHANIUK, W.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
564	0154442	SE	36	055	22	4	Screen	30.5							29.3	30.5			21/03/1990		STEFFLER, BEN/GERALD	Domestic & Stock	New Well	Rotary	No Chemistry
565	0262523	SE	13	055	23	4	Casing/Perforated Liner	103.6	82.3	103.6									19/03/1983		KOZAK, NICK	Domestic & Stock	New Well	Rotary	Chemistry Exists
566	0274016	EH	36	054	23	4	Perforated Casing/Liner	17.7											25/04/1983		GAUMONT, C	Domestic & Stock	New Well	Bored	Chemistry Exists
567	0260217	02	26	054	22	4	Perforated Casing/Liner	70.1	50.3	61.3									12/12/1966		SLATER, GRACE	Domestic & Stock	New Well	Rotary	Chemistry Exists
568	0260928	NW	13	054	23	4	Unknown	4.9													TURNBULL, R.J.	Domestic & Stock	Chemistry	Hand Dug	Chemistry Exists
569	0263896	NE	14	056	21	4	Screen	48.8							42.4	43.9			04/11/1988		HODGSON, G	Domestic & Stock	New Well	Rotary	No Chemistry
570	0264387	03	29	056	21	4	Unknown	5.5													PUCHALACH	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
571	0263979	04	19	056	21	4	Casing	15.2											01/01/1921		TAYLOR, J	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
572	0260195	13	21	054	22	4	Casing	61.0											01/01/1928		ARMSTRONG, G.	Domestic & Stock	New Well	Drilled	No Chemistry
573	0260193	05	21	054	22	4	Casing	42.7											01/01/1920		ARMSTRONG, J.	Domestic & Stock	New Well	Drilled	No Chemistry
574	0260192	NW	20	054	22	4	Screen & Open Hole	36.6							27.4	29.0			10/05/1966		STETSON, H.A.	Domestic & Stock	New Well	Rotary	Chemistry Exists
575	0260179	SW	17	054	22	4	Casing	61.0											01/01/1935		GALLOWY, P.	Domestic & Stock	New Well	Drilled	No Chemistry
576	0166391	SE	17	054	22	4	Perforated Casing/Liner	12.2	6.1	10.7									28/06/1989		TWIGGE, MRS E.	Domestic & Stock	New Well	Bored	No Chemistry
577	0260181	13	17	054	22	4	Casing	25.9													PETERS, H.B.	Domestic & Stock	New Well	Bored	No Chemistry
578	0160258	SW	16	054	22	4	Perforated Casing/Liner	15.2	7.6	13.7									09/11/1991		BIZUK, MORRIS	Domestic & Stock	New Well	Bored	No Chemistry
579	0260174	13	16	054	22	4	Casing	24.4											01/01/1910		SPALAN, G.	Domestic & Stock	New Well	Drilled	No Chemistry
580	0260172	04	16	054	22	4	Unknown	6.7													FLEMING, J.	Domestic & Stock	New Well	Hand Dug	No Chemistry
581	0260196	SE	22	054	22	4	Casing/Open Hole	37.2											29/11/1988		LA TRACE, DARLENE	Domestic & Stock	New Well	Rotary	Chemistry Exists
582	0153068	NE	08	054	22	4	Casing/Perforated Liner	73.2	61.0	73.2									26/09/1988		BORYS, BILLIE	Domestic & Stock	New Well	Cable Tool	No Chemistry
583	0260219	04	26	054	22	4	Slotted & Open Hole	59.4	49.1	55.2									24/03/1969		KLAUTT, A.R.	Domestic & Stock	New Well	Drilled	No Chemistry
584	0264354	01	29	056	21	4	Unknown	30.5													PUCHLUK, J.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
585	0264143	SW	12	056	22	4	Casing	26.8											22/08/1985		SERINK, MIKE	Domestic & Stock	New Well	Bored	Chemistry Exists
586	0164457	NE	11	056	22	4	Casing/Perforated Liner	59.4	30.2	58.5									10/03/1992		BRIGGS, ALAN	Domestic & Stock	New Well	Rotary	No Chemistry
587	0263856	14	02	056	22	4	Casing	54.9											01/01/1924		TROTTER, J.	Domestic & Stock	New Well	Drilled	No Chemistry
588	0263863	10	02	056	22	4	Unknown	10.7											02/01/1900		MCPIKE, T.	Domestic & Stock	New Well	Hand Dug	No Chemistry
589	0263841	NW	01	056	22	4	Perforated Casing/Liner	34.4											10/12/1987		LAMOUREUX, RENALD	Domestic & Stock	New Well	Bored	Chemistry Exists
590	0266021	13	01	056	22	4	Casing	18.3											01/01/1934		YANCH, J.	Domestic & Stock	New Well	Bored	Chemistry Exists
591	0263834	04	01	056	22	4	Casing	64.0											01/01/1929		MORROW, E.	Domestic & Stock	New Well	Drilled	No Chemistry
592	0261844	13	35	055	22	4	Casing	22.9											01/01/1935		LECLAIRE, L	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
593	0261822	SE	34	055	22	4	Casing/Perforated Liner	54.9	42.7	53.3									19/03/1984		JIGOLYK, H.	Domestic & Stock	New Well	Cable Tool	No Chemistry
594	0261821	08	34	055	22	4	Casing	60.0											01/01/1926		LA CHAPPELLE	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
595	0264395	09	29	056	21	4	Unknown	12.2													KACHUK	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
596	0261215	12	07	055	22	4	Unknown	5.5											01/01/1908		LAMOUREUX, A.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
597	0261651	09	21	055	22	4	Casing	11.0											01/01/1922		GAUMONT, A	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
598	0083366	02	06	055	21	4	Unknown	16.5													BRICK, A.W.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
599	0206702	NE	03	056	21	4	Screen	44.2							40.5	42.1			26/03/1993		VELTMAN, HERB	Domestic & Stock	New Well	Rotary	No Chemistry
600	0261602	12	18	055	22	4	Unknown	6.4											01/01/1930		MCIASSIC, S	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
601	0263966	06	18	056	21	4	Casing	42.7											01/01/1922		MATHIEU, A	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
602	0083265	14	31	055	20	4	Unknown	24.1											01/01/1915		FISHER, J.	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
603	0264014	16	19	056	21	4	Unknown	7.3											01/01/1930		SMOLSKI, D.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
604	0261433	04	13	055	22	4	Casing	111.3											01/01/1922		KELLY, G	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
605	0261231	SE	08	055	22	4	Perforated Casing/Liner	14.9	7.0	9.1	12.2	14.9							28/07/1988		COURCHESNE, R	Domestic & Stock	New Well	Bored	No Chemistry
606	0261229	07	08	055	22	4	Unknown	9.1													ADDERHORD, A.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
607	0260198	13	22	054	22	4	Casing	61.0											01/01/1916		ROTH, H.G.	Domestic & Stock	New Well	Drilled	No Chemistry
608	0083438	03	18	055	21	4	Unknown	12.2											01/01/1938		MOORE, T.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
609	0261679	09	24	055	22	4	Unknown	4.9											01/01/1932		THORNE, R E	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
610	0083459	NE	19	055	21	4	Unknown														SPRUCE HILL HOG RANCH	Domestic & Stock	Chemistry	Unknown	No Chemistry
611	0271540	NE	05	055	22	4	Open Hole	13.4											21/06/1985		GODBOUT, ROMEO	Domestic & Stock	New Well	Bored	No Chemistry
612	0083555	NW	34	055	21	4	Screen	42.7							38.1	39.9			01/09/1970		DAUST, CHARLIE	Domestic & Stock	New Well	Rotary	No Chemistry
613	0260442	NE	34	054	22	4	Screen	42.7											21/11/1988		BARTEL, RICHARD	Domestic & Stock	New Well	Rotary	Chemistry Exists
614	0260438	13	34	054	22	4	Casing	54.9											01/01/1926		WALL, T.	Domestic & Stock	New Well	Drilled	No Chemistry
615	0260427	04	34	054	22	4	Casing	48.8											01/01/1930		LAWRENCE, F.B.	Domestic & Stock	New Well	Drilled	No Chemistry
616	0260424	SE	32	054	22	4	Unknown	6.1														Domestic & Stock	New Well	Hand Dug	No Chemistry
617	0260378	11	29	054	22	4	Casing	61.0											01/01/1911		ADAMSON, R.F.	Domestic & Stock	New Well	Drilled	No Chemistry
618	0264335	SE	29	056	21	4	Casing/Perforated Liner	70.1											02/06/1976		PUCHALIK, P.	Domestic & Stock	New Well	Cable Tool	Chemistry Exists
619	0260228	05	28	054	22	4	Casing	30.5											01/01/1928		CRANSON, G.A.	Domestic & Stock	New Well	Drilled	No Chemistry
620	0260226	12	27	054	22	4	Casing	21.3													ROBERTSON, F.A.	Domestic & Stock	New Well	Bored	No Chemistry
621	0083435	NE	17	055	21	4	Casing/Perforated Liner	97.5	85.3	97.5									18/06/1985		SCOTFORD COLONY	Domestic & Stock	New Well	Rotary	No Chemistry
622	0091575	04	20	056	20	4	Unknown	3.7											01/01/1917		WIKEHLERK	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
623	0091499	16	06	056	20	4	Casing/Perforated Liner	68.0	48.8	68.0									12/04/1985		SCHRAM, GEORGE	Domestic & Stock	New Well	Rotary	Chemistry Exists
624	0264375	08	35	056	21	4	Unknown	3.7													CONSARTO	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
625	1911765	SW	02	057	21	4		79.2	71.0	77.1									27/02/2006	27/02/2006	SUNDAY KO, MIKE	Domestic & Stock	New Well	Rotary	No Chemistry
626	0083010	13	25	055	21	4	Unknown	27.4													HOFFMAN	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
627	0091560	SE	18	056	20	4	Cribbed	15.8											09/08/1978		MCLELLAN, ARTHUR	Domestic & Stock	New Well	Bored	No Chemistry
628	0264486	12	33	056	21	4	Unknown	24.4													PSYCH	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
629	0153696	NW	36	056	21	4	Casing/Perforated Liner	45.7	36.6	45.7									14/04/1989		BOWERIN, CATHERINE	Domestic & Stock	New Well	Cable Tool	No Chemistry
630	0264716	12	36	056	21	4	Unknown	4.0													TKACHUK	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
631	0262432	04	02	055	23	4	Unknown														SPEER, C.R.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
632	0265807	SE	04	057	21	4	Casing/Perforated Liner	30.5											02/12/1976		SAWKA, WALTER	Domestic & Stock	New Well	Cable Tool	Chemistry Exists
633	0091563	08	18	056	20	4	Unknown	4.6											01/01/1925		KAUS, A.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
634	0091570	02	19	056	20	4	Unknown	12.8													SCHUMAK, A.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
635	0091495	04	06	056	20	4	Cribbed	17.1											16/04/1986		YAWORSKI, MIKE	Domestic & Stock	New Well	Bored	No Chemistry
636	0083436	NE	17	055	21	4	Unknown	79.9													SCOTFORD HUTTERITE BRETHREN	Domestic & Stock	Chemistry	Unknown	Chemistry Exists
637	0083437	NE	17	055	21	4	Unknown														SCOTFORD COLONY	Domestic & Stock	Chemistry	Unknown	No Chemistry
638	0264672	SE	36	056	21	4	Casing/Perforated Liner	42.7	27.4	42.7									12/05/1976		CORNELIUS	Domestic & Stock	New Well	Cable Tool	No Chemistry
639	0083465	SE	21	055	21	4	Casing/Open Hole	64.0											12/09/1982		THOMAS, WARREN	Domestic & Stock	New Well	Rotary	No Chemistry
640	0083468	05	22	055	21	4	Unknown	39.0											01/01/1915		LANGHAUSEN, J.	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
641	0083477	NW	23	055	21	4	Screen	36.6							35.4	36.6			02/07/1968		ARNDT, ERDMAN	Domestic & Stock	New Well	Rotary	No Chemistry
642	0083469	NW	22	055	21	4	Casing/Open Hole	51.8											01/04/1965		LARSEN, S.A.	Domestic & Stock	New Well	Cable Tool	No Chemistry
643	0264662	04	35	056	21	4	Unknown	19.2													ROMANIUK, E.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
644	0153768	NW	23	055	21	4	Screen	42.7							35.4	36.6			31/08/1990		ARNDT, R.E.	Domestic & Stock	New Well	Rotary	No Chemistry
645	0091574	12	19	056	20	4	Cribbed	14.6											20/09/1985		MATTHEWS, B.	Domestic & Stock	New Well	Bored	No Chemistry
646	0264503	04	34	056	21	4	Unknown	3.7													MALOWNY	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
647	0091555	SE	17	056	20	4	Cribbed	19.2	4.3	17.4									19/08/1986		SAMPERT, RAY	Domestic & Stock	New Well	Bored	No Chemistry
648	0091503	04	08	056	20	4	Unknown	7.6											01/01/1919		RISKE, E.	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
649	0091505	13	08	056	20	4	Cribbed	17.7											18/07/1984		SAMPERT, ROGER	Domestic & Stock	New Well	Bored	Chemistry Exists
650	0083499	05	27	055	21	4	Unknown	30.5											01/01/1924		UNDERSCHULTZ, A.	Domestic & Stock	Federal Well Survey	Drilled	No Chemistry
651	0262341	SW	35	054	23	4	Casing/Perforated Liner	48.8	36.6	48.8									13/10/1981		HANES, ALBERT R	Domestic & Stock	New Well	Rotary	No Chemistry
652	0091500	08	07	056	20	4	Cribbed	14.6											24/07/1981		SCHRAM, ELMER	Domestic & Stock	New Well	Bored	No Chemistry
653	0220716	NE	17	055	21	4	Casing/Perforated Liner	105.2											20/09/1991		SCOTFORD COLONY	Domestic & Stock	Reconstructed	Cable Tool	No Chemistry
654	0158576	SW	08	056	20	4	Perforated Casing/Liner	21.0											25/09/1979		SCHRAM, EDWARD	Domestic & Stock	New Well	Bored	No Chemistry
655	0091552	04	16	056	20	4	Unknown	6.7											01/01/1930		HENKLEMAN	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
656	0083497	09	26	055	21	4	Unknown	13.7											01/01/1933		FLUKER, R.	Domestic & Stock	Federal Well Survey	Bored	No Chemistry
657	0274028	EH	36	054	23	4	Perforated Casing/Liner	15.5	9.8	13.7									20/04/1989		GAUMONT, L	Domestic & Stock	New Well	Bored	No Chemistry
658	0091551	05	16	056	20	4	Unknown	4.9											01/01/1930		KALAS	Domestic & Stock	Federal Well Survey	Hand Dug	No Chemistry
659	0208867	SW	06	056	20	4	Perforated Casing/Liner	16.5	4.6	13.7									12/03/1993		YAWORSKI, MICHEAL	Domestic & Stock	New Well	Bored	No Chemistry
660	0282105	NW	11	055	22	4	Open Hole	100.0											26/04/1984		DOW CHEMICAL #370-3	Industrial	New Well	Rotary	No Chemistry
661	0261535	10	17	055	22	4	Not Applicable	967.7											12/06/1953		NORTHWESTERN UTILITIES LTD#5	Industrial	Unknown	Unknown	No Chemistry
662	0261761	01	01	055	23	4		9.1													#SP. 1914497	Industrial	Flowing Shot Hole	Unknown	No Chemistry
663	0083546	SH	34	055	21	4	Unknown	36.6													NORTHWESTERN UTILITIES	Industrial	Chemistry	Unknown	No Chemistry
664	0083545	SE	34	055	21	4	Casing/Perforated Liner	54.9	0.3	54.9									19/10/1982		NORTHWESTERN UTILITIES	Industrial	New Well	Rotary	No Chemistry
665	0289175	EH	17	056	21	4	Not Applicable	14.9	11.9	14.9									06/09/1997	06/09/1997	I.O.L. #2	Industrial	Test Hole-Abandoned	Rotary	No Chemistry
666	0083566	01	36	055	21	4	Slotted & Open Hole	24.4	20.4	21.9									16/11/1980		SHELL OIL	Industrial	New Well	Rotary	No Chemistry
667	0289174	EH	17	056	21	4	Not Applicable	13.4											08/09/1997	08/09/1997	I.O.L. #5	Industrial	Test Hole-Abandoned	Rotary	No Chemistry
668	0282106	NW	11	055	22	4	Open Hole	94.8											25/04/1984		DOW CHEMICAL #370-2	Industrial	New Well	Rotary	No Chemistry
669	0280652	WH	11	055	22	4	Not Applicable	29.0											19/07/1984		DOW CHEMICAL	Industrial	Cathodic Protection	Rotary	No Chemistry
670	0282102	SW	11	055	22	4	Open Hole	27.4											03/05/1984		DOW CHEMICAL #R-240-2	Industrial	New Well	Rotary	No Chemistry
671	0289177	EH	17	056	21	4	Not Applicable	15.2											08/09/1997	08/09/1997	I.O.L. #4	Industrial	Test Hole-Abandoned	Rotary	No Chemistry
672	0261436	SW	13	055	22	4	Unknown	4.9													DOW CHEMICAL	Industrial	Chemistry	Unknown	No Chemistry
673	0289173	EH	17	056	21	4	Not Applicable	15.2	11.9	13.4									09/09/1997	09/09/1997	I.O.L. #6	Industrial	Test Hole-Abandoned	Rotary	No Chemistry
674	0152048	NW	10	055	22	4	Screen	37.8							34.7	37.8			13/12/1989		DOW CHEMICAL#MONITORING WELL	Industrial	New Well	Rotary	No Chemistry
675	0152047	NW	10	055	22	4	Screen	41.1							38.1	41.1			10/12/1989		DOW CHEMICAL#MONITORING WELL	Industrial	New Well	Rotary	No Chemistry
676	0152045	NW	10	055	22	4	Screen	37.8							34.7	37.8			08/12/1989		DOW CHEMICAL#MONITORING WELL	Industrial	New Well	Rotary	No Chemistry
677	0261496	11	14	055	22	4	Screen	39.6							33.2	35.1			14/09/1974		DOME PETRO	Industrial	New Well	Rotary	No Chemistry
678	0261344	10	10	055	22	4	Not Applicable	1881.5											30/08/1966		DOW CHEMICAL #NACL	Industrial	Cathodic Protection	Unknown	No Chemistry
679	0282103	NW	11	055	22	4	Open Hole	98.8											01/05/1984		DOW CHEMICAL #370-5	Industrial	New Well	Rotary	No Chemistry
680	0282117	SE	10	055	22	4	Open Hole	25.9											04/05/1984		DOW CHEMICAL #150-2	Industrial	New Well	Rotary	No Chemistry
681	0282104	NW	11	055	22	4	Open Hole	100.6											03/05/1984		DOW CHEMICAL #370-4	Industrial	New Well	Rotary	No Chemistry
682	0298284	SW	19	055	21	4	Not Applicable	41.1														Industrial	Old Well-Abandoned	Not Applicable	No Chemistry
683	0261848	16	36	055	22	4	Not Applicable	365.8											11/05/1946		IMPERIAL OIL LTD #615	Industrial	Oil Exploratory	Unknown	No Chemistry
684	0083568	02	36	055	21	4	Slotted & Open Hole	15.2	11.9	13.1									18/11/1980		SHELL OIL	Industrial	New Well	Rotary	No Chemistry
685	0083569	01	36	055	21	4	Screen	30.5							13.1	18.9			06/11/1980		SHELL OIL	Industrial	New Well	Rotary	No Chemistry
686	0083567	01	36	055	21	4	Slotted & Open Hole	45.7	40.2	41.5									17/11/1980		SHELL OIL	Industrial	New Well	Rotary	No Chemistry
687	0083509	SE	29	055	21	4	Slotted & Open Hole	45.7	41.8	44.8									24/06/1977		CF BRAUN CO	Industrial	New Well	Rotary	No Chemistry
688	0083565	01	36	055	21	4	Screen	24.4							18.0	22.6			15/11/1980		SHELL OIL	Industrial	New Well	Rotary	No Chemistry
689	0282101	SE	10	055	22	4	Open Hole	71.9											08/05/1984		DOW CHEMICAL#R-90-3	Industrial	New Well	Rotary	No Chemistry
690	0083540	NE	32	055	21	4	Screen	41.1							35.7	41.1			06/10/1981		PCL BRAUN SIMONS LTD #HOLE5	Industrial	New Well	Rotary	No Chemistry
691	0261736	16	27	055	22	4	Not Applicable	304.5											21/05/1953		IMPERIAL OIL LTD #AO282-3	Industrial	Oil Exploratory	Unknown	No Chemistry
692	0152046	NW	10	055	22	4	Screen	36.0							32.9	36.0			12/12/1989		DOW CHEMICAL#MONITORING WELL	Industrial	New Well	Rotary	No Chemistry
693	0263849	01	02	056	22	4	Unknown	304.5											17/05/1953		IMPERIAL OIL LTD	Industrial	Oil Exploratory	Drilled	No Chemistry
694	0264153	04	13	056	22	4	Unknown												11/08/1953		IMPERIAL OIL LTD	Industrial	Flowing Shot Hole	Unknown	No Chemistry
695	0260380	10	29	054	22	4	Unknown	751.3											02/10/1953		MID-WESTERN IND GAS LTD	Industrial	Oil Exploratory	Drilled	No Chemistry
696	0260182	10	17	054	22	4	Unknown	780.3											10/05/1954		TRIZONE OIL DEV CO LTD	Industrial	Oil Exploratory	Drilled	No Chemistry
697	0091601	03	30	056	20	4	Open Hole	954.0											21/12/1950		IMPERIAL OIL LTD	Industrial	Oil Exploratory	Rotary	No Chemistry
698	0289172	EH	07	056	21	4	Not Applicable	30.5											06/09/1997	06/09/1997	I.O.L. #1	Industrial	Test Hole-Abandoned	Rotary	No Chemistry
699	0263918	04	15	056	21	4	Not Applicable	996.1											15/11/1950		SEABOARD OIL CO #4-15	Industrial	Oil Exploratory	Unknown	No Chemistry
700	0264161	13	12	056	22	4	Unknown	292.6											14/05/1953		IMPERIAL OIL LTD	Industrial	Test Hole	Drilled	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
701	0261104	08	04	055	22	4	Unknown	762.0											03/09/1962		MIDWESTERN IND GAS LTD #8-4	Industrial	New Well	Unknown	No Chemistry
702	0264108	01	11	056	22	4	Unknown	286.5											14/05/1953		IMPERIAL OIL LTD	Industrial	Test Hole	Drilled	No Chemistry
703	0261723	04	26	055	22	4	Not Applicable	317.9											17/05/1953		IMPERIAL OIL LTD #AO282-1	Industrial	Oil Exploratory	Unknown	No Chemistry
704	1575400	SE	18	056	21	4		47.2							16.8	47.2			25/10/2006		ACCESS PIPELINES	Industrial	New Well	Rotary	No Chemistry
705	0264189	03	13	056	22	4	Unknown	246.3														Industrial	Flowing Shot Hole	Drilled	No Chemistry
706	0261247	06	09	055	22	4	Not Applicable	765.0											03/12/1959		DOME PETRO LTD	Industrial	Oil Exploratory	Unknown	No Chemistry
707	0260408	NW	32	054	22	4	Casing/Perforated Liner	35.7	31.4	35.1									01/01/1955		PEACE RIVER GLASS	Industrial	New Well	Unknown	No Chemistry
708	0261097	SE	03	055	22	4	Unknown	64.0													CAN COMSTOCK LTD	Industrial	Chemistry	Unknown	Chemistry Exists
709	0282100	NW	02	055	22	4	Open Hole	70.7											09/05/1984		DOW CHEMICAL#R-240-1	Industrial	New Well	Rotary	No Chemistry
710	0261092	00	02	055	22	4	Casing/Perforated Liner	42.7	39.6	42.7									08/03/1978		DOW CHEMICALS	Industrial	New Well	Unknown	No Chemistry
711	0261087	00	02	055	22	4	Casing/Perforated Liner	25.9	21.3	25.9									02/03/1978		DOW CHEMICALS	Industrial	New Well	Unknown	No Chemistry
712	0263860	13	02	056	22	4	Unknown	286.5											18/05/1953		IMPERIAL OIL LTD	Industrial	Oil Exploratory	Drilled	No Chemistry
713	0261825	12	34	055	22	4	Not Applicable	304.5											13/05/1953		IMPERIAL OIL LTD #AO282 5	Industrial	Oil Exploratory	Unknown	No Chemistry
714	0263838	03	01	056	22	4	Unknown	1321.3											28/02/1951		LINGNORA GOLD MINES LTD	Industrial	Unknown	Drilled	No Chemistry
715	0261682	04	36	055	22	4	Not Applicable	299.0											21/05/1953		IMPERIAL OIL LTD #AO282-2	Industrial	Oil Exploratory	Unknown	No Chemistry
716	0260402	NW	32	054	22	4	Casing	64.0											29/11/1956		PEACE RIVER GLASS	Industrial	New Well	Drilled	No Chemistry
717	0289176	EH	17	056	21	4	Not Applicable	18.3	15.8	17.4									07/09/1997	07/09/1997	I.O.L. #3	Industrial	Test Hole-Abandoned	Rotary	No Chemistry
718	0083543	NE	32	055	21	4	Slotted & Open Hole	42.7	40.5	42.7									25/08/1981		PCL BRAUN SIMONS LTD #HOLE3	Industrial	New Well	Rotary	No Chemistry
719	0083542	NE	32	055	21	4	Slotted & Open Hole	42.7	40.2	42.7									02/09/1981		PCL BRAUN SIMONS LTD #HOLE2	Industrial	New Well	Rotary	No Chemistry
720	0083541	NE	32	055	21	4	Slotted & Open Hole	42.7	40.2	42.7									20/08/1981		PCL BRAUN SIMONS LTD #HOLE1	Industrial	New Well	Rotary	No Chemistry
721	0083539	NE	32	055	21	4	Screen	41.1							35.1	41.1			09/10/1981		PCL BRAUN SIMONS LTD #WELL4	Industrial	New Well	Rotary	Chemistry Exists
722	0261083	00	02	055	22	4	Casing/Perforated Liner	44.2	33.5	39.6									24/02/1978		DOW CHEMICAL	Industrial	New Well	Unknown	No Chemistry
723	0242400	NW	11	055	22	4	Perforated Casing/Liner	7.9	0.9	7.9									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
724	0242405	NW	11	055	22	4	Perforated Casing/Liner	11.6	0.9	11.6									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
725	0242404	NW	11	055	22	4	Perforated Casing/Liner	10.7	0.9	10.7									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
726	0242406	SE	11	055	22	4	Open Hole	13.1											29/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
727	0242403	NW	11	055	22	4	Perforated Casing/Liner	9.8	0.9	9.8									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
728	0242402	NW	11	055	22	4	Perforated Casing/Liner	9.4	0.9	9.4									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
729	0242401	NW	11	055	22	4	Perforated Casing/Liner	8.5	0.9	8.5									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
730	0261846	NE	35	054	22	4	Not Applicable	30.5											05/08/1976		ALTA ENV	Investigation	Test Hole	Unknown	No Chemistry
731	0242398	NW	11	055	22	4	Perforated Casing/Liner	7.3	0.9	7.3									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
732	0281173	SE	01	056	22	4	Not Applicable	29.0											11/05/1969		ALTA ENV #0292E	Investigation	Test Hole	Drilled	No Chemistry
733	0261826	NE	34	054	22	4	Not Applicable	36.6											07/08/1976		EDMONTON REGIONAL GW ST#16201	Investigation	Test Hole	Unknown	No Chemistry
734	0281168	SH	06	056	21	4	Not Applicable	36.6											11/05/1969		ALTA ENV #0294E	Investigation	Test Hole	Drilled	No Chemistry
735	0242397	SE	10	055	22	4	Open Hole	12.2											14/11/1978		DOW CHEMICAL	Investigation	Test Hole	Cable Tool	No Chemistry
736	0242399	NW	11	055	22	4	Perforated Casing/Liner	7.6	0.9	7.6									22/11/1978		DOW CHEMICAL	Investigation	New Well	Cable Tool	No Chemistry
737	0281169	09	33	056	21	4	Not Applicable	19.8											18/04/1972		ALTA ENV #0792E	Investigation	Test Hole	Drilled	No Chemistry
738	0281170	09	32	055	21	4	Screen	47.2							40.5	42.1	45.1	46.3	09/05/1970		ALTA ENV #0499E	Investigation	Test Hole	Drilled	Chemistry Exists
739	1420564	NW	19	054	22	4		38.1							27.7	34.4			24/01/2005		N C I A	Monitoring	New Well	Rotary	No Chemistry
740	0261489	SW	14	055	22	4	Screen	6.1							4.6	6.1					DOME PETRO#UGS@BRINEPITSITE 4	Monitoring	Chemistry	Unknown	Chemistry Exists
741	0261460	SW	14	055	22	4	Screen	6.1							4.6	6.1					DOME PETRO#BRINE UGS PITSITE 1	Monitoring	Chemistry	Unknown	Chemistry Exists
742	0261475	SW	14	055	22	4	Screen	6.1							4.6	6.1					DOME PETRO#BRINE UGS PITSITE 2	Monitoring	Chemistry	Unknown	Chemistry Exists
743	0042021	13	24	056	21	4	Screen	4.6							3.0	4.6			25/09/1991		ALTA ENV	Monitoring	New Well	Rotary	No Chemistry
744	0042022	SW	14	056	21	4	Screen	6.1							3.1	4.6			25/09/1991		ALTA ENV/CHMILIAR, W.	Monitoring	New Well	Rotary	No Chemistry
745	0261485	SW	14	055	22	4	Screen	6.1							4.6	6.1					DOME PETRO#UGS@BRINEPITSITE 3	Monitoring	Chemistry	Unknown	Chemistry Exists
746	0264103	SE	20	056	21	4	Unknown	3.0													IMPERIAL OIL #9	Monitoring	Chemistry	Unknown	Chemistry Exists
747	0264078	SE	20	056	21	4	Unknown	5.5													IMPERIAL OIL #7	Monitoring	Chemistry	Unknown	Chemistry Exists
748	0264081	SE	20	056	21	4	Unknown	5.5													IMPERIAL OIL #10	Monitoring	Chemistry	Unknown	Chemistry Exists
749	0264086	SE	20	056	21	4	Unknown	4.3													IMPERIAL OIL #8	Monitoring	Chemistry	Unknown	Chemistry Exists
750	0264089	SE	20	056	21	4	Unknown	4.3													IMPERIAL OIL #5H	Monitoring	Chemistry	Unknown	Chemistry Exists
751	0264094	SE	20	056	21	4	Unknown	4.3													IMPERIAL OIL #5E	Monitoring	Chemistry	Unknown	Chemistry Exists
752	0264056	SE	20	056	21	4	Unknown	43.3													IMPERIAL OIL #5A	Monitoring	Chemistry	Unknown	Chemistry Exists
753	0264098	SE	20	056	21	4	Unknown	4.0													IMPERIAL OIL #5G	Monitoring	Chemistry	Unknown	Chemistry Exists
754	0264054	SE	20	056	21	4	Unknown	2.1													IMPERIAL OIL #5F	Monitoring	Chemistry	Unknown	Chemistry Exists
755	0264021	SE	20	056	21	4	Unknown	5.2													IMPERIAL OIL #6A	Monitoring	Chemistry	Unknown	Chemistry Exists
756	0264050	SE	20	056	21	4	Unknown	43.0													IMPERIAL OIL #3B	Monitoring	Chemistry	Unknown	Chemistry Exists
757	0264075	SE	20	056	21	4	Unknown	7.3													IMPERIAL OIL #5D	Monitoring	Chemistry	Unknown	Chemistry Exists
758	1420288	NW	14	056	21	4		42.7							35.1	38.1			02/02/2005		NCIA	Monitoring	New Well	Rotary	No Chemistry
759	1420305	NW	31	055	21	4		42.7							31.1	37.2			28/01/2005		NCIA	Monitoring	Test Hole	Rotary	No Chemistry
760	1420309	NE	33	055	21	4		44.8							35.7	41.8			27/01/2005		NCIA	Monitoring	New Well	Rotary	No Chemistry
761	0264096	SE	20	056	21	4	Unknown	4.0													IMPERIAL OIL #4A	Monitoring	Chemistry	Unknown	Chemistry Exists
762	0261294	NW	10	055	22	4	Screen	16.5							13.4	16.5			26/10/1989		DOW CHEMICAL	Monitoring	Test Hole	Rotary	No Chemistry
763	0264036	SE	20	056	21	4	Unknown	21.9													IMPERIAL OIL #5B	Monitoring	Chemistry	Unknown	Chemistry Exists
764	0264045	SE	20	056	21	4	Unknown	33.5													IMPERIAL OIL #6B	Monitoring	Chemistry	Unknown	Chemistry Exists
765	0261420	NW	11	055	22	4	Screen	39.6							36.0	37.5			25/08/1980		DOW CHEMICAL	Monitoring	Test Hole	Rotary	No Chemistry
766	0261414	NW	11	055	22	4	Screen	36.6							34.1	35.7			27/08/1980		DOW CHEMICAL	Monitoring	Test Hole	Rotary	No Chemistry
767	0261427	NE	11	055	22	4	Perforated Casing/Liner	7.3	0.9	7.3									22/11/1978		DOW CHEMICAL #12 MONITORING W	Monitoring	Test Hole	Cable Tool	No Chemistry
768	0261423	NE	11	055	22	4	Casing/Open Hole	39.6											27/11/1978		DOW CHEMICAL #10 MONITORING W	Monitoring	Test Hole	Cable Tool	No Chemistry
769	0261297	NW	10	055	22	4	Screen	18.0							14.9	18.0			26/10/1989		DOW CHEMICAL	Monitoring	Test Hole	Rotary	No Chemistry
770	0261254	SE	10	055	22	4	Casing/Open Hole	8.5											08/11/1978		DOW CHEMICAL #MONCTOUNGWELL	Monitoring	New Well	Cable Tool	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
771	0264061	SE	20	056	21	4	Unknown	15.2													IMPERIAL OIL #6C	Monitoring	Chemistry	Unknown	Chemistry Exists
772	0261271	NW	10	055	22	4	Casing/Open Hole	16.8							13.4	16.5			24/10/1989		DOW CHEMICAL	Monitoring	Test Hole	Rotary	No Chemistry
773	0261321	10	10	055	22	4	Casing/Open Hole	4.9											09/04/1979		DOW CHEMICAL #22 MONITORING W	Monitoring	Test Hole	Cable Tool	No Chemistry
774	0261340	09	10	055	22	4	Casing/Open Hole	5.8											09/04/1979		DOW CHEMICAL	Monitoring	Test Hole	Cable Tool	No Chemistry
775	0261261	08	10	055	22	4	Casing/Open Hole	7.9											14/11/1978		DOW CHEMICAL LTD #8	Monitoring	Test Hole	Cable Tool	No Chemistry
776	0261265	07	10	055	22	4	Casing/Open Hole	33.5											08/11/1978		DOW CHEMICAL #6 MONITORING	Monitoring	Test Hole	Cable Tool	No Chemistry
777	0264030	SE	20	056	21	4	Unknown	7.9													IMPERIAL OIL #6D	Monitoring	Chemistry	Unknown	Chemistry Exists
778	0261428	10	11	055	22	4	Perforated Casing/Liner	7.3	0.9	7.3									22/11/1978		DOW CHEMICAL #13 MONITORING W	Monitoring	Test Hole	Cable Tool	No Chemistry
779	0263459	01	05	056	21	4	Screen	42.7							39.0	40.5			03/05/1982		CAN BADGER CO LTD #8	Monitoring	New Well	Rotary	No Chemistry
780	0263447	01	05	056	21	4	Casing/Perforated Liner	76.2	64.0	73.2									22/04/1982	22/04/1982	CAN BADGER CO LTD	Monitoring	New Well-Abandoned	Rotary	No Chemistry
781	0263465	01	05	056	21	4	Casing/Open Hole	42.7											05/05/1982		CAN BADGER CO LTD #9	Monitoring	New Well	Rotary	No Chemistry
782	0263387	01	05	056	21	4	Perforated Casing/Liner	42.1	39.3	42.1									27/04/1982		CAN BADGER CO LTD #7	Monitoring	New Well	Rotary	No Chemistry
783	1420299	SW	31	054	22	4		32.0							25.0	29.6			25/01/2005		NCIA	Monitoring	New Well	Rotary	No Chemistry
784	0263397	01	05	056	21	4	Perforated Casing/Liner	45.7	38.1	39.6									30/03/1982	30/03/1982	CAN BADGER CO LTD	Monitoring	New Well-Abandoned	Rotary	No Chemistry
785	0263417	01	05	056	21	4	Casing/Perforated Liner	61.0	45.7	61.0									08/04/1982		CAN BADGER CO LTD #3	Monitoring	New Well	Rotary	No Chemistry
786	0261285	NW	10	055	22	4	Screen	16.2							13.1	16.2			26/10/1989		DOW CHEMICAL	Monitoring	Test Hole	Rotary	No Chemistry
787	0261302	10	10	055	22	4	Casing/Open Hole	5.2											09/04/1979		DOW CHEMICAL #21	Monitoring	Test Hole	Cable Tool	No Chemistry
788	1420313	SE	04	055	22	4		36.6							26.5	31.1			03/02/2005		NCIA	Monitoring	New Well	Rotary	No Chemistry
789	0263410	01	05	056	21	4	Perforated Casing/Liner	47.2	38.1	41.1									06/04/1982		CAN BADGER CO LTD #2	Monitoring	New Well	Rotary	No Chemistry
790	0261281	NW	10	055	22	4	Screen & Open Hole	18.0							13.7	16.8			21/10/1989		DOW CHEMICAL #1 MONITOR	Monitoring	Test Hole	Rotary	No Chemistry
791	0263439	01	05	056	21	4	Casing/Perforated Liner	91.4	76.5	82.3									16/04/1982	16/04/1982	CAN BADGER CO LTD	Monitoring	New Well-Abandoned	Rotary	No Chemistry
792	0263423	01	05	056	21	4	Casing/Perforated Liner	61.0	45.7	61.0									13/04/1982		CAN BADGER CO LTD #4	Monitoring	New Well	Rotary	No Chemistry
793	0263828	16	13	056	21	4	Screen	36.6							31.1	32.3			10/11/1975		BRUDERHEIM, TOWN OF#13-75	Municipal	New Well-Abandoned	Unknown	Chemistry Exists
794	0263821	05	13	056	21	4	Screen & Open Hole	48.8							41.8	43.0			11/11/1975		BRUDERHEIM, TOWN OF#14-75	Municipal	New Well	Unknown	Chemistry Exists
795	0260416	NH	32	054	22	4	Casing/Open Hole	18.6														Municipal	New Well	Drilled	No Chemistry
796	0101384	NW	32	054	22	4	Unknown														FT SASK, TOWN OF #WELL 1	Municipal	Unknown	Unknown	No Chemistry
797	0264233	15	21	056	21	4	Screen	42.7							34.1	35.4			07/11/1975		BRUDERHEIM, TOWN OF#12-75	Municipal	New Well	Unknown	Chemistry Exists
798	0260180	04	17	054	22	4	Unknown	29.0											22/04/1972		ALTA ENV/WATER RES	Municipal	Unknown	Drilled	No Chemistry
799	0263738	01	13	056	21	4	Perforated Casing/Liner	43.6	30.8	38.4									16/07/1975		BRUDERHEIM, TOWN OF#6-75 PUMP	Municipal	New Well	Unknown	Chemistry Exists
800	0263912	09	14	056	21	4	Unknown	49.4											16/07/1975		BRUDERHEIM, TOWN OF	Municipal	New Well	Unknown	No Chemistry
801	0263729	16	12	056	21	4	Screen & Open Hole	42.7							33.8	37.2			04/11/1975		BRUDERHEIM, TOWN OF#10-75	Municipal	New Well	Unknown	Chemistry Exists
802	0263728	16	12	056	21	4	Screen & Open Hole	42.7							35.7	37.2			03/10/1975		BRUDERHEIM, TOWN OF #9-75	Municipal	New Well	Unknown	Chemistry Exists
803	0263723	16	12	056	21	4	Screen	42.7							29.3	30.8			06/11/1975		BRUDERHEIM, TOWN OF#11-75	Municipal	New Well	Unknown	Chemistry Exists
804	0156873	NW	09	055	22	4	Not Applicable														U.M.O.L.-C.R.N.E.W.S.	Municipal	Chemistry	Not Applicable	No Chemistry
805	0263789	01	13	056	21	4	Perforated Casing/Liner	35.7	34.4	35.7									16/07/1975		BRUDERHEIM, TOWN OF #6A-75	Municipal & Observation	New Well	Unknown	No Chemistry
806	1420210	15	09	056	21	4		48.8							32.0	53.3			22/03/2004		STANTEC CONSULTING LTD	Observation	New Well	Rotary	No Chemistry
807	1420565	SW	34	055	21	4		42.7											21/01/2005	21/01/2005	N C I A	Observation	New Well-Abandoned	Rotary	No Chemistry
808	1420224	16	10	056	21	4		48.8							40.2	43.3			24/03/2004		STANTEC CONSULTING LTD	Observation	New Well	Rotary	No Chemistry
809	0262034	09	33	054	23	4	Unknown	56.4											06/10/1972		ALTA ENV #0886E	Observation	Test Hole	Unknown	No Chemistry
810	0234526	SE	30	056	20	4	Unknown	37.5											13/05/1969		ALTA ENV #0299E	Observation	Test Hole	Unknown	No Chemistry
811	1420217	13	10	056	21	4		48.8							38.7	44.8			23/03/2004		STANTEC CONSULTING LTD	Observation	New Well	Rotary	No Chemistry
812	1420228	04	10	056	21	4		36.6							33.5	36.6			23/03/2004		STANTEC CONSULTING LTD	Observation	New Well	Rotary	No Chemistry
813	1420115	NE	10	055	22	4		24.7							18.6	24.7			09/02/2005		AGRIUM PLANT -FT SASKATCHEWAN	Observation	New Well	Rotary	No Chemistry
814	0234530	13	30	056	20	4	Screen	10.1							8.5	10.1			27/03/1985		ALTA ENV #2342E	Observation	Test Hole	Rotary	Chemistry Exists
815	1420174	SE	30	055	21	4		47.2											19/01/2005	19/01/2005	NCIA	Observation	Dry Hole-Abandoned	Rotary	No Chemistry
816	1420007	SW	24	055	22	4		43.9							37.8	43.9			15/05/2005		NCIA	Observation	New Well	Rotary	No Chemistry
817	0286117	13	28	055	21	4	Unknown	29.3											25/06/1969		#HOLE 669-H	Observation	Test Hole	Auger	No Chemistry
818	1420016	NE	10	055	22	4		17.4							14.3	17.4			10/02/2005		AGRIUM PLANT-FORT SASKATCHEWA	Observation	New Well	Rotary	No Chemistry
819	1420181	SE	36	055	22	4		12.2											19/01/2005	19/01/2005	NCIA	Observation	Dry Hole-Abandoned	Rotary	No Chemistry
820	1420030	NE	32	054	22	4		30.5							21.6	26.2			26/01/2005		NCIA	Observation	New Well	Rotary	No Chemistry
821	1420104	SW	10	055	22	4		15.8							12.8	15.8			10/11/2005		AGRIUM	Observation	New Well	Rotary	No Chemistry
822	1420197	SW	34	055	21	4		54.9											20/01/2005	20/01/2005	NCIA	Observation	Test Hole-Abandoned	Rotary	No Chemistry
823	1420143	NE	10	055	22	4		19.2							15.2	18.3			11/02/2005		AGRIUM PLANT-FT SASKATCHEWAN	Observation	New Well	Rotary	No Chemistry
824	0083370	SW	07	055	21	4	Casing/Open Hole	42.7											06/08/1976		ALTA ENV #1619BE	Observation	Test Hole	Rotary	No Chemistry
825	0083472	12	22	055	21	4	Open Hole	30.8											24/06/1969		ALTA AGRICULTURE	Observation	Test Hole	Rotary	No Chemistry
826	1420242	NW	15	056	21	4		42.7							36.0	40.5			02/02/2005		NCIA	Observation	New Well	Rotary	No Chemistry
827	1420203	SE	30	055	21	4		47.2											19/01/2005	19/01/2005	NCIA	Observation	Unknown	Rotary	No Chemistry
828	1420578	SE	16	056	21	4		48.8							39.6	45.7			23/06/2006		SHELL SCOTFORD	Observation	New Well	Rotary	No Chemistry
829	1420207	SW	34	055	21	4		54.9											20/01/2005	20/01/2005	NCIA	Observation	Test Hole	Rotary	No Chemistry
830	0286110	01	28	055	21	4	Unknown	21.3											24/06/1969		#HOLE 670-H	Observation	Test Hole	Auger	No Chemistry
831	0286112	13	22	055	21	4	Unknown	30.8											24/06/1969		#HOLE 671-H	Observation	Test Hole	Auger	No Chemistry
832	1420259	SE	29	054	22	4		36.6											17/01/2005	17/01/2005	NCIA	Observation	Test Hole-Abandoned	Rotary	No Chemistry
833	1420433	SW	32	055	21	4		45.7							38.7	41.8			08/09/2006		SHELL SCOTTFORD REFINERY	Observation	Piezometer	Rotary	No Chemistry
834	1420152	SW	25	055	22	4		48.8											21/01/2005	21/02/2005	NCIA	Observation	Test Hole-Abandoned	Rotary	No Chemistry
835	1420432	SW	32	055	21	4		17.1							14.0	17.1			08/09/2006		SHELL SCOTTFORD REFINERY	Observation	Piezometer	Rotary	No Chemistry
836	0260458	SW	36	054	22	4	Screen & Open Hole	13.7											07/04/1988			Observation	Test Hole	Bored	No Chemistry
837	0234548	13	30	056	20	4	Open Hole	78.9											19/03/1985		ALTA ENV #2339E	Observation	Test Hole	Rotary	Chemistry Exists
838	1420213	NE	32	054	22	4		30.5							21.6	26.2			26/01/2005		NCIA	Observation	New Well	Rotary	No Chemistry
839	0263831	SW	01	056	22	4	Unknown	19.8													ALTA ENV/WATER RES #0293E	Observation	Test Hole	Rotary	No Chemistry
840	0083369	NE	06	055	21	4	Casing/Open Hole	15.2											08/04/1988		ALTA ENV	Observation	Test Hole	Auger	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
841	0234549	13	30	056	20	4	Not Applicable	72.5											11/03/1985	11/03/1985	ALTA ENV #2334E	Observation	Test Hole-Abandoned	Rotary	No Chemistry
842	1420579	NE	04	056	21	4		44.2							36.9	39.9			21/06/2006		SHELL SCOTFORD	Observation	New Well	Rotary	No Chemistry
843	1420418	NE	10	055	22	4		25.0							21.9	25.0			09/02/2005		AGRIUM PLANT, FT SASKATCHEWAN	Observation	New Well	Rotary	No Chemistry
844	0234538	13	30	056	20	4	Screen	10.1							8.5	10.1			27/03/1985		ALTA ENV #2343E	Observation	Test Hole	Rotary	Chemistry Exists
845	1420419	NE	10	055	22	4		30.5							21.9	25.0			09/02/2005		AGRIUM PLANT, FT SASKATCHEWAN	Observation	New Well	Rotary	No Chemistry
846	0234545	13	30	056	20	4	Screen	48.2							46.3	47.9			22/03/1985		ALTA ENV #2340E	Observation	Test Hole	Rotary	No Chemistry
847	0234532	13	30	056	20	4	Screen	36.9							35.4	36.9			26/03/1985		ALTA ENV #2341E	Observation	Test Hole	Rotary	No Chemistry
848	2058433	04	17	054	22	4		29.0											22/04/1972		ALTA ENV - #791E	Observation	Test Hole	Unknown	No Chemistry
849	1420003	NW	05	056	21	4		44.2							38.1	44.2			24/09/2004		SHELL CANADA	Observation	New Well	Rotary	No Chemistry
850	0234510	NW	30	056	20	4	Unknown	51.8											12/05/1969		ALTA ENV #0298E	Observation	Test Hole	Unknown	No Chemistry
851	1420023	NE	18	055	21	4		38.7							34.1	38.7			31/01/2005		NCIA	Observation	New Well	Rotary	No Chemistry
852	1420001	NE	10	055	22	4		19.2							16.2	19.2			10/02/2005		AGRIUM PLANT-FORT SASKATCHEWA	Observation	New Well	Rotary	No Chemistry
853	0215410	08	30	054	22	4	Perforated Casing/Liner	42.7	29.0	34.1									06/08/1976		ALTA ENV #1619E	Observation	Test Hole	Unknown	No Chemistry
854	1420135	NE	10	055	22	4		18.3							15.2	18.3			10/02/2005		AGRIUM PLANT	Observation	New Well	Rotary	No Chemistry
855	1420161	SW	15	055	22	4		36.6											18/01/2005	18/01/2005	NCIA	Observation	Dry Hole-Abandoned	Rotary	No Chemistry
856	1420097	09	10	056	21	4		36.6											24/03/2004	24/03/2004	STANTEC CONSULTING LTD	Observation	Test Hole-Abandoned	Unknown	No Chemistry
857	1420165	NW	04	055	22	4		12.2											18/01/2005	18/01/2005	NCIA	Observation	Dry Hole-Abandoned	Rotary	No Chemistry
858	1495324	NE	12	056	21	4		34.4							31.1	34.1			22/08/2007		STRATHCONA COUNTY / UMA	Observation	New Well	Rotary	No Chemistry
859	1420173	SW	26	055	22	4		30.5											18/01/2005	18/01/2005	NCIA	Observation	Dry Hole-Abandoned	Rotary	No Chemistry
860	1420190	SW	15	055	22	4		36.6											18/01/2005	18/01/2005	NCIA	Observation	Unknown	Rotary	No Chemistry
861	1420020	SE	29	055	21	4		33.5							30.5	33.5			03/02/2005		NICA	Observation	New Well	Rotary	No Chemistry
862	1420018	NE	03	056	21	4		48.8											20/01/2005	20/01/2005	NCIA	Observation	Test Hole-Abandoned	Rotary	No Chemistry
863	0260051	NE	08	054	22	4	Screen	38.1							6.4	12.8			14/04/1977		KENNEDY	Observation	New Well	Rotary	No Chemistry
864	1420193	SW	25	055	22	4		48.8											21/01/2005	21/01/2005	NCIA	Observation	Test Hole	Rotary	No Chemistry
865	1420050	NW	24	054	23	4		19.8							15.5	19.8			24/01/2005		NCIA	Observation	New Well	Rotary	No Chemistry
866	0224185	SE	18	056	20	4	Not Applicable	73.2											08/10/1993	08/10/1993	MCLELLAN, ART	Observation	Test Hole-Abandoned	Rotary	No Chemistry
867	1420089	SW	24	055	22	4		43.9							37.8	43.9			15/02/2005		NCIA	Other	New Well	Rotary	No Chemistry
868	1420110	NE	10	055	22	4		25.0							21.9	25.0			09/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
869	1420095	SW	10	055	22	4		15.8							12.8	15.8			10/11/2005		AGRIUM	Other	New Well	Rotary	No Chemistry
870	1420102	NE	10	055	22	4		25.0							23.8	25.0			09/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
871	1420070	SE	29	054	22	4		36.6											17/01/2005	17/01/2005	NCIA	Other	New Well	Rotary	No Chemistry
872	1420140	NE	10	055	22	4		24.7							18.6	24.7			09/02/2005		AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
873	1420195	NW	24	054	23	4		19.8							15.5	19.8			24/01/2005		NCIA	Other	New Well	Rotary	No Chemistry
874	0261523	12	17	055	22	4	Unknown	10.7											01/01/1935		NORMANDEAU, J	Other	Federal Well Survey	Hand Dug	No Chemistry
875	0196962	08	22	054	22	4	Unknown	150.9											29/05/1975		ARC# TH 3-75	Other	Coal Test Hole	Unknown	No Chemistry
876	1420148	NE	10	055	22	4		17.4							14.3	17.4			10/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
877	1420011	NE	10	055	22	4		18.3							15.2	18.3			11/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
878	1420155	SE	29	055	21	4		33.5							30.5	33.5			03/02/2005		NICA	Other	New Well	Rotary	No Chemistry
879	1420129	NE	10	055	22	4		25.0							21.9	25.0			09/02/2005		AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
880	1420125	NE	10	055	22	4		19.2							16.2	19.2			10/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
881	1420117	NE	10	055	22	4		24.7							18.6	24.7			09/02/2005		FT SASKATC HOWAN,AGRIUM PLANT	Other	New Well	Rotary	No Chemistry
882	1420162	NE	18	055	21	4		38.7							34.1	38.7			31/01/2005		NCIA	Other	New Well	Rotary	No Chemistry
883	0261227	09	07	055	22	4	Unknown	7.9											01/01/1930		VILLENEUVE, E.	Stock	Federal Well Survey	Hand Dug	No Chemistry
884	0091568	NW	18	056	20	4	Slotted & Open Hole	47.2											24/08/1987		SERINK, WILLIAM	Stock	New Well	Rotary	No Chemistry
885	0264931	NE	17	054	22	4	Casing/Open Hole	67.1											18/04/1955		ARMSTRONG	Stock	New Well	Drilled	Chemistry Exists
886	0260183	NW	18	054	22	4	Casing/Open Hole	36.6											01/02/1974		SMITH, HARRY	Stock	New Well	Cable Tool	No Chemistry
887	0260190	SE	19	054	22	4	Casing	28.7											01/01/1925		LOREN, J.	Stock	New Well	Combination	No Chemistry
888	0264282	09	27	056	21	4	Screen	67.1							30.5	36.6	42.7	48.8	20/05/1986		MEDAK, W	Stock	New Well	Rotary	No Chemistry
889	0083430	16	17	055	21	4	Slotted & Open Hole	73.2	71.6	73.2									23/06/1978		SCOTFORD COLONY	Stock	New Well	Rotary	No Chemistry
890	0083424	NE	17	055	21	4	Casing/Perforated Liner	85.3	73.2	85.3									07/12/1983		SCOTFORD COLONY	Stock	New Well	Rotary	Chemistry Exists
891	0083422	NW	17	055	21	4	Casing/Open Hole	39.6											01/11/1973		SCOTFORD COLONY	Stock	New Well	Cable Tool	No Chemistry
892	0083441	16	18	055	21	4	Unknown	12.2											01/01/1928		BARCLEY, E.H.	Stock	Federal Well Survey	Bored	No Chemistry
893	0083515	SE	30	055	21	4	Cribbed	9.8	3.7	9.8									20/08/1975	01/01/2001	GODBOUT, STAN	Stock	New Well	Bored	No Chemistry
894	0264947	NE	35	054	22	4	Casing	51.8											01/09/1973		SIMMONS, HECTOR	Stock	New Well	Cable Tool	Chemistry Exists
895	0083432	16	17	055	21	4	Casing/Open Hole	134.1											02/12/1983		SCOTFORD COLONY	Stock	New Well	Rotary	No Chemistry
896	0083464	01	21	055	21	4	Casing/Perforated Liner	38.1	31.7	36.6									03/04/1980		KRIBS, ROBERT	Stock	New Well	Rotary	Chemistry Exists
897	1325000	NE	35	054	22	4		51.8											01/09/1973		SIMMONS, HECTOR	Stock	New Well	Cable Tool	No Chemistry
898	0260222	SW	26	054	22	4	Casing/Open Hole	54.9											08/06/1978		GALLOWAY, ED	Stock	New Well	Rotary	No Chemistry
899	0264254	08	25	056	21	4	Casing	14.9											17/06/1978		SERINK, W	Stock	New Well	Bored	No Chemistry
900	0083444	SW	19	055	21	4	Unknown	4.3													BLACKLOCK, BRIAN	Stock	Chemistry	Hand Dug	Chemistry Exists
901	0264315	SE	29	056	21	4	Casing	7.3													PUCHALUK, P.	Stock	Chemistry	Unknown	Chemistry Exists
902	0264272	SW	26	056	21	4	Perforated Casing/Liner	39.6	31.7	37.8									12/04/1988		SAWATZKI, W	Stock	New Well	Rotary	No Chemistry
903	0159288	SE	05	055	22	4	Perforated Casing/Liner	13.4	8.2	12.2									10/07/1991		GODBOUT, ROMEO	Stock	Reconstructed	Bored	No Chemistry
904	0083443	SW	19	055	21	4	Unknown	3.0													WING, GERRY	Stock	Chemistry	Hand Dug	Chemistry Exists
905	0261456	16	13	055	22	4	Casing	103.6											01/01/1924		KREPS, J.	Stock	Federal Well Survey	Drilled	No Chemistry
906	0091567	13	18	056	20	4	Unknown	6.7											01/01/1918		SERANT, M.	Stock	Federal Well Survey	Unknown	No Chemistry
907	0260184	SE	19	054	22	4	Screen & Open Hole	28.3							26.5	28.0			27/04/1968		GALLOWAY, R.	Stock	New Well	Drilled	No Chemistry
908	0083442	SW	19	055	21	4	Unknown	2.4													WING, H.S.	Stock	Chemistry	Hand Dug	Chemistry Exists
909	0264218	SW	21	056	21	4	Casing/Open Hole	53.6											01/03/1974		SMITH, E.	Stock	New Well	Cable Tool	Chemistry Exists
910	0297412	SW	36	056	21	4	Casing/Perforated Liner	48.8	36.6	48.8									23/05/2000		DABBLE, R.	Stock	New Well	Rotary	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
911	0167849	NE	17	055	21	4	Not Applicable	14.9											10/07/1992		SCOTFORD COLONY	Stock	New Well-Abandoned	Bored	No Chemistry
912	1690056	NW	09	056	21	4		11.6	3.0	9.1									09/07/2002		GAUMONT, CONARD	Stock	New Well	Bored	No Chemistry
913	0083427	16	17	055	21	4	Casing/Open Hole	82.3											02/07/1974		SCOTFORD COLONY	Stock	New Well	Cable Tool	No Chemistry
914	0185985	SW	17	056	20	4	Casing/Perforated Liner	67.1	48.8	61.0									28/10/1992		SCHRAM, BARRY	Stock	New Well	Rotary	No Chemistry
915	0263699	SW	12	056	21	4	Casing/Open Hole	31.1													OLSON, R	Stock	New Well	Cable Tool	No Chemistry
916	0083454	15	19	055	21	4	Cribbed	7.3											10/05/1968	01/01/2001	NEBEL, ROBERT	Stock	New Well	Bored	Chemistry Exists
917	0083429	09	17	055	21	4	Casing/Open Hole	45.7											01/08/1973		SCOTFORD COLONY	Stock	New Well	Cable Tool	No Chemistry
918	0083559	13	34	055	21	4	Screen	42.7							36.6	42.7			14/07/1987		DAOUST, C.	Stock	New Well	Rotary	No Chemistry
919	0262001	02	33	054	23	4	Casing/Open Hole	152.4											01/01/1931		DORLAND	Stock	Federal Well Survey	Drilled	No Chemistry
920	0083466	04	21	055	21	4	Cribbed	18.3											14/09/1983		WAKARYK, ANDREW	Stock	New Well	Bored	No Chemistry
921	0167850	NE	17	055	21	4	Perforated Casing/Liner	20.4	12.2	13.1	19.5	20.4							12/07/1992		SCOTFORD COLONY	Stock	New Well	Bored	No Chemistry
922	0263703	SW	12	056	21	4	Casing/Open Hole	13.7											03/09/1977		OLSEN, R	Stock	New Well	Rotary	No Chemistry
923	0091556	04	17	056	20	4	Casing/Perforated Liner	42.7	27.4	42.7									16/08/1982		SCHRAM, BARRY	Stock	New Well	Cable Tool	No Chemistry
924	0263710	NW	12	056	21	4	Casing/Open Hole	44.2											12/08/1983		GABERT, M.	Stock	New Well	Rotary	No Chemistry
925	0262361	EH	35	054	23	4	Casing/Open Hole	35.1	26.5	31.1									01/09/1973		DEVEREUX, J	Stock	New Well	Rotary	No Chemistry
926	0262123	SE	35	054	23	4	Casing/Perforated Liner	36.6	24.4	25.0	27.4	30.5	32.0	32.6					01/06/1975		DEVEREUX, JOHN	Stock	New Well	Drilled	No Chemistry
927	0083574	12	36	055	21	4	Unknown	12.2											01/01/1936		PROKOPCZAK, J.	Stock	Federal Well Survey	Bored	No Chemistry
928	0083431	16	17	055	21	4	Unknown	85.3													MANN, A.A.	Stock	Federal Well Survey	Drilled	No Chemistry
929	0261236	03	08	055	22	4	Casing	105.5											01/01/1924		HOULE, O.	Stock	Federal Well Survey	Drilled	No Chemistry
930	0262022	16	33	054	23	4	Unknown	15.2											01/01/1916		WILSON	Stock	Federal Well Survey	Bored	No Chemistry
931	0083478	14	23	055	21	4	Unknown	13.4											01/01/1926		ARNDT, G.	Stock	Federal Well Survey	Bored	No Chemistry
932	0270766	04	21	056	20	4	Casing/Open Hole	68.6													GRONER, LARRY	Stock	New Well	Cable Tool	No Chemistry
933	0083498	SE	27	055	21	4	Casing/Perforated Liner	56.4	40.2	51.2									30/11/1962		CHOLOWSKI, ALBERT	Stock	New Well	Rotary	No Chemistry
934	0083504	16	27	055	21	4	Casing/Open Hole	26.8											05/07/1974		HEINRICHS, ED	Stock	New Well	Cable Tool	Chemistry Exists
935	0083371	03	07	055	21	4	Casing/Perforated Liner	50.3	39.6	50.3									11/09/1981		MOYSEY, FRANK	Stock	New Well	Rotary	No Chemistry
936	0261833	NE	14	056	21	4	Casing	11.3											19/04/1989		HODGSON, GEORGE	Stock	Deepened	Bored	No Chemistry
937	0263941	04	16	056	21	4	Casing/Open Hole	42.7													KROPP, L.	Stock	New Well	Cable Tool	Chemistry Exists
938	0091557	12	17	056	20	4	Screen	48.8							39.6	41.5			04/06/1984		HODGSON, L.	Stock	New Well	Rotary	No Chemistry
939	0261753	08	29	055	22	4	Casing	22.9											01/01/1933		LANGLOIS, L	Stock	Federal Well Survey	Bored	No Chemistry
940	0091571	04	19	056	20	4	Casing/Open Hole	45.7											08/07/1977		SERINK, WILLIAM	Stock	New Well	Rotary	Chemistry Exists
941	0261550	04	18	055	22	4	Casing	118.9											01/01/1930		VILLENEUVE, M	Stock	Federal Well Survey	Drilled	No Chemistry
942	0083475	05	23	055	21	4	Unknown	54.9											01/01/1926		PENELTON, J.	Stock	Federal Well Survey	Drilled	No Chemistry
943	0083434	NE	17	055	21	4	Screen	21.3							17.7	19.2			27/08/1986		SCOTFORD COLONY	Stock	New Well	Rotary	No Chemistry
944	0083530	13	30	055	21	4	Casing/Open Hole	42.7											01/05/1974		LIVING, DALE	Stock	New Well	Cable Tool	Chemistry Exists
945	0263818	03	13	056	21	4	Unknown	4.9													PROCNAIM, R.	Stock	Federal Well Survey	Hand Dug	No Chemistry
946	0263351	SE	03	056	21	4	Casing/Perforated Liner	10.7	6.1	10.7									17/09/1974		PROKOPCZAK, J.	Stock	New Well	Backhoe	No Chemistry
947	0261611	08	19	055	22	4	Unknown	5.5											01/01/1931		ROCK, L.C.	Stock	Federal Well Survey	Hand Dug	No Chemistry
948	0159197	NE	34	055	21	4	Casing/Perforated Liner	54.9	46.6	52.7									29/09/1991		BERG, RON	Stock	New Well	Rotary	No Chemistry
949	0083553	04	34	055	21	4	Cribbed	14.6											06/11/1981		RADKE, BEN	Stock	New Well	Bored	No Chemistry
950	0083456	15	19	055	21	4	Cribbed	8.5	1.8	7.9									07/01/1980		HENDERSON, GARTH	Stock	New Well	Bored	No Chemistry
951	0083457	15	19	055	21	4	Cribbed	12.2	5.5	7.6									02/01/1980	01/01/2001	HENDERSON, GARTH	Stock	New Well	Bored	No Chemistry
952	0267241	SE	03	056	21	4	Casing/Perforated Liner	10.7	4.6	10.7									10/10/1974		PROKOPCZAK, L.J.	Stock	New Well	Bored	No Chemistry
953	0083547	04	34	055	21	4	Casing/Open Hole	32.0											13/04/1982		RADKE, BEN	Stock	New Well	Cable Tool	No Chemistry
954	0264180	SE	21	056	21	4	Screen	54.9							47.5	48.2			03/07/1978		DEBAAN, J	Stock	New Well	Rotary	No Chemistry
955	0290971	SW	34	056	21	4	Perforated Casing/Liner	16.8	12.8	15.8									18/10/1998		WOHNSKY, WALT	Stock	New Well	Bored	No Chemistry
956	0083562	16	34	055	21	4	Casing/Open Hole	53.3											01/05/1982		BERG, RON	Stock	New Well	Cable Tool	No Chemistry
957	0154375	NE	03	056	22	4	Casing/Perforated Liner	59.4	45.7	57.9									17/04/1985		KUGLER, IRWIN	Stock	New Well	Rotary	No Chemistry
958	0263607	NE	11	056	21	4	Casing	37.2											01/08/1973		FAIRWEATHER, B.	Stock	New Well	Cable Tool	Chemistry Exists
959	0083550	SW	34	055	21	4	Casing/Perforated Liner	94.5	85.3	94.5									28/09/1977		RADKE, BEN	Stock	New Well	Rotary	Chemistry Exists
960	0091569	01	19	056	20	4	Casing/Open Hole	50.3											31/07/1975		RADKE, SIEGFRIED	Stock	New Well	Cable Tool	No Chemistry
961	0083421	16	16	055	21	4	Unknown	14.0											01/01/1934		MANZ, A.	Stock	Federal Well Survey	Bored	No Chemistry
962	0159190	NE	17	055	21	4	Open Hole	82.3											28/05/1976		SCOTFORD COLONY#PUMP HOUSE	Stock	New Well	Rotary	Chemistry Exists
963	0083558	13	34	055	21	4	Casing/Open Hole	40.5											19/10/1978		DAOUST, CHARLES	Stock	New Well	Cable Tool	No Chemistry
964	0262430	SE	01	055	23	4	Unknown	12.2											14/07/1922		VAN ACKER, L.	Stock	Federal Well Survey	Hand Dug	No Chemistry
965	0262520	SE	13	055	23	4	Unknown	120.1											13/07/1925		VILLENEUVE, O.	Stock	Federal Well Survey	Drilled	No Chemistry
966	0083557	13	34	055	21	4	Casing/Open Hole	36.6											09/09/1981		HALL'S AUTO	Stock	New Well	Cable Tool	No Chemistry
967	0263599	NE	11	056	21	4	Casing/Open Hole	36.6													TAYLOR, G J	Stock	New Well	Cable Tool	Chemistry Exists
968	0260053	NE	08	054	22	4	Unknown														SUPINA, NICK	Unknown	Chemistry	Unknown	Chemistry Exists
969	1420578	SE	16	056	21	4														01/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
970	0260056	NE	08	054	22	4	Unknown	24.4													HENDRICKSON, CONNIE	Unknown	Chemistry	Unknown	Chemistry Exists
971	0264091	SE	11	056	22	4	Casing/Perforated Liner	64.0	51.8	64.0									10/10/1973		SERINK, MIKE	Unknown	New Well	Rotary	Chemistry Exists
972	1575670	SW	16	056	21	4														11/06/2008	SHELL CANADA LTD.	Unknown	Old Well-Abandoned	Unknown	No Chemistry
973	0260055	NE	08	054	22	4	Unknown	7.9													BECKER, MARK	Unknown	Chemistry	Unknown	Chemistry Exists
974	1575671	SE	16	056	21	4														11/06/2008	SHELL CANADA LTD.	Unknown	Old Well-Abandoned	Unknown	No Chemistry
975	0262257	SW	35	054	23	4	Cribbed	21.0											12/11/1977	12/11/1977	YUSKIW, N	Unknown	Old Well-Abandoned	Bored	No Chemistry
976	0260057	NE	08	054	22	4	Unknown	3.0													SPALLIN, LYNNE	Unknown	Chemistry	Unknown	Chemistry Exists
977	0260059	NE	08	054	22	4	Unknown	16.8													KENNEDY, KENNETH	Unknown	Chemistry	Unknown	Chemistry Exists
978	0260060	NE	08	054	22	4	Unknown	9.1													GROTEN, HELEN	Unknown	Chemistry	Unknown	Chemistry Exists
979	1575669	SW	16	056	21	4														11/06/2008	SHELL CANADA LTD.	Unknown	Old Well-Abandoned	Unknown	No Chemistry
980	0164457	NE	11	056	22	4														08/12/2008	PETRO CANADA	Unknown	Old Well-Abandoned	Unknown	No Chemistry

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
981	1575428	SW	09	056	21	4														19/10/2007	SHELL CANADA LIMITED OIL SANDS	Unknown	Old Well-Abandoned	Unknown	No Chemistry
982	1575587	SE	30	055	21	4														02/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
983	1575427	SW	09	056	21	4														19/10/2007	SHELL CANADA LIMITED OIL SANDS	Unknown	Old Well-Abandoned	Unknown	No Chemistry
984	1575585	SE	30	055	21	4														02/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
985	0260042	NE	08	054	22	4	Unknown														GIDYCH, R.T.	Unknown	Chemistry	Unknown	Chemistry Exists
986	1575583	SW	16	056	21	4														20/10/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
987	0160230	NE	08	054	22	4	Perforated Casing/Liner	17.7	6.1	13.7									24/10/1991		KROENING, GREG	Unknown	New Well	Bored	No Chemistry
988	0260036	NE	08	054	22	4	Unknown	21.3													TUCKER, CHARLES	Unknown	Chemistry	Bored	Chemistry Exists
989	1575582	SW	16	056	21	4														20/10/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
990	0091501	01	07	056	20	4	Open Hole	27.4											17/07/1975		HYDROGEOLOGICAL CONSULT LTD	Unknown	Test Hole	Auger	No Chemistry
991	1690056	NW	09	056	21	4														01/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
992	0260040	NE	08	054	22	4	Unknown	20.7											28/10/1974		KREBS, CLIFF	Unknown	Chemistry	Drilled	Chemistry Exists
993	0261749	SE	01	055	23	4		4.6														Unknown	Unknown	Unknown	No Chemistry
994	0263525	NE	05	056	21	4														19/10/2007	SHELL CANAD LIMITED	Unknown	Old Well-Abandoned	Unknown	Chemistry Exists
995	1575588	SE	30	055	21	4														02/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
996	0260061	00	08	054	22	4	Unknown	10.7													DIRKS, G.A.	Unknown	Chemistry	Unknown	Chemistry Exists
997	1575581	NW	09	056	21	4														20/10/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
998	0260032	NW	07	054	22	4	Unknown	45.7													HOPKIN, JIM	Unknown	Chemistry	Drilled	Chemistry Exists
999	0240750	NE	30	055	21	4	Unknown	42.7											11/05/1969		ALTA ENV/WATER RES #0295E	Unknown	Test Hole	Rotary	No Chemistry
1000	0260043	NE	08	054	22	4	Unknown	8.2													STEVENSON, R.C.	Unknown	Chemistry	Hand Dug	Chemistry Exists
1001	0260044	NE	08	054	22	4	Unknown	7.9													LIVINGSTON, BRIAN	Unknown	Chemistry	Bored	Chemistry Exists
1002	1575584	SE	16	056	21	4														01/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1003	1575586	SE	30	055	21	4														02/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1004	0260047	NE	08	054	22	4	Unknown	67.1													MCKINLAY, R.L.	Unknown	Chemistry	Drilled	Chemistry Exists
1005	0260049	NE	08	054	22	4	Unknown	12.2													KENSON HLDG	Unknown	Chemistry	Bored	Chemistry Exists
1006	1420003	NW	05	056	21	4														01/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1007	0260041	NE	08	054	22	4	Unknown	23.8													WILKINSON, J.P.	Unknown	Chemistry	Bored	Chemistry Exists
1008	0260431	SW	34	054	22	4	Slotted & Open Hole	49.4											02/05/1955			Unknown	New Well	Drilled	No Chemistry
1009	0260405	NW	32	054	22	4	Unknown	15.8											01/01/1927		HOPPER#N SASK RIVER	Unknown	New Well	Drilled	No Chemistry
1010	0262042	SE	34	054	23	4	Casing/Open Hole	91.4	24.4	42.7									28/10/1974		BELYEA, A.F.	Unknown	New Well	Unknown	Chemistry Exists
1011	1575589	NW	30	055	21	4														02/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1012	0083529	NW	30	055	21	4														02/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1013	0261751	SE	01	055	23	4	Open Hole	29.6											28/08/1984	28/08/1984	SERNA, VICTOR	Unknown	New Well-Abandoned	Bored	No Chemistry
1014	0268135	SE	01	055	23	4		4.6														Unknown	Unknown	Unknown	No Chemistry
1015	0263661	09	11	056	21	4	Perforated Casing/Liner	66.4	32.9	36.0	36.9	37.8							31/08/1973		ANURATIL, J.	Unknown	Unknown	Unknown	No Chemistry
1016	0083507	01	28	055	21	4	Open Hole	21.3											24/06/1969		ALTA AGRICULTURE #670H	Unknown	Test Hole	Rotary	No Chemistry
1017	0240761	02	33	054	23	4	Unknown	42.7											20/09/1973		ALTA ENV #1072E	Unknown	Test Hole	Rotary	Chemistry Exists
1018	0260436	SW	34	054	22	4	Unknown														EMONTS, GERALD	Unknown	Chemistry	Unknown	No Chemistry
1019	0240752	NE	15	055	21	4	Unknown	24.4											12/05/1969		ALTA ENV #0297E	Unknown	Test Hole	Rotary	No Chemistry
1020	0240769	NE	34	054	22	4	Unknown	36.6											07/08/1976		ALTA ENV #1620E	Unknown	Test Hole	Rotary	No Chemistry
1021	0260401	SW	32	054	22	4	Unknown	12.8													DONALDSON, ARTHUR	Unknown	Chemistry	Unknown	Chemistry Exists
1022	0260400	SW	32	054	22	4	Unknown	9.1													KOHUT, WM	Unknown	Chemistry	Drilled	Chemistry Exists
1023	0260399	SW	32	054	22	4	Unknown														SCOTFORD COLONY	Unknown	Chemistry	Unknown	No Chemistry
1024	0260398	SW	32	054	22	4	Unknown	71.6													SEWCHUK, S.	Unknown	Chemistry	Unknown	Chemistry Exists
1025	0169121	SE	16	056	21	4	Not Applicable	34.7											23/09/1992	23/09/1992	HENKELMAN, P.R.	Unknown	New Well-Abandoned	Rotary	No Chemistry
1026	0260415	NW	32	054	22	4	Unknown														SHERRITT GORDON MINES	Unknown	Chemistry	Unknown	No Chemistry
1027	0260050	NE	08	054	22	4	Unknown	12.2													KENSON HLDG	Unknown	Chemistry	Bored	Chemistry Exists
1028	0262433	01	03	055	23	4	Unknown	15.2													WILSON	Unknown	Federal Well Survey	Bored	No Chemistry
1029	0260462	EH	36	054	22	4	Unknown	12.2													LAMOUREUX, JIM	Unknown	Chemistry	Unknown	No Chemistry
1030	0261432	SE	13	055	22	4	Unknown	56.4											01/09/1930		TATHAM, J	Unknown	New Well	Unknown	No Chemistry
1031	0208911	SE	16	056	21	4														01/11/2007	SHELL CANADA LIMITED	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1032	0261038	SE	01	055	22	4	Casing/Open Hole	54.9											19/07/1959		HANSEN, P E	Unknown	New Well	Unknown	No Chemistry
1033	0261035	SE	01	055	22	4	Unknown	69.5											01/09/1930		ATKINSON, H	Unknown	Well Inventory	Unknown	No Chemistry
1034	0261596	16	18	055	22	4	Casing	12.5											23/10/1964		LAMOUREUX, J A	Unknown	New Well	Bored	No Chemistry
1035	0240767	NE	36	054	22	4	Unknown	12.2											08/08/1976		ALTA ENV #1621E	Unknown	Test Hole	Rotary	No Chemistry
1036	1575666	SW	12	056	22	4														08/12/2008	PETRO CANADA	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1037	1575667	SW	13	056	22	4														09/12/2008	PETRO CANADA	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1038	0262078	NW	34	054	23	4	Casing/Open Hole	67.1											01/07/1954		SPEER, A.	Unknown	New Well	Drilled	No Chemistry
1039	0260942	NW	13	054	23	4	Unknown	69.5											02/09/1930		ARMSTRONG, E.	Unknown	Other	Drilled	No Chemistry
1040	0152372	WH	08	056	21	4	Not Applicable	30.5											26/06/1990		MASCHMEYER, RAY	Unknown	Dry Hole	Rotary	No Chemistry
1041	0240768	NE	35	054	22	4	Unknown	30.5											05/08/1976		ALTA ENV #1618E	Unknown	Test Hole	Auger	No Chemistry
1042	0264168	SE	13	056	22	4	Unknown	61.0													BLOOM, B.	Unknown	Chemistry	Unknown	Chemistry Exists
1043	0264193	NE	13	056	22	4	Unknown	50.3													OOSTERHUIS, H.T.	Unknown	Chemistry	Unknown	Chemistry Exists
1044	0264141	SE	12	056	22	4	Unknown	61.0													SERINK, MIKE	Unknown	Chemistry	Unknown	Chemistry Exists
1045	0264390	SW	29	056	21	4	Unknown														ESSO RES	Unknown	Chemistry	Unknown	Chemistry Exists
1046	0261583	SW	25	054	23	4	Casing/Open Hole	39.6											12/10/1963		HANES, A	Unknown	New Well	Rotary	No Chemistry
1047	0298285	NE	19	055	21	4	Not Applicable															Unknown	Old Well-Abandoned	Not Applicable	No Chemistry
1048	0260218	02	26	054	22	4	Screen & Open Hole	22.9							12.2	13.4			18/09/1964		MID WESTERN INDUSTRIAL GAS LTD	Unknown	New Well	Unknown	No Chemistry
1049	1575668	SW	13	056	22	4														09/12/2008	PETRO CANADA	Unknown	Old Well-Abandoned	Unknown	No Chemistry
1050	0260189	10	19	054	22	4	Unknown	32.9														Unknown	Chemistry	Unknown	Chemistry Exists

WorleyParsons

resources & energy

Waterwell Records Within the Study Area

	WELL ID	LOCATION					WELL_FINISH	WELL DEPTH (m)	PERFORATIONS 1 (m)		PERFORATIONS 2 (m)		PERFORATIONS 3 (m)		SCREENINGS 1 (m)		SCREENINGS 2 (m)		DATE		WELL OWNER	PROPOSED_USE	TYPE_WORK	DRILL_METHOD	CHEMISTRY
		LSD	SECTION	TOWNSHIP	RANGE	MERIDIAN			FROM	TO	FROM	TO	FROM	TO	FROM	TO	FROM	TO	COMPLETED	ABANDONED					
1051	0260413	NW	32	054	22	4	Unknown														WALKER, L.	Unknown	Chemistry	Unknown	No Chemistry
1052	0260197	SW	22	054	22	4	Unknown	9.1													SHACKLETON, STV	Unknown	Chemistry	Unknown	Chemistry Exists
1053	0260359	NW	28	054	22	4	Unknown	32.0													KOVAC, JOE	Unknown	Chemistry	Unknown	Chemistry Exists
1054	0268141	SE	01	055	23	4		4.6														Unknown	Unknown	Unknown	No Chemistry
1055	0263560	SW	08	056	21	4														01/11/2007	SHELL CANADA - OIL SANDS	Unknown	Old Well-Abandoned	Unknown	Chemistry Exists
1056	0260191	04	20	054	22	4	Casing	28.3											01/01/1915		PETERS, R.J.	Unknown	New Well	Drilled	No Chemistry
1057	0260186	SE	19	054	22	4	Unknown	56.4													GALLOWAY, ROY	Unknown	Chemistry	Unknown	Chemistry Exists
1058	0260185	SE	19	054	22	4	Unknown	54.9													RIVER BRAE FARM	Unknown	Chemistry	Unknown	Chemistry Exists
1059	0260221	SW	26	054	22	4	Unknown	51.8													GALLOWAY, EDWARD	Unknown	Chemistry	Drilled	Chemistry Exists
1060	0260187	NW	19	054	22	4	Unknown	57.9													LAMPRECHT, HENRY	Unknown	Chemistry	Unknown	Chemistry Exists
1061	0260371	00	28	054	22	4	Unknown	24.4													FINDLAY, W.	Unknown	Chemistry	Unknown	No Chemistry
1062	0261166	NW	06	055	22	4	Not Applicable	57.9													JESKE, O	Unknown	Test Hole	Rotary	No Chemistry
1063	0260178	SW	17	054	22	4	Unknown	80.8													GALLOWAY, LLOYD	Unknown	Chemistry	Unknown	Chemistry Exists
1064	0260177	SE	17	054	22	4	Unknown	6.1													TWIGGE, E.R.	Unknown	Chemistry	Drilled	Chemistry Exists
1065	0091497	04	06	056	20	4	Open Hole	7.0											17/07/1975		HYDROGEOLOGICAL CONSULT LTD	Unknown	Test Hole	Auger	No Chemistry
1066	0263554	NW	07	056	21	4	Unknown	56.7													VISSCHER, P.	Unknown	Unknown	Unknown	No Chemistry
1067	0260175	NW	16	054	22	4	Unknown	29.6													MCKAY, A.A.	Unknown	Chemistry	Unknown	Chemistry Exists
1068	0260173	NW	16	054	22	4	Unknown	27.4													THOMAS, ALFRED	Unknown	Chemistry	Unknown	Chemistry Exists
1069	0260176	NE	16	054	22	4	Unknown	24.1													GUY, F.E.	Unknown	Chemistry	Unknown	Chemistry Exists
1070	0260188	NW	19	054	22	4	Unknown	70.1													GABERT, DOUG	Unknown	Chemistry	Drilled	Chemistry Exists
1071	0083446	SW	19	055	21	4	Unknown	3.7												20/12/2002	DZURNY, E.	Unknown	Chemistry	Unknown	No Chemistry
1072	0260395	NW	31	054	22	4	Unknown	23.2													#TH 5	Unknown	Test Hole	Unknown	No Chemistry
1073	0260394	NW	31	054	22	4	Unknown	15.8													#TH 4	Unknown	Test Hole	Unknown	No Chemistry
1074	0260392	NW	31	054	22	4	Unknown	16.8													#TH 3	Unknown	Test Hole	Unknown	No Chemistry
1075	0260391	NW	31	054	22	4		16.2													#TH 2	Unknown	Test Hole	Unknown	No Chemistry
1076	0260389	NW	31	054	22	4	Unknown	18.9													#TH 1	Unknown	Test Hole	Unknown	No Chemistry
1077	0260385	SE	30	054	22	4	Unknown	67.1													LAINPRECHT, H.	Unknown	Chemistry	Unknown	Chemistry Exists
1078	0240751	EH	20	055	21	4	Unknown	45.1											12/05/1969		ALTA ENV/WATER RES #0296E	Unknown	Test Hole	Rotary	No Chemistry
1079	0260374	NW	29	054	22	4	Unknown	35.1													VAN DEN BERG	Unknown	Chemistry	Unknown	Chemistry Exists
1080	0260220	SW	26	054	22	4	Unknown	61.0													IRELAND, KEN	Unknown	Chemistry	Bored	Chemistry Exists
1081	0240770	NW	29	054	22	4	Unknown	42.7											08/08/1976		ALTA ENV #1622E	Unknown	Test Hole	Rotary	No Chemistry
1082	0260067	NW	09	054	22	4	Unknown	61.0													VAN CAMP, ERIC	Unknown	Chemistry	Drilled	Chemistry Exists
1083	0260381	00	29	054	22	4	Casing	15.5											01/05/1965		HANFORD, R.M.	Unknown	New Well	Bored	No Chemistry
1084	0261055	NW	28	054	22	4	Unknown	36.0														Unknown	New Well	Drilled	No Chemistry
1085	0260364	NW	28	054	22	4	Casing	25.9													LEONHARDT, C.J.	Unknown	Chemistry	Drilled	Chemistry Exists
1086	0260363	NW	28	054	22	4	Unknown	29.9													HAMER, LYLE	Unknown	Chemistry	Unknown	Chemistry Exists
1087	0260361	NW	28	054	22	4	Unknown	30.5													MCNIRNE, ROBERT	Unknown	Chemistry	Unknown	Chemistry Exists
1088	0083508	13	28	055	21	4	Open Hole	29.3											25/06/1969		ALTA AGRICULTURE #669H	Unknown	Test Hole	Rotary	No Chemistry
1089	0083445	SW	19	055	21	4	Unknown														BLACKLOCK, OLGA	Unknown	Chemistry	Unknown	No Chemistry
1090	0260231	NW	28	054	22	4	Unknown	61.0													RUDOLPH, MARJORIE	Unknown	Chemistry	Drilled	Chemistry Exists
1091	0260372	NW	29	054	22	4	Unknown	10.4													VAN DEN BERG	Unknown	Chemistry	Unknown	Chemistry Exists

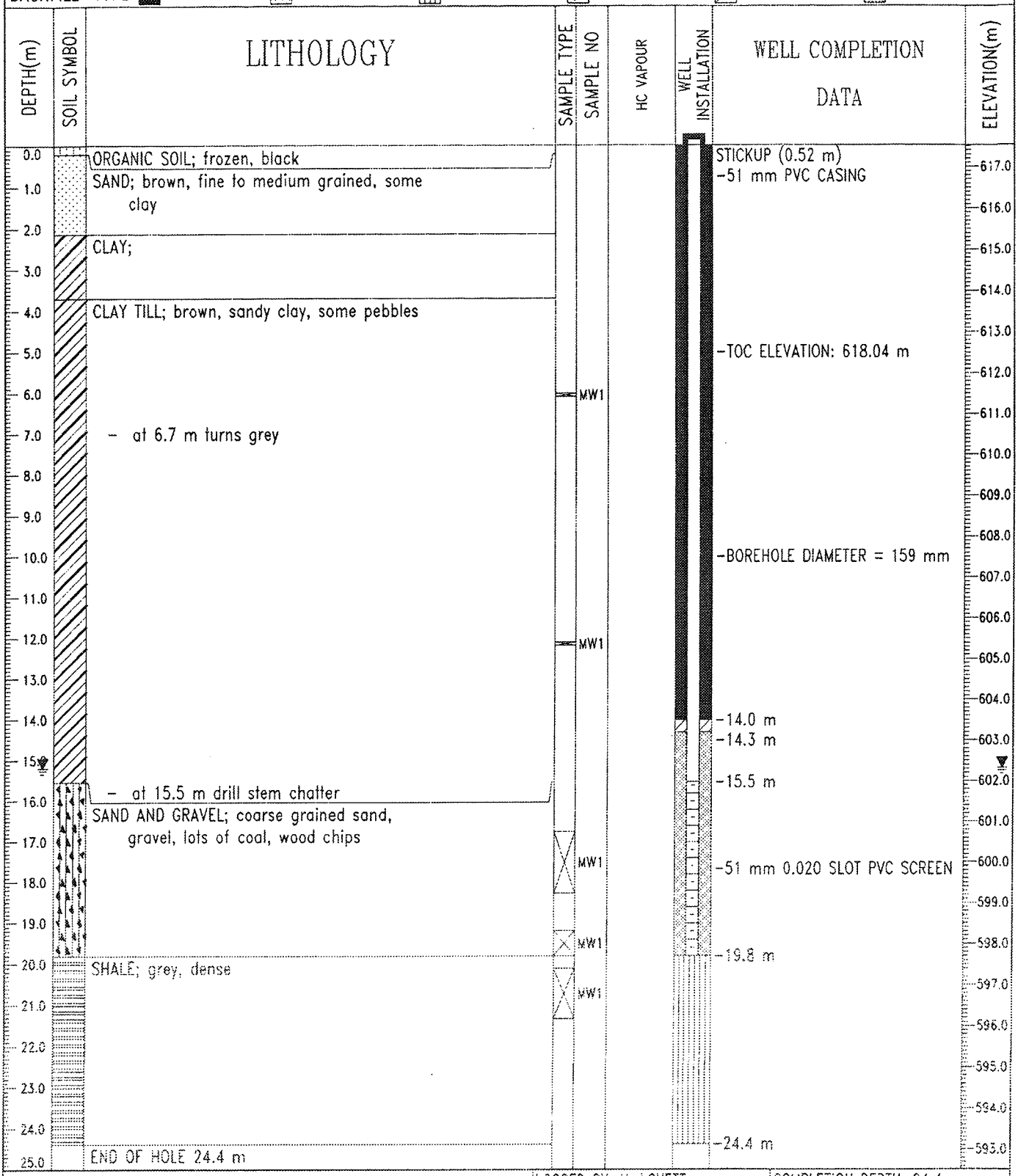
* Data Source: Alberta Environment Water Well Database, June 2009
* Date of Search: May 31, 2010

Appendix 2 Borehole Logs

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-01
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:350335.04 N:5951040.45	ELEVATION: 617.52 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 24.4 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/24/05
	Fig. No: 17094	Page 1 of 1

05/11/04 07:28PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-02
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:352457.80 N:5950583.37	ELEVATION: 630.71 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		ORGANIC SOIL; frozen, black					STICKUP (0.60 m)	630.0
1.0		SAND; brown, medium grained					-51 mm PVC CASING	
2.0							-TOC ELEVATION: 631.31 m	629.0
3.0							-BOREHOLE DIAMETER = 159 mm	628.0
4.0								627.0
5.0								626.0
6.0								625.0
7.0		CLAY TILL; brown, sandy clay, silty, some pebbles, coal chips						624.0
8.0								623.0
9.0								622.0
10.0								621.0
11.0								620.0
12.0								619.0
13.0								618.0
14.0		SAND; brown, grey, speckled medium grained sand						617.0
15.0								616.0
16.0								615.0
17.0		CLAY; brown, sandy						614.0
18.0		SAND; grey, medium speckled sand		MW2				613.0
19.0								612.0
20.0								611.0
21.0								610.0
22.0								609.0
23.0								608.0
24.0				MW2				607.0
25.0								606.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 38.1 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/24/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:28PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-02
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:352457.80 N:5950583.37	ELEVATION: 630.71 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0								605.0
26.0							-25.9 m	
27.0		SAND AND GRAVEL; coarse grained sand and gravel, coal chips, wood					-26.2 m	604.0
28.0								603.0
29.0		- at 29.0 m lots of chatter on drill stem						602.0
30.0				MW2			-51 mm 0.020 SLOT PVC SCREEN	601.0
31.0								600.0
32.0								599.0
33.0								598.0
34.0		SHALE; grey, dense					-33.8 m	597.0
35.0								596.0
36.0				MW2				595.0
37.0								594.0
38.0		END OF HOLE 38.1 m					-38.1 m	593.0
39.0								592.0
40.0								591.0
41.0								590.0
42.0								589.0
43.0								588.0
44.0								587.0
45.0								586.0
46.0								585.0
47.0								584.0
48.0								583.0
49.0								582.0
50.0								581.0

Stantec Consulting Ltd.
Edmonton, Alberta

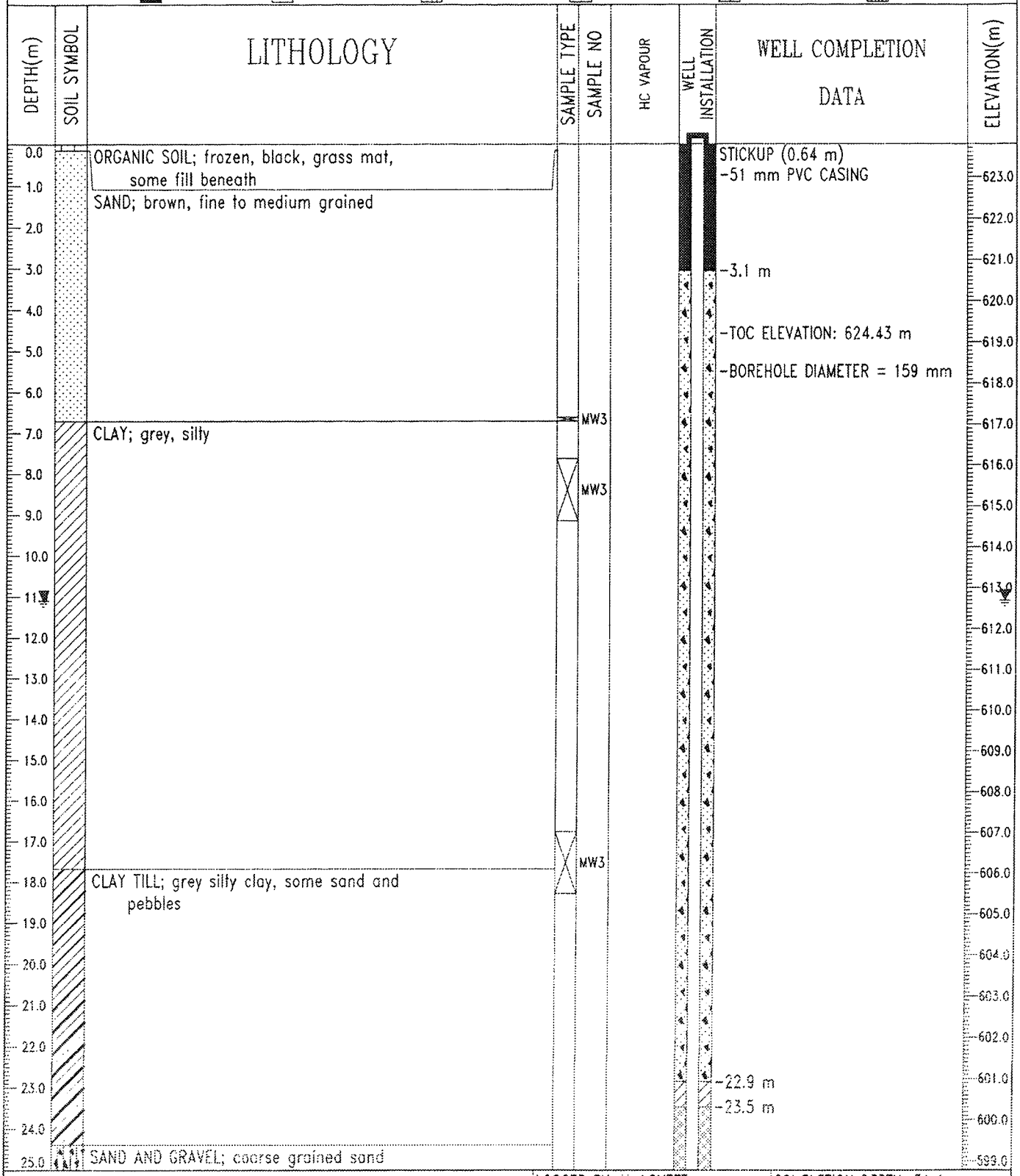
LOGGED BY: H. LOVETT	COMPLETION DEPTH: 38.1 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/24/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:28PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-03
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:353030.21 N:5952940.90	ELEVATION: 623.79 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 31.4 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
	Fig. No: 17094	Page 1 of 2

05/11/04 02:28PM (PETCH-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-03
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:353030.21 N:5952940.90	ELEVATION: 623.79 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0	with coal and gravel					-25.0 m	598.0
26.0			MW3				
27.0			MW3			-51 mm 0.020 SLOT PVC SCREEN	597.0
28.0							596.0
29.0							595.0
30.0	SHALE; grey, dense		MW3			-29.6 m	594.0
31.0						-31.4 m	593.0
32.0	END OF HOLE 31.4 m						592.0
33.0							591.0
34.0							590.0
35.0							589.0
36.0							588.0
37.0							587.0
38.0							586.0
39.0							585.0
40.0							584.0
41.0							583.0
42.0							582.0
43.0							581.0
44.0							580.0
45.0							579.0
46.0							578.0
47.0							577.0
48.0							576.0
49.0							575.0
50.0							574.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 31.4 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:26PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-04
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354823.41 N:5953959.76	ELEVATION: 620.25 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE / SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0	ORGANIC SOIL; black, frozen				STICKUP (0.54 m)	620.0
1.0	CLAY; grey, sandy				-152 mm PVC CASING	619.0
2.0					-1.5 m	618.0
3.0					-TOC ELEVATION: 620.79 m	617.0
4.0					-BOREHOLE DIAMETER = 222 mm	616.0
5.0						615.0
6.0						614.0
7.0	SAND; brown, fine to coarse grained, pebbles, black speckles	MW4				613.0
8.0						612.0
9.0						611.0
10.0						610.0
11.0						609.0
12.0						608.0
13.0						607.0
14.0						606.0
15.0						605.0
16.0						604.0
17.0	- at 16.8 m finer grained brown sand					603.0
18.0 ▼					-18.3 m	602.0 ▼
19.0	- at 18.3 m back to medium to coarse grained grey/brown sand				-19.5 m	601.0
20.0	SHALE; grey, clay					600.0
21.0		MW4				599.0
22.0	SAND; grey, medium to coarse grained	MW4			-21.6 m	598.0
23.0	SAND AND GRAVEL; grey, coarse grained sand and gravel, wood fibers	MW4				597.0
24.0						596.0
25.0					-155 mm 0.020 SLOT PVC SCREEN	

Stantec Consulting Ltd.
Edmonton, Alberta

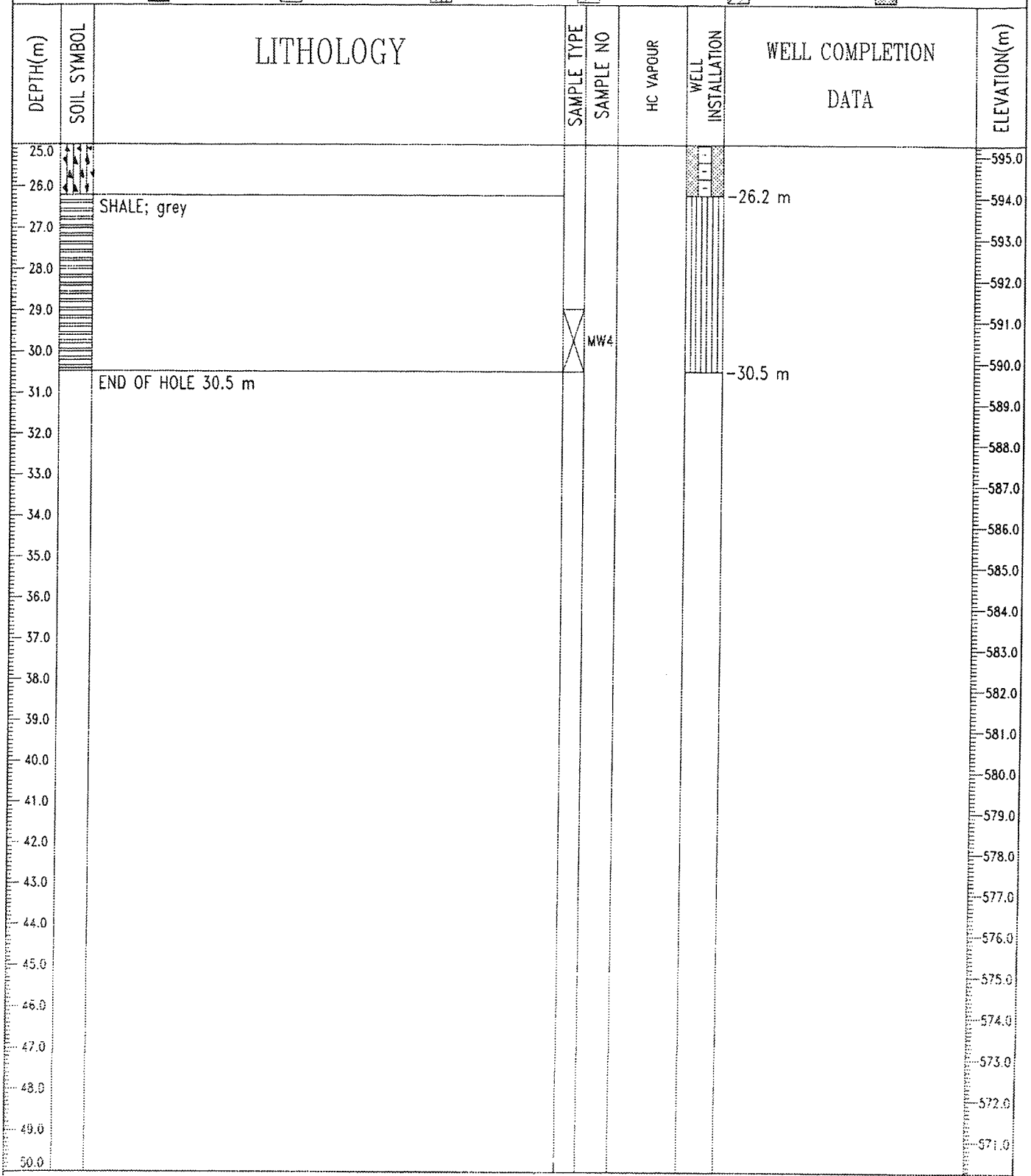
LOGGED BY: H. LOVETT	COMPLETION DEPTH: 30.5 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:32PM (PETIOR-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-04
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354823.41 N:5953959.76	ELEVATION: 620.25 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 30.5 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
	Fig. No: 17094	Page 2 of 2

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-05
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354293.74 N:5954889.46	ELEVATION: 624.28 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		TOPSOIL; frozen, black, some organics					STICKUP (0.61 m)	624.0
1.0		SAND; brown, fine to medium grained					-51 mm PVC CASING	623.0
2.0								622.0
3.0							-3.1 m	621.0
4.0		CLAY; brown, soft, silty					-TOC ELEVATION: 624.89 m	620.0
5.0							-BOREHOLE DIAMTER = 159 mm	619.0
6.0								618.0
7.0		- from 7.3 to 10.7 m blue, silty clay						617.0
8.0								616.0
9.0								615.0
10.0								614.0
11.0		TILL; blue, silty clay, small gravel, multi colored						613.0
12.0								612.0
13.0								611.0
14.0								610.0
15.0								609.0
16.0		GRAVEL; large gravel, multi colored, tower shakes						608.0
17.0		TILL; sandy, sandy clay, fine grained, small gravel, grey						607.0
18.0		SAND AND GRAVEL; grey, medium to coarse grained sand, small gravel						606.0
19.0		CLAY TILL; sandy, grey, fine grained sandy clay till		MW5				605.0
20.0								604.0
21.0								603.0
22.0							-22.6 m	602.0
23.0		- well cemented from 23.2 to 25.0 m					-23.2 m	601.0
24.0								600.0
25.0				MW5				

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.5 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 1 of 2

05/11/04 01:29PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-05
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354293.74 N:5954889.46	ELEVATION: 624.28 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE NO	WELL COMPLETION DATA	ELEVATION(m)
25.0		MW5		599.0
26.0	SAND; grey, salt and pepper color, fine to medium grained sand			598.0
27.0			-26.8 m	597.0
28.0	GRAVEL; small to large gravel, multi colored, sand and gravel mixed alot	MW	-28.4 m	596.0
29.0				595.0
30.0			-51 mm 0.020 SLOT PVC SCREEN	594.0
31.0			-31.4 m	593.0
32.0	SHALE; grey, dense			592.0
33.0				591.0
34.0				590.0
35.0				589.0
36.0				588.0
37.0			-37.5 m	587.0
38.0	END OF HOLE 37.5 m			586.0
39.0				585.0
40.0				584.0
41.0				583.0
42.0				582.0
43.0				581.0
44.0				580.0
45.0				579.0
46.0				578.0
47.0				577.0
48.0				576.0
49.0				575.0
50.0				

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.5 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:29PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-06
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361559.34 N:5958812.22	ELEVATION: 629.61 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		TOPSOIL; black/brown, frozen, organics					STICKUP (0.67 m)	629.0
1.0		CLAY; sandy, light brown, fine grained					-51 mm PVC CASING	
2.0								628.0
3.0		- at 3.1 m turns grey, silty					-3.1 m	627.0
4.0				MW6			-TOC ELEVATION: 630.28 m	626.0
5.0							-BOREHOLE DIAMETER = 159 mm	
6.0								625.0
7.0				MW6				624.0
8.0		CLAY TILL; grey, silty, clay, some rocks and pebbles						623.0
9.0								622.0
10.0								621.0
11.0								620.0
12.0								619.0
13.0								618.0
14.0		- at 13.7 m becomes more sandy, firm						617.0
15.0								616.0
16.0								615.0
17.0								614.0
18.0								613.0
19.0								612.0
20.0								611.0
21.0								610.0
22.0								609.0
23.0		SAND; grey, black speckled, medium grained, some silt		MW6				608.0
24.0		CLAY; grey, sandy, silty						607.0
25.0		SAND;						606.0
								605.0

Stantec Consulting Ltd.
Edmonton, Alberta

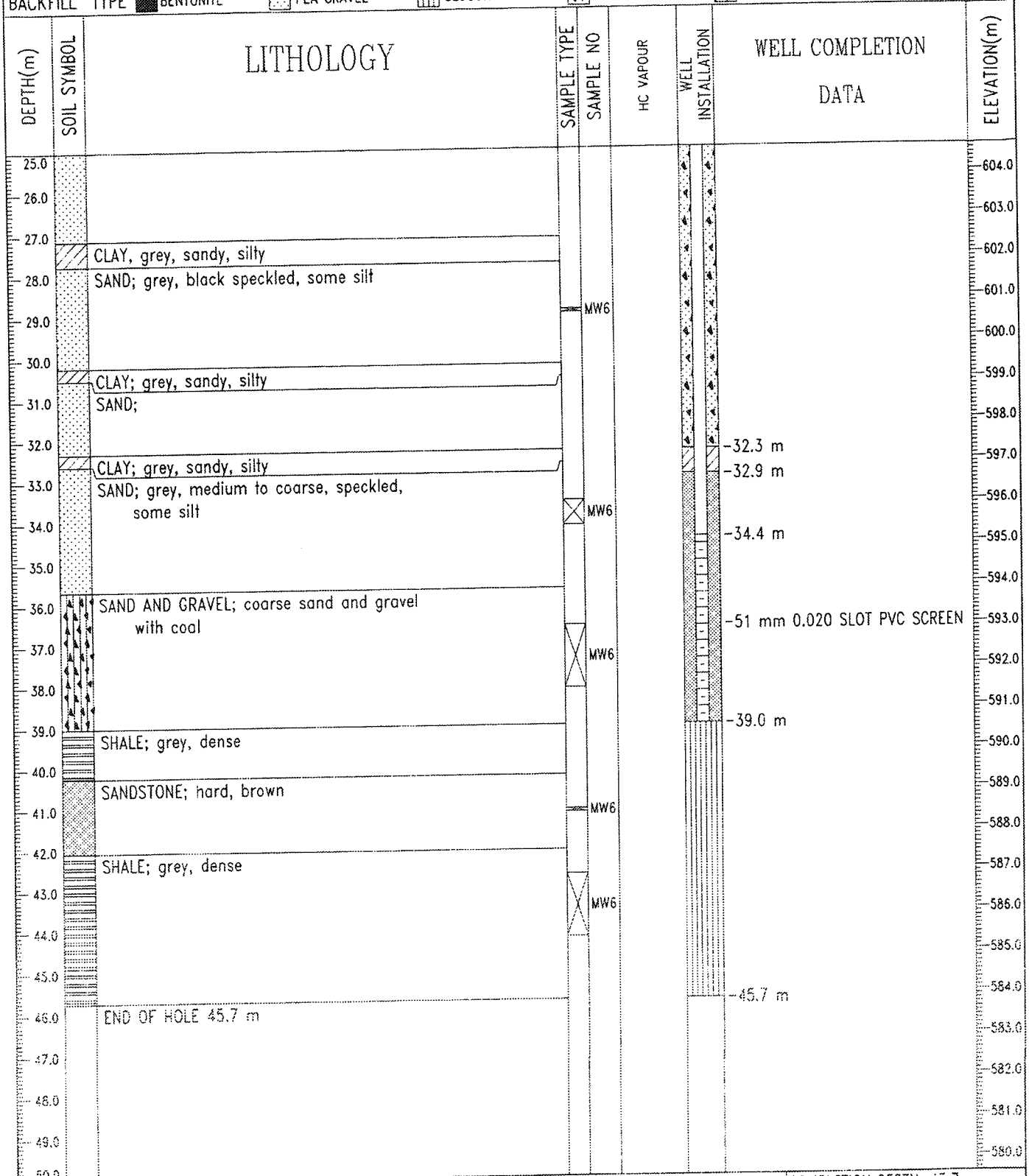
LOGGED BY: H. LOVETT | COMPLETION DEPTH: 45.7 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 01/31/05
Fig. No: 17094 |

05/11/04 02:42PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-06
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361559.34 N:5958812.22	ELEVATION: 629.61 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 45.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/31/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:42PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-07
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:359089.70 N:5959604.24	ELEVATION: 630.41 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		SAND; brown, medium to coarse grained sand and gravel					STICKUP (0.60 m)	630.0
1.0							-152 mm PVC CASING	629.0
2.0								628.0
3.0		CLAY; grey, sandy					-TOC ELEVATION: 631.01 m	627.0
4.0		SAND; grey, fine grained					-BOREHOLE DIAMETER = 222 mm	626.0
5.0								625.0
6.0								624.0
7.0								623.0
8.0								622.0
9.0								621.0
10.0		CLAY; grey, sandy						620.0
11.0								619.0
12.0								618.0
13.0		SAND; grey, fine grained						617.0
14.0								616.0
15.0								615.0
16.0								614.0
17.0		CLAY TILL; grey, sandy clay with pebbles						613.0
18.0								612.0
19.0								611.0
20.0								610.0
21.0								609.0
22.0								608.0
23.0								607.0
24.0								606.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

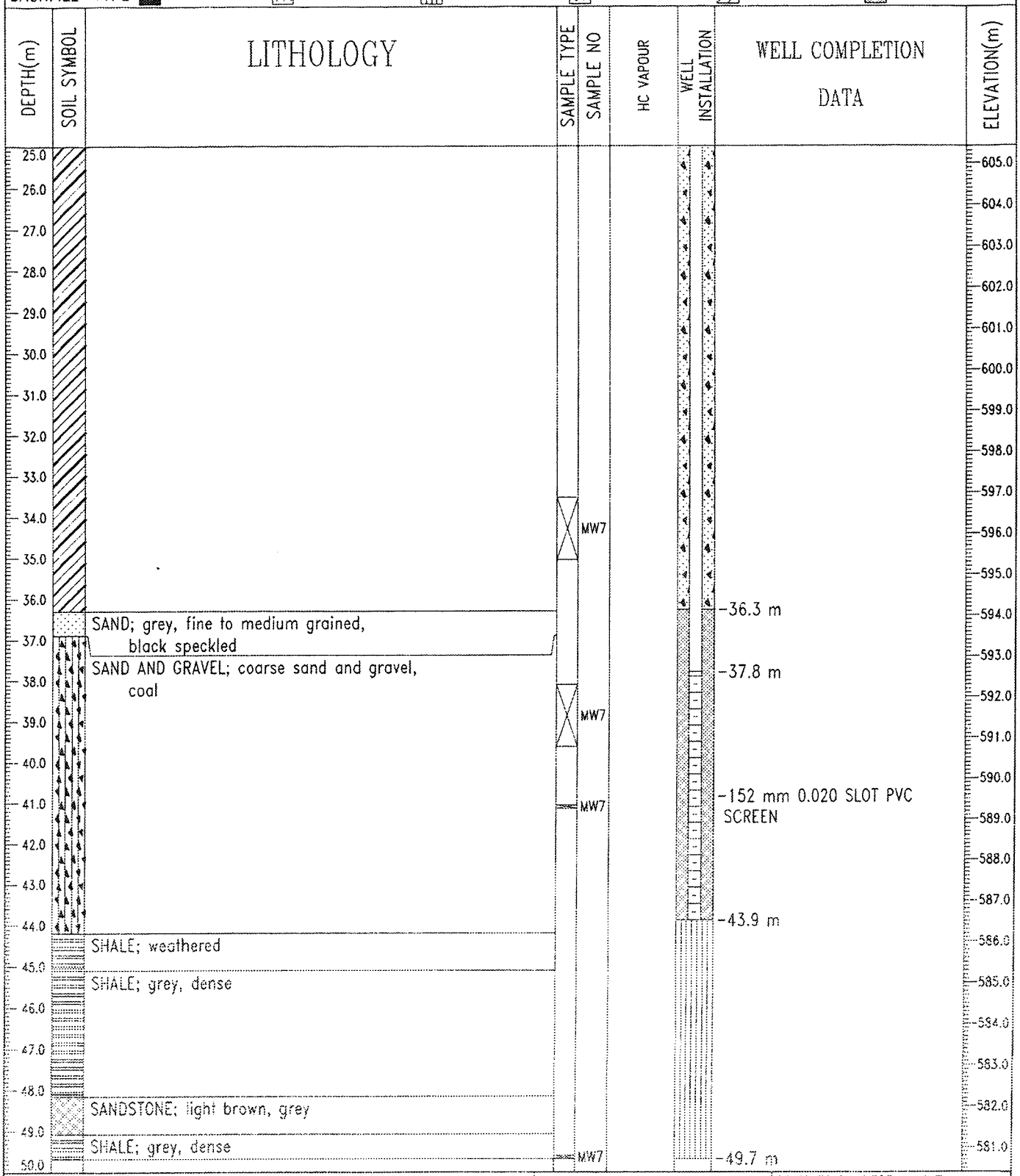
LOGGED BY: H. LOVETT | COMPLETION DEPTH: 49.7 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 02/14/05
Fig. No: 17094 |

05/11/04 02:47PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-07
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:359089.70 N:5959604.24	ELEVATION: 630.41 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 49.7 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/14/05
	Fig. No: 17094	Page 2 of 2

05/11/04 02:47PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-08
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:363133.77 N:5961204.95	ELEVATION: 625.87 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0	TOPSOIL; black, roots, grasses					STICKUP (0.57 m)	625.0
1.0	SAND; brown/black grains, fine to medium grained					-51 mm PVC CASING	
2.0	CLAY; brown/grey, silty						624.0
3.0							623.0
4.0						-3.1 m -TOC ELEVATION: 626.44 m -BOREHOLE DIAMETER = 159 mm	622.0
5.0	SAND; silty, brown, very fine grained						621.0
6.0							620.0
7.0							619.0
8.0							618.0
9.0							617.0
10.0	CLAY; blue/grey, silty						616.0
11.0							615.0
12.0							614.0
13.0							613.0
14.0	CLAY TILL; blue clay, sandy						612.0
15.0							611.0
16.0							610.0
17.0							609.0
18.0							608.0
19.0	SAND; coarse grained, grey/brown						607.0
20.0	CLAY TILL; blue clay, small gravel, sandy						606.0
21.0							605.0
22.0			MW8				604.0
23.0							603.0
24.0	SHALE; rafted						602.0
25.0							601.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.8 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:28PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-08
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:363133.77 N:5961204.95	ELEVATION: 625.87 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0								600.0
26.0		SAND; fine to medium grained, grey, black specks						599.0
27.0								598.0
28.0				MW8			-28.0 m	597.0
29.0							-28.7 m	596.0
30.0				MW8			-30.5 m	595.0
31.0		GRAVEL; brown/black, small gravel, coal chunks					-51 mm 0.020 SLOT PVC SCREEN	594.0
32.0								593.0
33.0				MW8			-33.5 m	592.0
34.0		SHALE; grey, dense						591.0
35.0								590.0
36.0				MW8				589.0
37.0								588.0
38.0		END OF HOLE 37.8 m					-37.8 m	587.0
39.0								586.0
40.0								585.0
41.0								584.0
42.0								583.0
43.0								582.0
44.0								581.0
45.0								580.0
46.0								579.0
47.0								578.0
48.0								577.0
49.0								576.0
50.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.8 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 2 of 2

05/11/24 02:29PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-09
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361003.46 N:5962032.28	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		ORGANIC SOIL; frozen, black					STICKUP (0.67 m)	624.0
1.0		CLAY; silty, light brown, some sand, some pebbles					-51 mm PVC CASING	623.0
2.0								622.0
3.0		- at 3.1 m turns darker brown					-TOC ELEVATION: 624.73 m	621.0
4.0							-BOREHOLE DIAMETER = 159 mm	620.0
5.0								619.0
6.0								618.0
7.0								617.0
8.0								616.0
9.0								615.0
10.0								614.0
11.0		CLAY TILL; grey, silty, some pebbles						613.0
12.0								612.0
13.0								611.0
14.0								610.0
15.0		- at 14.6 m becomes sandy						609.0
16.0								608.0
17.0								607.0
18.0		SAND; grey, fine to medium grained, some clay and coal						606.0
19.0		CLAY TILL; grey, fine to medium grained sand and pebbles						605.0
20.0								604.0
21.0								603.0
22.0								602.0
23.0								601.0
24.0								600.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 43.6 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/28/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:30PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-09
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361003.46 N:5962032.28	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0							599.0
26.0	SAND; grey, medium grained, some clay, black coal speckles						598.0
27.0							597.0
28.0							596.0
29.0	CLAY; grey, sandy						595.0
30.0	GRAVEL; gravel with coarse sand and gravel					-29.9 m -30.5 m	594.0
31.0			MW9				593.0
32.0	SAND AND GRAVEL; coarse sand and coal with gravel					-32.0 m	592.0
33.0						-51 mm 0.020 SLOT PVC SCREEN	591.0
34.0	GRAVEL; gravel with coarse sand and coal						590.0
35.0							589.0
36.0			MW9			-36.6 m	588.0
37.0							587.0
38.0							586.0
39.0	SHALE; grey, dense						585.0
40.0			MW9				584.0
41.0							583.0
42.0							582.0
43.0						-43.6 m	581.0
44.0	END OF HOLE 43.6 m						580.0
45.0							579.0
46.0							578.0
47.0							577.0
48.0							576.0
49.0							575.0
50.0							

Stantec Consulting Ltd Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 43.6 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/28/05
	Fig. No: 17094	Page 2 of 2

05/11/04 02:50PM (PEL GN-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-10
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:364,954.62 N:5,963,505.11	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		TOPSOIL; brown, frozen, sandy					STICKUP (0.61 m)	624.0
1.0		SAND; brown, fine to medium grained					-152 mm PVC CASING	623.0
2.0								622.0
3.0		- at 3.1 m turns grey, some silt					-3.0 m	621.0
4.0							-TOC ELEVATION: 624.67 m	620.0
5.0							-BOREHOLE DIAMETER = 200 mm	619.0
6.0								618.0
7.0								617.0
8.0		CLAY; grey, silty						616.0
9.0								615.0
10.0								614.0
11.0								613.0
12.0		SAND; grey, fine grained						612.0
13.0								611.0
14.0								610.0
15.0								609.0
16.0		CLAY TILL; grey, silty						608.0
17.0		SILT; sandy, grey, fine grained sand and silt						607.0
18.0		CLAY TILL; grey, silty						606.0
19.0								605.0
20.0								604.0
21.0								603.0
22.0								602.0
23.0		SAND; grey, fine grained, some silt						601.0
24.0								600.0
25.0		CLAY; grey, silty, harder						

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT | COMPLETION DEPTH: 44.8 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 01/26/05
Fig. No: 17094

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-10
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:364,954.62 N:5,963,505.11	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE, NO RECOVERY, GRAB, SPT, A-CASING, CORE

BACKFILL TYPE: BENTONITE, PEA GRAVEL, SLOUGH, GROUT, PELTONITE, SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	WELL COMPLETION DATA	ELEVATION(m)
25.0					599.0
25.0	SAND; cemented, grey, black speckled				598.0
27.0					597.0
28.0		GRAB	MW10		596.0
29.0					595.0
30.0				-30.2 m	594.0
31.0				-31.4 m	593.0
32.0					592.0
33.0					591.0
34.0	SAND AND GRAVEL; coarse grained sand and gravel, coal	GRAB	MW10	-SHALE BASKET	590.0
35.0					589.0
36.0				-35.7 m	588.0
37.0		GRAB	MW10	-152 mm 0.020 SLOT PVC SCREEN	587.0
38.0					586.0
39.0	GRAVEL; mostly gravel, lots of drill stem chatter, some sand				585.0
40.0					584.0
41.0					583.0
42.0	SHALE; grey, dense			-41.8 m	582.0
43.0		GRAB	MW10		581.0
44.0					580.0
45.0	END OF HOLE 44.8 m			-44.8 m	579.0
46.0					578.0
47.0					577.0
48.0					576.0
49.0					575.0
50.0					

HC VAPOUR | WELL INSTALLATION

Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 44.8 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/26/05
	Fig. No: 17094	Page 2 of 2

05/06/23 11:08AM (PELTON-1)

CLIENT: NCIA	DRILLING COMPANY: SPT DRILLING LTD.	BOREHOLE NO: MW-11
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: N:5,965,300.71 E:362,564.36	ELEVATION: 624.491 (m)

SAMPLE TYPE: SHELBY TUBE, NO RECOVERY, GRAB, SPT, A-CASING, CORE

BACKFILL TYPE: BENTONITE, PEA GRAVEL, SLOUGH, GROUT, PELTONITE, SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	SLOTTED PIEZOMETER	WELL COMPLETION DATA	ELEVATION(m)
0.0	TOPSOIL; soft, black, organic silty soil					-STICKUP (0.67 m)	
	SAND; loose, brown, fine to medium grained					-51 mm PVC CASING	624.0
1.0	CLAY; firm, brown, orange, grey, silty, no pebbles						623.0
2.0	CLAY TILL; firm, brown, sandy clay, grey, silt strands, some orange oxidation, some coal, pebbles						622.0
3.0						-3.0 m	621.0
4.0						-BOREHOLE DIAMETER 160 mm	620.0
5.0	- at 5.5 m turns grey						619.0
6.0	- at 6.4 m damp to moist						618.0
7.0							617.0
8.0							616.0
9.0							615.0
10.0							614.0
11.0							613.0
12.0							612.0
13.0							611.0
14.0							610.0
15.0	- from 15.2 to 17.7 m lots of sand, coarse grained, speckled, larger rocks mixed with clay, wet						609.0
16.0							608.0
17.0	- at 17.7 m returns to firm, grey clay till						607.0
18.0							606.0
19.0	- at 18.9 m small band of coarse grained sand then returns to grey						605.0
20.0							

Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 44.2 m
	REVIEWED BY: H. LOVETT	COMPLETE: 09/24/04
	Fig. No: 17094	Page 1 of 3

06/08/29 11:13AM (PELTON-1)

CLIENT: NCIA	DRILLING COMPANY: SPT DRILLING LTD.	BOREHOLE NO: MW-11
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: N:5,965,300.71 E:362,564.36	ELEVATION: 624.491 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	SLOTTED PIEZOMETER	WELL COMPLETION DATA	ELEVATION(m)
20.0		clay till						604.0
21.0								603.0
22.0								602.0
23.0								601.0
24.0								600.0
25.0								599.0
26.0								598.0
27.0		SAND; loose, fine to medium grained, wet						597.0
28.0								596.0
29.0								595.0
30.0								594.0
31.0								593.0
32.0								592.0
33.0								591.0
34.0								590.0
35.0							-35.1 m	589.0
36.0								588.0
37.0		SAND AND GRAVEL; loose, grey, wet, large gravel						587.0
38.0							-38.1 m	586.0
39.0								585.0
40.0								

Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 44.2 m
	REVIEWED BY: H. LOVETT	COMPLETE: 09/24/04
	Fig. No: 17094	Page 2 of 3

CLIENT: NCIA	DRILLING COMPANY: SPT DRILLING LTD.	BOREHOLE NO: MW-11
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: N:5,965,300.71 E:362,564.36	ELEVATION: 624.491 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	SLOTTED PIEZOMETER	WELL COMPLETION DATA	ELEVATION(m)
40.0								584.0
41.0							-51 mm 0.010 SLOT PVC SCREEN	583.0
42.0								582.0
43.0								581.0
44.0							-44.2 m	580.0
45.0		SHALE; dark grey, dry						579.0
46.0								578.0
47.0							-47.2 m	577.0
48.0		END OF HOLE 47.2 m NOTE: ON COMPLETION -backfill borehole with 10/20 grade sand to 44.2 mBGL MONITOR WELL INSTALLED -blue steel casing protector with lock added -above ground PVC stickup (0.67 mAGL) ON SEPTEMBER 24, 2004 -water level at 29.84 mBGL ON SEPTEMBER 28, 2004 -water level at 29.83 mBGL LOCAL COORDINATES: N:5242.77 E:2786.27 NOTE: -Originally installed for Shell Scotford Upgrader 04-10-44						576.0
49.0								575.0
50.0								574.0
51.0								573.0
52.0								572.0
53.0								571.0
54.0								570.0
55.0								569.0
56.0								568.0
57.0								567.0
58.0								566.0
59.0								565.0
60.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT | COMPLETION DEPTH: 44.2 m
REVIEWED BY: H. LOVETT | COMPLETE: 09/24/04
Fig. No: 17094 |

08/08/29 11:10AM (PETTOH-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-12
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:366805.93 N:5968379.85	ELEVATION: 625.46 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		MOSS; frozen, green, some organics					STICKUP (0.61 m)	625.0
1.0		SAND; brown, fine to medium grained					-51 mm PVC CASING	624.0
2.0								623.0
3.0							-3.1 m	622.0
4.0							-TOC ELEVATION: 626.07 m	621.0
5.0							-BOREHOLE DIAMETER = 159 mm	620.0
6.0								619.0
7.0								618.0
8.0		CLAY; grey, silty SILT; grey						617.0
9.0								616.0
10.0								615.0
11.0		CLAY; grey, silty						614.0
12.0								613.0
13.0		SILT; grey						612.0
14.0								611.0
15.0		CLAY; grey, silty						610.0
16.0								609.0
17.0								608.0
18.0								607.0
19.0		CLAY TILL; grey, sandy, clay, some silt,						606.0
20.0		some pebbles						605.0
21.0								604.0
22.0								603.0
23.0								602.0
24.0								601.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 42.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/02/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:30PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-12
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:366805.93 N:5968379.85	ELEVATION: 625.46 (m)

SAMPLE TYPE: SHELBY TUBE, NO RECOVERY, GRAB, SPT, A-CASING, CORE

BACKFILL TYPE: BENTONITE, PEA GRAVEL, SLOUGH, GROUT, PELTONITE, SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	WELL COMPLETION DATA	ELEVATION(m)
25.0					600.0
26.0–27.5		GRAB	MW12		
28.0	SAND; grey, medium grained, black speckled	GRAB	MW12		597.0
32.9				-32.9 m	
33.5				-33.5 m	
36.8	SAND AND GRAVEL; coarse sand and gravel, coal			-51 mm 0.020 SLOT PVC SCREEN	
38.1				-38.1 m	
38.3	SHALE; grey, dense	GRAB	MW12		
40.5	- brown, soft shale				
41.7	- grey, dense	GRAB	MW12		
42.7	END OF HOLE 42.7 m			-42.7 m	
50.0					576.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 42.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/02/05
Fig. No: 17094	Page 2 of 2

05/11/04 07:00PM (PETCON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-13
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:365292.72 N:5968147.12	ELEVATION: 625.65 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		PEAT MOSS;					STICKUP (0.63 m)	625.0
1.0		SAND; brown, fine to medium grained					-51 mm PVC CASING	624.0
2.0								623.0
3.0							-3.1 m	622.0
4.0							-TOC ELEVATION: 626.28 m	621.0
5.0							-BOREHOLE DIAMETER = 159 mm	620.0
6.0								619.0
7.0								618.0
8.0		CLAY; brown grey, silty						617.0
9.0		SAND; brown, grey, fine to medium grained, some clay						616.0
10.0		CLAY; grey, silty						615.0
11.0								614.0
12.0								613.0
13.0								612.0
14.0								611.0
15.0								610.0
16.0								609.0
17.0								608.0
18.0								607.0
19.0								606.0
20.0		CLAY TILL; grey, sandy (fine to medium grained), clay with pebbles - at 19.8 m rock						605.0
21.0								604.0
22.0								603.0
23.0				MW13				602.0
24.0								601.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

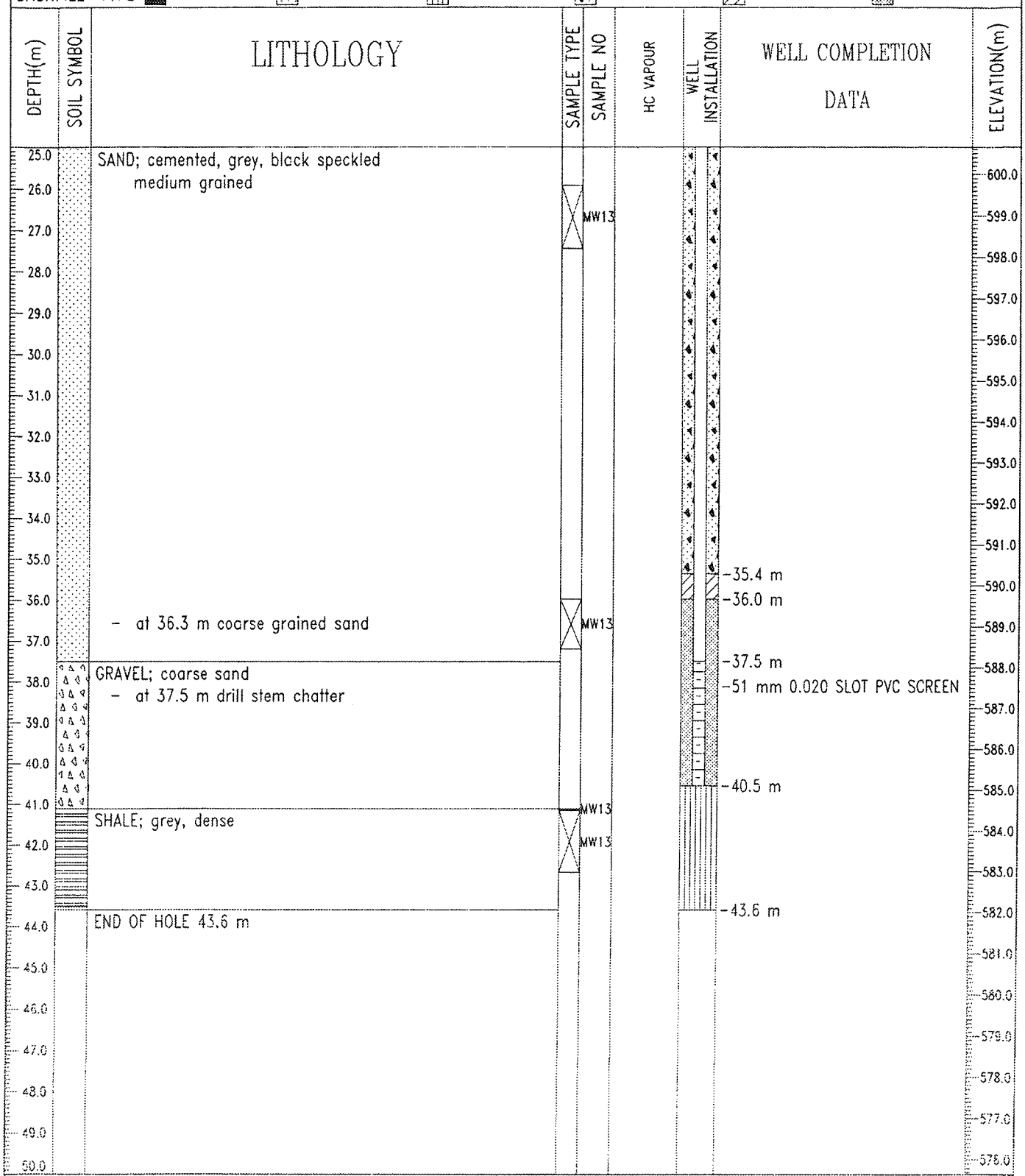
LOGGED BY: H. LOVETT | COMPLETION DEPTH: 43.6 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 01/02/05
Fig. No: 17094 | Page 1 of 2

05/11/04 02:48PM (FELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-13
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:365292.72 N:5968147.12	ELEVATION: 625.65 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

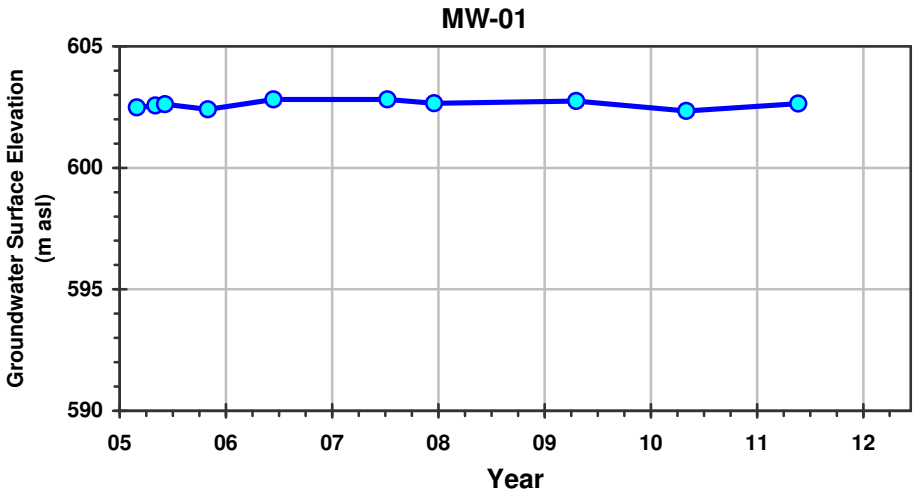
BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

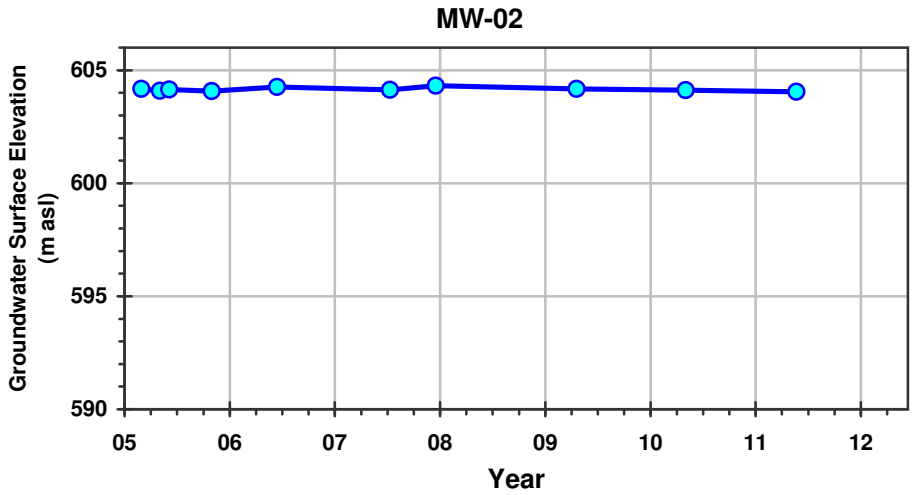


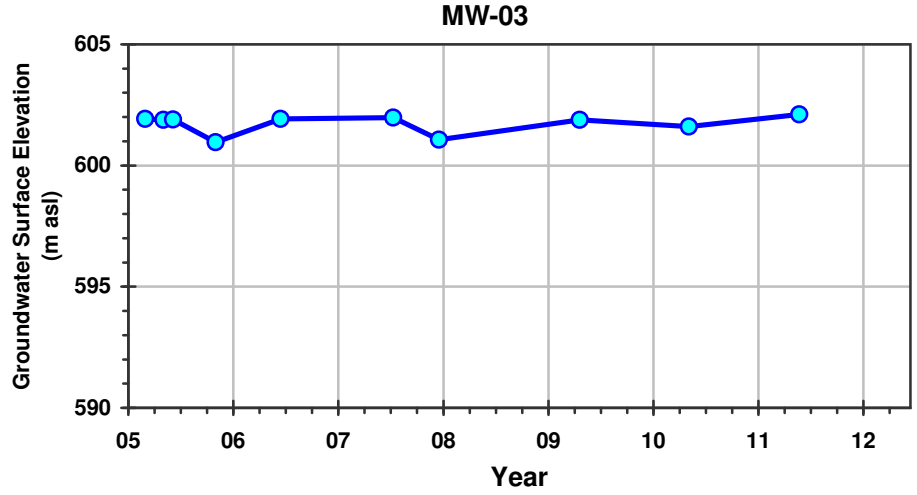
Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 43.6 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/02/05
	Fig. No: 17094	Page 2 of 2

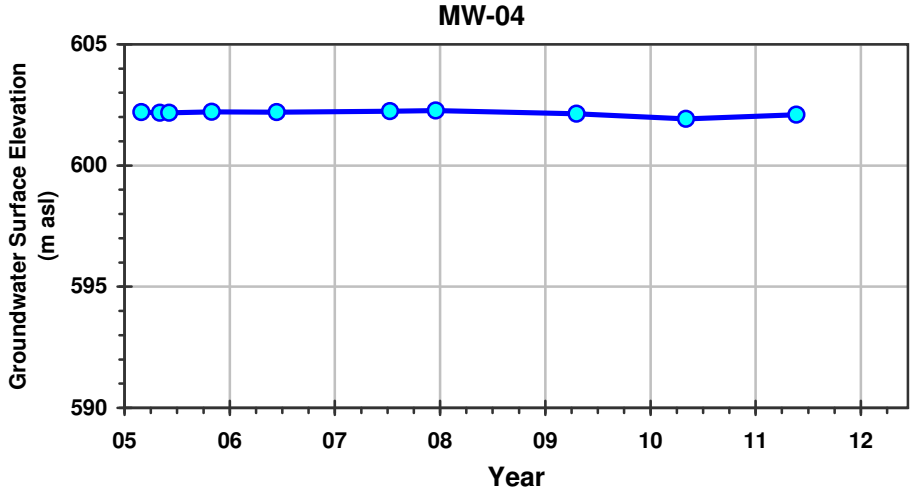
05/11/04 02:48PM (PELTON-1)

Appendix 3 Groundwater Hydrographs









Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols represent dry well elevations*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
GROUNDWATER HYDROGRAPHS
MONITORING STATIONS: MW-01, MW-02, MW-03, and MW-04

WorleyParsons
resources & energy

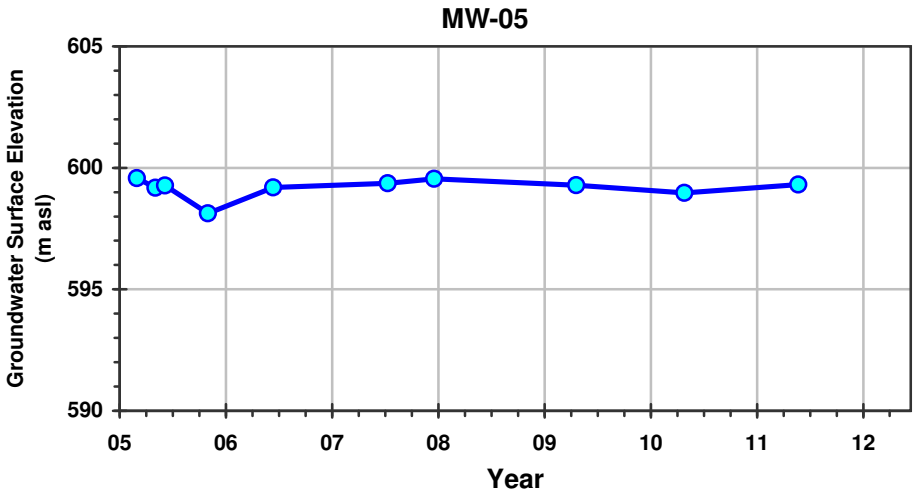
27-Jun-11 date	edited by	KS drawn by	app by

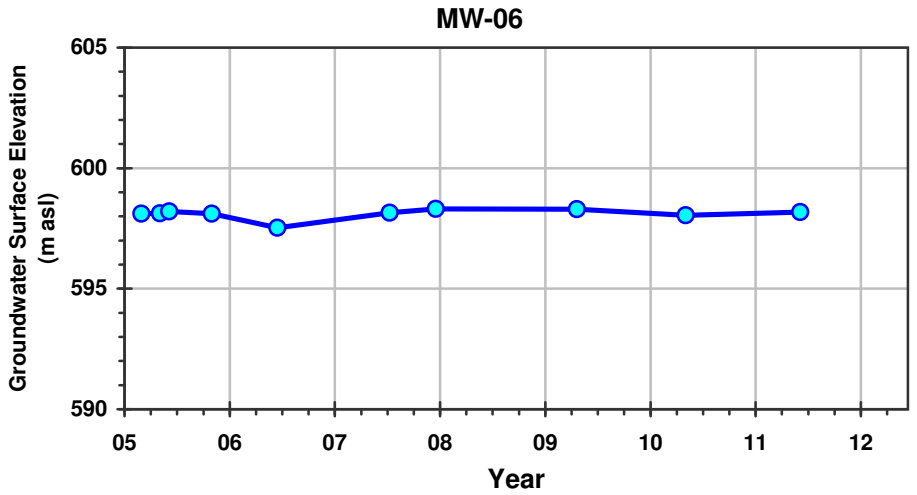
PREPARED SOLELY FOR THE USE OF OUR CLIENT AS SPECIFIED IN THE ACCOMPANYING REPORT. NO REPRESENTATION OF ANY KIND IS MADE TO OTHER PARTIES WITH WHICH WORLEYPARSONS HAS NOT ENTERED INTO A CONTRACT.

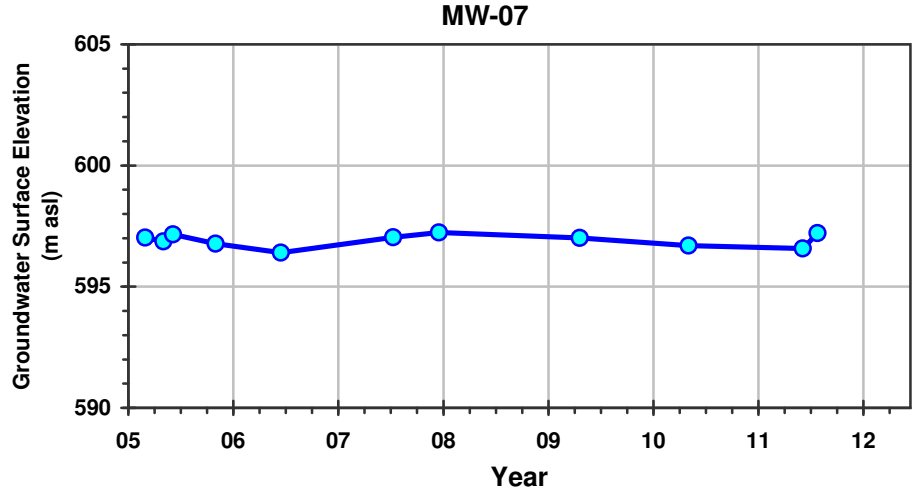
PROJECT NUMBER: **E00100102**

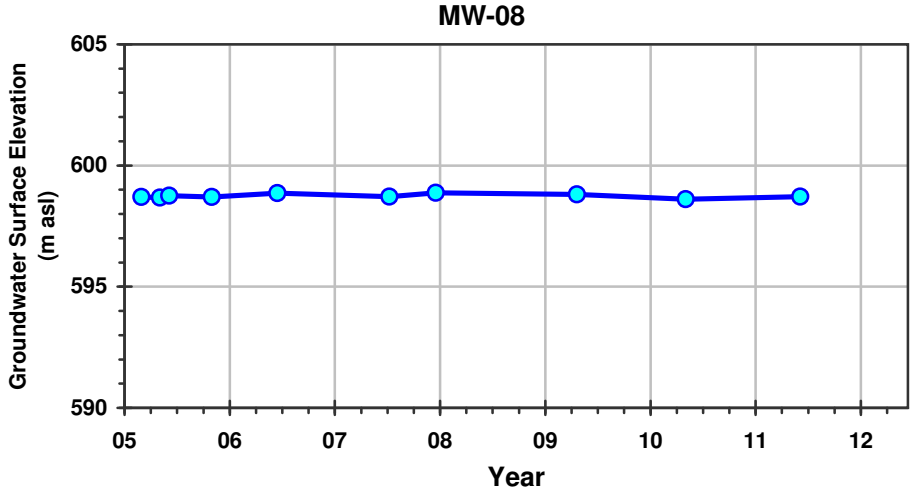
FIGURE: **A3-1**

J:\E001s\E00100101 (NCIA 2010 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 3 - Groundwater Hydrographs









Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols represent dry well elevations*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
GROUNDWATER HYDROGRAPHS
MONITORING STATIONS: MW-05, MW-06, MW-07, MW-08

WorleyParsons
resources & energy

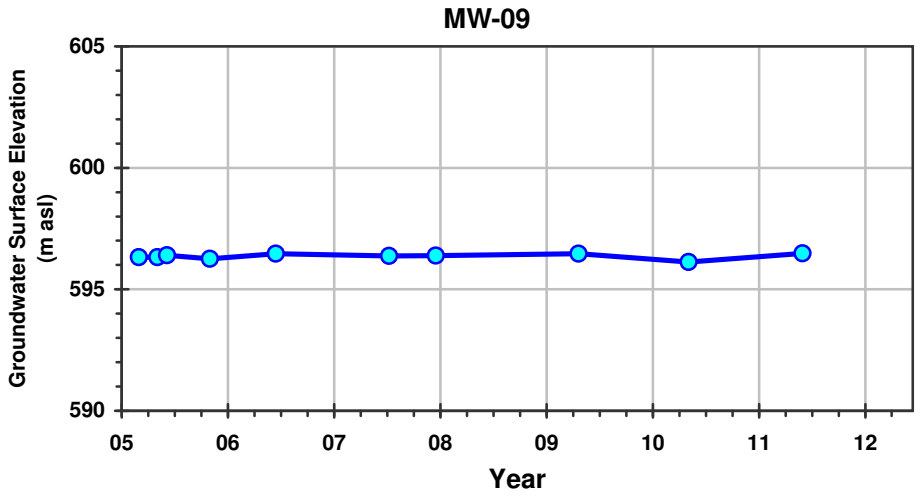
27-Jun-11 date	edited by	KS drawn by	app by

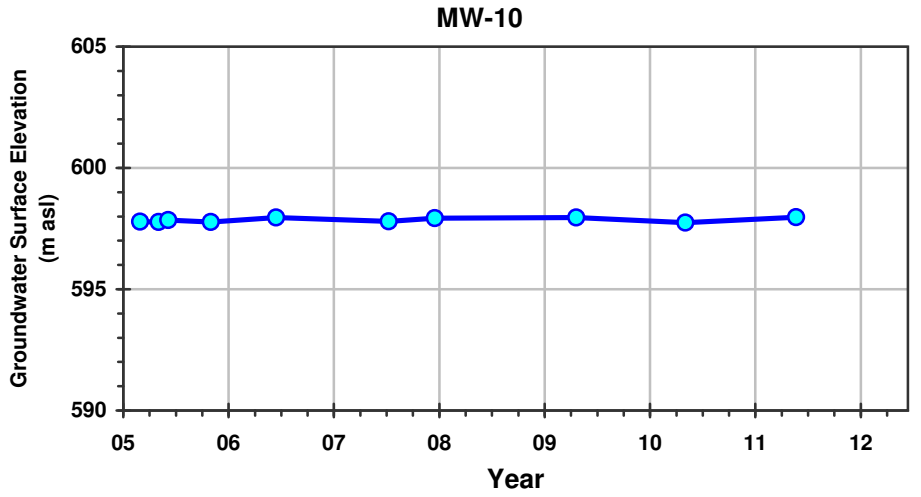
PREPARED SOLELY FOR THE USE OF OUR CLIENT AS SPECIFIED IN THE ACCOMPANYING REPORT. NO REPRESENTATION OF ANY KIND IS MADE TO OTHER PARTIES WITH WHICH WORLEYPARSONS HAS NOT ENTERED INTO A CONTRACT.

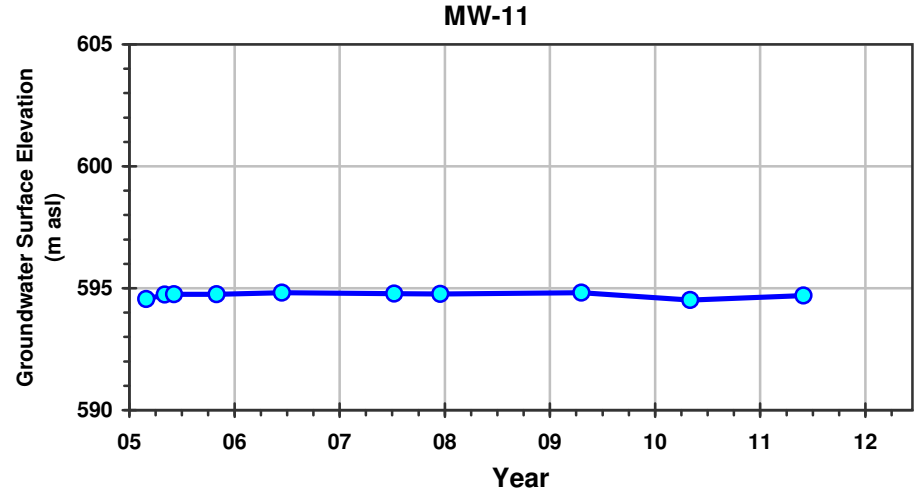
PROJECT NUMBER: **E00100102**

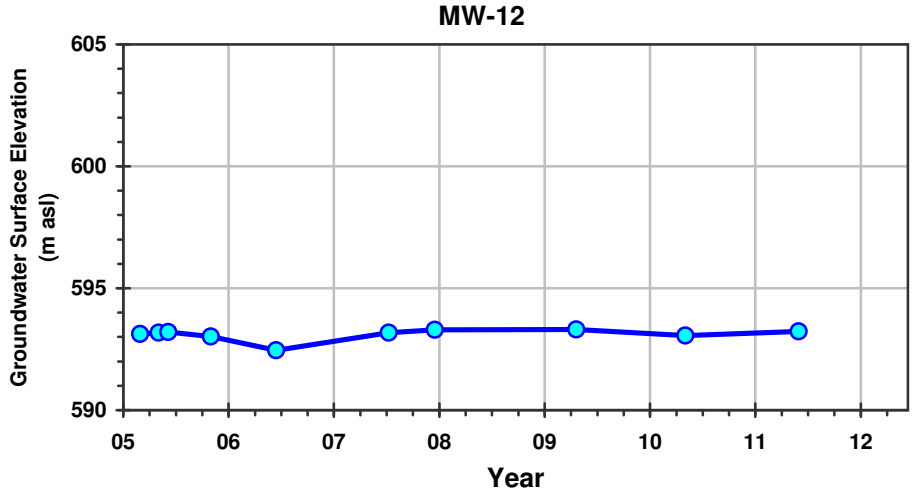
FIGURE: **A3-2**

J:\E001s\E00100101 (NCIA 2010 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 3 - Groundwater Hydrographs









Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols represent dry well elevations*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
GROUNDWATER HYDROGRAPHS
MONITORING STATIONS: MW-09, MW-10, MW-11, MW-12

WorleyParsons
resources & energy

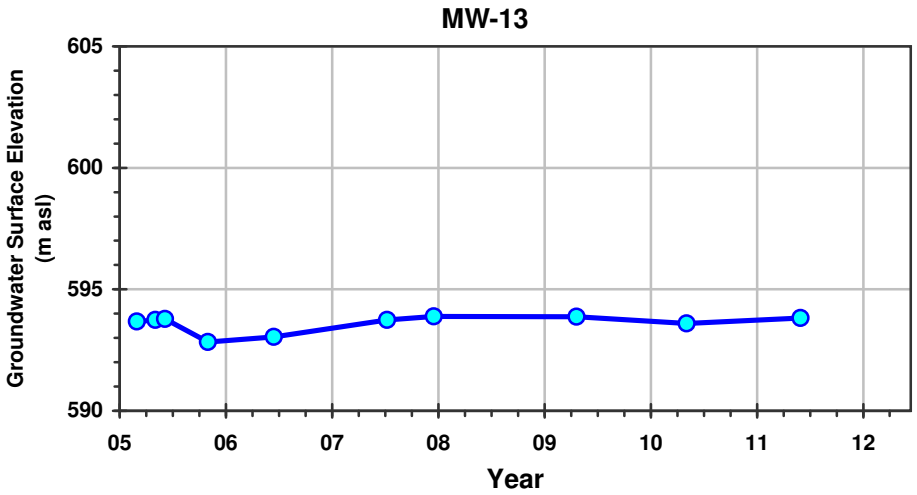
27-Jun-11 date	edited by	KS drawn by	app by

PREPARED SOLELY FOR THE USE OF OUR CLIENT AS SPECIFIED IN THE ACCOMPANYING REPORT. NO REPRESENTATION OF ANY KIND IS MADE TO OTHER PARTIES WITH WHICH WORLEYPARSONS HAS NOT ENTERED INTO A CONTRACT.

PROJECT NUMBER: **E00100102**

FIGURE: **A3-3**

J:\E001s\E00100101 (NCIA 2010 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 3 - Groundwater Hydrographs



Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols represent dry well elevations*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
GROUNDWATER HYDROGRAPHS
MONITORING STATION: MW-13

WorleyParsons
resources & energy

27-Jun-11 date	edited by	KS drawn by	app by

PROJECT NUMBER: **E00100102**

FIGURE: **A3-4**

J:\E001s\E00100101 (NCIA 2010 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 3 - Groundwater Hydrographs

Appendix 4 Laboratory Analytical Data

WORLEYPARSONS CANADA SERVICES LTD
ATTN: TREVOR BUTTERFIELD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Date Received: 25-MAY-11
Report Date: 01-JUN-11 15:24 (MT)
Version: FINAL

Client Phone: 780-496-9055

Certificate of Analysis

Lab Work Order #:	**L1008890**
Project P.O. #:	NOT SUBMITTED
Job Reference:	E00100102
Legal Site Desc:	NCIA BEVERLY CHANNEL
C of C Numbers:	01010

Maureen Olinek
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1008890-1 MW-01							
Sampled By: SOMK/MULS on 25-MAY-11 @ 08:50							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Toluene	<0.00075		0.00075	mg/L		26-MAY-11	R2192597
EthylBenzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
o-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
m+p-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Styrene	<0.0010		0.0010	mg/L		26-MAY-11	R2192597
F1(C6-C10)	<0.10		0.10	mg/L		26-MAY-11	R2192597
F1-BTEX	<0.10		0.10	mg/L		26-MAY-11	R2192597
Xylenes	<0.00071		0.00071	mg/L		26-MAY-11	R2192597
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	26-MAY-11	26-MAY-11	R2194548
Surrogate: 2-Bromobenzotrifluoride	100		65-135	%	26-MAY-11	26-MAY-11	R2194548
Miscellaneous Parameters							
Ammonia as N, Dissolved	0.271		0.050	mg/L		27-MAY-11	R2194721
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		26-MAY-11	R2194644
Dissolved Organic Carbon	3.4		1.0	mg/L		31-MAY-11	R2197018
Fluoride (F)	0.109		0.050	mg/L		26-MAY-11	R2194637
Phenols (4AAP)	<0.0010		0.0010	mg/L		31-MAY-11	R2196490
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	3.02	RRV	0.50	mg/L		26-MAY-11	R2194637
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	0.0051		0.0050	mg/L		29-MAY-11	R2195766
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Arsenic (As)-Dissolved	0.00093		0.00040	mg/L		29-MAY-11	R2195766
Barium (Ba)-Dissolved	0.147		0.0050	mg/L		29-MAY-11	R2195766
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		29-MAY-11	R2195766
Boron (B)-Dissolved	<0.050		0.050	mg/L		29-MAY-11	R2195766
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Cobalt (Co)-Dissolved	0.00084		0.00010	mg/L		29-MAY-11	R2195766
Copper (Cu)-Dissolved	0.0017		0.0010	mg/L		29-MAY-11	R2195766
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Molybdenum (Mo)-Dissolved	0.00039		0.00010	mg/L		29-MAY-11	R2195766
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		29-MAY-11	R2195766
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		29-MAY-11	R2195766
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		29-MAY-11	R2195766
Uranium (U)-Dissolved	0.00205		0.00010	mg/L		29-MAY-11	R2195766
Vanadium (V)-Dissolved	0.00016		0.00010	mg/L		29-MAY-11	R2195766
Zinc (Zn)-Dissolved	0.0074		0.0020	mg/L		29-MAY-11	R2195766
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	91.1		0.50	mg/L		01-JUN-11	R2197107
Iron (Fe)-Dissolved	1.53		0.020	mg/L		01-JUN-11	R2197107
Magnesium (Mg)-Dissolved	25.4		0.10	mg/L		01-JUN-11	R2197107
Manganese (Mn)-Dissolved	0.675		0.0050	mg/L		01-JUN-11	R2197107
Potassium (K)-Dissolved	2.68		0.10	mg/L		01-JUN-11	R2197107
Sodium (Na)-Dissolved	33.3		0.50	mg/L		01-JUN-11	R2197107
Ion Balance Calculation							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1008890-1 MW-01							
Sampled By: SOMK/MULS on 25-MAY-11 @ 08:50							
Matrix: GROUNDWATER							
Ion Balance Calculation							
Ion Balance	94.9			%		01-JUN-11	
TDS (Calculated)	432			mg/L		01-JUN-11	
Hardness (as CaCO3)	332			mg/L		01-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		27-MAY-11	R2194876
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		30-MAY-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Sulfate by IC							
Sulfate (SO4)	57.1	RRV	0.50	mg/L		26-MAY-11	R2194637
pH, Conductivity and Total Alkalinity							
pH	8.04		0.10	pH		26-MAY-11	R2192863
Conductivity (EC)	768		0.20	uS/cm		26-MAY-11	R2192863
Bicarbonate (HCO3)	446		5.0	mg/L		26-MAY-11	R2192863
Carbonate (CO3)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Hydroxide (OH)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Alkalinity, Total (as CaCO3)	366		5.0	mg/L		26-MAY-11	R2192863
L1008890-2 MW-02							
Sampled By: SOMK/MULS on 25-MAY-11 @ 10:45							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Toluene	<0.00075		0.00075	mg/L		26-MAY-11	R2192597
EthylBenzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
o-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
m+p-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Styrene	<0.0010		0.0010	mg/L		26-MAY-11	R2192597
F1(C6-C10)	<0.10		0.10	mg/L		26-MAY-11	R2192597
F1-BTEX	<0.10		0.10	mg/L		26-MAY-11	R2192597
Xylenes	<0.00071		0.00071	mg/L		26-MAY-11	R2192597
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	26-MAY-11	26-MAY-11	R2194548
Surrogate: 2-Bromobenzotrifluoride	99		65-135	%	26-MAY-11	26-MAY-11	R2194548
Miscellaneous Parameters							
Ammonia as N, Dissolved	0.728		0.050	mg/L		27-MAY-11	R2194721
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		26-MAY-11	R2194644
Dissolved Organic Carbon	11.3		1.0	mg/L		31-MAY-11	R2197018
Fluoride (F)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Phenols (4AAP)	<0.0010		0.0010	mg/L		31-MAY-11	R2196490
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	22.3	RRV	0.50	mg/L		26-MAY-11	R2194637
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Arsenic (As)-Dissolved	0.00327		0.00040	mg/L		29-MAY-11	R2195766
Barium (Ba)-Dissolved	0.0420		0.0050	mg/L		29-MAY-11	R2195766

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1008890-2 MW-02							
Sampled By: SOMK/MULS on 25-MAY-11 @ 10:45							
Matrix: GROUNDWATER							
Diss. Metals in Water by ICPMS (Low)							
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		29-MAY-11	R2195766
Boron (B)-Dissolved	0.135		0.050	mg/L		29-MAY-11	R2195766
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Cobalt (Co)-Dissolved	0.00100		0.00010	mg/L		29-MAY-11	R2195766
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		29-MAY-11	R2195766
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Molybdenum (Mo)-Dissolved	0.00040		0.00010	mg/L		29-MAY-11	R2195766
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		29-MAY-11	R2195766
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		29-MAY-11	R2195766
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		29-MAY-11	R2195766
Uranium (U)-Dissolved	0.00114		0.00010	mg/L		29-MAY-11	R2195766
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Zinc (Zn)-Dissolved	0.0025		0.0020	mg/L		29-MAY-11	R2195766
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	141	RRV	0.50	mg/L		27-MAY-11	R2194912
Iron (Fe)-Dissolved	9.25	RRV	0.020	mg/L		27-MAY-11	R2194912
Magnesium (Mg)-Dissolved	51.3	RRV	0.10	mg/L		27-MAY-11	R2194912
Manganese (Mn)-Dissolved	0.434	RRV	0.0050	mg/L		27-MAY-11	R2194912
Potassium (K)-Dissolved	4.25	RRV	0.10	mg/L		27-MAY-11	R2194912
Sodium (Na)-Dissolved	97.9	RRV	0.50	mg/L		27-MAY-11	R2194912
Ion Balance Calculation							
Ion Balance	89.1	BL:INT		%		28-MAY-11	
TDS (Calculated)	944			mg/L		28-MAY-11	
Hardness (as CaCO3)	563			mg/L		28-MAY-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		27-MAY-11	R2194876
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		30-MAY-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Sulfate by IC							
Sulfate (SO4)	318	RRV	0.50	mg/L		26-MAY-11	R2194637
pH, Conductivity and Total Alkalinity							
pH	7.90		0.10	pH		26-MAY-11	R2192863
Conductivity (EC)	1500		0.20	uS/cm		26-MAY-11	R2192863
Bicarbonate (HCO3)	628		5.0	mg/L		26-MAY-11	R2192863
Carbonate (CO3)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Hydroxide (OH)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Alkalinity, Total (as CaCO3)	515		5.0	mg/L		26-MAY-11	R2192863
L1008890-3 MW-05							
Sampled By: SOMK/MULS on 25-MAY-11 @ 13:00							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Toluene	<0.00075		0.00075	mg/L		26-MAY-11	R2192597

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1008890-3 MW-05							
Sampled By: SOMK/MULS on 25-MAY-11 @ 13:00							
Matrix: GROUNDWATER							
BTEX, Styrene and F1 (C6-C10)							
EthylBenzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
o-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
m+p-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Styrene	<0.0010		0.0010	mg/L		26-MAY-11	R2192597
F1(C6-C10)	<0.10		0.10	mg/L		26-MAY-11	R2192597
F1-BTEX	<0.10		0.10	mg/L		26-MAY-11	R2192597
Xylenes	<0.00071		0.00071	mg/L		26-MAY-11	R2192597
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	26-MAY-11	26-MAY-11	R2194548
Surrogate: 2-Bromobenzotrifluoride	95		65-135	%	26-MAY-11	26-MAY-11	R2194548
Miscellaneous Parameters							
Ammonia as N, Dissolved	0.261		0.050	mg/L		27-MAY-11	R2194721
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		26-MAY-11	R2194644
Dissolved Organic Carbon	4.4		1.0	mg/L		31-MAY-11	R2197018
Fluoride (F)	0.075		0.050	mg/L		26-MAY-11	R2194637
Phenols (4AAP)	<0.0010		0.0010	mg/L		31-MAY-11	R2196490
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	30.9		0.50	mg/L		26-MAY-11	R2194637
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Arsenic (As)-Dissolved	0.00159		0.00040	mg/L		29-MAY-11	R2195766
Barium (Ba)-Dissolved	0.0552		0.0050	mg/L		29-MAY-11	R2195766
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		29-MAY-11	R2195766
Boron (B)-Dissolved	0.052		0.050	mg/L		29-MAY-11	R2195766
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Cobalt (Co)-Dissolved	0.00075		0.00010	mg/L		29-MAY-11	R2195766
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		29-MAY-11	R2195766
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Molybdenum (Mo)-Dissolved	0.00042		0.00010	mg/L		29-MAY-11	R2195766
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		29-MAY-11	R2195766
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		29-MAY-11	R2195766
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		29-MAY-11	R2195766
Uranium (U)-Dissolved	0.00066		0.00010	mg/L		29-MAY-11	R2195766
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		29-MAY-11	R2195766
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	105		0.50	mg/L		27-MAY-11	R2194912
Iron (Fe)-Dissolved	3.82		0.020	mg/L		27-MAY-11	R2194912
Magnesium (Mg)-Dissolved	32.7		0.10	mg/L		27-MAY-11	R2194912
Manganese (Mn)-Dissolved	0.657		0.0050	mg/L		27-MAY-11	R2194912
Potassium (K)-Dissolved	7.29		0.10	mg/L		27-MAY-11	R2194912
Sodium (Na)-Dissolved	41.7		0.50	mg/L		27-MAY-11	R2194912
Ion Balance Calculation							
Ion Balance	91.1			%		28-MAY-11	
TDS (Calculated)	572			mg/L		28-MAY-11	
Hardness (as CaCO3)	397			mg/L		28-MAY-11	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1008890-3 MW-05							
Sampled By: SOMK/MULS on 25-MAY-11 @ 13:00							
Matrix: GROUNDWATER							
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		27-MAY-11	R2194876
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		30-MAY-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Sulfate by IC							
Sulfate (SO4)	141		0.50	mg/L		26-MAY-11	R2194637
pH, Conductivity and Total Alkalinity							
pH	8.05		0.10	pH		26-MAY-11	R2192863
Conductivity (EC)	990		0.20	uS/cm		26-MAY-11	R2192863
Bicarbonate (HCO3)	433		5.0	mg/L		26-MAY-11	R2192863
Carbonate (CO3)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Hydroxide (OH)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Alkalinity, Total (as CaCO3)	355		5.0	mg/L		26-MAY-11	R2192863
L1008890-4 DUP 1							
Sampled By: SOMK/MULS on 25-MAY-11 @ 12:00							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Toluene	<0.00075		0.00075	mg/L		26-MAY-11	R2192597
EthylBenzene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
o-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
m+p-Xylene	<0.00050		0.00050	mg/L		26-MAY-11	R2192597
Styrene	<0.0010		0.0010	mg/L		26-MAY-11	R2192597
F1(C6-C10)	<0.10		0.10	mg/L		26-MAY-11	R2192597
F1-BTEX	<0.10		0.10	mg/L		26-MAY-11	R2192597
Xylenes	<0.00071		0.00071	mg/L		26-MAY-11	R2192597
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	26-MAY-11	26-MAY-11	R2194548
Surrogate: 2-Bromobenzotrifluoride	100		65-135	%	26-MAY-11	26-MAY-11	R2194548
Miscellaneous Parameters							
Ammonia as N, Dissolved	<0.050		0.050	mg/L		27-MAY-11	R2194721
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		26-MAY-11	R2194644
Dissolved Organic Carbon	<1.0		1.0	mg/L		31-MAY-11	R2197018
Fluoride (F)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Phenols (4AAP)	<0.0010		0.0010	mg/L		31-MAY-11	R2196490
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	<0.50		0.50	mg/L		26-MAY-11	R2194637
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Arsenic (As)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Barium (Ba)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		29-MAY-11	R2195766
Boron (B)-Dissolved	<0.050		0.050	mg/L		29-MAY-11	R2195766
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		29-MAY-11	R2195766

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1008890-4 DUP 1							
Sampled By: SOMK/MULS on 25-MAY-11 @ 12:00							
Matrix: GROUNDWATER							
Diss. Metals in Water by ICPMS (Low)							
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		29-MAY-11	R2195766
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Molybdenum (Mo)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		29-MAY-11	R2195766
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		29-MAY-11	R2195766
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		29-MAY-11	R2195766
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		29-MAY-11	R2195766
Uranium (U)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		29-MAY-11	R2195766
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		29-MAY-11	R2195766
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	<0.50		0.50	mg/L		27-MAY-11	R2194912
Iron (Fe)-Dissolved	<0.020		0.020	mg/L		27-MAY-11	R2194912
Magnesium (Mg)-Dissolved	<0.10		0.10	mg/L		27-MAY-11	R2194912
Manganese (Mn)-Dissolved	<0.0050		0.0050	mg/L		27-MAY-11	R2194912
Potassium (K)-Dissolved	<0.10		0.10	mg/L		27-MAY-11	R2194912
Sodium (Na)-Dissolved	<0.50		0.50	mg/L		27-MAY-11	R2194912
Ion Balance Calculation							
Ion Balance	Low TDS			%		28-MAY-11	
TDS (Calculated)	<1.0			mg/L		28-MAY-11	
Hardness (as CaCO3)	<1.0			mg/L		28-MAY-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		27-MAY-11	R2194876
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		30-MAY-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		26-MAY-11	R2194637
Sulfate by IC							
Sulfate (SO4)	<0.50		0.50	mg/L		26-MAY-11	R2194637
pH, Conductivity and Total Alkalinity							
pH	6.02		0.10	pH		26-MAY-11	R2192863
Conductivity (EC)	1.06		0.20	uS/cm		26-MAY-11	R2192863
Bicarbonate (HCO3)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Carbonate (CO3)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Hydroxide (OH)	<5.0		5.0	mg/L		26-MAY-11	R2192863
Alkalinity, Total (as CaCO3)	<5.0		5.0	mg/L		26-MAY-11	R2192863

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
BL:INT	Balance Reviewed: Interference Or Non-Measured Component
DLM	Detection Limit Adjusted For Sample Matrix Effects
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
C-DIS-ORG-ED	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
CL-IC-ED	Water	Chloride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F-IC-ED	Water	Fluoride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
NH4-DIS-ED	Water	Ammonia-N	APHA4500NH3F Colorimetry
NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-ED	Water	Nitrite as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
NO3-IC-ED	Water	Nitrate as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
PHENOLS-4AAP-ED	Water	Phenols (4AAP)	AB ENV.06537-COLORIMETRIC
PO4-DO-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-ED	Water	Sulfate by IC	APHA 4110 B-ION CHROMATOGRAPHY

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

01010

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L1008890

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L1008890 Report Date: 01-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED	**Water**							
Batch R2192597								
WG1285285-4 DUP		**L1008576-1**						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	26-MAY-11
Toluene		<0.00075	<0.00075	RPD-NA	mg/L	N/A	30	26-MAY-11
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	26-MAY-11
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	26-MAY-11
m+p-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	26-MAY-11
Styrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	26-MAY-11
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	26-MAY-11
WG1285285-2 LCS								
Benzene			71		%		70-130	26-MAY-11
Toluene			80		%		70-130	26-MAY-11
EthylBenzene			77		%		70-130	26-MAY-11
o-Xylene			84		%		70-130	26-MAY-11
m+p-Xylene			78		%		70-130	26-MAY-11
Styrene			99		%		70-130	26-MAY-11
WG1285285-3 LCS								
F1(C6-C10)			105		%		70-130	26-MAY-11
WG1285285-1 MB								
Benzene			<0.00050		mg/L		0.0005	26-MAY-11
Toluene			<0.00075		mg/L		0.00075	26-MAY-11
EthylBenzene			<0.00050		mg/L		0.0005	26-MAY-11
o-Xylene			<0.00050		mg/L		0.0005	26-MAY-11
m+p-Xylene			<0.00050		mg/L		0.0005	26-MAY-11
Styrene			<0.0010		mg/L		0.001	26-MAY-11
F1(C6-C10)			<0.10		mg/L		0.1	26-MAY-11
C-DIS-ORG-ED	**Water**							
Batch R2197018								
WG1288376-3 CVS								
Dissolved Organic Carbon			124		%		80-160	31-MAY-11
WG1288376-4 DUP		**L1008387-8**						
Dissolved Organic Carbon		4.7	4.4		mg/L	6.6	20	31-MAY-11
WG1288376-2 LCS								
Dissolved Organic Carbon			101		%		80-120	31-MAY-11
WG1288376-5 MS		**L1008387-8**						
Dissolved Organic Carbon			103		%		70-130	31-MAY-11
CL-IC-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-ED	**Water**							
Batch R2194637								
WG1284828-7 DUP		**L1008533-1**						
Chloride (Cl)		4.50	4.49		mg/L	0.10	20	26-MAY-11
WG1284828-2 LCS								
Chloride (Cl)			104		%		85-115	26-MAY-11
WG1284828-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-MAY-11
WG1284828-8 MS		**L1008533-1**						
Chloride (Cl)			105		%		75-125	26-MAY-11
F-IC-ED	**Water**							
Batch R2194637								
WG1284828-3 DUP		**L1007494-595**						
Fluoride (F)		5.14	5.25		mg/L	2.1	20	26-MAY-11
WG1284828-5 DUP		**L1007494-701**						
Fluoride (F)		2.29	2.28		mg/L	0.80	20	26-MAY-11
WG1284828-7 DUP		**L1008533-1**						
Fluoride (F)		1.01	1.01		mg/L	0.34	20	26-MAY-11
WG1284828-2 LCS								
Fluoride (F)			107		%		85-115	26-MAY-11
WG1284828-1 MB								
Fluoride (F)			<0.050		mg/L		0.05	26-MAY-11
WG1284828-4 MS								
Fluoride (F)			N/A	MS-B	%		-	26-MAY-11
WG1284828-6 MS		**L1007494-701**						
Fluoride (F)			N/A	MS-B	%		-	26-MAY-11
WG1284828-8 MS		**L1008533-1**						
Fluoride (F)			104		%		75-125	26-MAY-11
F2-ED	**Water**							
Batch R2194548								
WG1285562-2 LCS								
F2 (>C10-C16)			101		%		65-135	26-MAY-11
WG1285562-1 MB								
F2 (>C10-C16)			<0.25		mg/L		0.25	26-MAY-11
WG1285562-3 MS		**L1008546-6**						
F2 (>C10-C16)			99		%		50-150	26-MAY-11
HG-D-L-CVAA-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-L-CVAA-ED	**Water**							
Batch R2194876								
WG1285757-10 DUP		**L1008890-2**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	27-MAY-11
WG1285757-4 DUP		**L1008945-5**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	27-MAY-11
WG1285757-2 LCS								
Mercury (Hg)-Dissolved			110		%		80-120	27-MAY-11
WG1285757-3 LCSD		**WG1285757-2**						
Mercury (Hg)-Dissolved		110	113		%	3.3	20	27-MAY-11
WG1285757-1 MB								
Mercury (Hg)-Dissolved			<0.000020		mg/L		0.00002	27-MAY-11
WG1285757-11 MS		**L1008890-2**						
Mercury (Hg)-Dissolved			91		%		70-130	27-MAY-11
WG1285757-5 MS		**L1008945-5**						
Mercury (Hg)-Dissolved			99		%		70-130	27-MAY-11
MET-D-L-ICP-ED	**Water**							
Batch R2194912								
WG1285742-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			101		%		80-120	27-MAY-11
Iron (Fe)-Dissolved			103		%		80-120	27-MAY-11
Magnesium (Mg)-Dissolved			101		%		80-120	27-MAY-11
Manganese (Mn)-Dissolved			105		%		80-120	27-MAY-11
Potassium (K)-Dissolved			96		%		80-120	27-MAY-11
Sodium (Na)-Dissolved			104		%		80-120	27-MAY-11
WG1285742-7 DUP		**L1008309-3**						
Calcium (Ca)-Dissolved		72.8	67.0		mg/L	1.5	20	27-MAY-11
Iron (Fe)-Dissolved		0.027	0.026		mg/L	1.4	20	27-MAY-11
Magnesium (Mg)-Dissolved		18.5	17.1		mg/L	0.91	20	27-MAY-11
Manganese (Mn)-Dissolved		<0.0050	<0.0020	RPD-NA	mg/L	N/A	20	27-MAY-11
Potassium (K)-Dissolved		5.61	5.48		mg/L	0.23	20	27-MAY-11
Sodium (Na)-Dissolved		40.0	37.7		mg/L	1.2	20	27-MAY-11
WG1285742-1 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	27-MAY-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	27-MAY-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	27-MAY-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	27-MAY-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	27-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2194912								
WG1285742-1 MB								
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	27-MAY-11
WG1285742-8 MS		**L1008309-3**						
Iron (Fe)-Dissolved			73		%		70-130	28-MAY-11
Magnesium (Mg)-Dissolved			71		%		70-130	28-MAY-11
Manganese (Mn)-Dissolved			74		%		70-130	28-MAY-11
Potassium (K)-Dissolved			76		%		70-130	28-MAY-11
Sodium (Na)-Dissolved			72		%		70-130	28-MAY-11
Batch R2197107								
WG1288034-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			99		%		80-120	01-JUN-11
Iron (Fe)-Dissolved			98		%		80-120	01-JUN-11
Magnesium (Mg)-Dissolved			110		%		80-120	01-JUN-11
Manganese (Mn)-Dissolved			99		%		80-120	01-JUN-11
Potassium (K)-Dissolved			93		%		80-120	01-JUN-11
Sodium (Na)-Dissolved			95		%		80-120	01-JUN-11
MET-D-L-MS-ED	**Water**							
Batch R2195766								
WG1286463-2 CRM		**ED-HIGH-WATRM**						
Aluminum (Al)-Dissolved			86		%		80-120	29-MAY-11
Antimony (Sb)-Dissolved			93		%		80-120	29-MAY-11
Arsenic (As)-Dissolved			85		%		80-120	29-MAY-11
Barium (Ba)-Dissolved			88		%		80-120	29-MAY-11
Beryllium (Be)-Dissolved			88		%		80-120	29-MAY-11
Boron (B)-Dissolved			83		%		80-120	29-MAY-11
Cadmium (Cd)-Dissolved			90		%		80-120	29-MAY-11
Chromium (Cr)-Dissolved			83		%		80-120	29-MAY-11
Cobalt (Co)-Dissolved			80		%		80-120	29-MAY-11
Copper (Cu)-Dissolved			84		%		80-120	29-MAY-11
Lead (Pb)-Dissolved			84		%		80-120	29-MAY-11
Molybdenum (Mo)-Dissolved			88		%		80-120	29-MAY-11
Nickel (Ni)-Dissolved			82		%		80-120	29-MAY-11
Selenium (Se)-Dissolved			90		%		80-120	29-MAY-11
Silver (Ag)-Dissolved			81		%		80-120	29-MAY-11
Thallium (Tl)-Dissolved			88		%		80-120	29-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2195766								
WG1286463-2 CRM		**ED-HIGH-WATRM**						
Titanium (Ti)-Dissolved			86		%		80-120	29-MAY-11
Uranium (U)-Dissolved			83		%		80-120	29-MAY-11
Vanadium (V)-Dissolved			86		%		80-120	29-MAY-11
Zinc (Zn)-Dissolved			84		%		80-120	29-MAY-11
WG1286463-3 DUP		**L1009095-5**						
Aluminum (Al)-Dissolved		<0.010	<0.0050	RPD-NA	mg/L	N/A	20	29-MAY-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Arsenic (As)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Barium (Ba)-Dissolved		0.0234	0.0227		mg/L	3.2	20	29-MAY-11
Beryllium (Be)-Dissolved		<0.0010	<0.00050	RPD-NA	mg/L	N/A	20	29-MAY-11
Boron (B)-Dissolved		0.223	0.222		mg/L	0.60	20	29-MAY-11
Cadmium (Cd)-Dissolved		0.000134	0.000137		mg/L	1.9	20	29-MAY-11
Chromium (Cr)-Dissolved		<0.0050	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Cobalt (Co)-Dissolved		<0.0020	0.00029		mg/L	4.0	20	29-MAY-11
Copper (Cu)-Dissolved		0.0019	0.00180		mg/L	5.9	20	29-MAY-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Molybdenum (Mo)-Dissolved		<0.0050	0.00058		mg/L	3.3	20	29-MAY-11
Nickel (Ni)-Dissolved		0.0045	0.00445		mg/L	1.5	20	29-MAY-11
Selenium (Se)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Thallium (Tl)-Dissolved		<0.00010	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11
Titanium (Ti)-Dissolved		<0.0010	<0.00030	RPD-NA	mg/L	N/A	20	29-MAY-11
Uranium (U)-Dissolved		0.0287	0.0285		mg/L	0.67	20	29-MAY-11
Vanadium (V)-Dissolved		<0.0010	0.00010		mg/L	4.0	20	29-MAY-11
Zinc (Zn)-Dissolved		0.0094	0.0085		mg/L	11	20	29-MAY-11
WG1286463-4 DUP		**L1008890-4**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-MAY-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Arsenic (As)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Barium (Ba)-Dissolved		<0.0050	0.00015	J	mg/L	0.00007	0.01	29-MAY-11
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-MAY-11
Boron (B)-Dissolved		<0.050	<0.0020	RPD-NA	mg/L	N/A	20	29-MAY-11
Cadmium (Cd)-Dissolved		<0.00010	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2195766								
WG1286463-4 DUP		**L1008890-4**						
Chromium (Cr)-Dissolved		<0.0050	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Copper (Cu)-Dissolved		<0.0010	<0.00060	RPD-NA	mg/L	N/A	20	29-MAY-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Molybdenum (Mo)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Nickel (Ni)-Dissolved		<0.0020	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Selenium (Se)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	29-MAY-11
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Vanadium (V)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Zinc (Zn)-Dissolved		<0.0020	<0.0010	RPD-NA	mg/L	N/A	20	29-MAY-11
WG1286463-5 DUP		**L1008309-1**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-MAY-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Arsenic (As)-Dissolved		0.00088	0.00089		mg/L	1.6	20	29-MAY-11
Barium (Ba)-Dissolved		0.149	0.149		mg/L	0.18	20	29-MAY-11
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-MAY-11
Boron (B)-Dissolved		0.053	0.0536		mg/L	1.4	20	29-MAY-11
Cadmium (Cd)-Dissolved		<0.00010	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11
Chromium (Cr)-Dissolved		<0.0050	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Cobalt (Co)-Dissolved		0.00011	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Copper (Cu)-Dissolved		0.0033	0.00326		mg/L	1.6	20	29-MAY-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Molybdenum (Mo)-Dissolved		0.00355	0.00359		mg/L	1.0	20	29-MAY-11
Nickel (Ni)-Dissolved		0.0029	0.00283		mg/L	3.8	20	29-MAY-11
Selenium (Se)-Dissolved		0.00057	0.00057		mg/L	0.035	20	29-MAY-11
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	29-MAY-11
Uranium (U)-Dissolved		0.00216	0.00216		mg/L	0.0093	20	29-MAY-11
Vanadium (V)-Dissolved		0.00097	0.00096		mg/L	1.3	20	29-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2195766								
WG1286463-5 DUP		**L1008309-1**						
Zinc (Zn)-Dissolved		<0.0020	<0.0010	RPD-NA	mg/L	N/A	20	29-MAY-11
WG1286463-7 DUP		**L1009550-3**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-MAY-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Arsenic (As)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Barium (Ba)-Dissolved		0.120	0.118		mg/L	1.7	20	29-MAY-11
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-MAY-11
Boron (B)-Dissolved		0.0055	0.0056		mg/L	1.4	20	29-MAY-11
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11
Chromium (Cr)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Copper (Cu)-Dissolved		0.00061	0.00062		mg/L	1.4	20	29-MAY-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Molybdenum (Mo)-Dissolved		0.00041	0.00039		mg/L	3.0	20	29-MAY-11
Nickel (Ni)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Selenium (Se)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	29-MAY-11
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	29-MAY-11
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	29-MAY-11
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	29-MAY-11
Uranium (U)-Dissolved		0.00092	0.00091		mg/L	0.83	20	29-MAY-11
Vanadium (V)-Dissolved		0.00025	0.00026		mg/L	4.8	20	29-MAY-11
Zinc (Zn)-Dissolved		0.0019	0.0020		mg/L	4.4	20	29-MAY-11
WG1286463-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	29-MAY-11
Antimony (Sb)-Dissolved			<0.00040		mg/L		0.0004	29-MAY-11
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	29-MAY-11
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	29-MAY-11
Boron (B)-Dissolved			<0.0020		mg/L		0.002	29-MAY-11
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	29-MAY-11
Chromium (Cr)-Dissolved			<0.00040		mg/L		0.0004	29-MAY-11
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Copper (Cu)-Dissolved			<0.00060		mg/L		0.0006	29-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2195766								
WG1286463-1 MB								
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Nickel (Ni)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Selenium (Se)-Dissolved			<0.00040		mg/L		0.0004	29-MAY-11
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	29-MAY-11
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	29-MAY-11
Uranium (U)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Vanadium (V)-Dissolved			<0.00010		mg/L		0.0001	29-MAY-11
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	29-MAY-11
NH4-DIS-ED	**Water**							
Batch R2194721								
WG1285579-6 DUP		**L1008890-4**						
Ammonia as N, Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	25	27-MAY-11
WG1285579-8 DUP		**L1007412-1**						
Ammonia as N, Dissolved		0.066	0.061		mg/L	7.7	25	27-MAY-11
NO2-IC-ED	**Water**							
Batch R2194637								
WG1284828-7 DUP		**L1008533-1**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	26-MAY-11
WG1284828-2 LCS								
Nitrite (as N)			103		%		85-115	26-MAY-11
WG1284828-1 MB								
Nitrite (as N)			<0.050		mg/L		0.05	26-MAY-11
WG1284828-8 MS		**L1008533-1**						
Nitrite (as N)			83		%		75-125	26-MAY-11
NO3-IC-ED	**Water**							
Batch R2194637								
WG1284828-3 DUP		**L1007494-595**						
Nitrate (as N)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	26-MAY-11
WG1284828-5 DUP		**L1007494-701**						
Nitrate (as N)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	26-MAY-11
WG1284828-7 DUP		**L1008533-1**						
Nitrate (as N)		0.052	<0.050	RPD-NA	mg/L	N/A	20	26-MAY-11
WG1284828-2 LCS								

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-ED	**Water**							
Batch R2194637								
WG1284828-2 LCS								
Nitrate (as N)			101		%		85-115	26-MAY-11
WG1284828-1 MB								
Nitrate (as N)			<0.050		mg/L		0.05	26-MAY-11
WG1284828-4 MS								
Nitrate (as N)			90		%		75-125	26-MAY-11
WG1284828-6 MS		**L1007494-701**						
Nitrate (as N)			102		%		75-125	26-MAY-11
WG1284828-8 MS		**L1008533-1**						
Nitrate (as N)			104		%		75-125	26-MAY-11
PH/EC/ALK-ED	**Water**							
Batch R2192863								
WG1283438-10 DUP		**L1007944-11**						
pH		7.91	7.89	J	pH	0.02	0.2	25-MAY-11
Conductivity (EC)		2510	2520		uS/cm	0.39	10	25-MAY-11
Bicarbonate (HCO3)		773	773		mg/L	0.067	25	25-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Alkalinity, Total (as CaCO3)		634	634		mg/L	0.067	6.5	25-MAY-11
WG1283438-11 DUP		**L1007944-27**						
pH		8.20	8.20	J	pH	0.00	0.2	25-MAY-11
Conductivity (EC)		1210	1210		uS/cm	0.084	10	25-MAY-11
Bicarbonate (HCO3)		628	630		mg/L	0.41	25	25-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Alkalinity, Total (as CaCO3)		514	517		mg/L	0.41	6.5	25-MAY-11
WG1283438-12 DUP		**L1007952-30**						
pH		8.33	8.34	J	pH	0.00	0.2	26-MAY-11
Conductivity (EC)		1020	1020		uS/cm	0.60	10	26-MAY-11
Bicarbonate (HCO3)		635	616		mg/L	3.0	25	26-MAY-11
Carbonate (CO3)		7.5	8.6		mg/L	14	25	26-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Alkalinity, Total (as CaCO3)		533	519		mg/L	2.6	6.5	26-MAY-11
WG1283438-13 DUP		**L1007902-17**						
pH		8.31	8.31	J	pH	0.00	0.2	25-MAY-11
Conductivity (EC)		1280	1280		uS/cm	0.32	10	25-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch R2192863								
WG1283438-13 DUP		**L1007902-17**						
Bicarbonate (HCO3)		563	561		mg/L	0.29	25	25-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Alkalinity, Total (as CaCO3)		466	467		mg/L	0.10	6.5	25-MAY-11
WG1283438-14 DUP		**L1008072-5**						
pH		6.40	6.43	J	pH	0.03	0.2	26-MAY-11
Conductivity (EC)		49.0	49.5		uS/cm	1.0	10	26-MAY-11
Bicarbonate (HCO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Alkalinity, Total (as CaCO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	6.5	26-MAY-11
WG1283438-15 DUP		**L1008069-6**						
pH		5.34	5.31	J	pH	0.02	0.2	26-MAY-11
Conductivity (EC)		19.7	19.8		uS/cm	0.51	10	26-MAY-11
Bicarbonate (HCO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	26-MAY-11
Alkalinity, Total (as CaCO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	6.5	26-MAY-11
WG1283438-6 DUP		**L1007815-3**						
pH		7.84	7.82	J	pH	0.02	0.2	24-MAY-11
Conductivity (EC)		1330	1330		uS/cm	0.15	10	24-MAY-11
Bicarbonate (HCO3)		596	594		mg/L	0.26	25	24-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-MAY-11
Alkalinity, Total (as CaCO3)		488	487		mg/L	0.26	6.5	24-MAY-11
WG1283438-8 DUP		**L1007952-6**						
pH		7.79	7.74	J	pH	0.05	0.2	24-MAY-11
Conductivity (EC)		1490	1480		uS/cm	0.40	10	24-MAY-11
Bicarbonate (HCO3)		991	991		mg/L	0.0063	25	24-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-MAY-11
Alkalinity, Total (as CaCO3)		812	812		mg/L	0.0063	6.5	24-MAY-11
WG1283438-9 DUP		**L1007945-22**						
pH		8.20	8.19	J	pH	0.02	0.2	25-MAY-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch R2192863								
WG1283438-9 DUP		**L1007945-22**						
Conductivity (EC)		1140	1130		uS/cm	0.18	10	25-MAY-11
Bicarbonate (HCO3)		674	675		mg/L	0.22	25	25-MAY-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	25-MAY-11
Alkalinity, Total (as CaCO3)		552	553		mg/L	0.22	6.5	25-MAY-11
WG1283438-2 LCS								
Conductivity (EC)			104		%		90-110	24-MAY-11
WG1283438-3 LCS								
pH			7.00		pH		6.9-7.1	24-MAY-11
WG1283438-4 LCS								
Alkalinity, Total (as CaCO3)			105		%		85-115	24-MAY-11
WG1283438-5 LCS								
Conductivity (EC)			98		%		90-110	24-MAY-11
WG1283438-1 MB								
Bicarbonate (HCO3)			<5.0		mg/L		5	24-MAY-11
Carbonate (CO3)			<5.0		mg/L		5	24-MAY-11
Hydroxide (OH)			<5.0		mg/L		5	24-MAY-11
Alkalinity, Total (as CaCO3)			<5.0		mg/L		5	24-MAY-11
PHENOLS-4AAP-ED	**Water**							
Batch R2196490								
WG1287707-5 DUP		**L1009244-11**						
Phenols (4AAP)		<0.0010	0.0019	RPD-NA	mg/L	N/A	15	31-MAY-11
WG1287707-6 DUP		**L1006341-9**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	31-MAY-11
WG1287707-7 DUP		**L1009095-10**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	31-MAY-11
WG1287707-3 LCS								
Phenols (4AAP)			91		%		85-115	31-MAY-11
WG1287707-2 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	31-MAY-11
WG1287707-4 MS		**L1006276-2**						
Phenols (4AAP)			92		%		75-125	31-MAY-11
PO4-DO-COL-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-ED	**Water**							
Batch R2194644								
WG1285704-3 DUP		**L1008050-12**						
Orthophosphate-Dissolved (as P)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-MAY-11
WG1285704-2 LCS								
Orthophosphate-Dissolved (as P)			102		%		80-120	26-MAY-11
WG1285704-1 MB								
Orthophosphate-Dissolved (as P)			<0.010		mg/L		0.01	26-MAY-11
WG1285704-4 MS		**L1008050-12**						
Orthophosphate-Dissolved (as P)			97		%		70-130	26-MAY-11
SO4-IC-ED	**Water**							
Batch R2194637								
WG1284828-7 DUP		**L1008533-1**						
Sulfate (SO4)		92.0	92.1		mg/L	0.050	20	26-MAY-11
WG1284828-2 LCS								
Sulfate (SO4)			105		%		85-115	26-MAY-11
WG1284828-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-MAY-11
WG1284828-8 MS		**L1008533-1**						
Sulfate (SO4)			N/A	MS-B	%		-	26-MAY-11

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

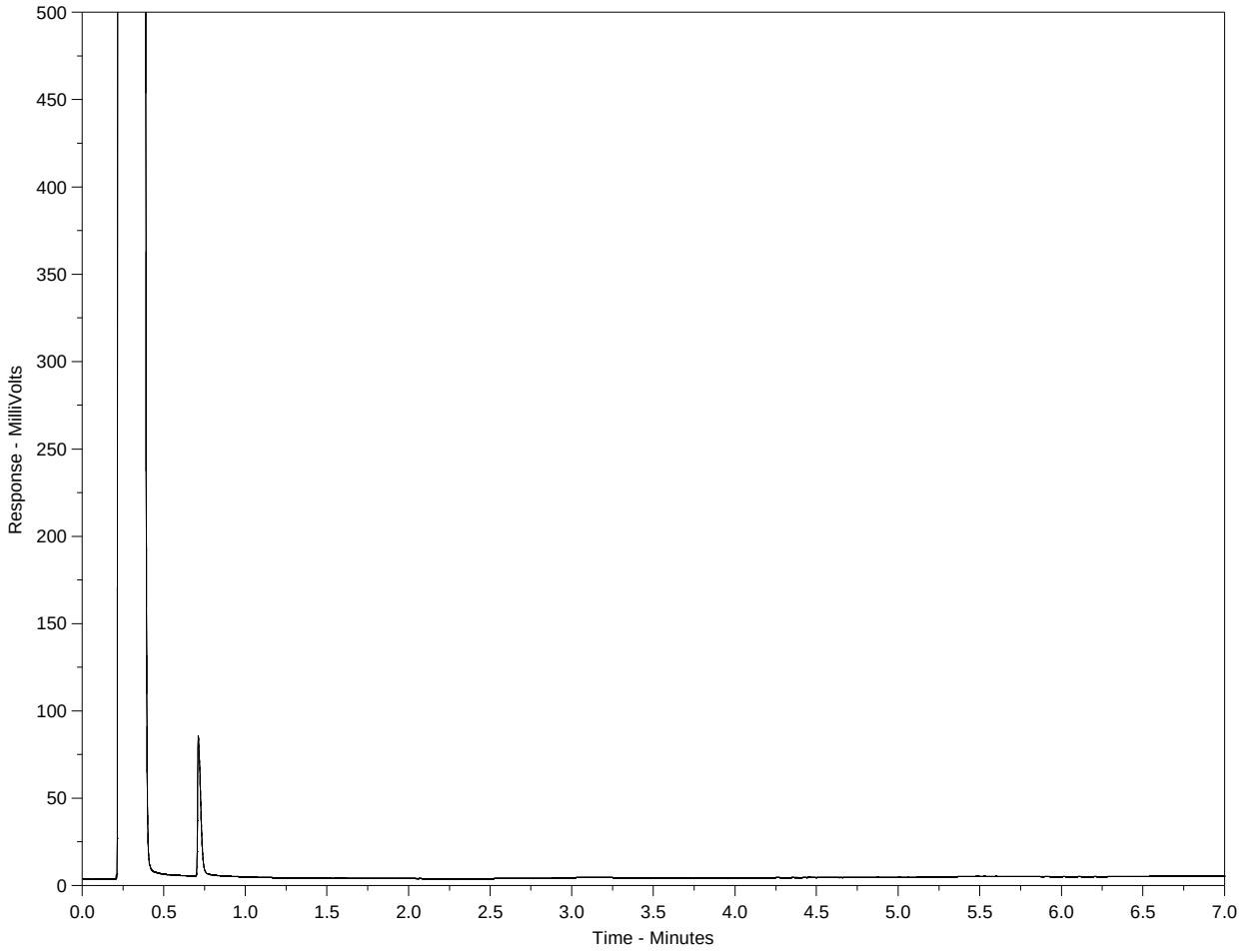
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: **L1008890-1**
Client ID: **MW-01**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

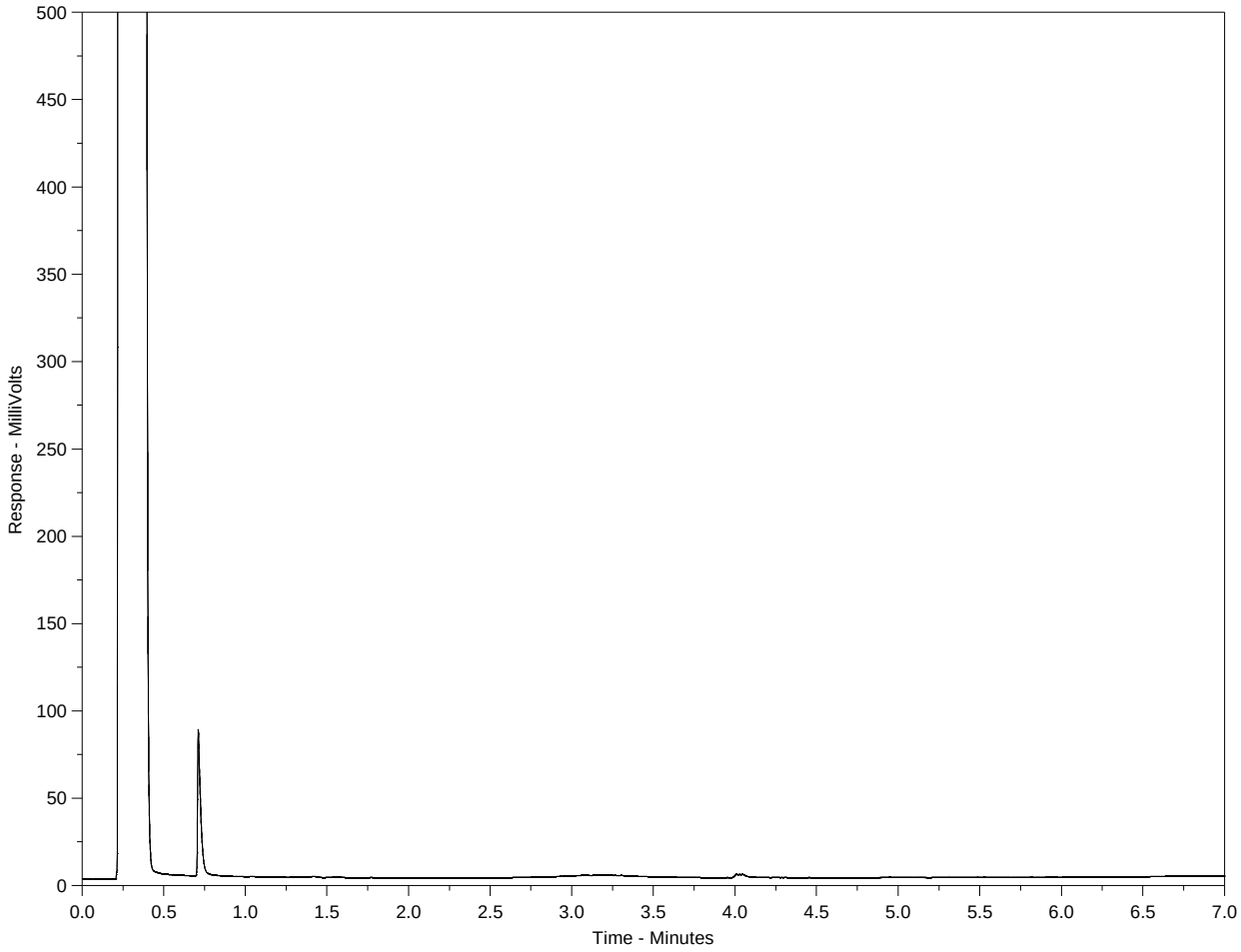
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1008890-2**
Client ID: **MW-02**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

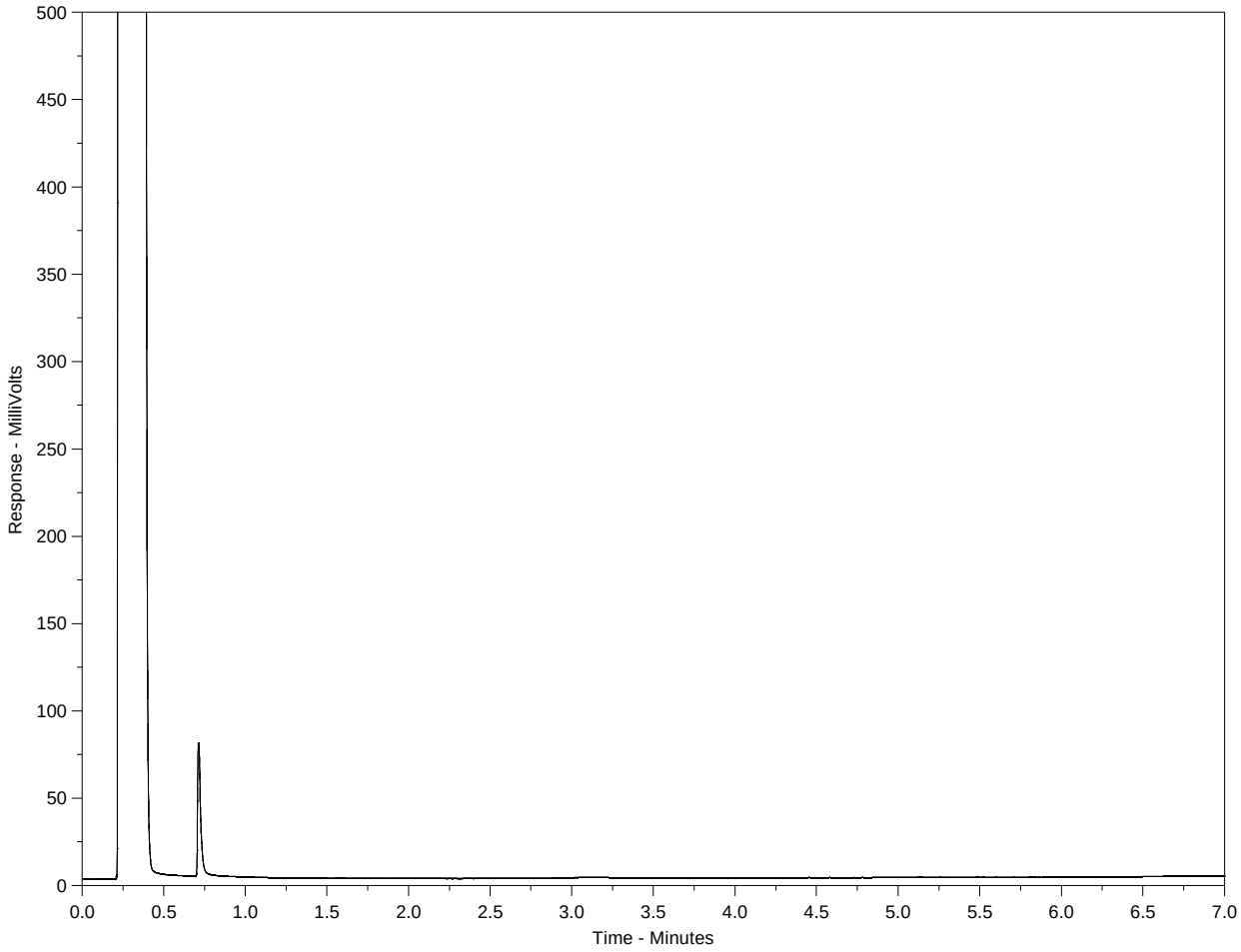
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1008890-3**
Client ID: **MW-05**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

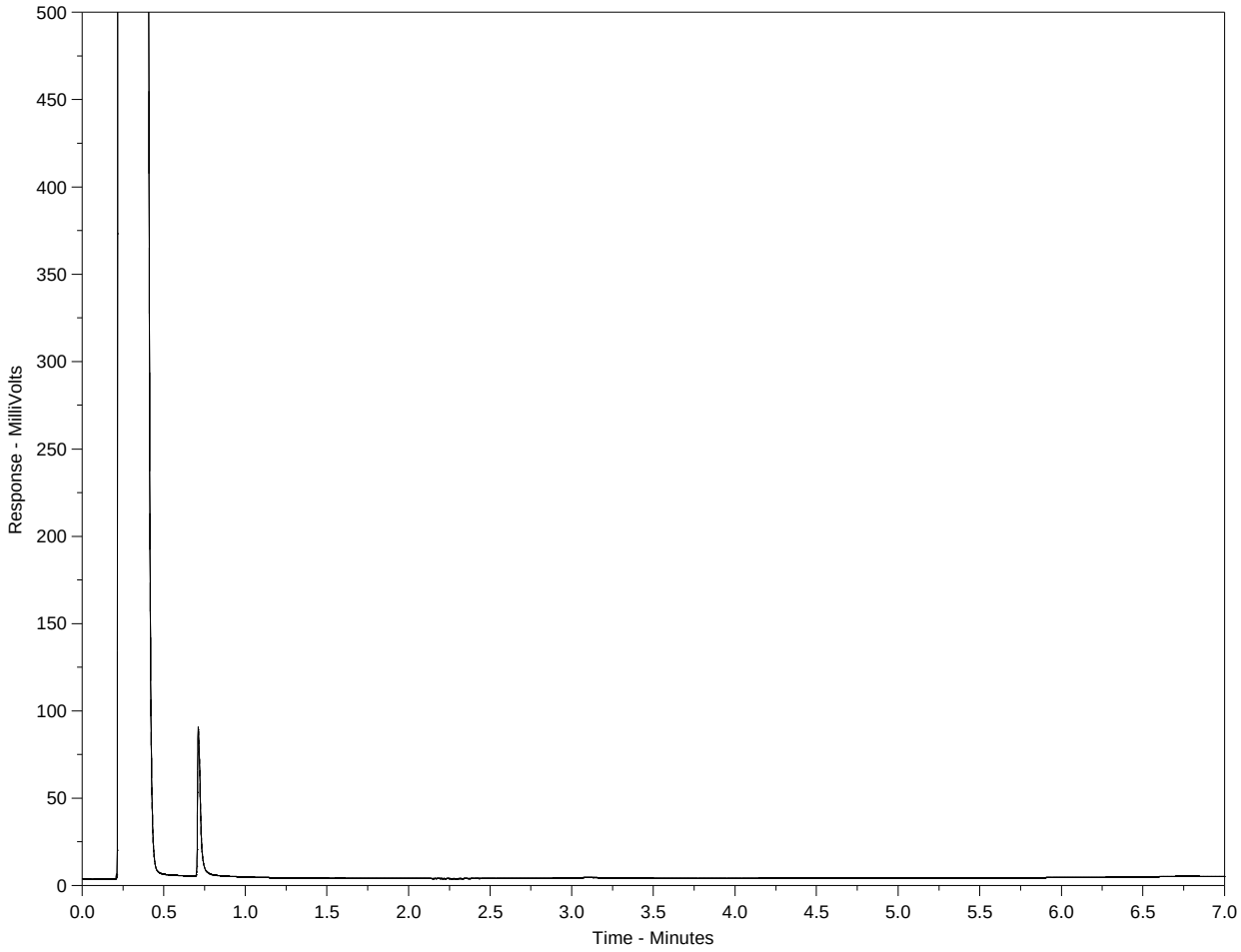
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1008890-4**
Client ID: **DUP 1**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

01010

COC # C1010

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	WorleyParsons	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Trevor Butterfield	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	#705 10240 124 Street	Email 1:	edm.chemistry@worleyparsons.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Edmonton, Alberta, T5N 3W6	Email 2:	trevor.butterfield@worleyparsons.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	780-496-9055 Fax: 780-496-9575	Email 3:	ken.sommerstad@worleyparsons.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #:	E00100102	
Company:		PO / AFE:		
Contact:		LSD:	NCIA Beverly Channel	
Address:				
Phone:	Fax:	Quote #:	Q23924	
Lab Work Order # (lab use only)	L1008890	ALS Contact:	Maurren Olinek	Sampler: SOMK/MULS

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine+PO4+F	BTEX F1, F2	Phenols	DOC	Dissolved Ammonia	Dissolved Metals	Number of Containers
							P	F/P	F/P	F/P	
	MW-01	25-May-11	8:50	Groundwater	X	X	X	X	X	X	10
	MW-02	25-May-11	10:45	Groundwater	X	X	X	X	X	X	10
	~~MW-03~~	~~25-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~
	MW-05	25-May-11	13:00	Groundwater	X	X	X	X	X	X	10
	~~MW-06~~	~~25-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~
	~~MW-09~~	~~25-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~
	MW-12	25-May-11		Groundwater	X	X	X	X	X	X	10
	~~MW-13~~	~~25-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~
	DUP I	25-May-11	12:00	Groundwater	X	X	X	X	X	X	10

L1008890-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

AB Tier 1

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Ken Sommerstad	25-May-11	13:57		25 MAY 11	14:01	7.3 °C				

GENF 18.01 Front

WORLEYPARSONS CANADA SERVICES LTD
ATTN: TREVOR BUTTERFIELD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Date Received: 03-JUN-11
Report Date: 13-JUN-11 16:45 (MT)
Version: FINAL

Client Phone: 780-496-9055

Certificate of Analysis

Lab Work Order #:	**L1012848**
Project P.O. #:	NOT SUBMITTED
Job Reference:	E00100102
Legal Site Desc:	NCIA BEVERLY CHANNEL
C of C Numbers:	

Maureen Olinek
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-1 MW-03							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 13:30							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	94		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	0.302		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	3.3		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	0.105		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	<0.0010		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	44.2		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00141		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.0389		0.0050	mg/L		09-JUN-11	R2201905
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.103		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Cobalt (Co)-Dissolved	0.00061		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00056		0.00010	mg/L		09-JUN-11	R2201905
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00058		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	115		0.50	mg/L		10-JUN-11	R2202109
Iron (Fe)-Dissolved	5.55		0.020	mg/L		10-JUN-11	R2202109
Magnesium (Mg)-Dissolved	40.1		0.10	mg/L		10-JUN-11	R2202109
Manganese (Mn)-Dissolved	0.277		0.0050	mg/L		10-JUN-11	R2202109
Potassium (K)-Dissolved	3.20		0.10	mg/L		10-JUN-11	R2202109
Sodium (Na)-Dissolved	52.7		0.50	mg/L		10-JUN-11	R2202109
Ion Balance Calculation							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-1 MW-03							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 13:30							
Matrix: GROUNDWATER							
Ion Balance Calculation							
Ion Balance	105			%		10-JUN-11	
TDS (Calculated)	588			mg/L		10-JUN-11	
Hardness (as CaCO3)	452			mg/L		10-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		07-JUN-11	R2200000
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Sulfate by IC							
Sulfate (SO4)	120		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	7.98		0.10	pH		04-JUN-11	R2198745
Conductivity (EC)	1000		0.20	uS/cm		04-JUN-11	R2198745
Bicarbonate (HCO3)	433		5.0	mg/L		04-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	355		5.0	mg/L		04-JUN-11	R2198745
L1012848-2 MW-09							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 16:40							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	96		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	2.05		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	8.0		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	<0.0010		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	5.84		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00280		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.0294		0.0050	mg/L		09-JUN-11	R2201905

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-2 MW-09							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 16:40							
Matrix: GROUNDWATER							
Diss. Metals in Water by ICPMS (Low)							
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.255		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Cobalt (Co)-Dissolved	0.00128		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00156		0.00010	mg/L		09-JUN-11	R2201905
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	0.00013		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00132		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	0.00012		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	0.0020		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	87.4		0.50	mg/L		07-JUN-11	R2200113
Iron (Fe)-Dissolved	1.46		0.020	mg/L		07-JUN-11	R2200113
Magnesium (Mg)-Dissolved	25.2		0.10	mg/L		07-JUN-11	R2200113
Manganese (Mn)-Dissolved	0.754		0.0050	mg/L		07-JUN-11	R2200113
Potassium (K)-Dissolved	4.09		0.10	mg/L		07-JUN-11	R2200113
Sodium (Na)-Dissolved	212		0.50	mg/L		07-JUN-11	R2200113
Ion Balance Calculation							
Ion Balance	90.0			%		08-JUN-11	
TDS (Calculated)	978			mg/L		08-JUN-11	
Hardness (as CaCO3)	322			mg/L		08-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		07-JUN-11	R2200000
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Sulfate by IC							
Sulfate (SO4)	325		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	8.17		0.10	pH		04-JUN-11	R2198745
Conductivity (EC)	1580		0.20	uS/cm		04-JUN-11	R2198745
Bicarbonate (HCO3)	646		5.0	mg/L		04-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	530		5.0	mg/L		04-JUN-11	R2198745
L1012848-3 MW-10							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 19:00							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-3 MW-10							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 19:00							
Matrix: GROUNDWATER							
BTEX, Styrene and F1 (C6-C10)							
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	93		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.60		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	6.7		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	0.0018		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	1.19		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00287		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.0321		0.0050	mg/L		09-JUN-11	R2201905
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.170		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Cobalt (Co)-Dissolved	0.00031		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00481		0.00010	mg/L		09-JUN-11	R2201905
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00133		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	0.00021		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	0.0030		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	113		0.50	mg/L		07-JUN-11	R2200113
Iron (Fe)-Dissolved	3.89		0.020	mg/L		07-JUN-11	R2200113
Magnesium (Mg)-Dissolved	30.2		0.10	mg/L		07-JUN-11	R2200113
Manganese (Mn)-Dissolved	0.566		0.0050	mg/L		07-JUN-11	R2200113
Potassium (K)-Dissolved	5.58		0.10	mg/L		07-JUN-11	R2200113
Sodium (Na)-Dissolved	105		0.50	mg/L		07-JUN-11	R2200113
Ion Balance Calculation							
Ion Balance	89.9			%		08-JUN-11	
TDS (Calculated)	759			mg/L		08-JUN-11	
Hardness (as CaCO3)	407			mg/L		08-JUN-11	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-3 MW-10							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 19:00							
Matrix: GROUNDWATER							
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		07-JUN-11	R2200000
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Sulfate by IC							
Sulfate (SO4)	206		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	8.04		0.10	pH		04-JUN-11	R2198745
Conductivity (EC)	1260		0.20	uS/cm		04-JUN-11	R2198745
Bicarbonate (HCO3)	607		5.0	mg/L		04-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	497		5.0	mg/L		04-JUN-11	R2198745
L1012848-4 MW-11							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 13:45							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	90		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.55		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	6.8		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	<0.0010		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	9.69		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00239		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.0423		0.0050	mg/L		09-JUN-11	R2201905
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.199		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-4 MW-11							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 13:45							
Matrix: GROUNDWATER							
Diss. Metals in Water by ICPMS (Low)							
Cobalt (Co)-Dissolved	0.00047		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	0.0017		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00061		0.00010	mg/L		09-JUN-11	R2201905
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00109		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	0.00010		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	0.0105		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	148		0.50	mg/L		10-JUN-11	R2202109
Iron (Fe)-Dissolved	6.99		0.020	mg/L		10-JUN-11	R2202109
Magnesium (Mg)-Dissolved	46.4		0.10	mg/L		10-JUN-11	R2202109
Manganese (Mn)-Dissolved	0.687		0.0050	mg/L		10-JUN-11	R2202109
Potassium (K)-Dissolved	5.36		0.10	mg/L		10-JUN-11	R2202109
Sodium (Na)-Dissolved	96.0		0.50	mg/L		10-JUN-11	R2202109
Ion Balance Calculation							
Ion Balance	102			%		10-JUN-11	
TDS (Calculated)	830			mg/L		10-JUN-11	
Hardness (as CaCO3)	561			mg/L		10-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		08-JUN-11	R2200724
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Sulfate by IC							
Sulfate (SO4)	203		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	8.00		0.10	pH		04-JUN-11	R2198745
Conductivity (EC)	1320		0.20	uS/cm		04-JUN-11	R2198745
Bicarbonate (HCO3)	653		5.0	mg/L		04-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	536		5.0	mg/L		04-JUN-11	R2198745
L1012848-5 MW-12							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 11:30							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-5 MW-12							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 11:30							
Matrix: GROUNDWATER							
BTEX, Styrene and F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	85		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.31		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	13.5		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	0.071		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	<0.0010		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	6.40		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00199		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.130		0.0050	mg/L		09-JUN-11	R2201905
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.244		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Cobalt (Co)-Dissolved	0.00043		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00102		0.00010	mg/L		09-JUN-11	R2201905
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00087		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	0.0021		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	98.1		0.50	mg/L		10-JUN-11	R2202109
Iron (Fe)-Dissolved	3.34		0.020	mg/L		10-JUN-11	R2202109
Magnesium (Mg)-Dissolved	30.9		0.10	mg/L		10-JUN-11	R2202109
Manganese (Mn)-Dissolved	0.450		0.0050	mg/L		10-JUN-11	R2202109
Potassium (K)-Dissolved	4.86		0.10	mg/L		10-JUN-11	R2202109
Sodium (Na)-Dissolved	95.4		0.50	mg/L		10-JUN-11	R2202109
Ion Balance Calculation							
Ion Balance	97.9			%		10-JUN-11	
TDS (Calculated)	606			mg/L		10-JUN-11	
Hardness (as CaCO3)	372			mg/L		10-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		07-JUN-11	R2200000
Nitrate as N by IC							
Nitrate (as N)	0.054		0.050	mg/L		05-JUN-11	R2199245

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-5 MW-12							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 11:30							
Matrix: GROUNDWATER							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Sulfate by IC							
Sulfate (SO4)	44.6		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	8.14		0.10	pH		04-JUN-11	R2198745
Conductivity (EC)	1050		0.20	uS/cm		04-JUN-11	R2198745
Bicarbonate (HCO3)	662		5.0	mg/L		04-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	543		5.0	mg/L		04-JUN-11	R2198745
L1012848-6 MW-13							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 10:30							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	90		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.36		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	5.2		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	0.162		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	<0.0010		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	1.92		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00157		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.411		0.0050	mg/L		09-JUN-11	R2201905
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.265		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Cobalt (Co)-Dissolved	0.00062		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00194		0.00010	mg/L		09-JUN-11	R2201905

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-6 MW-13							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 10:30							
Matrix: GROUNDWATER							
Diss. Metals in Water by ICPMS (Low)							
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00073		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	48.1		0.50	mg/L		07-JUN-11	R2200113
Iron (Fe)-Dissolved	1.25		0.020	mg/L		07-JUN-11	R2200113
Magnesium (Mg)-Dissolved	15.3		0.10	mg/L		07-JUN-11	R2200113
Manganese (Mn)-Dissolved	0.231		0.0050	mg/L		07-JUN-11	R2200113
Potassium (K)-Dissolved	3.74		0.10	mg/L		07-JUN-11	R2200113
Sodium (Na)-Dissolved	103		0.50	mg/L		07-JUN-11	R2200113
Ion Balance Calculation							
Ion Balance	92.1			%		08-JUN-11	
TDS (Calculated)	442			mg/L		08-JUN-11	
Hardness (as CaCO3)	183			mg/L		08-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		07-JUN-11	R2200000
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Sulfate by IC							
Sulfate (SO4)	9.12		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	8.24		0.10	pH		04-JUN-11	R2198745
Conductivity (EC)	796		0.20	uS/cm		04-JUN-11	R2198745
Bicarbonate (HCO3)	530		5.0	mg/L		04-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		04-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	434		5.0	mg/L		04-JUN-11	R2198745
L1012848-7 DUP II							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 12:00							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Toluene	<0.00075		0.00075	mg/L		05-JUN-11	R2199861
EthylBenzene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
o-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
m+p-Xylene	<0.00050		0.00050	mg/L		05-JUN-11	R2199861
Styrene	<0.0010		0.0010	mg/L		05-JUN-11	R2199861
F1(C6-C10)	<0.10		0.10	mg/L		05-JUN-11	R2199861
F1-BTEX	<0.10		0.10	mg/L		05-JUN-11	R2199861
Xylenes	<0.00071		0.00071	mg/L		05-JUN-11	R2199861
F2 (>C10-C16)							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-7 DUP II							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 12:00							
Matrix: GROUNDWATER							
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	08-JUN-11	08-JUN-11	R2200055
Surrogate: 2-Bromobenzotrifluoride	95		65-135	%	08-JUN-11	08-JUN-11	R2200055
Miscellaneous Parameters							
Ammonia as N, Dissolved	2.09		0.050	mg/L		07-JUN-11	R2199871
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-JUN-11	R2199778
Dissolved Organic Carbon	7.1		1.0	mg/L		10-JUN-11	R2202159
Fluoride (F)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Phenols (4AAP)	<0.0010		0.0010	mg/L		08-JUN-11	R2201013
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	5.64		0.50	mg/L		05-JUN-11	R2199245
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Arsenic (As)-Dissolved	0.00272		0.00040	mg/L		09-JUN-11	R2201905
Barium (Ba)-Dissolved	0.0296		0.0050	mg/L		09-JUN-11	R2201905
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		09-JUN-11	R2201905
Boron (B)-Dissolved	0.237		0.050	mg/L		09-JUN-11	R2201905
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		09-JUN-11	R2201905
Cobalt (Co)-Dissolved	0.00126		0.00010	mg/L		09-JUN-11	R2201905
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		09-JUN-11	R2201905
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Molybdenum (Mo)-Dissolved	0.00152		0.00010	mg/L		09-JUN-11	R2201905
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		09-JUN-11	R2201905
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		09-JUN-11	R2201905
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		09-JUN-11	R2201905
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		09-JUN-11	R2201905
Uranium (U)-Dissolved	0.00128		0.00010	mg/L		09-JUN-11	R2201905
Vanadium (V)-Dissolved	0.00015		0.00010	mg/L		09-JUN-11	R2201905
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		09-JUN-11	R2201905
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	89.5		0.50	mg/L		07-JUN-11	R2200113
Iron (Fe)-Dissolved	1.29		0.020	mg/L		07-JUN-11	R2200113
Magnesium (Mg)-Dissolved	26.0		0.10	mg/L		07-JUN-11	R2200113
Manganese (Mn)-Dissolved	0.773		0.0050	mg/L		07-JUN-11	R2200113
Potassium (K)-Dissolved	4.16		0.10	mg/L		07-JUN-11	R2200113
Sodium (Na)-Dissolved	220		0.50	mg/L		07-JUN-11	R2200113
Ion Balance Calculation							
Ion Balance	93.0			%		08-JUN-11	
TDS (Calculated)	988			mg/L		08-JUN-11	
Hardness (as CaCO3)	331			mg/L		08-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		07-JUN-11	R2200000
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		06-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		05-JUN-11	R2199245

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1012848-7 DUP II							
Sampled By: NYCJ/DOUJ on 02-JUN-11 @ 12:00							
Matrix: GROUNDWATER							
Sulfate by IC							
Sulfate (SO4)	325		0.50	mg/L		05-JUN-11	R2199245
pH, Conductivity and Total Alkalinity							
pH	8.22		0.10	pH		05-JUN-11	R2198745
Conductivity (EC)	1570		0.20	uS/cm		05-JUN-11	R2198745
Bicarbonate (HCO3)	646		5.0	mg/L		05-JUN-11	R2198745
Carbonate (CO3)	<5.0		5.0	mg/L		05-JUN-11	R2198745
Hydroxide (OH)	<5.0		5.0	mg/L		05-JUN-11	R2198745
Alkalinity, Total (as CaCO3)	530		5.0	mg/L		05-JUN-11	R2198745

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
C-DIS-ORG-ED	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
CL-IC-ED	Water	Chloride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F-IC-ED	Water	Fluoride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
NH4-DIS-ED	Water	Ammonia-N	APHA4500NH3F Colorimetry
NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-ED	Water	Nitrite as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
NO3-IC-ED	Water	Nitrate as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
PHENOLS-4AAP-ED	Water	Phenols (4AAP)	AB ENV.06537-COLORIMETRIC
PO4-DO-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-ED	Water	Sulfate by IC	APHA 4110 B-ION CHROMATOGRAPHY

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L1012848

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L1012848 Report Date: 13-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED	**Water**							
Batch R2199861								
WG1290441-4 DUP		**L1012848-1**						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	05-JUN-11
Toluene		<0.00075	<0.00075	RPD-NA	mg/L	N/A	30	05-JUN-11
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	05-JUN-11
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	05-JUN-11
m+p-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	05-JUN-11
Styrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	05-JUN-11
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	05-JUN-11
WG1290441-2 LCS								
F1(C6-C10)			114		%		70-130	05-JUN-11
WG1290441-3 LCS								
Benzene			85		%		70-130	05-JUN-11
Toluene			93		%		70-130	05-JUN-11
EthylBenzene			83		%		70-130	05-JUN-11
o-Xylene			85		%		70-130	05-JUN-11
m+p-Xylene			84		%		70-130	05-JUN-11
Styrene			85		%		70-130	05-JUN-11
WG1290441-1 MB								
Benzene			<0.00050		mg/L		0.0005	05-JUN-11
Toluene			<0.00075		mg/L		0.00075	05-JUN-11
EthylBenzene			<0.00050		mg/L		0.0005	05-JUN-11
o-Xylene			<0.00050		mg/L		0.0005	05-JUN-11
m+p-Xylene			<0.00050		mg/L		0.0005	05-JUN-11
Styrene			<0.0010		mg/L		0.001	05-JUN-11
F1(C6-C10)			<0.10		mg/L		0.1	05-JUN-11
C-DIS-ORG-ED	**Water**							
Batch R2202159								
WG1293523-3 CVS								
Dissolved Organic Carbon			103		%		80-160	09-JUN-11
WG1293523-2 LCS								
Dissolved Organic Carbon			96		%		80-120	09-JUN-11
WG1293523-1 MB								
Dissolved Organic Carbon			<1.0		mg/L		1	09-JUN-11
CL-IC-ED	**Water**							

Quality Control Report

Workorder: L1012848 Report Date: 13-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-ED	**Water**							
Batch R2199245								
WG1290415-3 DUP		**L1012848-1**						
Chloride (Cl)		44.2	44.1		mg/L	0.17	20	05-JUN-11
WG1290415-2 LCS								
Chloride (Cl)			101		%		85-115	05-JUN-11
WG1290415-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-JUN-11
WG1290415-4 MS		**L1012848-1**						
Chloride (Cl)			98		%		75-125	05-JUN-11
F-IC-ED	**Water**							
Batch R2199245								
WG1290415-3 DUP		**L1012848-1**						
Fluoride (F)		0.105	0.104		mg/L	1.4	20	05-JUN-11
WG1290415-2 LCS								
Fluoride (F)			102		%		85-115	05-JUN-11
WG1290415-1 MB								
Fluoride (F)			<0.050		mg/L		0.05	05-JUN-11
WG1290415-4 MS		**L1012848-1**						
Fluoride (F)			95		%		75-125	05-JUN-11
F2-ED	**Water**							
Batch R2200055								
WG1291476-3 DUP		**L1012068-12**						
F2 (>C10-C16)		19.4	18.5		mg/L	4.4	46	08-JUN-11
WG1291476-4 DUP		**L1012828-6**						
F2 (>C10-C16)		<0.25	<0.25	RPD-NA	mg/L	N/A	46	08-JUN-11
WG1291476-2 LCS								
F2 (>C10-C16)			95		%		65-135	06-JUN-11
WG1291476-1 MB								
F2 (>C10-C16)			<0.25		mg/L		0.25	06-JUN-11
Surrogate: 2-Bromobenzotrifluoride			100		%		65-135	06-JUN-11
HG-D-L-CVAA-ED	**Water**							
Batch R2200000								
WG1291434-4 DUP		**L1010373-4**						
Mercury (Hg)-Dissolved		<0.020	<0.000020	RPD-NA	mg/L	N/A	20	07-JUN-11
WG1291434-6 DUP		**L1012021-5**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	07-JUN-11
WG1291434-8 DUP		**L1012046-13**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	07-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-L-CVAA-ED	**Water**							
Batch R2200000								
WG1291434-2 LCS								
Mercury (Hg)-Dissolved			103		%		80-120	07-JUN-11
WG1291434-3 LCSD		**WG1291434-2**						
Mercury (Hg)-Dissolved		103	106		%	2.4	20	07-JUN-11
WG1291434-1 MB								
Mercury (Hg)-Dissolved			<0.000020		mg/L		0.00002	07-JUN-11
WG1291434-5 MS		**L1010373-4**						
Mercury (Hg)-Dissolved			101		%		70-130	07-JUN-11
WG1291434-7 MS		**L1012021-5**						
Mercury (Hg)-Dissolved			91		%		70-130	07-JUN-11
WG1291434-9 MS		**L1012046-13**						
Mercury (Hg)-Dissolved			103		%		70-130	07-JUN-11
Batch R2200724								
WG1292196-4 DUP		**L1012848-4**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292196-2 LCS								
Mercury (Hg)-Dissolved			110		%		80-120	08-JUN-11
WG1292196-3 LCSD		**WG1292196-2**						
Mercury (Hg)-Dissolved		110	111		%	0.54	20	08-JUN-11
WG1292196-1 MB								
Mercury (Hg)-Dissolved			<0.000020		mg/L		0.00002	08-JUN-11
WG1292196-5 MS		**L1012848-4**						
Mercury (Hg)-Dissolved			103		%		70-130	08-JUN-11
MET-D-L-ICP-ED	**Water**							
Batch R2200113								
WG1291372-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			102		%		80-120	07-JUN-11
Iron (Fe)-Dissolved			98		%		80-120	07-JUN-11
Magnesium (Mg)-Dissolved			103		%		80-120	07-JUN-11
Manganese (Mn)-Dissolved			101		%		80-120	07-JUN-11
Potassium (K)-Dissolved			103		%		80-120	07-JUN-11
Sodium (Na)-Dissolved			102		%		80-120	07-JUN-11
WG1291372-5 DUP		**L1012848-1**						
Calcium (Ca)-Dissolved		115	101		mg/L	4.3	20	07-JUN-11
Iron (Fe)-Dissolved		5.55	4.67		mg/L	5.4	20	07-JUN-11
Magnesium (Mg)-Dissolved		40.1	34.5		mg/L	5.0	20	07-JUN-11
Manganese (Mn)-Dissolved		0.277	0.246		mg/L	5.6	20	07-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2200113								
WG1291372-5 DUP		**L1012848-1**						
Potassium (K)-Dissolved		3.20	2.90		mg/L	0.21	20	07-JUN-11
Sodium (Na)-Dissolved		52.7	49.6		mg/L	5.5	20	07-JUN-11
WG1291372-9 DUP		**L1010370-4**						
Calcium (Ca)-Dissolved		1.74	1.75		mg/L	0.25	20	07-JUN-11
Iron (Fe)-Dissolved		0.106	0.107		mg/L	0.90	20	07-JUN-11
Magnesium (Mg)-Dissolved		0.99	0.99		mg/L	0.27	20	07-JUN-11
Manganese (Mn)-Dissolved		0.0113	0.0113		mg/L	0.0089	20	07-JUN-11
Potassium (K)-Dissolved		0.61	0.57		mg/L	6.9	20	07-JUN-11
Sodium (Na)-Dissolved		1.0	0.99		mg/L	3.2	20	07-JUN-11
WG1291372-1 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	07-JUN-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	07-JUN-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	07-JUN-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	07-JUN-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	07-JUN-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	07-JUN-11
WG1291372-10 MS		**L1010370-4**						
Calcium (Ca)-Dissolved			90		%		70-130	07-JUN-11
Iron (Fe)-Dissolved			84		%		70-130	07-JUN-11
Magnesium (Mg)-Dissolved			91		%		70-130	07-JUN-11
Manganese (Mn)-Dissolved			91		%		70-130	07-JUN-11
Potassium (K)-Dissolved			91		%		70-130	07-JUN-11
Sodium (Na)-Dissolved			92		%		70-130	07-JUN-11
WG1291372-6 MS		**L1012848-1**						
Calcium (Ca)-Dissolved			90	E	%		70-130	07-JUN-11
Iron (Fe)-Dissolved			89		%		70-130	07-JUN-11
Magnesium (Mg)-Dissolved			87		%		70-130	07-JUN-11
Manganese (Mn)-Dissolved			93		%		70-130	07-JUN-11
Potassium (K)-Dissolved			101		%		70-130	07-JUN-11
Sodium (Na)-Dissolved			96		%		70-130	07-JUN-11
Batch R2202109								
WG1293446-12 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			103		%		80-120	11-JUN-11
Iron (Fe)-Dissolved			106		%		80-120	11-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2202109								
WG1293446-12 CRM		**EU-H-3_OPTWATER**						
Magnesium (Mg)-Dissolved			103		%		80-120	11-JUN-11
Manganese (Mn)-Dissolved			103		%		80-120	11-JUN-11
Potassium (K)-Dissolved			107		%		80-120	11-JUN-11
Sodium (Na)-Dissolved			106		%		80-120	11-JUN-11
WG1293446-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			107		%		80-120	10-JUN-11
Iron (Fe)-Dissolved			104		%		80-120	10-JUN-11
Magnesium (Mg)-Dissolved			109		%		80-120	10-JUN-11
Manganese (Mn)-Dissolved			108		%		80-120	10-JUN-11
Potassium (K)-Dissolved			105		%		80-120	10-JUN-11
Sodium (Na)-Dissolved			103		%		80-120	10-JUN-11
WG1293446-3 DUP		**L1012848-4**						
Calcium (Ca)-Dissolved		148	140		mg/L	5.2	20	10-JUN-11
Iron (Fe)-Dissolved		6.99	6.57		mg/L	6.2	20	10-JUN-11
Magnesium (Mg)-Dissolved		46.4	43.7		mg/L	6.2	20	10-JUN-11
Manganese (Mn)-Dissolved		0.687	0.644		mg/L	6.4	20	10-JUN-11
Potassium (K)-Dissolved		5.36	5.17		mg/L	3.5	20	10-JUN-11
Sodium (Na)-Dissolved		96.0	90.0		mg/L	6.5	20	10-JUN-11
WG1293446-1 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	10-JUN-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	10-JUN-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	10-JUN-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	10-JUN-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	10-JUN-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	10-JUN-11
WG1293446-11 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	11-JUN-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	11-JUN-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	11-JUN-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	11-JUN-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	11-JUN-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	11-JUN-11
WG1293446-4 MS		**L1012848-4**						
Calcium (Ca)-Dissolved			72		%		70-130	10-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2202109								
WG1293446-4 MS		**L1012848-4**						
Iron (Fe)-Dissolved			97		%		70-130	10-JUN-11
Magnesium (Mg)-Dissolved			96		%		70-130	10-JUN-11
Manganese (Mn)-Dissolved			98		%		70-130	10-JUN-11
Potassium (K)-Dissolved			100		%		70-130	10-JUN-11
Sodium (Na)-Dissolved			92		%		70-130	10-JUN-11
MET-D-L-MS-ED	**Water**							
Batch R2201905								
WG1292863-2 CRM		**ED-HIGH-WATRM**						
Aluminum (Al)-Dissolved			103		%		80-120	09-JUN-11
Aluminum (Al)-Dissolved			102		%		80-120	09-JUN-11
Antimony (Sb)-Dissolved			101		%		80-120	09-JUN-11
Antimony (Sb)-Dissolved			100		%		80-120	09-JUN-11
Arsenic (As)-Dissolved			101		%		80-120	09-JUN-11
Arsenic (As)-Dissolved			102		%		80-120	09-JUN-11
Barium (Ba)-Dissolved			99		%		80-120	09-JUN-11
Barium (Ba)-Dissolved			99		%		80-120	09-JUN-11
Beryllium (Be)-Dissolved			104		%		80-120	09-JUN-11
Beryllium (Be)-Dissolved			104		%		80-120	09-JUN-11
Boron (B)-Dissolved			101		%		80-120	09-JUN-11
Boron (B)-Dissolved			100		%		80-120	09-JUN-11
Cadmium (Cd)-Dissolved			103		%		80-120	09-JUN-11
Cadmium (Cd)-Dissolved			102		%		80-120	09-JUN-11
Chromium (Cr)-Dissolved			100		%		80-120	09-JUN-11
Chromium (Cr)-Dissolved			100		%		80-120	09-JUN-11
Cobalt (Co)-Dissolved			95		%		80-120	09-JUN-11
Cobalt (Co)-Dissolved			94		%		80-120	09-JUN-11
Copper (Cu)-Dissolved			100		%		80-120	09-JUN-11
Copper (Cu)-Dissolved			98		%		80-120	09-JUN-11
Lead (Pb)-Dissolved			99		%		80-120	09-JUN-11
Lead (Pb)-Dissolved			98		%		80-120	09-JUN-11
Molybdenum (Mo)-Dissolved			96		%		80-120	09-JUN-11
Molybdenum (Mo)-Dissolved			96		%		80-120	09-JUN-11
Nickel (Ni)-Dissolved			101		%		80-120	09-JUN-11
Nickel (Ni)-Dissolved			102		%		80-120	

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2201905								
WG1292863-2 CRM		**ED-HIGH-WATRM**						
Nickel (Ni)-Dissolved			102		%		80-120	09-JUN-11
Selenium (Se)-Dissolved			104		%		80-120	09-JUN-11
Selenium (Se)-Dissolved			103		%		80-120	09-JUN-11
Silver (Ag)-Dissolved			95		%		80-120	09-JUN-11
Silver (Ag)-Dissolved			94		%		80-120	09-JUN-11
Thallium (Tl)-Dissolved			104		%		80-120	09-JUN-11
Thallium (Tl)-Dissolved			102		%		80-120	09-JUN-11
Titanium (Ti)-Dissolved			93		%		80-120	09-JUN-11
Titanium (Ti)-Dissolved			99		%		80-120	09-JUN-11
Uranium (U)-Dissolved			98		%		80-120	09-JUN-11
Uranium (U)-Dissolved			100		%		80-120	09-JUN-11
Vanadium (V)-Dissolved			103		%		80-120	09-JUN-11
Vanadium (V)-Dissolved			101		%		80-120	09-JUN-11
Zinc (Zn)-Dissolved			99		%		80-120	09-JUN-11
Zinc (Zn)-Dissolved			99		%		80-120	09-JUN-11
WG1292863-4 DUP		**L1012741-4**						
Aluminum (Al)-Dissolved		<0.010	<0.0050	RPD-NA	mg/L	N/A	20	09-JUN-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Arsenic (As)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Barium (Ba)-Dissolved		0.00021	0.00019		mg/L	12	20	09-JUN-11
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUN-11
Boron (B)-Dissolved		0.0129	0.0097	J	mg/L	0.0031	0.004	09-JUN-11
Cadmium (Cd)-Dissolved		<0.00010	<0.000050	RPD-NA	mg/L	N/A	20	09-JUN-11
Chromium (Cr)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Copper (Cu)-Dissolved		<0.00060	<0.00060	RPD-NA	mg/L	N/A	20	09-JUN-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Molybdenum (Mo)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Nickel (Ni)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Selenium (Se)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Silver (Ag)-Dissolved		<0.00020	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUN-11
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	09-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2201905								
WG1292863-4 DUP		**L1012741-4**						
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Vanadium (V)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUN-11
WG1292863-6 DUP		**L1012979-7**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUN-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Arsenic (As)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Barium (Ba)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUN-11
Boron (B)-Dissolved		0.0029	0.0022	J	mg/L	0.0008	0.004	09-JUN-11
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUN-11
Chromium (Cr)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Copper (Cu)-Dissolved		<0.00060	<0.00060	RPD-NA	mg/L	N/A	20	09-JUN-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Molybdenum (Mo)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Nickel (Ni)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Selenium (Se)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	09-JUN-11
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUN-11
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	09-JUN-11
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Vanadium (V)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUN-11
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUN-11
WG1292863-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	09-JUN-11
Antimony (Sb)-Dissolved			<0.00040		mg/L		0.0004	09-JUN-11
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	09-JUN-11
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	09-JUN-11
Boron (B)-Dissolved			<0.0020		mg/L		0.002	09-JUN-11
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	09-JUN-11
Chromium (Cr)-Dissolved			<0.00040		mg/L		0.0004	09-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2201905								
WG1292863-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Copper (Cu)-Dissolved			<0.00060		mg/L		0.0006	09-JUN-11
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Nickel (Ni)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Selenium (Se)-Dissolved			<0.00040		mg/L		0.0004	09-JUN-11
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	09-JUN-11
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	09-JUN-11
Uranium (U)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Vanadium (V)-Dissolved			<0.00010		mg/L		0.0001	09-JUN-11
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	09-JUN-11
NH4-DIS-ED	**Water**							
Batch R2199871								
WG1291225-4 DUP		**L1012848-2**						
Ammonia as N, Dissolved		2.05	2.03		mg/L	0.90	25	07-JUN-11
NO2-IC-ED	**Water**							
Batch R2199245								
WG1290415-3 DUP		**L1012848-1**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-JUN-11
WG1290415-2 LCS								
Nitrite (as N)			95		%		85-115	05-JUN-11
WG1290415-1 MB								
Nitrite (as N)			<0.050		mg/L		0.05	05-JUN-11
WG1290415-4 MS		**L1012848-1**						
Nitrite (as N)			97		%		75-125	05-JUN-11
NO3-IC-ED	**Water**							
Batch R2199245								
WG1290415-3 DUP		**L1012848-1**						
Nitrate (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-JUN-11
WG1290415-2 LCS								
Nitrate (as N)			99		%		85-115	05-JUN-11
WG1290415-1 MB								
Nitrate (as N)			<0.050		mg/L		0.05	05-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-ED	**Water**							
Batch R2199245								
WG1290415-4 MS		**L1012848-1**						
Nitrate (as N)			97		%		75-125	05-JUN-11
PH/EC/ALK-ED	**Water**							
Batch R2198745								
WG1290180-6 DUP		**L1012518-2**						
pH		8.50	8.50	J	pH	0.01	0.2	04-JUN-11
Conductivity (EC)		469	471		uS/cm	0.43	10	04-JUN-11
Bicarbonate (HCO3)		247	246		mg/L	0.33	25	04-JUN-11
Carbonate (CO3)		8.2	8.7		mg/L	5.4	25	04-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	04-JUN-11
Alkalinity, Total (as CaCO3)		216	216		mg/L	0.039	6.5	04-JUN-11
WG1290180-7 DUP		**L1012529-8**						
pH		7.56	7.59	J	pH	0.03	0.2	04-JUN-11
Conductivity (EC)		2640	2650		uS/cm	0.37	10	04-JUN-11
Bicarbonate (HCO3)		1790	1800		mg/L	0.55	25	04-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	04-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	04-JUN-11
Alkalinity, Total (as CaCO3)		1470	1480		mg/L	0.55	6.5	04-JUN-11
WG1290180-2 LCS								
Conductivity (EC)			98		%		90-110	04-JUN-11
WG1290180-3 LCS								
pH			7.00		pH		6.9-7.1	04-JUN-11
WG1290180-4 LCS								
Alkalinity, Total (as CaCO3)			104		%		85-115	04-JUN-11
WG1290180-5 LCS								
Conductivity (EC)			98		%		90-110	04-JUN-11
WG1290180-1 MB								
Bicarbonate (HCO3)			<5.0		mg/L		5	04-JUN-11
Carbonate (CO3)			<5.0		mg/L		5	04-JUN-11
Hydroxide (OH)			<5.0		mg/L		5	04-JUN-11
Alkalinity, Total (as CaCO3)			<5.0		mg/L		5	04-JUN-11
PHENOLS-4AAP-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-ED	**Water**							
Batch R2201013								
WG1292661-4 DUP		**L1012741-5**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	08-JUN-11
WG1292661-5 DUP		**L1012529-1**						
Phenols (4AAP)		0.0377	0.0416		mg/L	9.8	15	08-JUN-11
WG1292661-6 DUP		**L1012468-8**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	08-JUN-11
WG1292661-8 DUP		**L1012982-3**						
Phenols (4AAP)		0.0024	0.0019	J	mg/L	0.0005	0.002	08-JUN-11
WG1292661-9 DUP		**L1012848-7**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	08-JUN-11
WG1292661-3 LCS								
Phenols (4AAP)			98		%		85-115	08-JUN-11
WG1292661-2 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	08-JUN-11
WG1292661-7 MS		**L1009310-7**						
Phenols (4AAP)			97		%		75-125	08-JUN-11
PO4-DO-COL-ED	**Water**							
Batch R2199778								
WG1291034-3 DUP		**L1012848-7**						
Orthophosphate-Dissolved (as P)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	06-JUN-11
WG1291034-2 LCS								
Orthophosphate-Dissolved (as P)			104		%		80-120	06-JUN-11
WG1291034-1 MB								
Orthophosphate-Dissolved (as P)			<0.010		mg/L		0.01	06-JUN-11
WG1291034-4 MS		**L1012848-7**						
Orthophosphate-Dissolved (as P)			97		%		70-130	06-JUN-11
SO4-IC-ED	**Water**							
Batch R2199245								
WG1290415-3 DUP		**L1012848-1**						
Sulfate (SO4)		120	120		mg/L	0.21	20	05-JUN-11
WG1290415-2 LCS								
Sulfate (SO4)			103		%		85-115	05-JUN-11
WG1290415-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	05-JUN-11
WG1290415-4 MS		**L1012848-1**						
Sulfate (SO4)			N/A	MS-B	%		-	05-JUN-11

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
E	Matrix Spike recovery outside ALS DQO due to analyte background in sample.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Leachable Anions & Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	02-JUN-11 13:30	06-JUN-11 15:26	48	98	hours	EHTL
	2	02-JUN-11 16:40	06-JUN-11 15:26	48	95	hours	EHT
	3	02-JUN-11 19:00	06-JUN-11 15:26	48	92	hours	EHT
	4	02-JUN-11 13:45	06-JUN-11 15:26	48	98	hours	EHTL
	5	02-JUN-11 11:30	06-JUN-11 15:26	48	100	hours	EHTL
	6	02-JUN-11 10:30	06-JUN-11 15:26	48	101	hours	EHTL
	7	02-JUN-11 12:00	06-JUN-11 15:26	48	99	hours	EHTL
Anions and Nutrients							
Nitrate as N by IC							
	1	02-JUN-11 13:30	05-JUN-11 12:28	48	71	hours	EHTL
	2	02-JUN-11 16:40	05-JUN-11 12:28	48	68	hours	EHT
	3	02-JUN-11 19:00	05-JUN-11 12:28	48	66	hours	EHT
	4	02-JUN-11 13:45	05-JUN-11 12:28	48	71	hours	EHTL
	5	02-JUN-11 11:30	05-JUN-11 12:28	48	73	hours	EHTL
	6	02-JUN-11 10:30	05-JUN-11 12:28	48	74	hours	EHTL
	7	02-JUN-11 12:00	05-JUN-11 12:28	48	72	hours	EHTL
Nitrite as N by IC							
	1	02-JUN-11 13:30	05-JUN-11 12:28	48	71	hours	EHTL
	2	02-JUN-11 16:40	05-JUN-11 12:28	48	68	hours	EHT
	3	02-JUN-11 19:00	05-JUN-11 12:28	48	66	hours	EHT
	4	02-JUN-11 13:45	05-JUN-11 12:28	48	71	hours	EHTL
	5	02-JUN-11 11:30	05-JUN-11 12:28	48	73	hours	EHTL
	6	02-JUN-11 10:30	05-JUN-11 12:28	48	74	hours	EHTL
	7	02-JUN-11 12:00	05-JUN-11 12:28	48	72	hours	EHTL

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1012848 were received on 03-JUN-11 16:16.

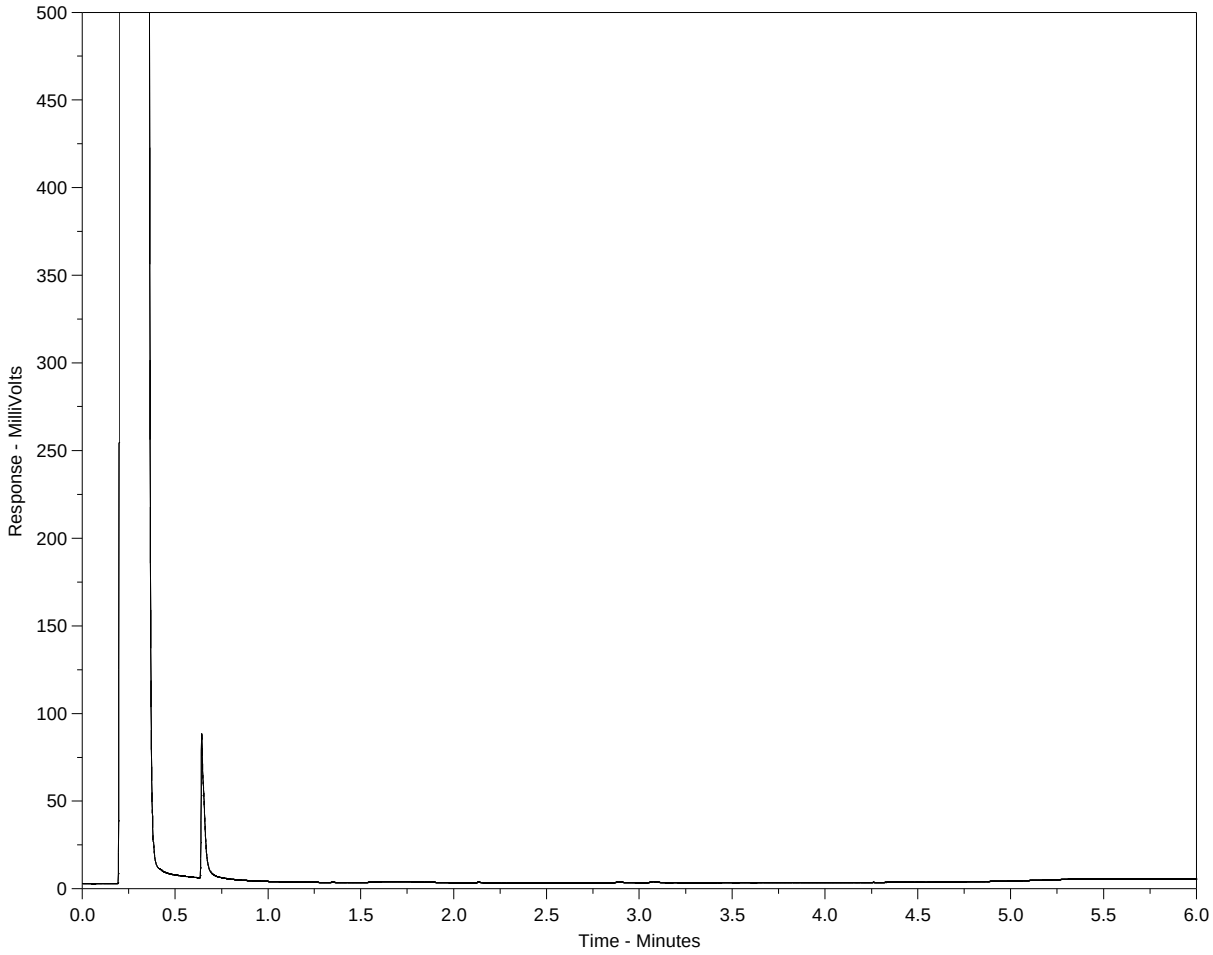
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-1**
Client ID: **MW-03**



<-C10--------C11--------------------C16----------------------------C30---C34----------------------C50->
<--------------Gasoline--------------------> <----------------Heavy Oils---------------->
|------------------Diesel--------------------|

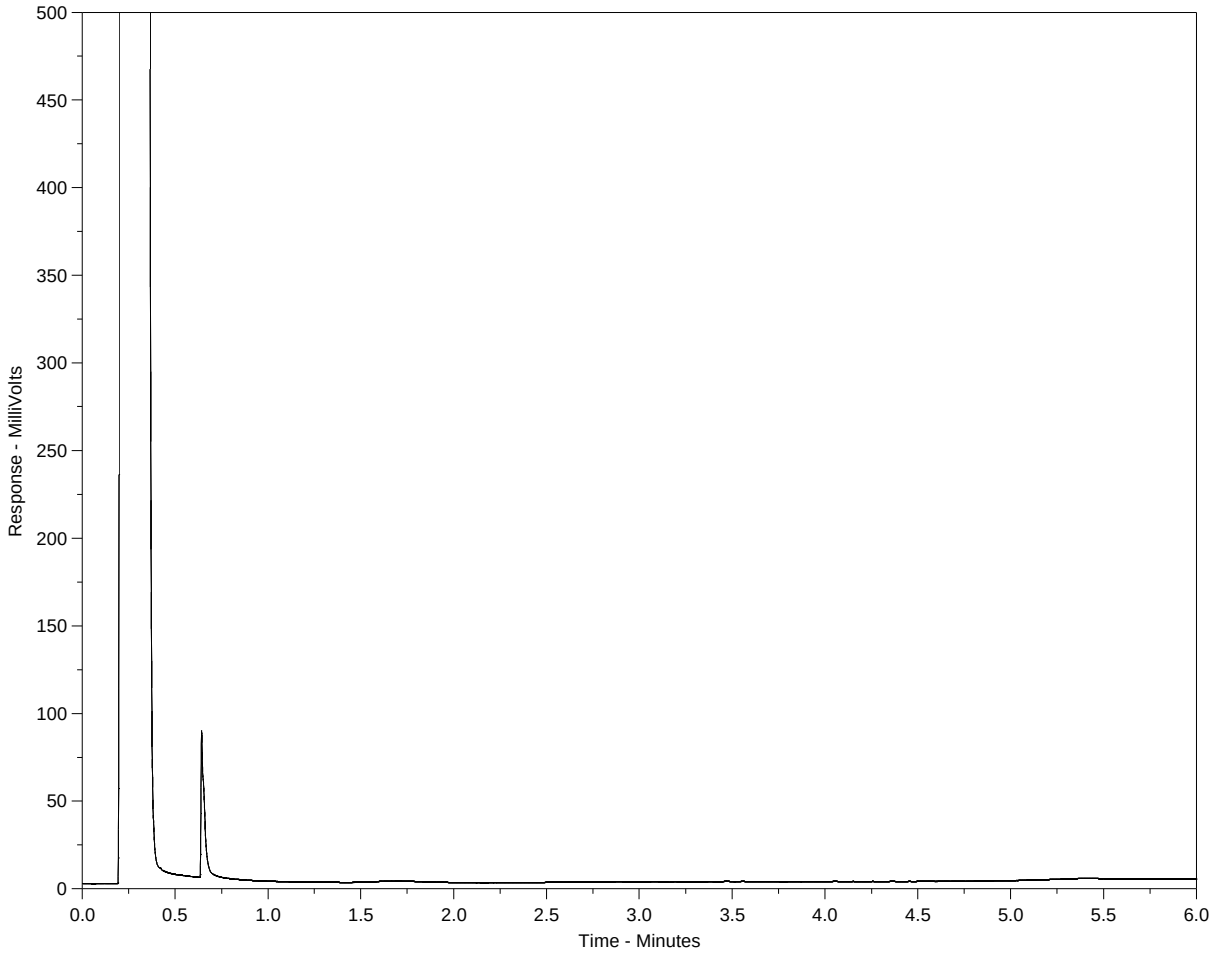
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-2**
Client ID: **MW-09**



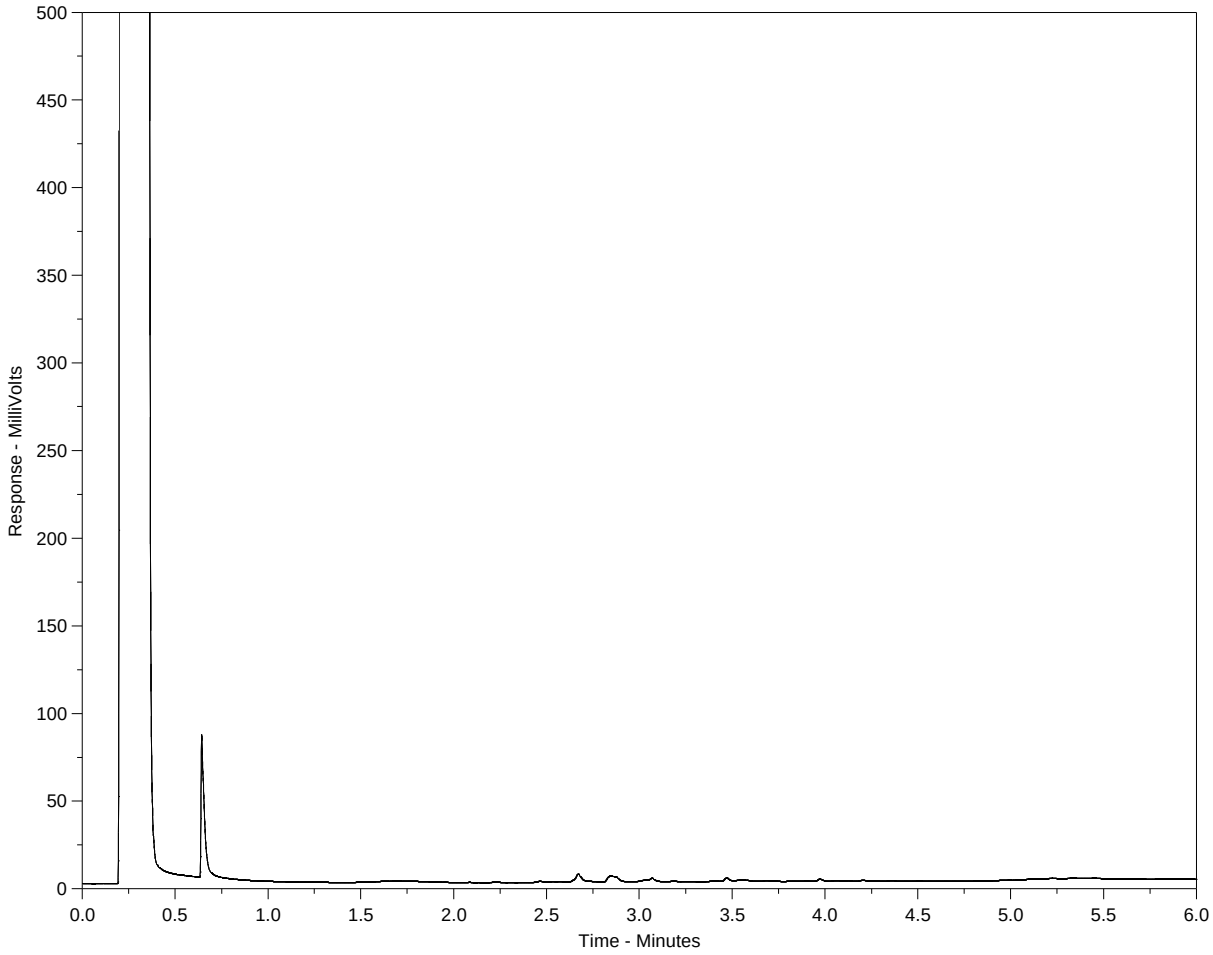
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-3**
Client ID: **MW-10**



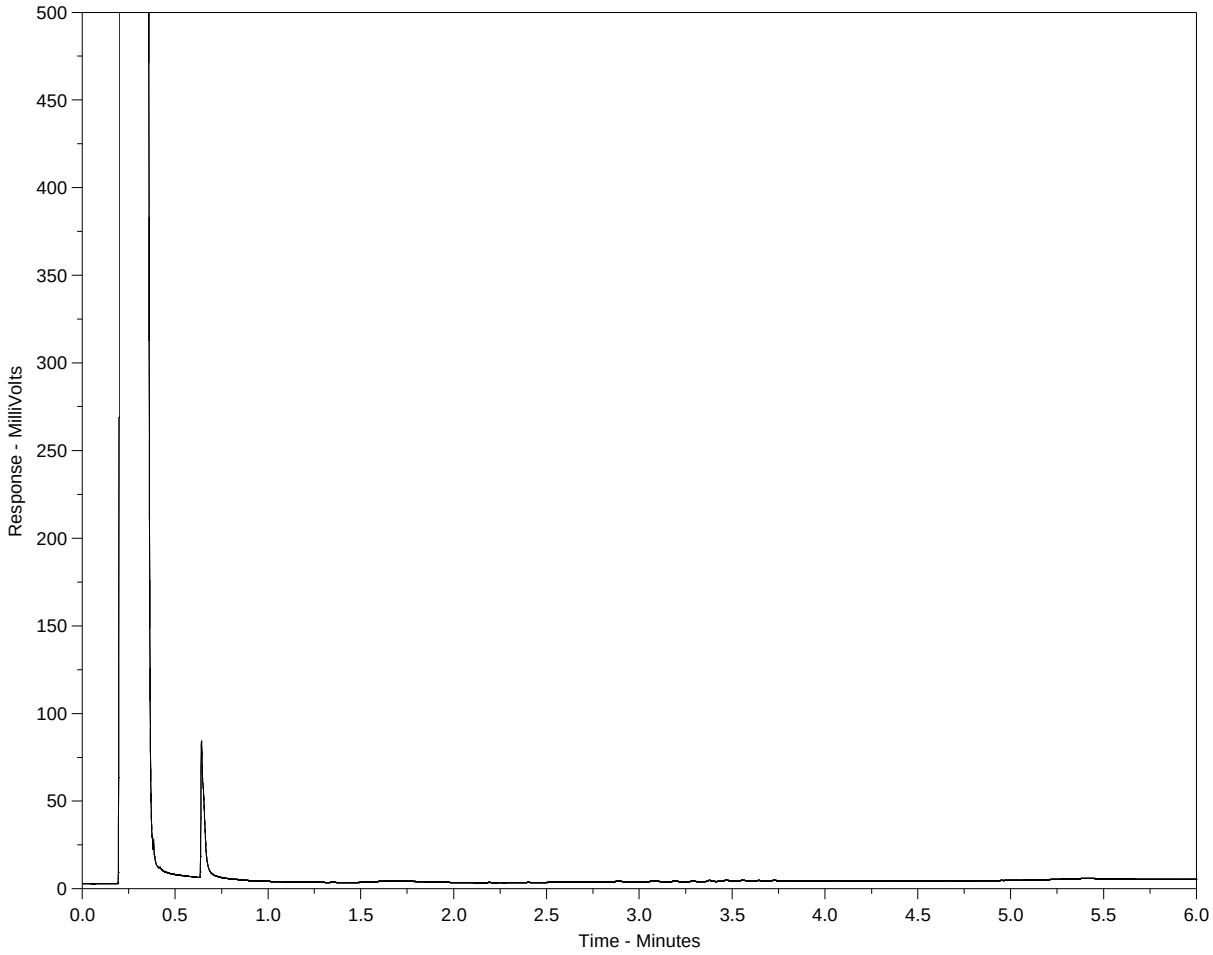
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-4**
Client ID: **MW-11**



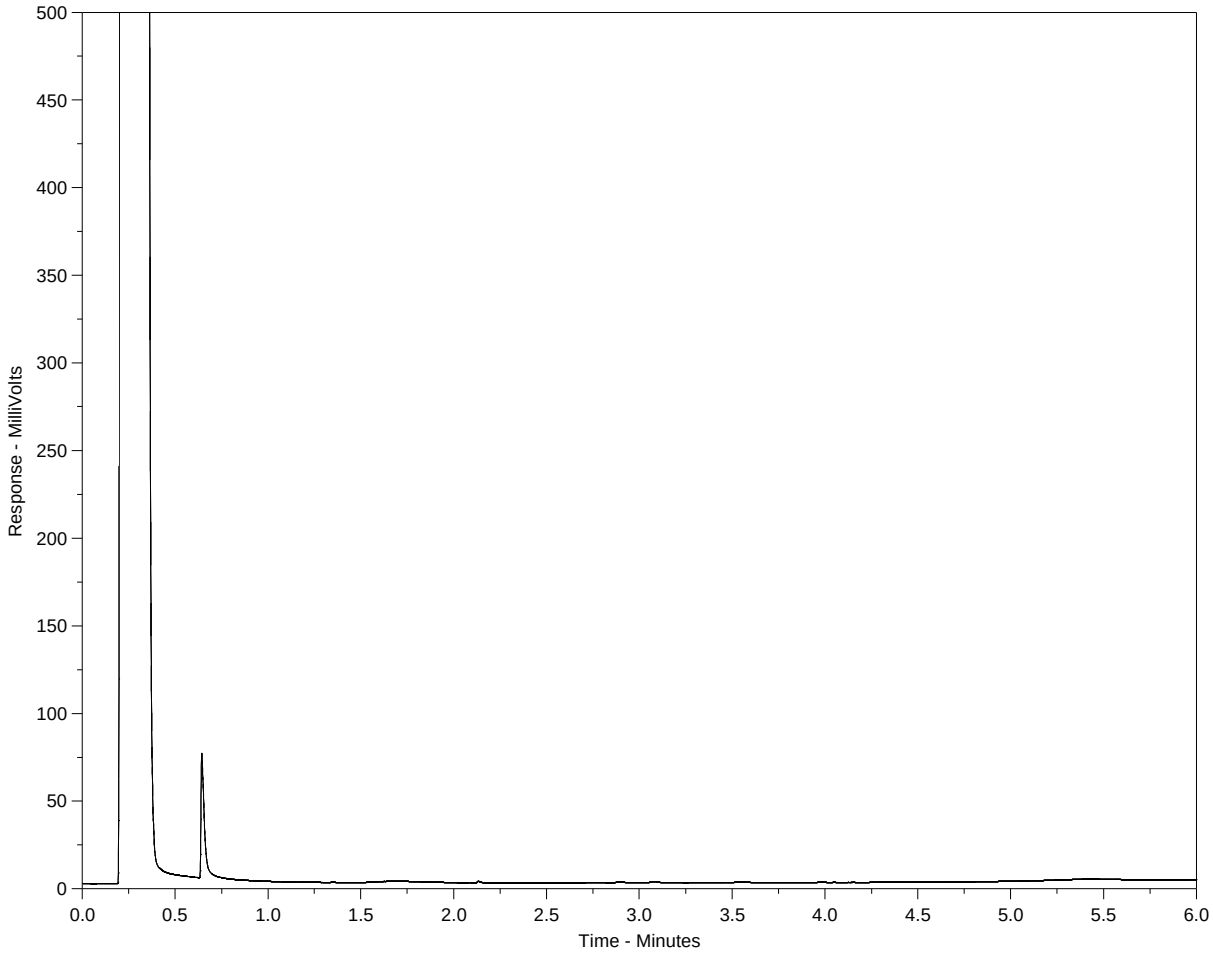
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-5**
Client ID: **MW-12**



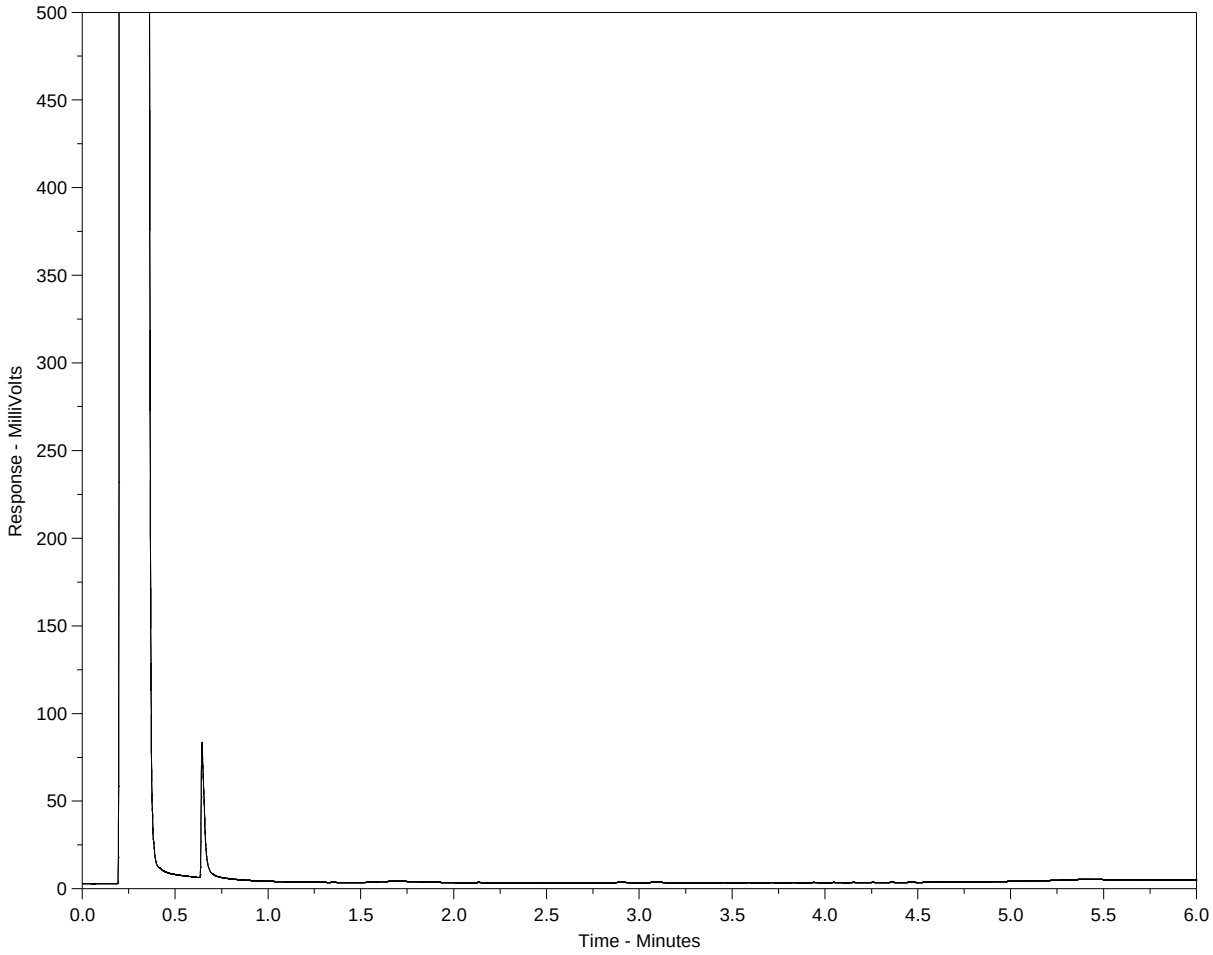
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-6**
Client ID: **MW-13**



<-C10--------C11--------------------C16----------------------------C30---C34----------------------C50->
<--------------Gasoline---------------------> <----------------Heavy Oils---------------->
|-------------------Diesel--------------------|

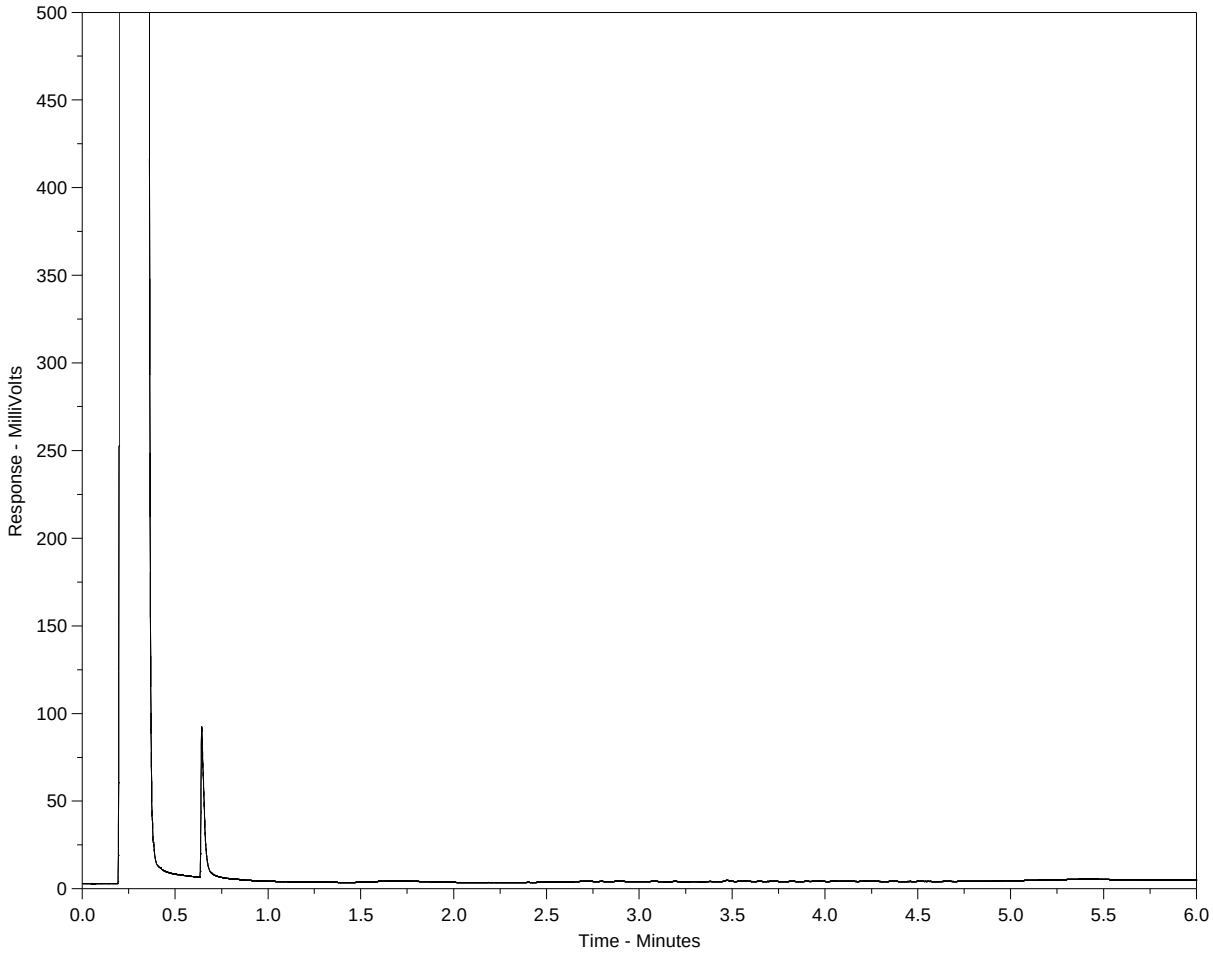
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1012848-7**
Client ID: **DUP II**



The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Chain of Custody / Analytic
Canada Toll Free: 1 8
www.alsglobal.

COC #

Page 1 of 1

Report To		Report Format / Distribution				routine analysis subject to availability)
Company:	WorleyParsons	☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Trevor Butterfield	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	#705 10240 124 Street	Email 1:	edm.chemistry@worleyparsons.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Edmonton, Alberta, T5N 3W6	Email 2:	trevor.butterfield@worleyparsons.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	780-496-9055 Fax: 780-496-9575	Email 3:	ken.sommerstad@worleyparsons.com			Analysis Request
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #:	E00100102			
Company:		PO / AFE:				
Contact:		LSD:	NCIA Beverly Channel			
Address:						
Phone:	Fax:	Quote #:	Q23924			
Lab Work Order # (lab use only)	L1012848	ALS Contact:	Maurren Olinek	Sampler:	NYCJ/DOUJ	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine+PO4+F	BTEX F1, F2	Phenols	DOC	Dissolved Ammonia	Dissolved Metals	Number of Containers
	MW-03	02-Jun-11	13:30	Groundwater	X	X	X	X	X	X	10
	MW-09	02-Jun-11	16:40	Groundwater	X	X	X	X	X	X	10
	MW-10	02-Jun-11	19:00	Groundwater	X	X	X	X	X	X	10
	MW-11	03-Jun-11	13:45	Groundwater	X	X	X	X	X	X	10
	MW-12	02-Jun-11	11:30	Groundwater	X	X	X	X	X	X	10
	MW-13	02-Jun-11	10:30	Groundwater	X	X	X	X	X	X	10
	DUP 1	02-Jun-11	12:00	Groundwater	X	X	X	X	X	X	10

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

AB Tier 1

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: Jeff Nychka	Date (dd-mmm-yy) 3/06/201	Time (hh-mm) 16:15	Received by:	Date: 08-JUN-11	Time: 16:16	Temperature: 4.8 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

GENF 18.01 Front

WORLEYPARSONS CANADA SERVICES LTD
ATTN: KEN SOMMERSTAD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Date Received: 07-JUN-11
Report Date: 15-JUN-11 09:59 (MT)
Version: FINAL

Client Phone: 780-496-9055

Certificate of Analysis

Lab Work Order #:	**L1014045**
Project P.O. #:	NOT SUBMITTED
Job Reference:	E00100102
Legal Site Desc:	NCIA BEVERLY CHANNEL
C of C Numbers:	

Maureen Olinek
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014045-1 MW-04							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 10:45							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Toluene	<0.00075		0.00075	mg/L		10-JUN-11	R2200753
EthylBenzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
o-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
m+p-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Styrene	<0.0010		0.0010	mg/L		10-JUN-11	R2200753
F1(C6-C10)	<0.10		0.10	mg/L		10-JUN-11	R2200753
F1-BTEX	<0.10		0.10	mg/L		10-JUN-11	R2200753
Xylenes	<0.00071		0.00071	mg/L		10-JUN-11	R2200753
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	09-JUN-11	09-JUN-11	R2202124
Surrogate: 2-Bromobenzotrifluoride	104		65-135	%	09-JUN-11	09-JUN-11	R2202124
Miscellaneous Parameters							
Ammonia as N, Dissolved	<0.050		0.050	mg/L		10-JUN-11	R2201747
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		10-JUN-11	R2202433
Dissolved Organic Carbon	3.0		1.0	mg/L		10-JUN-11	R2202826
Fluoride (F)	0.119		0.050	mg/L		08-JUN-11	R2200896
Phenols (4AAP)	<0.0010		0.0010	mg/L		13-JUN-11	R2203617
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	125		0.50	mg/L		08-JUN-11	R2200896
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		13-JUN-11	R2203127
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Arsenic (As)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Barium (Ba)-Dissolved	0.0832		0.0050	mg/L		13-JUN-11	R2203127
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		13-JUN-11	R2203127
Boron (B)-Dissolved	0.090		0.050	mg/L		13-JUN-11	R2203127
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		13-JUN-11	R2203127
Cobalt (Co)-Dissolved	0.00015		0.00010	mg/L		13-JUN-11	R2203127
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		13-JUN-11	R2203127
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Molybdenum (Mo)-Dissolved	0.00038		0.00010	mg/L		13-JUN-11	R2203127
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		13-JUN-11	R2203127
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		13-JUN-11	R2203127
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		13-JUN-11	R2203127
Uranium (U)-Dissolved	0.00333		0.00010	mg/L		13-JUN-11	R2203127
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		13-JUN-11	R2203127
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	140		0.50	mg/L		10-JUN-11	R2201409
Iron (Fe)-Dissolved	0.028		0.020	mg/L		10-JUN-11	R2201409
Magnesium (Mg)-Dissolved	41.3		0.10	mg/L		10-JUN-11	R2201409
Manganese (Mn)-Dissolved	0.114		0.0050	mg/L		10-JUN-11	R2201409
Potassium (K)-Dissolved	8.78		0.10	mg/L		10-JUN-11	R2201409
Sodium (Na)-Dissolved	50.7		0.50	mg/L		10-JUN-11	R2201409
Ion Balance Calculation							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014045-1 MW-04							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 10:45							
Matrix: GROUNDWATER							
Ion Balance Calculation							
Ion Balance	96.3			%		10-JUN-11	
TDS (Calculated)	693			mg/L		10-JUN-11	
Hardness (as CaCO3)	520			mg/L		10-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		10-JUN-11	R2202032
Nitrate as N by IC							
Nitrate (as N)	0.264		0.050	mg/L		08-JUN-11	R2200896
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.264		0.071	mg/L		10-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Sulfate by IC							
Sulfate (SO4)	88.9		0.50	mg/L		08-JUN-11	R2200896
pH, Conductivity and Total Alkalinity							
pH	7.95		0.10	pH		09-JUN-11	R2201007
Conductivity (EC)	1280		0.20	uS/cm		09-JUN-11	R2201007
Bicarbonate (HCO3)	482		5.0	mg/L		09-JUN-11	R2201007
Carbonate (CO3)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Hydroxide (OH)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Alkalinity, Total (as CaCO3)	395		5.0	mg/L		09-JUN-11	R2201007
L1014045-2 MW-06							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 14:30							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Toluene	<0.00075		0.00075	mg/L		10-JUN-11	R2200753
EthylBenzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
o-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
m+p-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Styrene	<0.0010		0.0010	mg/L		10-JUN-11	R2200753
F1(C6-C10)	<0.10		0.10	mg/L		10-JUN-11	R2200753
F1-BTEX	<0.10		0.10	mg/L		10-JUN-11	R2200753
Xylenes	<0.00071		0.00071	mg/L		10-JUN-11	R2200753
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	09-JUN-11	09-JUN-11	R2202124
Surrogate: 2-Bromobenzotrifluoride	102		65-135	%	09-JUN-11	09-JUN-11	R2202124
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.57		0.050	mg/L		10-JUN-11	R2201747
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		10-JUN-11	R2202433
Dissolved Organic Carbon	8.0		1.0	mg/L		10-JUN-11	R2202826
Fluoride (F)	0.129		0.050	mg/L		08-JUN-11	R2200896
Phenols (4AAP)	<0.0010		0.0010	mg/L		13-JUN-11	R2203617
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	3.45		0.50	mg/L		08-JUN-11	R2200896
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	0.0288		0.0050	mg/L		13-JUN-11	R2203127
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Arsenic (As)-Dissolved	0.00570		0.00040	mg/L		13-JUN-11	R2203127
Barium (Ba)-Dissolved	0.0309		0.0050	mg/L		13-JUN-11	R2203127

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014045-2 MW-06							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 14:30							
Matrix: GROUNDWATER							
Diss. Metals in Water by ICPMS (Low)							
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		13-JUN-11	R2203127
Boron (B)-Dissolved	0.138		0.050	mg/L		13-JUN-11	R2203127
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		13-JUN-11	R2203127
Cobalt (Co)-Dissolved	0.00036		0.00010	mg/L		13-JUN-11	R2203127
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		13-JUN-11	R2203127
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Molybdenum (Mo)-Dissolved	0.00080		0.00010	mg/L		13-JUN-11	R2203127
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		13-JUN-11	R2203127
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		13-JUN-11	R2203127
Titanium (Ti)-Dissolved	0.00063		0.00030	mg/L		13-JUN-11	R2203127
Uranium (U)-Dissolved	0.00180		0.00010	mg/L		13-JUN-11	R2203127
Vanadium (V)-Dissolved	0.00016		0.00010	mg/L		13-JUN-11	R2203127
Zinc (Zn)-Dissolved	<0.0020		0.0020	mg/L		13-JUN-11	R2203127
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	164		0.50	mg/L		10-JUN-11	R2201409
Iron (Fe)-Dissolved	5.55		0.020	mg/L		10-JUN-11	R2201409
Magnesium (Mg)-Dissolved	60.4		0.10	mg/L		10-JUN-11	R2201409
Manganese (Mn)-Dissolved	1.64		0.0050	mg/L		10-JUN-11	R2201409
Potassium (K)-Dissolved	5.02		0.10	mg/L		10-JUN-11	R2201409
Sodium (Na)-Dissolved	123		0.50	mg/L		10-JUN-11	R2201409
Ion Balance Calculation							
Ion Balance	91.3			%		10-JUN-11	
TDS (Calculated)	1150			mg/L		10-JUN-11	
Hardness (as CaCO3)	658			mg/L		10-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		10-JUN-11	R2202032
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		10-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Sulfate by IC							
Sulfate (SO4)	501		0.50	mg/L		08-JUN-11	R2200896
pH, Conductivity and Total Alkalinity							
pH	7.96		0.10	pH		09-JUN-11	R2201007
Conductivity (EC)	1760		0.20	uS/cm		09-JUN-11	R2201007
Bicarbonate (HCO3)	603		5.0	mg/L		09-JUN-11	R2201007
Carbonate (CO3)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Hydroxide (OH)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Alkalinity, Total (as CaCO3)	494		5.0	mg/L		09-JUN-11	R2201007
L1014045-3 MW-08							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 12:40							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Toluene	<0.00075		0.00075	mg/L		10-JUN-11	R2200753

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014045-3 MW-08							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 12:40							
Matrix: GROUNDWATER							
BTEX, Styrene and F1 (C6-C10)							
EthylBenzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
o-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
m+p-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Styrene	<0.0010		0.0010	mg/L		10-JUN-11	R2200753
F1(C6-C10)	<0.10		0.10	mg/L		10-JUN-11	R2200753
F1-BTEX	<0.10		0.10	mg/L		10-JUN-11	R2200753
Xylenes	<0.00071		0.00071	mg/L		10-JUN-11	R2200753
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	09-JUN-11	09-JUN-11	R2202124
Surrogate: 2-Bromobenzotrifluoride	98		65-135	%	09-JUN-11	09-JUN-11	R2202124
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.71		0.050	mg/L		10-JUN-11	R2201747
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		10-JUN-11	R2202433
Dissolved Organic Carbon	10.3		1.0	mg/L		10-JUN-11	R2202826
Fluoride (F)	0.082		0.050	mg/L		08-JUN-11	R2200896
Phenols (4AAP)	0.0016		0.0010	mg/L		13-JUN-11	R2203617
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	0.97		0.50	mg/L		08-JUN-11	R2200896
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		11-JUN-11	R2202460
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		11-JUN-11	R2202460
Arsenic (As)-Dissolved	0.00667		0.00040	mg/L		11-JUN-11	R2202460
Barium (Ba)-Dissolved	0.0614		0.0050	mg/L		11-JUN-11	R2202460
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		11-JUN-11	R2202460
Boron (B)-Dissolved	0.180		0.050	mg/L		11-JUN-11	R2202460
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		11-JUN-11	R2202460
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		11-JUN-11	R2202460
Cobalt (Co)-Dissolved	0.00036		0.00010	mg/L		11-JUN-11	R2202460
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		11-JUN-11	R2202460
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		11-JUN-11	R2202460
Molybdenum (Mo)-Dissolved	0.00154		0.00010	mg/L		11-JUN-11	R2202460
Nickel (Ni)-Dissolved	0.0025		0.0020	mg/L		11-JUN-11	R2202460
Selenium (Se)-Dissolved	0.00159		0.00040	mg/L		11-JUN-11	R2202460
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		11-JUN-11	R2202460
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		11-JUN-11	R2202460
Titanium (Ti)-Dissolved	0.00144		0.00030	mg/L		11-JUN-11	R2202460
Uranium (U)-Dissolved	0.00080		0.00010	mg/L		11-JUN-11	R2202460
Vanadium (V)-Dissolved	0.00018		0.00010	mg/L		11-JUN-11	R2202460
Zinc (Zn)-Dissolved	0.0116		0.0020	mg/L		11-JUN-11	R2202460
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	136		0.50	mg/L		10-JUN-11	R2201409
Iron (Fe)-Dissolved	5.41		0.020	mg/L		10-JUN-11	R2201409
Magnesium (Mg)-Dissolved	38.3		0.10	mg/L		10-JUN-11	R2201409
Manganese (Mn)-Dissolved	0.411		0.0050	mg/L		10-JUN-11	R2201409
Potassium (K)-Dissolved	5.12		0.10	mg/L		10-JUN-11	R2201409
Sodium (Na)-Dissolved	98.0		0.50	mg/L		10-JUN-11	R2201409
Ion Balance Calculation							
Ion Balance	89.8			%		10-JUN-11	
TDS (Calculated)	876			mg/L		10-JUN-11	
Hardness (as CaCO3)	497			mg/L		10-JUN-11	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014045-3 MW-08							
Sampled By: NYCJ/MULS on 07-JUN-11 @ 12:40							
Matrix: GROUNDWATER							
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		10-JUN-11	R2202032
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		10-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Sulfate by IC							
Sulfate (SO4)	320		0.50	mg/L		08-JUN-11	R2200896
pH, Conductivity and Total Alkalinity							
pH	7.95		0.10	pH		09-JUN-11	R2201007
Conductivity (EC)	1400		0.20	uS/cm		09-JUN-11	R2201007
Bicarbonate (HCO3)	565		5.0	mg/L		09-JUN-11	R2201007
Carbonate (CO3)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Hydroxide (OH)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Alkalinity, Total (as CaCO3)	463		5.0	mg/L		09-JUN-11	R2201007

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
C-DIS-ORG-ED	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
CL-IC-ED	Water	Chloride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F-IC-ED	Water	Fluoride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
NH4-DIS-ED	Water	Ammonia-N	APHA4500NH3F Colorimetry
NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-ED	Water	Nitrite as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
NO3-IC-ED	Water	Nitrate as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
PHENOLS-4AAP-ED	Water	Phenols (4AAP)	AB ENV.06537-COLORIMETRIC
PO4-DO-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-ED	Water	Sulfate by IC	APHA 4110 B-ION CHROMATOGRAPHY

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L1014045

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L1014045 Report Date: 15-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED	**Water**							
Batch R2200753								
WG1292941-2 LCS								
Benzene			98		%		70-130	10-JUN-11
Toluene			97		%		70-130	10-JUN-11
EthylBenzene			99		%		70-130	10-JUN-11
o-Xylene			99		%		70-130	10-JUN-11
m+p-Xylene			102		%		70-130	10-JUN-11
Styrene			80		%		70-130	10-JUN-11
WG1292941-3 LCS								
F1(C6-C10)			109		%		70-130	10-JUN-11
WG1292941-1 MB								
Benzene			<0.00050		mg/L		0.0005	11-JUN-11
Toluene			<0.00075		mg/L		0.00075	11-JUN-11
EthylBenzene			<0.00050		mg/L		0.0005	11-JUN-11
o-Xylene			<0.00050		mg/L		0.0005	11-JUN-11
m+p-Xylene			<0.00050		mg/L		0.0005	11-JUN-11
Styrene			<0.0010		mg/L		0.001	11-JUN-11
F1(C6-C10)			<0.10		mg/L		0.1	11-JUN-11
C-DIS-ORG-ED	**Water**							
Batch R2202826								
WG1294406-3 CVS								
Dissolved Organic Carbon			102		%		80-160	10-JUN-11
WG1294406-4 DUP		**L1014539-8**						
Dissolved Organic Carbon		10.5	10.3		mg/L	1.7	20	10-JUN-11
WG1294406-6 DUP		**L1014231-15**						
Dissolved Organic Carbon		24.8	24.7		mg/L	0.49	20	11-JUN-11
WG1294406-2 LCS								
Dissolved Organic Carbon			89		%		80-120	10-JUN-11
WG1294406-1 MB								
Dissolved Organic Carbon			<1.0		mg/L		1	10-JUN-11
WG1294406-5 MS		**L1014539-8**						
Dissolved Organic Carbon			N/A	MS-B	%		-	10-JUN-11
WG1294406-7 MS		**L1014231-15**						
Dissolved Organic Carbon			N/A	MS-B	%		-	11-JUN-11
CL-IC-ED	**Water**							

Quality Control Report

Workorder: L1014045 Report Date: 15-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Chloride (Cl)		4.34	4.34		mg/L	0.041	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Chloride (Cl)		32.5	32.6		mg/L	0.018	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Chloride (Cl)		87.0	86.9		mg/L	0.054	20	08-JUN-11
WG1292029-2 LCS								
Chloride (Cl)			101		%		85-115	08-JUN-11
WG1292029-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Chloride (Cl)			103		%		75-125	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Chloride (Cl)			100		%		75-125	08-JUN-11
F-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Fluoride (F)		0.320	0.320		mg/L	0.031	20	08-JUN-11
WG1292029-2 LCS								
Fluoride (F)			103		%		85-115	08-JUN-11
WG1292029-1 MB								
Fluoride (F)			<0.050		mg/L		0.05	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Fluoride (F)			81		%		75-125	08-JUN-11
F2-ED	**Water**							
Batch R2202124								
WG1293539-2 LCS								
F2 (>C10-C16)			99		%		65-135	09-JUN-11
WG1293539-1 MB								
F2 (>C10-C16)			<0.25		mg/L		0.25	09-JUN-11
Surrogate: 2-Bromobenzotrifluoride			98		%		65-135	09-JUN-11
WG1293539-3 MS		**L1014695-2**						
F2 (>C10-C16)			97		%		50-150	09-JUN-11
HG-D-L-CVAA-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-L-CVAA-ED	**Water**							
Batch R2202032								
WG1293525-8 DUP		**L1014471-1**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	10-JUN-11
WG1293525-2 LCS								
Mercury (Hg)-Dissolved			99		%		80-120	10-JUN-11
WG1293525-3 LCSD		**WG1293525-2**						
Mercury (Hg)-Dissolved		99	101		%	2.1	20	10-JUN-11
WG1293525-1 MB								
Mercury (Hg)-Dissolved			<0.000020		mg/L		0.00002	10-JUN-11
WG1293525-9 MS		**L1014471-1**						
Mercury (Hg)-Dissolved			95		%		70-130	10-JUN-11
MET-D-L-ICP-ED	**Water**							
Batch R2201409								
WG1292721-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			107		%		80-120	09-JUN-11
Iron (Fe)-Dissolved			106		%		80-120	09-JUN-11
Magnesium (Mg)-Dissolved			108		%		80-120	09-JUN-11
Manganese (Mn)-Dissolved			106		%		80-120	09-JUN-11
Potassium (K)-Dissolved			104		%		80-120	09-JUN-11
Sodium (Na)-Dissolved			105		%		80-120	09-JUN-11
WG1292721-9 DUP		**L1014045-3**						
Calcium (Ca)-Dissolved		136	137		mg/L	0.61	20	10-JUN-11
Iron (Fe)-Dissolved		5.41	5.46		mg/L	0.88	20	10-JUN-11
Magnesium (Mg)-Dissolved		38.3	38.7		mg/L	0.99	20	10-JUN-11
Manganese (Mn)-Dissolved		0.411	0.416		mg/L	1.1	20	10-JUN-11
Potassium (K)-Dissolved		5.12	5.31		mg/L	3.6	20	10-JUN-11
Sodium (Na)-Dissolved		98.0	101		mg/L	3.2	20	10-JUN-11
WG1292721-1 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	09-JUN-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-JUN-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	09-JUN-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	09-JUN-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-JUN-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	09-JUN-11
WG1292721-10 MS		**L1014045-3**						
Calcium (Ca)-Dissolved			89		%		70-130	10-JUN-11
Iron (Fe)-Dissolved			91		%		70-130	10-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2201409								
WG1292721-10 MS		**L1014045-3**						
Magnesium (Mg)-Dissolved			97		%		70-130	10-JUN-11
Manganese (Mn)-Dissolved			95		%		70-130	10-JUN-11
Potassium (K)-Dissolved			90		%		70-130	10-JUN-11
Sodium (Na)-Dissolved			87		%		70-130	10-JUN-11
MET-D-L-MS-ED	**Water**							
Batch R2202460								
WG1293479-2 CRM		**1643E_WATER**						
Aluminum (Al)-Dissolved			101		%		80-120	11-JUN-11
Antimony (Sb)-Dissolved			97		%		80-120	11-JUN-11
Arsenic (As)-Dissolved			98		%		80-120	11-JUN-11
Barium (Ba)-Dissolved			99		%		80-120	11-JUN-11
Beryllium (Be)-Dissolved			96		%		80-120	11-JUN-11
Boron (B)-Dissolved			96		%		80-120	11-JUN-11
Cadmium (Cd)-Dissolved			99		%		80-120	11-JUN-11
Chromium (Cr)-Dissolved			105		%		80-120	11-JUN-11
Cobalt (Co)-Dissolved			98		%		80-120	11-JUN-11
Copper (Cu)-Dissolved			100		%		80-120	11-JUN-11
Lead (Pb)-Dissolved			97		%		80-120	11-JUN-11
Molybdenum (Mo)-Dissolved			100		%		80-120	11-JUN-11
Nickel (Ni)-Dissolved			98		%		80-120	11-JUN-11
Selenium (Se)-Dissolved			111		%		80-120	11-JUN-11
Thallium (Tl)-Dissolved			101		%		80-120	11-JUN-11
Vanadium (V)-Dissolved			97		%		80-120	11-JUN-11
Zinc (Zn)-Dissolved			98		%		80-120	11-JUN-11
WG1293479-5 DUP		**L1014045-3**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	11-JUN-11
Antimony (Sb)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	11-JUN-11
Arsenic (As)-Dissolved		0.00667	0.00675		mg/L	1.2	20	11-JUN-11
Barium (Ba)-Dissolved		0.0614	0.0614		mg/L	0.065	20	11-JUN-11
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	11-JUN-11
Boron (B)-Dissolved		0.180	0.188		mg/L	4.3	20	11-JUN-11
Cadmium (Cd)-Dissolved		<0.00010	<0.000050	RPD-NA	mg/L	N/A	20	11-JUN-11
Chromium (Cr)-Dissolved		<0.0050	0.00179		mg/L	3.0	20	11-JUN-11
Cobalt (Co)-Dissolved		0.00036	0.00035		mg/L			11-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2202460								
WG1293479-5 DUP		**L1014045-3**						
Cobalt (Co)-Dissolved		0.00036	0.00035		mg/L	1.7	20	11-JUN-11
Copper (Cu)-Dissolved		<0.0010	0.00069		mg/L	5.1	20	11-JUN-11
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	11-JUN-11
Molybdenum (Mo)-Dissolved		0.00154	0.00151		mg/L	2.2	20	11-JUN-11
Nickel (Ni)-Dissolved		0.0025	0.00248		mg/L	0.97	20	11-JUN-11
Selenium (Se)-Dissolved		0.00159	0.00123	J	mg/L	0.00036	0.0008	11-JUN-11
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	11-JUN-11
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	11-JUN-11
Titanium (Ti)-Dissolved		0.00144	0.00137		mg/L	4.3	20	11-JUN-11
Uranium (U)-Dissolved		0.00080	0.00079		mg/L	0.88	20	11-JUN-11
Vanadium (V)-Dissolved		0.00018	0.00017		mg/L	1.1	20	11-JUN-11
Zinc (Zn)-Dissolved		0.0116	0.0114		mg/L	2.3	20	11-JUN-11
WG1293479-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	11-JUN-11
Antimony (Sb)-Dissolved			<0.00040		mg/L		0.0004	11-JUN-11
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	11-JUN-11
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	11-JUN-11
Boron (B)-Dissolved			<0.0020		mg/L		0.002	11-JUN-11
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	11-JUN-11
Chromium (Cr)-Dissolved			<0.00040		mg/L		0.0004	11-JUN-11
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Copper (Cu)-Dissolved			<0.00060		mg/L		0.0006	11-JUN-11
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Nickel (Ni)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Selenium (Se)-Dissolved			<0.0004		mg/L		0.0004	11-JUN-11
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	11-JUN-11
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	11-JUN-11
Uranium (U)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Vanadium (V)-Dissolved			<0.00010		mg/L		0.0001	11-JUN-11
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	11-JUN-11
WG1293479-4 MS		**L1014045-3**						

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2202460								
WG1293479-4 MS		**L1014045-3**						
Aluminum (Al)-Dissolved			103		%		70-130	11-JUN-11
Antimony (Sb)-Dissolved			96		%		70-130	11-JUN-11
Arsenic (As)-Dissolved			101		%		70-130	11-JUN-11
Barium (Ba)-Dissolved			97		%		70-130	11-JUN-11
Beryllium (Be)-Dissolved			99		%		70-130	11-JUN-11
Boron (B)-Dissolved			104		%		70-130	11-JUN-11
Cadmium (Cd)-Dissolved			97		%		70-130	11-JUN-11
Chromium (Cr)-Dissolved			99		%		70-130	11-JUN-11
Cobalt (Co)-Dissolved			95		%		70-130	11-JUN-11
Copper (Cu)-Dissolved			94		%		70-130	11-JUN-11
Lead (Pb)-Dissolved			102		%		70-130	11-JUN-11
Molybdenum (Mo)-Dissolved			91		%		70-130	11-JUN-11
Nickel (Ni)-Dissolved			94		%		70-130	11-JUN-11
Selenium (Se)-Dissolved			105		%		70-130	11-JUN-11
Silver (Ag)-Dissolved			92		%		70-130	11-JUN-11
Thallium (Tl)-Dissolved			101		%		70-130	11-JUN-11
Titanium (Ti)-Dissolved			99		%		70-130	11-JUN-11
Uranium (U)-Dissolved			105		%		70-130	11-JUN-11
Vanadium (V)-Dissolved			99		%		70-130	11-JUN-11
Zinc (Zn)-Dissolved			94		%		70-130	11-JUN-11
Batch R2203127								
WG1294574-2 CRM		**ED-HIGH-WATRM**						
Aluminum (Al)-Dissolved			105		%		80-120	13-JUN-11
Antimony (Sb)-Dissolved			99		%		80-120	13-JUN-11
Arsenic (As)-Dissolved			101		%		80-120	13-JUN-11
Barium (Ba)-Dissolved			97		%		80-120	13-JUN-11
Beryllium (Be)-Dissolved			104		%		80-120	13-JUN-11
Boron (B)-Dissolved			96		%		80-120	13-JUN-11
Cadmium (Cd)-Dissolved			103		%		80-120	13-JUN-11
Chromium (Cr)-Dissolved			101		%		80-120	13-JUN-11
Cobalt (Co)-Dissolved			100		%		80-120	13-JUN-11
Copper (Cu)-Dissolved			97		%		80-120	13-JUN-11
Lead (Pb)-Dissolved			102		%		80-120	13-JUN-11
Molybdenum (Mo)-Dissolved			97		%		80-120	13-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2203127								
WG1294574-2 CRM		**ED-HIGH-WATRM**						
Nickel (Ni)-Dissolved			103		%		80-120	13-JUN-11
Selenium (Se)-Dissolved			99		%		80-120	13-JUN-11
Silver (Ag)-Dissolved			97		%		80-120	13-JUN-11
Thallium (Tl)-Dissolved			102		%		80-120	13-JUN-11
Titanium (Ti)-Dissolved			93		%		80-120	13-JUN-11
Uranium (U)-Dissolved			102		%		80-120	13-JUN-11
Vanadium (V)-Dissolved			100		%		80-120	13-JUN-11
Zinc (Zn)-Dissolved			99		%		80-120	13-JUN-11
WG1294574-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	13-JUN-11
Antimony (Sb)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	13-JUN-11
Boron (B)-Dissolved			<0.0020		mg/L		0.002	13-JUN-11
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	13-JUN-11
Chromium (Cr)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Copper (Cu)-Dissolved			<0.00060		mg/L		0.0006	13-JUN-11
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Nickel (Ni)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Selenium (Se)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	13-JUN-11
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	13-JUN-11
Uranium (U)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Vanadium (V)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	13-JUN-11
NH4-DIS-ED	**Water**							
Batch R2201747								
WG1293280-8 DUP		**L1014471-1**						
Ammonia as N, Dissolved		1.83	1.86		mg/L	1.2	25	10-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-7 DUP		**L1013854-5**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Nitrite (as N)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-2 LCS								
Nitrite (as N)			95		%		85-115	08-JUN-11
WG1292029-1 MB								
Nitrite (as N)			<0.050		mg/L		0.05	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Nitrite (as N)			101		%		75-125	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Nitrite (as N)			78		%		75-125	08-JUN-11
WG1292029-8 MS		**L1013854-5**						
Nitrite (as N)			88		%		75-125	08-JUN-11
NO3-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Nitrate (as N)		0.090	0.090		mg/L	0.44	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Nitrate (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-7 DUP		**L1013854-5**						
Nitrate (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Nitrate (as N)		0.64	0.64		mg/L	0.88	20	08-JUN-11
WG1292029-2 LCS								
Nitrate (as N)			97		%		85-115	08-JUN-11
WG1292029-1 MB								
Nitrate (as N)			<0.050		mg/L		0.05	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Nitrate (as N)			97		%		75-125	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Nitrate (as N)			103		%		75-125	08-JUN-11
WG1292029-8 MS		**L1013854-5**						
Nitrate (as N)			94		%		75-125	08-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch R2201007								
WG1291873-10 DUP		**L1014030-8**						
pH		8.03	8.00	J	pH	0.03	0.2	09-JUN-11
Conductivity (EC)		3160	3160		uS/cm	0.0	10	09-JUN-11
Bicarbonate (HCO3)		784	780		mg/L	0.56	25	09-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Alkalinity, Total (as CaCO3)		643	639		mg/L	0.56	6.5	09-JUN-11
WG1291873-11 DUP		**L1014231-15**						
pH		8.38	8.37	J	pH	0.02	0.2	08-JUN-11
Conductivity (EC)		994	998		uS/cm	0.41	10	08-JUN-11
Bicarbonate (HCO3)		470	473		mg/L	0.75	25	08-JUN-11
Carbonate (CO3)		7.8	6.7		mg/L	15	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		398	399		mg/L	0.26	6.5	08-JUN-11
WG1291873-6 DUP		**L1013656-9**						
pH		8.35	8.33	J	pH	0.02	0.2	08-JUN-11
Conductivity (EC)		295	296		uS/cm	0.34	10	08-JUN-11
Bicarbonate (HCO3)		179	179		mg/L	0.19	25	08-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		149	149		mg/L	0.23	6.5	08-JUN-11
WG1291873-7 DUP		**L1014539-1**						
pH		7.57	7.56	J	pH	0.01	0.2	08-JUN-11
Conductivity (EC)		2230	2230		uS/cm	0.0	10	08-JUN-11
Bicarbonate (HCO3)		379	377		mg/L	0.51	25	08-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		310	309		mg/L	0.51	6.5	08-JUN-11
WG1291873-8 DUP		**L1014440-21**						
pH		7.38	7.39	J	pH	0.01	0.2	08-JUN-11
Conductivity (EC)		15400	15300		uS/cm	0.26	10	08-JUN-11
Bicarbonate (HCO3)		550	547		mg/L	0.43	25	08-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		451	449					

Quality Control Report

Workorder: L1014045 Report Date: 15-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch **R2201007**								
WG1291873-8 DUP		**L1014440-21**						
Alkalinity, Total (as CaCO3)		451	449		mg/L	0.43	6.5	08-JUN-11
WG1291873-9 DUP		**L1014030-9**						
pH		8.06	8.07	J	pH	0.01	0.2	09-JUN-11
Conductivity (EC)		2170	2160		uS/cm	0.46	10	09-JUN-11
Bicarbonate (HCO3)		654	652		mg/L	0.35	25	09-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Alkalinity, Total (as CaCO3)		536	534		mg/L	0.35	6.5	09-JUN-11
WG1291873-2 LCS								
Conductivity (EC)			99		%		90-110	08-JUN-11
WG1291873-3 LCS								
pH			6.98		pH		6.9-7.1	08-JUN-11
WG1291873-4 LCS								
Alkalinity, Total (as CaCO3)			104		%		85-115	08-JUN-11
WG1291873-5 LCS								
Conductivity (EC)			98		%		90-110	08-JUN-11
WG1291873-1 MB								
Bicarbonate (HCO3)			<5.0		mg/L		5	08-JUN-11
Carbonate (CO3)			<5.0		mg/L		5	08-JUN-11
Hydroxide (OH)			<5.0		mg/L		5	08-JUN-11
Alkalinity, Total (as CaCO3)			<5.0		mg/L		5	08-JUN-11
PHENOLS-4AAP-ED	**Water**							
Batch **R2203617**								
WG1295231-4 DUP		**L1012683-10**						
Phenols (4AAP)		0.0275	0.0282		mg/L	2.5	15	13-JUN-11
WG1295231-6 DUP		**L1014687-9**						
Phenols (4AAP)		0.0028	0.0036	J	mg/L	0.0008	0.002	13-JUN-11
WG1295231-7 DUP		**L1013822-1**						
Phenols (4AAP)		0.0016	0.0032	J	mg/L	0.0016	0.002	13-JUN-11
WG1295231-8 DUP		**L1009965-10**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	13-JUN-11
WG1295231-3 LCS								
Phenols (4AAP)			96		%		85-115	13-JUN-11
WG1295231-2 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	13-JUN-11
WG1295231-5 MS		**L1014539-8**						

Quality Control Report

Workorder: L1014045 Report Date: 15-JUN-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: KEN SOMMERSTAD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-ED	**Water**							
Batch R2203617								
WG1295231-5 MS		**L1014539-8**						
Phenols (4AAP)			99		%		75-125	13-JUN-11
WG1295231-9 MS		**L1013822-1**						
Phenols (4AAP)			86		%		75-125	13-JUN-11
PO4-DO-COL-ED	**Water**							
Batch R2202433								
WG1294093-3 DUP		**L1014116-1**						
Orthophosphate-Dissolved (as P)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-JUN-11
WG1294093-2 LCS								
Orthophosphate-Dissolved (as P)			106		%		80-120	10-JUN-11
WG1294093-1 MB								
Orthophosphate-Dissolved (as P)			<0.010		mg/L		0.01	10-JUN-11
WG1294093-4 MS		**L1014116-1**						
Orthophosphate-Dissolved (as P)			95		%		70-130	10-JUN-11
SO4-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Sulfate (SO4)		767	768		mg/L	0.13	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Sulfate (SO4)		91.0	91.0		mg/L	0.023	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Sulfate (SO4)		5180	5170		mg/L	0.17	20	08-JUN-11
WG1292029-2 LCS								
Sulfate (SO4)			103		%		85-115	08-JUN-11
WG1292029-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Sulfate (SO4)			N/A	MS-B	%		-	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Sulfate (SO4)			N/A	MS-B	%		-	08-JUN-11

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Leachable Anions & Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	07-JUN-11 10:45	10-JUN-11 13:52	48	75	hours	EHT
	2	07-JUN-11 14:30	10-JUN-11 13:52	48	71	hours	EHT
	3	07-JUN-11 12:40	10-JUN-11 13:52	48	73	hours	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1014045 were received on 07-JUN-11 15:58.

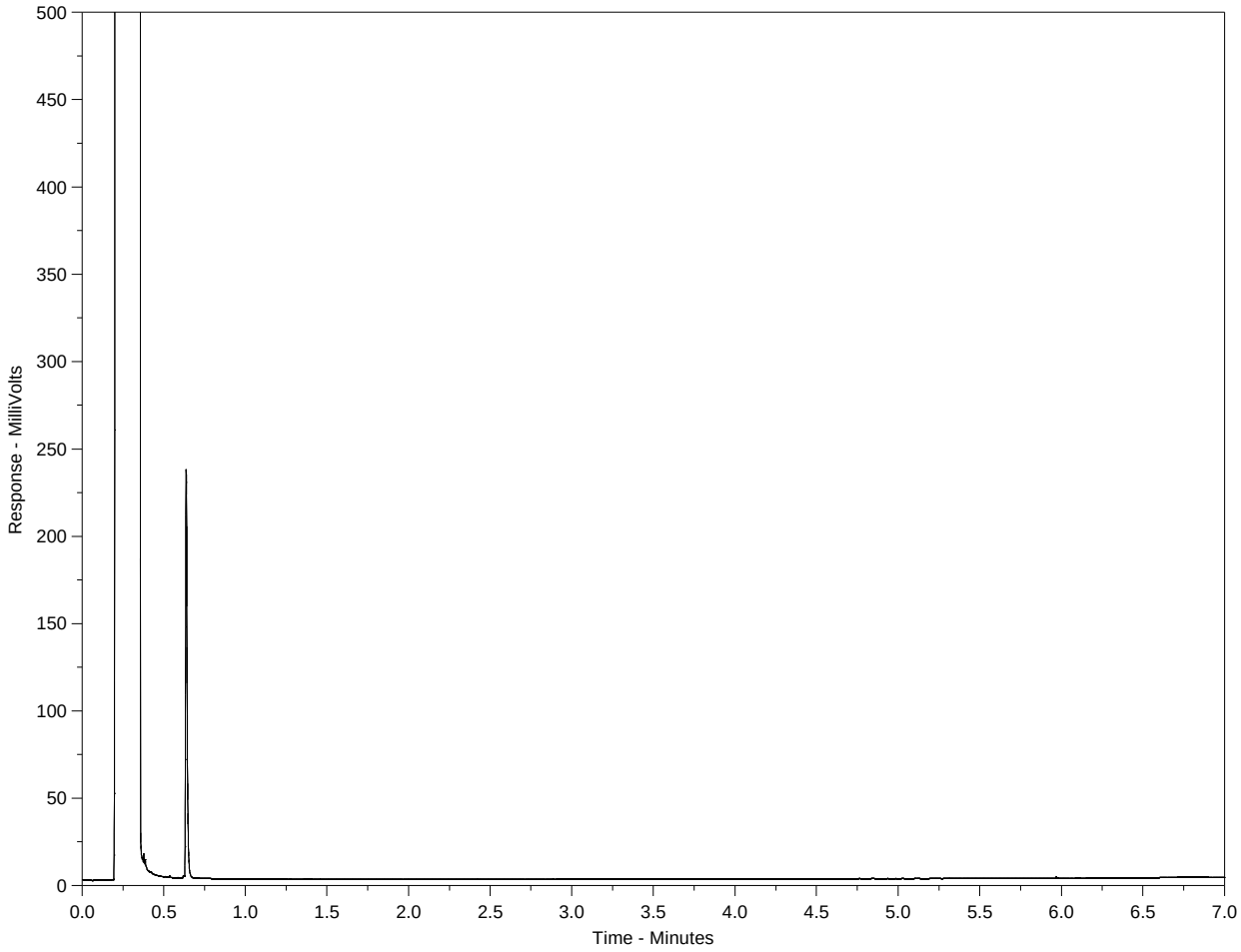
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: **L1014045-1**
Client ID: **MW-04**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

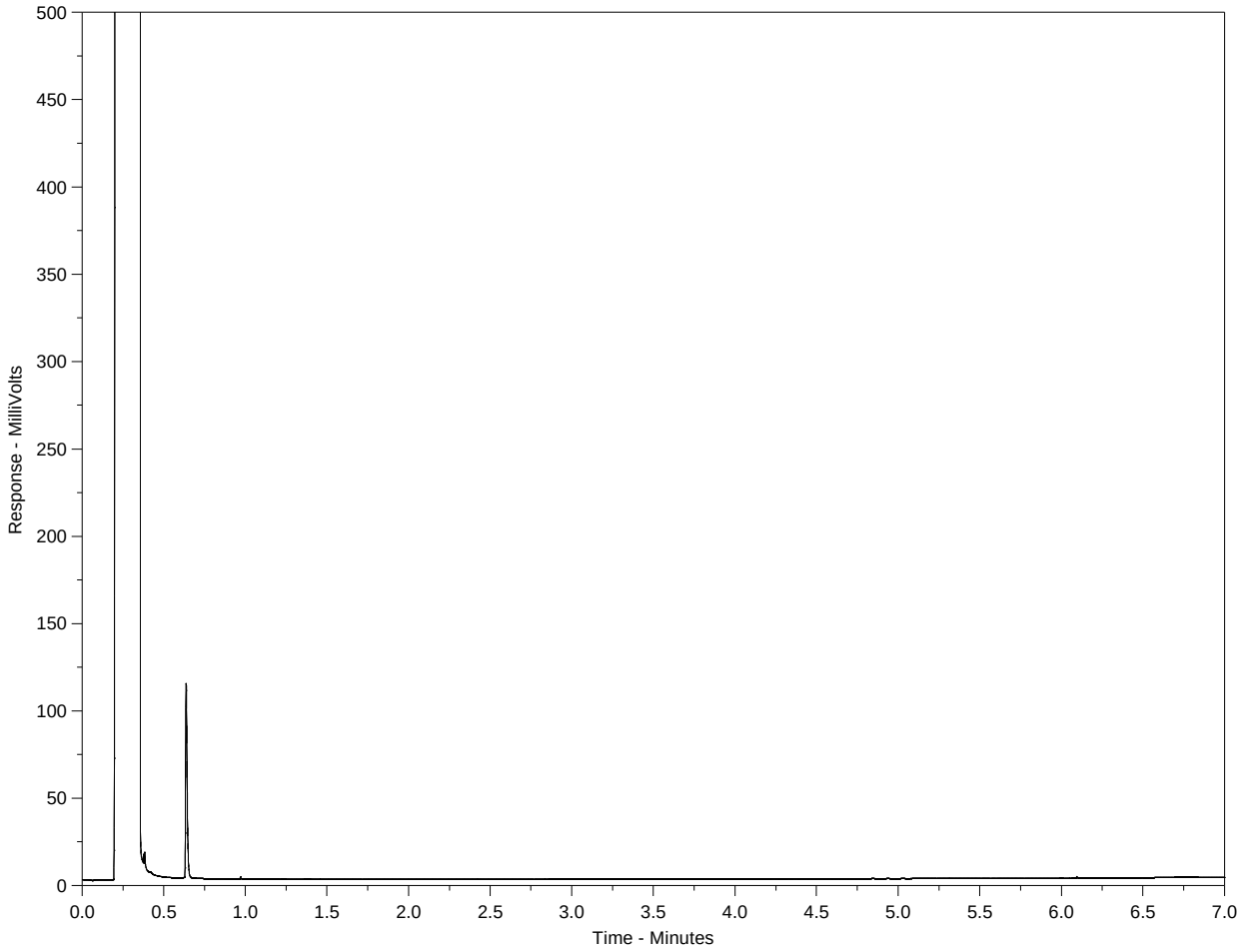
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1014045-2**
Client ID: **MW-06**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

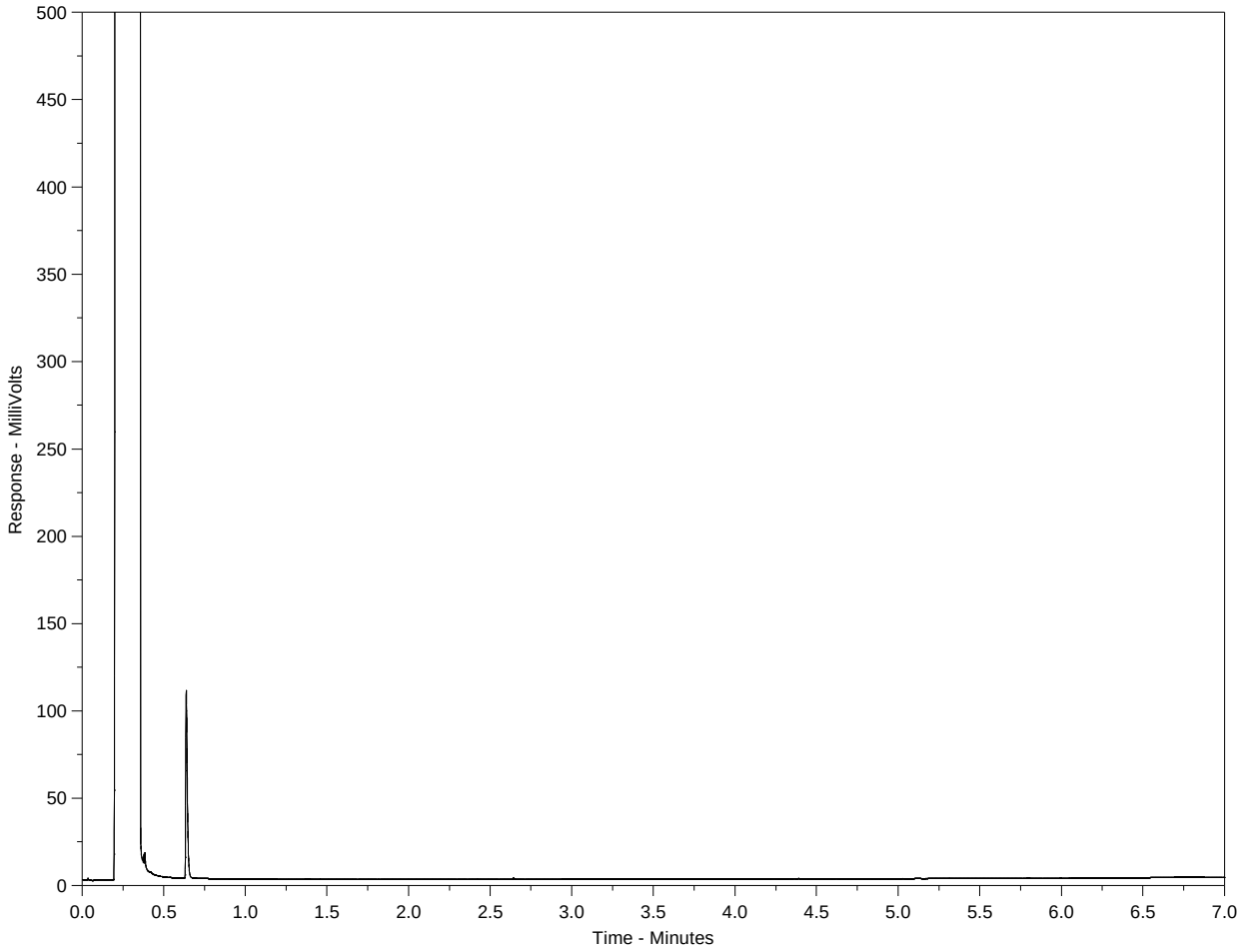
The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report

ALS Sample ID: **L1014045-3**
Client ID: **MW-08**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

ALS

CI  
01011

COC # 01011

Page 1 of 1

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	WorleyParsons	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Trevor Butterfield	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	#705 10240 124 Street	Email 1: edm.chemistry@worleyparsons.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Edmonton, Alberta, T5N 3W6	Email 2: trevor.butterfield@worleyparsons.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	780-496-9055 Fax: 780-496-9575	Email 3: ken.sommerstad@worleyparsons.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: E00100102	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD: NCIA Beverly Channel	
Address:			
Phone:	Fax:	Quote #: Q23924	

Lab Work Order # (lab use only): L1014045

ALS Contact: Maurren Olinek Sampler: NYCJ/MULS

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine+PO4+F	BTEX F1, F2	Phenols	DOC	Dissolved Ammonia	Dissolved Metals	Number of Containers
	MW-04	7-Jun ~~26-May~~-11	1045	Groundwater	X	X	X	X	X	X	10
	~~MW-07~~ MW-06	7-Jun ~~26-May~~-11	1430	Groundwater	X	X	X	X	X	X	10
	MW-08	7-Jun ~~26-May~~-11	1240	Groundwater	X	X	X	X	X	X	10
	~~MW-10~~	~~26-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~
	~~MW-11~~	~~26-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~
	~~DUP-11~~	~~26-May-11~~		~~Groundwater~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~10~~

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

AB Tier 1

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: Shawn Endicott	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	7-Jun-11	1600		07-Jun-11	15:55	6.5 °C				

GENF 18.01 Front

WORLEYPARSONS CANADA SERVICES LTD
ATTN: TREVOR BUTTERFIELD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Date Received: 08-JUN-11
Report Date: 07-JUL-11 13:22 (MT)
Version: FINAL REV. 2

Client Phone: 780-496-9055

Certificate of Analysis

Lab Work Order #:	**L1014471**
Project P.O. #:	NOT SUBMITTED
Job Reference:	E00100102
Legal Site Desc:	NCIA BEVERLY CHANNEL
C of C Numbers:	

Comments: ADDITIONAL 07-JUL-11 12:50

07-JUL-11: Revised Report: Report Revised for Sampling Date and the addition of 6 dissolved Metals.

Maureen Olinek
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014471-1 MW-07							
Sampled By: ENDS on 08-JUN-11 @ 10:20							
Matrix: WATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Toluene	<0.00075		0.00075	mg/L		10-JUN-11	R2200753
EthylBenzene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
o-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
m+p-Xylene	<0.00050		0.00050	mg/L		10-JUN-11	R2200753
Styrene	<0.0010		0.0010	mg/L		10-JUN-11	R2200753
F1(C6-C10)	<0.10		0.10	mg/L		10-JUN-11	R2200753
F1-BTEX	<0.10		0.10	mg/L		10-JUN-11	R2200753
Xylenes	<0.00071		0.00071	mg/L		10-JUN-11	R2200753
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	09-JUN-11	09-JUN-11	R2202124
Surrogate: 2-Bromobenzotrifluoride	99		65-135	%	09-JUN-11	09-JUN-11	R2202124
Miscellaneous Parameters							
Ammonia as N, Dissolved	1.83		0.050	mg/L		10-JUN-11	R2201747
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		13-JUN-11	R2203378
Dissolved Organic Carbon	11.5		1.0	mg/L		11-JUN-11	R2202826
Fluoride (F)	0.116		0.050	mg/L		10-JUN-11	R2202431
Phenols (4AAP)	0.0020		0.0010	mg/L		13-JUN-11	R2203617
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	8.07		0.50	mg/L		08-JUN-11	R2200896
Diss. Metals in Water by ICPMS (Low)							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		13-JUN-11	R2203127
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Arsenic (As)-Dissolved	0.00570		0.00040	mg/L		13-JUN-11	R2203127
Barium (Ba)-Dissolved	0.0954		0.0050	mg/L		13-JUN-11	R2203127
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		13-JUN-11	R2203127
Boron (B)-Dissolved	0.215		0.050	mg/L		13-JUN-11	R2203127
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		13-JUN-11	R2203127
Cobalt (Co)-Dissolved	0.00116		0.00010	mg/L		13-JUN-11	R2203127
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		13-JUN-11	R2203127
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Molybdenum (Mo)-Dissolved	0.00151		0.00010	mg/L		13-JUN-11	R2203127
Nickel (Ni)-Dissolved	0.0021		0.0020	mg/L		13-JUN-11	R2203127
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		13-JUN-11	R2203127
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Thallium (Tl)-Dissolved	0.000071		0.000050	mg/L		13-JUN-11	R2203127
Titanium (Ti)-Dissolved	0.00030		0.00030	mg/L		13-JUN-11	R2203127
Uranium (U)-Dissolved	0.00138		0.00010	mg/L		13-JUN-11	R2203127
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		13-JUN-11	R2203127
Zinc (Zn)-Dissolved	0.0050		0.0020	mg/L		13-JUN-11	R2203127
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	178		0.50	mg/L		13-JUN-11	R2202109
Iron (Fe)-Dissolved	8.26		0.020	mg/L		13-JUN-11	R2202109
Magnesium (Mg)-Dissolved	68.8		0.10	mg/L		13-JUN-11	R2202109
Manganese (Mn)-Dissolved	1.21		0.0050	mg/L		13-JUN-11	R2202109
Potassium (K)-Dissolved	4.38		0.10	mg/L		13-JUN-11	R2202109
Sodium (Na)-Dissolved	189		0.50	mg/L		13-JUN-11	R2202109
Ion Balance Calculation							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1014471-1 MW-07							
Sampled By: ENDS on 08-JUN-11 @ 10:20							
Matrix: WATER							
Ion Balance Calculation							
Ion Balance	104			%		14-JUN-11	
TDS (Calculated)	1330			mg/L		14-JUN-11	
Hardness (as CaCO3)	728			mg/L		14-JUN-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		10-JUN-11	R2202032
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		10-JUN-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		08-JUN-11	R2200896
Sulfate by IC							
Sulfate (SO4)	622		0.50	mg/L		08-JUN-11	R2200896
pH, Conductivity and Total Alkalinity							
pH	7.69		0.10	pH		09-JUN-11	R2201007
Conductivity (EC)	1900		0.20	uS/cm		09-JUN-11	R2201007
Bicarbonate (HCO3)	537		5.0	mg/L		09-JUN-11	R2201007
Carbonate (CO3)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Hydroxide (OH)	<5.0		5.0	mg/L		09-JUN-11	R2201007
Alkalinity, Total (as CaCO3)	440		5.0	mg/L		09-JUN-11	R2201007

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
C-DIS-ORG-ED	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
CL-IC-ED	Water	Chloride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F-IC-ED	Water	Fluoride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
NH4-DIS-ED	Water	Ammonia-N	APHA4500NH3F Colorimetry
NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-ED	Water	Nitrite as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
NO3-IC-ED	Water	Nitrate as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PHENOLS-4AAP-ED	Water	Phenols (4AAP)	AB ENV.06537-COLORIMETRIC
PO4-DO-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-ED	Water	Sulfate by IC	APHA 4110 B-ION CHROMATOGRAPHY

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L1014471

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L1014471 Report Date: 07-JUL-11

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED	**Water**							
Batch R2200753								
WG1292941-2 LCS								
Benzene			98		%		70-130	10-JUN-11
Toluene			97		%		70-130	10-JUN-11
EthylBenzene			99		%		70-130	10-JUN-11
o-Xylene			99		%		70-130	10-JUN-11
m+p-Xylene			102		%		70-130	10-JUN-11
Styrene			80		%		70-130	10-JUN-11
WG1292941-3 LCS								
F1(C6-C10)			109		%		70-130	10-JUN-11
WG1292941-1 MB								
Benzene			<0.00050		mg/L		0.0005	11-JUN-11
Toluene			<0.00075		mg/L		0.00075	11-JUN-11
EthylBenzene			<0.00050		mg/L		0.0005	11-JUN-11
o-Xylene			<0.00050		mg/L		0.0005	11-JUN-11
m+p-Xylene			<0.00050		mg/L		0.0005	11-JUN-11
Styrene			<0.0010		mg/L		0.001	11-JUN-11
F1(C6-C10)			<0.10		mg/L		0.1	11-JUN-11
C-DIS-ORG-ED	**Water**							
Batch R2202826								
WG1294406-3 CVS								
Dissolved Organic Carbon			102		%		80-160	10-JUN-11
WG1294406-4 DUP		**L1014539-8**						
Dissolved Organic Carbon		10.5	10.3		mg/L	1.7	20	10-JUN-11
WG1294406-6 DUP		**L1014231-15**						
Dissolved Organic Carbon		24.8	24.7		mg/L	0.49	20	11-JUN-11
WG1294406-2 LCS								
Dissolved Organic Carbon			89		%		80-120	10-JUN-11
WG1294406-1 MB								
Dissolved Organic Carbon			<1.0		mg/L		1	10-JUN-11
WG1294406-5 MS		**L1014539-8**						
Dissolved Organic Carbon			N/A	MS-B	%		-	10-JUN-11
WG1294406-7 MS		**L1014231-15**						
Dissolved Organic Carbon			N/A	MS-B	%		-	11-JUN-11
CL-IC-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Chloride (Cl)		4.34	4.34		mg/L	0.041	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Chloride (Cl)		32.5	32.6		mg/L	0.018	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Chloride (Cl)		87.0	86.9		mg/L	0.054	20	08-JUN-11
WG1292029-2 LCS								
Chloride (Cl)			101		%		85-115	08-JUN-11
WG1292029-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Chloride (Cl)			103		%		75-125	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Chloride (Cl)			100		%		75-125	08-JUN-11
F-IC-ED	**Water**							
Batch R2202431								
WG1293756-3 DUP		**L1015577-10**						
Fluoride (F)		0.303	0.304		mg/L	0.49	20	10-JUN-11
WG1293756-7 DUP		**L1015490-18**						
Fluoride (F)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	10-JUN-11
WG1293756-2 LCS								
Fluoride (F)			99		%		85-115	10-JUN-11
WG1293756-1 MB								
Fluoride (F)			<0.050		mg/L		0.05	10-JUN-11
WG1293756-4 MS		**L1015577-10**						
Fluoride (F)			89		%		75-125	10-JUN-11
WG1293756-8 MS		**L1015490-18**						
Fluoride (F)			101		%		75-125	10-JUN-11
F2-ED	**Water**							
Batch R2202124								
WG1293539-2 LCS								
F2 (>C10-C16)			99		%		65-135	09-JUN-11
WG1293539-1 MB								
F2 (>C10-C16)			<0.25		mg/L		0.25	09-JUN-11
Surrogate: 2-Bromobenzotrifluoride			98		%		65-135	09-JUN-11
WG1293539-3 MS		**L1014695-2**						
F2 (>C10-C16)			97		%		50-150	09-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-L-CVAA-ED	**Water**							
Batch R2202032								
WG1293525-8 DUP		**L1014471-1**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	10-JUN-11
WG1293525-2 LCS								
Mercury (Hg)-Dissolved			99		%		80-120	10-JUN-11
WG1293525-3 LCSD		**WG1293525-2**						
Mercury (Hg)-Dissolved		99	101		%	2.1	20	10-JUN-11
WG1293525-1 MB								
Mercury (Hg)-Dissolved			<0.000020		mg/L		0.00002	10-JUN-11
WG1293525-9 MS		**L1014471-1**						
Mercury (Hg)-Dissolved			95		%		70-130	10-JUN-11
MET-D-L-ICP-ED	**Water**							
Batch R2202109								
WG1293446-12 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			103		%		80-120	11-JUN-11
Iron (Fe)-Dissolved			106		%		80-120	11-JUN-11
Magnesium (Mg)-Dissolved			103		%		80-120	11-JUN-11
Manganese (Mn)-Dissolved			103		%		80-120	11-JUN-11
Potassium (K)-Dissolved			107		%		80-120	11-JUN-11
Sodium (Na)-Dissolved			106		%		80-120	11-JUN-11
WG1293446-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			107		%		80-120	10-JUN-11
Iron (Fe)-Dissolved			104		%		80-120	10-JUN-11
Magnesium (Mg)-Dissolved			109		%		80-120	10-JUN-11
Manganese (Mn)-Dissolved			108		%		80-120	10-JUN-11
Potassium (K)-Dissolved			105		%		80-120	10-JUN-11
Sodium (Na)-Dissolved			103		%		80-120	10-JUN-11
WG1293446-13 DUP		**L1010779-5**						
Calcium (Ca)-Dissolved		0.72	0.73		mg/L	0.40	20	13-JUN-11
Iron (Fe)-Dissolved		0.271	0.269		mg/L	0.67	20	13-JUN-11
Magnesium (Mg)-Dissolved		0.37	0.37		mg/L	1.2	20	13-JUN-11
Manganese (Mn)-Dissolved		0.0086	0.0087		mg/L	1.6	20	13-JUN-11
Potassium (K)-Dissolved		0.73	0.73		mg/L	0.13	20	13-JUN-11
Sodium (Na)-Dissolved		<1.0	<0.50	RPD-NA	mg/L	N/A	20	13-JUN-11
WG1293446-3 DUP		**L1012848-4**						
Calcium (Ca)-Dissolved		148	140		mg/L	5.2	20	10-JUN-11
Iron (Fe)-Dissolved		6.99	6.57		mg/L	6.2	20	10-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2202109								
WG1293446-3 DUP		**L1012848-4**						
Magnesium (Mg)-Dissolved		46.4	43.7		mg/L	6.2	20	10-JUN-11
Manganese (Mn)-Dissolved		0.687	0.644		mg/L	6.4	20	10-JUN-11
Potassium (K)-Dissolved		5.36	5.17		mg/L	3.5	20	10-JUN-11
Sodium (Na)-Dissolved		96.0	90.0		mg/L	6.5	20	10-JUN-11
WG1293446-5 DUP		**L1014471-1**						
Calcium (Ca)-Dissolved		178	192		mg/L	7.6	20	13-JUN-11
Iron (Fe)-Dissolved		8.26	8.86		mg/L	7.0	20	13-JUN-11
Magnesium (Mg)-Dissolved		68.8	73.6		mg/L	6.7	20	13-JUN-11
Manganese (Mn)-Dissolved		1.21	1.30		mg/L	7.2	20	13-JUN-11
Potassium (K)-Dissolved		4.38	4.64		mg/L	6.0	20	13-JUN-11
Sodium (Na)-Dissolved		189	200		mg/L	5.4	20	13-JUN-11
WG1293446-1 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	10-JUN-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	10-JUN-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	10-JUN-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	10-JUN-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	10-JUN-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	10-JUN-11
WG1293446-11 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	11-JUN-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	11-JUN-11
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	11-JUN-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	11-JUN-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	11-JUN-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	11-JUN-11
WG1293446-14 MS		**L1010779-5**						
Calcium (Ca)-Dissolved			95		%		70-130	13-JUN-11
Iron (Fe)-Dissolved			100		%		70-130	13-JUN-11
Magnesium (Mg)-Dissolved			96		%		70-130	13-JUN-11
Manganese (Mn)-Dissolved			94		%		70-130	13-JUN-11
Potassium (K)-Dissolved			93		%		70-130	13-JUN-11
Sodium (Na)-Dissolved			97		%		70-130	13-JUN-11
WG1293446-4 MS		**L1012848-4**						
Calcium (Ca)-Dissolved			72		%		70-130	10-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2202109								
WG1293446-4 MS		**L1012848-4**						
Iron (Fe)-Dissolved			97		%		70-130	10-JUN-11
Magnesium (Mg)-Dissolved			96		%		70-130	10-JUN-11
Manganese (Mn)-Dissolved			98		%		70-130	10-JUN-11
Potassium (K)-Dissolved			100		%		70-130	10-JUN-11
Sodium (Na)-Dissolved			92		%		70-130	10-JUN-11
WG1293446-6 MS		**L1014471-1**						
Iron (Fe)-Dissolved			99		%		70-130	13-JUN-11
Magnesium (Mg)-Dissolved			92		%		70-130	13-JUN-11
Manganese (Mn)-Dissolved			89		%		70-130	13-JUN-11
Potassium (K)-Dissolved			96		%		70-130	13-JUN-11
Sodium (Na)-Dissolved			101		%		70-130	13-JUN-11
MET-D-L-MS-ED	**Water**							
Batch R2203127								
WG1294574-2 CRM		**ED-HIGH-WATRM**						
Aluminum (Al)-Dissolved			105		%		80-120	13-JUN-11
Antimony (Sb)-Dissolved			99		%		80-120	13-JUN-11
Arsenic (As)-Dissolved			101		%		80-120	13-JUN-11
Barium (Ba)-Dissolved			97		%		80-120	13-JUN-11
Beryllium (Be)-Dissolved			104		%		80-120	13-JUN-11
Boron (B)-Dissolved			96		%		80-120	13-JUN-11
Cadmium (Cd)-Dissolved			103		%		80-120	13-JUN-11
Chromium (Cr)-Dissolved			101		%		80-120	13-JUN-11
Cobalt (Co)-Dissolved			100		%		80-120	13-JUN-11
Copper (Cu)-Dissolved			97		%		80-120	13-JUN-11
Lead (Pb)-Dissolved			102		%		80-120	13-JUN-11
Molybdenum (Mo)-Dissolved			97		%		80-120	13-JUN-11
Nickel (Ni)-Dissolved			103		%		80-120	13-JUN-11
Selenium (Se)-Dissolved			99		%		80-120	13-JUN-11
Silver (Ag)-Dissolved			97		%		80-120	13-JUN-11
Thallium (Tl)-Dissolved			102		%		80-120	13-JUN-11
Titanium (Ti)-Dissolved			93		%		80-120	13-JUN-11
Uranium (U)-Dissolved			102		%		80-120	13-JUN-11
Vanadium (V)-Dissolved			100		%		80-120	13-JUN-11
Zinc (Zn)-Dissolved			99		%		80-120	13-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-MS-ED	**Water**							
Batch R2203127								
WG1294574-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	13-JUN-11
Antimony (Sb)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	13-JUN-11
Boron (B)-Dissolved			<0.0020		mg/L		0.002	13-JUN-11
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	13-JUN-11
Chromium (Cr)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Copper (Cu)-Dissolved			<0.00060		mg/L		0.0006	13-JUN-11
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Nickel (Ni)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Selenium (Se)-Dissolved			<0.00040		mg/L		0.0004	13-JUN-11
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	13-JUN-11
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	13-JUN-11
Uranium (U)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Vanadium (V)-Dissolved			<0.00010		mg/L		0.0001	13-JUN-11
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	13-JUN-11
NH4-DIS-ED	**Water**							
Batch R2201747								
WG1293280-8 DUP		**L1014471-1**						
Ammonia as N, Dissolved		1.83	1.86		mg/L	1.2	25	10-JUN-11
NO2-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-7 DUP		**L1013854-5**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Nitrite (as N)		<0.50	<0.50					

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-ED	**Water**							
Batch R2200896								
WG1292029-9 DUP		**L1014709-7**						
Nitrite (as N)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-2 LCS								
Nitrite (as N)			95		%		85-115	08-JUN-11
WG1292029-1 MB								
Nitrite (as N)			<0.050		mg/L		0.05	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Nitrite (as N)			101		%		75-125	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Nitrite (as N)			78		%		75-125	08-JUN-11
WG1292029-8 MS		**L1013854-5**						
Nitrite (as N)			88		%		75-125	08-JUN-11
NO3-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Nitrate (as N)		0.090	0.090		mg/L	0.44	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Nitrate (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-7 DUP		**L1013854-5**						
Nitrate (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Nitrate (as N)		0.64	0.64		mg/L	0.88	20	08-JUN-11
WG1292029-2 LCS								
Nitrate (as N)			97		%		85-115	08-JUN-11
WG1292029-1 MB								
Nitrate (as N)			<0.050		mg/L		0.05	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Nitrate (as N)			97		%		75-125	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Nitrate (as N)			103		%		75-125	08-JUN-11
WG1292029-8 MS		**L1013854-5**						
Nitrate (as N)			94		%		75-125	08-JUN-11
PH/EC/ALK-ED	**Water**							
Batch R2201007								
WG1291873-10 DUP		**L1014030-8**						
pH		8.03	8.00	J	pH	0.03	0.2	09-JUN-11
Conductivity (EC)		3160	3160		uS/cm	0.0	10	09-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch R2201007								
WG1291873-10 DUP		**L1014030-8**						
Bicarbonate (HCO3)		784	780		mg/L	0.56	25	09-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Alkalinity, Total (as CaCO3)		643	639		mg/L	0.56	6.5	09-JUN-11
WG1291873-11 DUP		**L1014231-15**						
pH		8.38	8.37	J	pH	0.02	0.2	08-JUN-11
Conductivity (EC)		994	998		uS/cm	0.41	10	08-JUN-11
Bicarbonate (HCO3)		470	473		mg/L	0.75	25	08-JUN-11
Carbonate (CO3)		7.8	6.7		mg/L	15	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		398	399		mg/L	0.26	6.5	08-JUN-11
WG1291873-6 DUP		**L1013656-9**						
pH		8.35	8.33	J	pH	0.02	0.2	08-JUN-11
Conductivity (EC)		295	296		uS/cm	0.34	10	08-JUN-11
Bicarbonate (HCO3)		179	179		mg/L	0.19	25	08-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		149	149		mg/L	0.23	6.5	08-JUN-11
WG1291873-7 DUP		**L1014539-1**						
pH		7.57	7.56	J	pH	0.01	0.2	08-JUN-11
Conductivity (EC)		2230	2230		uS/cm	0.0	10	08-JUN-11
Bicarbonate (HCO3)		379	377		mg/L	0.51	25	08-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		310	309		mg/L	0.51	6.5	08-JUN-11
WG1291873-8 DUP		**L1014440-21**						
pH		7.38	7.39	J	pH	0.01	0.2	08-JUN-11
Conductivity (EC)		15400	15300		uS/cm	0.26	10	08-JUN-11
Bicarbonate (HCO3)		550	547		mg/L	0.43	25	08-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	08-JUN-11
Alkalinity, Total (as CaCO3)		451	449		mg/L	0.43	6.5	08-JUN-11
WG1291873-9 DUP		**L1014030-9**						
pH		8.06	8.07	J	pH	0.01	0.2	09-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch **R2201007**								
WG1291873-9 **DUP**		**L1014030-9**						
Conductivity (EC)		2170	2160		uS/cm	0.46	10	09-JUN-11
Bicarbonate (HCO3)		654	652		mg/L	0.35	25	09-JUN-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	09-JUN-11
Alkalinity, Total (as CaCO3)		536	534		mg/L	0.35	6.5	09-JUN-11
WG1291873-2 **LCS**								
Conductivity (EC)			99		%		90-110	08-JUN-11
WG1291873-3 **LCS**								
pH			6.98		pH		6.9-7.1	08-JUN-11
WG1291873-4 **LCS**								
Alkalinity, Total (as CaCO3)			104		%		85-115	08-JUN-11
WG1291873-5 **LCS**								
Conductivity (EC)			98		%		90-110	08-JUN-11
WG1291873-1 **MB**								
Bicarbonate (HCO3)			<5.0		mg/L		5	08-JUN-11
Carbonate (CO3)			<5.0		mg/L		5	08-JUN-11
Hydroxide (OH)			<5.0		mg/L		5	08-JUN-11
Alkalinity, Total (as CaCO3)			<5.0		mg/L		5	08-JUN-11
PHENOLS-4AAP-ED	**Water**							
Batch **R2203617**								
WG1295231-4 **DUP**		**L1012683-10**						
Phenols (4AAP)		0.0275	0.0282		mg/L	2.5	15	13-JUN-11
WG1295231-6 **DUP**		**L1014687-9**						
Phenols (4AAP)		0.0028	0.0036	J	mg/L	0.0008	0.002	13-JUN-11
WG1295231-7 **DUP**		**L1013822-1**						
Phenols (4AAP)		0.0016	0.0032	J	mg/L	0.0016	0.002	13-JUN-11
WG1295231-8 **DUP**		**L1009965-10**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	13-JUN-11
WG1295231-3 **LCS**								
Phenols (4AAP)			96		%		85-115	13-JUN-11
WG1295231-2 **MB**								
Phenols (4AAP)			<0.0010		mg/L		0.001	13-JUN-11
WG1295231-5 **MS**		**L1014539-8**						
Phenols (4AAP)			99		%		75-125	13-JUN-11
WG1295231-9 **MS**		**L1013822-1**						
Phenols (4AAP)			86		%		75-125	13-JUN-11

Quality Control Report

Client: WORLEYPARSONS CANADA SERVICES LTD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-ED	**Water**							
Batch R2203378								
WG1294898-3 DUP		**L1016427-1**						
Orthophosphate-Dissolved (as P)		0.457	0.460		mg/L	0.55	20	13-JUN-11
WG1294898-2 LCS								
Orthophosphate-Dissolved (as P)			104		%		80-120	13-JUN-11
WG1294898-1 MB								
Orthophosphate-Dissolved (as P)			<0.010		mg/L		0.01	13-JUN-11
WG1294898-4 MS		**L1016427-1**						
Orthophosphate-Dissolved (as P)			N/A	MS-B	%		-	13-JUN-11
SO4-IC-ED	**Water**							
Batch R2200896								
WG1292029-3 DUP		**L1013757-16**						
Sulfate (SO4)		767	768		mg/L	0.13	20	08-JUN-11
WG1292029-5 DUP		**L1014231-6**						
Sulfate (SO4)		91.0	91.0		mg/L	0.023	20	08-JUN-11
WG1292029-9 DUP		**L1014709-7**						
Sulfate (SO4)		5180	5170		mg/L	0.17	20	08-JUN-11
WG1292029-2 LCS								
Sulfate (SO4)			103		%		85-115	08-JUN-11
WG1292029-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	08-JUN-11
WG1292029-4 MS		**L1013757-16**						
Sulfate (SO4)			N/A	MS-B	%		-	08-JUN-11
WG1292029-6 MS		**L1014231-6**						
Sulfate (SO4)			N/A	MS-B	%		-	08-JUN-11

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Leachable Anions & Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	08-JUN-11 10:20	13-JUN-11 15:54	48	126	hours	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1014471 were received on 08-JUN-11 11:27.

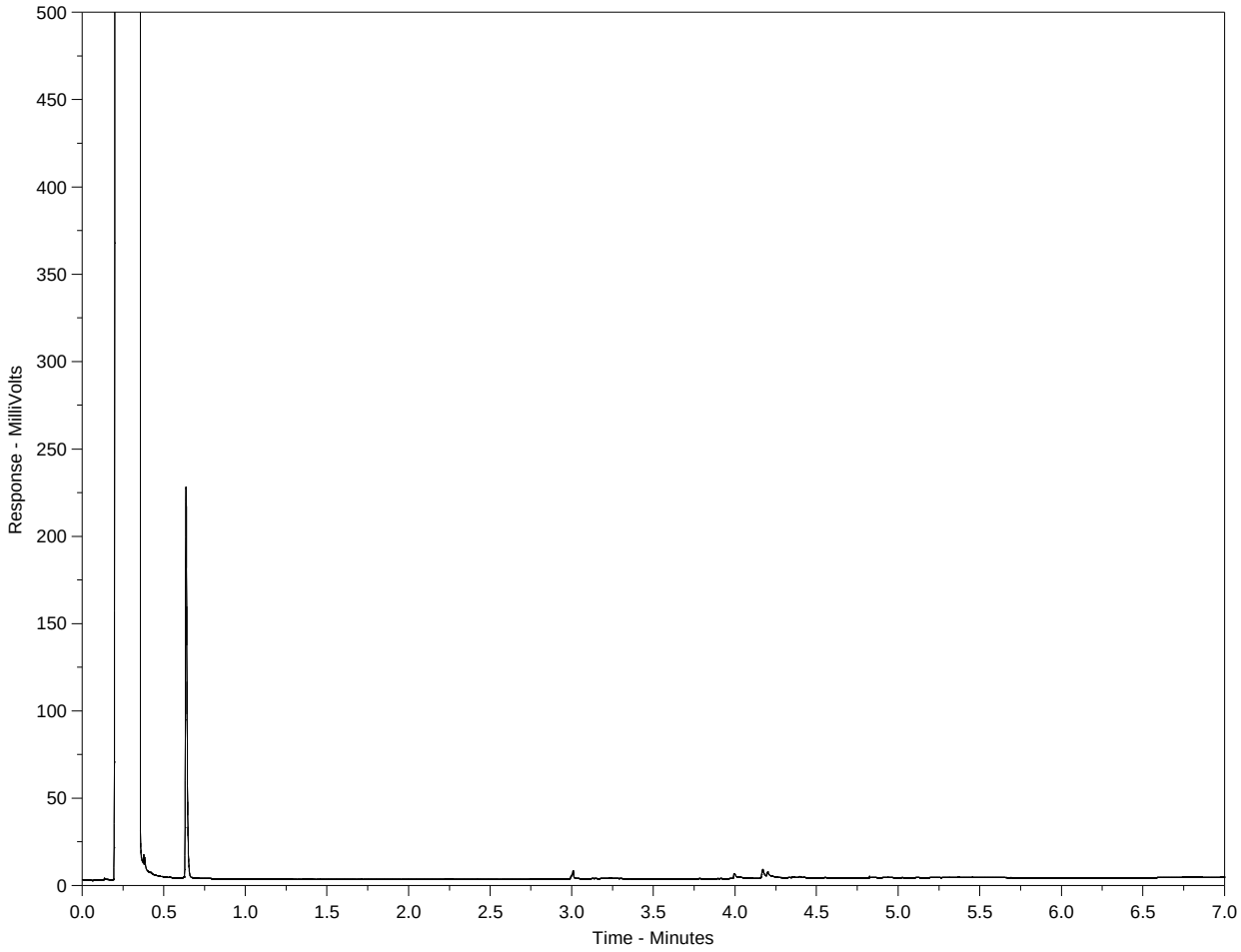
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: **L1014471-1**
Client ID: **MW-07**



<-nC10----------nC16----------nC34----------nC50->
<----------Gasoline----------> <----------Heavy Oils---------->
|----------Diesel----------|

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

ALS

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 6
www.alsglobal.com

10- 110693

Page 1 of 1

Report To		Report Format / Distribution		Service Request (Rush subject to availability - Contact ALS to confirm TAT)	
Company:	WorleyParsons	Standard: X	Other (specify):	X	Regular (Standard Turnaround Times - Business Days)
Contact:	Trevor Butterfield	Select: PDF X	Excel X Digital X Fax		Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Address:	705 10440 - 114 st	Email 1:	[illegible]		Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
	Edmonton AB	Email 2:	trevor.butterfield@worleyparsons.com		Same Day or Weekend Emergency - Contact ALS to confirm TAT
Phone: 780-496-9035	Fax: 780-496-9575		[illegible]		

Invoice To	Same as Report ? (circle) Yes or No (if No, provide details)	Client / Project Information	
	Copy of Invoice with Report? (circle) Yes or No	Job #:	E00100102
Company:		PO / AFE:	
Contact:		LSD:	NCIA Beverly Channel
Address:			
Phone:	Fax:	Quote #:	Q23924
Lab Work Order # (lab use only)	L1014471	ALS Contact: Maureen	Sampler: EN[illegible]

Analysis Request (Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine + PO4 + F	BTEX F1-F2	P Phenols	DOC	Dissolved Ammonia	Dissolved Metals							Number of Containers
							P	F P	F P	F P							
	MW-07	08-Jun-11	10:20	Water	X	X	X	X	X	X							10

Special Instructions / Regulations / Hazardous Details

AB Tier 1

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: [illegible]	Date: 8-Jun-11	Time:	Received by: [signature]	Date: 08JUN-11	Time: 11:27	Temperature: 6.5 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY GENF 18.01 Front

WORLEYPARSONS
ATTN: Trevor Butterfield
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Date Received: 28-JUL-11
Report Date: 19-AUG-11 09:47 (MT)
Version: FINAL REV. 2

Client Phone: 780-496-9055

Certificate of Analysis

Lab Work Order #: L1037751

Project P.O. #:	NOT SUBMITTED
Job Reference:	E00100102
C of C Numbers:	01013
Legal Site Desc:	NCIA BEVERLY CHANNEL

Comments:

19-AUG-11: Revised Report: Revised for the addition of dissolved metals

Maureen Olinek
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1037751-1 MW-07							
Sampled By: HRYJ/BRZK on 28-JUL-11 @ 13:25							
Matrix: GROUNDWATER							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L		01-AUG-11	R2227200
Toluene	<0.00075		0.00075	mg/L		01-AUG-11	R2227200
EthylBenzene	<0.00050		0.00050	mg/L		01-AUG-11	R2227200
o-Xylene	<0.00050		0.00050	mg/L		01-AUG-11	R2227200
m+p-Xylene	<0.00050		0.00050	mg/L		01-AUG-11	R2227200
Styrene	<0.0010		0.0010	mg/L		01-AUG-11	R2227200
F1(C6-C10)	<0.10		0.10	mg/L		01-AUG-11	R2227200
F1-BTEX	<0.10		0.10	mg/L		01-AUG-11	R2227200
Xylenes	<0.00071		0.00071	mg/L		01-AUG-11	R2227200
F2 (>C10-C16)							
F2 (>C10-C16)	<0.25		0.25	mg/L	29-JUL-11	02-AUG-11	R2228204
Surrogate: 2-Bromobenzotrifluoride	92		65-135	%	29-JUL-11	02-AUG-11	R2228204
Miscellaneous Parameters							
Ammonia as N, Dissolved	2.39		0.050	mg/L		03-AUG-11	R2228274
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		28-JUL-11	R2226439
Dissolved Organic Carbon	6.3		1.0	mg/L		06-AUG-11	R2229956
Fluoride (F)	0.128		0.050	mg/L		29-JUL-11	R2226847
Phenols (4AAP)	<0.0010	RRV	0.0010	mg/L		02-AUG-11	R2228551
Major Ions & Trace Dissolved Metals							
Chloride by IC							
Chloride (Cl)	11.8		0.50	mg/L		29-JUL-11	R2226847
Diss. Metals in Water by ICPOES (Low)							
Calcium (Ca)-Dissolved	256		0.50	mg/L		02-AUG-11	R2227771
Iron (Fe)-Dissolved	11.7		0.020	mg/L		02-AUG-11	R2227771
Magnesium (Mg)-Dissolved	87.9		0.10	mg/L		02-AUG-11	R2227771
Manganese (Mn)-Dissolved	1.84		0.0050	mg/L		02-AUG-11	R2227771
Potassium (K)-Dissolved	5.55		0.10	mg/L		02-AUG-11	R2227771
Sodium (Na)-Dissolved	245		0.50	mg/L		02-AUG-11	R2227771
Dissolved Metals in Water by CRC ICPMS							
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L		04-AUG-11	R2229776
Antimony (Sb)-Dissolved	<0.00040		0.00040	mg/L		04-AUG-11	R2229776
Arsenic (As)-Dissolved	0.00333		0.00040	mg/L		04-AUG-11	R2229776
Barium (Ba)-Dissolved	0.0483		0.0050	mg/L		04-AUG-11	R2229776
Beryllium (Be)-Dissolved	<0.00050		0.00050	mg/L		04-AUG-11	R2229776
Boron (B)-Dissolved	0.262		0.050	mg/L		04-AUG-11	R2229776
Cadmium (Cd)-Dissolved	<0.00010		0.00010	mg/L		04-AUG-11	R2229776
Chromium (Cr)-Dissolved	<0.0050		0.0050	mg/L		04-AUG-11	R2229776
Cobalt (Co)-Dissolved	0.00092		0.00010	mg/L		04-AUG-11	R2229776
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L		04-AUG-11	R2229776
Lead (Pb)-Dissolved	<0.00010		0.00010	mg/L		04-AUG-11	R2229776
Molybdenum (Mo)-Dissolved	0.000781		0.000050	mg/L		04-AUG-11	R2229776
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L		04-AUG-11	R2229776
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L		04-AUG-11	R2229776
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L		04-AUG-11	R2229776
Thallium (Tl)-Dissolved	<0.000050		0.000050	mg/L		04-AUG-11	R2229776
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-AUG-11	R2229776
Uranium (U)-Dissolved	0.00152		0.00010	mg/L		04-AUG-11	R2229776
Vanadium (V)-Dissolved	<0.00010		0.00010	mg/L		04-AUG-11	R2229776
Zinc (Zn)-Dissolved	<0.0030		0.0030	mg/L		04-AUG-11	R2229776
Ion Balance Calculation							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1037751-1 MW-07							
Sampled By: HRYJ/BRZK on 28-JUL-11 @ 13:25							
Matrix: GROUNDWATER							
Ion Balance Calculation							
Ion Balance	95.2			%		03-AUG-11	
TDS (Calculated)	1950			mg/L		03-AUG-11	
Hardness (as CaCO3)	1000			mg/L		03-AUG-11	
Mercury (Hg) - Dissolved							
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		02-AUG-11	R2227910
Nitrate as N by IC							
Nitrate (as N)	<0.050		0.050	mg/L		29-JUL-11	R2226847
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.071		0.071	mg/L		02-AUG-11	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		29-JUL-11	R2226847
Sulfate by IC							
Sulfate (SO4)	1020		0.50	mg/L		29-JUL-11	R2226847
pH, Conductivity and Total Alkalinity							
pH	7.98	RRV	0.10	pH		30-JUL-11	R2227792
Conductivity (EC)	2670	RRV	0.20	uS/cm		30-JUL-11	R2227792
Bicarbonate (HCO3)	659	RRV	5.0	mg/L		30-JUL-11	R2227792
Carbonate (CO3)	<5.0	RRV	5.0	mg/L		30-JUL-11	R2227792
Hydroxide (OH)	<5.0	RRV	5.0	mg/L		30-JUL-11	R2227792
Alkalinity, Total (as CaCO3)	540	RRV	5.0	mg/L		30-JUL-11	R2227792

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
C-DIS-ORG-ED	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
CL-IC-ED	Water	Chloride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F-IC-ED	Water	Fluoride by IC	APHA 4110 B-ION CHROMATOGRAPHY
F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
MET-D-CCMS-ED	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
NH3-D-CFA-ED	Water	Ammonia in Water by Colour	APHA 4500 NH3-NITROGEN (AMMONIA)
This analysis is carried out using procedures adapted from APHA Method 4500 NH3 "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.			
NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-ED	Water	Nitrite as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
NO3-IC-ED	Water	Nitrate as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PHENOLS-4AAP-ED	Water	Phenols (4AAP)	AB ENV.06537-COLORIMETRIC
PO4-DO-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-ED	Water	Sulfate by IC	APHA 4110 B-ION CHROMATOGRAPHY

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

01013

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L1037751

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L1037751 Report Date: 19-AUG-11

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED	**Water**							
Batch R2227200								
WG1321544-2 LCS								
Benzene			121		%		70-130	01-AUG-11
Toluene			111		%		70-130	01-AUG-11
EthylBenzene			114		%		70-130	01-AUG-11
o-Xylene			115		%		70-130	01-AUG-11
m+p-Xylene			119		%		70-130	01-AUG-11
Styrene			101		%		70-130	01-AUG-11
WG1321544-3 LCS								
F1(C6-C10)			94		%		70-130	01-AUG-11
WG1321544-1 MB								
Benzene			<0.00050		mg/L		0.0005	01-AUG-11
Toluene			<0.00075		mg/L		0.00075	01-AUG-11
EthylBenzene			<0.00050		mg/L		0.0005	01-AUG-11
o-Xylene			<0.00050		mg/L		0.0005	01-AUG-11
m+p-Xylene			<0.00050		mg/L		0.0005	01-AUG-11
Styrene			<0.0010		mg/L		0.001	01-AUG-11
F1(C6-C10)			<0.10		mg/L		0.1	01-AUG-11
WG1321544-5 MS		**L1037675-3**						
Benzene			108		%		50-150	01-AUG-11
Toluene			110		%		50-150	01-AUG-11
EthylBenzene			96		%		50-150	01-AUG-11
o-Xylene			98		%		50-150	01-AUG-11
m+p-Xylene			100		%		50-150	01-AUG-11
Styrene			94		%		50-150	01-AUG-11
WG1321544-6 MS		**L1037675-3**						
F1(C6-C10)			80		%		50-150	01-AUG-11
C-DIS-ORG-ED	**Water**							
Batch R2229956								
WG1325370-3 CVS								
Dissolved Organic Carbon			103		%		80-160	05-AUG-11
WG1325370-2 LCS								
Dissolved Organic Carbon			94		%		80-120	05-AUG-11
WG1325370-1 MB								
Dissolved Organic Carbon			<1.0		mg/L		1	05-AUG-11
CL-IC-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-ED	**Water**							
Batch R2226847								
WG1321441-2 LCS								
Chloride (Cl)			102		%		85-115	29-JUL-11
WG1321441-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	29-JUL-11
F-IC-ED	**Water**							
Batch R2226847								
WG1321441-2 LCS								
Fluoride (F)			99		%		85-115	29-JUL-11
WG1321441-1 MB								
Fluoride (F)			<0.050		mg/L		0.05	29-JUL-11
F2-ED	**Water**							
Batch R2228204								
WG1323504-2 LCS								
F2 (>C10-C16)			92		%		65-135	02-AUG-11
WG1323504-1 MB								
F2 (>C10-C16)			<0.25		mg/L		0.25	02-AUG-11
Surrogate: 2-Bromobenzotrifluoride			101		%		65-135	02-AUG-11
WG1323504-3 MS		**L1037675-4**						
F2 (>C10-C16)			97		%		50-150	02-AUG-11
HG-D-L-CVAA-ED	**Water**							
Batch R2227910								
WG1322717-10 DUP		**L1033838-6**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	02-AUG-11
WG1322717-4 DUP		**L1037751-1**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	02-AUG-11
WG1322717-6 DUP		**L1034952-1**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	02-AUG-11
WG1322717-8 DUP		**L1036718-2**						
Mercury (Hg)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	02-AUG-11
WG1322717-2 LCS								
Mercury (Hg)-Dissolved			107		%		80-120	02-AUG-11
WG1322717-3 LCSD		**WG1322717-2**						
Mercury (Hg)-Dissolved		107	109		%	2.3	20	02-AUG-11
WG1322717-1 MB								
Mercury (Hg)-Dissolved			<0.000020		mg/L		0.00002	02-AUG-11
WG1322717-11 MS		**L1033838-6**						
Mercury (Hg)-Dissolved			103		%		70-130	02-AUG-11

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-L-CVAA-ED	**Water**							
Batch R2227910								
WG1322717-5 MS		**L1037751-1**						
Mercury (Hg)-Dissolved			98		%		70-130	02-AUG-11
WG1322717-7 MS		**L1034952-1**						
Mercury (Hg)-Dissolved			73		%		70-130	02-AUG-11
WG1322717-9 MS		**L1036718-2**						
Mercury (Hg)-Dissolved			96		%		70-130	02-AUG-11
MET-D-CCMS-ED	**Water**							
Batch R2229776								
WG1324388-2 CRM		**ED-HIGH-WATRM**						
Aluminum (Al)-Dissolved			99		%		80-120	04-AUG-11
Antimony (Sb)-Dissolved			101		%		80-120	04-AUG-11
Arsenic (As)-Dissolved			100		%		80-120	04-AUG-11
Barium (Ba)-Dissolved			98		%		80-120	04-AUG-11
Beryllium (Be)-Dissolved			101		%		80-120	04-AUG-11
Boron (B)-Dissolved			90		%		80-120	04-AUG-11
Cadmium (Cd)-Dissolved			105		%		80-120	04-AUG-11
Chromium (Cr)-Dissolved			97		%		80-120	04-AUG-11
Cobalt (Co)-Dissolved			96		%		80-120	04-AUG-11
Copper (Cu)-Dissolved			96		%		80-120	04-AUG-11
Lead (Pb)-Dissolved			102		%		80-120	04-AUG-11
Molybdenum (Mo)-Dissolved			97		%		80-120	04-AUG-11
Nickel (Ni)-Dissolved			100		%		80-120	04-AUG-11
Selenium (Se)-Dissolved			108		%		80-120	04-AUG-11
Silver (Ag)-Dissolved			99		%		80-120	04-AUG-11
Thallium (Tl)-Dissolved			105		%		80-120	04-AUG-11
Titanium (Ti)-Dissolved			90		%		80-120	04-AUG-11
Uranium (U)-Dissolved			100		%		80-120	04-AUG-11
Vanadium (V)-Dissolved			99		%		80-120	04-AUG-11
Zinc (Zn)-Dissolved			98		%		80-120	04-AUG-11
WG1324388-1 MB								
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	04-AUG-11
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-AUG-11
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0004	04-AUG-11
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	04-AUG-11
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	04-AUG-11

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-ED	**Water**							
Batch R2229776								
WG1324388-1 MB								
Boron (B)-Dissolved			<0.0020		mg/L		0.01	04-AUG-11
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	04-AUG-11
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-AUG-11
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-AUG-11
Copper (Cu)-Dissolved			<0.00010		mg/L		0.0001	04-AUG-11
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-AUG-11
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-AUG-11
Nickel (Ni)-Dissolved			<0.00010		mg/L		0.0005	04-AUG-11
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0004	04-AUG-11
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-AUG-11
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.0001	04-AUG-11
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.001	04-AUG-11
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-AUG-11
Vanadium (V)-Dissolved			<0.00010		mg/L		0.001	04-AUG-11
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	04-AUG-11
MET-D-L-ICP-ED	**Water**							
Batch R2227771								
WG1322695-2 CRM		**EU-H-3_OPTWATER**						
Calcium (Ca)-Dissolved			103		%		80-120	02-AUG-11
Iron (Fe)-Dissolved			102		%		80-120	02-AUG-11
Magnesium (Mg)-Dissolved			103		%		80-120	02-AUG-11
Manganese (Mn)-Dissolved			102		%		80-120	02-AUG-11
Potassium (K)-Dissolved			102		%		80-120	02-AUG-11
Sodium (Na)-Dissolved			102		%		80-120	02-AUG-11
WG1322695-3 DUP		**L1037751-1**						
Calcium (Ca)-Dissolved		256	264		mg/L	3.1	20	02-AUG-11
Iron (Fe)-Dissolved		11.7	12.3		mg/L	5.5	20	02-AUG-11
Magnesium (Mg)-Dissolved		87.9	92.8		mg/L	5.4	20	02-AUG-11
Manganese (Mn)-Dissolved		1.84	1.94		mg/L	5.5	20	02-AUG-11
Potassium (K)-Dissolved		5.55	5.76		mg/L	3.7	20	02-AUG-11
Sodium (Na)-Dissolved		245	266		mg/L	8.2	20	02-AUG-11
WG1322695-1 MB								
Calcium (Ca)-Dissolved			<0.20		mg/L		0.2	02-AUG-11
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	02-AUG-11

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-L-ICP-ED	**Water**							
Batch R2227771								
WG1322695-1 MB								
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	02-AUG-11
Manganese (Mn)-Dissolved			<0.0020		mg/L		0.002	02-AUG-11
Potassium (K)-Dissolved			<0.10		mg/L		0.1	02-AUG-11
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	02-AUG-11
WG1322695-4 MS		**L1037751-1**						
Calcium (Ca)-Dissolved			73		%		70-130	02-AUG-11
Iron (Fe)-Dissolved			105		%		70-130	02-AUG-11
Magnesium (Mg)-Dissolved			103		%		70-130	02-AUG-11
Manganese (Mn)-Dissolved			107		%		70-130	02-AUG-11
Potassium (K)-Dissolved			121		%		70-130	02-AUG-11
Sodium (Na)-Dissolved			100		%		70-130	02-AUG-11
NH3-D-CFA-ED	**Water**							
Batch R2228274								
WG1323336-7 DUP		**L1037751-1**						
Ammonia as N, Dissolved		2.39	2.42		mg/L	1.1	20	03-AUG-11
NO2-IC-ED	**Water**							
Batch R2226847								
WG1321441-2 LCS								
Nitrite (as N)			112		%		85-115	29-JUL-11
WG1321441-1 MB								
Nitrite (as N)			<0.050		mg/L		0.05	29-JUL-11
NO3-IC-ED	**Water**							
Batch R2226847								
WG1321441-2 LCS								
Nitrate (as N)			98		%		85-115	29-JUL-11
WG1321441-1 MB								
Nitrate (as N)			<0.050		mg/L		0.05	29-JUL-11
PH/EC/ALK-ED	**Water**							
Batch R2227792								
WG1322213-6 DUP		**L1037751-1**						
pH		7.98	7.99	J	pH	0.01	0.2	30-JUL-11
Conductivity (EC)		2670	2670		uS/cm	0.0	10	30-JUL-11
Bicarbonate (HCO3)		659	661		mg/L	0.30	25	30-JUL-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	30-JUL-11

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch R2227792								
WG1322213-6 DUP		**L1037751-1**						
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	30-JUL-11
Alkalinity, Total (as CaCO3)		540	542		mg/L	0.30	6.5	30-JUL-11
WG1322213-7 DUP		**L1038432-7**						
pH		8.40	8.41	J	pH	0.01	0.2	30-JUL-11
Conductivity (EC)		227	228		uS/cm	0.44	10	30-JUL-11
Bicarbonate (HCO3)		89.5	89.4		mg/L	0.089	25	30-JUL-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	30-JUL-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	30-JUL-11
Alkalinity, Total (as CaCO3)		75.7	76.1		mg/L	0.47	6.5	30-JUL-11
WG1322213-8 DUP		**L1038478-2**						
pH		8.21	8.21	J	pH	0.01	0.2	31-JUL-11
Conductivity (EC)		1600	1610		uS/cm	0.12	10	31-JUL-11
Bicarbonate (HCO3)		348	352		mg/L	1.1	25	31-JUL-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	31-JUL-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	31-JUL-11
Alkalinity, Total (as CaCO3)		285	288		mg/L	1.1	6.5	31-JUL-11
WG1322213-9 DUP		**L1038436-8**						
pH		8.23	8.24	J	pH	0.01	0.2	31-JUL-11
Conductivity (EC)		348	348		uS/cm	0.0	10	31-JUL-11
Bicarbonate (HCO3)		190	191		mg/L	0.42	25	31-JUL-11
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	31-JUL-11
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	31-JUL-11
Alkalinity, Total (as CaCO3)		156	156		mg/L	0.42	6.5	31-JUL-11
WG1322213-2 LCS								
Conductivity (EC)			97		%		90-110	30-JUL-11
WG1322213-3 LCS								
pH			7.01		pH		6.9-7.1	30-JUL-11
WG1322213-4 LCS								
Alkalinity, Total (as CaCO3)			102		%		85-115	30-JUL-11
WG1322213-5 LCS								
Conductivity (EC)			96		%		90-110	30-JUL-11
WG1322213-1 MB								
Bicarbonate (HCO3)			<5.0		mg/L		5	30-JUL-11
Carbonate (CO3)			<5.0		mg/L		5	30-JUL-11
Hydroxide (OH)			<5.0		mg/L		5	30-JUL-11

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED	**Water**							
Batch R2227792								
WG1322213-1 MB								
Alkalinity, Total (as CaCO3)			<5.0		mg/L		5	30-JUL-11
PHENOLS-4AAP-ED	**Water**							
Batch R2228551								
WG1323222-10 DUP		**L1037751-1**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	02-AUG-11
WG1323222-11 DUP		**L1038137-4**						
Phenols (4AAP)		0.0206	0.0231		mg/L	11	15	02-AUG-11
WG1323222-4 DUP		**L1025065-13**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	02-AUG-11
WG1323222-6 DUP		**L1037473-2**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	15	02-AUG-11
WG1323222-8 DUP		**L1034271-3**						
Phenols (4AAP)		0.0123	0.0138		mg/L	11	15	02-AUG-11
WG1323222-3 LCS								
Phenols (4AAP)			94.8		%		85-115	02-AUG-11
WG1323222-2 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	02-AUG-11
WG1323222-5 MS		**L1036989-5**						
Phenols (4AAP)			94		%		75-125	02-AUG-11
WG1323222-7 MS		**L1034271-2**						
Phenols (4AAP)			78		%		75-125	02-AUG-11
WG1323222-9 MS		**L1034526-4**						
Phenols (4AAP)			81		%		75-125	02-AUG-11
PO4-DO-COL-ED	**Water**							
Batch R2226439								
WG1321132-3 DUP		**L1037318-1**						
Orthophosphate-Dissolved (as P)		0.591	0.577		mg/L	2.4	20	28-JUL-11
WG1321132-2 LCS								
Orthophosphate-Dissolved (as P)			109		%		80-120	28-JUL-11
WG1321132-1 MB								
Orthophosphate-Dissolved (as P)			<0.010		mg/L		0.01	28-JUL-11
WG1321132-4 MS		**L1037318-1**						
Orthophosphate-Dissolved (as P)			N/A	MS-B	%		-	28-JUL-11
SO4-IC-ED	**Water**							

Quality Control Report

Client: WORLEYPARSONS
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6
Contact: Trevor Butterfield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-ED	**Water**							
Batch R2226847								
WG1321441-2 LCS								
Sulfate (SO4)			102		%		85-115	29-JUL-11
WG1321441-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	29-JUL-11

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

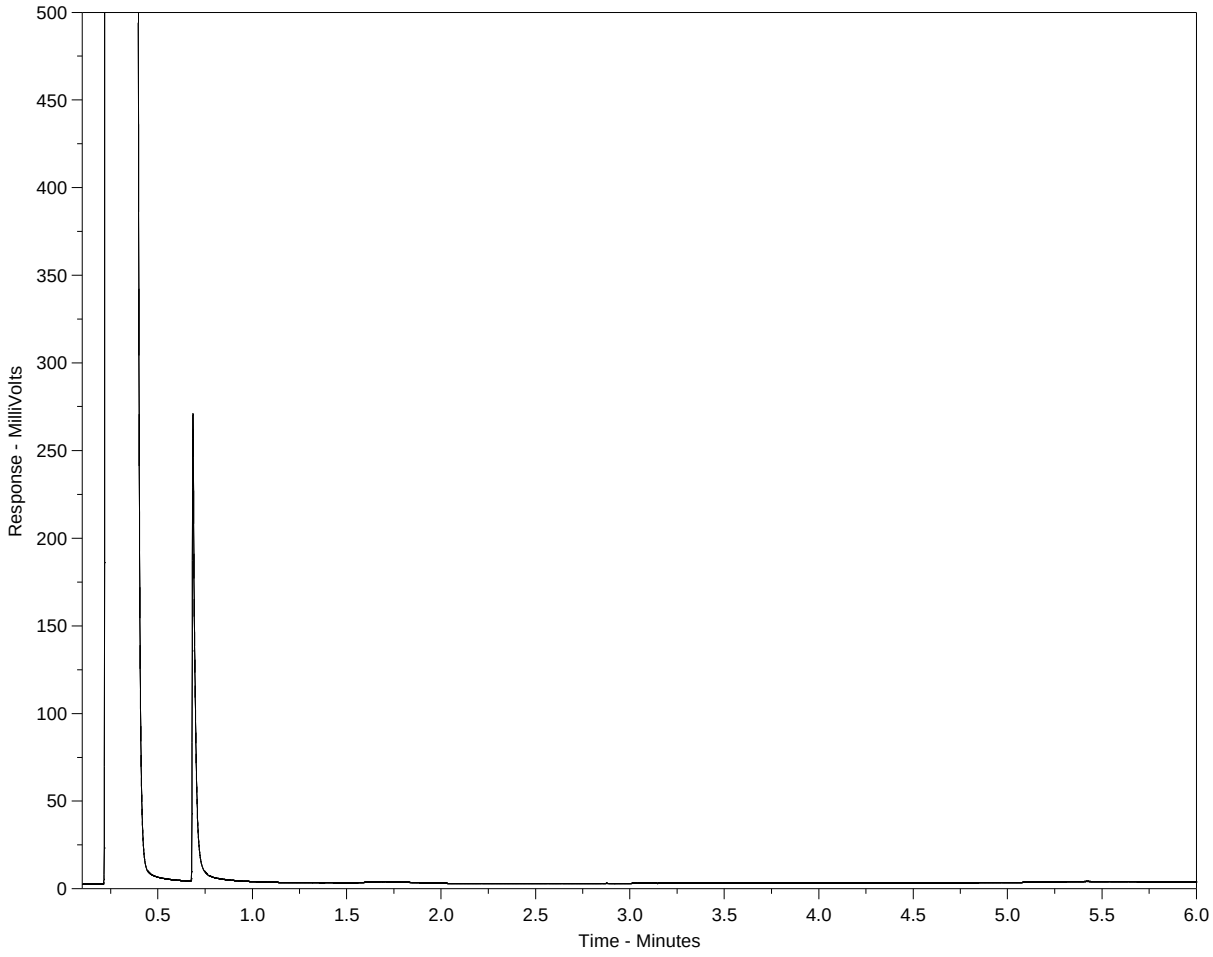
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: **L1037751-1**
Client ID: **MW-07**



The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method (December 2007 version). Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # 01013

Page 1 of 1

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	WorleyParsons	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Trevor Butterfield	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	#705 10240 124 Street	Email 1: edm.chemistry@worleyparsons.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Edmonton, Alberta, T5N 3W6	Email 2: trevor.butterfield@worleyparsons.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	780-496-9055 Fax: 780-496-9575	Email 3: ken.sommerstad@worleyparsons.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: E00100102	
Company:		PO / AFE:	
Contact:		LSD: NCIA Beverly Channel	
Address:			
Phone:	Fax:	Quote #: Q23924	
Lab Work Order # (lab use only)	L1037751	ALS Contact: Maurren Olinek	Sampler: HRYJ/BRZK

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine+PO4+F	BTEX F1, F2	Phenols	DOC	Dissolved Ammonia	Dissolved Metals	Number of Containers
	MW-07	28-Jul-11	13:25	Groundwater	X	X	X	X	X	X	10

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

AB Tier 1

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
[signature]	28-Jul-11	3:15	JC	28-Jul-11	15:15	-0.4 °C				

GENF 18.01 Front

Appendix 5 Mann-Kendall/Sen's Slope Analysis and Hydrochemical Control Charts

WorleyParsons

resources & energy

Appendix 5 - Table 1

pH Trend Analysis:
Mann Kendall and Sen's Slope

Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)

Full Mann-Kendall Analysis, Sorted by Slope

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-10	8	0.929	0.067	0.868	7.5	7.75	8.07
MW-11	8	0.862	0.054	0.703	7.4	7.7	8.04
MW-08	8	0.887	0.050	0.646	7.5	7.7	8.04
MW-04	8	0.887	0.048	0.625	7.5	7.75	8.01
MW-05	8	0.683	0.046	0.586	7.58	7.8	8.1
MW-12	8	0.887	0.045	0.575	7.4	7.85	8.14
MW-03	8	0.764	0.037	0.467	7.4	7.89	8.03
MW-06	8	0.683	0.034	0.432	7.47	7.8	8.06
MW-01	8	0.764	0.031	0.389	7.67	7.85	8.06
MW-13	8	0.887	0.023	0.283	7.8	8.05	8.24
MW-09	8	0.832	0.021	0.265	7.73	8.05	8.17
MW-07	8	0.594	0.012	0.155	7.19	7.55	7.9
MW-02	8	0.000	0.000	0.000	7.36	7.9	7.97

WorleyParsons

resources & energy

Appendix 5 - Table 2

Chloride Trend Analysis:
Mann Kendall and Sen's Slope

Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-05	8	0.999	2.470	10.509	15	23.5	30.9
MW-08	8	0.984	-0.342	-13.681	0.97	2.5	4

Full Mann-Kendall Analysis, Sorted by Slope

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-05	8	0.999	2.470	10.509	15	23.5	30.9
MW-03	8	0.969	1.751	5.004	31	35	44.3
MW-11	8	0.000	0.000	0.000	8	10	16
MW-12	8	0.000	0.000	0.000	5	7	8
MW-13	8	0.801	-0.022	-1.049	1.92	2.075	4
MW-02	8	0.683	-0.206	-1.331	11.6	15.5	38
MW-04	8	0.801	-2.769	-1.816	125	152.5	200
MW-09	8	0.726	-0.113	-1.916	4	5.92	7
MW-01	8	0.764	-0.130	-3.477	2	3.73	5
MW-10	8	0.640	-0.081	-5.092	0.5	1.595	3
MW-07	8	0.801	-0.712	-5.435	8.07	13.1	18
MW-06	8	0.832	-0.782	-10.819	3	7.225	13
MW-08	8	0.984	-0.342	-13.681	0.97	2.5	4

WorleyParsons

resources & energy

Appendix 5 - Table 3

Iron Trend Analysis:
Mann Kendall and Sen's Slope

Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-06	8	0.969	0.470	11.637	0.03	4.04	5.7

Full Mann-Kendall Analysis, Sorted by Slope

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-02	8	0.911	1.332	56.797	0.03	2.345	9.35
MW-06	8	0.969	0.470	11.637	0.03	4.04	5.7
MW-09	8	0.946	0.138	9.526	0.03	1.45	2.04
MW-13	8	0.946	0.067	5.472	0.03	1.22	1.45
MW-12	8	0.862	0.149	4.187	0.03	3.565	4.24
MW-03	8	0.887	0.169	3.634	0.03	4.66	5.55
MW-07	8	0.683	0.286	2.681	0.0025	10.65	14
MW-01	8	0.594	0.041	2.558	0.03	1.6	2.02
MW-05	8	0.683	0.080	2.398	0.03	3.35	4
MW-10	8	0.726	0.134	2.351	0.03	5.69	6.8
MW-11	8	0.726	0.021	0.305	0.03	6.995	7.61
MW-08	8	0.500	-0.012	-0.223	0.03	5.535	7.29
MW-04	8	0.764	-0.004	-13.522	0.0025	0.03	0.173

WorleyParsons

resources & energy

Appendix 5 - Table 4

Manganese Trend Analysis: Mann Kendall and Sen's Slope

Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)

Full Mann-Kendall Analysis, Sorted by Slope

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-06	8	0.969	0.099	7.277	0.943	1.355	1.7
MW-05	8	0.984	0.047	7.063	0.402	0.6585	0.758
MW-04	8	<0.50	0.004	4.343	0.009	0.0835	0.258
MW-12	8	0.977	0.012	2.818	0.365	0.429	0.456
MW-09	8	0.862	0.016	2.068	0.714	0.7775	0.86
MW-10	8	0.726	0.008	1.215	0.566	0.649	0.735
MW-01	8	0.911	0.007	1.112	0.605	0.667	0.73
MW-03	8	0.640	0.001	0.531	0.239	0.2515	0.277
MW-11	8	0.801	0.003	0.522	0.61	0.661	0.687
MW-08	8	0.726	-0.004	-0.957	0.384	0.452	0.481
MW-13	8	0.911	-0.003	-1.285	0.231	0.251	0.263
MW-07	8	0.726	-0.057	-3.114	1.21	1.845	2.3
MW-02	8	0.801	-0.044	-7.365	0.236	0.6005	1.09

WorleyParsons

resources & energy

Appendix 5 - Table 5

Sodium Trend Analysis:
Mann Kendall and Sen's Slope

Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)

Full Mann-Kendall Analysis, Sorted by Slope

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-11	8	0.832	1.371	1.498	85	91.5	98.1
MW-04	8	0.594	0.679	1.113	50.7	61	71
MW-09	8	0.801	1.791	0.777	212	230.5	240
MW-10	8	0.594	0.539	0.475	105	113.5	124
MW-13	8	0.764	-0.436	-0.397	103	110	112
MW-03	8	0.801	-0.477	-0.908	49	52.5	56
MW-12	8	0.832	-1.235	-1.165	95.4	106	111
MW-01	8	0.764	-0.428	-1.189	33	36	40
MW-05	8	0.832	-0.535	-1.243	41	43	51
MW-02	8	0.832	-3.050	-3.348	81	91.1	120
MW-08	8	0.911	-4.134	-3.519	98	117.5	137
MW-06	8	0.726	-6.175	-3.720	123	166	211
MW-07	8	0.801	-14.287	-5.321	189	268.5	320

WorleyParsons

resources & energy

Appendix 5 - Table 6

Sulphate Trend Analysis: Mann Kendall and Sen's Slope

Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)

Full Mann-Kendall Analysis, Sorted by Slope

Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-05	8	0.984	5.923	4.470	105	132.5	150
MW-02	8	0.862	8.404	3.124	227	269	318
MW-06	8	0.862	8.859	1.846	420	480	560
MW-09	8	0.969	4.700	1.453	312	323.5	350
MW-03	8	0.683	0.755	0.624	98	121	130
MW-04	8	0.640	0.441	0.517	74	85.35	92.1
MW-11	8	0.640	0.977	0.495	170	197.5	212
MW-01	8	0.548	-0.260	-0.454	44	57.25	62
MW-10	8	0.726	-1.824	-0.842	190	216.5	230
MW-08	8	0.594	-3.129	-0.958	300	326.5	370
MW-12	8	0.726	-1.158	-2.609	32	44.4	52.5
MW-07	8	0.764	-29.943	-2.965	622	1010	1200
MW-13	8	0.929	-0.312	-3.339	9	9.33	12.5

WorleyParsons

resources & energy

Appendix 5 - Table 7

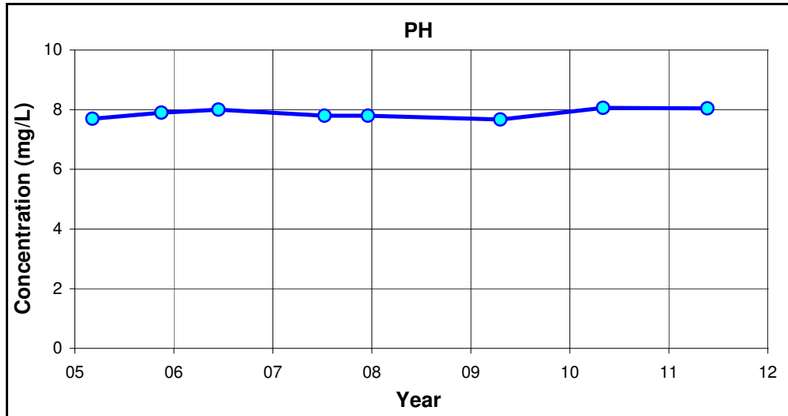
Total Dissolved Solids Trend Analysis: Mann Kendall and Sen's Slope

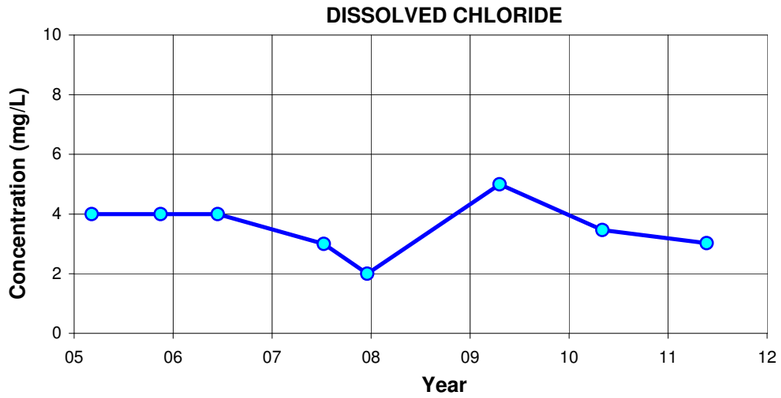
Filtered Trend Results, Probability > 95% AND Slope > +/-10%/year

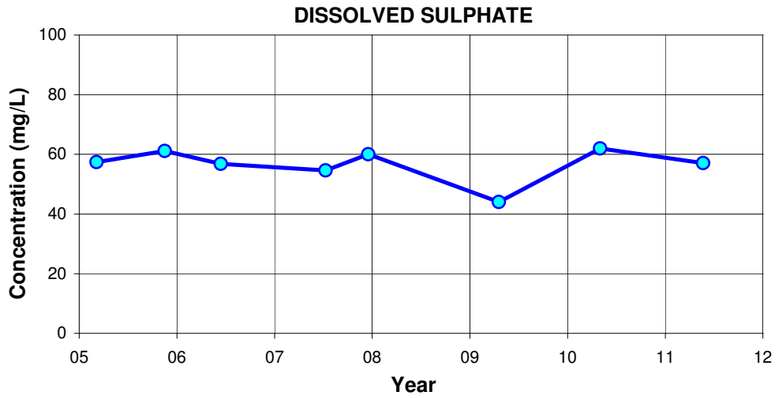
Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)

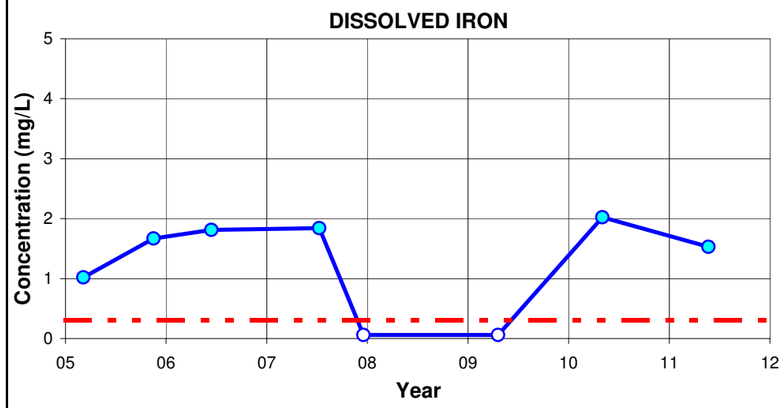
Full Mann-Kendall Analysis, Sorted by Slope

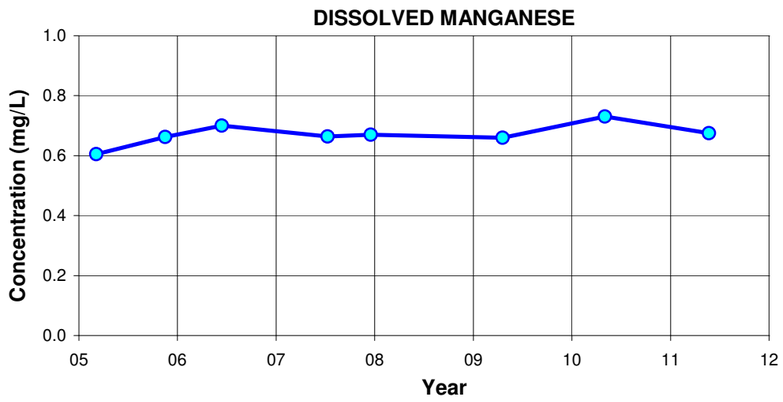
Location	Count	Probability	Slope (mg/L per year)	Normalized slope (%/year)	Min (mg/L)	Median (mg/L)	Max (mg/L)
MW-05	8	1.000	13.492	2.390	499	564.5	596
MW-02	8	0.726	10.705	1.207	759	887	944
MW-09	8	0.887	8.529	0.853	954	1000	1030
MW-03	8	0.911	2.846	0.498	520	572	588
MW-06	8	0.640	5.711	0.472	1100	1210	1250
MW-11	8	0.548	1.392	0.172	800	811.5	840
MW-12	8	<0.50	-0.204	-0.033	600	609.5	651
MW-04	8	0.683	-0.708	-0.098	690	724	774
MW-13	8	0.887	-1.690	-0.370	442	456.5	470
MW-01	8	0.683	-2.001	-0.453	410	442	456
MW-10	8	0.683	-4.346	-0.532	759	816.5	847
MW-08	8	0.862	-13.757	-1.491	862	922.5	999
MW-07	8	0.764	-76.177	-3.809	1330	2000	2400

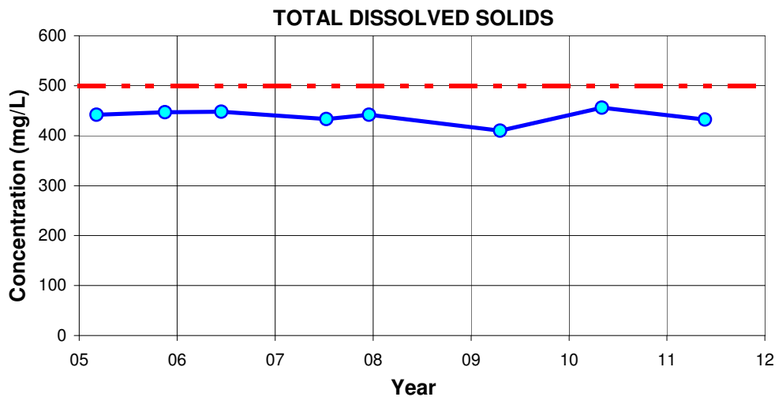


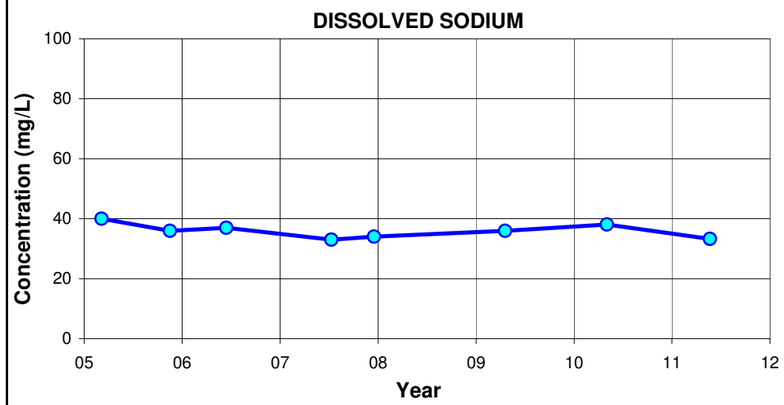


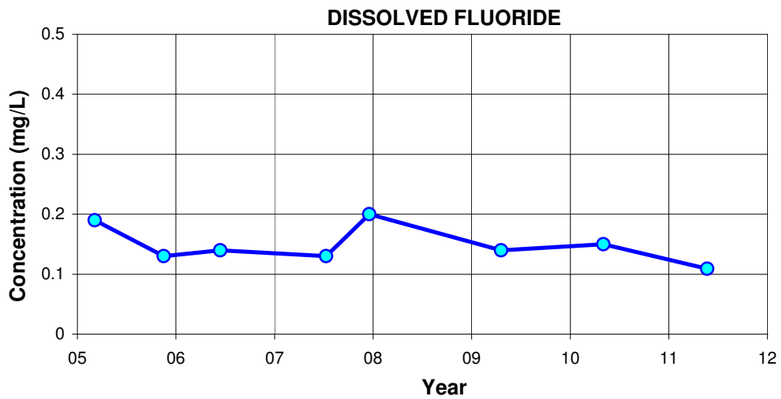


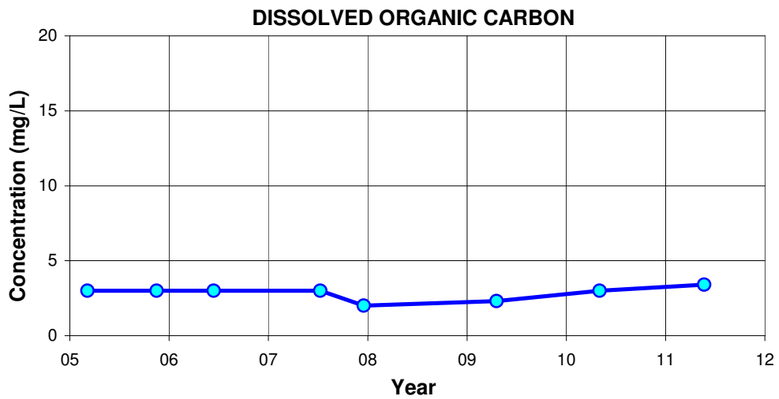












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

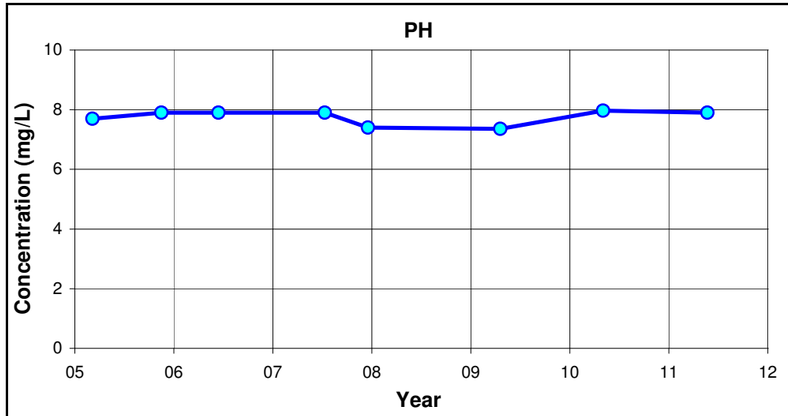
MW-01

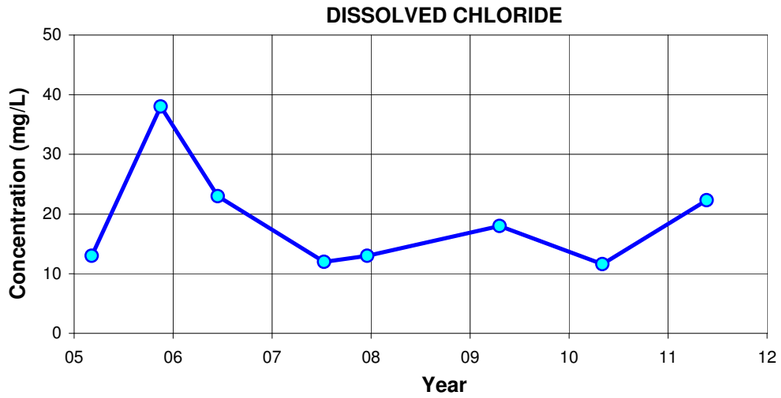
WorleyParsons resources & energy

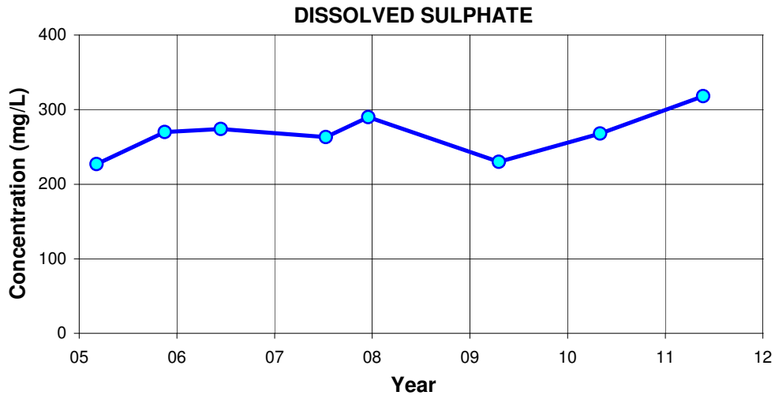
07-Jul-11 (date)	edited by	KS (drawn by)	app by	PROJECT NUMBER: E00100102	FIGURE: A5-1

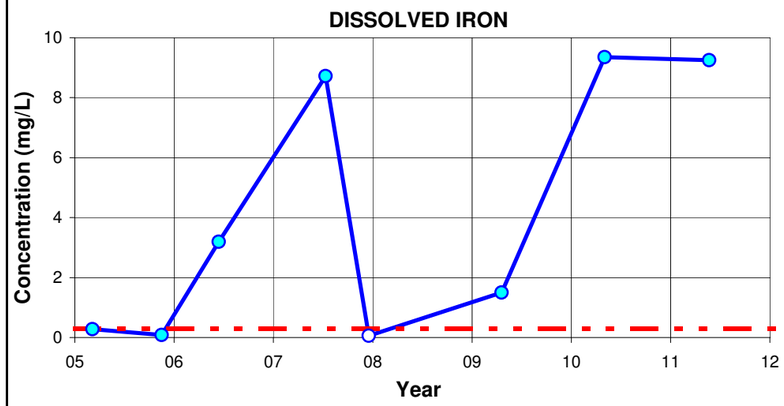
File Location: Edmonton

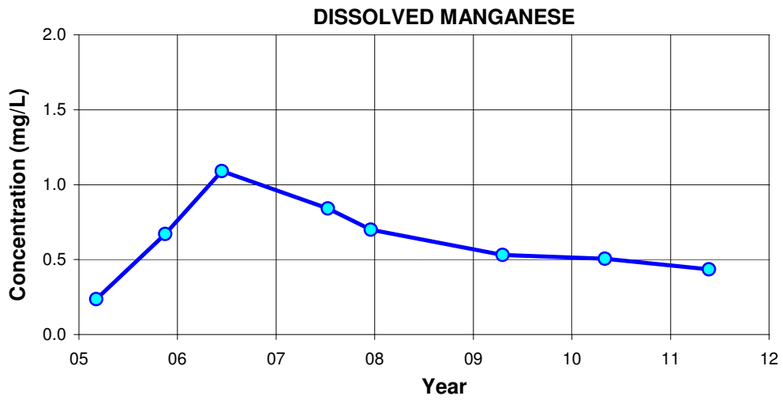
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

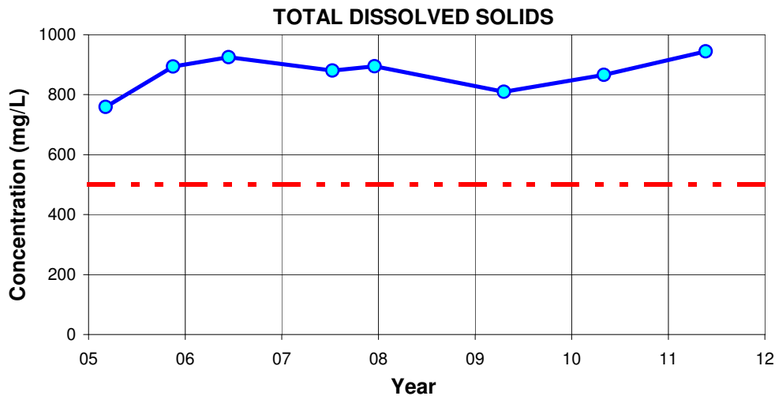


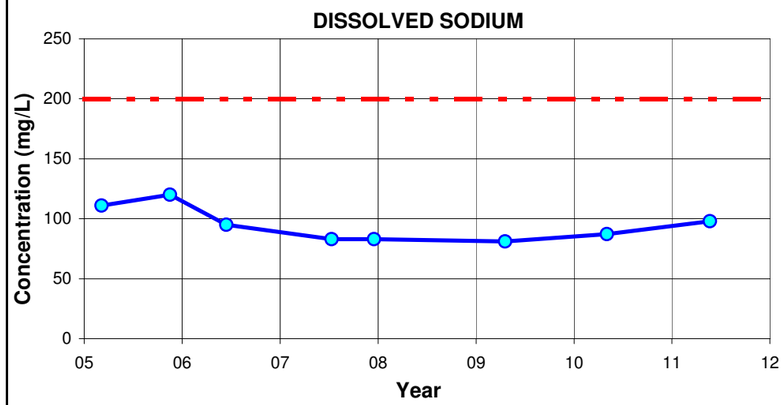


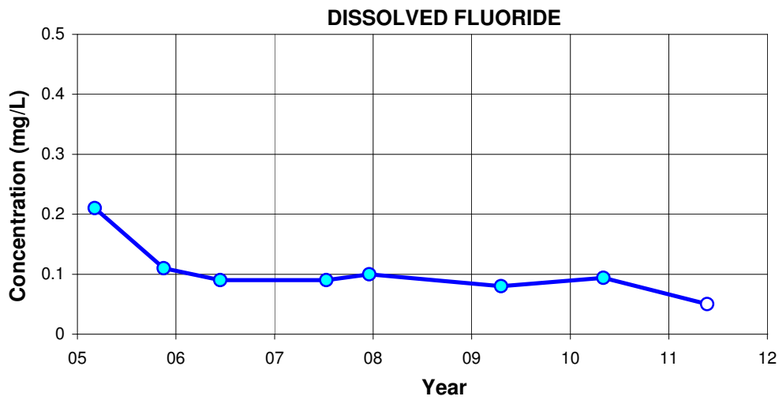


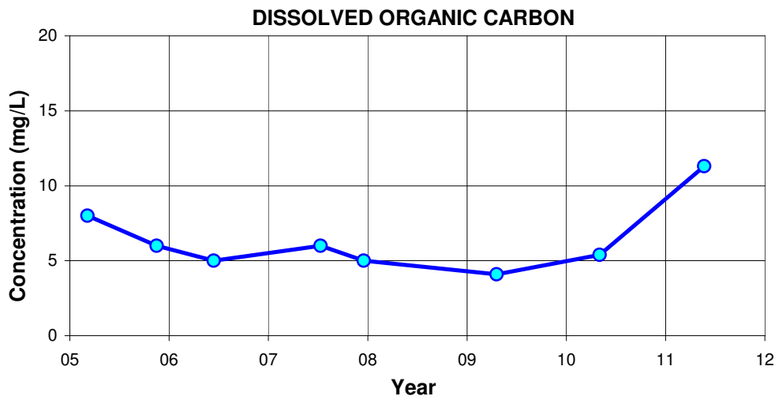












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-02

WorleyParsons resources & energy

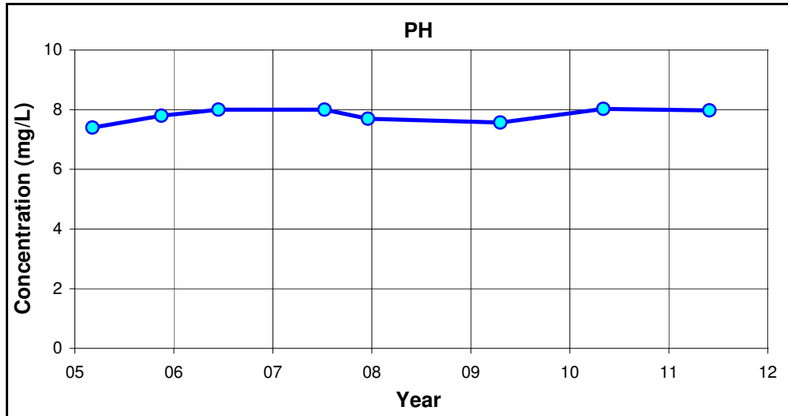
07-Jul-11 date	edited by	KS drawn by	app by

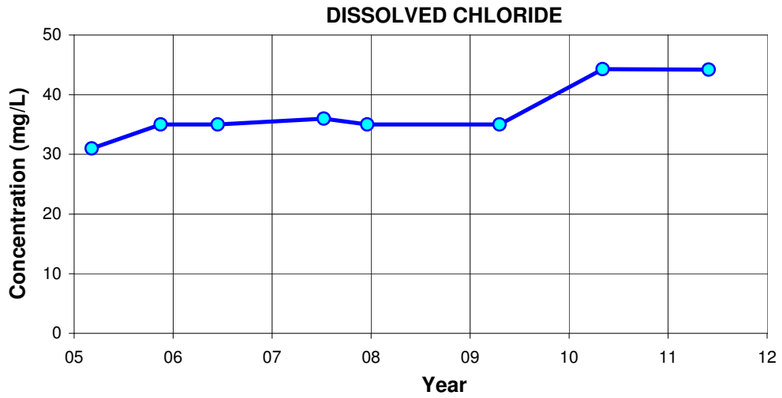
PROJECT NUMBER: **E00100102**

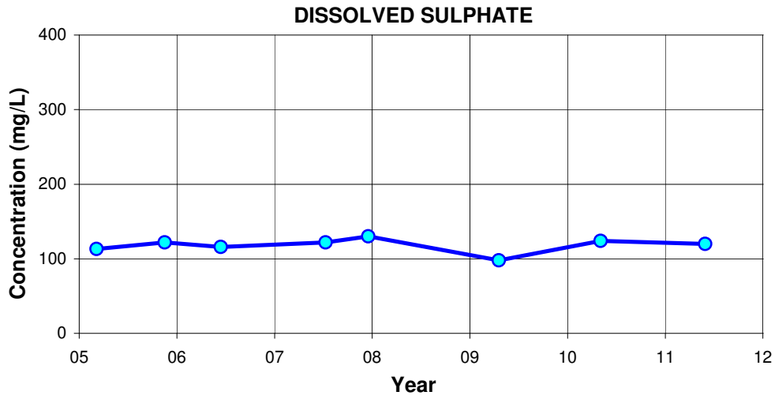
FIGURE: **A5-2**

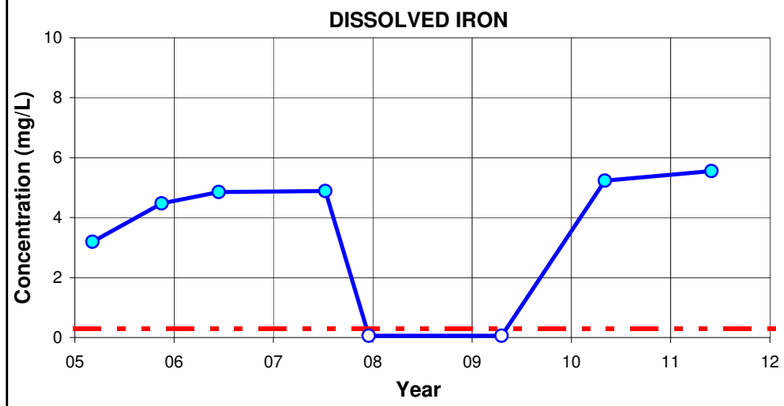
File Location: Edmonton

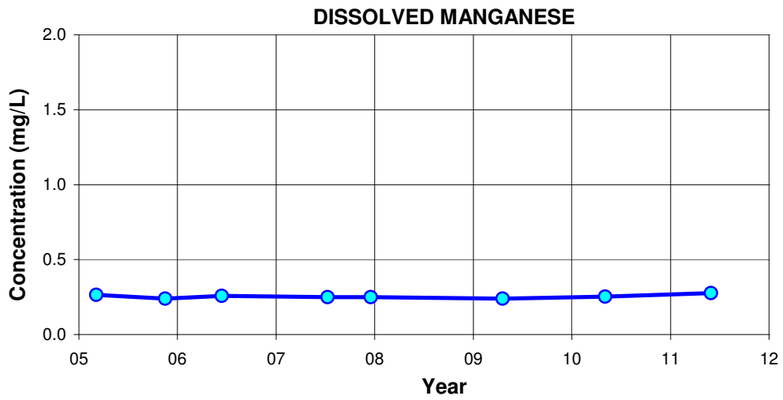
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

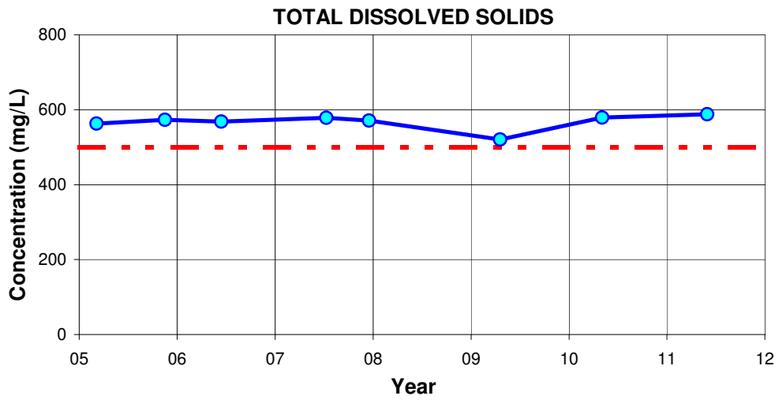


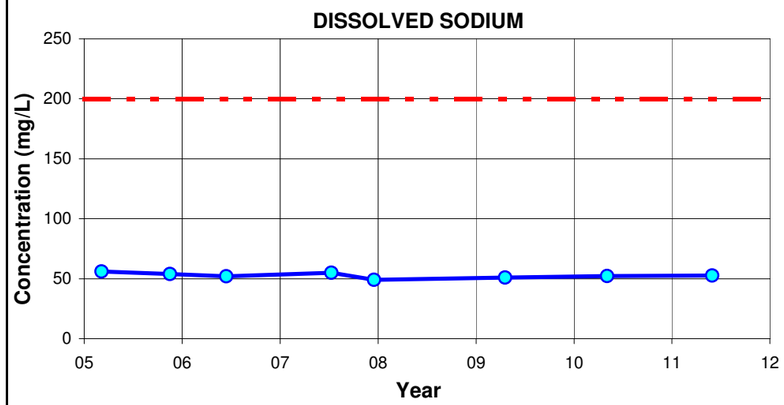


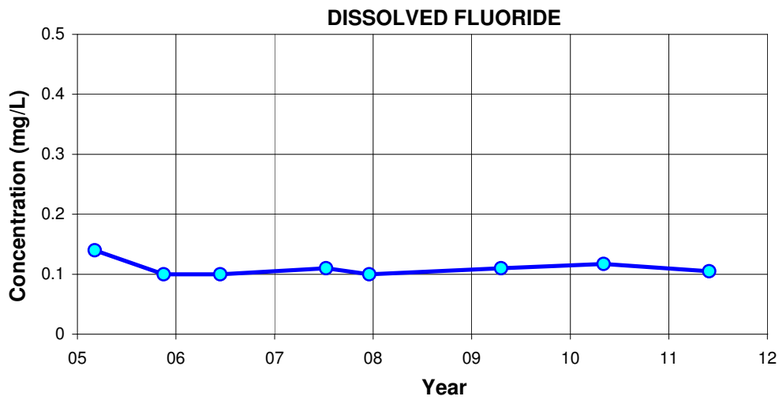


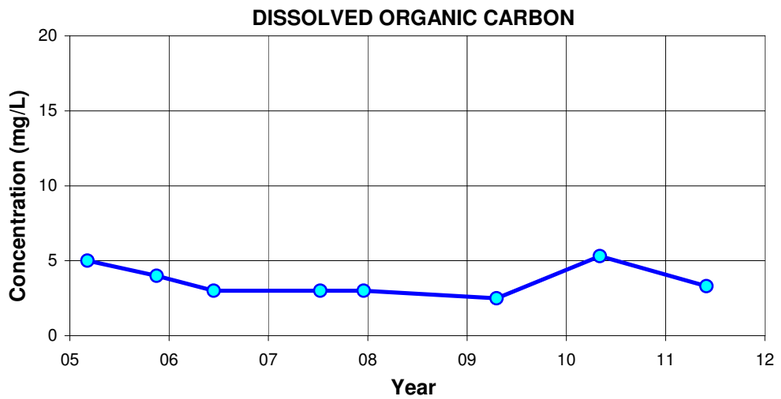












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

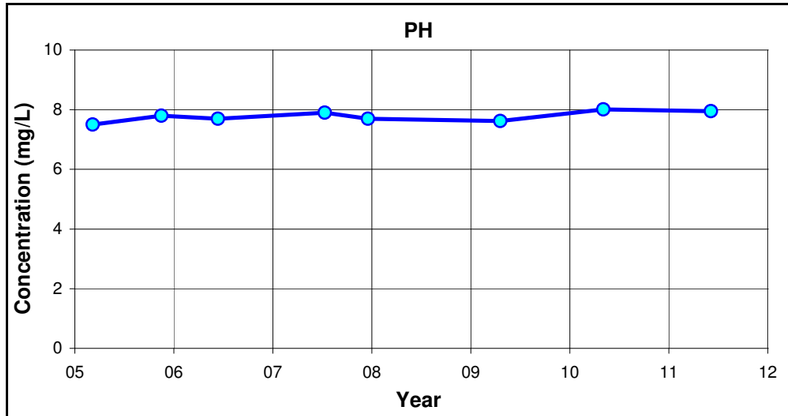
MW-03

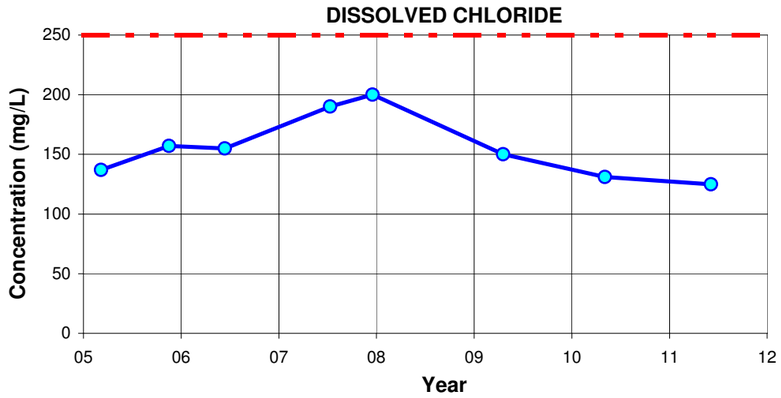
WorleyParsons resources & energy

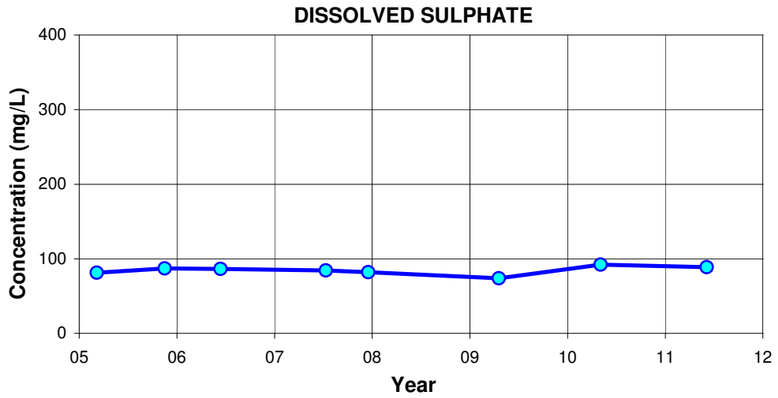
07-Jul-11 (date)	edited by	KS (drawn by)	app by	PROJECT NUMBER: E00100102	FIGURE: A5-3

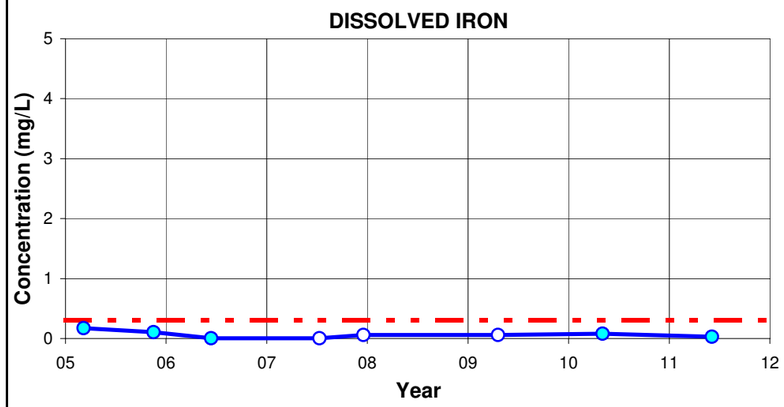
File Location: Edmonton

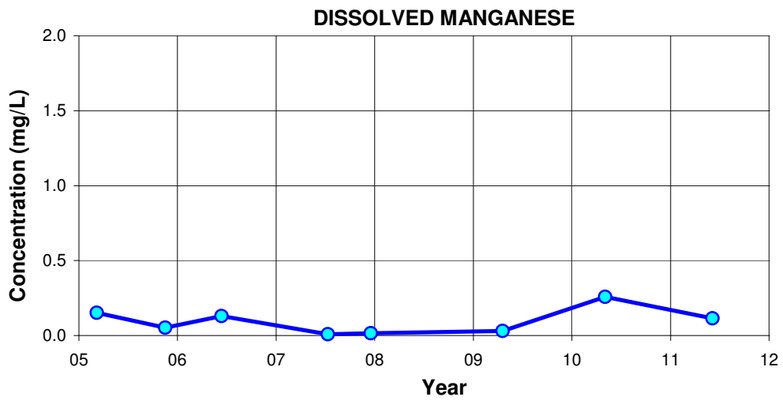
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

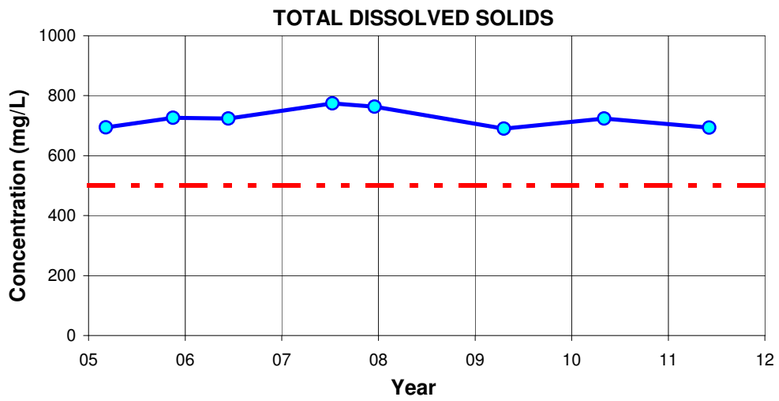


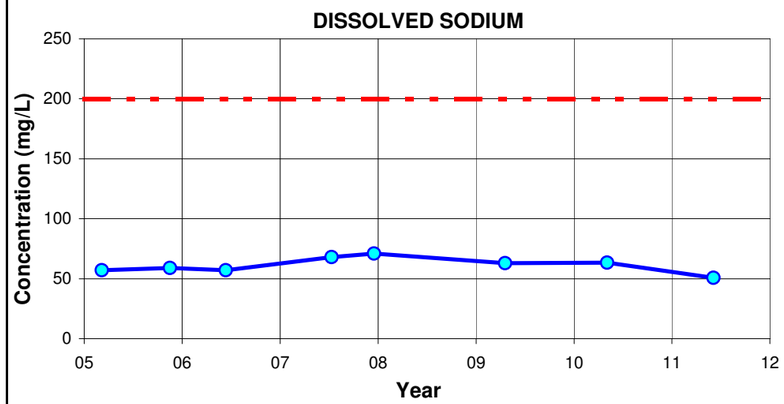


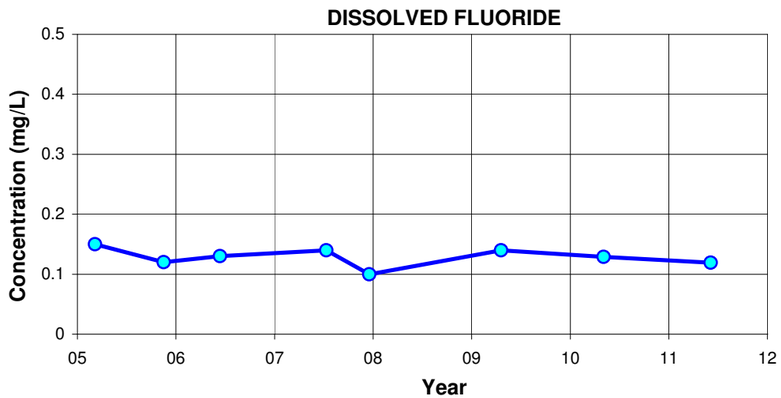


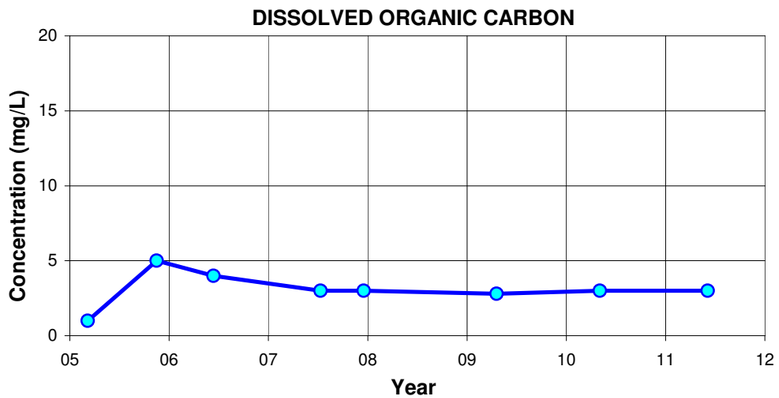












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-04

WorleyParsons resources & energy

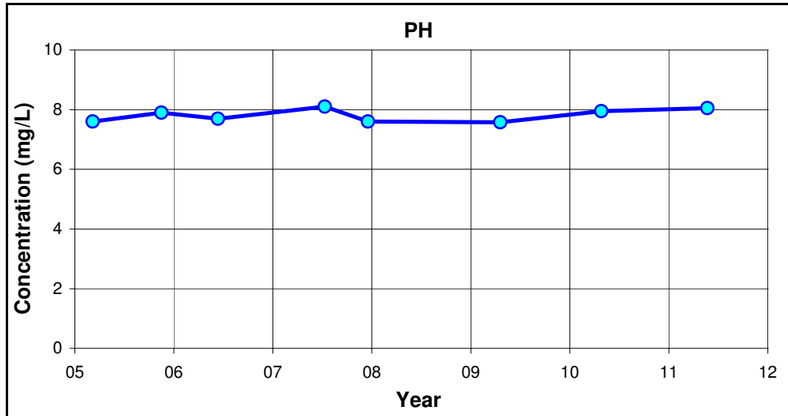
07-Jul-11 (date)	edited by	KS (drawn by)	app by

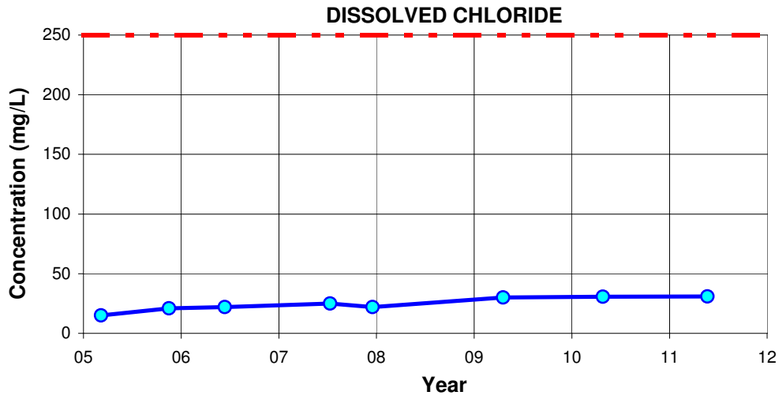
PROJECT NUMBER: **E00100102**

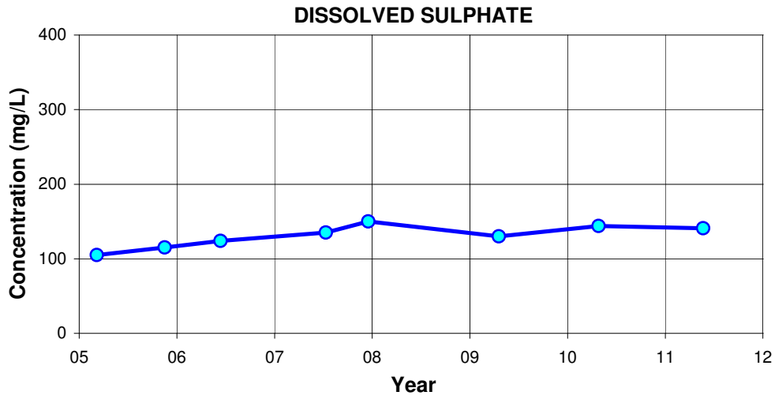
FIGURE: **A5-4**

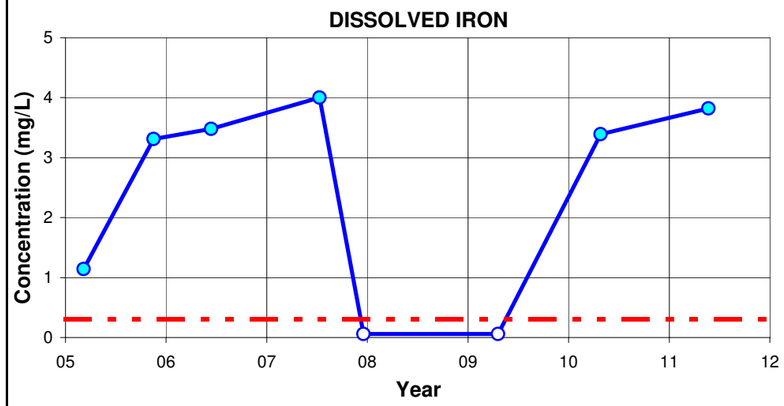
File Location: Edmonton

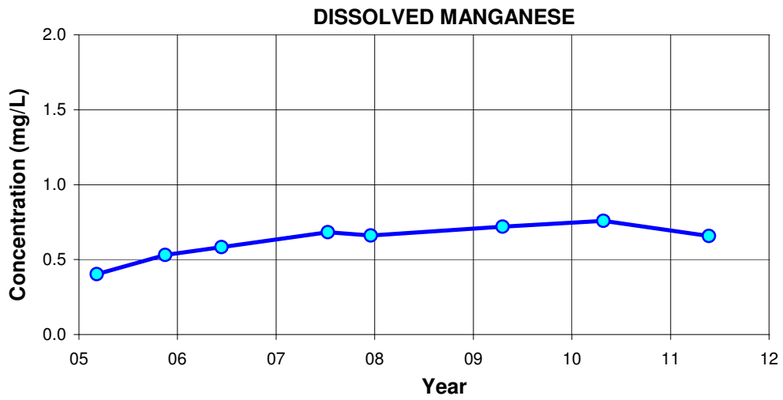
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

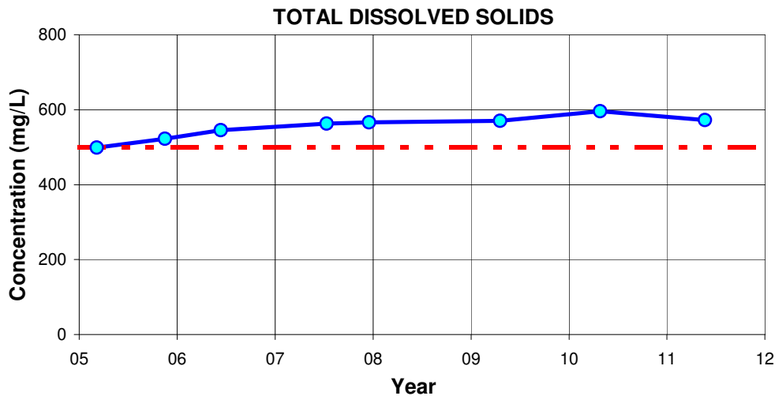


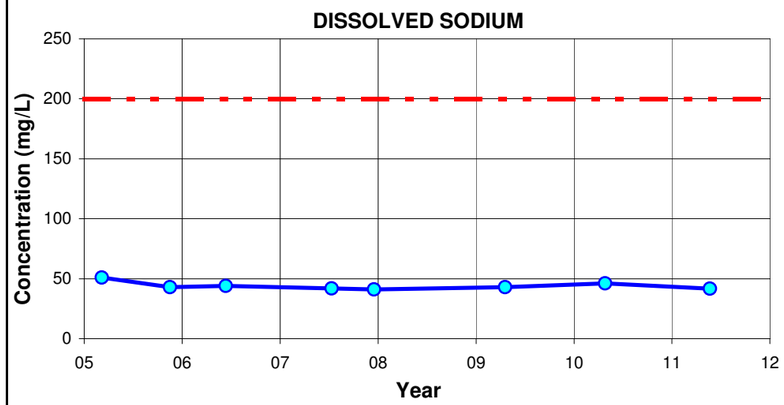


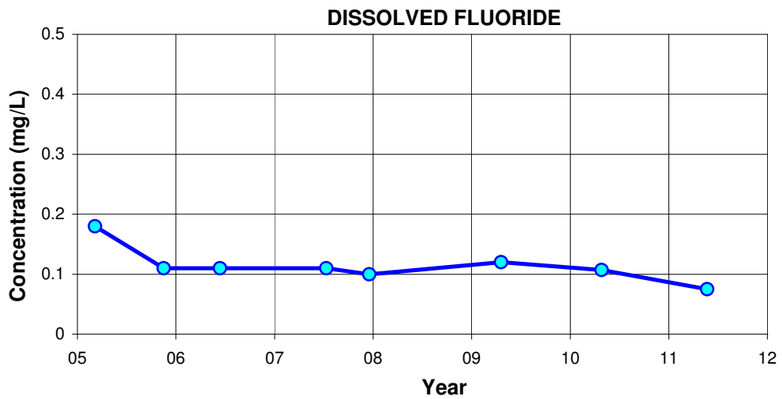


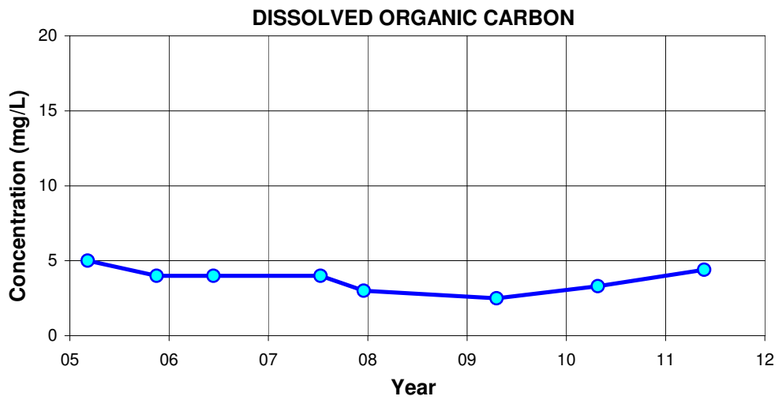












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-05

WorleyParsons resources & energy

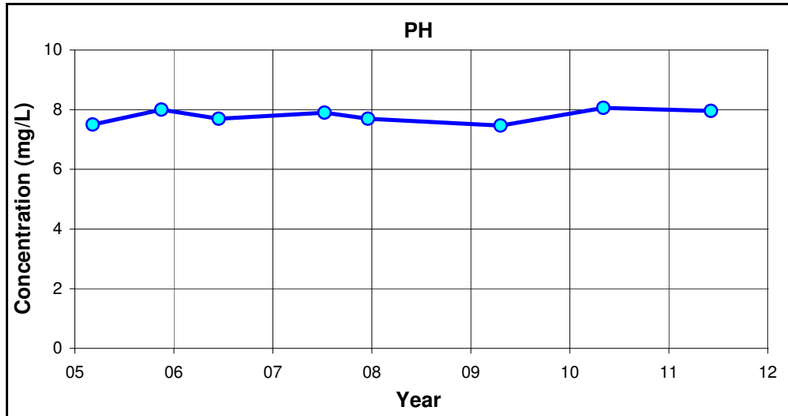
07-Jul-11 date	edited by	KS drawn by	app by

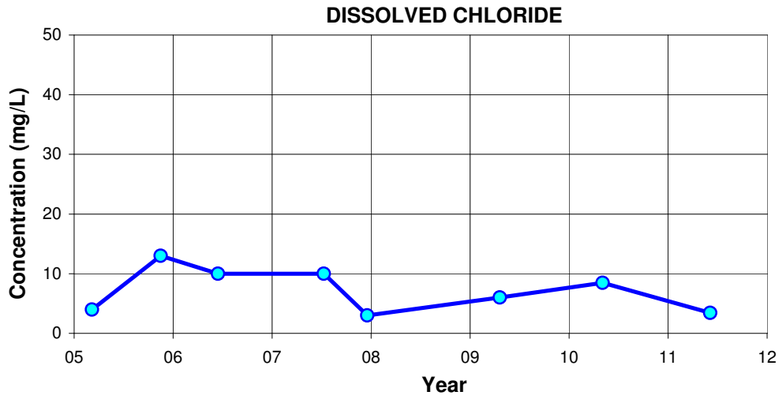
PROJECT NUMBER: **E00100102**

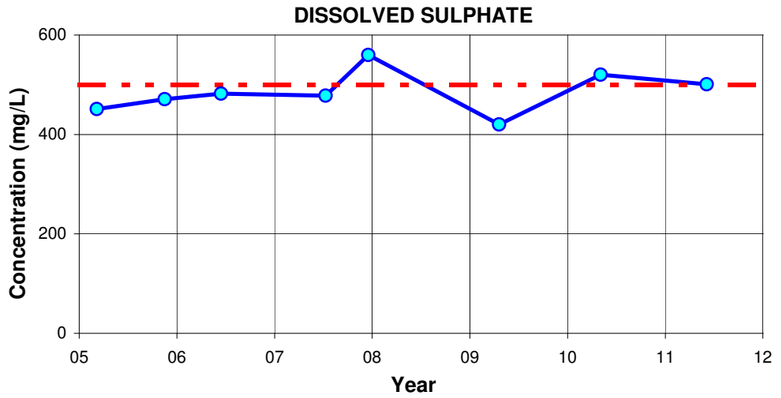
FIGURE: **A5-5**

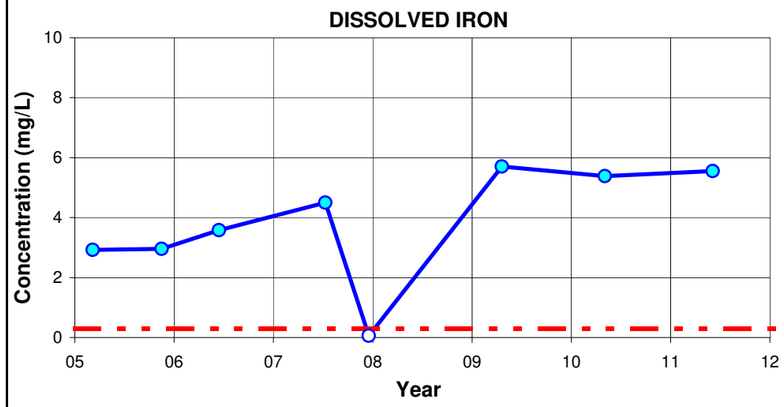
File Location: Edmonton

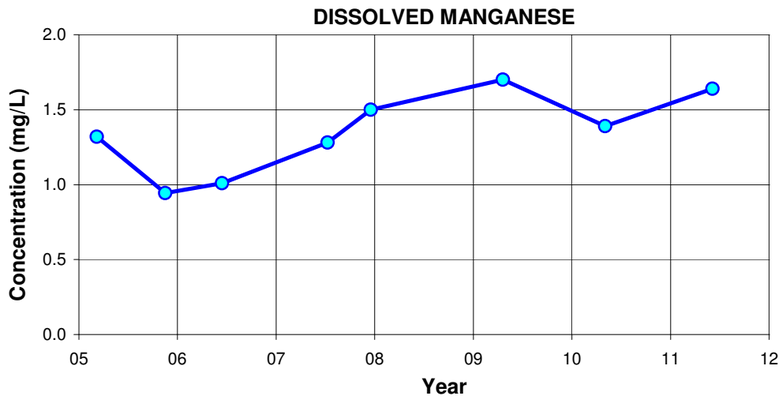
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

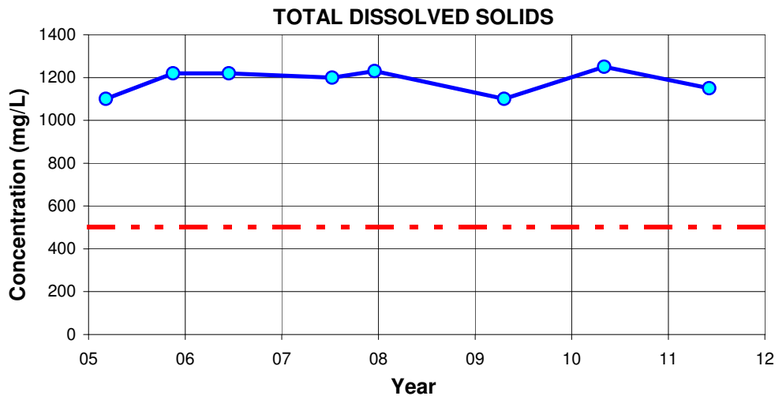


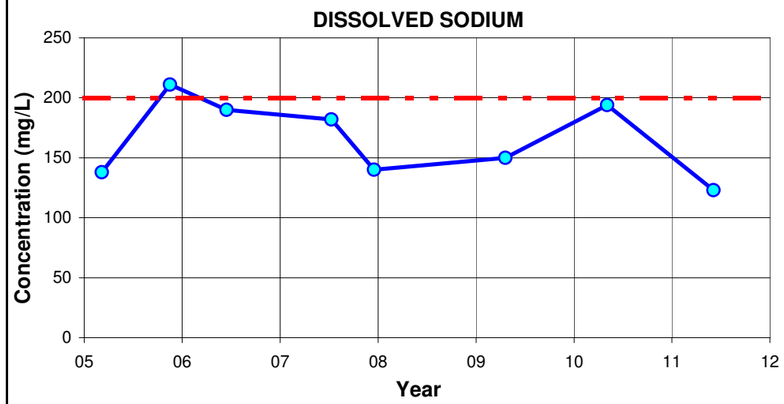


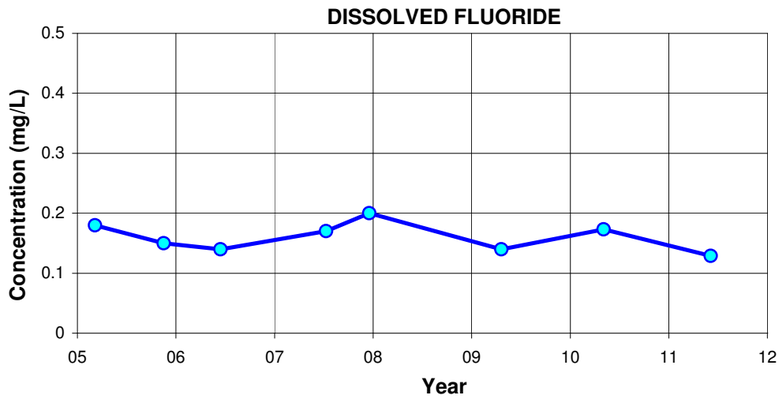


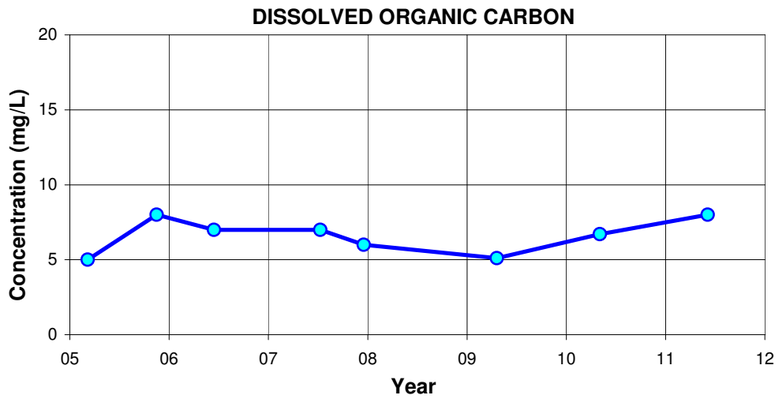












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-06

WorleyParsons resources & energy

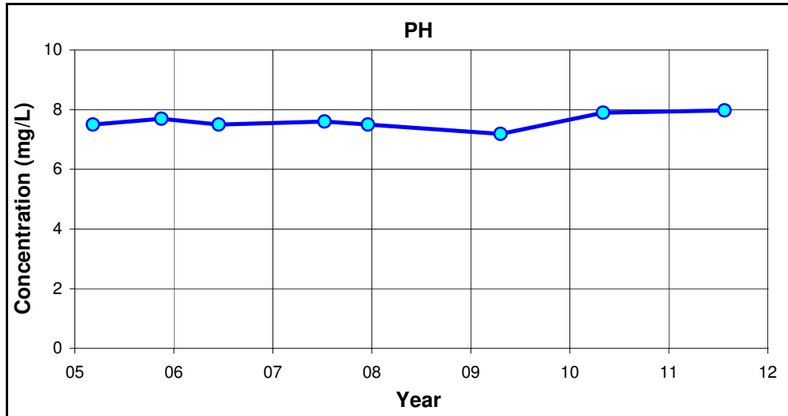
07-Jul-11 date	edited by	KS drawn by	app by

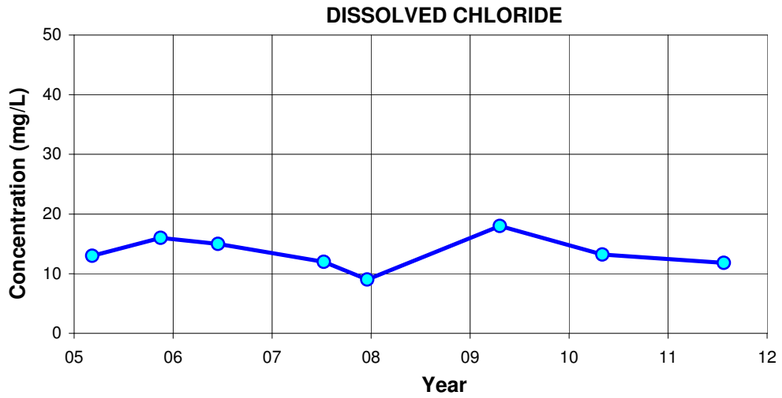
PROJECT NUMBER: **E00100102**

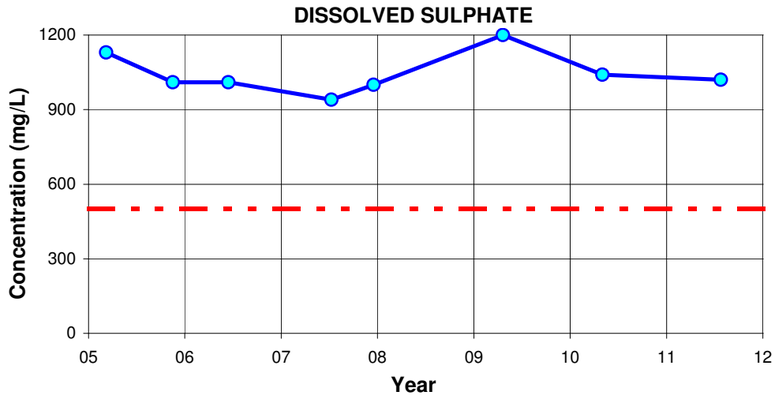
FIGURE: **A5-6**

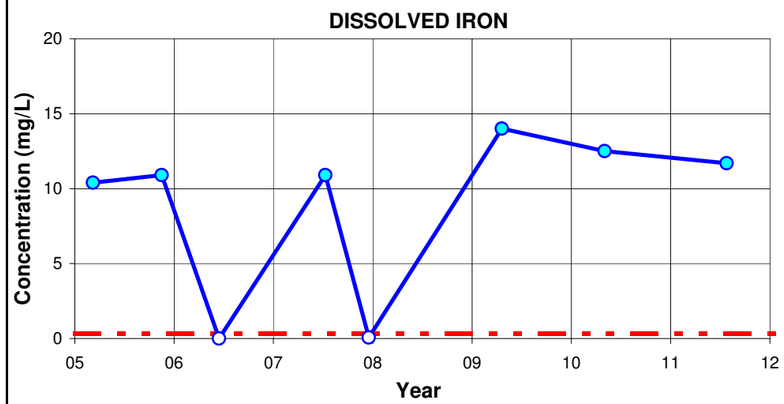
File Location: Edmonton

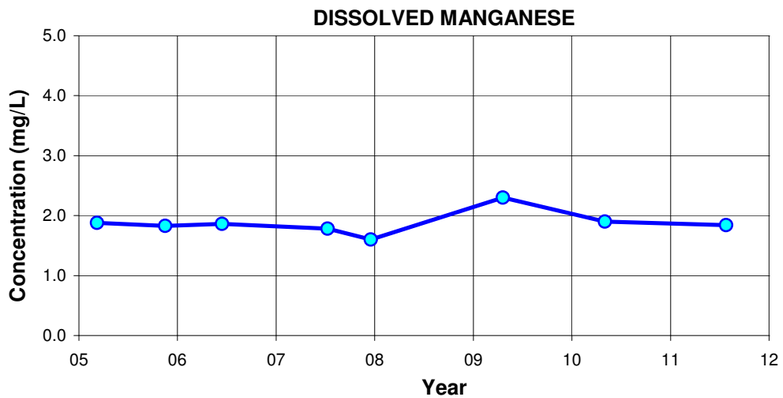
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

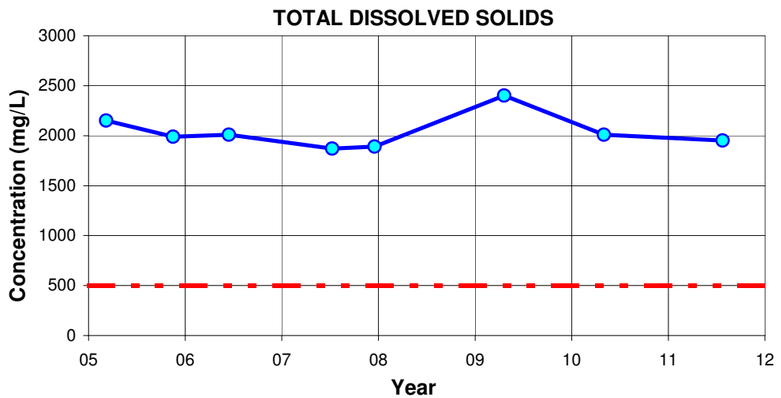


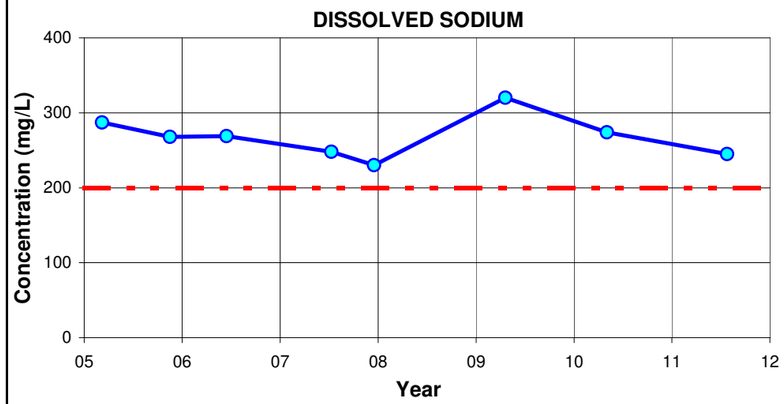


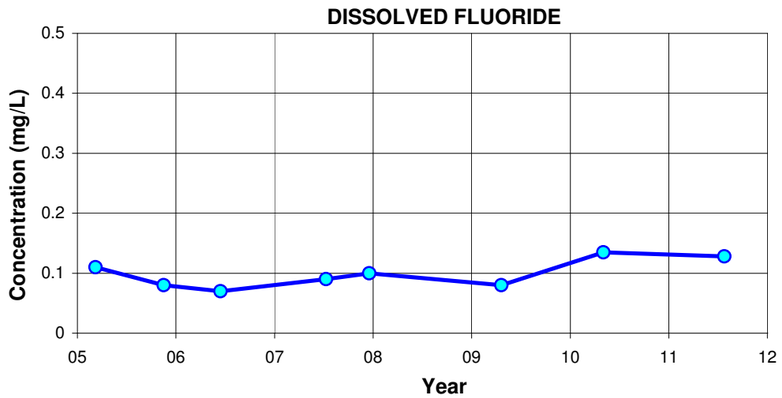


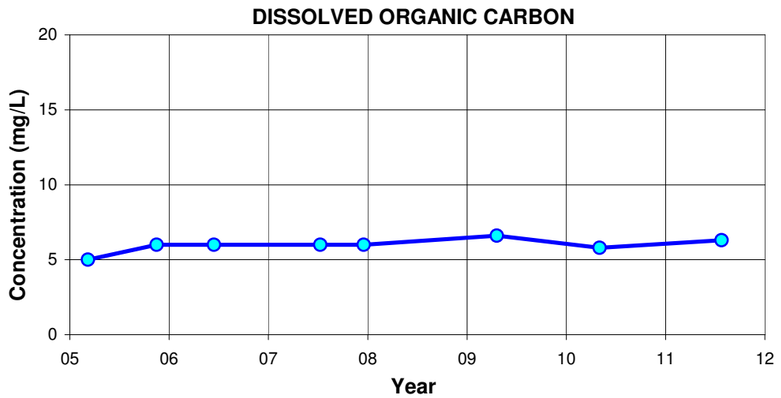












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-07

WorleyParsons resources & energy

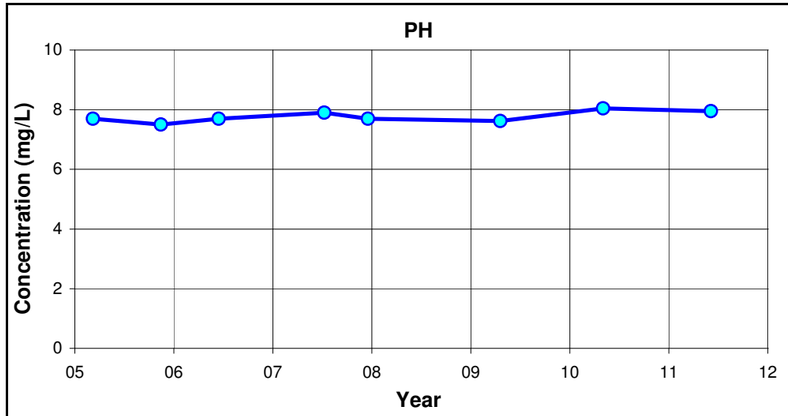
22-Aug-11 date	edited by	KS drawn by	app by

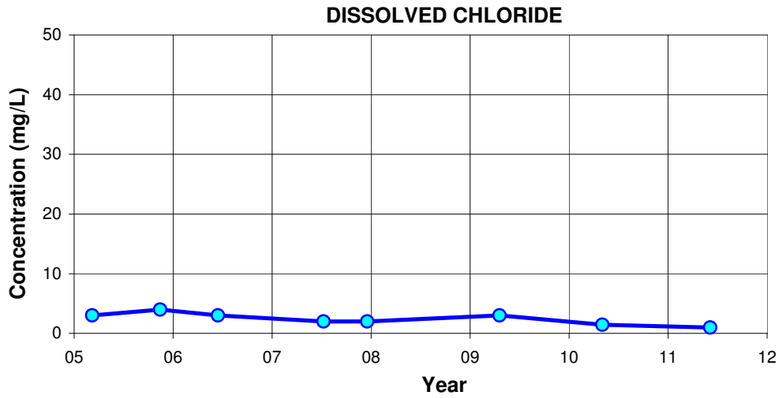
PROJECT NUMBER: **E00100102**

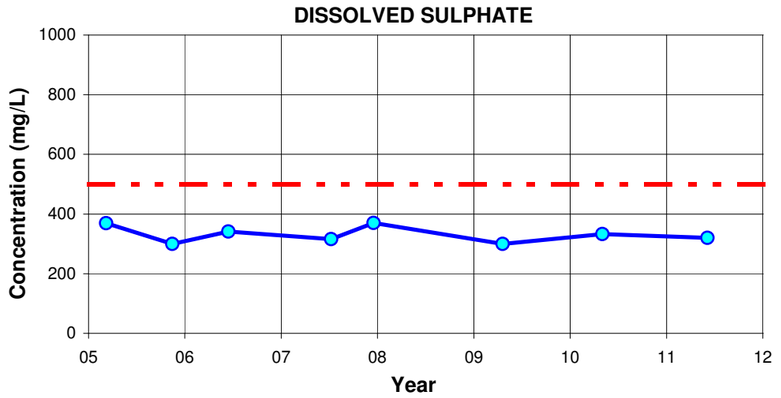
FIGURE: **A5-7**

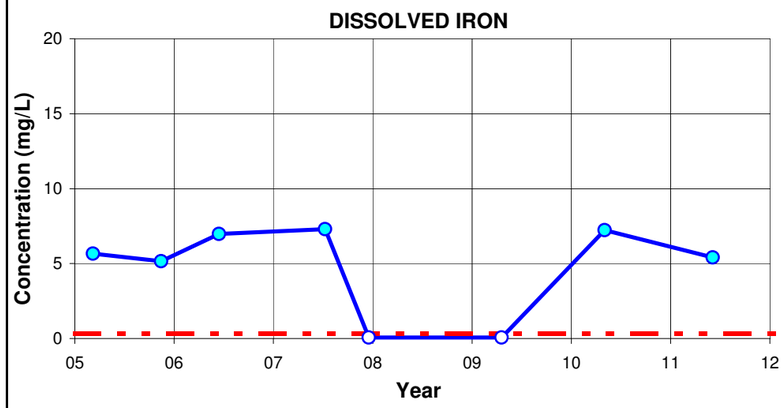
File Location: Edmonton

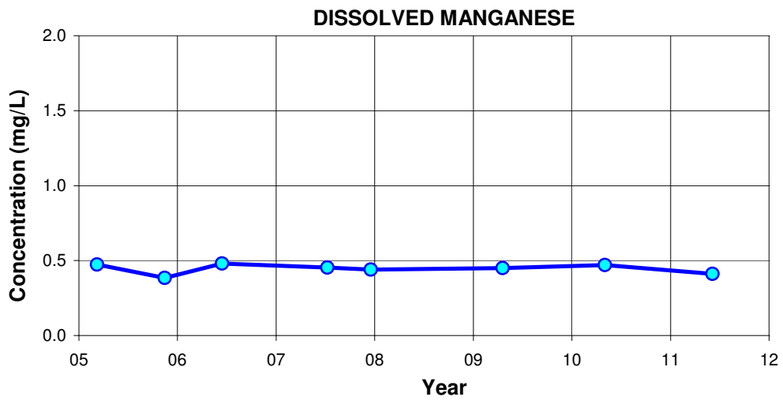
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

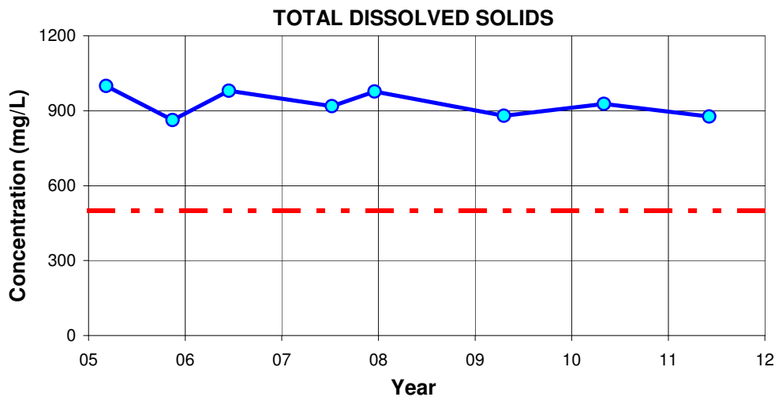


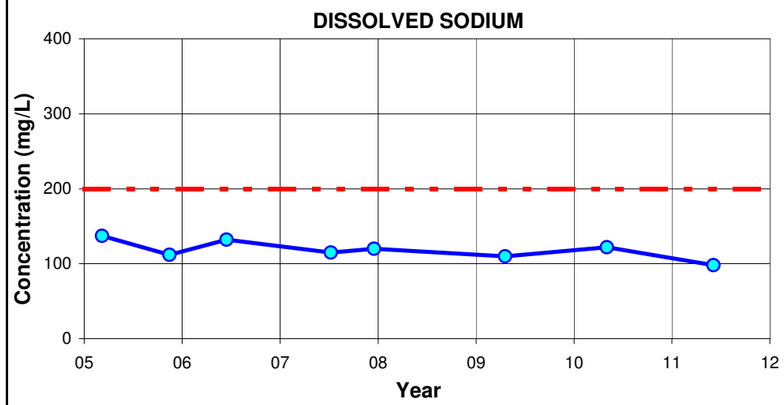


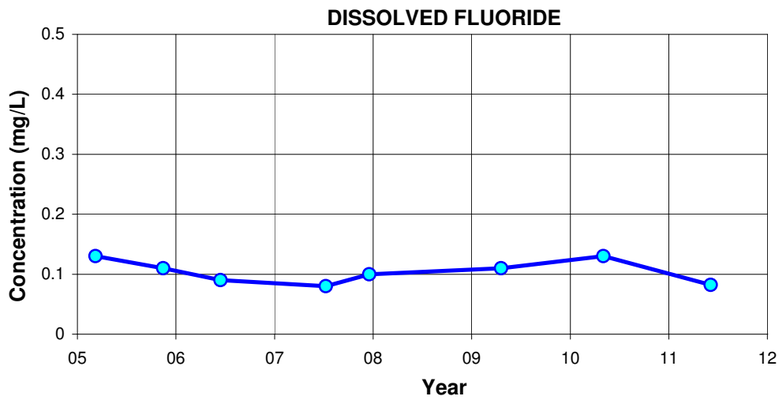


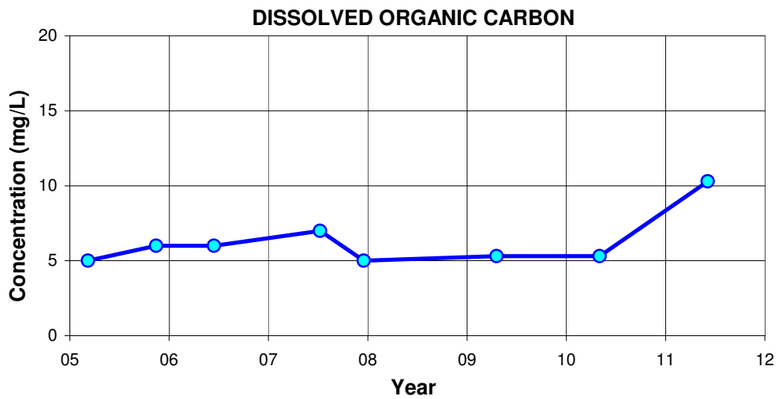












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-08

WorleyParsons resources & energy

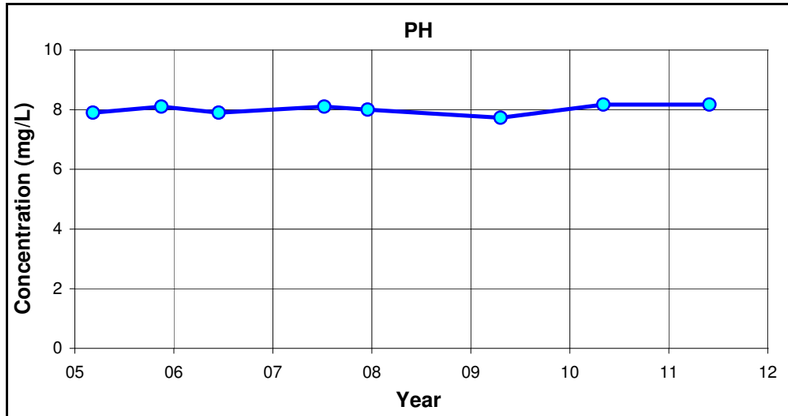
07-Jul-11 date	edited by	KS drawn by	app by

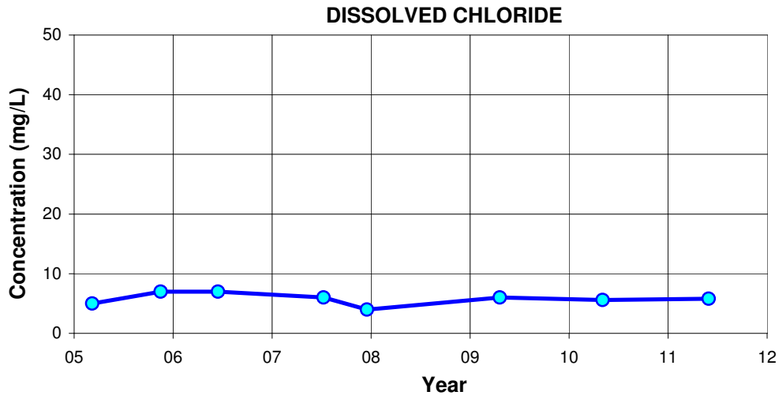
PROJECT NUMBER: **E00100102**

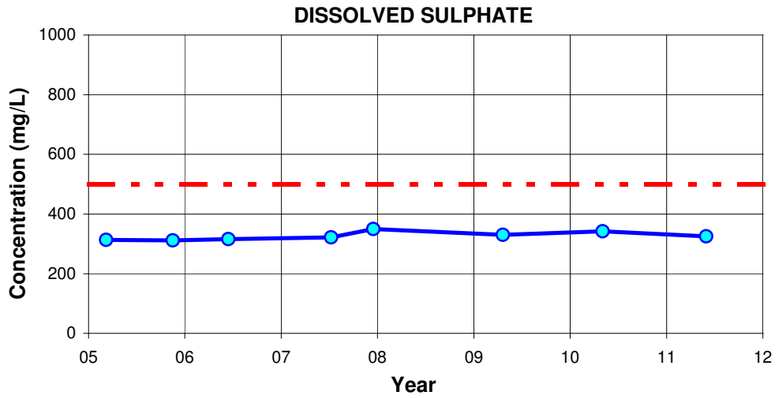
FIGURE: **A5-8**

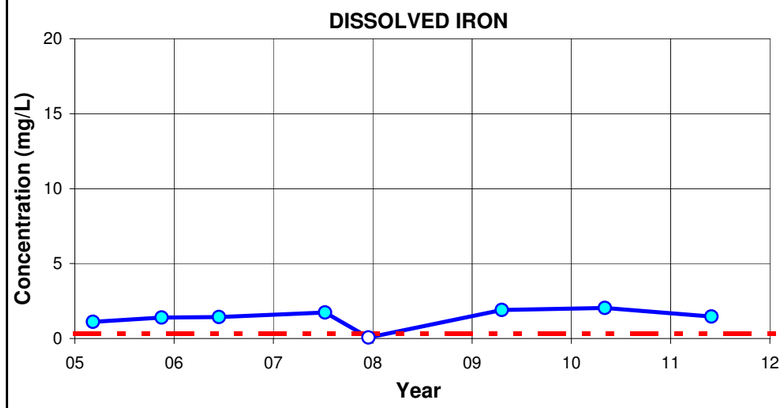
File Location: Edmonton

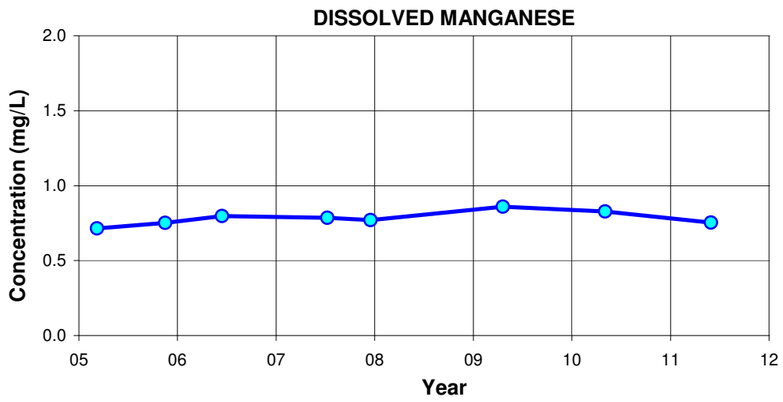
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

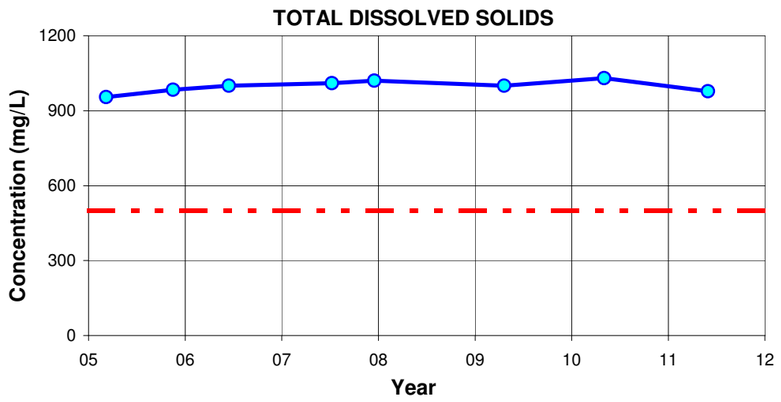


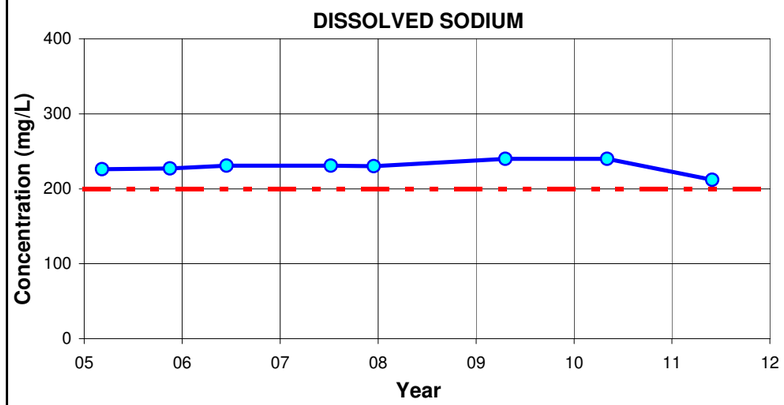


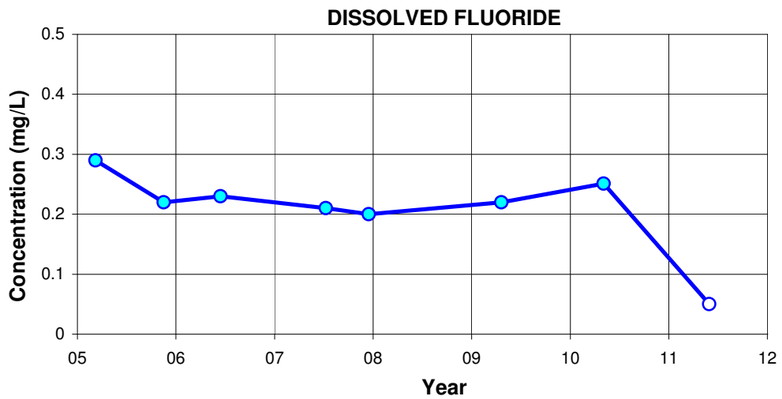


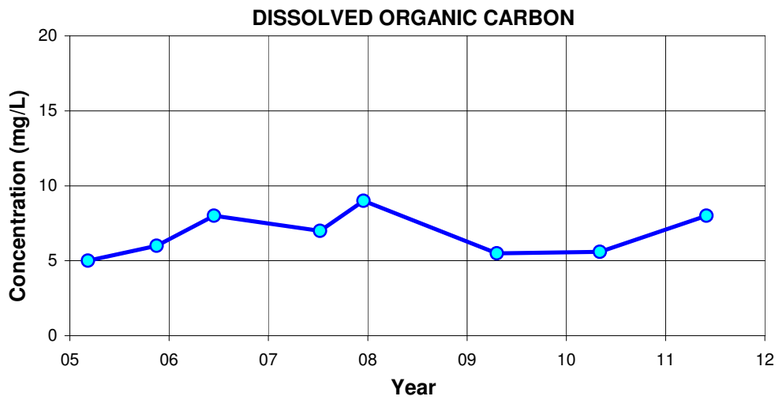












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-09

WorleyParsons resources & energy

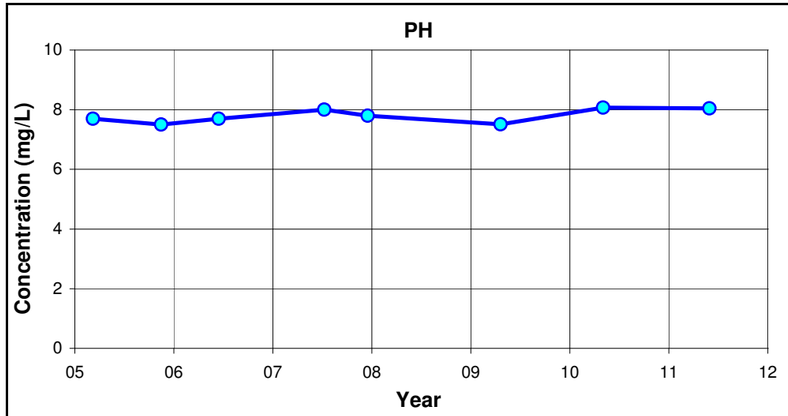
07-Jul-11 date	edited by	KS drawn by	app by

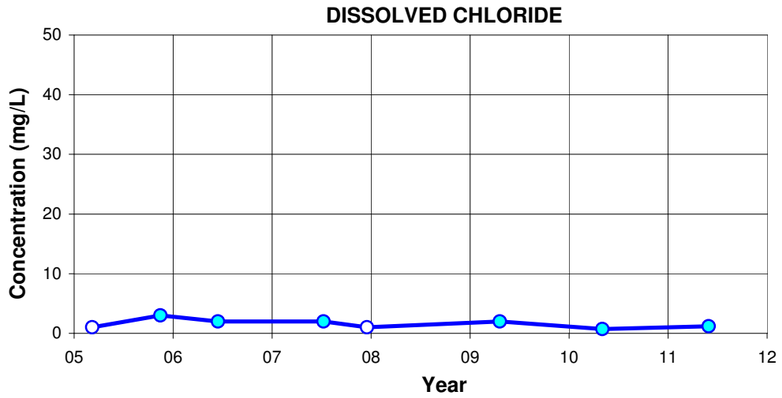
PROJECT NUMBER: **E00100102**

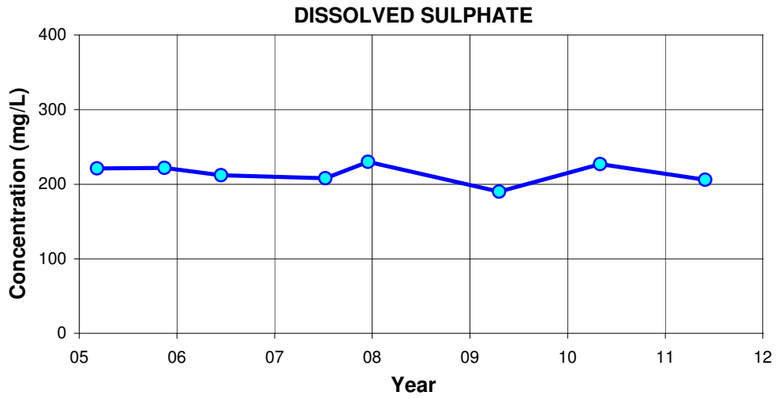
FIGURE: **A5-9**

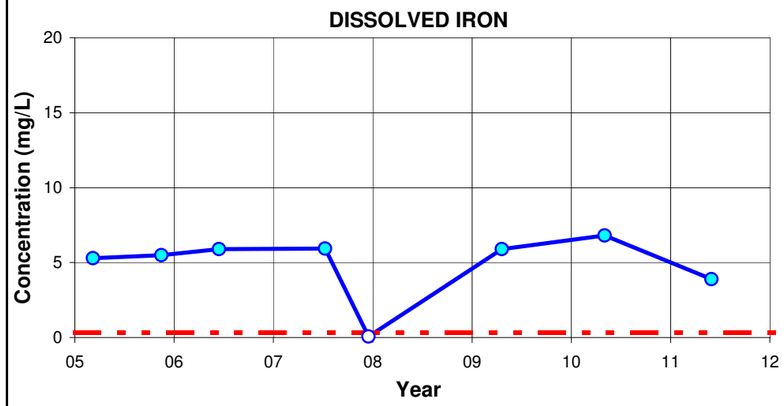
File Location: Edmonton

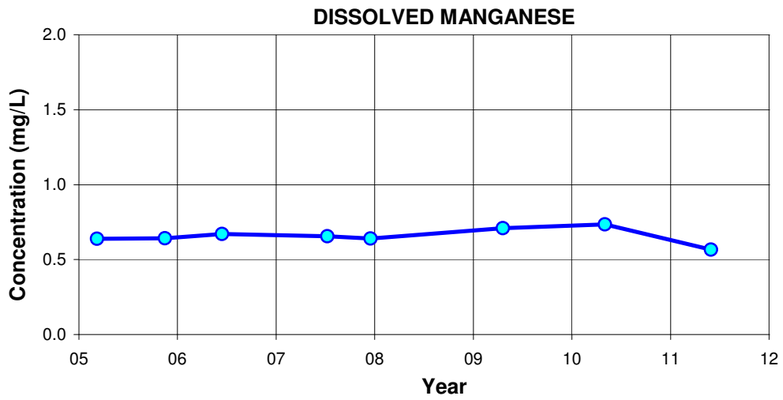
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

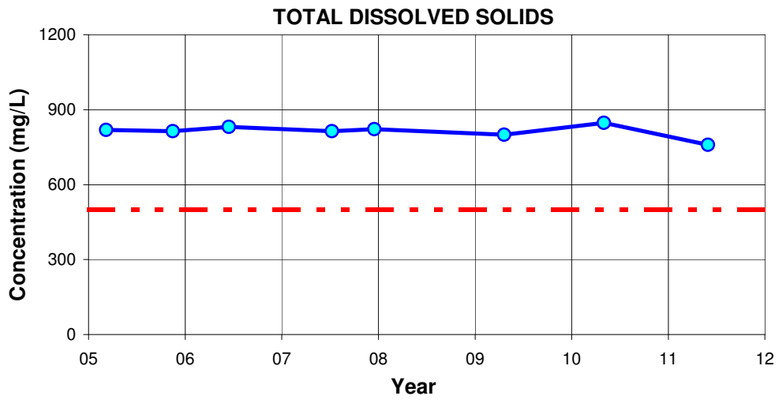


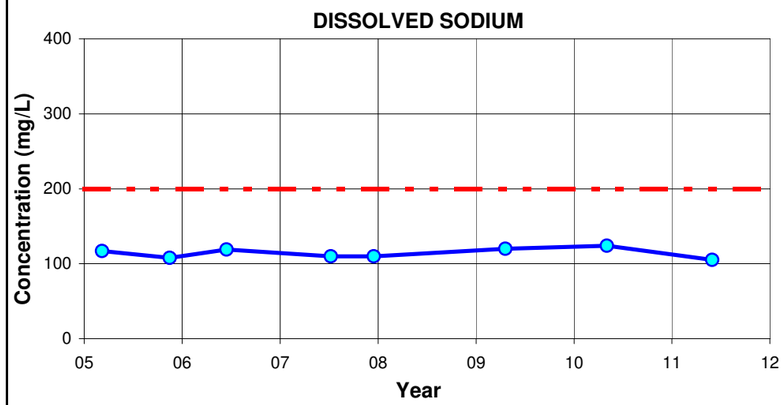


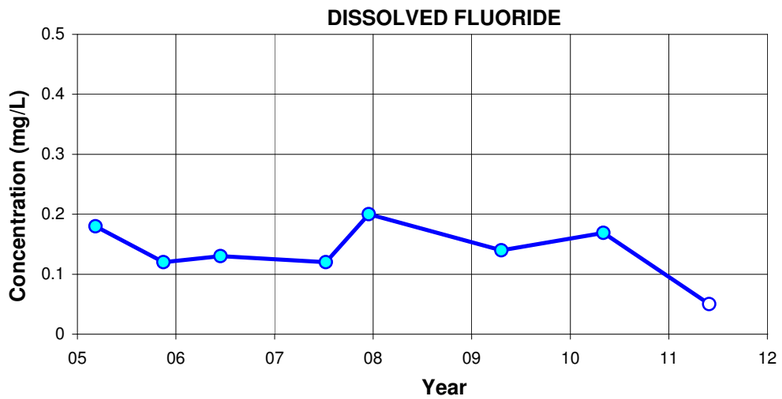


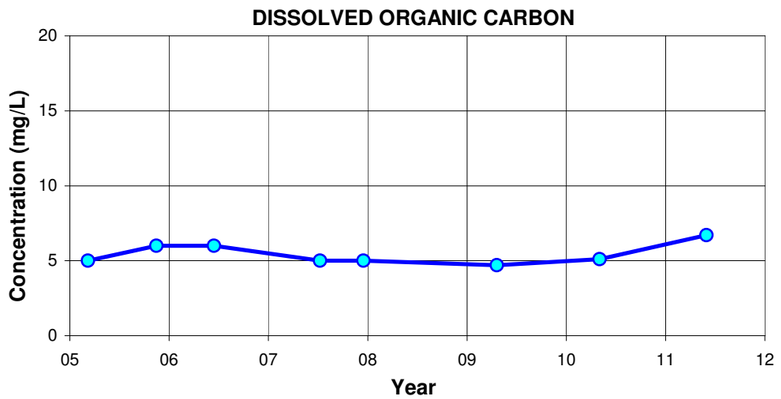












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-10

WorleyParsons resources & energy

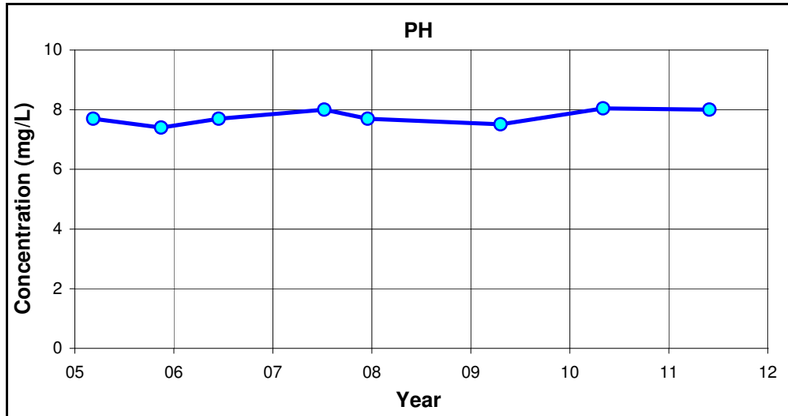
07-Jul-11 date	edited by	KS drawn by	app by

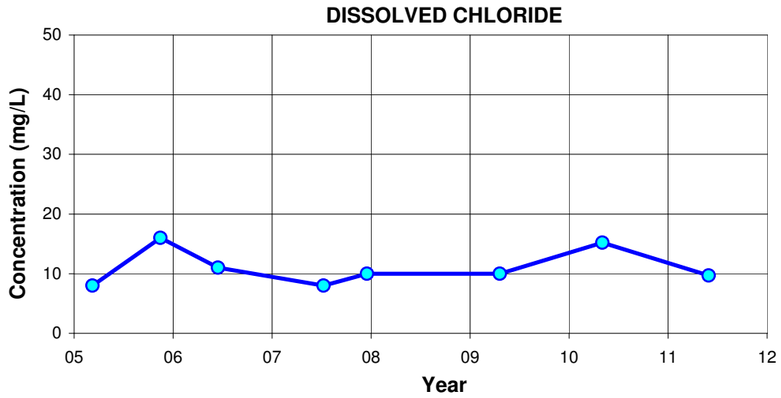
PROJECT NUMBER: **E00100102**

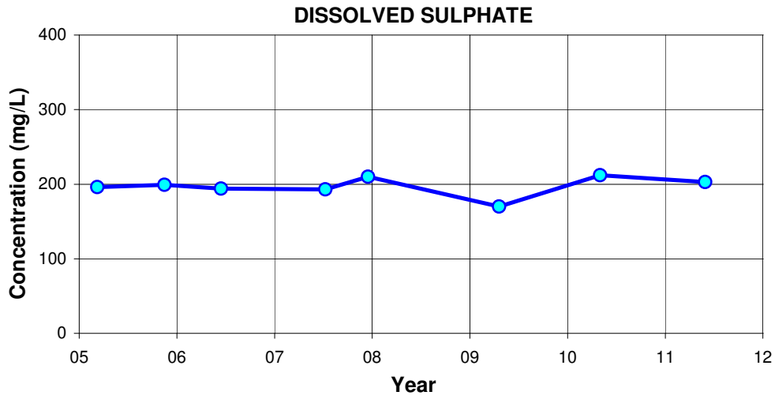
FIGURE: **A5-10**

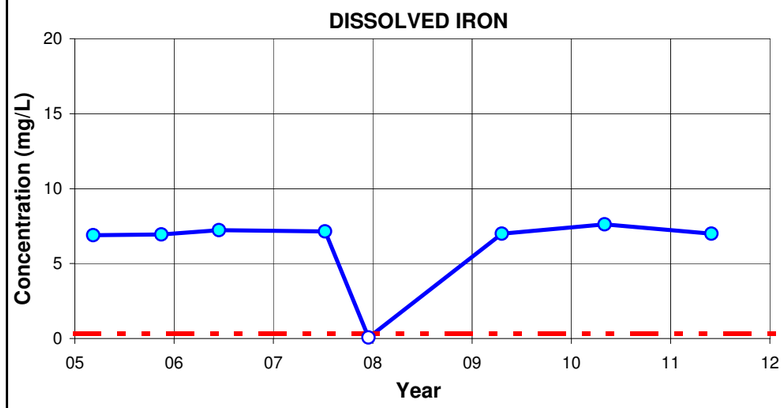
File Location: Edmonton

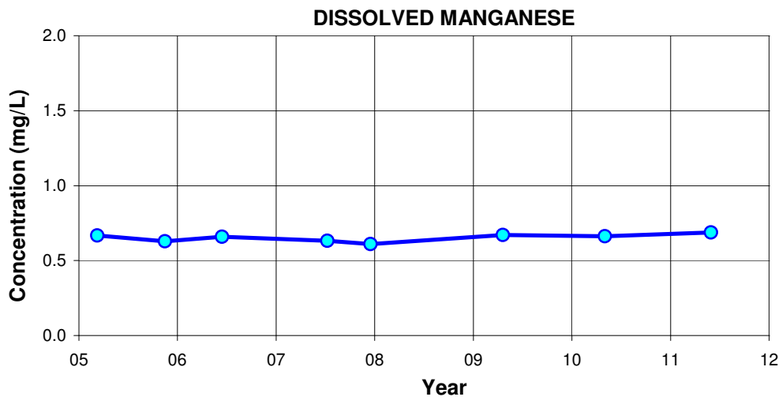
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

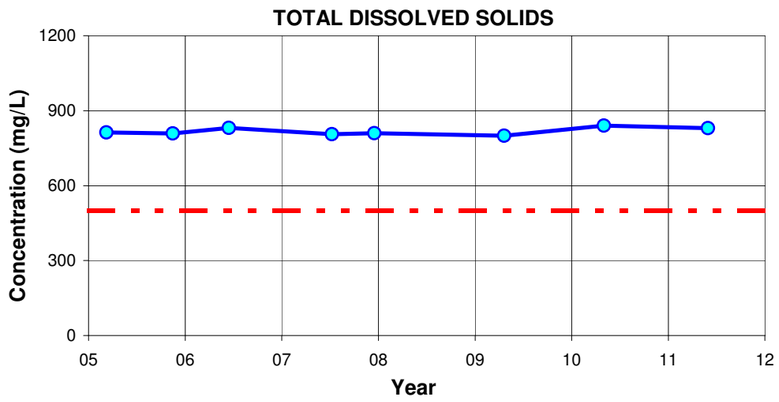


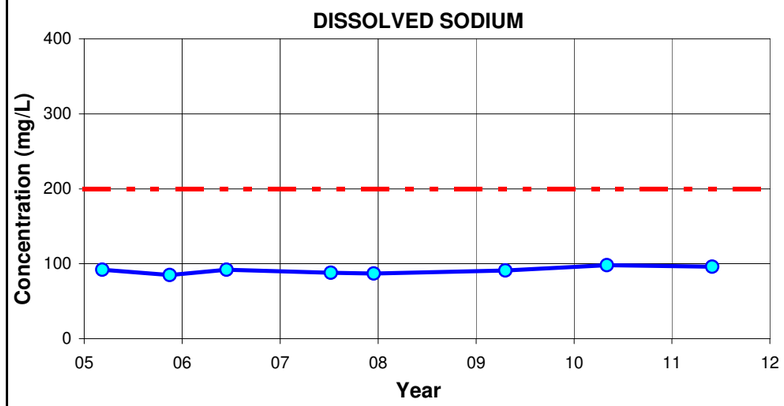


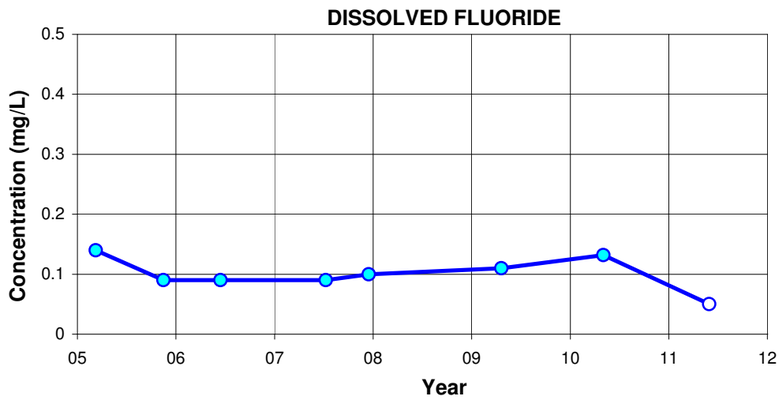


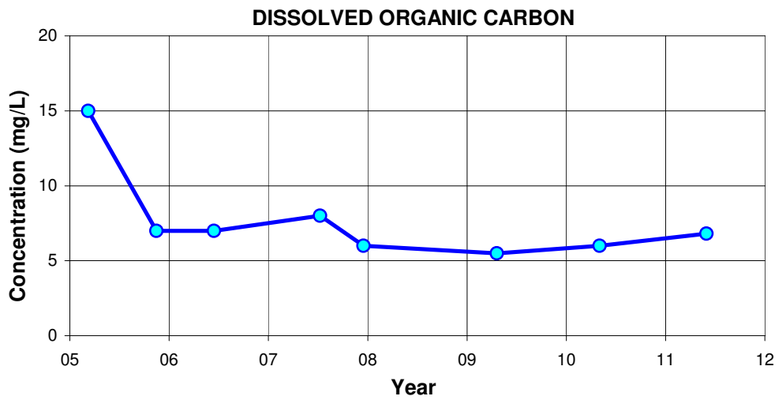












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-11

WorleyParsons resources & energy

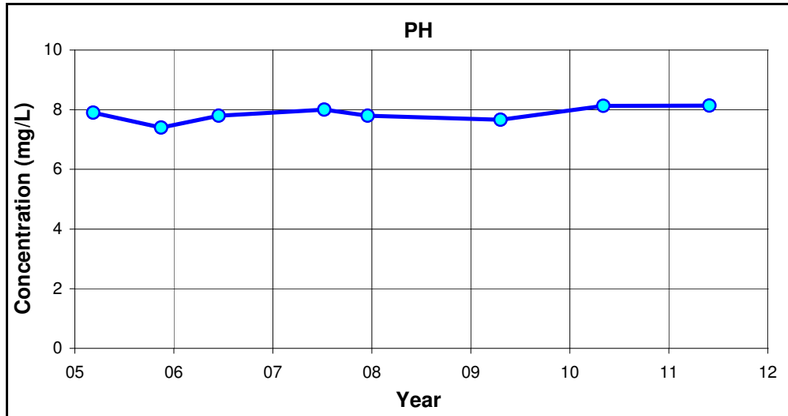
07-Jul-11 date	edited by	KS drawn by	app by

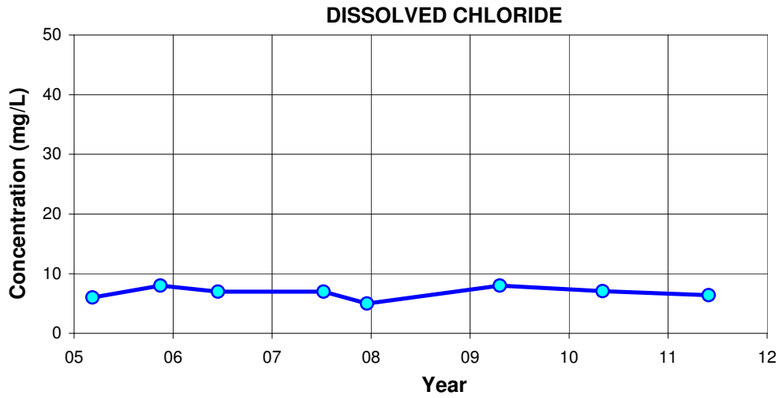
PROJECT NUMBER: **E00100102**

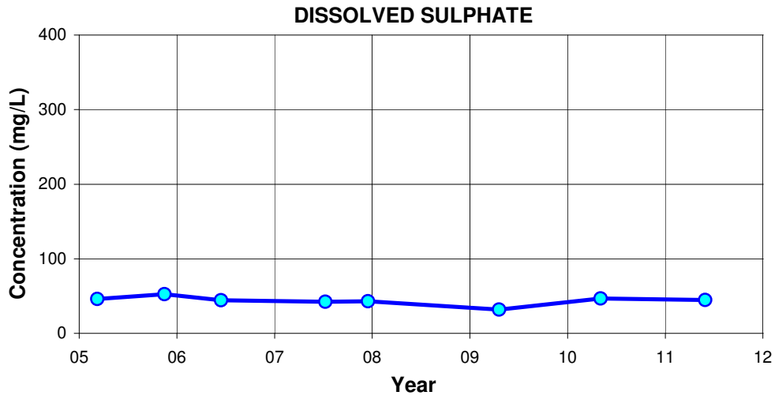
FIGURE: **A5-11**

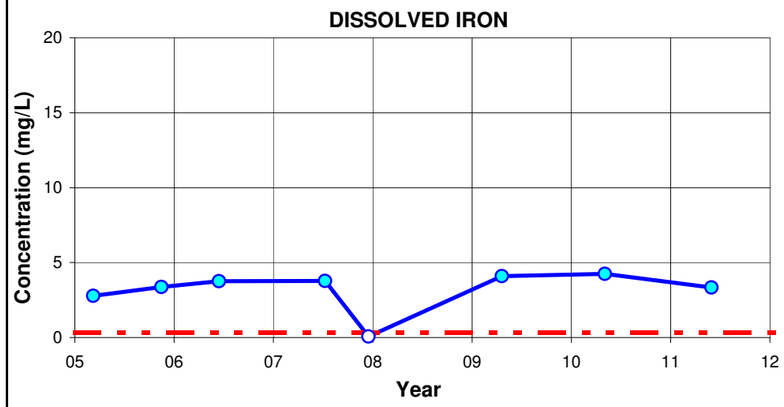
File Location: Edmonton

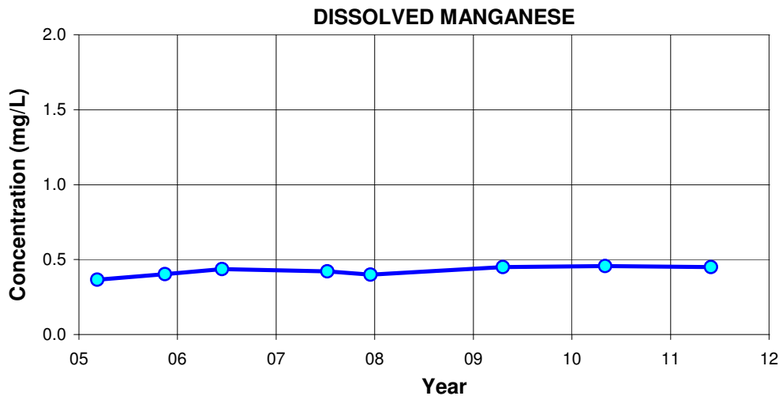
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

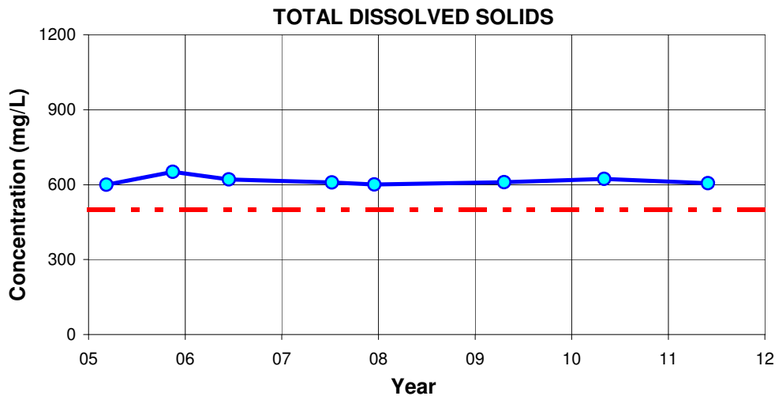


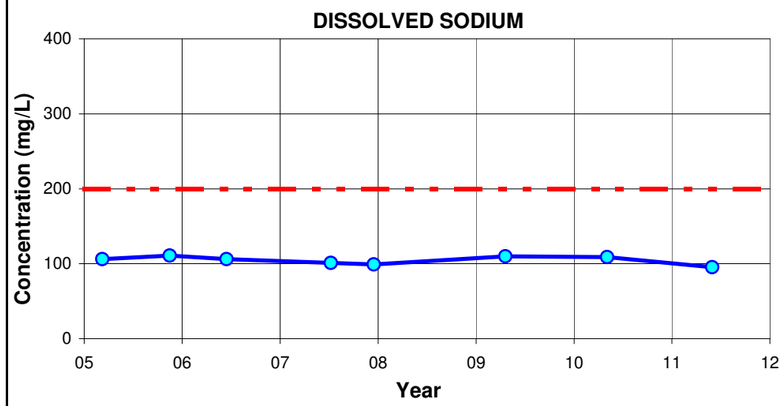


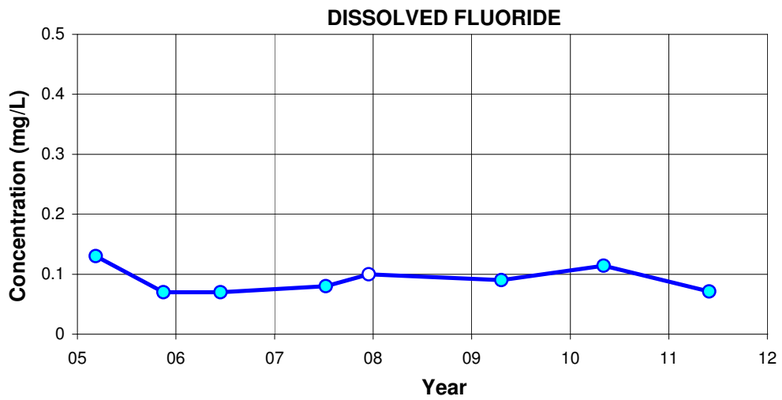


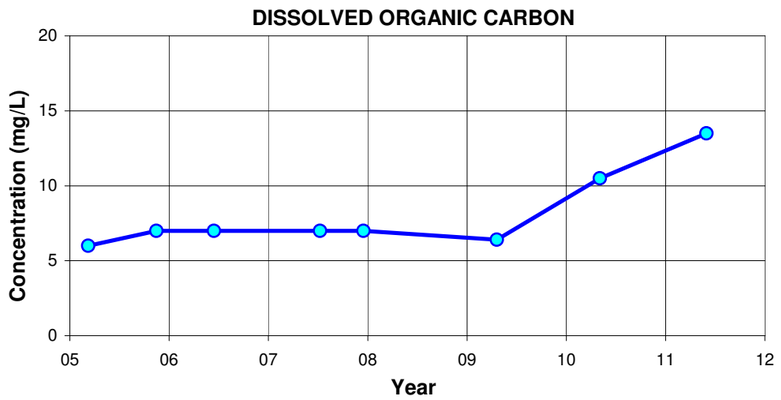












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-12

WorleyParsons resources & energy

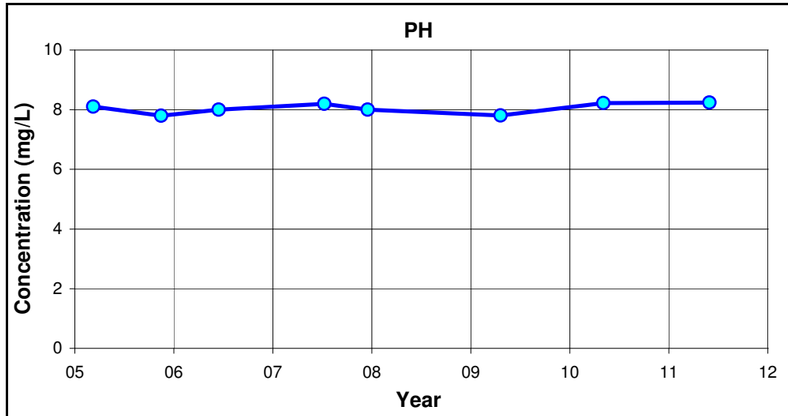
07-Jul-11 (date)	edited by	KS (drawn by)	app by

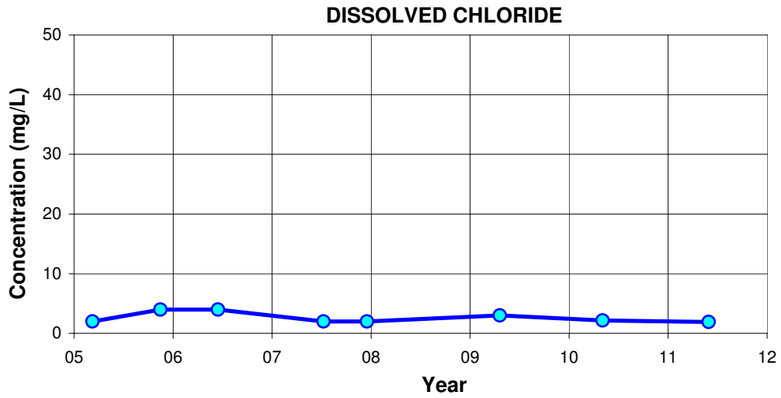
PROJECT NUMBER: **E00100102**

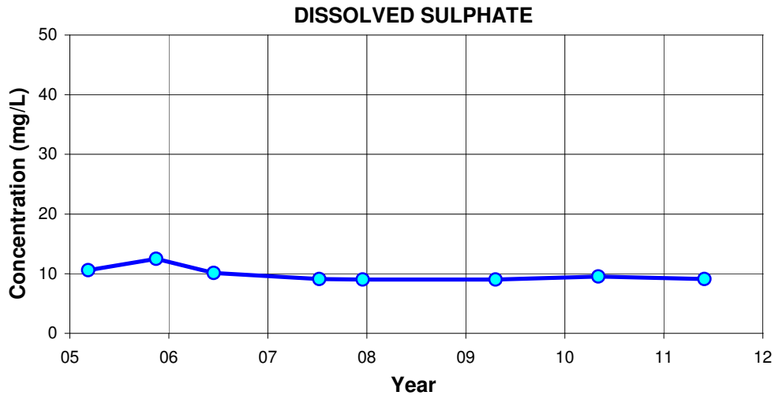
FIGURE: **A5-12**

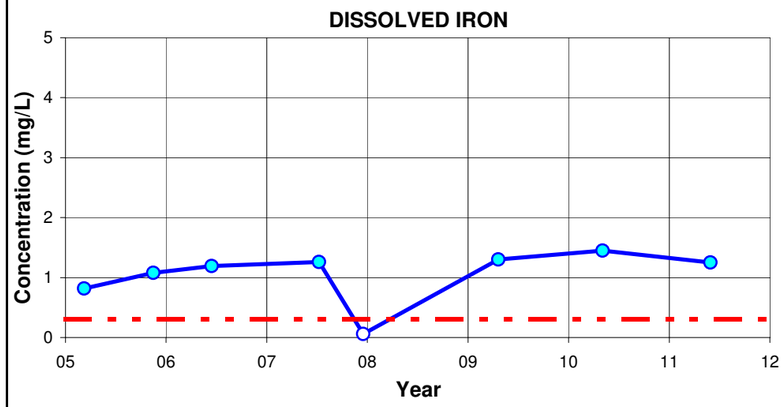
File Location: Edmonton

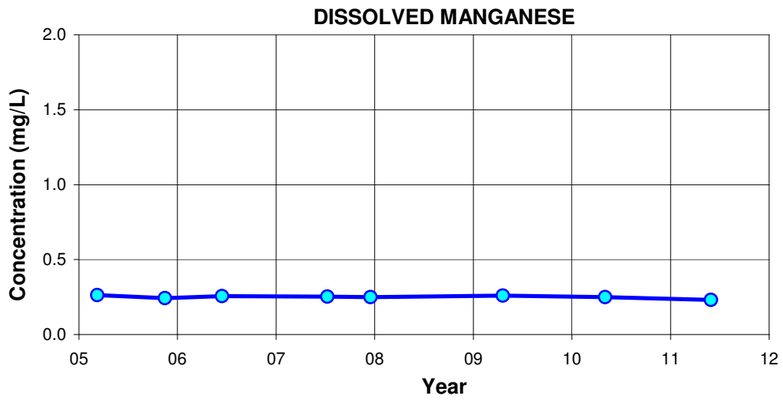
J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

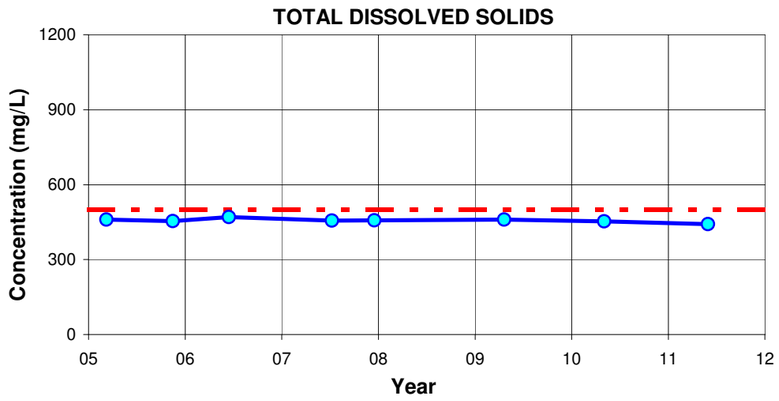


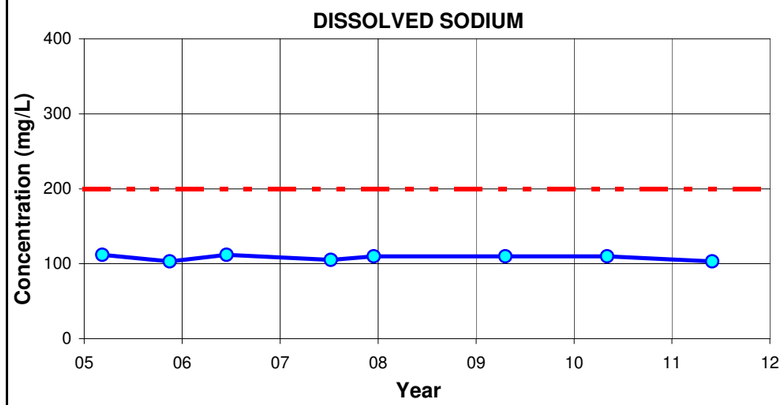


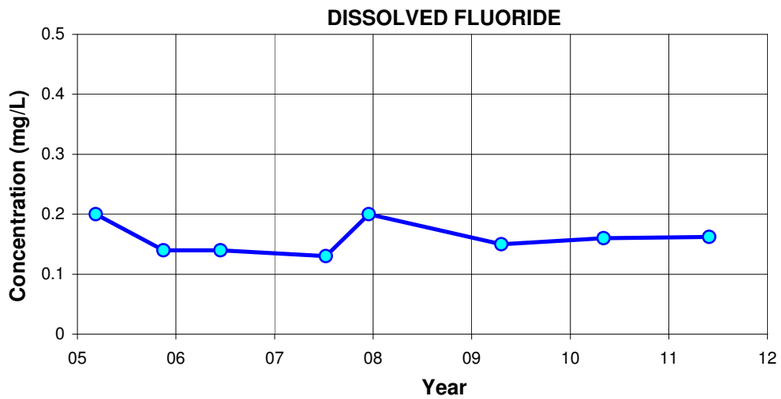


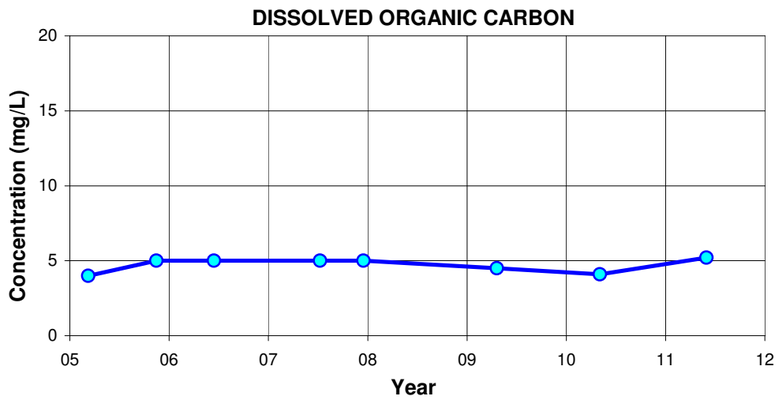












Notes:

- *Filled symbols denote sample values*
- *Unfilled symbols denote values are less than detection limit(s)*
- *Canadian Drinking Water Quality Guidelines (Health Canada 2010)*
  - *pH: 6.5 - 8.5*
  - *Dissolved Iron: 0.3 mg/L*
  - *Dissolved Sodium: 200 mg/L*
  - *Dissolved Chloride: 250 mg/L*
  - *Dissolved Manganese: 0.05 mg/L*
  - *Dissolved Fluoride: 1.5 mg/L*
  - *Dissolved Sulphate: 500 mg/L*
  - *Total Dissolved Solids: 500 mg/L*
  - *Dissolved Organic Carbon: N/A*

Infrastructure & Environment

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2011 GROUNDWATER QUALITY MONITORING
HYDROCHEMICAL CONTROL CHARTS

MW-13

WorleyParsons resources & energy

07-Jul-11 date	edited by	KS drawn by	app by

PROJECT NUMBER: **E00100102**

FIGURE: **A5-13**

File Location: Edmonton

J:\E001s\E00100102 (NCIA 2011 Beverly Channel GW Monitoring)\12.0_Reports\12.3_Backend\Appendices\Appendix 5 - Hydrochemical Control Charts

Appendix 6 Statistical Tables

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-01

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	15.55	15.64	15.23	15.23	15.38	15.29	15.70	15.40	15.23	15.7	15.4	0.2	8
Groundwater Surface Elevation	(m asl)	602.49	602.4	602.81	602.81	602.66	602.75	602.34	602.64	602.34	602.81	602.6	0.2	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	749	741	741	749	745.0	5.7	2
pH	(---)	---	---	---	---	---	---	6.95	7.11	6.95	7.11	7.0	0.1	2
Temperature	(°C)	---	---	---	---	---	---	5.6	7.7	5.6	7.7	6.7	1.5	2
Select Indicator Parameters														
Calcium	(mg/L)	94.6	94.8	99.7	95.1	87	84	98.6	91.1	84	99.7	93.1	5.44	8
Chloride	(mg/L)	4	4	4	3	2	5	3.46	3.02	2	5	3.6	0.90	8
Fluroide	(mg/L)	0.19	0.13	0.14	0.13	0.2	0.14	0.15	0.109	0.109	0.2	0.1	0.03	8
Iron	(mg/L)	1.02	1.67	1.81	1.84	<0.06	<0.06	2.02	1.53	1.02	2.02	1.6	0.35	8
Magnesium	(mg/L)	24.8	26.9	27.3	26.1	23	24	28.4	25.4	23	28.4	25.7	1.79	8
Manganese	(mg/L)	0.605	0.662	0.7	0.664	0.67	0.66	0.73	0.675	0.605	0.73	0.7	0.04	8
Potassium	(mg/L)	3.1	2.3	2.9	2.3	2.2	2.4	---	2.68	2.2	3.1	2.6	0.34	7
Sodium	(mg/L)	40	36	37	33	34	36	38.1	33.3	33	40	35.9	2.44	8
Bicarbonate	(mg/L)	444	451	448	445	470	450	453	446	444	470	450.9	8.3	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.003	<0.050	<0.050	0.003	0.003	0.003	N/A	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.003	<0.071	<0.071	0.003	0.003	0.003	N/A	8
Sulphate	(mg/L)	57.4	61.1	56.8	54.6	60	44	62	57.1	44	62	56.6	5.7	8
Dissolved Organic Carbon	(mg/L)	3	3	3	3	2	2.3	3	3.4	2	3.4	2.8	0.5	8
Electrical Conductivity	(µS/cm)	762	760	748	718	770	770	762	768	718	770	757.3	17.4	8
Ion Balance	(%)	100	97.6	103	98.6	0.87	93	102	94.9	0.87	103	86.2	34.7	8
pH	(---)	7.7	7.9	8	7.8	7.8	7.67	8.06	8.04	7.67	8.06	7.9	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.0010	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	442	447	448	433	442	410	456	432	410	456	438.8	14.0	8
Total Alkalinity as $CaCO_3$	(mg/L)	364	370	367	365	390	370	371	366	364	390	370.4	8.3	8
Total Hardness as $CaCO_3$	(mg/L)	338	347	361	345	310	310	363	332	310	363	338.3	20.3	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	0.02	0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	0.0051	0.0051	0.02	0.012	0.0076	8
Antimony	(mg/L)	0.0008	0.0005	0.0006	0.0004	<0.0002	<0.0002	<0.00040	<0.00040	0.0004	0.0008	0.001	0.0002	8
Arsenic	(mg/L)	0.0008	0.0009	0.0009	0.0009	<0.001	0.0008	0.00095	0.00093	0.0008	0.00095	0.001	0.0001	8
Barium	(mg/L)	0.199	0.143	0.134	0.127	0.11	---	0.132	0.147	0.11	0.199	0.142	0.0280	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	<0.0001	<0.00005	<0.00005	---	---	---	---	N/A	N/A	N/A	N/A	4
Boron	(mg/L)	0.053	0.046	0.045	0.054	0.05	---	0.053	<0.050	0.045	0.054	0.050	0.0039	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.000005	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Chromium	(mg/L)	0.0009	<0.0004	0.0027	0.0011	<0.001	<0.001	<0.0050	<0.0050	0.0009	0.0027	0.002	0.0010	8
Cobalt	(mg/L)	0.0017	0.0015	0.0008	0.0009	0.0009	0.0008	0.00088	0.00084	0.0008	0.0017	0.001	0.0004	8
Copper	(mg/L)	<0.0006	0.0007	<0.0006	<0.0006	<0.0002	0.0005	<0.0010	0.0017	0.0005	0.0017	0.001	0.0006	8
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	0.0004	0.0004	0.000	N/A	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	0.000001	<0.00010	<0.000020	0.000001	0.000001	0.000	N/A	8
Molybdenum	(mg/L)	0.0007	0.0013	0.0004	0.0009	0.0008	0.0004	0.00046	0.00039	0.00039	0.0013	0.001	0.0003	8
Nickel	(mg/L)	0.0004	0.0012	<0.0001	0.003	0.0027	0.0009	0.0025	<0.0020	0.0004	0.003	0.002	0.0011	8
Selenium	(mg/L)	<0.0004	<0.0004	<0.0004	0.0005	<0.001	<0.0002	<0.00040	<0.00040	0.0005	0.0005	0.001	N/A	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	0.579	0.551	0.554	0.558	0.53	---	---	---	0.53	0.579	0.554	0.0175	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0013	0.0012	0.001	0.0008	0.001	<0.001	0.00081	<0.00030	0.0008	0.0013	0.001	0.0002	8
Uranium	(mg/L)	0.0026	0.0023	0.0022	0.0022	0.0024	0.0021	0.00209	0.00205	0.00205	0.0026	0.002	0.0002	8
Vanadium	(mg/L)	0.0003	0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.00010	0.00016	0.0001	0.0003	0.000	0.0001	8
Zinc	(mg/L)	0.004	<0.002	0.005	<0.002	<0.003	<0.003	<0.0020	0.0074	0.004	0.0074	0.005	0.0017	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-02

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	27.14	27.23	27.05	27.18	26.99	27.13	27.20	26.26	26.26	27.23	27.0	0.3	8
Groundwater Surface Elevation	(m asl)	604.17	604.08	604.26	604.13	604.32	604.18	604.11	605.05	604.08	605.05	604.3	0.3	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,306	1,397	1306	1397	1351.5	64.3	2
pH	(---)	---	---	---	---	---	---	7.04	7.02	7.02	7.04	7.0	0.0	2
Temperature	(°C)	---	---	---	---	---	---	4.8	8.3	4.8	8.3	6.6	2.5	2
Select Indicator Parameters														
Calcium	(mg/L)	113	125	162	154	140	130	147	141	113	162	139.0	15.93	8
Chloride	(mg/L)	13	38	23	12	13	18	11.6	22.3	11.6	38	18.9	8.98	8
Fluroide	(mg/L)	0.21	0.11	0.09	0.09	0.1	0.08	0.094	<0.050	0.08	0.21	0.1	0.04	8
Iron	(mg/L)	0.275	0.085	3.19	8.72	<0.06	1.5	9.35	9.25	0.085	9.35	4.6	4.32	8
Magnesium	(mg/L)	34.5	51.3	55.4	54.4	46	44	54	51.3	34.5	55.4	48.9	7.07	8
Manganese	(mg/L)	0.236	0.671	1.09	0.841	0.7	0.53	0.505	0.434	0.236	1.09	0.6	0.26	8
Potassium	(mg/L)	6.8	7.2	5.5	4.3	4.5	4.4	---	4.25	4.25	7.2	5.3	1.25	7
Sodium	(mg/L)	111	120	95	83	83	81	87.2	97.9	81	120	94.8	14.31	8
Bicarbonate	(mg/L)	514	575	629	630	660	610	597	628	514	660	605.4	44.8	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.050	<0.050	0.005	0.1	0.053	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.071	<0.071	0.005	0.1	0.053	0.1	8
Sulphate	(mg/L)	227	270	274	263	290	230	268	318	227	318	267.5	29.7	8
Dissolved Organic Carbon	(mg/L)	8	6	5	6	5	4.1	5.4	11.3	4.1	11.3	6.4	2.3	8
Electrical Conductivity	(µS/cm)	1210	1400	1420	1360	1400	1400	1290	1,500	1210	1500	1372.5	88.0	8
Ion Balance	(%)	101	98.4	102	98.7	0.84	89	100	89.1	0.84	102	84.9	34.3	8
pH	(---)	7.7	7.9	7.9	7.9	7.4	7.36	7.97	7.9	7.36	7.97	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	0.002	0.002	0.002	<0.0010	<0.0010	0.002	0.002	0.002	0.000	8
Total Dissolved Solids	(mg/L)	759	894	925	880	895	810	866	944	759	944	871.6	60.6	8
Total Alkalinity as $CaCO_3$	(mg/L)	422	471	516	516	540	500	489	515	422	540	496.1	36.4	8
Total Hardness as $CaCO_3$	(mg/L)	424	523	633	609	530	500	589	563	424	633	546.4	67.0	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	0.02	0.03	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.02	0.03	0.025	0.0071	8
Antimony	(mg/L)	0.001	0.0006	0.0007	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	0.0005	0.001	0.001	0.0002	8
Arsenic	(mg/L)	0.0025	0.0014	0.0024	0.0036	0.003	0.0038	0.00369	0.00327	0.0014	0.0038	0.003	0.0008	8
Barium	(mg/L)	0.204	0.152	0.107	0.0749	0.04	---	0.0544	0.042	0.04	0.204	0.096	0.0621	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	<0.0001	0.00005	<0.00005	---	---	---	---	0.00005	0.00005	0.000	N/A	4
Boron	(mg/L)	0.12	0.189	0.152	0.136	0.13	---	0.144	0.135	0.12	0.189	0.144	0.0224	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.000005	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Chromium	(mg/L)	0.0013	<0.0004	0.004	<0.0004	0.004	<0.001	<0.0050	<0.0050	0.0013	0.004	0.003	0.0016	8
Cobalt	(mg/L)	0.0008	0.0031	0.0031	0.0032	0.0026	0.0017	0.00157	0.001	0.0008	0.0032	0.002	0.0010	8
Copper	(mg/L)	0.0015	0.0021	0.0011	0.0007	0.0005	0.0002	<0.0010	<0.0010	0.0002	0.0021	0.001	0.0007	8
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	0.0003	<0.0002	<0.00010	<0.00010	0.0003	0.0004	0.000	0.0001	8
Mercury	(mg/L)	0.0001	<0.0001	<0.0001	<0.0001	<0.00005	0.000001	<0.00010	<0.000020	0.000001	0.0001	0.000	0.0001	8
Molybdenum	(mg/L)	0.0046	0.0148	0.0009	0.0008	0.0006	0.0005	0.00041	0.0004	0.0004	0.0148	0.003	0.0050	8
Nickel	(mg/L)	<0.0001	0.0644	0.0012	0.0055	0.0046	0.0019	0.0043	<0.0020	0.0012	0.0644	0.014	0.0249	8
Selenium	(mg/L)	0.0008	0.0006	0.0005	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	0.0005	0.0008	0.001	0.0002	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	1.03	1.54	1.46	1.46	1.3	---	---	---	1.03	1.54	1.358	0.2030	5
Thallium	(mg/L)	<0.0005	0.00006	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	0.00006	0.00006	0.000	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0012	0.0015	0.0012	0.0011	0.002	<0.001	0.00104	<0.00030	0.00104	0.002	0.001	0.0004	8
Uranium	(mg/L)	0.0032	0.0053	0.0023	0.0019	0.0014	0.0014	0.00139	0.00114	0.00114	0.0053	0.002	0.0014	8
Vanadium	(mg/L)	0.0017	0.0005	<0.0001	<0.0001	0.002	<0.001	<0.00010	<0.00010	0.0005	0.002	0.001	0.0008	8
Zinc	(mg/L)	0.004	<0.002	0.1012	<0.002	<0.003	<0.003	0.0044	0.0025	0.0025	0.1012	0.028	0.0488	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-03

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	22.5	23.47	22.5	22.45	23.36	22.54	22.82	22.32	22.32	23.47	22.7	0.4	8
Groundwater Surface Elevation	(m asl)	601.93	600.96	601.93	601.98	601.07	601.89	601.61	602.11	600.96	602.11	601.7	0.4	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	974	976	974	976	975.0	1.4	2
pH	(---)	---	---	---	---	---	---	7.14	7.08	7.08	7.14	7.1	0.0	2
Temperature	(°C)	---	---	---	---	---	---	6.6	8.9	6.6	8.9	7.8	1.6	2
Select Indicator Parameters														
Calcium	(mg/L)	106	104	109	108	98	92	104	115	92	115	104.5	7.01	8
Chloride	(mg/L)	31	35	35	36	35	35	44.3	44.2	31	44.3	36.9	4.75	8
Fluroide	(mg/L)	0.14	0.1	0.1	0.11	0.1	0.11	0.117	0.105	0.1	0.14	0.1	0.01	8
Iron	(mg/L)	3.19	4.47	4.85	4.89	<0.06	<0.06	5.23	5.55	3.19	5.55	4.7	0.82	8
Magnesium	(mg/L)	36.1	36.4	36.6	37.7	32	32	36.8	40.1	32	40.1	36.0	2.75	8
Manganese	(mg/L)	0.264	0.239	0.258	0.249	0.25	0.24	0.253	0.277	0.239	0.277	0.3	0.01	8
Potassium	(mg/L)	3.5	3	3	3	2.7	2.8	---	3.2	2.7	3.5	3.0	0.26	7
Sodium	(mg/L)	56	54	52	55	49	51	52.3	52.7	49	56	52.8	2.24	8
Bicarbonate	(mg/L)	442	445	439	440	460	430	435	433	430	460	440.5	9.3	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.009	<0.050	<0.050	0.009	0.009	0.009	N/A	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.009	<0.071	<0.071	0.009	0.009	0.009	N/A	8
Sulphate	(mg/L)	113	122	116	122	130	98	124	120	98	130	118.1	9.6	8
Dissolved Organic Carbon	(mg/L)	5	4	3	3	3	2.5	5.3	3.3	2.5	5.3	3.6	1.0	8
Electrical Conductivity	(µS/cm)	937	949	943	930	960	950	967	1,000	930	1000	954.5	21.9	8
Ion Balance	(%)	103	98.1	102	102	0.87	95	96.4	105	0.87	105	87.8	35.3	8
pH	(---)	7.4	7.8	8	8	7.7	7.57	8.03	7.98	7.4	8.03	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.0010	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	563	573	568	578	571	520	579	588	520	588	567.5	20.6	8
Total Alkalinity as $CaCO_3$	(mg/L)	362	365	360	361	380	350	357	355	350	380	361.3	8.9	8
Total Hardness as $CaCO_3$	(mg/L)	413	410	423	425	370	360	411	452	360	452	408.0	29.8	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.01	0.01	0.010	N/A	8
Antimony	(mg/L)	0.0007	0.0006	0.0006	0.0004	<0.0002	<0.0002	<0.00040	<0.00040	0.0004	0.0007	0.001	0.0001	8
Arsenic	(mg/L)	0.0012	0.0014	0.0013	0.0014	<0.001	0.0013	0.00154	0.00141	0.0012	0.00154	0.001	0.0001	8
Barium	(mg/L)	0.0744	0.0418	0.0411	0.0379	0.03	---	0.038	0.0389	0.03	0.0744	0.043	0.0143	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.00045	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00009	<0.00005	<0.00005	---	---	---	---	0.00009	0.00009	0.000	N/A	4
Boron	(mg/L)	0.128	0.119	0.109	0.115	0.11	---	0.116	0.103	0.103	0.128	0.114	0.0080	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.000005	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Chromium	(mg/L)	0.0009	<0.0004	0.0029	0.0012	0.002	<0.001	<0.0050	<0.0050	0.0009	0.0029	0.002	0.0009	8
Cobalt	(mg/L)	0.0012	0.0008	0.0008	0.0008	0.0008	0.0006	0.00076	0.00061	0.0006	0.0012	0.001	0.0002	8
Copper	(mg/L)	<0.0006	0.0008	0.0007	<0.0006	0.0002	0.0007	<0.0010	<0.0010	0.0002	0.0008	0.001	0.0003	8
Lead	(mg/L)	<0.0001	<0.0001	<0.0001	0.0005	0.0002	<0.0002	<0.00010	<0.00010	0.0002	0.0005	0.000	0.0002	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	0.00009	<0.00005	0.000001	<0.00010	<0.000020	0.000001	0.00009	0.000	0.0001	8
Molybdenum	(mg/L)	0.0008	0.0015	0.0007	0.0029	0.0012	0.0007	0.00079	0.00056	0.00056	0.0029	0.001	0.0008	8
Nickel	(mg/L)	<0.0001	0.0003	<0.0001	<0.00001	0.0042	0.001	0.0027	<0.0020	0.0003	0.0042	0.002	0.0018	8
Selenium	(mg/L)	<0.0004	0.0005	0.0005	<0.0002	<0.001	<0.0002	<0.00040	<0.00040	0.0005	0.0005	0.001	0.0000	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	0.811	0.828	0.845	0.001	0.82	---	---	---	0.001	0.845	0.661	0.3692	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	0.0007	<0.0002	<0.0002	<0.000050	<0.000050	0.0007	0.0007	0.001	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	0.882	<0.001	<0.001	---	---	0.882	0.882	0.882	N/A	6
Titanium	(mg/L)	0.001	0.0019	0.001	<0.00005	0.002	<0.001	0.00079	<0.00030	0.00079	0.002	0.001	0.0006	8
Uranium	(mg/L)	0.0007	0.0007	0.0007	0.0002	0.0006	0.0006	0.00056	0.00058	0.0002	0.0007	0.001	0.0002	8
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.001	0.001	<0.001	0.00036	<0.00010	0.00036	0.001	0.001	0.0005	8
Zinc	(mg/L)	0.003	<0.002	0.01	<0.002	<0.003	<0.003	<0.0020	<0.0020	0.003	0.01	0.007	0.0049	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	0.0005	0.0005	0.0	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-04

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	18.59	18.57	18.59	18.55	18.52	18.66	18.87	18.70	18.52	18.87	18.6	0.1	8
Groundwater Surface Elevation	(m asl)	602.2	602.22	602.2	602.24	602.27	602.13	601.92	602.1	601.92	602.27	602.2	0.1	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,213	1,230	1213	1230	1221.5	12.0	2
pH	(---)	---	---	---	---	---	---	7.14	7.12	7.12	7.14	7.1	0.0	2
Temperature	(°C)	---	---	---	---	---	---	8.2	8.1	8.1	8.2	8.2	0.1	2
Select Indicator Parameters														
Calcium	(mg/L)	142	147	147	154	140	140	152	140	140	154	145.3	5.63	8
Chloride	(mg/L)	137	157	155	190	200	150	131	125	125	200	155.6	26.93	8
Fluroide	(mg/L)	0.15	0.12	0.13	0.14	0.1	0.14	0.129	0.119	0.1	0.15	0.1	0.02	8
Iron	(mg/L)	0.173	0.104	0.005	<0.005	<0.06	<0.06	0.078	0.028	0.005	0.173	0.1	0.07	8
Magnesium	(mg/L)	37.7	40	42.7	43.6	35	37	44	41.3	35	44	40.2	3.32	8
Manganese	(mg/L)	0.152	0.053	0.13	0.009	0.016	0.03	0.258	0.114	0.009	0.258	0.1	0.09	8
Potassium	(mg/L)	9.9	9.5	10.2	10.4	10	9.4	---	8.78	8.78	10.4	9.7	0.55	7
Sodium	(mg/L)	57	59	57	68	71	63	63.4	50.7	50.7	71	61.1	6.55	8
Bicarbonate	(mg/L)	458	449	455	449	460	450	470	482	449	482	459.1	11.6	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.8	1.2	0.5	0.5	0.6	0.4	0.09	0.264	0.09	1.2	0.544	0.3	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.8	1.2	0.5	0.5	0.6	0.4	0.09	0.264	0.09	1.2	0.544	0.3	8
Sulphate	(mg/L)	81.4	87	86.2	84.5	82	74	92.1	88.9	74	92.1	84.5	5.5	8
Dissolved Organic Carbon	(mg/L)	1	5	4	3	3	2.8	3	3	1	5	3.1	1.1	8
Electrical Conductivity	(µS/cm)	1200	1280	1280	1360	1400	1200	1220	1,280	1200	1400	1277.5	72.9	8
Ion Balance	(%)	98.5	98.2	99.4	99.9	0.9	99	107	96.3	0.9	107	87.4	35.1	8
pH	(---)	7.5	7.8	7.7	7.9	7.7	7.62	8.01	7.95	7.5	8.01	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	<0.002	<0.0010	<0.0010	0.002	0.002	0.002	N/A	8
Total Dissolved Solids	(mg/L)	694	726	724	774	763	690	724	693	690	774	723.5	31.7	8
Total Alkalinity as $CaCO_3$	(mg/L)	375	368	373	368	380	370	385	395	368	395	376.8	9.5	8
Total Hardness as $CaCO_3$	(mg/L)	510	532	543	564	500	500	561	520	500	564	528.8	25.6	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	N/A	N/A	N/A	N/A	8
Antimony	(mg/L)	0.0009	0.0007	0.0008	<0.0004	<0.0002	<0.0002	<0.00040	<0.00040	0.0007	0.0009	0.001	0.0001	8
Arsenic	(mg/L)	0.0011	0.0006	0.0006	0.0008	<0.001	<0.0002	0.00117	<0.00040	0.0006	0.00117	0.001	0.0003	8
Barium	(mg/L)	0.0737	0.0809	0.764	0.085	0.08	---	0.0843	0.0832	0.0737	0.764	0.179	0.2581	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00007	<0.00005	<0.00005	---	---	---	---	0.00007	0.00007	0.000	N/A	4
Boron	(mg/L)	0.101	0.093	0.092	0.1	0.09	---	0.098	0.09	0.09	0.101	0.095	0.0047	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000024	<0.00010	<0.00010	0.000024	0.000024	0.000	N/A	8
Chromium	(mg/L)	0.0018	0.0007	0.0017	0.0047	0.001	<0.001	<0.0050	<0.0050	0.0007	0.0047	0.002	0.0016	8
Cobalt	(mg/L)	0.0007	0.0049	<0.0001	0.0001	<0.0003	<0.0003	0.00054	0.00015	0.0001	0.0049	0.001	0.0020	8
Copper	(mg/L)	0.0008	0.0012	0.0009	<0.0006	0.0006	0.0009	<0.0010	<0.0010	0.0006	0.0012	0.001	0.0002	8
Lead	(mg/L)	0.0002	<0.0001	<0.0001	<0.0001	0.0002	<0.0002	<0.00010	<0.00010	0.0002	0.0002	0.000	0.0000	8
Mercury	(mg/L)	<0.0001	0.0002	<0.0001	0.0002	<0.00005	0.000003	<0.00010	<0.000020	0.000003	0.0002	0.000	0.0001	8
Molybdenum	(mg/L)	0.0005	0.003	0.0005	0.0005	0.0006	0.0004	0.00038	0.00038	0.00038	0.003	0.001	0.0009	8
Nickel	(mg/L)	<0.0001	0.014	0.0007	0.0042	0.0052	0.0021	0.0047	<0.0020	0.0007	0.014	0.005	0.0047	8
Selenium	(mg/L)	0.0006	0.0009	0.001	0.0006	<0.001	<0.0002	0.00106	<0.00040	0.0006	0.00106	0.001	0.0002	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	0.561	0.616	0.585	0.59	0.61	---	---	---	0.561	0.616	0.592	0.0219	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	0.00024	<0.0002	<0.0002	<0.000050	<0.000050	0.00024	0.00024	0.000	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0007	0.0004	0.0003	0.0004	0.002	<0.001	0.00046	<0.00030	0.0003	0.002	0.001	0.0006	8
Uranium	(mg/L)	0.0029	0.0025	0.0028	0.0027	0.0023	0.0029	0.00284	0.00333	0.0023	0.00333	0.003	0.0003	8
Vanadium	(mg/L)	<0.0001	<0.0001	0.0022	0.0009	<0.001	<0.001	0.00072	<0.00010	0.00072	0.0022	0.001	0.0008	8
Zinc	(mg/L)	0.004	0.029	0.005	0.005	<0.003	<0.003	<0.0020	<0.0020	0.004	0.029	0.011	0.0122	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-05

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	25.32	26.77	25.7	25.52	25.34	25.61	25.92	25.58	25.32	26.77	25.7	0.5	8
Groundwater Surface Elevation	(m asl)	599.57	598.12	599.19	599.37	599.55	599.28	598.97	599.31	598.12	599.57	599.2	0.5	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	985	1,070	985	1070	1027.5	60.1	2
pH	(---)	---	---	---	---	---	---	7.08	7.06	7.06	7.08	7.1	0.0	2
Temperature	(°C)	---	---	---	---	---	---	7.6	8.3	7.6	8.3	8.0	0.5	2
Select Indicator Parameters														
Calcium	(mg/L)	96.2	98.6	107	110	100	120	120	105	96.2	120	107.1	9.16	8
Chloride	(mg/L)	15	21	22	25	22	30	30.6	30.9	15	30.9	24.6	5.65	8
Fluroide	(mg/L)	0.18	0.11	0.11	0.11	0.1	0.12	0.107	0.075	0.075	0.18	0.1	0.03	8
Iron	(mg/L)	1.14	3.31	3.48	4	<0.06	<0.06	3.39	3.82	1.14	4	3.2	1.04	8
Magnesium	(mg/L)	27.5	30.1	33.5	34.3	30	34	36.7	32.7	27.5	36.7	32.4	2.95	8
Manganese	(mg/L)	0.402	0.531	0.583	0.682	0.66	0.72	0.758	0.657	0.402	0.758	0.6	0.11	8
Potassium	(mg/L)	6.1	6.9	7.6	7.3	7.4	7.6	---	7.29	6.1	7.6	7.2	0.53	7
Sodium	(mg/L)	51	43	44	42	41	43	46.1	41.7	41	51	44.0	3.24	8
Bicarbonate	(mg/L)	403	422	421	426	440	420	428	433	403	440	424.1	10.9	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<05	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<5.0	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.007	<0.050	<0.050	0.007	0.007	0.007	N/A	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.007	<0.071	<0.071	0.007	0.007	0.007	N/A	8
Sulphate	(mg/L)	105	115	124	135	150	130	144	141	105	150	130.5	15.2	8
Dissolved Organic Carbon	(mg/L)	5	4	4	4	3	2.5	3.3	4.4	2.5	5	3.8	0.8	8
Electrical Conductivity	(µS/cm)	831	881	902	931	930	960	969	990	831	990	924.3	51.7	8
Ion Balance	(%)	103	95.4	101	98.5	0.88	100	103	91.1	0.88	103	86.6	34.9	8
pH	(---)	7.6	7.9	7.7	8.1	7.6	7.58	7.95	8.05	7.58	8.1	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	0.002	<0.001	0.003	<0.0010	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	499	522	545	563	566	570	596	572	499	596	554.1	30.9	8
Total Alkalinity as $CaCO_3$	(mg/L)	330	346	345	349	360	350	351	355	330	360	348.3	8.8	8
Total Hardness as $CaCO_3$	(mg/L)	353	370	405	416	380	430	451	397	353	451	400.3	32.3	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	N/A	N/A	N/A	N/A	8
Antimony	(mg/L)	0.0008	0.0005	0.0007	0.0005	<0.0002	<0.0002	0.00052	<0.00040	0.0005	0.0008	0.001	0.0001	8
Arsenic	(mg/L)	0.0035	0.0081	0.0051	0.0018	0.001	0.0014	0.0017	0.00159	0.001	0.0081	0.003	0.0025	8
Barium	(mg/L)	0.0618	0.0564	0.454	0.0455	0.04	---	0.0478	0.0552	0.04	0.454	0.109	0.1525	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00006	<0.00005	<0.00005	---	---	---	---	0.00006	0.00006	0.000	N/A	4
Boron	(mg/L)	0.14	0.116	0.081	0.052	0.06	---	0.064	0.052	0.052	0.14	0.081	0.0344	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.000005	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Chromium	(mg/L)	0.0009	<0.0004	0.0016	0.0005	0.003	<0.001	<0.0050	<0.0050	0.0005	0.003	0.002	0.0011	8
Cobalt	(mg/L)	0.0008	0.001	0.0007	0.0008	0.0007	0.0007	0.00082	0.00075	0.0007	0.001	0.001	0.0001	8
Copper	(mg/L)	<0.0006	0.0007	0.0006	0.0009	<0.0002	0.0008	<0.0010	<0.0010	0.0006	0.0009	0.001	0.0001	8
Lead	(mg/L)	0.0002	<0.0001	<0.0001	<0.0001	0.0002	<0.0002	<0.00010	<0.00010	0.0002	0.0002	0.000	0.0000	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	0.000001	<0.00010	<0.000020	0.000001	0.000001	0.000	N/A	8
Molybdenum	(mg/L)	0.0022	0.0029	0.0013	0.0006	0.0005	0.0006	0.00063	0.00042	0.00042	0.0029	0.001	0.0009	8
Nickel	(mg/L)	<0.0001	0.0022	0.0002	0.0034	0.0029	0.0014	0.0039	<0.0020	0.0002	0.0039	0.002	0.0014	8
Selenium	(mg/L)	0.0004	0.0004	<0.0004	0.0005	<0.001	<0.0002	0.00086	<0.00040	0.0004	0.00086	0.001	0.0002	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	0.71	0.667	0.659	0.684	0.63	---	---	---	0.63	0.71	0.670	0.0297	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0008	0.0009	0.0005	0.0006	0.002	<0.001	0.00088	<0.00030	0.0005	0.002	0.001	0.0005	8
Uranium	(mg/L)	0.0014	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007	0.00066	0.00066	0.0014	0.001	0.0002	8
Vanadium	(mg/L)	0.0002	0.0001	0.0008	<0.0001	0.001	<0.001	0.00017	<0.00010	0.0001	0.001	0.000	0.0004	8
Zinc	(mg/L)	0.003	<0.002	0.004	0.005	<0.003	<0.003	0.0025	<0.0020	0.0025	0.005	0.004	0.0011	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	0.0005	0.0005	0.0	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-06

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	32.17	32.17	32.76	32.13	31.97	31.99	32.24	32.10	31.97	32.76	32.2	0.2	8
Groundwater Surface Elevation	(m asl)	598.11	598.11	597.52	598.15	598.31	598.29	598.04	598.18	597.52	598.31	598.1	0.2	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,773	1,762	1762	1773	1767.5	7.8	2
pH	(---)	---	---	---	---	---	---	7.21	7.22	7.21	7.22	7.2	0.0	2
Temperature	(°C)	---	---	---	---	---	---	5.7	11.1	5.7	11.1	8.4	3.8	2
Select Indicator Parameters														
Calcium	(mg/L)	171	148	168	157	160	180	156	164	148	180	163.0	9.99	8
Chloride	(mg/L)	4	13	10	10	3	6	8.45	3.45	3	13	7.2	3.67	8
Fluroide	(mg/L)	0.18	0.15	0.14	0.17	0.2	0.14	0.173	0.129	0.129	0.2	0.2	0.02	8
Iron	(mg/L)	2.92	2.96	3.58	4.5	<0.06	5.7	5.38	5.55	2.92	5.7	4.4	1.22	8
Magnesium	(mg/L)	58.9	52	57.7	55.3	54	62	57.1	60.4	52	62	57.2	3.32	8
Manganese	(mg/L)	1.32	0.943	1.01	1.28	1.5	1.7	1.39	1.64	0.943	1.7	1.3	0.27	8
Potassium	(mg/L)	6.1	5	5.5	4.8	5	5.5	---	5.02	4.8	6.1	5.3	0.45	7
Sodium	(mg/L)	138	211	190	182	140	150	194	123	123	211	166.0	32.08	8
Bicarbonate	(mg/L)	560	641	633	637	630	590	626	603	560	641	615.0	28.3	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.004	<0.050	<0.050	0.004	0.004	0.004	N/A	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.2	0.004	<0.071	<0.071	0.004	0.004	0.004	N/A	8
Sulphate	(mg/L)	451	471	482	478	560	420	520	501	420	560	485.4	42.7	8
Dissolved Organic Carbon	(mg/L)	5	8	7	7	6	5.1	6.7	8	5	8	6.6	1.2	8
Electrical Conductivity	(µS/cm)	1580	1780	1700	1760	1700	1700	1770	1,780	1580	1780	1721.3	67.7	8
Ion Balance	(%)	105	101	104	99.4	0.85	110	98.8	91.3	0.85	110	88.8	35.9	8
pH	(---)	7.5	8	7.7	7.9	7.7	7.47	8.06	7.96	7.47	8.06	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.0010	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	1,100	1,220	1,220	1,200	1,230	1,100	1,250	1,150	1100	1250	1183.8	59.3	8
Total Alkalinity as $CaCO_3$	(mg/L)	459	526	519	522	510	490	513	494	459	526	504.1	22.3	8
Total Hardness as $CaCO_3$	(mg/L)	670	584	657	620	620	710	625	658	584	710	643.0	38.7	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	0.0288	0.01	0.0288	0.019	0.0133	8
Antimony	(mg/L)	0.0009	0.0005	0.0009	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	0.0005	0.0009	0.001	0.0002	8
Arsenic	(mg/L)	0.0042	0.0038	0.0034	0.0042	0.003	0.005	0.00507	0.0057	0.003	0.0057	0.004	0.0009	8
Barium	(mg/L)	0.071	0.0557	0.0666	0.043	0.03	---	0.0353	0.0309	0.03	0.071	0.048	0.0170	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00006	<0.00005	<0.00005	---	---	---	---	0.00006	0.00006	0.000	N/A	4
Boron	(mg/L)	0.148	0.16	0.149	0.159	0.13	---	0.15	0.138	0.13	0.16	0.148	0.0108	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000009	<0.00010	<0.00010	0.000009	0.000009	0.000	N/A	8
Chromium	(mg/L)	0.0035	<0.0004	0.0015	0.0014	0.002	<0.001	<0.0050	<0.0050	0.0014	0.0035	0.002	0.0010	8
Cobalt	(mg/L)	0.0012	0.0012	0.0007	0.0009	0.0008	0.0004	0.00052	0.00036	0.00036	0.0012	0.001	0.0003	8
Copper	(mg/L)	0.0011	0.0012	0.0014	0.0014	0.0011	<0.0002	0.0012	<0.0010	0.0011	0.0014	0.001	0.0001	8
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	0.0002	<0.0002	<0.00010	<0.00010	0.0002	0.0004	0.000	0.0001	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.000001	<0.00010	<0.000020	N/A	N/A	N/A	N/A	8
Molybdenum	(mg/L)	0.0014	0.0015	0.0014	0.0016	0.0012	0.001	0.00094	0.0008	0.0008	0.0016	0.001	0.0003	8
Nickel	(mg/L)	<0.0001	0.0004	<0.0001	0.006	0.0052	0.0015	0.0039	<0.0020	0.0004	0.006	0.003	0.0024	8
Selenium	(mg/L)	0.0005	0.0005	0.0007	<0.0004	<0.001	<0.0002	0.00041	<0.00040	0.00041	0.0007	0.001	0.0001	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.00021	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	1.2	1.26	1.28	1.42	1.4	---	---	---	1.2	1.42	1.312	0.0944	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0008	0.0015	0.001	0.0014	0.002	<0.001	0.00125	0.00063	0.00063	0.002	0.001	0.0005	8
Uranium	(mg/L)	0.0023	0.0015	0.0016	0.0016	0.0018	0.0017	0.00146	0.0018	0.00146	0.0023	0.002	0.0003	8
Vanadium	(mg/L)	0.0002	0.0001	<0.001	<0.0001	0.001	<0.001	0.00016	0.00016	0.0001	0.001	0.000	0.0004	8
Zinc	(mg/L)	0.004	<0.002	0.008	0.003	<0.003	<0.003	0.0063	<0.0020	0.003	0.008	0.005	0.0023	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-07

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	July 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation															
Depth To Groundwater	(m btoc)	33.98	34.23	34.6	33.97	33.78	34	34.32	34.43	33.80	33.78	34.6	34.1	0.3	9
Groundwater Surface Elevation	(m asl)	597.03	596.78	596.41	597.04	597.23	597.01	596.69	596.58	597.21	596.41	597.23	596.9	0.3	9
Field-Measured Parameters															
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	2,640	---	2,680	2640	2680	2660.0	28.3	2
pH	(---)	---	---	---	---	---	---	6.91	---	7.11	6.91	7.11	7.0	0.1	2
Temperature	(°C)	---	---	---	---	---	---	7.2	---	7.2	7.2	7.2	7.2	0.0	2
Select Indicator Parameters															
Calcium	(mg/L)	287	270	284	257	220	330	262	---	256	220	330	270.8	31.6	8
Chloride	(mg/L)	13	16	15	12	9	18	13.2	---	11.8	9	18	13.5	2.8	8
Fluroide	(mg/L)	0.11	0.08	0.07	0.09	0.1	0.08	0.135	---	0.128	0.07	0.135	0.10	0.02	8
Iron	(mg/L)	10.4	10.9	<0.005	10.9	<0.06	14	12.5	---	11.7	10.4	14	11.7	1.3	8
Magnesium	(mg/L)	100	94.8	96.4	89.8	72	110	93.5	---	87.9	72	110	93.1	10.9	8
Manganese	(mg/L)	1.88	1.83	1.86	1.78	1.6	2.3	1.9	---	1.84	1.6	2.3	1.9	0.2	8
Potassium	(mg/L)	6.6	5.5	6.2	4.6	5.1	6.6	---	---	5.55	4.6	6.6	5.7	0.8	7
Sodium	(mg/L)	287	268	269	248	230	320	274	---	245	230	320	267.6	28.0	8
Bicarbonate	(mg/L)	664	666	661	641	660	730	657	---	659	641	730	667.3	26.5	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	---	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	---	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	---	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	0.1	<0.1	<0.2	0.004	<0.050	---	<0.050	0.004	0.1	0.1	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	0.1	<0.1	<0.2	0.004	<0.071	---	<0.071	0.004	0.1	0.1	0.1	8
Sulphate	(mg/L)	1,130	1,010	1,010	940	1,000	1,200	1,040	---	1,020	940	1200	1043.8	82.3	8
Dissolved Organic Carbon	(mg/L)	5	6	6	6	6	6.6	5.8	---	6.3	5	6.6	6.0	0.5	8
Electrical Conductivity	(µS/cm)	2680	2670	2530	2290	2500	3000	2600	---	2670	2290	3000	2617.5	201.7	8
Ion Balance	(%)	102	102	105	103	0.84	110	100	---	95.2	0.84	110	89.8	36.2	8
pH	(---)	7.5	7.7	7.5	7.6	7.5	7.19	7.9	---	7.98	7.19	7.98	7.6	0.3	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.0010	---	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	2,150	1,990	2,010	1,870	1,890	2,400	2,010	---	1,950	1870	2400	2033.8	171.2	8
Total Alkalinity as $CaCO_3$	(mg/L)	544	546	542	526	540	600	538	---	540	526	600	547.0	22.2	8
Total Hardness as $CaCO_3$	(mg/L)	1130	1060	1110	1010	850	1300	1040	---	1000	850	1300	1062.5	128.5	8
Dissolved Metals Parameters															
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	<0.0050	N/A	N/A	N/A	N/A	9
Antimony	(mg/L)	0.0008	0.0007	0.0007	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	<0.00040	0.0005	0.0008	0.001	0.0001	9
Arsenic	(mg/L)	0.0017	0.0019	0.0022	0.0027	0.001	0.0021	0.00361	0.0057	0.00333	0.001	0.0057	0.003	0.001	9
Barium	(mg/L)	0.0733	0.053	0.0543	0.0596	0.04	---	0.049	0.0954	0.0483	0.04	0.0954	0.059	0.018	8
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	<0.00050	N/A	N/A	N/A	N/A	9
Bismuth	(mg/L)	<0.00005	0.00005	<0.00005	<0.00005	---	---	---	---	---	0.00005	0.00005	0.00005	N/A	4
Boron	(mg/L)	0.366	0.311	0.312	0.289	0.26	---	0.279	0.215	0.262	0.215	0.366	0.287	0.045	8
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000016	<0.00010	<0.00010	<0.00010	0.000016	0.000016	0.00002	N/A	9
Chromium	(mg/L)	0.0017	<0.0004	0.0018	0.0011	0.004	<0.001	<0.0050	<0.0050	<0.0050	0.0011	0.004	0.002	0.001	9
Cobalt	(mg/L)	0.0026	0.002	0.0012	0.0014	0.0013	0.0013	0.00128	0.00116	0.00092	0.00092	0.0026	0.001	0.001	9
Copper	(mg/L)	0.0024	0.0018	0.0023	0.0015	0.0016	0.0007	0.0014	<0.0010	<0.0010	0.0007	0.0024	0.002	0.001	9
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	0.0003	<0.0002	<0.00010	<0.00010	<0.00010	0.0003	0.0004	0.0004	0.0001	9
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.000001	<0.00010	<0.000020	<0.000020	N/A	N/A	N/A	N/A	9
Molybdenum	(mg/L)	0.001	0.001	0.0008	0.0012	0.0011	0.0004	0.00097	0.0151	0.000781	0.0004	0.0151	0.002	0.0047	9
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.0056	0.0059	0.0024	0.0056	0.0021	<0.0020	0.0021	0.0059	0.004	0.002	9
Selenium	(mg/L)	0.0008	<0.0004	0.0007	0.0008	<0.001	<0.0002	0.00127	<0.00040	<0.00040	0.0007	0.00127	0.001	0.0003	9
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	N/A	N/A	N/A	N/A	9
Strontium	(mg/L)	2.49	2.45	2.58	2.49	2.2	---	---	---	---	2.2	2.58	2.442	0.143	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	0.000071	<0.000050	0.000071	0.000071	0.000	N/A	9
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0012	0.0009	0.001	0.0011	0.002	<0.001	0.00109	0.0003	<0.00030	0.0003	0.002	0.001	0.0005	9
Uranium	(mg/L)	0.0018	0.0017	0.0017	0.0016	0.0014	0.0016	0.00156	0.00138	0.00152	0.00138	0.0018	0.002	0.0001	9
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	0.002	<0.001	<0.00010	<0.00010	<0.00010	0.002	0.002	0.002	N/A	9
Zinc	(mg/L)	0.006	<0.002	0.006	0.002	0.003	<0.003	0.0057	0.005	<0.0030	0.002	0.006	0.005	0.002	9
Petroleum Hydrocarbon Parameters															
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	N/A	N/A	N/A	N/A	9
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	<0.00075	N/A	N/A	N/A	N/A	9
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	N/A	N/A	N/A	N/A	9
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	<0.001	N/A	N/A	N/A	N/A	9
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	N/A	N/A	N/A	N/A	9
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	N/A	N/A	N/A	N/A	9
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	<0.25	N/A	N/A	N/A	N/A	9

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***
4. ***Routine Parameters from Spring 2011 have been determined to be anomlous and have not been included in the statistical analysis.***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-08

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	27.74	27.74	27.58	27.72	27.57	27.63	27.83	27.72	27.57	27.83	27.7	0.1	8
Groundwater Surface Elevation	(m asl)	598.7	598.7	598.86	598.72	598.87	598.81	598.61	598.72	598.61	598.87	598.7	0.1	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,359	1,378	1359	1378	1368.5	13.4	2
pH	(---)	---	---	---	---	---	---	7.09	7.41	7.09	7.41	7.3	0.2	2
Temperature	(°C)	---	---	---	---	---	---	5.4	9.0	5.4	9	7.2	2.5	2
Select Indicator Parameters														
Calcium	(mg/L)	147	133	161	150	130	150	146	136	130	161	144.1	10.38	8
Chloride	(mg/L)	3	4	3	2	2	3	1.43	0.97	0.97	4	2.4	1.00	8
Fluroide	(mg/L)	0.13	0.11	0.09	0.08	0.1	0.11	0.13	0.082	0.08	0.13	0.1	0.02	8
Iron	(mg/L)	5.66	5.16	6.97	7.29	<0.06	<0.06	7.22	5.41	5.16	7.29	6.3	0.98	8
Magnesium	(mg/L)	45	37.4	44.2	42.9	36	40	43.2	38.3	36	45	40.9	3.40	8
Manganese	(mg/L)	0.474	0.384	0.481	0.454	0.44	0.45	0.47	0.411	0.384	0.481	0.4	0.03	8
Potassium	(mg/L)	6	5.2	6.1	5	5.4	5.6	---	5.12	5	6.1	5.5	0.43	7
Sodium	(mg/L)	137	112	132	115	120	110	122	98	98	137	118.3	12.45	8
Bicarbonate	(mg/L)	593	549	594	583	630	560	558	565	549	630	579.0	26.6	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.007	<0.050	<0.050	0.007	0.1	0.054	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.007	<0.071	<0.071	0.007	0.1	0.054	0.1	8
Sulphate	(mg/L)	369	300	341	316	370	300	333	320	300	370	331.1	27.6	8
Dissolved Organic Carbon	(mg/L)	5	6	6	7	5	5.3	5.3	10.3	5	10.3	6.2	1.8	8
Electrical Conductivity	(µS/cm)	1470	1310	1240	1390	1400	1400	1360	1400	1240	1470	1371.3	69.4	8
Ion Balance	(%)	98.8	95.9	104	100	0.84	100	101	89.8	0.84	104	86.3	34.8	8
pH	(---)	7.7	7.5	7.7	7.9	7.7	7.62	8.04	7.95	7.5	8.04	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.0010	0.0016	0.001	0.002	0.002	0.001	8
Total Dissolved Solids	(mg/L)	999	862	980	918	977	880	927	876	862	999	927.4	52.9	8
Total Alkalinity as $CaCO_3$	(mg/L)	486	450	487	478	520	450	458	463	450	520	474.0	23.8	8
Total Hardness as $CaCO_3$	(mg/L)	552	486	584	551	480	530	542	497	480	584	527.8	36.8	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	N/A	N/A	N/A	N/A	8
Antimony	(mg/L)	0.0006	0.0005	0.0006	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	0.0005	0.0006	0.001	0.0001	8
Arsenic	(mg/L)	0.0042	0.0046	0.0044	0.0052	0.002	0.0062	0.00672	0.00667	0.002	0.00672	0.005	0.0016	8
Barium	(mg/L)	0.084	0.115	0.0629	0.0519	0.03	---	0.0675	0.0614	0.03	0.115	0.068	0.0266	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00009	<0.00005	<0.00005	---	---	---	---	0.00009	0.00009	0.000	N/A	4
Boron	(mg/L)	0.244	0.184	0.206	0.176	0.17	---	0.179	0.18	0.17	0.244	0.191	0.0259	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.000005	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Chromium	(mg/L)	0.0011	0.0005	0.0012	0.0016	0.003	<0.001	<0.0050	<0.0050	0.0005	0.003	0.001	0.0009	8
Cobalt	(mg/L)	0.0008	0.0009	0.0004	0.0005	0.0004	<0.0003	0.00035	0.00036	0.00035	0.0009	0.001	0.0002	8
Copper	(mg/L)	0.001	0.001	0.0011	0.0012	0.0006	0.0016	<0.0010	<0.0010	0.0006	0.0016	0.001	0.0003	8
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	0.0002	<0.0002	<0.00010	<0.00010	0.0002	0.0004	0.000	0.0001	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.000001	<0.00010	<0.000020	N/A	N/A	N/A	N/A	8
Molybdenum	(mg/L)	0.0012	0.0025	0.0011	0.0016	0.0014	0.002	0.00168	0.00154	0.0011	0.0025	0.002	0.0005	8
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.0031	0.0036	0.0017	0.0027	0.0025	0.0017	0.0036	0.003	0.0007	8
Selenium	(mg/L)	0.0004	0.0005	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	0.00159	0.0004	0.00159	0.001	0.0007	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	1.4	1.27	1.45	1.59	1.4	---	---	---	1.27	1.59	1.422	0.1152	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0008	0.001	0.0008	0.0012	0.002	<0.001	0.00094	0.00144	0.0008	0.002	0.001	0.0004	8
Uranium	(mg/L)	0.0011	0.0015	0.0009	0.0008	0.0008	0.0007	0.00072	0.0008	0.0007	0.0015	0.001	0.0003	8
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	0.001	<0.001	0.00017	0.00018	0.00017	0.001	0.000	0.0004	8
Zinc	(mg/L)	0.003	<0.002	0.006	0.004	<0.003	<0.003	0.0163	0.0116	0.003	0.0163	0.008	0.0056	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-09

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	28.41	28.48	28.27	28.35	28.34	28.27	28.61	28.25	28.25	28.61	28.4	0.1	8
Groundwater Surface Elevation	(m asl)	596.32	596.25	596.46	596.38	596.39	596.46	596.12	596.48	596.12	596.48	596.4	0.1	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,538	1,548	1538	1548	1543.0	7.1	2
pH	(---)	---	---	---	---	---	---	7.35	7.49	7.35	7.49	7.4	0.1	2
Temperature	(°C)	---	---	---	---	---	---	6.8	9.1	6.8	9.1	8.0	1.6	2
Select Indicator Parameters														
Calcium	(mg/L)	71.6	92.6	98.1	94.9	83	97	93.1	87.4	71.6	98.1	89.7	8.85	8
Chloride	(mg/L)	5	7	7	6	4	6	5.57	5.84	4	7	5.8	0.99	8
Fluroide	(mg/L)	0.29	0.22	0.23	0.21	0.2	0.22	0.251	<0.050	0.2	0.29	0.2	0.03	8
Iron	(mg/L)	1.11	1.4	1.44	1.74	<0.06	1.9	2.04	1.46	1.11	2.04	1.6	0.32	8
Magnesium	(mg/L)	26	27.3	27.7	27.6	22	27	27.8	25.2	22	27.8	26.3	1.97	8
Manganese	(mg/L)	0.714	0.752	0.797	0.785	0.77	0.86	0.828	0.754	0.714	0.86	0.8	0.05	8
Potassium	(mg/L)	4.2	3.9	3.9	3.3	3.5	4.1	---	4.09	3.3	4.2	3.9	0.33	7
Sodium	(mg/L)	226	227	231	231	230	240	240	212	212	240	229.6	8.86	8
Bicarbonate	(mg/L)	626	640	644	656	670	630	639	646	626	670	643.9	14.1	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.050	<0.050	0.005	0.1	0.053	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.071	<0.071	0.005	0.1	0.053	0.1	8
Sulphate	(mg/L)	313	312	316	322	350	330	342	325	312	350	326.3	13.8	8
Dissolved Organic Carbon	(mg/L)	5	6	8	7	9	5.5	5.6	8	5	9	6.8	1.5	8
Electrical Conductivity	(µS/cm)	1520	1550	1520	1530	1500	1500	1540	1580	1500	1580	1530.0	26.7	8
Ion Balance	(%)	93.2	98	99.9	97.9	0.86	100	98.4	90	0.86	100	84.8	34.1	8
pH	(---)	7.9	8.1	7.9	8.1	8	7.73	8.17	8.17	7.73	8.17	8.0	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.0010	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	954	984	1,000	1,010	1,020	1,000	1,030	978	954	1030	997.0	24.4	8
Total Alkalinity as $CaCO_3$	(mg/L)	513	524	528	538	550	520	524	530	513	550	528.4	11.4	8
Total Hardness as $CaCO_3$	(mg/L)	286	344	359	351	300	350	347	322	286	359	332.4	26.8	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	0.14	0.02	<0.01	<0.01	<0.001	0.1	<0.0050	<0.0050	0.02	0.14	0.087	0.0611	8
Antimony	(mg/L)	0.0007	0.0006	0.0006	0.0004	<0.0002	<0.0002	<0.00040	<0.00040	0.0004	0.0007	0.001	0.0001	8
Arsenic	(mg/L)	0.0019	0.0018	0.0018	0.002	0.002	0.0023	0.00255	0.0028	0.0018	0.0028	0.002	0.0004	8
Barium	(mg/L)	0.0608	0.052	0.0389	0.0302	0.02	---	0.025	0.0294	0.02	0.0608	0.037	0.0149	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	<0.0001	<0.00005	<0.00005	---	---	---	---	N/A	N/A	N/A	N/A	4
Boron	(mg/L)	0.339	0.294	0.289	0.26	0.26	---	0.267	0.255	0.255	0.339	0.281	0.0299	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000008	<0.00010	<0.00010	0.000008	0.000008	0.000	N/A	8
Chromium	(mg/L)	0.0016	0.0006	0.0013	0.0016	<0.001	<0.001	<0.0050	<0.0050	0.0006	0.0016	0.001	0.0005	8
Cobalt	(mg/L)	0.0011	0.0023	0.0011	0.0009	0.0009	0.0008	0.00085	0.00128	0.0008	0.0023	0.001	0.0005	8
Copper	(mg/L)	0.001	0.0011	0.0012	0.0008	0.0008	0.0003	<0.0010	<0.0010	0.0003	0.0012	0.001	0.0003	8
Lead	(mg/L)	0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	0.0001	0.0001	0.000	N/A	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.000001	<0.00010	<0.000020	N/A	N/A	N/A	N/A	8
Molybdenum	(mg/L)	0.0019	0.0038	0.0015	0.0017	0.0018	0.0016	0.00158	0.00156	0.0015	0.0038	0.002	0.0008	8
Nickel	(mg/L)	0.0002	0.0087	<0.0001	0.003	0.0023	0.0017	0.0027	<0.0020	0.0002	0.0087	0.003	0.0029	8
Selenium	(mg/L)	<0.0004	0.0005	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	0.0005	0.0005	0.001	N/A	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	0.00013	0.00013	0.00013	0.000	N/A	8
Strontium	(mg/L)	0.843	0.869	0.861	0.961	0.81	---	---	---	0.81	0.961	0.869	0.0563	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0058	0.0038	0.0008	0.0009	0.002	0.005	0.00078	<0.00030	0.00078	0.0058	0.003	0.0021	8
Uranium	(mg/L)	0.0019	0.0015	0.0014	0.0014	0.0014	0.0012	0.00121	0.00132	0.0012	0.0019	0.001	0.0002	8
Vanadium	(mg/L)	0.0005	0.0002	<0.0001	0.0005	<0.001	<0.001	<0.00010	0.00012	0.00012	0.0005	0.000	0.0002	8
Zinc	(mg/L)	0.003	<0.002	0.005	<0.002	0.003	<0.003	<0.0020	0.002	0.002	0.005	0.003	0.0013	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	0.3	<0.25	<0.25	0.3	0.3	0.3	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-10

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	26.89	26.9	26.72	26.87	26.74	26.72	26.93	26.70	26.7	26.93	26.8	0.1	8
Groundwater Surface Elevation	(m asl)	597.78	597.77	597.95	597.8	597.93	597.95	597.74	597.97	597.74	597.97	597.9	0.1	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---		1,192	1192	1192	1192.0	N/A	1
pH	(---)	---	---	---	---	---	---		7.36	7.36	7.36	7.4	N/A	1
Temperature	(°C)	---	---	---	---	---	---		9.1	9.1	9.1	9.1	N/A	1
Select Indicator Parameters														
Calcium	(mg/L)	131	129	139	132	120	140	139	113	113	140	130.4	9.68	8
Chloride	(mg/L)	<1	3	2	2	<1	2	0.73	1.19	0.73	3	1.8	0.78	8
Fluroide	(mg/L)	0.18	0.12	0.13	0.12	0.2	0.14	0.169	<0.050	0.12	0.2	0.2	0.03	8
Iron	(mg/L)	5.29	5.49	5.89	5.93	<0.06	5.9	6.8	3.89	3.89	6.8	5.6	0.89	8
Magnesium	(mg/L)	36.1	35.2	37.8	36.9	29	36	39.1	30.2	29	39.1	35.0	3.58	8
Manganese	(mg/L)	0.639	0.642	0.67	0.656	0.64	0.71	0.735	0.566	0.566	0.735	0.7	0.05	8
Potassium	(mg/L)	5.3	5	5.6	4.7	4.8	5.6	---	5.58	4.7	5.6	5.2	0.39	7
Sodium	(mg/L)	117	108	119	110	110	120	124	105	105	124	114.1	6.75	8
Bicarbonate	(mg/L)	628	634	641	651	660	620	633	607	607	660	634.3	16.8	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.050	<0.050	0.005	0.1	0.053	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.071	<0.071	0.005	0.1	0.053	0.1	8
Sulphate	(mg/L)	221	222	212	208	230	190	227	206	190	230	214.5	13.2	8
Dissolved Organic Carbon	(mg/L)	5	6	6	5	5	4.7	5.1	6.7	4.7	6.7	5.4	0.7	8
Electrical Conductivity	(µS/cm)	1270	1260	1120	1270	1300	1300	1270	1260	1120	1300	1256.3	57.3	8
Ion Balance	(%)	99.7	93.8	103	97.2	0.84	110	104	89.9	0.84	110	87.3	35.5	8
pH	(---)	7.7	7.5	7.7	8	7.8	7.51	8.07	8.04	7.5	8.07	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.0010	0.0018	0.0018	0.002	0.002	0.000	8
Total Dissolved Solids	(mg/L)	819	814	831	814	822	800	847	759	759	847	813.3	25.9	8
Total Alkalinity as $CaCO_3$	(mg/L)	514	520	525	533	540	510	519	497	497	540	519.8	13.4	8
Total Hardness as $CaCO_3$	(mg/L)	476	467	503	482	410	490	508	407	407	508	467.9	39.0	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	N/A	N/A	N/A	N/A	8
Antimony	(mg/L)	0.0007	0.0006	0.0006	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	0.0005	0.0007	0.001	0.0001	8
Arsenic	(mg/L)	0.003	0.0037	0.0036	0.0039	0.002	0.0044	0.00459	0.00287	0.002	0.00459	0.004	0.0009	8
Barium	(mg/L)	0.0296	0.0331	0.0319	0.0291	0.02	---	0.029	0.0321	0.02	0.0331	0.029	0.0044	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	<0.0001	<0.00005	<0.00005	---	---	---	---	N/A	N/A	N/A	N/A	4
Boron	(mg/L)	0.209	0.202	0.187	0.168	0.16	---	0.177	0.17	0.16	0.209	0.182	0.0183	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000007	<0.00010	<0.00010	0.000007	0.000007	0.000	N/A	8
Chromium	(mg/L)	0.0012	<0.0004	0.0011	0.0015	<0.001	<0.001	<0.0050	<0.0050	0.0011	0.0015	0.001	0.0002	8
Cobalt	(mg/L)	0.0003	0.0005	0.0003	0.0004	0.0005	<0.0003	0.00044	0.00031	0.0003	0.0005	0.000	0.0001	8
Copper	(mg/L)	0.0007	0.0009	0.0009	0.0008	0.0006	0.0006	0.0015	<0.0010	0.0006	0.0015	0.001	0.0003	8
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	0.0004	0.0004	0.000	N/A	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.000001	<0.00010	<0.000020	N/A	N/A	N/A	N/A	8
Molybdenum	(mg/L)	0.0009	0.001	0.0009	0.0009	0.0011	0.0009	0.00097	0.00481	0.0009	0.00481	0.001	0.0014	8
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.003	0.0029	0.001	0.0029	<0.0020	0.001	0.003	0.002	0.0010	8
Selenium	(mg/L)	<0.0004	0.0006	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	0.0006	0.0006	0.001	N/A	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	1.29	1.43	1.41	1.55	1.3	---	---	---	1.29	1.55	1.396	0.1067	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0008	0.0008	0.0007	0.0007	0.002	<0.001	0.00083	<0.00030	0.0007	0.002	0.001	0.0005	8
Uranium	(mg/L)	0.0019	0.0015	0.0014	0.0013	0.0014	0.0011	0.00115	0.00133	0.0011	0.0019	0.001	0.0002	8
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.00010	0.00021	0.00021	0.0004	0.000	0.0001	8
Zinc	(mg/L)	0.003	<0.002	0.009	0.015	<0.003	<0.003	0.0023	0.003	0.0023	0.015	0.006	0.0055	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-11

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	30.6	30.41	30.34	30.38	30.4	30.35	30.64	30.46	30.34	30.64	30.4	0.1	8
Groundwater Surface Elevation	(m asl)	594.56	594.75	594.82	594.78	594.76	594.81	594.52	594.7	594.52	594.82	594.7	0.1	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,303	1,341	1303	1341	1322.0	26.9	2
pH	(---)	---	---	---	---	---	---	7.06	7.42	7.06	7.42	7.2	0.3	2
Temperature	(°C)	---	---	---	---	---	---	7.2	6.9	6.9	7.2	7.1	0.2	2
Select Indicator Parameters														
Calcium	(mg/L)	150	140	153	143	130	150	144	148	130	153	144.8	7.34	8
Chloride	(mg/L)	8	16	11	8	10	10	15.2	9.69	8	16	11.0	3.03	8
Fluroide	(mg/L)	0.14	0.09	0.09	0.09	0.1	0.11	0.132	<0.050	0.09	0.14	0.1	0.02	8
Iron	(mg/L)	6.89	6.95	7.23	7.15	<0.06	7	7.61	6.99	6.89	7.61	7.1	0.25	8
Magnesium	(mg/L)	45.8	42.5	45.7	45.3	38	45	45.9	46.4	38	46.4	44.3	2.82	8
Manganese	(mg/L)	0.668	0.628	0.659	0.632	0.61	0.67	0.663	0.687	0.61	0.687	0.7	0.03	8
Potassium	(mg/L)	4.9	4.5	4.8	3.9	4.3	4.9	---	5.36	3.9	5.36	4.7	0.48	7
Sodium	(mg/L)	92	85	92	88	87	91	98.1	96	85	98.1	91.1	4.44	8
Bicarbonate	(mg/L)	642	654	672	662	680	640	650	653	640	680	656.6	14.0	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.003	<0.050	<0.050	0.003	0.1	0.052	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.003	<0.071	<0.071	0.003	0.1	0.052	0.1	8
Sulphate	(mg/L)	196	199	194	193	210	170	212	203	170	212	197.1	13.0	8
Dissolved Organic Carbon	(mg/L)	15	7	7	8	6	5.5	6	6.8	5.5	15	7.7	3.1	8
Electrical Conductivity	(µS/cm)	1270	1270	1100	1280	1300	1300	1290	1320	1100	1320	1266.3	69.3	8
Ion Balance	(%)	104	93.4	101	98.6	0.87	110	99.1	102	0.87	110	88.6	35.8	8
pH	(---)	7.7	7.4	7.7	8	7.7	7.51	8.04	8	7.4	8.04	7.8	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.004	<0.0010	<0.0010	0.002	0.004	0.003	0.001	8
Total Dissolved Solids	(mg/L)	813	809	831	806	810	800	840	830	800	840	817.4	14.3	8
Total Alkalinity as $CaCO_3$	(mg/L)	526	536	551	542	560	530	533	536	526	560	539.3	11.3	8
Total Hardness as $CaCO_3$	(mg/L)	563	525	570	544	480	560	549	561	480	570	544.0	29.4	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	0.02	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.02	0.02	0.020	N/A	8
Antimony	(mg/L)	0.0008	0.0006	0.0006	0.0004	<0.0002	<0.0002	<0.00040	<0.00040	0.0004	0.0008	0.001	0.0002	8
Arsenic	(mg/L)	0.0022	0.0025	0.0022	0.0023	<0.001	0.0024	0.00259	0.00239	0.0022	0.00259	0.002	0.0001	8
Barium	(mg/L)	0.0494	0.0466	0.044	0.0377	0.03	---	0.0396	0.0423	0.03	0.0494	0.041	0.0064	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00008	<0.00005	<0.00005	---	---	---	---	0.00008	0.00008	0.000	N/A	4
Boron	(mg/L)	0.189	0.227	0.205	0.186	0.18	---	0.189	0.199	0.18	0.227	0.196	0.0158	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000009	<0.00010	<0.00010	0.000009	0.000009	0.000	N/A	8
Chromium	(mg/L)	0.0011	0.0006	0.0013	0.0016	<0.001	<0.001	<0.0050	<0.0050	0.0006	0.0016	0.001	0.0004	8
Cobalt	(mg/L)	0.0006	0.0007	0.0003	0.0004	0.0006	0.0004	0.00047	0.00047	0.0003	0.0007	0.000	0.0001	8
Copper	(mg/L)	<0.0006	0.0009	0.0009	<0.0006	0.0008	0.0007	<0.0010	0.0017	0.0007	0.0017	0.001	0.0004	8
Lead	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	0.000001	<0.00010	<0.000020	0.000001	0.000001	0.000	N/A	8
Molybdenum	(mg/L)	0.001	0.0009	0.0006	0.0007	0.001	0.0007	0.00072	0.00061	0.0006	0.001	0.001	0.0002	8
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.0027	0.0027	0.0008	0.0027	<0.0020	0.0008	0.0027	0.002	0.0010	8
Selenium	(mg/L)	<0.0004	<0.0004	0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	0.0004	0.0004	0.000	N/A	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	1.27	1.24	1.22	1.35	1.1	---	---	---	1.1	1.35	1.236	0.0907	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0008	0.001	0.001	0.0024	0.003	<0.001	0.00102	<0.00030	0.0008	0.003	0.002	0.0009	8
Uranium	(mg/L)	0.0012	0.0012	0.0011	0.0011	0.0013	0.001	0.001	0.00109	0.001	0.0013	0.001	0.0001	8
Vanadium	(mg/L)	0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.00010	0.0001	0.0001	0.0004	0.000	0.0002	8
Zinc	(mg/L)	0.004	<0.002	0.009	<0.002	<0.003	<0.003	0.0023	0.0105	0.0023	0.0105	0.006	0.0039	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-12

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	32.95	33.05	33.62	32.9	32.77	32.76	33.01	32.84	32.76	33.62	33.0	0.3	8
Groundwater Surface Elevation	(m asl)	593.12	593.02	592.45	593.17	593.3	593.31	593.06	593.23	592.45	593.31	593.1	0.3	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,032	983	983	1032	1007.5	34.6	2
pH	(---)	---	---	---	---	---	---	7.32	6.95	6.95	7.32	7.1	0.3	2
Temperature	(°C)	---	---	---	---	---	---	5.1	8.7	5.1	8.7	6.9	2.5	2
Select Indicator Parameters														
Calcium	(mg/L)	95.7	94.9	100	95.4	82	98	96.4	98.1	82	100	95.1	5.54	8
Chloride	(mg/L)	6	8	7	7	5	8	7.05	6.4	5	8	6.8	1.00	8
Fluroide	(mg/L)	0.13	0.07	0.07	0.08	<0.1	0.09	0.114	0.071	0.07	0.13	0.1	0.02	8
Iron	(mg/L)	2.78	3.37	3.76	3.77	<0.06	4.1	4.24	3.34	2.78	4.24	3.6	0.50	8
Magnesium	(mg/L)	27.9	28.5	29.1	29.2	23	29	30.2	30.9	23	30.9	28.5	2.40	8
Manganese	(mg/L)	0.365	0.402	0.436	0.422	0.4	0.45	0.456	0.45	0.365	0.456	0.4	0.03	8
Potassium	(mg/L)	5	5.2	5.1	4.2	4.3	4.9	---	4.86	4.2	5.2	4.8	0.39	7
Sodium	(mg/L)	106	111	106	101	99	110	109	95.4	95.4	111	104.7	5.64	8
Bicarbonate	(mg/L)	636	712	669	670	700	650	667	662	636	712	670.8	24.8	8
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.050	<0.050	0.005	0.1	0.053	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.071	<0.071	0.005	0.1	0.053	0.1	8
Sulphate	(mg/L)	46	53	44	42.4	43	32	47		32	52.5	43.8	6.2	7
Dissolved Organic Carbon	(mg/L)	6	7	7	7	7	6.4	10.5	13.5	6	13.5	8.1	2.6	8
Electrical Conductivity	(µS/cm)	1000	1020	904	1020	1000	1000	1030	1050	904	1050	1003.0	43.7	8
Ion Balance	(%)	102	92.7	100	97.4	0.84	110	100	97.9	0.84	110	87.6	35.4	8
pH	(---)	7.9	7.4	7.8	8	7.8	7.66	8.13	8.14	7.4	8.14	7.9	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.0010	<0.0010	0.002	0.003	0.003	0.001	8
Total Dissolved Solids	(mg/L)	600	651	621	609	601	610	623	606	600	651	615.1	16.7	8
Total Alkalinity as $CaCO_3$	(mg/L)	521	584	549	550	570	540	547	543	521	584	550.5	19.1	8
Total Hardness as $CaCO_3$	(mg/L)	354	354	370	358	300	360	365	372	300	372	354.1	22.9	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	N/A	N/A	N/A	N/A	8
Antimony	(mg/L)	0.0008	0.0005	0.0006	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	0.0005	0.0008	0.001	0.0001	8
Arsenic	(mg/L)	0.0022	0.0026	0.0023	0.0025	0.002	0.0026	0.00285	0.00199	0.00199	0.00285	0.002	0.0003	8
Barium	(mg/L)	0.153	0.182	0.178	0.146	0.1	---	0.143	0.13	0.1	0.182	0.147	0.0281	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	0.00006	<0.00005	<0.00005	---	---	---	---	0.00006	0.00006	0.000	N/A	4
Boron	(mg/L)	0.234	0.282	0.251	0.233	0.22	---	0.242	0.244	0.22	0.282	0.244	0.0196	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.00012	<0.001	<0.0002	0.000006	<0.00010	<0.00010	0.000006	0.000006	0.000	N/A	8
Chromium	(mg/L)	0.0038	<0.0004	0.0016	0.0015	<0.001	<0.001	<0.0050	<0.0050	0.0015	0.0038	0.002	0.0013	8
Cobalt	(mg/L)	0.0008	0.001	0.0007	0.0012	0.0007	0.0006	0.00065	0.00043	0.00043	0.0012	0.001	0.0002	8
Copper	(mg/L)	<0.0006	0.0008	<0.0006	<0.0006	<0.0002	0.0008	<0.0010	<0.0010	0.0008	0.0008	0.001	0.0000	8
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	0.0004	0.0004	0.000	N/A	8
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	0.00007	0.000001	<0.00010	<0.000020	0.000001	0.00007	0.000	0.0000	8
Molybdenum	(mg/L)	0.0015	0.0013	0.0012	0.0017	0.0014	0.0012	0.00115	0.00102	0.00102	0.0017	0.001	0.0002	8
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.0033	0.0021	0.0012	0.0022	<0.0020	0.0012	0.0033	0.002	0.0009	8
Selenium	(mg/L)	<0.0004	<0.0004	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	N/A	N/A	N/A	N/A	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	0.915	0.903	0.925	0.972	0.84	---	---	---	0.84	0.972	0.911	0.0475	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0011	0.0008	0.0008	0.0007	0.002	<0.001	0.00081	<0.00030	0.0007	0.002	0.001	0.0005	8
Uranium	(mg/L)	0.001	0.0011	0.001	0.0009	0.0011	0.0008	0.00083	0.00087	0.0008	0.0011	0.001	0.0001	8
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.00010	<0.00010	0.0004	0.0004	0.000	N/A	8
Zinc	(mg/L)	0.01	<0.002	0.007	0.004	<0.003	<0.003	<0.0020	0.0021	0.0021	0.01	0.006	0.0035	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

WorleyParsons
resources & energy

Appendix 6
Statistical Tables: MW-13

PROJECT NO.: E00100102

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation														
Depth To Groundwater	(m btoc)	32.6	33.45	33.24	32.54	32.39	32.41	32.68	32.46	32.39	33.45	32.7	0.4	8
Groundwater Surface Elevation	(m asl)	593.68	592.83	593.04	593.74	593.89	593.87	593.6	593.82	592.83	593.89	593.6	0.4	8
Field-Measured Parameters														
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	776	541	541	776	658.5	166.2	2
pH	(---)	---	---	---	---	---	---	7.53	7.06	7.06	7.53	7.3	0.3	2
Temperature	(°C)	---	---	---	---	---	---	7.0	8.5	7	8.5	7.8	1.1	2
Select Indicator Parameters														
Calcium	(mg/L)	53.7	51.2	55.6	53	45	54	50	48.1	45	55.6	51.3	3.51	8
Chloride	(mg/L)	2	4	4	2	2	3	2.15	1.92	1.92	4	2.6	0.91	8
Fluroide	(mg/L)	0.2	0.14	0.14	0.13	0.2	0.15	0.16	0.162	0.13	0.2	0.2	0.03	8
Iron	(mg/L)	0.818	1.08	1.19	1.26	<0.06	1.3	1.45	1.25	0.818	1.45	1.2	0.20	8
Magnesium	(mg/L)	16.5	16.2	17.1	16.9	14	17	16.4	15.3	14	17.1	16.2	1.05	8
Manganese	(mg/L)	0.263	0.243	0.256	0.252	0.25	0.26	0.249	0.231	0.231	0.263	0.3	0.01	8
Potassium	(mg/L)	4.2	3.4	3.9	3.5	3.5	3.9	---	3.74	3.4	4.2	3.7	0.29	7
Sodium	(mg/L)	112	103	112	105	110	110	110	103	103	112	108.1	3.83	8
Bicarbonate	(mg/L)	531	537	715	541	560	520	530	530	520	715	558.0	64.5	8
Carbonate	(mg/L)	<5	<5	541	<5	<1	<0.5	<5.0	<5.0	541	541	541.0	N/A	8
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	N/A	N/A	N/A	N/A	8
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	N/A	N/A	N/A	N/A	8
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	0.2	<0.1	<0.2	0.005	<0.050	<0.050	0.005	0.2	0.102	0.1	8
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	0.2	<0.1	<0.2	0.005	<0.071	<0.071	0.005	0.2	0.102	0.1	8
Sulphate	(mg/L)	11	13	10	9.1	9	9	10	9	9	12.5	9.9	1.2	8
Dissolved Organic Carbon	(mg/L)	4	5	5	5	5	4.5	4.1	5.2	4	5.2	4.7	0.5	8
Electrical Conductivity	(µS/cm)	784	782	715	782	790	770	776	796	715	796	774.4	25.3	8
Ion Balance	(%)	100	92.2	99.4	96.3	0.87	100	97.5	92.1	0.87	100	84.8	34.1	8
pH	(---)	8.1	7.8	8	8.2	8	7.81	8.22	8.24	7.8	8.24	8.0	0.2	8
Phenols	(mg/L)	<0.001	<0.001	<0.001	0.001	<0.001	0.003	<0.0010	<0.0010	0.001	0.003	0.002	0.001	8
Total Dissolved Solids	(mg/L)	460	454	470	456	457	460	453	442	442	470	456.5	7.9	8
Total Alkalinity as $CaCO_3$	(mg/L)	435	440	443	444	460	430	435	434	430	460	440.1	9.3	8
Total Hardness as $CaCO_3$	(mg/L)	202	195	209	202	170	200	192	183	170	209	194.1	12.5	8
Dissolved Metals Parameters														
Aluminum	(mg/L)	<0.01	0.07	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.07	0.07	0.070	N/A	8
Antimony	(mg/L)	0.0008	0.0006	0.0006	0.0004	<0.0002	<0.0002	<0.00040	<0.00040	0.0004	0.0008	0.001	0.0002	8
Arsenic	(mg/L)	0.0012	0.0016	0.0014	0.0014	0.001	0.0015	0.00162	0.00157	0.001	0.00162	0.001	0.0002	8
Barium	(mg/L)	0.389	0.413	0.424	0.428	0.29	---	0.407	0.411	0.29	0.428	0.395	0.0478	7
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Bismuth	(mg/L)	<0.00005	<0.0001	<0.00005	<0.00005	---	---	---	---	N/A	N/A	N/A	N/A	4
Boron	(mg/L)	0.258	0.301	0.273	0.246	0.25	---	0.254	0.265	0.246	0.301	0.264	0.0187	7
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000005	<0.00010	<0.00010	0.000005	0.000005	0.000	N/A	8
Chromium	(mg/L)	0.0048	0.0007	0.0011	0.0016	<0.001	<0.001	<0.0050	<0.0050	0.0007	0.0048	0.002	0.0019	8
Cobalt	(mg/L)	0.0008	0.0033	0.0007	0.0009	0.0009	0.0007	0.00092	0.00062	0.00062	0.0033	0.001	0.0009	8
Copper	(mg/L)	<0.0006	0.0007	<0.0006	<0.0006	<0.0002	0.0003	<0.0010	<0.0010	0.0003	0.0007	0.001	0.0003	8
Lead	(mg/L)	0.0002	0.0002	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	0.0002	0.0002	0.000	0.0000	8
Mercury	(mg/L)	<0.0001	0.0001	<0.0001	<0.0001	0.00007	<0.000001	<0.00010	<0.000020	0.00007	0.0001	0.000	0.0000	8
Molybdenum	(mg/L)	0.0023	0.0027	0.0021	0.0023	0.0028	0.0022	0.00219	0.00194	0.00194	0.0028	0.002	0.0003	8
Nickel	(mg/L)	0.0009	0.0015	<0.0001	0.0022	0.0016	0.0012	0.0021	<0.0020	0.0009	0.0022	0.002	0.0005	8
Selenium	(mg/L)	<0.0004	0.0005	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	0.0005	0.0005	0.001	N/A	8
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	N/A	N/A	N/A	N/A	8
Strontium	(mg/L)	0.57	0.542	0.553	0.58	0.5	---	---	---	0.5	0.58	0.549	0.0311	5
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	N/A	N/A	N/A	N/A	8
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	N/A	N/A	N/A	N/A	6
Titanium	(mg/L)	0.0006	0.0006	0.0006	0.0006	0.002	<0.001	0.0007	<0.00030	0.0006	0.002	0.001	0.0006	8
Uranium	(mg/L)	0.0008	0.0009	0.0008	0.0008	0.0009	0.0007	0.00069	0.00073	0.00069	0.0009	0.001	0.0001	8
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.00010	<0.00010	0.0004	0.0004	0.000	N/A	8
Zinc	(mg/L)	0.005	<0.002	0.009	<0.002	<0.003	<0.003	<0.0020	<0.0020	0.005	0.009	0.007	0.0028	8
Petroleum Hydrocarbon Parameters														
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	N/A	N/A	N/A	N/A	8
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	N/A	N/A	N/A	N/A	8
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10})	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F1 (C_6-C_{10}) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	N/A	N/A	N/A	N/A	8
PHC F2 ($C_{>10}$-C_{16})	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	N/A	N/A	N/A	N/A	8

NOTES:

1. ***Electrical conductivity values standardized to 25°C (within the limitations of the equipment).***
2. ***--- Denotes parameter not measured.***
3. ***Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2008).***

CONTENTS

Tables within Text

A7.1 INTRODUCTION

At times a measured value at groundwater monitoring well may appear to be anomalous with respect to historical measurements at the particular monitoring well. These “anomalous” values can arise for several reasons including, transcription errors, analytical instrument failure, calibration errors, and/or an underestimation of spatial or temporal variability, among others (Gibbons 1994).

In combination with verification sampling (i.e. the re-sampling of the monitoring well), statistical analysis can be applied to the data to support the conclusion that the data are anomalous. The US EPA (2009) recommends the Dixon Outlier Test to assess outliers in data sets with less than 25 data points.

A summary of the assumptions and methodology of the Dixon Outlier Test and the results of the test as applied to the June 8, 2011 data for monitoring well MW-07 are presented below. The analytical results for a verification sample collected on July 28, 2011 are also included in the analysis.

A7.2 THE DIXON OUTLIER TEST

A7.2.1 Assumptions

Assumptions of the Dixon Outlier Test include the following:

- The data set, excluding the suspected outlier, is normally-distributed.
- The data set includes only one suspected outlier and that outlier is the highest or lowest value in the data set.

Although the Dixon Outlier Test assumes that there is only one suspected outlier, the method can be modified to test multiple suspected outliers by sequentially testing each suspected outlier.

A7.2.2 Methodology

To apply the Dixon Outlier Test, the data set should be ordered in ascending order prior to the calculation. The applied formula varies depending on the size of the data set (n) and whether the suspected outlier is the highest or lowest value in the dataset (Table A7-1).

The value obtained from the calculation is then compared to a list of critical values based on the level of confidence (α) desired. Should the calculated value exceed the critical value it can be concluded that the result is statistically an outlier (i.e. the value falls outside the range at which the α percentage of all data should reside). Critical values as described by the US EPA (2009) are provided in Table A7-2.

Table A7-1 Dixon Outlier Test Sample Size and Equations (US EPA, 2009)

Sample Size (n)	Highest Value	Lowest Value
3 to 7	$\frac{x_n - x_{n-1}}{x_n - x_1}$	$\frac{x_2 - x_1}{x_n - x_1}$
8 to 10	$\frac{x_n - x_{n-1}}{x_n - x_2}$	$\frac{x_2 - x_1}{x_{n-1} - x_1}$
11 to 13	$\frac{x_n - x_{n-2}}{x_n - x_2}$	$\frac{x_3 - x_1}{x_{n-1} - x_1}$
14 to 25	$\frac{x_n - x_{n-2}}{x_n - x_3}$	$\frac{x_3 - x_1}{x_{n-2} - x_1}$

Table A7-2 Critical Values for the Dixon Outlier Test (US EPA, 2009)

Sample Size (n)	Level of Confidence		
	99th Percentile	95th Percentile	90th Percentile
3	0.988	0.941	0.886
4	0.889	0.765	0.679
5	0.780	0.642	0.557
6	0.698	0.560	0.482
7	0.637	0.507	0.434
8	0.683	0.554	0.479
9	0.635	0.512	0.441
10	0.597	0.477	0.409
11	0.679	0.576	0.517
12	0.642	0.546	0.490
13	0.615	0.521	0.467
14	0.641	0.546	0.492
15	0.616	0.525	0.472
16	0.595	0.507	0.454
17	0.577	0.490	0.438
18	0.561	0.475	0.424
19	0.547	0.462	0.412
20	0.535	0.450	0.401
21	0.524	0.440	0.391
22	0.514	0.430	0.382
23	0.505	0.421	0.374
24	0.497	0.413	0.367
25	0.489	0.406	0.360

Appendix 7 Dixon Outlier Test

A7.2.3 Results

Table A7-3 shows the results of the Dixon Outlier Test calculations and Dixon values. For a sample size *n* = 9 values, the critical values are 0.635 at 99% confidence level, 0.512 at 95% confidence level, and 0.441 at 90% confidence level. For convenience, these values are indicated in Table A7-2.

The results of the Dixon Outlier Test indicate the following:

- Bicarbonate, TDS and DOC are considered outliers at 99% confidence level.
- Bicarbonate, sulphate, TDS, manganese and DOC are considered outliers at 95% confidence level.
- Bicarbonate, sulphate, TDS, EC, iron, manganese and DOC are considered outliers at 90% confidence level.
- Calcium, magnesium, potassium, sodium and chloride can not be considered outliers even at a 90% confidence level.

A7.2.4 Conclusions

The Dixon Outlier Test indicated that, at a 95% confidence level, the June 8, 2011 results for sulphate, bicarbonate, TDS, manganese and DOC are outliers.

Therefore, the June 8, 2011 groundwater quality results for MW-07 are considered anomalous and will not be included in any future statistical analysis, hydrochemical control charts, or data interpretation. These results will be kept in the data tables with proper annotation that the data are anomalous.

A7.3 REFERENCES

Gibbons, R.D. 1994. Statistical Methods for Groundwater Monitoring. John Wiley & Sons Inc. New York, New York.

US Environmental Protection Agency (EPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. March 2009.

WorleyParsons
resources & energy

Table A7-3
Results for Dixon Outlier Test

Project No.: E00100102

Chloride		Sulphate		Iron		Manganese		TDS		Calcium		Magnesium		Potassium		Sodium		Bicarbonate		Fluoride		Electical Conductivity		DOC	
Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)	Date	Conc. (mg/L)
8-Jun-11	**8.07**	**8-Jun-11**	**622**	16-Jun-06	<0.005	**8-Jun-11**	**1.21**	**8-Jun-11**	**1330**	**8-Jun-11**	**178**	**8-Jun-11**	**68.8**	5-May-10	---	**8-Jun-11**	**189**	**8-Jun-11**	**537**	16-Jun-06	0.07	**8-Jun-11**	**1900**	9-Mar-05	5
19-Dec-07	9	12-Jul-07	940	19-Dec-07	<0.06	19-Dec-07	1.6	12-Jul-07	1870	19-Dec-07	220	19-Dec-07	72	**8-Jun-11**	**4.38**	19-Dec-07	230	12-Jul-07	641	17-Nov-05	0.08	12-Jul-07	2290	5-May-10	5.8
28-Jul-11	11.8	19-Dec-07	1000	**8-Jun-11**	**8.26**	12-Jul-07	1.78	19-Dec-07	1890	28-Jul-11	256	28-Jul-11	87.9	12-Jul-07	4.6	28-Jul-11	245	5-May-10	657	22-Apr-09	0.08	19-Dec-07	2500	17-Nov-05	6
12-Jul-07	12	17-Nov-05	1010	9-Mar-05	10.4	17-Nov-05	1.83	28-Jul-11	1950	12-Jul-07	257	12-Jul-07	89.8	19-Dec-07	5.1	12-Jul-07	248	28-Jul-11	659	12-Jul-07	0.09	16-Jun-06	2530	16-Jun-06	6
9-Mar-05	13	16-Jun-06	1010	17-Nov-05	10.9	28-Jul-11	1.84	17-Nov-05	1990	5-May-10	262	5-May-10	93.5	17-Nov-05	5.5	17-Nov-05	268	19-Dec-07	660	19-Dec-07	0.1	5-May-10	2600	12-Jul-07	6
5-May-10	13.2	28-Jul-11	1020	12-Jul-07	10.9	16-Jun-06	1.86	16-Jun-06	2010	17-Nov-05	270	17-Nov-05	94.8	28-Jul-11	5.55	16-Jun-06	269	16-Jun-06	661	9-Mar-05	0.11	17-Nov-05	2670	19-Dec-07	6
16-Jun-06	15	5-May-10	1040	28-Jul-11	11.7	9-Mar-05	1.88	5-May-10	2010	16-Jun-06	284	16-Jun-06	96.4	16-Jun-06	6.2	5-May-10	274	9-Mar-05	664	**8-Jun-11**	**0.116**	28-Jul-11	2670	28-Jul-11	6.3
17-Nov-05	16	9-Mar-05	1130	5-May-10	12.5	5-May-10	1.9	9-Mar-05	2150	9-Mar-05	287	9-Mar-05	100	9-Mar-05	6.6	9-Mar-05	287	17-Nov-05	666	28-Jul-11	0.128	9-Mar-05	2680	22-Apr-09	6.6
22-Apr-09	18	22-Apr-09	1200	22-Apr-09	14	22-Apr-09	2.3	22-Apr-09	2400	22-Apr-09	330	22-Apr-09	110	22-Apr-09	6.6	22-Apr-09	320	22-Apr-09	730	5-May-10	0.135	22-Apr-09	3000	**8-Jun-11**	**11.5**

Dixon Values

0.117	0.626 [2, 3]	0.505 [3]	0.565 [2, 3]	0.659 [1, 2, 3]	0.385	0.103	0.099	0.418	0.806 [1, 2, 3]	N/A	0.500 [3]	0.860 [1, 2, 3]

NOTES:

1. ***Bold entries represent the number being tested by the Dixon Outlier Test.***
2. ***--- denotes parameter not analyzed.***
3. ***Superscript [1] denotes values that exceed the Dixon Critical Value at the 99th percentile (US EPA 2009).***
   For a sample size of nine, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance (US EPA 2009) indicates a critical value of 0.635 to support determination of an outlier at the 99th percentile.
4. ***Superscript [2] denotes values that exceed the Dixon Critical Value at the 95th percentile.***
   For a sample size of nine, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance (US EPA 2009) indicates a critical value of 0.512 to support determination of an outlier at the 95th percentile.
5. ***Superscript [3] denotes values that exceed the Dixon Critical Value at the 90th percentile.***
   For a sample size of nine, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance (US EPA 2009) indicates a critical value of 0.441 to support determination of an outlier at the 90th percentile.
6. ***Yellow highlighting denotes values that exceed the Dixon Critical Value at the 95th percentile.***