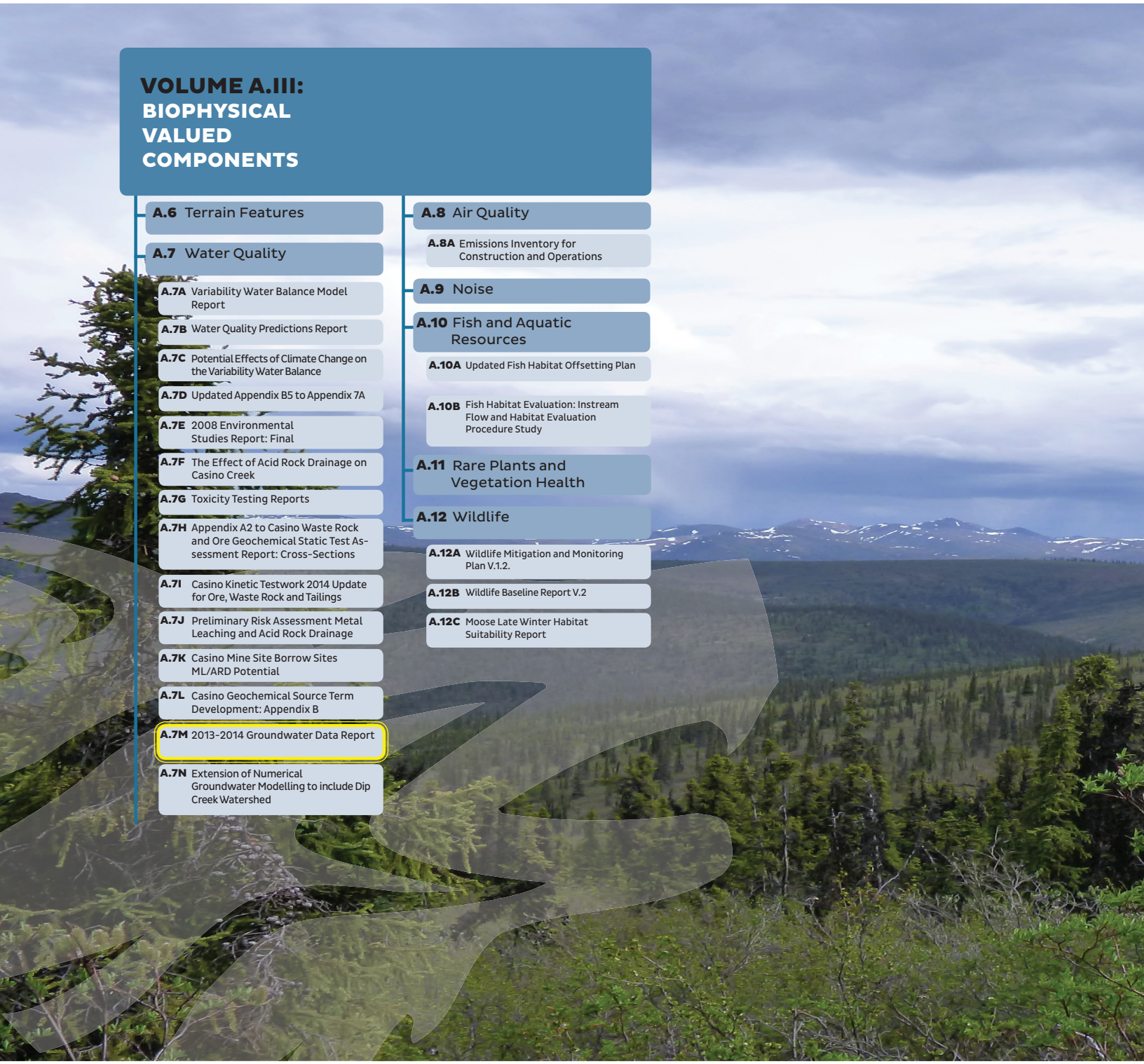
APPENDIX A.7M: 2013-2014 Groundwater Data Report



CASINO MINING CORPORATION
CASINO PROJECT

2013-2014 GROUNDWATER DATA REPORT

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Rev 0
March 6, 2015

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CASINO PROJECT

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VA101-325/17-1

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EXECUTIVE SUMMARY

Knight Piésold Ltd. (KP) was contracted by Casino Mining Corporation (CMC) to perform a supplemental hydrogeological site investigation in the summer of 2013 to install monitoring wells and further advance baseline data collection. This data report documents the 2013 hydrogeological site investigation and presents baseline groundwater data collected across the site in 2013 and 2014.

The 2013 site investigation program included the drilling and installation of 11 monitoring wells at 6 locations. Overburden encountered during drilling generally consisted of silty sands and gravels of up to 7 m thick. The overburden deposits were interpreted to be colluvial deposits. Bedrock encountered during drilling included granodiorite and quartzite. Bedrock was weathered to at least 20 m below ground surface.

Monitoring well development, response testing, groundwater sampling and installation of pressure transducers for long-term water level monitoring were carried out in August 2013. A Waterra inertial pumping system was used to develop the monitoring wells where possible. Response testing was completed following monitoring well development. Hydraulic conductivity estimates from response testing ranged from less than $1x10^{-8}$ m/s to $2x10^{-4}$ m/s. Pressure transducers were installed in all monitoring wells and are programmed to record water level data every three hours.

Hydrogeology data were collected at the site during six site visits during 2013 and 2014, including continuous groundwater level and ground temperature monitoring, groundwater quality sampling, and re-development of select historic monitoring wells.

Water quality samples and *in situ* data were collected from 16 monitoring wells located throughout the project area in 2013 and 2014. Samples were collected three times per year targeting seasonal representation (spring, summer, and fall). The baseline groundwater quality datasets for all wells are provided in this report along with the assessment of the data quality for data collected since 2013.

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1 – INTRODUCTION

1.1 PROJECT DESCRIPTION

Casino Mining Corporation (CMC) is proposing to develop the Casino Project (the Project), a proposed copper-gold-molybdenum mine, in Yukon Territory. The project is located in the Dawson Range Mountains of the Klondike Plateau approximately 300 km northwest of Whitehorse, as shown on Figure 1.1.

Knight Piésold Ltd. (KP) previously completed a baseline hydrogeology and groundwater quality study for the Project, detailed in the 2012 Baseline Hydrogeology Report (KP 2013). The report presented the understanding of the existing groundwater regime and summarized groundwater-related data collected during site investigations conducted from 1993 through 2012. Subsequent to the baseline report, KP was retained to carry out a 2013 hydrogeological site investigation to further advance baseline data collection in key areas of the Project and to continue baseline groundwater monitoring and collection of groundwater data in 2013 and 2014. The results of the 2013 site investigation and 2013 and 2014 data collection are presented in this report. This information will ultimately be used to support the understanding of the existing groundwater regime.

In addition to the 2013 site investigation and data collection work documented in this report, groundwater-related data was collected during a geotechnical site investigation in 2013 (KP 2014). A total of nine drillholes were advanced and two standpipes and two thermistors were installed during the geotechnical site investigation. Data collected from these installation sites are included in this report.

1.2 SCOPE OF REPORT

The objective of this data report is to describe the methodology and results of the 2013 hydrogeological site investigation and to present baseline groundwater data collected at the site in 2013 and 2014. Baseline groundwater data was collected during a total of six site visits in 2013 and 2014:

- June, August and September 2013, and
- May, July and September 2014.

The work described in this report includes:

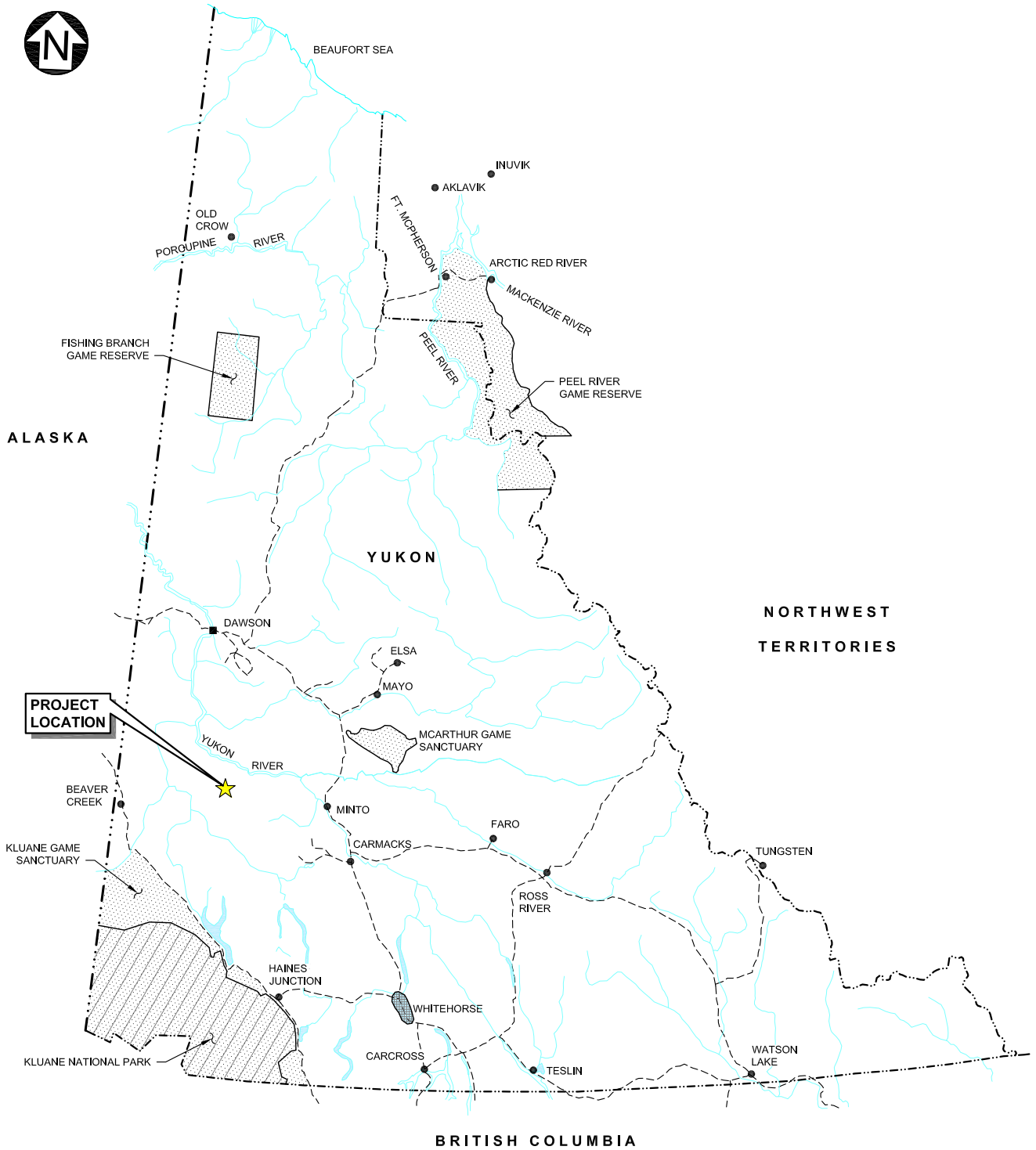
2013 Hydrogeology Site Investigation:

- Supervising the drilling and installation of 11 monitoring wells at 6 locations,
- Developing the new monitoring wells,
- Response testing the new monitoring wells,
- Installing pressure transducers to collect long-term water level data at each location, and
- Groundwater sampling the new monitoring wells.

2013-2014 Data Collection Program (to October 2014):

- Collecting manual and continuous time-series water level data from monitoring wells, standpipe piezometers and vibrating wire piezometers (VWPs),
- Collecting ground temperature data from thermistor and VWP installations,
- Re-developing select monitoring wells installed prior to 2013, and
- Collecting groundwater samples at select monitoring wells.

Site investigation and groundwater monitoring methodology is presented in Section 2. Site investigation results and data collected during the site visits are presented in Section 3. Drillhole logs and monitoring well installation details are provided in Appendix A, response testing data are provided in Appendix B, water level data are provided in Appendix C, and ground temperature data are provided in Appendix D. Groundwater sampling methodology and results are presented in Appendices E through G.



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CASINO MINING CORPORATION

CASINO PROJECT

PROJECT LOCATION MAP

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF NO. 1

FIGURE 1.1

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2 – METHODS

2.1 DRILLING AND MONITORING WELL INSTALLATIONS

Kluane Drilling Ltd., based out of Whitehorse, Yukon was contracted to carry out drilling and installation of the groundwater monitoring wells at the Casino Project under the supervision of KP. A KD1000 diamond coring rig was used to complete the drilling.

Drillholes were completed using one of two drill rod and casing sizes based on the availability of drilling equipment:

- The first four drillholes (MW13-01D/S and MW13-02D/S) were advanced through overburden using 11.4 cm (4.5 inch) diameter HWT drill casing. Drilling continued without casing using 9.1 cm (3.6 inch) diameter HT drill rods once stable bedrock was encountered. Overburden and rock samples were recovered using an HQ core barrel.
- The remaining seven drillholes were completed using 14 cm (5.5 inch) PW casing to advance through the overburden and 11.4 cm (4.5 inch) HWT drill rod through bedrock. The larger diameter rods provided a greater annular space to accommodate monitoring well installation. Overburden and rock samples were recovered using an HT core barrel.

Rock core was collected in five foot lengths as drilling progressed and logged and photographed to characterize stratigraphy and identify potentially permeable zones. Observations recorded during drilling included input from the driller (e.g. drill chatter) and notes on zones of drilling fluid circulation losses. Water level measurements were taken during pauses in drilling to assess the depth to water or if permafrost was present. Additional notes related to the presence of permafrost included observations of ice in the drill core and indications that drill rods were sticking (freezing) to the drillhole walls.

All drillholes were flushed with water prior to monitoring well installation. All monitoring wells were constructed with the following materials in accordance with best practices:

- A 3 m (10 feet) long, 49 mm inner diameter (ID) (nominal 2 inch) threaded Schedule 40 or 80 machine slotted PVC screen (washed and bagged), 0.5 mm (0.020 inch) slot size, fitted with a threaded bottom cap,
- 3 m (10 feet) lengths of 49 mm ID (nominal 2 inch) threaded Schedule 40 or 80 PVC solids (washed and bagged) to approximately 0.5 m above ground surface,
- Filter sand (10/20) placed approximately 1.5 m (5 feet) below and above the screen,
- A 2 m (6 feet) seal of slow-release bentonite pellets above the filter sand,
- A cement/bentonite grout backfill prepared as approximately 30 liters (8 gallons) of water per 43 kg (94 lbs) portland cement and 2 kg (5 lbs) bentonite powder,
- A PVC monitoring well cap and a locking monitoring well surface protector, and
- A concrete surface pad approximately 1.5 m x 1.5 m to direct surface flow away from the monitoring well.

2.2 MONITORING WELL DEVELOPMENT

The objective of well development is to minimize near-well disturbances resulting from drilling so that collected data (response tests, groundwater levels and groundwater quality) are defensible and representative. To minimize these potential drilling effects, well developments aids with removing

drilling debris and fine-grained sediment from the vicinity of the screened zone. The following equipment was used to carry out the well development activities:

- A high capacity Waterra inertial pumping system activated by a Waterra Power Pump (Power Pump), and
- HDPE Waterra tubing (2.54 cm (1-inch)) fitted with a foot valve and surge block.

The water level in the monitoring well was recorded at the beginning of well development. The foot valve and surge block were fitted to the end of the Waterra tubing and lowered down the monitoring well to 1 m above the base of the well screen. Development began at this depth and the foot valve and surge block were raised in 1 m increments until the top of the screen was reached. Water level measurements were taken during development to monitor the rate of water level recovery and prevent the water level from dropping below the top of the well screen. Well development continued until there was an observable improvement in water quality based on recorded in-situ measurements (temperature, pH, electrical conductivity and turbidity) and qualitative observations (water clarity and sediment).

The above approach was modified for monitoring wells where the water level recovery was too slow to maintain the water level above the top of the screen during development. In these instances, the well development was limited to slightly agitating fines from within the well screen by plugging the discharge end of the Waterra tubing at surface. The pumping/surging action of the foot valve/surge block being operated manually moved water back and forth through the screen and filter pack without removing water from the monitoring well. If there was sufficient water in the monitoring well, the Waterra tubing was unblocked and the Power Pump was briefly operated to remove as much of the loosened sediment from the monitoring well without dewatering the screen. This modified approach is less efficient but provides a means to complete some development for monitoring wells with relatively slow water level recovery.

2.3 RESPONSE TESTING

The monitoring wells were response tested (slug tested) after water levels had stabilized following development. Slug tests are an efficient and inexpensive method to estimate a hydraulic conductivity in the immediate vicinity of a drillhole.

A 1.07 m length of 0.025 m outer diameter (OD) Schedule 80 PVC pipe capped and filled with 10/20 filter sand was used as a slug. The slug was secured to a 60 m tagline (manufactured by Solinst) so it could be quickly lowered into and retrieved from the monitoring well. A pressure transducer manufactured by Schlumberger Water Services (Diver model DI502-20m or DI505-50m) was used to record the water level response during testing. Manual water level measurements were taken during testing using a 100 m water level meter (manufactured by Solinst).

The response test data for the monitoring wells were analyzed using the Hvorslev (1951) method, which involves matching field data to a theoretical solution to produce an estimate of the formation hydraulic conductivity near the drillhole.

2.4 GROUNDWATER LEVELS

Water levels were measured manually after monitoring well installation and before and after monitoring well development and response testing. A pressure transducer was installed in each monitoring well suspended on stainless steel aircraft cable following well installation. The pressure

transducers are manufactured by Solinst and were programmed to record water level data every three hours. An atmospheric pressure transducer is located near the existing camp and records atmospheric pressure at hourly intervals. The barometric data were used to compensate the groundwater elevation time-series data for fluctuations in barometric pressure.

WellBuster™ monitoring well packers were installed in 2014 in some of the wells that are artesian or have shallow water tables. The intent of the well packers is to supress the water levels in the wells below the freezing elevation to enable sampling earlier in the year by keeping the well from freezing and to prevent damage to the wells that may result from expansion of frozen water in the PVC. WellBuster™ packers are specifically built for installation in water wells and are constructed of rubber seals and stainless steel.

2.5 INSTALLATION OF HEAT TRACE

Electric heat trace (3 watt, 120 volt) was installed in the new monitoring wells immediately following well completion to allow the monitoring well to be thawed for development and sampling work in the event the water column in the well froze due to permafrost. The heat trace was cut to length after installation so that it extended the entire depth of the monitoring well. A waterproof end splice was applied to the down-well end to guard against water intrusion and short-circuiting of the submerged heat trace. A 120 volt grounded plug was installed to the free end of the heat trace located at the well head. When activated, the heat trace was powered by 120 volt power supplied from a portable gasoline generator. Heat trace remains installed at all of the 2013 monitoring wells except MW13-02D/S and MW13-06D/S which have been unfrozen during all sampling events in 2013 and 2014.

The heat trace in MW13-01D and MW13-03S was upgraded to a higher wattage heat trace (10 watt, 120 volt) to increase heat output in order to promote thawing of the water column in the well prior to sampling and well development work.

2.6 GROUNDWATER QUALITY SAMPLING

KP adapted well purging and sampling procedures employed during the field program from the following documents:

- British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-emission, Water, Wastewater, Soil, Sediment and Biological Samples (BC Ministry of Water, Land, and Air Protection, 2003).
- United States Environmental Protection Agency Low-Flow (Minimum Drawdown) Ground-Water Sampling Procedures (US EPA, 1996).

The purging and sampling methods employed were dictated by the conditions of each individual well. Two approaches were applied to the groundwater wells as the wells fell into two categories: wells that recharged very quickly and a minimum drawdown could be maintained while purging, and wells with slow to very slow recharge where minimum drawdown could not be maintained (despite very low pumping rates). Methods common to both procedures are described in the following section and methods for each well purging scenario are provided in the two following sections.

2.6.1 General Sampling Method

Both methods (minimum drawdown method and low recharge method) required the use of a submersible pump, which was placed approximately 1 m above the top of the screen, and both required a low pump rate during sampling and purging to minimize turbulence in the well. Target pumping rates ranged from 0.2 L/min to 0.5 L/min (higher rates may be achieved where turbidity does not increase and the water level is maintained).

In situ parameters were monitored during the well purging process using a flow-thru cell attachment on a calibrated multi-parameter probe. Final *in situ* parameters were recorded for the sampling event immediately prior to collecting the sample.

Samples for dissolved metals analysis were field filtered using a 0.45 µm in-line filter and samples for dissolved organic carbon analysis were field filtered using a syringe with a 0.45 µm syringe filter. Any required preservatives were added immediately after sample collection. Syringe filters were used for dissolved organic carbon analysis because the in-line filters contain activated carbon, which is known to contaminate samples with organic carbon; these filters are only certified for use for filtration of inorganic parameters.

2.6.2 Low-Flow Minimum Drawdown Purging and Sampling Method

The low-flow minimum drawdown method was used to purge and sample the wells where hydraulic conductivity was high enough to do so. The primary objective of this sampling method is to match the pumping rate with that of the natural groundwater flow-rate across the screened interval. This was achieved by adjusting the pumping rate such that the water level in the well was stable and relatively close to the static water level prior to pumping. With a stable water level, the water entering the pump must be from the screened interval below the pump intake and not from the stagnant overlying water column.

The key advantages of the low-flow groundwater quality sampling method are:

- Reduced stress on the surrounding aquifer,
- More representative samples due to reduced turbidity, and
- Reduced purge volume.

Well purging was considered complete and samples were collected when all of the following objectives were met during the purging process:

- Minimum purge volume was removed (volume in drawdown plus the volume below the pump intake),
- In situ parameters were stable (temperature, pH, specific conductance, turbidity, and dissolved oxygen), and
- The water level was confirmed to be stable or rising.

2.6.3 Low Hydraulic Conductivity Formation Purging and Sampling Method

This second approach was used where the groundwater recovery rate was slower than the lowest pump rate and the water level continued to drop during the purging process. The pump was placed above the top of the screen and the stagnant water above the pump was purged until the water level dropped to the pump intake. The water level in the well was then allowed to recover overnight or longer. The pump was left in place and was used to collect a sample once the water level had

recovered, unless the water in the tubing was likely to freeze overnight. If freezing temperatures were expected, the pump was removed from the well and the water sample was collected using a bailer or by re-deploying the pump down the well, once the well had recovered to a sufficient water level. In both cases, *in situ* parameters were recorded before and after sampling.

The key disadvantages of this second purge and sample approach are:

- Potentially less representative samples due to mixing of stagnant water with formation water,
- Greater stress on the surrounding formation,
- Greater purge volume, and
- Longer sampling time.

2.6.4 Alternative Groundwater Sampling Methods

In some cases, neither of the standard methods could be used to collect samples and alternative methods were used. Circumstances where alternative methods were applicable included the following:

- Blockages in the groundwater monitoring well: in some wells, frost or other factors have resulted in partial blockages in the PVC, inhibiting the use of a submersible pump.
- Low water levels in wells that are slow to recover: in some wells, there is not enough of a water column above the well screen to purge and sample.

Sampling methods for these circumstances included the use of bailers or HDPE tubing with a foot valve. These sampling methods are more aggressive than low-flow methods with a submersible pump and can result in higher turbidity and can result in mixing of stagnant well water with fresh water from the screened interval of the well. Analytical results for samples collected using these alternative methods can provide information about groundwater quality in the formation around the well, however, the resulting data may not be of the same quality as that resulting from the standard groundwater sampling methods. Data collected using the alternative methods are always interpreted with consideration to the method used.

2.6.5 Description of Groundwater Quality Monitoring Locations and Sampling Events

Water quality samples have been collected at the site from 29 groundwater quality monitoring wells strategically located in the vicinity of and down-gradient of key proposed project facilities. Monitoring well locations are grouped for analysis into three general areas, which are listed in Table 2.1: Open Pit area (eight wells), Casino Creek valley area (nine wells) and hillslope area (12 wells).

Samples were collected three times per year targeting seasonal representation (spring, summer, and fall). The timing of each sampling event was chosen such that the annual sample set would be representative of the seasonal variability of groundwater levels. Groundwater sampling events were intended to coincide with the lowest groundwater levels (prior to freshet), the highest groundwater levels (after freshet), and intermediate groundwater levels (autumn).

Over the course of the baseline data collection program some monitoring wells have been dropped from the sampling program as a result of damage such as blockages, likely due to winter ground freezing conditions. New monitoring wells were installed in 2013 and added to the sampling program. Samples were not collected from a monitoring well if it was frozen, which was more likely to occur in the spring and early summer.

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TABLE 2.1

CASINO MINING CORPORATION
CASINO PROJECT

2013-2014 GROUNDWATER DATA REPORT
GROUNDWATER QUALITY MONITORING LOCATIONS AND SAMPLE SUMMARY

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Site Location	Site Description	Samples Collected	1994	1995		2008	2009	2010			2011			2012		2013			2014		
			Sep	Feb	May	Sep	Sep	Jun	Aug	Sep	May	Jul/ Aug	Sep	May	Sep	Jun	Aug	Sep/Oct	May	Jul	Sep/Oct
Open Pit Area																					
94-337	Open Pit Area	19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
HG10-01	Proctor Gulch	11	-	-	-	-	-	-	1	1	-	1	1	1	-	1	1	1	1	1	1
HG10-02	Proctor Gulch	10	-	-	-	-	-	-	1	1	-	1	1	1	-	-	1	1	1	1	1
HG10-04	Proctor Gulch	13	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1
HG10-05	Proctor Gulch	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
HG10-07	Open Pit Area	2	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
MW13-02D	North of Open Pit near Canadian Creek	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1
MW13-02S	North of Open Pit near Canadian Creek	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1 [2]	-	1	-
Casino Creek Area																					
94-340	Upper limits of TMF	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94-342	Upper limits of TMF	7	1	1	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
94-343	Upper limits of TMF	4	1	-	-	1	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-
94-345	Middle of TMF	10	1	1	1	-	1	1	1	1	-	1	1	1	-	-	-	-	-	-	-
94-346	Middle of TMF	8	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-
94-347	Middle of TMF	9	1	-	-	1	1	-	1	1	-	1	1	-	1	-	-	-	-	-	1
94-348	TMF Embankment	4	-	-	-	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-
94-350	Downgradient of TMF	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94-351	Downgradient of TMF	6	-	-	-	1	1	-	1	1	-	1	1	-	-	-	-	-	-	-	-
Hillslope Area																					
94-352	Heap Leach Facility	9	1	-	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	1	1
94-353	Heap Leach Facility	7	-	-	1	1	1	-	1	1	1	1	-	-	-	-	-	-	-	-	-
94-354	Heap Leach Facility	7	-	-	1	1	-	-	1	1	-	1	1	-	-	-	-	-	-	1	-
MW11-01A	Historic Meloy Creek mine adit area	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
MW11-01B	Historic Meloy Creek mine adit area	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
MW11-02A	Historic Meloy Creek mine adit area	9	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
MW11-02B	Historic Meloy Creek mine adit area	9	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
MW13-01D	Supergene Ox/ Low Grade Ore Stockpile	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 [3]	-
MW13-03S	North of Gold Ore Stockpile	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1 [3,4]	-
MW13-04S	South of Gold Ore Stockpile	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1
MW13-05	West of Tailings Management Facility	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1
MW13-06D	West of Tailings Management Facility	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1

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NOTES:
1. SAMPLE COUNT DOES NOT INCLUDE DUPLICATE SAMPLES COLLECTED AT A MONITORING SITE.
2. WELL DEVELOPMENT INCOMPLETE WHEN SAMPLE WAS COLLECTED.
3. SAMPLE COLLECTED AFTER WELL WAS THAWED.
4. RESULTS REJECTED BASED ON CONCLUSION THAT THEY WERE NOT REPRESENTATIVE OF FORMATION CONDITIONS.

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2.6.6 Laboratory Analysis

Groundwater samples were submitted to ALS Environmental in Burnaby. The following parameters were analyzed:

- Physical Tests – Hardness, pH, specific conductivity, total dissolved solids (TDS), total suspended solids (TSS), and turbidity.
- Dissolved Anions – Alkalinity (bicarbonate, carbonate, and hydroxide), bromide, chloride, fluoride, and sulphate.
- Nutrients – Ammonium nitrogen, nitrate, nitrite, dissolved orthophosphate, and total and dissolved phosphate.
- Total and Dissolved Metals – metals and metalloids analyzed at low levels to meet the B.C. Water Quality Guidelines (BCWQG) and the Canadian Environmental Quality Guidelines (CEQG) criteria values (low-levels): Aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, selenium, silver, sodium, thallium, uranium, vanadium, and zinc.
- Total and Dissolved Mercury – ultra-low detection limits.
- Cyanide - Free, total, and weak acid dissociable (WAD).
- Organics – Total organic carbon (TOC) and dissolved organic carbon (DOC).

2.6.7 Relevant Guidelines

Baseline water quality analytical and *in situ* data from the groundwater samples were examined and compared to relevant guidelines with respect to the most sensitive receptors in the downstream environment which are aquatic life. While groundwater is not considered aquatic life habitat, the results of the groundwater quality baseline program for the Project have been compared to aquatic life guidelines because groundwater may contribute to the streamflow of creeks that do support aquatic life in the project area. The guidelines are reported in territorial and federal guidance documents and include the following:

- Yukon Contaminated Sites Regulation (YCSR) Schedule 3 - Generic Numerical Water Standards – Aquatic Life – The aquatic life standards were developed for groundwater assuming a minimum 1:10 dilution ratio for groundwater to surface water. Pursuant to section 145 of the Yukon Environment Act (O.I.C. 2002/171).
- Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Aquatic Life (Freshwater) (CCME).

The guidelines are provided in Table F1 of Appendix F. Guidelines for some parameters are hardness or pH dependent. In these cases, the guideline was assessed based on the measured hardness or pH in each sample.

2.6.8 Quality Assurance/Quality Control, Data Management and Data Analysis

The QA/QC procedure aids with the collection of representative data that are scientifically defensible, repeatable, and well documented. KP implemented these procedures from 2011 to present. During the time when KP has been responsible for overseeing the groundwater quality data collection, these procedures have been facilitated at the project management level through organization and planning and the enforcement of both external and internal quality control. The following lists summarize the QA/QC procedures and practices that have been followed from 2011 to present, which are described in detail in Appendix E:

Internal Quality Control:

- Staffing the project with experienced/trained individuals,
- Providing representative, meaningful data through planning and efficient research,
- Use of standard protocols for sample collection, preservation, and documentation,
- Regular calibration and maintenance of all field equipment, and
- Collection of duplicate, blank, filter and travel blank samples for submission for analysis (approximately 10% of overall samples).

External Quality Control:

- Employment of fully accredited analytical laboratories for the analysis of all samples, and
- Determination of analytical precision and accuracy through the interpretation of the analysis reports for the blind duplicate, blank, filter and travel blank samples.

The quality of project data was assessed based on the performance of the data when compared to the pre-set data quality objectives (DQOs). DQOs provide a means of assessing the QA/QC data and determining whether the data in question are precise, accurate, representative, and complete. The results from QA/QC samples were reviewed to determine if sample contamination occurred, and these data were further used to determine if the contamination occurred during collection, handling, storage, or shipping. Upon receipt from the laboratory the data were uploaded into the FULCRUM data management system, along with copies of field notes, photos, Sample Receipt Confirmations, Microsoft Excel data, and Certificates of Analysis. The data were then routinely reviewed, based on the following considerations:

- Duplicate sample analytical results,
- Blank sample analytical results,
- Total and dissolved metals comparison,
- Ion balance,
- Data validation,
- Detection limits,
- Analytical precision, and
- Analytical accuracy.

The DQOs and the results of the QA/QC program are described in detail in Appendix E.

3 – RESULTS

3.1 2013 HYDROGEOLOGY SITE INVESTIGATION

3.1.1 Drilling and Monitoring Well Installations

Eleven monitoring wells were completed at six locations during the 2013 site investigation. Paired monitoring wells were installed at five locations to support estimation of vertical hydraulic gradients and maximize monitoring zones (BC MOE 2012). MW13-01D/S and MW13-02D/S were installed using HT drill rods and the overburden was cased using HWT size rods. The remaining seven drillholes were drilled using HWT drill rods and the overburden was cased using PW size rods. Based on availability of materials at the site, eight monitoring wells were constructed using Schedule 40 PVC (MW13-01S/D, MW13-02S/D, MW13-03S/D, and MW13-04S/D). The remaining three monitoring wells were constructed using Schedule 80 PVC. Monitoring well installation details are summarized in Table 3.1. Monitoring well locations are shown on Figure 3.1.

Drillhole depths varied from approximately 15 to 50 meters below ground surface (mbgs). Monitoring well screens were 3 m long and the top of monitoring well screen placement ranged from 10 m to 46 mbgs. In general, the most permeable zone observed during drilling was selected as the depth at which to place the screen, with subsurface lithology, fracture spacing and degree of weathering taken into account. Drillhole logs and monitoring well installation details are provided in Appendix A1. Geologic logs of drill core provided by CMC are included in Appendix A2.

The overburden encountered during drilling generally consisted of silty and gravelly sands. Overburden ranged in thickness from about 0.6 m to 7 m and was interpreted to be colluvium at all drillholes except MW13-02D/S. Sandy and gravelly material was recovered from the full depth of drillholes MW13-02D/S, advanced to a maximum depth of 30 mbgs. The origin of the material in drillholes MW13-02D/S was interpreted to be a fault zone; however, the deposit may be alluvial in origin given the proximity of these drillholes to Canadian Creek. Poor recovery of subsurface material for the entire length of both drillholes made logging and classification of the subsurface material difficult. Based on the recovered samples, subsurface material at drillholes MW13-02D/S was described as silty sand with cobbles and gravels with weathered and oxidized surfaces.

Bedrock encountered during drilling consisted of granodiorite and quartzite. Bedrock was described as weathered at the bottom of all drillholes except MW13-01D and MW13-03D, where bedrock at the bottom of the drillhole was described as competent. Fault zones up to 3 m thick were encountered in drillholes MW13-01S/D and a narrow shear interval (0.2 m) was encountered at the bottom of drillhole MW13-03D.

The following observations during drilling and monitoring well installation indicated that permafrost was present at MW13-01D/S, MW13-02D/S and MW13-03D/S:

- A 2 cm thick ice lens was observed in rock core sampled from approximately 10 mbgs in drillhole MW13-01D. The water column in both MW13-01D and MW13-01S froze before the 2013 drilling program was completed.
- Water level recovery measured during pauses while drilling at MW13-02D/S was negligible or slow at depths above 10 mbgs and was rapid below 10 mbgs. The base of permafrost at these drillholes was inferred to be 10 mbgs based on the change in water level recovery in the drillholes.

- The drill rods started to freeze to the walls of drillholes MW13-03D/S. The rods freezing complicated the installation of monitoring well MW13-03D.

No indications of permafrost were noted at drillholes MW13-04D/S, MW13-05, or MW13-06D/S during drilling and monitoring well installation. Ice was not observed in drill core retrieved from any drillhole locations other than MW13-01D.

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XREF FILE(S): IMAGE FILE(S):

OPEN PIT AREA
SCALE B

615 000 E
620 000 E
605 000 E
610 000 E
6 970 000 N
6 965 000 N
6 960 000 N
6 955 000 N
6 950 000 N
6 945 000 N

YUKON RIVER
BRITANNIA CREEK
CANADIAN CREEK
BRYNELSON CREEK
MELOY CREEK
AUSTIN CREEK
CASINO CREEK
DIP CREEK

MW13-02D/S
W7
MP10-01
DH11-39
HG10-07
HG10-08
94-321
94-326
94-334
DH11-38
93-145
94-298
CAS-036
94-288
OPEN PIT
P-39
CAS-033
HG10-10
94-310
94-331
94-305
94-337
CAS-037
93-226
94-332
DH11-37
HG10-06
HG10-01
HG10-04
HG10-05
HG10-02
HG10-03
DH10-18
HG10-09
94-333
CAS-034
DH11-36

DH11-PEG-01
DH11-PEG-02
DH11-PEG-03
DH11-PEG-04
W1
W14
W3

FOR DETAILS SEE INSET

OPEN PIT
MW13-03D/S
GOLD ORE STOCKPILE
MW13-04D/S
94-340
MW13-01D/S
94-342
SUPERGENE OXIDE / LOW GRADE ORE STOCKPILE
DH11-34
DH11-33
LOW GRADE ORE STOCKPILES
DH11-32
94-343
HEAP LEACH FACILITY
DH12-05
94-353
94-355
MW11-02A/B
DH11-29
MW11-01A/B
94-344
DH12-04
94-352
94-351
A
MW13-05
MELOY CREEK
94-346
94-345
DH10-01
94-347
TAILINGS MANAGEMENT FACILITY
DH10-02
DH11-21A/B
MW13-06D/S
DH10-03
94-348
DH11-22
DH11-24
DH10-04
DH12-01
DH12-02
DH11-23A/B
DH10-05
DH10-06
DH11-15
MP10-02
94-351
W11
DH11-25
DH12-03
94-349
94-350
W18
MP10-03
H18
DH11-14
CASINO CREEK
DH11-13
MP10-04
W4
DH11-10
DH11-12
W9
DH11-09
DH11-11
R2
DH11-08
DH13-04
DH13-03
AIRSTRIP PROPOSED
DH11-01

LEGEND:

- MONITORING WELL
- THERMISTOR
- OPEN DRILLHOLE
- VIBRATING WIRE PIEZOMETER
- R2 HYDROLOGY STATION
- GEOTECHNICAL PIEZOMETER
- VIBRATING WIRE PIEZOMETER & THERMISTOR
- FAULT
- SEISMIC LINE
- A HISTORIC ADIT

NOTES:

1. CONTOUR INTERVAL IS 25 METERS.
2. DIMENSIONS ARE IN METRES UNLESS NOTED.
3. COORDINATE GRID IS UTM NAD 83 ZONE 7
4. OUTLINES ARE PROVIDED FOR PROPOSED FACILITIES.

SCALE B: 250 125 0 250 500 750 1000 1250 m
SCALE A: 800 400 0 1000 2000 3000 4000 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
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CASINO COPPER-GOLD PROJECT

PROJECT LAYOUT AND GROUNDWATER MONITORING LOCATIONS

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P/A NO. VA101-325/17 | REF NO. 1

FIGURE 3.1 | REV 0

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TABLE 3.1

CASINO MINING CORPORATION
CASINO PROJECT

2013 - 2014 GROUNDWATER DATA REPORT
2013 MONITORING WELL INSTALLATION SUMMARY

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Monitoring Well	Coordinates[1]			Drill hole Diameter	Total Depth	Depth to Bedrock	Monitoring Well Installation									Response Test Summary	
	Northing	Easting	Ground Elevation				Date Completed	PVC Schedule	PVC Stickup	Completion Zone		Screened Zone		Water Level After Installation	Date of Water Level Measurement	Date	Calculated Hydraulic Conductivity
	(m)	(m)	(masl)	Nominal (m)	(mbgs)	(mbgs)	dd-mmm-yr	-	(m)	From (mbgs)	To (mbgs)	From (mbgs)	To (mbgs)	(mbPVC)	dd-mmm-yr	dd-mmm-yr	(m/s)
MW13-01D	6,957,455	611,804	1,149	0.091	41.2	7.6	6-Jun-13	40	0.69	25.9	32.0	27.5	30.5	frozen at 2.6 m	27-Jun-13	28-Jul-14	- [3]
MW13-01S	6,957,450	611,802	1,150	0.091	15.2	4.6	7-Jun-13	40	0.68	10.0	15.2	10.7	13.7	frozen at 2.4 m	27-Jun-13	-	frozen
MW13-02D	6,959,341	609,888	1,193	0.091	30.3	>30.3	12-Jun-13	40	0.57	22.8	30.3	24.3	27.3	2.18	27-Jun-13	4-Aug-13	1E-05
MW13-02S	6,959,345	609,886	1,193	0.091	18.3	>18.3	9-Jun-13	40	0.57	10.0	16.2	11.8	14.8	1.57	26-Jun-13	-	-
MW13-03D	6,958,593	613,068	1,214	0.114	36.6	3.0	16-Jun-13	40	0.37	29.2	36.6	30.7	33.8	27.42	28-Jun-13	14-Aug-13	8E-08
MW13-03S	6,958,589	613,065	1,213	0.114	18.3	0.6	17-Jun-13	40	0.30	9.1	14.9	10.6	13.6	12.0	28-Jun-13	14-Aug-13	- [3]
MW13-04D	6,957,637	613,298	1,024	0.114	41.2	2.1	19-Jun-13	40	0.38	36.1	41.2	37.7	40.7	8.27	19-Jun-13	14-Aug-13	<1E-8
MW13-04S	6,957,633	613,297	1,024	0.114	21.2	1.8	19-Jun-13	40	0.69	16.0	21.2	18.0	21.0	10.89	27-Jun-13	5-Aug-13	3E-06
MW13-05	6,955,823	614,719	1,024	0.114	50.3	4.6	22-Jun-13	80	0.50	44.9	50.3	46.6	49.6	33.23	28-Jun-13	28-Jul-14	2E-04
MW13-06D	6,953,267	613,962	1,069	0.114	48.8	3.0	24-Jun-13	80	0.16	43.8	48.8	45.4	48.4	32.90	27-Jun-13	7-Aug-13	9E-06
MW13-06S	6,953,276	613,958	1,070	0.114	38.7	4.0	25-Jun-13	80	0.23	32.0	38.7	33.6	37.8	31.0	28-Jun-13	13-Aug-13	9E-07

M:\1\01\00325\17\A\Report\1-2013 Hydrogeology\Rev 0\Tables\[Table 3.1- Monitoring Well Summary_r0.xls]Well Summary

NOTES:

1. UTM COORDINATES AND ELEVATION WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013 AND ARE IN NAD83 UTM ZONE 7V.
2. MONITORING WELLS COMPLETED WITH NOMINAL 2-INCH DIAMETER PVC .
3. RESPONSE TEST CONDUCTED BUT RESULTS NOT CONSIDERED REPRESENTATIVE OF NATURAL FORMATION DURE TO FROZEN SUBSURFACE CONDITIONS.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

3.1.2 Monitoring Well Development (2013 Monitoring Wells)

Eight of the eleven monitoring wells were developed using the methods described above. The column of water in monitoring wells MW13-01D/S froze within 20 days of installation and these wells could not be developed. Development of MW13-02S has been attempted over multiple site visits but has not been successfully completed due to an inflow of silt/sand through the well screen. Turbidity of water purged from MW13-02S remained above the recommended turbidity for groundwater sample collection.

Relatively high pH (above 9) was measured during well development at two locations, MW13-03D and MW13-04D, and likely indicates contamination from a bentonite or cement source. Slow groundwater recharge rates to these wells made development difficult. Efforts were made to purge as much water as possible from these monitoring wells to improve water quality, including purging the well completely dry. The pH remained above expected background levels at these wells.

Results of the monitoring well development are summarized in Table 3.2.

3.1.3 Response Testing

Response testing was carried out at nine of the eleven monitoring wells installed in 2013. Hydraulic conductivity values estimated from testing ranged from less than $1x10^{-8}$ m/s to $2x10^{-4}$ m/s. A response test was not conducted at monitoring well MW13-01S since the well is screened within permafrost or at MW13-02D since the well requires further development.

The water columns in monitoring wells MW13-01D and MW13-03S were thawed during the July 2014 site visit and a hydraulic conductivity was estimated using the water level recovery in the well following purging. Results of hydraulic conductivity testing at MW13-01D and MW13-03S were $<1x10^{-8}$ m/s and $2x10^{-8}$ m/s, respectively. The presence of frozen ground conditions are expected to reduce the hydraulic conductivity of the test interval and the results are not considered representative of formation conditions. Response test analyses at MW13-01D and MW13-03S are presented in Appendix C for qualitative purposes only and the hydraulic conductivity values are not included in Table 3.1.

Hydraulic conductivity values are summarized in Table 3.1 and response test analyses are presented in Appendix C.

3.2 2013 – 2014 DATA COLLECTION PROGRAM

Baseline hydrogeology data were collected during six site visits to the Project in 2013 and 2014. Data collected during these site visits are discussed in the sections that follow and include groundwater level monitoring, ground temperature monitoring, re-development of select historic monitoring wells and groundwater quality sampling.

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TABLE 3.2

CASINO MINING CORPORATION
CASINO PROJECT

2013-2014 GROUNDWATER DATA REPORT
MONITORING WELL DEVELOPMENT SUMMARY

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Monitoring Well	Well Development Summary								Notes
	Start Date	Finish Date	Water Level Before Development	Water Level After Development	pH	Conductivity	Turbidity	Total Volume Purged	
	dd-mmm-yr	dd-mmm-yr	(mbPVC)	(mbPVC)		uS/cm	NTU	L	
MW13-01D	-	-	-	-	-	-	-	-	Development not conducted. Water column is frozen.
MW13-01S	-	-	-	-	-	-	-	-	Development not conducted. Water column is frozen.
MW13-02D	3-Aug-13	4-Aug-13	0.75	3.28	5.8	67	261	1,770	
MW13-02S[2]	3-Aug-13	26-Jul-14	2.25	6.65	6.2	65	1,899	540	Development was not completed due to sand/silt influx to the monitoring well screen. In-situ parameters are presented for the last development attempt on July 26, 2014.
MW13-03D	8-Aug-13	Not Completed	11.25	dry	10.9	211	721	180	pH high after development (suspect grout contamination). Slow recharging well.
MW13-03S	8-Aug-13	9-Aug-13	12.01	13.51	8.2	285	100	160	
MW13-04D[2]	4-Aug-13	Not Completed	8.27	dry	10.2	310	1147	240	Water was used from MW13-04S for development in this well. pH high after development (suspect grout contamination). Slow recharging well.
MW13-04S	4-Aug-13	4-Aug-13	8.65	11.78	7.6	207	77	770	
MW13-05	8-Aug-13	8-Aug-13	41.78	41.80	7.5	225	14	660	Very good recharge
MW13-06D	5-Aug-13	5-Aug-13	31.89	33.22	6.9	512	25	680	Not developed with surge block
MW13-06S	6-Aug-13	8-Aug-13	32.72	33.12	7.2	457	65	280	Not developed with surge block.
HG10-01	8-Jun-13	8-Jun-13	Artesian	Artesian	6.8	1,006	1,050	1,900	Not developed with surge block.
HG10-04	9-Jun-13	11-Jun-13	4.42	9.93	8.6	547	10	310	
MW11-02A	9-Jun-13	11-Jun-13	7.15	7.67	7.7	195	39.4	790	Surge block hit blockage at 2.77 m, not developed with surge block
MW11-02B[2]	9-Jun-13	11-Jun-13	6.57	8.67	8.1	255	1,072	80	(Re)-Development not completed due to insufficient groundwater recharge to well. In-situ parameters taken from the time at which well development was stopped on Sept 30, 2014.

M:\1\01\00325\17\A\Report\1-2013 Hydrogeology\Rev 0\Tables\[Table 3.2 Well Development.xlsx]Table 3.2 Well Development

NOTES:

1. IN-SITU MEASUREMENTS ARE BASED ON THE LAST RECORDED VALUES (AT FINAL WELL SCREEN INTERVAL) DURING DEVELOPMENT.
2. DEVELOPMENT NOT COMPLETED. IN-SITU PARAMETERS TAKEN FROM THE TIME AT WHICH DEVELOPMENT WORK WAS STOPPED.
3. m IS METRES, mags IS METRES ABOVE GROUND SURFACE, mbgs IS METRES BELOW GROUND SURFACE, - IS NOT RECORDED, N/A IS NOT APPLICABLE.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	22DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

3.2.1 Groundwater Levels

Manual water levels have been collected in monitoring wells and standpipe piezometers on site using a water level tape during all groundwater sampling events, after well installation/development and before and after response testing. Manual water levels measured at the 2013 monitoring wells soon after installation are presented in Table 3.1. All historic manual water level measurements at standpipes and monitoring wells across the site are presented in Appendix C1.

Pressure transducers were fitted in all 11 monitoring wells installed in 2013. Pressure transducers are also installed in seven additional monitoring wells across the project site and have been collecting water level data since 2010. Pressure transducers were removed from all wells in September 2012 by a third party consultant contracted to CMC and were re-installed in the monitoring wells in June 2013. Plots of long-term groundwater elevation data at the monitoring wells up to October 2014 are presented in Appendix C2. Transducer water level data collected at monitoring well MW13-06S is not included in Appendix C2 as the transducer was either unsaturated or suspect to be malfunctioning during the site visits. The transducer was replaced in September 2014.

Continuous water level data have been collected at six vibrating wire piezometers (VWPs) on site since 2009. A plot showing groundwater elevations calculated at the six VWPs is provided in Appendix C3.

3.2.2 Ground Temperature Data

Ground temperature data were collected from ten thermistor strings and six VWPs on site. In addition to the thermistor sites reported in the 2012 baseline report (KP 2013), two 10-node thermistor strings were installed as part of the 2013 geotechnical site investigation program (KP 2014). A summary of current thermistor installations is presented in Table 3.3 and includes details on permafrost presence and depth to the base of permafrost at each site. The depth of the active layer at thermistor locations, which is the uppermost layer of ground which freezes in the winter and thaws in the summer, is also included in Table 3.3. Plots of temperature versus time and temperature versus depth are presented in Appendix D1 for each thermistor string installation.

Temperature data were additionally recorded at temperature sensors at the six VWPs installed on site. Temperature data collected from the VWPs is presented in Appendix D2.

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TABLE 3.3

CASINO MINING CORPORATION
CASINO PROJECT

2013-2014 GROUNDWATER DATA REPORT
THERMISTOR DATA SUMMARY

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Thermistor	Location	Inferred Depth of Active Layer (mbgs)	Inferred Depth of Permafrost (mbgs)
CAS-034	Deposit	3	104
CAS-036	Deposit	-	-
DH11-21B	Casino Creek	9	50
DH11-23B	Casino Creek	2	68
DH12-01	Casino Creek	4	62
DH12-02	Casino Creek	5	46
DH12-03	Casino Creek	4	43
DH12-05	Hillslope	-	-
DH13-03	Dip Creek Valley	All frozen	138
DH13-04	Dip Creek Valley	1	111

M:\1\01\00325\17\A\Report\1-2013 Hydrogeology\Rev 0\Tables\[Table 3.3 Thermistor Summary.xlsx]Table 3.2

NOTES:

1. THERMISTORS INSTALLED AT CAS-036 AND DH12-05 DID NOT REPORT TEMPERATURES BELOW ZERO DEGREES CELCIUS.

REV	DATE	DESCRIPTION	PREP'	CHK'	APP'
0	06MAR'1	ISSUED WITH REPORT	KTD	CAS	KJB

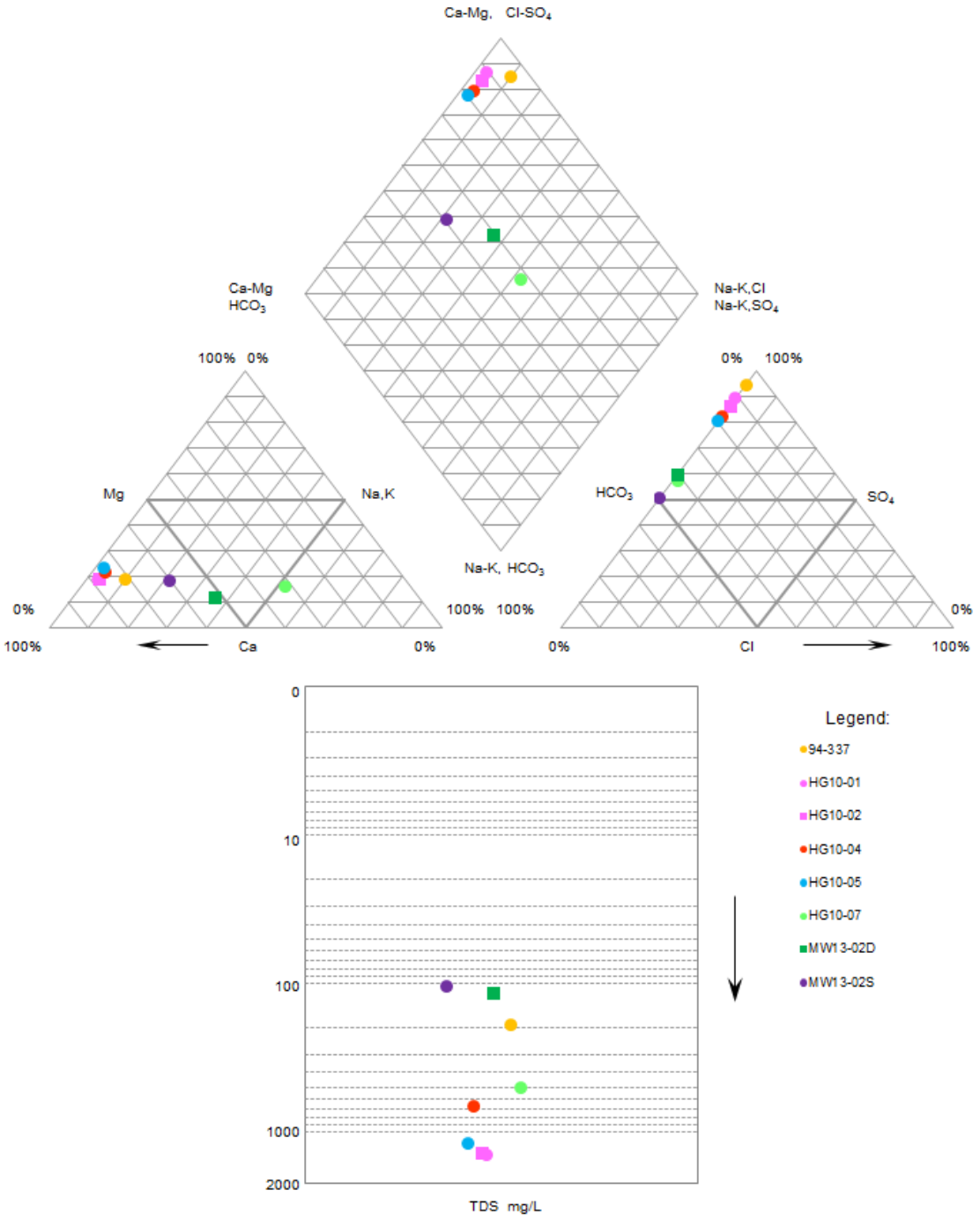
3.2.3 Monitoring Well Development (Monitoring Wells Installed Prior to 2013)

Groundwater samples have been collected by various consultants since the program began in 1993 and sampling and development methods have not always been clearly documented. It has been assumed that the groundwater sampling methods have been in accordance with the best practices for the time that they were sampled and likely ranged from hand or mechanical pump purging methods (three well volume) to low flow / minimum drawdowns (submersible pumps) methods. Turbidity is generally a good indicator of sample condition and higher turbidity samples tend to arise when pumping rates are greater than the natural flow through the screened interval of the well and sediments in the well are mobilized. Turbid conditions can also be an indicator that the wells were not sufficiently developed. The majority of the groundwater sample collected from monitoring wells prior to 2013 reported turbidity values below 50 NTU. Monitoring wells that reported groundwater sample turbidity values higher than 50 NTU even when sampled using the low flow submersible pumps were re-developed in the summer of 2013. Monitoring wells HG10-01, HG10-04, and MW11-02A were re-developed in June 2013 and MW11-02B was re-developed in September 2014. Results of the monitoring well development are presented on Table 3.2.

3.2.4 Groundwater Quality

Baseline analytical and *in situ* data have been compared to the relevant water quality guidelines for the Project. Data tables with guideline comparisons are provided in Appendix F. The data tables are inclusive of all data collected from 1994 to 2014; however, the QA/QC analysis (Appendix E) is limited to the data collected in 2013 and 2014. The QA/QC of preceding data are provided in the 2012 Baseline Hydrogeology Report (KP 2013). To remain consistent with the format of the previous report, data are presented by project area: Open Pit area, hillslope area, and Casino Creek valley area.

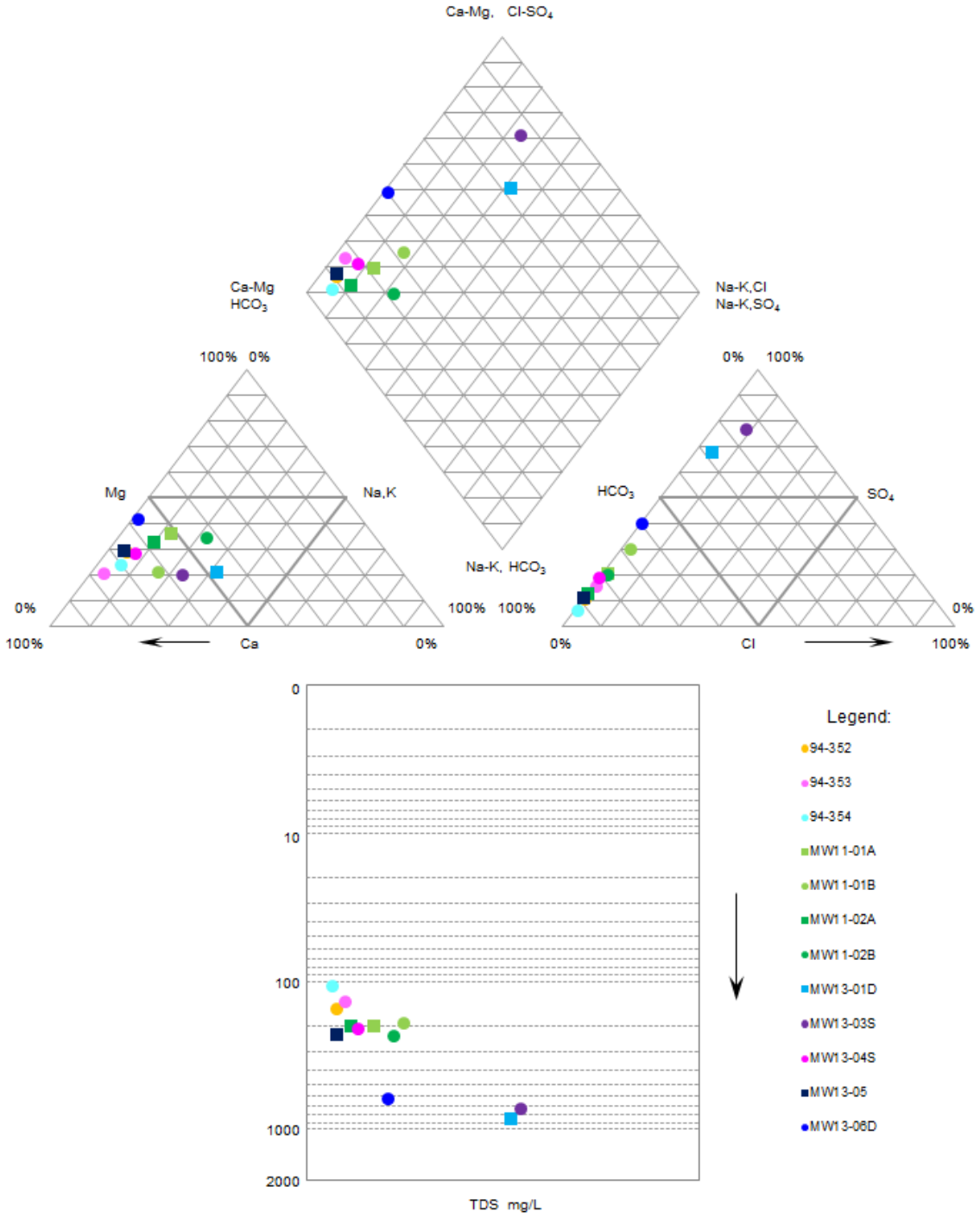
Piper diagrams were used to assist in characterizing groundwater quality in the project area and to compare major water types. A Piper diagram is a trilinear plot of the relative concentrations of the major dissolved ions in water, which provides a visual interpretation of the similarities and differences in the water throughout the project area. Piper diagrams were prepared for each of the three main project areas, using average analytical results for all samples collected from 1994 through 2014 from each monitoring site for major anion (bicarbonate, chloride, and sulphate) and cation (calcium, magnesium, sodium, and potassium) concentrations. These diagrams are provided on Figure 3.2 (Open Pit area), Figure 3.3 (hillslope area), and Figure 3.4 (Casino Creek Valley area). Piper diagrams showing individual samples for each well are provided in Appendix G.



NOTES:

1. DATA USED FOR THIS PLOT ARE AVERAGE VALUES.
2. PIPER DATA ARE PLOTTED IN PERCENT MILLI-EQUIVALENTS PER LITRE (%meq/L).
3. TOTAL ALKALINITY WAS USED FOR BICARBONATE VALUE, IF REQUIRED.

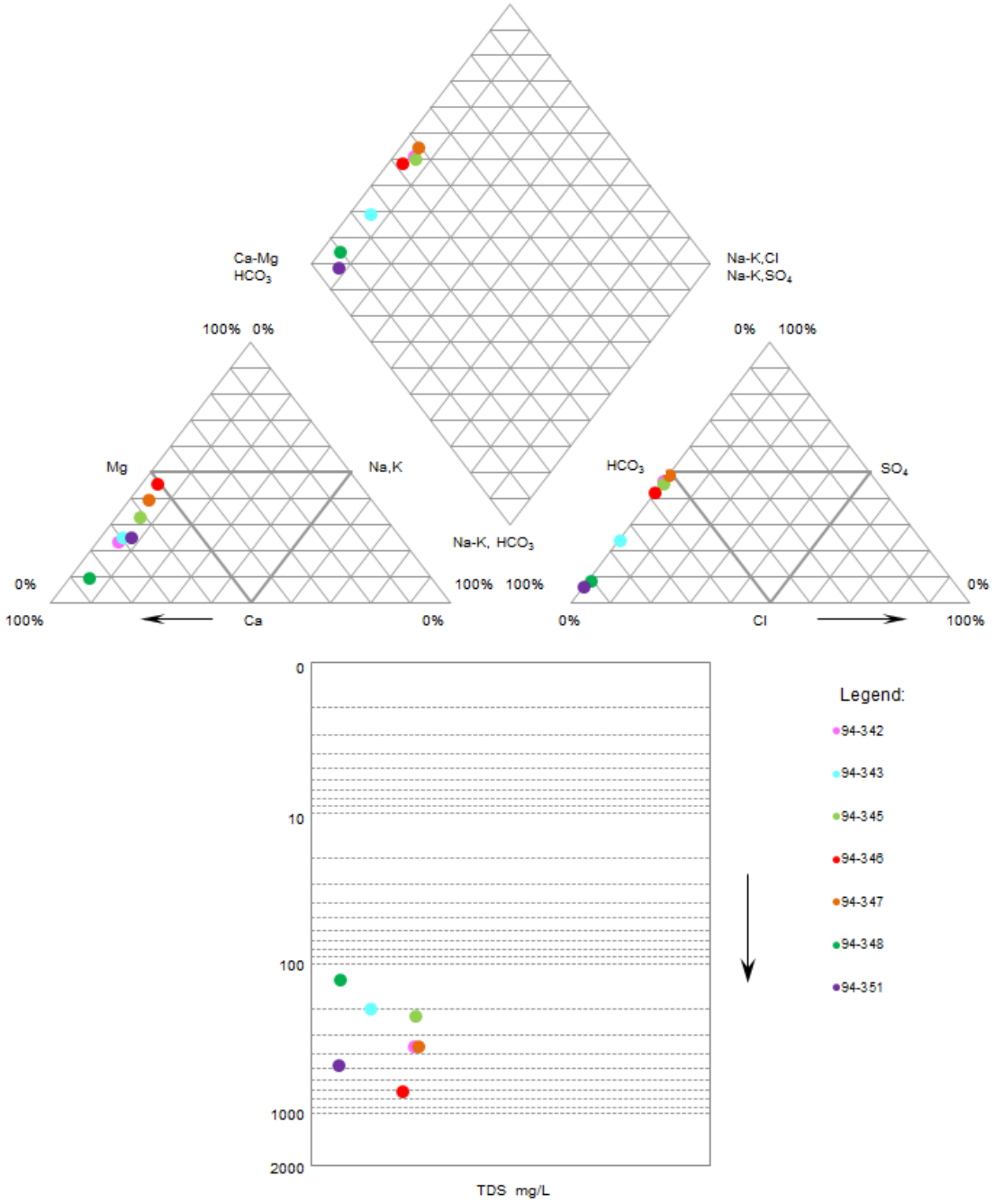
Figure 3.2 Trilinear Piper Diagram – Open Pit Area



NOTES:

1. DATA USED FOR THIS PLOT ARE AVERAGE VALUES.
2. PIPER DATA ARE PLOTTED IN PERCENT MILLI-EQUIVALENTS PER LITRE (%meq/L).
3. 94-352 DATA FOR 1994 AND 1995 WERE EXCLUDED.

Figure 3.3 Trilinear Piper Diagram – Hillslope Area



NOTES:

1. DATA USED FOR THIS PLOT ARE AVERAGE VALUES.
2. PIPER DATA ARE PLOTTED IN PERCENT MILLI-EQUIVALENTS PER LITRE (%meq/L).
3. GROUNDWATER CHEMISTRY DATA FOR SAMPLES COLLECTED PRIOR TO 2008 WERE EXCLUDED FOR THE CHARACTERIZATION OF 94-342 AND 94-345.

Figure 3.4 Trilinear Piper Diagram – Casino Creek Valley Area

4 – REFERENCES

BC Ministry of Water, Land and Air Protection. 2003. *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-emission, Water, Wastewater, Soil, Sediment and Biological Samples.*

Hvorslev, M.J. 1951. Time Lag and Soil Permeability in Ground-Water Observations. Waterways Exper. Sta. Corps of Engrs, U.S. Army. Bull. No. 36: 1-50.

Knight Piésold Ltd. (KP), 2013. Casino Copper-Gold Project. 2012 Baseline Hydrogeology Report (Ref. No. VA101-325/14-4).

Knight Piésold Ltd. (KP), 2014. Casino Project. 2013 Geotechnical Site Investigation Data Report, Mine Site (Ref. No. VA101-325/16-1).

Ministry of Environment, British Columbia (BC MOE). 2012. Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.

United States Environmental Protection Agency. 1996. Low-Flow (Minimum Drawdown) Ground-Water Sampling Procedures. EPA/540/S-95/504.

5 – CERTIFICATION

This report was prepared, reviewed and approved by the undersigned.

Groundwater Quality Prepared:

for Kevin Davenport, EIT
Staff Engineer

Groundwater Quality Prepared:

Catriona Jackson, EIT
Staff Engineer

PROFESSIONAL ENGINEER
YUKON TERRITORY
DR. CYNTHIA STARZYK

March 2015

Groundwater Quality Reviewed:

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Groundwater Quality Reviewed:

Jessica Mackie, EP
Senior Environmental Scientist

This report was prepared by Knight Piésold Ltd. for the account of Casino Mining Corporation. Report content reflects Knight Piésold's best judgement based on the information available at the time of preparation. Any use a third party makes of this report, or any reliance on or decisions made based on it is the responsibility of such third parties. Knight Piésold Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This numbered report is a controlled document. Any reproductions of this report are uncontrolled and might not be the most recent revision.

Approval that this document adheres to Knight Piésold Quality Systems: KB

APPENDIX A

DRILLHOLE AND MONITORING WELL COMPLETION LOGS

Appendix A1 Drillhole and Monitoring Well Completion Logs
Appendix A2 Geological Logs from CMC

APPENDIX A1

DRILLHOLE AND MONITORING WELL COMPLETION LOGS

(Pages A1-1 to A1-11)

Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-01D**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**5 Jun 13**
Location:	**Supergene Ox / Low Grade Ore Stockpile**	Total Depth:	**41.2 m**	Date Completed:	**6 Jun 13**
Coordinates:	**6,957,455 N, 611,804 E, UTM NAD83**	Elevation:	**1149 m**	Date Well Installed:	**6 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD/CAS**
Drilling Method:	**Diamond Coring**	Hole size:	**0.091 m**	Reviewed by:	**CAS**

ELVATION - (m)	DEPTH - (m)	GRAPHIC LOG			
			Steel Protector Cap PVC Stick-up = 0.69 m		**NOTES**
			OVERBURDEN, FROZEN (0 m to 7.6 m) Frozen, no material recovery	0.6 m	Concrete Surface Seal
1144	5				Cased with HWT rods (0.114 m OD) to 7.62 mbgs. Water level measured 27 June 2013, Frozen at 2.6 mbgs
			WEATHERED WRGD (7.6 m to 24.4 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled grey and white with orange oxide staining, strong with extremely weak to weak zones (9.1 m - 10.2 m) and (14.3 m - 18.9 m), highly weathered, joint spacing close to moderately close oriented at 40° and 80°.		
1139	10				2 cm ice lense observed at 10.2 mbgs
					Slough 50 mm (2-inch) PVC Schedule 40, Solid
1134	15				
1129	20				
				24.4 m	
1124	25		**FAULT ZONE** (24.4 m to 27.1 m) Mottled green, grey and white, very weak to weak, clay infill of joints	25.9 m	Bentonite Pellets Stopped drilling to check water level at 29 m. Water level measured at 15.1 m and slowly rising.
			WRGD (27.1 m to 28.5 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled white and grey, strong to very strong, joint spacing moderately close to wide oriented at 45° and 80°, orange oxide staining on fracture surfaces.	27.5 m	10/20 Filter Sand 50 mm (2-inch) PVC Screen, Schedule 40, 20 Slot, Capped
1119	30			30.5 m	
				32 m	
1114	35		**FAULT ZONE** (28.5 m to 28.73 m) Sheared/fault with ground up rock/clay/gouge		Slough
			WRGD (28.73 m to 41.2 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled white and grey, strong to very strong, joint spacing moderately close to wide oriented at 45° and 80°, orange oxide staining on fracture surfaces.		
1109	40			41.2 m	
1104	45		**END OF HOLE - 41.2 m**		

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

REV. 1 - Issued with Report

CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-01D

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.1** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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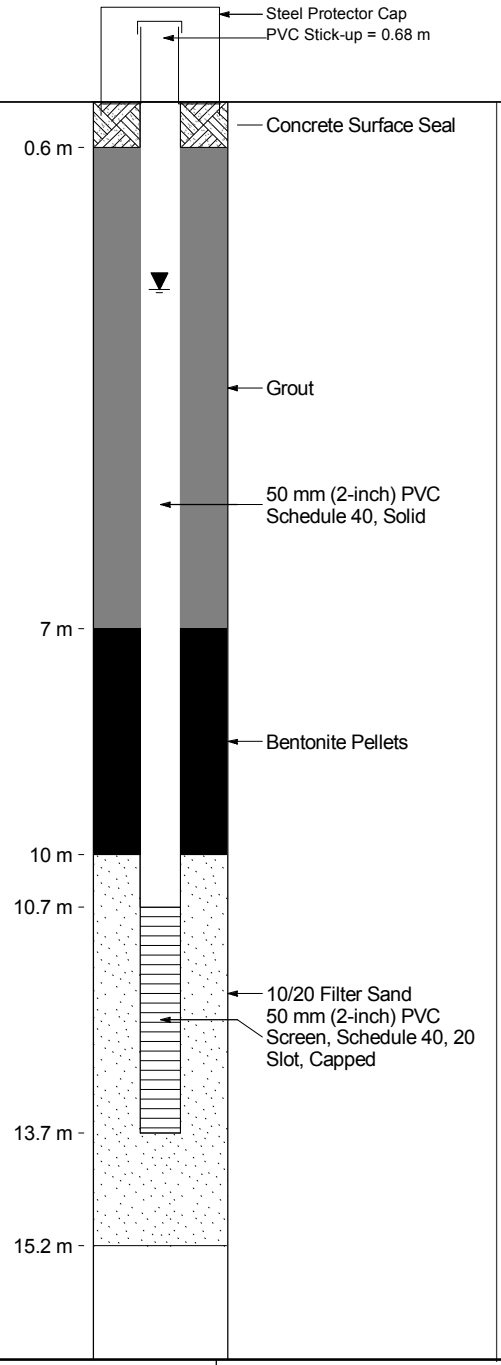
Library: M:\1101\00325114\A\DAT\TASK 320 - HYDROGEOLOGY - PHYSICAL\TASK 320-02 2013 HYDROGEO SITE INVESTIGATION\1-MONITORING WELLS\GINT\LIBRARY_TEMPLATE- NEW.GLB, WELL COMPLETION, CASINO 2013 DATA TEMPLATE.GDT, 6 I

Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-01S**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**7 Jun 13**
Location:	**Supergene Ox / Low Grade Ore Stockpile**	Total Depth:	**15.2 m**	Date Completed:	**7 Jun 13**
Coordinates:	**6,957,450 N, 611,802 E, UTM NAD83**	Elevation:	**1150 m**	Date Well Installed:	**7 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD/CAS**
Drilling Method:	**Diamond Coring**	Hole size:	**0.091 m**	Reviewed by:	**CAS**

ELEVATION - (m)	DEPTH - (m)	GRAPHIC LOG	
			SILTY SAND, FROZEN (0 m to 1.2 m) Angular, fine to coarse grained, well graded, brown, wet
			SAND AND SILT, FROZEN (1.2 m to 4.6 m) Angular, fine to coarse grained, well graded, frozen (Residual Soil)
1145	5		**WEATHERED WRGD** (4.6 m to 9.1 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled white and grey, strong to very strong, moderately to highly weathered, joint spacing close to moderately close oriented at 45° and 80° with orange oxide on joint surfaces.
1140	10		**FAULT ZONE** (9.1 m to 13.6 m) Fault zone, highly fractured to <10 cm pieces, clay altered with orange oxide staining
1135	15		**WEATHERED WRGD** (13.6 m to 15.2 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled white and grey, strong to very strong, orange oxidation of joints, slight to moderate weathering, calcite and quartz infilled veins. **END OF HOLE - 15.2 m**



NOTES

Cased with HWT rods (0.114 m OD) to 4.57 mbgs

Water level measured June 27, 2013, Frozen at 2.4 mbgs

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

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CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-01S

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.2** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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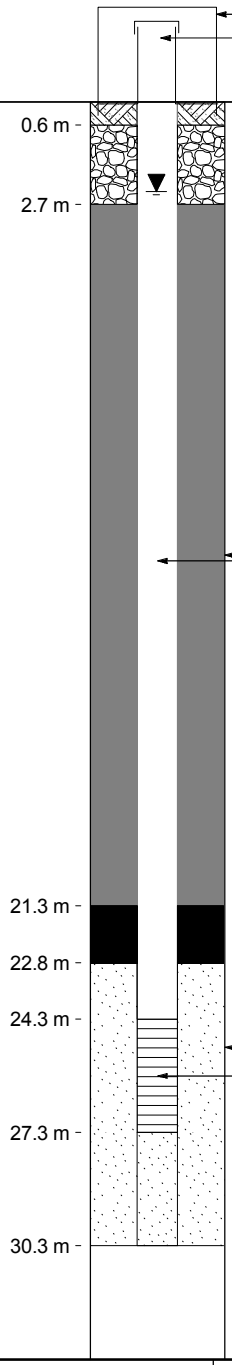
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-02D**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**12 Jun 13**
Location:	**North of Open Pit**	Total Depth:	**30.3 m**	Date Completed:	**12 Jun 13**
Coordinates:	**6,959,341 N, 609,888 E, UTM NAD83**	Elevation:	**1193 m**	Date Well Installed:	**12 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.091 m**	Reviewed by:	**CAS**

ELVATION - (m)	DEPTH - (m)	GRAPHIC LOG	
1188	5		**SILTY SAND, FROZEN** (0 m to 10 m) Subangular, fine to medium, some cobble and gravek, reddish brown with red and orange coloration on gravel and cobble surfaces, saturated/frozen, poor recovery (potential Fault Zone)
1183	10		**SILTY SAND** (10 m to 30.29 m) Poor recovery, some cobble and gravel, unfrozen (potential Fault Zone)
1178	15		
1173	20		
1168	25		
1163	30		**END OF HOLE - 30.3 m**



NOTES

Cased with HW1 (0.114 m OD) to 10.7 mbgs

Water level measured at 2.18 mbgs on June 27, 2013

Bottom of permafrost inferred to be approx. 10 mbgs based on water flow into drillhole

Heaving sands during drilling and installation. Installed solid PVC sump below screen for potential fine accumulation.

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

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CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-02D

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.3** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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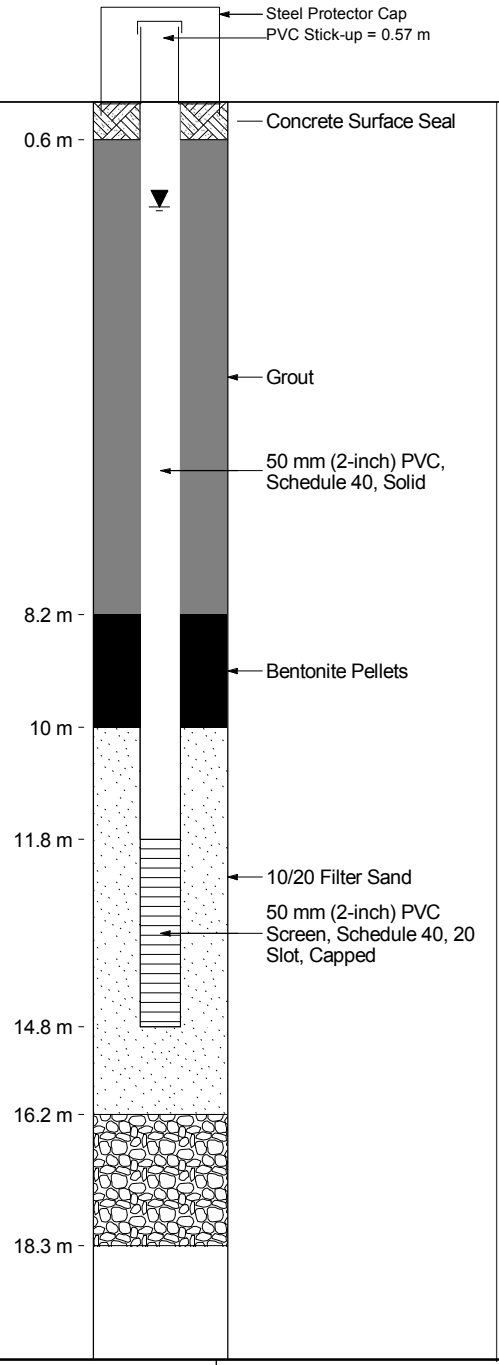
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-02S**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**8 Jun 13**
Location:	**North of Open Pit**	Total Depth:	**18.3 m**	Date Completed:	**8 Jun 13**
Coordinates:	**6,959,345 N, 609,886 E, UTM NAD83**	Elevation:	**1193 m**	Date Well Installed:	**9 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD/CAS**
Drilling Method:	**Diamond Coring**	Hole size:	**0.091 m**	Reviewed by:	**CAS**

ELVATION - (m)	DEPTH - (m)	GRAPHIC LOG
1188	5	
1183	10	
1178	15	
1173	20	

SILTY SAND, FROZEN
(0 m to 10 m)
Subangular, fine to medium, some cobbles and gravel, well graded, reddish brown with red and orange coloration on gravel and cobble surfaces, saturated, frozen, poor recovery (potential Fault Zone)

SILTY SAND
(10 m to 18.3 m)
Poor recovery, some cobble and gravel, unfrozen (potential Fault Zone)

END OF HOLE - 18.3 m



NOTES

Cased with HWT rods (0.114 m OD) to 10.6 mbgs

Water level measured at 1.57 mbgs on June 26, 2013

Bottom of permafrost inferred to be approx. 10 mbgs based on water flow into drillhole

Heaving Sands into drillhole during installation

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

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CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-02S

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**
FIGURE. **Figure A1.4** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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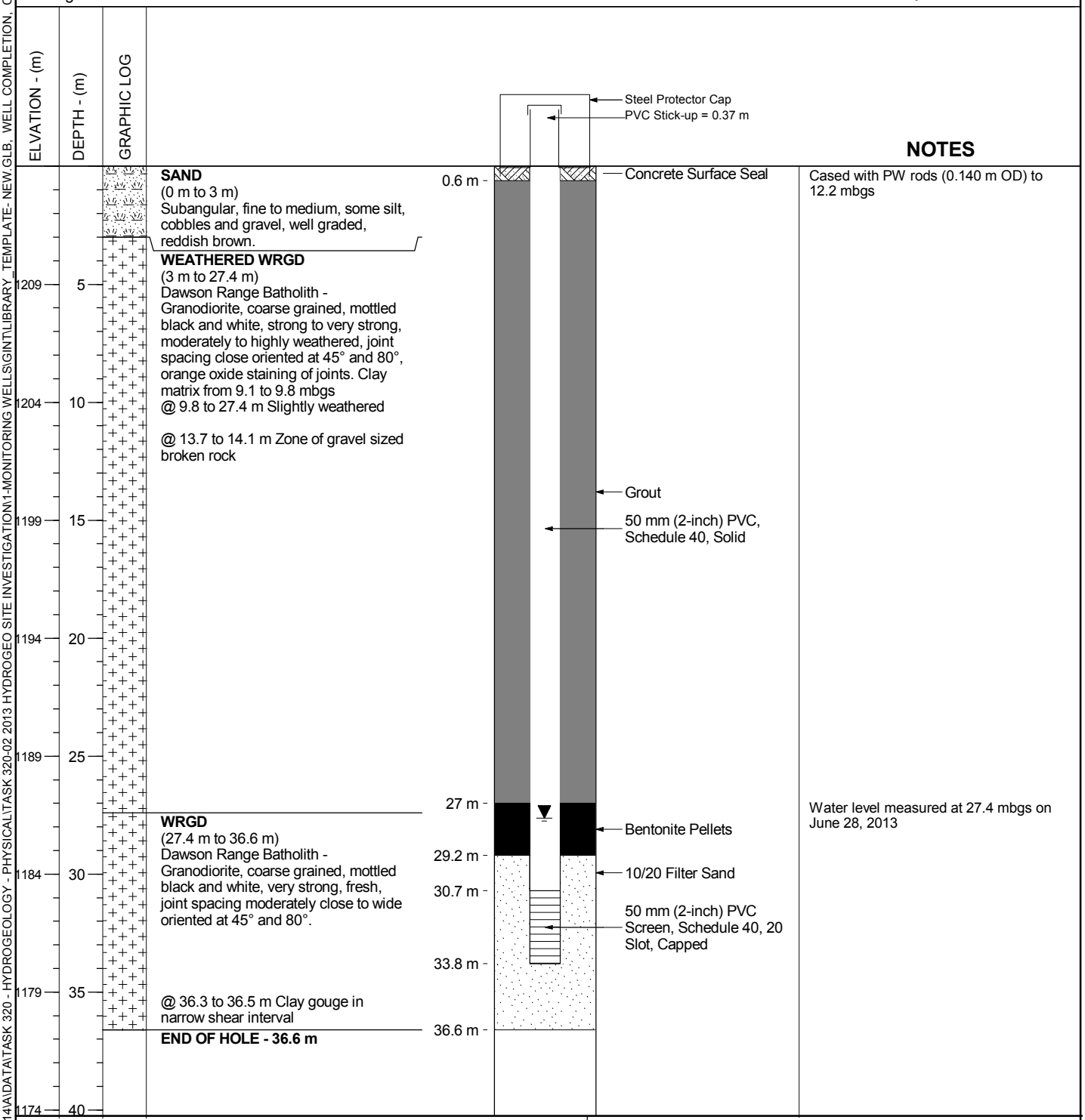
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-03D**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**14 Jun 13**
Location:	**North of Gold Ore Stockpile**	Total Depth:	**36.6 m**	Date Completed:	**16 Jun 13**
Coordinates:	**6,958,593 N, 613,068 E, UTM NAD83**	Elevation:	**1214 m**	Date Well Installed:	**16 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**



NOTES

Cased with PW rods (0.140 m OD) to 12.2 mbgs

Water level measured at 27.4 mbgs on June 28, 2013

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.
DIFFICULTY REMOVING RODS DURING INSTALLATION DUE TO FREEZING TO DRILLHOLE WALLS.

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MONITORING WELL DETAILS FOR MW13-03D

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PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**
FIGURE. **Figure A1.5** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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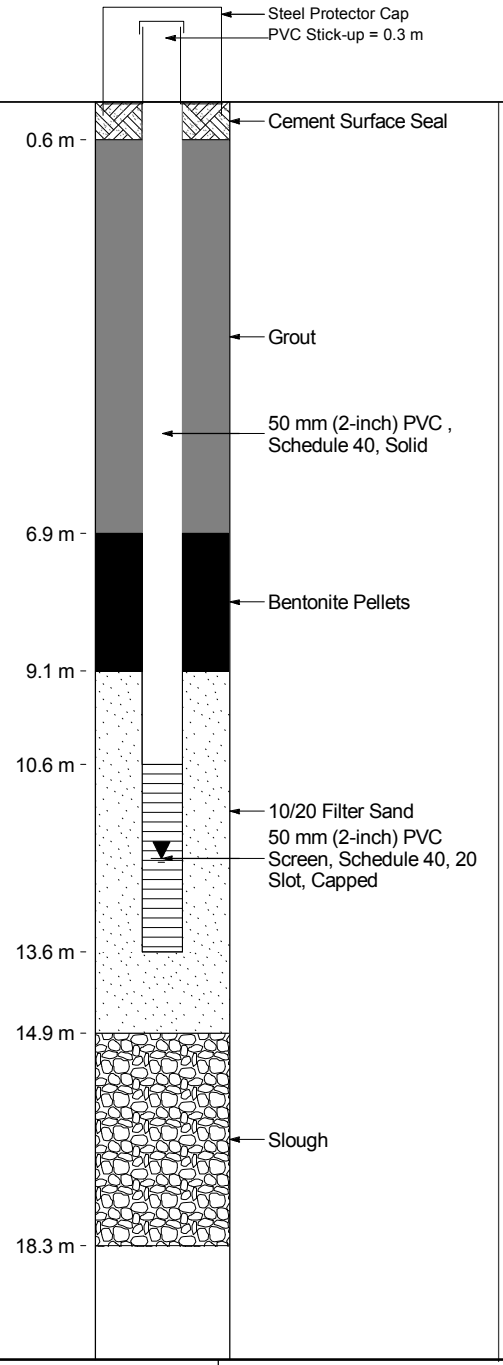
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-03S**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**17 Jun 13**
Location:	**North of Gold Ore Stockpile**	Total Depth:	**18.3 m**	Date Completed:	**17 Jun 13**
Coordinates:	**6,958,589 N, 613,065 E, UTM NAD83**	Elevation:	**1213 m**	Date Well Installed:	**17 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**

ELVATION - (m)	DEPTH - (m)	GRAPHIC LOG	
			SAND (0 m to 0.6 m) Subangular, fine, some silt, brown, wet
			WEATHERED WRGD (0.6 m to 18.3 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled black and white, strong to very strong, moderately weathered, joint spacing very close to moderately close oriented at 0°, 45°. @ 3.0 to 3.7 m Completely weathered
1208	5		@ 6.4 to 7.6 m Highly to completely weathered, broken rock with clay matrix
1203	10		@ 10.4 to 13.1 m Highly to completely weathered, broken rock with clay matrix
1198	15		@ 15.5 to 16.8 m Completely weathered zone @ 16.8 to 18.3 m Slightly weathered to fresh, moderately close joint spacing
1193	20		**END OF HOLE - 18.3 m**



NOTES

Cased with PW rods (0.140 m OD) to 3.05 mbgs

Water Level Measured at 12.2 mbgs on June 15, 2013

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

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CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-03S

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.6** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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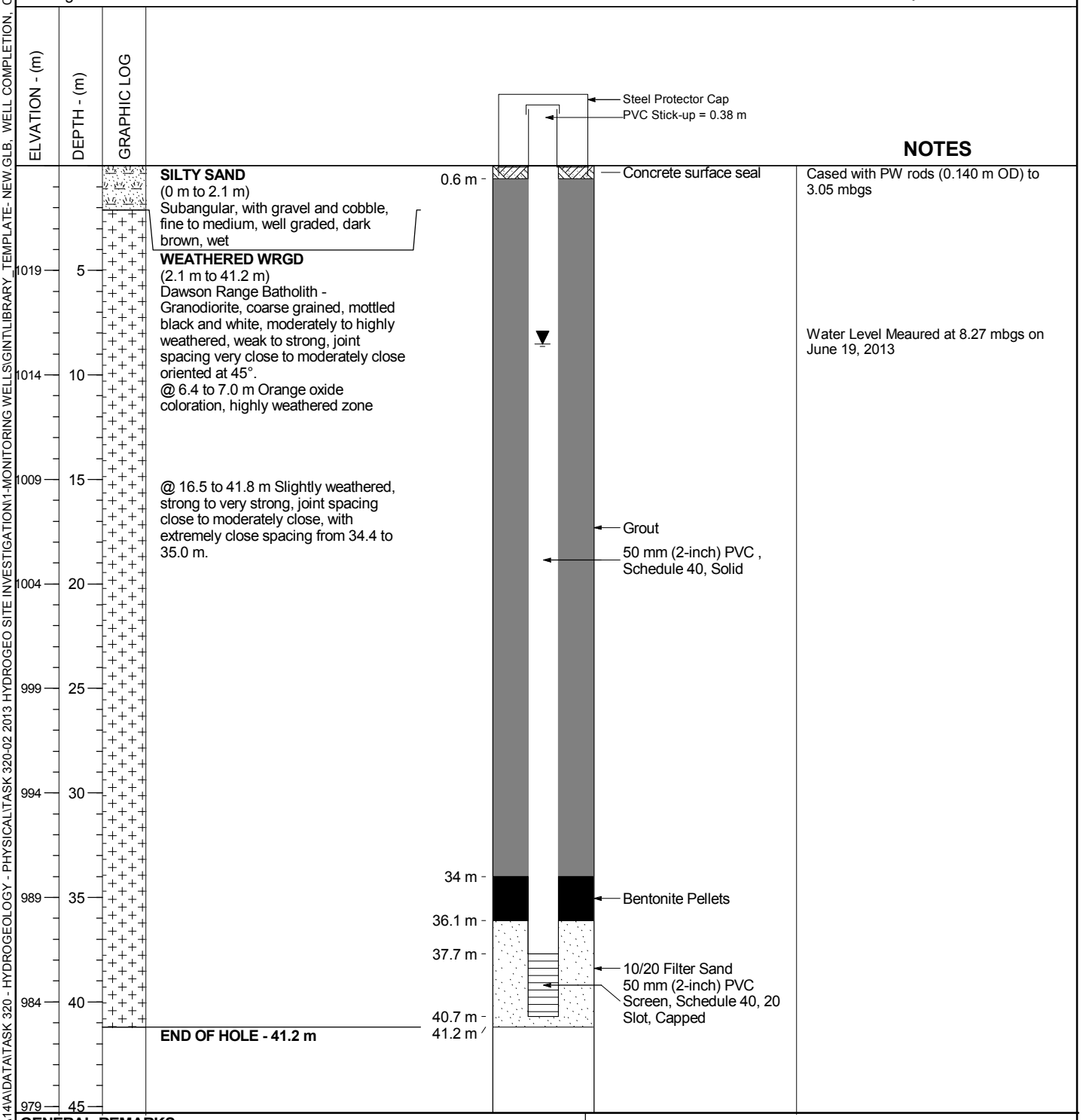
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-04D**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**18 Jun 13**
Location:	**South of Gold Ore Stockpile**	Total Depth:	**41.2 m**	Date Completed:	**19 Jun 13**
Coordinates:	**6,957,637 N, 613,298 E, UTM NAD83**	Elevation:	**1024 m**	Date Well Installed:	**19 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**



NOTES

Cased with PW rods (0.140 m OD) to 3.05 mbgs

Water Level Meaured at 8.27 mbgs on June 19, 2013

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

REV. 1 - Issued with Report

CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-04D

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.7** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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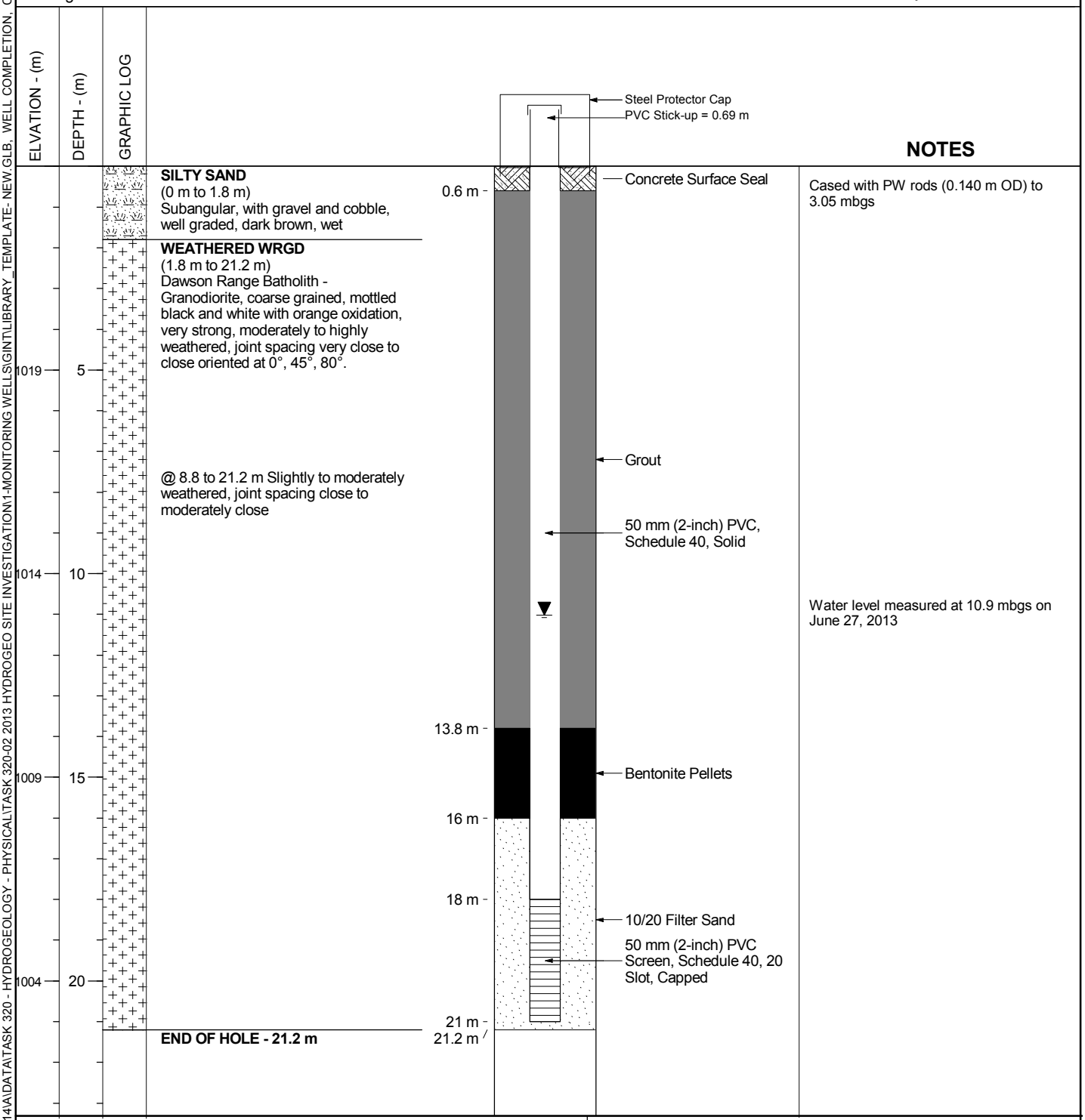
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-04S**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**19 Jun 13**
Location:	**South of Gold Ore Stockpile**	Total Depth:	**21.2 m**	Date Completed:	**19 Jun 13**
Coordinates:	**6,957,633 N, 613,297 E, UTM NAD83**	Elevation:	**1024 m**	Date Well Installed:	**19 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**



GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

REV. 1 - Issued with Report

CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-04S

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.8** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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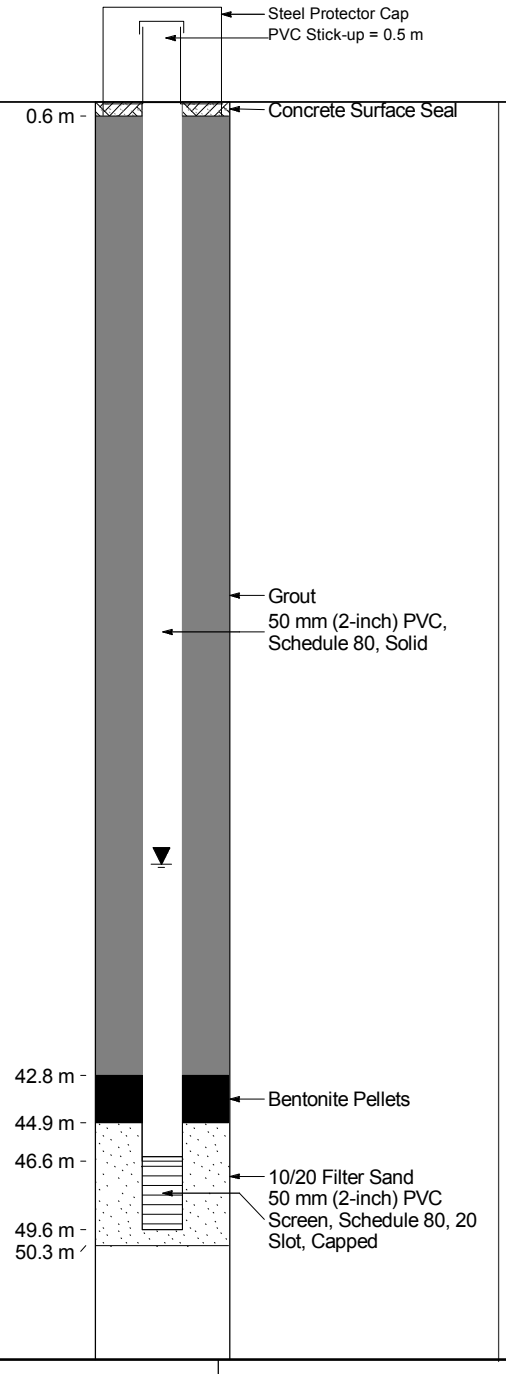
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-05**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**20 Jun 13**
Location:	**Tailing Management Facility**	Total Depth:	**50.3 m**	Date Completed:	**20 Jun 13**
Coordinates:	**6,955,823 N, 614,719 E, UTM NAD83**	Elevation:	**1024 m**	Date Well Installed:	**22 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**

ELVATION - (m)	DEPTH - (m)	GRAPHIC LOG	
1019	5		**SAND** (0 m to 4.6 m) Subangular, fine to medium, with some silt, gravel and cobble, brown, well graded, wet
1014	10		**WEATHERED WRGD** (4.6 m to 27.5 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled black and white with orange oxide staining, strong, moderately to highly weathered with completely weathered zones containing clay matrix from 9.1 m to 9.4 m, 17.7 m to 18.3 m, joint spacing very close to close oriented at 45°.
1009	15		
1004	20		
999	25		
994	30		**WEATHERED YMQT** (27.5 m to 29 m) Meta-sedimetary rock, quartzite, blue-grey to white-grey, very strong, moderately to highly weathered
989	35		**WEATHERED WRGD** (29 m to 36.9 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled black and white, strong, slightly to moderately weathered with completely weathered zones, very strong, joint spacing close. @ 32.0 m Oxide staining on joint surfaces @ 32.9 to 35.4 m Completely weathered
984	40		
979	45		**WEATHERED YQMT** (36.9 m to 42.5 m) Meta-sedimetary rock, quartzite, blue-grey to white-grey, very strong, moderately to highly weathered @ 36.9 m broken gravel and cobble sized rock
974	50		**WEATHERED WRGD** (42.5 m to 50.3 m) Dawson Range Batholith - Granodiorite, coarse grained, mottled
969	55		



NOTES

Cased with PW rods (0.140 m OD) to 4.57 mbgs

Circulation losses during drilling at 17.1 m

Water level measured at 33.2 mbgs on June 28, 2013

Circulation losses at 37.5 m

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

REV. 1 - Issued with Report

CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-05

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.9** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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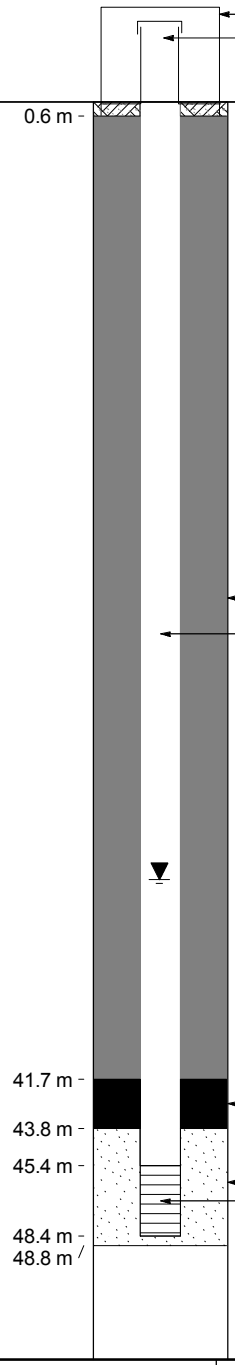
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-06D**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**23 Jun 13**
Location:	**Tailing Management Facility**	Total Depth:	**48.8 m**	Date Completed:	**24 Jun 13**
Coordinates:	**6,953,267 N, 613,962 E, UTM NAD83**	Elevation:	**1069 m**	Date Well Installed:	**24 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**

ELVATION - (m)	DEPTH - (m)	GRAPHIC LOG	
1064	5		**GRAVEL** (0 m to 3 m) Subangular, with cobbles and sand, greyish blue to brown, well graded
			WEATHERED YMQT (3 m to 48.8 m) Meta-sedimetary rock, Quartzite, blue-grey to white-grey, medium strong to strong, moderately to highly weathered, joint spacing very close to close oriented at 45° and 80°
1059	10		
1054	15		@ 15.8 to 46.9 m Slightly to moderately weathered
1049	20		
1044	25		
1039	30		@ 29.9 to 32.2 m Highly weathered zone with intervals of gravel-sized broken rock
1034	35		
1029	40		
1024	45		@ 46.9 to 48.8 m Highly weathered, very close to moderately close joint spacing
1019	50		**END OF HOLE - 48.8 m**



NOTES

Cased with PW rods (0.140 m OD) to 4.57 mbgs

Circulation losses at 7.6 - 9.1mbgs

Water level measured at 32.9 mbgs on June 27, 2013

GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

REV. 1 - Issued with Report

CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-06D

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.10** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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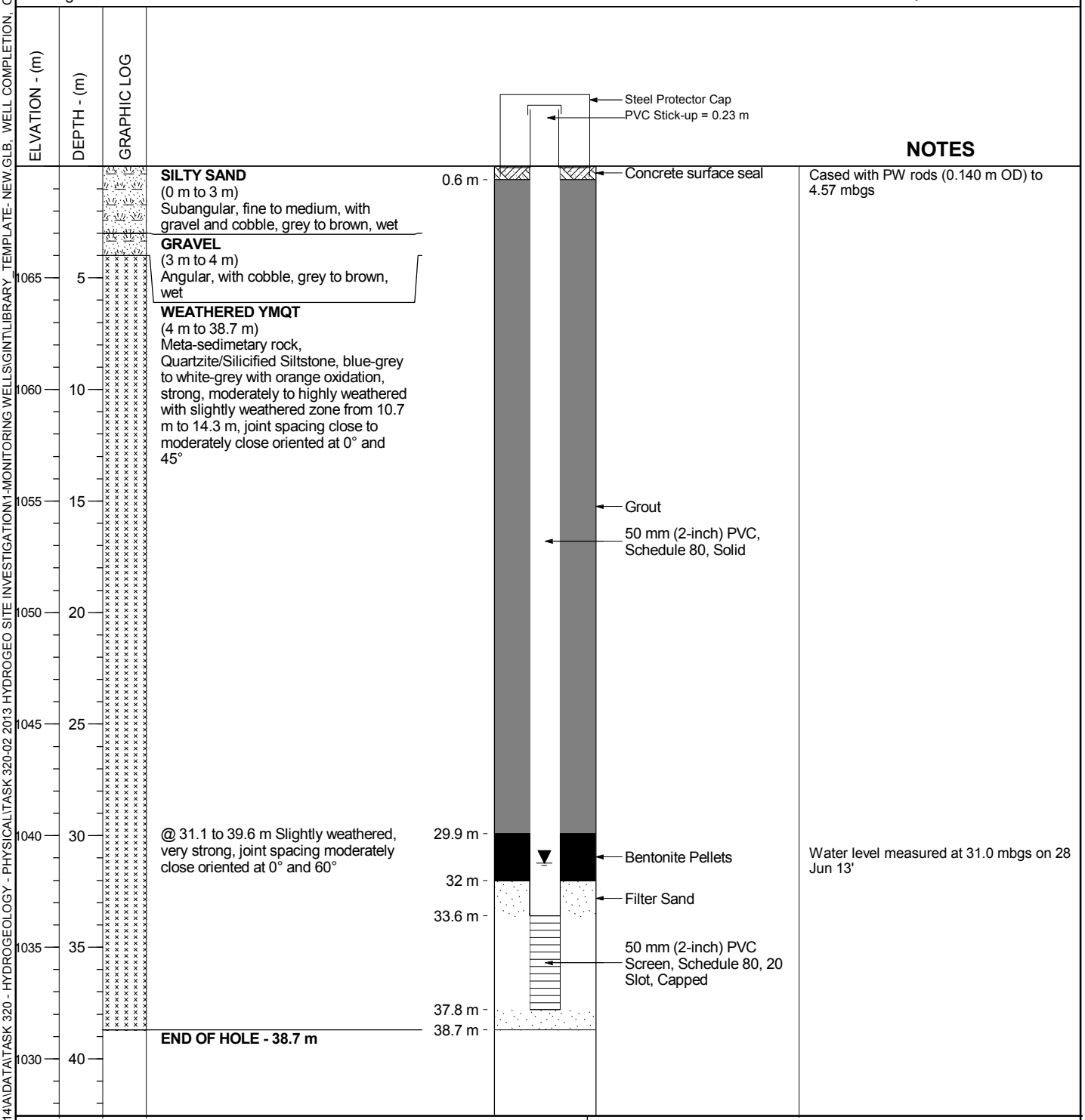
Project:	**CASINO PROJECT**	Drill Hole No.	**MW13-06S**	**PAGE**	1 of 1
Contractor:	**Kluane Drilling Ltd.**	In Situ Sampler:	**N/A**	Date Started:	**25 Jun 13**
Location:	**Tailing Management Facility**	Total Depth:	**38.7 m**	Date Completed:	**25 Jun 13**
Coordinates:	**6,953,276 N, 613,958 E, UTM NAD83**	Elevation:	**1070 m**	Date Well Installed:	**25 Jun 13**
Drilling Rig:	**KD1000 Exploration**	"Inclination":	**-90°**	Logged by:	**KTD**
Drilling Method:	**Diamond Coring**	Hole size:	**0.114 m**	Reviewed by:	**CAS**



GENERAL REMARKS:

COORDINATES WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPT 2013.

REV. 1 - Issued with Report

CASINO MINING CORPORATION
CASINO PROJECT
MONITORING WELL DETAILS FOR MW13-06S

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO. **VA101-325/17** | REF. NO. **1**

FIGURE. **Figure A1.11** | REV. **1**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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APPENDIX A2

GEOLOGICAL LOGS FROM CASINO MINING CORPORATION

(Pages A2-1 to A2-18)

HOLE # : MW13-01D

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-01D

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6957454.626 mN**
Easting : **611803.918 mE**
Elevation (m) : **1149.196 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **41.15 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HTW**

Overburden : **6.84 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 5, 2013**
Date Hole Completed : **June 6, 2013**

Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	6.84	OVB: Overburden, no recovery
5				6.84	14.17	WRGD: Granodiorite. Intensely wheathered and bleached, fractured to pieces < 10 cm long. Aboundant iron oxide staining, orange-white colour.
10				14.17	41.15	WRGD: Granodiorite. Gradually becomes more competent and less wheathered down to 21.5 m. Then becomes fresh, competent granodiorite. Grey-white colour with 10% hornbelnde laths to 0.5 cm. Traces of fine-grained cubic pyrite. Sheared/fault with ground up rock/clay/gouge at 24.38 - 27.42 m and 28.53 - 28.73 m.
15						
20						

Sample Data

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : **MW13-01D**

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-01S

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

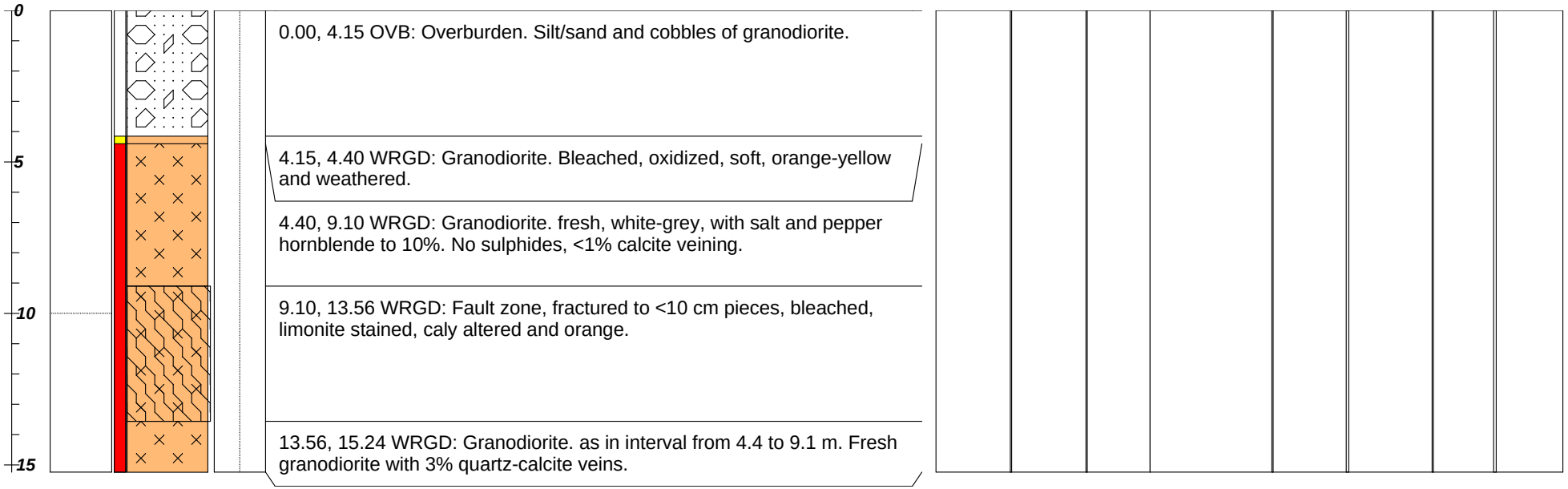
HOLE # : MW13-01S

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6957449.506 mN**
Easting : **611801.731 mE**
Elevation (m) : **1149.709 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **15.24 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HTW**

Overburden : **4.15 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 7, 2013**
Date Hole Completed : **June 8, 2013**



---------- Sample Data ----------

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : MW13-02D

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-02D

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6959340.83 mN**
Easting : **609887.935 mE**
Elevation (m) : **1193.08 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **30.29**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HW**

Overburden :
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 12, 2013**
Date Hole Completed : **June 13, 2013**

Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	30.29	OVB: Overburden. No recovery.
5						
10						
15						
20						

---------- Sample Data ----------

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : **MW13-02D**

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-02S

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-02S

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6959345.499 mN**
Easting : **609886.187 mE**
Elevation (m) : **1192.658 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **18.29 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HW**

Overburden :
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 8, 2013**
Date Hole Completed : **June 9, 2013**

Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	18.29	0.00, 18.29 OVB: Overburden. Mixed gravel, cobbles of grabodiorite and silt.
5						
10						
15						

---------- Sample Data ----------

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : MW13-03D

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-03D

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6958593.441 mN**
Easting : **613067.9832 mE**
Elevation (m) : **1213.5847m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **36.58 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HWT**

Overburden : **2.63 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 13, 2013**
Date Hole Completed : **June 15, 2013**

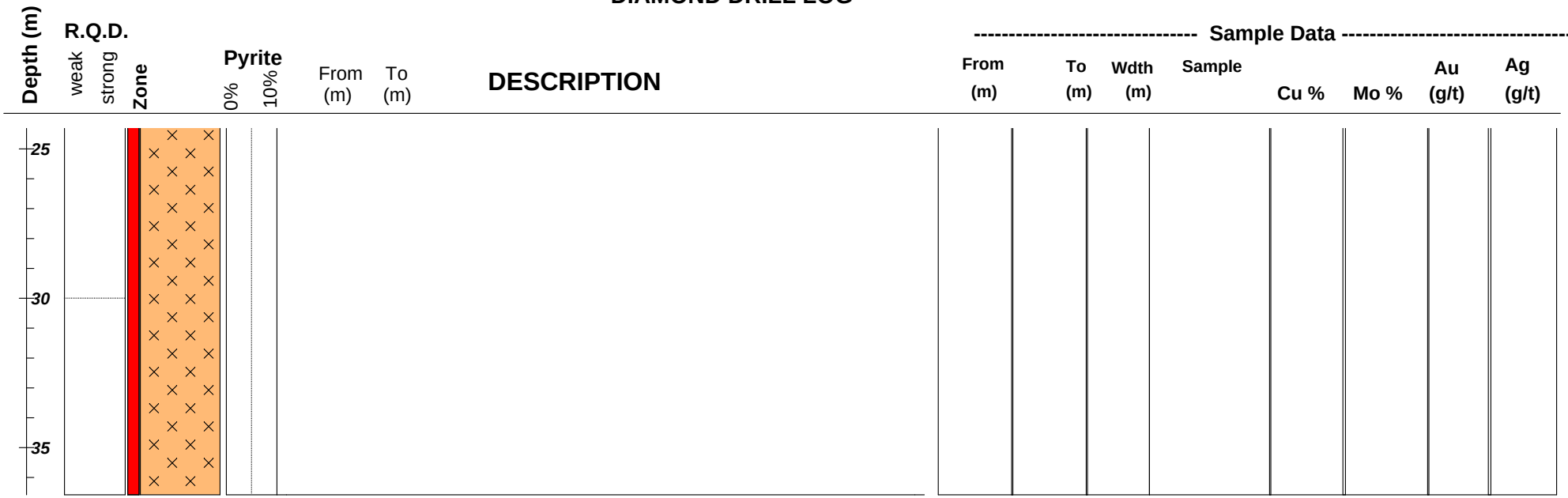
Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	2.63	OVB: Overburden. No recovery
5				2.63	10.97	WRGD: Granodiorite. Weathered and fractured with moderate to strong limonite staining, weak clay alteration of plagioclase.
10				10.97	36.58	WRGD: Granodiorite. Fresh, realtively competent, <1% calcite veining, occassional pyrite on fracture surfaces to 1%. From 36.3 to 36.45 m have clayey gouge in narrow shear. At 26.10 m have 25 cm zone of clay-silica alteration cored by 0.8 cm pyrite veinlet.
15						
20						

---------- Sample Data ----------

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : **MW13-03D**

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG



HOLE # : MW13-03S

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-03S

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6958588.546 mN**
Easting : **613065.4492 mE**
Elevation (m) : **1212.9567 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **18.29 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HWT**

Overburden : **1.50 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 13, 2013**
Date Hole Completed : **June 16, 2013**

Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	1.50	OVB: Overburden. No recovery
5				1.50	8.22	WRGD: Granodiorite. Highly oxidized and fractured with 5 to 10% orange limonitic clay on fractures.
10				8.22	18.29	WRGD: Granodiorite. Becomes much more competent, white to grey, medium to coarse grained with minor limonite on fractures. Rare pyrite (<<1%), 15 to 20% hornblende laths to 8 mm.
15						

---------- Sample Data ----------

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : MW13-04D

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-04D

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6957637.117 mN**
Easting : **613297.7722 mE**
Elevation (m) : **1023.8557 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **41.15 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HWT**

Overburden : **2.33 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 17, 2013**
Date Hole Completed : **June 18, 2013**

Depth (m) | **R.Q.D.** weak strong | **Zone** | **Pyrite** 0% 10% | From (m) | To (m) | **DESCRIPTION**

0.00, 2.33 OVB: Overburden. No recovery

2.33, 4.00 WRGD: Granodiorite. Quite fractured and weathered with pieces < 15 cm long.

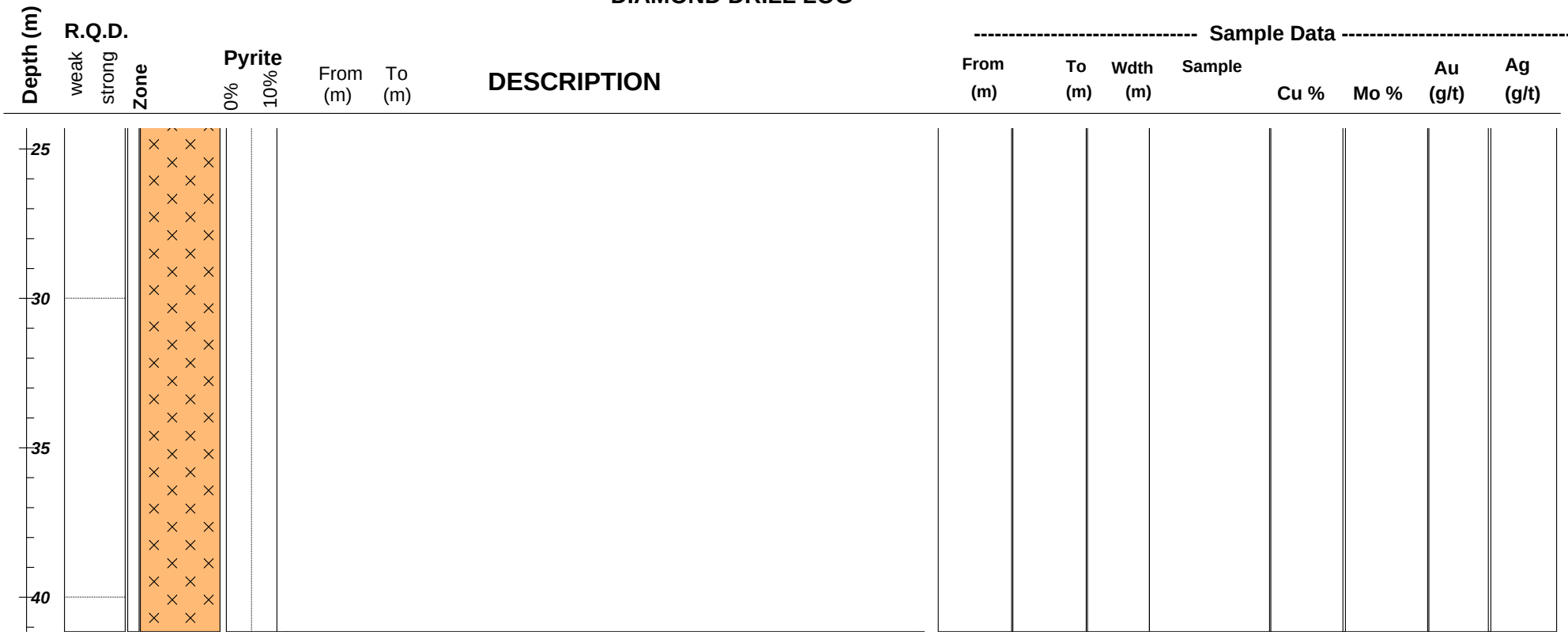
4.00, 41.15 WRGD: Granodiorite. Becomes more competent, fresh with minimal weathering. Minor iron oxide staining on fracture surfaces to 35.0 m. Medium to coarse-grained, white to grey with salt and pepper hornblende phenocrysts to 0.6 cm. Trace of pyrite, <0.5mm cubes. << 1% calcite veilets.

Sample Data

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : **MW13-04D**

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG



HOLE # : MW13-04S

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-04S

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6957632.744 mN**
Easting : **613296.7022 mE**
Elevation (m) : **1023.8357 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **21.20 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HWT**

Overburden : **2.77 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 19, 2013**
Date Hole Completed : **June 19, 2013**

Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	2.77	OVB: Overburden. no recovery
5				2.77	3.10	WRGD: Granodiorite. Quite fractured and bleached regolith.
10				3.10	21.20	WRGD: Granodiorite. Becomes much more competent over the top 5 m, still has iron oxide staining on fractures, but less bleached. From 8.0 m down becomes much more competent, less iron on fractures, white to light grey salt and pepper, medium grained granodiorite with 10% hornblende laths.
15						
20						

Sample Data

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : MW13-05

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-05

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6955822.543 mN**
Easting : **614718.9042 mE**
Elevation (m) : **1023.9847 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **50.29 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HWT**

Overburden : **4.33 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 20, 2013**
Date Hole Completed : **June 22, 2013**

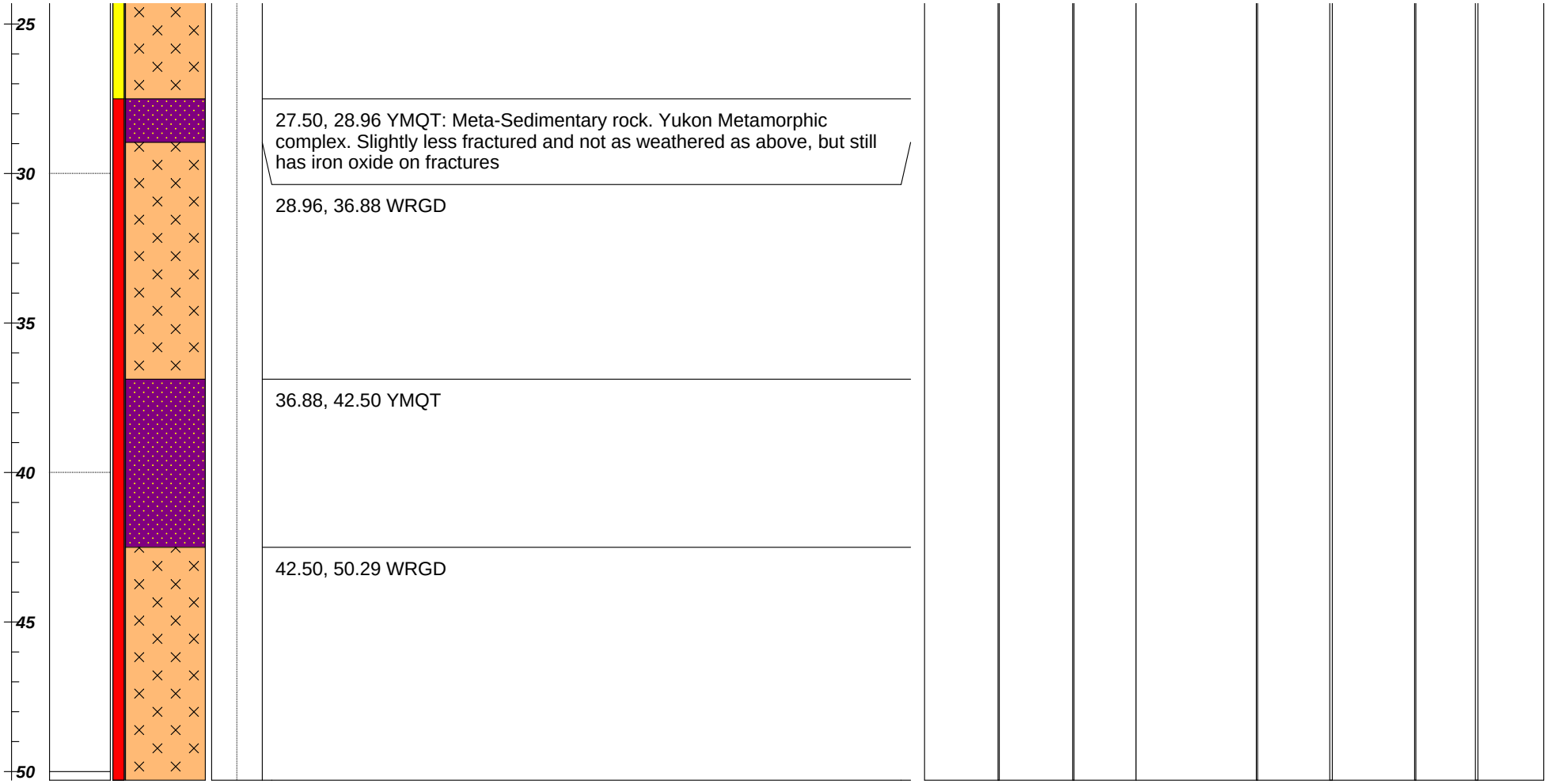
Depth (m)	R.Q.D. weak / strong	Zone	Pyrite 0% / 10%	From (m)	To (m)	DESCRIPTION
0				0.00	4.33	OVB: Overburden. no recovery
5				4.33	27.50	WRGD: Granodiorite. Intensely weathered and bleached with orange-grey colour due to iron staining. Pieces <15 cm long with abundant gravel and clay/sand from weathered granodiorite. No sulphides.
10						
15						
20						

Sample Data

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : MW13-05

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG



HOLE # : MW13-06D

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-06D

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6953267.365 mN**
Easting : **613961.8672 mE**
Elevation (m) : **1069.4677 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **48.77 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HWT**

Overburden : **2.90 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 23, 2013**
Date Hole Completed : **June 24, 2013**

Depth (m) | **R.Q.D.** weak strong | **Zone** | **Pyrite** 0% 10% | From (m) | To (m) | **DESCRIPTION**

0.00, 2.90 OVB: Overburden. Very little recovery, minor rounded pebbles.

2.90, 15.70 YMQT: Meta-sedimetary rock, Quartzite. Intensely weathered and fractured, bleached and limonite stained.

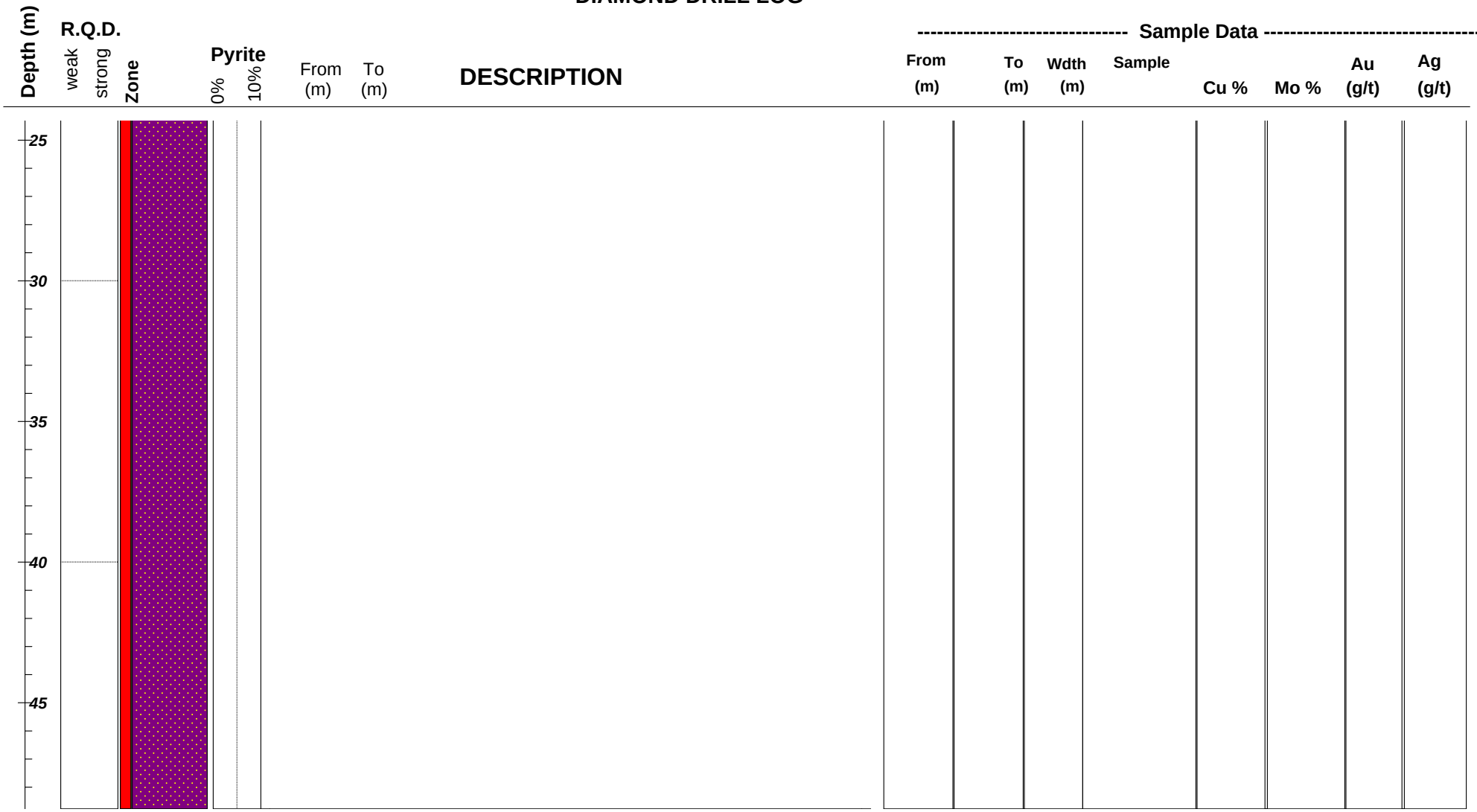
15.70, 48.77 YMQT: Meta-sedimentary rock, Quartzite. jBecomes more competent and less weathered. Blue-grey to white-grey, variably bedded, laminated meta-seds. Bedding variable, with folds, but at a high angle to core axis. Iron oxide on fractures decreases down hole. No sulphides.

---------- Sample Data ----------

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : **MW13-06D**

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG



HOLE # : MW13-06S

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG

HOLE # : MW13-06S

UTM Coordinates NAD 83, Zone 7
Collar Survey Type: **Yukon Engineering**
Northing : **6953275.724 mN**
Easting : **613957.9722 mE**
Elevation (m) : **1069.7017 m**

Zone Legend
CAP
SOX
SUS
HYP

Hole Length : **38.70 m**
Azimuth (true) : **0**
Dip : **-90**
NTS : 115J/10
Core Size: **HW**

Overburden : **2.75 m**
Contractor : Kluane Drilling Ltd.
Logged By : **S. Casselman**
Date Hole Started : **June 25, 2013**
Date Hole Completed : **June 26, 2013**

Depth (m) | **R.Q.D.** weak strong | **Zone** | **Pyrite** 0% 10% | From (m) | To (m) | **DESCRIPTION**

0.00, 2.75 OVB: Overburden - no recovery

2.75, 11.92 YMQT: Quartzite/silicified siltstone. Intensely fractured to pieces < 10 cm long. Slightly bleached and iron stained.

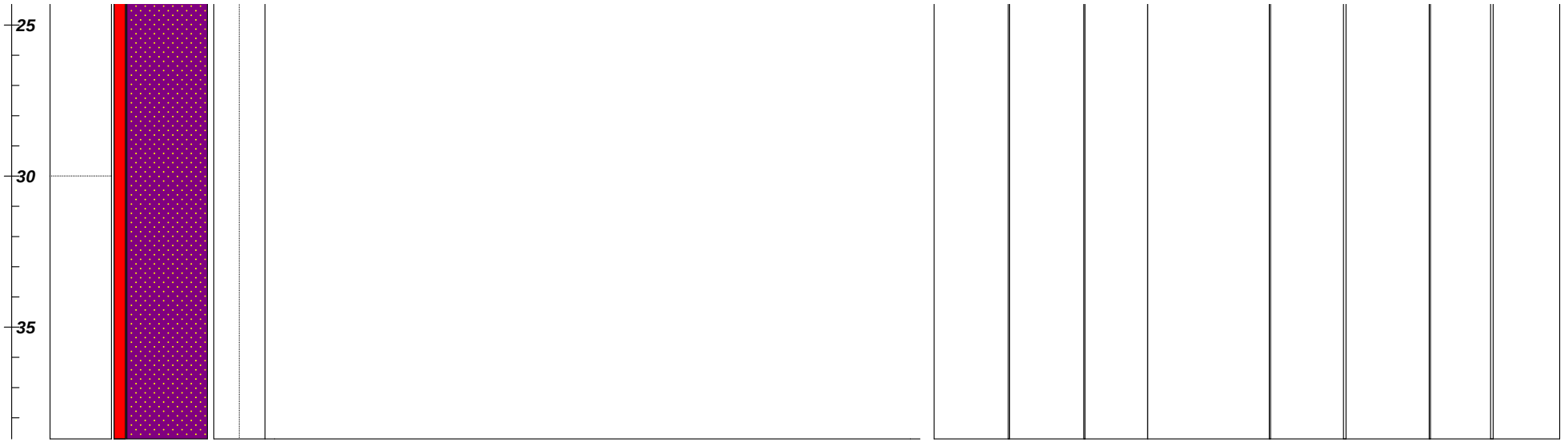
11.29, 38.70 YMQT: Quartzite/silicified siltstone. variably oxidized and iron stained. Folded and brecciated, obvious evidence of tectonism. Traces of pyrite deeper down hole towards the bottom. Becomes more competent and less iron oxide towards bottom.

Sample Data

From (m)	To (m)	Wdth (m)	Sample	Cu %	Mo %	Au (g/t)	Ag (g/t)

HOLE # : **MW13-06S**

WESTERN COPPER CORPORATION
CASINO PROJECT
DIAMOND DRILL LOG



APPENDIX B

RESPONSE TEST DATA

(Pages B-1 to B-9)

Knight Piésold CONSULTING

CASINO MINING CORPORATION
CASINO PROJECT

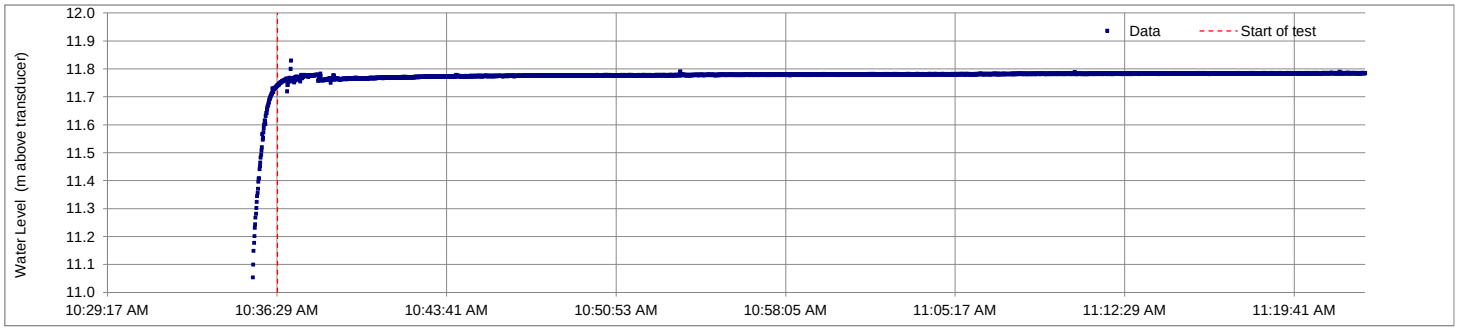
HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

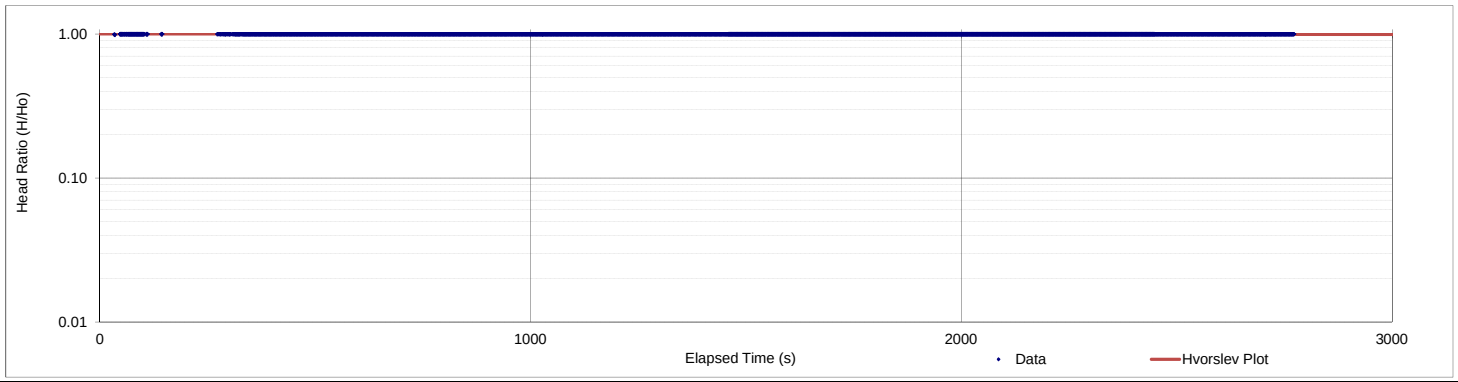
Print 03/06/15 8:23

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-01D**
Field Technician	CKJ		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	Purged for sampling		
Test Date	28-Jul-14		

Drill-hole diameter, D	0.091	**m**	**Slug Injected, Time = 0**	10:36:30 AM	
Effective diameter of PVC riser pipe, d_e	0.053	**m**	**Initial water level**	16.62	**m above transducer**
Top of test zone	27.5	**mbgs**	**Water level after slug**	11.77	**m above transducer**
Bottom of test zone	30.5	**mbgs**	**Change In Water Level, H_o**	-4.85	**m**
Test Length, L	3.0	**m**	**Expected Change In Water Level, H_o**	-	**m**
PVC type	Schedule 40				
Slot size	20 Slot				

Transmissivity, T	-	**m^2/s**		
Hydraulic Conductivity, K	<1E-8	**m/s**	H/H_o Intercept	1.00





TEST COMMENTS: The water column in the well was thawed in order to sample the well and the test analysis is based on water level recovery following sampling. The well was sampled 1.5 hour priors to conducting the slug test and a 3L slug of water was injected to the well at the test start time. Manually measured water level was 27m below the top of PVC at the test start time. The water level recovery over the monitored interval suggests that test results may be influenced by frozen conditions around the screen. Results are provided for qualitative purposes only in order to document the slow water level recovery.

M:\1\01\00325\17\A\Data\Task 200 - 2013 Hydrogeology Adendum\3-Response Tests\[1. MW13-01D.xlsx]Hvorslev

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

Knight Piésold CONSULTING

CASINO MINING CORPORATION
CASINO PROJECT

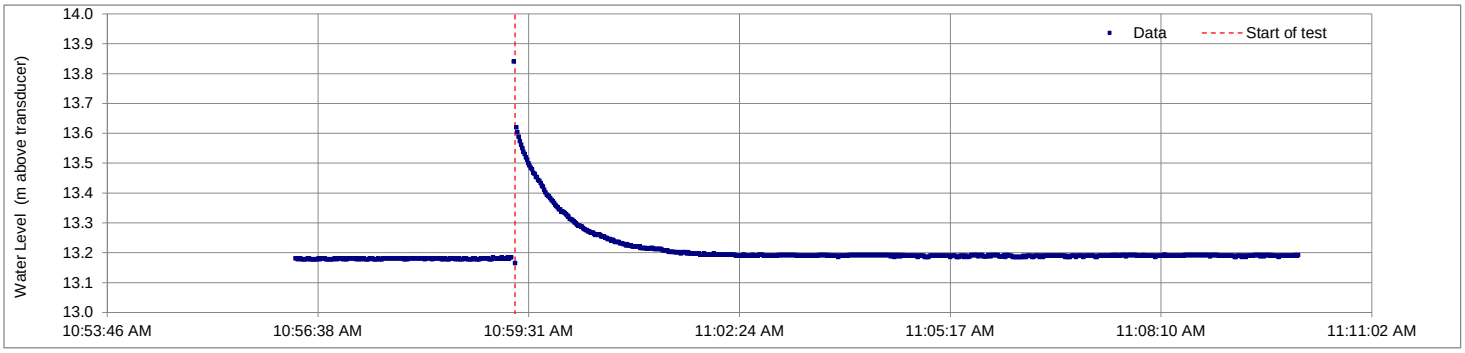
HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

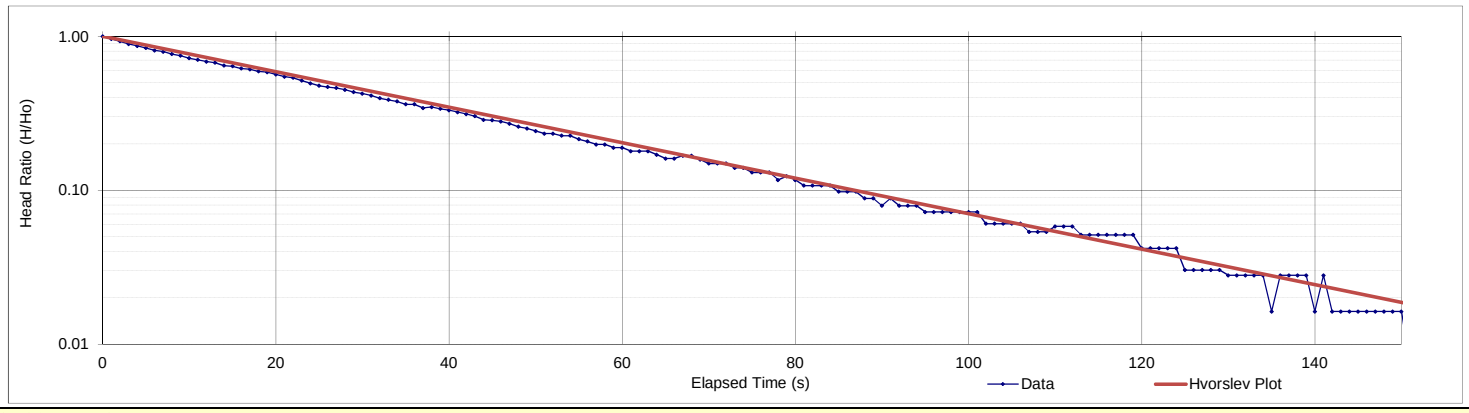
Print 03/06/15 8:23

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-02D**
Field Technician	KTD		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	RST Solid Slug (Vol=1061ml)		
Test Date	04-Aug-13		

Drill-hole diameter, D	0.091	**m**	**Slug Injected, Time = 0**	10:59:20 AM	
Effective diameter of PVC riser pipe, d_e	0.053	**m**	**Initial water level**	13.19	**m above transducer**
Top of test zone	24.3	**mbgs**	**Water level after slug**	13.62	**m above transducer**
Bottom of test zone	27.3	**mbgs**	**Change In Water Level, H_o**	0.43	**m**
Test Length, L	3.0	**m**	**Expected Change In Water Level, H_o**	0.48	**m**
PVC type	Schedule 40				
Slot size	20 Slot				

Transmissivity, T	4E-05	**m^2/s**		
Hydraulic Conductivity, K	1E-05	**m/s**	H/H_o Intercept	1.00





TEST COMMENTS:

M:\1\01\00325\17\A\Data\Task 200 - 2013 Hydrogeology Adendum\3-Response Tests\[2. MW13-02D.xlsx]Hvorslev

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

Knight Piésold CONSULTING

CASINO MINING CORPORATION
CASINO PROJECT

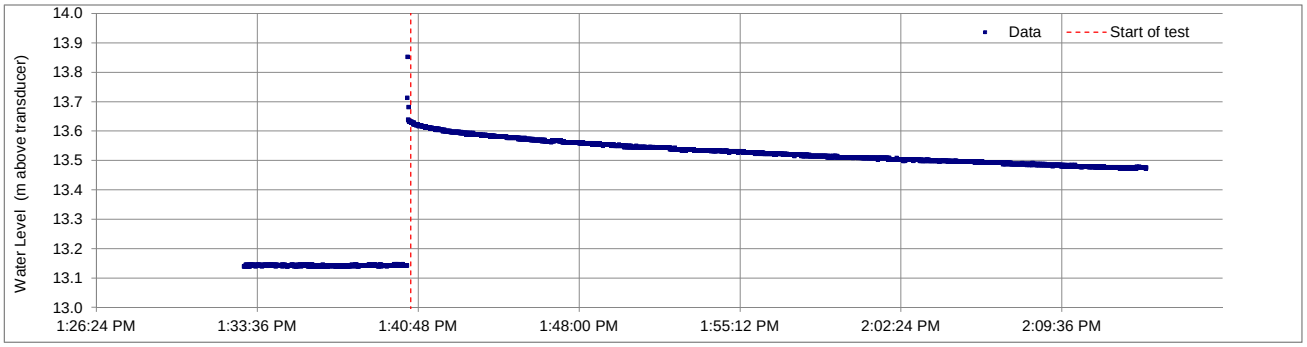
HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

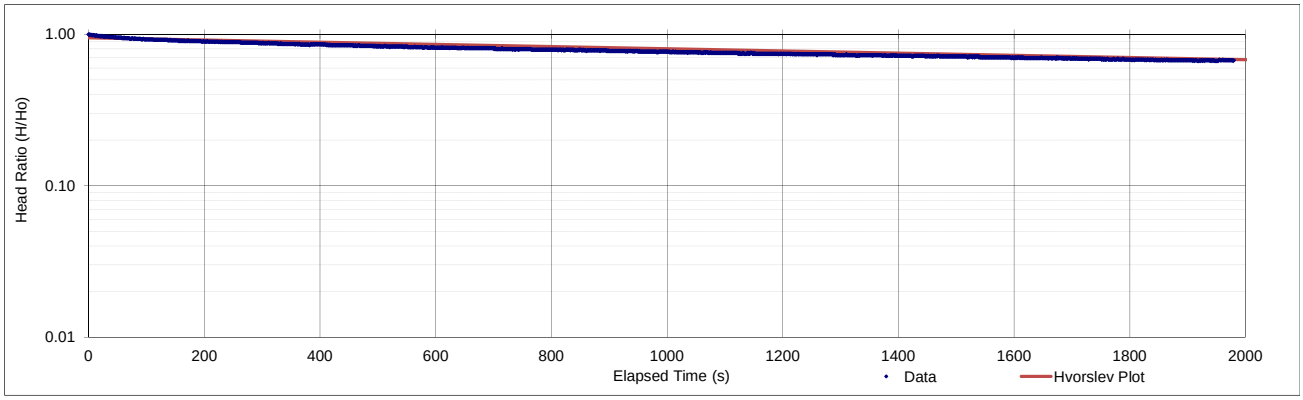
Print 03/06/15 8:23

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-03D**
Field Technician	CM		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	RST Solid Slug (Vol=1061ml)		
Test Date	14-Aug-13		

Drill-hole diameter, D	0.091	**m**	**Slug Injected, Time = 0**	1:40:28 PM	
Effective diameter of PVC riser pipe, d_e	0.053	**m**	**Initial water level**	13.15	**m above transducer**
Top of test zone	30.7	**mbgs**	**Water level after slug**	13.64	**m above transducer**
Bottom of test zone	33.8	**mbgs**	**Change In Water Level, H_o**	0.49	**m**
Test Length, L	3.1	**m**	**Expected Change In Water Level, H_o**	0.48	**m**
PVC type	Schedule 40				
Slot size	20 Slot				

Transmissivity, T	2E-07	**m^2/s**		
Hydraulic Conductivity, K	8E-08	**m/s**	H/H_o Intercept	0.95





TEST COMMENTS: The test was stopped prior to full recovery to the pre-testing water level because the slow water level recovery over this monitoring period was sufficient to constrain that the formation has a relatively low hydraulic conductivity value.

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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

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CASINO MINING CORPORATION
CASINO PROJECT

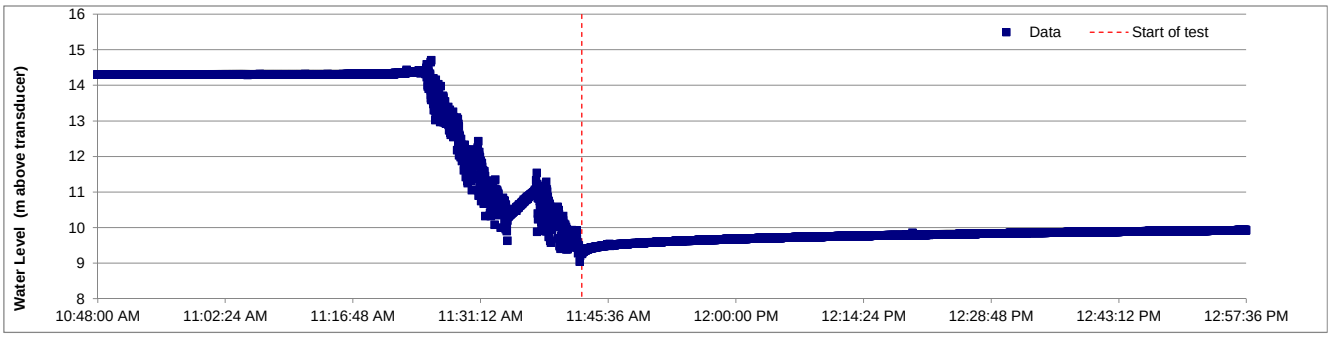
HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

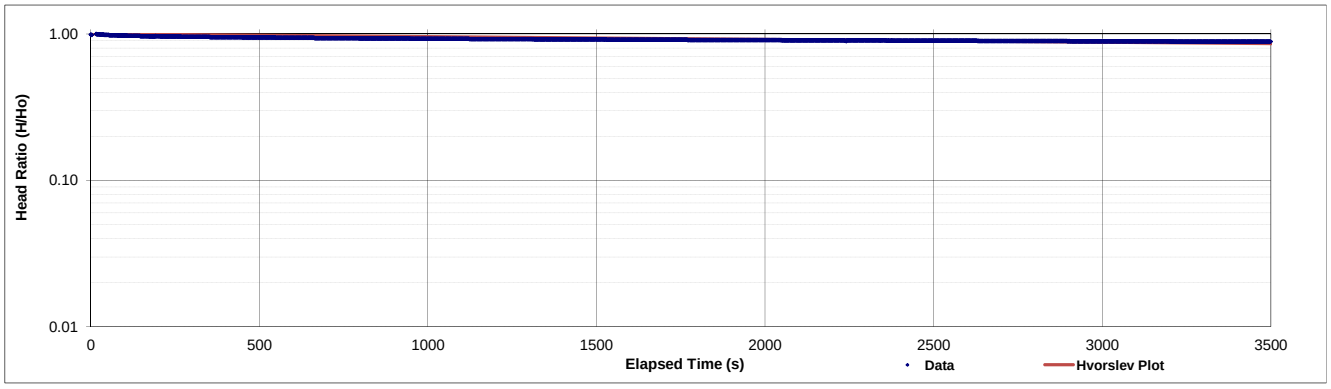
Print 03/06/15 8:28

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-03S**
Field Technician	CMJ		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	Water purged from well		
Test Date	27-Jul-14		

Drillhole diameter, D	0.114	**m**	**Slug Injected, Time = 0**	11:42:37 AM	
Effective diameter of PVC riser pipe, d_e	0.053	**m**	**Initial water level**	14.10	**m above transducer**
Top of test zone	10.6	**m**	**Water level after slug**	9.33	**m above transducer**
Bottom of test zone	13.6	**m**	**Change In Water Level, H_o**	-4.77	**m**
Test Length, L	3.05	**m**	**Expected Change In Water Level, H_o**	-	**m**
PVC type	Schedule 40				
Slot size	20 Slot				

Transmissivity, T	6E-08	**m^2/s**		
Hydraulic Conductivity, K	2E-08	**m/s**	Intercept	1.0





TEST COMMENTS: Analysis conducted on water level recovery following purging and sampling of well. The water column was thawed prior to conducting the test and results are assumed to be influenced by frozen ground conditions surrounding the screen. Test value reported for qualitative purposes.

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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

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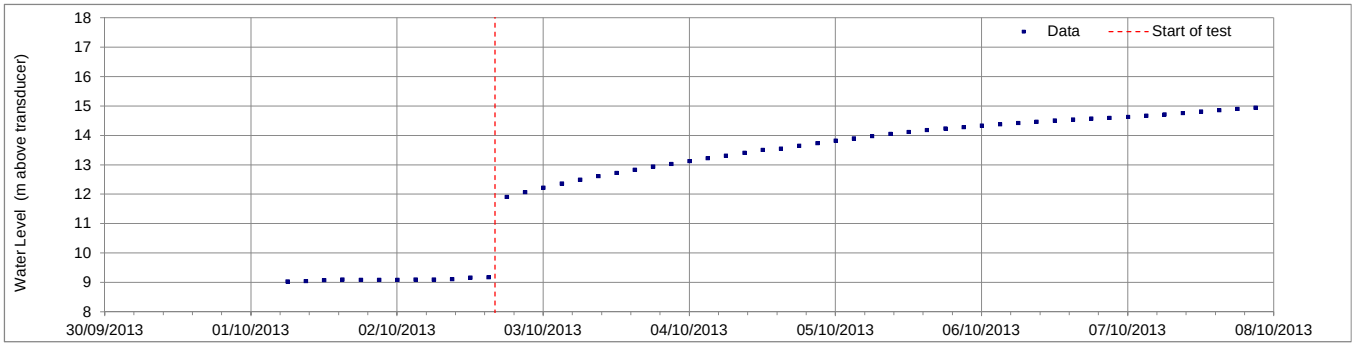
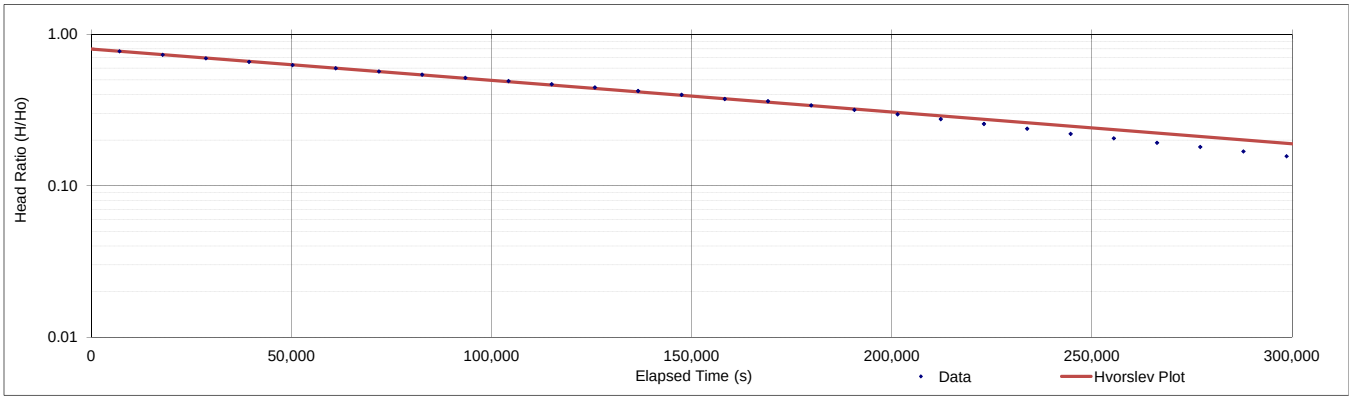
CASINO PROJECT

HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

Print 03/06/15 8:28

Project No.	VA101-325/17		**Monitoring Well/Piezometer**	**MW13-04D**	
Field Technician	CKJ				
Analyst	KTD				
Monitoring Instrument Type	Transducer				
Slug Dimensions and Type	Purged for sampling				
Test Date	02-Oct-13				
Drill-hole diameter, D	0.114	m	**Slug Injected, Time = 0**	4:05:00 PM	
Effective diameter of PVC riser pipe, d_e	0.053	m	**Initial water level**	15.00	**m above transducer**
Top of test zone	37.7	mbgs	**Water level after slug**	11.00	**m above transducer**
Bottom of test zone	40.7	mbgs	**Change In Water Level, H_o**	-4.00	**m**
Test Length, L	3.0	m	**Expected Change In Water Level, H_o**	-	**m**
PVC type	Schedule 40				
Slot size	20 Slot				
Transmissivity, T	-	m^2/s			
Hydraulic Conductivity, K	<1E-8	m/s	H/H_o Intercept	0.80	





TEST COMMENTS:

Hydraulic conductivity estimated as less than 1E-08 m/s using water level recovery following sampling. Water level data was recorded at 12 hr intervals.

M:\1\01\00325\17\A\Data\Task 200 - 2013 Hydrogeology Adendum\3-Response Tests\[5. MW13-04D.xlsx]Hvorslev (Sampling Test 2)

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

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CASINO MINING CORPORATION
CASINO PROJECT

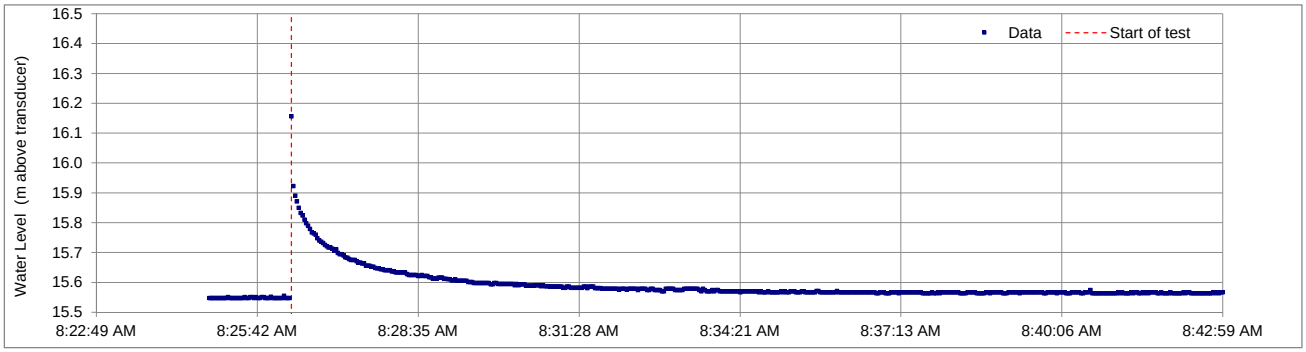
HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

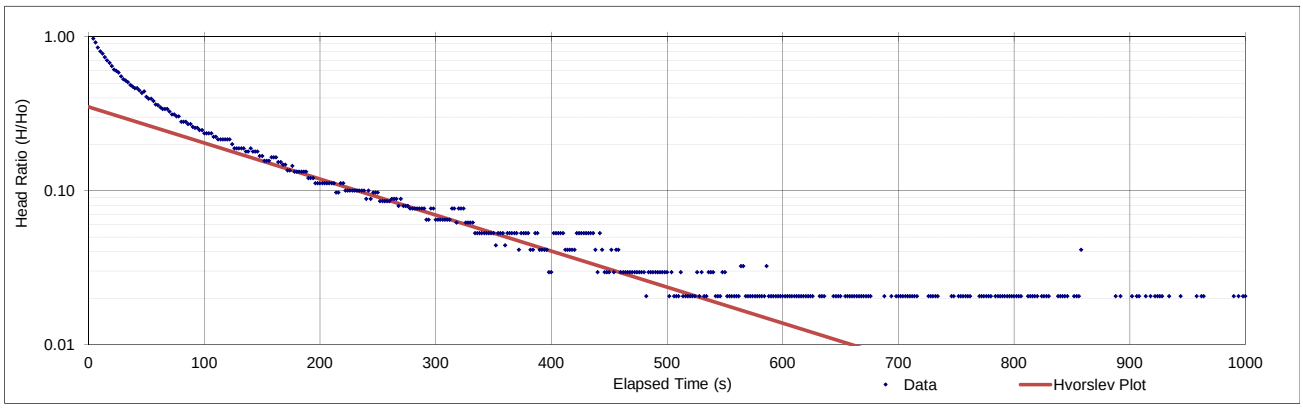
Print 03/06/15 8:58

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-04S**
Field Technician	CM		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	RST Solid Slug (Vol=1061ml)		
Test Date	05-Aug-13		

Drill-hole diameter, D	0.114	**m**	**Slug Injected, Time = 0**	8:26:19 AM	
Effective diameter of PVC riser pipe, d_e	0.053	**m**	**Initial water level**	15.56	**m above transducer**
Top of test zone	18.0	**mbgs**	**Water level after slug**	15.90	**m above transducer**
Bottom of test zone	21.0	**mbgs**	**Change In Water Level, H_o**	0.34	**m**
Test Length, L	3.0	**m**	**Expected Change In Water Level, H_o**	0.48	**m**
PVC type	Schedule 40				
Slot size	20 Slot				

Transmissivity, T	8E-06	**m^2/s**		
Hydraulic Conductivity, K	3E-06	**m/s**	H/H_o Intercept	0.35





TEST COMMENTS:

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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

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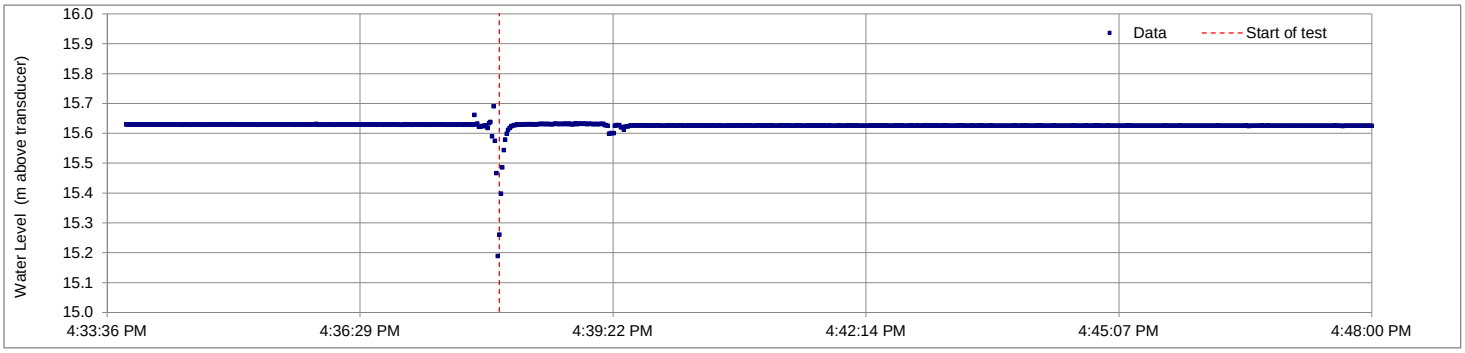
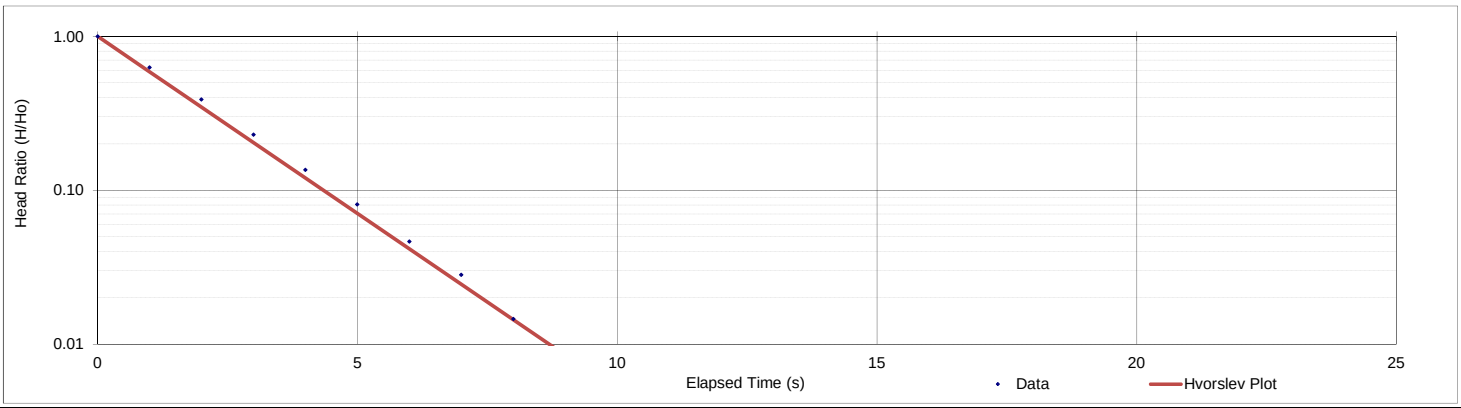
CASINO MINING CORPORATION
CASINO PROJECT

HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

Print 03/06/15 8:33

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-05**
Field Technician	CMJ		
Analyst	MCW		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	1.4m of 1" PVC		
Test Date	28-Jul-14		
Drill-hole diameter, D	0.114 **m**	**Slug Injected, Time = 0**	4:38:04 PM
Effective diameter of PVC riser pipe, d_e	0.049 **m**	**Initial water level**	15.63 **m above transducer**
Top of test zone	46.6 **mbgs**	**Water level after slug**	15.26 **m above transducer**
Bottom of test zone	49.6 **mbgs**	**Change In Water Level, H_o**	-0.37 **m**
Test Length, L	3.0 **m**	**Expected Change In Water Level, H_o**	0.33 **m**
PVC type	Schedule 80		
Slot size	20 Slot		
Transmissivity, T	6E-04 **m^2/s**		
Hydraulic Conductivity, K	2E-04 **m/s**	H/H_o Intercept	1.0





TEST COMMENTS: The water level response may be limited by filter pack surrounding the screen and the hydrauilc conductivity may be higher than estimated.

M:\1\01\00325\17\A\Data\Task 200 - 2013 Hydrogeology Adendum\3-Response Tests\[7. MW13-05.xlsx]Hvorslev

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

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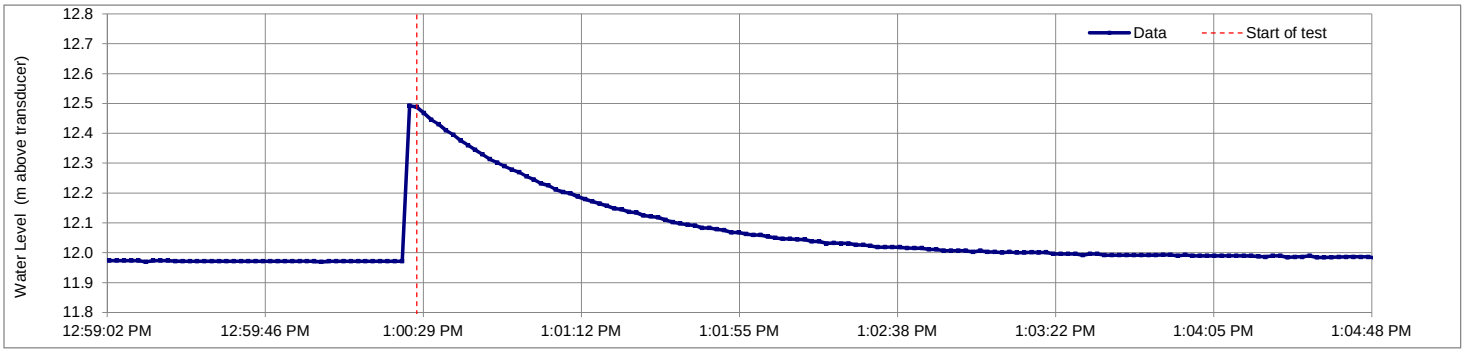
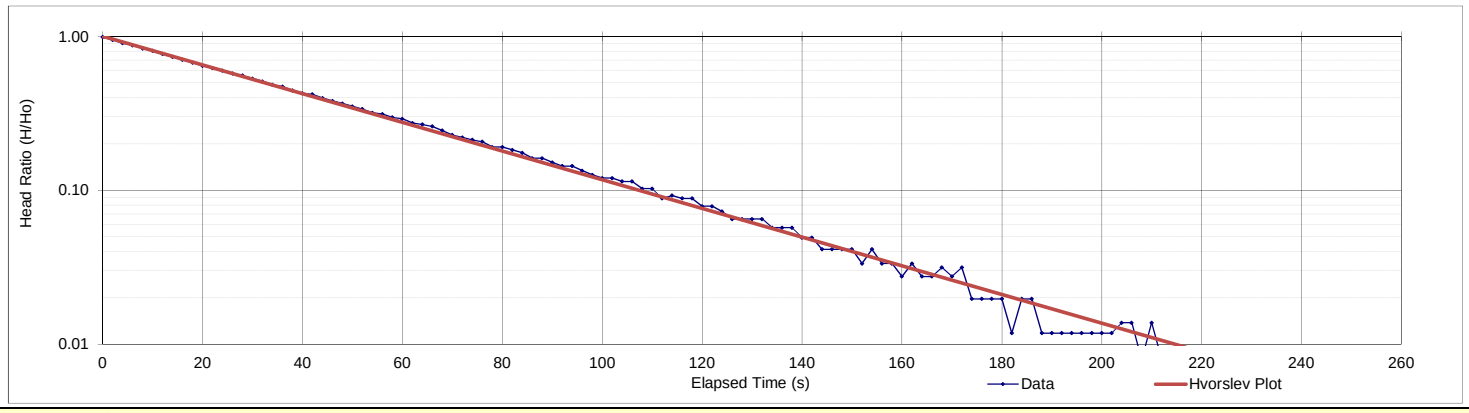
CASINO MINING CORPORATION
CASINO PROJECT

HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

Print 03/06/15 8:58

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-06D**
Field Technician	KTD		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	RST Slug (Vol=1061ml)		
Test Date	07-Aug-13		
Drill-hole diameter, D	0.114 **m**	**Slug Injected, Time = 0**	1:00:27 PM
Effective diameter of PVC riser pipe, d_e	0.049 **m**	**Initial water level**	11.99 **m above transducer**
Top of test zone	45.4 **mbgs**	**Water level after slug**	12.49 **m above transducer**
Bottom of test zone	48.4 **mbgs**	**Change In Water Level, H_o**	0.51 **m**
Test Length, L	3.0 **m**	**Expected Change In Water Level, H_o**	0.56
PVC type	Schedule 80		
Slot size	20 Slot		
Transmissivity, T	3E-05 **m^2/s**		
Hydraulic Conductivity, K	9E-06 **m/s**	H/H_o Intercept	1.0





TEST COMMENTS:

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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

Knight Piésold CONSULTING

CASINO MINING CORPORATION
CASINO PROJECT

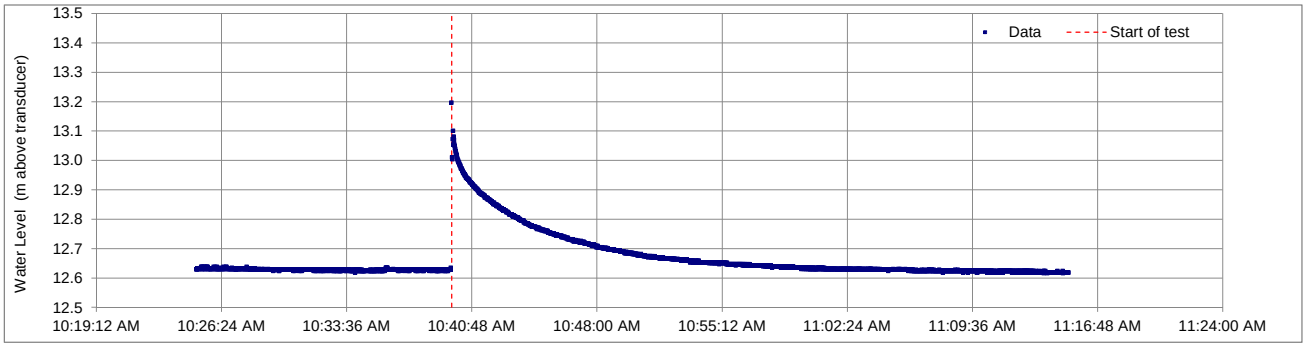
HYDRAULIC CONDUCTIVITY CALCULATION
USING HVORSLEV (1951) METHOD

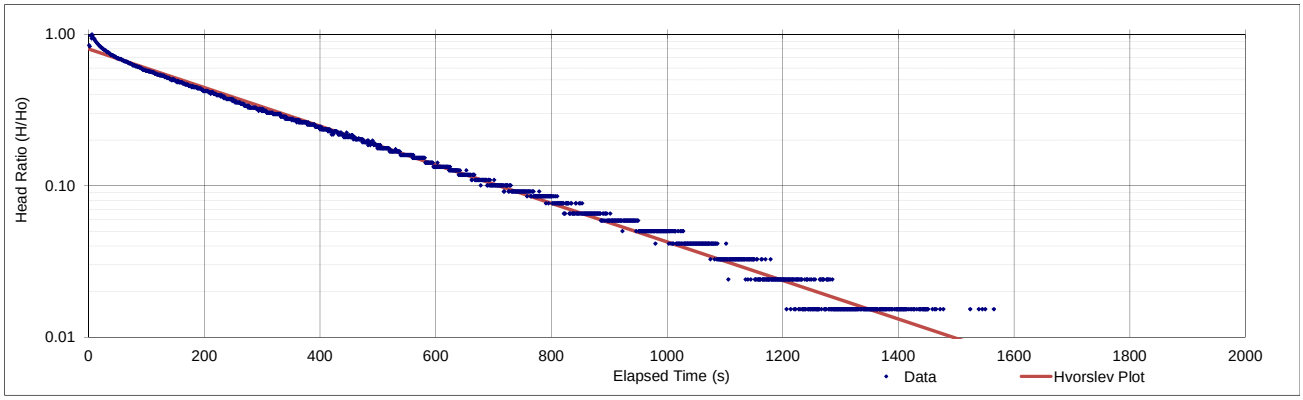
Print 03/06/15 8:58

Project No.	VA101-325/17	**Monitoring Well/Piezometer**	**MW13-06S**
Field Technician	CM		
Analyst	KTD		
Monitoring Instrument Type	Transducer		
Slug Dimensions and Type	RST Solid Slug (Vol=1061ml)		
Test Date	13-Aug-13		

Drill-hole diameter, D	0.114	**m**	**Slug Injected, Time = 0**	10:39:39 AM	
Effective diameter of PVC riser pipe, d_e	0.049	**m**	**Initial water level**	12.62	**m above transducer**
Top of test zone	33.6	**mbgs**	**Water level after slug**	13.08	**m above transducer**
Bottom of test zone	37.8	**mbgs**	**Change In Water Level, H_o**	0.46	**m**
Test Length, L	4.2	**m**	**Expected Change In Water Level, H_o**	0.56	**m**
PVC type	Schedule 80				
Slot size	20 Slot				

Transmissivity, T	4E-06	**m^2/s**		
Hydraulic Conductivity, K	9E-07	**m/s**	H/H_o Intercept	0.80





TEST COMMENTS:

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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

APPENDIX C

WATER LEVEL DATA

Appendix C1 Manual Water Level Measurements
Appendix C2 Time-Series Measurements from Pressure Transducers
Appendix C3 Time-Series Measurements from Vibrating Wire Piezometers

APPENDIX C1

MANUAL WATER LEVEL MEASUREMENTS

(Table C1)

Knight Piésold CONSULTING

TABLE C1

CASINO MINING CORPORATION
CASINO PROJECT

20113-2014 GROUNDWATER DATA REPORT
MEASURED DEPTH TO GROUNDWATER

Print Mar/06/15 15:47:12

Location	Well ID	Top of Piezometer Elevation[1]	Screened Interval		Groundwater Levels																										Notes
			Top	Bottom	June 1, 1994	July 1, 1994	Sept. 1, 1994	Oct. 1, 1994	Dec. 1, 1994	May 23-25, 1995	May 20-25, 2008	Sept. 9-11, 2008	Sept 21 - Oct 3, 2009	May 22-26, 2010	June 5-10, 2010	July 10-27, 2010	August 17-20, 2010	Sept. 13-16, 2010	May 21-22, 2011	July 15-17, 2011	Aug. 17-29, 2011	Sept. 17-28, 2011	May 25-28, 2012	Sept. 13-17, 2012	June 10-30 2013	Aug. 3-16, 2013	Sept. 26-29, 2013	May 22-25, 2014	July 22-30, 2014	Sept. 27-Oct. 2, 2014	
		masl	mbgs	mbgs	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	mbPVC	
Open Pit	93-145[8]	1272	-	-	-	-	-	-	-	-	-	4.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	93-226[8]	1171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.64	13.36	-	-	-	-	-	16.95	-	-	-	-	-	-	
	94-326	1253	73.2	76.2	-	-	-	-	-	D at 6.9	-	D/F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Blocked or damaged by frost jacking (Sept. 2009)
	94-332	1324	102.7	105.8	-	-	-	-	-	D at 23.29	-	-	-	-	D at 23.2	-	D at 23.2	D at 23.2	-	-	-	-	-	F/B at 4.63	F/B at 4.6	F/B at 4.57	-	-	-	-	Suspect damaged
	94-337	1143	32.3	35.4	12.70	16.20	-	14.50	16.81	18.31	18.38	8.45	11.47	-	17.03	13.49	9.27	9.22	19.20	7.73	-	10.49	15.22	12.04	15.00	6.92	10.50	16.70	15.39	9.16	Suspect damaged based on transducer data
	P39	1145	46.3	49.4	-	-	-	-	-	-	-	-	-	-	-	-	6.28	6.56	-	-	-	-	-	9.52	-	-	-	-	-	-	
	CAS-051[8]	1206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.89	4.55	-	-	-	-	-	5.62	-	-	-	-	-	-	
	CAS-061[8]	1219	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.43	6.33	-	-	-	-	-	8.46	-	-	-	-	-	-	
	HG10-01	1168	89.4	92.4	-	-	-	-	-	-	-	-	-	-	-	6.79 m atop	8.43 m atop	9.89 m atop	F	Artesian	-	Artesian	Artesian	Artesian	Artesian	Artesian	Artesian	Artesian	Artesian	Artesian	
	HG10-02	1168	42.4	45.3	-	-	-	-	-	-	-	-	-	-	-	0.58 m atop	1.43 m atop	2.79 m atop	F	Artesian	-	Artesian	1.78	0.47	Artesian	Artesian	Artesian	2.91	1.43	0.18	
	HG10-03[2]	1172	16.1	19.1	-	-	-	-	-	-	-	-	-	-	-	4.25	4.35	3.54	7.74	-	-	-	6.68	4.32	-	-	-	-	-	-	
	HG10-04	1139	15.2	18.2	-	-	-	-	-	-	-	-	-	-	-	2.01	4.24	3.43	4.76	3.688	-	4.52	4.26	3.84	4.25	3.46	3.54	4.24	4.13	3.74	
	HG10-05	1183	43.4	46.3	-	-	-	-	-	-	-	-	-	-	-	3.98	6.05	D/F at 5.757	F	D/F at 5.321	-	-	F	F at 5.18	F at 2.8	F	-	-	F at 3.73	-	Frozen water column
	HG10-06	1182	19.8	22.8	-	-	-	-	-	-	-	-	-	-	-	D/F	20.67	D/F	-	-	-	-	F	F	F	-	-	-	F at 3.92	-	Frozen water column
	HG10-07	1214	19.8	22.8	-	-	-	-	-	-	-	-	-	-	-	0.6	1.72	1.82	F at 13.88	F at 13.071	-	F at 10.41	F	F at 10.41	F	-	-	-	F at 7.91	-	Frozen water column
	DH11-36	1399	7.9	10.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F at 4.77	-	F at 4.78	F at 1.71	Frozen water column
	DH11-39[2]	1225	80.8	86.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.02	-	-	-	-	F at 1.65	-	F at 0.73	F at 4.78	Frozen water column
	MW13-02D	1194	24.3	27.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.18	0.79	0.93	F at 1.62	2.01	0.93	
	MW13-02S	1193	11.8	14.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.57	1.67	2.00	F at 1.95	2.02	1.74	
Casino Creek Valley	94-342	947	20.4	23.5	-	-	-	-	-	-	D/F	0.95	7.85	-	1.8	-	1.02	1.00	F at 13.0	F at 13.297	-	F at 1.2	-	1.05[11]	1.02[11]	-	-	-	-	-	Frost jacked/damaged (AECOM, 2011); Well casing appears cracked, blocked at 13 mbgs (May 2012/June 2013)
	94-343	864	25.0	28.0	Artesian	-	-	Artesian	D/F	F at 1.09	Artesian	Artesian	Artesian	-	Artesian	-	-	-	-	-	-	-	F	2.28[11]	1.49[11]	-	-	-	-	-	Frost jacked and severed below ground (June 2010)
	94-345	759	14.9	18.0	-	-	2.99	-	3.07	2.88	18.49[12]	2.72	2.7	-	3.05	-	2.38	2.74	F at 6.76	D/F at ~6	-	D/F at ~6	F at 6.69	2.93[11]	2.82[11]	-	-	-	-	-	Blockage at 6 mbgs (Sept. 2012/June 2013)
	94-346	779	30.5	33.5	-	-	23.20	-	23.28	23.1	D/F at 33.7	22.1	22.62	-	23.2	-	22.27	22.19	23.28	21.613	-	22.41	22.73	22.62	22.73	-	-	-	-	-	Blockage at 3 mbgs (Sept. 2012/June 2013)
	94-347	755	19.8	22.9	-	-	1.20	-	D/F at 1.2	F at 1.6	D/F at 0.86	2.053	1.57	-	1.26	2.02	1.55	1.46	D/F at 1.2	1.815	-	0.8	F at 1.49	1.48	F at 1.58	-	-	-	-	1.15	
	94-348	732	22.0	25.1	-	-	-	-	-	F at 1.47	-	1.2	1.69	-	1.1	-	1.68	1.52	D/F at 1.67	F at 6.723	-	-	F at 1.80	F at 6.8	F at 1.82	-	-	-	-	F at 7.06	Frozen water column
	94-350	702	62.5	65.5	-	-	4.12	-	D/F at 4.12	D/F at 4.15	D/F at 1.90	2.01	D/F	-	6.165	-	D/F	D/F	D/F at 6.14	-	-	D/F	D/F at 6.16	-	F at 6.17	F at 6.16	-	F at 6.62	F at 6.16	F at 5.90	Frozen water column
	94-351	719	15.9	19.0	-	-	11.80	-	D/F at 11.8	D/F at 11.77	-	1.24[12]	2.14	-	4.4	-	2.84	1.73	D/F at 5.92	F at 5.924	-	-	F at 6.3	F at 6.53	F at 6.51	F at 5.77	-	F at 3.00	F at 5.70	-	Frozen water column
	DH10-01	978	8.2	11.2	-	-	-	-	-	-	-	-	-	10.95[10]	-	-	-	-	-	-	-	-	-	-	-	-	10.75	-	11.06	11.39	
	DH10-02	921	34.1	40.2	-	-	-	-	-	-	-	-	-	30.4[10]	-	-	-	-	-	-	-	-	-	-	-	-	37.38	-	37.09	37.78	
	DH10-03	812	31.6	36.9	-	-	-	-	-	-	-	-	-	30.4[10]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	DH10-04	723	18.0	21.0	-	-	-	-	-	-	-	-	-	0.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	DH10-05	783	2.9	5.9	-	-	-	-	-	-	-	-	-	3.45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.87	
	DH10-06	908	2.7	5.8	-	-	-	-	-	-	-	-	-	3.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.11	
	DH11-14	673	22.9	25.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F at 2.21	-	F at 2.30	F at 1.35	Frozen water column
	DH11-21A	819	37.4	43.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	>44.3	>44.3	>44.3	
	DH11-22	807	17.9	20.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.63[10]	-	-	-	-	-	-	-	-	
	DH11-23A	728	20.9	24.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F at 3.00	F at 2.16	F at 1.12	Frozen water column
	DH11-24	838	32.8	35.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	>36.6	
	DH11-25S	783	6.1	9.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.08[10]	-	-	-	-	-	F/B at 6.00	-	F/B at 5.05	F/B at 6.96	Frozen water column
	DH11-25D	783	18.4	21.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.55[10]	-	-	-	-	-	F/B at 16.34	-	F/B at 16.34	F/B at 16.34	Frozen water column
	MW13-05	1024	46.6	49.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.23[10]	41.78	41.15	43.44	43.11	42.26	
	MW13-06D	1070	45.4	48.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.97	31.89	37.47	44.36	41.81	38.42	
	MW13-06S	1070	33.6	37.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.33	32.72	37.44	37.44	37.45	36.42	
Hillslope Area	94-352	1190	14.1	17.2	-	-	3.20	-	9.65	4.62	D/F at 17.46	0.96	2.7	-	4.29	-	2.81	1.63	11.68[11]	-	-	-	-	-	5.07	1.73	-	6.09	1.00	1.81	
	94-353	1210	11.6	14.6	-	-	-	-	-	13.17	D/F at 12.14	11.61	12.55	-	15.09	-	12.55	11.27	12.83	9.44	-	11.55	-	-	13.46	1.03	-	13.45	10.30	12.18	PVC damaged at ground surface Aug 2011, repaired June 2012
	94-354	1098	18.2	21.3	-	-	-	-	-	18.82	D/F at 22.8	18.04	21.9	-	22.23	-	20.48	19	22.50	18.80	-	17.11	22.23	21.25	Dry (>22.8)	Dry (>22.8)	-	Dry (>22.8)	19.48	20.48	
	DH12-04A	1232	18.8	21.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F/B at 6.20	F/B at 8.01	
	MW11-01A	1084	27.5	30.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.76	26.38	-	20.23	-	-	23.03	-	-	Could not pass surge block down well, not developed
	MW11-01B	1087	14.5	17.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.59	D at 16.81	D (>16.7)		12.80	-	Dry (>16.7)	-	-	
	MW11-02A	1082	23.0	26.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.72	5.58	7.16	7.68	5.77	-	7.63	7.49	5.75	
	MW11-02B	1083	14.6	18.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.98	6.29	5.42	8.68	4.25	-	6.74	6.30	4.28	
	MW13-01D	1150	27.5	30.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	F at 3.03	F	F	F	Frozen water column
	MW13-01S	1150	10.7	13.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	F at 3.22	F	F	F	Frozen water column
	MW13-03D	1214	30.7	33.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.42	11.25	9.78	F at 7.01	F at 16.43	F at 11.73	Frozen water column
	MW13-03S	1213	10.6	13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.17	F at 9.14	F at 1.50	F at 9.98	F at 3.09	Frozen water column
	MW13-04D	1024	37.7	40.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.28[10]	18.95	17.99	24.41	18.92	17.91	
	MW13-04S	1025	18.0	21.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.89	8.52	10.99	17.74	13.05	10.30	
Plant Site	DH11-32	1191	9.0	12.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.33	-	-	-	-	-	B/F at 1.2	-	B/F at 1.184	F at 1.19	Frozen water column
	DH11-33	1195	6.5	9.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.61	-		-	-	-	6.37	-	5.90	Dry (>10.5)	
	DH11-34	1181	17.3	20.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.45[10]	-	-	-	-	-	F/B at 4.76	-	F/B at 3.5	F/B at 5.12	Frozen water column
Dip Creek Valley	DH11-09	632	33.7	39.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F at 3.6	-	-	-	-	-	-	-	-	
	DH11-10[8]	642	11.7	17.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	
	DH11-11	653	3.7	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	
	DH11-12	652	21.9	30.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	
	DH11-13[8]	662	19.3	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	
Brynelson Creek	DH11-15	717	20.6	23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.45	-	-	-	-	F at 1.53	-	F at 0.52	F at Artesian	
Britannia Creek	DH11-PEG-01	394	6.9	9.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.45	-	-	-	-	-	-	-	-	
	DH11-PEG-02	395	11.0	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.91	-	-	-	-	-	-	-	-	
	DH11-PEG-03	404	8.3	11.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.53	-	-	-	-	-	-	-	-	
	DH11-PEG-04	429	8.2	11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.74	-	-	-	-	-	-	-	-	

M:\1\01\00325\17\A\Data\Task 200 - 2013 Hydrogeology Adendum\1- Water levels\Manual Water Levels\[TABLE C1 - Measured GW levels and elevations.xlsx]C1- GW levels

NOTES:

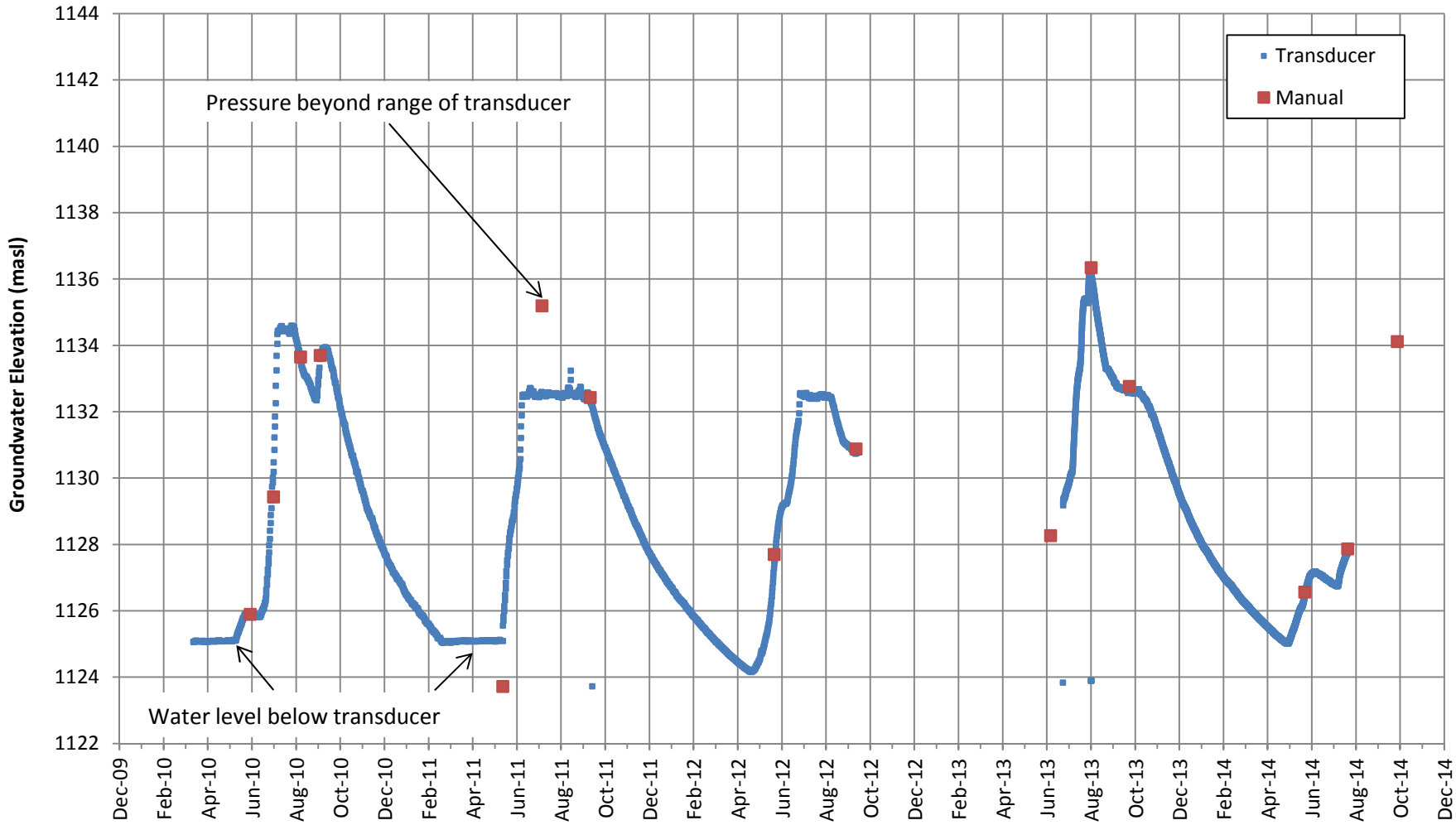
1. 2011, 2012 AND 2013 LOCATIONS WERE SURVEYED BY YUKON ENGINEERING SERVICES IN SEPTEMBER 2013. COORDINATES PRESENTED IN UTM NAD83 ZONE 7.
2. ANGLED PIEZOMETER, DEPTHS ARE MEASURED ALONG HOLE.
3. mbPVC: METERS BELOW TOP OF PVC.
4. mbgs: METERS BELOW GROUND SURFACE.
5. DRY: DRY WELL.
6. F: FROZEN WELL.
7. atop: ABOVE TOP OF PIPE
8. OPEN BOREHOLE, DEPTH IS MEASURED FROM GROUND SURFACE.
9. B: BLOCKED
10. WATER LEVEL MEASURED IMMEDIATELY AFTER WELL INSTALLATION AND MAY NOT REPRESENT STATIC WATER LEVEL CONDITIONS.
11. THE WELL MAY BE DAMAGED AND THE WATER LEVEL MAY NOT BE REPRESENTATIVE OF HYDROLOGIC CONDITIONS AT THE SCREEN DEPTH.
12. WATER LEVEL MEASUREMENT IS NOTICABLY DIFFERENT THAN PREVIOUS MEASUREMENTS.

0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

APPENDIX C2

TIME-SERIES MEASUREMENTS FROM PRESSURE TRANSDUCERS

(Pages C2-1 to C2-14)



NOTES:

1. GROUND SURFACE ELEVATION IS 1142.8 m.
2. THE WELL IS SCREENED BETWEEN 1110.2 masl AND 1107.1 masl.
3. TRANSDUCER WAS INSTALLED AT 1125.3 masl UNTIL MAY 22, 2011 WHEN THE TRANSDUCER WAS LOWERED 2 m TO 1123.3 masl.
4. THE TRANSDUCER WAS REMOVED FROM THE WELL IN SEPTEMBER 2012 AND WAS REPLACED WITH A TRANSDUCER WITH A GREATER RANGE OF MEASUREMENT JUNE 2013 .
5. TRANSDUCER WAS TEMPORARILY REMOVED FROM THE WELL BETWEEN JULY AND OCTOBER 2014.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

94-337
GROUNDWATER ELEVATION

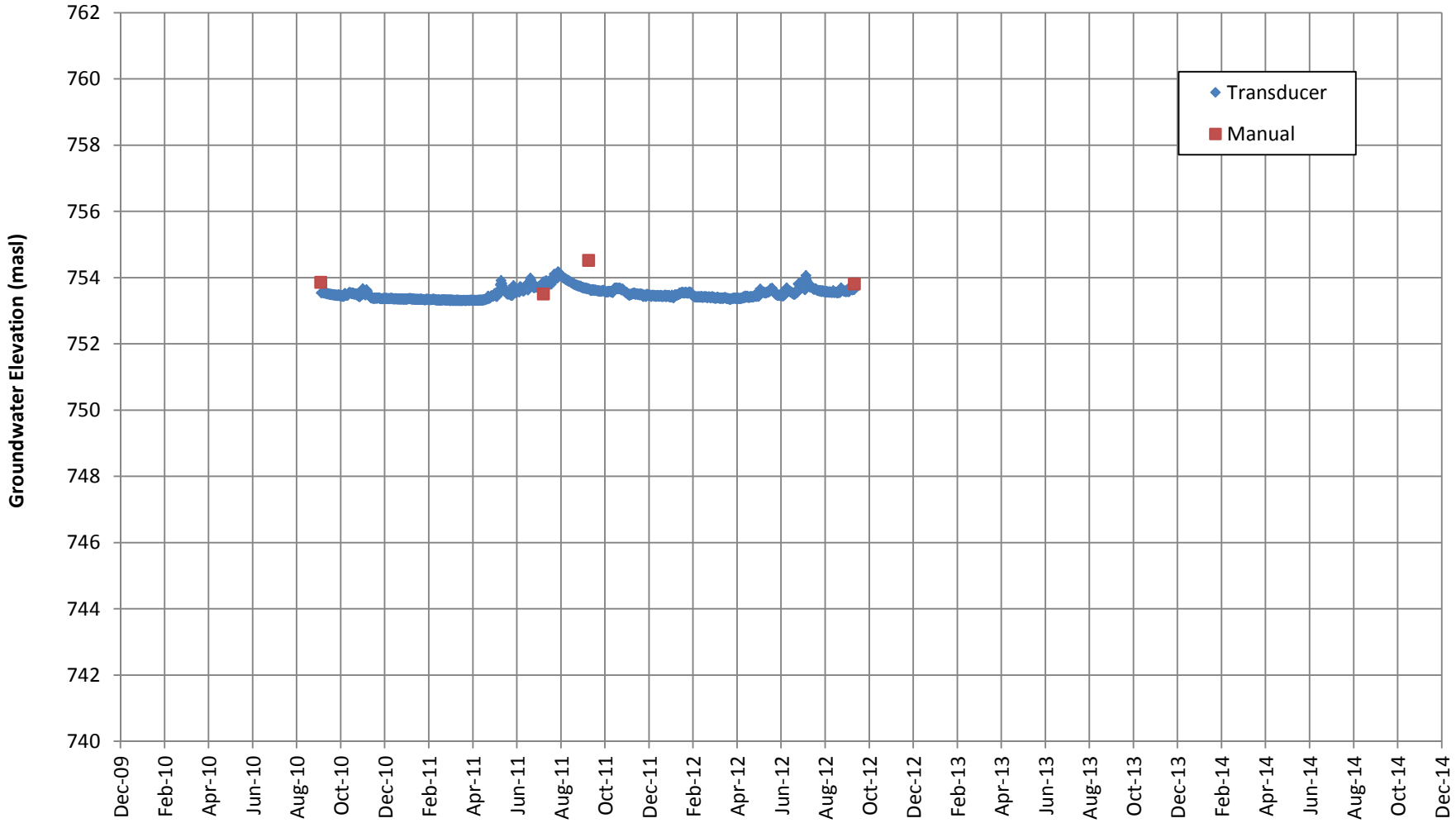
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.1

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 754.2 m.
2. WELL IS SCREENED BETWEEN 734.4 masl AND 731.1 masl.
3. WATER IN WELL APPEARS TO FREEZE FROM APPROXIMATELY DECEMBER TO MAY BASED ON MANUAL WATER LEVEL MEASUREMENTS.
4. TRANSDUCER REMOVED FROM WELL SEPTEMBER 2012 AND NOT RE-INSTALLED.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

94-347
GROUNDWATER ELEVATION

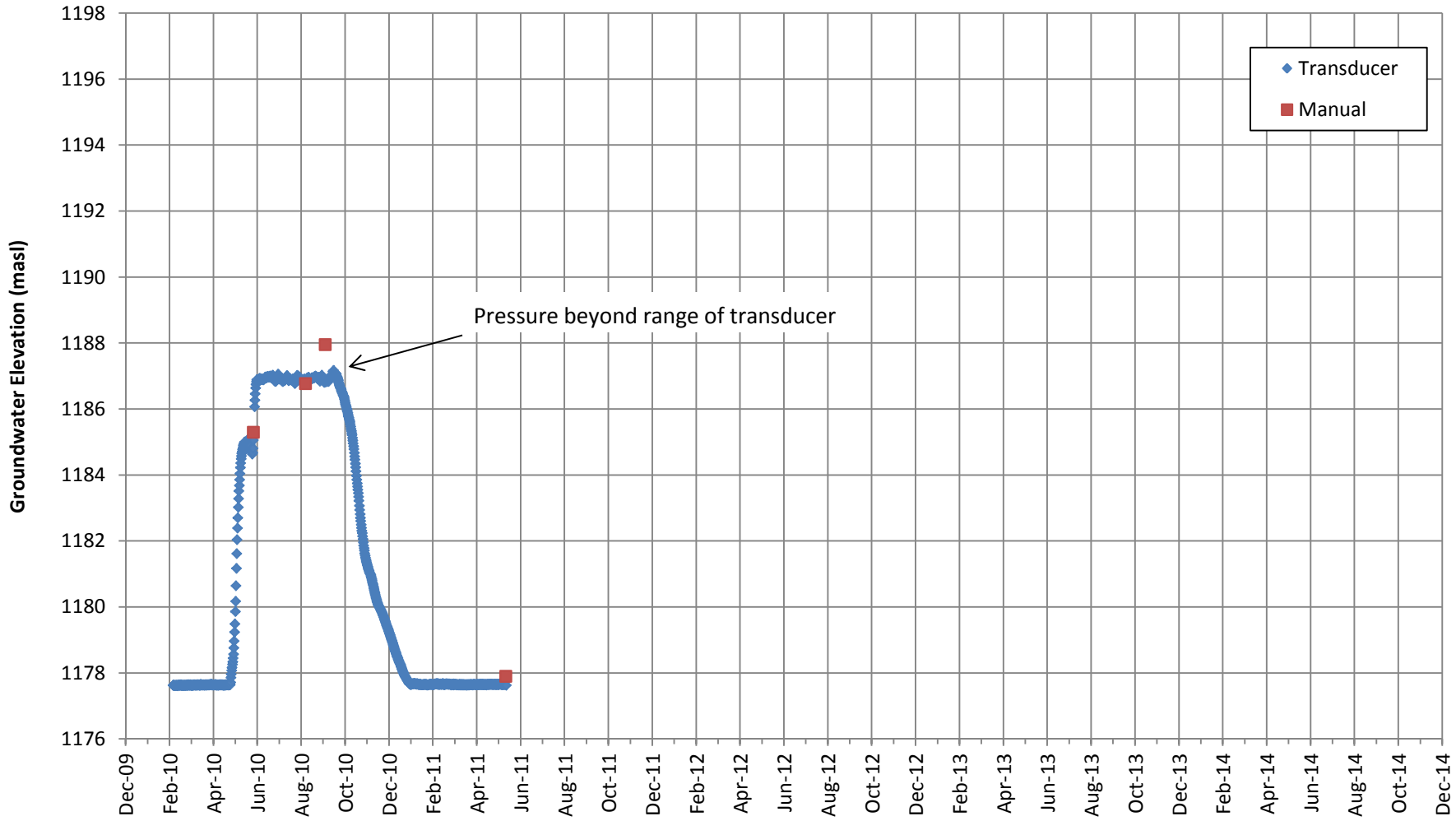
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.2

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 1188.6 m.
2. WELL IS SCREENED BETWEEN 1174.5 masl AND 1171.4 masl.
3. IN MAY 2011 THE PVC WAS NOTED TO BE DAMAGED AT 3 mbgs AND THE TRANSDUCER WAS REMOVED FROM THE WELL. THE WELL IS SUSPECTED TO BE DAMAGED OVER THE PERIOD OF RECORD SHOWN ON THE PLOT.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

94-352
GROUNDWATER ELEVATION

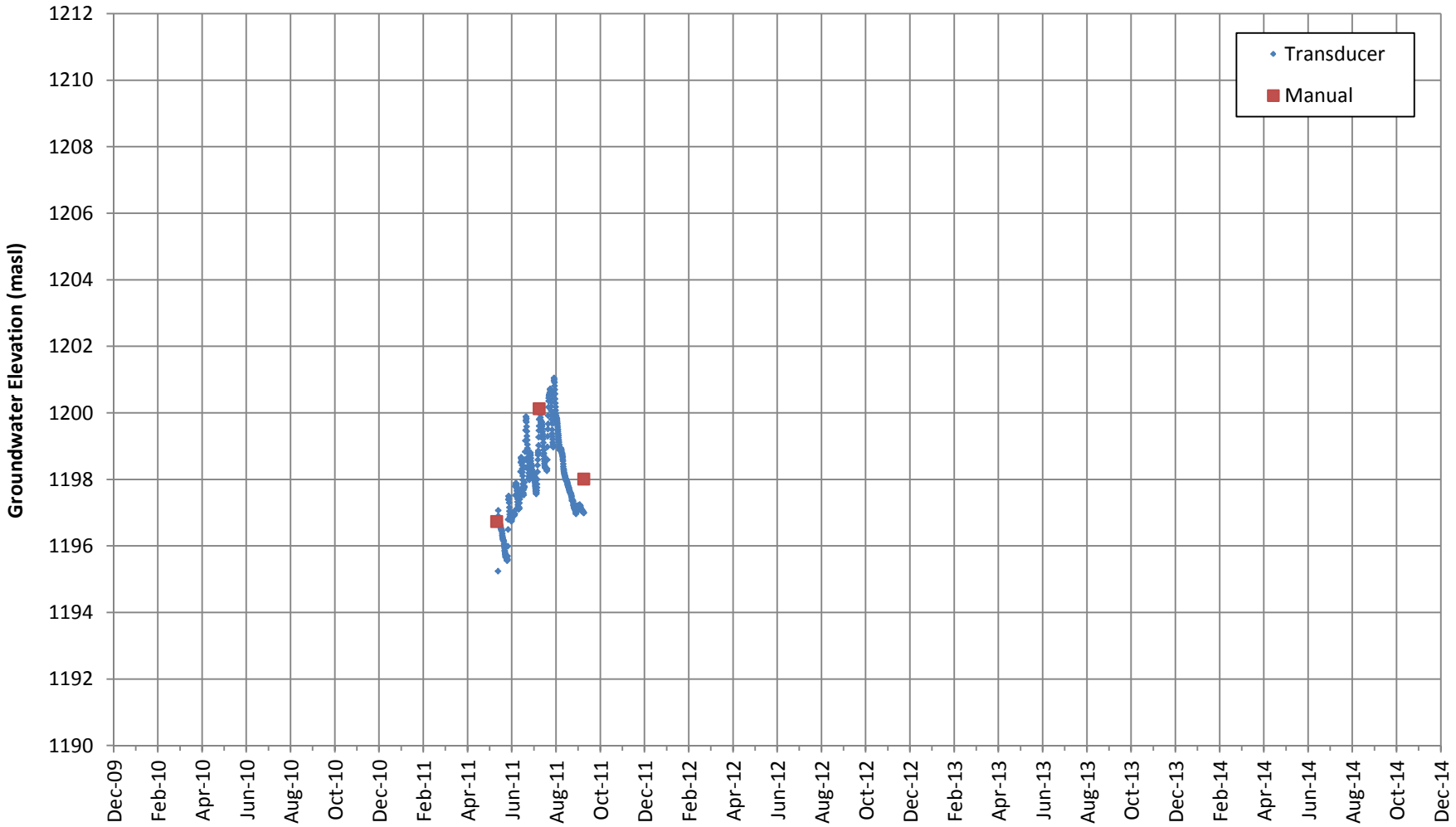
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.3

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 1208.6 m.
2. WELL IS SCREENED BETWEEN 1197.0 masl AND 1194.0 masl.
3. TRANSDUCER WAS REMOVED FROM THE WELL IN SEPTEMBER 2011 WHEN THE PVC WAS DAMAGED AT GROUND SURFACE.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

94-353
GROUNDWATER ELEVATION

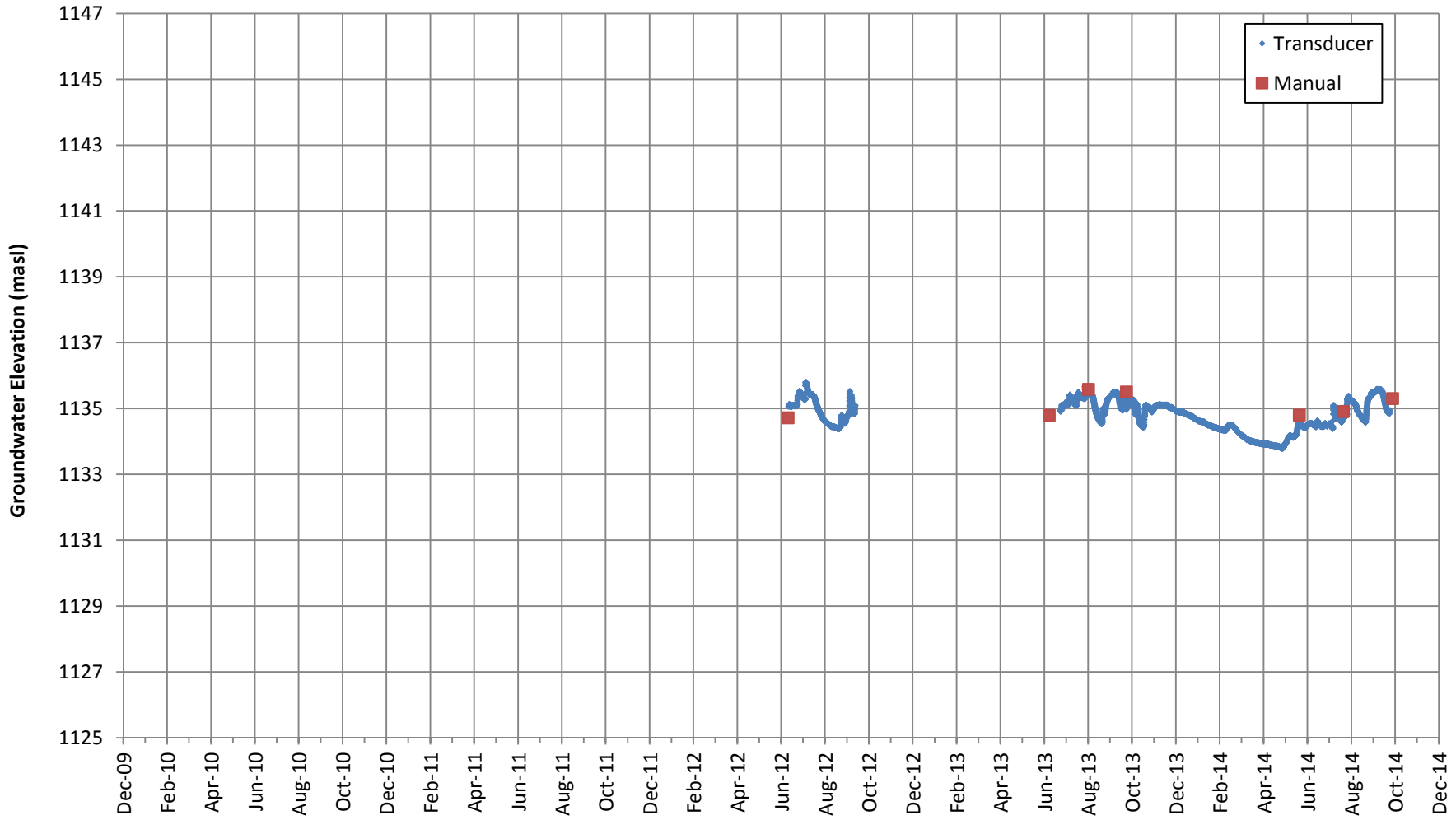
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.4

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 1138.7 m.
2. WELL IS SCREENED BETWEEN 1123.6 masl AND 1120.6 masl.
3. THE LEVELOGGER WAS REMOVED IN SEPTEMBER 2012 AND REPLACED JUNE 2013.

CASINO MINING CORPORATION

CASINO PROJECT

HG10-04
GROUNDWATER ELEVATION

Knight Piésold CONSULTING

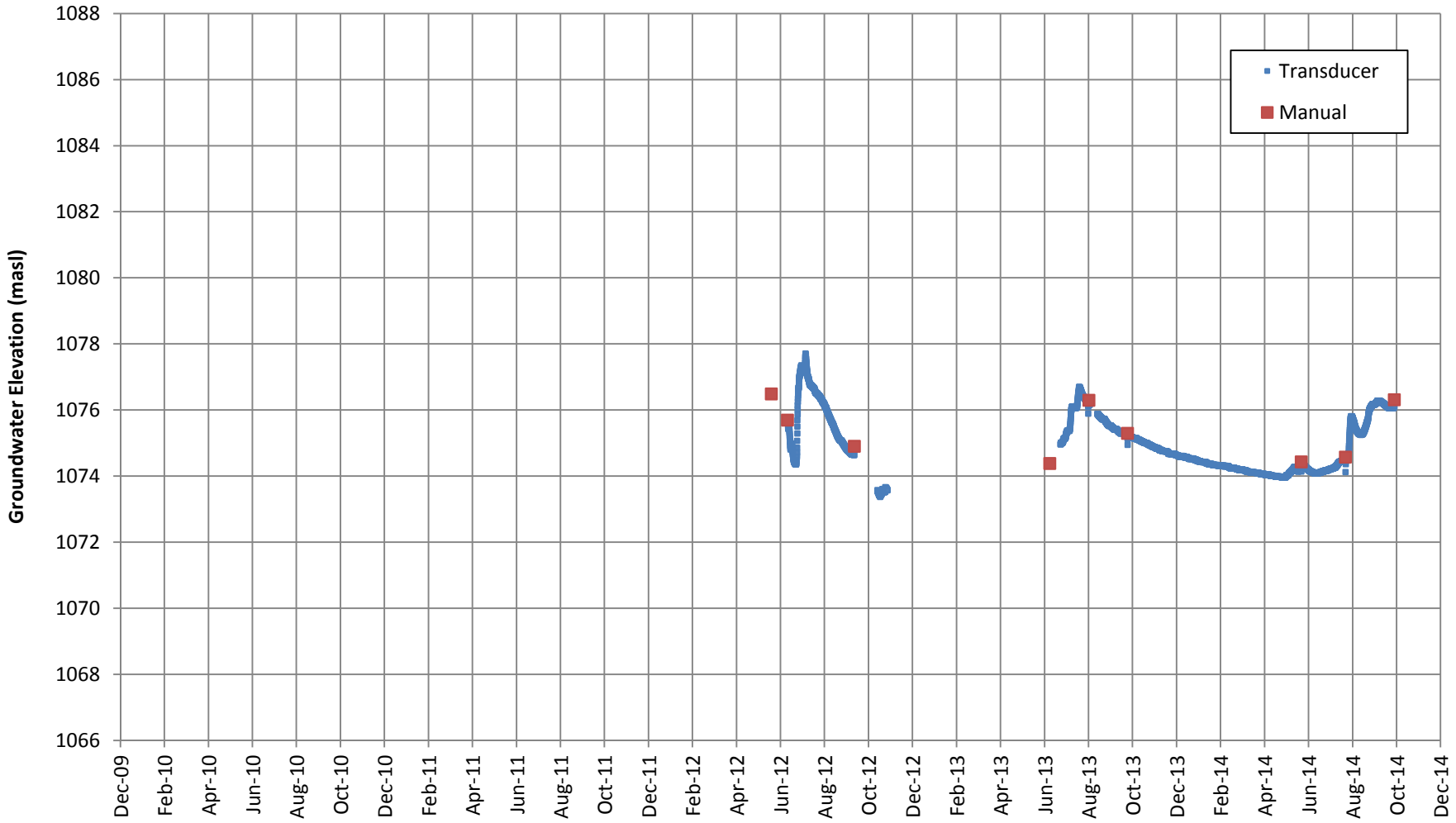
P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.5

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. GROUND SURFACE ELEVATION IS 1081.1 masl.
2. WELL IS SCREENED BETWEEN 1058.1 masl AND 1055.1 masl.
3. TRANSDUCER WAS REMOVED FROM THE WELL SEPTEMBER 2012 AND REPLACED JUNE 2013.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

MW11-02A
GROUNDWATER ELEVATION

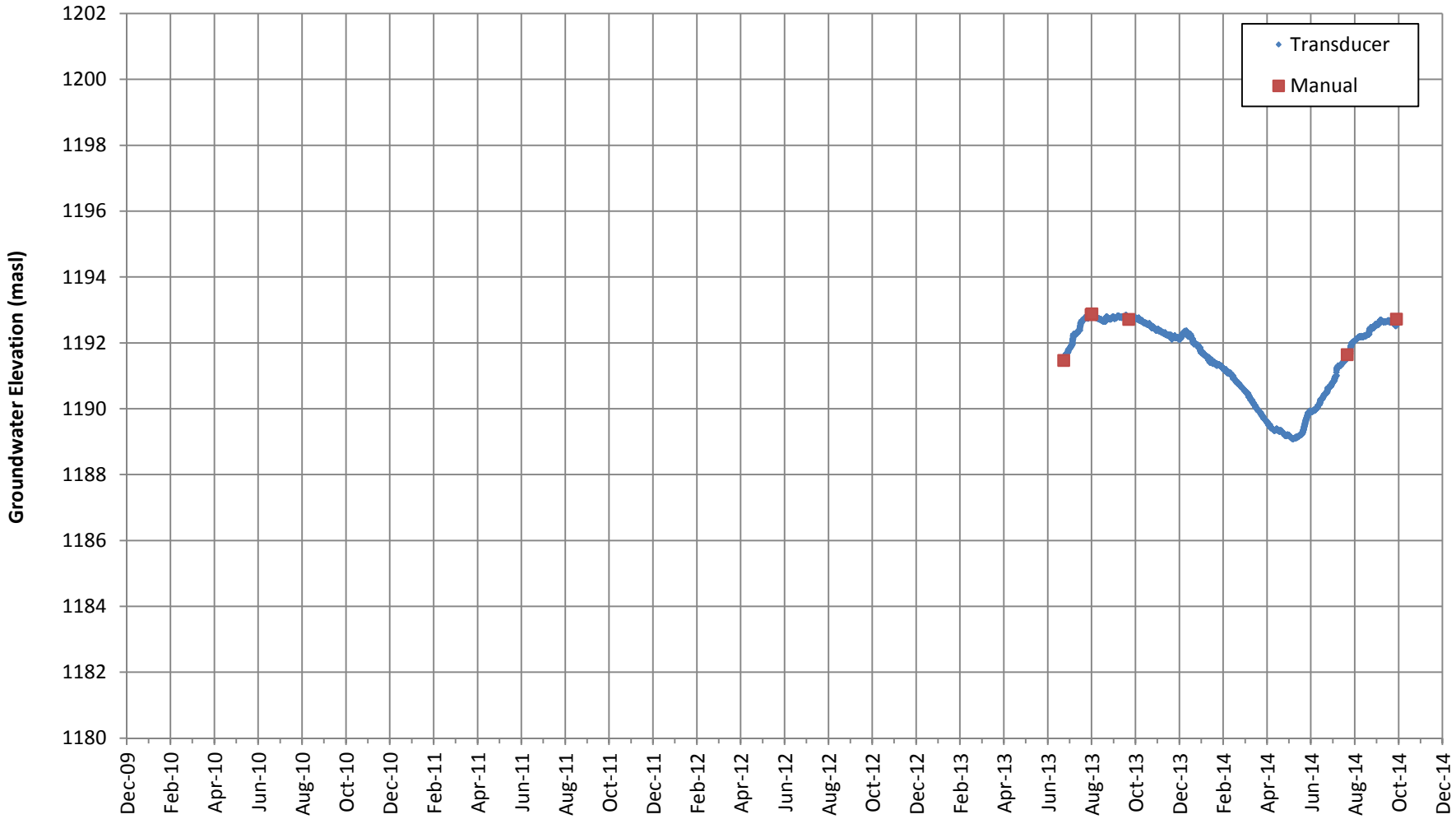
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.6

REV 0



NOTES:
1. GROUND SURFACE ELEVATION IS 1193.1 masl.
2. WELL IS SCREENED BETWEEN 1168.8 masl AND 1165.8 masl.
3. WELL FROZEN DURING MAY 2014 SITE VISIT AND MANUAL MEASUREMENT IS NOT SHOWN.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

MW13-02D
GROUNDWATER ELEVATION

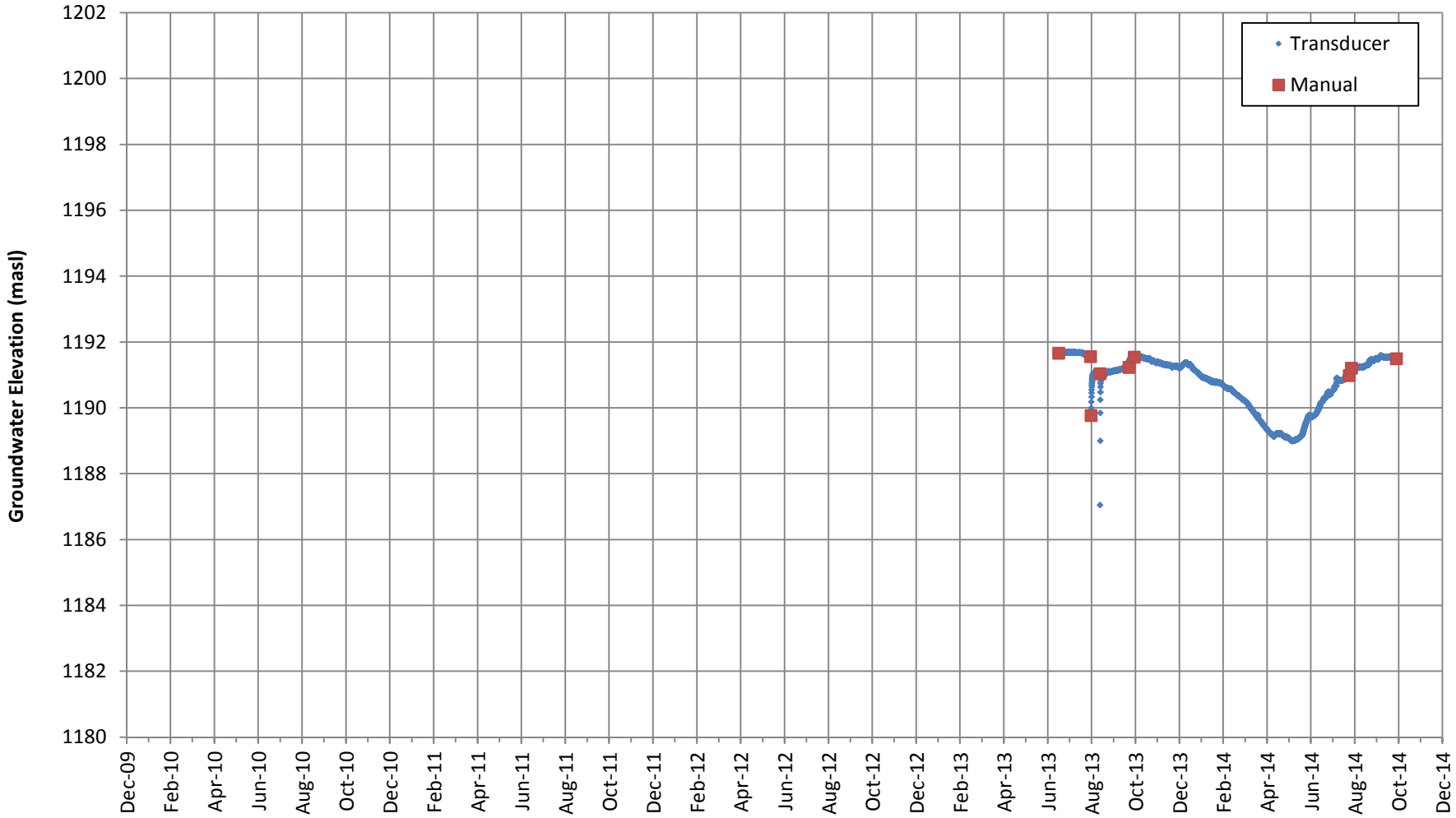
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.7

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 1192.7 m.
2. WELL IS SCREENED BETWEEN 1180.9 masl AND 1177.9 masl.
3. WATER COLUMN IN WELL FROZEN DURING SITE VISIT IN MAY 2014 AND MANUAL MEASUREMENT NOT SHOWN.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

MW13-02S
GROUNDWATER ELEVATION

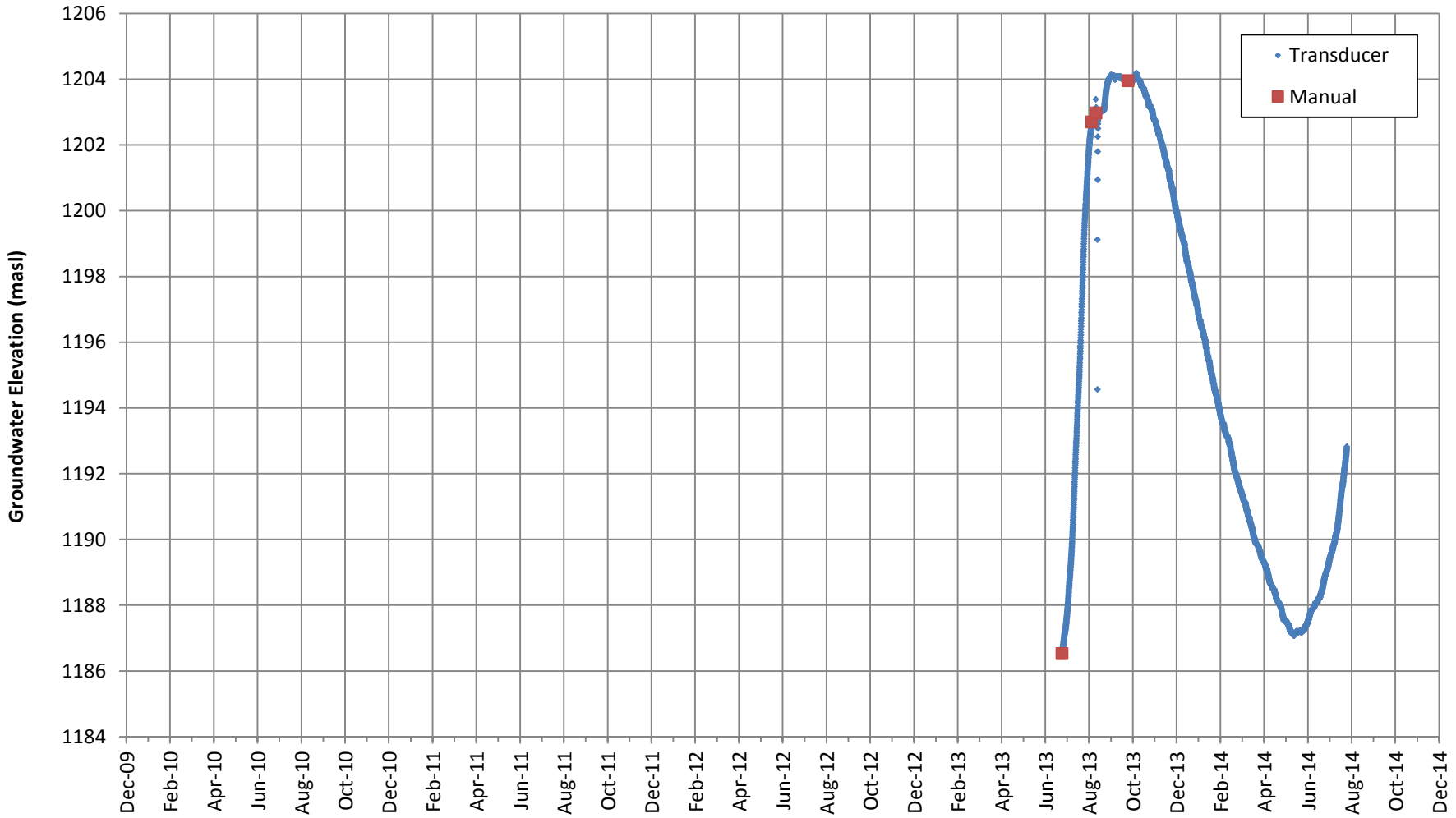
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.8

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 1213.6 masl.
2. WELL IS SCREENED BETWEEN 1182.9 masl AND 1179.8 masl.
3. WATER COLUMN IN WELL FROZEN DURING MAY, JUNE, AND SEPTEMBER 2014 SITE VISITS AND MANUAL MEASUREMENTS ARE NOT SHOWN. WATER COLUMN THAWED IN JULY 2014 AND TRANSDUCER DOWNLOADED.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

MW13-03D
GROUNDWATER ELEVATION

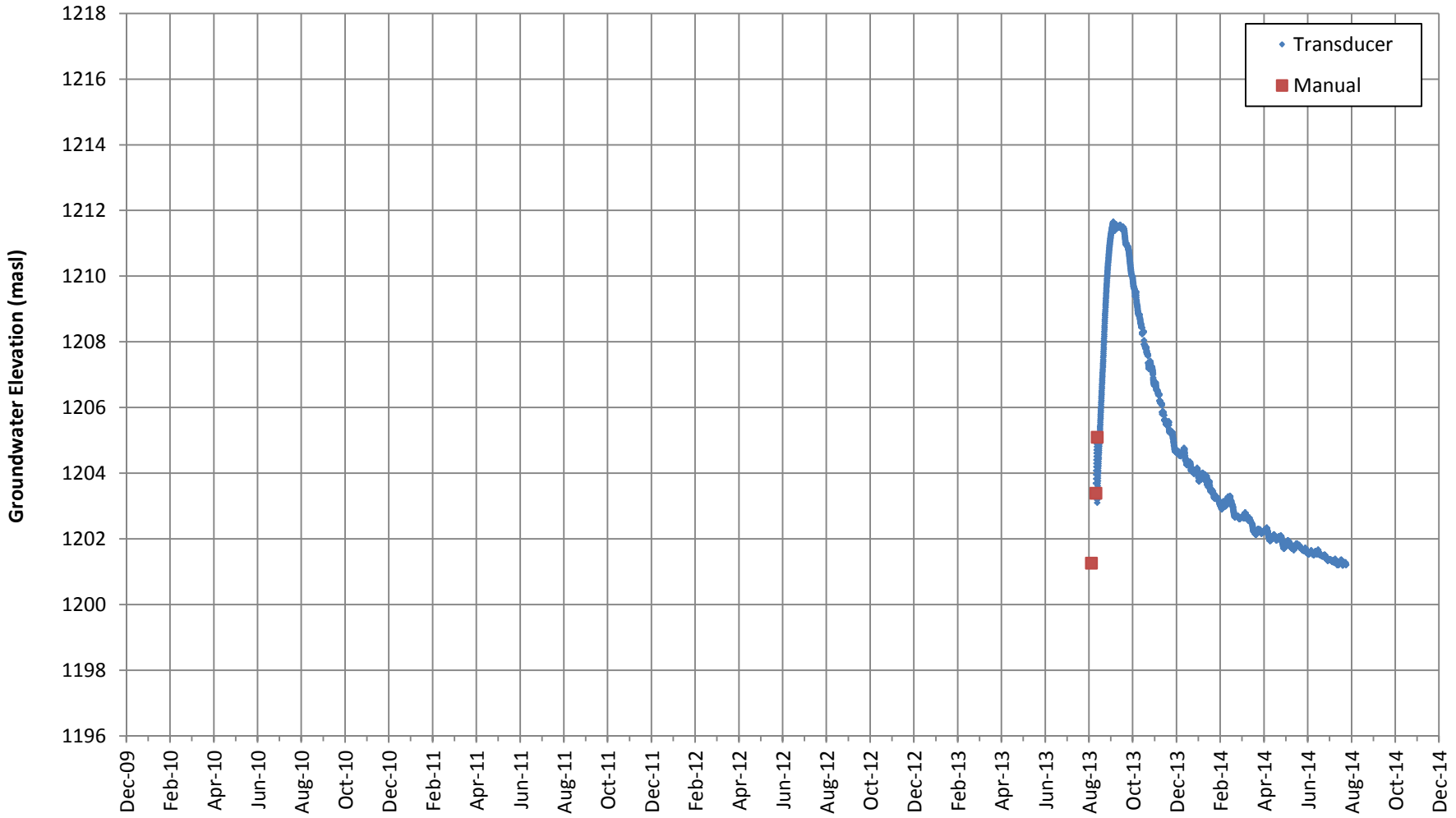
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.9

REV 0



NOTES:

1. GROUND SURFACE ELEVATION IS 1213.0 masl.
2. WELL IS SCREENED BETWEEN 1202.4 masl AND 1199.4 masl.
3. WELL FROZEN DURING SITE VISITS FROM SEPTEMBER 2013 THROUGH SEPTEMBER 2014 AND MANUAL WATER LEVEL MEASUREMENTS NOT SHOWN.
4. ICE IN WELL THAWED DURING JULY 2014 SITE VISIT AND TRANSDUCER DOWNLOADED.

CASINO MINING CORPORATION

CASINO PROJECT

MW13-03S
GROUNDWATER ELEVATION

Knight Piésold CONSULTING

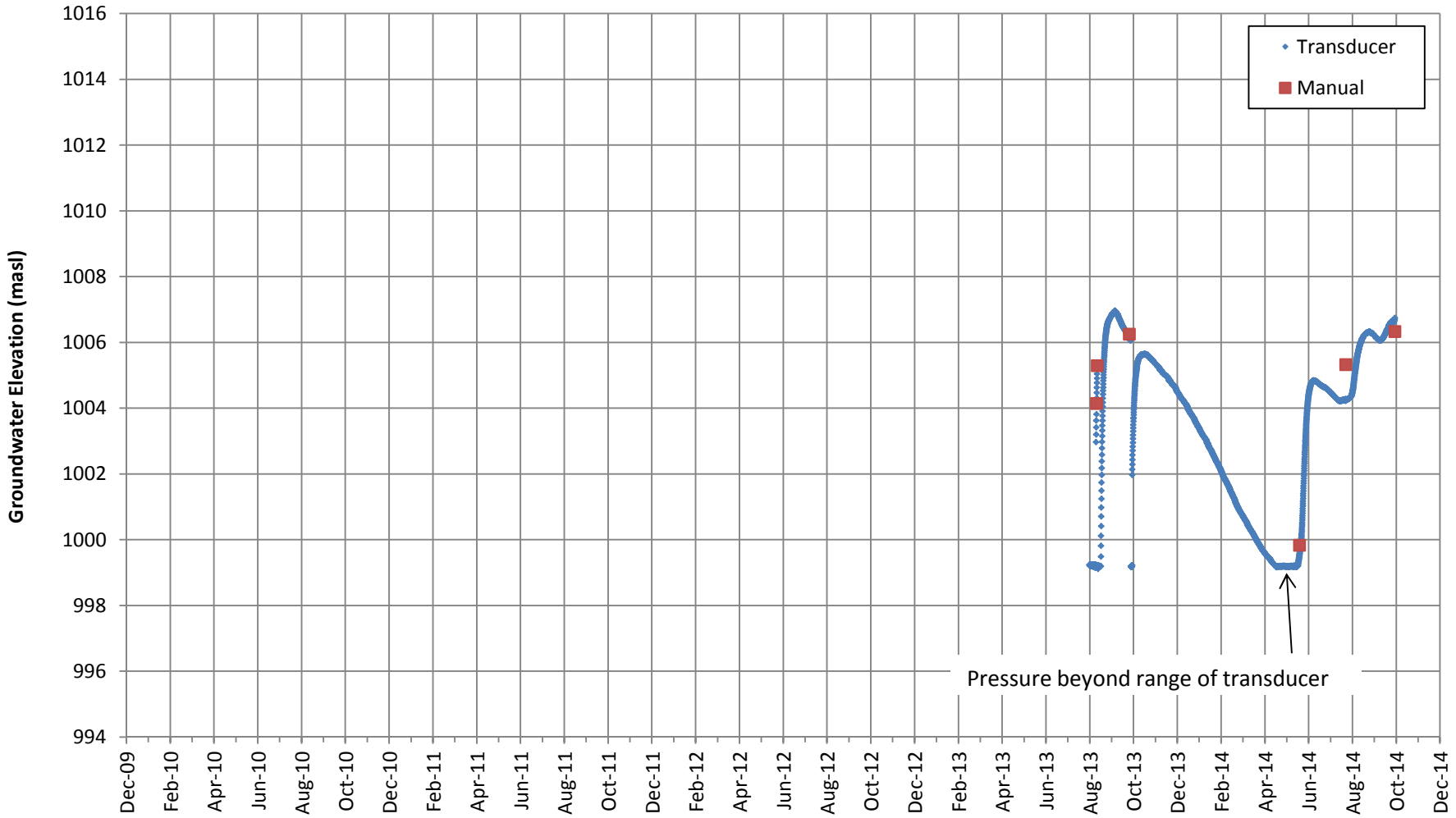
P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.10

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:
1. GROUND SURFACE ELEVATION IS 1023.9 masl.
2. WELL IS SCREENED BETWEEN 986.2 masl AND 983.2 masl.

CASINO MINING CORPORATION

CASINO PROJECT

MW13-04D
GROUNDWATER ELEVATION

Knight Piésold CONSULTING

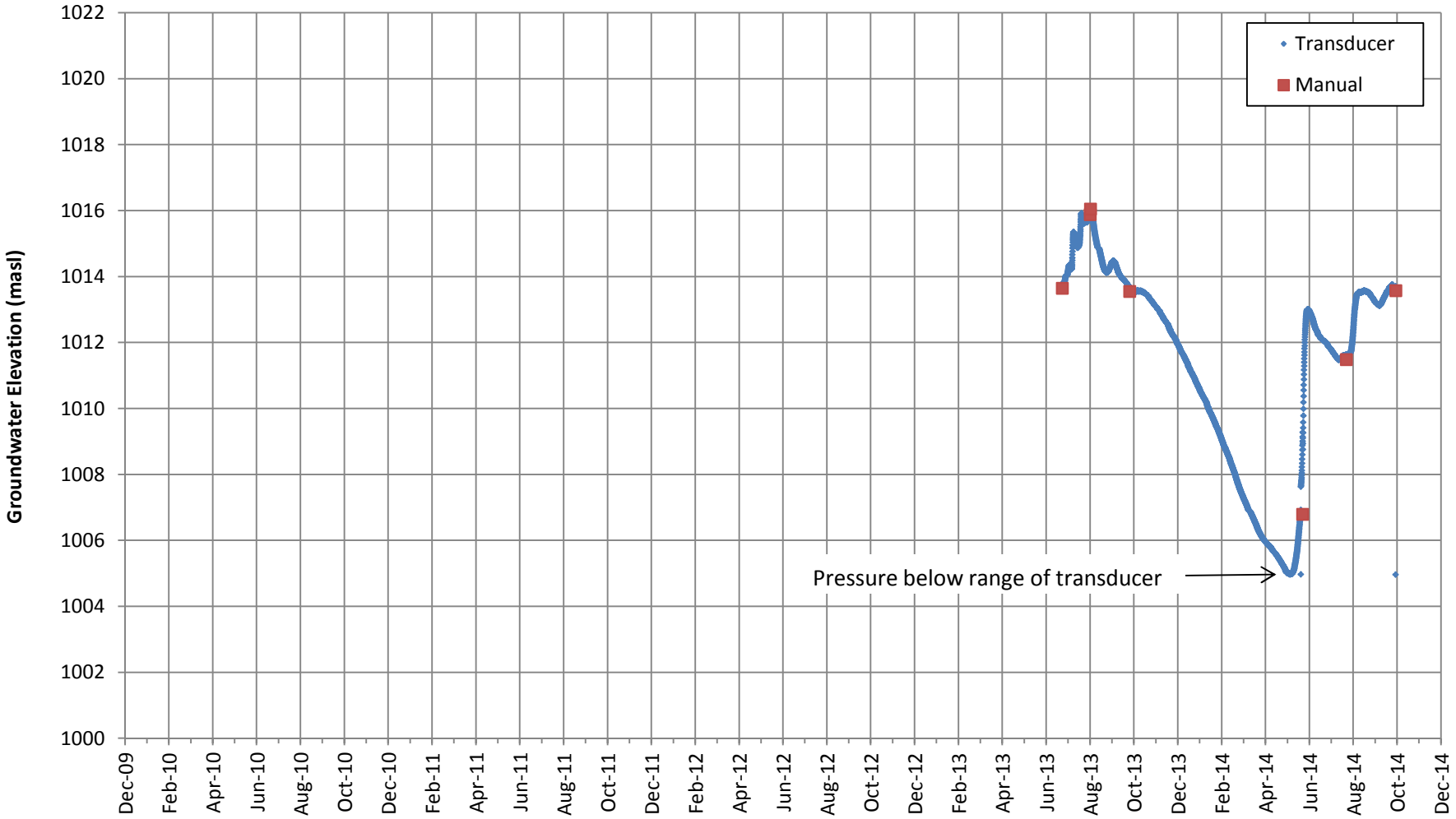
P/A NO. VA101-325/12

REF. NO. 1

FIGURE C2.11

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:
1. GROUND SURFACE ELEVATION IS 1023.8 masl.
2. WELL IS SCREENED BETWEEN 1005.8 masl AND 1002.8 masl.

CASINO MINING CORPORATION

CASINO PROJECT

MW13-04S
GROUNDWATER ELEVATION

Knight Piésold CONSULTING

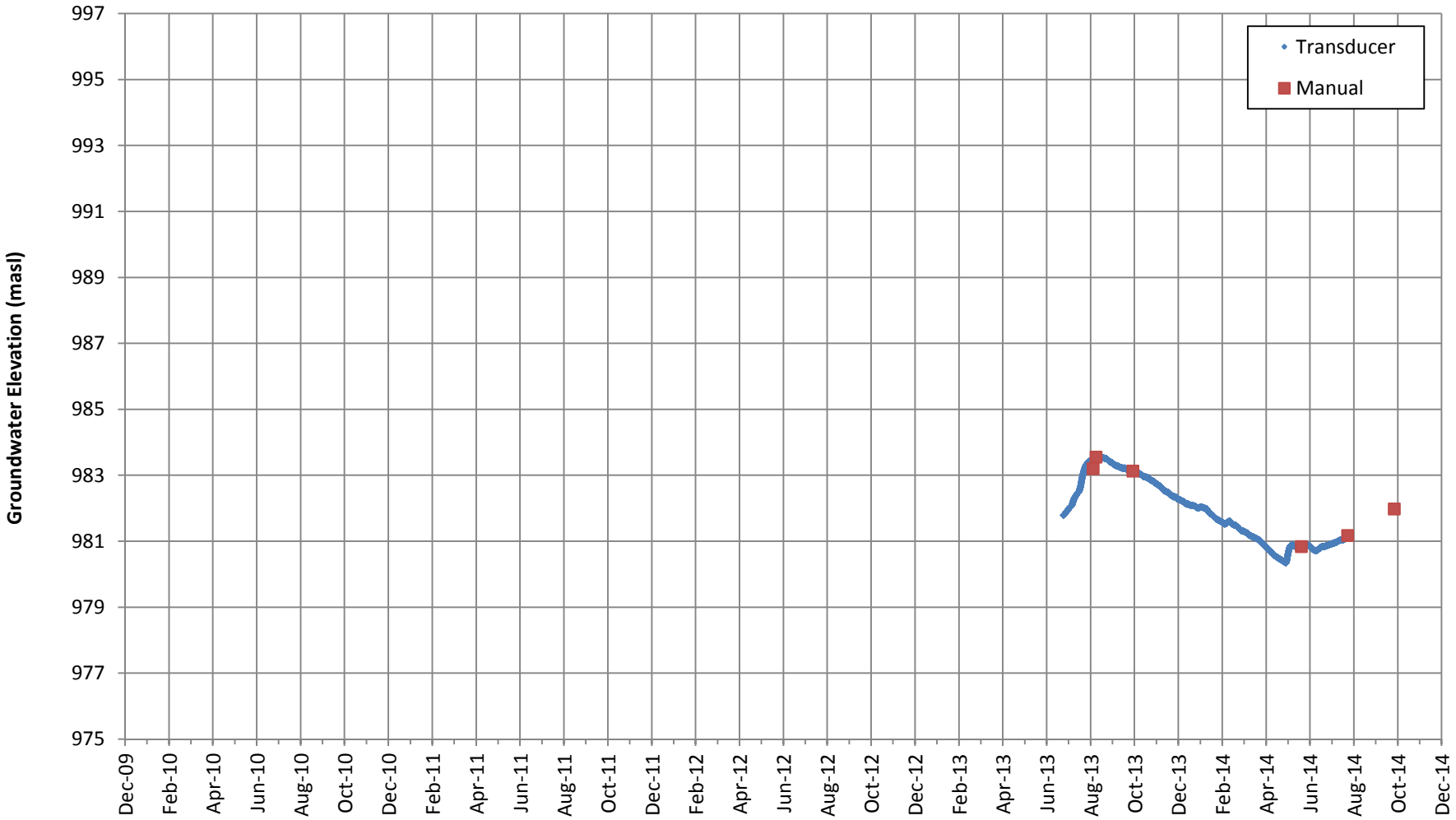
P/A NO. VA101-325/12

REF. NO. 1

FIGURE C2.12

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:
1. GROUND SURFACE ELEVATION IS 1024.0 masl.
2. WELL IS SCREENED BETWEEN 977.4 masl AND 974.4 masl.
3. TRANSDUCER TEMPORARILY REMOVED FROM WELL FROM JULY TO SEPTEMBER 2014.

CASINO MINING CORPORATION

CASINO PROJECT

MW13-05
GROUNDWATER ELEVATION

Knight Piésold CONSULTING

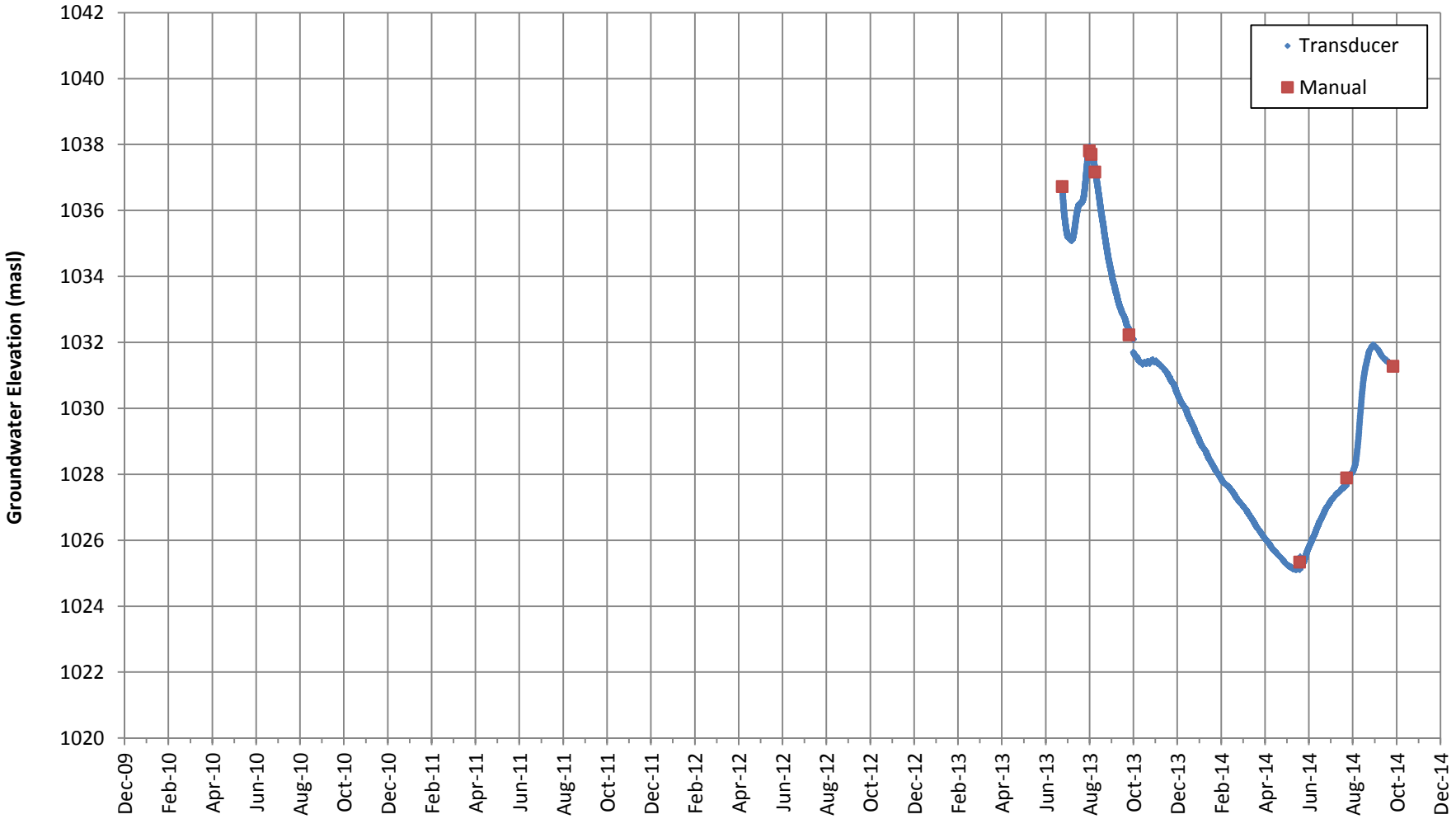
P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.13

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:
1. GROUND SURFACE ELEVATION IS 1069.5 masl.
2. WELL IS SCREENED BETWEEN 1024.1 masl AND 1021.1 masl.

CASINO MINING CORPORATION

CASINO PROJECT

MW13-06D
GROUNDWATER ELEVATION

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C2.14

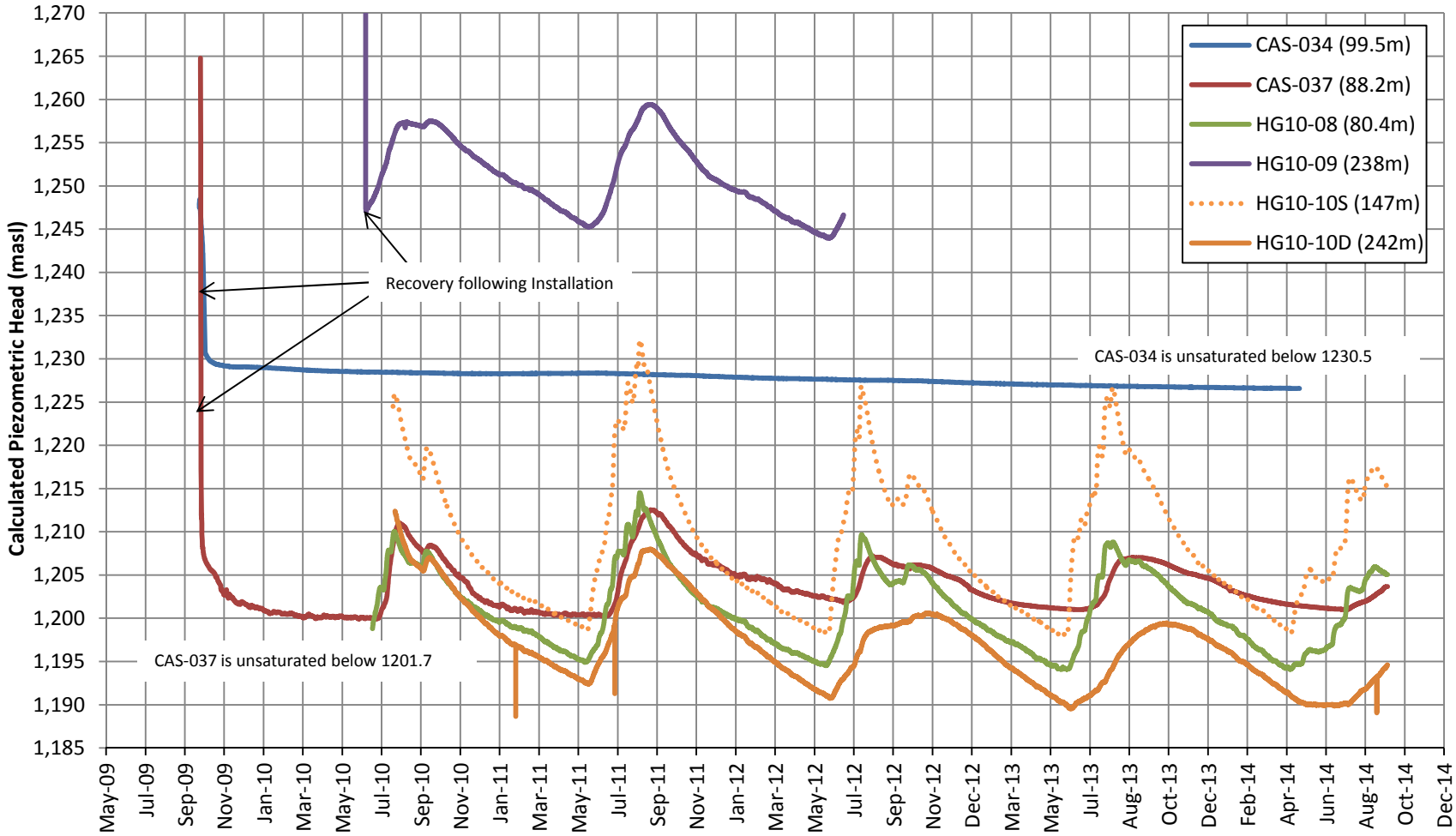
REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	KTD	CAS	KJB

APPENDIX C3

TIME-SERIES MEASUREMENTS FROM VIBRATING WIRE PIEZOMETERS

(Figure C3)



NOTES:
1. DEPTH OF INSTALLATION IS SHOWN IN LEGEND BESIDE PIEZOMETER NAME.
2. HG10-09 HAS NOT BEEN DOWNLOADED SINCE 2012, AND
3. CAS-034 WAS LAST DOWNLOADED IN MAY 2014.

CASINO MINING CORPORATION

CASINO PROJECT

VIBRATING WIRE PIEZOMETERS
CALCULATED PIEZOMETERIC HEAD

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE C3

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

APPENDIX D

GROUND TEMPERATURE MEASUREMENTS

Appendix D1 Thermistor Temperature Data
Appendix D2 Vibrating Wire Piezometer Temperature Data

APPENDIX D1

THERMISTOR TEMPERATURE DATA

(Pages D1-1 to D1-20)

M:\1\01\00325\17\A\Data\Task 200 - 2013 Hydrogeology Adendum\2- Thermistor data\[1. Ground Temperature over Time CAS 034_KTD.xls]Figure D1.1

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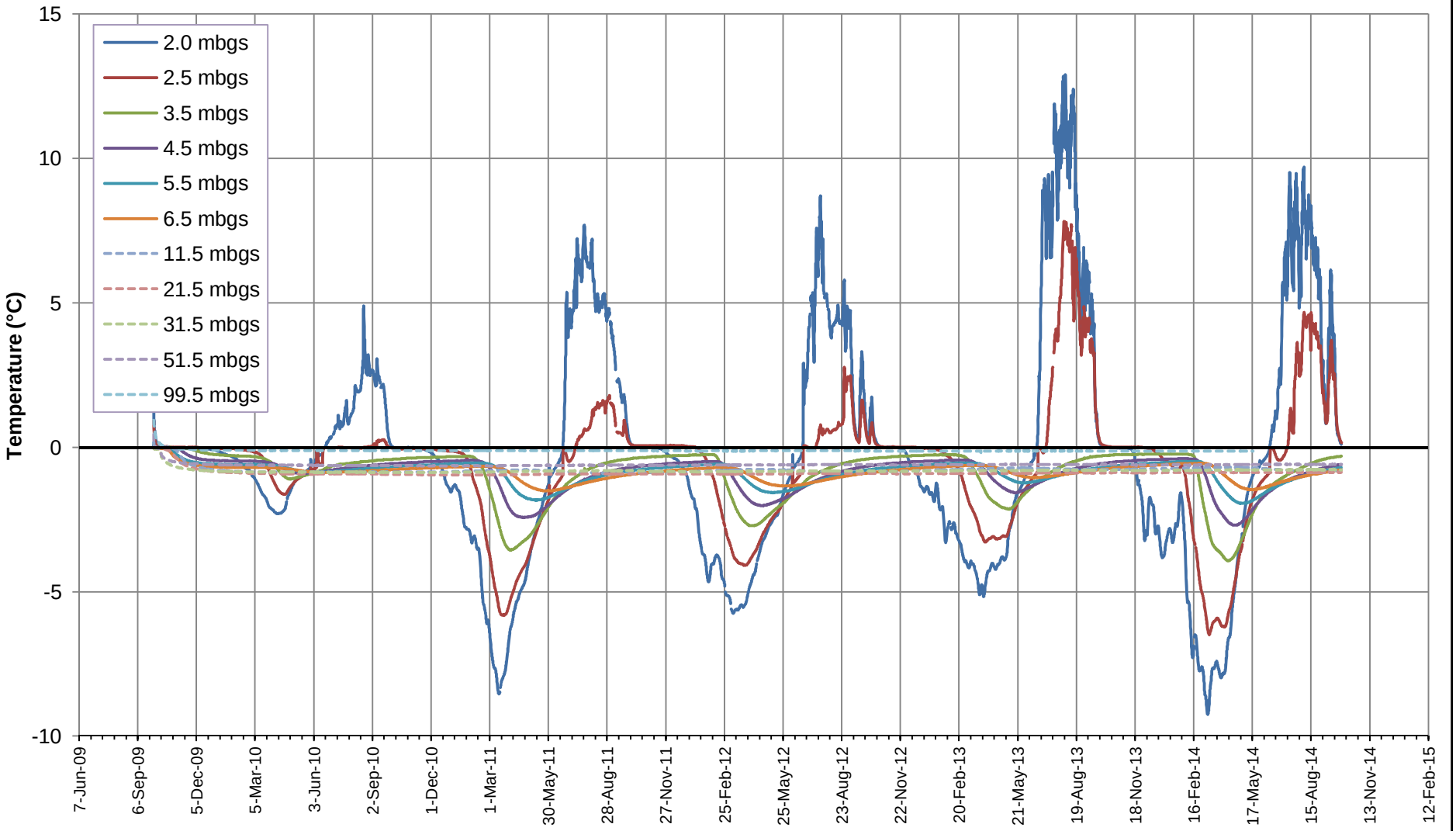


NOTES:

1. TEMPERATURE MEASUREMENTS AT 99.5 mbgs WERE RECORDED WITH A VIBRATING WIRE PIEZOMETER INSTALLED IN THE DRILLHOLE

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME CAS-034

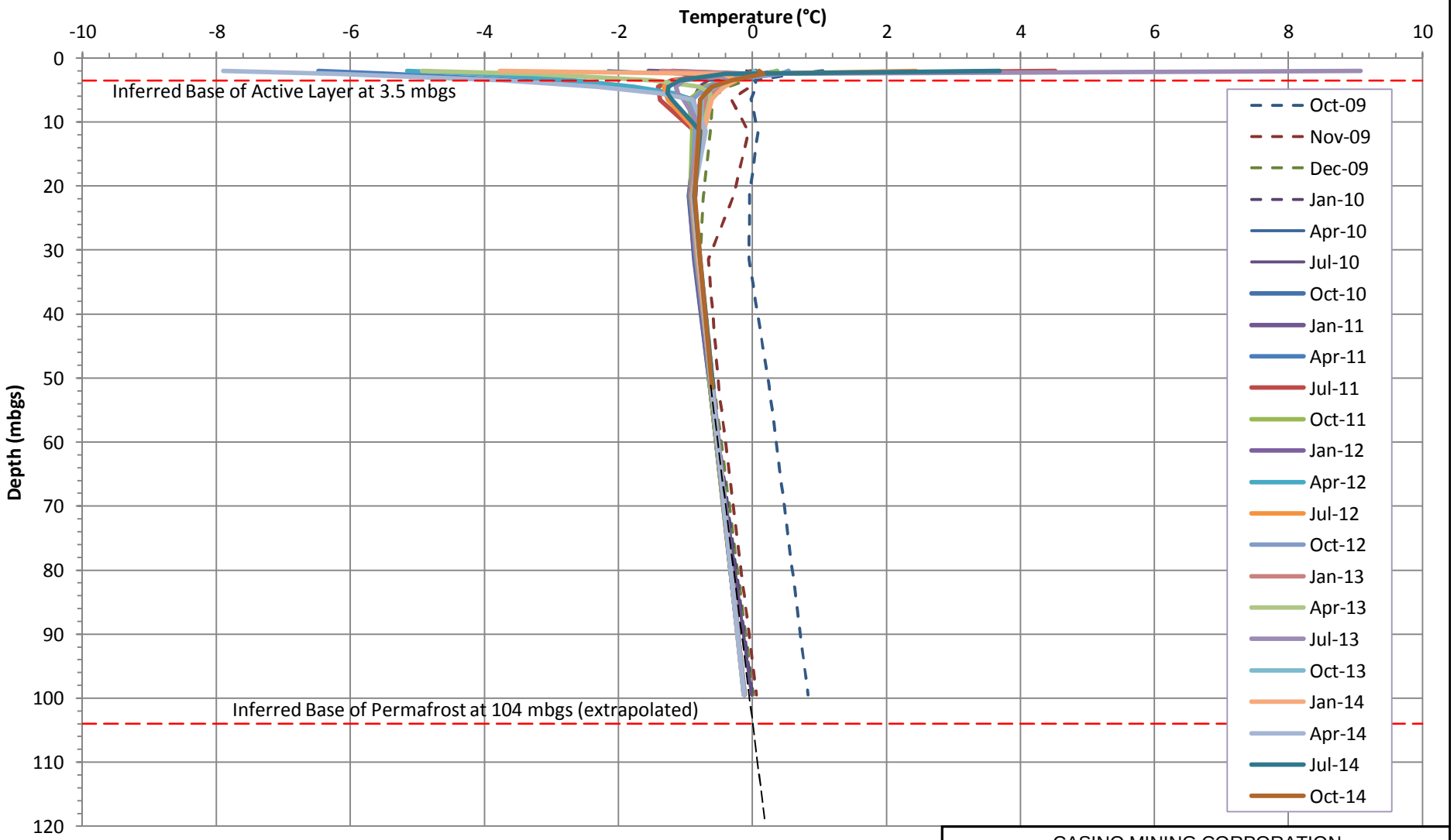
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.1

REV 0



NOTES:

1. THERMISTORS WERE INSTALLED IN SEPTEMBER 2009. OCTOBER THROUGH DECEMBER 2009 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

2. TEMPERATURE MEASUREMENTS AT 99.5 mbgs WERE RECORDED WITH A VIBRATING WIRE PIEZOMETER INSTALLED IN THE DRILL HOLE.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT CAS-034

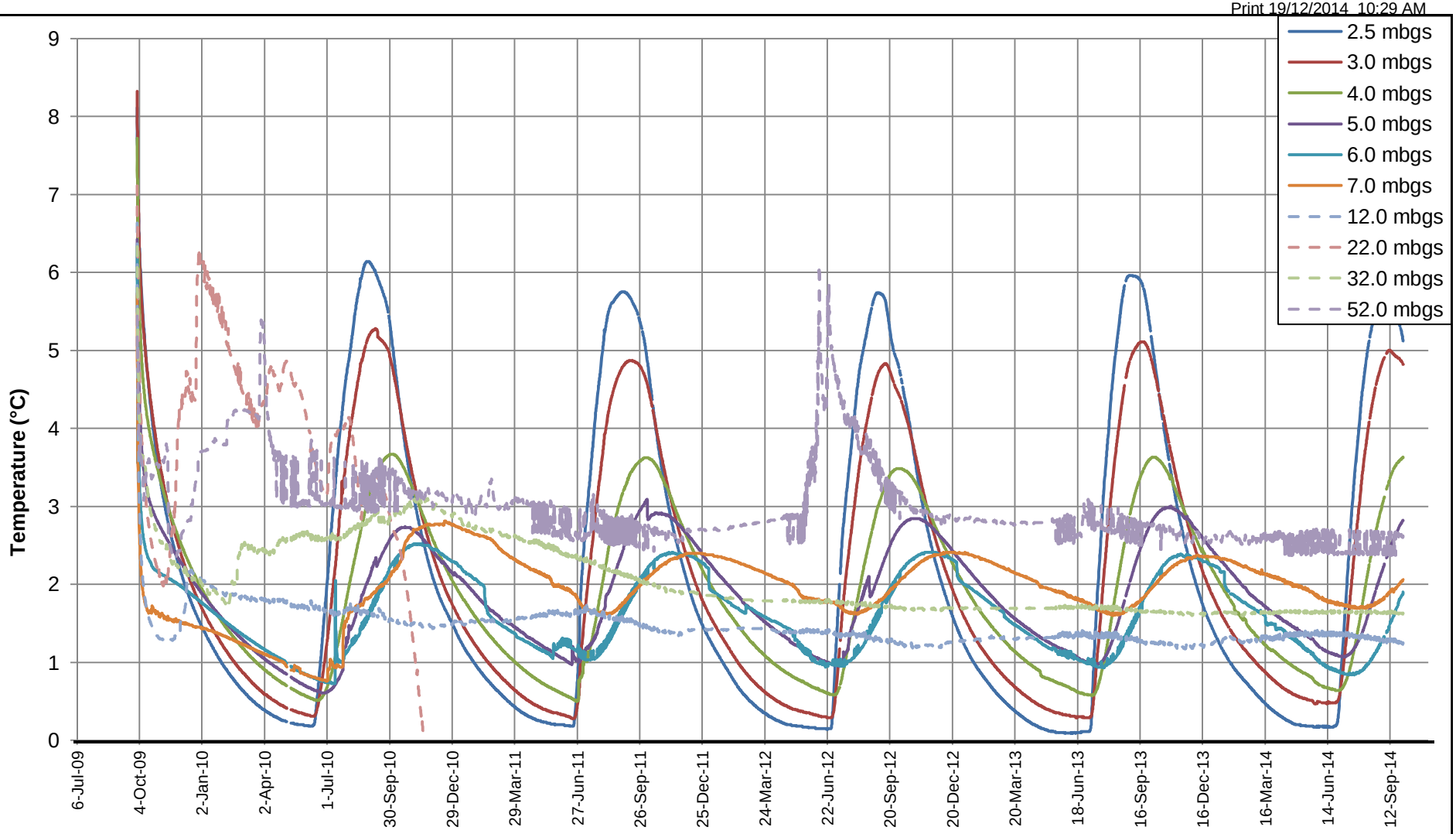
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.2

REV 0



NOTES:

1. SENSOR INSTALLED AT 22 mbgs MALFUNCTIONED.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC14	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME AT CAS-036

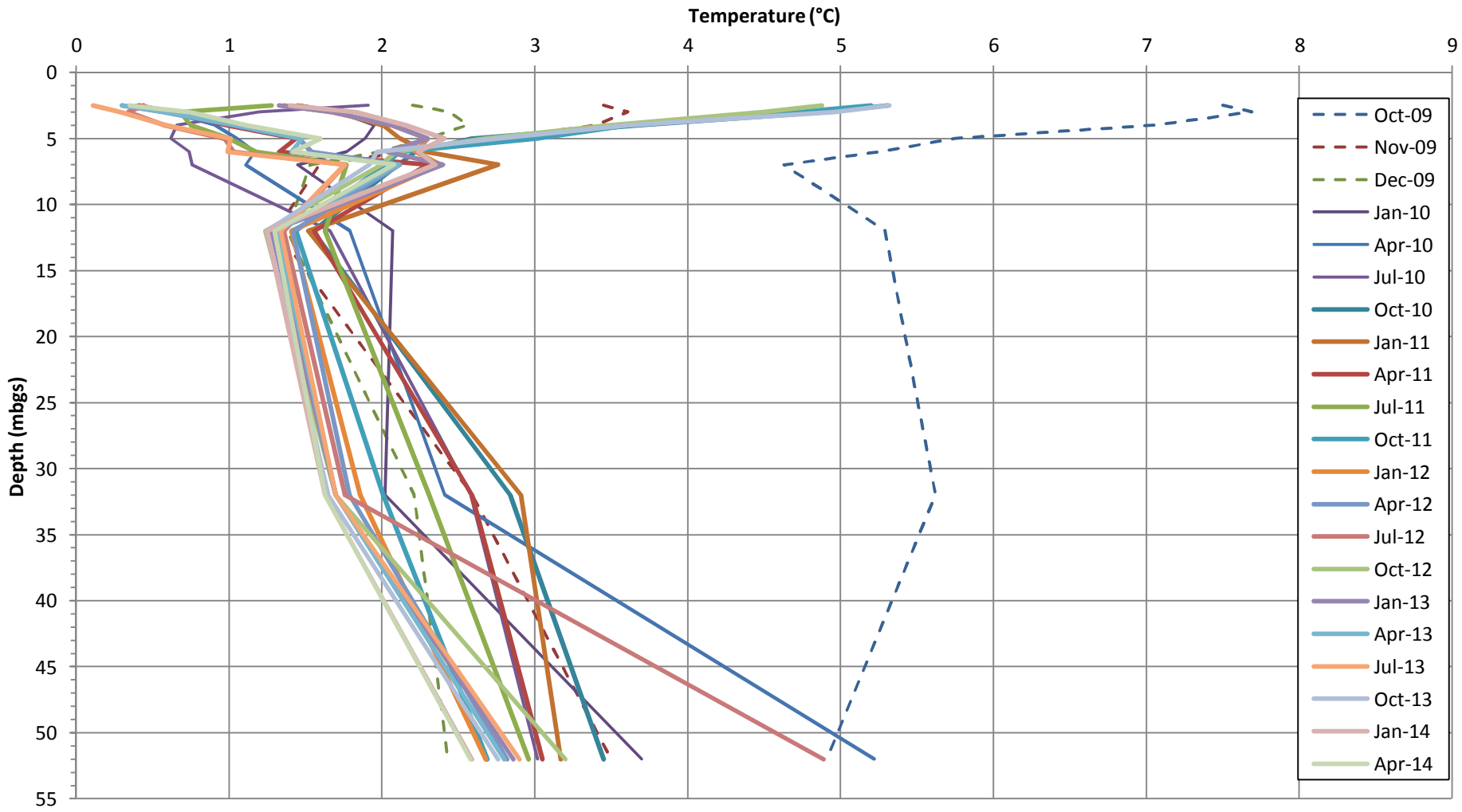
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.3

REV 0



NOTES:

1. THERMISTORS WERE INSTALLED IN SEPTEMBER 2009. OCTOBER AND NOVEMBER 2009 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.
2. SENSOR INSTALLED AT 22 mbgs MALFUNCTIONED AND DATA IS NOT PRESENTED.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT CAS-036

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.4

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

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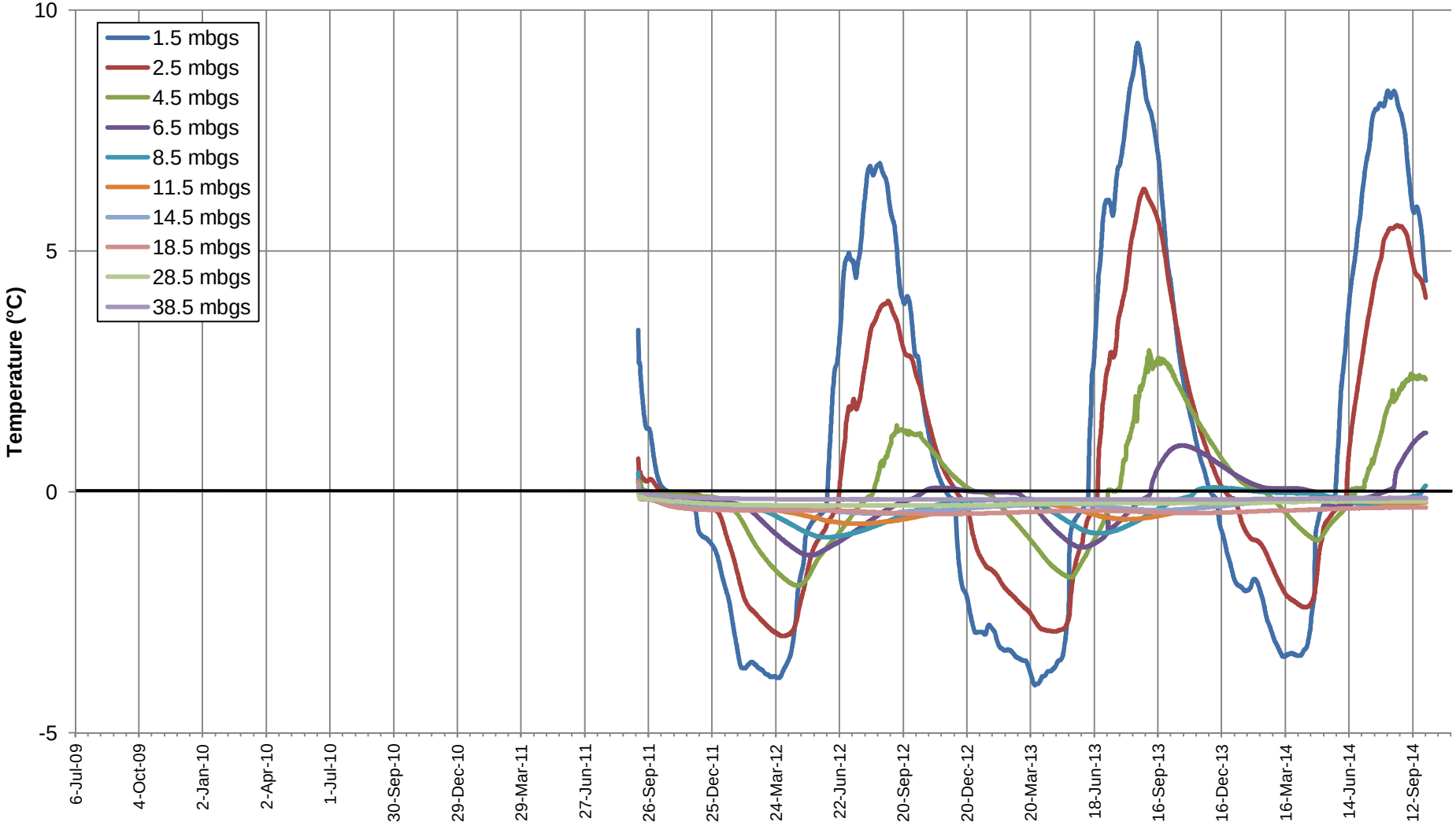


CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME AT DH11-21B

Knight Piésold CONSULTING

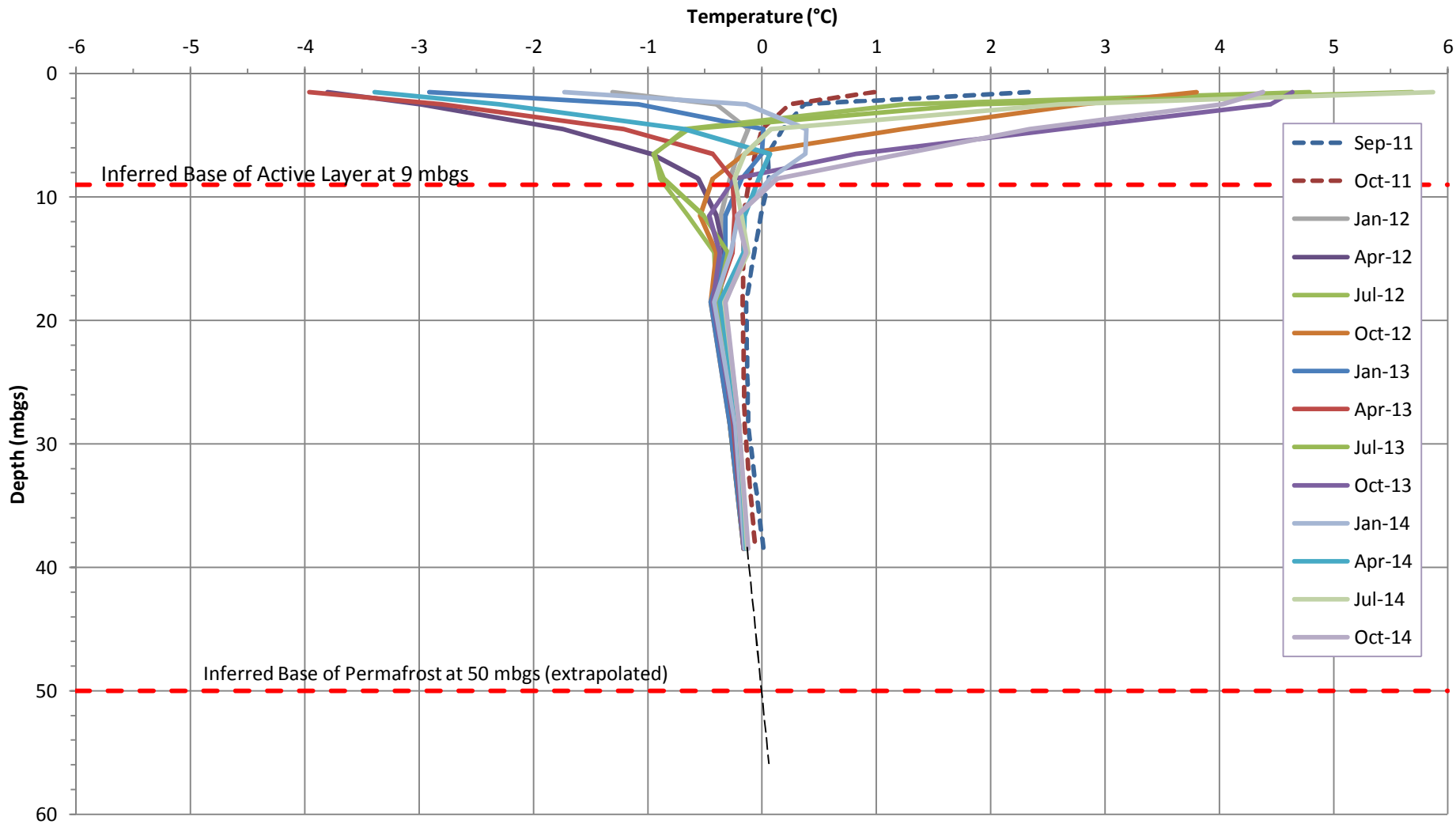
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.5

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN SEPTEMBER 2011. SEPTEMBER AND OCTOBER 2011 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH11-21B

Knight Piésold CONSULTING

P/A NO. VA101-325/17

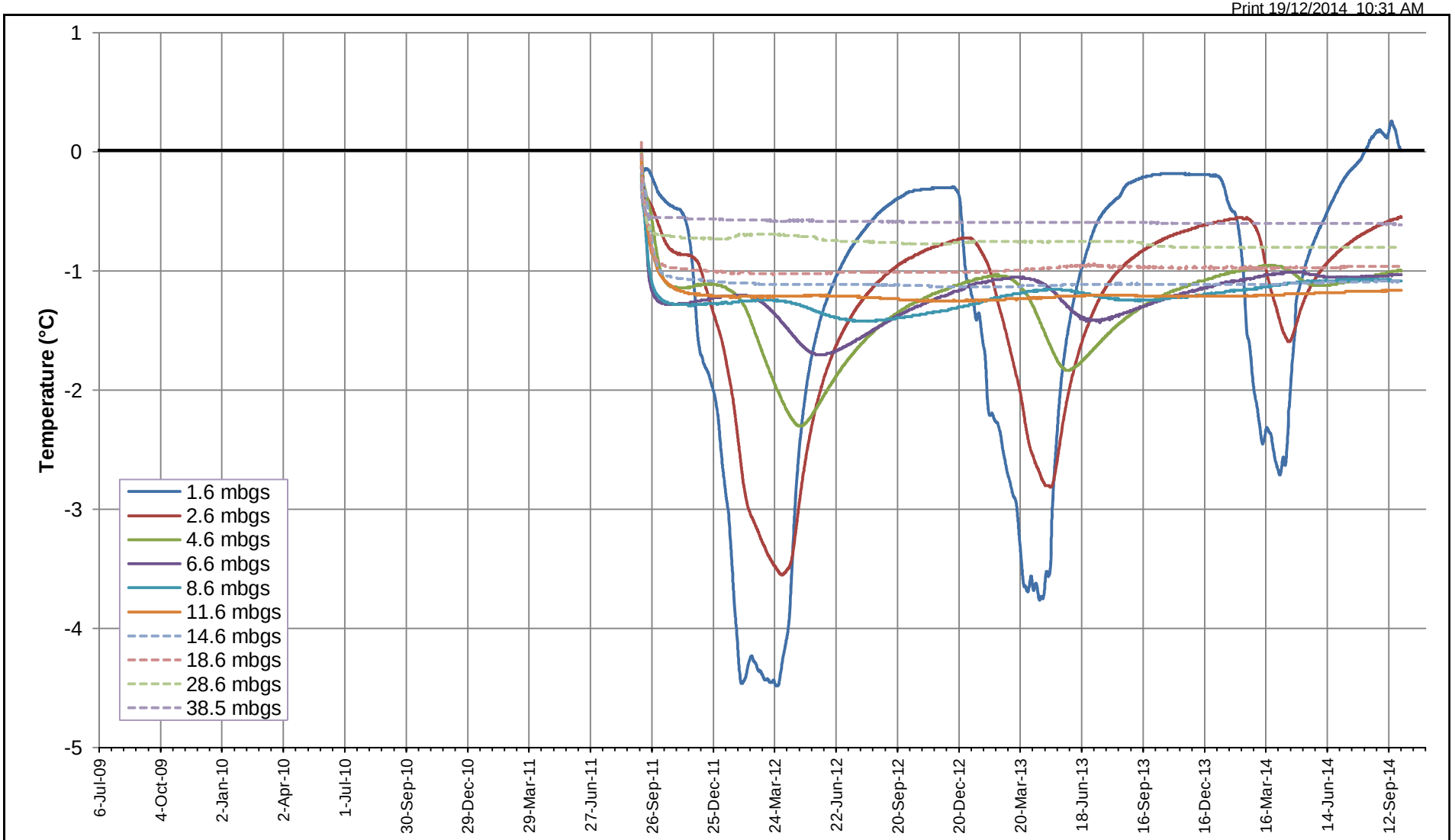
REF. NO. 1

FIGURE D1.6

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

Print 19/12/2014 10:31 AM



CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME DH11-23B

Knight Piésold CONSULTING

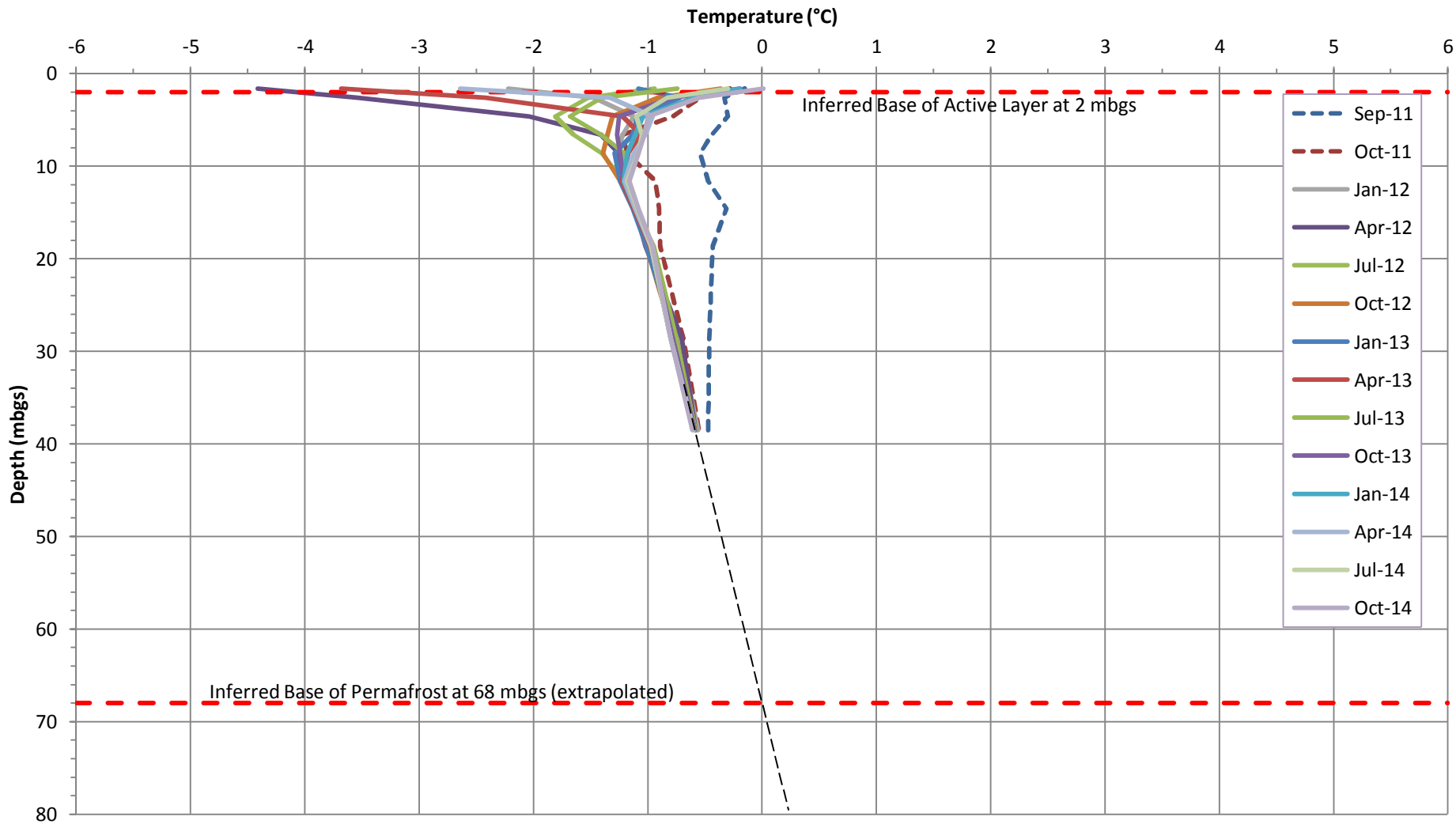
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.7

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	ktd	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN SEPTEMBER 2011. SEPTEMBER AND OCTOBER 2011 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH11-23B

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.8

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

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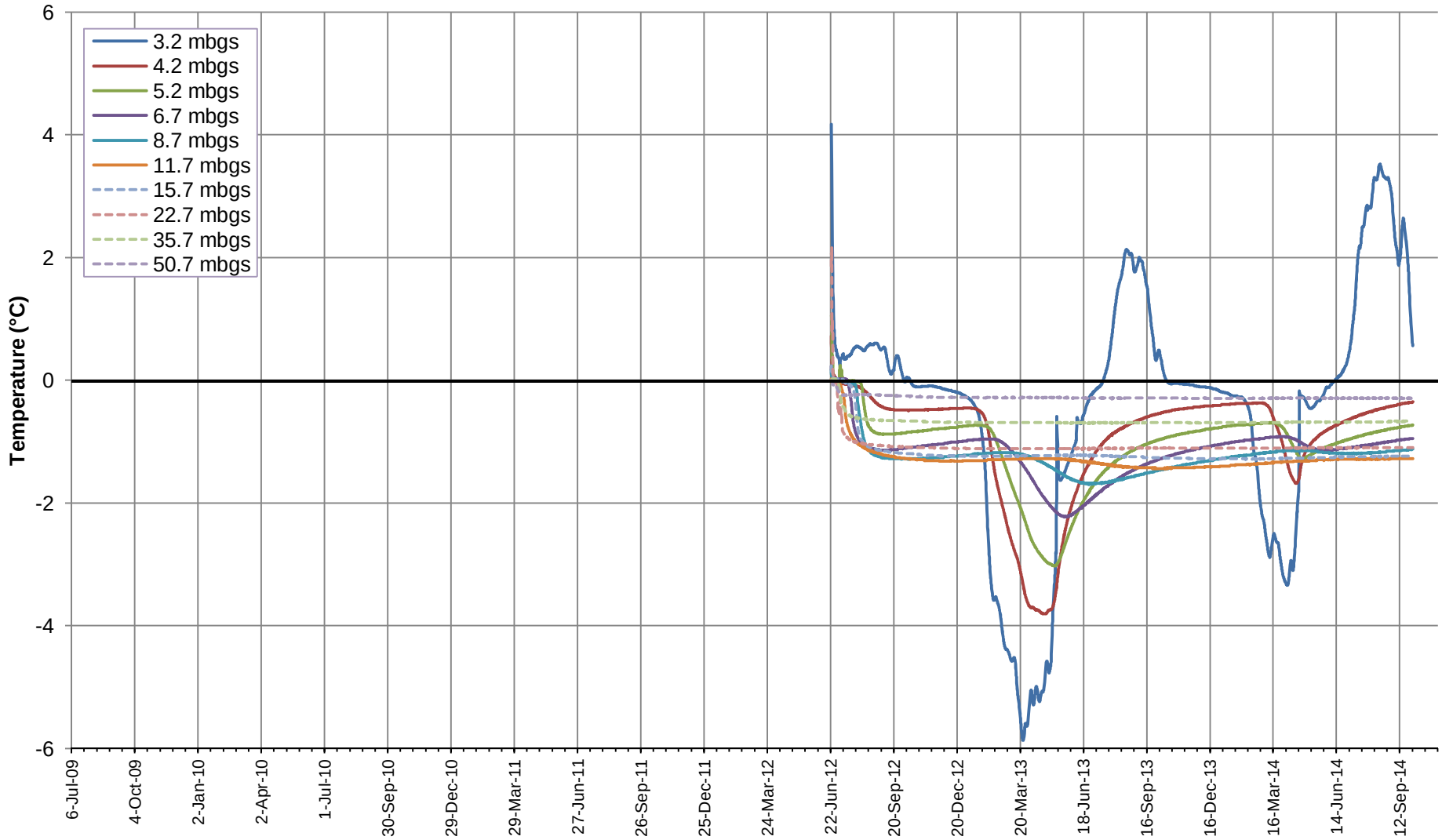


CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME DH12-01

Knight Piésold CONSULTING

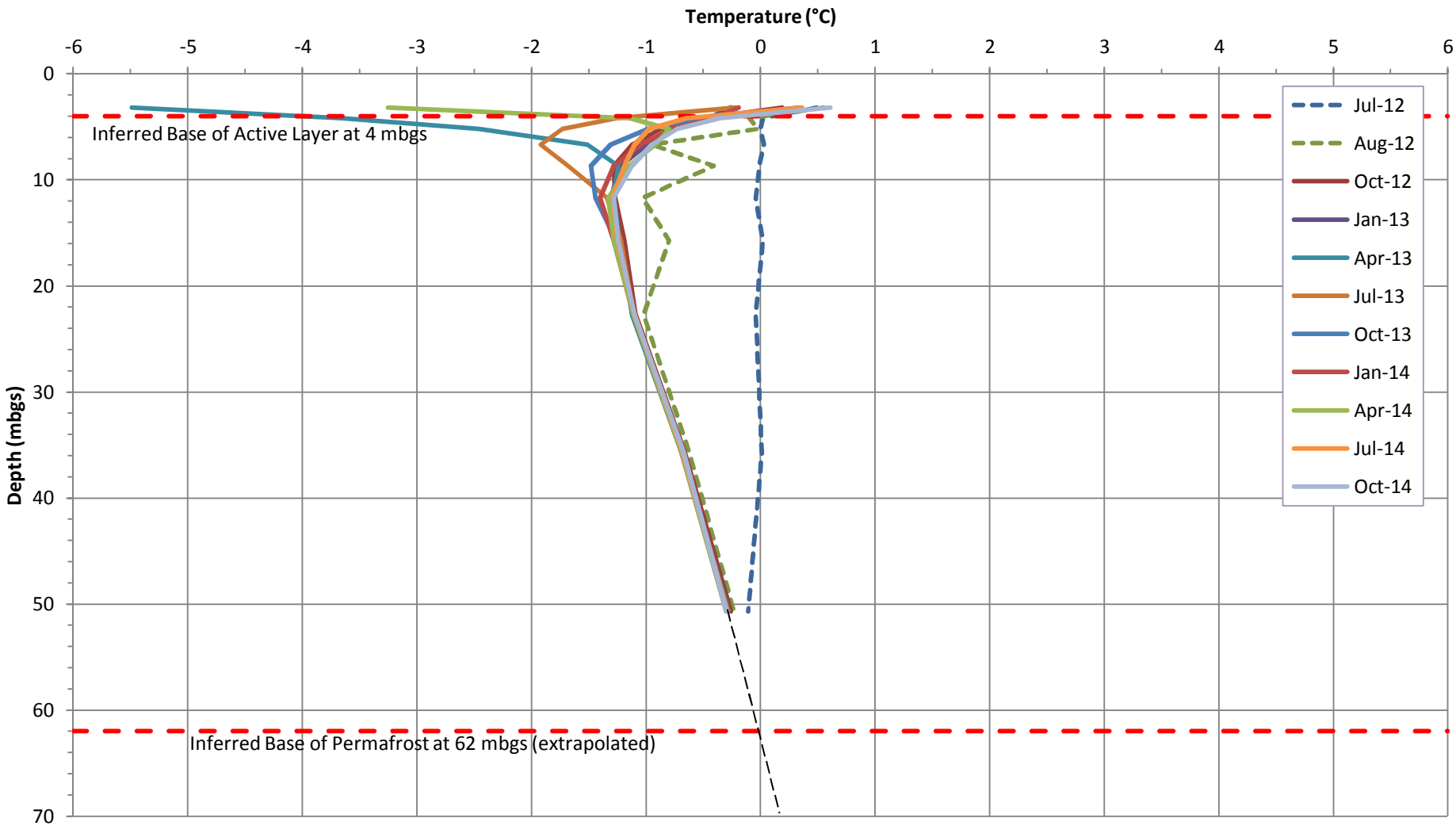
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.9

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN JUNE 2012. JULY AND AUGUST 2012 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH12-01

Knight Piésold CONSULTING

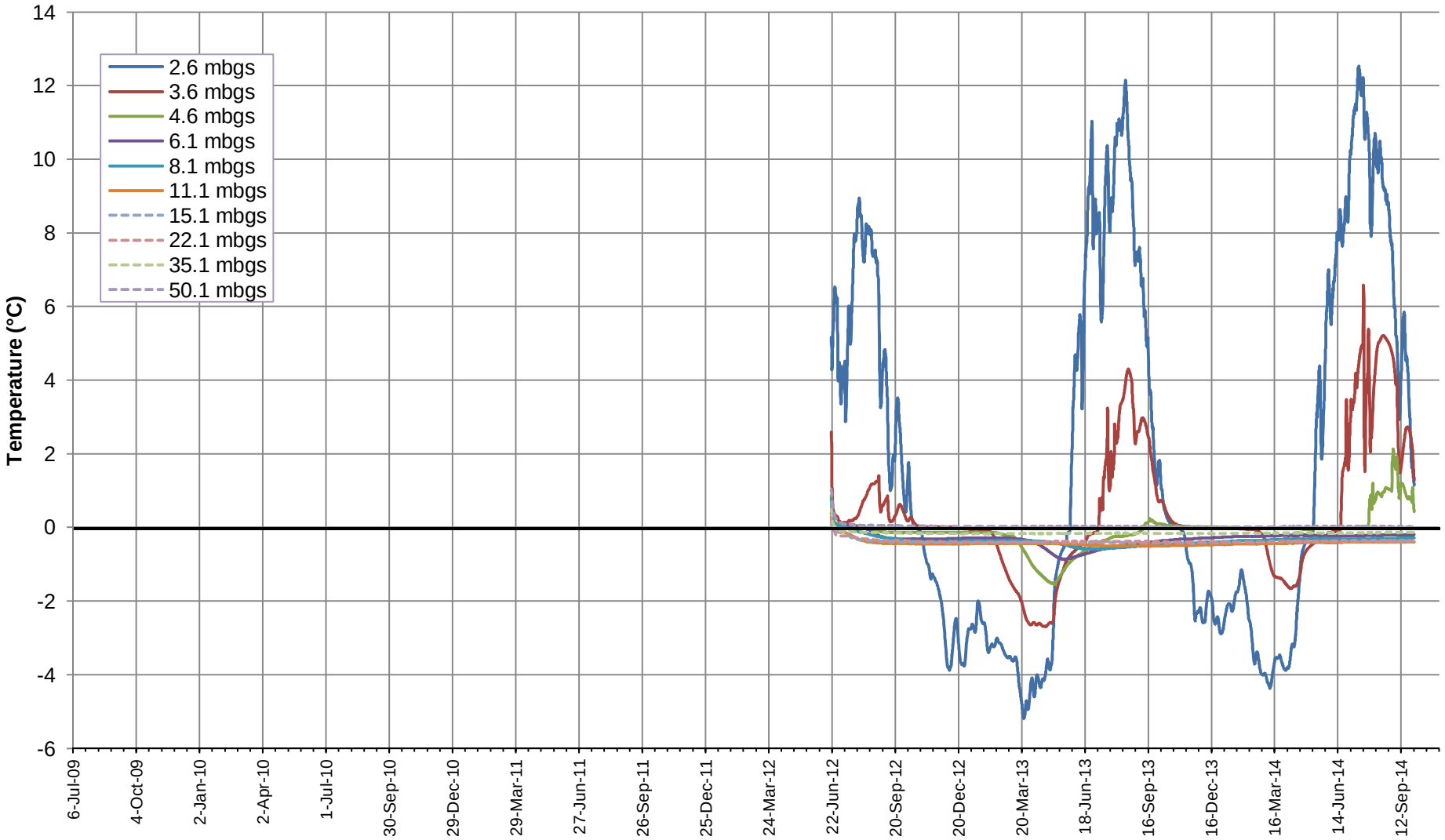
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.10

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME DH12-02

Knight Piésold CONSULTING

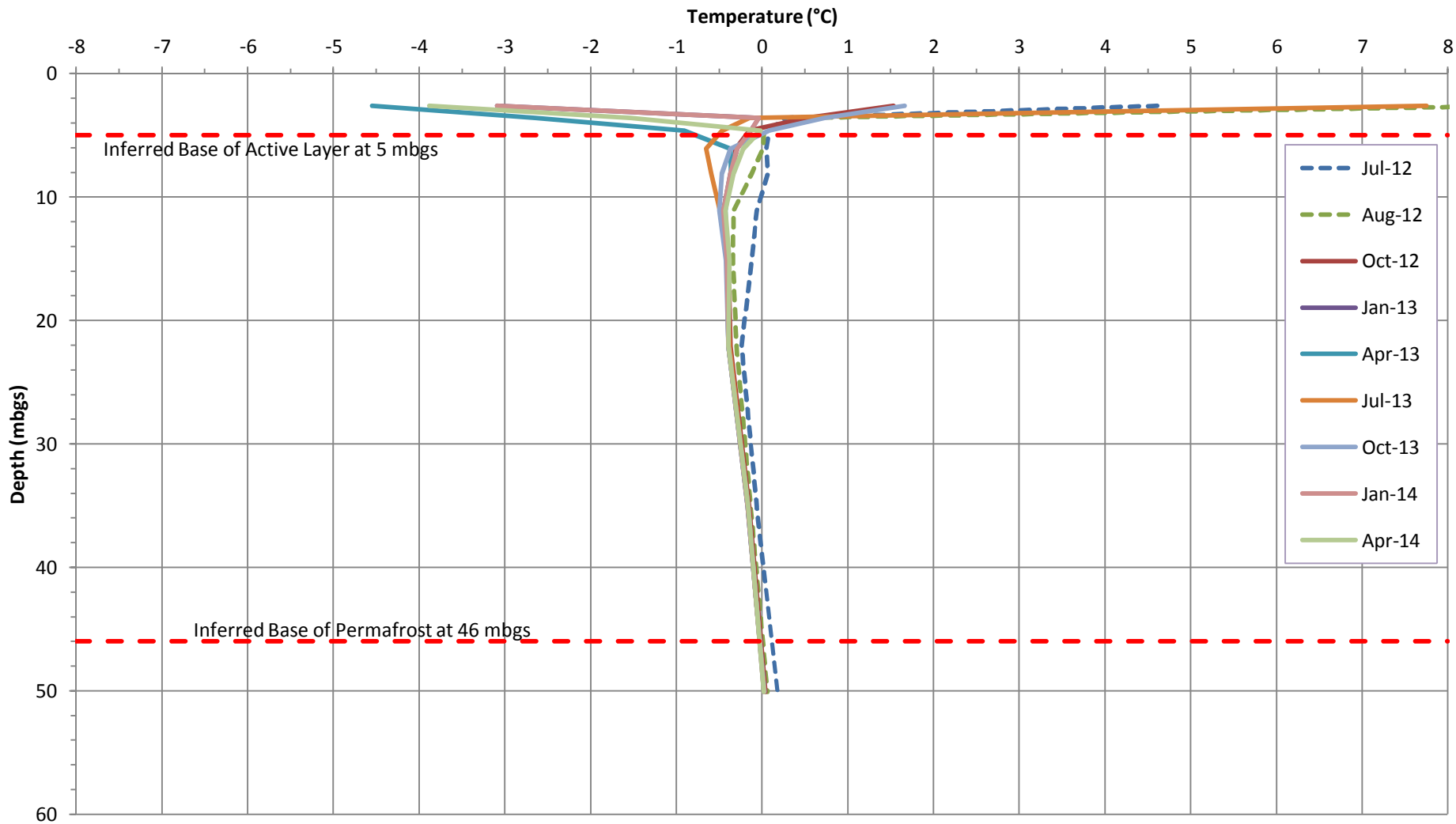
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.11

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN JUNE 2012. JULY AND AUGUST 2012 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH12-02

Knight Piésold CONSULTING

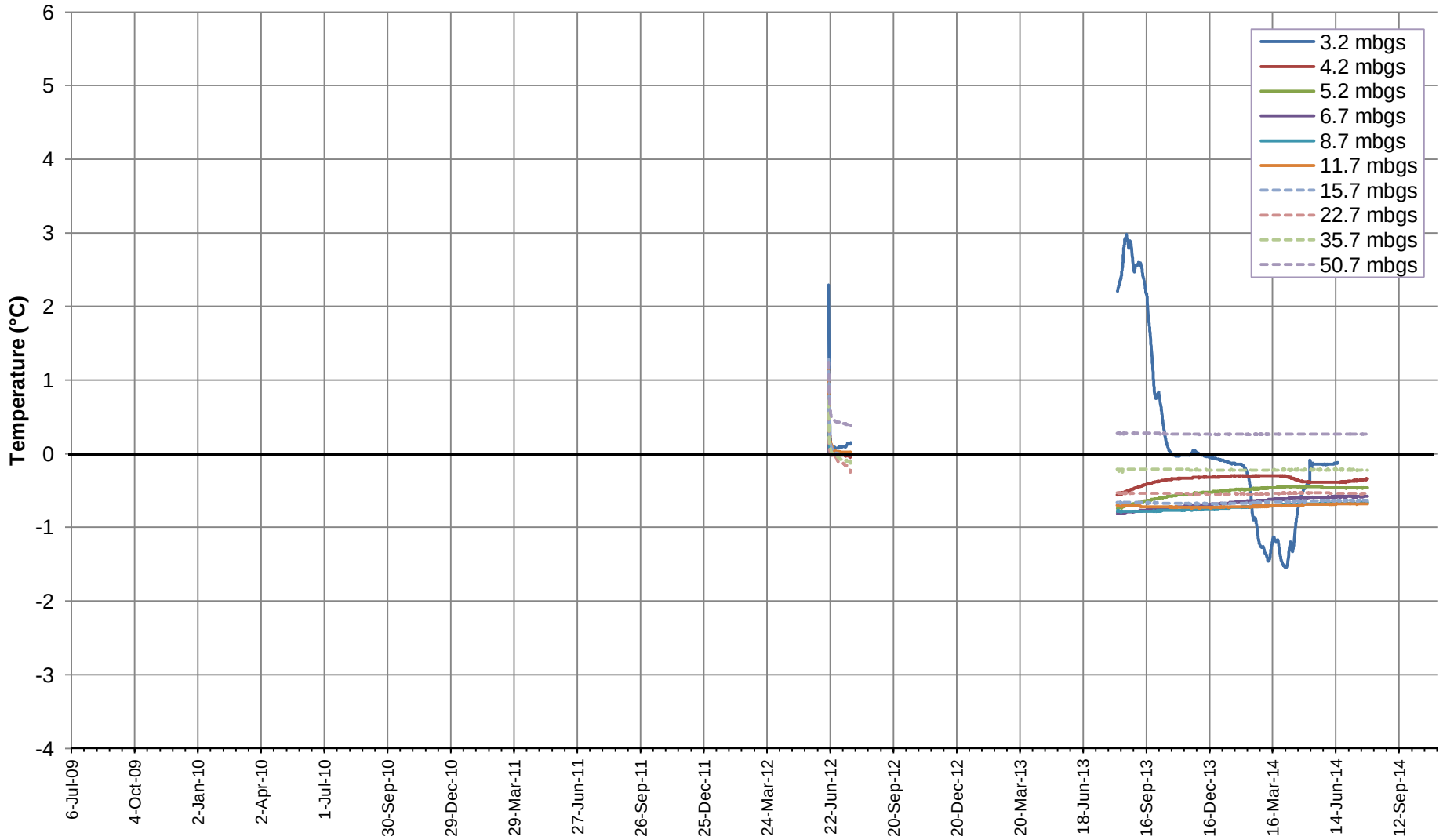
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.12

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. DATA LOGGER NON-FUNCTIONAL FROM JULY 23, 2012 TO AUGUST 6, 2014.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME DH12-03

Knight Piésold CONSULTING

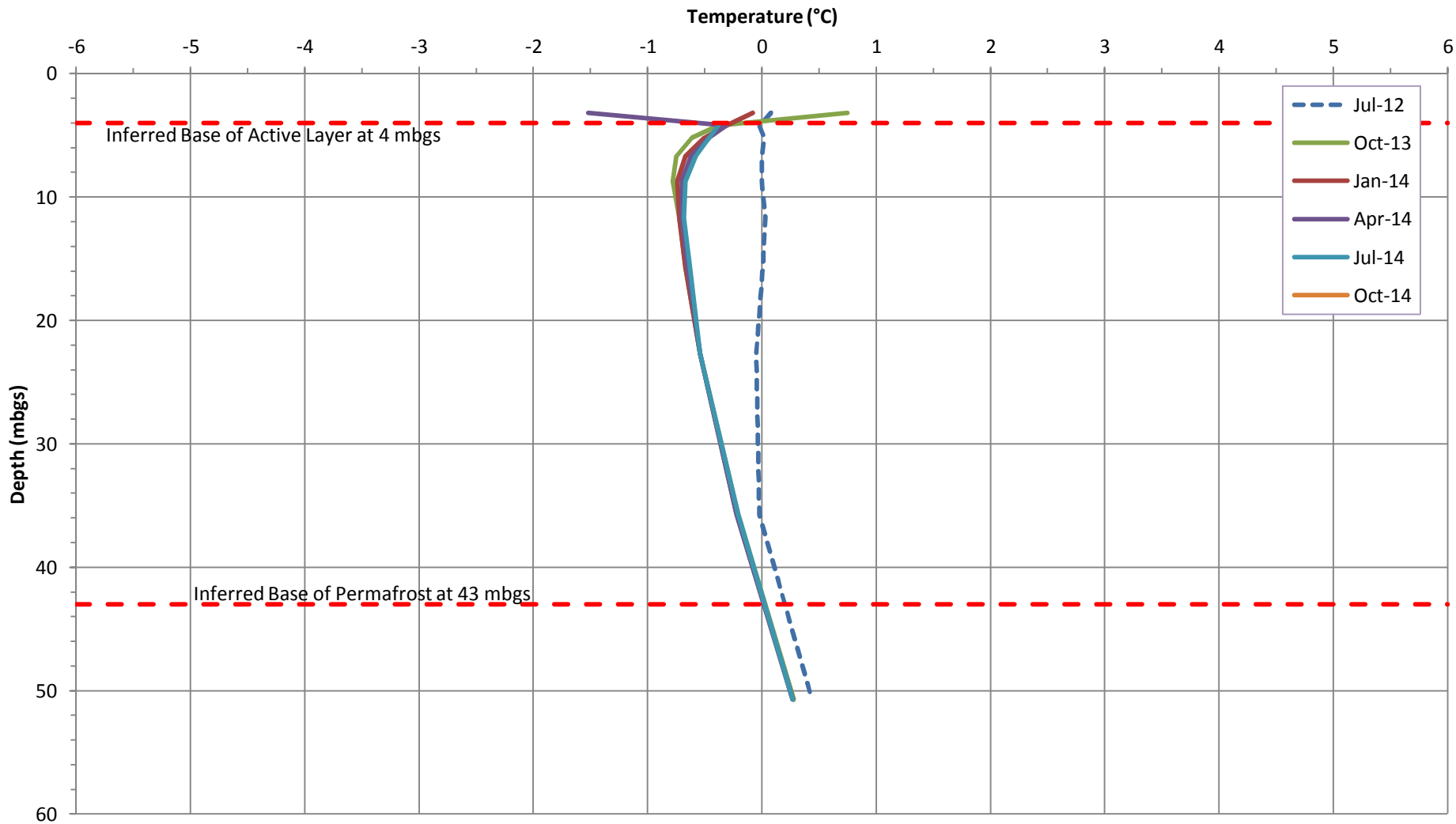
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.13

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN JUNE 2012. JULY 2012 DATA IS INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.
2. DATA UNAVAILABLE FROM JULY 2012 TO AUGUST 2013 DUE TO DATA LOGGER MALFUNCTION.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH12-03

Knight Piésold CONSULTING

P/A NO. VA101-325/17

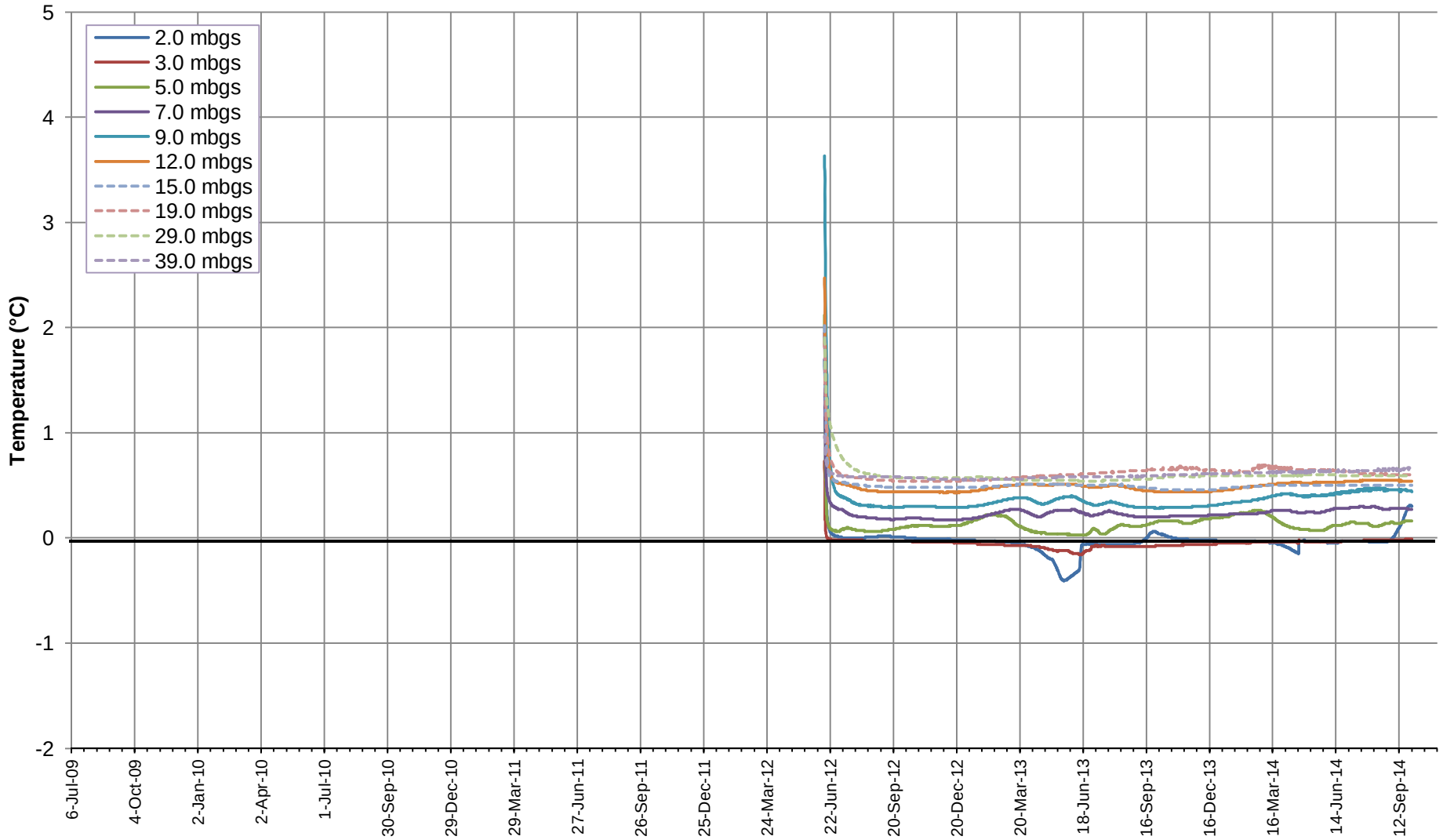
REF. NO. 1

FIGURE D1.14

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

Print 19/12/2014 10:33 AM



CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME DH12-05

Knight Piésold CONSULTING

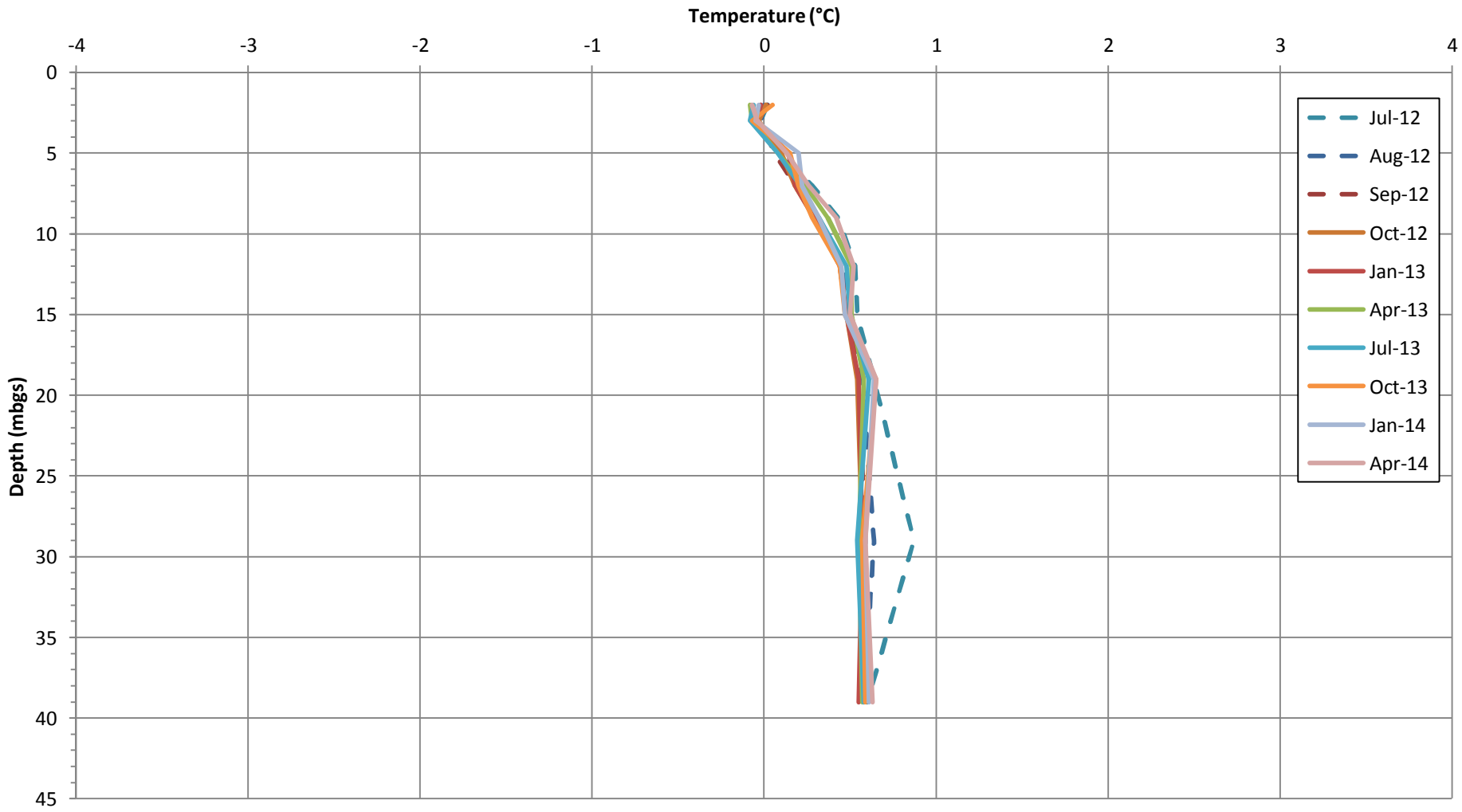
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.15

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN JUNE 2012. JULY, AUGUST AND SEPTEMBER 2012 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH12-05

Knight Piésold CONSULTING

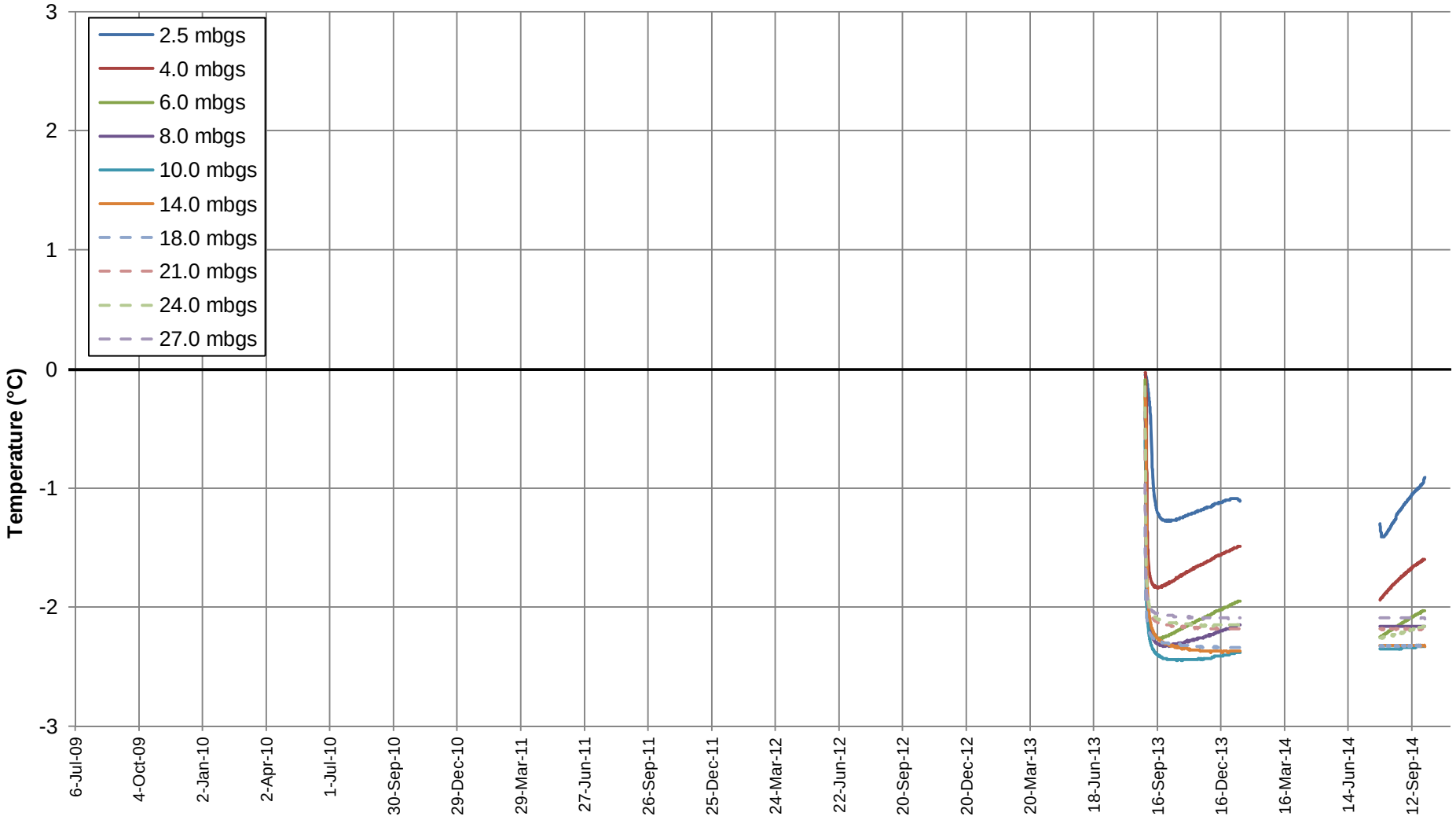
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.16

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. CABLE DAMAGED ON JANUARY 13, 2014 AND RESPLICED ON JULY 29, 2014.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC"14	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME AT DH13-03

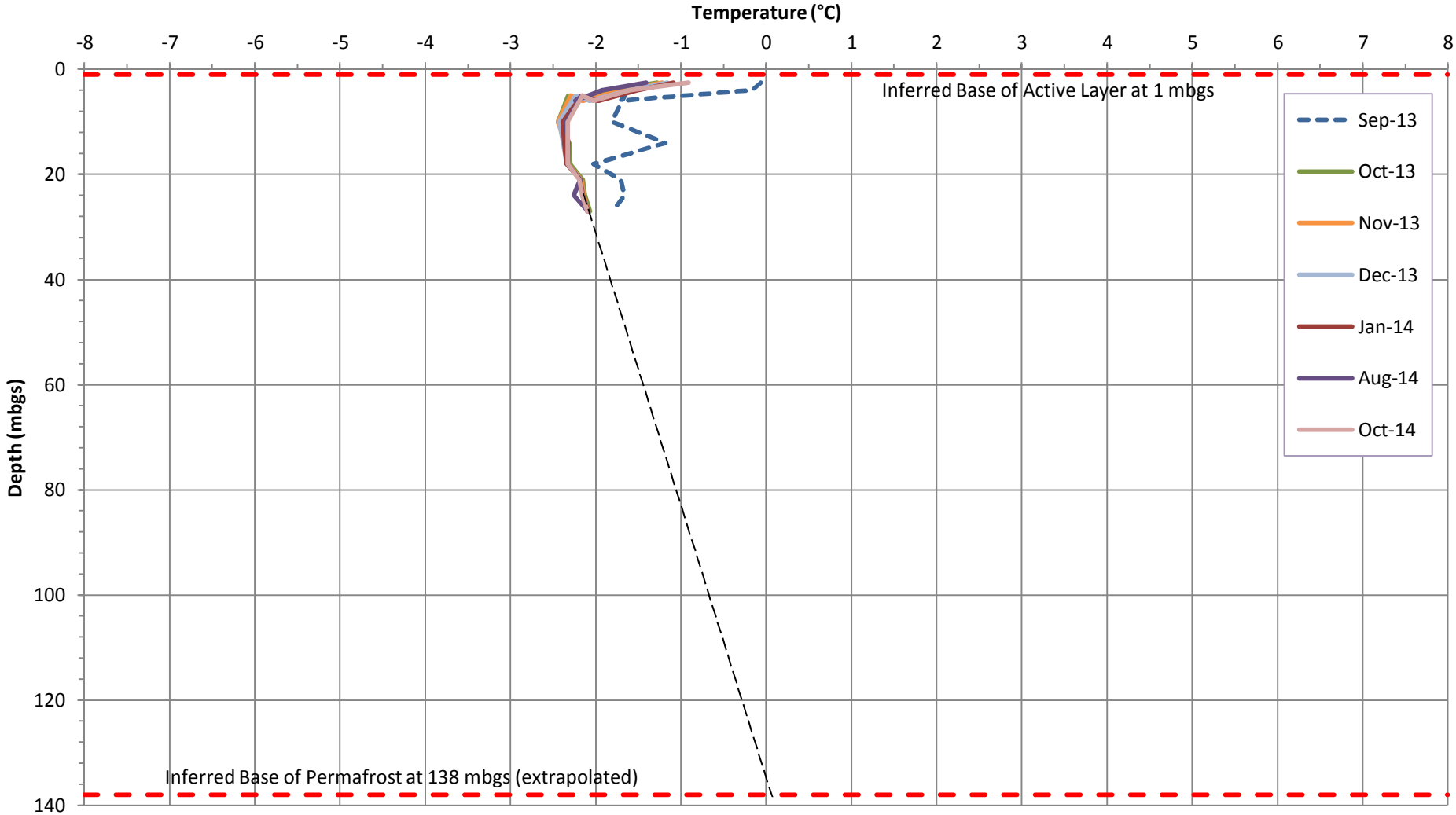
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.17

REV 0



NOTES:

1. THERMISTORS WERE INSTALLED IN AUGUST 2013. SEPTEMBER 2013 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.
2. DATA LOGGER CABLE DAMAGED IN JANUARY 2014 AND RESPLICED IN JULY 2014.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH13-03

Knight Piésold CONSULTING

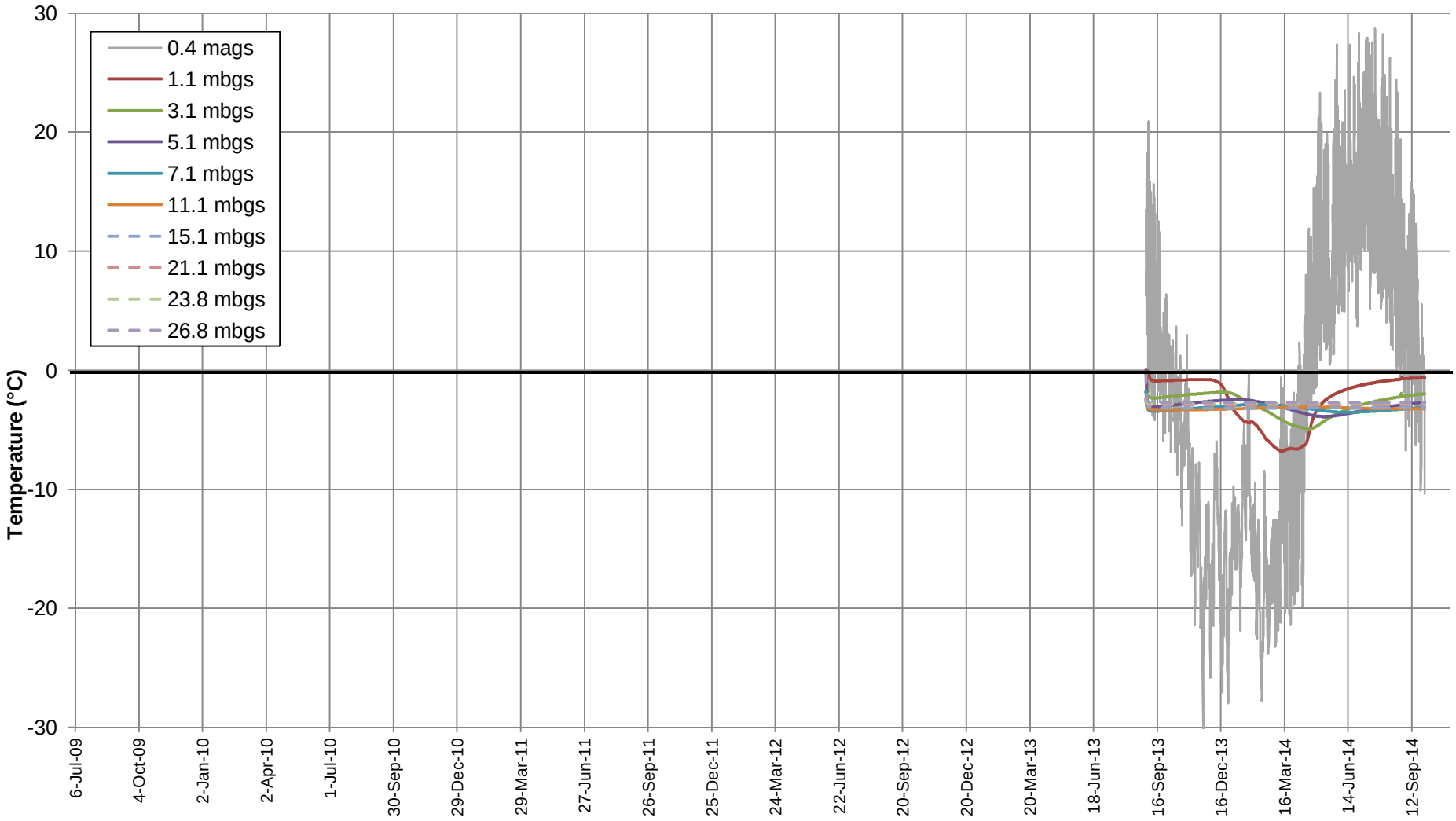
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.18

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTOR #1 IS INSTALLED AT 0.4m ABOVE GROUND SURFACE AND IS RECORDING AMBIENT TEMPERATURE.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE OVER TIME AT DH13-04

Knight Piésold CONSULTING

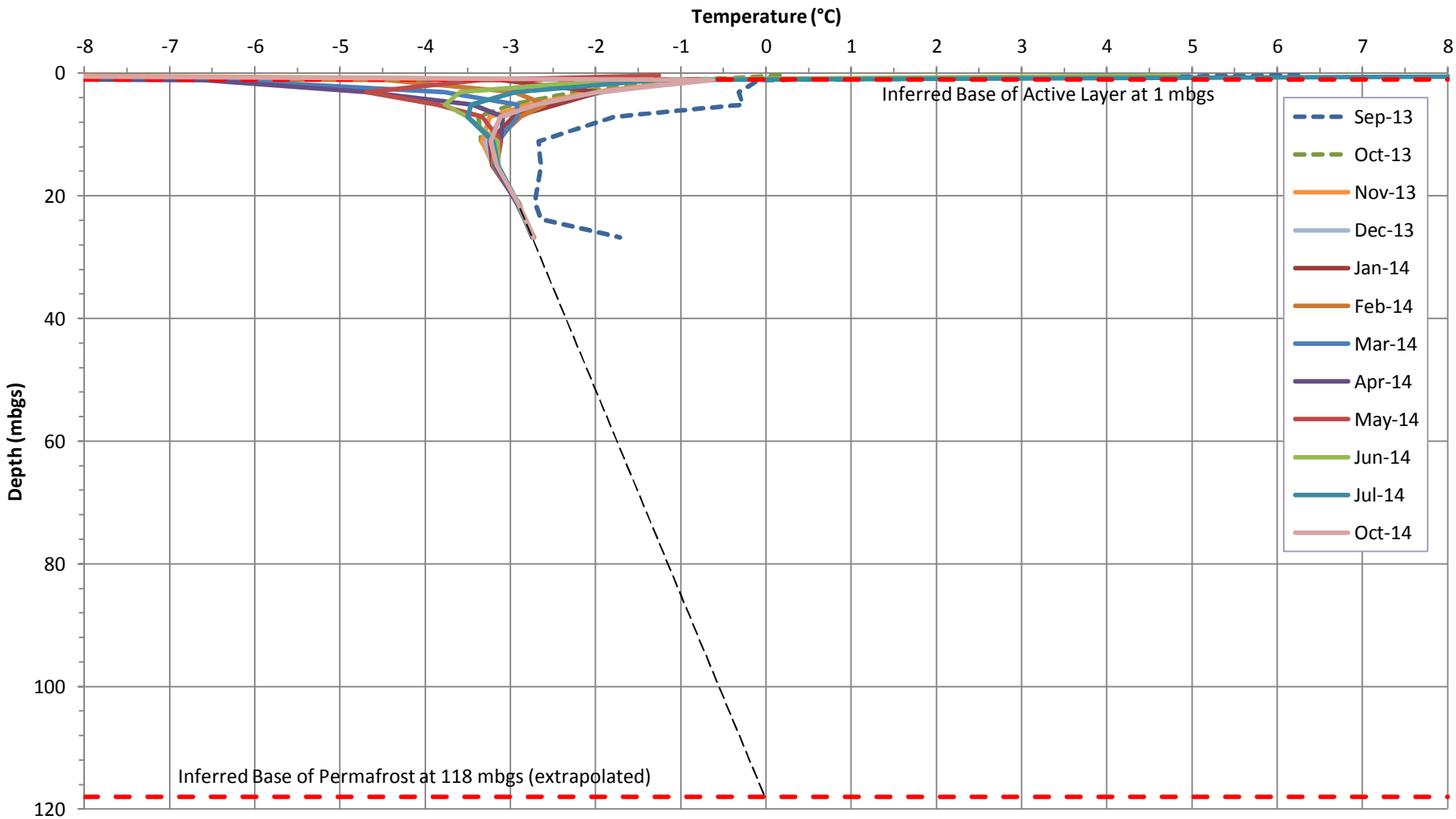
P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.19

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB



NOTES:

1. THERMISTORS WERE INSTALLED IN AUGUST 2013. SEPTEMBER AND OCTOBER 2013 DATA ARE INTERPRETED TO BE UNREPRESENTATIVE OF NATURAL GROUND CONDITIONS.

CASINO MINING CORPORATION

CASINO PROJECT

GROUND TEMPERATURE WITH DEPTH AT DH13-04

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D1.20

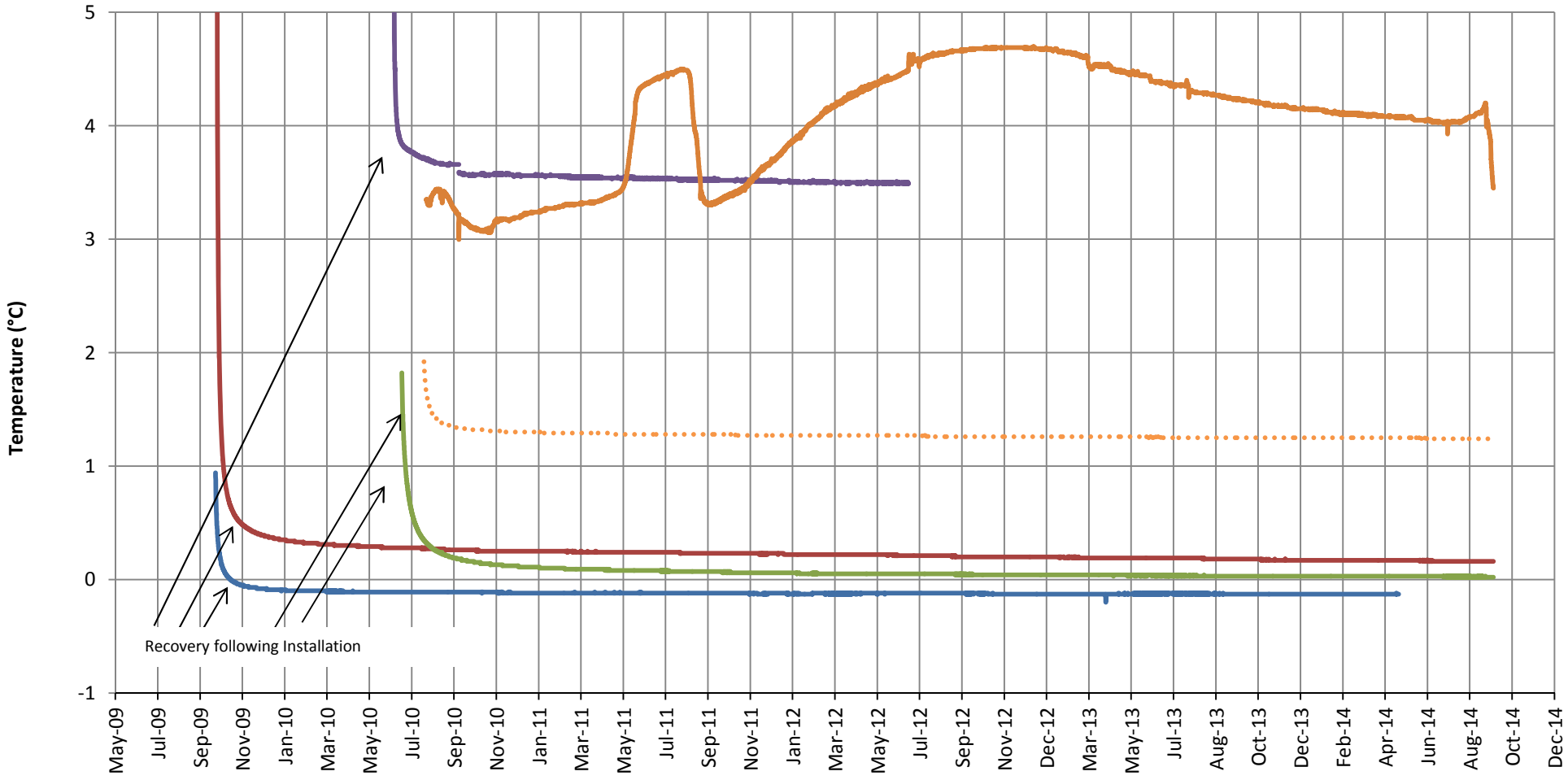
REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

APPENDIX D2

VIBRATING WIRE PIEZOMETER TEMPERATURE DATA

(Figure D2)



NOTES:

1. DEPTH OF INSTALLATION IS SHOWN IN LEGEND BESIDE PIEZOMETER NAME.
2. HG10-09 HAS NOT BEEN DOWNLOADED SINCE 2012.
3. CAS-034 WAS LAST DOWNLOADED IN MAY 2014.
4. THE TEMPERATURE SENSOR IN HG10-10D IS SUSPECTED TO BE FAULTY.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	17DEC'14	ISSUED WITH REPORT	KTD	CAS	KJB

CASINO MINING CORPORATION

CASINO PROJECT

VIBRATING WIRE PIEZOMETERS
GROUND TEMPERATURE

Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE D2

REV 0

APPENDIX E

GROUNDWATER QUALITY – QUALITY ASSURANCE/QUALITY CONTROL

(Pages E-1 to E-16)

APPENDIX E – 2013 QUALITY ASSURANCE AND QUALITY CONTROL ANALYSIS

1 – OVERVIEW

The quality assurance and quality control (QA/QC) analysis within Appendix F includes review of data collected from June 2013 onwards. This appendix builds on the previous QA/QC reports generated for earlier data (Table E.1). As stated in the 2012 Baseline Hydrogeology Report (KP Ref. No. VA101-325/14-4), groundwater samples have been collected by various consultants and sub-consultants since the program began in 1993 and sampling methods have not been clearly documented. This report will detail the methods used to collect sample data from June 2013 onwards.

The quality of the data obtained for a project is assessed via adherence to a set of pre-defined data quality objectives (DQOs) for the project. DQOs provide a means of assessing whether the data in question are precise, accurate, representative, and complete. This 2013 QA/QC analysis covers three areas of operations: field data collection, laboratory analysis and office data management.

The results from QA/QC samples are reviewed to determine if sample contamination occurred. The data for any contaminated samples are then reviewed to determine if the contamination occurred during collection, handling, storage, shipping, or analysis.

The QA/QC Protocol and DQOs were compiled with reference to the following Canadian guidance documents:

- Guidance Document for the Sampling and Analysis of Metal Mining Effluents (Environment Canada, 2011).
- Canadian Council of Ministers of the Environment (CCME) Protocols Manual for Water Quality Sampling in Canada (CCME, 2011). This document is based on the Alberta and British Columbia sampling manuals (Alberta Environment, 2006; BC MWLAP, 2003).

Procedures for each area of operations are summarized in Section 2 and are described in detail within the internal manuals and during staff training to ensure the proper collection, analysis, and management of data that will meet the DQOs. A summary of the results obtained during the QA/QC analysis are provided in Section 3.

Table E.1 Historic Quality Assurance and Quality Control Reports

Data Range	Primary Consultant	Location of QA/QC Analysis
June 2012 – Current	Knight Piésold	Current Appendix
2011- June 2012	Knight Piésold	Appendix F1: 2012 Baseline Hydrogeology Report (KP Report VA101-325/14-4 Rev 1)
1993-2011	AECOM	Appendix G1: 2012 Baseline Hydrogeology Report (KP Report VA101-325/14-4 Rev 1)

2 – PROCEDURES

2.1 FIELD DATA COLLECTION QA/QC PROCEDURES

2.1.1 Equipment

Field water quality meters (YSI6820 or YSI6920) for measuring *in situ* parameters are rented from Pine Environmental, where they are maintained and calibrated between water sampling events. Each YSI is calibrated daily for dissolved oxygen and, in cases where water quality sampling events take more than two days, each YSI is recalibrated every three days for other *in situ* parameters using standard solutions specific to each parameter (i.e. pH, turbidity, conductivity, and ORP). The YSI is recalibrated more often if parameter readings are suspect (ex. pH values that are inconsistent with the rest of the data for a given monitoring well).

All equipment used in water quality sampling is rinsed or cleaned with a shop towel between sites. Each YSI is rinsed with distilled water or well water between sites for the collection of surface water samples. The YSI is stored overnight in a sheltered environment. Equipment used for processing samples (i.e gloves, filters, and syringes) is disposable and new packaged equipment is used at each site.

2.1.2 Field Procedures

Specific work instructions were provided in KP sampling manuals, which were based on the CCME Protocols Manual for Water Quality Sampling in Canada (CCME, 2011), as well as office presentations, and on-the-job training. All staff engaged in this work were required to read the sampling manuals prior to conducting any water or sediment quality work on-site. Staff were also required to work with more experienced personnel during their first site visit.

Field notes and *in situ* data were recorded on waterproof paper. At the end of each day, field personnel checked their field notes and sample labels to ensure that no samples were missing and that notes were complete. The laboratories provided protocols for sample labelling, preservation, and shipment. Bottles and preservatives were shipped with labels, chain of custody (COC) forms, and specific instructions. Water quality samples were labelled with their actual site name rather than an identification code since the samples are re-labelled by the lab prior to analysis.

2.1.3 QA/QC Samples

The repeatability and reliability of sample results was evaluated by submitting duplicate water samples, field blanks, and travel blanks for the same parameters for which the primary samples are analyzed. This allows for the detection and reduction of errors that may occur due to contamination of samples. The QA/QC samples conformed to standard sampling methods, outlined by the CCME and were labelled as QA/QC samples because the laboratory adds their own labels upon sample receipt (CCME, 2011). Details regarding each type of QA/QC sample are outlined below:

Duplicate Samples - The purpose of a duplicate sample is to estimate sampling and laboratory analytical precision. At least one duplicate sample is collected for every sampling event and the total number of duplicate samples is maintained at least 10% of the total number of samples. Duplicate samples are the same as their primary sample in collection and handling and are collected at the same time or a few minutes apart from their primary sample.

Field Blank Sample - The purpose of a field blank is to identify potential sources of contamination with preservatives, field filtration, sample handling or transportation, as well as any potential contamination from analytical procedures. Field blanks were prepared from distilled/deionized water provided by the laboratory. The distilled/deionized water was added to sample bottles using the same field techniques as other samples, including field filtration and field preservation. The DDW is filtered and preserved using the same methods as for sampling site groundwater.

Travel Blank Sample - The purpose of a travel blank is to identify potential sources of contamination associated with sample containers, shipping, storage, and analysis. These samples are prepared by the laboratory with distilled/deionized water and are never opened. Travel blanks travel with the sample bottles sent from the laboratory to the field site, and back to the laboratory.

2.2 EXTERNAL LABORATORY ANALYSIS QA/QC PROCEDURES

ALS Environmental (ALS) was retained for the analysis of the samples collected from the project site. ALS is an accredited laboratory for water quality analysis with rigorous internal QA/QC procedures. In the event of a failed internal QA/QC test, both laboratories re-run all analyses affected by the same factors as the failed internal QA/QC sample.

Sample integrity issues are highlighted on the sample receipt confirmation (SRC) reports that were provided to Knight Piésold Ltd. in a timely manner following receipt of samples at the laboratory. Where sample integrity issues were identified, the laboratories and Knight Piésold Ltd. followed up to provide corrective actions or clarity.

2.3 OFFICE DATA MANAGEMENT QA/QC PROCEDURES

The FULCRUM data management system is used to organize and store data received from ALS laboratories. In FULCRUM, data are transferred electronically into the database through the use of electronic data files.

Upon receipt of laboratory results, several data validation checks are conducted and any QA/QC issues are recorded in a tracking document. If the QA/QC results do not meet the DQOs, results associated with the QA/QC samples in question are flagged and further inspected. If the issue with the QA/QC sample is determined to potentially affect the validity of the sample results associated with it, data are rejected. Rejected results are not used in the statistical analysis of the data, but are presented in Appendix B with the rest of the data. Data are also rejected when the QA/QC issue indicates that the analytical result is not representative of the sample (ex. the blank sample is contaminated and the primary sample contains elevated concentrations of the same parameter that was observed in the blank sample). Data rejected due to potential contamination concerns are excluded from the final data tables and summary statistics. The validation checks used to determine whether data should be qualified are outlined below:

Hold time exceedances – hold time exceedances occur when the time period between the sample collection time and the sample analysis time is greater than the recommended maximum holding time. These time frames range from 0.25 hr to 6 months and represent the maximum length of time that should not be exceeded or sample degradation may occur. Reasons for hold time exceedances are determined and wherever possible revised to prevent future exceedances. The validity of the results is determined on a case by case basis. Where the holding time exceedance was significant and likely to have an effect on the quality of the result, the results were rejected.

Sample Blanks – results of blank samples are used to assess the potential sources of contamination associated with the sample containers, preservatives, and sample handling and transportation, as well as any potential contamination from the analytical procedures. For each batch of samples collected in the field, at least one field blank and one travel blank sample was analyzed. Blank sample results are flagged if any analyte exceeds the method detection limit (MDL). The sample blank data are assessed and any MDL exceedances are noted and investigated to determine the source of error. Field sampling and handling procedures may be modified to prevent similar errors from occurring in future sampling events. Blank sample results that exceed five times the MDL are considered invalid. In these cases, all site sample analyses associated with the blank sample in question are rejected unless the detected concentration in the blank is significantly (i.e. one order of magnitude) lower than the concentrations observed in the samples. Blank sample results that are greater than the MDL, but lower than five times the MDL may not always indicate potential contamination because of the uncertainty of results near the MDL. These values usually result in discussions with the lab about uncertainty. The decision matrix used to assess the QA/QC results are provided in Table E.2.

Table E.2 Decision Matrix for Flagged Blank Samples

Case	Travel Blank	Field Blank (unfiltered)	Field Blank (filtered)	Likely Cause	Actions Taken
1	>5xMDL	>5xMDL	>5xMDL	Contamination during transport, storage, or analysis of samples.	If the results were greater than 10% of the average of the results for samples collected on site, data were rejected.
2	>MDL	>MDL	>MDL	Some uncertainty associated with the MDL and the analysis.	Data were accepted, but the lab was consulted for a discussion on the uncertainty.
3	>5xMDL	-	-	Contamination at the laboratory or contamination of DDW	Discussions with laboratory on potential contamination of DDW. Results were accepted.
4	-	>5xMDL	-	Contamination due to sampling procedures or leaching from bottles.	See Case 1
5	-	-	>5xMDL	Contamination due to filters or filtering process.	See Case 1
6	>5xMDL	>5xMDL	-	Potential contamination of DDW, contamination from the bottles, or a combination of contamination sources.	See Case 1
7		>5xMDL	>5xMDL	Contamination due to sampling methods or contaminated DDW water.	See Case 1
8	>5xMDL		>5xMDL	Contamination from two sources.	See Case 1

Duplicate Samples – duplicate samples are used to estimate sampling and laboratory precision. Analytical results obtained for two samples collected from the same site at the same time are flagged if the relative percent difference (RPD) is greater than 20% and the measured concentrations are greater than five times the MDL. The RPD is the absolute difference in concentrations of the two duplicate samples divided by the average of the two values. Flagged results are further reviewed and to determine whether the high RPD is a result of naturally variable conditions or sampling error. If the latter case is suspected, efforts are made to prevent similar errors from occurring in the future and results associated with the result in question may be rejected. If the high RPD is most likely a result of natural variability in the water body from which the duplicate samples are collected, flagged data are noted as a point of discussion, but are not rejected.

Detection Limits – detection limits are examined on a regular basis to ensure that they coincide with guideline limits. If detection limits exceed the guideline limits, the laboratory is contacted and efforts are made to adjust the analytical procedures to achieve lower detection limits. Detection limits are often increased due to sample matrix interference and all efforts are made to adjust methodology, though results may not improve.

Dissolved and Total Metals Concentrations – dissolved and totals metal concentrations in all site samples are compared and flagged if the reported concentration of a dissolved metal was greater than reported concentration of the total metal. These sample results are further investigated and if the sample concentration exceeds five times the MDL and RPD between the total metal and the dissolved metal is greater than 30%.

2.3.1 Data Analysis

Data from FULCRUM was used for statistical calculations. Results that are below the MDL are set to equal the MDL for the statistical analysis. *In situ* and laboratory results are compared with previous results for the same sites and with expected data trends. Any data outliers are confirmed with the laboratory for validity. Results that do not fit within the realistic expected range are flagged and may be rejected if the likely cause of the discrepancy is determined to be a methodology error. For all analytes, annual statistics and monthly mean values are calculated. Several of the calculations are checked at random using a calculator to proof the Excel spreadsheet calculations.

3 – RESULTS

QA/QC results are used to verify data and identify any data that should be rejected. These results are divided into two categories: procedural results and results of the analysis of QA/QC samples. Procedural results included the analysis of field, laboratory, and office procedures that were part of the QA/QC process. Results of the analysis of the QA/QC samples are quantitative results that were used to identify specific data that did not meet the DQOs.

A total of 74 samples were collected since June 2013, including 11 blank samples and six duplicate samples; QA/QC samples represent 22% of the total. A summary of the samples collected is shown in Table E.3.

Table E.3 Summary of Samples Collected

Site ID	2013			2014			Total Samples
	Jun	Aug	Sep/Oct	May	Jul	Sep/Oct	
94-337	1	1	1	1	1	1	6
94-347	-	-	-	-	-	1	1
94-352	-	-	-	-	1	1	2
94-354	-	-	-	-	1	-	1
HG10-01	1	1	1	1	1	1	6
HG10-02	-	1	1	1	1	1	5
HG10-04	1	1	1	1	1	1	6
MW11-02A	1	1	1	1	1	1	6
MW11-02B	1	1	1	1	1	1	6
MW13-01D	-	-	-	-	1	-	1
MW13-02D	-	1	1	-	1	1	4
MW13-02S	-	1	1	-	1	-	3
MW13-03S	-	1	-	-	1	-	2
MW13-04S	-	1	1	1	1	1	5
MW13-05	-	1	1	1	1	1	5
MW13-06D	-	1	1	-	1	1	4
MW13-06S	-	1	-	-	-	-	1
Camp Well	-	-	-	-	1	-	1
WR Well	-	-	-	-	1	-	1

NOTES:

1. SAMPLES SHOWN ON THIS TABLE INDICATE SAMPLING EVENTS AND DO NOT INCLUDE QA/QC SAMPLES.
2. ONE DUPLICATE AND ONE FIELD BLANK SAMPLE WERE COLLECTED FOR EACH OF THE SIX SITE VISITS.
2. A TOTAL OF FIVE TRAVEL BLANK SAMPLES WERE ANALYSED.

3.1 OPERATIONAL QA/QC RESULTS

Issues related to field, laboratory, or office procedures that could affect the validity of the data collected were flagged and evaluated in a QA/QC tracking document. If the issue was likely to affect the integrity of the data, the data was rejected.

3.1.1 Field Operations

3.1.1.1 Field Equipment

Field equipment was maintained either in the field or at Pine Environmental, where equipment was rented. In-situ probes were calibrated at Pine Environmental prior to shipping to site. Calibration records have been stored with the field notes. Dissolved oxygen was calibrated on site at the beginning of each sampling event and every time the atmospheric pressure or elevation of the sampling site changed significantly. Other parameters were recalibrated every three to five days, or when the probes detected readings that were unexpected and did not fit within the range of other samples collected from the same site. Probes were rinsed with distilled water or surface water between sampling sites. All other equipment used in sampling (ex. syringes, filters, gloves) was disposable and new equipment was used at each site.

3.1.1.2 Field Procedures

Site specific challenges, including permafrost, low water levels, damaged wells, and very low groundwater recharge rates, resulted in the need to use alternative groundwater sampling methods to collect samples from some wells. The quality of data collected using the alternative methods is not equal to that collected using the standard minimum drawdown or low recharge methods; however, these methods were used only when conditions made it impossible to collect groundwater samples using a submersible pump. The samples collected are not considered to be as representative of the baseline groundwater as the samples collected using the standard methods; however, the results may be used to support conclusions if specific considerations are made to the QA/QC analysis of such samples. The following samples, collected using alternative methods, should be flagged for potential QA/QC issues:

- MW13-03S (August 2013): this sample was collected several days after development and was not purged sufficiently for the standard methods due to low recharge. The water type of this sample is defined as containing more sulphate and less bicarbonate than other samples collected from the hillslope area.
- MW13-03S (July 2014): the well was frozen upon arrival and was thawed using hot tap water. The tap water was then purged using a foot valve and HDPE tubing until the water level was at the top of the screen. The water level was left to recover overnight before a sample was collected using a bailer. The water type of this sample is similar to that of other samples collected from the hillslope area, but is different from the other sample collected from the same well (August 2013). This July 2014 sample was collected using unconventional methods and is likely to represent a combination of groundwater and residual hot tap water. The sample was excluded from the dataset based on the metals analysis (see Section 3.2.3 – Metals Analysis).
- MW13-01D (July 2014): the well was frozen upon arrival and was thawed using hot tap water. The tap water was then purged using a foot valve and HDPE tubing until the water level was at the top of the screen. The water level recovered very slowly and a sample was collected a few

days later, after minimal recharge. The water type of this sample contains less bicarbonate and calcium and more sulphate than other samples collected from the hillslope area.

3.1.1.3 Monitoring Wells Excluded from Groundwater Quality Characterization Program

The pH of the water from monitoring wells MW13-04D and MW13-03D was high after well development and grout contamination is suspected. The low recharge rates of these wells poses a challenge for further well development; it is unlikely that further development could result in the clearing of the grout contamination. Data associated with samples collected from these wells have been excluded from the data set and samples are not proposed to be collected in future sampling events.

Permafrost conditions were observed in the vicinity of monitoring wells MW13-03S and MW13-01D and the wells were frozen when sampling was attempted in July 2014. The wells were thawed using hot tap water, which was purged prior to sampling; however, the low recharge conditions of these wells did not allow for sufficient purging. The sample quality for MW13-03S was poor and the July 2014 sample was rejected, as describe further in section 3.2.3 of this QA/QC summary. The sample quality for MW13-01D did not get flagged through the assessment of the DQOs, however, the sampling technique was similar to that used to collect the sample from monitoring well MW13-03S, and future sampling of both of these wells is not recommended.

3.1.2 Laboratory Operations

ALS has their own internal QA/QC methods for verifying data. Laboratory QA/QC results were reported for matrix spikes, method blanks, laboratory control samples, reference materials, and duplicates/replicates. ALS laboratory reports also provided details regarding sampling hold times.

3.1.2.1 Laboratory Qualifiers

Very few of the results reported by the laboratories were categorized as rejected. In most cases where data were flagged by the laboratory, the issue resulted in an adjustment of the MDL and did not result in the exclusion of results from the statistical analysis. Reasons for the MDL adjustment included the requirement of further dilution of samples prior to analysis, the detection of an analyte in the Method Blank, and sample matrix effects.

3.1.3 Office Data Management Operations

In the office, all *in situ* data and laboratory results from ALS laboratories were entered into FULCRUM. This task was completed by the field personnel who collected the samples and the entered data was checked regularly by other staff members. On the few occasions where an error in data entry was noted, the error was most commonly a unit conversion error. In these cases, the field personnel were informed of the non-conformance and the error was corrected.

3.2 QA/QC SAMPLE RESULTS

3.2.1 Blank Samples

Very few blank sample analyses were flagged. A summary of flagged blank sample results is shown in Table E.4 and all field blank and travel blank analytical results are shown in Table E.7 and Table

E.8, respectively. The flagged travel blank results indicate possible ammonia contamination at the laboratory or contamination of the DDI water. The latter is a more likely possibility, since laboratory contamination was checked with laboratory QA/QC protocols, which did not indicate contamination of ammonia. Dissolved organic carbon had a detectable concentration within the May 25, 2014 field blank. This detectable concentration is suspected to be as a result of the filtration device used for the dissolved samples, since the total samples are unaffected. The corrective action was to use a different filtering apparatus for future sampling.

Table E.4 Flagged Blank Results

Analyte (MDL)	Date	Blank Concentration (mg/L)	MDL (mg/L)	Holding Time	Type of Blank Sample
Ammonia	10-Jun-13	0.0121	0.005	28 days	Travel Blank
	26-Sep-13	0.0138	0.005		Travel Blank
	26-Sep-13	0.0238	0.005		Travel Blank
Dissolved Organic Carbon	25-May-14	0.01	0.5	28 days	Field Blank

NOTES:

1. THIS TABLE INCLUDES ONLY BLANK RESULTS WITH DETECTABLE CONCENTRATIONS.

3.2.2 Duplicate Samples

A summary of duplicate sample results for which the relative percent difference (RPD) between samples was greater than 20%, where one or both sample concentrations was greater than five times the MDL are listed in Table E.5. All duplicate analytical results from ALS Laboratories are shown in

Table E.9. A total of five duplicates were collected since June 2013. Each duplicate tested between 92 to 102 parameters. Over 450 individual samples were queried, and seven analytes reported RPDs in excess of 20%.

There are several possible reasons for duplicate sample RPDs exceeding 20%. Natural variability in groundwater quality data indicates the possibility that certain wells are not achieving a uniform steady state. Inconsistent sampling methods are another possibility.

All data associated with duplicate samples exceeding the acceptable RPD of 20% for analyses that were greater than five times the MDL were flagged and further examined. Two wells had more than one analyte that exceeded the acceptable RPD (HG10-04 and HG10-02). One sampling event (June 22, 2013) was responsible for three of the seven duplicates with elevated RPDs and a second sampling event (August 5, 2013) was responsible for two of the seven elevated duplicates. It is likely that the minimal variability shown in the duplicate data is both as a result of natural variability within groundwater, and inconsistencies in sampling methodology. Neither the site sample data nor the site data associated with the flagged duplicates were removed from the dataset used in the statistical analysis of results.

Table E.5 Flagged Groundwater Quality Duplicate Results

Site	Parameter	Date	Sample Concentrations		RPD (%)
			Sample	Duplicate	
HG10-04	Turbidity (NTU)	22-Jun-13	3.58	6.42	57%
	Total Aluminum (mg/L)	05-Aug-13	0.56	0.38	117%
	Total Lead (mg/L)	05-Aug-13	0.021	0.0054	117%
HG10-02	Sulphate (mg/L)	22-Jul-13	836	82.1	164%
	Total Zinc (mg/L)	22-Jul-13	0.087	0.05	54%
HG10-01	Turbidity (NTU)	23-May-13	2.32	8.53	115%
94-337	Total Lead (mg/L)	26-Sep-13	0.0037	0.0015	83%
MW13-04S	Lithium (Dissolved)	30-Sep-14	0.00623	0.00303	69%
	Manganese (Dissolved)		0.000537	0.000425	23%
	Molybdenum (Dissolved)		0.000841	0.00057	38%
	Potassium (Dissolved)		2.59	1.6	47%
	Sodium (Dissolved)		9.03	4.69	63%
	Manganese (Total)		0.000827	0.00109	27%

NOTES:

1. DUPLICATE SAMPLES WERE FLAGGED WHEN THE RPD WAS GREATER THAN 20% AND CONCENTRATIONS WERE GREATER THAN FIVE TIMES THE MDL.

3.2.3 Metals Analysis

Relative percent differences between total and dissolved metals concentrations were calculated for samples for which the dissolved concentrations of metals exceeded total concentrations of the same metals and one or both concentrations exceeded five times the MDL. Data were flagged when the RPD was greater than 20%. In cases where the flagged analytical result was different from the rest of the dataset (e.g., total concentration was lower and dissolved concentration was higher than the other data), both the total and dissolved data were rejected. A summary of the sample analyses that

were flagged is shown in Table E.6. Most of the flagged metals analyses were observed in the sample collected from MW13-03S in July, 2014 and are likely related to the unconventional methods used in sampling this well (see Section 3.1.1.2 – Field Procedures). Monitoring well MW13-03S is installed in a permafrost area and was frozen at the time of sampling. The ice inside the well was thawed using hot tap water, which was purged prior to sampling; however, the low recharge conditions of this well did not allow for sufficient purging. The sample likely represents a combination of tap water and groundwater. In addition, the sample was collected using a bailer because a low flow pump could not fit inside the well. The use of bailers can increase the turbidity in the well and stir sediments at the bottom. This could have resulted in a non-uniform sample, which would account for the discrepancies between total and dissolved metals. The data for the sample collected from MW13-03S in July, 2014 has been rejected for these two reasons.

Table E.6 Flagged Metals Analyses

Site	Date	Analyte	MDL	Dissolved	Total	RPD
94-352	30/09/2014	Zinc (Zn)	0.001	0.0139	0.0106	27%
94-352	30/07/2014	Zinc (Zn)	0.001	0.0185	0.0127	37%
MW13-03S	28/07/2014	Strontium (Sr)	0.0002	0.461	0.337	31%
MW13-03S	28/07/2014	Uranium (U)	0.00001	0.00869	0.00564	43%
MW13-03S	28/07/2014	Sodium (Na)	0.05	79	49.6	46%
MW13-03S	28/07/2014	Magnesium (Mg)	0.1	39.5	19.2	69%
MW13-03S	28/07/2014	Manganese (Mn)	0.00005	4.71	1.66	96%
MW13-03S	28/07/2014	Nickel (Ni)	0.0005	0.0252	0.00871	97%
MW13-03S	28/07/2014	Cobalt (Co)	0.0001	0.0162	0.00333	132%
MW13-03S	28/07/2014	Sulphur (S)	0.5	124	13.4	161%
MW13-03S	28/07/2014	Zinc (Zn)	0.001	0.527	0.0461	168%
MW13-04S	30/09/2014	Molybdenum (Mo)	0.00005	0.000841	0.000564	39%
MW13-04S	30/09/2014	Sodium (Na)	0.05	9.03	4.61	65%
MW13-04S	30/09/2014	Potassium (K)	0.1	2.59	1.31	66%

NOTES:

1. UNITS ARE mg/L UNLESS STATED OTHERWISE.
2. RESULTS ARE SHOWN FOR SAMPLES FOR WHICH A DISSOLVED METAL CONCENTRATION EXCEEDED THE TOTAL CONCENTRATION BY MORE THAN 20% AND THE CONCENTRATION EXCEEDED FIVE TIMES THE MDL.

REFERENCES

Alberta Environment, 2006. *Guidelines for Quality Assurance and Quality Control in Surface Water Quality Programs in Alberta*. Retrieved from: http://www.environment.gov.ab.ca/info/library/7739.pdf (accessed August 2014).

Canadian Council of Ministers of the Environment (CCME), 2011. *Protocols Manual for Water Quality Sampling in Canada*. Retrieved from: http://www.ccme.ca/assets/pdf/protocols_document_e_final_101.pdf (accessed August 2014).

Environment Canada, 2001. *Guidance Document for the Sampling and Analysis of Metal Mining Effluents*. Retrieved from: http://publications.gc.ca/collections/Collection/En49-24-1-39E.pdf (accessed August 2014).

Knight Piésold Ltd. (KP), 2014. *Water and Sediment Quality Review and CREMP Study Design*. North Bay, Ontario. Ref. No. NB102-181/33-1, Rev. 2.

Water, Air and Climate Change Branch of Ministry of Water, Land and Air Protection Province of British Columbia (BC MWLAP), 2003. *British Columbia Field Sampling Manual: For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples*. Retrieved from: http://www.env.gov.bc.ca/wsd/data_searches/field_sampling_manual/field_man_pdfs/fld_man_03.pdf (accessed during August 2014).

TABLE E.7 - FIELD BLANKS
(PAGE 1 OF 1)

Sample ID	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK
Date Sampled	26-Sep-13	13-Jun-13	16-Aug-13	25-May-14	25-Jul-14	2-Oct-14
Lab ID	L1370205-8	L1316836-4	L1350241-2	L1460749-5	L1493225-6	L1527854-5
Calculated Parameters						
Anions Sum meq/L	<0.1		<0.1		<0.1	<0.1
Cations Sum meq/L	<0.1		<0.1		<0.1	<0.1
Physical Tests						
Acidity to pH 8.3 (as CaCO3)						
Alkalinity (Total as CaCO3)	<2	<2	<2	<1	<2	<1
Bicarbonate Alkalinity	<2	<2	<2	<1	<2	<1
Carbonate Alkalinity	<2	<2	<2	<1	<2	<1
Color TCU	<5	<5	<5	<5	<5	<5
Conductivity µS/cm	<2	<2	<2	<2	<2	<2
Hardness as CaCO3 (Dissolved)	<0.0005	<0.0005	<0.0005	<0.5	<0.5	<0.5
Hardness as CaCO3 (Total)						
Hydroxide Alkalinity	<2	<2	<2	<1	<2	<1
Ion Balance %	0		0		0	0
pH pH	5.57	5.59	5.93	5.89	5.42	5.51
Total Dissolved Solids	<10	<10	<1	<10	<10	<10
Total Suspended Solids	<3	<3	<3	<3	<3	<3
Turbidity NTU	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Anions						
Bromide (Dissolved)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloride (Dissolved)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride (Dissolved)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sulphate (Dissolved)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nutrients						
Ammonia (Total)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate (as N)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite (as N)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrogen (Total)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen Kjeldahl (Total)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Orthophosphate (Dissolved)		<0.001	<0.001	<0.001		<0.001
Phosphate (Dissolved)			<0.002			
Phosphorus (Nutrient) Dissolved	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Phosphorus (Nutrient) Total	<0.002	<0.002		<0.002	<0.002	<0.002
Cyanide						
Cyanide (Free)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide (Total)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide (WAD)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Metals						
Aluminum (Dissolved	<0.001	<0.001		<0.001	<0.001	<0.001
Antimony (Dissolved)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Arsenic (Dissolved)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Barium (Dissolved)	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005
Beryllium (Dissolved)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Bismuth (Dissolved)	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
Boron (Dissolved)	<0.01	<0.01		<0.01	<0.01	<0.01
Cadmium (Dissolved)	<0.00001	<0.00001		<0.00001	<0.00001	<0.00001
Calcium (Dissolved)	<0.05	<0.05		<0.05	<0.05	<0.05
Chromium (Dissolved	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Cobalt (Dissolved)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Copper (Dissolved)	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Iron (Dissolved)	<0.01	<0.01		<0.01	<0.01	<0.01
Lead (Dissolved)	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005
Lithium (Dissolved)	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
Magnesium (Dissolved)	<0.1	<0.1		<0.1	<0.1	<0.1
Manganese (Dissolved)	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005
Mercury (Dissolved)	<0.00001	<0.00001		<0.00001	<0.00001	<0.00001
Molybdenum (Dissolved)	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005
Nickel (Dissolved)	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
Phosphorus (Metal) Dissolved	<0.05	<0.05		<0.05	<0.05	<0.05
Potassium (Dissolved)	<0.1	<0.1		<0.1	<0.1	<0.1
Selenium (Dissolved	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Silicon (Dissolved)	<0.05	<0.05		<0.05	<0.05	<0.05
Silver (Dissolved)	<0.00001	<0.00001		<0.00001	<0.00001	<0.00001
Sodium (Dissolved)	<0.05	<0.05		<0.05	<0.05	<0.05
Strontium (Dissolved)	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Sulphur (Dissolved	<0.5	<0.5		<0.5	<0.5	<0.5
Thallium (Dissolved	<0.00001	<0.00001		<0.00001	<0.00001	<0.00001
Tin (Dissolved)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Titanium (Dissolved)	<0.01	<0.01		<0.01	<0.01	<0.01
Uranium (Dissolved	<0.00001	<0.00001		<0.00001	<0.00001	<0.00001
Vanadium (Dissolved	<0.001	<0.001		<0.001	<0.001	<0.001
Zinc (Dissolved)	<0.001	<0.001		<0.001	<0.001	<0.001
Total Metals						
Aluminum (Total)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Antimony (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Barium (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Beryllium (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron (Total)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Calcium (Total)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Iron (Total)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Magnesium (Total)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Mercury (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Nickel (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus (Metal) Total	<0.05	<0.05	<0.05	<0.05	<0.00005	<0.05
Potassium (Total)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silicon (Total)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium (Total)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Strontium (Total)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sulphur (Total)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium (Total)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Vanadium (Total)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Total)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Organics						
Carbon Organic (Dissolved)	<0.5	<0.5		**1.01**	<0.5	<0.5
Carbon Organic (Total)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Percent of sample > MDL	**0.00%**	**0.00%**	**0.00%**	**1.05%**	**0.00%**	**0.00%**

NOTES:
1. UNITS ARE mg/L UNLESS OTHERWISE STATED
2. BOLD RED INDICATES THE RESULT EXCEEDS THE MDL FOR THAT ANALYTE
3. MDL EXCEEDANCE CALCULATION DOES NOT INCLUDE PH; WILL ALWAYS BE ABOVE THE MDL

APPENDIX E - QUALITY ASSURANCE/QUALITY CONTROL

TABLE E.8 - TRAVEL BLANKS
(PAGE 1 OF 1)

Sample ID	TRAVEL BLANK	TRAVEL BLANK	TRAVEL BLANK	TRAVEL BLANK	TRAVEL BLANK
Date Sampled	10-Jun-13	16-Aug-13	26-Sep-13	24-Jul-14	2-Oct-14
Lab ID	L1314790-3	L1350241-3	L1370205-7	L1493225-7	L1527854-6
Calculated Parameters					
Anions Sum meq/L	<0.1	<0.1	<0.1	<0.1	<0.1
Cations Sum meq/L	<0.1	<0.1	<0.1	<0.1	<0.1
Physical Tests					
Acidity to pH 8.3 (as CaCO3)	1.8				
Alkalinity (Total as CaCO3)	<2	<2	<2	<2	<1
Bicarbonate Alkalinity	<2	<2	<2	<2	<1
Carbonate Alkalinity	<2	<2	<2	<2	<1
Color TCU	<5	<5	<5	<5	<5
Conductivity µS/cm	<2	<2	<2	<2	<2
Hardness as CaCO3 (Dissolved)	<0.0005	<0.0005		<0.5	<0.5
Hydroxide Alkalinity	<2	<2	<2	<2	<1
Ion Balance %	0	0	0	0	0
pH pH	5.63	5.78	5.6	5.48	5.45
Total Dissolved Solids	<10	<1	<10	<10	<10
Total Suspended Solids	<3	<3	<3	<3	<3
Turbidity NTU	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Anions					
Bromide (Dissolved)	<0.05	<0.05	<0.05	<0.05	<0.05
Chloride (Dissolved)	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride (Dissolved)	<0.02	<0.02	<0.02	<0.02	<0.02
Sulphate (Dissolved)	<0.5	<0.5	<0.5	<0.5	<0.5
Nutrients					
Ammonia (Total)	**0.0121**	<0.005	**0.0138**	<0.005	**0.0238**
Nitrate (as N)	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite (as N)	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrogen (Total)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen Kjeldahl (Total)	<0.05	<0.05	<0.05	<0.05	<0.05
Orthophosphate (Dissolved)	<0.001	<0.001			<0.001
Phosphate (Dissolved)		<0.002			
Phosphorus (Nutrient) Dissolved	<0.002	<0.002	<0.002	<0.002	<0.002
Phosphorus (Nutrient) Total	<0.002		<0.002	<0.002	<0.002
Cyanide					
Cyanide (Free)	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide (Total)	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide (WAD)	<0.005	<0.005	<0.005	<0.005	<0.005
Total Metals					
Aluminum (Total)	<0.003	<0.003	<0.003	<0.003	<0.003
Antimony (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Barium (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Beryllium (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron (Total)	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Calcium (Total)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Iron (Total)	<0.01	<0.01	<0.01	<0.01	<0.01
Lead (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Magnesium (Total)	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Mercury (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum (Total)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Nickel (Total)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus (Metal) Total	<0.05	<0.05	<0.05	<0.00005	<0.05
Potassium (Total)	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silicon (Total)	<0.05	<0.05	<0.05	<0.05	<0.05
Silver (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium (Total)	<0.05	<0.05	<0.05	<0.05	<0.05
Strontium (Total)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sulphur (Total)	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin (Total)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium (Total)	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium (Total)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Vanadium (Total)	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Total)	<0.003	<0.003	<0.003	<0.003	<0.003
Organics					
Carbon Organic (Dissolved)					
Carbon Organic (Total)	<0.5	<0.5	<0.5	<0.5	<0.5
Percent of sample > MDL	**3.17%**	**0.00%**	**1.67%**	**0.00%**	**1.61%**

NOTES:
1. UNITS ARE mg/L UNLESS OTHERWISE STATED.
2. BOLD RED INDICATES THE RESULT EXCEEDS THE MDL FOR THAT ANALYTE.
3. MDL EXCEEDANCE CALCULATION DOES NOT INCLUDE pH; WILL ALWAYS BE ABOVE THE MDL.

APPENDIX E - QUALITY ASSURANCE/QUALITY CONTROL

TABLE E.9 - DUPLICATE SAMPLES
(PAGE 1 OF 2)

Site Date Sampled	MDL	94-337 26-Sep-13	Duplicate	RPD (%)	MDL	HG10-01 23-May-14	Duplicate	RPD (%)	MDL	HG10-02 22-Jul-14	Duplicate	RPD (%)
Physical Tests												
Alkalinity (Total as CaCO3)	2	10.2	9.3		2	126	126	0.00%	2	176	172	2.30%
Bicarbonate Alkalinity	2	10.2	9.3		2	126	126	0.00%				
Carbonate Alkalinity	2	<2	<2		2	<2	<2					
Color TCU	5	15.5	26.1		5	20.6	21.8		5	<5	<5	
Conductivity µS/cm	2	229	233	1.73%	2	1520	1530	0.66%	2	1570	1570	0.00%
Hardness as CaCO3 (Dissolved)	0.0005	0.082	0.0799	2.59%	0.5	959	953	0.63%	0.5	940	951	1.16%
Hydroxide Alkalinity	2	<2	<2		2	<2	<2					
Ion Balance %		0.8	0			3	2.4					
pH pH	0.1	6.55	6.84	4.33%	0.1	7.15	7.12	0.42%	0.1	7.36	7.52	2.15%
Total Dissolved Solids	10	184	187	1.62%	10	1370	1360	0.73%	10	1300	1320	1.53%
Total Suspended Solids	3	<3	<3		3	13.6	16.2		3	8.8	15.7	
Turbidity NTU	0.1	6.94	7.14	2.84%	0.1	2.32	8.53	**114.47%**	0.1	44.2	41.2	7.03%
Dissolved Anions												
Bromide (Dissolved)	0.05	<0.05	<0.05		0.5	<0.5	<0.5		0.5	<0.5	<0.05	
Chloride (Dissolved)	0.5	<0.5	<0.5		5	<5	<5		5	<5	<0.5	
Fluoride (Dissolved)	0.02	1.34	1.28	4.58%	0.2	0.58	0.58		0.2	0.71	0.07	
Sulphate (Dissolved)	0.5	95.6	96.1	0.52%	5	832	838	0.72%	5	836	82.1	**164.23%**
Nutrients												
Ammonia (Total)	0.005	0.0106	0.0098		0.005	0.0324	0.032	1.24%	0.005	0.0314	0.0305	2.91%
Nitrate (as N)	0.005	<0.005	<0.005		0.05	<0.05	<0.05		0.05	<0.05	<0.005	
Nitrate+Nitrite (Dissolved)												
Nitrite (as N)	0.001	<0.001	<0.001		0.01	<0.01	<0.01		0.01	<0.01	0.0011	
Nitrogen (Total)	0.05	<0.05	<0.05		0.071	0.086	0.085		0.071	0.101	0.085	
Nitrogen Kjeldahl (Total)	0.05	<0.05	<0.05		0.05	0.086	0.085		0.05	0.101	0.084	
Orthophosphate (Dissolved)					0.01	<0.01	<0.01					
Phosphate (Dissolved)												
Phosphorus (Nutrient) Dissolved	0.002	<0.002	<0.02		0.02	<0.02	<0.02		0.002	<0.002	<0.002	
Phosphorus (Nutrient) Total	0.002	<0.002	<0.02						0.002	<0.002	<0.002	
Cyanide												
Cyanide (Free)	0.005	<0.005	<0.005		0.005	<0.005	<0.005		0.005	<0.005	<0.005	
Cyanide (SAD)												
Cyanide (Total)	0.005	<0.005	<0.005		0.005	<0.005	<0.005		0.005	<0.005	<0.005	
Cyanide (WAD)	0.005	<0.005	<0.005		0.005	<0.005	<0.005		0.005	<0.005	<0.005	
Dissolved Metals												
Aluminum (Dissolved	0.001	0.632	0.619	2.08%	0.001	0.018	0.0198	9.52%	0.002	0.0049	0.0056	
Antimony (Dissolved)	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0002	<0.0002	<0.0002	
Arsenic (Dissolved)	0.0001	0.0006	0.0006	0.00%	0.0001	0.0182	0.0188	3.24%	0.0002	0.0134	0.014	4.38%
Barium (Dissolved)	0.00005	0.0117	0.0113	3.48%	0.00005	0.00547	0.00545	0.37%	0.0001	0.00471	0.00458	2.80%
Beryllium (Dissolved)	0.0001	0.00126	0.00124	1.60%	0.0001	<0.0001	<0.0001		0.0002	<0.0002	<0.0002	
Bismuth (Dissolved)	0.0005	<0.0005	<0.0005		0.0005	<0.0005	<0.0005		0.001	<0.001	<0.001	
Boron (Dissolved)	0.01	<0.01	<0.01		0.01	<0.01	<0.01		0.02	<0.02	<0.02	
Cadmium (Dissolved)	0.00001	0.00581	0.00563	3.15%	0.00001	<0.00001	0.000012		0.00002	<0.00002	<0.00002	
Calcium (Dissolved)	0.05	26	25.4	2.33%	0.05	310	309	0.32%	0.05	303	307	1.31%
Chromium (Dissolved	0.0001	0.0018	0.00167	7.49%	0.0001	<0.0001	<0.0001		0.0002	0.0002	<0.0002	
Cobalt (Dissolved)	0.0001	0.0663	0.066	0.45%	0.0001	0.0315	0.032	1.57%	0.0002	0.0188	0.0194	3.14%
Copper (Dissolved)	0.0002	1.88	1.85	1.61%	0.0002	<0.0002	<0.0002		0.0004	<0.0004	<0.0004	
Iron (Dissolved)	0.01	5.17	5.06	2.15%	0.01	23.3	23.2	0.43%	0.01	12.1	12.3	1.64%
Lead (Dissolved)	0.00005	0.00157	0.00134	15.81%	0.00005	0.000061	0.000062		0.0001	<0.0001	<0.0001	
Lithium (Dissolved)	0.0005	0.0185	0.0176	4.99%	0.0005	0.0063	0.0067	6.15%	0.001	0.0027	0.0025	
Magnesium (Dissolved)	0.1	4.13	4.02	2.70%	0.1	44.9	43.9	2.25%	0.1	44.3	44.5	0.45%
Manganese (Dissolved)	0.00005	0.625	0.628	0.48%	0.00005	0.973	0.981	0.82%	0.0001	0.661	0.666	0.75%
Mercury (Dissolved) unitless	0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001	
Molybdenum (Dissolved)	0.00005	0.00136	0.00135	0.74%	0.00005	0.0165	0.0161	2.45%	0.0001	0.0262	0.0265	1.14%
Nickel (Dissolved)	0.0005	0.0159	0.0157	1.27%	0.0005	0.0031	0.00313	0.96%	0.001	0.0012	0.0013	
Phosphorus (Metal) Dissolved	0.05	<0.05	<0.05		0.05	<0.05	<0.05		0.05	<0.05	<0.05	
Potassium (Dissolved)	0.1	1.5	1.39	7.61%	0.1	3.5	3.45	1.44%	0.1	3.24	3.33	2.74%
Selenium (Dissolved	0.0001	0.00012	0.00011		0.0001	<0.0001	<0.0001		0.0002	<0.0002	<0.0002	
Silicon (Dissolved)	0.05	9.5	9.15	3.75%	0.05	4.53	4.53	0.00%	0.05	4.27	4.33	1.40%
Silver (Dissolved)	0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001		0.00002	<0.00002	<0.00002	
Sodium (Dissolved)	0.05	4.22	4.27	1.18%	0.05	12.6	12.8	1.57%	0.1	14.3	14.4	0.70%
Strontium (Dissolved)	0.0002	0.166	0.161	3.06%	0.0002	1.56	1.54	1.29%	0.0004	1.64	1.59	3.10%
Sulphur (Dissolved	0.5	32	30.9	3.50%	0.5	259	256	1.17%	0.5	256	256	0.00%
Thallium (Dissolved	0.00001	0.000039	0.000038		0.00001	<0.00001	0.000015		0.00002	0.000029	0.000028	
Tin (Dissolved)	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0002	<0.0002	<0.0002	
Titanium (Dissolved)	0.01	<0.01	<0.01		0.01	<0.01	<0.01		0.02	<0.02	<0.02	
Uranium (Dissolved	0.00001	0.000897	0.000908	1.22%	0.00001	0.036	0.0343	4.84%	0.00002	0.0414	0.0421	1.68%
Vanadium (Dissolved	0.001	<0.001	<0.001		0.001	<0.001	<0.001		0.002	<0.002	<0.002	
Zinc (Dissolved)	0.001	0.378	0.376	0.53%	0.001	0.095	0.0965	1.57%	0.002	0.0513	0.0533	3.82%
Total Metals												
Aluminum (Total)	0.003	0.705	0.643	9.20%	0.003	0.0199	0.0179	10.58%	0.006	0.0095	0.0096	
Antimony (Total)	0.0001	<0.0001	<0.0001		0.0001	0.0001	<0.0001		0.0002	<0.0002	<0.0002	
Arsenic (Total)	0.0001	0.00071	0.00065	8.82%	0.0001	0.019	0.0191	0.52%	0.0002	0.0137	0.0142	3.58%
Barium (Total)	0.00005	0.0133	0.0119	11.11%	0.00005	0.00559	0.00548	1.99%	0.0001	0.00473	0.00467	1.28%
Beryllium (Total)	0.0001	0.00132	0.0012	9.52%	0.0001	0.00013	<0.0001		0.0002	<0.0002	<0.0002	
Bismuth (Total)	0.0005	<0.0005	<0.0005		0.0005	<0.0005	<0.0005		0.001	<0.001	<0.001	
Boron (Total)	0.01	<0.01	<0.01		0.01	0.011	<0.01		0.02	<0.02	<0.02	
Cadmium (Total)	0.00001	0.00603	0.00579	4.06%	0.00001	0.000016	<0.00001		0.00002	<0.00002	<0.00002	
Calcium (Total)	0.05	27.3	27.8	1.81%	0.05	311	306	1.62%	0.05	312	309	0.97%
Chromium (Total)	0.0001	0.00345	0.00299	14.29%	0.0001	0.00015	<0.0001		0.0002	0.00053	0.00056	
Cobalt (Total)	0.0001	0.0692	0.0706	2.00%	0.0001	0.0326	0.0323	0.92%	0.0002	0.0186	0.0192	3.17%
Copper (Total)	0.0005	2.05	1.99	2.97%	0.0005	<0.0005	<0.0005		0.001	<0.001	<0.001	
Iron (Total)	0.01	5.62	5.43	3.44%	0.01	23.7	23.1	2.56%	0.01	12.5	12.4	0.80%
Lead (Total)	0.00005	0.00366	0.00152	**82.63%**	0.00005	0.000111	0.000053		0.0001	<0.0001	<0.0001	
Lithium (Total)	0.0005	0.0192	0.0176	8.70%	0.0005	0.00703	0.00613	13.68%	0.001	0.0027	0.0025	
Magnesium (Total)	0.1	4.35	4.29	1.39%	0.1	45.2	44.4	1.79%	0.1	45.2	45.3	0.22%
Manganese (Total)	0.00005	0.663	0.66	0.45%	0.00005	1.02	0.988	3.19%	0.0001	0.647	0.664	2.59%
Mercury (Total)	0.00001	0.000011	<0.00001		0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001	
Molybdenum (Total)	0.00005	0.0017	0.00151	11.84%	0.00005	0.0172	0.0168	2.35%	0.0001	0.0254	0.0266	4.62%
Nickel (Total)	0.0005	0.0171	0.0169	1.18%	0.0005	0.00321	0.00319	0.63%	0.001	0.0013	0.0013	
Phosphorus (Metal) Total	0.05	<0.05	<0.05		0.05	<0.05	<0.05		0.00005	<0.00005	<0.00005	
Potassium (Total)	0.1	1.63	1.56	4.39%	0.1	3.53	3.42	3.17%	0.1	3.37	3.34	0.89%
Selenium (Total)	0.0001	0.00012	0.00011		0.0001	0.00015	<0.0001		0.0002	<0.0002	<0.0002	
Silicon (Total)	0.05	9.89	9.55	3.50%	0.05	4.62	4.51	2.41%	0.05	4.43	4.39	0.91%
Silver (Total)	0.00001	<0.00001	<0.00001		0.00001	0.000011	<0.00001		0.00002	0.000693	<0.00002	
Sodium (Total)	0.05	4.35	4.43	1.82%	0.05	13.3	12.8	3.83%	0.1	14.1	14.5	2.80%
Strontium (Total)	0.0002	0.173	0.164	5.34%	0.0002	1.66	1.57	5.57%	0.0004	1.58	1.66	4.94%
Sulphur (Total)	0.5	32.9	32.4	1.53%	0.5	265	261	1.52%	0.5	268	265	1.13%
Thallium (Total)	0.00001	0.000039	0.00004		0.00001	0.000018	<0.00001		0.00002	0.000028	0.000026	
Tin (Total)	0.0001	0.00014	<0.0001		0.0001	<0.0001	<0.0001		0.0002	<0.0002	<0.0002	
Titanium (Total)	0.01	<0.01	<0.01		0.01	<0.01	<0.01		0.02	<0.02	<0.02	
Uranium (Total)	0.00001	0.00101	0.000983	2.71%	0.00001	0.0366	0.0361	1.38%	0.00002	0.0396	0.0427	7.53%
Vanadium (Total)	0.001	<0.001	<0.001		0.001	<0.001	<0.001		0.002	<0.002	<0.002	
Zinc (Total)	0.003	0.383	0.389	1.55%	0.003	0.0986	0.0976	1.02%	0.006	0.0874	0.0501	**54.25%**
Organics												
Carbon Organic (Dissolved)	0.5	1.16	1.21		0.5	1.3	1.08		0.5	1.22	1.03	
Carbon Organic (Total)	0.5	1.11	0.93		0.5	0.97	1.05		0.5	1.12	1.03	

NOTES:
1. UNITS ARE mg/L UNLESS OTHERWISE STATED.
2. BOLD RED INDICATES THE RPD [RELATIVE PERCENT DIFFERENCE] EXCEEDS THE 20% DATA QUALITY OBJECTIVE FOR VALUES GREATER THAN 5 TIMES THE MDL.

TABLE E.9 - DUPLICATE SAMPLES
(PAGE 2 OF 2)

Site Date Sampled	MDL	HG10-04 12-Jun-13	Duplicate	RPD (%)	MDL	HG10-04 5-Aug-13	Duplicate	RPD (%)	MDL	MW13-04S 30-Sep-14	Duplicate	RPD (%)
Physical Tests												
Alkalinity (Total as CaCO3)	1	94.9	104	9.15%	2	101	102	0.99%	1	168	168	0.00%
Bicarbonate Alkalinity	1	94.9	104	9.15%	2	101	102	0.99%	1	168	168	0.00%
Carbonate Alkalinity	1	<1	<2		2	<2	<2		1	<1	<1	
Color TCU	5	60.1	55.6	7.78%	5	69.8	71.3	2.13%	5	<5	<5	
Conductivity µS/cm	2	852	844	0.94%	2	872	875	0.34%	2	344	343	0.29%
Hardness as CaCO3 (Dissolved)	0.0005	0.457	0.461	0.87%	0.0005	0.456	0.447	1.99%	0.5	174	185	6.13%
Hydroxide Alkalinity	1	<1	<2		2	<2	<2		1	<1	<1	
Ion Balance %						5.8	5.5			-0.8	-0.8	
pH pH	0.1	6.65	6.56	1.36%	0.1	6.85	6.82	0.44%	0.1	8.17	8.25	0.97%
Total Dissolved Solids	10	698	648	7.43%	10	690	732	5.91%	10	202	211	4.36%
Total Suspended Solids	3	25.2	23.9	5.30%	3	40.1	34.3	15.59%	3	14	6	
Turbidity NTU	0.1	78.9	71.1	10.40%	0.1	3.58	6.42	**56.80%**	0.1	2.2	0.86	**87.58%**
Dissolved Anions												
Bromide (Dissolved)	0.5	<0.5	<0.5		0.5	<0.5	<0.5		0.05	<0.05	<0.05	
Chloride (Dissolved)	5	<5	<5		5	<5	<5		0.5	<0.5	<0.5	
Fluoride (Dissolved)	0.2	0.53	0.58		0.2	0.62	0.61		0.02	0.099	0.107	
Sulphate (Dissolved)	5	390	382	2.07%	5	399	392	1.77%	0.5	30.4	30.6	0.66%
Nutrients												
Ammonia (Total)	0.005	0.0536	0.0569	5.97%	0.005	0.0528	0.0537	1.69%	0.005	<0.005	<0.005	
Nitrate (as N)	0.05	<0.05	<0.05		0.05	<0.05	<0.05		0.005	0.0838	0.0841	0.36%
Nitrate+Nitrite (Dissolved)												
Nitrite (as N)	0.01	<0.01	<0.01		0.01	0.01	0.013		0.001	<0.001	<0.001	
Nitrogen (Total)	0.05	<0.05	<0.05		0.05	<0.05	<0.05		0.05	0.165	0.17	
Nitrogen Kjeldahl (Total)	0.05	0.107	0.103		0.05	0.097	0.094		0.05	0.081	0.086	
Orthophosphate (Dissolved)	0.001	<0.001	<0.001						0.001	<0.001	<0.001	
Phosphate (Dissolved)												
Phosphorus (Nutrient) Dissolved	0.02	0.025	<0.02		0.002	<0.002	<0.002		0.002	0.0025	0.002	
Phosphorus (Nutrient) Total	0.02	<0.02	<0.02		0.002	0.0078	0.0046		0.002	0.0025	0.0023	
Cyanide												
Cyanide (Free)	0.005	<0.005	<0.005		0.005	<0.005	<0.005		0.005	<0.005	<0.005	
Cyanide (SAD)												
Cyanide (Total)	0.005	<0.005	<0.005		0.005	<0.005	<0.005		0.005	<0.005	<0.005	
Cyanide (WAD)	0.005	<0.005	<0.005		0.005	<0.005	<0.005		0.005	<0.005	<0.005	
Dissolved Metals												
Aluminum (Dissolved	0.001	0.0234	0.0227	3.04%	0.001	0.0208	0.0203	2.43%	0.001	0.0013	<0.001	
Antimony (Dissolved)	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001	
Arsenic (Dissolved)	0.0001	0.00191	0.00197	3.09%	0.0001	0.0019	0.00208	9.05%	0.0001	0.00539	0.00528	2.06%
Barium (Dissolved)	0.00005	0.0102	0.00995	2.48%	0.00005	0.0106	0.0103	2.87%	0.00005	0.0242	0.023	5.08%
Beryllium (Dissolved)	0.0001	0.00033	0.00033		0.0001	0.00031	0.00031		0.0001	<0.0001	<0.0001	
Bismuth (Dissolved)	0.0005	<0.0005	<0.0005		0.0005	<0.0005	<0.0005		0.0005	<0.0005	<0.0005	
Boron (Dissolved)	0.01	<0.01	<0.01		0.01	<0.01	<0.01		0.01	<0.01	<0.01	
Cadmium (Dissolved	0.00001	0.000788	0.000761	3.49%	0.00001	0.000447	0.000491	9.38%	0.00001	0.000334	0.000379	12.62%
Calcium (Dissolved)	0.05	143	144	0.70%	0.05	141	139	1.43%	0.05	48.7	52.1	6.75%
Chromium (Dissolved	0.0001	0.00012	0.00015		0.0001	<0.0001	<0.0001		0.0001	0.00091	0.00041	
Cobalt (Dissolved)	0.0001	0.0383	0.0384	0.26%	0.0001	0.0361	0.0368	1.92%	0.0001	<0.0001	<0.0001	
Copper (Dissolved)	0.0002	0.00043	0.0003		0.0002	<0.0002	<0.0002		0.0002	0.00075	0.00063	
Iron (Dissolved)	0.01	35.2	35.7	1.41%	0.01	36	35.4	1.68%	0.01	<0.01	<0.01	
Lead (Dissolved)	0.00005	0.000938	0.000918	2.16%	0.00005	0.000587	0.000605	3.02%	0.00005	<0.00005	<0.00005	
Lithium (Dissolved)	0.0005	0.00198	0.00182		0.0005	0.00129	0.00102		0.0005	0.00623	0.00303	**69.11%**
Magnesium (Dissolved)	0.1	24.6	24.5	0.41%	0.1	24.9	24.5	1.62%	0.1	12.8	13.3	3.83%
Manganese (Dissolved)	0.00005	3.85	3.78	1.83%	0.00005	3.99	4.01	0.50%	0.00005	0.000537	0.000425	**23.28%**
Mercury (Dissolved) unitless	0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001	
Molybdenum (Dissolved)	0.00005	0.000126	0.000123		0.00005	0.000119	0.000112		0.00005	0.000841	0.00057	**38.41%**
Nickel (Dissolved)	0.0005	0.00288	0.00287	0.35%	0.0005	0.00265	0.00257	3.07%	0.0005	<0.0005	<0.0005	
Phosphorus (Metal) Dissolved	0.05	<0.05	<0.05		0.05	<0.05	<0.05		0.05	<0.05	<0.05	
Potassium (Dissolved)	0.1	2.58	2.5	3.15%	0.1	2.34	2.25	3.92%	0.1	2.59	1.6	**47.26%**
Selenium (Dissolved	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001	
Silicon (Dissolved)	0.05	3.81	3.82	0.26%	0.05	3.69	3.6	2.47%	0.05	4.02	4.03	0.25%
Silver (Dissolved)	0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001	
Sodium (Dissolved)	0.05	7.59	7.68	1.18%	0.05	8.45	8.55	1.18%	0.05	9.03	4.69	**63.27%**
Strontium (Dissolved)	0.0002	0.365	0.374	2.44%	0.0002	0.361	0.36	0.28%	0.0002	0.201	0.198	1.50%
Sulphur (Dissolved	0.5	122	124	1.63%	0.5	125	125	0.00%	0.5	10.4	10.1	2.93%
Thallium (Dissolved	0.00001	0.000017	0.000016		0.00001	0.000016	0.000016		0.00001	<0.00001	<0.00001	
Tin (Dissolved)	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001	
Titanium (Dissolved)	0.01	<0.01	<0.01		0.01	<0.01	<0.01		0.01	<0.01	<0.01	
Uranium (Dissolved	0.00001	0.00669	0.00662	1.05%	0.00001	0.00829	0.00822	0.85%	0.00001	0.00677	0.00711	4.90%
Vanadium (Dissolved	0.001	<0.001	<0.001		0.001	<0.001	<0.001		0.001	<0.001	<0.001	
Zinc (Dissolved)	0.001	0.138	0.138	0.00%	0.001	0.106	0.109	2.79%	0.001	0.0302	0.0329	8.56%
Total Metals												
Aluminum (Total)	0.003	0.0584	0.0575	1.55%	0.003	0.559	0.384	**37.12%**	0.003	0.0042	0.0131	
Antimony (Total)	0.0001	<0.0001	<0.0001		0.0001	0.00011	<0.0001		0.0001	<0.0001	<0.0001	
Arsenic (Total)	0.0001	0.002	0.002	0.00%	0.0001	0.00241	0.00242	0.41%	0.0001	0.00553	0.00553	0.00%
Barium (Total)	0.00005	0.0103	0.0103	0.00%	0.00005	0.0167	0.0176	5.25%	0.00005	0.0259	0.0291	11.64%
Beryllium (Total)	0.0001	0.00035	0.00033		0.0001	0.00037	0.00035		0.0001	<0.0001	<0.0001	
Bismuth (Total)	0.0005	<0.0005	<0.0005		0.0005	<0.0005	<0.0005		0.0005	<0.0005	<0.0005	
Boron (Total)	0.01	<0.01	<0.01		0.01	<0.01	<0.01		0.01	0.01	<0.01	
Cadmium (Total)	0.00001	0.0008	0.000844	5.35%	0.00001	0.00115	0.000943	19.78%	0.00001	0.000376	0.00038	1.06%
Calcium (Total)	0.05	145	144	0.69%	0.05	143	143	0.00%	0.05	52.3	53.1	1.52%
Chromium (Total)	0.0001	0.00032	0.00031		0.0001	0.00046	0.0004		0.0001	0.00087	0.00096	9.84%
Cobalt (Total)	0.0001	0.04	0.0397	0.75%	0.0001	0.038	0.0387	1.83%	0.0001	<0.0001	<0.0001	
Copper (Total)	0.0005	0.00096	0.0012		0.0005	0.00277	0.00198		0.0005	0.00106	0.0011	
Iron (Total)	0.01	36.1	36.1	0.00%	0.01	37.1	37.7	1.60%	0.01	<0.01	0.011	
Lead (Total)	0.00005	0.00118	0.0012	1.68%	0.00005	0.0209	0.00543	**117.51%**	0.00005	0.000071	0.000087	
Lithium (Total)	0.0005	0.00234	0.00199		0.0005	0.00175	0.00153		0.0005	0.0023	0.00255	
Magnesium (Total)	0.1	25.7	25.8	0.39%	0.1	25.3	25.7	1.57%	0.1	13.4	13.6	1.48%
Manganese (Total)	0.00005	4	3.92	2.02%	0.00005	4.2	4.17	0.72%	0.00005	0.000827	0.00109	**27.44%**
Mercury (Total)	0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001		0.00001	<0.00001	<0.00001	
Molybdenum (Total)	0.00005	0.000208	0.000153		0.00005	0.0002	0.000175		0.00005	0.000564	0.00059	4.51%
Nickel (Total)	0.0005	0.00304	0.00301	0.99%	0.0005	0.0031	0.00298	3.95%	0.0005	<0.0005	<0.0005	
Phosphorus (Metal) Total	0.05	<0.05	<0.05		0.05	<0.05	<0.05		0.05	<0.05	<0.05	
Potassium (Total)	0.1	2.81	2.91	3.50%	0.1	2.45	2.48	1.22%	0.1	1.31	1.46	10.83%
Selenium (Total)	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001	
Silicon (Total)	0.05	3.98	4	0.50%	0.05	5.21	4.81	7.98%	0.05	4	4.11	2.71%
Silver (Total)	0.00001	<0.00001	<0.00001		0.00001	0.000046	0.000033		0.00001	<0.00001	<0.00001	
Sodium (Total)	0.05	8.03	7.77	3.29%	0.05	9.07	9.12	0.55%	0.05	4.61	4.4	4.66%
Strontium (Total)	0.0002	0.383	0.389	1.55%	0.0002	0.385	0.373	3.17%	0.0002	0.207	0.213	2.86%
Sulphur (Total)	0.5	127	126	0.79%	0.5	131	131	0.00%	0.5	10.1	10.2	0.99%
Thallium (Total)	0.00001	0.000016	0.000016		0.00001	0.000025	0.000023		0.00001	<0.00001	<0.00001	
Tin (Total)	0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001		0.0001	<0.0001	<0.0001	
Titanium (Total)	0.01	<0.01	<0.01		0.01	0.014	<0.01		0.01	<0.01	<0.01	
Uranium (Total)	0.00001	0.00698	0.00679	2.76%	0.00001	0.00933	0.00903	3.27%	0.00001	0.00752	0.00772	2.62%
Vanadium (Total)	0.001	<0.001	<0.001		0.001	<0.001	<0.001		0.001	<0.001	<0.001	
Zinc (Total)	0.003	0.139	0.143	2.84%	0.003	0.119	0.119	0.00%	0.003	0.0366	0.0354	3.33%
Organics												
Carbon Organic (Dissolved)	0.5	1.61	1.37		0.5	1.38	1.36		0.001	<0.001	<0.001	
Carbon Organic (Total)	0.5	1.52	1.1		0.5	1.73	1.59		0.003	0.0366	0.0354	3.33%

NOTES:
1. UNITS ARE mg/L UNLESS OTHERWISE STATED.
2. BOLD RED INDICATES THE RPD [RELATIVE PERCENT DIFFERENCE] EXCEEDS THE 20% DATA QUALITY OBJECTIVE FOR VALUES GREATER THAN 5 TIMES THE MDL.

APPENDIX F

GROUNDWATER QUALITY DATA TABLES

(Pages F-1 to F-17)

APPENDIX F - GROUNDWATER QUALITY DATA

CASINO COPPER-GOLD PROJECT
TABLE F1 - GUIDELINES AND STANDARDS

	CCME[2]	YCSR [3,4]
Physical Tests		
pH (pH)	6.5 to 9	
Dissolved Anions		
Chloride	640	
Fluoride	0.12	2 @ H < 50 [5] 3 @ H >= 50 [5]
Sulphate		1000
Nutrients		
Ammonia (Total)	0.017 to 192 [6,7]	1.31 to 200 [6,7]
Nitrate (as N)	3 (LTE) [11] / 124 (STE) [10]	400
Nitrate+Nitrite (Dissolved)		400
Nitrite (as N)	0.06	0.2 to 2 [8]
Cyanide		
Cyanide (WAD)		0.05
Metals		
Aluminum	0.005 to 0.1 [6]	
Antimony		0.2
Arsenic	0.005	0.05
Barium		10
Beryllium		0.053
Cadmium	0.000036 to $10^{(0.83*(\log(H)-2.46)}$/1000 to 0.000373 [11,5] 0.000106 to $10^{(1.016*(\log(H)-1.71)}$/1000 to 0.0077 [10,5]	0.0001 to 0.0006 [5]
Chromium	0.001 (Cr VI) [9] 0.0089 (Cr III)	0.006 (Cr VI) [9] 0.090 (Cr III)
Cobalt		0.009
Copper	$e^{(0.8545*\ln(H)-1.465)}$ 0.2/1000 to 0.004 [5]	0.020 to 0.090 [5]
Iron	0.3	
Lead	0.001 to $e^{1.273*\ln(H)-4.705}$/1000 to 0.007 [5]	0.040 to 0.160 [5]
Mercury	0.000026	0.001
Molybdenum	0.073	10
Nickel	e $^{((0.76*\ln(H)+1.06))}$ /1000 to 0.15 [5]	0.250 to 1.5 [5]
Selenium	0.001	0.01
Silver	0.0001	0.0005 to 0.015 [5]
Thallium	0.0008	0.003
Uranium	0.015	3
Zinc	0.03	0.075 to 2.4 [5]

M:\1\01\00325\17\A\Report\1-2013 Hydrogeology\Appendices\Appendix F - Groundwater Quality Data Tables\[Tables F1-F4 - Updated2014.xlsx]F1 - GUIDELINES AND STANDARDS

NOTES:

1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. CCME - CANADIAN COUNCIL OF MINSTERS FOR THE ENVIRONMENT - CANADIAN ENVIRONMENTAL QUALITY GUIDELINES - WATER QUALITY GUIDELINE FOR THE PROTECTION OF AQUATIC LIFE (CEQG-PAL) - FRESHWATER.
3. YCSR - YUKON CONTAMINATED SITES REGULATION - GENERIC NUMERICAL WATER STANDARDS - SCHEDULE 3 - COLUMN 2 - YUKON ENVIRONMENT ACT (O.I.C. 2002/171).
4. YCSR AQUATIC LIFE STANDARDS ASSUME A MINIMUM 1:10 DILUTION IS AVAILABLE.
5. HARDNESS (H) DEPENDENT GUIDELINE LIMIT (DISSOLVED).
6. pH DEPENDENT GUIDELINE LIMIT (*IN SITU* VALUE PREFFERED).
7. TEMPERATURE DEPENDENT GUIDELINE LIMIT.
8. CHLORIDE (DISSOLVED) DEPENDENT GUIDELINE LIMIT.
9. Cr III (TRIVALENT CHROMIUM) GUIDELINES WERE ASSUMED FOR COMPARISON TO THE GROUNDWATER CHEMISTRY DATA.
10. STE - SHORT TERM EXPOSURE LIMIT.
11. LTE - LONG-TERM EXPOSURE LIMIT.
12. THIS SHADING INDICATES THAT THE VALUE EXCEEDS THE CCME LIMIT.
13. THIS SHADING INDICATES THAT THE VALUE EXCEEDS THE LIMITS OF THE YCSR.
14. THIS SHADING INDICATES THAT THE VALUE EXCEEDS BOTH THE CCME AND YCSR LIMITS.
15. ITALICIZED TEXT INDICATES SAMPLES THAT WERE COLLECTED IN 2013 AND 2014.

APPENDIX F - GROUNDWATER QUALITY DATA

CASINO COPPER-GOLD PROJECT
TABLE F2 - PROPOSED OPEN PIT AREA

Site ID Date/Time Sampled	MDL	94-337 24-Sep-94	94-337 3-Feb-95	94-337 24-May-95	94-337 10-Sep-08	94-337 21-Sep-09	94-337 6-Jun-10	94-337 18-Aug-10	94-337 14-Sep-10	94-337 22-May-11	94-337 15-Jul-11	94-337 19-Sep-11	94-337 28-May-12
Calculated Parameters													
Ion Balance Ratio	0.01					1.1							
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5					<0.5	<0.5	<0.5	<0.5				<0.5
Acidity to pH 8.3 (as CaCO3)	0.5					14.5	18.1	30.6	7.5				26
Alkalinity (PP as CaCO3)	0.5									<0.5	<0.5	<0.5	
Alkalinity (Total as CaCO3)	0.5	6	8.8	5.4	5	12	2.1	6.9	7.1	1.8	6.3	6.2	6.64
Bicarbonate Alkalinity	0.5									2.2	7.6	7.6	
Carbonate Alkalinity	0.5									<0.5	<0.5	<0.5	
Conductivity µS/cm	1	320	315	301	280	310	259	272	266	253	235	247	246
Hardness as CaCO3 (Dissolved)	0.5				101	103	99.6	94.5	93.5	92	94.2	86.7	82.3
Hardness as CaCO3 (Total)	0.5	121	125	121						97.7	91.1	45	91.2
Hydroxide Alkalinity	0.5									<0.5	<0.5	<0.5	
pH (pH)	0	5.32	5.62	5.31	6.2	6.16	5.89	5.74	5.98	5.82	7.05	6.02	5.95
Total Dissolved Solids	1.0 to 10.0	219	206	242	200	180	190	150	200	170	200	190	166
Total Suspended Solids	1	51	366	22	47					2	3	7	2.1
Turbidity (NTU)	0.1	51.6	257	29.8	50.2					16.6	8.2	10.3	16
Dissolved Anions													
Bromide	0.01 to 0.4				<0.1	<0.4	<0.4	<0.4	<0.4				<0.01
Chloride	0.5	<0.6	<0.5	<0.5	0.6	1.3	<0.5		<0.5	0.6	1	1.2	1.2
Fluoride	0.01	1.64	1.16	1.41	1.24	1.24	1.2	1	1.16	1.14	1.2	1.3	1.1
Sulphate	0.5 to 5.0	130	121	134	110	98	110	110	110	100	100	92	104
Thiocyanate	0.2						<0.2						
Nutrients													
Ammonia (Total)	0.005 to 0.01	0.019	<0.005	0.008	0.02	0.01	0.022	0.05	<0.005	0.014	0.036	0.058	0.02
Nitrate (as N)	0.002 to 0.02	<0.02	<0.02	<0.02	0.006	<0.002	0.007	<0.002	<0.002	<0.02	<0.02	<0.02	<0.002
Nitrate+Nitrite (Dissolved)	0.002 to 0.02				0.014	0.011	0.007	0.003	0.003	<0.02	<0.02	<0.02	<0.002
Nitrite (as N)	0.002 to 0.005	<0.005	<0.005	<0.005	0.008	0.011	<0.002	0.004	0.005	0.006	<0.005	<0.005	0.0051
Nitrogen (Total)	0.02				0.05	0.05	0.04	0.21	0.07				0.098
Nitrogen Kjeldahl (Total)	0.02				0.04	0.04	0.03	0.21	0.06				0.098
Orthophosphate (Dissolved)	0.001 to 0.005	<0.005	<0.005	<0.005	0.008	0.001	0.004	0.002	0.007	0.031	<0.005		0.0039
Phosphorus Dissolved	0.002 to 0.01	0.003	0.005	0.003	<0.002		0.005	0.003	0.005				
Cyanide													
Cyanide (SAD)	0.001					0.004							
Cyanide (WAD)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005				<0.0005
Cyanide+Thiocyanate	0.0005 to 0.001	<0.001	<0.001	<0.001	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0541	<0.0005
Dissolved Metals													
Aluminum	0.0002 to 0.003	0.971	0.753	0.904	0.515	0.686	0.683	0.63	0.628	0.6	0.665	0.633	0.611
Antimony	0.00002 to 0.0005	0.0001	<0.0001	<0.0001	0.00004	0.00005	0.00006	0.00006	0.00005	<0.0005	<0.0005	<0.0005	0.000054
Arsenic	0.00002 to 0.001	0.0011	0.0003	0.0009	0.00011	0.00071	0.00079	0.00077	0.00072	0.0007	0.0007	0.0006	0.000625
Barium	0.00002 to 0.001	0.029	0.035	0.019	0.0138	0.0111	0.011	0.011	0.0106	0.01		0.01	0.0105
Beryllium	0.00001 to 0.005	<0.005	<0.005	<0.005	0.00137	0.00141	0.0014	0.00143	0.00133	0.0013	0.0013	0.0012	0.00136
Bismuth	0.000005 to 0.1	<0.1	<0.1	<0.1	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.001	<0.000005
Boron	0.05 to 0.3	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	0.000005 to 0.00003	0.0084	0.0085	0.0073	0.00714	0.00772	0.00743	0.00743	0.00717	0.007	0.00682	0.00633	0.00607
Calcium	0.05 to 0.3	38.2	39.5	38.1	32.1	32.7	30.8	29.7	29.4	29	29.7	27.5	25.9
Chromium	0.0001 to 0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.0001
Cobalt	0.000005 to 0.001	0.1	0.107	0.081	0.0821	0.0814	0.0811	0.0794	0.0777	0.074	0.0772	0.0723	0.0691
Copper	0.00005 to 0.0003	2.39	1.69	2.07	1.89	1.94	1.82	1.73	1.77	1.67	1.84	1.92	1.81
Iron	0.001 to 0.03	5.3	1.89	6.81	2.16	6.03	6.2	6.12	5.96	5.81	5.9	5.24	5.41
Lead	0.000005 to 0.001	<0.001	0.002	0.002	0.000355	0.00194	0.00205	0.00176	0.00185	0.0018	0.0018	0.0015	0.00155
Lithium	0.0005 to 0.005				0.0202	0.0202	0.0202	0.0195	0.0203	0.018	0.019	0.019	0.0182
Magnesium	0.001 to 0.3	6.34	6.26	6.23	5.15	5.31	5.47	4.98	4.88	4.74	4.85	4.35	4.3
Manganese	0.00002 to 0.005	1.02	1.04	0.937	0.787	0.745	0.739	0.712	0.718	0.726		<0.00002	0.656
Mercury	0.00000001 to 0.00005				<0.00001		<0.00001	<0.00001	0.00001	<0.00002	<0.00002		<0.00001
Molybdenum	0.00005 to 0.001	<0.001	<0.001	<0.001	0.00008	0.00128	0.00132	0.00133	0.00134	0.001	0.001	0.001	0.00133
Nickel	0.00002 to 0.001	0.038	0.024	0.016	0.0165	0.0165	0.0163	0.0158	0.0156	0.015	0.016	0.015	0.0144
Phosphorus	0.002 to 0.01												0.0091
Potassium	0.05 to 0.3	1.91	2.03	1.96	1.55	1.61	1.58	1.51	1.52	1.55	1.58	1.91	1.44
Selenium	0.00004 to 0.0005	<0.0005	<0.0005	<0.0005	0.00013	0.00013	0.00012	0.00012	0.00011	0.0001	0.0001	0.0001	0.000116
Silicon	0.1 to 0.5	9.55	9.61	9.64	8.9	9.8	9.9	9	9.6	9.61	9.94	9.2	9.09
Silver	0.000005 to 0.0001	<0.0001	<0.0001	<0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.00002	<0.000005
Sodium	0.05 to 0.3	5.72	4.39	5.12	3.92	4.23	4.32	3.99	3.97	3.88	4.01	3.89	4.06
Strontium	0.00005 to 0.001	0.237	0.244	0.229	0.199	0.195	0.192	0.187	0.184	0.181		0.175	0.172
Sulphur	1.0 to 50.0				38	40	42	37	38	38	37	33	31
Thallium	0.000002 to 0.00005				0.000039	0.00004	0.000037	0.00004	0.000039	<0.00005	<0.00005	<0.00005	0.0000419
Tin	0.00001 to 0.005				0.00033	<0.00001	0.00002	<0.00001	<0.00001	<0.005	<0.005	<0.005	<0.0002
Titanium	0.0005 to 0.01		<0.01	<0.01	0.0008	<0.0005	<0.0005	<0.0005	0.001	<0.005	<0.005	<0.005	<0.0005
Uranium	0.000002 to 0.0001	0.00048	0.00036	0.00055	0.00063	0.00122	0.00121	0.00101	0.00114	0.0011	0.0011	0.0008	0.00101
Vanadium	0.0002 to 0.03	<0.03	<0.03	<0.03	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.005	<0.0002
Zinc	0.0001 to 0.005	0.503	0.496	0.528	0.434	0.444	0.452	0.43	0.427	0.419	0.428	0.505	0.391
Zirconium	0.0001 to 0.005				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001
Total Metals													
Aluminum	0.0002 to 0.006	1.5	4.49	1.44						0.676	0.643	0.95	0.678
Antimony	0.00002 to 0.001	0.0002	0.0014	<0.0005						<0.0005	<0.0005	<0.001	0.000062
Arsenic	0.00002 to 0.0002	0.0016	0.0092	0.0017						0.0007	0.0005	0.0002	0.000705
Barium	0.00002 to 0.002	0.047	0.159	0.029						0.011	0.01	0.012	0.0109
Beryllium	0.00001 to 0.005	<0.005	<0.005	<0.005						0.0013	0.0014	0.0015	0.0013
Bismuth	0.000005 to 0.1	<0.1	<0.1	<0.1						<0.001	<0.001	<0.002	<0.000005
Boron	0.05 to 0.25	<0.1	<0.1	<0.1						<0.05	<0.05	<0.1	<0.05
Cadmium	0.000005 to 0.00005	0.011	0.009	0.0077						0.00684	0.00625	0.00824	0.00623
Calcium	0.05 to 0.25	40.8	45.6	38.8						30.7	28.6	7.4	28.8
Chromium	0.0001 to 0.002	<0.001	0.018	<0.001						<0.001	<0.001	<0.002	<0.0001
Cobalt	0.000005 to 0.001	0.11	0.135	0.084						0.0832	0.0749	0.097	0.0748
Copper	0.00005 to 0.0004									1.98	1.84	2.7	1.96
Iron	0.001 to 0.01	7.18	1.76	7.36						6.64	5.89	7.24	5.76
Lead	0.000005 to 0.001	<0.001	0.125	0.006						0.002	0.0018	0.0031	0.00173
Lithium	0.0005 to 0.01									0.019	0.021	0.02	0.0187
Magnesium	0.001 to 0.25	6.7	8.22	6.45						5.09	0.707	6.4	4.67
Manganese	0.00005 to 0.002	1.08	1.24	0.958								0.928	0.702
Mercury	0.00001 to 0.00005	<0.00001	0.00016	<0.00001						<0.00002	<0.00002	<0.00002	<0.00001
Molybdenum	0.00005 to 0.002	0.003	0.007	<0.001						0.001	0.001	<0.002	0.00135
Nickel	0.00002 to 0.002	0.043	0.051	0.017						0.017	0.015	0.021	0.0158
Phosphorus	0.000002 to 0.01	0.000028	0.000118	0.000023									0.0066
Potassium	0.05 to 0.25									1.58	1.51	2	1.6
Selenium	0.00004 to 0.1	<0.0005	<0.0005	<0.0005						<0.0001	<0.0001	<0.0002	0.000147
Silicon	0.1 to 0.5	10.8	15.3	11						9.85		11.4	10.3
Silver	0.000005 to 0.0001	<0.0001	0.0002	<0.0001						<0.00002	<0.00002	<0.00004	0.0000189
Sodium	0.05 to 0.25									4.37	4.09	1840	4.4
Strontium	0.00005 to 0.002	0.246	0.288	0.238						0.2	0.183	0.13	0.174
Sulphur	3.0 to 50.0									36	34	41	37
Thallium	0.000002 to 0.0001									<0.00005	<0.00005	<0.0001	0.0000418
Tin	0.0002 to 0.01									<0.005	<0.005	<0.01	<0.0002
Titanium	0.0005 to 0.01		0.136	0.013								<0.01	<0.0005
Uranium	0.000002 to 0.0002	0.00114	0.00252	0.00078						0.0012	0.0011	0.0015	0.00108
Vanadium	0.0002 to 0.03	<0.03	<0.03	<0.03						<0.005	<0.005	<0.01	<0.0002
Zinc	0.0001 to 0.01	0.529	0.585	0.559						0.424	0.403	0.64	0.41
Zirconium	0.0001 to 0.001									<0.0005	<0.0005	<0.001	<0.0001
Organics													
Dissolved Organic Carbon													
Total Organic Carbon	0.5 to 5.0	0.9	2	0.8	1.6	2	1.5	0.7	1.1	0.8	1.1	1.2	<5

M:\1\01\00325\17\A\Report\1-2013 Hydrogeology\Appendices\Appendix F - Groundwater Quality Data Tables\[Tables F1-F4 - Updated2014.xlsx]F2 - PROPOSED OPEN PIT AREA

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	94-337 17-Sep-12	94-337 10-Jun-13	94-337 5-Aug-13	94-337 26-Sep-13	94-337 24-May-14	94-337 22-Jul-14	94-337 28-Sep-14	HG10-01 19-Aug-10	HG10-01 14-Sep-10	HG10-01 15-Jul-11	HG10-01 18-Sep-11	HG10-01 28-May-12
Calculated Parameters													
Ion Balance Ratio	0.01	1.1						0.89					0.92
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5	<0.5							<0.5	<0.5			<0.5
Acidity to pH 8.3 (as CaCO3)	0.5	16.2	45.3	20.9					60.4	15			56
Alkalinity (PP as CaCO3)	0.5										<0.5	<0.5	
Alkalinity (Total as CaCO3)	0.5	6.36	6.5	6.4	10.2	5.2	10.1	4.8	110	120	120	120	125
Bicarbonate Alkalinity	0.5		6.5	6.4	10.2	5.2		4.8			150	150	
Carbonate Alkalinity	0.5		<2	<2	<2	<1		<1			<0.5	<0.5	
Conductivity µS/cm	1	240	225	235	229	233	244	233	1750	1700	1630	1610	1610
Hardness as CaCO3 (Dissolved)	0.5	88		83.6	82	87.3	92	84.5	992	1010	970	944	899
Hardness as CaCO3 (Total)	0.5	89.2	90.2								910	1060	917
Hydroxide Alkalinity	0.5		<2	<2	<2	<1		<1			<0.5	<0.5	
pH (pH)	0	5.98	5.99	6.06	6.55	6.11	6.03	5.97	7.04	7.13	7.05	7.18	7.04
Total Dissolved Solids	1.0 to 10.0	184	178	195	184	180	209	178	1500	1500	1500	1400	1380
Total Suspended Solids	1	14.2	16.4	<3	<3	5.7	<3	<3			10	16	5
Turbidity (NTU)	0.1	18.1	21.3	4.06	6.94	8.48	7.5	9.08			21.9	91.5	55.4
Dissolved Anions													
Bromide	0.01 to 0.4	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.4	0.4			<0.05
Chloride	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		0.6	1	1.4	1.4
Fluoride	0.01	1.1	1.2	1.31	1.34	1.23	1.25	1.16	0.58	0.6	0.06	0.67	0.61
Sulphate	0.5 to 5.0	89.4	96.6	97.3	95.6	94.7	97.6	94	880	1000	850	830	900
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 to 0.01	0.032	0.0081	0.0121	0.0106	0.0109	0.0092	0.0097	0.074	0.025	0.054	0.077	0.043
Nitrate (as N)	0.002 to 0.02	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.02	<0.02	<0.002
Nitrate+Nitrite (Dissolved)	0.002 to 0.02	0.0034						<0.001	0.005	0.002	<0.02	<0.02	<0.002
Nitrite (as N)	0.002 to 0.005	0.0078	<0.001	<0.001	<0.001	<0.001	<0.001	0.184	0.008	0.003	0.005	0.01	0.0041
Nitrogen (Total)	0.02	0.135	0.056	<0.05	<0.05	0.063	0.069	0.184	0.03	0.1			0.128
Nitrogen Kjeldahl (Total)	0.02	0.132	0.056	0.053	<0.05	0.063	0.069		0.03	0.1			0.128
Orthophosphate (Dissolved)	0.001 to 0.005	0.0029	<0.001			<0.001		<0.002	0.002	0.001	<0.005		0.0037
Phosphorus Dissolved	0.002 to 0.01		<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.01			
Cyanide													
Cyanide (SAD)	0.001							<0.005					
Cyanide (WAD)	0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005			<0.0005
Cyanide+Thiocyanate	0.0005 to 0.001	<0.0005						<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Metals													
Aluminum	0.0002 to 0.003	0.657	0.562	0.635	0.632	0.546	0.579	0.611	0.035	0.032	0.023	0.021	0.0271
Antimony	0.00002 to 0.0005	0.00006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0005	<0.0005	<0.0001
Arsenic	0.00002 to 0.001	0.000636	0.00073	0.00063	0.0006	0.00064	0.00066	0.00063	0.0172	0.0195	0.0158	0.0163	0.0168
Barium	0.00002 to 0.001	0.0156	0.0119	0.0118	0.0117	0.0124	0.0116	0.0115	0.0086	0.008		0.005	0.00745
Beryllium	0.00001 to 0.005	0.00131	0.00115	0.00126	0.00126	0.00117	0.00126	0.00127	<0.00005	<0.00005	<0.0001	<0.0001	<0.00005
Bismuth	0.000005 to 0.1	<0.000005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00003	<0.00003	<0.001	<0.001	<0.000025
Boron	0.05 to 0.3	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.3	<0.3	<0.05	<0.05	<0.25
Cadmium	0.000005 to 0.00003	0.00586	0.00587	0.00589	0.00581	0.00561	0.00599	0.00595	0.0001	0.00009	<0.00001	0.00003	<0.000025
Calcium	0.05 to 0.3	28.2	28.9	26.5	26	27.8	29.2	26.8	318	324	312	306	289
Chromium	0.0001 to 0.001	0.00519	0.00369	0.00184	0.0018	0.0035	0.00116	0.00195	<0.0005	<0.0005	<0.001	<0.001	<0.0005
Cobalt	0.000005 to 0.001	0.0708	0.0681	0.0694	0.0663	0.0661	0.0693	0.0705	0.0399	0.0403	0.0335	0.0271	0.0313
Copper	0.00005 to 0.0003	1.85	1.69	1.87	1.88	1.71	1.8	1.93	<0.0003	0.0003	<0.0002	0.0004	0.00203
Iron	0.001 to 0.03	5.78	5.52	5.32	5.17	5.32	5.69	5.26	28	28.1	23.5	22.3	22.9
Lead	0.000005 to 0.001	0.00112	0.00661	0.00143	0.00157	0.00213	0.000952	0.00165	0.00018	0.00017	<0.0002	<0.0002	0.000093
Lithium	0.0005 to 0.005	0.019	0.0165	0.0208	0.0185	0.0168	0.0176	0.0177	0.007	0.007	0.007	0.005	0.0081
Magnesium	0.001 to 0.3	4.26	4.41	4.25	4.13	4.35	4.64	4.25	47.7	47.9	46.5	44.1	43
Manganese	0.00002 to 0.005	0.668	0.638	0.626	0.625	0.658	0.662	0.624	1.12	1.17		<0.00002	0.959
Mercury	0.00000001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00002		<0.00005
Molybdenum	0.00005 to 0.001	0.00202	0.00187	0.0013	0.00136	0.00166	0.0014	0.00135	0.0167	0.0171	0.017	0.013	0.0157
Nickel	0.00002 to 0.001	0.0256	0.0185	0.0154	0.0159	0.0174	0.0152	0.0164	0.008	0.0041	0.003	0.003	0.00354
Phosphorus	0.002 to 0.01	0.0039	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					0.019
Potassium	0.05 to 0.3	1.52	1.74	1.54	1.5	1.57	1.57	1.47	3.4	3.7	3.68	3.38	3.26
Selenium	0.00004 to 0.0005	0.000178	0.00012	0.00011	0.00012	<0.0001	0.0001	0.00011	<0.0002	<0.0002	<0.0001	<0.0001	<0.0002
Silicon	0.1 to 0.5	10.2	9.3	9.34	9.5	9.36	9.54	9.48	4.3	4.8	4.67	4.3	4.33
Silver	0.000005 to 0.0001	<0.000005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00003	<0.00003	<0.00002	<0.00002	<0.000025
Sodium	0.05 to 0.3	4.2	3.83	4.63	4.22	3.89	4.34	4.32	14.1	14.5	13.9	13.3	13.9
Strontium	0.00005 to 0.001	0.175	0.167	0.159	0.166	0.166	0.173	0.161	1.71	1.65		1.69	1.67
Sulphur	1.0 to 50.0	32	32.5	31.4	32	31.5	32.9	32.2	311	332	311	288	280
Thallium	0.000002 to 0.00005	0.000041	0.000043	0.000039	0.000039	0.000041	0.000037	0.000041	0.00002	0.00001	<0.00005	<0.00005	<0.00001
Tin	0.00001 to 0.005	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.005	<0.005	<0.001
Titanium	0.0005 to 0.01	<0.0005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.003	0.006	<0.005	<0.005	<0.0025
Uranium	0.000002 to 0.0001	0.000931	0.00103	0.000955	0.000897	0.000952	0.001	0.00094	0.0489	0.0393	0.0398	0.0324	0.0364
Vanadium	0.0002 to 0.03	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001
Zinc	0.0001 to 0.005	0.407	0.382	0.489	0.378	0.359	0.391	0.392	0.156	0.159	0.08	0.096	0.0699
Zirconium	0.0001 to 0.005	<0.0001							<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total Metals													
Aluminum	0.0002 to 0.006	0.793	0.787	0.67	0.705	0.572	0.591	0.598			0.022	0.025	0.0284
Antimony	0.00002 to 0.001	0.000127	0.00026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			<0.0005	<0.0005	<0.0001
Arsenic	0.00002 to 0.0002	0.000934	0.00117	0.00069	0.00071	0.00075	0.00071	0.00062			0.0172	0.018	0.0187
Barium	0.00002 to 0.002	0.0214	0.0161	0.0124	0.0133	0.0127	0.012	0.0116			0.006	0.006	0.00928
Beryllium	0.00001 to 0.005	0.00131	0.00116	0.00129	0.00132	0.00122	0.00119	0.00122			<0.0001	<0.0001	<0.00005
Bismuth	0.000005 to 0.1	0.000007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			<0.001	<0.001	<0.000025
Boron	0.05 to 0.25	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.01			<0.05	<0.05	<0.25
Cadmium	0.000005 to 0.00005	0.0057	0.00581	0.00621	0.00603	0.00573	0.00592	0.00594			<0.00001	<0.00005	<0.000025
Calcium	0.05 to 0.25	28.1	26.9	30.3	27.3	29.3	28.8	26.4			289	339	293
Chromium	0.0001 to 0.002	0.0456	0.00893	0.00396	0.00345	0.00561	0.00156	0.0025			<0.001	<0.001	<0.0005
Cobalt	0.000005 to 0.001	0.0725	0.0685	0.0751	0.0692	0.0688	0.0708	0.0701			0.0321	0.0345	0.0358
Copper	0.00005 to 0.0004	2.83	2.05	1.98	2.05	1.89	1.88	1.93			0.0002	<0.0002	0.00099
Iron	0.001 to 0.01	6.48	5.74	5.74	5.62	5.69	5.61	5.25			21.6	24.3	23.5
Lead	0.000005 to 0.001	0.00383	0.0139	0.0016	0.00366	0.00236	0.00104	0.00166			<0.0002	<0.0002	0.000172
Lithium	0.0005 to 0.01	0.019	0.0167	0.0213	0.0192	0.017	0.0174	0.0171			0.008	0.007	0.0074
Magnesium	0.001 to 0.25	4.63	4.58	4.61	4.35	4.58	4.55	4.22			45.8	51.8	45.2
Manganese	0.00005 to 0.002	0.688	0.642	0.671	0.663	0.651	0.671	0.614				1.05	1.03
Mercury	0.00001 to 0.00005	<0.00001	<0.00001	<0.00001	0.000011	<0.00001	<0.00001	<0.00001			<0.00002	<0.00002	<0.00005
Molybdenum	0.00005 to 0.002	0.0043	0.00276	0.00163	0.0017	0.00197	0.00155	0.00139			0.016	0.02	0.0163
Nickel	0.00002 to 0.002	0.0389	0.0204	0.0176	0.0171	0.019	0.0159	0.016			0.003	0.003	0.0056
Phosphorus	0.000002 to 0.01	0.0132	<0.05	<0.05	<0.05	<0.05	<0.00005	<0.05					<0.01
Potassium	0.05 to 0.25	1.63	2.04	1.77	1.63	1.5	1.53	1.46			3.46	3.86	3.45
Selenium	0.00004 to 0.1	0.000177	0.00013	0.00011	0.00012	0.00011	<0.0001	0.00011			<0.0001	<0.0001	<0.0002
Silicon	0.1 to 0.5	10.2	9.74	9.86	9.89	9.97	9.44	9.4				4.8	4.27
Silver	0.000005 to 0.0001	0.000017	0.00008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			<0.00002	<0.00002	<0.000025
Sodium	0.05 to 0.25	4.47	3.86	4.73	4.35	4.15	4.26	4.33			14	15.7	14.9
Strontium	0.00005 to 0.002	0.179	0.169	0.166	0.166	0.173	0.175	0.174	0.165		1.68	1.91	1.69
Sulphur	3.0 to 50.0	34	31.9	33.9	32.9	33.6	32.8	32.3			301	325	294
Thallium	0.000002 to 0.0001	0.000044	0.000049	0.000044	0.000039	0.000041	0.000039	0.000046			<0.00005	<0.00005	<0.00001
Tin	0.0002 to 0.01	0.00054	0.00024	<0.0001	0.00014	<0.0001	<0.0001	<0.0001			<0.005	<0.005	<0.001
Titanium	0.0005 to 0.01	0.0049	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.005	<0.0025
Uranium	0.000002 to 0.0002	0.00121	0.0014	0.00102	0.00101	0.00101	0.00109	0.000975			0.0366	0.041	0.0352
Vanadium	0.0002 to 0.03	0.0004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.005	<0.005	<0.001
Zinc	0.0001 to 0.01	0.43	0.37	0.485	0.383	0.36	0.386	0.375			0.076	0.098	0.0973
Zirconium	0.0001 to 0.001	<0.0001									<0.0005	<0.0005	<0.0005
Organics													
Dissolved Organic Carbon								0.95					
Total Organic Carbon	0.5 to 5.0	1.2	1.07	0.82	1.11	0.94	0.93	1.07	7.1	1.7	1.1	1.1	<5

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	HG10-01 10-Jun-13	HG10-01 4-Aug-13	HG10-01 26-Sep-13	HG10-01 23-May-14	HG10-01 22-Jul-14	HG10-01 28-Sep-14	HG10-02 20-Aug-10	HG10-02 14-Sep-10	HG10-02 16-Jul-11	HG10-02 18-Sep-11	HG10-02 27-May-12	HG10-02 4-Aug-13
Calculated Parameters													
Ion Balance Ratio	0.01						0.94					1	
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5							<0.5	<0.5			<0.5	
Acidity to pH 8.3 (as CaCO3)	0.5	29.1	35.3					12.6	5.2			16.2	15.3
Alkalinity (PP as CaCO3)	0.5									<0.5	<0.5		
Alkalinity (Total as CaCO3)	0.5	147	137	142	126	144	128	170	180	170	160	153	167
Bicarbonate Alkalinity	0.5	147	137	142	126		128			200	200		167
Carbonate Alkalinity	0.5	<2	<2	<2	<2		<1			<0.5	<0.5		<2
Conductivity µS/cm	1	1560	1570	1590	1520	1590	1590	1830	1800	1710	1670	1610	1550
Hardness as CaCO3 (Dissolved)	0.5		1010	964	959	956	982	1050	1040	1040	935	936	958
Hardness as CaCO3 (Total)	0.5	1010								921	1080	999	
Hydroxide Alkalinity	0.5	<2	<2	<2	<2		<1			<0.5	<0.5		<2
pH (pH)	0	6.92	7.05	7.42	7.15	7.09	7.29	7.36	7.55	7.46	7.5	7.58	7.45
Total Dissolved Solids	1.0 to 10.0	1420	1460	1460	1370	1380	1430	1600	1600	1400	1400	1350	1440
Total Suspended Solids	1	21.8	10.6	5.2	13.6	6.5	8			17	18	8.6	19.6
Turbidity (NTU)	0.1	94.7	14.2	9.3	2.32	26.8	32.8			43.9	86.4	126	32
Dissolved Anions													
Bromide	0.01 to 0.4	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.4	<0.4			<0.05	<1
Chloride	0.5	<10	<10	<5	<5	<5	<5	<0.5	<0.5	0.8	1.9	1.2	<10
Fluoride	0.01	0.82	0.92	0.58	0.58	0.75	0.49	0.57	0.64	0.65	0.68	0.61	1.12
Sulphate	0.5 to 5.0	907	884	862	832	871	852	890	1100	880	840	812	840
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 to 0.01	0.0281	0.0359	0.0307	0.0324	0.0321	0.0344	0.046	0.024	0.068	0.056	0.047	0.0349
Nitrate (as N)	0.002 to 0.02	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	0.002	<0.002	<0.02	0.08	<0.002	<0.1
Nitrate+Nitrite (Dissolved)	0.002 to 0.02						<0.01	0.002	<0.002	<0.02	0.08	<0.002	
Nitrite (as N)	0.002 to 0.005	<0.02	0.022	<0.01	<0.01	<0.01	0.092	<0.002	<0.002	<0.005	<0.005	<0.002	0.028
Nitrogen (Total)	0.02	<0.11	<0.05	<0.05	0.086	0.085	0.092	0.05	0.11			0.102	<0.05
Nitrogen Kjeldahl (Total)	0.02	0.091	0.056	<0.05	0.086	0.085		0.04	0.11			0.102	0.082
Orthophosphate (Dissolved)	0.001 to 0.005	<0.001			<0.01		<0.002	0.002	0.001	0.31		0.0048	
Phosphorus Dissolved	0.002 to 0.01	<0.02	<0.02	<0.02	<0.02	<0.002	<0.02	<0.01	0.02				0.0036
Cyanide													
Cyanide (SAD)	0.001						<0.005						
Cyanide (WAD)	0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	0.0007			<0.0005	<0.005
Cyanide+Thiocyanate	0.0005 to 0.001						<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Dissolved Metals													
Aluminum	0.0002 to 0.003	0.0175	0.0167	0.016	0.018	0.0223	0.0184	0.008	0.079	0.012	0.011	0.0087	0.0044
Antimony	0.00002 to 0.0005	<0.0001	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002	0.0002	<0.0001	<0.0005	<0.0005	<0.0001	<0.0001
Arsenic	0.00002 to 0.001	0.0195	0.0189	0.0179	0.0182	0.0189	0.018	0.0143	0.0149	0.0132	0.0125	0.0147	0.0129
Barium	0.00002 to 0.001	0.00585	0.00576	0.00536	0.00547	0.00596	0.00562	0.0061	0.0067		0.004	0.00502	0.00427
Beryllium	0.00001 to 0.005	<0.0001	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002	0.00006	0.00008	<0.0001	<0.0001	0.000088	<0.0001
Bismuth	0.000005 to 0.1	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.00003	0.00004	<0.001	<0.001	<0.000025	<0.0005
Boron	0.05 to 0.3	<0.01	<0.02	<0.01	<0.01	<0.02	<0.02	<0.3	<0.3	<0.05	<0.05	<0.25	<0.01
Cadmium	0.000005 to 0.00003	<0.00001	<0.00002	<0.00001	<0.00001	0.000023	<0.00002	0.00009	0.00013	0.00003	<0.00003	<0.000025	<0.00001
Calcium	0.05 to 0.3	327	324	307	310	308	317	335	335	337	303	302	306
Chromium	0.0001 to 0.001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002	<0.0005	<0.0005	<0.001	<0.001	<0.0005	0.00036
Cobalt	0.000005 to 0.001	0.0302	0.0284	0.0277	0.0315	0.0339	0.0304	0.0174	0.0187	0.0196	0.0155	0.0184	0.0179
Copper	0.00005 to 0.0003	0.00054	<0.0004	<0.0002	<0.0002	<0.0004	<0.0004	<0.0003	0.001	0.0004	0.0002	0.00064	<0.0002
Iron	0.001 to 0.03	21.6	21.3	20.8	23.3	24	21.6	11.1	10.9	12	11.5	11.9	12.3
Lead	0.000005 to 0.001	<0.00005	<0.0001	<0.00005	0.000061	<0.0001	<0.0001	0.00013	0.00138	<0.0002	<0.0002	0.000035	<0.00005
Lithium	0.0005 to 0.005	0.00557	0.0056	0.00617	0.0063	0.0064	0.006	0.003	<0.003	<0.005	<0.005	0.0041	0.00157
Magnesium	0.001 to 0.3	47.8	48.7	48.1	44.9	45.7	46.2	51.8	49.8	48.2	43.5	44.2	46.9
Manganese	0.00002 to 0.005	0.97	0.873	0.863	0.973	1.04	0.878	0.656	0.637		<0.00002	0.64	0.625
Mercury	0.00000001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00002		<0.00005	<0.00001
Molybdenum	0.00005 to 0.001	0.0171	0.017	0.0167	0.0165	0.0165	0.0175	0.0338	0.0325	0.032	0.021	0.0257	0.0247
Nickel	0.00002 to 0.001	0.00275	0.0024	0.0025	0.0031	0.0033	0.0027	0.0018	0.0011	0.001	<0.001	0.00108	0.00133
Phosphorus	0.002 to 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					0.023	<0.05
Potassium	0.05 to 0.3	3.76	3.72	3.54	3.5	3.52	3.56	3.6	3.4	3.6	3.14	3.09	3.34
Selenium	0.00004 to 0.0005	<0.0001	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002	0.0003	<0.0002	<0.0001	<0.0001	<0.0002	<0.0001
Silicon	0.1 to 0.5	4.11	4.17	4.29	4.53	4.67	4.45	3.9	4.6	4.81	4.1	4.31	4.2
Silver	0.000005 to 0.0001	<0.00001	<0.00002	<0.00001	<0.00001	<0.00002	<0.00002	<0.00003	0.00003	<0.00002	<0.00002	<0.000025	<0.00001
Sodium	0.05 to 0.3	13	14.8	14.2	12.6	13.3	14.4	17.8	16.9	15.9	14.6	15.7	15.8
Strontium	0.00005 to 0.001	1.75	1.6	1.69	1.56	1.62	1.69	1.85	1.69		1.62	1.58	1.41
Sulphur	1.0 to 50.0	295	278	285	259	267	280	332	353	322	286	277	263
Thallium	0.000002 to 0.00005	<0.00001	<0.00002	<0.00001	<0.00001	<0.00002	<0.00002	0.00003	0.00004	<0.00005	<0.00005	0.000025	0.000027
Tin	0.00001 to 0.005	<0.0001	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002	<0.00005	<0.00005	<0.005	<0.005	<0.001	<0.0001
Titanium	0.0005 to 0.01	<0.01	<0.02	<0.01	<0.01	<0.02	<0.02	0.003	0.008	<0.005	<0.005	<0.0025	<0.01
Uranium	0.000002 to 0.0001	0.0377	0.0363	0.0372	0.036	0.0325	0.0383	0.0668	0.0656	0.0621	0.0411	0.0495	0.0399
Vanadium	0.0002 to 0.03	<0.001	<0.002	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001
Zinc	0.0001 to 0.005	0.0874	0.0886	0.0886	0.095	0.104	0.0966	0.038	0.0386	0.047	0.055	0.0259	0.053
Zirconium	0.0001 to 0.005							<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Total Metals													
Aluminum	0.0002 to 0.006	0.0174	0.0194	0.0178	0.0199	0.0234	0.0191			0.027	0.031	0.0169	0.124
Antimony	0.00002 to 0.001	<0.0001	<0.0002	<0.0001	0.0001	<0.0002	<0.0002			<0.0005	<0.0005	<0.0001	<0.0001
Arsenic	0.00002 to 0.0002	0.0201	0.0192	0.018	0.019	0.0199	0.0179			0.0135	0.0146	0.0144	0.0187
Barium	0.00002 to 0.002	0.00563	0.00582	0.00552	0.00559	0.00597	0.00569			0.005	0.006	0.00536	0.00515
Beryllium	0.00001 to 0.005	<0.0001	<0.0002	<0.0001	0.00013	<0.0002	<0.0002			<0.0001	<0.0001	0.000113	0.00012
Bismuth	0.000005 to 0.1	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001			<0.001	<0.001	<0.000025	<0.0005
Boron	0.05 to 0.25	0.011	<0.02	0.011	0.011	<0.02	<0.02			<0.05	<0.05	<0.25	<0.01
Cadmium	0.000005 to 0.00005	<0.00001	<0.00002	<0.00001	0.000016	<0.00002	<0.00002			0.00002	<0.00005	0.000049	0.000055
Calcium	0.05 to 0.25	310	329	310	311	311	306			292	349	322	300
Chromium	0.0001 to 0.002	<0.0001	<0.0002	<0.0001	0.00015	<0.0002	<0.0002			<0.001	<0.001	<0.0005	0.00243
Cobalt	0.000005 to 0.001	0.0305	0.0302	0.0284	0.0326	0.0351	0.0306			0.0176	0.0198	0.02	0.0193
Copper	0.00005 to 0.0004	0.00099	<0.001	<0.0005	<0.0005	<0.001	<0.001			0.0006	0.0004	0.0005	0.00184
Iron	0.001 to 0.01	21.3	22.1	21.3	23.7	24.6	20.9			10.6	13.3	12.6	13.1
Lead	0.000005 to 0.001	<0.00005	<0.0001	<0.00005	0.000111	<0.0001	<0.0001			<0.0002	0.0002	0.000194	0.0023
Lithium	0.0005 to 0.01	0.00604	0.0058	0.00625	0.00703	0.0065	0.0061			<0.005	<0.005	0.004	0.00195
Magnesium	0.001 to 0.25	47.6	49.8	48.7	45.2	46.3	46.4			0.628	50.9	47.4	46.6
Manganese	0.00005 to 0.002	0.967	0.909	0.9	1.02	1.08	0.886				0.723	0.677	0.648
Mercury	0.00001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			<0.00002	<0.00002	<0.00005	<0.00001
Molybdenum	0.00005 to 0.002	0.0178	0.0176	0.0172	0.0172	0.0164	0.0171			0.029	0.034	0.0275	0.028
Nickel	0.00002 to 0.002	0.00275	0.0026	0.00273	0.00321	0.0034	0.0026			0.001	0.001	0.00106	0.00236
Phosphorus	0.000002 to 0.01	<0.05	<0.05	<0.05	<0.05	<0.00005	<0.05					<0.01	<0.05
Potassium	0.05 to 0.25	4.28	3.96	3.66	3.53	3.61	3.45			3.13	3.63	3.39	3.35
Selenium	0.00004 to 0.1	<0.0001	<0.0002	<0.0001	0.00015	<0.0002	<0.0002			<0.0001	<0.0001	<0.0002	<0.0001
Silicon	0.1 to 0.5	4.09	4.33	4.31	4.62	4.78	4.29				4.7	4.69	4.4
Silver	0.000005 to 0.0001	<0.00001	<0.00002	<0.00001	0.000011	<0.00002	<0.00002			<0.00002	<0.00002	<0.000025	0.000019
Sodium	0.05 to 0.25	13.1	16	14.3	13.3	13.7	14.5			14.9	17.1	16.9	16.1
Strontium	0.00005 to 0.002	1.79	1.67	1.7	1.66	1.6	1.65			1.63	1.86	1.62	1.56
Sulphur	3.0 to 50.0	294	296	296	265	278	284			283	322	299	279
Thallium	0.000002 to 0.0001	<0.00001	<0.00002	<0.00001	0.000018	<0.00002	<0.00002			<0.00005	<0.00005	0.000054	0.000267
Tin	0.0002 to 0.01	<0.0001	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002			<0.005	<0.005	<0.001	0.0005
Titanium	0.0005 to 0.01	<0.01	<0.02	<0.01	<0.01	<0.02	<0.02				<0.005	<0.0025	<0.01
Uranium	0.000002 to 0.0002	0.037	0.0392	0.0392	0.0366	0.0327	0.0384			0.0553	0.0531	0.0492	0.0445
Vanadium	0.0002 to 0.03	<0.001	<0.002	<0.001	<0.001	<0.002	<0.002			<0.005	<0.005	<0.001	<0.001
Zinc	0.0001 to 0.01	0.0876	0.0929	0.0905	0.0986	0.105	0.0975			0.078	0.103	0.057	0.359
Zirconium	0.0001 to 0.001									<0.0005	<0.0005	<0.0005	
Organics													
Dissolved Organic Carbon							1.14						
Total Organic Carbon	0.5 to 5.0	1.05	0.94	1.08	0.97	1.05	1.18	4.1	1.5	1.7	1	<5	1.28

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	HG10-02 26-Sep-13	HG10-02 23-May-14	HG10-02 22-Jul-14	HG10-02 28-Sep-14	HG10-04 19-Aug-10	HG10-04 13-Sep-10	HG10-04 22-May-11	HG10-04 15-Jul-11	HG10-04 18-Sep-11	HG10-04 28-May-12	HG10-04 17-Sep-12	HG10-04 12-Jun-13
Calculated Parameters													
Ion Balance Ratio	0.01				0.97						1.1	1.3	
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5					<0.5	<0.5				<0.5	<0.5	
Acidity to pH 8.3 (as CaCO3)	0.5					40.9	7.4				57.2	49.9	
Alkalinity (PP as CaCO3)	0.5							<0.5	<0.5	<0.5			
Alkalinity (Total as CaCO3)	0.5	175	166	176	158	88	120	98	120	120	93.2	107	94.9
Bicarbonate Alkalinity	0.5	175	166		158			120	150	140			94.9
Carbonate Alkalinity	0.5	<2	<2		<1			<0.5	<0.5	<0.5			<1
Conductivity µS/cm	1	1590	1510	1570	1580	812	885	885	955	937	897	909	852
Hardness as CaCO3 (Dissolved)	0.5	975	978	940	960	419	425	410	503	482	447	504	457
Hardness as CaCO3 (Total)	0.5							476	492	551	458	471	
Hydroxide Alkalinity	0.5	<2	<2		<1			<0.5	<0.5	<0.5			<1
pH (pH)	0	7.67	7.96	7.36	7.51	7.25	7.09	7.24	6.91	7.06	6.82	6.84	6.65
Total Dissolved Solids	1.0 to 10.0	1440	1360	1300	1380	550	650	660	750	700	676	696	698
Total Suspended Solids	1	12	18.6	8.8	17.3			18	23	42	21	32.8	25.2
Turbidity (NTU)	0.1	39.7	9.39	44.2	40.1			100	41.1	187	163	186	78.9
Dissolved Anions													
Bromide	0.01 to 0.4	<0.5	<0.5	<0.5	<0.5	<0.4	<0.4				<0.05	<0.05	<0.5
Chloride	0.5	<5	<5	<5	<5		1.9	1.8	0.9	1.5	2.7	1.4	<5
Fluoride	0.01	0.6	0.6	0.71	0.52	0.45	0.42	0.45	0.46	0.03	0.39	0.43	0.53
Sulphate	0.5 to 5.0	851	823	836	810	320	390	370	380	350	396	350	390
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 to 0.01	0.0335	0.0312	0.0314	0.0325	0.097	0.055	0.053	0.085	0.074	0.06	0.059	0.0536
Nitrate (as N)	0.002 to 0.02	<0.05	<0.05	<0.05	<0.05	<0.002	<0.002	<0.02	<0.02	<0.02	<0.002	0.0187	<0.05
Nitrate+Nitrite (Dissolved)	0.002 to 0.02				<0.01	0.004	0.004	<0.02	<0.02	<0.02	0.0052	0.0293	
Nitrite (as N)	0.002 to 0.005	<0.01	<0.01	<0.01	0.166	0.003	0.003	<0.005	<0.005	0.009	0.0043	0.0106	<0.01
Nitrogen (Total)	0.02	0.056	0.083	0.101	0.166	0.21	0.25				0.175	0.665	<0.05
Nitrogen Kjeldahl (Total)	0.02	0.058	0.083	0.101		0.21	0.25				0.17	0.636	0.107
Orthophosphate (Dissolved)	0.001 to 0.005		<0.01		<0.002	0.001	0.001	0.024	0.2		0.0024	0.0032	<0.001
Phosphorus Dissolved	0.002 to 0.01	<0.02	<0.002	<0.002	<0.002	0.002	<0.01						0.025
Cyanide													
Cyanide (SAD)	0.001				<0.005								
Cyanide (WAD)	0.0005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005				<0.0005	<0.0005	<0.005
Cyanide+Thiocyanate	0.0005 to 0.001				<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Dissolved Metals													
Aluminum	0.0002 to 0.003	0.0049	0.004	0.0049	0.0055	0.0186	0.014	0.022	0.018	0.015	0.0327	0.0216	0.0234
Antimony	0.00002 to 0.0005	<0.0001	<0.0001	<0.0002	<0.0002	0.00007	<0.0001	<0.0005	<0.0005	<0.0005	0.000047	0.000024	<0.0001
Arsenic	0.00002 to 0.001	0.0129	0.013	0.0134	0.0129	0.00652	0.0018	0.0018	0.0052	0.0061	0.00215	0.00254	0.00191
Barium	0.00002 to 0.001	0.00422	0.00449	0.00471	0.00441	0.0201	0.02	0.01		0.01	0.00973	0.011	0.0102
Beryllium	0.00001 to 0.005	<0.0001	<0.0001	<0.0002	<0.0002	0.0002	0.00016	0.0003	0.0003	0.0002	0.000419	0.000284	0.00033
Bismuth	0.000005 to 0.1	<0.0005	<0.0005	<0.001	<0.001	<0.000005	<0.00003	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.0005
Boron	0.05 to 0.3	<0.01	<0.01	<0.02	<0.02	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
Cadmium	0.000005 to 0.00003	0.000014	<0.00001	<0.00002	<0.00002	0.0234	0.0103	0.00177	0.00154	0.00144	0.00112	0.000727	0.000788
Calcium	0.05 to 0.3	312	319	303	312	131	130	126	157	151	139	163	143
Chromium	0.0001 to 0.001	0.00027	0.00096	0.0002	<0.0002	<0.0001	<0.0005	<0.001	<0.001	<0.001	0.00012	0.00221	0.00012
Cobalt	0.000005 to 0.001	0.0179	0.0187	0.0188	0.0191	0.0313	0.0327	0.0343	0.0392	0.0313	0.0394	0.0368	0.0383
Copper	0.00005 to 0.0003	0.00092	<0.0002	<0.0004	<0.0004	0.00086	0.0012	0.0011	<0.0002	0.0002	0.00108	0.0788	0.00043
Iron	0.001 to 0.03	12.3	12.6	12.1	12	26.6	28.1	32.1	36.1	34.7	38.8	43.5	35.2
Lead	0.000005 to 0.001	<0.00005	0.000081	<0.0001	<0.0001	0.000539	0.0002	0.0005	0.0006	0.0003	0.000795	0.000143	0.000938
Lithium	0.0005 to 0.005	0.00279	0.00337	0.0027	0.0034	0.0028	<0.003	<0.005	<0.005	<0.005	0.0024	0.00186	0.00198
Magnesium	0.001 to 0.3	47.6	44.2	44.3	44	22.3	24.3	23.2	26.9	25.7	24.5	23.5	24.6
Manganese	0.00002 to 0.005	0.634	0.661	0.661	0.65	3.07	3.48	3.7		<0.00002	4.24	4.06	3.85
Mercury	0.00000001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00002	<0.00002		<0.00001	<0.00000001	<0.00001
Molybdenum	0.00005 to 0.001	0.0263	0.0265	0.0262	0.0269	0.00042	0.0009	<0.001	<0.001	<0.001	0.000196	0.000748	0.000126
Nickel	0.00002 to 0.001	0.00109	0.00243	0.0012	0.0011	0.00444	0.0041	0.002	0.003	0.003	0.00252	0.00873	0.00288
Phosphorus	0.002 to 0.01	<0.05	<0.05	<0.05	<0.05						0.0083	<0.002	<0.05
Potassium	0.05 to 0.3	3.43	3.29	3.24	3.3	2.58	2.6	2.35	2.54	2.37	2.4	2.39	2.58
Selenium	0.00004 to 0.0005	<0.0001	<0.0001	<0.0002	<0.0002	0.00007	<0.0002	<0.0001	<0.0001	<0.0001	0.000106	0.000165	<0.0001
Silicon	0.1 to 0.5	4.44	4.43	4.27	4.37	3.7	4	3.61	4.39	3.8	3.82	4.34	3.81
Silver	0.000005 to 0.0001	<0.00001	<0.00001	<0.00002	<0.00002	<0.000005	<0.00003	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.00001
Sodium	0.05 to 0.3	14.9	13.7	14.3	15	8.34	10.6	6.74	7.73	7.34	7.71	6.96	7.59
Strontium	0.00005 to 0.001	1.55	1.6	1.64	1.62	0.38	0.369	0.357		0.415	0.379	0.416	0.365
Sulphur	1.0 to 50.0	282	254	256	265	123	133	135	142	127	136	129	122
Thallium	0.000002 to 0.00005	0.000026	0.000031	0.000029	0.000027	0.000022	0.00002	<0.00005	<0.00005	<0.00005	0.0000197	0.000017	0.000017
Tin	0.00001 to 0.005	<0.0001	<0.0001	<0.0002	<0.0002	<0.00001	0.00006	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0001
Titanium	0.0005 to 0.01	<0.01	<0.01	<0.02	<0.02	<0.0005	0.004	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.01
Uranium	0.000002 to 0.0001	0.0441	0.0442	0.0414	0.0434	0.0259	0.0221	0.0109	0.0163	0.0158	0.0106	0.012	0.00669
Vanadium	0.0002 to 0.03	<0.001	<0.001	<0.002	<0.002	<0.0002	<0.001	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.001
Zinc	0.0001 to 0.005	0.0355	0.0311	0.0513	0.0368	0.0937	0.107	0.12	0.119	0.154	0.131	0.153	0.138
Zirconium	0.0001 to 0.005					<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	
Total Metals													
Aluminum	0.0002 to 0.006	0.0199	0.0157	0.0095	0.0094			0.027	0.023	0.027	0.0495	0.0495	0.0584
Antimony	0.00002 to 0.001	<0.0001	<0.0001	<0.0002	<0.0002			<0.0005	<0.0005	<0.0005	0.000037	0.000033	<0.0001
Arsenic	0.00002 to 0.0002	0.0138	0.0142	0.0137	0.0136			0.002	0.0056	0.0066	0.0021	0.00287	0.002
Barium	0.00002 to 0.002	0.00449	0.00494	0.00473	0.00435			0.011	0.012	0.014	0.00978	0.0126	0.0103
Beryllium	0.00001 to 0.005	<0.0001	<0.0001	<0.0002	<0.0002			0.0003	0.0003	0.0002	0.000378	0.000306	0.00035
Bismuth	0.000005 to 0.1	<0.0005	<0.0005	<0.001	<0.001			<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.0005
Boron	0.05 to 0.25	0.01	<0.01	<0.02	<0.02			<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
Cadmium	0.000005 to 0.00005	0.000027	0.000017	<0.00002	<0.00002			0.00185	0.00158	0.00177	0.00148	0.00113	0.0008
Calcium	0.05 to 0.25	306	318	312	308			147	152	170	141	146	145
Chromium	0.0001 to 0.002	0.00054	0.00222	0.00053	0.00032			<0.001	<0.001	<0.001	0.00013	0.0199	0.00032
Cobalt	0.000005 to 0.001	0.0181	0.0189	0.0186	0.019			0.0392	0.038	0.0413	0.0404	0.0386	0.04
Copper	0.00005 to 0.0004	0.0029	0.00095	<0.001	<0.001			0.0003	0.0004	0.0007	0.00116	0.17	0.00096
Iron	0.001 to 0.01	12.2	12.7	12.5	11.9			38.5	35.8	39	40	39.3	36.1
Lead	0.000005 to 0.001	0.000266	0.000225	<0.0001	<0.0001			0.0006	0.0007	0.0005	0.00101	0.000861	0.00118
Lithium	0.0005 to 0.01	0.00296	0.00334	0.0027	0.0038			<0.005	<0.005	<0.005	0.00211	0.00199	0.00234
Magnesium	0.001 to 0.25	46.7	43.8	45.2	44.2			26.6	27.4	30.7	26	26	25.7
Manganese	0.00005 to 0.002	0.642	0.657	0.647	0.652					4.77	4.22	4.29	4
Mercury	0.00001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001			<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 to 0.002	0.0274	0.0271	0.0254	0.0271			<0.001	<0.001	<0.001	0.000345	0.00244	0.000208
Nickel	0.00002 to 0.002	0.00121	0.00373	0.0013	0.001			0.003	0.003	0.003	0.00253	0.0132	0.00304
Phosphorus	0.000002 to 0.01	<0.05	<0.05	<0.00005	<0.05						0.0066	0.0058	<0.05
Potassium	0.05 to 0.25	3.44	3.34	3.37	3.26			2.51	2.49	2.85	2.43	2.57	2.81
Selenium	0.00004 to 0.1	<0.0001	<0.0001	<0.0002	<0.0002			<0.0001	<0.0001	<0.0001	0.0001	0.000143	<0.0001
Silicon	0.1 to 0.5	4.37	4.47	4.43	4.34			4.33		4.4	3.93	3.91	3.98
Silver	0.000005 to 0.0001	0.000011	0.000012	0.000693	<0.00002			<0.00002	<0.00002	<0.00002	<0.000005	0.000006	<0.00001
Sodium	0.05 to 0.25	15.1	14.1	14.1	15			7.8	7.86	9.01	7.94	7.74	8.03
Strontium	0.00005 to 0.002	1.6	1.65	1.58	1.6			0.402	0.421	0.484	0.379	0.419	0.383
Sulphur	3.0 to 50.0	284	255	268	271			138	137	149	141	142	127
Thallium	0.000002 to 0.0001	0.000066	0.000045	0.000028	0.000029			<0.00005	<0.00005	<0.00005	0.0000191	0.000018	0.000016
Tin	0.0002 to 0.01	<0.0001	<0.0001	<0.0002	<0.0002			<0.005	<0.005	<0.005	<0.0002	0.00035	<0.0001
Titanium	0.0005 to 0.01	<0.01	<0.01	<0.02	<0.02					<0.005	0.00054	0.00144	<0.01
Uranium	0.000002 to 0.0002	0.0447	0.045	0.0396	0.0422			0.012	0.0156	0.0196	0.0102	0.0122	0.00698
Vanadium	0.0002 to 0.03	<0.001	<0.001	<0.002	<0.002			<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.001
Zinc	0.0001 to 0.01	0.0758	0.0415	0.0874	0.0388			0.131	0.116	0.197	0.132	0.187	0.139
Zirconium	0.0001 to 0.001							<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	
Organics													
Dissolved Organic Carbon					1.16								
Total Organic Carbon	0.5 to 5.0	1.05	1.04	1.12	1.15	3.4	2.1	1.8	1.7	1.3	<5	8.86	1.52

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	HG10-04 5-Aug-13	HG10-04 26-Sep-13	HG10-04 23-May-14	HG10-04 23-Jul-14	HG10-04 29-Sep-14	HG10-05 19-Aug-11	HG10-07 20-Aug-10	HG10-07 16-Sep-10	MW13-02D 5-Aug-13	MW13-02D 25-Sep-13	MW13-02D 23-Jul-14	MW13-02D 29-Sep-14
Calculated Parameters													
Ion Balance Ratio	0.01					0.83							0.86
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5						<0.5	<0.5	<0.5				
Acidity to pH 8.3 (as CaCO3)	0.5	45.8					23.4	5.4	7.8	7.7			
Alkalinity (PP as CaCO3)	0.5												
Alkalinity (Total as CaCO3)	0.5	101	86.3	87.5	106	89	200	160	190	37.1	22.8	29.6	14.5
Bicarbonate Alkalinity	0.5	101	86.3	87.5		89				37.1	22.8		14.5
Carbonate Alkalinity	0.5	<2	<2	<2		<1				<2	<2		<1
Conductivity µS/cm	1	872	865	880	911	882	1520	741	807	142	117	124	105
Hardness as CaCO3 (Dissolved)	0.5	456	440	475	481	473	913	171	184	379	30	32.7	31.1
Hardness as CaCO3 (Total)	0.5												
Hydroxide Alkalinity	0.5	<2	<2	<2		<1				<2	<2		<1
pH (pH)	0	6.85	7.47	6.96	6.71	7.09	7.71	7.58	7.98	6.93	7.94	6.98	6.85
Total Dissolved Solids	1.0 to 10.0	690	730	670	706	747	1200	480	530	138	110	117	105
Total Suspended Solids	1	40.1	18.5	38.5	8.2	20.7				378	53.6	346	22.7
Turbidity (NTU)	0.1	3.58	29.8	23.7	93.6	73.7				38.1	46.4	97.2	8.06
Dissolved Anions													
Bromide	0.01 to 0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.4	<0.4	<0.4	<0.05	<0.05	<0.05	<0.05
Chloride	0.5	<5	<5	<5	<5	<2.5		3.8	3.6	<0.5	<0.5	<0.5	<0.5
Fluoride	0.01	0.62	0.43	0.4	0.54	0.37	0.26	0.36	0.43	0.202	0.19	0.172	0.158
Sulphate	0.5 to 5.0	399	394	406	407	398	660	190	190	30.7	31	30.4	29.4
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 to 0.01	0.0528	0.0504	0.047	0.0448	0.0477	0.057	0.67	0.58	0.0061	<0.005	<0.005	<0.005
Nitrate (as N)	0.002 to 0.02	<0.05	<0.05	<0.05	<0.05	<0.025	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005
Nitrate+Nitrite (Dissolved)	0.002 to 0.02					<0.005	<0.002	0.009	0.002				<0.001
Nitrite (as N)	0.002 to 0.005	0.01	<0.01	<0.01	<0.01	0.12	<0.002	0.012	0.002	<0.001	<0.001	<0.001	0.08
Nitrogen (Total)	0.02	<0.05	<0.05	0.127	0.118	0.12	0.07	0.96	1.46	<0.05	<0.05	0.078	0.08
Nitrogen Kjeldahl (Total)	0.02	0.097	0.088	0.127	0.118		0.07	0.95	1.45	<0.05	0.053	0.078	
Orthophosphate (Dissolved)	0.001 to 0.005			<0.01		<0.002	0.002	0.005	0.001				<0.002
Phosphorus Dissolved	0.002 to 0.01	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	0.036	0.093	0.0046	<0.002	0.0063	0.042
Cyanide													
Cyanide (SAD)	0.001					<0.005							<0.005
Cyanide (WAD)	0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005
Cyanide+Thiocyanate	0.0005 to 0.001					<0.005	<0.0005	<0.0005	<0.0005				<0.005
Dissolved Metals													
Aluminum	0.0002 to 0.003	0.0208	0.0156	0.0305	0.0304	0.0271	0.0047	0.0059	0.544	0.0086	0.0147	0.0227	0.0232
Antimony	0.00002 to 0.0005	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	0.00006	0.00032	0.0004	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	0.00002 to 0.001	0.0019	0.00127	0.00185	0.00188	0.00183	0.00757	0.00096	0.0037	0.00085	0.00147	0.0006	0.00118
Barium	0.00002 to 0.001	0.0106	0.0127	0.0089	0.00899	0.00924	0.0162	0.0575	0.0943	0.0219	0.0216	0.0274	0.03
Beryllium	0.00001 to 0.005	0.00031	0.00024	0.00061	0.0004	0.00037	0.00003	<0.00001	0.00015	<0.0001	0.00013	0.00017	0.0002
Bismuth	0.000005 to 0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000005	<0.000005	0.000172	<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.05 to 0.3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
Cadmium	0.000005 to 0.00003	0.000447	0.000234	0.000426	0.000435	0.000552	0.00011	0.000404	0.000338	0.000056	0.000062	0.000023	0.000209
Calcium	0.05 to 0.3	141	137	146	148	146	278	44.9	49.5	12.7	9.98	10.8	9.71
Chromium	0.0001 to 0.001	<0.0001	0.00028	0.00091	0.00037	0.0002	<0.0001	<0.0001	0.0059	0.00015	0.00027	0.00333	0.00013
Cobalt	0.000005 to 0.001	0.0361	0.0336	0.0388	0.0398	0.0404	0.00373	0.0228	0.0134	0.00439	0.00395	0.00436	0.00581
Copper	0.00005 to 0.0003	<0.0002	<0.0002	0.00027	0.00022	0.00123	0.00018	0.0134	0.0798	0.00048	<0.0002	<0.0002	0.00104
Iron	0.001 to 0.03	36	36.6	40.1	40.6	39.9	4.74	3.23	7.42	3.13	2.14	1.74	2.98
Lead	0.000005 to 0.001	0.000587	0.000115	0.000775	0.0005	0.000806	0.000011	0.000038	0.00345	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	0.0005 to 0.005	0.00129	0.00202	0.00239	0.00181	0.00209	0.002	0.0027	0.0031	0.00288	0.00357	0.00343	0.00417
Magnesium	0.001 to 0.3	24.9	23.9	26.6	26.9	26.1	53.4	14.2	14.8	1.48	1.24	1.4	1.66
Manganese	0.00002 to 0.005	3.99	4.11	4.15	4.32	4.12	0.267	2.66	2.53	0.129	0.0872	0.0961	0.0957
Mercury	0.00000001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 to 0.001	0.000119	0.000138	0.000316	0.000148	0.000104	0.00052	0.0123	0.0125	0.00431	0.00496	0.00361	0.00366
Nickel	0.00002 to 0.001	0.00265	0.00328	0.00361	0.00288	0.00264	0.00123	0.00301	0.00374	0.00375	0.00255	0.0079	0.00246
Phosphorus	0.002 to 0.01	<0.05	<0.05	<0.05	<0.05	<0.05				<0.05	0.053	<0.05	0.068
Potassium	0.05 to 0.3	2.34	2.2	2.44	2.42	2.41	2.18	3.05	3.07	1.13	1.15	1.19	1.13
Selenium	0.00004 to 0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00006	0.00157	0.00038	<0.0001	<0.0001	<0.0001	<0.0001
Silicon	0.1 to 0.5	3.69	3.54	3.93	3.81	3.81	1.9	6.6	7.5	14.9	15.3	14.7	15.5
Silver	0.000005 to 0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000005	<0.000005	0.000214	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	0.05 to 0.3	8.45	7.73	7.11	7.31	7.54	11.1	87.1	89.2	9.77	10.8	6.66	5.5
Strontium	0.00005 to 0.001	0.361	0.381	0.373	0.391	0.344	2.98	0.268	0.29	0.11	0.117	0.198	0.0865
Sulphur	1.0 to 50.0	125	125	136	132	132	257	75	70	10	10.4	10	10.2
Thallium	0.000002 to 0.00005	0.000016	<0.00001	0.000035	0.000013	0.000014	0.000022	0.000006	0.00001	0.000014	0.000013	<0.00001	0.000028
Tin	0.00001 to 0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00001	0.00002	0.00011	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	0.0005 to 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0005	0.0007	0.0153	<0.01	<0.01	<0.01	<0.01
Uranium	0.000002 to 0.0001	0.00829	0.00746	0.00667	0.00643	0.00617	0.0638	0.00288	0.00299	0.000156	0.000083	0.000045	0.00002
Vanadium	0.0002 to 0.03	<0.001	<0.001	<0.001	<0.001	<0.001	0.0003	<0.0002	0.0017	<0.001	<0.001	<0.001	<0.001
Zinc	0.0001 to 0.005	0.106	0.0794	0.125	0.144	0.132	0.0142	0.0068	0.0086	0.0254	0.0251	0.0454	0.0378
Zirconium	0.0001 to 0.005						<0.0001	<0.0001	<0.005				
Total Metals													
Aluminum	0.0002 to 0.006	0.559	0.269	0.111	0.0715	0.0434				6.78	5.44	2.86	0.533
Antimony	0.00002 to 0.001	0.00011	0.00012	<0.0001	<0.0001	<0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	0.00002 to 0.0002	0.00241	0.00219	0.00185	0.00206	0.00171				0.00225	0.00162	0.00108	0.00125
Barium	0.00002 to 0.002	0.0167	0.0171	0.0093	0.00959	0.00915				0.0441	0.0331	0.0452	0.0329
Beryllium	0.00001 to 0.005	0.00037	0.00028	0.00044	0.00043	0.00038				0.00072	0.00057	0.00051	0.00024
Bismuth	0.000005 to 0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005				<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.05 to 0.25	<0.01	<0.01	<0.01	<0.01	0.016				<0.01	0.01	<0.01	<0.01
Cadmium	0.000005 to 0.00005	0.00115	0.000586	0.00149	0.000637	0.000525				0.000093	0.000111	0.000149	0.00054
Calcium	0.05 to 0.25	143	138	145	151	134				18.4	12.2	14.5	9.65
Chromium	0.0001 to 0.002	0.00046	0.00315	0.00142	0.00093	0.0005				0.00378	0.00274	0.0486	0.00146
Cobalt	0.000005 to 0.001	0.038	0.0336	0.039	0.0406	0.038				0.0059	0.0061	0.00561	0.00614
Copper	0.00005 to 0.0004	0.00277	0.00492	0.00108	0.00133	0.00124				0.0149	0.00345	0.0101	0.00695
Iron	0.001 to 0.01	37.1	38.2	39.6	41.3	36.7				6.92	5.64	3.23	3.17
Lead	0.000005 to 0.001	0.0209	0.00326	0.00284	0.00121	0.000961				0.006	0.00273	0.00396	0.000439
Lithium	0.0005 to 0.01	0.00175	0.00215	0.00203	0.00225	0.00214				0.0051	0.00528	0.00467	0.00423
Magnesium	0.001 to 0.25	25.3	24.1	26.1	27.3	24.1				4.15	4.48	2.51	1.81
Manganese	0.00005 to 0.002	4.2	4.16	4.14	4.43	3.84				0.182	0.122	0.13	0.101
Mercury	0.00001 to 0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001				<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 to 0.002	0.0002	0.000651	0.000332	0.000213	0.000127				0.00505	0.00454	0.00816	0.00396
Nickel	0.00002 to 0.002	0.0031	0.00505	0.00406	0.00303	0.00253				0.00505	0.00469	0.0323	0.00277
Phosphorus	0.000002 to 0.01	<0.05	<0.05	<0.05	<0.00005	<0.05				0.095	0.069	0.00008	0.061
Potassium	0.05 to 0.25	2.45	2.32	2.4	2.49	2.2				1.78	1.36	1.45	1.17
Selenium	0.00004 to 0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Silicon	0.1 to 0.5	5.21	4.05	4.04	3.97	3.53				49.8	53.8	24.2	16.9
Silver	0.000005 to 0.0001	0.000046	0.000033	<0.00001	<0.00001	<0.00001				0.000048	0.000016	0.000041	0.000025
Sodium	0.05 to 0.25	9.07	7.75	6.96	7.63	7.06				9.66	9.34	6.21	5.73
Strontium	0.00005 to 0.002	0.385	0.384	0.384	0.397	0.356				0.149	0.143	0.243	0.0865
Sulphur	3.0 to 50.0	131	128	135	135	124				9.92	10.3	9.83	10.3
Thallium	0.000002 to 0.0001	0.000025	0.000014	0.000018	0.000014	0.000013				0.000055	0.000028	0.000048	0.000035
Tin	0.0002 to 0.01	<0.0001	0.00018	<0.0001	<0.0001	<0.0001				0.00025	0.00034	0.00031	<0.0001
Titanium	0.0005 to 0.01	0.014	<0.01	<0.01	<0.01	<0.01				0.033	0.026	0.021	0.011
Uranium	0.000002 to 0.0002	0.00933	0.00796	0.0072	0.00698	0.00616				0.00158	0.000806	0.00102	0.00014
Vanadium	0.0002 to 0.03	<0.001	<0.001	<0.001	<0.001	<0.001				0.0031	0.0022	0.0019	<0.001
Zinc	0.0001 to 0.01	0.119	0.0926	0.126	0.167	0.125				0.0431	0.0441	0.0447	0.0407
Zirconium	0.0001 to 0.001												
Organics													
Dissolved Organic Carbon						1.48							0.91
Total Organic Carbon	0.5 to 5.0	1.73	1.46	1.32	1.44	1.48	4.4	34.3	45.7	1.57	1.36	1.48	1.02

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	*MW13-02S* *2-Oct-13*	*MW13-02S* *29-Jul-14*
Calculated Parameters			
Ion Balance Ratio	0.01		
Physical Tests			
Acidity to pH 4.5 (as CaCO3)	0.5		
Acidity to pH 8.3 (as CaCO3)	0.5		
Alkalinity (PP as CaCO3)	0.5		
Alkalinity (Total as CaCO3)	0.5	*48.9*	*19.1*
Bicarbonate Alkalinity	0.5	*48.9*	*19.1*
Carbonate Alkalinity	0.5	*<2*	*<2*
Conductivity µS/cm	1	*168*	*104*
Hardness as CaCO3 (Dissolved)	0.5	*64.2*	*27*
Hardness as CaCO3 (Total)	0.5		
Hydroxide Alkalinity	0.5	*<2*	*<2*
pH (pH)	0	*8.02*	*6.69*
Total Dissolved Solids	1.0 to 10.0	*113*	*97*
Total Suspended Solids	1	*770*	*97.3*
Turbidity (NTU)	0.1	*922*	*73*
Dissolved Anions			
Bromide	0.01 to 0.4	*<0.05*	*<0.05*
Chloride	0.5	*<0.5*	*<0.5*
Fluoride	0.01	*0.504*	*0.118*
Sulphate	0.5 to 5.0	*31.4*	*23.6*
Thiocyanate	0.2		
Nutrients			
Ammonia (Total)	0.005 to 0.01	*0.045*	*<0.005*
Nitrate (as N)	0.002 to 0.02	*<0.005*	*0.179*
Nitrate+Nitrite (Dissolved)	0.002 to 0.02		
Nitrite (as N)	0.002 to 0.005	*0.0227*	*0.0022*
Nitrogen (Total)	0.02	*0.094*	*0.28*
Nitrogen Kjeldahl (Total)	0.02	*0.071*	*0.099*
Orthophosphate (Dissolved)	0.001 to 0.005		
Phosphorus Dissolved	0.002 to 0.01	*<0.002*	*0.0027*
Cyanide			
Cyanide (SAD)	0.001		
Cyanide (WAD)	0.0005	*<0.005*	*<0.005*
Cyanide+Thiocyanate	0.0005 to 0.001		
Dissolved Metals			
Aluminum	0.0002 to 0.003	*<0.001*	*0.0054*
Antimony	0.00002 to 0.0005	*<0.0001*	*<0.0001*
Arsenic	0.00002 to 0.001	*0.00043*	*0.0017*
Barium	0.00002 to 0.001	*0.0524*	*0.0662*
Beryllium	0.00001 to 0.005	*<0.0001*	*<0.0001*
Bismuth	0.000005 to 0.1	*<0.0005*	*<0.0005*
Boron	0.05 to 0.3	*<0.01*	*<0.01*
Cadmium	0.000005 to 0.00003	*0.000045*	*0.00005*
Calcium	0.05 to 0.3	*19.7*	*8.34*
Chromium	0.0001 to 0.001	*<0.0001*	*<0.0001*
Cobalt	0.000005 to 0.001	*0.00336*	*0.00496*
Copper	0.00005 to 0.0003	*0.00041*	*<0.0002*
Iron	0.001 to 0.03	*12.6*	*8*
Lead	0.000005 to 0.001	*<0.00005*	*<0.00005*
Lithium	0.0005 to 0.005	*0.0007*	*0.00135*
Magnesium	0.001 to 0.3	*3.65*	*1.5*
Manganese	0.00002 to 0.005	*1.04*	*0.246*
Mercury	0.00000001 to 0.00005	*<0.00001*	*<0.00001*
Molybdenum	0.00005 to 0.001	*0.0103*	*0.00368*
Nickel	0.00002 to 0.001	*0.00959*	*0.017*
Phosphorus	0.002 to 0.01	*<0.05*	*<0.05*
Potassium	0.05 to 0.3	*3.35*	*0.93*
Selenium	0.00004 to 0.0005	*<0.0001*	*<0.0001*
Silicon	0.1 to 0.5	*8.46*	*10.9*
Silver	0.000005 to 0.0001	*<0.00001*	*<0.00001*
Sodium	0.05 to 0.3	*4.73*	*4.45*
Strontium	0.00005 to 0.001	*0.128*	*0.0668*
Sulphur	1.0 to 50.0	*10.5*	*7.89*
Thallium	0.000002 to 0.00005	*<0.00001*	*<0.00001*
Tin	0.00001 to 0.005	*<0.0001*	*<0.0001*
Titanium	0.0005 to 0.01	*<0.01*	*<0.01*
Uranium	0.000002 to 0.0001	*0.000303*	*0.00015*
Vanadium	0.0002 to 0.03	*<0.001*	*<0.001*
Zinc	0.0001 to 0.005	*0.002*	*0.0183*
Zirconium	0.0001 to 0.005		
Total Metals			
Aluminum	0.0002 to 0.006	*24.6*	*1.87*
Antimony	0.00002 to 0.001	*0.00255*	*0.00045*
Arsenic	0.00002 to 0.0002	*0.0328*	*0.00411*
Barium	0.00002 to 0.002	*0.507*	*0.101*
Beryllium	0.00001 to 0.005	*0.00098*	*<0.0001*
Bismuth	0.000005 to 0.1	*0.00255*	*<0.0005*
Boron	0.05 to 0.25	*0.015*	*<0.01*
Cadmium	0.000005 to 0.00005	*0.000269*	*0.000078*
Calcium	0.05 to 0.25	*20.6*	*8.14*
Chromium	0.0001 to 0.002	*0.0257*	*0.00254*
Cobalt	0.000005 to 0.001	*0.0105*	*0.00526*
Copper	0.00005 to 0.0004	*0.513*	*0.0364*
Iron	0.001 to 0.01	*62*	*11.3*
Lead	0.000005 to 0.001	*0.0429*	*0.00325*
Lithium	0.0005 to 0.01	*0.00507*	*0.00163*
Magnesium	0.001 to 0.25	*7.05*	*1.73*
Manganese	0.00005 to 0.002	*1.28*	*0.251*
Mercury	0.00001 to 0.00005	*0.000012*	*<0.00001*
Molybdenum	0.00005 to 0.002	*0.0583*	*0.0072*
Nickel	0.00002 to 0.002	*0.0291*	*0.0177*
Phosphorus	0.000002 to 0.01	*0.714*	*0.000053*
Potassium	0.05 to 0.25	*8.07*	*1.44*
Selenium	0.00004 to 0.1	*0.00066*	*0.00014*
Silicon	0.1 to 0.5	*40*	*13.5*
Silver	0.000005 to 0.0001	*0.0118*	*0.000631*
Sodium	0.05 to 0.25	*5.7*	*4.42*
Strontium	0.00005 to 0.002	*0.176*	*0.0713*
Sulphur	3.0 to 50.0	*11.8*	*7.77*
Thallium	0.000002 to 0.0001	*0.0004*	*0.000044*
Tin	0.0002 to 0.01	*0.0026*	*0.00072*
Titanium	0.0005 to 0.01	*0.551*	*0.049*
Uranium	0.000002 to 0.0002	*0.00632*	*0.000625*
Vanadium	0.0002 to 0.03	*0.0377*	*0.0029*
Zinc	0.0001 to 0.01	*0.0717*	*0.027*
Zirconium	0.0001 to 0.001		
Organics			
Dissolved Organic Carbon			
Total Organic Carbon	0.5 to 5.0	*3.99*	*1.54*

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NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	94-352 29-Sep-94	94-352 24-May-95	94-352 11-Sep-08	94-352 25-Sep-09	94-352 7-Jun-10	94-352 18-Aug-10	94-352 13-Sep-10	*94-352* *30-Jul-14*	*94-352* *30-Sep-14*	94-353 24-May-95	94-353 11-Sep-08	94-353 23-Sep-09
Calculated Parameters													
Ion Balance Ratio	0.01				0.97	1				*0.99*			1
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5				<0.5	<0.5	<0.5	<0.5					<0.5
Acidity to pH 8.3 (as CaCO3)	0.5				<0.5	1.6	3.4	<0.5	*1.8*				1.8
Alkalinity (PP as CaCO3)	0.5												
Alkalinity (Total as CaCO3)	0.5	94.9	127	120	120	150	130	120	*131*	*118*	98.8	100	120
Bicarbonate Alkalinity	0.5								*131*	*118*			
Carbonate Alkalinity	0.5								*<2*	*<1*			
Conductivity µS/cm	1	216	255	250	251	303	259	244	*257*	*226*	214	230	273
Hardness as CaCO3 (Dissolved)	0.5			126	123	162	135	117	*144*	*123*		113	143
Hardness as CaCO3 (Total)	0.5	111	134								116		
Hydroxide Alkalinity	0.5								*<2*	*<1*			
pH (pH)	0	7.53	7.48	8.1	7.9	8.23	8.06	8.04	*8.07*	*8.13*	7.21	7.9	7.57
Total Dissolved Solids	1.0 - 10.0	128	175	160	140	190	130	150	*165*	*151*	145	160	170
Total Suspended Solids	1	71	36	36					*47.9*	*<3*	139	750	
Turbidity (NTU)	0.1	33.5	26.1	6.7					*17.3*	*1.51*	76.5	208	
Dissolved Anions													
Bromide	0.01 - 0.4			0.3	<0.4	<0.4	<0.4	<0.4	*<0.05*	*<0.05*		0.2	<0.4
Chloride	0.5	1.1	0.8	<0.5	1.2	<0.5		<0.5	*<0.5*	*<0.5*	0.9	1	0.9
Fluoride	0.01	0.06	0.05	0.04	0.04	0.09	0.05	0.04	*0.048*	*0.039*	0.04	0.03	0.04
Sulphate	0.5	11.9	14.1	13	9.7	10	11	10	*11.1*	*10.1*	8.8	19	19
Thiocyanate	0.2					<0.2							
Nutrients													
Ammonia (Total)	0.005 - 0.05	0.021	<0.005	0.01	0.06	0.009	<0.005	<0.005	*<0.005*	*<0.005*	0.016	<0.01	0.06
Nitrate (as N)	0.002 - 0.02	0.179	0.139	0.093	0.086	0.096	0.099	0.103	*0.145*	*0.121*	1.54	0.355	0.36
Nitrate+Nitrite (Dissolved)	0.002 - 0.02			0.098	0.086	0.096	0.102	0.106		*<0.001*		0.397	0.36
Nitrite (as N)	0.002 - 0.005	0.021	0.008	0.005	<0.002	<0.002	0.002	0.003	*<0.001*	*0.254*	0.002	0.042	<0.002
Nitrogen (Total)	0.02			0.23	1.18	0.19	0.3	0.24	*0.242*	*0.132*		0.4	0.52
Nitrogen Kjeldahl (Total)	0.02			0.13	1.1	0.09	0.2	0.14	*0.096*	*0.003*		<0.02	0.16
Orthophosphate (Dissolved)	0.001 - 0.005	0.007	0.035	0.009	0.002	0.007	0.009	0.002	*0.0021*	*0.0069*	0.011	0.067	0.002
Phosphorus Dissolved	0.002	0.007	0.035	0.017		0.016	0.017	0.015	*0.0024*	*0.0091*	0.011	0.003	
Cyanide													
Cyanide (SAD)	0.001				0.003					*<0.005*			0.009
Cyanide (WAD)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	*<0.005*	*<0.005*		<0.0005	<0.0005
Cyanide+Thiocyanate	0.0005 - 0.001	<0.001	0.02	<0.0005		<0.0005	<0.0005	<0.0005		*<0.005*	0.01	0.0009	
Dissolved Metals													
Aluminum	0.0002 - 0.005	0.014	0.014	0.0081	0.0087	0.0108	0.0057	0.004	*0.0414*	*0.0023*	0.049	0.0547	0.0165
Antimony	0.00002 - 0.0005	0.0004	0.0004	0.0003	0.00025	0.00048	0.00029	0.00034	*0.00023*	*0.00018*	0.0002	0.0003	0.00032
Arsenic	0.00002 - 0.001	0.0009	0.0008	0.00023	0.00016	0.00028	0.00025	0.00024	*0.0002*	*0.00013*	0.0001	0.00016	0.00005
Barium	0.00002 - 0.001	0.035	0.058	0.0604	0.0579	0.0757	0.0609	0.0593	*0.0798*	*0.0635*	0.023	0.0167	0.0191
Beryllium	0.00001 - 0.005	<0.005	<0.005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	*<0.0001*	*<0.0001*	<0.005	<0.00001	<0.00001
Bismuth	0.000005 - 0.1	<0.1	<0.1	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	*<0.0005*	*<0.0005*	<0.1	<0.000005	<0.000005
Boron	0.05 - 0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	*<0.01*	*<0.01*	<0.1	<0.05	<0.05
Cadmium	0.000005 - 0.0002	<0.0002	<0.0002	0.000069	0.000028	0.000006	0.000025	0.000014	*0.000072*	*0.000034*	<0.0002	0.000161	0.000331
Calcium	0.05	32.2	37.7	35	34.3	43.3	37.1	32.3	*40.7*	*34.3*	37.2	35.8	45.6
Chromium	0.0001 - 0.001	<0.001	<0.001	<0.0001	<0.0001	0.0002	<0.0001	0.0002	*0.0022*	*0.00011*	<0.001	<0.0001	<0.0001
Cobalt	0.000005 - 0.001	0.001	<0.001	0.000435	0.000041	0.00004	0.000018	0.000034	*0.00039*	*<0.0001*	<0.001	0.000017	0.000054
Copper	0.00005 - 0.001	0.005	0.003	0.00174	0.00425	0.001	0.00086	0.00087	*0.00383*	*0.00277*	0.005	0.00363	0.00093
Iron	0.001 - 0.03	<0.03	<0.03	0.002	0.003	0.017	0.002	0.004	*0.063*	*<0.01*	0.039	0.035	0.011
Lead	0.000005 - 0.001	<0.001	0.001	0.000054	0.000056	0.000028	0.00001	0.000032	*0.000708*	*<0.00005*	<0.001	0.000449	0.000259
Lithium	0.0005 - 0.005			0.0013	0.0017	0.0013	0.0012	0.0011	*0.00135*	*0.00124*		0.0011	0.0011
Magnesium	0.001 - 0.05	7.52	9.8	9.26	9.09	13.1	10.2	8.71	*10.4*	*8.97*	5.7	5.73	7.03
Manganese	0.00005 - 0.005	0.043	0.011	0.0229	0.00149	0.00145	0.00037	0.00218	*0.0166*	*0.00183*	0.02	0.00108	0.00174
Mercury	0.00000001 - 0.00002			<0.00001		<0.00001	<0.00001	<0.00001	*<0.00001*	*<0.00001*		<0.00001	
Molybdenum	0.00005 - 0.001	0.005	0.003	0.0037	0.0035	0.0043	0.00315	0.00341	*0.00686*	*0.00303*	<0.001	0.00017	0.00022
Nickel	0.00002 - 0.001	0.008	0.001	0.00267	0.00031	0.00051	0.00025	0.00036	*0.0135*	*<0.0005*	0.001	0.00018	0.00016
Phosphorus	0.002								*<0.05*	*<0.05*			
Potassium	0.05	840	0.94	1.11	0.91	0.91	0.85	0.74	*0.89*	*0.78*	0.86	0.6	0.72
Selenium	0.00004 - 0.0005	<0.0005	<0.0005	<0.00004	<0.00004	0.00004	<0.00004	<0.00004	*<0.0001*	*<0.0001*	<0.0005	0.00006	<0.00004
Silicon	0.00002 - 0.1	4.69	4.21	4.3	4.2	4.4	4.4	4.4	*4.22*	*4.4*	3.84	4.7	4.8
Silver	0.000005 - 0.0001	<0.0001	<0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	*<0.00001*	*<0.00001*	<0.0001	0.000011	<0.000005
Sodium	0.05	3	3460	2.23	2.43	2.57	2.26	1.98	*2.38*	*2.06*	1.6	1.44	1.63
Strontium	0.00005 - 0.001	0.183	0.221	0.184	0.18	0.251	0.193	0.176	*0.213*	*0.173*	0.203	0.195	0.231
Sulphur	1.0 - 10.0			5	4	<10	<10	<10	*4.04*	*3.5*		6	8
Thallium	0.000002 - 0.00005			0.000006	0.000002	0.000003	<0.000002	<0.000002	*<0.00001*	*<0.00001*		0.000005	0.000005
Tin	0.00001 - 0.005			0.00004	0.00004	0.00002	<0.00001	0.00003	*<0.0001*	*0.00015*		0.00037	0.00002
Titanium	0.0005 - 0.01		<0.01	0.0008	<0.0005	0.0006	<0.0005	<0.0005	*<0.01*	*<0.01*	<0.01	0.0019	<0.0005
Uranium	0.000002 - 0.0001	0.00226	0.00309	0.00534	0.005	0.0089	0.00627	0.00441	*0.006*	*0.00387*	0.00021	0.00139	0.00271
Vanadium	0.0002 - 0.03	<0.03	<0.03	<0.0002	<0.0002	0.0003	<0.0002	0.0004	*<0.001*	*<0.001*	<0.03	<0.0002	<0.0002
Zinc	0.0001 - 0.005	<0.005	<0.005	0.0395	0.0136	0.0009	0.0013	0.0017	*0.0185*	*0.0139*	0.011	0.0101	0.0322
Zirconium	0.0001 - 0.0005			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001	<0.0001
Total Metals													
Aluminum	0.0002 - 0.003	1.43	0.504						*0.201*	*0.0279*	1.28		
Antimony	0.00002 - 0.0005	0.0005	0.0004						*0.00022*	*0.0002*	0.0003		
Arsenic	0.00002 - 0.0001	0.0013	0.0008						*0.00026*	*0.00018*	0.0008		
Barium	0.00002 - 0.001	0.05	0.07						*0.076*	*0.0647*	0.066		
Beryllium	0.00001 - 0.005	<0.005	<0.005						*<0.0001*	*<0.0001*	<0.005		
Bismuth	0.000005 - 0.1	<0.1	<0.1						*<0.0005*	*<0.0005*	<0.1		
Boron	0.05 - 0.1	<0.1	<0.1						*<0.01*	*0.011*	<0.1		
Cadmium	0.000005 - 0.0002	<0.0002	<0.0002						*0.000035*	*0.000037*	0.0002		
Calcium	0.05	32.6	39						*38.6*	*33.7*	38.6		
Chromium	0.0001 - 0.001	0.025	0.002						*0.0531*	*0.00063*	0.002		
Cobalt	0.000005 - 0.001	0.003	<0.001						*0.00093*	*<0.0001*	0.002		
Copper	0.00005 - 0.0002								*0.00652*	*0.00293*			
Iron	0.001 - 0.005	0.894	0.535						*0.536*	*0.051*	1.79		
Lead	0.000005 - 0.0002	0.005	0.003						*0.00139*	*0.000433*	0.028		
Lithium	0.0005 - 0.005								*0.0013*	*0.00119*			
Magnesium	0.001 - 0.05	7.77	10						*10.3*	*8.85*	6330		
Manganese	0.00005 - 0.001	0.061	0.027						*0.0181*	*0.00371*	0.127		
Mercury	0.00001 - 0.00002	<0.00001	<0.00001						*<0.00001*	*<0.00001*	<0.00001		
Molybdenum	0.00005 - 0.001	0.007	0.003						*0.0109*	*0.00331*	<0.001		
Nickel	0.00002 - 0.001	0.029	0.004						*0.0365*	*0.00057*	0.003		
Phosphorus	0.000002 - 0.002	0.000049	0.000122						*<0.00005*	*<0.05*	0.000118		
Potassium	0.05								*0.83*	*0.75*			
Selenium	0.00004 - 0.1	<0.0005	<0.0005						*<0.0001*	*<0.0001*	<0.0005		
Silicon	0.1	8	4.87						*4.56*	*4.4*	5.27		
Silver	0.000005 - 0.0001	<0.0001	<0.0001						*0.000037*	*<0.00001*	<0.0001		
Sodium	0.05								*2.11*	*2.02*			
Strontium	0.00005 - 0.001	0.183	0.221						*0.193*	*0.175*	0.214		
Sulphur	3.0 - 10.0								*3.62*	*3.46*			
Thallium	0.000002 - 0.00005								*<0.00001*	*<0.00001*			
Tin	0.0002 - 0.005								*0.00027*	*0.00028*			
Titanium	0.0005 - 0.01		0.026						*<0.01*	*<0.01*	0.056		
Uranium	0.000002 - 0.0001	0.00228	0.00317						*0.00564*	*0.00405*	0.00189		
Vanadium	0.0002 - 0.03	<0.03	<0.03						*<0.001*	*<0.001*	<0.03		
Zinc	0.0001 - 0.005	0.009	0.006						*0.0127*	*0.0106*	0.037		
Zirconium	0.0001 - 0.0005												
Organics													
Dissolved Organic Carbon										*1.49*			
Total Organic Carbon	0.5 - 5.0	2.3	2.5	2.3	1.5	1.7	4.5	1.5	*1.39*	*1.51*	10.5	2.8	1.7

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	94-353 18-Aug-10	94-353 13-Sep-10	94-353 21-May-11	94-353 18-Jul-11	94-354 24-May-95	94-354 10-Sep-08	94-354 18-Aug-10	94-354 13-Sep-10	94-354 15-Jul-11	94-354 20-Sep-11	94-354 31-Jul-14	MW11-01A 24-Sep-11
Calculated Parameters													
Ion Balance Ratio	0.01												
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5	<0.5	<0.5					<0.5	<0.5				
Acidity to pH 8.3 (as CaCO3)	0.5	8.2	0.9					6.1	1			2.9	
Alkalinity (PP as CaCO3)	0.5			<0.5	<0.5					<0.5	<0.5		0.25
Alkalinity (Total as CaCO3)	0.5	110	120	41	110	55.2	77	88	66	54	84	81.8	150
Bicarbonate Alkalinity	0.5			50	130					65	100	81.8	180
Carbonate Alkalinity	0.5			<0.5	<0.5					<0.5	<0.5	<2	0.25
Conductivity µS/cm	1	251	273	86	239	127	160	186	134	111	180	168	348
Hardness as CaCO3 (Dissolved)	0.5	118	131	45.3	116		78.9	87.7	64.4	57.9	79.4	88.5	161
Hardness as CaCO3 (Total)	0.5			50.4	116	64.4				54.4			149
Hydroxide Alkalinity	0.5			<0.5	<0.5					<0.5	<0.5	<2	0.25
pH (pH)	0	7.71	7.79	7.17	7.57	6.91	7.8	7.69	7.67	7.48	7.74	7.83	8.04
Total Dissolved Solids	1.0 - 10.0	120	160	62	140	81	140	100	96	86	120	124	200
Total Suspended Solids	1			35	<1	101	81			4	45	52.8	120
Turbidity (NTU)	0.1			30	1.4	59.7	115			5.1	15.1	26.9	64.1
Dissolved Anions													
Bromide	0.01 - 0.4	<0.4	<0.4				0.2	<0.4	<0.4			<0.05	
Chloride	0.5		<0.5	0.6	0.6	1.1	<0.5		<0.5	0.7	0.5	<0.5	1.8
Fluoride	0.01	0.03	0.05	0.03	0.05	0.04	0.07	0.04	0.07	0.04	0.05	0.037	0.08
Sulphate	0.5	21	22	0.8	13	3.9	7.3	6.2	0.6	<0.5	7.5	1.51	31
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 - 0.05	<0.005	0.14	0.011	0.021	0.014	0.02	0.029	<0.005	0.03	0.02	0.0055	0.044
Nitrate (as N)	0.002 - 0.02	0.208	0.563	0.12	0.43	0.957	0.242	0.612	0.428	0.26	0.42	0.909	0.3
Nitrate+Nitrite (Dissolved)	0.002 - 0.02	0.208	0.572	0.13	0.43		0.285	0.621	0.433	0.26	0.42		0.32
Nitrite (as N)	0.002 - 0.005	<0.002	0.009	0.01	<0.005	0.002	0.043	0.009	0.005	<0.005	<0.005	<0.001	0.021
Nitrogen (Total)	0.02	0.21	0.73				0.33	0.57	0.6			1.17	
Nitrogen Kjeldahl (Total)	0.02	<0.02	0.16				0.05	<0.02	0.17			0.26	
Orthophosphate (Dissolved)	0.001 - 0.005	0.001	0.001	<0.005		0.003	0.047	0.002	0.001	<0.005		0.0032	
Phosphorus Dissolved	0.002	0.013	0.002			0.003	0.005	0.01	0.005			0.0042	
Cyanide													
Cyanide (SAD)	0.001												
Cyanide (WAD)	0.0005	<0.0005	<0.0005	0.0009			<0.0005	<0.0005	0.0005			<0.005	
Cyanide+Thiocyanate	0.0005 - 0.001	<0.0005	<0.0005	0.0012	<0.0005	0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005		0.00025
Dissolved Metals													
Aluminum	0.0002 - 0.005	0.0031	0.006	0.078	0.006	0.08	0.0085	0.0054	0.009	0.033	0.009	0.0045	0.008
Antimony	0.00002 - 0.0005	0.00026	0.00026	<0.0005	<0.0005	<0.0001	0.00013	0.00015	0.00012	<0.0005	<0.0005	0.00013	0.00025
Arsenic	0.00002 - 0.001	0.00007	0.00008	0.0002	<0.0001	0.0001	0.00017	0.00016	0.00014	0.0002	<0.0001	0.00014	0.0003
Barium	0.00002 - 0.001	0.0159	0.0173	0.007		0.055	0.0455	0.0513	0.0401		0.054	0.0516	0.132
Beryllium	0.00001 - 0.005	<0.00001	<0.00001	<0.0001	<0.0001	<0.005	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.0001	0.00005
Bismuth	0.000005 - 0.1	<0.000005	<0.000005	<0.001	<0.001	<0.1	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.0005	0.0005
Boron	0.05 - 0.1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.025
Cadmium	0.000005 - 0.0002	0.000327	0.000311	0.00023	0.00027	<0.0002	0.000128	0.000134	0.000148	0.00016	0.00018	0.000184	0.00008
Calcium	0.05	36.8	41.3	14.4	36.1	19.5	23.6	26	19.3	17.2	25.3	26.5	38.1
Chromium	0.0001 - 0.001	<0.0001	<0.0001	0.001	<0.001	<0.001	<0.0001	<0.0001	0.0001	<0.001	<0.001	<0.0001	0.0005
Cobalt	0.000005 - 0.001	0.000021	0.000006	<0.0005	<0.0005	<0.001	0.00005	0.000058	0.00003	<0.0005	<0.0005	<0.0001	0.0005
Copper	0.00005 - 0.001	0.00144	0.00089	0.0056	0.0017	0.007	0.00244	0.0021	0.0021	0.0038	0.0008	0.00273	0.0011
Iron	0.001 - 0.03	0.002	0.006	0.083	0.009	0.05	0.011	0.006	0.007	0.024	0.014	<0.01	0.013
Lead	0.000005 - 0.001	0.000047	0.000069	0.0005	<0.0002	0.003	0.00119	0.00153	0.00113	0.0029	0.0014	0.00245	0.0001
Lithium	0.0005 - 0.005	0.0011	0.0011	<0.005	<0.005		0.0007	0.0005	0.0006	<0.005	<0.005	0.00063	0.0025
Magnesium	0.001 - 0.05	6.43	6.72	2.24	6.2	3.8	4.87	5.52	3.96	3.63	5.2	5.44	16.1
Manganese	0.00005 - 0.005	0.00026	0.00018	0.001		<0.005	0.00135	0.00069	0.00019		0.003	0.00122	0.14
Mercury	0.00000001 - 0.00002	<0.00001	<0.00001	<0.00002	<0.00002		<0.00001	<0.00001	<0.00001	<0.00002	<0.00002	<0.00001	0.00001
Molybdenum	0.00005 - 0.001	0.00017	0.00019	<0.001	<0.001	<0.001	0.0009	0.00096	0.00072	<0.001	<0.001	0.000721	0.003
Nickel	0.00002 - 0.001	0.00078	0.0002	0.001	<0.001	<0.001	0.00022	0.00052	0.0002	<0.001	<0.001	<0.0005	0.003
Phosphorus	0.002											<0.05	
Potassium	0.05	0.66	0.62	0.37	0.6	0.87	0.77	0.84	0.7	0.69	0.88	0.91	2.39
Selenium	0.00004 - 0.0005	<0.00004	<0.00004	<0.0001	<0.0001	<0.0005	<0.00004	<0.00004	<0.00004	<0.0001	<0.0001	<0.0001	0.0001
Silicon	0.00002 - 0.1	4.2	4.6	2.51	4.3	5.33	5.4	5.5	6	5.94	6	6.8	5.42
Silver	0.000005 - 0.0001	<0.000005	<0.000005		<0.00002	<0.0001	0.000013	<0.000005	0.000014	<0.00002	<0.00002	<0.00001	0.00001
Sodium	0.05	1.57	1.54	0.57	1.51	1.92	1.59	1.88	1.37	1.23	2.23	1.77	9.27
Strontium	0.00005 - 0.001	0.2	0.229	0.081		0.123	0.142	0.161	0.119		0.164	0.163	0.193
Sulphur	1.0 - 10.0	<10	<10	<3	5		<3	<10	<10	<3	3	0.63	11
Thallium	0.000002 - 0.00005	0.000003	0.000003	<0.00005	<0.00005		0.000007	0.000005	0.000007	<0.00005	<0.00005	<0.00001	0.000025
Tin	0.00001 - 0.005	<0.00001	<0.00001	<0.005	<0.005		0.00018	0.00005	0.00002	<0.005	<0.005	0.00013	0.0025
Titanium	0.0005 - 0.01	<0.0005	<0.0005	<0.005	<0.005	<0.01	0.0005	<0.0005	0.0006	<0.005	<0.005	<0.01	0.0025
Uranium	0.000002 - 0.0001	0.00173	0.00204	0.0004	0.0016	0.00124	0.00355	0.00403	0.0013	0.0016	0.0022	0.00257	0.0057
Vanadium	0.0002 - 0.03	<0.0002	<0.0002	<0.005	<0.005	<0.03	<0.0002	<0.0002	0.0002	<0.005	<0.005	<0.001	0.0025
Zinc	0.0001 - 0.005	0.033	0.0285	0.042	0.041	0.011	0.0066	0.0086	0.0077	0.025	0.018	0.0268	0.005
Zirconium	0.0001 - 0.0005	<0.0001	<0.0001	<0.0005	<0.0005		<0.0001	<0.0001	<0.0001	<0.0005	<0.0005		0.00025
Total Metals													
Aluminum	0.0002 - 0.003			1.68	0.058	0.603				0.094	0.703	0.586	2.41
Antimony	0.00002 - 0.0005			<0.0005	<0.0005	0.0001				<0.0005	<0.0005	0.00029	0.00025
Arsenic	0.00002 - 0.0001			0.0008	<0.0001	0.0005				<0.0001	0.0007	0.00075	0.001
Barium	0.00002 - 0.001			0.026	0.015	0.077				0.037	0.059	0.0616	0.217
Beryllium	0.00001 - 0.005			<0.0001	<0.0001	<0.005				<0.0001	<0.0001	<0.0001	0.00005
Bismuth	0.000005 - 0.1			<0.001	<0.001	<0.1				<0.001	<0.001	<0.0005	0.0005
Boron	0.05 - 0.1			<0.05	<0.05	<0.1				<0.05	<0.05	<0.01	0.025
Cadmium	0.000005 - 0.0002			0.0003	0.00031	<0.0002				0.00015	0.00021	0.000224	0.00014
Calcium	0.05			15.9	36.1	20.2				16	23.5	26.5	36.3
Chromium	0.0001 - 0.001			0.004	<0.001	0.002				<0.001	<0.001	0.00169	0.001
Cobalt	0.000005 - 0.001			<0.0005	<0.0005	0.002				<0.0005	0.0006	0.00041	0.0018
Copper	0.00005 - 0.0002			0.0074	0.0017					0.0042	0.0038	0.00788	0.0054
Iron	0.001 - 0.005			1.51	0.051	0.764				0.111	1.2	1.15	3.18
Lead	0.000005 - 0.0002			0.0039	0.0003	0.104				0.0079	0.04	0.0303	0.0023
Lithium	0.0005 - 0.005			<0.005	<0.005					<0.005	<0.005	0.00089	0.0025
Magnesium	0.001 - 0.05			2.56	6.16	3980				3.53	5.01	5.54	14.1
Manganese	0.00005 - 0.001			0.03		0.061					0.031	0.0253	0.359
Mercury	0.00001 - 0.00002			<0.00002	<0.00002	<0.00001				<0.00002	<0.00002	0.000026	0.00001
Molybdenum	0.00005 - 0.001			<0.001	<0.001	<0.001				<0.001	<0.001	0.000906	0.003
Nickel	0.00002 - 0.001			0.003	<0.001	0.002				<0.001	0.001	0.00149	0.004
Phosphorus	0.000002 - 0.002					0.00012						<0.00005	
Potassium	0.05			0.78	0.56					0.65	1.02	1.11	3.03
Selenium	0.00004 - 0.1			<0.0001	<0.0001	<0.0005				<0.0001	<0.0001	<0.0001	0.0001
Silicon	0.1			5.01		5.82					6.4	7.92	8.82
Silver	0.000005 - 0.0001			0.00033	0.00003	<0.0001				0.00018	0.00078	0.000794	0.00006
Sodium	0.05			1.03	1.42					1.18	2.1	1.76	7.28
Strontium	0.00005 - 0.001			0.089	0.208	0.128				0.105	0.159	0.162	0.174
Sulphur	3.0 - 10.0			<3	4					<3	<3	0.64	8
Thallium	0.000002 - 0.00005			<0.00005	<0.00005					<0.00005	<0.00005	0.000025	0.00015
Tin	0.0002 - 0.005			<0.005	<0.005					<0.005	<0.005	0.00093	0.0025
Titanium	0.0005 - 0.01			0.041		<0.01					0.026	0.018	0.07
Uranium	0.000002 - 0.0001			0.0006	0.0016	0.0015				0.0016	0.0028	0.00277	0.005
Vanadium	0.0002 - 0.03			<0.005	<0.005	<0.03				<0.005	<0.005	0.0016	0.0025
Zinc	0.0001 - 0.005			0.06	0.048	0.031				0.028	0.028	0.0357	0.014
Zirconium	0.0001 - 0.0005			0.0005	<0.0005					<0.0005	<0.0005		0.00025
Organics													
Dissolved Organic Carbon													3.7
Total Organic Carbon	0.5 - 5.0	5.1	2.3	15.1	3.6	12	5	6.1	5.3	8.6	1.2	6.13	

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	MW11-01B 24-Sep-11	MW11-02A 24-Sep-11	MW11-02A 27-May-12	MW11-02A 17-Sep-12	*MW11-02A* *12-Jun-13*	*MW11-02A* *5-Aug-13*	*MW11-02A* *27-Sep-13*	*MW11-02A* *24-May-14*	*MW11-02A* *24-Jul-14*	*MW11-02A* *29-Sep-14*	MW11-02B 24-Sep-11	MW11-02B 27-May-12
Calculated Parameters													
Ion Balance Ratio	0.01			1	0.91						*0.97*		0.97
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5			<0.5	<0.5								<0.5
Acidity to pH 8.3 (as CaCO3)	0.5			2.14	1.34		*1.1*						0.81
Alkalinity (PP as CaCO3)	0.5	0.25	<0.5									<0.5	
Alkalinity (Total as CaCO3)	0.5	98	160	159	163	*169*	*172*	*169*	*158*	*174*	*170*	130	147
Bicarbonate Alkalinity	0.5	120	200			*169*	*172*	*169*	*158*	*173*	*170*	160	
Carbonate Alkalinity	0.5	0.25	<0.5			*<2*	*<2*	*<2*	*<1*	*<1*	*<1*	<0.5	
Conductivity µS/cm	1	276	355	340	340	*333*	*327*	*332*	*326*	*340*	*337*	403	331
Hardness as CaCO3 (Dissolved)	0.5	109	156	165	147	*170*	*168*	*166*	*174*	*177*	*178*	164	143
Hardness as CaCO3 (Total)	0.5	159	155	175	167							168	157
Hydroxide Alkalinity	0.5	0.25	<0.5			*<2*	*<2*	*<2*	*<1*	*<1*	*<1*	<0.5	
pH (pH)	0	7.43	8.16	7.98	8.04	*8.23*	*8.21*	*7.95*	*8.17*	*8.33*	*8.22*	8.13	8.13
Total Dissolved Solids	1.0 - 10.0	190	240	184	196	*192*	*204*	*192*	*200*	*197*	*204*	260	170
Total Suspended Solids	1	820	2	4.1	6.1	*16*	*<3*	*4.5*	*4.5*	*5.5*	*3.3*	33	8
Turbidity (NTU)	0.1	442	20.1	3.53	4.71	*5.96*	*1.46*	*1.75*	*6.38*	*6.32*	*2.3*	24.2	6.62
Dissolved Anions													
Bromide	0.01 - 0.4			<0.01	<0.01	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*		0.011
Chloride	0.5	2.2	1.4	0.54	<0.5	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	12	1.7
Fluoride	0.01	0.04	0.11	0.09	0.093	*0.094*	*0.096*	*0.094*	*0.093*	*0.096*	*0.082*	0.1	0.15
Sulphate	0.5	35	26	18.8	18.3	*20.2*	*18.1*	*18.1*	*17.3*	*17.5*	*17.4*	61	25.5
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 - 0.05	0.03	0.014	0.022	0.028	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.019	0.014
Nitrate (as N)	0.002 - 0.02	0.93	<0.02	<0.002	0.0144	*1.8*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.02	<0.002
Nitrate+Nitrite (Dissolved)	0.002 - 0.02	0.96	<0.02	<0.002	0.0176						*<0.001*	<0.02	<0.002
Nitrite (as N)	0.002 - 0.005	0.033	<0.005	<0.002	0.0032	*0.0015*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*0.07*	0.009	<0.002
Nitrogen (Total)	0.02			0.033	0.08	*1.78*	*0.073*	*<0.05*	*<0.05*	*0.062*	*0.07*		0.149
Nitrogen Kjeldahl (Total)	0.02			0.033	0.062		*<0.05*	*0.074*	*<0.05*	*0.062*			0.149
Orthophosphate (Dissolved)	0.001 - 0.005			0.011	0.0061	*0.0035*			*0.0021*		*0.0028*		0.0012
Phosphorus Dissolved	0.002					*0.0054*	*0.0024*	*0.0029*	*0.002*	*<0.002*	*<0.002*		
Cyanide													
Cyanide (SAD)	0.001										*<0.005*		
Cyanide (WAD)	0.0005			<0.0005	<0.0005	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*		<0.0005
Cyanide+Thiocyanate	0.0005 - 0.001	0.00025	<0.0005	<0.0005	<0.0005						*<0.005*	<0.0005	<0.0005
Dissolved Metals													
Aluminum	0.0002 - 0.005	0.007	0.006	0.00409	0.00339	*0.0074*	*0.0036*	*0.0026*	*0.0024*	*0.0024*	*0.0025*	0.008	0.00411
Antimony	0.00002 - 0.0005	0.00025	<0.0005	0.000043	0.00002	*0.00021*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.0035	0.000117
Arsenic	0.00002 - 0.001	0.00005	0.0006	0.00103	0.000955	*0.00107*	*0.00093*	*0.00077*	*0.00101*	*0.00099*	*0.00104*	0.0018	0.00238
Barium	0.00002 - 0.001	0.248	0.106	0.0911	0.0924	*0.0843*	*0.0907*	*0.0999*	*0.0921*	*0.0954*	*0.0929*	0.125	0.0952
Beryllium	0.00001 - 0.005	0.00005	<0.0001	<0.00001	<0.00001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	<0.0001	<0.00001
Bismuth	0.000005 - 0.1	0.0005	<0.001	<0.000005	<0.000005	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	<0.001	<0.000005
Boron	0.05 - 0.1	0.025	<0.05	<0.05	<0.05	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	<0.05	<0.05
Cadmium	0.000005 - 0.0002	0.00123	0.00003	0.0000106	0.000009	*0.000017*	*<0.00001*	*<0.00001*	*0.000012*	*<0.00001*	*<0.00001*	0.00012	<0.000005
Calcium	0.05	32.8	39.4	42	35.7	*44*	*43.1*	*42.3*	*44.2*	*45.1*	*45.6*	39.5	32
Chromium	0.0001 - 0.001	0.0005	<0.001	<0.0001	0.00016	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*0.00023*	<0.001	0.00011
Cobalt	0.000005 - 0.001	0.00025	<0.0005	0.000479	0.000354	*0.00018*	*0.00022*	*0.0002*	*0.00023*	*0.00017*	*0.00016*	<0.0005	0.000158
Copper	0.00005 - 0.001	0.0004	<0.0002	0.000274	0.0407	*0.00131*	*<0.0002*	*<0.0002*	*0.00067*	*<0.0002*	*<0.0002*	0.0022	0.00231
Iron	0.001 - 0.03	0.011	0.01	0.0373	0.0899	*0.036*	*0.132*	*0.111*	*0.186*	*0.247*	*0.254*	0.013	0.136
Lead	0.000005 - 0.001	0.0001	<0.0002	0.0000539	0.000016	*0.00738*	*0.000101*	*0.000057*	*0.000067*	*0.000076*	*<0.00005*	<0.0002	0.00032
Lithium	0.0005 - 0.005	0.0025	<0.005	0.00263	0.00252	*0.00294*	*0.00189*	*0.00238*	*0.00269*	*0.00241*	*0.00293*	<0.005	0.00281
Magnesium	0.001 - 0.05	6.66	14.1	14.5	14.1	*14.5*	*14.7*	*14.7*	*15.4*	*15.7*	*15.5*	16	15.4
Manganese	0.00005 - 0.005	0.054	0.087	0.6	0.447	*0.208*	*0.334*	*0.52*	*0.37*	*0.437*	*0.358*	0.143	0.938
Mercury	0.00000001 - 0.00002	0.00001	<0.00002	<0.00001	<0.00000001	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	<0.00002	<0.00001
Molybdenum	0.00005 - 0.001	0.0005	0.001	0.00164	0.000904	*0.000563*	*0.000692*	*0.00116*	*0.000643*	*0.000796*	*0.000722*	0.016	0.0121
Nickel	0.00002 - 0.001	0.002	<0.001	0.000742	0.000794	*0.00068*	*<0.0005*	*0.00055*	*0.00106*	*<0.0005*	*<0.0005*	0.002	0.000407
Phosphorus	0.002			0.0156	0.0092	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*		0.0039
Potassium	0.05	1.72	1.79	1.55	1.51	*1.6*	*1.44*	*1.41*	*1.6*	*1.54*	*1.51*	3.96	2.04
Selenium	0.00004 - 0.0005	0.00005	<0.0001	<0.00004	<0.00004	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	<0.00004
Silicon	0.00002 - 0.1	8.5	4.57	5.01	4.18	*4.85*	*4.74*	*4.62*	*4.92*	*4.86*	*4.88*	2.71	3.44
Silver	0.000005 - 0.0001	0.00001	<0.00002	<0.000005	<0.000005	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	<0.00002	<0.000005
Sodium	0.05	9.21	11.3	6.86	7.1	*6.9*	*7.68*	*7.48*	*6.53*	*6.98*	*6.64*	14.3	10.7
Strontium	0.00005 - 0.001	0.332	0.558	0.583	0.56	*0.559*	*0.54*	*0.539*	*0.561*	*0.582*	*0.585*	0.528	0.514
Sulphur	1.0 - 10.0	12	9	<10	<10	*6.04*	*5.9*	*5.98*	*5.93*	*6.04*	*6.09*	21	<10
Thallium	0.000002 - 0.00005	0.000025	<0.00005	0.0000066	0.000006	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	<0.00005	<0.000002
Tin	0.00001 - 0.005	0.0025	<0.005	<0.0002	<0.0002	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	<0.005	0.00042
Titanium	0.0005 - 0.01	0.0025	<0.005	<0.0005	<0.0005	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	<0.005	<0.0005
Uranium	0.000002 - 0.0001	0.0008	0.0078	0.00596	0.00647	*0.00727*	*0.00594*	*0.00497*	*0.00609*	*0.00576*	*0.0064*	0.0031	0.000925
Vanadium	0.0002 - 0.03	0.0025	<0.005	<0.0002	<0.0002	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	<0.005	<0.0002
Zinc	0.0001 - 0.005	0.024	0.007	0.00296	0.0415	*0.0055*	*0.107*	*0.0497*	*0.0054*	*0.0038*	*0.0056*	0.116	0.00234
Zirconium	0.0001 - 0.0005	0.00025	<0.0005	<0.0001	<0.0001							<0.0005	<0.0001
Total Metals													
Aluminum	0.0002 - 0.003	17.3	0.911	0.0416	0.0578	*0.264*	*0.0884*	*0.0438*	*0.0361*	*0.0664*	*0.0128*	0.991	0.0813
Antimony	0.00002 - 0.0005	0.0006	0.0011	0.000078	0.000033	*0.00024*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.0029	0.000198
Arsenic	0.00002 - 0.0001	0.0068	0.0015	0.00107	0.00103	*0.00143*	*0.00121*	*0.00106*	*0.00119*	*0.00128*	*0.00114*	0.0029	0.00298
Barium	0.00002 - 0.001	0.808	0.13	0.1	0.1	*0.0967*	*0.0957*	*0.103*	*0.0983*	*0.1*	*0.0946*	0.133	0.109
Beryllium	0.00001 - 0.005	0.001	<0.0001	<0.00001	<0.00001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	<0.0001	<0.00001
Bismuth	0.000005 - 0.1	0.0005	<0.001	<0.000005	<0.000005	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	<0.001	<0.000005
Boron	0.05 - 0.1	0.025	<0.05	<0.05	<0.05	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*0.01*	<0.05	<0.05
Cadmium	0.000005 - 0.0002	0.00489	0.00024	0.0000309	0.000022	*0.000048*	*0.000023*	*0.000013*	*0.000013*	*0.000017*	*<0.00001*	0.00013	0.0000268
Calcium	0.05	43.6	39.4	45.1	42.2	*43.9*	*43.1*	*43.9*	*45.8*	*45.9*	*45.5*	38.7	35.3
Chromium	0.0001 - 0.001	0.007	0.006	0.00017	0.00384	*0.00037*	*0.0003*	*0.00019*	*0.00024*	*0.00059*	*0.00059*	0.002	0.00021
Cobalt	0.000005 - 0.001	0.0092	0.0006	0.000649	0.000489	*0.00026*	*0.00028*	*0.00023*	*0.00024*	*0.00023*	*0.00018*	0.0005	0.00026
Copper	0.00005 - 0.0002	0.0164	0.0076	0.00163	0.0705	*0.00294*	*0.00079*	*0.00054*	*0.00083*	*0.00104*	*0.00104*	0.0046	0.00227
Iron	0.001 - 0.005	24.8	1.32	0.171	0.231	*0.382*	*0.308*	*0.388*	*1.11*	*0.986*	*0.36*	1.02	0.52
Lead	0.000005 - 0.0002	0.0255	0.0197	0.00107	0.000447	*0.0113*	*0.00386*	*0.00242*	*0.00224*	*0.00308*	*0.000369*	0.0062	0.00131
Lithium	0.0005 - 0.005	0.012	<0.005	0.00272	0.00285	*0.00303*	*0.00204*	*0.00278*	*0.00273*	*0.00253*	*0.0027*	<0.005	0.00293
Magnesium	0.001 - 0.05	12.3	13.6	15.2	14.9	*14.9*	*14.9*	*15.3*	*16.1*	*15.9*	*15.5*	17.3	16.7
Manganese	0.00005 - 0.001	0.948	0.128	0.784	0.474	*0.239*	*0.367*	*0.46*	*0.395*	*0.474*	*0.348*	0.161	1.03
Mercury	0.00001 - 0.00002	0.00001	<0.00002	<0.00001	<0.00001	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	<0.00002	<0.00001
Molybdenum	0.00005 - 0.001	0.001	0.001	0.00133	0.000923	*0.000651*	*0.000785*	*0.000955*	*0.000698*	*0.000888*	*0.00073*	0.014	0.0122
Nickel	0.00002 - 0.001	0.012	0.004	0.00089	0.00233	*0.00069*	*<0.0005*	*0.00054*	*0.00094*	*<0.0005*	*0.00053*	0.003	0.000427
Phosphorus	0.000002 - 0.002			0.0205	0.0186	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.00005*	*<0.05*		0.0122
Potassium	0.05	5.73	2.05	1.65	1.6	*1.75*	*1.51*	*1.53*	*1.7*	*1.55*	*1.51*	3.55	2.22
Selenium	0.00004 - 0.1	0.0002	<0.0001	<0.00004	<0.00004	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	<0.00004
Silicon	0.1	37.1	5.65	5.44	5.01	*5.45*	*4.86*	*4.95*	*5.12*	*5.04*	*4.89*	4.32	4.05
Silver	0.000005 - 0.0001	0.00025	0.00019	0.0000164	0.000005	*0.000056*	*0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	0.00005	0.0000076
Sodium	0.05	11.3	11	7.14	7.77	*7.23*	*7.68*	*7.24*	*6.92*	*7.16*	*6.84*	14.3	11.5
Strontium	0.00005 - 0.001	0.421	0.501	0.611	0.631	*0.591*	*0.568*	*0.587*	*0.62*	*0.603*	*0.579*	0.507	0.536
Sulphur	3.0 - 10.0	12	9	<10	<10	*6.27*	*6.16*	*6.28*	*6.22*	*6.16*	*6.19*	20	<10
Thallium	0.000002 - 0.00005	0.00035	<0.00005	0.0000063	0.000009	*0.000017*	*0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	0.00005	0.0000036
Tin	0.0002 - 0.005	0.0025	<0.005	<0.0002	<0.0002	*0.00028*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	<0.005	0.00036
Titanium	0.0005 - 0.01	0.476	0.042	0.00192	0.0013	*0.014*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.021	0.00298
Uranium	0.000002 - 0.0001	0.0043	0.007	0.00588	0.00672	*0.00809*	*0.00641*	*0.0058*	*0.00647*	*0.00581*	*0.00676*	0.0031	0.000941
Vanadium	0.0002 - 0.03	0.035	<0.005	0.00025	<0.0002	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	<0.005	0.00029
Zinc	0.0001 - 0.005	0.215	0.502	0.00456	0.0666	*0.0135*	*0.136*	*0.0475*	*0.025*	*0.0265*	*0.008*	0.104	0.00531
Zirconium	0.0001 - 0.0005	0.0017	<0.0005	<0.0001	<0.0001							<0.0005	<0.0001
Organics													
Dissolved Organic Carbon		2									*0.76*		
Total Organic Carbon	0.5 - 5.0		1.8	<5	0.67	*0.91*	*0.98*	*1.33*	*0.93*	*0.6*	*0.86*	6.9	<5

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	MW11-02B 17-Sep-12	MW11-02B 12-Jun-13	MW11-02B 4-Aug-13	MW11-02B 27-Sep-13	MW11-02B 24-May-14	MW11-02B 24-Jul-14	MW11-02B 30-Sep-14	MW13-01D 28-Jul-14	MW13-03S 16-Aug-13	MW13-04S 5-Aug-13	MW13-04S 28-Sep-13	MW13-04S 25-May-14
Calculated Parameters													
Ion Balance Ratio	0.01	1						0.97					
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5	<0.5											
Acidity to pH 8.3 (as CaCO3)	0.5	0.85		<1							1.7		
Alkalinity (PP as CaCO3)	0.5												
Alkalinity (Total as CaCO3)	0.5	173	183	194	200	172	201	187	208	106	163	158	168
Bicarbonate Alkalinity	0.5		183	194	200	172	196	187	208	106	163	158	168
Carbonate Alkalinity	0.5		<1	<2	<2	<1	4	<1	<2	<2	<2	<2	<1
Conductivity µS/cm	1	527	394	379	387	361	386	370	1100	1070	331	333	353
Hardness as CaCO3 (Dissolved)	0.5	203	166	156	163	168	171	163	430	336	176	169	197
Hardness as CaCO3 (Total)	0.5	207											
Hydroxide Alkalinity	0.5		<1	<2	<2	<1	<1	<1	<2	<2	<2	<2	<1
pH (pH)	0	8.09	8.35	8.27	8.23	8.24	8.32	8.14	7.66	7.52	8.15	8.29	8.1
Total Dissolved Solids	1.0 - 10.0	316	222	240	204	225	233	218	849	731	209	194	222
Total Suspended Solids	1	26.4	25.1	4.5	9.9	28.9	10.9	3.3	1120	24.7	7.9	56.2	7.1
Turbidity (NTU)	0.1	13.8	16.3	3.04	6.08	14.4	10.8	2.85	637	24.1	6.28	18.9	2.15
Dissolved Anions													
Bromide	0.01 - 0.4	0.028	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.54	<0.5	<0.05	<0.05	<0.05
Chloride	0.5	5.1	0.56	<0.5	<0.5	0.52	<0.5	<0.5	19.9	36.5	<0.5	<0.5	<0.5
Fluoride	0.01	0.13	0.128	0.162	0.145	0.133	0.162	0.129	0.3	0.35	0.105	0.105	0.092
Sulphate	0.5	95	34.7	28.4	25.7	16.9	18.7	17.7	398	434	29.1	29.7	30.2
Thiocyanate	0.2												
Nutrients													
Ammonia (Total)	0.005 - 0.05	0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0504	0.0218	<0.005	<0.005	<0.005
Nitrate (as N)	0.002 - 0.02	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	0.0695	0.0737	0.0489
Nitrate+Nitrite (Dissolved)	0.002 - 0.02	<0.002						<0.001					
Nitrite (as N)	0.002 - 0.005	0.0038	<0.001	<0.001	<0.001	<0.001	<0.001	0.098	<0.01	<0.01	<0.001	0.001	<0.001
Nitrogen (Total)	0.02	0.219	<0.05	<0.05	0.054	0.063	0.058	0.098	0.838	0.822	0.101	0.152	0.109
Nitrogen Kjeldahl (Total)	0.02	0.219	0.107	0.058	0.054	0.063	0.058		0.838	0.822	0.057	0.077	0.06
Orthophosphate (Dissolved)	0.001 - 0.005	0.0029	<0.001			0.0015		<0.002		<0.001			0.001
Phosphorus Dissolved	0.002		<0.002	<0.002	0.0029	<0.002	<0.002	<0.002	0.0041	0.0403	<0.002	<0.002	<0.002
Cyanide													
Cyanide (SAD)	0.001							<0.005					
Cyanide (WAD)	0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide+Thiocyanate	0.0005 - 0.001	<0.0005						<0.005					
Dissolved Metals													
Aluminum	0.0002 - 0.005	0.00988	0.003	0.0017	0.0035	0.0016	0.0017	0.0012	0.004	0.021	0.0027	0.0021	0.0015
Antimony	0.00002 - 0.0005	0.000091	0.00044	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00104	0.00124	<0.0001	<0.0001	<0.0001
Arsenic	0.00002 - 0.001	0.00207	0.00491	0.00398	0.006	0.00439	0.00456	0.00535	0.0147	0.00088	0.00488	0.00456	0.00531
Barium	0.00002 - 0.001	0.172	0.167	0.148	0.154	0.148	0.149	0.128	0.0764	0.0478	0.0224	0.0267	0.0232
Beryllium	0.00001 - 0.005	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	0.000005 - 0.1	<0.000005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.05 - 0.1	<0.05	0.012	<0.01	0.01	<0.01	<0.01	<0.01	0.017	0.012	<0.01	<0.01	<0.01
Cadmium	0.000005 - 0.0002	0.00002	0.000019	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000313	0.00057	0.000317	0.000242	0.000392
Calcium	0.05	47.5	36.5	34.4	36.3	36.3	37.3	35.8	119	99.8	49.2	46.3	54.7
Chromium	0.0001 - 0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	0.00015	0.00222	0.00226	<0.0001
Cobalt	0.000005 - 0.001	0.000192	0.00023	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	0.00713	0.0227	0.00014	0.0001	<0.0001
Copper	0.00005 - 0.001	0.0179	0.00028	<0.0002	<0.0002	0.00064	<0.0002	0.00029	0.00503	0.00688	0.00074	0.00024	0.00048
Iron	0.001 - 0.03	0.0379	<0.01	0.073	0.241	0.072	0.181	<0.01	<0.01	0.027	0.025	<0.01	<0.01
Lead	0.000005 - 0.001	0.000058	0.000207	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000102	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	0.0005 - 0.005	0.00194	0.00364	0.00216	0.00357	0.00328	0.00303	0.0033	0.00931	0.0039	<0.0005	0.00383	0.0011
Magnesium	0.001 - 0.05	20.6	18.1	17.1	17.6	18.9	18.9	17.8	32.4	21.1	12.8	12.9	14.6
Manganese	0.00005 - 0.005	1.48	0.898	0.94	1	0.839	0.87	0.774	1.77	2.51	0.00528	0.0025	0.00136
Mercury	0.00000001 - 0.00002	<0.00000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 - 0.001	0.00997	0.013	0.00739	0.00454	0.00353	0.00312	0.00249	0.0102	0.00405	0.00348	0.00248	0.000485
Nickel	0.00002 - 0.001	0.00174	0.00213	<0.0005	0.00081	0.00368	<0.0005	<0.0005	0.0148	0.0403	0.00504	0.00469	<0.0005
Phosphorus	0.002	0.0038	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium	0.05	2.33	1.92	1.81	2.05	1.92	1.92	1.76	3.15	5.32	1.28	3.63	0.92
Selenium	0.00004 - 0.0005	<0.00004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00046	0.00056	<0.0001	<0.0001	<0.0001
Silicon	0.00002 - 0.1	3.47	4.37	4.16	4.74	4.53	4.81	4.83	3.47	4.71	3.88	3.97	4.17
Silver	0.000005 - 0.0001	<0.000005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001
Sodium	0.05	33.5	23.8	25.1	21.5	15.4	23.3	21.1	89.5	45	3.78	6.71	2.96
Strontium	0.00005 - 0.001	0.674	0.64	0.517	0.603	0.639	0.594	0.546	1.1	0.258	0.177	0.215	0.206
Sulphur	1.0 - 10.0	32	11.5	9.26	8.87	5.77	6.68	6.24	126	103	9.71	10	10.2
Thallium	0.000002 - 0.00005	<0.000002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000038	0.000027	<0.00001	<0.00001	<0.00001
Tin	0.00001 - 0.005	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.00011	0.00021	<0.0001	<0.0001	<0.0001
Titanium	0.0005 - 0.01	<0.0005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	0.000002 - 0.0001	0.00111	0.00248	0.00109	0.001	0.000808	0.000774	0.000993	0.0345	0.00134	0.00687	0.00642	0.00782
Vanadium	0.0002 - 0.03	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.0001 - 0.005	0.00465	0.004	0.0012	0.0021	<0.001	<0.001	0.0028	0.255	0.0212	0.0239	0.0041	0.0309
Zirconium	0.0001 - 0.0005	<0.0001											
Total Metals													
Aluminum	0.0002 - 0.003	0.237	0.588	0.103	0.303	1.02	0.241	0.0587	17	0.669	0.361	0.0853	0.0446
Antimony	0.00002 - 0.0005	0.000145	0.00055	0.00012	0.00012	0.00027	0.00012	<0.0001	0.00209	0.00186	0.00058	0.00016	<0.0001
Arsenic	0.00002 - 0.0001	0.00298	0.00577	0.00436	0.00618	0.00585	0.00519	0.00632	0.0519	0.00216	0.0147	0.00635	0.00555
Barium	0.00002 - 0.001	0.186	0.168	0.157	0.157	0.164	0.149	0.142	0.357	0.0655	0.0519	0.0846	0.0322
Beryllium	0.00001 - 0.005	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00166	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	0.000005 - 0.1	<0.000005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00072	<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.05 - 0.1	<0.05	0.013	0.012	0.013	0.01	0.011	0.014	0.029	0.017	<0.01	<0.01	<0.01
Cadmium	0.000005 - 0.0002	0.000052	0.000176	0.000029	0.000059	0.000269	0.000105	0.000029	0.00176	0.000716	0.000712	0.000461	0.000429
Calcium	0.05	46.5	34.1	35.8	35.7	38.2	36	35.2	119	110	54.8	58.1	57.2
Chromium	0.0001 - 0.001	0.0167	0.00145	0.00038	0.00083	0.00258	0.00141	0.0005	0.0136	0.00101	0.0193	0.0137	0.00028
Cobalt	0.000005 - 0.001	0.000634	0.00042	0.00012	0.00016	0.00041	0.00018	0.00011	0.0134	0.0256	0.00046	0.00023	<0.0001
Copper	0.00005 - 0.0002	0.192	0.0027	0.00091	0.00155	0.00256	0.00268	0.00292	0.0669	0.0137	0.00474	0.00195	0.00085
Iron	0.001 - 0.005	0.759	0.74	0.355	0.55	0.984	0.587	0.38	15.2	1.25	0.651	0.173	0.04
Lead	0.000005 - 0.0002	0.00282	0.00855	0.00126	0.00276	0.0136	0.00573	0.00136	0.124	0.00114	0.0111	0.000745	0.000222
Lithium	0.0005 - 0.005	0.00233	0.00363	0.00208	0.00372	0.00328	0.00314	0.00323	0.0157	0.00434	0.00068	0.00428	0.00094
Magnesium	0.001 - 0.05	22.2	17.6	17.8	17.6	20	18.4	17.5	35.4	23	13.1	14.1	15
Manganese	0.00005 - 0.001	1.66	0.925	1.09	1.02	0.9	0.879	0.9	2.16	2.79	0.0836	0.00845	0.00322
Mercury	0.00001 - 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00002	0.000013	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 - 0.001	0.00995	0.0129	0.00734	0.00475	0.00361	0.00326	0.00269	0.0101	0.00372	0.00516	0.00292	0.00051
Nickel	0.00002 - 0.001	0.00914	0.00143	<0.0005	<0.0005	0.00718	<0.0005	<0.0005	0.0248	0.0481	0.0119	0.00836	<0.0005
Phosphorus	0.000002 - 0.002	0.0172	<0.05	<0.05	<0.05	<0.05	<0.05	<0.00005	<0.05	0.000354	0.053	<0.05	<0.05
Potassium	0.05	2.5	2.13	1.93	2.26	2.51	2	1.75	6.19	5.08	1.4	3.56	0.93
Selenium	0.00004 - 0.1	<0.00004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00045	0.00063	<0.0001	<0.0001	<0.0001
Silicon	0.1	3.55	5.28	4.52	5.3	6.72	5.14	4.88	36.1	5.88	4.65	4.39	4.22
Silver	0.000005 - 0.0001	0.000006	0.000044	<0.00001	0.00003	0.000072	0.000039	<0.00001	0.00568	0.000185	0.000322	0.000022	0.000017
Sodium	0.05	36.2	23.7	26.5	20.9	15.4	23.8	21.6	77.4	47.8	3.73	7.22	3.1
Strontium	0.00005 - 0.001	0.693	0.611	0.555	0.622	0.65	0.605	0.566	1.17	0.285	0.233	0.397	0.238
Sulphur	3.0 - 10.0	35	11.1	9.76	8.86	6.01	6.51	6.24	114	118	9.9	10.1	10.5
Thallium	0.000002 - 0.00005	0.000004	0.000028	<0.00001	0.000016	0.000043	0.000017	<0.00001	0.000458	0.000055	0.000014	<0.00001	<0.00001
Tin	0.0002 - 0.005	0.00682	0.00023	<0.0001	<0.0001	<0.0001	<0.0001	0.00038	0.00246	0.00078	0.00013	0.00011	<0.0001
Titanium	0.0005 - 0.01	0.00807	0.011	<0.01	<0.01	0.02	<0.01	<0.01	0.058	0.015	<0.01	<0.01	<0.01
Uranium	0.000002 - 0.0001	0.00115	0.00256	0.000993	0.00109	0.00104	0.000852	0.00101	0.0394	0.00156	0.00758	0.00809	0.00846
Vanadium	0.0002 - 0.03	0.00041	0.0015	<0.001	<0.001	0.0018	<0.001	<0.001	0.0208	0.0022	<0.001	<0.001	<0.001
Zinc	0.0001 - 0.005	0.025	0.0118	0.0038	0.0051	0.008	0.0065	0.0061	0.676	0.0266	0.0559	0.0382	0.0343
Zirconium	0.0001 - 0.0005	0.00017											
Organics													
Dissolved Organic Carbon								2.28					
Total Organic Carbon	0.5 - 5.0	8.69	4.12	3.07	3.48	2.52	3.38	2.89	42.3	23.2	2.05	4.21	1.51

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID Date/Time Sampled	MDL	MW13-04S 24-Jul-14	MW13-04S 30-Sep-14	MW13-05 12-Aug-13	MW13-05 2-Oct-13	MW13-05 22-May-14	MW13-05 25-Jul-14	MW13-05 27-Sep-14	MW13-06D 12-Aug-13	MW13-06D 28-Sep-13	MW13-06D 25-Jul-14	MW13-06D 27-Sep-14
Calculated Parameters												
Ion Balance Ratio	0.01		0.99					0.98				0.96
Physical Tests												
Acidity to pH 4.5 (as CaCO3)	0.5											
Acidity to pH 8.3 (as CaCO3)	0.5											
Alkalinity (PP as CaCO3)	0.5											
Alkalinity (Total as CaCO3)	0.5	168	168	203	194	203	202	205	285	372	393	381
Bicarbonate Alkalinity	0.5	165	168	203	194	203	202	205	285	372	393	381
Carbonate Alkalinity	0.5	2.8	<1	<2	<1	<2	<2	<1	<2	<2	<2	<1
Conductivity µS/cm	1	356	344	394	379	387	409	410	887	909	984	954
Hardness as CaCO3 (Dissolved)	0.5	190	174	204	200	222	227	224	511	553	612	592
Hardness as CaCO3 (Total)	0.5											
Hydroxide Alkalinity	0.5	<1	<1	<2	<1	<2	<2	<1	<2	<2	<2	<1
pH (pH)	0	8.4	8.17	8.24	8.29	8.12	8.27	8.17	7.95	8.09	7.91	7.98
Total Dissolved Solids	1.0 - 10.0	211	202	222	215	229	241	243	522	617	691	670
Total Suspended Solids	1	5.7	14	<3	<3	4	<3	<3	<3	3.5	12.8	3.3
Turbidity (NTU)	0.1	1.43	2.2	4.05	0.23	2.4	0.71	0.14	5.7	3.38	13.7	0.39
Dissolved Anions												
Bromide	0.01 - 0.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.05	<0.5
Chloride	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<5
Fluoride	0.01	0.105	0.099	0.108	0.106	0.112	0.112	0.094	0.35	0.2	0.275	0.22
Sulphate	0.5	30.2	30.4	19	17	20.7	22.2	20.6	174	193	195	189
Thiocyanate	0.2											
Nutrients												
Ammonia (Total)	0.005 - 0.05	<0.005	<0.005	<0.005	<0.005	0.0095	<0.005	<0.005	<0.005	<0.005	0.0059	<0.005
Nitrate (as N)	0.002 - 0.02	0.0711	0.0838	0.447	0.468	0.348	0.363	0.469	0.083	0.079	0.0392	<0.05
Nitrate+Nitrite (Dissolved)	0.002 - 0.02		<0.001					<0.001				<0.01
Nitrite (as N)	0.002 - 0.005	<0.001	0.165	0.0024	0.0013	<0.001	<0.001	0.543	<0.01	<0.01	<0.001	<0.071
Nitrogen (Total)	0.02	0.143	0.081	0.53	0.558	0.432	0.43	0.074	0.137	0.14	0.105	<0.05
Nitrogen Kjeldahl (Total)	0.02	0.072	<0.001	0.08	0.089	0.083	0.067		0.054	0.062	0.065	
Orthophosphate (Dissolved)	0.001 - 0.005		0.0025	<0.001		<0.001		0.0021	<0.001			0.0026
Phosphorus Dissolved	0.002	<0.002	0.0025	<0.002	<0.002	0.0021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cyanide												
Cyanide (SAD)	0.001		<0.005					<0.005				<0.005
Cyanide (WAD)	0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide+Thiocyanate	0.0005 - 0.001		<0.005					<0.005				<0.005
Dissolved Metals												
Aluminum	0.0002 - 0.005	0.0014	0.0013	0.0017	0.0017	0.0024	0.0011	0.0014	0.0023	0.0028	0.002	0.0013
Antimony	0.00002 - 0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	0.00012	<0.0001	<0.0001
Arsenic	0.00002 - 0.001	0.00541	0.00539	0.00011	0.00011	<0.0001	0.0001	<0.0001	0.00017	0.00018	0.00017	0.00014
Barium	0.00002 - 0.001	0.0286	0.0242	0.0748	0.0692	0.0766	0.0772	0.077	0.0142	0.0159	0.0151	0.0121
Beryllium	0.00001 - 0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	0.000005 - 0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.05 - 0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01
Cadmium	0.000005 - 0.0002	0.000385	0.000334	<0.00001	<0.00001	0.000026	<0.00001	<0.00001	0.000037	0.000057	0.000039	0.000029
Calcium	0.05	53.5	48.7	56.3	55.6	61.3	63	62.3	117	129	140	139
Chromium	0.0001 - 0.001	0.00032	0.00091	0.00181	0.00216	0.00151	0.0017	0.0013	0.0022	0.00497	0.0059	0.00176
Cobalt	0.000005 - 0.001	<0.0001	<0.0001	0.0004	0.00011	0.00041	<0.0001	<0.0001	0.0007	0.00079	0.00067	0.00023
Copper	0.00005 - 0.001	0.00029	0.00075	0.00049	0.001	0.00491	0.00083	0.00307	0.00052	0.00209	0.00202	0.00641
Iron	0.001 - 0.03	<0.01	<0.01	0.03	0.01	0.017	0.013	<0.01	0.045	0.05	0.105	0.015
Lead	0.000005 - 0.001	<0.00005	<0.00005	<0.00005	<0.00005	0.00033	<0.00005	0.000136	0.000058	<0.00005	<0.00005	0.000472
Lithium	0.0005 - 0.005	0.00407	0.00623	0.00114	0.00128	0.00129	0.00109	0.00179	0.0175	0.0205	0.022	0.0218
Magnesium	0.001 - 0.05	13.8	12.8	15.4	14.8	16.8	16.9	16.5	53	55.8	63.4	59.7
Manganese	0.00005 - 0.005	0.000551	0.000537	0.0253	0.0104	0.00777	0.00278	0.00172	0.057	0.0852	0.0561	0.0359
Mercury	0.00000001 - 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 - 0.001	0.000511	0.000841	0.0065	0.00521	0.00732	0.00453	0.00438	0.00291	0.00421	0.00456	0.000908
Nickel	0.00002 - 0.001	<0.0005	<0.0005	0.00419	0.00225	0.0127	0.00179	0.00154	0.00659	0.0117	0.0181	0.00317
Phosphorus	0.002	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium	0.05	2.27	2.59	0.84	0.98	0.92	0.88	0.85	1.66	2.13	1.81	1.76
Selenium	0.00004 - 0.0005	<0.0001	<0.0001	0.00018	0.00013	0.00011	0.00011	0.00015	0.00139	0.00158	0.00115	0.00125
Silicon	0.00002 - 0.1	4.03	4.02	4.65	4.87	5.15	4.98	4.85	3.69	4.08	4.2	4.11
Silver	0.000005 - 0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	0.05	5.32	9.03	3.56	3.35	3.72	3.78	3.65	2.6	2.83	2.97	2.62
Strontium	0.00005 - 0.001	0.21	0.201	0.443	0.477	0.487	0.494	0.504	0.314	0.354	0.366	0.351
Sulphur	1.0 - 10.0	10	10.4	6.4	5.88	7.23	7.47	7.23	55.4	63.6	65	62.7
Thallium	0.000002 - 0.00005	<0.00001	<0.00001	0.000013	<0.00001	<0.00001	<0.00001	<0.00001	0.000259	0.000325	0.000456	0.000329
Tin	0.00001 - 0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00014	<0.0001	<0.0001
Titanium	0.0005 - 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	0.000002 - 0.0001	0.00697	0.00677	0.0123	0.0115	0.014	0.0134	0.0141	0.00377	0.0041	0.00444	0.00431
Vanadium	0.0002 - 0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.0001 - 0.005	0.0321	0.0302	0.0013	0.0013	0.0083	0.01	0.0037	0.0063	0.0067	0.0165	0.0116
Zirconium	0.0001 - 0.0005											
Total Metals												
Aluminum	0.0002 - 0.003	0.0182	0.0042	0.0301	0.0078	0.0645	0.0237	0.0046	0.0772	0.0826	0.156	0.0166
Antimony	0.00002 - 0.0005	0.00012	<0.0001	0.00011	<0.0001	0.00033	0.00013	<0.0001	0.00014	0.00016	0.00015	<0.0001
Arsenic	0.00002 - 0.0001	0.00539	0.00553	0.00035	0.00017	0.0002	0.00018	0.00011	0.00085	0.00063	0.0012	0.00017
Barium	0.00002 - 0.001	0.0421	0.0259	0.0771	0.0727	0.0769	0.0796	0.0788	0.0191	0.0192	0.0326	0.0123
Beryllium	0.00001 - 0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	0.000005 - 0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.05 - 0.1	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.013	<0.01	0.015
Cadmium	0.000005 - 0.0002	0.000369	0.000376	0.000025	0.000011	0.000028	<0.00001	<0.00001	0.000061	0.00005	0.000058	0.000032
Calcium	0.05	49.1	52.3	56.2	55.9	61	64.4	62.3	119	132	136	136
Chromium	0.0001 - 0.001	0.00088	0.00087	0.00897	0.00373	0.0226	0.00604	0.00266	0.0116	0.0107	0.044	0.00442
Cobalt	0.000005 - 0.001	<0.0001	<0.0001	0.00099	0.00015	0.00074	0.00016	<0.0001	0.00134	0.00084	0.00115	0.00024
Copper	0.00005 - 0.0002	0.00105	0.00106	0.0017	0.00124	0.00758	0.00184	0.00358	0.00297	0.00278	0.0057	0.00636
Iron	0.001 - 0.005	0.04	<0.01	0.183	0.028	0.228	0.078	0.02	0.278	0.201	0.714	0.051
Lead	0.000005 - 0.0002	0.000358	0.000071	0.000683	<0.00005	0.00266	0.000109	<0.0002	0.00105	0.000259	0.000739	0.000637
Lithium	0.0005 - 0.005	0.00634	0.0023	0.00073	0.00121	0.0018	0.00132	0.00173	0.0175	0.0205	0.021	0.0188
Magnesium	0.001 - 0.05	12.6	13.4	15.3	15.2	16.6	17.1	16.6	53.7	56	60.9	58.7
Manganese	0.00005 - 0.001	0.00206	0.000827	0.0324	0.0111	0.0105	0.00386	0.002	0.0681	0.0928	0.0753	0.0343
Mercury	0.00001 - 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 - 0.001	0.000612	0.000564	0.00692	0.0057	0.00858	0.00524	0.00434	0.00336	0.00366	0.00619	0.00103
Nickel	0.00002 - 0.001	<0.0005	<0.0005	0.00633	0.00254	0.0198	0.0043	0.00181	0.00848	0.00962	0.029	0.00392
Phosphorus	0.000002 - 0.002	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.00005	<0.05
Potassium	0.05	3.2	1.31	0.85	1.06	0.9	0.92	0.84	1.73	2.22	1.83	1.72
Selenium	0.00004 - 0.1	<0.0001	<0.0001	0.00018	0.00014	0.00012	0.00012	0.00014	0.00141	0.00135	0.00103	0.00106
Silicon	0.1	3.73	4	4.67	4.9	5.22	5.12	4.86	3.97	4.44	4.47	4.12
Silver	0.000005 - 0.0001	<0.00001	<0.00001	0.000777	0.00001	0.000022	0.000011	<0.00001	0.000757	0.000055	0.000202	<0.00001
Sodium	0.05	6.83	4.61	3.57	3.48	3.77	3.83	3.72	2.67	2.93	2.95	2.57
Strontium	0.00005 - 0.001	0.232	0.207	0.454	0.487	0.492	0.521	0.485	0.336	0.378	0.361	0.367
Sulphur	3.0 - 10.0	9.32	10.1	6.51	6.04	7.36	7.74	7.32	59	66.2	64.7	63.8
Thallium	0.000002 - 0.00005	<0.00001	<0.00001	0.000013	<0.00001	0.000011	0.000013	<0.00001	0.000334	0.000375	0.000574	0.000313
Tin	0.0002 - 0.005	<0.0001	<0.0001	<0.0001	<0.0001	0.00034	<0.0001	<0.0001	<0.0001	0.00022	0.00024	<0.0001
Titanium	0.0005 - 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	0.000002 - 0.0001	0.00678	0.00752	0.0128	0.0121	0.0141	0.0145	0.0137	0.00403	0.0043	0.00448	0.0042
Vanadium	0.0002 - 0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.0001 - 0.005	0.0332	0.0366	0.0036	0.0032	0.01	0.0135	0.0049	0.0077	0.0081	0.0225	0.0118
Zirconium	0.0001 - 0.0005											
Organics												
Dissolved Organic Carbon			3.81					1.58				0.77
Total Organic Carbon	0.5 - 5.0	2.93	2.77	2.25	2.16	1.6	1.21	1.57	1.31	0.91	0.74	0.81

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

CASINO COPPER-GOLD PROJECT
TABLE F4 - CASINO CREEK VALLEY AREA

Site ID	MDL	94-342	94-342	94-342	94-342	94-342	94-342	94-342	94-343	94-343	94-343	94-343	94-345
Date/Time Sampled		25-Sep-94	4-Feb-95	10-Sep-08	23-Sep-09	6-Jun-10	18-Aug-10	13-Sep-10	25-Sep-94	9-Sep-08	23-Sep-09	16-Sep-12	26-Sep-94
Calculated Parameters													
Ion Balance Ratio	0.01				1.1	1.1					1	1	
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5				<0.5	<0.5	<0.5	<0.5			<0.5	<0.5	
Acidity to pH 8.3 (as CaCO3)	0.5				2.1	4.6	7.1	1.7			1.9	5.44	
Alkalinity (PP as CaCO3)	0.5												
Alkalinity (Total as CaCO3)	0.5	233	236	130	140	150	140	130	124	140	140	132	158
Bicarbonate Alkalinity	0.5												
Carbonate Alkalinity	0.5												
Conductivity µS/cm	1	791	806	380	403	422	407	397	295	330	341	331	460
Hardness as CaCO3 (Dissolved)	0.5			184	206	232	188	187		161	172	168	
Hardness as CaCO3 (Total)	0.5	420	441						160			153	252
Hydroxide Alkalinity	0.5												
pH (pH)	0	7.59	7.59	8.1	7.82	8.21	7.75	7.94	6.91	8.1	7.62	7.76	6.91
Total Dissolved Solids	1.0 to 10.0	571	642	280	240	270	220	250	186	220	190	210	308
Total Suspended Solids	1	3	67	280					<1	7		66.8	1
Turbidity (NTU)	0.1	2.56	12.5	42					<0.1	0.5		14.1	0.59
Dissolved Anions													
Bromide	0.01 to 0.4			0.2	<0.4	<0.4	<0.4	<0.4		0.2	<0.4	<0.01	
Chloride	0.5	0.7	<0.5	<0.5	0.7	0.5		<0.5	0.5	0.7	0.7	<0.5	0.5
Fluoride	0.01	0.19	0.15	0.08	0.09	0.07	0.18	0.18	0.06	0.06	0.05	0.056	0.08
Sulphate	0.5 to 5.0	213	220	66	66	82	73	74	30.5	36	32	35.5	87.2
Thiocyanate	0.2					<0.2							
Nutrients													
Ammonia (Total)	0.005 to 0.05	0.005	<0.005	<0.01	0.01	<0.005	0.04	0.014	<0.005	<0.01	<0.01	0.0086	<0.005
Nitrate (as N)	0.002 to 0.02	<0.02	<0.02	<0.002	0.002	<0.002	<0.002	<0.002	0.185	0.454	0.269	0.369	0.042
Nitrate+Nitrite (Dissolved)	0.002 to 0.02			0.004	0.002	<0.002	<0.002	<0.002		0.456	0.269	0.375	
Nitrite (as N)	0.002 to 0.005	<0.005	<0.005	0.003	<0.002	<0.002	<0.002	<0.002	0.004	0.002	<0.002	0.0066	0.008
Nitrogen (Total)	0.02 to 0.2			0.05	0.11	0.06	0.06	0.46		0.48	0.38	0.431	
Nitrogen Kjeldahl (Total)	0.02 to 0.2			0.05	0.11	0.06	0.06	0.46		0.02	0.11	0.056	
Orthophosphate (Dissolved)	0.001 to 0.005	<0.005	0.011	0.005	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.0055	0.015
Phosphorus Dissolved	0.002 to 0.02	0.005	0.016	<0.002		<0.002	<0.002	0.003	0.005	0.002			0.02
Cyanide													
Cyanide (SAD)	0.001				0.004						0.006		
Cyanide (WAD)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	0.0005	<0.0005	
Cyanide+Thiocyanate	0.0005 to 0.001	0.001	<0.001	0.0008		<0.0005	<0.0005	<0.0005	0.001	<0.0005		<0.0005	0.002
Dissolved Metals													
Aluminum	0.0002 to 0.005	0.02	0.011	0.001	0.0026	0.0034	0.0027	0.0102	<0.005	0.0016	0.0041	0.00268	0.015
Antimony	0.00002 to 0.0005	0.0008	0.0005	0.0001	0.00011	0.00011	0.00011	0.00011	0.0003	0.00019	0.00022	0.000233	<0.0001
Arsenic	0.00002 to 0.001	0.0185	0.005	0.00251	0.00244	0.00257	0.0025	0.00246	0.0013	0.00149	0.00137	0.00146	0.0023
Barium	0.00002 to 0.001	0.044	0.041	0.0324	0.0359	0.0384	0.0347	0.033	0.055	0.048	0.0522	0.0595	0.064
Beryllium	0.00001 to 0.005	<0.005	<0.005	0.00002	0.00002	0.00002	0.00002	0.00002	<0.005	<0.00001	<0.00001	<0.00001	<0.005
Bismuth	0.000005 to 0.1	<0.1	<0.1	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.1	<0.000005	<0.000005	<0.000005	<0.1
Boron	0.05 to 0.5	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1
Cadmium	0.000005 to 0.0002	<0.0002	<0.0002	0.000009	<0.000005	0.000009	0.000008	0.00001	<0.0002	0.000026	0.000013	0.000033	<0.0002
Calcium	0.05 to 0.5	127	134	56.2	63.2	69.7	56	56.4	47.3	47.2	50.6	50.3	65.5
Chromium	0.0001 to 0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	0.00033	<0.001
Cobalt	0.000005 to 0.001	0.001	0.002	0.000855	0.000879	0.000981	0.000901	0.000847	<0.001	0.000007	0.000013	0.000033	0.001
Copper	0.00005 to 0.001	0.001	0.002	0.00013	0.00352	0.00008	0.00025	0.00044	<0.001	0.00048	0.00132	0.147	0.002
Iron	0.001 to 0.03	0.454	<0.03	0.803	0.88	1.02	0.814	0.845	<0.03	0.001	0.007	0.0045	0.04
Lead	0.000005 to 0.001	0.001	<0.001	0.000459	0.000434	0.000427	0.000273	0.000829	<0.001	0.000015	0.000062	0.000099	<0.001
Lithium	0.0005 to 0.005			0.0019	0.0025	0.0021	0.0019	0.0019		0.0028	0.003	0.00255	
Magnesium	0.001 to 0.5	25.1	26	10.7	11.7	14	11.6	11.1	10.1	10.5	11.2	10.2	21.5
Manganese	0.00002 to 0.005	0.481	0.521	0.546	0.582	0.634	0.572	0.538	0.069	0.0124	0.0181	0.00169	0.466
Mercury	0.00000001 to 0.0001			<0.00001		<0.00001	<0.00001	<0.00001		<0.00001		<0.00000001	
Molybdenum	0.00005 to 0.001	<0.001	<0.001	0.00021	0.00019	0.00018	0.0002	0.00018	<0.001	0.00017	0.00019	0.000523	<0.001
Nickel	0.00002 to 0.001	<0.001	0.005	0.00031	0.00035	0.00034	0.00031	0.00031	<0.001	0.00005	0.00005	0.00051	0.001
Phosphorus	0.002											<0.002	
Potassium	0.05 to 0.5	2.07	2.13	1.01	1.14	1.21	1.05	1.03	0.77	0.81	0.84	0.845	1.29
Selenium	0.00004 to 0.0005	<0.0005	<0.0005	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.0005	<0.00004	<0.00004	0.000045	<0.0005
Silicon	0.0 to 1.0	5.51	5.43	5	5.4	5.9	4.8	5.2	5.89	5.6	6	5.85	5.78
Silver	0.000005 to 0.0001	<0.0001	<0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.0001	<0.000005	<0.000005	<0.000005	<0.0001
Sodium	0.05 to 0.5	8.37	8.93	5.04	5.56	6.07	5.22	4.98	3.3	4.2	4.45	3.63	5.96
Strontium	0.00005 to 0.001	2	1.93	0.453	0.493	0.562	0.49	0.464	0.318	0.315	0.331	0.328	0.367
Sulphur	1.0 to 100.0			23	25	32	24	28		12	13	14	
Thallium	0.000002 to 0.00005			0.000003	0.000003	0.000002	0.000003	0.000004		0.000002	0.000002	<0.000002	
Tin	0.00001 to 0.005			0.00002	0.00001	0.00003	0.00002	0.00002		<0.00001	<0.00001	<0.0002	
Titanium	0.0005 to 0.01		<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0007		<0.0005	<0.0005	<0.0005	
Uranium	0.000002 to 0.0001	0.0178	0.0147	0.00628	0.00781	0.00887	0.00647	0.00697	0.00945	0.0288	0.0314	0.0224	0.015
Vanadium	0.0002 to 0.03	<0.03	<0.03	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.03	<0.0002	<0.0002	<0.0002	<0.03
Zinc	0.0001 to 0.005	0.009	0.01	0.0199	0.0379	0.0242	0.0208	0.0219	<0.005	0.0027	0.0042	0.0275	<0.005
Zirconium	0.0001 to 0.002			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	
Total Metals													
Aluminum	0.0002 to 0.003	0.066	0.7						0.005			0.495	0.023
Antimony	0.00002 to 0.0005	0.0008	0.0005						0.0003			0.000269	<0.0001
Arsenic	0.00002 to 0.0001	0.0187	0.0066						0.0013			0.00775	0.0023
Barium	0.00002 to 0.001	0.044	0.049						0.06			0.073	0.065
Beryllium	0.00001 to 0.005	<0.005	<0.005						<0.005			0.000024	<0.005
Bismuth	0.000005 to 0.1	<0.1	<0.1						<0.1			0.000022	<0.1
Boron	0.05 to 0.1	<0.1	<0.1						<0.1			<0.05	<0.1
Cadmium	0.000005 to 0.0002	<0.0002	0.0002						<0.0002			0.00006	<0.0002
Calcium	0.05	129	140						49.7			42.8	66.8
Chromium	0.0001 to 0.001	0.001	0.001						<0.001			0.00356	<0.001
Cobalt	0.000005 to 0.001	0.002	0.003						<0.001			0.00114	0.001
Copper	0.00005 to 0.0002											0.145	
Iron	0.001 to 0.03	0.513	1.09						<0.03			0.871	0.055
Lead	0.000005 to 0.001	0.002	0.013						0.001			0.0107	<0.001
Lithium	0.0005 to 0.005											0.00281	
Magnesium	0.001 to 0.05	26	26.8						10.7			11.2	22.2
Manganese	0.00005 to 0.001	0.491	0.571						0.069			0.0379	0.482
Mercury	0.00001 to 0.00002	<0.00001	<0.00001						<0.00001			<0.00001	<0.00001
Molybdenum	0.00005 to 0.001	0.001	<0.001						<0.001			0.000568	0.001
Nickel	0.00002 to 0.001	0.002	0.005						<0.001			0.0028	0.001
Phosphorus	0.000002 to 0.002	0.000006	0.000047						0.000005			0.0228	0.00002
Potassium	0.05											0.987	
Selenium	0.00004 to 0.1	<0.0005	<0.0005						<0.0005			<0.00004	<0.0005
Silicon	0.1	5.82	5.92						6.19			5.32	5.93
Silver	0.000005 to 0.0001	<0.0001	<0.0001						<0.0001			0.000049	<0.0001
Sodium	0.05											4.03	
Strontium	0.00005 to 0.001	2.07	2						0.33			0.351	0.375
Sulphur	3.0 to 10.0											14	
Thallium	0.000002 to 0.00005											0.000013	
Tin	0.0002 to 0.005											<0.0002	
Titanium	0.0005 to 0.01		<0.01									0.0252	
Uranium	0.000002 to 0.0001	0.0211	0.0148						0.0136			0.0242	0.0161
Vanadium	0.0002 to 0.03	<0.03	<0.03						<0.03			0.00108	<0.03
Zinc	0.0001 to 0.005	0.009	0.016						<0.005			0.0262	<0.005
Zirconium	0.0001 to 0.0005											0.0001	
Organics													
Dissolved Organic Carbon													
Total Organic Carbon	0.5 to 5.0	1.7	2	2.4	2.7	2.5	2.9	5.4	1.7	1.5	2.1	1.46	2

M:\1\01\00325\12\A\Data\Task 330 - Groundwater Quality\baseline report\[results and exceedences.xlsx]Casino creek

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID	MDL	94-345	94-345	94-345	94-345	94-345	94-345	94-345	94-345	94-345	94-346	94-346	94-346
Date/Time Sampled		4-Feb-95	24-May-95	22-Sep-09	8-Jun-10	20-Aug-10	15-Sep-10	17-Jul-11	17-Sep-11	26-May-12	24-May-95	9-Sep-08	22-Sep-09
Calculated Parameters													
Ion Balance Ratio	0.01			1	0.96								1
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5			<0.5	<0.5	<0.5	<0.5			<0.5			<0.5
Acidity to pH 8.3 (as CaCO3)	0.5			1.6	3	3	2.6			2.58			5.9
Alkalinity (PP as CaCO3)	0.5							<0.5	<0.5				
Alkalinity (Total as CaCO3)	0.5	146	158	86	87	74	84	77	97	63.1	368	390	380
Bicarbonate Alkalinity	0.5							94	120				
Carbonate Alkalinity	0.5							<0.5	<0.5				
Conductivity µS/cm	1	450	460	315	326	277	285	254	300	224	866	1000	1070
Hardness as CaCO3 (Dissolved)	0.5			148	157	129	140	127	145	103		616	618
Hardness as CaCO3 (Total)	0.5	231	252					120	164	110	517		
Hydroxide Alkalinity	0.5							<0.5	<0.5				
pH (pH)	0	7.14	6.91	7.65	7.84	7.98	7.98	7.55	7.59	7.56	7.23	8.1	7.84
Total Dissolved Solids	1.0 to 10.0	323	347	190	230	170	170	190	190	128	684	740	710
Total Suspended Solids	1	15	1					27	3	5.7	18	130	
Turbidity (NTU)	0.1	4.6	0.59					16	2.6	5.66	8.56	44.1	
Dissolved Anions													
Bromide	0.01 to 0.4			<0.4	<0.4	<0.4	<0.4			<0.01		0.2	<0.4
Chloride	0.5	<0.5	0.5	0.8	<0.5	1.3	<0.5	0.7	0.7	0.65	0.9	0.9	1.2
Fluoride	0.01	0.08	0.07	0.11	0.14	0.13	0.12	0.11	0.12	0.12	0.17	0.17	0.19
Sulphate	0.5 to 5.0	92.6	101	64	82	62	56	50	54	42.8	168	200	220
Thiocyanate	0.2				<0.2								
Nutrients													
Ammonia (Total)	0.005 to 0.05	<0.005	<0.005	0.04	0.11	0.026	<0.05	0.024	0.04	0.024	<0.005	<0.01	<0.01
Nitrate (as N)	0.002 to 0.02	0.069	0.139	0.178	0.142	0.147	0.139	0.12	0.18	0.0731	0.03	0.29	0.048
Nitrate+Nitrite (Dissolved)	0.002 to 0.02			0.178	0.156	0.147	0.148	0.12	0.18	0.0731		0.293	0.048
Nitrite (as N)	0.002 to 0.005	0.007	0.005	<0.002	0.013	<0.002	0.009	<0.005	<0.005	<0.002	<0.005	0.003	<0.002
Nitrogen (Total)	0.02 to 0.2			0.33	0.35	0.7	0.37			0.252		0.34	0.09
Nitrogen Kjeldahl (Total)	0.02 to 0.2			0.16	0.19	0.6	0.22			0.179		0.04	0.04
Orthophosphate (Dissolved)	0.001 to 0.005	0.008	0.004	0.001	0.001	0.008	0.001	<0.005		0.0022	0.005	0.016	0.001
Phosphorus Dissolved	0.002 to 0.02	0.01	0.004		<0.002	0.002	0.003				0.005	0.004	
Cyanide													
Cyanide (SAD)	0.001			0.016									0.004
Cyanide (WAD)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005			<0.0005		<0.0005	<0.0005
Cyanide+Thiocyanate	0.0005 to 0.001	<0.001	0.002		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00061	<0.001	<0.0005	
Dissolved Metals													
Aluminum	0.0002 to 0.005	0.007	0.012	0.008	0.0118	0.047	0.0078	0.005	0.006	0.00523	0.029	0.0024	0.0129
Antimony	0.00002 to 0.0005	<0.0001	0.0001	0.00016	0.00016	0.00017	0.00015	<0.0005	<0.0005	0.000161	<0.0001	0.00006	0.00007
Arsenic	0.00002 to 0.001	0.0005	0.0004	0.00026	0.00027	0.00039	0.0003	0.0003	0.0003	0.000291	0.0009	0.00058	0.0005
Barium	0.00002 to 0.001	0.073	0.081	0.076	0.0813	0.067	0.0672		0.076	0.0521	0.031	0.0219	0.0221
Beryllium	0.00001 to 0.005	<0.005	<0.005	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001	<0.005	<0.00001	<0.00001
Bismuth	0.000005 to 0.1	<0.1	<0.1	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005	<0.1	<0.000005	<0.000005
Boron	0.05 to 0.5	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Cadmium	0.000005 to 0.0002	<0.0002	<0.0002	0.000017	0.000031	0.00003	0.000024	0.00002	0.00004	0.0000189	<0.0002	0.000011	0.000032
Calcium	0.05 to 0.5	58	61.8	40.1	40.8	34.6	37.7	34.4	38.9	27.9	106	134	134
Chromium	0.0001 to 0.001	<0.001	<0.001	<0.0001	0.0001	0.0001	<0.0001	<0.001	<0.001	0.00028	<0.001	<0.0001	<0.0001
Cobalt	0.000005 to 0.001	0.002	<0.001	0.00002	0.000026	0.000055	0.000028	<0.0005	<0.0005	0.0000213	<0.001	0.000015	0.000013
Copper	0.00005 to 0.001	0.005	0.001	0.00625	0.00396	0.00473	0.00354	0.0043	0.0031	0.00495	0.002	0.00035	0.00561
Iron	0.001 to 0.03	<0.03	<0.03	0.021	0.07	0.156	0.025	<0.005	0.037	0.0052	<0.03	0.002	0.007
Lead	0.000005 to 0.001	<0.001	0.001	0.000113	0.000231	0.000437	0.000077	<0.0002	0.0003	0.0000298	<0.001	0.000031	0.000108
Lithium	0.0005 to 0.005			0.0024	0.0009	0.0008	0.0009	<0.005	<0.005	0.00075		0.0176	0.021
Magnesium	0.001 to 0.5	20.9	23.1	11.6	13.3	10.3	11.1	10.1	11.6	8.22	61.1	68.5	68.7
Manganese	0.00002 to 0.005	0.511	0.551	0.00142	0.00042	0.0022	0.00034		<0.00002	0.000124	0.126	0.00232	0.00123
Mercury	0.00000001 to 0.0001				<0.00001	0.00001	<0.00001	<0.00002		<0.00001		<0.00001	
Molybdenum	0.00005 to 0.001	<0.001	<0.001	0.00059	0.00063	0.00061	0.0006	<0.001	<0.001	0.00171	0.002	0.00095	0.00082
Nickel	0.00002 to 0.001	0.002	0.001	0.00045	0.00031	0.00041	0.00048	<0.001	<0.001	0.000316	0.002	0.00027	0.0003
Phosphorus	0.002									0.0041			
Potassium	0.05 to 0.5	1.36	1.34	1.1	0.94	0.92	0.9	0.88	0.95	0.739	2.21	1.82	1.9
Selenium	0.00004 to 0.0005	<0.0005	<0.0005	0.00014	0.00025	0.00014	0.00012	0.0002	<0.0001	0.00017	<0.0005	0.00019	0.00005
Silicon	0.0 to 1.0	5.33	5.35	5.7	4.7	5.4	5.7	5.64	5.3	4.79	6.33	7.2	7.4
Silver	0.000005 to 0.0001	<0.0001	<0.0001	<0.000005	<0.000005	0.000016	<0.000005	<0.00002	<0.00002	<0.000005	<0.0001	<0.000005	<0.000005
Sodium	0.05 to 0.5	5.47	5.6	4.13	4.13	3.52	3.72	3.55	4.22	3.25	9.39	9.87	9.79
Strontium	0.00005 to 0.001	0.345	0.367	0.243	0.277	0.212	0.222		0.251	0.172	0.833	0.967	0.987
Sulphur	1.0 to 100.0			27	27	22	21	19	20	16		77	89
Thallium	0.000002 to 0.00005			0.000003	<0.000002	0.000002	<0.000002	<0.00005	<0.00005	<0.000002		0.000005	0.000005
Tin	0.00001 to 0.005			0.00001	0.00003	0.00002	0.00003	<0.005	<0.005	<0.0002		0.00003	0.00002
Titanium	0.0005 to 0.01	<0.01	<0.01	<0.0005	0.0009	0.0021	<0.0005	0.021	<0.005	<0.0005	<0.01	0.0005	<0.0005
Uranium	0.000002 to 0.0001	0.0122	0.0145	0.00934	0.0159	0.00939	0.0109	0.0098	0.0127	0.00768	0.024	0.0427	0.0475
Vanadium	0.0002 to 0.03	<0.03	<0.03	<0.0002	<0.0002	<0.0002	0.0002	<0.005	<0.005	0.00023	<0.03	<0.0002	<0.0002
Zinc	0.0001 to 0.005	<0.005	<0.005	0.0159	0.0028	0.0019	0.0025	<0.005	0.006	0.00221	<0.005	0.0011	0.0172
Zirconium	0.0001 to 0.002			<0.0001	<0.0001	0.0001	<0.0001	<0.0005	<0.0005	<0.0001		<0.0001	<0.0001
Total Metals													
Aluminum	0.0002 to 0.003	0.185	0.45					0.323	0.171	0.0865	0.023		
Antimony	0.00002 to 0.0005	<0.0001	0.0002					<0.0005	<0.0005	0.000171	<0.0001		
Arsenic	0.00002 to 0.0001	0.0008	0.0013					0.0013	0.0007	0.00071	0.0016		
Barium	0.00002 to 0.001	0.073	0.089					0.073	0.085	0.0578	0.038		
Beryllium	0.00001 to 0.005	<0.005	<0.005					<0.0001	<0.0001	<0.00001	<0.005		
Bismuth	0.000005 to 0.1	<0.1	<0.1					<0.001	<0.001	<0.000005	<0.1		
Boron	0.05 to 0.1	<0.1	<0.1					<0.05	<0.05	<0.05	<0.1		
Cadmium	0.000005 to 0.0002	<0.0002	<0.0002					0.00011	0.00008	0.0000302	<0.0002		
Calcium	0.05	58.5	62.8					31.2	43	29.3	110		
Chromium	0.0001 to 0.001	0.001	<0.001					0.001	<0.001	0.00049	<0.001		
Cobalt	0.000005 to 0.001	0.002	0.001					0.0006	<0.0005	0.000111	<0.001		
Copper	0.00005 to 0.0002							0.0113	0.0051	0.0074			
Iron	0.001 to 0.03	0.266	0.446					1.14	0.315	0.386	0.381		
Lead	0.000005 to 0.001	0.002	0.003					0.0054	0.0011	0.00141	0.001		
Lithium	0.0005 to 0.005							<0.005	<0.005	0.00074			
Magnesium	0.001 to 0.05	21	23.4					10.2	13.7	8.98	62		
Manganese	0.00005 to 0.001	0.523	0.564						0.012	0.00383	0.134		
Mercury	0.00001 to 0.00002	<0.00001	<0.00001					<0.00002	<0.00002	<0.00001	<0.00001		
Molybdenum	0.00005 to 0.001	<0.001	<0.001					<0.001	<0.001	0.00158	0.002		
Nickel	0.00002 to 0.001	0.004	0.002					0.001	<0.001	0.000418	0.002		
Phosphorus	0.000002 to 0.002	0.000019	0.000019							0.006	0.000029		
Potassium	0.05							0.86	1.07	0.803			
Selenium	0.00004 to 0.1	<0.0005	<0.0005					0.0002	0.0001	0.000192	<0.0005		
Silicon	0.1	5.55	5.69						5.8	5.31	6.65		
Silver	0.000005 to 0.0001	<0.0001	<0.0001					0.00005	0.00002	0.0000125	<0.0001		
Sodium	0.05							3.5	4.79	3.53			
Strontium	0.00005 to 0.001	0.349	0.372					0.206	0.292	0.179	0.854		
Sulphur	3.0 to 10.0							19	20	17			
Thallium	0.000002 to 0.00005							<0.00005	<0.00005	<0.000002			
Tin	0.0002 to 0.005							<0.005	<0.005	<0.0002			
Titanium	0.0005 to 0.01	0.011	0.019						0.008	0.00507	0.014		
Uranium	0.000002 to 0.0001	0.0122	0.0153					0.0096	0.0169	0.00799	0.0245		
Vanadium	0.0002 to 0.03	<0.03	<0.03					<0.005	<0.005	0.00062	<0.03		
Zinc	0.0001 to 0.005	<0.005	0.006					0.008	0.016	0.00321	<0.005		
Zirconium	0.0001 to 0.0005							<0.0005	<0.0005	0.00015			
Organics													
Dissolved Organic Carbon													
Total Organic Carbon	0.5 to 5.0	2.1	2.1	5.7	12.5	9.3	5.2	4.1	3.5	<5	0.9	1.2	1.5

M:\1\01\00325\12\A\Data\Task 330 - Groundwater Quality\baseline report\[results a

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID	MDL	94-346	94-346	94-346	94-346	94-346	94-347	94-347	94-347	94-347	94-347	94-347	94-347
Date/Time Sampled		8-Jun-10	20-Aug-10	15-Sep-10	21-May-11	18-Jul-11	26-Sep-94	9-Sep-08	22-Sep-09	17-Aug-10	15-Sep-10	17-Jul-11	17-Sep-11
Calculated Parameters													
Ion Balance Ratio	0.01	1.2							1				
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5		
Acidity to pH 8.3 (as CaCO3)	0.5	12.5	4.5	11.8					<0.5	11.1	2.2		
Alkalinity (PP as CaCO3)	0.5				<0.5	<0.5						<0.5	<0.5
Alkalinity (Total as CaCO3)	0.5	310	340	370	370	370	187	140	150	150	140	150	180
Bicarbonate Alkalinity	0.5				450	460						180	210
Carbonate Alkalinity	0.5				<0.5	<0.5						<0.5	<0.5
Conductivity µS/cm	1	949	997	1040	1090	918	555	460	485	488	494	503	595
Hardness as CaCO3 (Dissolved)	0.5	651	622	667	582	525		234	258	244	246	260	304
Hardness as CaCO3 (Total)	0.5				634	480	311					242	320
Hydroxide Alkalinity	0.5				<0.5	<0.5						<0.5	<0.5
pH (pH)	0	7.94	8.27	8.18	7.68	7.89	7	8	7.73	7.84	7.9	7.66	7.84
Total Dissolved Solids	1.0 to 10.0	780	730	710	680	620	412	290	290	290	310	350	390
Total Suspended Solids	1				<1	<1	55	120				5	2
Turbidity (NTU)	0.1				0.1	0.1	19.8	40.9				4.1	6.5
Dissolved Anions													
Bromide	0.01 to 0.4	<0.4	<0.4	<0.4				0.1	<0.4	<0.4	<0.4		
Chloride	0.5	0.7	<0.5	<0.5	<0.5	1.1	0.6	2.2	0.9		<0.5	0.7	1
Fluoride	0.01	0.18	0.17	0.2	0.19	0.18	0.12	0.11	0.12	0.13	0.12	0.11	0.13
Sulphate	0.5 to 5.0	240	250	220	220	150	114	100	110	120	110	120	140
Thiocyanate	0.2	<0.2											
Nutrients													
Ammonia (Total)	0.005 to 0.05	<0.05	<0.005	<0.05	0.005	0.032	0.011	<0.01	0.05	0.017	<0.05	0.032	0.033
Nitrate (as N)	0.002 to 0.02	0.058	0.123	0.195	0.07	0.37	<0.02	0.005	0.006	<0.002	0.002	<0.02	<0.02
Nitrate+Nitrite (Dissolved)	0.002 to 0.02	0.058	0.123	0.195	0.07	0.37		0.007	0.006	<0.002	0.002	<0.02	<0.02
Nitrite (as N)	0.002 to 0.005	<0.002	<0.002	<0.002	<0.005	<0.005	0.001	0.002	<0.002	<0.002	<0.002	<0.005	<0.005
Nitrogen (Total)	0.02 to 0.2	0.16	0.13	0.22				0.08	0.1	0.07	0.08		
Nitrogen Kjeldahl (Total)	0.02 to 0.2	0.1	<0.02	0.03				0.08	0.09	0.07	0.08		
Orthophosphate (Dissolved)	0.001 to 0.005	0.003	0.005	0.002	<0.005	<0.005	0.001	0.01	0.001	0.001	0.002	<0.005	
Phosphorus Dissolved	0.002 to 0.02	0.003	<0.002	0.004			0.004	<0.002		<0.002	<0.002		
Cyanide													
Cyanide (SAD)	0.001								0.004				
Cyanide (WAD)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005			<0.0005	<0.0005	<0.0005	<0.0005		
Cyanide+Thiocyanate	0.0005 to 0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005		<0.0005	<0.0005	0.0007	<0.0005
Dissolved Metals													
Aluminum	0.0002 to 0.005	0.0055	0.0029	0.0045	0.004	<0.003	0.008	0.0033	0.002	0.0118	0.0028	<0.003	<0.003
Antimony	0.00002 to 0.0005	0.00006	0.00006	0.00006	<0.0005	<0.0005	<0.0001	0.00004	0.00003	0.00003	0.00002	<0.0005	<0.0005
Arsenic	0.00002 to 0.001	0.00056	0.00054	0.00057	0.0005	0.0005	0.0054	0.00232	0.003	0.00295	0.00304	0.0032	0.0036
Barium	0.00002 to 0.001	0.0217	0.0228	0.025	0.021		0.064	0.0489	0.0516	0.0499	0.0472		0.065
Beryllium	0.00001 to 0.005	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.005	0.00001	0.00001	<0.00001	0.00001	<0.0001	<0.0001
Bismuth	0.000005 to 0.1	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.1	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001
Boron	0.05 to 0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	0.000005 to 0.0002	0.000015	0.000008	0.000016	0.00001	0.00001	<0.0002	0.000028	0.000021	0.000112	0.000028	0.00003	0.00004
Calcium	0.05 to 0.5	135	130	140	121	107	73.6	55.5	62.4	56.7	58	60.1	72.7
Chromium	0.0001 to 0.001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001
Cobalt	0.000005 to 0.001	0.000013	0.000008	0.000019	<0.0005	<0.0005	0.001	0.000761	0.000735	0.000781	0.000776	0.0008	0.0008
Copper	0.00005 to 0.001	0.00045	0.00035	0.00032	0.0006	0.0007	0.002	0.00024	0.00038	0.00099	0.00014	0.0003	<0.0002
Iron	0.001 to 0.03	0.012	0.003	0.005	0.008	<0.005	0.759	0.399	0.478	0.51	0.52	0.514	0.599
Lead	0.000005 to 0.001	0.00007	0.00003	0.00002	<0.0002	<0.0002	<0.001	0.000077	0.000046	0.000152	0.00004	<0.0002	<0.0002
Lithium	0.0005 to 0.005	0.0179	0.0173	0.0196	0.016	0.016		0.0067	0.007	0.0069	0.0066	0.007	0.007
Magnesium	0.001 to 0.5	76.4	72.2	76.9	67.7	62.4	30.8	23.2	24.8	25	24.7	26.6	29.9
Manganese	0.00002 to 0.005	0.00127	0.00129	0.00152	0.003		0.45	0.347	0.393	0.398	0.408		<0.00002
Mercury	0.00000001 to 0.0001	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002		<0.00001		<0.00001	<0.00001	<0.00002	
Molybdenum	0.00005 to 0.001	0.00079	0.00084	0.00084	<0.001	<0.001	<0.001	0.00037	0.00033	0.00036	0.00041	<0.001	<0.001
Nickel	0.00002 to 0.001	0.00022	0.00021	0.00025	<0.001	<0.001	0.002	0.00047	0.00042	0.00044	0.0005	<0.001	<0.001
Phosphorus	0.002												
Potassium	0.05 to 0.5	1.88	1.81	1.97	1.69	1.77	1.53	1.02	1.09	1.05	1.03	1.12	1.33
Selenium	0.00004 to 0.0005	0.00005	0.00008	0.00013	<0.0001	0.0004	<0.0005	<0.00004	<0.00004	<0.00004	<0.00004	<0.0001	<0.0001
Silicon	0.0 to 1.0	7.5	7	8	6.67	7.76	6.69	6.2	6.9	6.2	6.7	7.03	6.8
Silver	0.000005 to 0.0001	<0.000005	<0.000005	<0.000005		<0.00002	<0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002
Sodium	0.05 to 0.5	10.1	9.61	10.2	8.44	8.79	7.32	4.93	5.25	5.25	5.17	5.5	5.71
Strontium	0.00005 to 0.001	1.03	0.989	1.06	0.916		0.501	0.411	0.434	0.437	0.41		0.549
Sulphur	1.0 to 100.0	105	89	96	89	57		36	41	43	41	43	48
Thallium	0.000002 to 0.00005	0.000004	0.000004	0.000005	<0.00005	<0.00005		0.000027	0.000027	0.000028	0.000023	<0.00005	<0.00005
Tin	0.00001 to 0.005	<0.00001	0.00002	0.00001	<0.005	<0.005		<0.00001	<0.00001	0.00001	0.00001	<0.005	<0.005
Titanium	0.0005 to 0.01	0.0006	<0.0005	<0.0005	<0.005	<0.005		0.0006	<0.0005	0.0008	<0.0005	<0.005	<0.005
Uranium	0.000002 to 0.0001	0.0464	0.0489	0.0507	0.0443	0.0372	0.0146	0.00912	0.0101	0.00867	0.00963	0.011	0.0135
Vanadium	0.0002 to 0.03	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.03	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005
Zinc	0.0001 to 0.005	0.0012	0.0013	0.0011	0.007	0.01	0.007	0.0036	0.0044	0.0058	0.0039	0.032	<0.005
Zirconium	0.0001 to 0.002	<0.0001	<0.0001	0.0013	<0.0005	<0.0005		<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005
Total Metals													
Aluminum	0.0002 to 0.003				0.014	0.005	0.768					0.033	0.016
Antimony	0.00002 to 0.0005				<0.0005	<0.0005	<0.0001					<0.0005	<0.0005
Arsenic	0.00002 to 0.0001				0.0005	0.0004	0.0061					0.003	0.0035
Barium	0.00002 to 0.001				0.023	0.018	0.072					0.049	0.063
Beryllium	0.00001 to 0.005				<0.0001	<0.0001	<0.005					<0.0001	<0.0001
Bismuth	0.000005 to 0.1				<0.001	<0.001	<0.1					<0.001	<0.001
Boron	0.05 to 0.1				<0.05	<0.05	<0.1					<0.05	<0.05
Cadmium	0.000005 to 0.0002				0.00002	0.00002	<0.0002					0.00022	0.00005
Calcium	0.05				132	99.7	73.6					56	74.3
Chromium	0.0001 to 0.001				<0.001	<0.001	0.001					<0.001	<0.001
Cobalt	0.000005 to 0.001				<0.0005	<0.0005	0.001					0.0008	0.001
Copper	0.00005 to 0.0002				0.0005	0.0008						0.0007	0.0003
Iron	0.001 to 0.03				0.023	0.006	0.0016					0.559	0.637
Lead	0.000005 to 0.001				<0.0002	<0.0002	0.001					0.0003	<0.0002
Lithium	0.0005 to 0.005				0.016	0.017						0.007	0.007
Magnesium	0.001 to 0.05				74	56.1	31.6					24.7	32.6
Manganese	0.00005 to 0.001				0.005		0.465						0.497
Mercury	0.00001 to 0.00002				<0.00002	<0.00002	<0.00001					<0.00002	<0.00002
Molybdenum	0.00005 to 0.001				<0.001	<0.001	<0.001					<0.001	<0.001
Nickel	0.00002 to 0.001				<0.001	<0.001	0.003					<0.001	<0.001
Phosphorus	0.000002 to 0.002						0.000016						
Potassium	0.05				1.83	1.55						1	1.2
Selenium	0.00004 to 0.1				<0.0001	0.0004	<0.0005					<0.0001	<0.0001
Silicon	0.1				7.41		7.72						7
Silver	0.000005 to 0.0001				<0.00002	<0.00002	<0.0001					<0.00002	<0.00002
Sodium	0.05				9.84	8.15						5.11	6.39
Strontium	0.00005 to 0.001				1.04	0.787	0.501					0.433	0.557
Sulphur	3.0 to 10.0				93	53						40	51
Thallium	0.000002 to 0.00005				<0.00005	<0.00005						<0.00005	<0.00005
Tin	0.0002 to 0.005				<0.005	<0.005						<0.005	<0.005
Titanium	0.0005 to 0.01				<0.005								<0.005
Uranium	0.000002 to 0.0001				0.0491	0.0329	0.0179					0.0099	0.0158
Vanadium	0.0002 to 0.03				<0.005	<0.005	<0.03					<0.005	<0.005
Zinc	0.0001 to 0.005				0.006	0.008	0.009					0.037	0.006
Zirconium	0.0001 to 0.0005				<0.0005	<0.0005						<0.0005	<0.0005
Organics													
Dissolved Organic Carbon													
Total Organic Carbon	0.5 to 5.0	<0.5	3	1	1.8	3.6	1.7	2.2	2.2	1.8	2	2.1	1.7

M:\1\01\00325\12\A\Data\Task 330 - Groundwater Quality\baseline report\[results a

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

Site ID	MDL	94-347	*94-347*	94-351	94-351	94-351	94-351	94-351	94-351	94-348	94-348	94-348	94-348
Date/Time Sampled		**16-Sep-12**	***2-Oct-14***	**9-Sep-08**	**22-Sep-09**	**17-Aug-10**	**15-Sep-10**	**17-Jul-11**	**18-Sep-11**	**9-Sep-08**	**8-Jun-10**	**20-Aug-10**	**15-Sep-10**
Calculated Parameters													
Ion Balance Ratio	0.01	0.96	*1.00*		1								
Physical Tests													
Acidity to pH 4.5 (as CaCO3)	0.5	<0.5			<0.5	<0.5	<0.5				<0.5	<0.5	<0.5
Acidity to pH 8.3 (as CaCO3)	0.5	10.6			<0.5	4.1	3.1				4.3	0.7	2.2
Alkalinity (PP as CaCO3)	0.5							<0.5	<0.5				
Alkalinity (Total as CaCO3)	0.5	188	*179*	630	380	240	280	290	660	62	78	99	72
Bicarbonate Alkalinity	0.5		*179*					350	810				
Carbonate Alkalinity	0.5		*<1*					<0.5	<0.5				
Conductivity µS/cm	1	638	*548*	1100	702	480	527	529	1140	130	168	207	148
Hardness as CaCO3 (Dissolved)	0.5	323	*307*	640	396	238	286	291	607	58.1	78.1	116	91
Hardness as CaCO3 (Total)	0.5	339						281	699				
Hydroxide Alkalinity	0.5		*<1*					<0.5	<0.5				
pH (pH)	0	7.7	*8*	8.3	8.06	8.1	8.32	8.03	7.96	8	7.86	7.93	7.78
Total Dissolved Solids	1.0 to 10.0	442	*425*	730	440	300	350	370	680	120	140	130	120
Total Suspended Solids	1	3.8	*4.5*	120				53	74	190			
Turbidity (NTU)	0.1	5.31	*3.05*	16.1				4.7	10.2	65.5			
Dissolved Anions													
Bromide	0.01 to 0.4	<0.01	*<0.05*	0.2	<0.4	<0.4	<0.4			0.1	<0.4	<0.4	<0.4
Chloride	0.5	<0.5	*<0.5*	1.5	1.6		0.5	1.1	1.6	1.2	0.6	<0.5	<0.5
Fluoride	0.01	0.11	*0.123*	0.23	0.24	0.21	0.24	0.14	0.17	0.03	0.02	0.02	0.07
Sulphate	0.5 to 5.0	159	*137*	51	25	14	17	5.6	10	<0.5	11	6.2	5.1
Thiocyanate	0.2										<0.2		
Nutrients													
Ammonia (Total)	0.005 to 0.05	0.015	*<0.005*	0.18	0.13	0.38	0.1	0.058	0.13	<0.01	0.07	0.33	<0.05
Nitrate (as N)	0.002 to 0.02	<0.002	*<0.005*	0.059	0.008	0.176	0.01	<0.02	<0.02	0.025	0.017	0.008	0.012
Nitrate+Nitrite (Dissolved)	0.002 to 0.02	<0.002	*<0.001*	0.076	0.015	0.228	0.019	<0.02	<0.02	0.067	0.017	0.008	0.014
Nitrite (as N)	0.002 to 0.005	<0.002	*0.108*	0.017	0.007	0.052	0.01	<0.005	<0.005	0.042	<0.002	<0.002	0.002
Nitrogen (Total)	0.02 to 0.2	0.084	*0.108*	1.32	1.04	1.01	0.77			0.28	0.27	0.41	0.41
Nitrogen Kjeldahl (Total)	0.02 to 0.2	0.084	*<0.001*	1.25	1.02	0.78	0.75			0.22	0.26	0.41	0.4
Orthophosphate (Dissolved)	0.001 to 0.005	0.0011	*0.0025*	0.011	0.001	0.002	0.007	0.011		0.008	0.005	0.005	0.001
Phosphorus Dissolved	0.002 to 0.02		*0.0029*	0.039		0.02	0.03			0.01	0.011	0.007	0.008
Cyanide													
Cyanide (SAD)	0.001		*<0.005*		0.034								
Cyanide (WAD)	0.0005	<0.0005	*<0.005*	0.0005	0.0007	0.0014	0.0011			0.001	0.0009	0.0012	0.0013
Cyanide+Thiocyanate	0.0005 to 0.001	<0.0005	*<0.005*	0.0022		0.001	0.0007	0.0009	0.0009	0.0018	0.0014	0.0006	0.0008
Dissolved Metals													
Aluminum	0.0002 to 0.005	0.00146	*0.0013*	0.015	0.0093	0.02	0.026	0.011	0.013	0.113	0.122	0.0429	0.0768
Antimony	0.00002 to 0.0005	0.000025	*<0.0001*	0.00103	0.00092	0.0007	0.0012	0.0006	0.0005	0.00025	0.00029	0.0004	0.00033
Arsenic	0.00002 to 0.001	0.00384	*0.0035*	0.00168	0.00149	0.0013	0.0014	0.0009	0.0013	0.00184	0.00168	0.00157	0.00137
Barium	0.00002 to 0.001	0.0743	*0.0598*	0.124	0.0829	0.041	0.0611		0.145	0.0299	0.0638	0.0467	0.0435
Beryllium	0.00001 to 0.005	0.000013	*<0.0001*	0.00001	<0.00001	<0.00005	<0.0001	<0.0001	<0.0001	0.00003	0.00002	0.00001	0.00002
Bismuth	0.000005 to 0.1	<0.000005	*<0.0005*	0.000007	<0.000005	<0.00003	<0.00005	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005
Boron	0.05 to 0.5	<0.05	*<0.01*	0.08	<0.05	<0.3	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	0.000005 to 0.0002	0.000034	*0.000029*	0.000047	0.000019	0.00018	0.00007	0.00002	0.00005	0.000029	0.000081	0.000147	0.000041
Calcium	0.05 to 0.5	74.4	*70.9*	165	112	72.9	83.6	89.9	178	21.5	27.6	42	33.1
Chromium	0.0001 to 0.001	<0.0001	*<0.0001*	0.0012	0.0008	<0.0005	<0.001	0.002	<0.001	0.0007	0.0005	0.0005	0.0007
Cobalt	0.000005 to 0.001	0.00102	*0.00084*	0.00119	0.00069	0.00053	0.00054	<0.0005	0.0006	0.00065	0.00101	0.00007	0.000161
Copper	0.00005 to 0.001	0.000338	*0.00088*	0.0445	0.0322	0.0194	0.0317	0.0224	0.0244	0.0216	0.0241	0.0168	0.0197
Iron	0.001 to 0.03	0.575	*0.494*	0.044	0.074	0.067	0.06	0.04	0.066	0.309	0.176	0.139	0.183
Lead	0.000005 to 0.001	0.000024	*<0.00005*	0.000435	0.000218	0.00031	0.00043	<0.0002	0.0003	0.00109	0.000819	0.000473	0.000721
Lithium	0.0005 to 0.005	0.00797	*0.00746*	0.0039	0.0068	<0.003	<0.005	<0.005	<0.005	0.0012	0.0016	0.0016	0.0014
Magnesium	0.001 to 0.5	33.2	*31.5*	55.6	28.3	13.6	18.7	0.031	39.8	1.07	2.25	2.67	2.02
Manganese	0.00002 to 0.005	0.521	*0.405*	0.406	0.239	0.109	0.0915		<0.00002	0.143	0.278	0.00455	0.0203
Mercury	0.00000001 to 0.0001	<0.00000001	*<0.00001*	<0.00001		<0.00005	<0.0001	<0.00002		<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	0.00005 to 0.001	0.000387	*0.000322*	0.0173	0.0136	0.0069	0.0094	0.01	0.008	0.00204	0.0011	0.00115	0.00137
Nickel	0.00002 to 0.001	0.000598	*0.00058*	0.0218	0.0151	0.0094	0.0157	0.008	0.013	0.00431	0.00617	0.00362	0.00383
Phosphorus	0.002	<0.002	*<0.05*										
Potassium	0.05 to 0.5	1.21	*1.15*	7.02	4.57	3.3	3.3	4.42	7.01	0.79	1.08	1.21	0.91
Selenium	0.00004 to 0.0005	<0.00004	*<0.0001*	0.00051	0.00039	0.0004	<0.0004	0.0002	0.0004	0.0001	0.00009	0.00012	0.00013
Silicon	0.0 to 1.0	6.64	*6.56*	9.6	8.6	7.3	8	9.45	10.7	5.6	5.5	7.4	7.1
Silver	0.000005 to 0.0001	<0.000005	*<0.00001*	0.00002	0.000009	<0.00003	<0.00005	<0.00002	<0.00002	0.000021	0.000017	0.000023	0.000014
Sodium	0.05 to 0.5	6.14	*5.66*	34.7	10.3	3.8	5	3.58	16.3	0.99	1.59	1.81	1.56
Strontium	0.00005 to 0.001	0.618	*0.527*	0.676	0.45	0.256	0.327		0.699	0.0343	0.0567	0.0771	0.0586
Sulphur	1.0 to 100.0	57	*46.3*	18	10	<50	<100	358	6	<3	<10	<10	<10
Thallium	0.000002 to 0.00005	0.000029	*0.000025*	0.000004	<0.000002	<0.00001	<0.00002	<0.00005	<0.00005	0.000006	0.000009	0.000005	0.000006
Tin	0.00001 to 0.005	<0.0002	*<0.0001*	0.00014	0.00011	0.00022	0.0002	<0.005	<0.005	0.00016	0.00012	0.00027	0.00017
Titanium	0.0005 to 0.01	<0.0005	*<0.01*	0.0027	0.0019	<0.003	<0.005	<0.005	<0.005	0.0016	0.0019	0.0012	0.0011
Uranium	0.000002 to 0.0001	0.0208	*0.0151*	0.0156	0.00932	0.00449	0.00686	0.0091	0.0111	0.00186	0.00127	0.0024	0.00197
Vanadium	0.0002 to 0.03	<0.0002	*<0.001*	0.0036	0.0034	0.003	0.005	<0.005	<0.005	0.001	0.0006	0.0004	0.0007
Zinc	0.0001 to 0.005	0.0042	*0.0069*	0.0047	0.0117	0.007	0.005	0.059	0.156	0.0017	0.0064	0.0027	0.0041
Zirconium	0.0001 to 0.002	<0.0001		0.0041	0.0024	0.0011	<0.002	0.0012	0.0026	0.0012	0.0007	0.0007	<0.001
Total Metals													
Aluminum	0.0002 to 0.003	0.0262	*0.0766*					0.464	0.755				
Antimony	0.00002 to 0.0005	0.000024	*<0.0001*					<0.0005	0.0006				
Arsenic	0.00002 to 0.0001	0.00368	*0.00335*					0.0009	0.0016				
Barium	0.00002 to 0.001	0.0728	*0.0577*					0.066	0.173				
Beryllium	0.00001 to 0.005	0.000014	*<0.0001*					<0.0001	<0.0001				
Bismuth	0.000005 to 0.1	<0.000005	*<0.0005*					<0.001	<0.001				
Boron	0.05 to 0.1	<0.05	*0.012*					<0.05	<0.05				
Cadmium	0.000005 to 0.0002	0.000034	*0.000074*					0.00003	0.00014				
Calcium	0.05	78.4	*67.4*					87	201				
Chromium	0.0001 to 0.001	0.00082	*0.00053*					0.002	0.002				
Cobalt	0.000005 to 0.001	0.00103	*0.00081*					0.0007	0.0015				
Copper	0.00005 to 0.0002	0.00869	*0.00089*					0.0245	0.0367				
Iron	0.001 to 0.03	0.642	*0.567*					0.754	1.31				
Lead	0.000005 to 0.001	0.000063	*0.000206*					0.0018	0.0039				
Lithium	0.0005 to 0.005	0.00808	*0.00728*					<0.005	<0.005				
Magnesium	0.001 to 0.05	34.9	*30.1*					15.5	47.6				
Manganese	0.00005 to 0.001	0.512	*0.395*						0.273				
Mercury	0.00001 to 0.00002	<0.00001	*0.000014*					<0.00002	<0.00002				
Molybdenum	0.00005 to 0.001	0.000358	*0.000387*					0.009	0.012				
Nickel	0.00002 to 0.001	0.00127	*0.00067*					0.01	0.015				
Phosphorus	0.000002 to 0.002	0.0046	*<0.05*										
Potassium	0.05	1.25	*1.12*					4.12	7.01				
Selenium	0.00004 to 0.1	<0.00004	*<0.0001*					0.0002	0.0004				
Silicon	0.1	6.91	*6.46*						12.9				
Silver	0.000005 to 0.0001	<0.000005	*<0.00001*					<0.00002	0.00002				
Sodium	0.05	6.39	*5.41*					3.41	21				
Strontium	0.00005 to 0.001	0.639	*0.536*					0.328	0.813				
Sulphur	3.0 to 10.0	57	*44.7*					<3	8				
Thallium	0.000002 to 0.00005	0.000026	*0.000028*					<0.00005	<0.00005				
Tin	0.0002 to 0.005	<0.0002	*<0.0001*					<0.005	<0.005				
Titanium	0.0005 to 0.01	0.00092	*<0.01*						0.041				
Uranium	0.000002 to 0.0001	0.021	*0.015*					0.0088	0.0147				
Vanadium	0.0002 to 0.03	<0.0002	*<0.001*					<0.005	0.006				
Zinc	0.0001 to 0.005	0.00474	*0.0072*					0.05	0.111				
Zirconium	0.0001 to 0.0005	<0.0001						0.0013	0.0034				
Organics													
Dissolved Organic Carbon			*1.82*										
Total Organic Carbon	0.5 to 5.0	1.49	*1.9*	25.9	24.1	24.5	22.5	20	23.8	19.7	17.2	17.2	18.8

M:\1\01\00325\12\A\Data\Task 330 - Groundwater Quality\baseline report\[results a

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

CASINO COPPER-GOLD PROJECT
TABLE F4 - CASINO CREEK VALLEY AREA

Site ID	MDL	94-340	94-350
Date/Time Sampled		25-Sep-94	27-Sep-94
Calculated Parameters			
Ion Balance Ratio	0.01		
Physical Tests			
Acidity to pH 4.5 (as CaCO3)	0.5		
Acidity to pH 8.3 (as CaCO3)	0.5		
Alkalinity (PP as CaCO3)	0.5		
Alkalinity (Total as CaCO3)	0.5	105	482
Bicarbonate Alkalinity	0.5		
Carbonate Alkalinity	0.5		
Conductivity µS/cm	1	330	1050
Hardness as CaCO3 (Dissolved)	0.5		
Hardness as CaCO3 (Total)	0.5	180	581
Hydroxide Alkalinity	0.5		
pH (pH)	0	7.22	7.28
Total Dissolved Solids	1.0 to 10.0	224	723
Total Suspended Solids	1	29	15
Turbidity (NTU)	0.1	13.6	11.4
Dissolved Anions			
Bromide	0.01 to 0.4		
Chloride	0.5	<0.5	1.1
Fluoride	0.01	0.08	0.1
Sulphate	0.5 to 5.0	68.6	140
Thiocyanate	0.2		
Nutrients			
Ammonia (Total)	0.005 to 0.05	0.007	0.011
Nitrate (as N)	0.002 to 0.02	<0.02	<0.005
Nitrate+Nitrite (Dissolved)	0.002 to 0.02		
Nitrite (as N)	0.002 to 0.005	<0.005	0.002
Nitrogen (Total)	0.02 to 0.2		
Nitrogen Kjeldahl (Total)	0.02 to 0.2		
Orthophosphate (Dissolved)	0.001 to 0.005	<0.005	<0.001
Phosphorus Dissolved	0.002 to 0.02	0.004	0.005
Cyanide			
Cyanide (SAD)	0.001		
Cyanide (WAD)	0.0005		
Cyanide+Thiocyanate	0.0005 to 0.001	<0.001	<0.001
Dissolved Metals			
Aluminum	0.0002 to 0.005	0.007	<0.005
Antimony	0.00002 to 0.0005	0.0001	0.0035
Arsenic	0.00002 to 0.001	0.0025	0.0061
Barium	0.00002 to 0.001	0.037	0.14
Beryllium	0.00001 to 0.005	<0.005	<0.005
Bismuth	0.000005 to 0.1	<0.1	<0.1
Boron	0.05 to 0.5	<0.1	<0.1
Cadmium	0.000005 to 0.0002	0.0002	<0.0002
Calcium	0.05 to 0.5	54.3	139
Chromium	0.0001 to 0.001	<0.001	<0.001
Cobalt	0.000005 to 0.001	0.001	0.001
Copper	0.00005 to 0.001	0.002	<0.001
Iron	0.001 to 0.03	0.677	<0.03
Lead	0.000005 to 0.001	<0.001	<0.001
Lithium	0.0005 to 0.005		
Magnesium	0.001 to 0.5	10.7	52.3
Manganese	0.00002 to 0.005	0.566	0.417
Mercury	0.00000001 to 0.0001		
Molybdenum	0.00005 to 0.001	<0.001	0.005
Nickel	0.00002 to 0.001	0.001	0.003
Phosphorus	0.002		
Potassium	0.05 to 0.5	0.98	2.45
Selenium	0.00004 to 0.0005	<0.0005	<0.0005
Silicon	0.0 to 1.0	4.94	6.58
Silver	0.000005 to 0.0001	<0.0001	<0.0001
Sodium	0.05 to 0.5	4.79	30.2
Strontium	0.00005 to 0.001	0.5	2.36
Sulphur	1.0 to 100.0		
Thallium	0.000002 to 0.00005		
Tin	0.00001 to 0.005		
Titanium	0.0005 to 0.01		
Uranium	0.000002 to 0.0001	0.00564	0.101
Vanadium	0.0002 to 0.03	<0.03	<0.03
Zinc	0.0001 to 0.005	0.015	<0.005
Zirconium	0.0001 to 0.002		
Total Metals			
Aluminum	0.0002 to 0.003	0.084	0.549
Antimony	0.00002 to 0.0005	0.0002	0.0035
Arsenic	0.00002 to 0.0001	0.0025	0.0077
Barium	0.00002 to 0.001	0.04	0.154
Beryllium	0.00001 to 0.005	<0.005	<0.005
Bismuth	0.000005 to 0.1	<0.1	<0.1
Boron	0.05 to 0.1	<0.1	<0.1
Cadmium	0.000005 to 0.0002	<0.0002	<0.0002
Calcium	0.05	60.3	154
Chromium	0.0001 to 0.001	0.001	0.002
Cobalt	0.000005 to 0.001	0.003	0.001
Copper	0.00005 to 0.0002		
Iron	0.001 to 0.03	0.814	1.3
Lead	0.000005 to 0.001	0.002	0.006
Lithium	0.0005 to 0.005		
Magnesium	0.001 to 0.05	11.9	56.8
Manganese	0.00005 to 0.001	0.566	0.464
Mercury	0.00001 to 0.00002	<0.00001	<0.00001
Molybdenum	0.00005 to 0.001	<0.001	0.007
Nickel	0.00002 to 0.001	0.001	0.004
Phosphorus	0.000002 to 0.002	0.00001	0.00001
Potassium	0.05		
Selenium	0.00004 to 0.1	<0.0005	<0.0005
Silicon	0.1	5.01	8.38
Silver	0.000005 to 0.0001	<0.0001	<0.0001
Sodium	0.05		
Strontium	0.00005 to 0.001	0.503	2.46
Sulphur	3.0 to 10.0		
Thallium	0.000002 to 0.00005		
Tin	0.0002 to 0.005		
Titanium	0.0005 to 0.01		
Uranium	0.000002 to 0.0001	0.00852	0.25
Vanadium	0.0002 to 0.03	<0.03	<0.03
Zinc	0.0001 to 0.005	0.015	<0.005
Zirconium	0.0001 to 0.0005		
Organics			
Dissolved Organic Carbon			
Total Organic Carbon	0.5 to 5.0	1.6	2.3

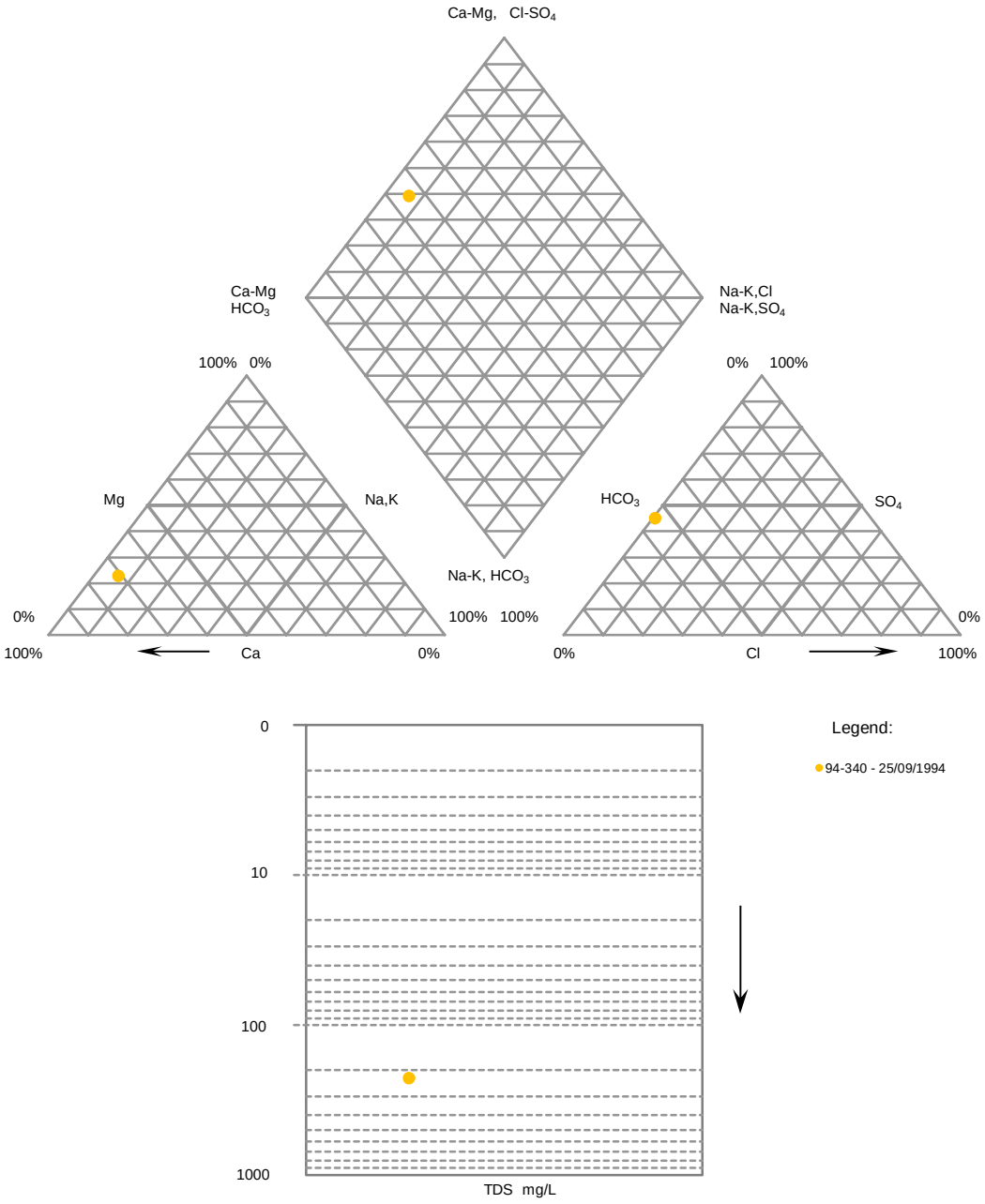
M:\1\01\00325\12\A\Data\Task 330 - Groundwater Quality\baseline report\[results a

NOTES:
1. UNITS ARE IN mg/L UNLESS OTHERWISE STATED.
2. REFER TO TABLE F1 FOR DETAILED FOOTNOTES ON CELL SHADING.

APPENDIX G

PIPER DIAGRAMS

(Pages G-1 to G-17)



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-340

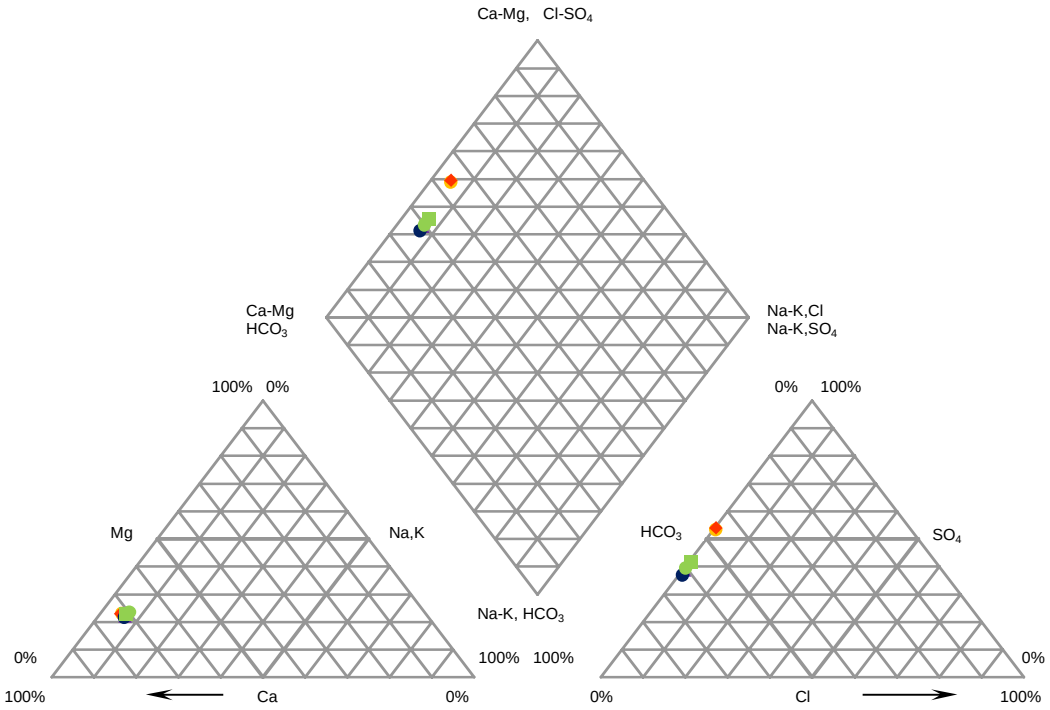
Knight Piésold CONSULTING

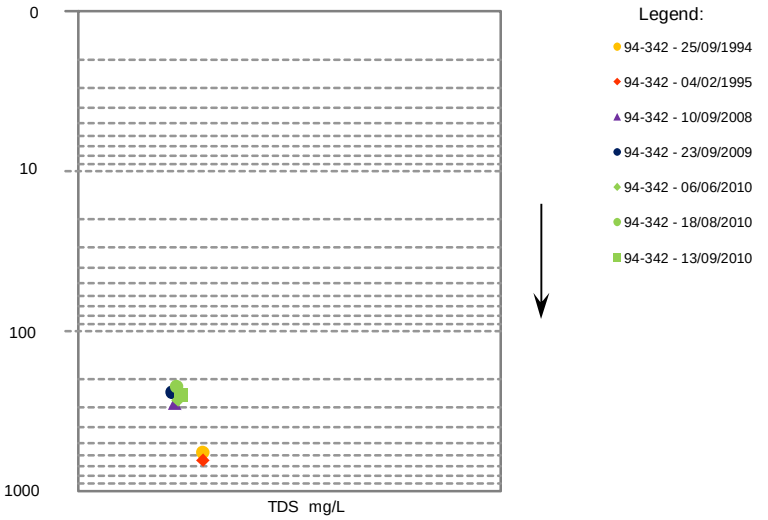
P/A NO. VA101-325/17

REF. NO. 1

FIGURE G1.1

REV 0





NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

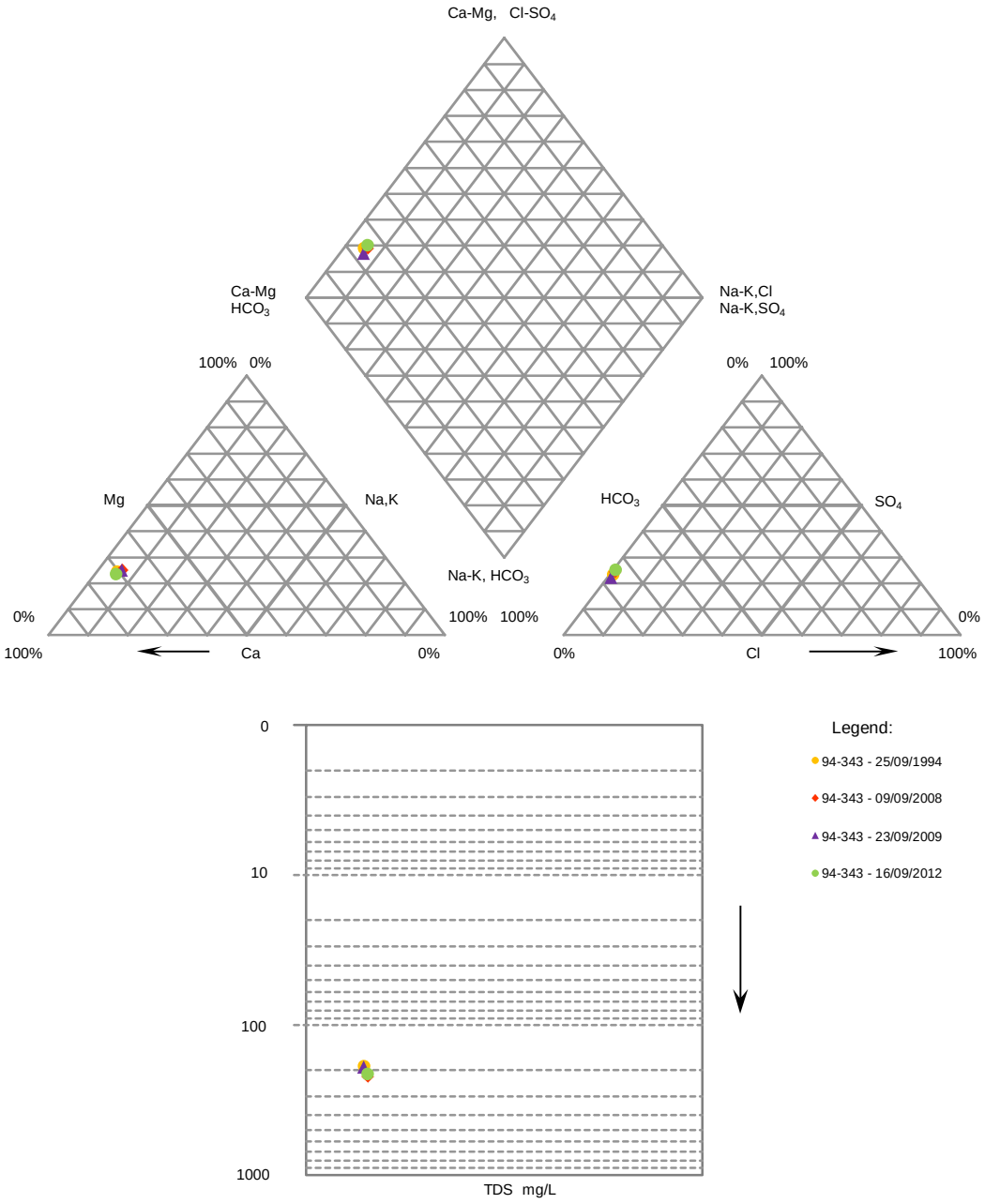
CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-342

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G1.2 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

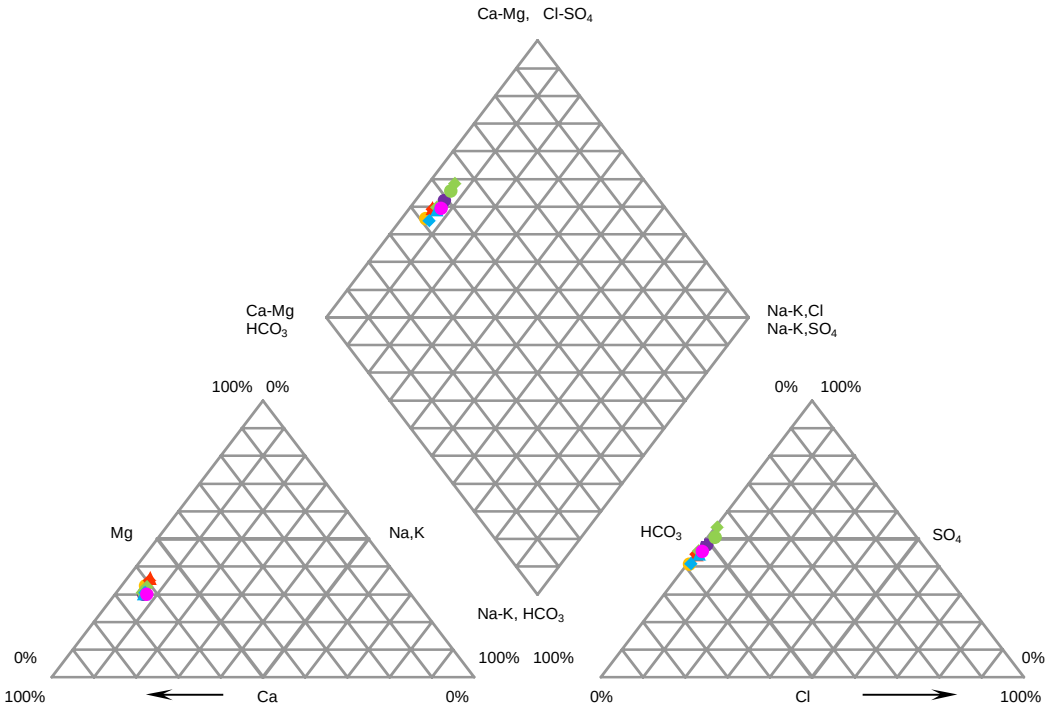
CASINO PROJECT

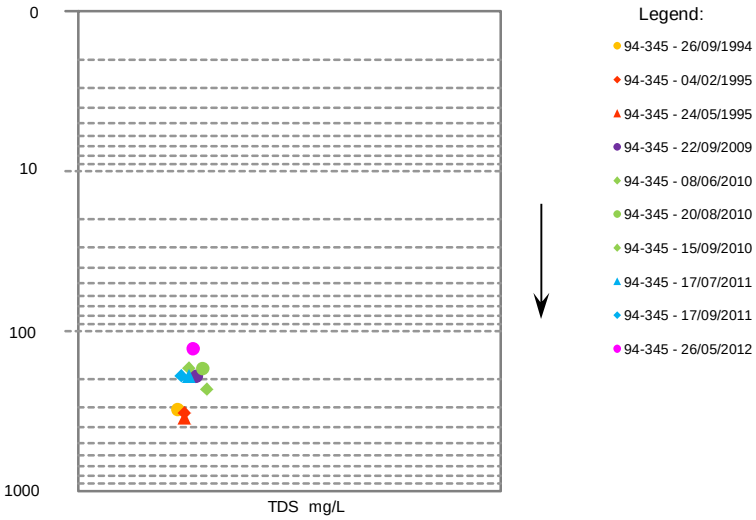
PIPER PLOT - CASINO CREEK AREA
94-343

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G1.3 | REV 0





NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

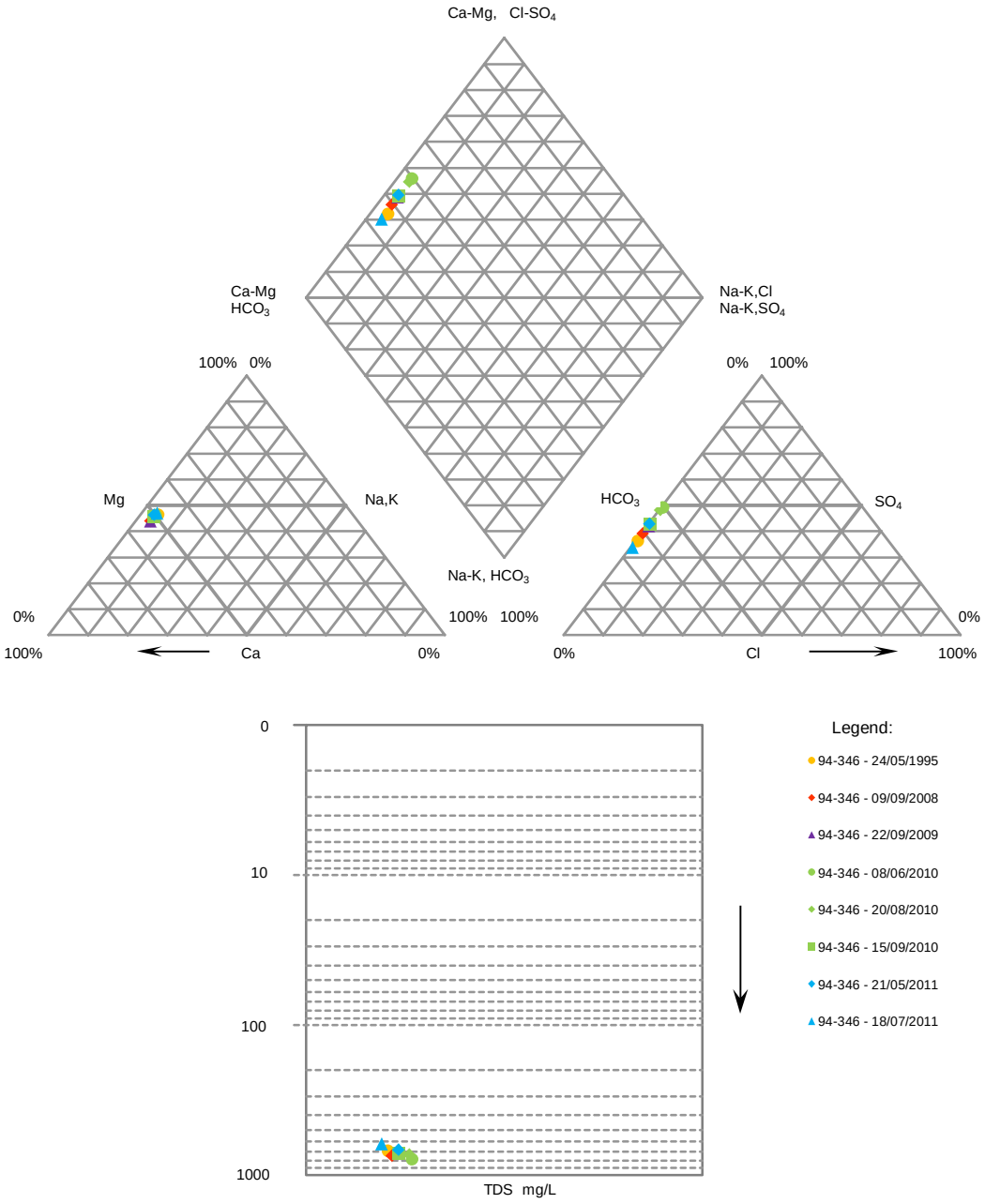
CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-345

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G1.4 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-346

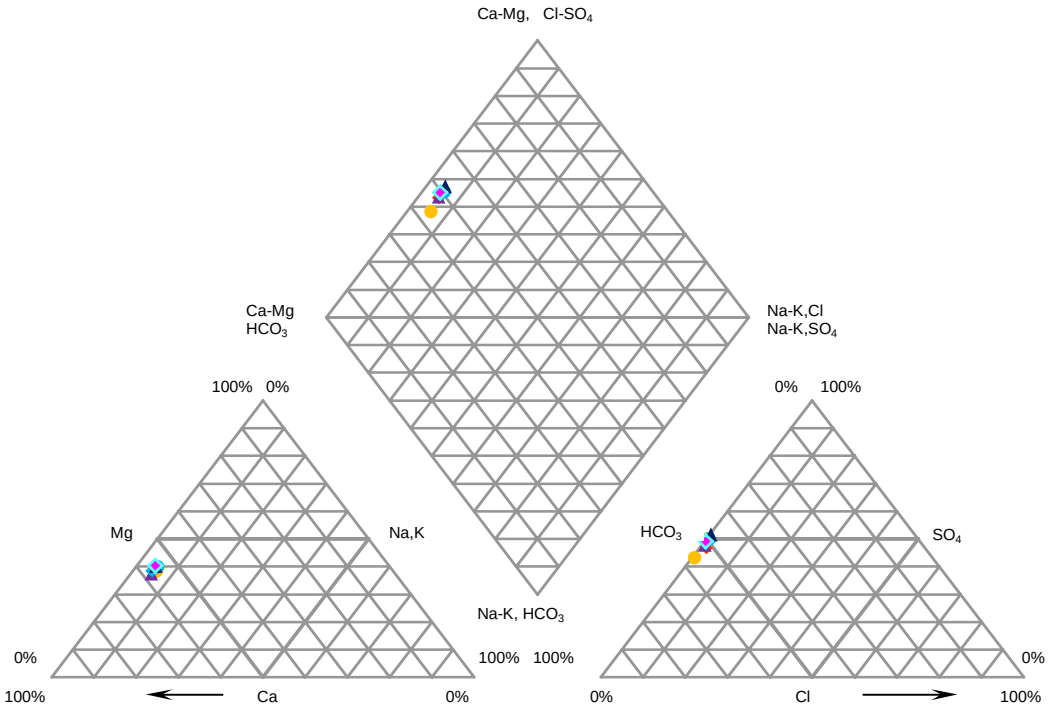
Knight Piésold CONSULTING

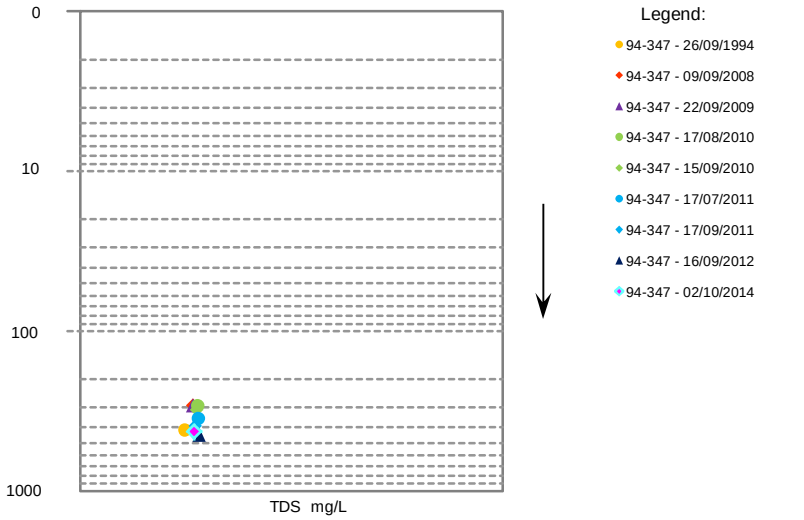
P/A NO. VA101-325/17

REF. NO. 1

FIGURE G1.5

REV 0





NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

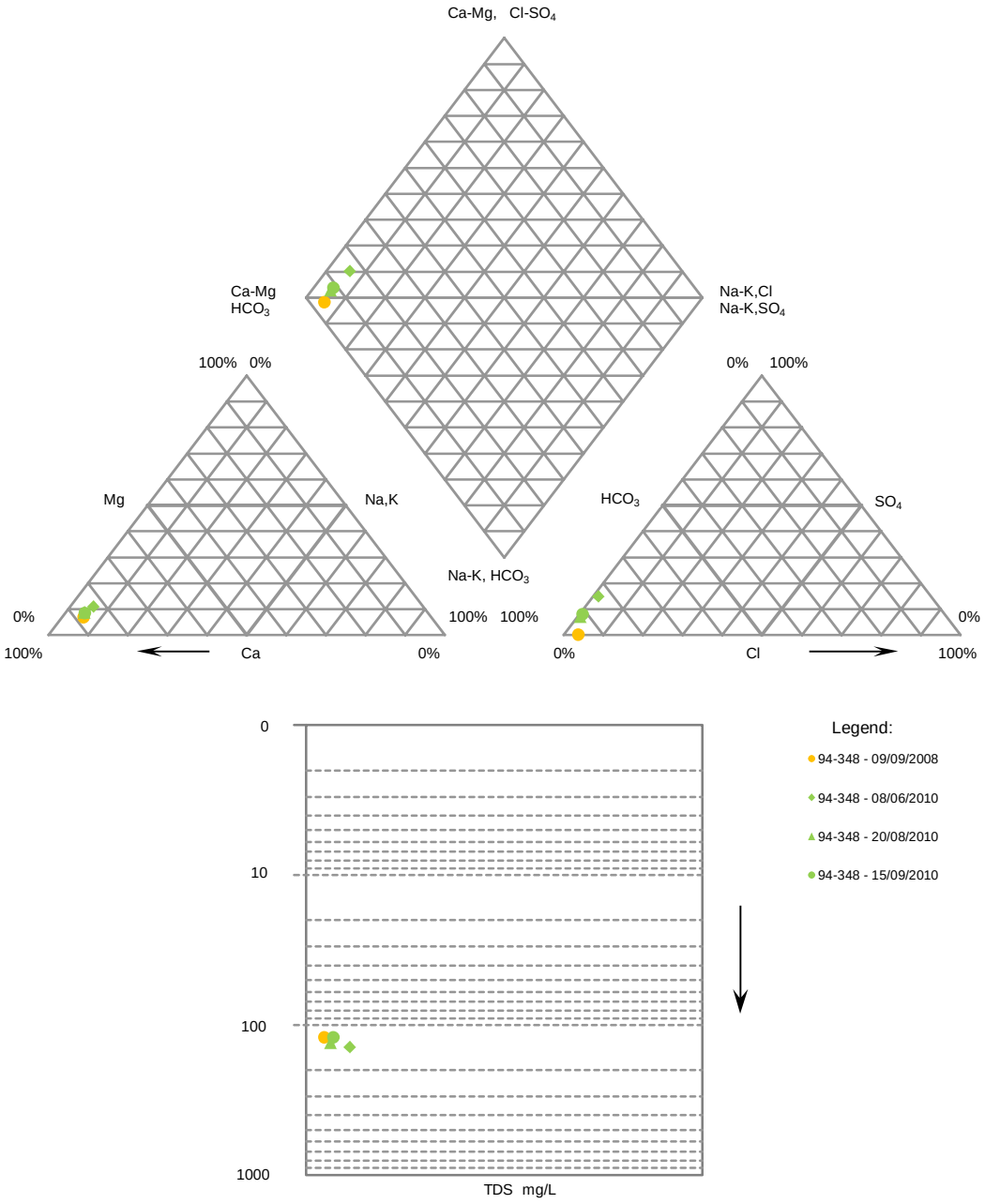
CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-347

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G1.6 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

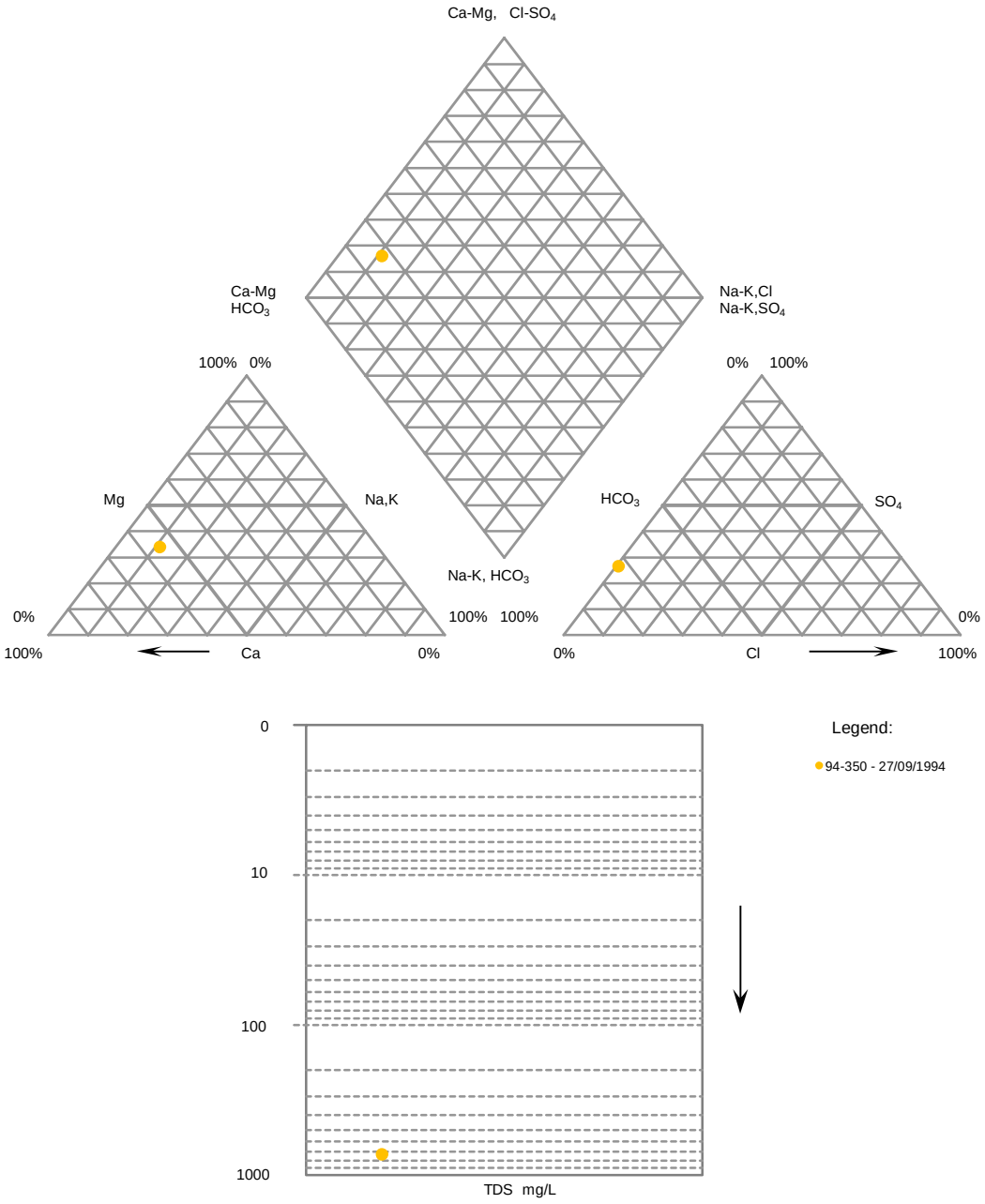
CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-348

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G1.7 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	CHK'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

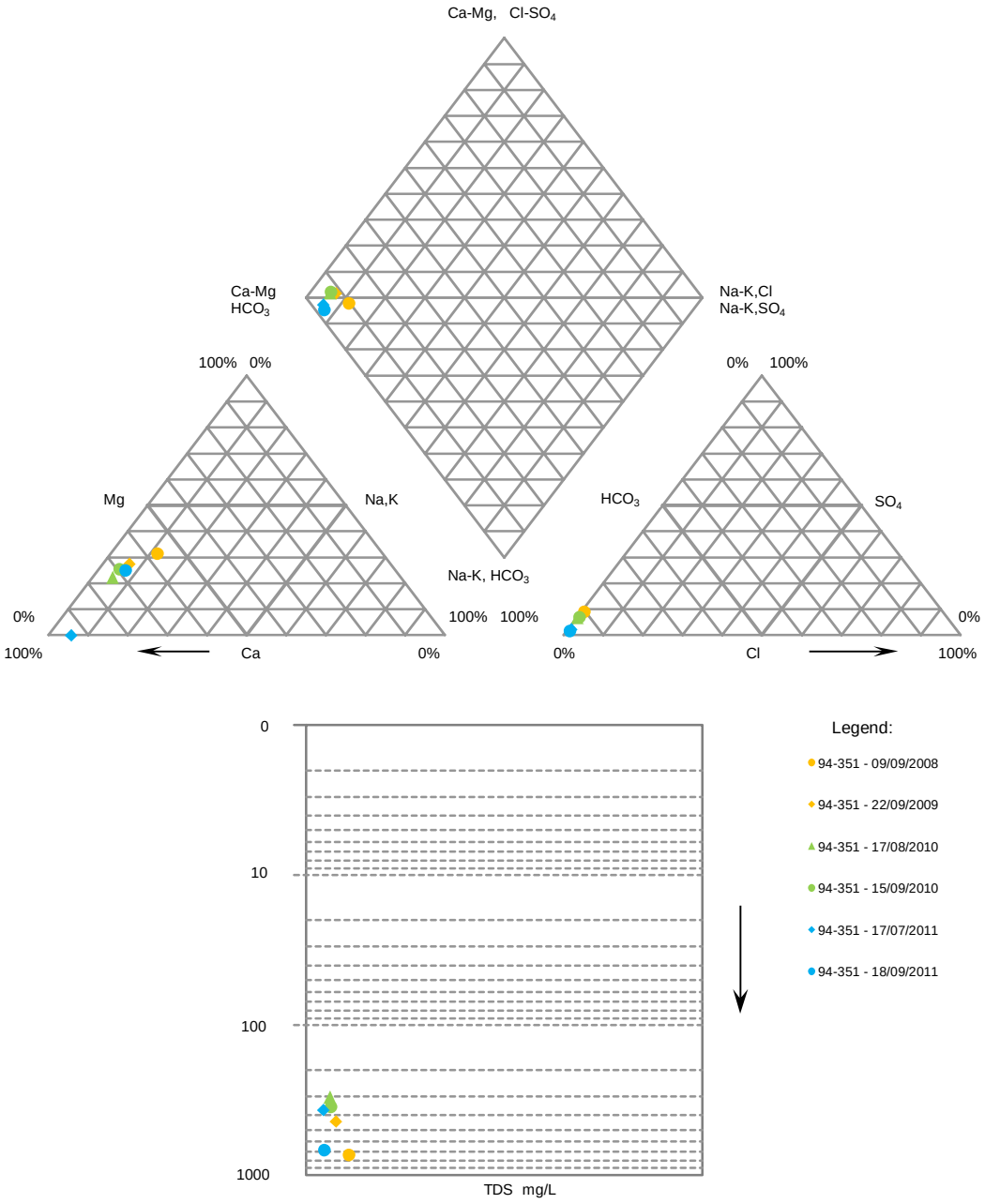
CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-350

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G1.8 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

CASINO PROJECT

PIPER PLOT - CASINO CREEK AREA
94-351

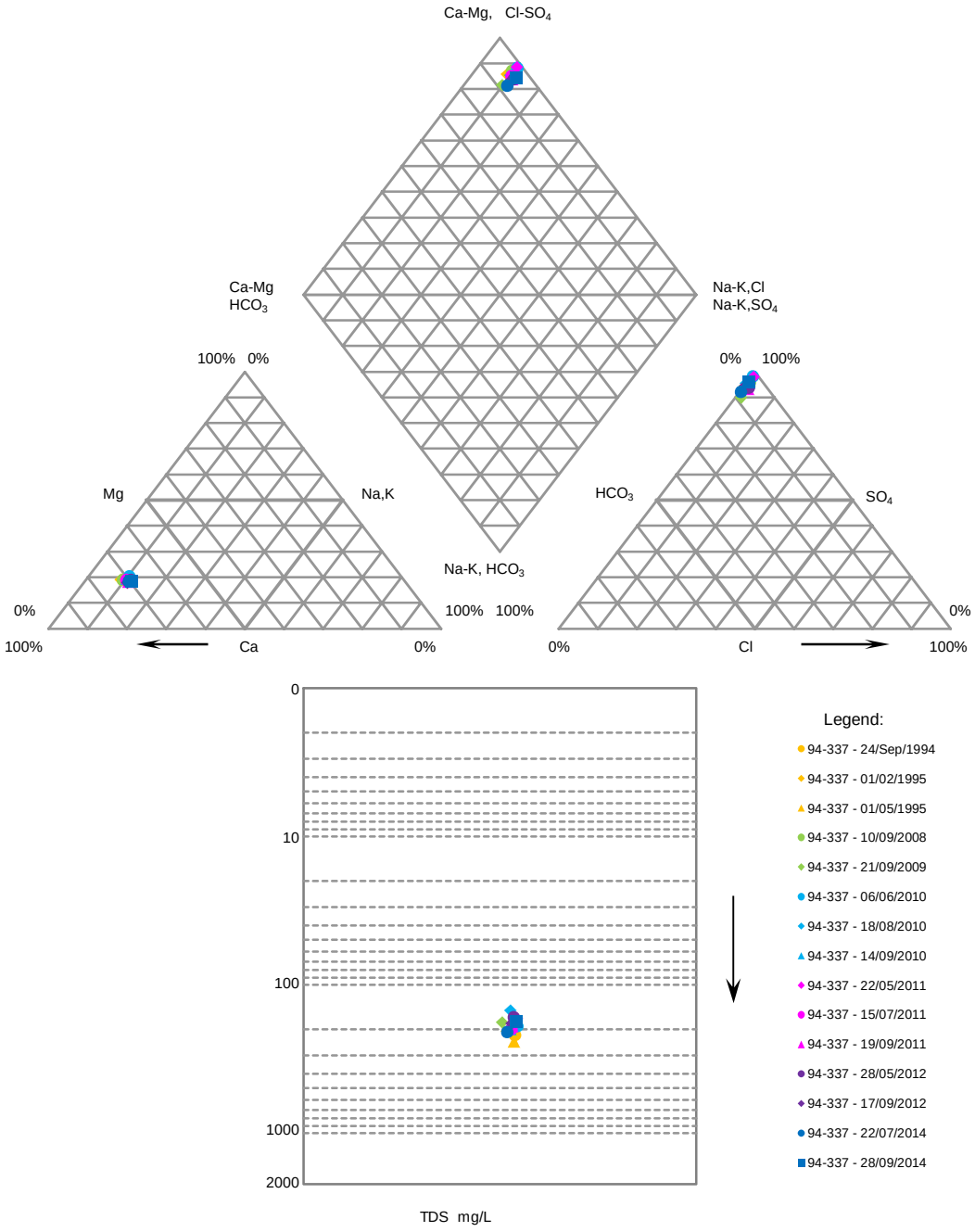
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE G1.9

REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

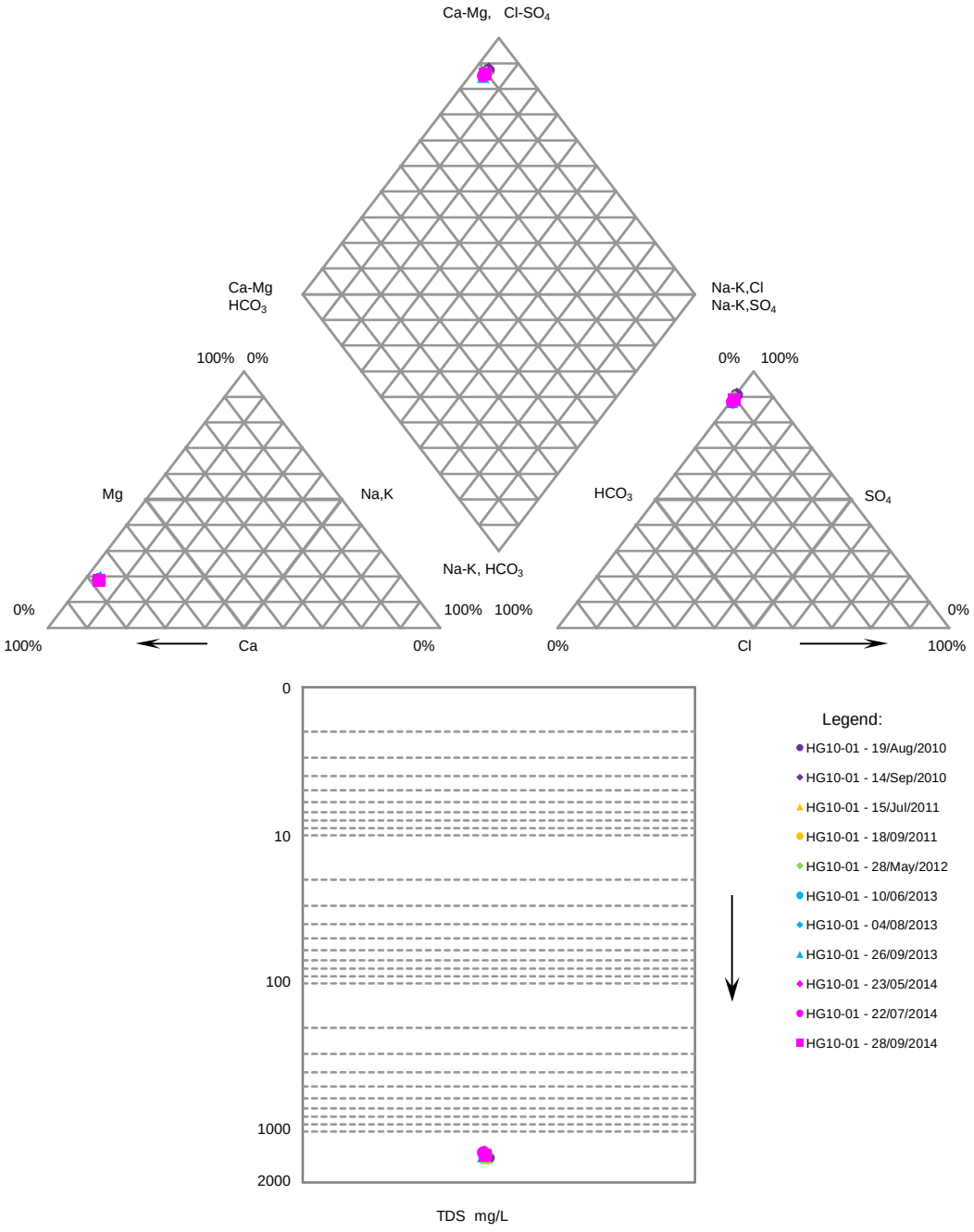
CASINO PROJECT

PIPER PLOT - OPEN PIT AREA
94-337

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G2.1 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

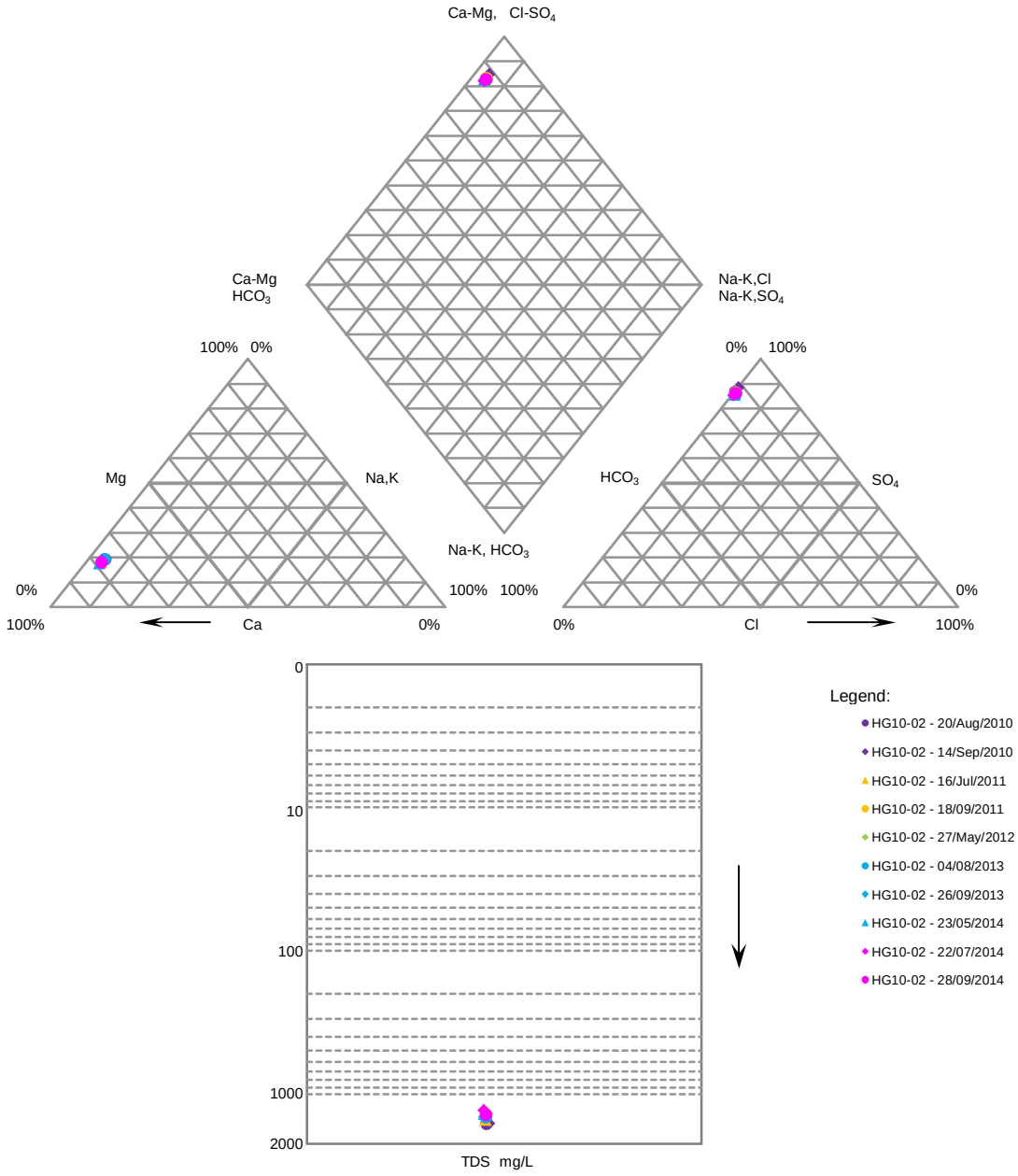
CASINO PROJECT

PIPER PLOT - OPEN PIT AREA
HG10-01

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G2.2 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.
4. QA/QC ISSUE WITH SULPHATE AND ZINC FOR JUNE 22, 2013

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

CASINO PROJECT

PIPER PLOT - OPEN PIT AREA
HG10-02

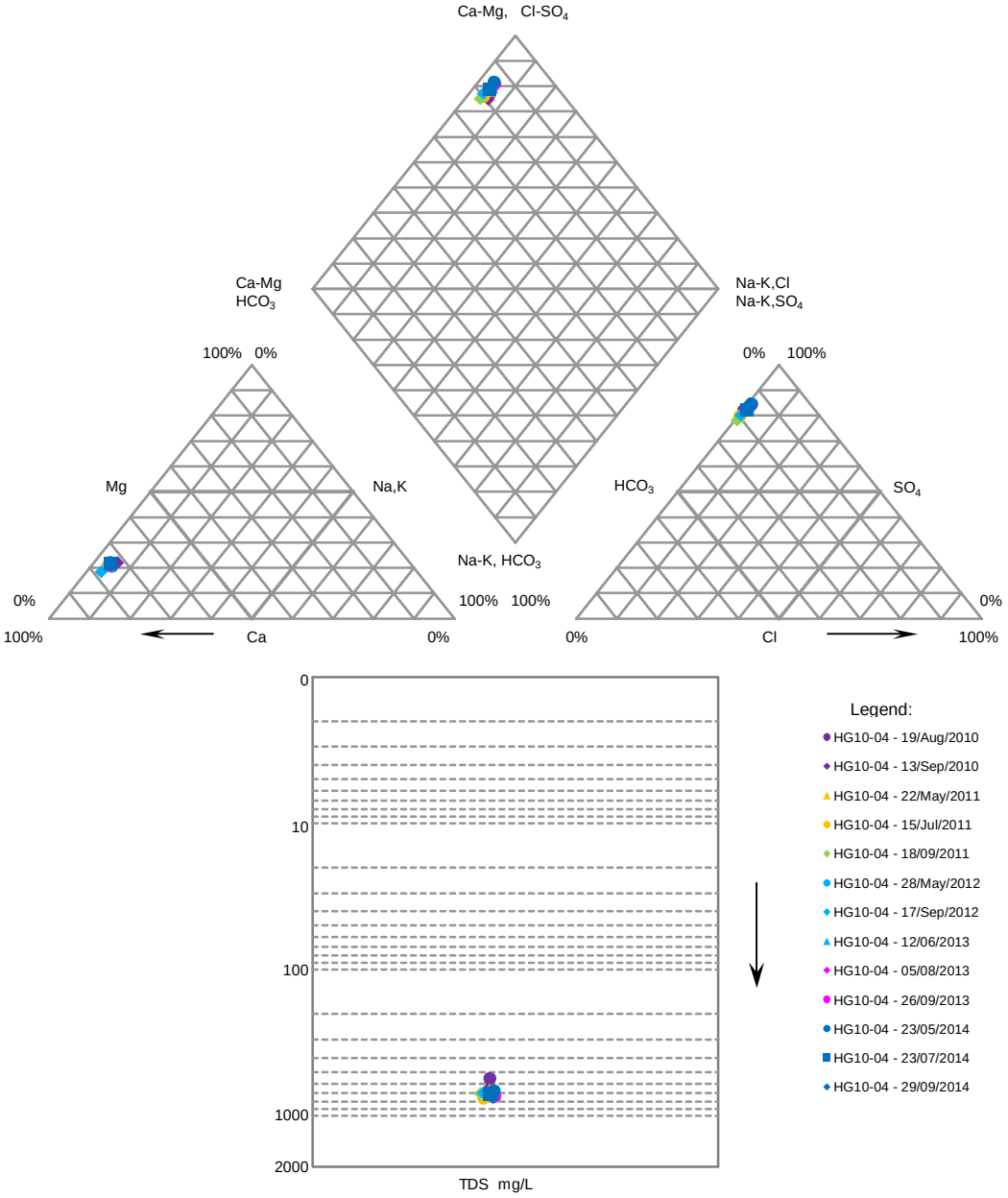
Knight Piésold CONSULTING

P/A NO. VA101-325/17

REF. NO. 1

FIGURE G2.2

REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.
4. QA/QC ISSUE WITH ALUMINUM, LEAD AND TURBIDITY FOR JUNE 22,

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

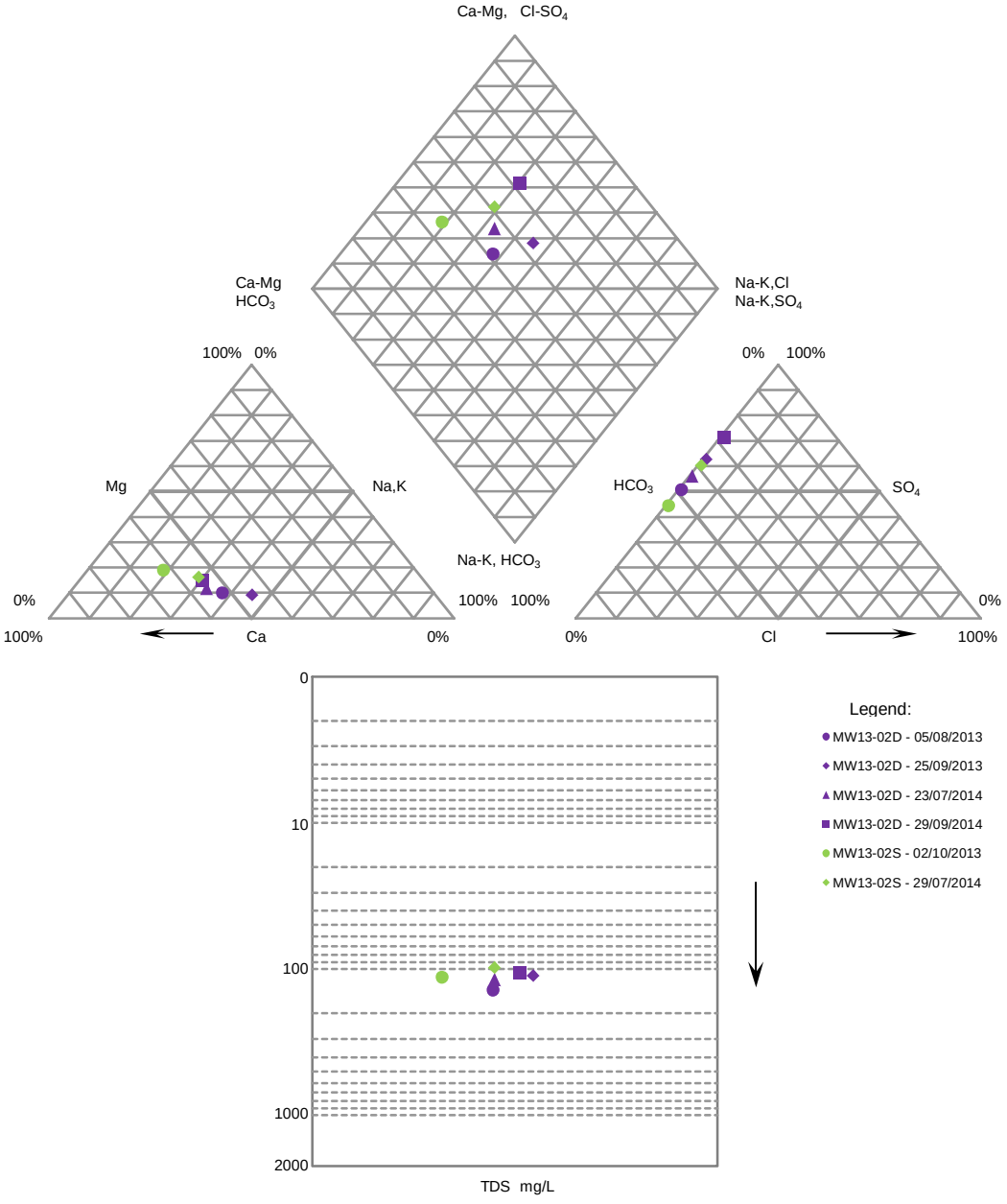
CASINO PROJECT

PIPER PLOT - OPEN PIT AREA
HG10-04

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G2.4 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

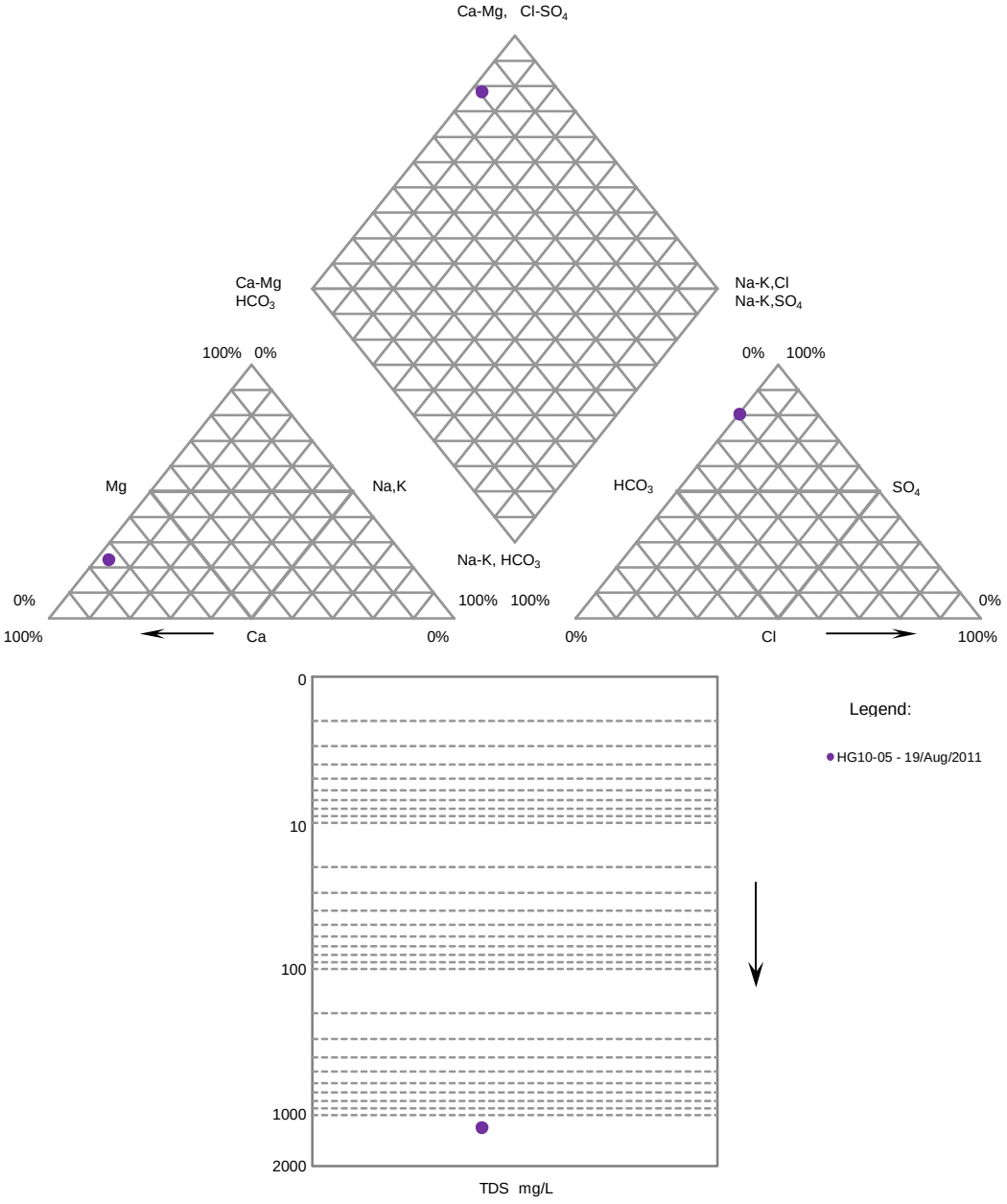
CASINO PROJECT

PIPER PLOT - OPEN PIT AREA
MW13-02D/S

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G2.5 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

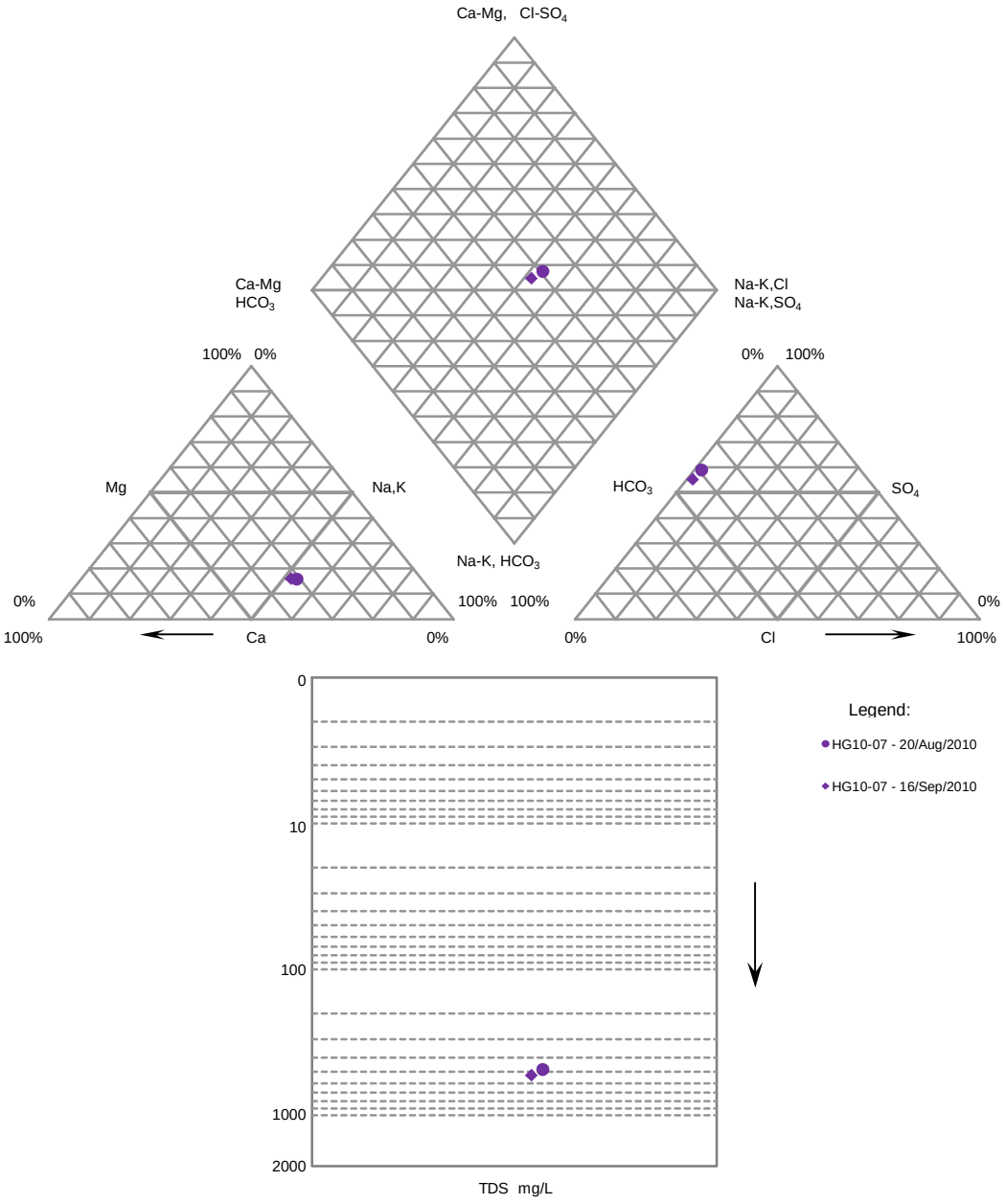
CASINO PROJECT

PIPER PLOT - OPEN PIT AREA
HG10-05

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G2.6 | REV 0



NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. DATA USED FOR THESE PLOTS ARE AVERAGE VALUES, BASED ON SAMPLES COLLECTED FROM DECEMBER 2011 TO MAY 2014.
3. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

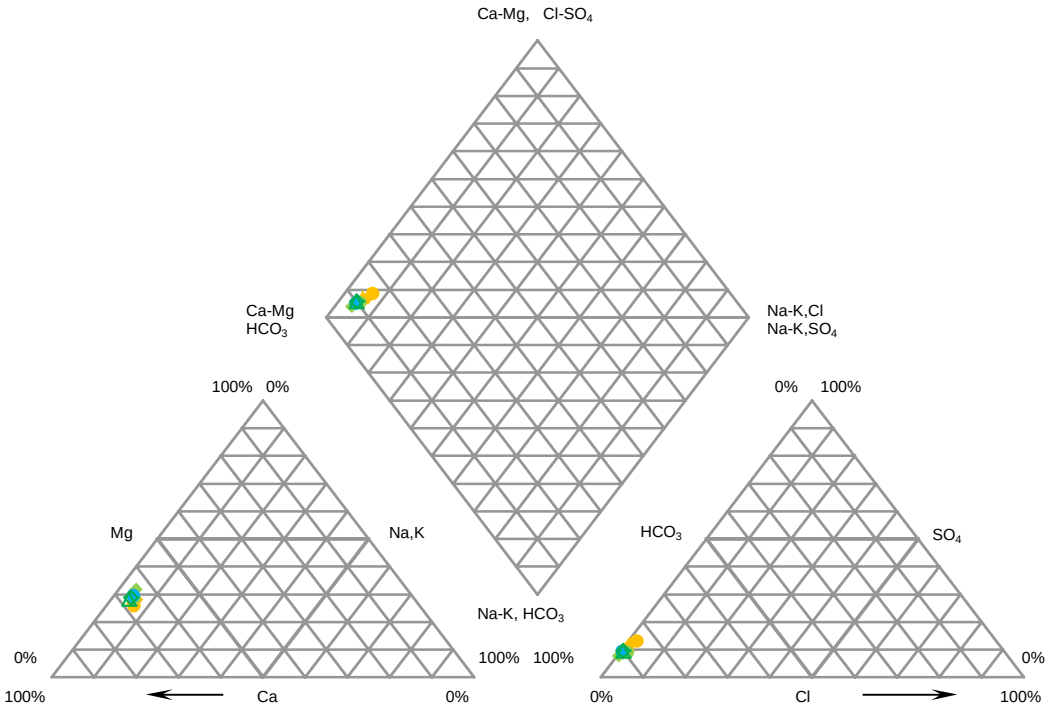
CASINO PROJECT

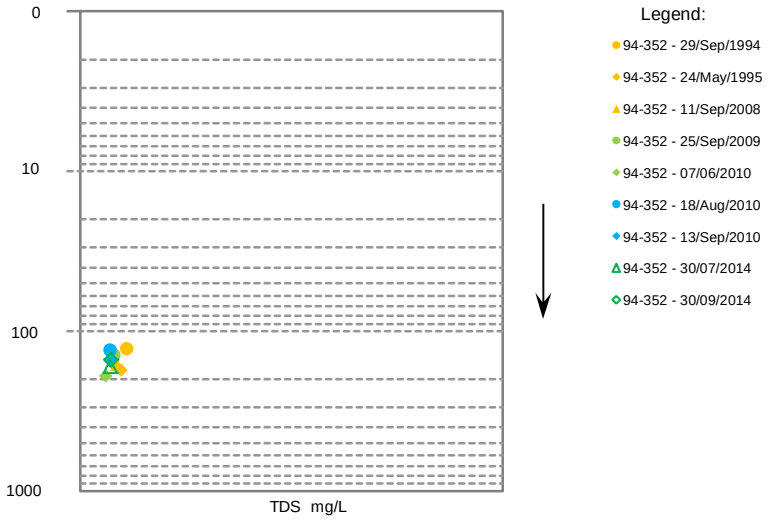
PIPER PLOT - OPEN PIT AREA
HG10-07

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G2.7 | REV 0





NOTES:

1. PIPER DATA ARE PLOTTED IN %meq/L.
2. VALUES BELOW THE METHOD DETECTION LIMIT (MDL) WERE ASSUMED TO EQUAL HALF THE MDL.

REV	DATE	DESCRIPTION	PREP'D	APP'D
0	06MAR'15	ISSUED WITH REPORT	CJ	JEM

WESTERN COPPER

CASINO PROJECT

PIPER PLOT - HILLSLOPE AREA
94-352

Knight Piésold CONSULTING

P/A NO. VA101-325/17 | REF. NO. 1

FIGURE G3.1 | REV 0