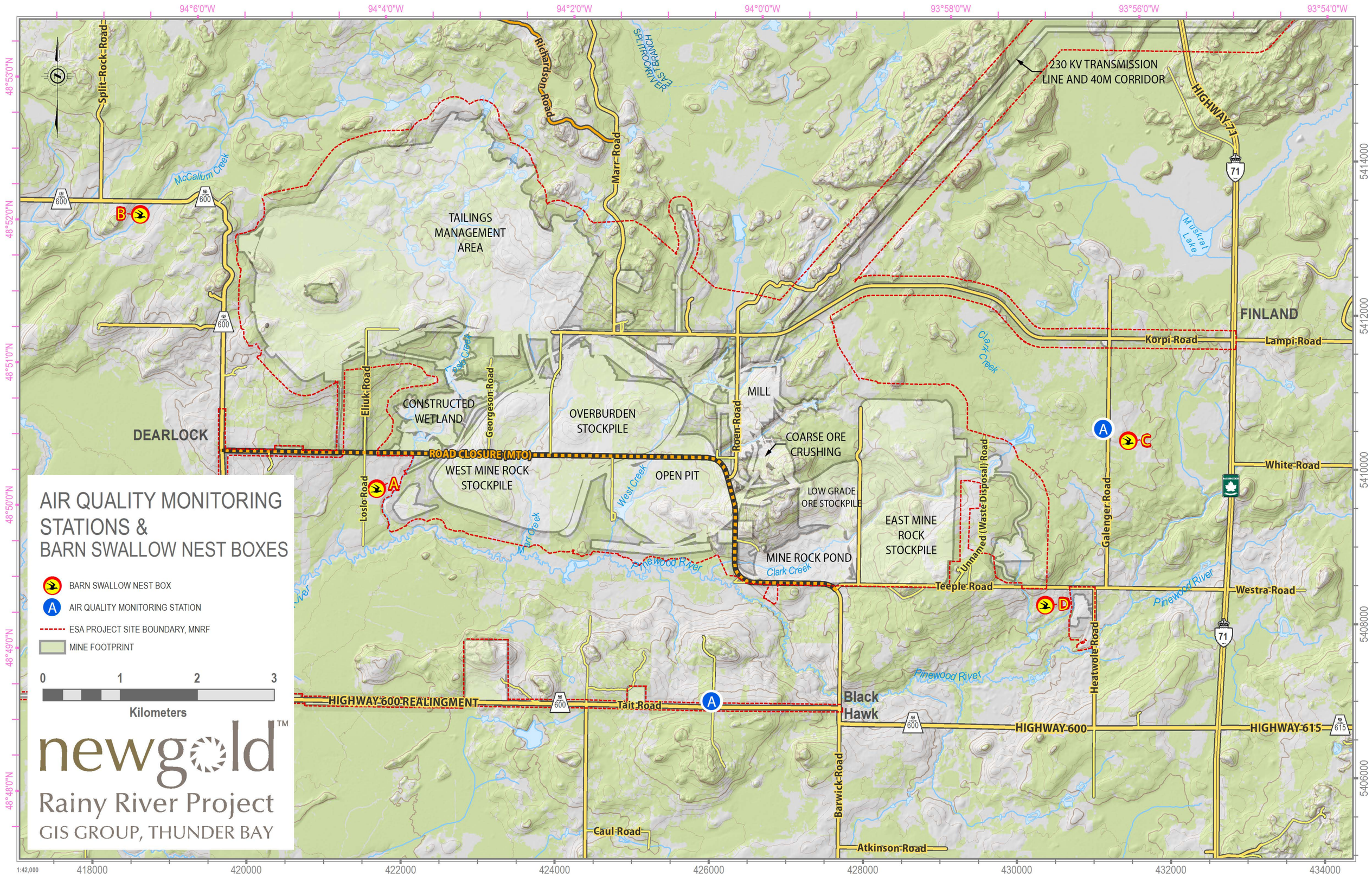
APPENDIX E

CONDITION 5
SUPPORTING DOCUMENTATION


AIR QUALITY MONITORING STATIONS & BARN SWALLOW NEST BOXES
BARN SWALLOW NEST BOX
AIR QUALITY MONITORING STATION
ESA PROJECT SITE BOUNDARY, MNRF
MINE FOOTPRINT
0 1 2 3
Kilometers
newgold
Rainy River Project
GIS GROUP, THUNDER BAY
230 KV TRANSMISSION LINE AND 40M CORRIDOR
TAILINGS MANAGEMENT AREA
CONSTRUCTED WETLAND
OVERBURDEN STOCKPILE
MILL
COARSE ORE CRUSHING
WEST MINE ROCK STOCKPILE
OPEN PIT
LOW GRADE ORE STOCKPILE
EAST MINE ROCK STOCKPILE
MINE ROCK POND
ROAD CLOSURE (MTO)
DEARLOCK
FINLAND
Black Hawk
HIGHWAY 600 REALINGMENT
HIGHWAY 600
HIGHWAY 615
HIGHWAY 71
Split Rock Road
Richardson Road
Marr Road
Eliuk Road
Georgeson Road
Roen Road
Loslo Road
Unnamed (Waste Disposal) Road
Galenger Road
Heatwole Road
Barwick Road
Korpi Road
Lampi Road
White Road
Teeple Road
Westra Road
Tait Road
Caul Road
Atkinson Road
McCallum Creek
Pete Creek
West Creek
Marr Creek
Pinewood River
Clark Creek
Muskrat Lake
SPLIT ROCK RIVER EAST BRANCH
94°6'0"W
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93°58'0"W
93°56'0"W
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AIR QUALITY MONITORING PROGRAM
SECOND QUARTER 2015 REPORT
RAINY RIVER PROJECT

REVISION 1

Submitted to:

New Gold Inc.
1111 Victoria Avenue East
Thunder Bay, Ontario
P7C 1B7

Submitted by:

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited
160 Traders Blvd. E., Suite 110
Mississauga, Ontario
L4Z 3K7

February 2016

Amec Foster Wheeler Project No.: TC111504.2015.6

February 17, 2016

AMEC Project No.: TC111504.2015.6

New Gold Inc.
1111 Victoria Avenue East
Thunder Bay, Ontario
P7C 1B7

Attention: Kyle Stanfield
Director Environment & Sustainability

Dear Mr. Stanfield:

Re: Rainy River Project, Second Quarter 2015 Air Monitoring Report (Revision 1)

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to submit to New Gold Inc. (New Gold) a revised summary report for the data collected in the second quarter 2015 for the air quality monitoring program initiated in 2015 at the Rainy River Project. Two air quality sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. The sampling stations were operated and maintained by New Gold staff.

Should you have any questions or wish to discuss the air monitoring program, please do not hesitate to contact the undersigned.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Caleb Vandenberg, P.Eng.
Air Quality Engineer

Tony van der Vooren P.Eng, Ph.D, QEP
Senior Air Quality Consultant

Amec Foster Wheeler Environment & Infrastructure
160 Traders Blvd. E., Suite 110
Mississauga, Ontario, CANADA L4Z 3K7
Phone 905.568.2929

Revision	Date	Revised By	Description
0	11-August-2015	Caleb Vandenberg	Drafted Report
0.1	11-August-2015	Linda Lattner	Text changes
0.2	23-September-2015	Tony van der Vooren	Text changes
1	17-February-2016	Caleb Vandenberg	Correction of dustfall values

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ACRONYMS AND ABBREVIATIONS

AAQC	Ambient Air Quality Criteria
ACFM	Actual Cubic Feet Per Minute
ASTM	American Society for Testing and Materials
CAAQS	Canadian Ambient Air Quality Standards
ICP/AES	Inductively Coupled Plasma Atomic Emission Spectroscopy
MOECC	Ministry of the Environment and Climate Change
NIST	National Institute of Standards and Technology
TSP	Total Suspended Particulate
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide a summary of the second quarter (Q2) 2015 results for the air quality monitoring program undertaken at the Rainy River Project located in Northwestern Ontario. Two sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. Their locations are shown in the satellite images in Appendix A (Figures 1, 2 and 3).

New Gold Inc. (New Gold) staff operate and maintain the sampling stations. Amec Foster Wheeler provided technical guidance to New Gold field staff, communicated with the laboratory staff as required and prepared the data summary report.

2.0 ANALYTICAL AND MONITORING METHODS

2.1 TSP and Metals

The total suspended particulate (TSP) concentrations were determined using the standard gravimetric method following the reference methods approved by the United States Environmental Protection Agency (USEPA) and the Ministry of the Environment and Climate Change (MOECC) as described in its Operations Manual (MOECC, 2008). Measurement of 24-hour average TSP and metal concentrations were undertaken as this is the averaging time upon which these parameters are set under Ontario Ambient Air Quality Criteria (AAQC 2012). Sampling was performed with hi-vol samplers (brush motor and mass flow controlled). The metals and metalloids analyzed included, but were not limited to, the following: arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), nickel (Ni), selenium (Se), vanadium (V) and zinc (Zn).

The lowest detectable limit is 0.1 milligrams (mg) of total particulate, resulting in a method detection limit of 0.06 micrograms per cubic metre (µg/m^3; based on a typical 24-hour sample volume of 1630 m^3).

The metal concentrations were determined with the standard ICP/AES method. The method detection limits are as shown in the data sheets in Appendix B-1.

2.2 $PM_{2.5}$

The $PM_{2.5}$ concentrations were determined using the standard gravimetric method following the reference methods approved by the USEPA and the MOECC as described in its Operations Manual (MOECC, 2008) Measurement of 24-hour average $PM_{2.5}$ was undertaken to match the averaging time for the Canadian Ambient Air Quality Standard (CAAQS). Sampling was performed with PQ200 samplers.

The lowest detectable limit is 1 µg of $PM_{2.5}$, resulting in a method detection limit of 0.04 µg/m^3 (based on a typical 24-hour sample volume of 24 m^3).

2.3 Total Dustfall

The water soluble and insoluble portions of dustfall were determined using ASTM method D-1739-98 and MOECC method DF-E3043A (September 8, 1995). Standard dustfall samplers were used to measure total dustfall deposition. The dustfall jars were lined with a 4 Mil plastic bag as required in the MOECC Operations Manual (MOECC, 2008). The method detection limit for total dustfall is 0.3 g/m^2/30 days.

2.4 Passive Sampling for SO_2 and NO_2

SO_2 and NO_2 concentrations were monitored with passive sampling devices. The exposed permeation filters were analyzed using the methodology employed by the Maxxam Analytics Inc. laboratory located in Edmonton, Alberta. The methodology was developed, approved and validated by Alberta Environment with the support of the Alberta Research Council, the Clean Air Strategic Alliance of Alberta, and the National Research Council of Canada.

Since the sample uptake is dependent on temperature, relative humidity and wind speed, the analytical results are adjusted for these meteorological parameters measured during the exposure period (monthly averages). The required meteorological data from the onsite weather station is provided by New Gold to Maxxam Analytics with each sample submission. The method detection limit is in the order of 0.1 parts per billion (ppb) for both SO_2 and NO_2. Validation tests conducted in Alberta show that results from passive sampling are typically within 10% of those obtained from sampling with continuous analyzers for 30-day exposure periods.

Since there are no MOECC guidelines for monthly concentrations of SO_2 and NO_2 obtained from passive sampling, the data will only be used for screening purposes and potentially for comparison with dispersion modelling results. For NO_2 the monthly results were compared to the MOECC AAQC for 24-hour converted to a 30-day average (78 ug/m^3). For SO2, the results were compared against the 30-day Alberta Ambient Air Quality Objectives (2013) of 30 ug/m^3.

2.5 Field Operations

2.5.1 HiVol Samplers

The two sites were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample in order to meet the requirements of the 1 in 6 day sampling schedule. Additional visits were made to resolve instrumentation issues and perform flow calibration checks and preventative maintenance.

Amec Foster Wheeler staff performed the original calibrations on the hi-vol samplers on 25 May 2015 using a BGI direct reading hivol electronic flow calibrator. The flows were set at 40 acfm for each station; the samplers are mass flow controlled. The electronic BGI flow calibrator was sent to the manufacturer for re-certification to National Institute of Standards and Technology (NIST) traceability in September 2014. New Gold staff recalibrated the SW HiVol on 30 June 2015 using the same calibrator and under the guidance of Amec Foster Wheeler staff after a pump was replaced. The overall uncertainty of the calibrator was determined to be 0.60% (ambient temperature, barometric pressure and flow), with an average error of -1.21% in the flow at standard conditions (Q_s) relative to the USEPA standard.

2.5.2 PQ200 Samplers

The stations were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample in order to meet the requirements of the 1 in 6 day sampling schedule. The PQ200 supplier performed the original calibrations on 20 May 2015 and the flow was checked using an electronic BGI flow calibrator by Amec Foster Wheeler staff on 26 May 2015 after the instruments had been installed.

2.5.3 Dustfall Samplers

The dustfall samplers were changed every month, as required.

2.5.4 Passive Samplers

The permeation filters in the passive samplers were changed every month, as required.

3.0 RESULTS

The results for the Q2 2015 sampling program are presented in Appendix B-1 for the hivol data, Appendix B-2 for the dustfall data and Appendix B-3 for the passive SO_2 and NO_2 data. By convention, all hivol results below the analytical detection limit were reported at half the detection limit.

For comparison purposes, the MOECC AAQC and CAAQS values are presented, where available.

A summary of the statistical analyses for Q2 for the TSP particulate concentrations is presented in Table 1 below. During the quarter, the 1 in 6 day hivol sampling schedule comprised a possible total of 6 sampling days between 28 May and 30 June 2015.

A summary of the statistical analyses for Q2 2015 for the total dustfall data is presented below in Table 2. A summary of the statistical analysis for the second quarter of 2015 for the passive SO_2 and NO_2 results is presented in Table 3.

3.1 Total Suspended Particulates and Metals

At the both the Tait Road and Gallinger Road stations, six valid samples were collected in Q2 2015, resulting in 100% valid data.

For the quarter, the arithmetic mean TSP concentrations were comparable, with the Tait Road station averaging 36.7 µg/m^3 and the Gallinger Road station averaging 34.5 µg/m^3. For values below the detection limit, by convention they are substituted with a value of 1.5 µg/m^3, which is half of the detection limit. The maximum 24-hour concentration for TSP was 85.2 µg/m^3 at the Tait Road station (28 May 2015), and 84.3 µg/m^3 at the Gallinger Road station (28 May 2015). Both values are lower than the 24-hour AAQC TSP level of 120 µg/m^3.

In the quarter, the 24-hour metal concentrations were all well below the applicable O.Reg.419/05 Schedule 3 standards and AAQCs. For three metals (As, Se, and V), statistics were not reported as more than 50% of the results were below the method detection limit.

Table 1: Summary Statistics for Q2 2015 for TSP Data

Statistic	Q2	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m^3)	31.9	28.9
Arithmetic mean (µg/m^3)	36.7	34.5
Maximum 24 hour (µg/m^3)	85.2 (28 May)	84.3 (28 May)
90th percentile	62.8	28.9
95th percentile	74.0	34.5
24-hour AAQC	120	120
No. of valid samples	6	6
% valid data	100	100
No. samples > AAQC (particulate)	0	0
No. samples > AAQC (metals)	0	0
No. samples > AAQC (elements)	0	0

3.2 $PM_{2.5}$

At the Tait Raid station, six samples were collected resulting in 100% valid data.

For the Gallinger Road station, the $PM_{2.5}$ sample for 26 June 2015 was invalid due to a runtime error resulting in the collected volume exceeding MOECC criterion. The invalid sample resulted in 83% valid data for the quarter for that instrument.

The arithmetic mean $PM_{2.5}$ concentrations for Q2 2015 were comparable with the Tait Road station averaging 8.98 µg/m^3 and the Gallinger Road station averaging 8.58 µg/m^3. For values below the detection limit, by convention they are substituted with a value of 0.5 µg/m^3, which is half of the detection limit. The maximum 24- hour concentration for $PM_{2.5}$ was 24.1 µg/m^3 at the Tait Road station (8 June), and 21.0 µg/m^3 at the Gallinger Road station (8 June). Both values are lower than the $PM_{2.5}$ AAQC of 30 µg/m^3 and the CAAQS of 28 µg/m^3.

The Q2 $PM_{2.5}$ data is summarized in Table 2.

Table 2: Summary Statistics for Q2 2015 for $PM_{2.5}$ Data

Statistic	Q2	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m^3)	7.15	6.75
Arithmetic mean (µg/m^3)	8.98	8.58
Maximum 24 hour (µg/m^3)	24.1	21.0
90th percentile	16.9	16.2
95th percentile	20.5	18.6
24-hour CAAQS	28	28
No. of valid samples	6	5
% valid data	100%	83%
No. samples > CAAQS	0	0

3.3 Total Dustfall

One valid dustfall sample was collected at each station each month for dustfall during Q2 2015; each dustfall jar was exposed for 31 days. There were no exceedances of the AAQC for dustfall. A summary of the results is presented in Table 3.

The monthly results are shown in Appendix B-2.

Table 3: Summary Statistics for Q2 2015 Total Dustfall Data

Statistic	Tait Road (SW)	Gallinger Road (NE)
Mean (g/m^2/30d)[1]	4.47	1.3
30-day AAQC	7	7
No. > AAQC	0	0
No. valid samples	1	1
% Valid data	100	100

N/A: No applicable criteria

[1]Only one sample taken at each station

3.4 Passive SO_2 and NO_2

In Q2 2015, one valid sample was collected at each station for each of SO_2 and NO_2.

There are no MOECC standards, guidelines or AAQCs for SO_2 and NO_2 data obtained from passive samplers for the 30-day averaging period.

The 30-day average SO2 and NO2 concentrations measured allow for future analysis of trends in the ambient concentrations, to identify any notable increases, and for comparison with dispersion modelling results. For NO2 the monthly results were compared to the MOECC AAQC for 24-hour converted to a 30-day average (78 µg/m3), which is equal to the Ontario 24-hour average AAQC converted to a 30-day averaging period using the methodology outlined in the *Procedure for Preparing and Emission Summary and Dispersion Modelling Report* (MOECC 2009). For SO2, the results were compared against the Alberta Ambient Air Quality Objectives (2013) of 30 µg/m3.

Table 4: Summary Statistics for Q2 2015 for Passive SO_2 and NO_2 Data

	Tait Road (SW)		Gallinger Road (NE)	
Statistic	**SO_2**	**NO_2**	**SO_2**	**NO_2**
Mean	1 µg/m^3 (0.4 ppb)	<0.2 µg/m^3 (<0.1 ppb)	<0.3 µg/m^3 (<0.1 ppb)	<0.2 µg/m^3 (<0.1 ppb)
Maximum	1 µg/m^3 (0.4 ppb)	<0.2 µg/m^3 (<0.1 ppb)	<0.3 µg/m^3 (<0.1 ppb)	<0.2 µg/m^3 (<0.1 ppb)
AAQC 24-hr converted to 30-day	N/A	78 µg/m^3	N/A	78 µg/m^3
Alberta Ambient Air Quality Objectives 2013	30 µg/m^3	N/A	30 µg/m^3	N/A
No. valid samples	1	1	1	1
% Valid data	100	100	100	100

N/A: No applicable criteria

4.0 CONCLUSIONS

Two ambient air quality monitoring stations were installed and commissioned in May 2015 at the Rainy River Project.

The following samples were collected in Q2 2015:

- Six valid TSP samples were collected at each of the two monitoring stations (100% valid data), with metal analyses performed on each of the TSP filters;
- Six valid $PM_{2.5}$ samples were collected at the Tait Road site (100% valid data); and five at the Gallinger Road site (83% valid data);
- One valid dustfall sample was collected at each of the two stations; and
- One valid passive sample for each of SO_2 and NO_2.

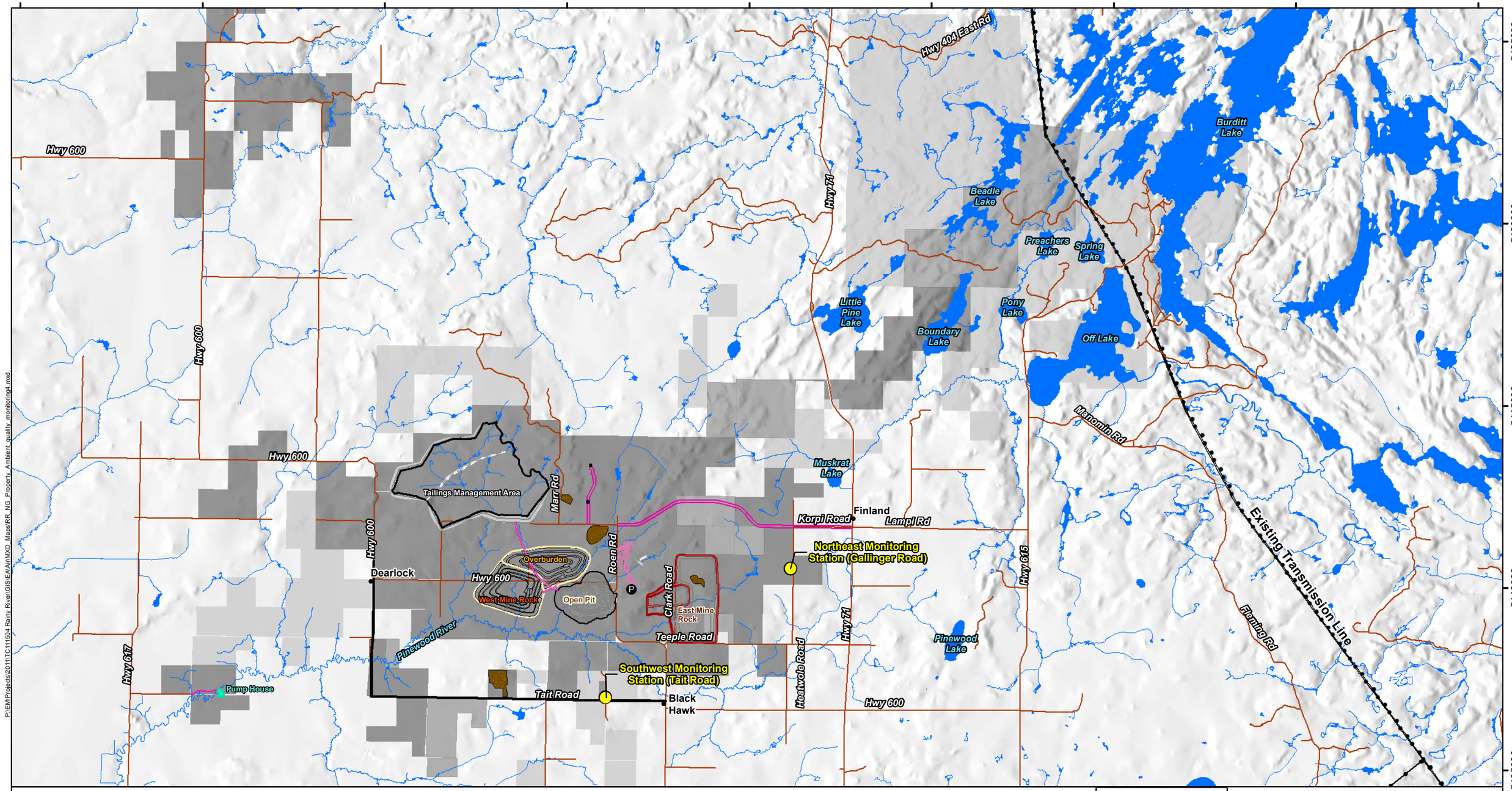
There were no measured exceedences of MOECC air quality standards, guidelines, or AAQCs, nor were there any exceedances of the Federal CAAQS for $PM_{2.5}$ or other established criteria. All air quality parameters were well below corresponding limits.

5.0 REFERENCES

Ministry of the Environment. 2008. Operations Manual for Air Quality Monitoring in Ontario.

APPENDIX A

SATELLITE IMAGES OF THE AIR SAMPLING STATION LOCATIONS



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LEGEND

- Ambient Air Quality Monitoring Stations
- New Gold - Rainy River Property Boundary
- New Gold Unpatented Claim (Applied to bring to lease) Acquisition in Progress
- New Gold Lands with No Current Access Control

Proposed Site Features

- Underground Portal
- Open Pit
- Plant Site / Ancillary Facilities
- Explosives Facilities
- Overburden / West Mine Rock Stockpile
- Ore / East Mine Rock Stockpile
- Proposed Pump House
- Tailings Management Area
- Aggregate Pit / Quarry
- Site Roads
- Roads
- Existing Transmission Line
- First Nation Land

NOTES:
- Road and Utility data and topographic data extracted from Land Information Ontario, Ontario Road Network, MNR Queen's Printer for Ontario, 2011-2012
- Land tenure information and parcels provided by NewGold, June 9, 2015

Datum: NAD83
Projection: UTM Zone 15N

0 2 4 8 12 16 20 Kilometres

newgold Rainy River Project

amec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring Stations

PROJECT N°: TC111504 | **FIGURE: 1**

SCALE: 1:100,000 | DATE: August 2015

P:\EM\Projects\2011\TC111504 Rainy River\GIS\EA\Air\MXD Maps\RR_NG_Ambient_quality_monitoring_stationTait.mxd

LEGEND

- Southwest Monitoring Station (Tait Road)
- Highway Re-alignment

0 10 20 40 60 80 100 Meters

Notes:
- Aerial imagery provided by RRR Plieades imagery (August 2014).

Datum & Projection:
NAD 1983 UTM Zone 15N

N W E S

newgold Rainy River Project

arnec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring
Southwest Monitoring Station

PROJECT N°: TC111504	**FIGURE: 2**
SCALE: 1:700	DATE: August 2015

P:\EM\Projects\2011\TC111504 Rainy River\GIS\EAA\MXD_Maps\RR_NG Ambient quality monitoring station Gallinger.mxd

LEGEND

- Northeast Monitoring Station (Gallinger Road)
- Gallinger Road

0 10 20 40 60 80 100 Meters

Notes:
- Aerial imagery provided by RRR Plieades imagery (August 2014).

Datum & Projection:
NAD 1983 UTM Zone 15N

N W E S

newgold Rainy River Project

amec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring
Northeast Monitoring Station

PROJECT N°: TC111504	**FIGURE: 3**
SCALE: 1:700	DATE: August 2015

APPENDIX B

Appendix B-1: TSP Sampling Results

Appendix B-2: Total Dustfall Sampling Results

Appendix B-3: SO_2 AND NO_2 Passive Sampling Results

APPENDIX B-1

TSP SAMPLING RESULTS

Southwest Tait Road Monitoring Results for TSP and Metals (Second Quarter 2015)
(results expresed in µg/m^3)

Date	TSP	PM2.5	As*	Cd	Cr	Co	Cu	Fe	Pb	Mn	Ni	Se*	V*	Zn
May 28, 2015	85.2	9.74	0.00044	0.0000758	0.00614	0.000176	0.163	0.272	0.000617	0.0120	0.00129	0.00044	0.00056	0.00952
June 2, 2015	23.4	5.58	0.00045	0.0000779	0.0054	0.000129	0.0974	0.201	0.00120	0.00734	0.000890	0.00045	0.00058	0.04268
June 8, 2015	40.5	24.1	0.00043	0.000169	0.0053	0.0000971	0.323	0.103	0.000977	0.0359	0.000779	0.00043	0.00056	0.02813
June 14, 2015	21.7	5.41	0.00043	0.0000374	0.0092	0.000118	0.496	0.178	0.000557	0.00695	0.000689	0.00043	0.00055	0.00664
June 20, 2015	22.0	3.25	0.00043	0.0000168	0.0081	0.0000919	0.573	0.101	0.000181	0.00294	0.000552	0.00043	0.00056	0.00428
June 26, 2015	27.4	5.83	0.00043	0.0000540	0.011	0.000318	0.124	0.441	0.000397	0.01136	0.00129	0.00043	0.00056	0.01012
Geometric mean	31.9	7.15	N/R	0.000057	0.0072	0.00014	0.238	0.188	0.000554	0.00950	0.00087	N/R	N/R	0.0122
Arithmetic mean	36.7	8.98	N/R	0.000072	0.0074	0.00015	0.296	0.216	0.000655	0.0128	0.00092	N/R	N/R	0.0169
Max. concentration	85.2	24.1	N/R	0.00017	0.011	0.00032	0.573	0.441	0.00120	0.03592	0.0013	N/R	N/R	0.04268
Min. concentration	21.7	3.25	N/R	0.000017	0.0053	0.000092	0.097	0.101	0.000181	0.00294	0.00055	N/R	N/R	0.00428
90th percentile	62.8	16.9	N/R	0.00012	0.010	0.00025	0.534	0.357	0.00109	0.0240	0.0013	N/R	N/R	0.0354
95th percentile	74.0	20.5	N/R	0.00015	0.010	0.00028	0.554	0.399	0.00115	0.0299	0.0013	N/R	N/R	0.0390
CAAQS	N/A	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AAQC (24 h)	120	30	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC (24 h)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	6	6	6	6	6	6	6	6	6	6	6	6	6	6
No. samples < mdl	0	0	6	0	0	0	0	0	0	0	0	6	6	0
Detection limit (µg)	1	1	1.4	0.0090	1.4	0.0077	3.4	17	0.081	0.44	0.10	1.4	1.8	1.4
Half detection limit (µg)	0.5	0.5	0.7	0.0045	0.7	0.00385	1.7	8.5	0.0405	0.22	0.05	0.7	0.9	0.7
% < detection limit	0	0	100	0	0	0	0	0	0	0	0	100	100	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Arsenic, Selenium, and Vanadium concentrations were below detection limit and as such were reported at 1/2 the detection limit

**Canadian Ambient Air Quality Standard, 24-hour standard

Northeast Gallinger Road Monitoring Results for TSP and Metals (Second Quarter 2015)
(results expresed in µg/m^3)

Date	TSP	PM2.5	As*	Cd	Cr	Co	Cu	Fe	Pb	Mn	Ni	Se*	V*	Zn
May 28, 2015	84.3	8.95	0.00044	0.000052	0.0045	0.0000912	0.213	0.133	0.000430	0.00881	0.00106	0.00044	0.00057	0.00824
June 2, 2015	27.9	5.20	0.00041	0.000140	0.0052	0.000317	0.335	0.658	0.00559	0.01083	0.00207	0.00041	0.00052	0.31219
June 8, 2015	34.3	21.0	0.00043	0.000122	0.0045	0.0000927	0.185	0.0829	0.000694	0.03015	0.000749	0.00043	0.00055	0.02149
June 14, 2015	21.9	4.79	0.00042	0.0000372	0.0087	0.0000994	0.193	0.145	0.000578	0.00627	0.000621	0.00042	0.00054	0.00663
June 20, 2015	12.8	3.00	0.00043	0.0000135	0.0074	0.0000431	0.225	0.0350	0.000236	0.00202	0.000522	0.00043	0.00055	0.00565
June 26, 2015	25.5	INV	0.00044	0.0000244	0.0080	0.000105	0.241	0.0946	0.000198	0.00352	0.000661	0.00044	0.00057	0.00864
Geometric mean	28.9	6.75	N/R	0.000047	0.0061	0.00010	0.228	0.123	0.000596	0.00710	0.00084	N/R	N/R	0.0162
Arithmetic mean	34.5	8.58	N/R	0.000065	0.0064	0.00012	0.232	0.191	0.00129	0.0103	0.00095	N/R	N/R	0.0605
Max. concentration	84.3	21.0	N/R	0.00014	0.0087	0.00032	0.335	0.658	0.00559	0.03015	0.00207	N/R	N/R	0.31219
Min. concentration	12.8	3.00	N/R	0.000014	0.0045	0.000043	0.185	0.0350	0.000198	0.00202	0.00052	N/R	N/R	0.00565
90th percentile	59.3	16.2	N/R	0.00013	0.0084	0.00021	0.288	0.402	0.00314	0.0205	0.0016	N/R	N/R	0.167
95th percentile	71.8	18.6	N/R	0.00014	0.0086	0.00026	0.312	0.530	0.00436	0.0253	0.0018	N/R	N/R	0.240
CAAQS	N/A	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AAQC	120	30	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	6	5	6	6	6	6	6	6	6	6	6	6	6	6
No. samples < mdl	0	0	6	0	0	0	0	0	0	0	0	6	6	0
Detection limit (µg)	1	1	1.4	0.0090	1.4	0.0077	3.4	17	0.081	0.44	0.10	1.4	1.8	1.4
Half detection limit (µg)	0.5	0.5	0.7	0.0045	0.7	0.00385	1.7	8.5	0.0405	0.22	0.05	0.7	0.9	0.7
% < detection limit	0	0	100	0	0	0	0	0	0	0	0	100	100	0
% valid data	100	83	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Arsenic, Selenium, and Vanadium concentrations were below detection limit and as such were reported at 1/2 the detection limit

**Canadian Ambient Air Quality Standard, 24-hour standard

APPENDIX B-2

TOTAL DUSTFALL SAMPLING RESULTS

Tait Road Monitoring Results for Dustfall (Second Quarter 2015)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)*	Dustfall (total)
April	N/A	N/A	N/A	N/A
May	N/A	N/A	N/A	N/A
June	31	4.47	0.15	4.47

Arithmetic mean	4.47
Max. concentration	4.47
Min. concentration	4.47
AAQC	7
No. > AAQC value**	0
No. of valid samples	1
% Valid data	100
No. samples < mdl	0
Detection limit	0.3
Half detection limit	0.15

Notes:
N/R: Statisics not reported due to high % of values <detedciton limit
N/A: Not applicable
INV: Invalid Sample
*All soluble dustfall results were below the detection limit and as such were report as 1/2 of the detection limit
**Ontario Ambient Air Quality Criteria, 30-day standard

Gallinger Road Monitoring Results for Dustfall (Second Quarter 2015)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)*	Dustfall (total)
April	N/A	N/A	N/A	N/A
May	N/A	N/A	N/A	N/A
June	31	1.1	0.15	1.3

Arithmetic mean	1.26
Max. concentration	1.26
Min. concentration	1.26
AAQC	7
No. > AAQC value**	0
No. of valid samples	1
% Valid data	100
No. samples < mdl	0
Detection limit	0.3
Half detection limit	0.15

Notes:
N/R: Statisics not reported due to high % of values <detedciton limit
N/A: Not applicable
INV: Invalid Sample
*All soluble dustfall results were below the detection limit and as such were report as 1/2 of the detection limit
**Ontario Ambient Air Quality Criteria, 30-day standard

APPENDIX B-3

SO_2 AND NO_2 PASSIVE SAMPLING RESULTS

Monitoring Results for Passive SO_2 and NO_2 (Second Quarter 2015)

	Tait Road		Gallinger Road	
Month	**SO_2**	**NO_2**	**SO_2**	**NO_2**
April	N/A	N/A	N/A	N/A
May	N/A	N/A	N/A	N/A
June	1 µg/m3 (0.4 ppb)	<0.2 µg/m3 (<0.1 ppb)	<0.3 µg/m3 (<0.1 ppb)	<0.2 µg/m3 (<0.1 ppb)
Arithmetic mean	N/A	N/A	N/A	N/A
Max. concentration	N/A	N/A	N/A	N/A
Min. concentration	N/A	N/A	N/A	N/A
AAQC* 24-hr converted to 30-day	N/A	78 µg/m^3	N/A	78 µg/m^3
Alberta Ambient Air Quality Objectives 2013	30 µg/m^3	N/A	30 µg/m^3	N/A
No. of valid samples	3	3	3	3
No. samples < mdl	0	0	0	0
Detection limit	0.1	0.1	0.1	0.1
Half detection limit	0.05	0.05	0.05	0.05

Notes:

All results reported by the lab in parts per billion (ppb) and are converted to µg/m3 assuming 101.23kPA and 25C

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Ontario Ambient Air Quality Criteria

AIR QUALITY MONITORING PROGRAM
THIRD QUARTER 2015 REPORT
RAINY RIVER PROJECT

REVISION 1

Submitted to:

New Gold Inc.
1111 Victoria Avenue East
Thunder Bay, Ontario
P7C 1B7

Submitted by:

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited
160 Traders Blvd. E., Suite 110
Mississauga, Ontario
L4Z 3K7

February 2016

Amec Foster Wheeler Project No.: TC111504.2015.6

February 17, 2016

Amec Foster Wheeler Project No.: TC111504.2015.6

New Gold Inc.
1111 Victoria Avenue East
Thunder Bay, Ontario
P7C 1B7

Attention: Kyle Stanfield
Director Environment & Sustainability

Dear Mr. Stanfield:

Re: Rainy River Project, Third Quarter 2015 Air Monitoring Report (Revision 1)

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to submit to New Gold Inc. (New Gold) a revised summary report for the data collected in the third quarter 2015 for the air quality monitoring program initiated in 2015 at the Rainy River Project. Two air quality sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. The sampling stations were operated and maintained by New Gold staff.

Should you have any questions or wish to discuss the air monitoring program, please do not hesitate to contact the undersigned.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Caleb Vandenberg, P.Eng.
Air Quality Engineer

Tony van der Vooren P.Eng, Ph.D, QEP
Senior Air Quality Consultant

Revision	Date	Revised By	Description
0	13-November-2015	Caleb Vandenberg	Drafted Report
0.1	13-November-2015	Thy-Thuy-Trang Nguyen	Text changes
0.2	4-December-2015	Tony van der Vooren	Text changes
1	17-February-2016	Caleb Vandenberg	Correction of dustfall values/dates

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ACRONYMS AND ABBREVIATIONS

AAQC	Ambient Air Quality Criteria
ACFM	Actual Cubic Feet Per Minute
ASTM	American Society for Testing and Materials
CAAQS	Canadian Ambient Air Quality Standards
ICP/AES	Inductively Coupled Plasma Atomic Emission Spectroscopy
MOECC	Ministry of the Environment and Climate Change
NIST	National Institute of Standards and Technology
TSP	Total Suspended Particulate
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide a summary of the third quarter (Q3) 2015 results for the air quality monitoring program undertaken at the Rainy River Project located in northwestern Ontario. Two sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. Their locations are shown in the satellite images in Appendix A (Figures 1, 2 and 3).

New Gold Inc. (New Gold) staff operate and maintain the sampling stations. Amec Foster Wheeler provided technical guidance to New Gold field staff, communicated with the laboratory staff as required and prepared the data summary report.

2.0 ANALYTICAL AND MONITORING METHODS

2.1 TSP and Metals

The total suspended particulate (TSP) concentrations were determined using the standard gravimetric method following the reference methods approved by the United States Environmental Protection Agency (USEPA) and the Ontario Ministry of the Environment and Climate Change (MOECC) as described in its Operations Manual (MOECC, 2008). Measurements of 24-hour average TSP and metal concentrations were undertaken as this is the averaging time upon which these parameters are set under Ontario Ambient Air Quality Criteria (AAQC 2012). Sampling was performed with hi-vol samplers (brush motor and mass flow controlled). The metals and metalloids analyzed included, but were not limited to, the following: arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), nickel (Ni), selenium (Se), vanadium (V) and zinc (Zn).

The lowest detectable limit is 0.1 milligrams (mg) of total particulate, resulting in a method detection limit of 0.06 micrograms per cubic metre ($\mu g/m^3$; based on a typical 24-hour sample volume of 1630 m^3).

The metal concentrations were determined with the standard ICP/AES method. The method detection limits are as shown in the data sheets in Appendix B-1.

2.2 $PM_{2.5}$

The $PM_{2.5}$ concentrations were determined using the standard gravimetric method following the reference methods approved by the USEPA and the MOECC as described in its Operations Manual (MOECC, 2008). Measurement of 24-hour average $PM_{2.5}$ was undertaken to match the averaging time for the Canadian Ambient Air Quality Standard (CAAQS). Sampling was performed with PQ200 samplers.

The lowest detectable limit is 1 µg of $PM_{2.5}$, resulting in a method detection limit of 0.04 $\mu g/m^3$ (based on a typical 24-hour sample volume of 24 m^3).

2.3 Total Dustfall

The water soluble and insoluble portions of dustfall were determined using ASTM method D-1739-98 and MOECC method DF-E3043A (September 8, 1995). Standard dustfall samplers were used to measure total dustfall deposition. The dustfall jars were lined with a 4 Mil plastic bag as required in the MOECC Operations Manual (MOECC, 2008). The method detection limit for total dustfall is usually 0.3 g/m^2/30 days.

2.4 Passive Sampling for SO_2 and NO_2

SO_2 and NO_2 concentrations were monitored with passive sampling devices. The exposed permeation filters were analyzed using the methodology employed by the Maxxam Analytics Inc. laboratory located in Edmonton, Alberta. The methodology was developed, approved and validated by Alberta Environment with the support of the Alberta Research Council, the Clean Air Strategic Alliance of Alberta, and the National Research Council of Canada.

Since the sample uptake is dependent on temperature, relative humidity and wind speed, the analytical results are adjusted for these meteorological parameters measured during the exposure period (monthly averages). The required meteorological data are taken from the Environment Canada Fort Frances meteorological station (Climate ID 6022474) by Maxxam Analytics to use with each sample submission. The method detection limit is in the order of 0.1 parts per billion (ppb) for both SO_2 and NO_2. Validation tests conducted in Alberta show that results from passive sampling are typically within 10% of those obtained from sampling with continuous analyzers for 30-day exposure periods.

Since there are no MOECC guidelines for monthly concentrations of SO_2 and NO_2 obtained from passive sampling, the data will only be used for screening purposes and potentially for comparison with dispersion modelling results. For NO_2, the monthly results were compared to the MOECC AAQC for 24-hour converted to a 30-day average (78 ug/m^3). For SO_2, the results were compared against the 30-day Alberta Ambient Air Quality Objectives (2013) of 30 ug/m^3.

2.5 Field Operations

2.5.1 Hi-Vol Samplers

The two sites were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample in order to meet the requirements of the 1 in 6 day sampling schedule. Additional visits were made to resolve instrumentation issues and perform flow calibration checks and preventative maintenance.

Amec Foster Wheeler staff performed the original calibrations on the hi-vol samplers on 25 May 2015 using a BGI direct reading hivol electronic flow calibrator. The flows were set at 40 acfm for each station; the samplers are mass flow controlled. The electronic BGI flow calibrator was sent to the manufacturer for re-certification to National Institute of Standards and Technology (NIST) traceability in September 2014. New Gold staff recalibrated the SW HiVol on 30 June 2015 using the same calibrator and under the guidance of Amec Foster Wheeler staff after a pump was replaced. The overall uncertainty of the calibrator was determined to be 0.60% (ambient temperature, barometric pressure and flow), with an average error of -1.21% in the flow at standard conditions (Q_s) relative to the USEPA standard.

2.5.2 PQ200 Samplers

The stations were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample in order to meet the requirements of the 1 in 6 day sampling schedule. The PQ200 supplier performed the original calibrations on 20 May 2015 and the flow, temperature, and barometric pressure were checked using an electronic BGI flow calibrator by Amec Foster Wheeler staff on 26 May 2015 after the instruments had been installed.

2.5.3 Dustfall Samplers

The dustfall samplers were changed every month, as required.

2.5.4 Passive Samplers

The permeation filters in the passive samplers were changed every month, as required.

3.0 RESULTS

The results for the Q3 2015 sampling program are presented in Appendix B-1 for the hi-vol data, Appendix B-2 for the dustfall data and Appendix B-3 for the passive SO_2 and NO_2 data. By convention, all hi-vol results below the analytical detection limit were reported at half the detection limit.

For comparison purposes, the MOECC AAQC and CAAQS values are presented, where available.

A summary of the statistical analyses for Q3 for the TSP concentrations is presented in Table 1 below. During the quarter, the 1 in 6 day hi-vol sampling schedule comprised a possible total of 16 sampling days between 1 July and 30 September 2015.

A summary of the statistical analyses for Q3 2015 for the total dustfall data is presented below in Table 2. A summary of the statistical analysis for the third quarter of 2015 for the passive SO_2 and NO_2 results is presented in Table 3.

3.1 Total Suspended Particulates and Metals

At the both the Tait Road and Gallinger Road stations, sixteen valid samples were collected in Q3 2015, resulting in 100% valid data.

For the quarter, the arithmetic mean TSP concentrations were comparable, with the Tait Road station averaging 22.5 µg/m^3 and the Gallinger Road station averaging 29.5 µg/m^3. For values below the detection limit, by convention they are substituted with half of the detection limit. The maximum 24-hour concentration for TSP was 48.2 µg/m^3 at the Tait Road station (18 September 2015), and 136.3 µg/m^3 at the Gallinger Road station (30 September 2015). The 30 September 2015 concentration measured at the Gallinger Road station was the only exceedance of the 24-hour TSP AAQC (120 µg/m^3) in the third quarter; New Gold field staff noted increased truck traffic on Gallinger Road during this time due to construction on the East Access Road which may have influenced concentrations.

In the quarter, the 24-hour metal concentrations were all well below the applicable O.Reg.419/05 Schedule 3 standards and AAQCs. For three metals (As, Se, and V), statistics were not reported as more than 50% of the results were below the method detection limit.

Table 1: Summary Statistics for Q3 2015 for TSP Data

Statistic	Q3	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m^3)	19.1	21.8
Arithmetic mean (µg/m^3)	22.5	29.5
Maximum 24 hour (µg/m^3)	48.2 (18 Sept.)	136.3 (30 Sept.)
90th percentile	38.1	42.1
95th percentile	41.8	68.4
24-hour AAQC	120	120
No. of valid samples	16	16
% valid data	100	100
No. samples > AAQC (particulate)	0	1
No. samples > AAQC (metals)	0	0
No. samples > AAQC (elements)	0	0

3.2 $PM_{2.5}$

At the Tait Raid station, sixteen samples were collected resulting in 100% valid data.

The arithmetic mean $PM_{2.5}$ concentrations for Q3 2015 were comparable with the Tait Road station averaging 4.55 µg/m^3 and the Gallinger Road station averaging 4.60 µg/m^3. For values below the detection limit, by convention they are substituted with a concentration representing half of the detection limit. The maximum 24-hour concentration for $PM_{2.5}$ was 15.3 µg/m^3 at the Tait Road station (31 August), and 15.0 µg/m^3 at the Gallinger Road station (31 August). Both values are lower than the $PM_{2.5}$ AAQC of 30 µg/m^3 and the CAAQS of 28 µg/m^3.

The Q3 $PM_{2.5}$ data is summarized in Table 2.

Table 2: Summary Statistics for Q3 2015 for $PM_{2.5}$ Data

Statistic	Q3	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m^3)	3.07	3.19
Arithmetic mean (µg/m^3)	4.55	4.60
Maximum 24 hour (µg/m^3)	15.3 (31 Aug.)	15.0 (31 Aug.)
90th percentile	10.6	10.3
95th percentile	13.7	13.4
24-hour CAAQS	28	28
No. of valid samples	16	16
% valid data	100%	100%
No. samples > CAAQS	0	0

3.3 Total Dustfall

One sample was collected at each station each month for dustfall during Q3 2015; each dustfall jar was exposed for approximately 30-days to coincide with each calendar month in the quarter. The July dustfall results at both stations were invalidated due to algae growth. There was an exceedance of the dustfall AAQC in August and September at the Gallinger Road station which may have been influenced by increased truck traffic on Gallinger Road due to construction on the East Access Road. A summary of the results is presented in Table 3.

The monthly results are shown in Appendix B-2.

Table 3: Summary Statistics for Q3 2015 Total Dustfall Data

Statistic	Tait Road (SW)	Gallinger Road (NE)
Mean (g/m^2/30d)	4.1	13.1
30-day AAQC	7	7
No. > AAQC	0	2
No. valid samples	3	3
% Valid data	66.6	66.6

N/A: No applicable criteria

3.4 Passive SO_2 and NO_2

In Q3 2015, three (3) valid samples were collected at each station for each of SO_2 and NO_2.

There are no MOECC standards, guidelines or AAQCs for SO_2 and NO_2 data obtained from passive samplers for the 30-day averaging period.

The 30-day average SO_2 and NO_2 concentrations measured allow for future analysis of trends in the ambient concentrations, to identify any notable increases, and for comparison with dispersion modelling results. For NO_2 the monthly results were compared to the MOECC AAQC for 24-hour converted to a 30-day average (78 µg/m^3), which is equal to the Ontario 24-hour average AAQC converted to a 30-day averaging period using the methodology outlined in the *Procedure for Preparing and Emission Summary and Dispersion Modelling Report* (MOECC 2009). For SO_2, the results were compared against the Alberta Ambient Air Quality Objectives (2013) of 30 µg/m^3.

Table 4: Summary Statistics for Q3 2015 for Passive SO_2 and NO_2 Data

	Tait Road (SW)		Gallinger Road (NE)	
Statistic	**SO_2**	**NO_2**	**SO_2**	**NO_2**
Mean	<0.1 µg/m^3 (<0.05 ppb)	<0.6 µg/m^3 (<0.3 ppb)	<0.2 µg/m^3 (<0.07 ppb)	<0.4 µg/m^3 (<0.2 ppb)
Maximum	<0.1 µg/m^3 (<0.05 ppb)	<0.8 µg/m^3 (<0.4 ppb)	0.3 µg/m^3 (0.1 ppb)	<0.8 µg/m^3 (<0.4 ppb)
AAQC 24-hr converted to 30-day	N/A	78 µg/m^3	N/A	78 µg/m^3
Alberta Ambient Air Quality Objectives 2013	30 µg/m^3	N/A	30 µg/m^3	N/A
No. valid samples	3	3	3	3
% Valid data	100	100	100	100

N/A: No applicable criteria

4.0 CONCLUSIONS

Two ambient air quality monitoring stations were installed and commissioned in May 2015 at the Rainy River Project.

The following samples were collected in Q3 2015:

- Sixteen (16) valid TSP samples were collected at each of the two monitoring stations (100% valid data), with metal analyses performed on each of the TSP filters;
    - One (1) exceedance of the Ontario AAQC for TSP was measured on 30 September 2015 at the Gallinger Road station which may have been influenced by increased truck traffic on Gallinger Road due to construction on the East Access Road.
- Sixteen (16) valid $PM_{2.5}$ samples were collected at each of the two monitoring stations (100% valid data);
- Two (2) valid dustfall samples were collected at each of the two stations with the July samples being invalidated due to algae growth;
    - Two (2) exceedances of the Ontario AAQC for dustfall were measured in August and September at the Gallinger Road station which may have been influenced by increased truck traffic on Gallinger Road due to construction on the East Access Road; and
- Three (3) valid passive samples for each of SO_2 and NO_2 at each of the two stations.

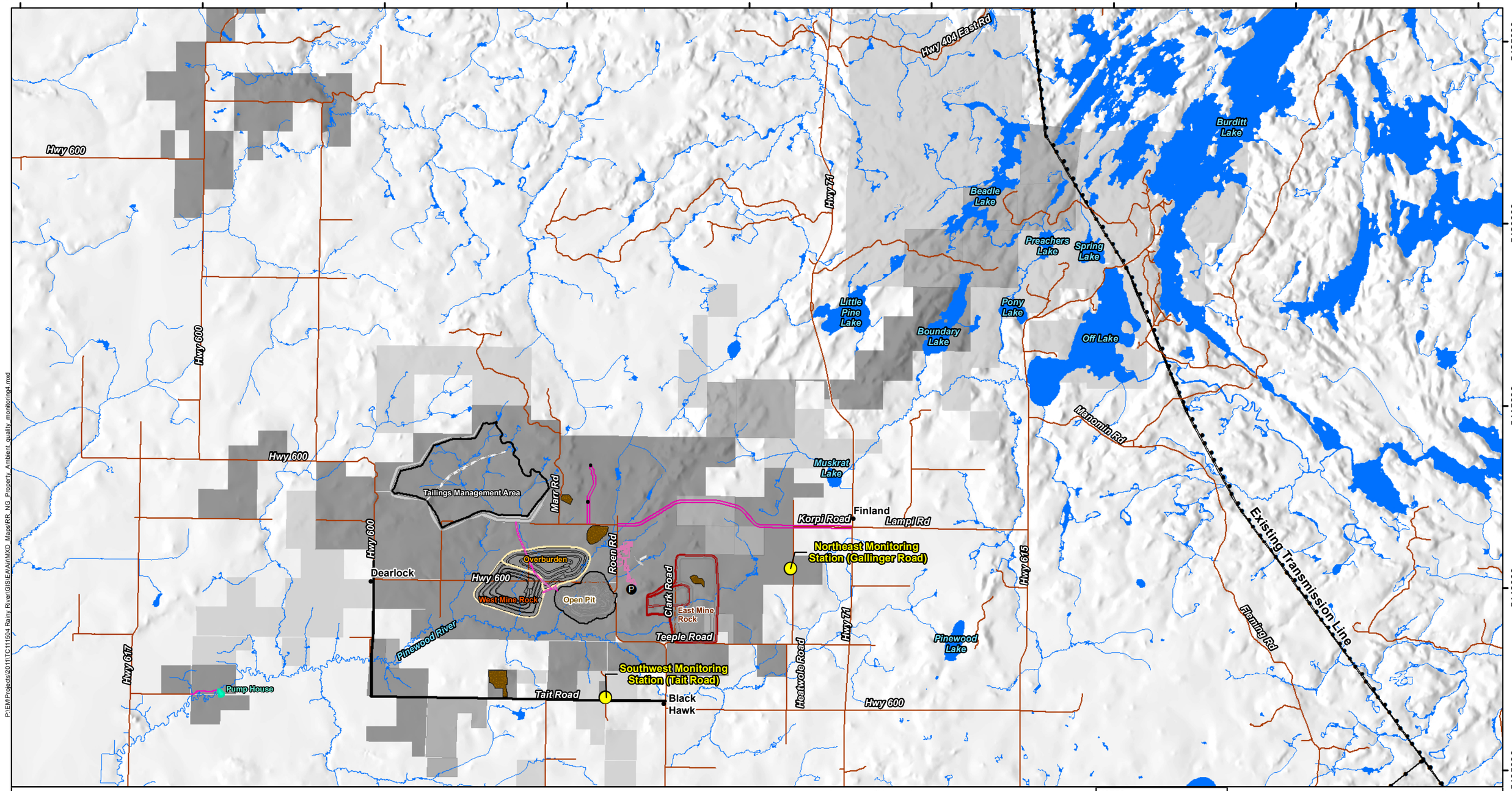
There was one (1) TSP exceedance and two (2) dustfall exceedances of the MOECC AAQC measured in Q3. There were no measured exceedances of other MOECC air quality standards, guidelines, or AAQCs, nor were there any exceedances of the Federal CAAQS for $PM_{2.5}$ or other established criteria.

5.0 REFERENCES

Ministry of the Environment. 2008. Operations Manual for Air Quality Monitoring in Ontario.

APPENDIX A

SATELLITE IMAGES OF THE AIR SAMPLING STATION LOCATIONS



P:\EMProjects\2011\TC111504 Rainy River\GIS\EA\MXD_Maps\RR_NG_Property_Ambient_quality_monitoring4.mxd

LEGEND

- Ambient Air Quality Monitoring Stations
- New Gold - Rainy River Property Boundary
- New Gold Unpatented Claim (Applied to bring to lease) Acquisition in Progress
- New Gold Lands with No Current Access Control

Proposed Site Features

- Underground Portal
- Open Pit
- Plant Site / Ancillary Facilities
- Explosives Facilities
- Overburden / West Mine Rock Stockpile
- Ore / East Mine Rock Stockpile
- Proposed Pump House
- Tailings Management Area
- Aggregate Pit / Quarry
- Site Roads
- Roads
- Existing Transmission Line
- First Nation Land

NOTES:
- Road and Utility data and topographic data extracted from Land Information Ontario, Ontario Road Network, MNR Queen's Printer for Ontario, 2011-2012
- Land tenure information and parcels provided by NewGold, June 9, 2015

Datum: NAD83
Projection: UTM Zone 15N

0 2 4 8 12 16 20 Kilometres

newgold Rainy River Project

amec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring Stations

PROJECT N°: TC111504 | **FIGURE: 1**

SCALE: 1:100,000 | DATE: August 2015

P:\EM\Projects\2011\TC111504 Rainy River\GIS\EA\Air\MXD Maps\RR_NG_Ambient_quality_monitoring_stationTait.mxd

LEGEND

- Southwest Monitoring Station (Tait Road)
- Highway Re-alignment

0 10 20 40 60 80 100 Meters

Notes:
- Aerial imagery provided by RRR Plieades imagery (August 2014).

Datum & Projection:
NAD 1983 UTM Zone 15N

N W E S

newgold Rainy River Project

arnec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring
Southwest Monitoring Station

PROJECT N°: TC111504	**FIGURE: 2**
SCALE: 1:700	DATE: August 2015

P:\EM\Projects\2011\TC111504 Rainy River\GIS\EAA\MXD_Maps\RR_NG Ambient quality monitoring station Gallinger.mxd

LEGEND

- Northeast Monitoring Station (Gallinger Road)
- Gallinger Road

0 10 20 40 60 80 100 Meters

Notes:
- Aerial imagery provided by RRR Plieades imagery (August 2014).

Datum & Projection:
NAD 1983 UTM Zone 15N

N W E S

newgold Rainy River Project

amec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring
Northeast Monitoring Station

PROJECT N°: TC111504	**FIGURE: 3**
SCALE: 1:700	DATE: August 2015

APPENDIX B

Appendix B-1: TSP Sampling Results

Appendix B-2: Total Dustfall Sampling Results

Appendix B-3: SO_2 AND NO_2 Passive Sampling Results

APPENDIX B-1

TSP SAMPLING RESULTS

Southwest Tait Road Monitoring Results for TSP and Metals (Third Quarter 2015)
(results expresed in µg/m^3)

Date	TSP	PM2.5	As*	Cd	Cr	Co	Cu	Fe	Pb	Mn	Ni	Se*	V*	Zn
July 2, 2015	39.6	13.10	0.00042	0.0000832	0.0087	0.000345	0.0568	0.421	0.00091	0.01436	0.001321	0.00042	0.00054	0.02063
July 8, 2015	17.7	3.5	0.00044	0.000046	0.0110	0.0001523	0.074	0.232	0.000733	0.0090	0.000877	0.00044	0.00056	0.01003
July 14, 2015	22.9	8.15	0.00044	0.0000366	0.0106	0.000078	0.059	0.089	0.000324	0.00335	0.000637	0.00044	0.00056	0.00962
July 20, 2015	15.9	2.66	0.00043	0.0000195	0.0107	0.0001488	0.045	0.179	0.000306	0.00573	0.000777	0.00043	0.00055	0.00863
July 26, 2015	23.6	5.28	0.00042	0.0000543	0.011	0.000183	0.075	0.294	0.000754	0.01675	0.00109	0.00042	0.00053	0.00689
August 1, 2015	26.3	2.95	0.00046	0.0000437	0.0101	0.000338	0.0402	0.452	0.00039	0.01421	0.001173	0.00046	0.00059	0.00586
August 7, 2015	11.5	5.6	0.00045	0.000043	0.0116	0.0001317	0.097	0.089	0.000700	0.0043	0.000668	0.00045	0.00057	0.01120
August 13, 2015	27.2	6.40	0.00045	0.0000424	0.0035	0.000251	0.089	0.384	0.000469	0.01520	0.000782	0.00045	0.00057	0.00833
August 19, 2015	7.4	1.00	0.00042	0.0000182	0.0028	0.0000631	0.120	0.077	0.000223	0.00265	0.000522	0.00042	0.00055	0.00583
August 25, 2015	7.5	0.75	0.00043	0.0000214	0.002	0.000046	0.102	0.036	0.000139	0.00177	0.00047	0.00043	0.00055	0.00630
August 31, 2015	36.7	15.34	0.00043	0.0001119	0.003	0.000240	0.057	0.369	0.001317	0.01734	0.00071	0.00043	0.00056	0.01467
September 6, 2015	10.0	1.87	0.00043	0.0000753	0.0025	0.000097	0.0480	0.052	0.00037	0.00279	0.000576	0.00043	0.00055	0.00717
September 12, 2015	25.7	2.1	0.00043	0.000038	0.0031	0.0002414	0.055	0.328	0.000488	0.0248	0.000852	0.00043	0.00055	0.00625
September 18, 2015	48.2	1.12	0.00046	0.0000281	0.0041	0.000431	0.082	0.496	0.000496	0.01798	0.001146	0.00046	0.00059	0.00775
September 24, 2015	7.8	1.33	0.00043	0.0000219	0.0035	0.0000513	0.140	0.046	0.000307	0.00176	0.000502	0.00043	0.00056	0.00552
September 30, 2015	32.7	1.70	0.00044	0.0000366	0.004	0.000262	0.151	0.398	0.000541	0.01766	0.00108	0.00044	0.00057	0.00743
Geometric mean	19.1	3.07	N/R	0.000039	0.0052	0.00016	0.075	0.179	0.000459	0.00759	0.00078	N/R	N/R	0.0083
Arithmetic mean	22.5	4.55	N/R	0.000045	0.0063	0.00019	0.081	0.246	0.000529	0.0106	0.00082	N/R	N/R	0.0089
Max. concentration	48.2	15.3	N/R	0.00011	0.012	0.00043	0.151	0.496	0.00132	0.02481	0.0013	N/R	N/R	0.02063
Min. concentration	7.4	0.75	N/R	0.000018	0.0023	0.000046	0.040	0.036	0.000139	0.00176	0.00047	N/R	N/R	0.00552
90th percentile	38.1	10.6	N/R	0.00008	0.011	0.00034	0.130	0.436	0.00083	0.0178	0.0012	N/R	N/R	0.0129
95th percentile	41.8	13.7	N/R	0.00009	0.011	0.00037	0.143	0.463	0.00101	0.0197	0.0012	N/R	N/R	0.0162
CAAQS	N/A	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AAQC (24 h)	120	30	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC (24 h)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	16	16	16	16	16	16	16	16	16	16	16	16	16	16
No. samples < mdl	0	0	15	0	0	0	0	0	0	0	0	15	15	0
Detection limit (µg)	1	1	1.4	0.0090	1.4	0.0077	3.4	17	0.081	0.44	0.10	1.4	1.8	1.4
Half detection limit (µg)	0.5	0.5	0.7	0.0045	0.7	0.00385	1.7	8.5	0.0405	0.22	0.05	0.7	0.9	0.7
% < detection limit	0	0	94	0	0	0	0	0	0	0	0	94	94	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Arsenic, Selenium, and Vanadium concentrations were below detection limit and as such were reported at 1/2 the detection limit

**Canadian Ambient Air Quality Standard, 24-hour standard

Northeast Gallinger Road Monitoring Results for TSP and Metals (Third Quarter 2015)
(results expresed in µg/m^3)

Date	TSP	PM2.5	As*	Cd	Cr	Co	Cu	Fe	Pb	Mn	Ni	Se*	V*	Zn
July 2, 2015	33.5	12.81	0.00043	0.000073	0.0079	0.000148	0.152	0.204	0.00058	0.00870	0.00078	0.00043	0.00056	0.01416
July 8, 2015	26.9	3.7	0.00045	0.000042	0.0087	0.0000719	0.182	0.0855	0.000502	0.00534	0.000700	0.00045	0.00058	0.00810
July 14, 2015	25.1	7.69	0.00046	0.0000329	0.0098	0.0000620	0.352	0.029	0.000172	0.00268	0.001234	0.00046	0.00059	0.01880
July 20, 2015	14.4	2.83	0.00043	0.0000197	0.0087	0.0000509	0.116	0.0458	0.000181	0.00214	0.000880	0.00043	0.00055	0.00678
July 26, 2015	19.1	4.82	0.00042	0.0000297	0.0093	0.000098	0.290	0.1418	0.000733	0.00703	0.000607	0.00042	0.00054	0.00769
August 1, 2015	45.8	3.58	0.00043	0.000016	0.0097	0.000534	0.162	0.805	0.00048	0.01868	0.00155	0.00043	0.00172	0.00633
August 7, 2015	10.6	5.7	0.00044	0.000032	0.0107	0.0000646	0.410	0.0754	0.000613	0.00359	0.000747	0.00044	0.00057	0.01064
August 13, 2015	26.6	6.32	0.00043	0.0000391	0.0039	0.0001520	0.490	0.268	0.000396	0.01040	0.000941	0.00043	0.00055	0.00948
August 19, 2015	8.6	1.08	0.00045	0.0000124	0.0029	0.0000676	0.255	0.0650	0.000142	0.00204	0.000733	0.00045	0.00057	0.00548
August 25, 2015	8.1	1.08	0.00044	0.0000108	0.0026	0.000046	0.448	0.0340	0.000162	0.00183	0.000592	0.00044	0.00057	0.00800
August 31, 2015	38.5	15.04	0.00044	0.0000906	0.0032	0.000220	0.346	0.3485	0.001368	0.01586	0.001056	0.00044	0.00056	0.01730
September 6, 2015	13.9	1.66	0.00044	0.000035	0.0029	0.000088	0.315	0.084	0.00035	0.00393	0.00079	0.00044	0.00056	0.01412
September 12, 2015	15.2	2.4	0.00044	0.000027	0.0029	0.0000910	0.365	0.1122	0.000373	0.01739	0.000561	0.00044	0.00056	0.00723
September 18, 2015	38.3	0.83	0.00044	0.0000246	0.0048	0.0003224	0.392	0.409	0.000532	0.01133	0.001245	0.00044	0.00056	0.01133
September 24, 2015	11.2	1.00	0.00044	0.0000167	0.0035	0.0000702	0.733	0.0708	0.000266	0.00186	0.000476	0.00044	0.00056	0.01128
September 30, 2015	136.3	3.08	0.00044	0.0000631	0.0064	0.002088	0.694	2.3912	0.001199	0.05823	0.003293	0.00044	0.00177	0.01779

Geometric mean	21.8	3.19	N/R	0.000030	0.0054	0.00013	0.316	0.142	0.000405	0.00632	0.00089	N/R	N/R	0.0101
Arithmetic mean	29.5	4.60	N/R	0.000035	0.0061	0.00026	0.356	0.323	0.00050	0.0107	0.00101	N/R	N/R	0.0109
Max. concentration	136.3	15.0	N/R	0.00009	0.0107	0.00209	0.733	2.391	0.00137	0.05823	0.00329	N/R	N/R	0.01880
Min. concentration	8.1	0.83	N/R	0.000011	0.0026	0.000046	0.116	0.0287	0.000142	0.00183	0.00048	N/R	N/R	0.00548
90th percentile	42.1	10.3	N/R	0.00007	0.0098	0.00043	0.592	0.607	0.00097	0.0180	0.0014	N/R	N/R	0.018
95th percentile	68.4	13.4	N/R	0.00008	0.0100	0.00092	0.704	1.202	0.00124	0.0286	0.0020	N/R	N/R	0.018
CAAQS	N/A	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AAQC	120	30	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC	1	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	16	16	16	16	16	16	16	16	16	16	16	16	16	16
No. samples < mdl	0	0	15	0	0	0	0	0	0	0	0	15	14	0
Detection limit (µg)	1	1	1.4	0.0090	1.4	0.0077	3.4	17	0.081	0.44	0.10	1.4	1.8	1.4
Half detection limit (µg)	0.5	0.5	0.7	0.0045	0.7	0.00385	1.7	8.5	0.0405	0.22	0.05	0.7	0.9	0.7
% < detection limit	0	0	94	0	0	0	0	0	0	0	0	94	88	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Arsenic, Selenium, and Vanadium concentrations were below detection limit and as such were reported at 1/2 the detection limit with the exception of the Vanadium concentrations on 1 August 2015 and 25 September 20

**Canadian Ambient Air Quality Standard, 24-hour standard

APPENDIX B-2

TOTAL DUSTFALL SAMPLING RESULTS

Tait Road Monitoring Results for Dustfall (Third Quarter 2015)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
July	33	INV	INV	INV
August	28	2.3	2.6	4.86
September	35	2.5	0.87	3.39

Arithmetic mean	4.1
Max. concentration	4.9
Min. concentration	3.39
AAQC	7
No. > AAQC value**	0
No. of valid samples	2
% Valid data	100
No. samples < mdl	0
Detection limit	0.3
Half detection limit	0.15

Notes:
N/R: Statisics not reported due to high % of values <detedciton limit
N/A: Not applicable
INV: Invalid Sample; algae growth
**Ontario Ambient Air Quality Criteria, 30-day standard

Gallinger Road Monitoring Results for Dustfall (Third Quarter 2015)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
July	33	INV	INV	INV
August	28	5.67	8.10	13.8
September	35	8.61	3.87	12.5

Arithmetic mean	13.1
Max. concentration	13.80
Min. concentration	12.5
AAQC	7
No. > AAQC value**	2
No. of valid samples	2
% Valid data	100
No. samples < mdl	0
Detection limit	0.3
Half detection limit	0.15

Notes:
N/R: Statisics not reported due to high % of values <detedciton limit
N/A: Not applicable
INV: Invalid Sample; algae growth
**Ontario Ambient Air Quality Criteria, 30-day standard

APPENDIX B-3

SO_2 AND NO_2 PASSIVE SAMPLING RESULTS

Monitoring Results for Passive SO_2 and NO_2 (Third Quarter 2015)

	Tait Road		Gallinger Road	
Month	**SO_2**	**NO_2**	**SO_2**	**NO_2**
July	<0.3 µg/m3 (<0.1 ppb)	0.8 µg/m3 (0.4 ppb)	<0.3 µg/m3 (<0.1 ppb)	0.8 µg/m3 (0.4 ppb)
August	<0.3 µg/m3 (<0.1 ppb)	0.4 µg/m3 (0.2 ppb)	0.3 µg/m3 (0.1 ppb)	<0.2 µg/m3 (<0.1 ppb)
September	<0.3 µg/m3 (<0.1 ppb)	0.8 µg/m3 (0.4 ppb)	<0.3 µg/m3 (<0.1 ppb)	0.4 µg/m3 (0.2 ppb)

Arithmetic mean	0.05	0.3	0.07	0.2
Max. concentration	0.05	0.4	0.1	0.4
Min. concentration	0.05	0.2	0.05	0.05
AAQC* 24-hr converted to 30-day	N/A	78 µg/m^3	N/A	78 µg/m^3
Alberta Ambient Air Quality Objectives 2013	30 µg/m^3	N/A	30 µg/m^3	N/A
No. of valid samples	3	3	3	3
No. samples < mdl	3	0	2	1
Detection limit	0.1	0.1	0.1	0.1
Half detection limit	0.05	0.05	0.05	0.05

Notes:

All statistics were calculated using 1/2DL for values reported as <DL

All results reported by the lab in parts per billion (ppb) and are converted to µg/m3 assuming 101.23kPA and 25C

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Ontario Ambient Air Quality Criteria

AIR QUALITY MONITORING PROGRAM
FOURTH QUARTER 2015 REPORT
RAINY RIVER PROJECT

Submitted to:

New Gold Inc.
1111 Victoria Avenue East
Thunder Bay, Ontario
P7C 1B7

Submitted by:

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited
160 Traders Blvd. E., Suite 110
Mississauga, Ontario
L4Z 3K7

February 2016

Amec Foster Wheeler Project No.: TC111504.2015.6

February 17, 2015

Amec Foster Wheeler Project No.: TC111504.2015.6

New Gold Inc.
1111 Victoria Avenue East
Thunder Bay, Ontario
P7C 1B7

Attention: Kyle Stanfield
Director Environment & Sustainability

Dear Mr. Stanfield:

Re: Rainy River Project, Fourth Quarter 2015 Air Monitoring Report

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to submit to New Gold Inc. (New Gold) a summary report for the data collected in the fourth quarter 2015 for the air quality monitoring program initiated in 2015 at the Rainy River Project. Two air quality sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. The sampling stations were operated and maintained by New Gold staff.

Should you have any questions or wish to discuss the air monitoring program, please do not hesitate to contact the undersigned.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Caleb Vandenberg, P.Eng.
Air Quality Engineer

Tony van der Vooren P.Eng, Ph.D, QEP
Senior Air Quality Consultant

Amec Foster Wheeler Environment & Infrastructure
160 Traders Blvd. E., Suite 110
Mississauga, Ontario, CANADA L4Z 3K7
Phone 905.568.2929

Revision	Date	Revised By	Description
0	3-February-2016	Caleb Vandenberg	Drafted Report
0.1	3-February-2016	Ryan Fletcher	Data formatting
0.2	17-February-2016	Tony van der Vooren	Text change

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Appendix B-3 SO_2 and NO_2 Passive Sampling Results

ACRONYMS AND ABBREVIATIONS

AAQC	Ambient Air Quality Criteria
ACFM	Cubic Feet Per Minute at Actual Conditions
ASTM	American Society for Testing and Materials
CAAQS	Canadian Ambient Air Quality Standards
Hi-Vol	High Volume Sampler
ICP/AES	Inductively Coupled Plasma Atomic Emission Spectroscopy
MOECC	Ministry of the Environment and Climate Change
NIST	National Institute of Standards and Technology
TSP	Total Suspended Particulate
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide a summary of the fourth quarter (Q4) 2015 results for the air quality monitoring program undertaken at the Rainy River Project located in northwestern Ontario. Two sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. Their locations are shown in the satellite images in Appendix A (Figures 1, 2 and 3).

New Gold Inc. (New Gold) staff operate and maintain the sampling stations. Amec Foster Wheeler provided technical guidance to New Gold field staff, communicated with the laboratory staff as required and prepared the data summary report.

2.0 ANALYTICAL AND MONITORING METHODS

2.1 TSP and Metals

The total suspended particulate (TSP) concentrations were determined using the standard gravimetric method following the reference methods approved by the United States Environmental Protection Agency (USEPA) and the Ontario Ministry of the Environment and Climate Change (MOECC) as described in its Operations Manual (MOECC, 2008). Measurements of 24-hour average TSP and metal concentrations were undertaken as this is the averaging time upon which these parameters are set under Ontario Ambient Air Quality Criteria (AAQC 2012). Sampling was performed with hi-vol samplers (brush motor and mass flow controlled). The metals and metalloids analyzed included, but were not limited to, the following: arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), nickel (Ni), selenium (Se), vanadium (V) and zinc (Zn).

The lowest detectable limit is 0.1 milligrams (mg) of total particulate, resulting in a method detection limit of 0.06 micrograms per cubic metre ($\mu g/m^3$; based on a typical 24-hour sample volume of 1630 m^3).

The metal concentrations were determined with the standard ICP/AES method. The method detection limits are as shown in the data sheets in Appendix B-1.

2.2 $PM_{2.5}$

The $PM_{2.5}$ concentrations were determined using the standard gravimetric method following the reference methods approved by the USEPA and the MOECC as described in its Operations Manual (MOECC, 2008). Measurement of 24-hour average $PM_{2.5}$ was undertaken to match the averaging time for the Canadian Ambient Air Quality Standard (CAAQS). Sampling was performed with PQ200 samplers.

The lowest detectable limit is 1 µg of $PM_{2.5}$, resulting in a method detection limit of 0.04 $\mu g/m^3$ (based on a typical 24-hour sample volume of 24 m^3).

2.3 Total Dustfall

The water soluble and insoluble portions of dustfall were determined using ASTM method D-1739-98 and MOECC method DF-E3043A (September 8, 1995). Standard dustfall samplers were used to measure total dustfall deposition. The dustfall jars were lined with a 4 Mil plastic bag as required in the MOECC Operations Manual (MOECC, 2008). The method detection limit for total dustfall is 0.3 g/m^2/30 days.

2.4 Passive Sampling for SO_2 and NO_2

SO_2 and NO_2 concentrations were monitored with passive sampling devices. The exposed permeation filters were analyzed using the methodology employed by the Maxxam Analytics Inc. laboratory located in Edmonton, Alberta. The methodology was developed, approved and validated by Alberta Environment with the support of the Alberta Research Council, the Clean Air Strategic Alliance of Alberta, and the National Research Council of Canada.

Since the sample uptake is dependent on temperature, relative humidity and wind speed, the analytical results are adjusted for these meteorological parameters measured during the exposure period (monthly averages). The required meteorological data are taken from the Environment Canada Fort Frances meteorological station (Climate ID 6022474) by Maxxam Analytics to use with each sample submission. The method detection limit is in the order of 0.1 parts per billion (ppb) for both SO_2 and NO_2. Validation tests conducted in Alberta show that results from passive sampling are typically within 10% of those obtained from sampling with continuous analyzers for 30-day exposure periods.

Since there are no MOECC guidelines for monthly concentrations of SO_2 and NO_2 obtained from passive sampling, the data will only be used for screening purposes and potentially for comparison with dispersion modelling results. For NO_2, the monthly results were compared to the MOECC AAQC for 24-hour converted to a 30-day average (78 ug/m^3) using the methodology outlined in the *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* (MOECC 2009). For SO_2, the results were compared against the 30-day Alberta Ambient Air Quality Objectives (2013) of 30 ug/m^3.

2.5 Field Operations

2.5.1 Hi-Vol Samplers

The two sites were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample in order to meet the requirements of the 1 in 6 day sampling schedule. Additional visits were made to resolve instrumentation issues and perform flow calibration checks and preventative maintenance.

Amec Foster Wheeler staff performed the original calibrations on the hi-vol samplers on 25 May 2015 using a BGI direct reading hi-vol electronic flow calibrator. The flows were set at 40 acfm for each station; the samplers are mass flow controlled. Two calibrations were performed that are relevant to this quarter's data.

On 2 October 2015, Amec Foster Wheeler staff recalibrated both hi-vol samplers with a BGI flow calibrator which was sent to the manufacturer most recently for re-certification to National Institute of Standards and Technology (NIST) traceability in June 2015. The overall uncertainty of the calibrator was determined to be 0.60% (ambient temperature, barometric pressure and flow), with an average error of 0.01% in the flow at standard conditions (Q_s) relative to the USEPA standard.

On 22 December 2015, Amec Foster Wheeler staff recalibrated both hi-vol samplers with a BGI flow calibrator which was sent to the manufacturer most recently for re-certification to National Institute of Standards and Technology (NIST) traceability in in October 2015. The overall uncertainty of the calibrator was determined to be 0.60% (ambient temperature, barometric pressure and flow), with an average error of -0.01% in the flow at standard conditions (Q_s) relative to the USEPA standard.

2.5.2 PQ200 Samplers

The stations were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample in order to meet the requirements of the 1 in 6 day sampling schedule. Additional visits were made to resolve instrumentation issues and perform flow calibration checks and preventative maintenance.

The PQ200 supplier performed the original calibrations on 20 May 2015 and the flow, temperature, and barometric pressure were checked using an electronic BGI flow calibrator by Amec Foster Wheeler staff on 26 May 2015 after the instruments had been installed. Two calibrations were performed that are relevant to this quarter's data.

On 2 October 2015, Amec Foster Wheeler staff recalibrated both PQ200 samplers with a BGI flow calibrator which was sent to the manufacturer most recently for re-certification to National Institute of Standards and Technology (NIST) traceability in June 2015. The overall uncertainty of the calibrator was determined to be 0.35% (ambient temperature, barometric pressure and flow), with an average error of 0.06% in the flow at standard conditions (Q_s) relative to the USEPA standard.

On 22 December 2015, Amec Foster Wheeler staff recalibrated both PQ200 samplers with a BGI flow calibrator which was sent to the manufacturer most recently for re-certification to National Institute of Standards and Technology (NIST) traceability in in June 2015. The overall uncertainty of the calibrator was determined to be 0.35% (ambient temperature, barometric pressure and flow), with an average error of 0.06% in the flow at standard conditions (Q_s) relative to the USEPA standard.

2.5.3 Dustfall Samplers

The dustfall samplers were changed every month, as required.

2.5.4 Passive Samplers

The permeation filters in the passive samplers were changed every month, as required.

3.0 RESULTS

The results for the Q4 2015 sampling program are presented in Appendix B-1 for the hi-vol data, Appendix B-2 for the dustfall data and Appendix B-3 for the passive SO_2 and NO_2 data. For the purpose of performing statistical analyses and in keeping was a commonly accepted practice, a value of half the detection limit was substituted for concentrations less than the detection limit.

For comparison purposes, the MOECC AAQC and CAAQS values are presented, where available.

A summary of the statistical analyses for Q4 for the TSP concentrations is presented in Table 1 below. During the quarter, the 1 in 6 day hi-vol sampling schedule comprised a possible total of 15 sampling days between 1 October and 31 December 2015.

A summary of the statistical analyses for Q4 2015 for the total dustfall data is presented below in Table 2. A summary of the statistical analysis for the fourth quarter of 2015 for the passive SO_2 and NO_2 results is presented in Table 3.

3.1 Total Suspended Particulates and Metals

At both the Tait Road and Gallinger Road stations, fifteen (15) valid samples were collected in Q4 2015, resulting in 100% valid data.

For the quarter, the arithmetic mean TSP concentrations were comparable, with the Tait Road station averaging 16.2 µg/m^3 and the Gallinger Road station averaging 12.3 µg/m^3. For values below the detection limit, by convention they are substituted with half of the detection limit. The maximum 24-hour concentration for TSP was 91.3 µg/m^3 at the Tait Road station (29 November 2015), and 43.9 µg/m^3 at the Gallinger Road station (18 October 2015); there were no exceedances of the TSP AAQC measured in the quarter.

In the quarter, the 24-hour metal concentrations were all well below the applicable O.Reg.419/05 Schedule 3 standards and AAQCs. For three metals (As, Se, and V), statistics were not reported as more than 50% of the results were below the method detection limit.

Table 1: Summary Statistics for Q4 2015 for TSP Data

Statistic	Q4	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m^3)	10.0	8.8
Arithmetic mean (µg/m^3)	16.2	12.3
October Maximum (µg/m^3)	27.1	43.9
November Maximum (µg/m^3)	91.3	23.9
December Maximum (µg/m^3)	17.4	11.0
Maximum 24 hour (µg/m^3)	91.3 (29 Nov.)	43.9 (18 Oct.)
90th percentile	24.5	28.7
95th percentile	46.3	35.4
24-hour AAQC	120	120
No. of valid samples	15	15
% valid data	100	100
No. samples > AAQC (particulate)	0	0
No. samples > AAQC (metals)	0	0
No. samples > AAQC (elements)	0	0

3.2 $PM_{2.5}$

At the both the Tait Road and Gallinger Road stations, fifteen (15) valid samples were collected in Q4 2015, resulting in 100% valid data.

The arithmetic mean $PM_{2.5}$ concentrations for Q4 2015 were comparable with the Tait Road station averaging 2.62 µg/m^3 and the Gallinger Road station averaging 2.63 µg/m^3. For values below the detection limit, by convention they are substituted with a concentration representing half of the detection limit. The maximum 24-hour concentration for $PM_{2.5}$ was 5.28 µg/m^3 at the Tait Road station (23 December), and 5.03 µg/m^3 at the Gallinger Road station (23 December). Both values are lower than the $PM_{2.5}$ AAQC of 30 µg/m^3 and the CAAQS of 28 µg/m^3.

The Q4 $PM_{2.5}$ data is summarized in Table 2.

Table 2: Summary Statistics for Q4 2015 for $PM_{2.5}$ Data

Statistic	Q4	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m^3)	2.00	2.12
Arithmetic mean (µg/m^3)	2.62	2.63
October Maximum (µg/m^3)	2.99	2.99
November Maximum (µg/m^3)	4.41	4.37
December Maximum (µg/m^3)	5.28	5.03
Maximum 24 hour (µg/m^3)	5.28 (23 Dec.)	5.03 (23 Dec.)
90th percentile	4.9	4.7
95th percentile	5.2	5.0
24-hour CAAQS	28	28
No. of valid samples	15	15
% valid data	100	100
No. samples > CAAQS	0	0

3.3 Total Dustfall

One valid sample was collected at each station each month for dustfall during Q4 2015; each dustfall jar was exposed for approximately 30-days to coincide with each calendar month in the quarter. There were no exceedances of the AAQC for dustfall. Decreased truck traffic related to the construction of the East Access Road in Q4 may have been influential in the decrease of dustfall concentrations between Q3 and Q4. A summary of the results is presented in Table 3.

The monthly results are shown in Appendix B-2.

Table 3: Summary Statistics for Q4 2015 Total Dustfall Data

Statistic	Tait Road (SW)	Gallinger Road (NE)
Arithmetic mean ($g/m^2/30d$)	1.7	1.3
Maximum ($g/m^2/30d$)	4.14	2.91
30-day AAQC	7	7
No. > AAQC	0	0
No. valid samples	3	3
% Valid data	100	100

N/A: No applicable criteria

3.4 Passive SO_2 and NO_2

In Q4 2015, three (3) valid samples were collected at each station for each of SO_2 and NO_2.

There are no MOECC standards, guidelines or AAQCs for SO_2 and NO_2 data obtained from passive samplers for the 30-day averaging period.

The 30-day average SO_2 and NO_2 concentrations measured allow for future analysis of trends in the ambient concentrations, to identify any notable increases, and for comparison with dispersion modelling results. For NO_2 the monthly results were compared to the MOECC AAQC for 24-hour converted to a 30-day average (78 µg/m^3), which is equal to the Ontario 24-hour average AAQC converted to a 30-day averaging period using the methodology outlined in the *Procedure for Preparing and Emission Summary and Dispersion Modelling Report* (MOECC 2009). For SO_2, the results were compared against the Alberta Ambient Air Quality Objectives (2013) of 30 µg/m^3.

Table 4: Summary Statistics for Q4 2015 for Passive SO_2 and NO_2 Data

	Tait Road (SW)		Gallinger Road (NE)	
Statistic	**SO_2**	**NO_2**	**SO_2**	**NO_2**
Mean	0.2 µg/m^3 (0.08 ppb)	2.4 µg/m^3 (1.3 ppb)	0.3 µg/m^3 (0.1 ppb)	1.5 µg/m^3 (0.8 ppb)
Maximum	0.3 µg/m^3 (0.1 ppb)	4.0 µg/m^3 (2.1 ppb)	0.8 µg/m^3 (0.3 ppb)	1.9 µg/m^3 (1.0 ppb)
AAQC 24-hr converted to 30-day	N/A	78 µg/m^3	N/A	78 µg/m^3
Alberta Ambient Air Quality Objectives 2013	30 µg/m^3	N/A	30 µg/m^3	N/A
No. valid samples	3	3	3	3
% Valid data	100	100	100	100

N/A: No applicable criteria

4.0 CONCLUSIONS

Two ambient air quality monitoring stations were installed and commissioned in May 2015 at the Rainy River Project.

The following samples were collected in Q4 2015:

- Fifteen (15) valid TSP samples were collected at each of the two monitoring stations (100% valid data), with metal analyses performed on each of the TSP filters;
- Sixteen (15) valid $PM_{2.5}$ samples were collected at each of the two monitoring stations (100% valid data);
- Three (3) valid dustfall samples were collected at each of the two stations; and
- Three (3) valid passive samples for each of SO_2 and NO_2 at each of the two stations.

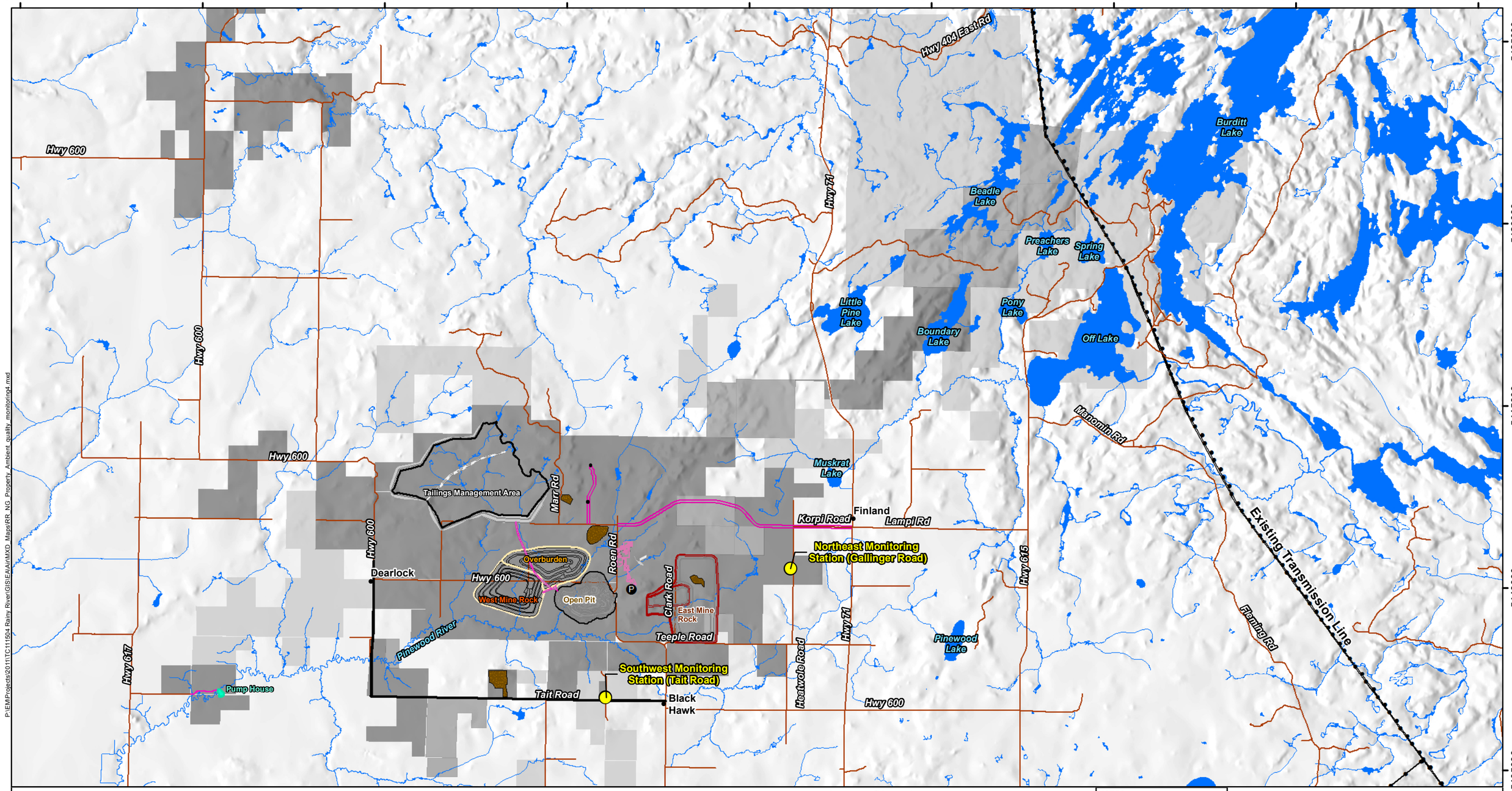
There were no measured exceedances of MOECC air quality standards, guidelines, or AAQCs, nor were there any exceedances of the Federal CAAQS for $PM_{2.5}$ or other established criteria.

5.0 REFERENCES

Ministry of the Environment. 2008. Operations Manual for Air Quality Monitoring in Ontario.

APPENDIX A

SATELLITE IMAGES OF THE AIR SAMPLING STATION LOCATIONS



P:\EMProjects\2011\TC111504 Rainy River\GIS\EA\MXD_Maps\RR_NG_Property_Ambient_quality_monitoring4.mxd

LEGEND

- Ambient Air Quality Monitoring Stations
- New Gold - Rainy River Property Boundary
- New Gold Unpatented Claim (Applied to bring to lease) Acquisition in Progress
- New Gold Lands with No Current Access Control

Proposed Site Features

- Underground Portal
- Open Pit
- Plant Site / Ancillary Facilities
- Explosives Facilities
- Overburden / West Mine Rock Stockpile
- Ore / East Mine Rock Stockpile
- Proposed Pump House
- Tailings Management Area
- Aggregate Pit / Quarry
- Site Roads
- Roads
- Existing Transmission Line
- First Nation Land

NOTES:
- Road and Utility data and topographic data extracted from Land Information Ontario, Ontario Road Network, MNR Queen's Printer for Ontario, 2011-2012
- Land tenure information and parcels provided by NewGold, June 9, 2015

Datum: NAD83
Projection: UTM Zone 15N

0 2 4 8 12 16 20 Kilometres

newgold Rainy River Project

amec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring Stations

PROJECT N°: TC111504 | **FIGURE: 1**

SCALE: 1:100,000 | DATE: August 2015

P:\EM\Projects\2011\TC111504 Rainy River\GIS\EA\Air\MXD Maps\RR_NG_Ambient_quality_monitoring_stationTait.mxd

LEGEND

- Southwest Monitoring Station (Tait Road)
- Highway Re-alignment

0 10 20 40 60 80 100 Meters

Notes:
- Aerial imagery provided by RRR Plieades imagery (August 2014).

Datum & Projection:
NAD 1983 UTM Zone 15N

N W E S

newgold Rainy River Project

arnec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring
Southwest Monitoring Station

PROJECT N°: TC111504	**FIGURE: 2**
SCALE: 1:700	DATE: August 2015

P:\EM\Projects\2011\TC111504 Rainy River\GIS\EAA\MXD_Maps\RR_NG Ambient quality monitoring station Gallinger.mxd

LEGEND

- Northeast Monitoring Station (Gallinger Road)
- Gallinger Road

0 10 20 40 60 80 100 Meters

Notes:
- Aerial imagery provided by RRR Plieades imagery (August 2014).

Datum & Projection:
NAD 1983 UTM Zone 15N

N W E S

newgold Rainy River Project

amec foster wheeler

RAINY RIVER PROJECT

Ambient Air Monitoring
Northeast Monitoring Station

PROJECT N°: TC111504	**FIGURE: 3**
SCALE: 1:700	DATE: August 2015

APPENDIX B

Appendix B-1: TSP Sampling Results

Appendix B-2: Total Dustfall Sampling Results

Appendix B-3: SO_2 AND NO_2 Passive Sampling Results

APPENDIX B-1

TSP SAMPLING RESULTS

Southwest Tait Road Monitoring Results for TSP and Metals (Fourth Quarter 2015)
(results expressed in µg/m^3)

Date	TSP	PM2.5	As*	Cd	Cr	Co	Cu	Fe	Pb	Mn	Ni	Se*	V*	Zn
October 6, 2015	20.6	2.41	0.00042	0.0000256	0.0033	0.000229	0.0497	0.296	0.00039	0.01147	0.000772	0.00042	0.00054	0.00628
October 12, 2015	10.1	0.5	0.00041	0.000021	0.0067	0.0001131	0.047	0.125	0.000206	0.0050	0.000766	0.00041	0.00053	0.01154
October 18, 2015	27.1	2.99	0.00044	0.0000555	0.0063	0.000213	0.040	0.323	0.000887	0.01882	0.000963	0.00044	0.00057	0.00868
October 24, 2015	7.9	2.33	0.00043	0.0000435	0.0059	0.0001073	0.038	0.133	0.000310	0.00394	0.000670	0.00043	0.00056	0.00750
October 30, 2015	6.9	1.29	0.00043	0.0000465	0.005	0.000040	0.029	0.038	0.000292	0.00420	0.00055	0.00043	0.00056	0.01229
November 5, 2015	5.9	3.49	0.00043	0.0000530	0.0052	0.000041	0.0236	0.038	0.00013	0.00260	0.000506	0.00043	0.00055	0.00920
November 11, 2015	17.0	4.2	0.00043	0.000082	0.0061	0.0001103	0.049	0.166	0.000254	0.0109	0.000690	0.00043	0.00055	0.00826
November 17, 2015	3.0	0.91	0.00042	0.0001316	0.0050	0.000032	0.040	0.025	0.000097	0.00092	0.000489	0.00042	0.00054	0.00863
November 23, 2015	9.2	3.70	0.00044	0.0000756	0.0060	0.0002168	0.047	0.260	0.000208	0.00744	0.000794	0.00044	0.00057	0.00800
November 29, 2015	91.3	4.41	0.00043	0.0000808	0.008	0.001838	0.048	2.677	0.000283	0.08329	0.00297	0.00043	0.00376	0.01400
December 5, 2015	10.7	5.19	0.00044	0.0000772	0.0065	0.000194	0.0139	0.227	0.00042	0.00734	0.000791	0.00044	0.00056	0.00866
December 11, 2015	2.4	0.5	0.00042	0.000061	0.0031	0.0000877	0.018	0.105	0.000191	0.0029	0.000520	0.00042	0.00054	0.00520
December 17, 2015	17.4	0.91	0.00041	0.0005292	0.0035	0.000371	0.025	0.468	0.000474	0.01240	0.001181	0.00041	0.00053	0.01345
December 23, 2015	11.6	5.28	0.00040	0.0002707	0.0067	0.0001265	0.038	0.108	0.000767	0.00355	0.001391	0.00040	0.00052	0.01958
December 29, 2015	2.5	1.16	0.00041	0.0001051	0.003	0.000033	0.070	0.030	0.000282	0.00081	0.00040	0.00041	0.00053	0.00479
Geometric mean	10.0	2.00	N/R	0.000076	0.0051	0.00013	0.036	0.144	0.000293	0.00571	0.00078	N/R	N/R	0.0091
Arithmetic mean	16.2	2.62	N/R	0.000111	0.0053	0.00025	0.038	0.335	0.000346	0.0117	0.00090	N/R	N/R	0.0097
Max. concentration	91.3	5.3	N/R	0.00053	0.008	0.00184	0.070	2.677	0.00089	0.08329	0.0030	N/R	N/R	0.01958
Min. concentration	2.4	0.46	N/R	0.000021	0.0027	0.000032	0.014	0.025	0.000097	0.00081	0.00040	N/R	N/R	0.00479
90th percentile	24.5	4.9	N/R	0.00022	0.007	0.00031	0.050	0.410	0.00065	0.0162	0.0013	N/R	N/R	0.0138
95th percentile	46.3	5.2	N/R	0.00035	0.007	0.00081	0.056	1.131	0.00080	0.0382	0.0019	N/R	N/R	0.0157
CAAQS	N/A	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AAQC (24 h)	120	30	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC (24 h)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	15	15	15	15	15	15	15	15	15	15	15	15	15	15
No. samples < mdl	0	0	14	0	0	0	0	0	0	0	0	14	13	0
Detection limit (µg)	1	1	1.4	0.0090	1.4	0.0077	3.4	17	0.081	0.44	0.10	1.4	1.8	1.4
Half detection limit (µg)	0.5	0.5	0.7	0.0045	0.7	0.00385	1.7	8.5	0.0405	0.22	0.05	0.7	0.9	0.7
% < detection limit	0	0	93	0	0	0	0	0	0	0	0	93	87	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

N/R: Statistics not reported due to high % of values <detection limit

N/A: Not applicable

INV: Invalid Sample

*Arsenic, Selenium, and Vanadium concentrations were below detection limit and as such were reported at 1/2 the detection limit with the exception of the Vanadium concentrations on 29 November 2015

**Canadian Ambient Air Quality Standard, 24-hour standard

Northeast Gallinger Road Monitoring Results for TSP and Metals (Fourth Quarter 2015)
(results expressed in µg/m^3)

Date	TSP	PM2.5	As*	Cd	Cr	Co	Cu	Fe	Pb	Mn	Ni	Se*	V*	Zn
October 6, 2015	31.8	2.91	0.00042	0.000061	0.0033	0.000276	0.302	0.326	0.00044	0.01129	0.00078	0.00042	0.00053	0.00659
October 12, 2015	9.9	1.2	0.00041	0.000039	0.0062	0.0000850	0.175	0.1069	0.000207	0.00391	0.000732	0.00041	0.00053	0.00620
October 18, 2015	43.9	2.99	0.00041	0.0000728	0.0073	0.0004344	0.239	0.681	0.001042	0.02391	0.001326	0.00041	0.00053	0.01012
October 24, 2015	7.8	2.49	0.00042	0.0000706	0.0060	0.0000483	0.237	0.0398	0.000337	0.00162	0.000579	0.00042	0.00054	0.00700
October 30, 2015	6.3	1.16	0.00042	0.0000288	0.0049	0.000039	0.134	0.0290	0.000082	0.00351	0.000779	0.00042	0.00054	0.00900
November 5, 2015	8.1	4.37	0.00043	0.000059	0.0051	0.000047	0.088	0.031	0.00012	0.00264	0.00057	0.00043	0.00055	0.00996
November 11, 2015	13.4	4.2	0.00044	0.000049	0.0045	0.0000586	0.212	0.0747	0.000190	0.00641	0.000454	0.00044	0.00056	0.00759
November 17, 2015	2.3	0.75	0.00043	0.0000462	0.0058	0.0000468	0.180	0.027	0.000124	0.00104	0.000608	0.00043	0.00055	0.00750
November 23, 2015	8.2	3.37	0.00044	0.0000748	0.0054	0.0000539	0.223	0.0692	0.000219	0.00295	0.000555	0.00044	0.00056	0.01795
November 29, 2015	23.9	3.16	0.00042	0.0000637	0.0057	0.000191	0.257	0.2602	0.000178	0.00934	0.000740	0.00042	0.00055	0.00758
December 5, 2015	6.0	4.99	0.00043	0.000046	0.0049	0.000037	0.055	0.036	0.00030	0.00137	0.00048	0.00043	0.00056	0.00713
December 11, 2015	4.0	0.6	0.00044	0.000041	0.0028	0.0000758	0.333	0.0690	0.000183	0.00153	0.000485	0.00044	0.00056	0.00360
December 17, 2015	11.0	0.91	0.00042	0.0000977	0.0030	0.0000656	0.064	0.065	0.000375	0.00183	0.000656	0.00042	0.00055	0.00728
December 23, 2015	4.2	5.03	0.00045	0.0001157	0.0030	0.0000739	0.116	0.0334	0.000714	0.00145	0.000649	0.00045	0.00058	0.00971
December 29, 2015	3.7	1.37	0.00047	0.0000414	0.0030	0.000144	0.528	0.0523	0.000186	0.00125	0.000456	0.00047	0.00060	0.00402
Geometric mean	8.8	2.12	N/R	0.000057	0.0045	0.00008	0.178	0.073	0.000247	0.00307	0.00063	N/R	N/R	0.0075
Arithmetic mean	12.3	2.63	N/R	0.000060	0.0047	0.00011	0.209	0.127	0.00031	0.0049	0.00066	N/R	N/R	0.0081
Max. concentration	43.9	5.0	N/R	0.00012	0.0073	0.00043	0.528	0.681	0.00104	0.02391	0.00133	N/R	N/R	0.01795
Min. concentration	2.3	0.58	N/R	0.000029	0.0028	0.000037	0.055	0.0270	0.000082	0.00104	0.00045	N/R	N/R	0.00360
90th percentile	28.7	4.7	N/R	0.00009	0.0061	0.00024	0.321	0.300	0.00060	0.0105	0.0008	N/R	N/R	0.010
95th percentile	35.4	5.0	N/R	0.00010	0.0065	0.00032	0.392	0.432	0.00081	0.0151	0.0009	N/R	N/R	0.012
CAAQS	N/A	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AAQC	120	30	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	15	15	15	15	15	15	15	15	15	15	15	15	15	15
No. samples < mdl	0	0	14	0	0	0	0	0	0	0	0	14	14	0
Detection limit (µg)	1	1	1.4	0.0090	1.4	0.0077	3.4	17	0.081	0.44	0.10	1.4	1.8	1.4
Half detection limit (µg)	0.5	0.5	0.7	0.0045	0.7	0.00385	1.7	8.5	0.0405	0.22	0.05	0.7	0.9	0.7
% < detection limit	0	0	93	0	0	0	0	0	0	0	0	93	93	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

N/R: Statistics not reported due to more than 50% of values being less than the detection limit

N/A: Not applicable

INV: Invalid Sample

*Arsenic, Selenium, and Vanadium concentrations were below detection limit and as such were reported at 1/2 the detection limit.

**Canadian Ambient Air Quality Standard, 24-hour standard

APPENDIX B-2

TOTAL DUSTFALL SAMPLING RESULTS

Tait Road Monitoring Results for Dustfall (Fourth Quarter 2015)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
October	27	1.1	3.06	4.14
November	32	0.15	0.75	0.66
December	28	0.17	0.17	0.33

Arithmetic mean	1.7
Max. concentration	4.14
Min. concentration	0.33
AAQC	7
No. > AAQC value**	0
No. of valid samples	3
% Valid data	100
No. samples < mdl	0
Detection limit	0.3
Half detection limit	0.15

Gallinger Road Monitoring Results for Dustfall (Fourth Quarter 2015)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
October	27	0.17	2.6	2.9
November	32	0.15	0.42	0.60
December	28	0.17	0.17	0.36

Arithmetic mean	1.3
Max. concentration	2.91
Min. concentration	0.36
AAQC	7
No. > AAQC value**	0
No. of valid samples	3
% Valid data	100
No. samples < mdl	0
Detection limit	0.3
Half detection limit	0.15

Notes:
N/R: Statisics not reported due to high % of values <detedciton limit
N/A: Not applicable
INV: Invalid Sample
**Ontario Ambient Air Quality Criteria, 30-day standard

APPENDIX B-3

SO_2 AND NO_2 PASSIVE SAMPLING RESULTS

Monitoring Results for Passive SO_2 and NO_2 (Fourth Quarter 2015)

	Tait Road		Gallinger Road	
Month	**SO_2**	**NO_2**	**SO_2**	**NO_2**
October	<0.3 µg/m3 (<0.1 ppb)	0.9 µg/m3 (0.5 ppb)	<0.3 µg/m3 (<0.1 ppb)	1.3 µg/m3 (0.7 ppb)
November	0.3 µg/m3 (0.1 ppb)	4.0 µg/m3 (2.1 ppb)	<0.3 µg/m3 (<0.1 ppb)	1 µg/m3 (0.7 ppb)
December	0.3 µg/m3 (0.1 ppb)	2.6 µg/m3 (1.4 ppb)	0.8 µg/m3 (0.3 ppb)	1.9 µg/m3 (1.0 ppb)

Arithmetic mean	0.08	1.3	0.13	0.8
Max. concentration	0.10	2.1	0.3	1.0
Min. concentration	0.05	0.5	0.05	0.70
AAQC* 24-hr converted to 30-day	N/A	78 µg/m^3	N/A	78 µg/m^3
Alberta Ambient Air Quality Objectives 2013	30 µg/m^3	N/A	30 µg/m^3	N/A
No. of valid samples	3	3	3	3
No. samples < mdl	1	0	2	0
Detection limit	0.1	0.1	0.1	0.1
Half detection limit	0.05	0.05	0.05	0.05

Notes:

All statistics were calculated using 1/2DL for values reported as <DL

All results reported by the lab in parts per billion (ppb) and are converted to µg/m3 assuming 101.23kPA and 25C

N/R: Statisics not reported due to high % of values <detedciton limit

N/A: Not applicable

INV: Invalid Sample

*Ontario Ambient Air Quality Criteria

RAINY RIVER PROJECT

2015 ANNUAL GROUNDWATER MONITORING REPORT

PER ENVIRONMENTAL COMPLIANCE APPROVAL

#5781-9VJQ2J Condition 13(6)c

and

PER PERMITS TO TAKE WATER

#0040-9VUL6B Condition 4.2.3
#1386-9VTP2H Condition 4.2.3
#2133-9VUPVZ Condition 4.2.3
#7631-9VULMS Condition 4.2.4
#8776-9W2QN3 Condition 4.2.5

March 2016
TC111504

Principal Contact: Darrell Martindale Environmental Manager
Rainy River Project
5967 Highway 11/71
P.O. Box 5
Emo, Ontario, Canada P0W IE0
Telephone: (807) 707-3497
E-mail: Darrell.Martindale@newgold.com

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9.0 ASSESSMENT OF IMPACT ON RECEIVING WATER AND OFFSITE GROUNDWATER 3
10.0 ASSESSMENT OF CONTINGENCY PLAN TRIGGERS 3
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B Stratigraphic Cross Sections
C Borehole Logs
D Historical Groundwater Chemistry and Water Level Data
E Historical Groundwater Chemistry and Level Trends

1.0 PROJECT BACKGROUND

New Gold Inc. (New Gold) is currently constructing, and plans to operate and eventually reclaim a new open pit and underground gold mine, the Rainy River Project (RRP). An Environmental Compliance Approval (ECA) Industrial Sewage Works #5781-9VJQ2J was issued by the Ontario Ministry of the Environment and Climate Change (MOECC) on May 8, 2015 related to the Tait Quarry and Construction Phase industrial sewage works. Condition 13(6)c of this approval requires that:

> *The Owner shall prepare and submit the following reports to the District Manager on an annual basis by March 31 of every year, with the first report(s) due March 31, 2016. The Owner shall ensure that all reports submitted in accordance with this Approval are accompanied by a signed and dated certification statement from the Mine Manager, or a person designated by the Mine Manager, on behalf of the Owner, in the following form: "I certify that the information in this document and all attachments are correct, accurate and complete to the best of my knowledge".*
>
> *,…(c) Groundwater Monitoring Report*

The required certification is provided in Appendix A.

Table 1 provides a summary of the Annual Groundwater Monitoring Report content requirements for each these approvals for reader reference. A similar approval condition was included in each of the following Permits to Take Water (PTTWs):

- Condition 4.2.3 of PTTW #0040-9VUL6B issued by the MOECC on May 8, 2015 related to water takings from:

  1) Water Management Pond Dam
  2) Loslo Creek (Tailings Management Area Construction Diversion Dam)
  3) Tailings Management Area West Dam
  4) Loslo Creek (Tailings Management Area South Dam)
  5) Tailings Management Area North Dam
  6) Water Management Pond Control Outlet
  7) Water Management Pond Emergency Spillway
  8) Tailings Management Area Emergency Spillway
  9) Borrow Area A
  10) Borrow Area B

- Condition 4.2.3 of PTTW #1386-9VTP2H issued by the MOECC on May 8, 2015 related to water takings from:

1) Outcrop 3 Quarry
2) Outcrop 4 Quarry
3) Roen Road Pit

- Condition 4.2.3 of PTTW #2133-9VUPVZ as amended issued by the MOECC on May 21, 2015 related to minor construction water takings from 25 sources.

- Condition 4.2.4 of PTTW #7631-9VULMS issued by the MOECC on August 31, 2015 related to water takings from:

  1) Rainy River Project Mine Workings
  2) Well 1
  3) Well 2A
  4) Well B
  5) Well C

- Condition 4.2.5 of PTTW # 8776-9W2QN3 issued by the MOECC on August 31, 2015 related to water takings from the Pinewood River.

Sections are provided in this report describing each of the requirements as required by these approvals. Please note that installation of groundwater monitoring wells was not completed until early 2016. As such, no groundwater quality samples were obtained, nor were any groundwater level measurements obtained.

2.0 SITE PLAN

The site plan (Figure 1) shows the location of the entire site illustrating significant site features and sampling locations during 2015.

3.0 MAP OF POTENTIALLY SENSITIVE RECEPTORS

Figure 1 illustrates the entire site relative to nearby potentially sensitive groundwater / surface water features and includes the groundwater monitoring well network (from Table 1 of the PTTWs referenced in this annual report) that was established as of December 2015.

4.0 WATER CONTOUR MAP

Figure 2 provides a water table contour map (Figure 3-3 taken from the Federal Environmental Assessment Report, issued December 2013).

5.0 STRATIGRAPHIC CROSS SECTIONS

Appendix B provides stratigraphic cross sections which illustrate subsurface distribution of geological materials.

6.0 BOREHOLE LOGS

Appendix C provides copies of borehole logs for all existing monitoring wells. Borehole logs for new monitoring wells (those constructed as part of the monitoring plan as listed in Table 11a of ECA #5781-9VJQ2J) will be provided with the next annual monitoring report, or upon request.

7.0 HISTORICAL GROUNDWATER CHEMISTRY AND LEVEL DATA

Appendix D provides water level data and tables summarizing historical (prior to 2015) groundwater chemistry.

8.0 HISTORICAL GROUNDWATER CHEMISTRY AND LEVEL TRENDS

Appendix E provides graphs demonstrating the baseline (pre-development) condition. Subsequent annual reports will provide information regarding groundwater quality trends for key parameters in a graphical format as applicable.

9.0 ASSESSMENT OF IMPACT ON SURFACE WATER AND OFFSITE GROUNDWATER

The data presented in Appendices D and E represent the baseline condition. Data presented in Appendix F represents monitoring data collected from wells that were existing in 2015. As the site was not operating in 2015, no impacts to surface water, receiving water and offsite groundwater are anticipated. Subsequent annual reports will evaluate the monitoring data with respect to potential impacts to receiving surface waterbodies and offsite groundwater.

10.0 ASSESSMENT OF CONTINGENCY PLAN TRIGGERS

As the monitoring well network was not completed until early 2016, no water quality samples or water levels were obtained. No contingency measures (as triggered by certain criteria such as water quality) were required to be implemented.

11.0 ASSESSMENT OF GROUNDWATER LEVEL DATA TO PREDICTIONS

As the monitoring well network was not completed until early 2016, no water levels were obtained. Subsequent annual reports will summarize the monitoring data in the format requested.

12.0 SUMMARY OF ANNUAL MONITORING PROGRAM

Groundwater monitoring was not completed during 2015, due to delay in monitoring well installation.

Subsequent annual reports will summarize the monitoring data in the format requested.

13.0 HYDROGEOLOGICAL MODEL UPDATE

Updates to the hydrogeological model are to occur once every three years, with the first update to be provided in the March 2018 report. The 2018 annual report will provide the information requested.

14.0 RECOMMENDATIONS FOR MONITORING OR REMEDIAL ACTIONS

Groundwater monitoring was not completed during 2015, due to a delay in monitoring well installation. No recommendations / remedial actions are proposed at this time.

15.0 FIELD SAMPLING PROTOCOLS AND QA/QC MEASURES

Groundwater monitoring was not completed during 2015, due to a delay in monitoring well installation. Subsequent annual reports will summarize the field sampling protocols and QA/QC measures utilized.

16.0 CLOSING

This environmental compliance report was prepared by Amec Foster Wheeler Environment & Infrastructure on behalf of New Gold Inc. with information provided by New Gold. The quality of information and conclusions are based on: i) information available at the time of preparation, and ii) the assumptions, conditions and qualifications set forth in this document. This report has been prepared in accordance with generally accepted industry-standard. No other warranty, expressed or implied, is made. If you require further, please contact Sheila Daniel, Principal, Mining Environmental at (905) 568-2929.

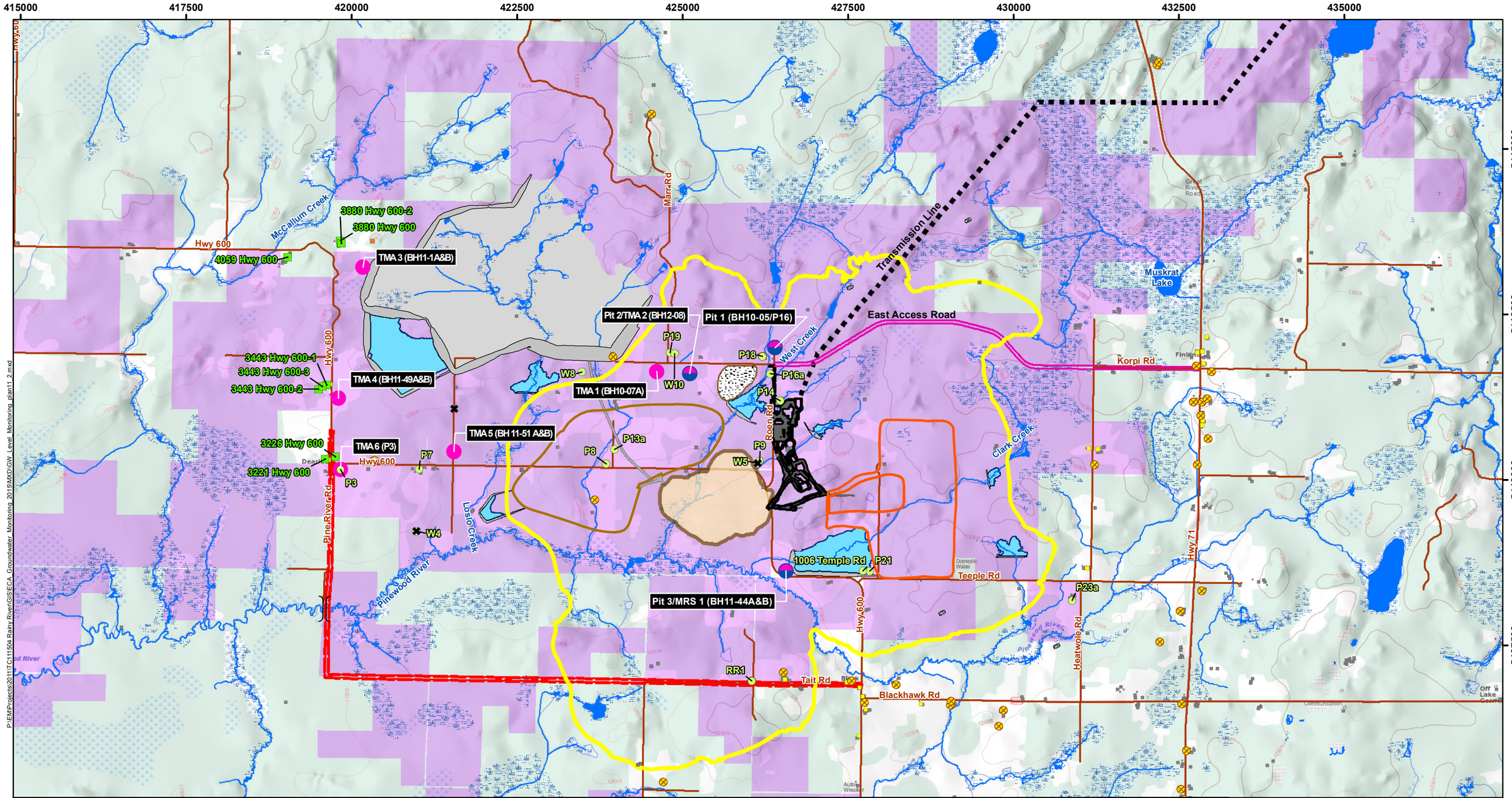
Lesley Lorrimer, B.Sc.
Environmental Scientist

Sheila Daniel, M.Sc., P. Geo.
Principal, Mining Environmental

cc. MOECC, Kenora Office

Table 1: Summary of Groundwater Report Content by Approval

Groundwater Report Content Requirements (or very similar)	ECA #5781-9VJQ2J Condition 13(6)c	PTTW #0040-9VUL6B Condition 4.2.3	PTTW #1386-9VTP2H Condition 4.2.3	PTTW #2133-9VUPVZ Condition 4.2.3	PTTW #7631-9VULMS Condition 4.2.4	PTTW #8776-9W2QN3 Condition 4.2.5
A scale site plan or plans of the entire site illustrating significant site features such as mine facilities, rivers, seeps, ponds, ditches, collection and treatment facilities, and Roadways, as well as all of the monitoring locations.	I	a	a	a	a	a
A scale location map illustrating the site relative to nearby potentially sensitive groundwater/surface water features (lakes, streams, wells, etc.).	ii	b	b	b	b	b
Water table contour maps [including current and baseline contour maps for comparison purposes]. Where multiple groundwater flow regimes exist, a contour map for each groundwater flow regime shall be included.	iii	c	c	c	c	c
Stratigraphic cross-sections which clearly illustrate the subsurface distribution of geological materials.	iv	d	d	d	d	d
Borehole logs for all monitoring wells.	v					
Tables illustrating historical water chemistry and water level data.	vi					
Tables illustrating historical water level data.		e	e	e	e	e
Graphs illustrating historical water quality trends with time for the key analytical parameters.	vii					
Graphs illustrating historical water level trends with time for the key monitoring locations.		f	f	f	f	f
An assessment of monitoring data to evaluate the impact on receiving bodies and offsite groundwater.	viii					
An assessment of monitoring data to evaluate the impact on surface water features and offsite groundwater supply wells.		g	g	g	g	g
Assessment of the monitoring criteria with respect to the trigger mechanisms identified in the Contingency Plan, and discussion related to requirements for contingency measures to be implemented.	ix					
An assessment of the groundwater level monitoring results as related to the anticipated groundwater levels as predicted by the current hydrogeological model.		h	h	h	h	h
A summary of the annual monitoring program in the format of Tables 11a and 11b [ECA] / Table 1 [PTTW] (or similar).	x	i	i	i	i	i
Results and discussion of hydrogeological model update once every 3 years, with the first update to be included in the report due march 31, 2018.	xi					
Recommendations for future monitoring and/or remedial actions.	xii	j	j	j	j	j
A section detailing the field sampling protocols and QA/QC measures.	xiii					



LEGEND

- Residence-House
- Lodging Cabin-Occasional Use
- Building - Unknown Use
- Roads
- Contours, 10 m interval
- Watercourses
- Low-lying Area
- RRR Active Dispositions/Unpatented Claims

Proposed Site Features

- Plant Site / Ancillary Facilities
- Open Pit
- Highway Re-alignment
- East Access Road
- Site Roads
- Transmission Line
- Pond
- Aggregate Pit
- Dams
- Tailings Management Area
- Overburden / West Mine Rock Stockpile
- Ore / East Mine Rock Stockpile

Proposed Monitoring Wells (labelled on map)

- Groundwater quality monitoring location
- Groundwater level and quality monitoring location
- 1 m Drawdown Envelope of all Sensitivity Runs Extended Model
- Destroyed or Decommissioned Wells
- Private Water Wells (2013 Survey)
- Private Water Wells (2012 Survey)
- Private Water Wells (MOE Records)

0 1 2 4 6 8 10 Kilometres

Source / Notes:
- Background topographic and elevation data extracted from MNR Land Information Ontario
- Only major facilities are shown. Connecting infrastructure and supporting facilities are generally not shown.
- RRP lands current as of Dec. 2015

Datum: NAD83
Projection: UTM Zone 15N

N W E S

newgold Rainy River Project

amec foster wheeler

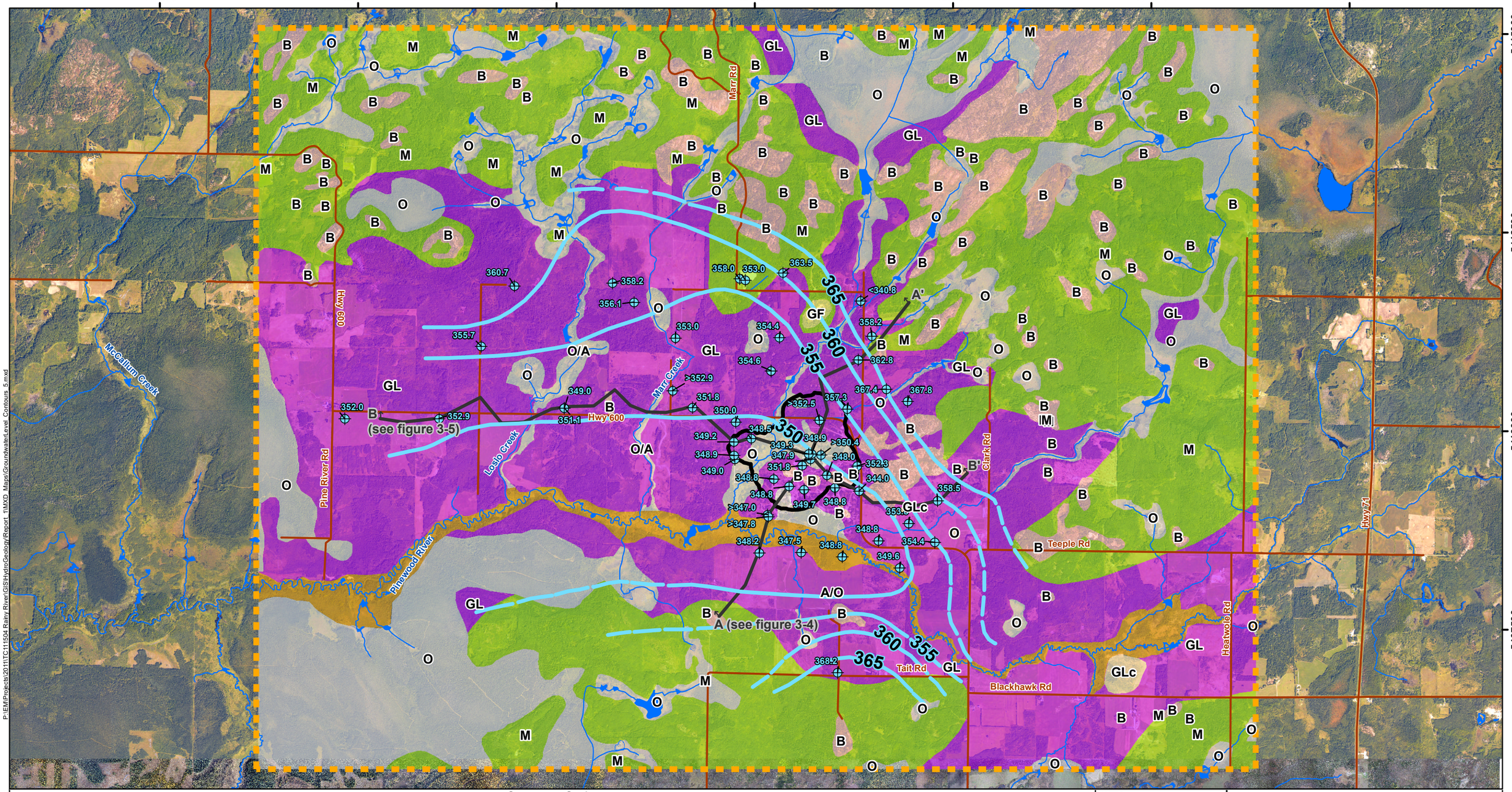
RAINY RIVER PROJECT

Groundwater Quality and Level Monitoring Well Network as of December 31, 2015

PROJECT Nº: TC111504 | **FIGURE: 1**

SCALE: 1:55,000 | Date: March 2016

P:\EM\Projects\2011\TC111504 Rainy River\GIS\ECA_Groundwater_Monitoring_2015\MXD\GW_Level_Monitoring_plan11_2.mxd



LEGEND

- General Project Area
- Approximate Open Pit Outline
- Cross Section
- Roads
- Watercourses
- Borehole Used in Groundwater Contour Interpolation labelled with Groundwater level (masl)
- 360 Groundwater Level Contours

Quaternary Geology

- O — Organic: peat and organic clay; includes bogs, fens, marsh, ponds and standing water along poorly defined creeks.
- A — Alluvium: fine sand, silt, and clay; deposits of Pinewood River and tributaries
- B — Bedrock: exposures or with very thin cover
- GL — Glaciolacustrine: clay, silt, and minor sand; glacial lake bottom
- GLc — Glaciolacustrine Coarse Grained: sand and gravel; beach, bar and, near-shore deposits
- GF — Glaciofluvial: sand, gravel, and boulders, minor till; deposited from glacial meltwater in ice-contact environment.
- M — Moraine: glacial till with some interbedded glaciolacustrine clay and silt; inferred to mostly Whitemouth Lake Till, clay rich with carbonate rocks and matrix.

NOTES:
- Road data extracted from Land Information Ontario, Ontario Road Network, MNR
- Township and watercourse data extracted from Land Information Ontario, MNR
- Surficial geology based on air photo analysis and review of published geology maps. Surficial materials may vary from those indicated

Datum: NAD83
Projection: UTM Zone 15N

0 1 2 4 6 8 10 Kilometres

RAINYRIVER amec

RAINY RIVER GOLD PROJECT

Groundwater Level Contour Map for June 2012 for Whiteshell Till and Shallow Bedrock

PROJECT N°: TC111504	FIGURE: 2
SCALE: 1:46,000	DATE: March 2013

APPENDIX A

CERTIFICATION OF DOCUMENT BY OWNER

newgold™ Rainy River Project

March 28, 2016

Director Manager
Ministry of the Environment and Climate Change
Thunder Bay District Office
331-435 James St S
Thunder Bay ON P7E 6S7

Re: Certification regarding Rainy River Project, 2015 Annual Groundwater Monitoring Report Per ECA #5781-9VJQ2J, Condition 13(6)c

With regards to the Rainy River Project located in Unsurveyed Territory (Kenora Area Office), District of Rainy River, Ontario:

I certify that the information in this document and all attachments are correct, accurate and complete to the best of my knowledge.

Should you have any questions or require additional information for any part of this submission, please contact the undersigned or Cailey Anderson at 807-707-3058.

Sincerely,

Darrell Martindale
Environmental Manager

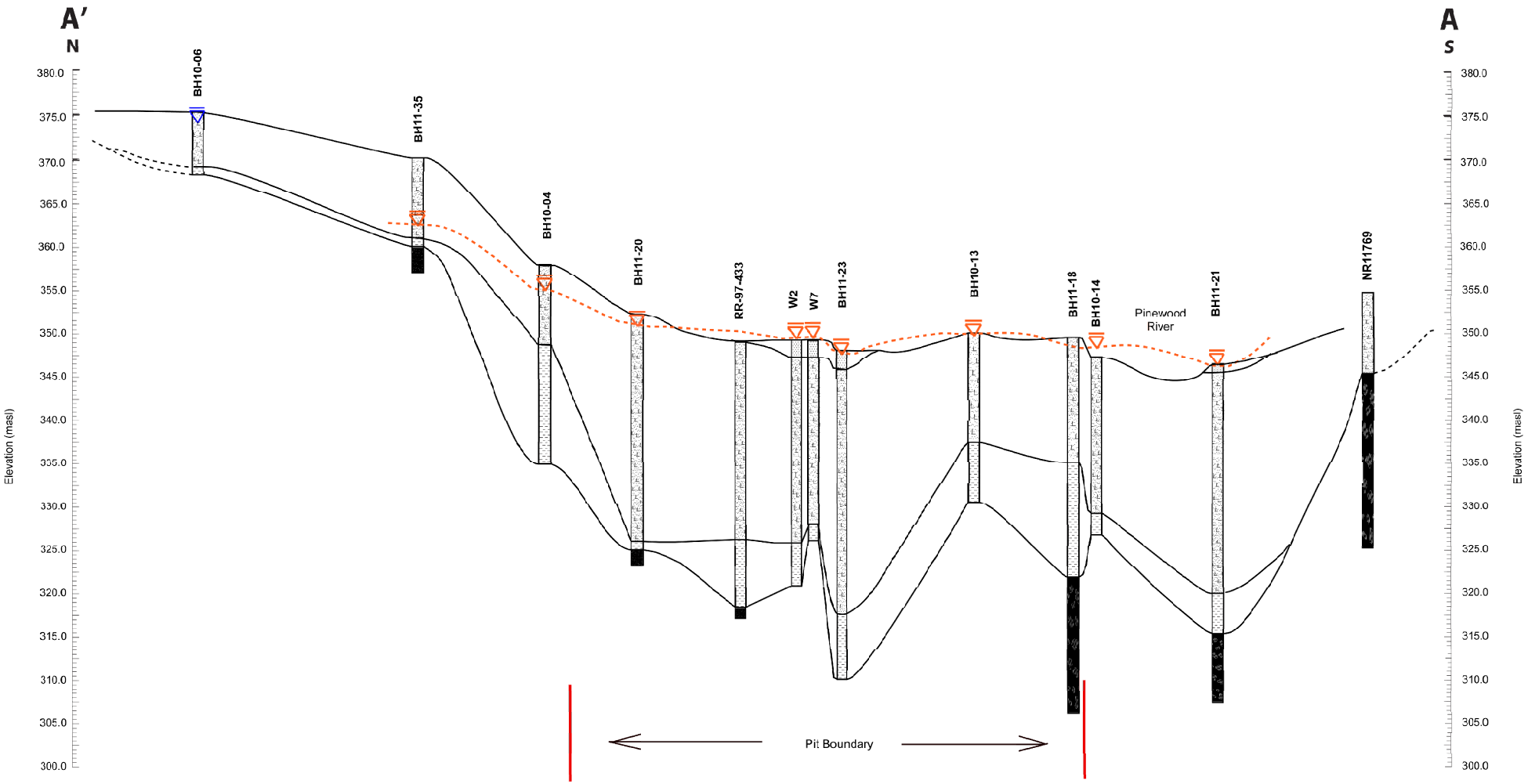
cc. MOECC Northern Region, Kenora Area Office

New Gold Inc., Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario, Canada P0W IE0
www.newgold.com

T 807-707-3497

APPENDIX B

STRATIGRAPHIC CROSS SECTIONS



P:\EM\Projects\2011\TC111504 Rainy River\GIS\HydroGeology\Report_1\MXD_Maps\NorthSouth_XSection_2.mxd

LEGEND

- Top soil/shallow sediments
- Predominantly Whitemouth Lake Till, (Pleistocene Aquitard)
- Predominantly Whiteshell Till, (Pleistocene Lower Granular Deposits)
- Bedrock
- Groundwater level (withiin Whitemouth Lake Till)
- Groundwater level (within Whiteshell Till and bedrock)
- Interpreted contact
- Interpreted groundwater level (within Whitesehll Till and shallow bedrock)

NOTES:
- RR-97 Data sourced from Nuinsco (1997)

Datum: NAD83
Projection: UTM Zone 15N

N S

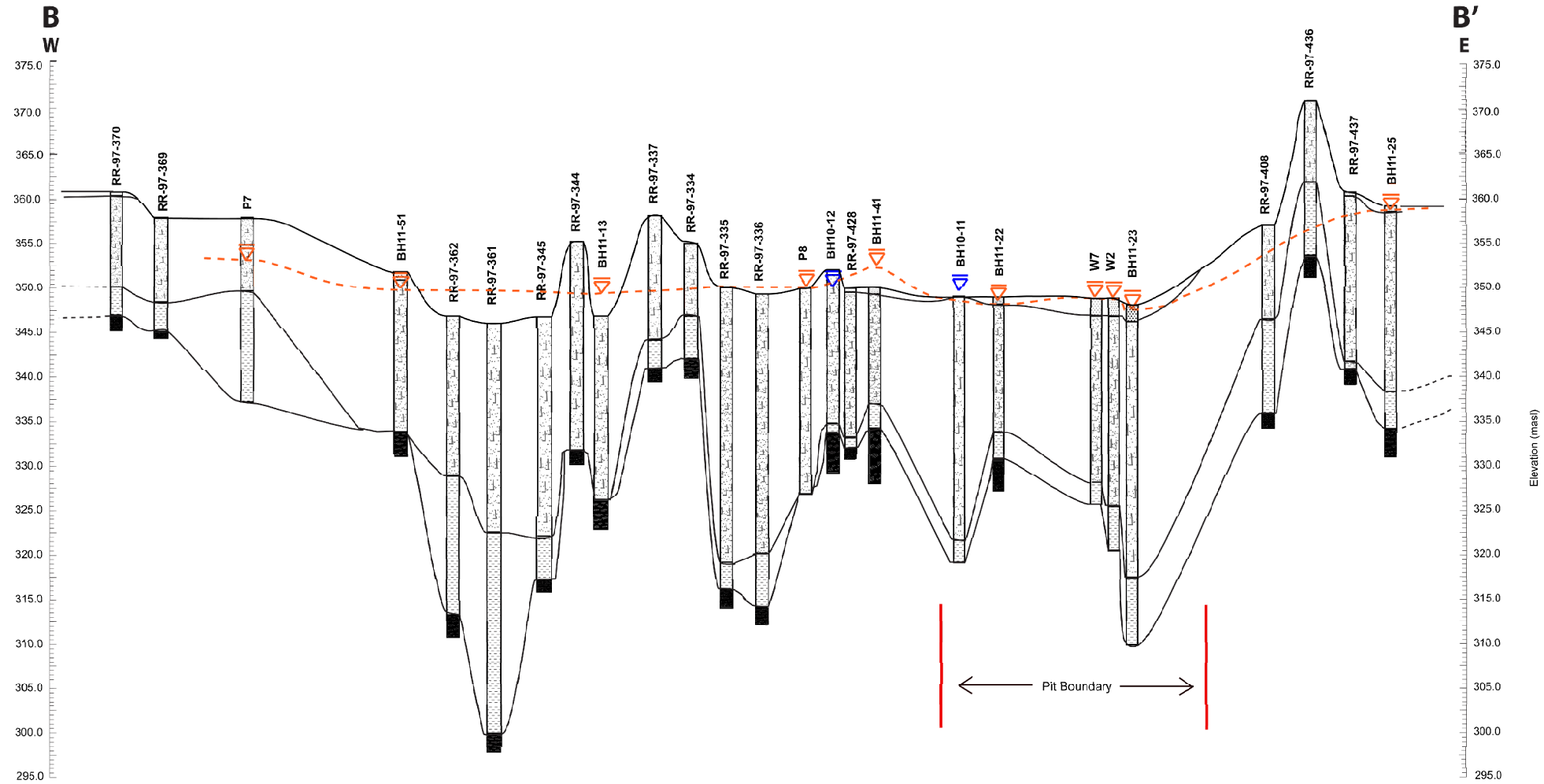
RAINYRIVER amec

RAINY RIVER GOLD PROJECT

Cross Section of Overburden and Shallow Bedrock (North-South)

PROJECT N°: TC111504 | **FIGURE: 3-4**

SCALE: As Shown | DATE: March 2013



P:\EM\Projects\2011\TC111504 Rainy River\GIS\HydroGeology\Report_1\MXD_Maps\EastWest_XSection_2.mxd

LEGEND

- Top soil/shallow sediments
- Predominantly Whitemouth Lake Till, (Pleistocene Aquitard)
- Predominantly Whiteshell Till, (Pleistocene Lower Granular Deposits)
- Bedrock
- Groundwater level (within Whitemouth Lake Till)
- Groundwater level (within Whiteshell Till and bedrock)
- Interpreted contact
- Interpreted groundwater level (within Whitesehll Till and shallow bedrock)

NOTES:
- RR-97 Data sourced from Nuinsco (1997)

Datum: NAD83
Projection: UTM Zone 15N

W E

RAINYRIVER amec

RAINY RIVER GOLD PROJECT

Cross Section of Overburden and Shallow Bedrock (West-East)

PROJECT N°: TC111504 | **FIGURE: 3-5**

SCALE: As Shown | DATE: March 2013

APPENDIX C

BOREHOLE LOGS

TEST HOLE LOG

STARTED: 11/17/2009 **FINISHED:** 11/17/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 350.00
COORDINATES (m): N 5409786 E 425850

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ ▲ UC/2
FIELD REMOLD ◇ ▲ P.PEN/2
LAB ■ □
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT	DETAILS
0–3.00					Peat.		
3.00 / 347.00					KEEWATIN TILL (CH) High plasticity clay with trace sand (fine to medium grain), grey, soft-firm		

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 1 **OF** 3 **HOLE NO.:** RR09-213A

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/17/2009 **FINISHED:** 11/17/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 350.00
COORDINATES (m): N 5409786 E 425850

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
21						
22						
23						
24					24.00 / 326.00 As above, but 30% of regular recovery.	
25					25.50 / 324.50 As above	
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 2 **OF** 3 **HOLE NO.:** RR09-213A

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/17/2009 **FINISHED:** 11/17/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 350.00
COORDINATES (m): N 5409786 E 425850

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
41						
					41.50 LABRADOREAN/boulder (no sample)	
42					308.20 DACITE	
43						
44						
45						
46					46.50	
47					303.50 End of Hole at 46.50 m	
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 3 **OF** 3 **HOLE NO.:** RR09-213A

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/18/2009 **FINISHED:** 11/18/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 350.00
COORDINATES (m): N 5409790 E 425850

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
0–3.00					Peat.	
3.00 / 347.00					KEEWATIN TILL (CH) High plasticity clay with trace sand (fine to medium grain), grey, soft-firm	
16.90 / 333.10					End of Hole at 16.90 m	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** RR09-213B

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/20/2009 **FINISHED:** 11/21/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 348.00
COORDINATES (m): N 5409856 E 425286

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ ■ ▲UC/2
REMOLD ◇ □ △P.PEN/2
FIELD LAB
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – ×
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT	DETAILS
					Peat (no recovery)		
1.00					347.00 Clay and Silt (CH), beige/brown, heavily oxidized		
2.00					346.00 Clay (CH) Sandy to some fine to coarse sand (likely interbedded fine sand/silt), grey, soft to firm, possibly stiff if undisturbed		
18.00					330.00 As above with little to no recovery.		
19.50					328.50 As above.		

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 1 **OF** 3 **HOLE NO.:** RR09-214A

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/20/2009 **FINISHED:** 11/21/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 348.00
COORDINATES (m): N 5409856 E 425286

Su - kPa: 20 60 100 140 180
VANE PEAK / REMOLD — FIELD ◆ ◇ — LAB ■ □ — ▲ UC/2 — △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L% — 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
23					23.00 / 325.00 / 23.10 / 324.90 As above increasing coarse sand content.	
29					As above decreasing sand content to trace or none.	
30					30.20 / 317.80 Sand, gravel and cobbles. Trace to some silt.	
40					39.50 / 308.50 BEDROCK	

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 2 **OF** 3 **HOLE NO.:** RR09-214A

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/20/2009 **FINISHED:** 11/21/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 348.00
COORDINATES (m): N 5409856 E 425286

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					40.50 / 307.50 End of Hole at 40.50 m	
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 3 **OF** 3 **HOLE NO.:** RR09-214A

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: 11/22/2009 **FINISHED:** 11/22/2009
DRILL METHOD: Reverse Circulation
GROUND ELEV. (m): 348.00
COORDINATES (m): N 5409860 E 425286

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					Peat (no recovery)	
1.00					347.00 Clay and Silt (CH), beige/brown, heavily oxidized	
2.00					346.00 Clay (CH) Sandy to some fine to coarse sand (likely interbedded fine sand/silt), grey, soft to firm, possibly stiff if undisturbed	
13.50					334.50 End of Hole at 13.50 m	

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: TJ **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** RR09-214B

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/16/10

TEST HOLE LOG

STARTED: May 31, 2010 **FINISHED:** May 31, 2010
DRILL METHOD: Air Rotary
GROUND ELEV. (m): 349.00
COORDINATES (m): N 5409720 E 425718

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					PEAT (PT), "black muskeg", logs, wet	
1.83 / 347.17					CLAY (CL), silty, sandy, brown, wet	
3.05 / 345.95					CLAY (CH), trace of organics, blue-grey, wet	
6.10 / 342.90					CLAY (CH), trace of sands and gravels, blue-grey, wet	
22.86 / 326.14					GRAVEL (GM), and sand, silty, some cobbles, wet, producing water	
25.91 / 323.09						
28.04 / 320.96					GRANITE, cuttings, blue-green, producing little water	
					End of Hole at 28.00 m	
					5" 14-slot stainless steel screen installed with K-packer	

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: KP **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** TW10-01

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/15/10

TEST HOLE LOG

STARTED: Jun 1, 2010 **FINISHED:** Jun 1, 2010
DRILL METHOD: Air Rotary
GROUND ELEV. (m): 349.00
COORDINATES (m): N 5409718 E 425672

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					PEAT (PT), "black muskeg", logs, wet (1.83)	
					347.17 CLAY (CL), silty, sandy, brown, wet (3.05)	
					345.95 CLAY (CH), blue-grey, wet, soft (21.34)	
					327.66 GRAVEL (GM), and sand, silty, some cobbles, wet, producing water (23.06)	
					325.94 End of Hole at 23.10 m	
					No screen installed. Bottom of casing left open.	

Su - kPa: 20 60 100 140 180

VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N

W_P% W% W_L%
× – – – – o – – – – ×
20 40 60 80

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: KP **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** TW10-02

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/15/10

TEST HOLE LOG

STARTED: Jun 2, 2010 **FINISHED:** Jun 2, 2010
DRILL METHOD: Air Rotary
GROUND ELEV. (m): 348.00
COORDINATES (m): N 5409707 E 424744

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
1					CLAY (CL), silty, sandy, some organics, brown, wet	
2						
3					2.74 / 345.26 CLAY (CH), blue-grey, wet, soft	
4						
5						
6					6.10 / 341.90 CLAY (CH), blue-grey, wet, soft	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25					25.60 / 322.40 GRAVEL (GM), and sand, silty, some cobbles, wet, producing water	
26						
27						
28					28.65 / 319.35	
29					29.26 / 318.74 GRANITE, broken, blue-green	
30					End of Hole at 29.30 m	
31					5" 14-slot stainless steel screen installed with K-packer	
32						
33						
34						
35						

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: KP **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** TW10-03

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/15/10

TEST HOLE LOG

STARTED: Jun 3, 2010 **FINISHED:** Jun 3, 2010
DRILL METHOD: Air Rotary
GROUND ELEV. (m): 348.00
COORDINATES (m): N 5409651 E 424745

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ ■ ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
FIELD LAB
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					PEAT (PT), "black muskeg", logs, wet	
1.22 / 346.78					CLAY (CL), silty, sandy, brown, wet	
3.66 / 344.34					CLAY (CH), blue-grey, wet, soft	
28.96 / 319.04					GRAVEL (GM), and sand, silty, some cobbles, grey silt, wet, producing water	
31.09 / 316.99					GRAVEL (GM), coarse, and sand, silty, some cobbles, wet, compact, producing water	
316.61 / 32.31					GRANITE, broken, blue-green	
315.69					~~End of Hole at 32.30 m~~	

No screen installed. Bottom of casing left open.

Klohn Crippen Berger

PROJECT NO.: M09559A04
PROJECT: Rainy River Baseline Studies
LOCATION: Richardson Township, Ontario
LOGGED BY: KP **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** TW10-04

KCBL_TEST_HOLE-SI KCBWELLS.GPJ KC_DATA.GDT 11/15/10

TEST HOLE LOG

STARTED: May 11, 2010 **FINISHED:** May 12, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 358.00
COORDINATES (m): N 5410646 E 425815

Su - kPa: 20 60 100 140 180
VANE PEAK FIELD ◆ LAB ■ ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – ×
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
0					**SILTY CLAY (CH)** high plasticity, some grey mottling, moist, brown	
1						
		D	1			
2						
3		D	2		with some medium gravels, well rounded, black red	
4						
		D	3			
5						
6						
		U	1		becoming grey	
7						
		D	4			
8						
8.80 / 349.20					**SAND (SW)** well graded, fine to medium sand, wet, grey and black	
9		D	5			
10					10.00	

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 3 **HOLE NO.:** BH10-04

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 11, 2010 **FINISHED:** May 12, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 358.00
COORDINATES (m): N 5410646 E 425815

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	DESCRIPTION OF MATERIALS
				348.00 Alternating layers of **SAND (SW) and SILTY CLAY (CH)** Sand is well graded, fine to medium, wet, grey and black, 10 cm thick. Clay is high plasticity, grey, moist, 10 cm thick.
11	3,1,8,8	D	6	
12		D	7	
13				
14		U	2	
				cobble
15	7,6,8	D	8	with some fine to medium gravels, sub-rounded, white, grey
16				
17		D	9	
18		D	10	
19				
20				20.00

SYMBOL | INSTRUMENT DETAILS

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB
REMOLD ◇ □
▲UC/2 △P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

Continued Next Page

Klohn Crippen Berger

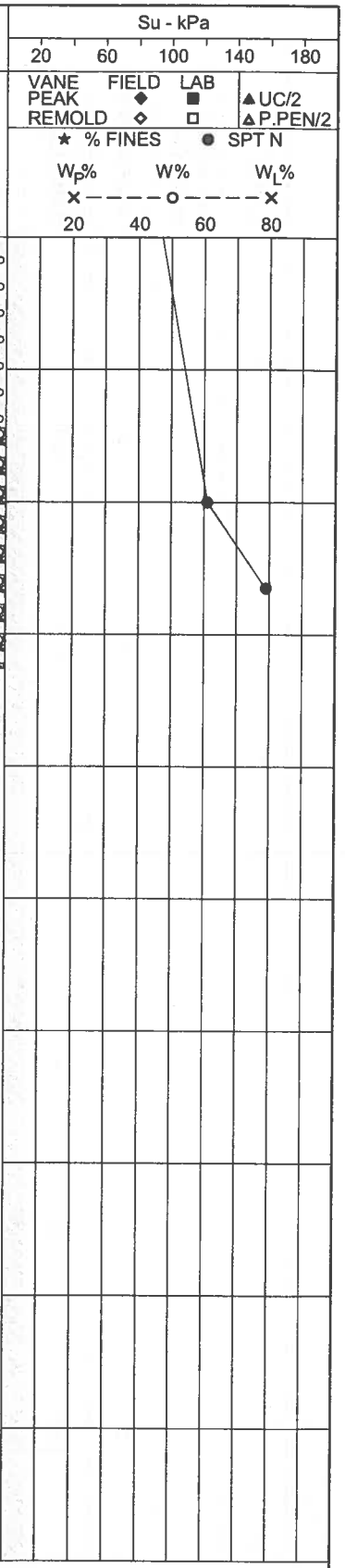
PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 3 **HOLE NO.:** BH10-04

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 11, 2010 **FINISHED:** May 12, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 358.00
COORDINATES (m): N 5410646 E 425815

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
		D	11		338.00 Alternating layers of **SAND (SW) and SILTY CLAY (CH)** Sand is well graded, fine to medium, wet, grey and black, 10 cm thick. Clay is high plasticity, grey, moist, 10 cm thick. Some fine to medium gravels, sub-rounded, white, grey. 21.50	
21					336.50 **GRAVEL (GP)** poorly sorted, angular, wet, maximum particle 3 cm 22.00	
22	24,30,31	D	12		336.00 **SAND (SP)** poorly sorted, rounded, wet 22.50	
					335.50 **SILTY CLAY (CH)** high plasticity, grey 23.00	
23	16,17,29,50	D	13		335.00 23.25 **SILT (ML)** low plasticity, grey 334.75	
24					End of Hole at 23.26 m Refusal on cobbles	
25						
26						
27						
28						
29						
30						



Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 3 **OF** 3 **HOLE NO.:** BH10-04

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 12, 2010 **FINISHED:** May 13, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 373.00
COORDINATES (m): N 5411993 E 426400

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT	DETAILS
					SILTY CLAY (CH) high plasticity, moist, brown, some fine to coarse sand, sub-rounded, white and black, moist		
1							
		D	1				
2							
3		D	2				
4							
		D	3		becoming grey		
5							
6		U	4				
7							
		D	5				
8							
9		D	6				
10					10.00		

Su - kPa: 20, 60, 100, 140, 180
VANE PEAK ◆ FIELD ■ LAB ▲UC/2
REMOLD ◇ □ ▲P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
20 40 60 80

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 2 **HOLE NO.:** BH10-05

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 12, 2010 **FINISHED:** May 13, 2010

DRILL METHOD: Washbore

GROUND ELEV. (m): 373.00

COORDINATES (m): N 5411993 E 426400

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					363.00 **SILTY CLAY (CH)** high plasticity, moist, grey, some fine to coarse sand, sub-rounded, white and black, moist	
					10.50	
		D	7		362.50 **SILTY SAND (SM)** fine sand, wet, grey, fine to coarse silt, non plastic	
11					11.27	
					361.73	
					End of Hole at 11.27 m	
					Refusal on probable bedrock	
12						
13						
14						
15						
16						
17						
18						
19						
20						

Su - kPa: 20 60 100 140 180

VANE PEAK FIELD ◆ LAB ■ ▲UC/2

REMOLD ◇ □ △P.PEN/2

★ % FINES ● SPT N

W_P% W% W_L%

× - - - - o - - - - ×

20 40 60 80

Klohn Crippen Berger

PROJECT NO.: M09559A06

PROJECT: Rainy River Mine Waste and Geotech.

LOCATION: Richardson Township, Ontario

LOGGED BY: ARD **CHECKED BY:**

SHEET 2 **OF** 2 **HOLE NO.:** BH10-05

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 14, 2010 **FINISHED:** May 14, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 375.50
COORDINATES (m): N 5411494 E 426904

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, brown, moist, some fine to coarse sand, sub-rounded, some fine gravel, sub-rounded	
1		D	1			
2						
3		D	2		becoming grey	
4						
		D	3			
5						
6		D	4			
					6.70 / 368.80 **SANDY GRAVEL** maximum particle size 3 cm, fine to medium gravel, fine to medium sand	
7					7.16 / 368.34	
					End of Hole at 7.16 m Refusal on probable bedrock	
8						
9						
10						

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲UC/2
REMOLD ◇ □ ▲P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** BH10-06

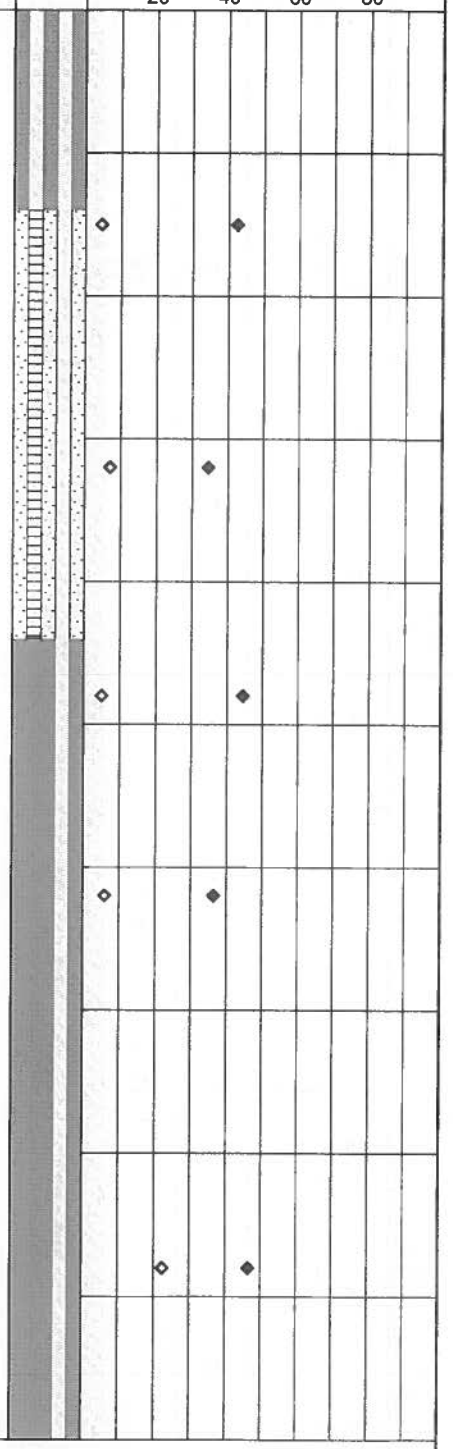
KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 15, 2010 **FINISHED:** May 16, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 350.50
COORDINATES (m): N 5411633 E 424605

Su - kPa: 20 60 100 140 180
VANE PEAK FIELD ◆ LAB ■ ▲UC/2
REMOLD ◇ □ △P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, moist, grey, some fine to coarse sand, sub-rounded	
1						
2						
3		D	2			
4					some gravel layers, fine to medium at 30 cm intervals, maximum particle size 3 cm, sub-rounded	
5						
6						
7		U	1			
8						
9						
10					10.00	



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Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 3 **HOLE NO.:** BH10-07

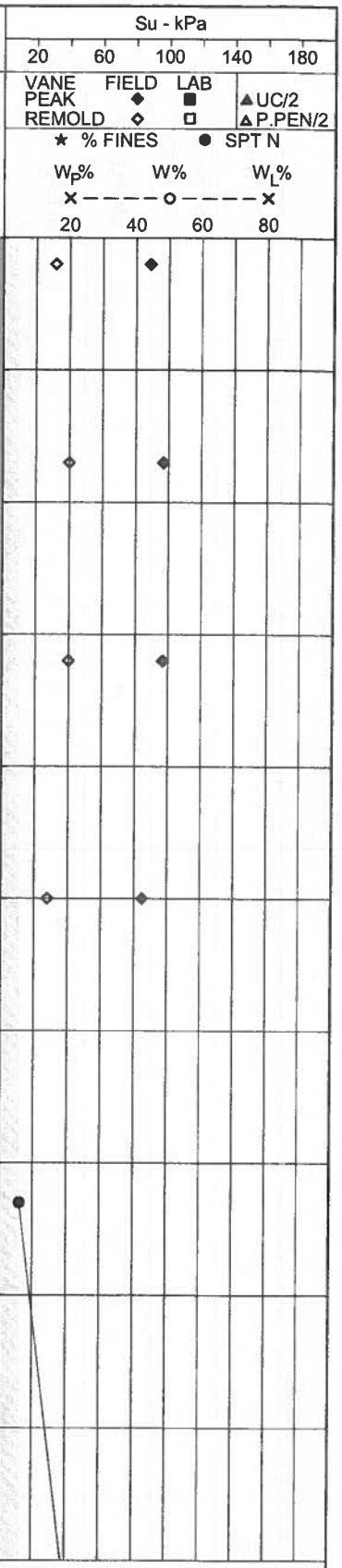
KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 15, 2010 **FINISHED:** May 16, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 350.50
COORDINATES (m): N 5411633 E 424605

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					340.50 **SILTY CLAY (CH)** high plasticity, moist, grey, some fine to coarse sand, sub-rounded. Some gravel layers, fine to medium at 30 cm intervals, maximum particle size 3 cm, sub-rounded	
11						
		D	7			
12						
13						
		D	8			
14						
15						
16						
		D	9			
17						
	2,3,2,4	D	10			
18						
19						
		U	1			
20					20.00	

Continued Next Page



Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 3 **HOLE NO.:** BH10-07

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

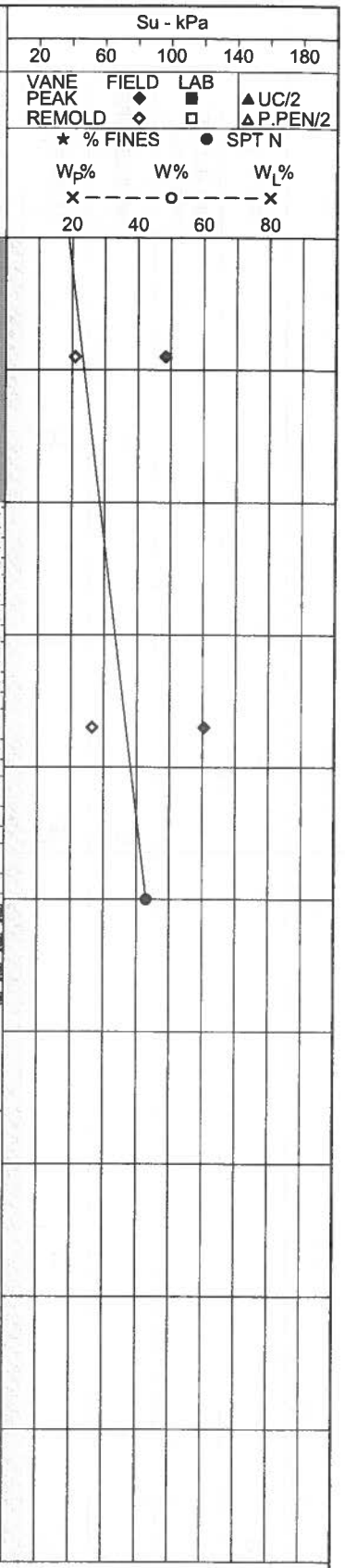
TEST HOLE LOG

STARTED: May 15, 2010 **FINISHED:** May 16, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 350.50
COORDINATES (m): N 5411633 E 424605

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	DESCRIPTION OF MATERIALS
				330.50 **SILTY CLAY (CH)** high plasticity, moist, grey, some fine to coarse sand, sub-rounded. Some gravel layers, fine to medium at 30 cm intervals, maximum particle size 3 cm, sub-rounded
21		D	11	
22		D	12	
23		D	13	
24				
25	12,15,19,24	D	14	
				25.50 / 325.00 **SANDY SILT (ML)** low plasticity, fine to coarse silt, fine sand, wet, grey
				25.80 / 324.70 **SILTY CLAY (CL)** varves at 3 cm intervals, clay varves are 5 mm, low plasticity, dark grey
26				
27				End of Hole at 26.60 m
28				
29				
30				

SYMBOL

INSTRUMENT DETAILS



Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 3 **OF** 3 **HOLE NO.:** BH10-07

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 27, 2010 **FINISHED:** May 28, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 357.50
COORDINATES (m): N 5411756 E 423975

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲UC/2
REMOLD ◇ □ △P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, brown, moist with grey mottling, some fine to coarse sand	
1		D	1			
2					becoming grey	
3		D	2			
4						
		D	3			
5						
6		D	4			
7						
		U	1			
8						
9		D	5			
10						

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 2 **HOLE NO.:** BH10-08

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 27, 2010 **FINISHED:** May 28, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 357.50
COORDINATES (m): N 5411756 E 423975

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ ■ ▲UC/2
REMOLD ◇ □ △P.PEN/2
FIELD LAB
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – ×
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, grey, moist, some fine to coarse sand	
		D	6			
11						
12		D	7			
13						
					13.60 / 343.90 **VARVED CLAY** Clay (CH) is high plasticity, dark grey, 5 mm layers. Silt (ML) is low plasticity, grey, 10 mm layers.	
		U	2			
14						
					15.00 / 342.50 **SAND (SP)** fine sand, grey, wet, well rounded	
15		D	9			
16						
					16.50 / 341.00 **SANDY GRAVEL (GW)** fine to coarse, sub-angular, wet, grey, sand is fine to coarse, sub-angular, wet, grey	
	12,17,50	D	10		16.80 / 340.70	
17					End of Hole at 16.80 m Refusal on cobbles	
18						
19						
20						

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 2 **HOLE NO.:** BH10-08

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 29, 2010 **FINISHED:** May 29, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 367.50
COORDINATES (m): N 5412736 E 423950

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, brown, wet	
					0.50 / 367.00 **SANDY GRAVEL (GW)** well graded, fine to coarse, angular, black, sand is fine to coarse sub-angular	
1						
	12,22,23,28	D	1			
2					2.20 / 365.30 **BEDROCK**	
					End of Hole at 2.20 m	
3					3.72 / 363.78	
4						
5						
6						
7						
8						
9						
10						

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ FIELD □ LAB △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× - - - - o - - - - × 20 40 60 80

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 1 **HOLE NO.:** BH10-09

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 29, 2010 **FINISHED:** May, 30, 2010

DRILL METHOD: Washbore

GROUND ELEV. (m): 350.50

COORDINATES (m): N 5410003 E 425995

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, some fine sand, brown	
1						
		D	1			
2						
3		D	2			
4						
		D	3		becoming grey	
5						
6						
7						
		U	1			
8						
9		D	5			
10						

Continued Next Page

Su - kPa: 20 60 100 140 180

VANE PEAK FIELD ◆ LAB ■ ▲UC/2

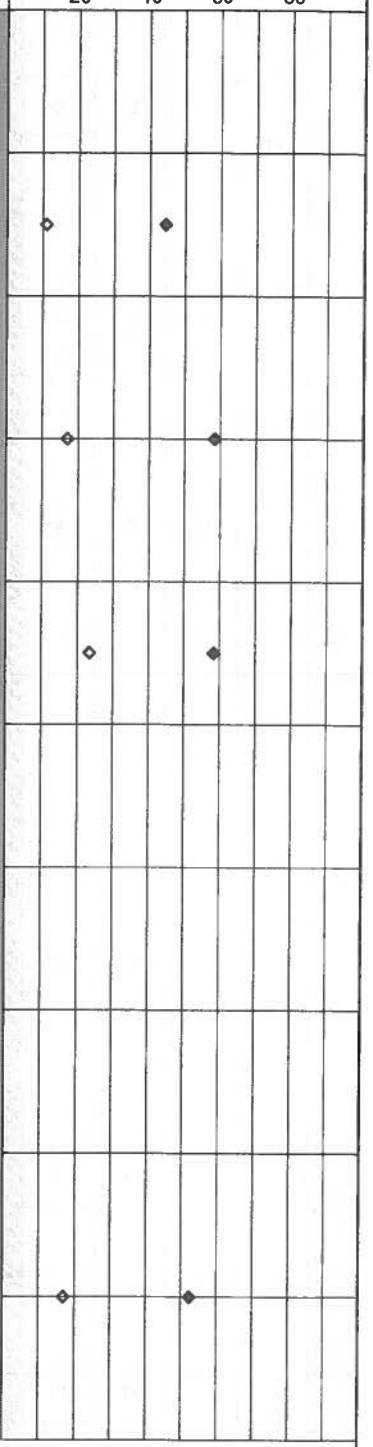
REMOLD ◇ □ △P.PEN/2

★ % FINES ● SPT N

W_P% W% W_L%

× - - - - o - - - - ×

20 40 60 80



Klohn Crippen Berger

PROJECT NO.: M09559A06

PROJECT: Rainy River Mine Waste and Geotech.

LOCATION: Richardson Township, Ontario

LOGGED BY: ARD **CHECKED BY:**

SHEET 1 **OF** 4 **HOLE NO.:** BH10-10

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 29, 2010 **FINISHED:** May, 30, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 350.50
COORDINATES (m): N 5410003 E 425995

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	DESCRIPTION OF MATERIALS
				10.20 **SILTY CLAY (CH)** high plasticity, some fine sand, grey
				340.30 **SILTY SAND (SM)** fine, moist, grey, silt is low plasticity, with some gravels, sub-angular, maximum particle size 1 cm
		D	6	
11				
12	8,9,10	D	7	
13				
				13.50
	5,4,6,8	D	8	337.00 **SILTY CLAY (CH)** high plasticity, grey moist, some fine to coarse sand and gravel, sub-angular
14				
15				with some silt
16				
		D	10	attempted undisturbed sample - no return
17				
18		U	2	
19				
		D	11	
20				

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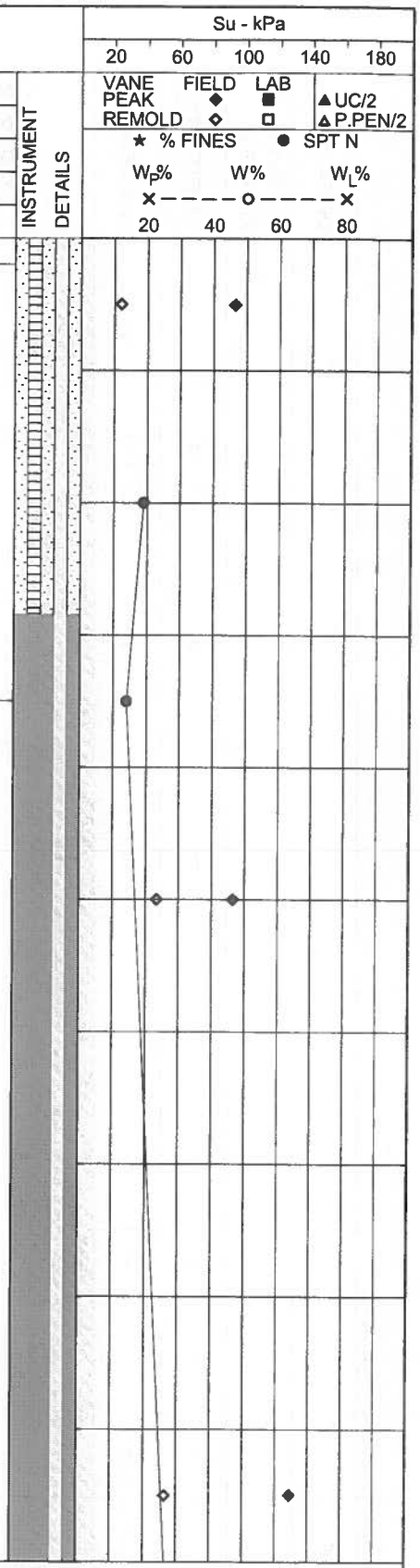


Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 4 **HOLE NO.:** BH10-10

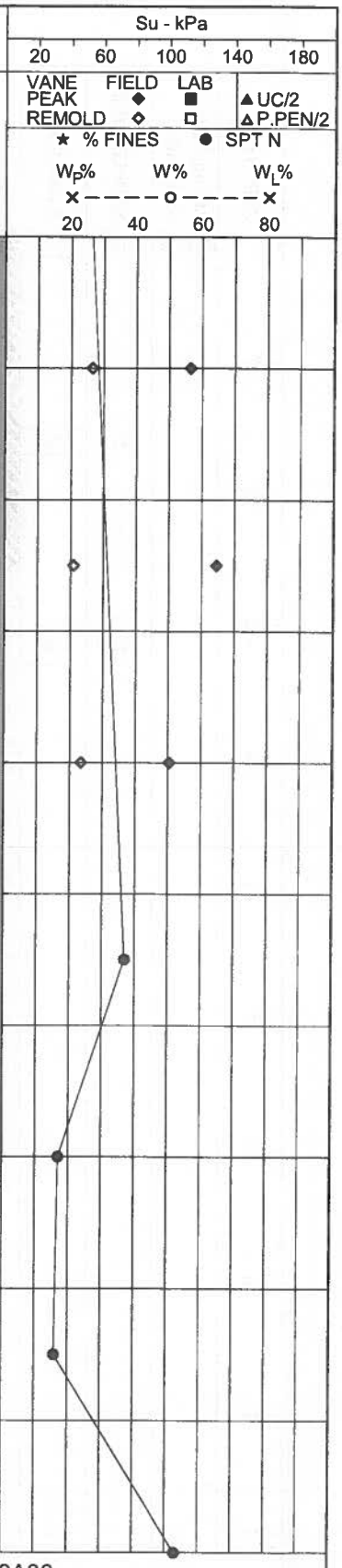
KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 29, 2010 **FINISHED:** May, 30, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 350.50
COORDINATES (m): N 5410003 E 425995

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	DESCRIPTION OF MATERIALS
				SILTY CLAY (CH) high plasticity, grey moist, some fine to coarse sand and gravel, sub-angular
21		D	12	
22				
23				
24		D	13	
25				
25.30 / 325.20				**SILTY SAND (SM)** fine, grey, moist
	8,14,23	D	14	
26				
27	8,7,8,9	D	15	with some high plasticity clay and some gravels, sub-angular
28				
28.30 / 322.20				**SILTY CLAY(CH)** high plasticity, grey, moist, with some fine to coarse sand and fine gravel
	5,7,7,9	D	16	
29				
30				

INSTRUMENT DETAILS



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Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 3 **OF** 4 **HOLE NO.:** BH10-10

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: May 29, 2010 **FINISHED:** May, 30, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 350.50
COORDINATES (m): N 5410003 E 425995

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× - - - - o - - - - × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
	18,22,31	D	17		**SILTY CLAY(CH)** high plasticity, grey, moist, with some fine to coarse sand and fine gravel. Driller reported increased resistance	
31						
		D	18			
32						
					32.60 / 317.90 **GRAVELLY SILT (ML)** low plasticity, grey,, gravel is angular, maximum particle size 2.5 cm with some fine sand	
33		D	19			
34					34.10 / 316.40	
					End of Hole at 34.10 m Refusal on bedrock or boulders	
35						
36						
37						
38						
39						
40						

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 4 **OF** 4 **HOLE NO.:** BH10-10

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 1, 2010 **FINISHED:** June 2, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.00
COORDINATES (m): N 5409864 E 424735

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plastcity, moist, brown sand fine to course sand, sub-angular, some fine gravel, sub-angular	
1		D	1			
2						
3		D	2		becoming grey	
4					4.20 / 344.80 **SILTY CLAY (CH)** high plasticity, grey, moist, some fine sand	
		D	3			
5						
6		D	4			
7						
		D	5			
8						
9		U	1			
10						

Su - kPa: 20, 60, 100, 140, 180

VANE FIELD LAB
PEAK ◆ ■ ▲UC/2
REMOLD ◇ □ △P.PEN/2
★ % FINES ● SPT N

W_P% W% W_L%
20 40 60 80

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Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 4 **HOLE NO.:** BH10-11

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 1, 2010 **FINISHED:** June 2, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.00
COORDINATES (m): N 5409864 E 424735

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT	DETAILS
					SILTY CLAY (CH) high plasticity, grey, moist, some fine sand		
		D	6				
11							
12		D	7				
13							
		D	8				
14							
15		D	9				
16							
		D	10				
17							
18							
19							
		D	11				
20							

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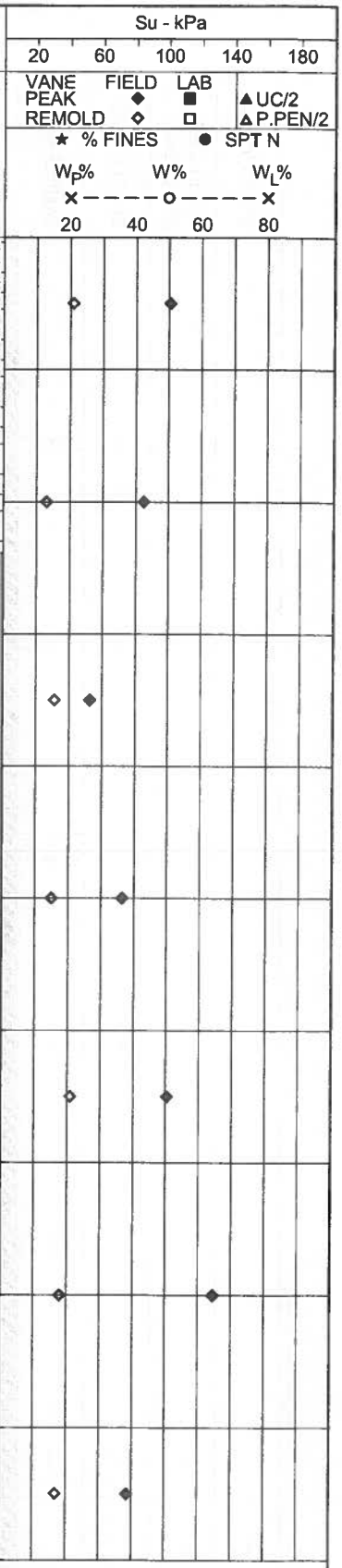

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 4 **HOLE NO.:** BH10-11

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 1, 2010 **FINISHED:** June 2, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.00
COORDINATES (m): N 5409864 E 424735

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, grey, moist, some fine sand	
21		U	2			
22		D	12			
23						
24		D	13			
25		D	14			
26					26.70 / 322.30 **SILTY SAND (SM)** fine, grey, wet, silt is non plastic, grey, wet	
27		D	15			
28					28.10 / 320.90 **SAND AND GRAVEL (SW/GW)** sand is fine to coarse, subangular, gravel is fine, angular, some non plastic silt	
29		D	16			
30						

Continued Next Page

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 3 **OF** 4 **HOLE NO.:** BH10-11

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 1, 2010 **FINISHED:** June 2, 2010

DRILL METHOD: Washbore

GROUND ELEV. (m): 349.00

COORDINATES (m): N 5409864 E 424735

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					30.17 / 318.83 **SAND AND GRAVEL (SW/GW)** sand is fine to coarse, subangular, gravel is fine, angular, some non plastic silt	
					End of Hole at 30.17 m	
					Refusal on boulder or bedrock	
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

Su - kPa: 20 60 100 140 180

VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2

★ % FINES ● SPT N

W_P% W% W_L%
× - - - - o - - - - ×
20 40 60 80

Klohn Crippen Berger

PROJECT NO.: M09559A06

PROJECT: Rainy River Mine Waste and Geotech.

LOCATION: Richardson Township, Ontario

LOGGED BY: ARD **CHECKED BY:**

SHEET 4 **OF** 4 **HOLE NO.:** BH10-11

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 2, 2010 **FINISHED:** June 3, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 351.50
COORDINATES (m): N 5410568 E 424015

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT	DETAILS
					SILTY CLAY (CH) brown, high plasticity, some gravel, maximum particle size 1 cm, sub-angular		
1		D	1				
2							
3		D	2				
4					becoming grey		
		D	3				
5							
6		D	4				
7							
		D	5				
8							
9		D	6				
10							

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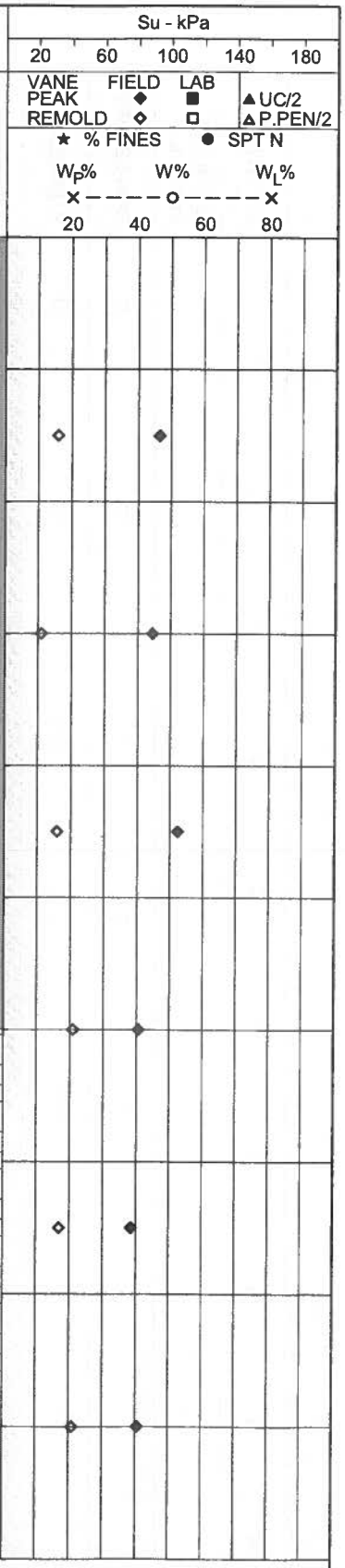

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 3 **HOLE NO.:** BH10-12

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 2, 2010 **FINISHED:** June 3, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 351.50
COORDINATES (m): N 5410568 E 424015

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
		D	7		**SILTY CLAY (CH)** grey, high plasticity, some gravel, maximum particle size 1 cm, sub-angular	
11						
12		D	8			
13						
		D	9			
14						
15		D	10			
16						
		D	11		16.60 / 334.90 **SILTY SAND (SM)** fine, grey, wet, silt is non plastic	
17						
18					18.00 / 333.50 **BEDROCK**	
19						
20						

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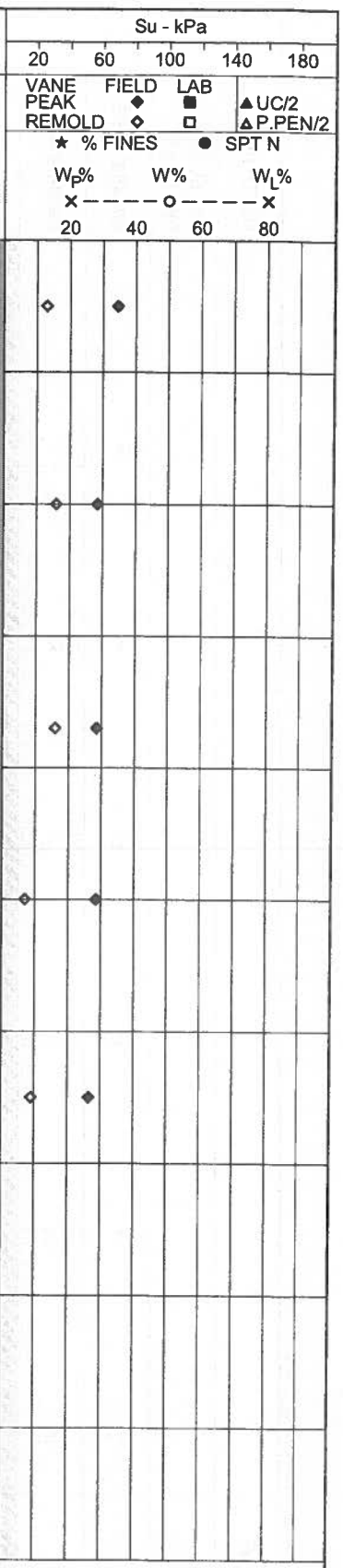

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 3 **HOLE NO.:** BH10-12

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 2, 2010 **FINISHED:** June 3, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 351.50
COORDINATES (m): N 5410568 E 424015

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ ■ ▲UC/2
REMOLD ◇ □ △P.PEN/2
FIELD LAB
★ % FINES ● SPT N
W_P% W% W_L%
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					BEDROCK	
21						
22						
					22.70 / 328.80	
23					End of Hole at 22.70 m Bedrock at 18.5 m 1 inch PVC at 19.5 m	
24						
25						
26						
27						
28						
29						
30						

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 3 **OF** 3 **HOLE NO.:** BH10-12

TEST HOLE LOG

STARTED: June 3, 2010 **FINISHED:** June 4, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.50
COORDINATES (m): N 5409311 E 425433

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× - - - - o - - - - ×
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, brown, some fine sand, moist	
1						
		D	1			
2						
3		D	2		becoming grey	
4						
		D	3			
5						
6		D	4		artesian conditions encountered	
7						
		D	5			
8						
9		D	6			
10						

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Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 2 **HOLE NO.:** BH10-13

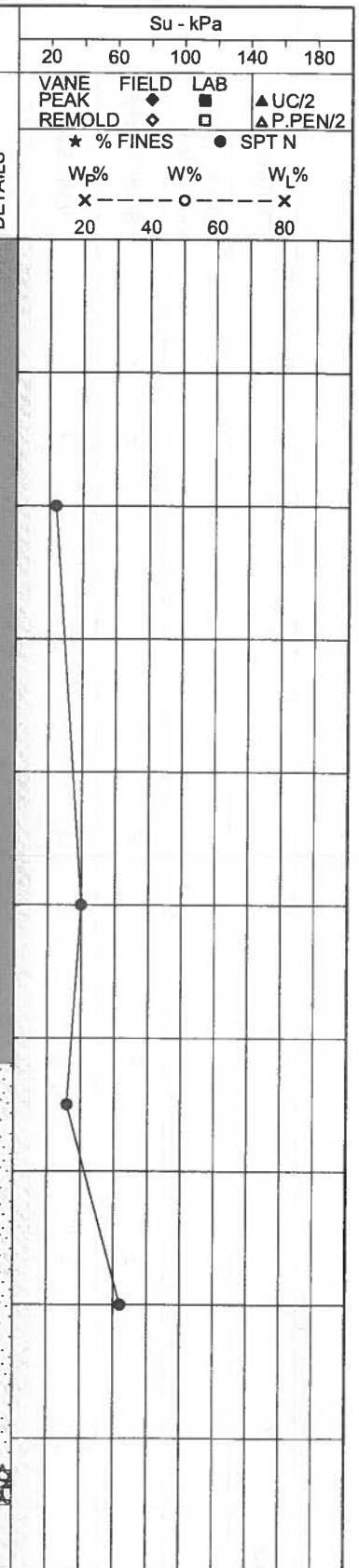
KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 3, 2010 **FINISHED:** June 4, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.50
COORDINATES (m): N 5409311 E 425433

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS
					SILTY CLAY (CH) high plasticity, grey, some fine sand, moist
		D	7		increasing fine sand, some gravels, sub-angular
11					
12	6,6,5,7	D	8		
13					13.00 / 336.50 **SILTY SAND (SM)** fine, grey, wet
		D	9		13.60 / 335.90 **SANDY GRAVEL (GP)** poorly graded, fine, sand is fine to coarse, with some silt
14					
15	8,8,9,11	D	10		increasing silt content
16					
	7,7,9,7	D	11		16.80 / 332.70 **SILTY CLAY (CH)** high plasticity, grey, moist
17					
18	13,17,14,18	D	12		17.80 / 331.70 **SAND (SW)** fine to coarse, moist, sub-angular, some gravel, angular, maximum aprticle size 2 cm, some silt, low plasticity, grey Clay lens at 18.3 - 18.35 m, high plasticity, grey
19					
20					19.50 / 330.00 End of Hole at 19.50 m

INSTRUMENT DETAILS



Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 2 **HOLE NO.:** BH10-13

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 5, 2010 **FINISHED:** June 5, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 347.00
COORDINATES (m): N 5408924 E 425168

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲UC/2
REMOLD ◇ □ △P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT	DETAILS
					SILTY CLAY (CH) high plasticity, moist, brown, sand is fine to coarse, angular, brown, some non plastic silt, brown		
1							
		D	1				
2							
3		D	2		becoming grey with some coarse gravel, subangular		
4							
		D	3		decreasing sand and gravel content		
5							
6		D	4				
7							
		U	1				
8							
9		D	5				
10							

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Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 3 **HOLE NO.:** BH10-14

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 5, 2010 **FINISHED:** June 5, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 347.00
COORDINATES (m): N 5408924 E 425168

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲UC/2
REMOLD ◇ □ △P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
		D	6		**SILTY CLAY (CH)** high plasticity, moist, brown, sand is fine to coarse, angular, brown, some non plastic silt, brown	
11						
12		D	7			
13						
		D	8			
14						
15		D	9			
16						
		D	10			
17						
17.80 / 329.20					**SANDY GRAVEL (GW)** fine to coarse gravel, sub-angular, maximum particle size 3 cm, sand is fine to coarse, sub-angular	
18	9,5,17,16	D	11			
19						
20	10,15,18,22	D	12			

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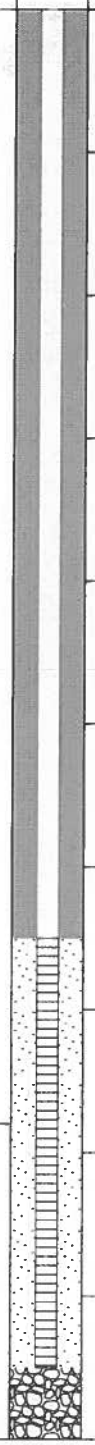
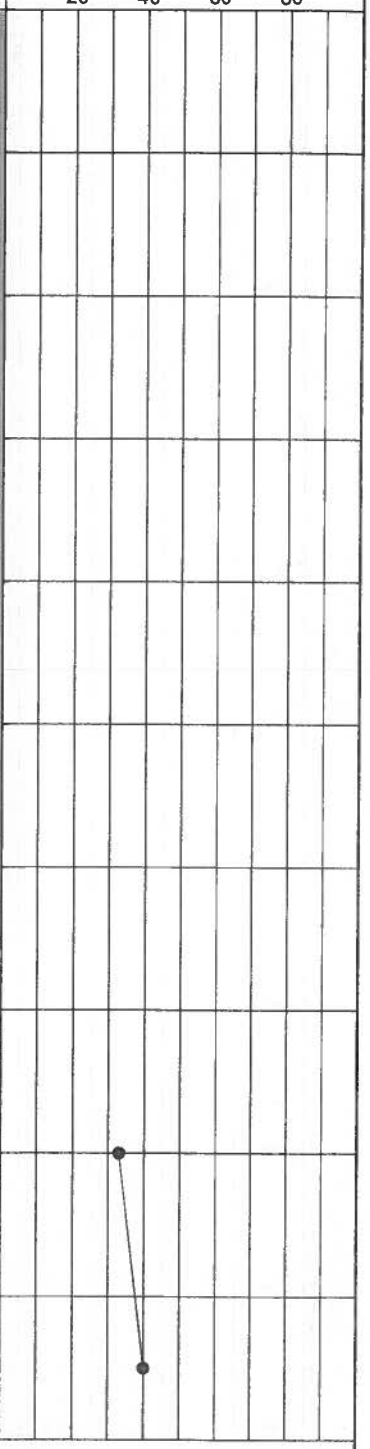




Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 3 **HOLE NO.:** BH10-14

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 5, 2010 **FINISHED:** June 5, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 347.00
COORDINATES (m): N 5408924 E 425168

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SANDY GRAVEL (GW) fine to coarse gravel, sub-angular, maximum particle size 3 cm, sand is fine to coarse, sub-angular (20.40 / 326.60)	
					End of Hole at 20.40 m Refusal on bedrock or boulders	

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
× – – – – o – – – – × 20 40 60 80

21 22 23 24 25 26 27 28 29 30

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 3 **OF** 3 **HOLE NO.:** BH10-14

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

TEST HOLE LOG

STARTED: June 6, 2010 **FINISHED:** June 7, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.50
COORDINATES (m): N 5409401 E 425244

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB ▲UC/2
REMOLD ◇ □ △P.PEN/2
★ % FINES ● SPT N
W_P% W% W_L%
20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
					SILTY CLAY (CH) high plasticity, brown, some fine sand	
1						
		D	1			
2						
3					becoming grey	
		D	2			
4						
		D	3			
5						
6						
		D	4			
7						
		D	5			
8						
9	4,4,3,1	D	6		sand in return water	
10						

Continued Next Page

Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 1 **OF** 2 **HOLE NO.:** BH10-15

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

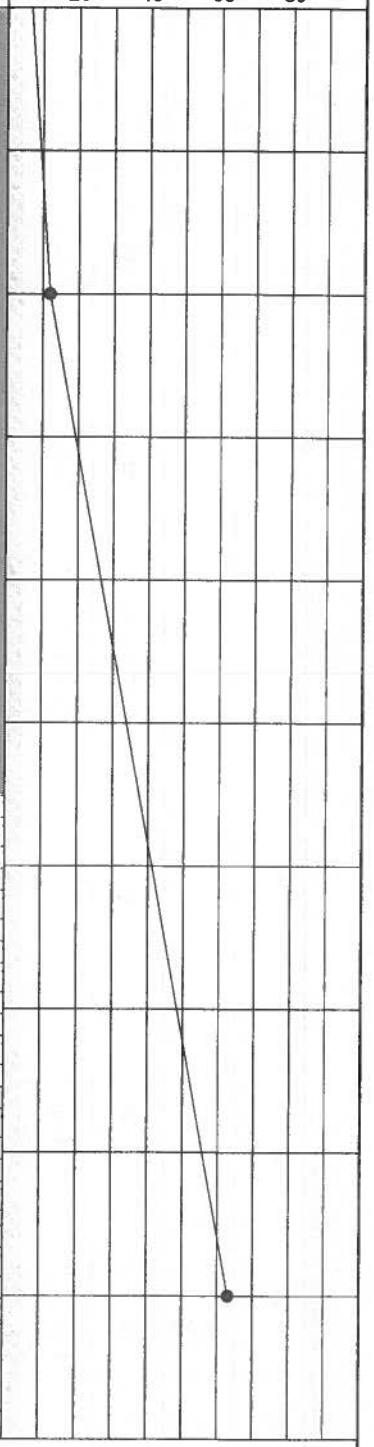
TEST HOLE LOG

STARTED: June 6, 2010 **FINISHED:** June 7, 2010
DRILL METHOD: Washbore
GROUND ELEV. (m): 349.50
COORDINATES (m): N 5409401 E 425244

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	DESCRIPTION OF MATERIALS
		D	7	**SILTY CLAY (CH)** high plasticity, brown, some fine sand
10.80				
338.70				**SAND** fine to coarse, some silt, wet
11.30				
338.20				**SILTY CLAY (CH)** high plasticity, grey, some fine sand
12	6,5,6,6	D	8	
13		D	9	
14				
15		D	10	
16		D	11	
17				
17.90				
331.60				**SANDY SILT (ML)** low plasticity, grey, sand is fine to coarse, well graded
18		D	12	
19	34,29	D	13	
19.20				
330.30				
				End of Hole at 19.20 m
				Refusal on bedrock or boulders
20				

SYMBOL | INSTRUMENT DETAILS

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ ▲UC/2
FIELD REMOLD ◇ ▲P.PEN/2
LAB ■ □
★ % FINES ● SPT N
W_P% W% W_L%
20 40 60 80



Klohn Crippen Berger

PROJECT NO.: M09559A06
PROJECT: Rainy River Mine Waste and Geotech.
LOCATION: Richardson Township, Ontario
LOGGED BY: ARD **CHECKED BY:**
SHEET 2 **OF** 2 **HOLE NO.:** BH10-15

KCBL_TEST_HOLE-SI M09559A06 DRILLHOLE LOGS.GPJ KC_DATA.GDT 19/10/10

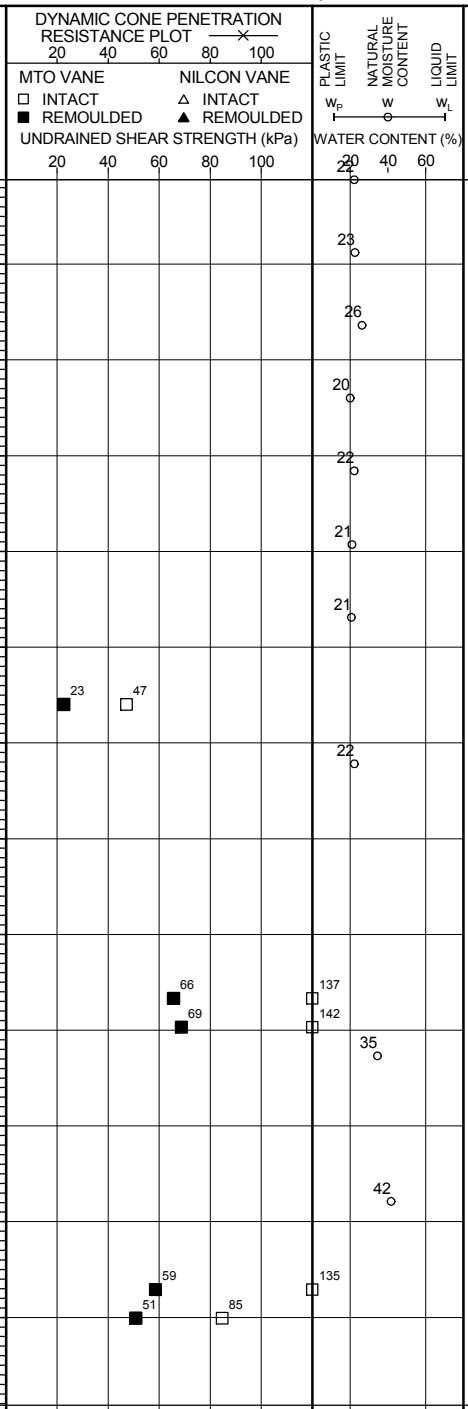
RECORD OF BOREHOLE No. BBAF-BH-2004

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	SM
ELEVATION	368.882 m	COORD.	N 5,410,565 E 426,971	BORING DATE	Start: Apr 17, 12 End: Apr 18, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
368.9	Ground surface					
368.8 / 0.1	**TOPSOIL**					
	Silty CLAY Light brown silty clay, trace sand, firm to stiff, low plasticity, moist, trace rootlets [Upper Glaciolacustrine]	1	SS		6	
		2	SS	71	10	
	...at 1.5m clayey silt, some sand, trace oxidation, no to low plasticity	3	SS	79	14	
	...at 2.6m occasional grey silty sand layers, trace clay, trace fine gravel, stiff to very stiff, moist to wet	4	SS	75	19	
		5	SS	79	14	
364.3		6	SS	88	8	
4.6	**SILTY CLAY** Grey silty clay, trace fine gravel, trace silt lenses, firm to stiff, medium plasticity, moist [WML Till]	8	SS	92	8	
		9	SS	92	9	
		12	TW			
		13	SS	100	8	
356.1		16	SS	100	13	
12.8	**End of Borehole** at 12.8m Standpipe installed with flush mounted steel casing. Water Level at 1.8m on April18/2012					



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BBAF-BH-2009

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	SM
ELEVATION	378.292 m	COORD.	N 5,410,976 E 427,029	BORING DATE	Start: Apr 15, 12 End: Apr 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
378.3	Ground surface					
378.2 / 0.1	**TOPSOIL**					
0.4	**Silty CLAY** Brown silty clay, trace to some sand, firm to stiff, medium plasticity, moist, trace rootlets, trace oxidised pockets [Upper Glaciolacustrine]	1	SS	50	5	
		2	SS	79	11	
376.5 / 1.8	**SILTY CLAY** Dark brown silty clay, trace fine gravel, trace silty pockets, very stiff, medium plasticity, moist [WML Till]	3A&B	SS	83	17	
		4	SS	87	17	
375.1 / 3.2	**SILTY CLAY** Brown silty clay, some sand and gravel, sand lensing, hard, low plasticity, moist	5	SS	92	44	
373.7 / 4.6	**Sandy TILL** Inferred sandy Till [WS TILL] ...from 5.2m to 6.7m - boulders	6	SS	0	39	
		7	RC			
371.6 / 6.7	**BEDROCK** Bluish grey rock, fractured	8	RC	100	27	
		9	RC	100		
	...at 9.8m slightly fractured	10	RC	100	92	
367.0 / 11.3	**End of Borehole** at 11.3m Stand pipe installed with 1.0m stick up Water Level (b.g.s): at 1.8m on April17/12					

WELL / PIEZOMETER INSTALLATION

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

RECORD OF BOREHOLE No. BBAF-BH-2010

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	SM
ELEVATION	377.417 m	COORD.	N 5,411,078 E 426,970	BORING DATE	Start: Apr 14, 12 End: Apr 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
377.4	Ground surface							
377.4 / 0.1	**TOPSOIL** Dark brown topsoil	1	SS	63	5		377	
	Silty CLAY Brown silty clay, trace gravel, some oxidation, firm to stiff, low to medium plasticity, moist, trace rootlets [Upper Glaciolacustrine]	2	SS	79	16	1	376	
375.9 / 1.5	**SAND AND GRAVEL** Grey sand and gravel, very dense, well graded, damp [WS Till]	3	SS	52	101	2		
375.3 / 2.1	**Bedrock**	4	RC	97	48	3	375	
						4	374	
		5	RC	90	63	5	373	
		6	RC	100	52	6	372	
							371	
370.2		7	RC	100	0	7		
7.2	**End of Borehole** at 7.18m Standpipe installed with 0.5m stick-up Water level (b.g.s): at 1.25m on April 14/12							

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

RECORD OF BOREHOLE No. BBAF-BH-2012

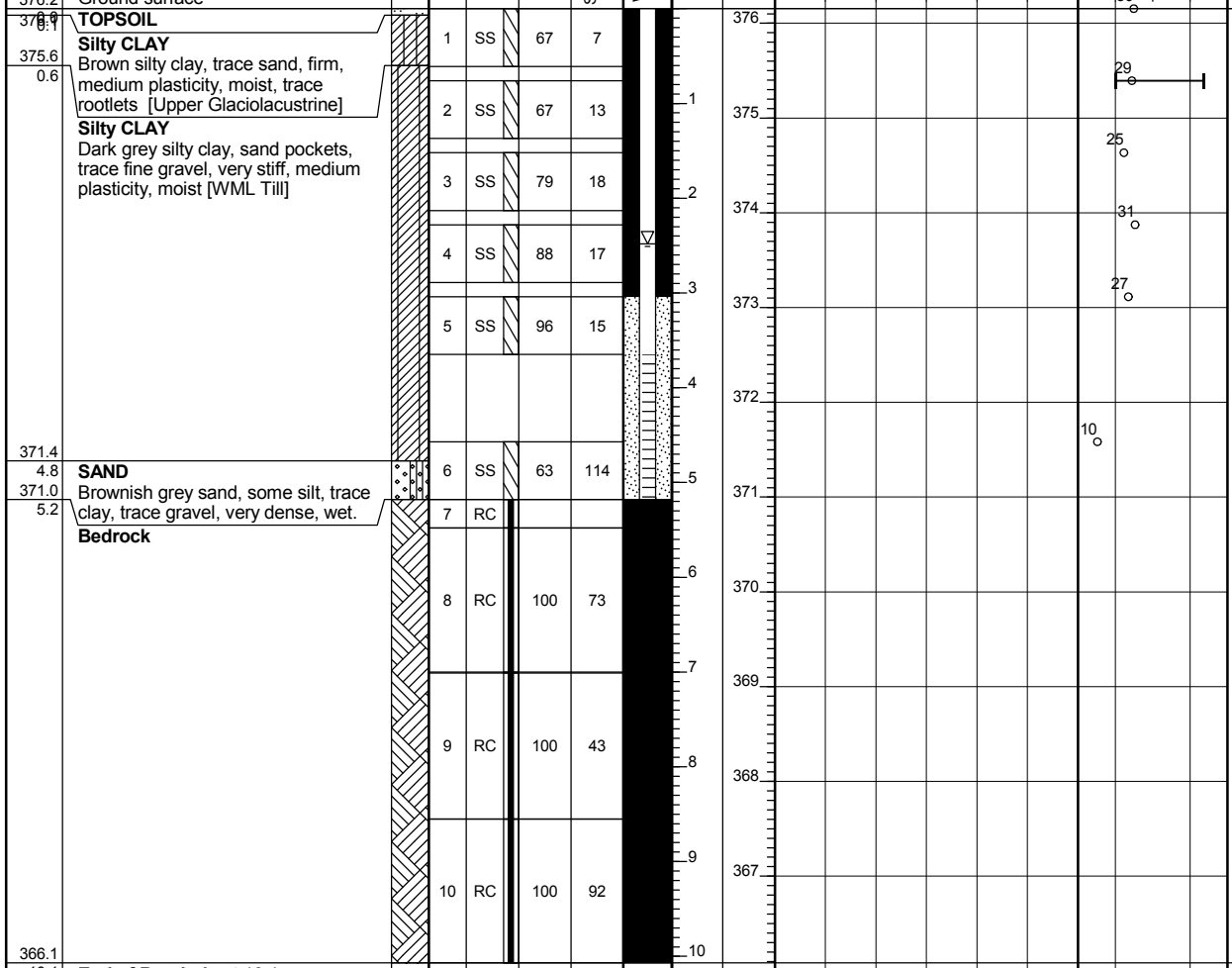
PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	SM
ELEVATION	376.154 m	COORD.	N 5,411,172 E 426,823	BORING DATE	Start: Apr 13, 12 End: Apr 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
376.2	Ground surface					
376.0 / 0.1	**TOPSOIL**					
375.6 / 0.6	**Silty CLAY** Brown silty clay, trace sand, firm, medium plasticity, moist, trace rootlets [Upper Glaciolacustrine]	1	SS	67	7	
	Silty CLAY Dark grey silty clay, sand pockets, trace fine gravel, very stiff, medium plasticity, moist [WML Till]	2	SS	67	13	
		3	SS	79	18	
		4	SS	88	17	
		5	SS	96	15	
371.4 / 4.8	**SAND** Brownish grey sand, some silt, trace clay, trace gravel, very dense, wet.	6	SS	63	114	
371.0 / 5.2	**Bedrock**	7	RC			
		8	RC	100	73	
		9	RC	100	43	
		10	RC	100	92	
366.1 / 10.1	**End of Borehole** at 10.1m Stand pipe installed with 1.3m stick up Water level (b.g.s): at 4.92m on April 21/12					

SOIL PROFILE | SAMPLES | STRAT PLOT | WELL / PIEZOMETER INSTALLATION | DEPTH (m) | ELEVATION (m) | DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) | MTO VANE: INTACT □, REMOULDED ■ | NILCON VANE: INTACT △, REMOULDED ▲ | UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100) | PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L | WATER CONTENT (%) (20 40 60) | PERMEABILITY (cm/s)



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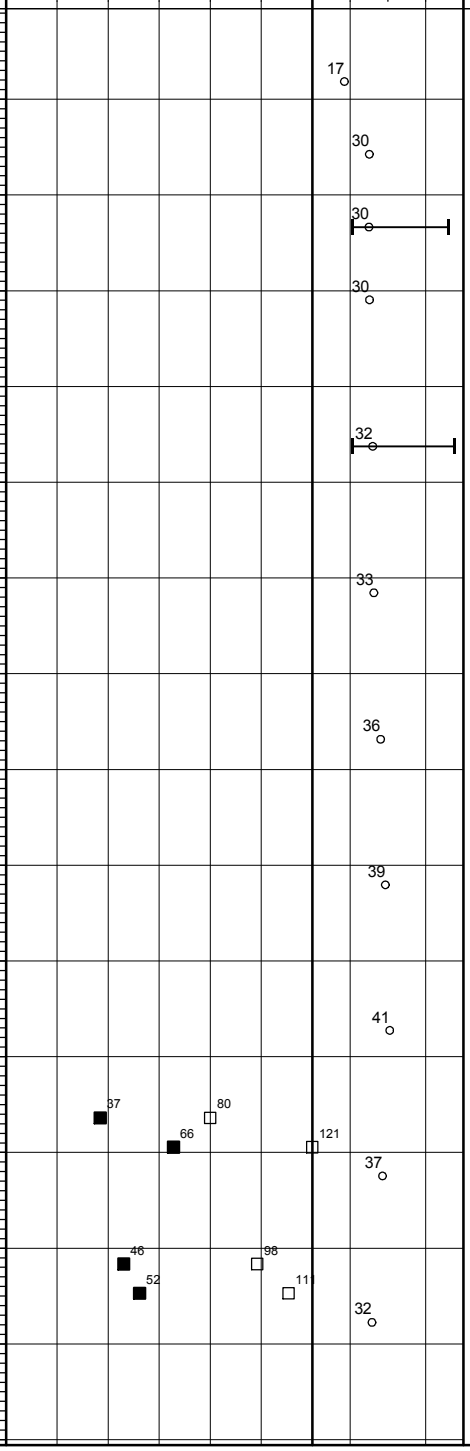
RECORD OF BOREHOLE No. BH11-01

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	362.945 m	COORD.	N 5,413,209 E 420,171	BORING DATE	Start: Apr 12, 12 End: Apr 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
362.9	Ground surface					
0.0	**Silty CLAY** Light Brown silty clay, trace to some sand, trace gravel, low to medium plasticity, stiff, moist [Upper Glaciolacustrine]	2	SS	67	9	
		3	SS		12	
		4	SS	100	12	
359.9						
3.0	**Silty CLAY** Dark brown silty clay, trace gravel, medium plasticity, stiff, moist [WML Till]	5	SS	100	11	
		8	SS	100	11	
		11	SS	100	10	
	...becoming firm at 7.6m	14	SS	100	8	
		17	SS	100	8	
		18	SS	100	7	
		21	SS	100	6	
348.9		24	SS	100	8	
14.0 / 348.6	**SILTY CLAY** Dark grey silty clay, varved, low plastic, firm, moist [Lower Glaciolacustrine]	25	RC	95	63	
14.3						



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-01

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	362.945 m	COORD.	N 5,413,209 E 420,171	BORING DATE	Start: Apr 12, 12 End: Apr 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	BEDROCK							16	347				
			26	RC	100	88		17	346				
			27	RC	100	80		18	345				
344.7 / 18.2	**End of Borehole** at 18.2m Standpipes installed with flush mounted steel casing Water level (b.g.s): For Piezometer A (bottom sensing zone) at 0.3m on April 13/12 For Piezometer B (top sensing zone) at surface on April 13/12												

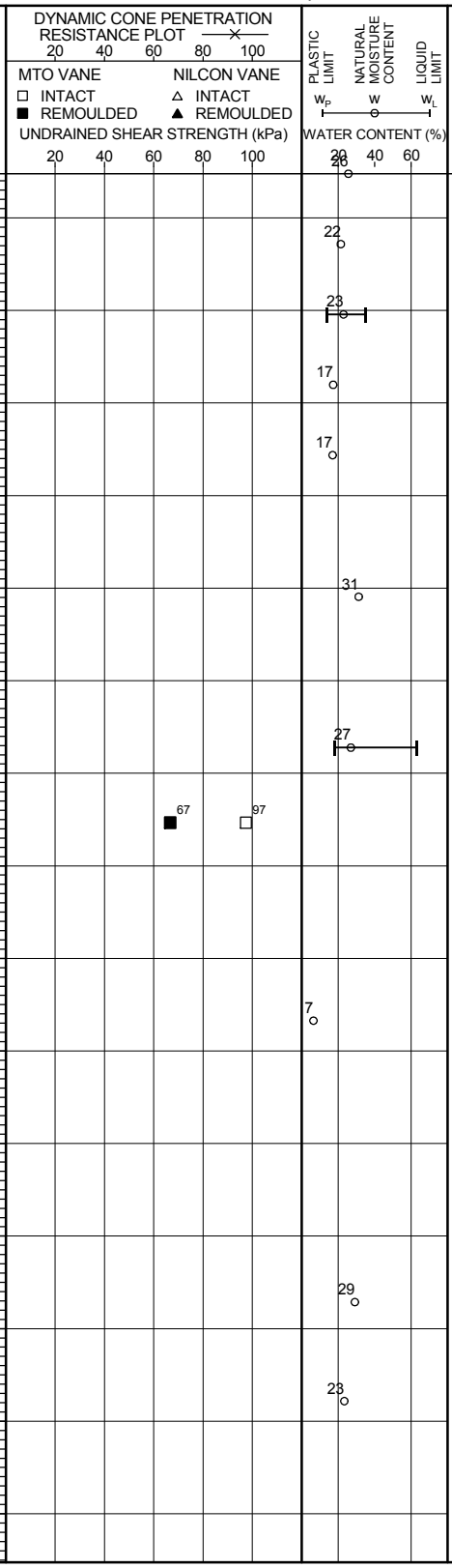
RECORD OF BOREHOLE No. BH11-04

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	365.477 m	COORD.	N 5,411,832 E 421,970	BORING DATE	Start: Mar 20, 12 End: Mar 20, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
365.5	Ground surface					
365.3 / 0.2	**TOPSOIL** Dark brown organics, fibrous, rootlets	1	SS	63	4	
	CLAYEY SILT Light Brown to brown clayey silt, some sand and gravel, varved, low to medium plasticity, stiff, damp to moist [Upper Glaciolacustrine] ...at 0.76 m becoming sandy , grey clay lenses ...at 2.3m , trace mottled brown lenses	2	SS	63	10	
		3	SS	100	10	
		4	SS	100	10	
		5	SS	100	11	
360.9 / 4.6	**Silty CLAY** Dark grey silty clay, trace sand, high plasticity, firm, moist [WML Till]	6	SS	100	8	
		8	SS	92	8	
357.9 / 7.6	**SILTY CLAY** Greenish grey silty clay , varved [Lower Glaciolacustrine]	11	TW	91		...at 6.4m PP=49-61 kPa TV=20 KPa
356.3 / 9.1	**SAND & GRAVEL** Greenish grey sand and gravel, silty, angular to subangular (black, grey and brown, granite pebbles), dense, wet	13	SS	63	39	...at 9.1 m switched to washboring
		14	SS	0	67	
	...below 12.2m greenish silt, trace gravel, no plasticity, firm, moist	15	SS	54	15	
352.1 / 13.4	**BEDROCK** Greenish grey , highly fractured and weathered	16	SS	58	50/0.15	
		17	RC	35	44	...at 13.7 m switched to NQ coring



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RECORD OF BOREHOLE No. BH11-04

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	365.477 m	COORD.	N 5,411,832 E 421,970	BORING DATE	Start: Mar 20, 12 End: Mar 20, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	... very mushy bellow 14.7 m, possible infill		18	RC	60	0			350				
349.2								16					
16.2	**End of Borehole** at 16.2 m Standpipe installed with flush mounted steel casing Water level (b.g.s): at 0.48 m on Mar 20/12												

RECORD OF BOREHOLE No. BH11-08

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	356.564 m	COORD.	N 5,411,863 E 423,205	BORING DATE	Start: Dec 13, 11 End: Dec 16, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	WATER CONTENT (%)	REMARKS
356.6	Ground Surface							
356.4 / 0.2	**TOPSOIL**							
356.0 / 0.6	**SILTY CLAY** Light Brown silty clay, trace sand, low plastic, rootlets [Upper Glaciolacustrine]	1	SS	75	7	356	16	...frozen to 0.6m
	SILTY CLAY Light brown silty clay, trace to some silt, trace sand, trace gravel, firm to stiff, medium to low plastic, moist [WML Till]	2	SS	67	9	355	17	
		3	SS	100	8	354	19	
	...at 2.3m becoming dark brown	4	SS	71	11	353	32	
		5	SS	75	9	352	35	
	...below 4.57m dark grey	6	SS	100	7	351	32	
		7	TW	92		350		...at 6.4m PP=73 kPa TV=49 KPa
		8	SS	100	7	349	40	...at 7.63m , switched to wash boring
		9	SS	100	8	347	36	
		10	SS	100	8	346	39	
		11	SS	100	9	344	37	
		12	SS	100	7	343	38	

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RECORD OF BOREHOLE No. BH11-08

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	356.564 m	COORD.	N 5,411,863 E 423,205	BORING DATE	Start: Dec 13, 11 End: Dec 16, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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WS Wash Sample

ABBREVIATIONS
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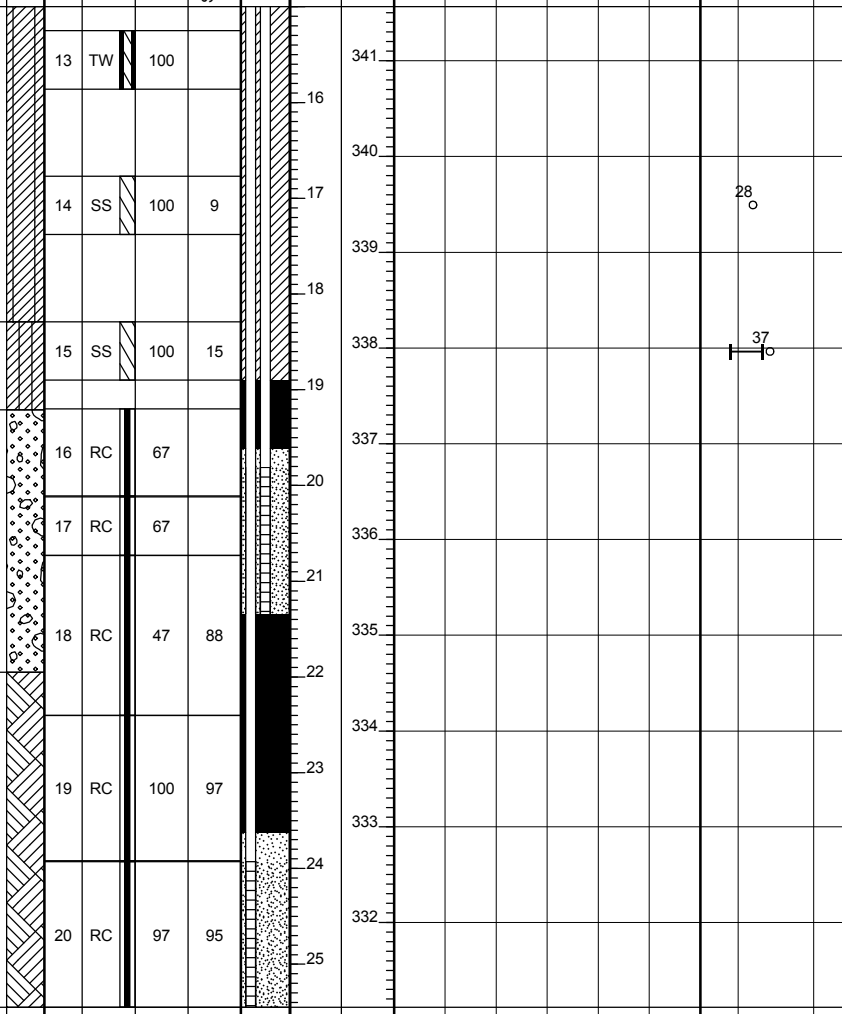
ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
		13	TW	100		...at 15.25m TV=78 kPa PP=98 kPa
	...At 16.77m , sandy lenses/laminate	14	SS	100	9	
338.3 / 18.3	**Varved SILTY CLAY** Grey silty clay , moist to wet, varved, medium plastic, very stiff [Lower Glaciolacustrine]	15	SS	100	15	GS on SS15
337.4 / 19.2	**Gravelly SAND** Sand boulders, some cobbles in silty sand, very wet [WS Till, inferred]	16	RC	67		...switched to NQ coring at 19.2m
		17	RC	67		
334.6 / 22.0	**BEDROCK**	18	RC	47	88	
		19	RC	100	97	
331.1 / 25.5	**End of Borehole** at 25.5m	20	RC	97	95	

Standpipes installed with flush mounted steel casing

Water level (b.g.s):
For Piezometer A (bottom sensing zone) at surface on Dec 16/11
For Piezometer B (middle sensing zone) Artesian condition on Dec 16/11
For Piezometer C (top sensing zone) 3.05 m on Dec 16/11



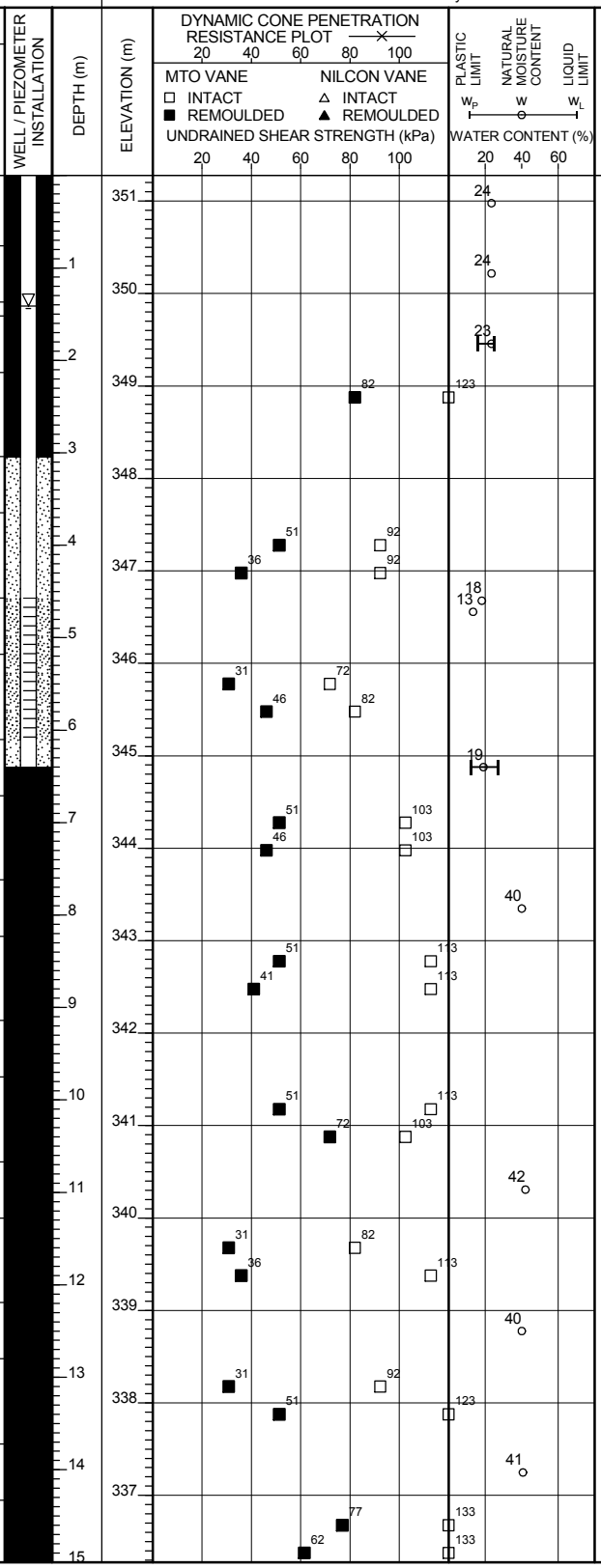
RECORD OF BOREHOLE No. BH11-09

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	351.277 m	COORD.	N 5,411,182 E 424,201	BORING DATE	Start: Dec 10, 11 End: Dec 11, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
351.3	Ground Surface					
0.0	**TOP SOIL** Dark brown silty clay, trace muskeg, rootlets, plastic, firm	1	AU			
350.5						
0.8	**SILTY CLAY** Light brown silty clay (grey clay in lenses), low to medium plasticity, firm to stiff, moist [Upper Glaciolacustrine] ...at 1.52m becoming firm, trace clay	2	SS	79	10	...frozen to 1.4m
		3	SS	100	6	
348.2						
3.0	**SILTY CLAY** Dark grey silty clay, trace sand and gravel, firm to stiff, medium to high plasticity, moist [WML Till]	6	TW	63		...at 3.35m PP=61 KPa TV=49 KPa
	...Sand and Gravel layer between 4.64m to 4.8m	8 A&B)	SS	100	5	
		9	SS	100	5	
		12	SS	100	5	
		15	TW	88		...at 9.45m PP=61 KPa TV=69 KPa
		18	SS	100	6	
		20	SS	100	6	
		23	SS	100	5	



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RECORD OF BOREHOLE No. BH11-09

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	351.277 m	COORD.	N 5,411,182 E 424,201	BORING DATE	Start: Dec 10, 11 End: Dec 11, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
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ABBREVIATIONS
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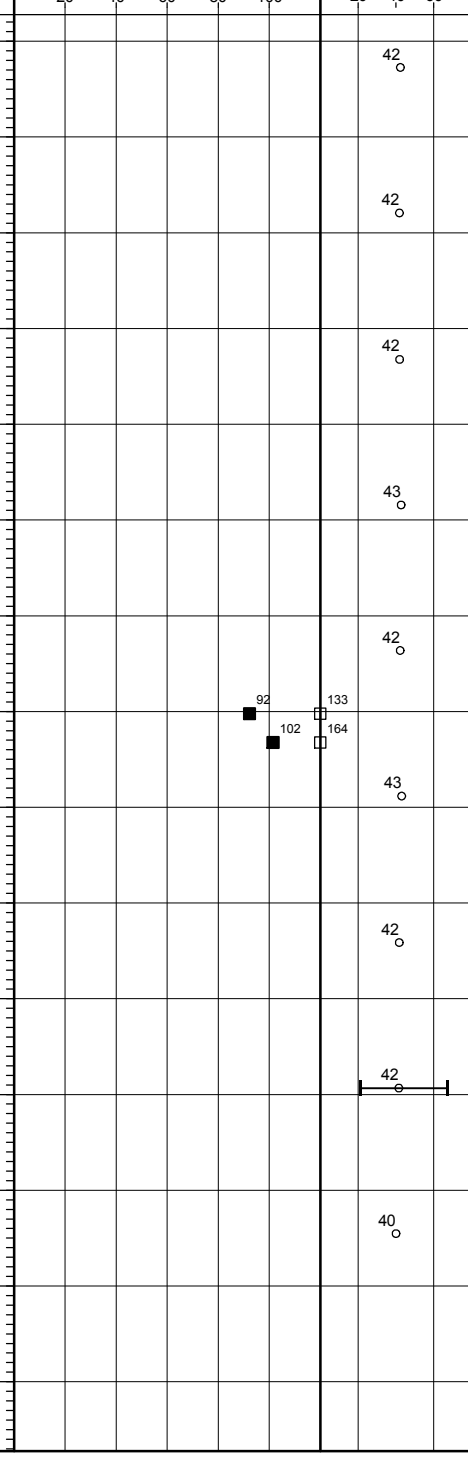
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
		26	SS	100			336	
						16	335	
		27	SS	100	6	17	334	
						18	333	
	...at 18.3m small brown sandy pockets	28	SS	100	8			
						19	332	
	...at 19.8m small silty pockets	30	SS	100	9	20	331	
						21	330	
		31	SS	100	11			
						22	329	
		34	SS	100	12	23	328	
						24	327	
	..at 24.4m trace to some gravel, angular to subangular	35	SS	100	12			
						25	326	
		36	SS	100	15	26	325	
						27	324	
		37	SS	100	15			
						28	323	
322.2 / 29.1	... at 29m becoming firm, low to medium plastic, some gravel	38 (A&B)	RC	67		29	322	...at 29m, switched to NQ coring.
	GRAVELLY SAND Greyish blue boulders and gravel,					30		

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%) 20 40 60



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-09

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	351.277 m	COORD.	N 5,411,182 E 424,201	BORING DATE	Start: Dec 10, 11 End: Dec 11, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	trace clay and sand, angular to subangular [WS Till, inferred]		39	RC	92				321					...at 30.17m, encountered artesian pressure up to 2.85m above ground level
			40	RC				31	320					
319.6														
31.7	**End of Borehole** at 31.7m Standpipe installed with 0.9m stick up Water Level (bgs): at 2.23m on Dec 13/12 at 1.36m on Dec 18/12													

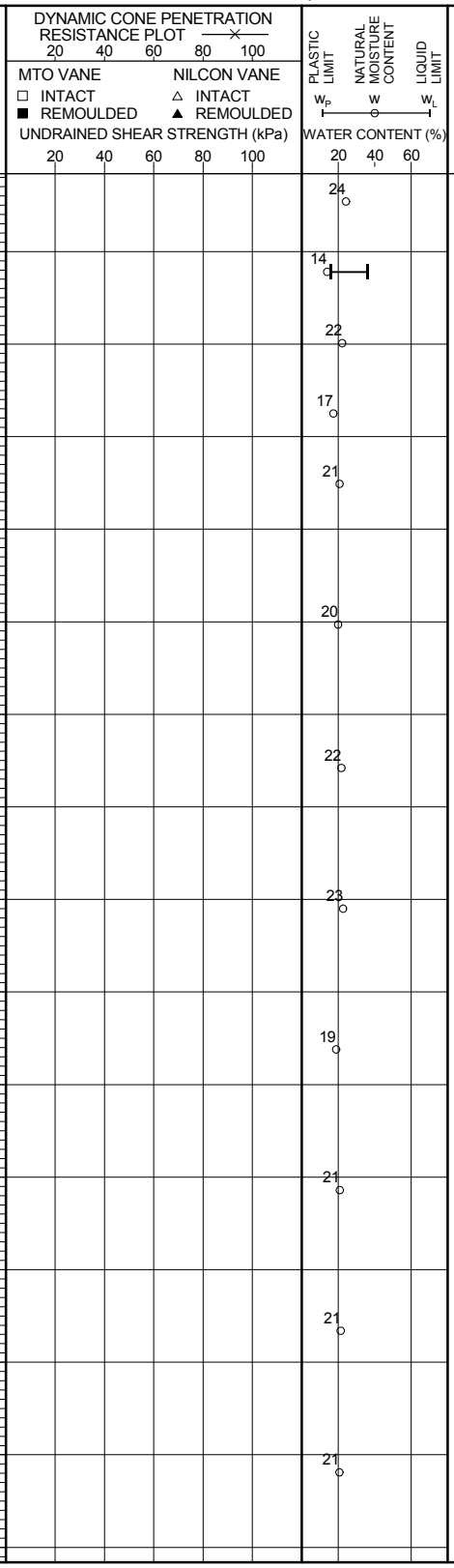
RECORD OF BOREHOLE No. BH11-11 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	NH
ELEVATION	359.84 m	COORD.	N 5,410,763 E 425,205	BORING DATE	Start: Jan 30, 12 End: Feb 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
359.8	Ground surface					
359.6 / 0.2	**TOP SOIL** Dark brown organics, silty, fibrous, rootlets	1	SS	54	10	
	Silty CLAY Light brown silty clay, trace sand, trace gravel, varved, moist, low to medium plasticity, stiff [Upper Glaciolacustrine]	2	SS	67	11	
	...at 1.52m, occasional sand lenses	3	SS	100	10	
357.6 / 2.3	**Silty SAND** Light brown silty sand, trace clay, well graded, loose to compact, occasional silt lenses, moist [Glacial sand]	4	SS	100	11	
		5	SS	100	8	
	...below 4.57m, very loose to loose, wet	6	SS	83	6	
		7	SS	100	7	
		8	SS	83	2	
		9	SS	83	3	
		10	SS	75		...at 10.8m SPT sampler sank under its own weight
		11	SS	92	4	
346.1 / 13.7		12	SS	96	5	



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RECORD OF BOREHOLE No. BH11-11 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	NH
ELEVATION	359.84 m	COORD.	N 5,410,763 E 425,205	BORING DATE	Start: Jan 30, 12 End: Feb 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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TV Torvane
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RQD Rock Quality Designation
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
		15	SS	100	6	16	344	
	Silty CLAY Grey silty clay, trace gravel, trace sand, high plasticity, stiff, moist [WML Till] ...at 17m, sand pocket/layer.	18	SS	100	11	17	343	
		19	SS	100	11	18	342	...at 18.3m, 75 mm of heaving sand.
		20	SS	100	10	20	340	
		21	SS	100	6	21	339	
337.0 / 22.9	**Silty SAND** Dark grey silty sand, trace clay, gravel, compact to dense, saturated [WS Till] ...below 23.5m, frequent cobles and boulders	24	SS	46	24	23	337	
		25	SS	25	24	24	336	
		26	SS	0.04	50/0.1	25	335	...at 25.9m- SPT refusal on possible cobbles and boulders; switched to coring.
						26	334	
						27	333	
						28	332	
						29	331	
						30	330	

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE □ INTACT ■ REMOULDED
NILCON VANE △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60
PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-11 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	NH
ELEVATION	359.84 m	COORD.	N 5,410,763 E 425,205	BORING DATE	Start: Jan 30, 12 End: Feb 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
								31	329				
								32	328				
								33	327				
								34	326				
325.2													
34.6	**BEDROCK**		27	RC	83	67		35	325				
			28	RC	98	70		36	324				
			29	RC	100	93		37	323				
322.1													
37.8	**End of Borehole** at 37.8m. Standpipe A and B installed with flush mounted casing Water Level (bgs): For Piezometer A (bottom sensing zone) at 4.7m on Feb 02/12 For Piezometer B (middle sensing zone) at 5.6 m on Feb 02/12												

RECORD OF BOREHOLE No. BH11-11C

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD		LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	359.84 m	COORD.	N 5,410,763 E 425,205	BORING DATE	Start: Feb 2, 12 End: Feb 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
359.8	Ground surface																		
0.0	BH11-11C shows installation details of shallow standpipe piezometer BH11-11C Refer to BH11-11 for stratigraphic Information							1 2 3 4 5 6 7	359 358 357 356 355 354 353 352										
351.9																			
7.9	**End of Borehole** Standpipes installed with flush mounted steel casing Water Level (b.g.s): At 5.25m on Feb 02/12																		

RECORD OF BOREHOLE No. BH11-12

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	355.723 m	COORD.	N 5,411,178 E 425,311	BORING DATE	Start: Mar 17, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

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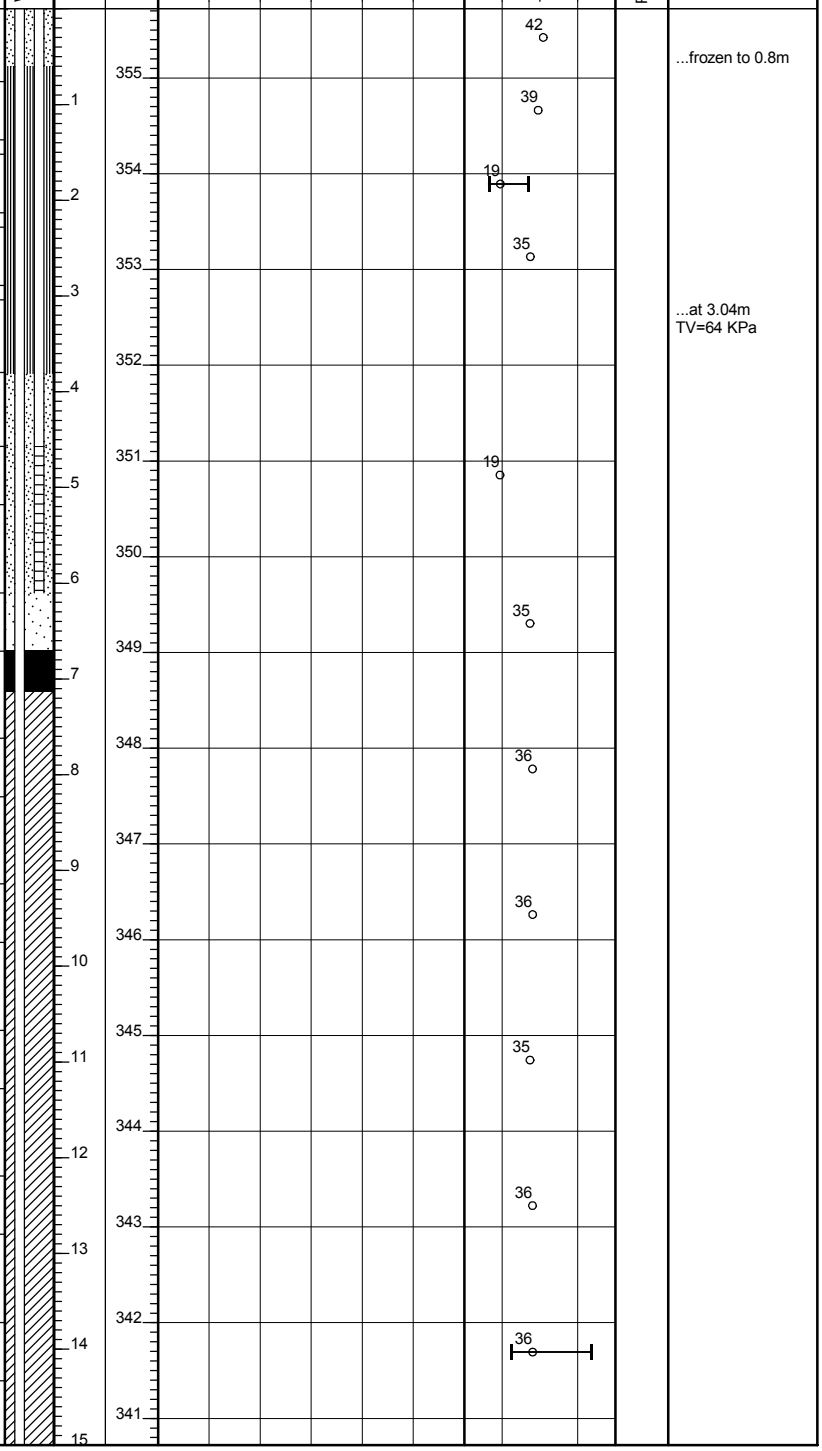
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
355.7	Ground surface					
0.0	**TOPSOIL** Dark brown peat and clay, some rootlets	1	AS			...frozen to 0.8m
355.0						
0.8	**SILTY CLAY** Greyish brown silty clay, trace to some sand, some lensing and oxidation, varved, firm to stiff, low to medium plasticity, moist [Upper Glaciolacustrine] ...at 1.5 m trace gravel ...at 2.3 m trace rootlets	2	SS	67	8	
		3	SS	92	14	
		4	SS	100	8	
		5	TW	100		...at 3.04m TV=64 KPa
351.2						
4.6	**Silty CLAY** Dark brown to grey silty clay, trace sand, trace gravel, occasional silt pockets, medium plasticity, stiff, moist [WML Till]	6	SS	87	10	
		7	SS	100	10	
		8	SS	100	9	
		9	SS	100	14	
		10	SS	100	14	
		11	SS	100	13	
		12	SS	100	7	



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RECORD OF BOREHOLE No. BH11-12

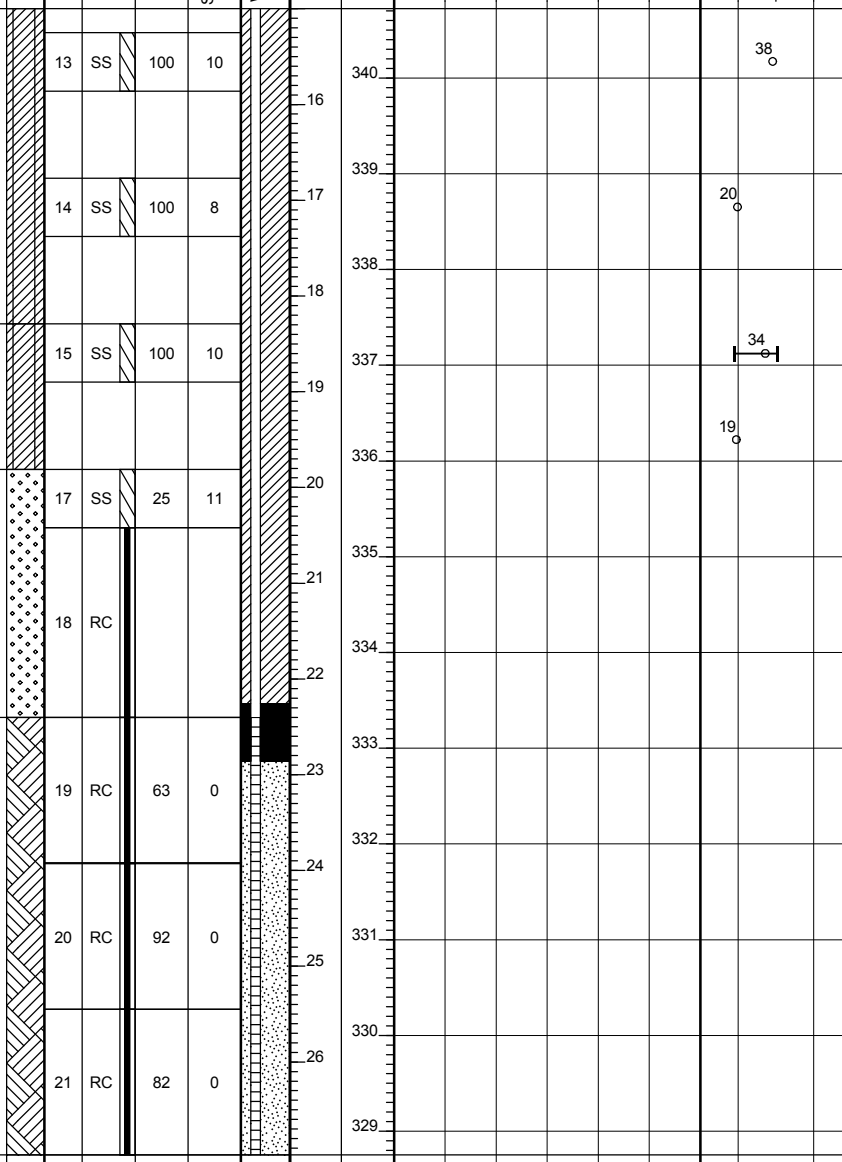
PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	SM
ELEVATION	355.723 m	COORD.	N 5,411,178 E 425,311	BORING DATE	Start: Mar 17, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
	... at 16.8 m sand lenses/laminae, firm	13	SS	100	10	
		14	SS	100	8	
337.4 / 18.3	**SILTY CLAY** Dark grey silty clay and gravel, varved, low plasticity, stiff, moist [Lower Glaciolacustrine]	15	SS	100	10	
335.9 / 19.8	**Gravelly SAND** Grey sand, some silt and gravel, well graded, boulders, compact, wet [inferred WS Till]	17	SS	25	11	
		18	RC			
333.3 / 22.4	**BEDROCK** highly fractured and weathered, bluish green	19	RC	63	0	...at 22.4 m switched to NQ
		20	RC	92	0	
		21	RC	82	0	
328.8 / 27.0	**End of Borehole** at 27m Standpipes installed with flush mounted steel casing					

Water level (b.g.s):
For Piezometer A (bottom sensing zone) at 1.1 m on Mar 18/12
For Piezometer B (top sensing zone) 0.65 m on Mar 18/12



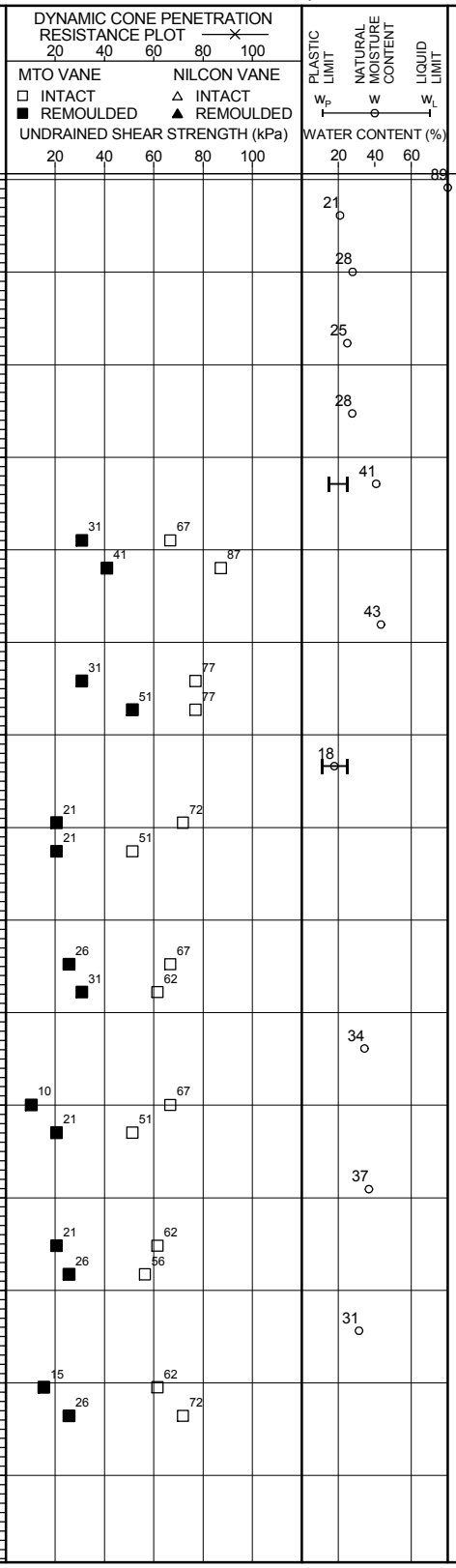
RECORD OF BOREHOLE No. BH11-13

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile			COMPILED BY	NH
ELEVATION	347.063 m	COORD.	N 5,410,290 E 422,597	BORING DATE	Start: Mar 3, 12 End: Mar 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
347.1 / 0.0	Ground surface					
346.8 / 0.3	**TOPSOIL** Woody, fibrous organics	1	SS	87.5	4	
	Sandy SILT Dark brown to light brown sandy silt, trace clay, rootlets, trace organics, soft, low plasticity, damp [Upper Glaciolacustrine]	2	SS	29.2	7	
		3	SS	92	4	
344.8 / 2.3	**Clayey SILT** Grey clayey silt, trace sand, no to low plasticity, moist, soft ...30cm thick silty clay at the top	4	SS	83	7	
		5	SS	92	3	
342.5 / 4.6	...at 4.49m, brown oxidised pockets **Silty CLAY** Dark grey silty clay, trace sand, trace subangular gravel, limestone, high plasticity, moist, firm [WMLTill]	8	SS	100	7	
	...from 6.25m to 9.14m, medium plasticity	11	SS	92	5	
		14	TW	100		...at 7.9m PP=37 KPa Torvane=49 KPa
		17	SS	92	5	
		20	SS	88	6	
		23	SS	96	5	
		26	TW	100		...at 14m PP=61-85 KPa Torvane=44 KPa



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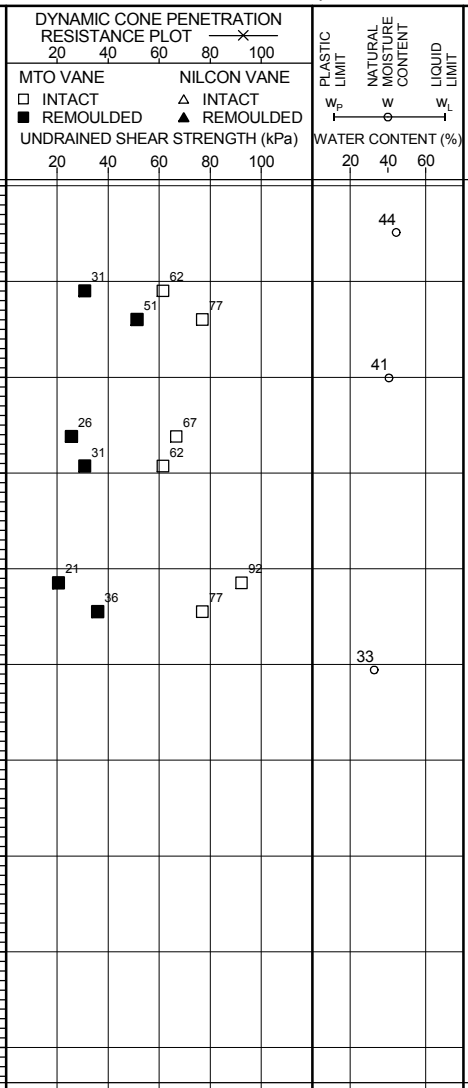
RECORD OF BOREHOLE No. BH11-13

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile			COMPILED BY	NH
ELEVATION	347.063 m	COORD.	N 5,410,290 E 422,597	BORING DATE	Start: Mar 3, 12 End: Mar 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
		27	SS	100	5	Artesian pressure up to 1.06m encountered after installing the second standpipe.
		30	SS	100	6	
		33	SS	100	4	
327.3 / 19.8	**Sandy SILT** Greyish green sandy silt, trace clay, grey clay lamination, no plasticity, wet, soft to firm [Lower Glaciolacustrine]	36	SS		7	
325.7 / 21.3	**BEDROCK**	37	RC	98	70	
		38	RC	100	100	
322.6 / 24.4	**End of Borehole** at 24.4m Two standpipes, BH11-13A and BH11-13B (orange spray) installed with flush mounted steel casing Water level (b.g.s): For Piezometer A (bottom sensing zone) at surface on Mar 5/12 For Piezometer B (top sensing zone) surface on Mar 5/12					



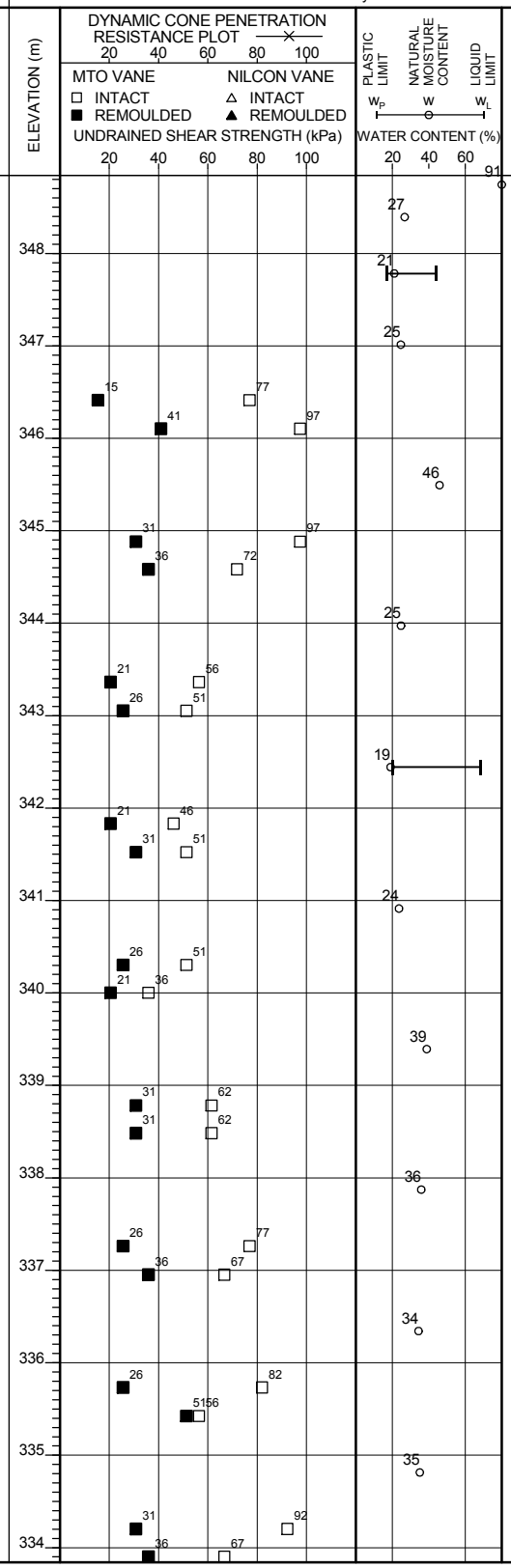
RECORD OF BOREHOLE No. BH11-16 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile			COMPILED BY	NH
ELEVATION	348.843 m	COORD.	N 5,409,752 E 423,785	BORING DATE	Start: Feb 29, 12 End: Mar 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
348.8	Ground surface					
348.9 / 0.1	**TOPSOIL** Dark brown organics, fibrous rootlets	1	SS	100	15	...frozen to 0.8m
	Clayey SILT Brown clayey silt, trace sand, grey clay laminations, varved, low plasticity, damp, organics [Upper Glaciolacustrine]	2	SS	100	6	
	...below 1.5m mottled brown lenses, no to low plasticity, firm, damp	3	SS	100	6	
345.8 / 3.0	**Silty CLAY** Dark grey silty clay, medium to high plasticity, soft to firm, damp to moist [WML Till]	6	SS	100	6	
	...at 4.57m, some sand, subangular to subrounded gravel, damp to moist, soft to firm, sand lenses	9	SS	100	3	
	...sandy lense between 6.3 and 6.35m	12	SS	100	4	
	...between 7.6m to 9.5m - clayey silt, soft, no to low plasticity, wet	15	SS	71		...at 7.6m SPT sampler sank under its own weight
		18	SS	100	4	
		21	SS	100	5	
		24	SS	100	5	
		27	SS	100	6	



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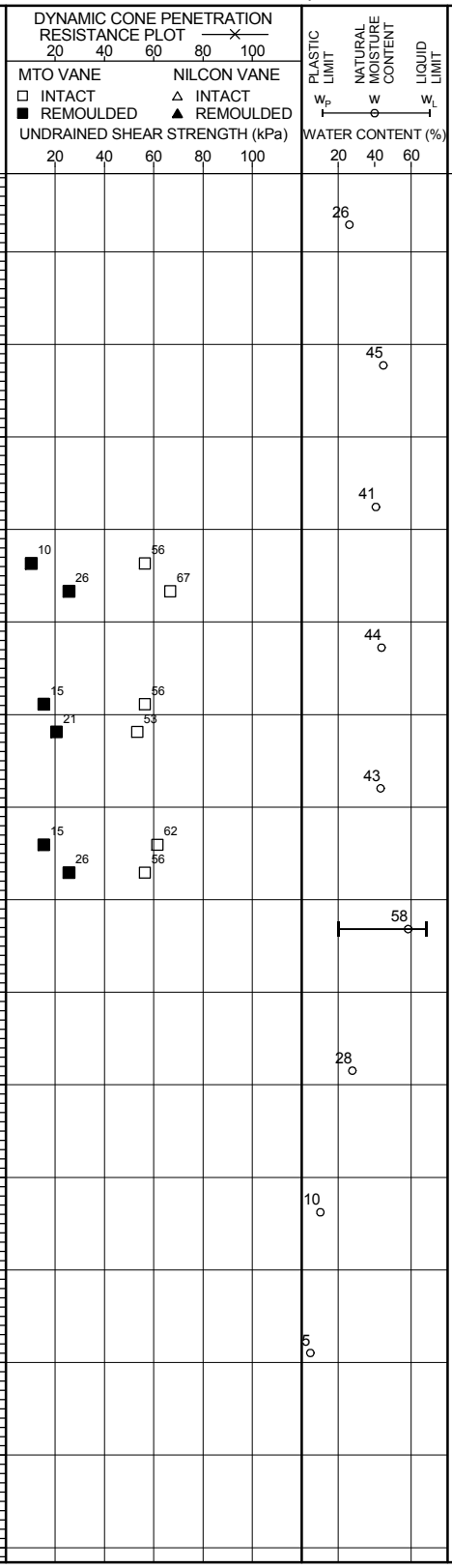
RECORD OF BOREHOLE No. BH11-16 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile			COMPILED BY	NH
ELEVATION	348.843 m	COORD.	N 5,409,752 E 423,785	BORING DATE	Start: Feb 29, 12 End: Mar 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	DEPTH (m)	REMARKS
	...sand and gravel lense between 15.75 m and 15.85m	30	SS	79	11			
	...sand and gravel lense between 17.3 m and 17.4m	31	SS	79	8			
		32	SS	100	6			
		35	SS	100	6			
		38	SS	100	6			
326.0								
22.9	**Silty CLAY** Silty clay, medium plasticity, varved, firm, moist to wet [Lower Glaciolacustrine]	41	SS	100	6			
324.5								
24.4	**Silty SAND and GRAVEL** Silty sand and white brown angular to subangular gravel, trace clay, compact, moist to wet [WS Till]	43	SS	38	25			
		44	SS	29	25			
321.4								
27.4	**BEDROCK** Fractured at the top	45	SS	25	27			
		46	RC	100	30			
		47	RC	100	63			



WELL / PIEZOMETER INSTALLATION

PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-16 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile			COMPILED BY	NH
ELEVATION	348.843 m	COORD.	N 5,409,752 E 423,785	BORING DATE	Start: Feb 29, 12 End: Mar 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE □ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			48	RC	100	83		31	318				
317.2													
31.6	**End of Borehole** at 31.65m Two standpipes, BH11-16A and BH11-16B (orange spray) installed with flush mounted steel casing Water level (b.g.s): For Piezometer A (bottom sensing zone) at surface on Mar 3/12 For Piezometer B (middle sensing zone) surface on Mar 3/12												

RECORD OF BOREHOLE No. BH11-16C

PROJECT	Rainy River - Geotechnical Investigation 2011/2012			ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	
LOGGED BY	SM				
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile	COMPILED BY	SM
ELEVATION	348.431 m	COORD.	N 5,409,753 E 423,785	BORING DATE	Start: Mar 3, 12 End: Mar 3, 12
CHECKED BY	DGR				

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
348.4	Ground surface												
0.0	BH11-16C shows installation details of shallow standpipe piezometer BH11-16C Refer to BH11-16 for stratigraphic Information								348				
								1	347				
								2	346				
								3	345				
								4	344				
								5	343				
								6	342				
								7	341				
								8	340				
								9	339				
								10	338				
								11	337				
								12	336				
								13	335				
								14	334				
								15					

Continued on Next Page

RECORD OF BOREHOLE No. BH11-16C

PROJECT	Rainy River - Geotechnical Investigation 2011/2012			ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	
LOGGED BY	SM				
CLIENT	Rainy River Resources.	LOCATION	Overburden stockpile	COMPILED BY	SM
ELEVATION	348.431 m	COORD.	N 5,409,753 E 423,785	BORING DATE	Start: Mar 3, 12 End: Mar 3, 12
CHECKED BY	DGR				

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
								16	333										
									332										
								17											
									331										
330.1								18											
18.3	**End of Borehole** at 16.3m Standpipes installed with flush mounted steel casing Water Level (b.g.s): At surface on March 03/12																		

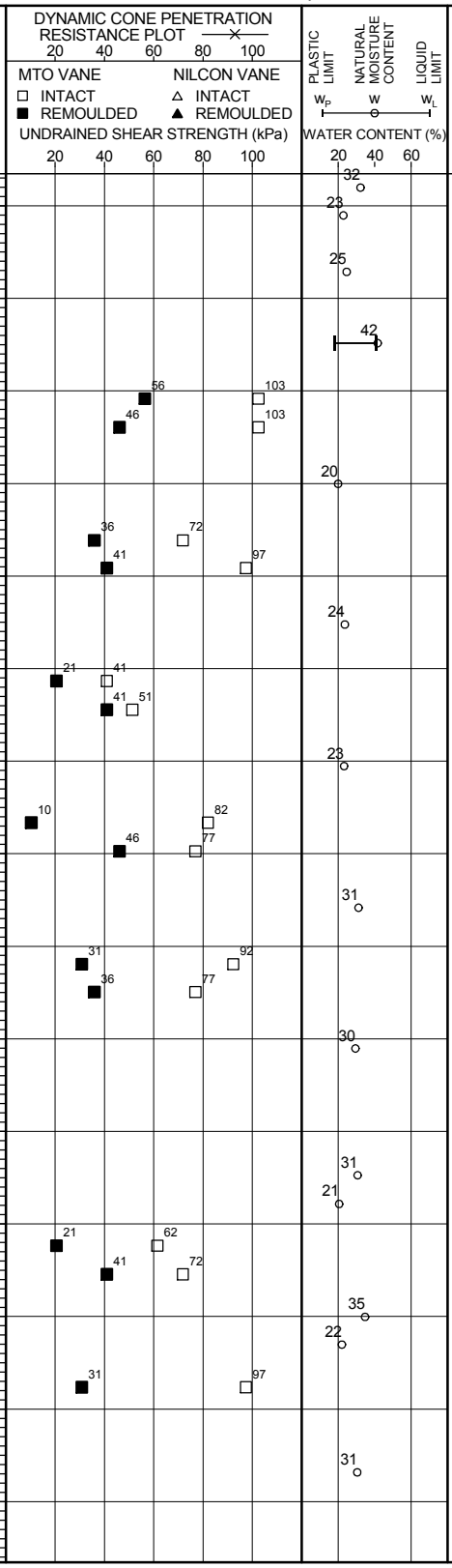
RECORD OF BOREHOLE No. BH11-17

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Pit diversion			COMPILED BY	NH
ELEVATION	349.346 m	COORD.	N 5,410,114 E 424,758	BORING DATE	Start: Feb 27, 12 End: Feb 28, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
349.3	Ground surface					
0.0 / 349.0	**TOPSOIL** Dark brown, fibrous, rootlets	1	SS	100	29	...frozen to 0.8m
0.3 / 348.6	**SILT** Light brown silt, trace clay, some sand, trace organics	2	SS	96	8	
0.8	**Clayey SILT to Silty CLAY** Light brown clayey silt, trace gravel, trace sand, rootlets, mottled brown lenses, low to medium plasticity, firm, damp [Upper Glaciolacustrine]	3	SS	88	4	
	..at 1.7m brown silty clay, medium to high plasticity, firm to stiff, damp					
346.3 / 3.0	**Silty CLAY** Brown silty clay, trace sand and gravel, medium to high plasticity, soft to firm, damp to moist [WML Till]	6	SS	100	4	
		9	SS	100	3	
	...at 6.1m grey silty, low plasticity	12	SS	100	3	
	... below 7.6m becoming dark grey	15	SS	100	6	
		18	SS	100	5	
		20A&B	SS		3	
	...from 10.7m to 14.3m occasional dark grey silty sand and gravel lamination	23	SS		5	...at 11.89m, heaving sands; switched to wash boring.
		26	SS	100	5	



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RECORD OF BOREHOLE No. BH11-17

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Pit diversion			COMPILED BY	NH
ELEVATION	349.346 m	COORD.	N 5,410,114 E 424,758	BORING DATE	Start: Feb 27, 12 End: Feb 28, 12	CHECKED BY	DGR

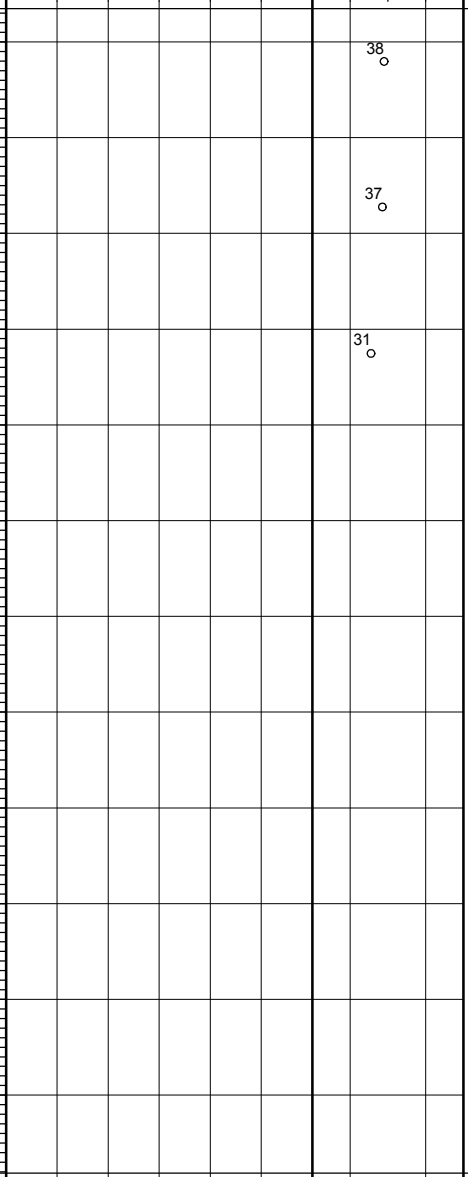
SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	DEPTH (m)	REMARKS
		27	SS	92	5	334	16	
		28	SS	100	6	333	17	
	...at 18.29m, silty pockets.	29	SS	100	6	332	18	
329.4						331	19	
20.0	**Silty CLAY** Greyish green silty clay(silt as 3-4mm lamintions) medium plasticity, varved, firm, moist [Lower Glaciolacustrine]	30	SS	100	8	330	20	
328.0						329	21	
21.3	**Clayey SAND and GRAVEL** Dark grey clayey sand and gravel, subrounded to angular [WS Till]					328	22	
	...below 22.6m, boulders					327	23	
325.0		34	RC	37	0	326	24	
24.4	**BEDROCK** Highly fractured bedrock	35	RC	100	0	325	25	
		36	RC	78	9	324	26	Artesian pressure up to 0.7m encountered pulling rods out
322.2		37	RC	100	100	323	27	
27.2	**End of Borehole** at 27.1m Standpipe installed with flush mounted steel casing Water level (b.g.s): at 0.15m on Feb 29/12							

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60



PERMEABILITY (cm/s)

RECORD OF BOREHOLE No. BH11-18

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR/SM
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.507 m	COORD.	N 5,408,990 E 425,202	BORING DATE	Start: Jan 15, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
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k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L (WATER CONTENT (%))	PERMEABILITY (cm/s)	REMARKS
348.5	Ground surface									
0.0	**TOPSOIL** Silt and peat, dark brown, fibrous						348			
347.7										
0.8	**Silty CLAY** Brown silty clay, trace to some sand, trace gravel, varved, low to medium plasticity, stiff, moist, occasional sand laminations [Upper Glaciolacustrine]	2	SS	88	10	1	347	34		...frozen to 1.5m
		3	SS	83	11	2		22		
		4	SS	96	10	3	346	22		
		5	SS	96	10	4	345	25		
343.9							344			
4.6	**silty CLAY** Dark brown silty clay, trace sand, trace gravel, stiff, medium plasticity, moist [WML Till].	6	SS	100	11	5		36		
						6	343			
		7	SS	100	10	7	342	35		
							341			
		8	SS	100	9	8		35		
						9	340			
	From 9.45m to 9.78m, silty sand, trace clay, compact, wet.	9	SS	100	14	10	339	33		
		10	SS	92	9	11	338	32		
336.3						12	337			
12.2	**silty CLAY** Dark grey silty clay, varved (greenish grey silty layers 2-3mm), soft, medium to high plasticity, moist, varved [Glaciolacustrine].	11	SS	100	4	13	336	43		
334.8							335			
13.7	**SAND AND GRAVEL** Greenish brown sand and gravel, trace silt, well graded, very dense, angular to subangular, wet [WS Till].	12	SS		69	14	334	11		...at 13.72m, heaving sand; switched to wash boring.
						15				

Continued on Next Page

RECORD OF BOREHOLE No. BH11-18

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR/SM
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.507 m	COORD.	N 5,408,990 E 425,202	BORING DATE	Start: Jan 15, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
333.3													
15.3	**BOULDERS AND COBBLES** Boulders and cobbles, some coarse sand [Inferred WS Till].							16	333				...at 15.7m, switched to NQ coring
			13	WS				17	332				
								18	331				
								19	330				
								20	329				
								21	328				
			14	WS				22	327				
								23	326				
								24	325				
								25	324				
								26	323				
321.6								27	322				
26.9	**BEDROCK**		16	RC	100	55		28	321				
			16	RC	100	93		29	320				...at 28.9m to 43.4m, Constant head Packer test carried out; no change in flow noted.
								30	319				

Continued on Next Page

RECORD OF BOREHOLE No. BH11-18

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR/SM
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.507 m	COORD.	N 5,408,990 E 425,202	BORING DATE	Start: Jan 15, 12	CHECKED BY	DGR

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ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			17	RC	100	75		31	318				
			18	RC	100	83		32	317				
			19	RC	100	100		33	316				
			20	RC	100	93		34	315				
			21	RC	100	70		35	314				
			22	RC	100	90		36	313				
			23	RC	100	75		37	312				
			24	RC	100	73		38	311				
			25	RC	98	98		39	310				
								40	309				
								41	308				
								42	307				
								43	306				
305.2													
43.4	**End of Borehole** at 43.35m Standpipe installed with flushmounted steel casing Water Level (bgs): For Piezometer A (bottom sensing												

Continued on Next Page

RECORD OF BOREHOLE No. BH11-18

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR/SM
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.507 m	COORD.	N 5,408,990 E 425,202	BORING DATE	Start: Jan 15, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
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C Consolidation
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GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	zone) at 0.76m on Feb 02/12 For Piezometer B (middle sensing zone) at 0.76m on Feb 02/12												

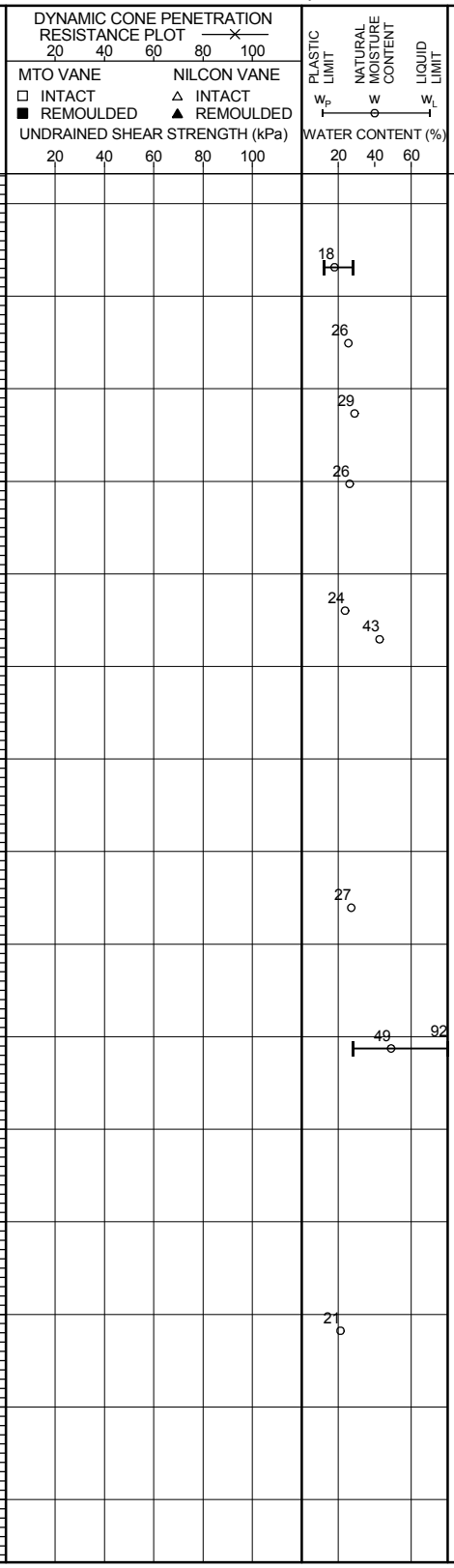
RECORD OF BOREHOLE No. BH11-19 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	350.323 m	COORD.	N 5,409,287 E 426,009	BORING DATE	Start: Jan 3, 12 End: Jan 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
350.3	Ground Surface					
350.1 / 0.0	**TOPSOIL** dark brown, peat	1	SS	83	15	
0.3	**SILTY CLAY** Light brown silty clay, some sand, varved, soft to firm, low plastic, moist to wet [Upper Glaciolacustrine] ...at 0.8m becoming sandy ...becoming dark brown below 2.2m	2	SS	46	5	..frozen to 1.4m
		3	SS	100	8	
		4	SS	100	3	
		5	SS	100	7	
345.5 / 4.9	**SILTY CLAY** Drak grey silty (to trace silt) clay, trace sand, trace gravel, firm to stiff, medium to high plasticity, moist [WML Till]	6	SS	100	11	
		7	TW	100		...at 6.4m PP=122-134 KPa
		8	SS	92	8	
		9	SS	100	5	
		10	SS	100	13	
		11	SS	100	9	
		12	SS	100	11	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-19 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	350.323 m	COORD.	N 5,409,287 E 426,009	BORING DATE	Start: Jan 3, 12 End: Jan 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
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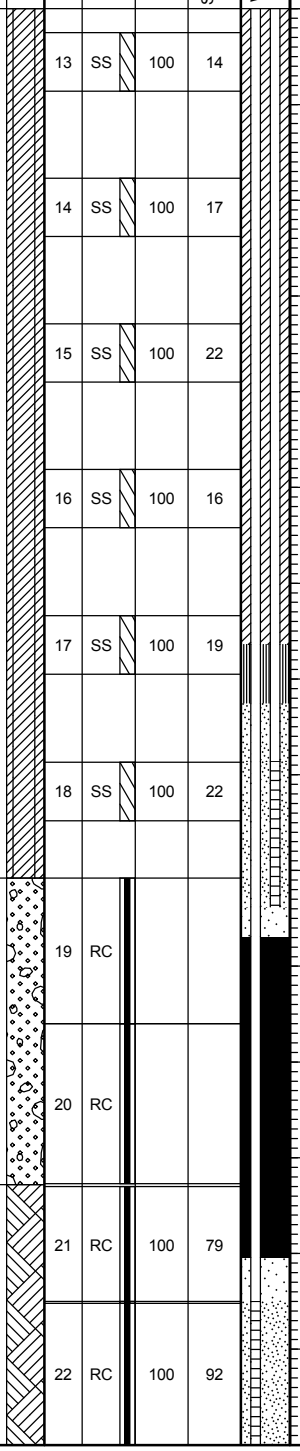
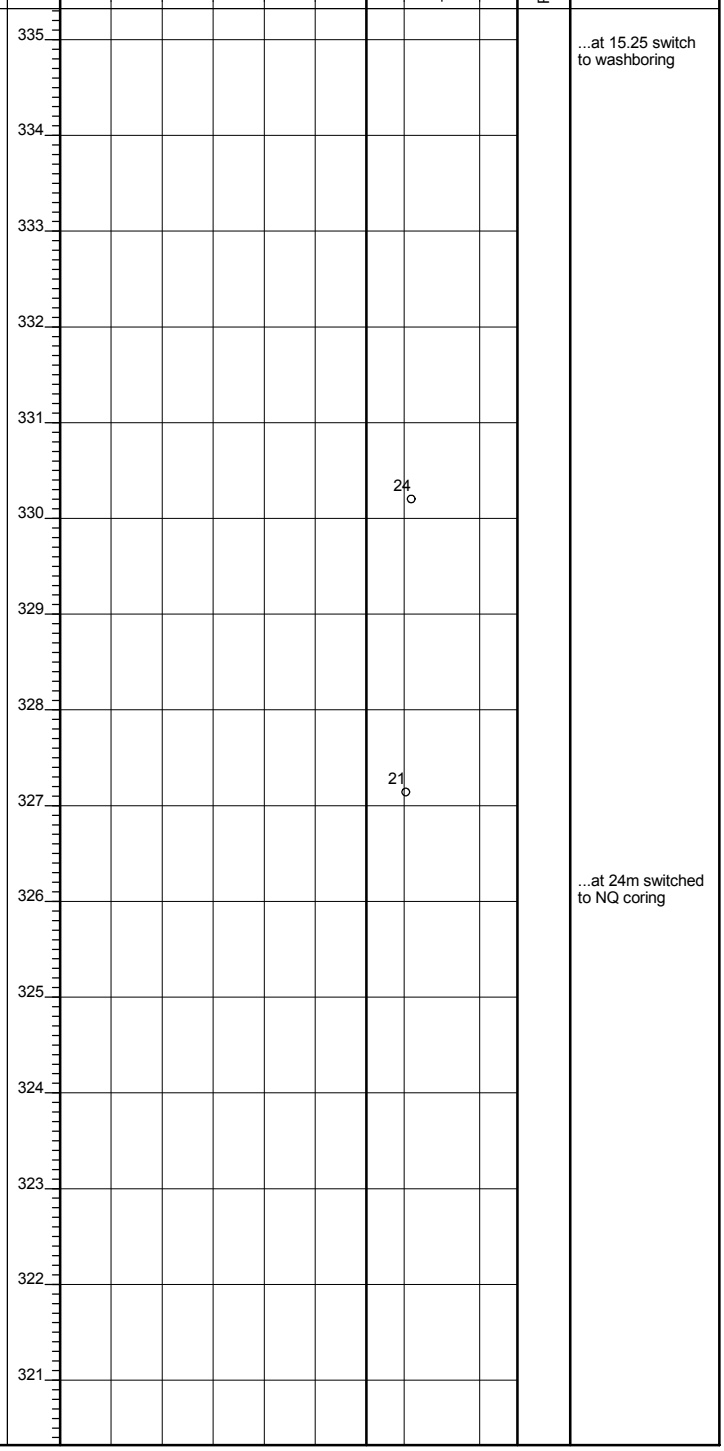
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
		13	SS	100	14	...at 15.25 switch to washboring
	...below 16.8m very stiff	14	SS	100	17	
		15	SS	100	22	
		16	SS	100	16	
		17	SS	100	19	
	...possibly varved below 22.9m	18	SS	100	22	
326.2 / 24.1	**Sandy GRAVEL** Sandy gravel and boulders, wet [inferred WS Till]	19	RC			...at 24m switched to NQ coring
		20	RC			
323.0 / 27.3	**Bedrock**	21	RC	100	79	
		22	RC	100	92	
320.3						





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RECORD OF BOREHOLE No. BH11-19 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	350.323 m	COORD.	N 5,409,287 E 426,009	BORING DATE	Start: Jan 3, 12 End: Jan 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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C Consolidation
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GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
30.0	**End of Borehole** at 30.02m Standpipes installed with A 0.86m, B 0.91m stick up Water Level (b.g.s): For Piezometer A (bottom sensing zone) at 1.83 m on Jan 07/12 at 1.86 m on Jan 14/12 For Piezometer B (middle sensing zone) at 1.83 m on Jan 07/12 at 1.86 m on Jan 14/12								320					

RECORD OF BOREHOLE No. BH11-19C

PROJECT	Rainy River - Geotechnical Investigation 2011/2012			ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	
LOGGED BY	PDR	CLIENT	Rainy River Resources.	LOCATION	Open Pit
COMPILED BY	NH	ELEVATION	350.453 m	COORD.	N 5,409,285 E 426,011
BORING DATE	Start: Jan 7, 12 End: Jan 7, 12	CHECKED BY	DGR		

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); MTO VANE □ INTACT ■ REMOULDED; NILCON VANE △ INTACT ▲ REMOULDED; UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100	PLASTIC LIMIT W_P; NATURAL MOISTURE CONTENT W; LIQUID LIMIT W_L; WATER CONTENT (%) 20 40 60	PERMEABILITY (cm/s)	REMARKS
350.5	Ground Surface												
0.0	BH11-19C shows installation details of shallow standpipe piezometer BH11-19C Refer to BH11-19 for stratigraphic Information							1, 2, 3, 4, 5, 6	350, 349, 348, 347, 346, 345				
344.1 6.4	**End of Borehole** at 6.4m Standpipe installed with 0.91m stick up Water level (b.g.s): ...at 4.57 m on Jan 07/12 at 1.24 m on Jan 14/12.												

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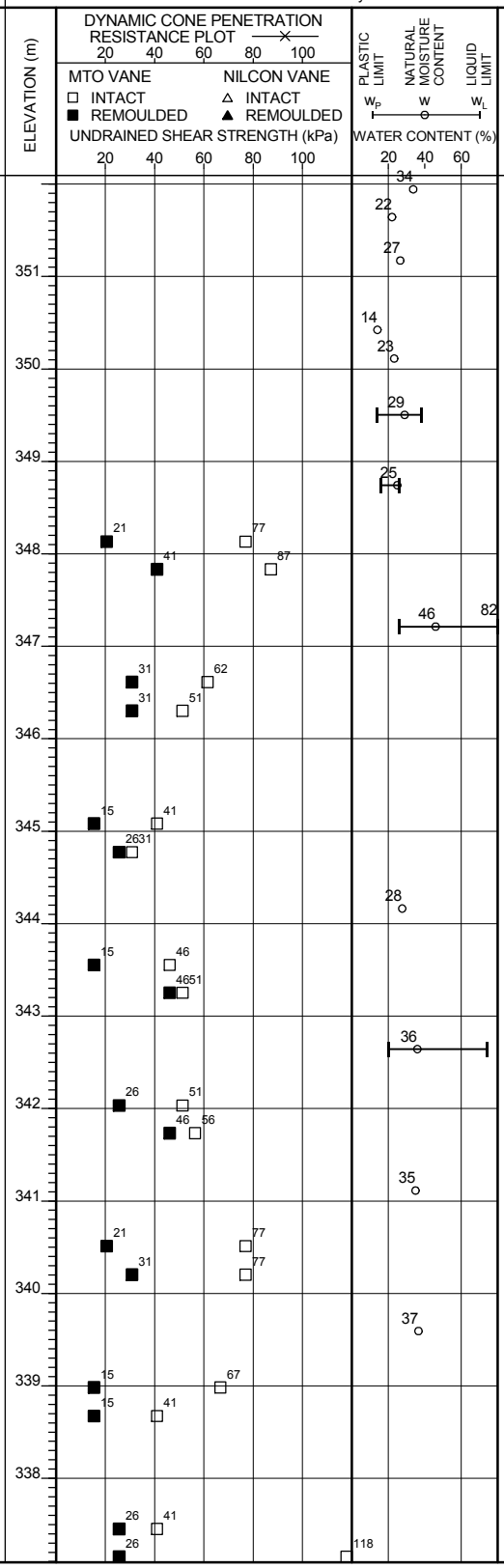
RECORD OF BOREHOLE No. BH11-20 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Open pit			COMPILED BY	NH
ELEVATION	352.093 m	COORD.	N 5,410,232 E 425,891	BORING DATE	Start: Jan 6, 12 End: Jan 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
352.1	Ground surface					
0.0 / 351.9	**TOPSOIL**					
0.2	Dark brown organics, fibrous, rootlets	1	SS	63	10	
	SANDY SILT Brown sandy silt to silty sand, trace clay, trace brown lenses , organics, low to medium plasticity, soft to firm, damp to moist [Glacial Sand??]	2	SS	50	3	
		3	SS	54	5	
349.8 / 2.3	...below 2.3m - Greyish blue silty clay, trace sand, low to medium plasticity, soft, moist	4	SS	83	4	
	... becoming brown, sandy, low plasticity	5	SS	92	3	
347.5 / 4.6	**CLAY** Dark grey clay, trace silt, trace sand, trace gravel, firm to stiff, medium to high plasticity, moist [WML Till]	8	SS	100	5	
	...becoming soft	11	TW	100		...at 6.4m PP = 36 KPa TV=44 KPa
	...at 7.62 becoming silty	14	SS	96	5	
	..becoming firm, moist to wet	17	SS	100	5	
		20	SS	100	7	
		23	SS	100	5	
		26	TW	95		...at 14m PP = 49 KPa TV=59 KPa



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RECORD OF BOREHOLE No. BH11-20 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Open pit			COMPILED BY	NH
ELEVATION	352.093 m	COORD.	N 5,410,232 E 425,891	BORING DATE	Start: Jan 6, 12 End: Jan 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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WS Wash Sample

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k Permeability
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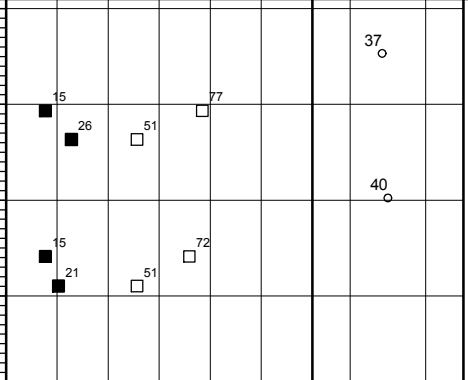
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	REMARKS
		29	SS	100	5		
		32	SS	100	6		...at 16.76m switched to washboring
		35	SS	100	7		
		38	SS	100	6		
		40	SS	100	7		
	...At 22.86m occasional sandy pockets, stiff	41	SS	100	9		
327.6 / 24.5	**SILTY CLAY** Greenish grey silty clay, varved (2-3 mm) dark grey clay , firm, medium plasticity, moist [Lower Glaciolacustrine]	42	SS	100	16		
326.2 / 25.9	**BOULDERS AND GRAVEL** Dark grey boulders in sand and clay, angular, cm scale [WS Till]	43	SS		/0.08		
		44	RC	67			...at 26m spoon refused switched to NQ coring
325.5 / 26.6	**BEDROCK** Highly fractured	45	RC	87	23		
		46	RC	100	22		
		47	RC	100	0		
323.1 / 29.0	**End of Borehole** at 29m due to fractured rock cavin Standpipes installed with flush mounted steel casing Water Level (b.g.s):	48	RC	0			



PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH11-20 A&B

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Open pit			COMPILED BY	NH
ELEVATION	352.093 m	COORD.	N 5,410,232 E 425,891	BORING DATE	Start: Jan 6, 12 End: Jan 9, 12	CHECKED BY	DGR

SAMPLE TYPES
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DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

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PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	For Piezometer A (bottom sensing zone) at surface on Jan 09/12 Frozen on Jan 14/12																		

RECORD OF BOREHOLE No. BH11-20C

PROJECT	Rainy River - Geotechnical Investigation 2011/2012			ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	
LOGGED BY	SM				
CLIENT	Rainy River Resources.	LOCATION	Open pit	COMPILED BY	SM
ELEVATION	352.093 m	COORD.	N 5,410,232 E 425,891	BORING DATE	Start: Jan 9, 12 End: Jan 9, 12
CHECKED BY	DGR				

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
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ABBREVIATIONS
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DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED — UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
352.1	Ground surface															
0.0	BH11-20C shows installation details of shallow standpipe piezometer BH11-20C Refer to BH11-20 for stratigraphic Information							1 2 3	351 350							
349.1																
3.0	**End of Borehole** at 3.0m Standpipe installed with flushmounted steel casing Water Level (b.g.s): At 0.15m on 09-Jan-12															

RECORD OF BOREHOLE No. BH11-21

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of river			COMPILED BY	NH
ELEVATION	346.495 m	COORD.	N 5,408,466 E 425,055	BORING DATE	Start: Feb 25, 12 End: Mar 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	WATER CONTENT (%)	REMARKS
346.5	Ground surface								
0.0	**TOPSOIL** dark brown peat, trace clay.						346	299	...frozen to 0.8m
345.7 / 0.8	**Silty SAND** Brownish grey silty sand, trace fine gravel, well graded, loose, wet.	2	SS	29	6	1	345	17	
345.0 / 1.5	**Silty CLAY** Light brown silty clay, trace sand, dark brown lenses, low to medium plasticity, firm, varved, moist [Upper Glaciolacustrine]	3	SS	92	5	2		26	
		4	SS	100	5		344	25	
						3		42	
		5	SS	100	6		343	45	
						4	342		
		6	SS	100	5	5		21	
							341		
						6			
		7	TW	67			340		...at 6.1m PP = 73 KPa TV=74 KPa
						7	339		
338.9 / 7.6	**Silty CLAY** Dark grey silty clay, trace fine gravel, occasional silt pockets, firm, moist [WML Till]	8	SS	100	7	8		36	
							338		
	...below 9.2m, becoming stiff.	9	SS	100	9	9	337	35	
						10	336		
		10	SS	100	10	11		36	
							335		
						12			
		11	SS		11		334	35	
						13	333		
		12	SS	100	10	14		37	
							332		
						15			

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RECORD OF BOREHOLE No. BH11-21

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of river			COMPILED BY	NH
ELEVATION	346.495 m	COORD.	N 5,408,466 E 425,055	BORING DATE	Start: Feb 25, 12 End: Mar 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	WATER CONTENT (%)	REMARKS
		13	SS	100	11		331	38	...switch to NW wash boring.
						16	330		
	...at 17.2m - 2cm thick light brown sandy layer/lense	14	SS	100	15	17	329		
						18	328		
		15	SS	100	11	19	327		
		16	SS	100	10	20	326		
						21	325	38	
		17	SS	100	12	22	324		
		18	SS	100	13	23	323	38	
						24	322		
		19	SS	100	13	25	321		
320.6 / 25.9	**Silty CLAY** Dark grey silty clay, varved, stiff, low to medium plasticity, moist [Lower Glaciolacustrine]	20	SS	100	14	26	320	43	
319.4 / 27.1	**SAND AND GRAVEL** Sand and gravel. [Inferred WS Till]					27	319		...at 27.1m, 1.2m of artesian pressure encountered
		21	RC	45		28	318		
		22	RC	67		29	317		
						30			

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RECORD OF BOREHOLE No. BH11-21

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of river			COMPILED BY	NH
ELEVATION	346.495 m	COORD.	N 5,408,466 E 425,055	BORING DATE	Start: Feb 25, 12 End: Mar 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
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PT Standard Proctor Test
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C Consolidation
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GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			23	RC	45			31	316				
314.8									315				
31.7	**BEDROCK** Highly weathered/fractured		24	RC		0		32	314				
								33	313				
			25	RC		0		34	312				
			26	RC	77	0		35	311				
								36	310				
			27	RC	37	0		37	309				
								38	308				
			28	RC	60	0		39					
307.2													
39.3	**End of Borehole** at 39.3m Standpipes installed with flushmounted steel casing Water Level (b.g.s): For Piezometer A (bottom sensing zone) at surface on March 02/12 For Piezometer B (middle sensing zone) at surface on March 02/12												...borehole terminated due to dificult drilling condition

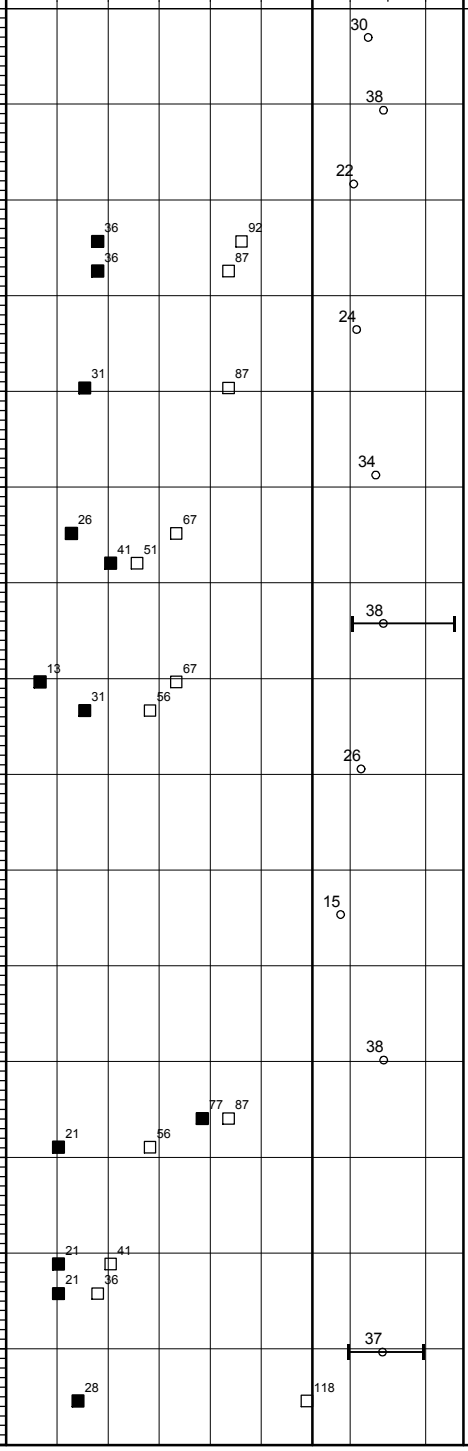
RECORD OF BOREHOLE No. BH11-22

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.996 m	COORD.	N 5,409,908 E 424,953	BORING DATE	Start: Feb 2, 12 End: Feb 3, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
349.0	Ground surface					
0.0	**TOPSOIL** Light brown silty sand, moist, loose, trace organics.	1	SS	96	18	...frozen to 1.4m
348.2						
0.8	**Silty CLAY** Light brown silty clay, trace sand, varved [Upper Glaciolacustrine]	2	SS	83	7	
		3	SS	100	6	
		6	SS	100	5	
344.4						
4.6	**Silty CLAY** Grey silty clay, trace sand, moist, medium to high plasticity, soft [WML Till]	9	SS	100	5	
		12	SS	100	4	
		15	SS	100	6	
	...at 9.15m, 15cm thick grey silty sand layer, trace gravel, compact, wet	16	SS	50	15	...at 8.55m, Vane refusal; possible sandy layer
		17	SS	100	6	
		20	TW	95		...at 12.19m, TV = 49 KPa
335.3						
13.7	**CLAY** Grey clay, trace gravel, trace silt, varved, moist, medium to high plasticity, firm [Lower Glaciolacustrine]	23	SS	100	6	
334.3						
14.7						...at 14.65m, heaving sand.



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-22

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.996 m	COORD.	N 5,409,908 E 424,953	BORING DATE	Start: Feb 2, 12 End: Feb 3, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
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GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
	Silty SAND Grey silty sand, trace gravels, wet, loose [inferred WS Till]					16	333	
	...boulders below 16.8m	27	RC			17	332	...at 16.38m; switched to NQ coring.
		28	RC			18	331	
330.6 / 18.4	**BEDROCK**	29	RC	100	22	19	330	
		20	RC	100	97	20	329	
						21	328	
327.5 / 21.5	**End of Borehole** at 21.5m Standpipe installed with flush mounted steel casing. Water Level (bgs): at 0.9 m on Feb04/12							

STRAT PLOT
WELL / PIEZOMETER INSTALLATION

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

RECORD OF BOREHOLE No. BH11-23

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.143 m	COORD.	N 5,409,645 E 425,704	BORING DATE	Start: Jan 7, 12 End: Jan 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
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ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
348.1	Ground Surface					
0.0	**SILTY SAND** Brown silty sand, fine grained, some clay and gravel, some wood, peat.	1	AS			
		2	SS	42		...frozen to 1.3m
346.6						
1.5	**SILT** Light brown silt some clay, varved, firm, low plastic, wet [Upper Glaciolacustrine]	3	SS	50	7	...at 1.5m - SPT sample on possible slough
		4	SS	100	6	
		5	SS	83	10	
343.6						
4.6	**SILTY CLAY** Dark grey clay, some silt and sand, varved, occasional silt lamination, firm, medium plasticity, moist [WML Till]	6	SS	96	6	
		7	TW	67		...at 6.4m PP=49 KPa TV=49 KPa
	...At 7.6m , occasional sand laminations, very soft	8	SS	100		...at 7.6m , SPT spoon sank on its own weight
	...at 9.2m becoming stiff	9	SS	100	9	
		10	SS	100	9	
		11	SS	100	9	
	...soft clay layer between 13.9m and 14.2m	12	SS	100	8	...at 12.9m , switched to wash boring

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)

PLASTIC LIMIT (w_P) — NATURAL MOISTURE CONTENT (w) — LIQUID LIMIT (w_L)
WATER CONTENT (%) (20 40 60)

PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-23

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.143 m	COORD.	N 5,409,645 E 425,704	BORING DATE	Start: Jan 7, 12 End: Jan 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
	...at 15.25m occasional pockets of sandy silt	13	SS	100	11		333	
						16	332	
		14	TW	100		17	331	...at 17.1m PP=73 KPa TV=83 KPa
						18	330	
		15	SS	100	11			
						19	329	
		16	SS	100	11	20	328	
						21	327	
		17	SS	100	13			
						22	326	
		18	SS	100	12	23	325	
						24	324	
		19	SS	100	13			
						25	323	
		20	SS	100	13	26	322	
						27	321	
		21	SS	100	14			
						28	320	
		22	SS	100	15	29	319	
						30		

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%) 20 40 60

Depth (m)	Water content (%)
16	34
17	
18	
19	31
20	29
21	
22	28
23	33
24	
25	40
26	43
27	
28	42
29	51 (89)

PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-23

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Open Pit			COMPILED BY	NH
ELEVATION	348.143 m	COORD.	N 5,409,645 E 425,704	BORING DATE	Start: Jan 7, 12 End: Jan 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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TW Thin Walled Open (Shelby)
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ABBREVIATIONS
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ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
317.7							318	
30.5	**SANDY GRAVEL Silty** Grey sandy gravel, trace clay, dense to very dense [WS Till]	23	SS		51/0.15	31	317	...at 30.6m ,SPT sampler bouncing on possible boulder; switched to NQ coring
						32	316	
						33	315	
						34	314	
	Heaving sands from 34.4m to 35.05m					35	313	
						36	312	
						37	311	
310.0						38		
38.1	**End of Borehole** at 38.1m Standpipes installed with flush mounted steel casing. Water Level (bgs): For piezometer A (bottom sensing zone) at 0.27m on Jan10/12 frozen on Jan14/12 For piezometer B (top sensing zone) at 0.82m on Jan10/12 frozen on Jan14/12							

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

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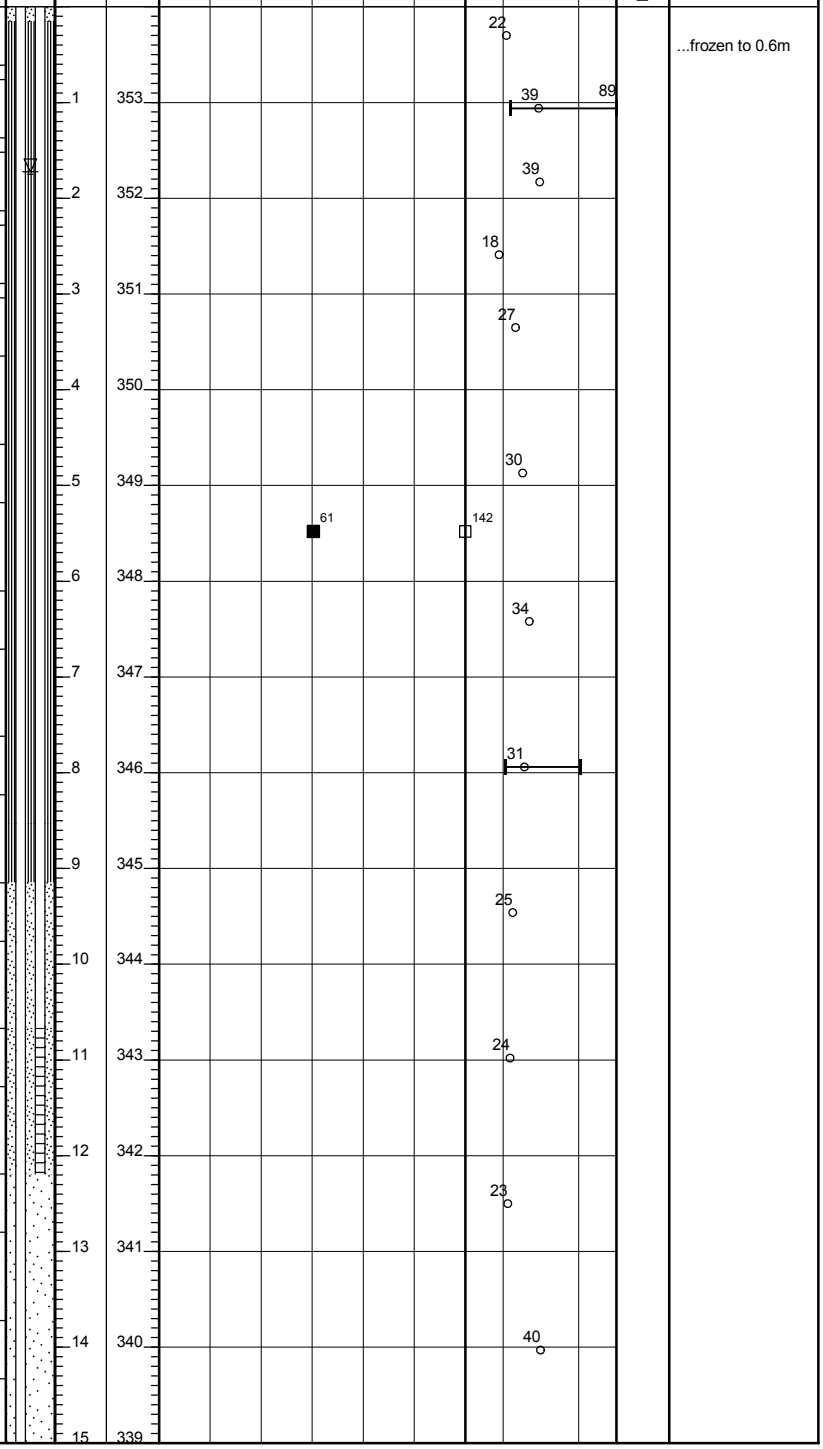
RECORD OF BOREHOLE No. BH11-24

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	354 m	COORD.	N 5,408,843 E 426,940	BORING DATE	Start: Mar 13, 12 End: Mar 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
354.0	Ground Surface					
0.0	**TOPSOIL** Dark brown sandy silt muskeg, occasional rootlets	1	AS			...frozen to 0.6m
353.2						
0.8	**Silty CLAY** Light brown silty clay, trace sand lensing, varved, firm, medium plasticity, moist [Glaciolacustrine] ...at 1.52m trace fine gravel, stiff	2	SS	75	7	
		3	SS	88	10	
		4	SS	100	13	
		5	SS	100	11	
349.4						
4.6	**Silty CLAY** Dark greyish brown silty clay, trace to some fine gravel, occasional silt pockets, stiff, medium plasticity, moist [WML Till]	8	SS	100	10	
		11	SS	100	10	
		14	SS	100	9	
		17	SS	100	7	
		20	SS	100	11	
		23	SS	92	12	
		24	SS	100	10	



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RECORD OF BOREHOLE No. BH11-24

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	354 m	COORD.	N 5,408,843 E 426,940	BORING DATE	Start: Mar 13, 12 End: Mar 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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RQD Rock Quality Designation
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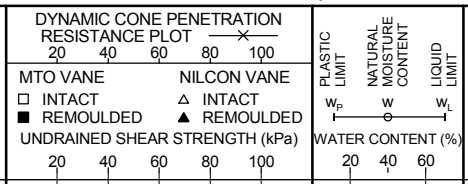
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
	...at 15.25m firm	25	SS	100	5			
						16	338	...at 15.9m switched to washboring
		28	SS	100	10	17	337	
						18	336	
335.7 / 18.3	**Silty CLAY** Dark grey clay some light grey silt, varved, firm, low plasticity, moist [Lower Glaciolacustrine]	31	SS	100	8			
335.1 / 18.9		32	BS			19	335	
334.8 / 19.2	**BOULDERS** [inferred WS Till]							...at 19.2m switched to NQ coring
	BEDROCK	33	RC	97	58	20	334	
		34	RC	98	38	21	333	
						22	332	
		35	RC	95	75	23	331	
		36	RC	100	67	24	330	
						25	329	
		37	RC	97	40	26	328	
		38	RC	100	50	27	327	
						28	326	
		39	RC	100	100	29	325	
						30	324	



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RECORD OF BOREHOLE No. BH11-24

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	354 m	COORD.	N 5,408,843 E 426,940	BORING DATE	Start: Mar 13, 12 End: Mar 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			40	RC	100	87		31	323										
			41	RC	100	52		32	322										
			42	RC	100	80		33	321										
319.6								34	320										
34.4	**End of Borehole** at 34.44m Standpipes installed with flush mounted steel casing Water level (b.g.s): For Piezometer A (bottom sensing zone) 1.67m on March 14/12 For Piezometer B (top sensing zone) 0.35 on April 22/12																		

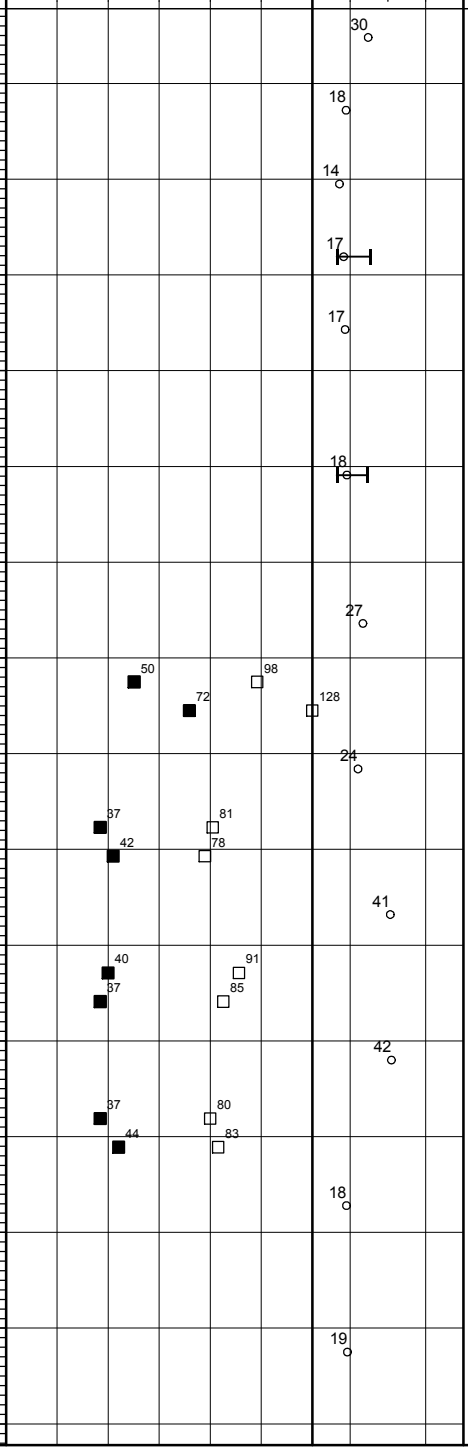
RECORD OF BOREHOLE No. BH11-25

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	358.780 m	COORD.	N 5,409,122 E 427,302	BORING DATE	Start: Mar 15, 12 End: Mar 16, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
358.8	Ground Surface					
0.0	**Silty CLAY** Brown silty clay, some sand, trace fine gravel, low plasticity, occasional rootlets	1	AS			...frozen to 0.8m
358.0						
0.8	**Silty CLAY** Light brown silty clay, some sand, trace gravel, varved, very stiff, low plasticity, moist, trace oxidation [Upper Glaciolacustrine]	2	SS	75	18	
		3	SS	96	17	
	...at 2.3m becoming stiff	4	SS	92	14	
		5	SS	96	13	
354.2						
4.6	**Silty CLAY** Dark grey silty clay, trace to some sand, trace gravel, occasional silt lenses, stiff, medium plasticity, moist [WML Till]	6	SS	100	12	
	...at 6.1m becoming firm, no gravel	7	SS	100	6	
		10	SS	100	8	
	...at 9.15m trace gravel	13	SS	100	4	
		16	SS	100	4	
	...at 12.2m stiff	19	SS	100	10	
	...at 13.7m very stiff	22	SS	100	20	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-25

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	358.780 m	COORD.	N 5,409,122 E 427,302	BORING DATE	Start: Mar 15, 12 End: Mar 16, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
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DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
	...at 15.25m some gravel	23	SS	58	17	343		22			...at 15.3m switched to washboring
		24	TW			342					
		25	TW			341					...at 17.5m PP = 73 KPa Torvane = 25 KPa
						340					...at 18.6m PP = 73 KPa Torvane = 25 KPa
338.4	... at 19.8m gravel, trace sand, hard, low plasticity, moist	26	SS	17	46	339		10			
20.4	**BOULDERS** [Inferred WS Till]	27	RC			338					...at 20.4m switched to NQ coring
333.6						337					
25.2	**BEDROCK**	28	RC	95	85	336					
		29	RC	97	85	335					
330.6						334					
28.2	**End of Borehole** at 28.19m Standpipes installed with flush mounted steel casing Water level (b.g.s): For Piezometer A at 3.35m on Mar 16/12					333					
						332					
						331					

DEPTH (m): 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

WATER CONTENT (%) 20 40 60

RECORD OF BOREHOLE No. BH11-27

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	355.103 m	COORD.	N 5,408,603 E 427,269	BORING DATE	Start: Mar 14, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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U.W. Wet Unit Weight
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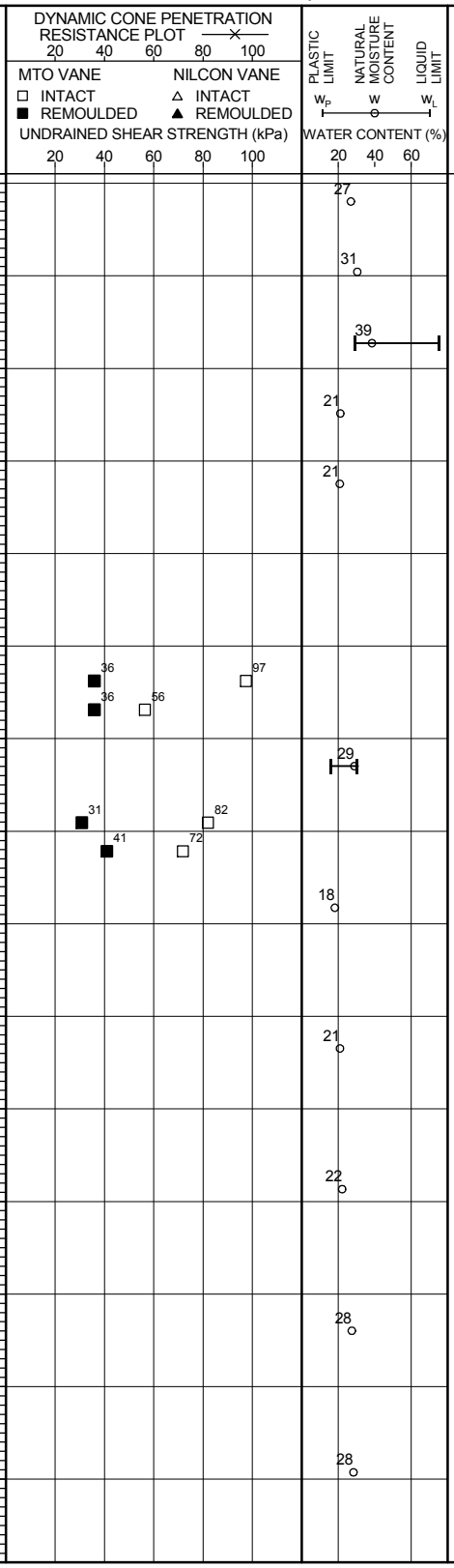
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
355.1	Ground Surface					
0.0	**TOPSOIL** Brown silty clay, trace to some sand, stiff, rootlets and organics	1	SS	100	21	
353.9		2	SS	83	16	...frozen to 1.2m
1.2	**SILTY CLAY** Greyish brown silty clay, trace sand and gravel, stiff, medium plasticity, damp to moist. [Upper Glaciolacustrine]	3	SS	88	9	
	...at 1.5m varved, medium to high plasticity, trace mottled brown lenses	4	SS	100	9	
	...at 3.0 m trace to some sand and gravel, rounded to subangular	5	SS	100	9	
350.5						
4.6	**SILTY CLAY** Greyish brown silty clay, firm to stiff, medium to high plasticity, moist. [WML Till]	6	SS	100	5	
		9	SS	100	6	
	...at 9.1m becoming dark grey, trace to some sand and gravel (subangular)	12	SS	100	9	
		14	SS	71	9	
	...at 12.6m , 5cm thick sand lense	15	SS	100	12	
	...at 13.7m occasional silty pockets	16	SS	100	9	...at 12.2 switched to washboring
		18	SS	100	9	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-27

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	355.103 m	COORD.	N 5,408,603 E 427,269	BORING DATE	Start: Mar 14, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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ABBREVIATIONS
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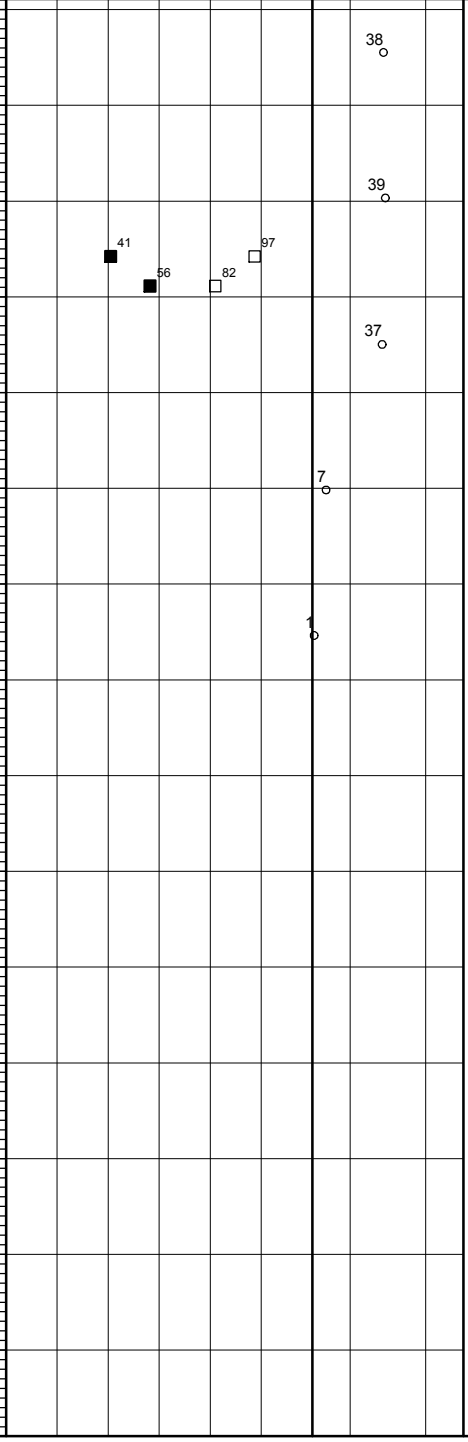
ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
		19	SS	100	8	
	...at 16.8m becoming firm	21	SS	100	5	
336.4		24	SS	100	8	
18.7	**Silty CLAY** Greyish green silty clay, varved, firm, medium plasticity, moist. [Lower Glaciolacustrine]					
335.3						
19.8	**Sandy GRAVEL AND SILT** Grey sandy gravel, trace clay, angular, dense, wet [inferred WS Till]	26	SS	13	36	
		27	SS	25	49	
	...below 22.3m occasional boulders					
327.2						
27.9	**BEDROCK** Grey fractured	28	RC	84	67	...switched to NQ coring at 27.9 m



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RECORD OF BOREHOLE No. BH11-27

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Stockpile			COMPILED BY	SM
ELEVATION	355.103 m	COORD.	N 5,408,603 E 427,269	BORING DATE	Start: Mar 14, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
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SCR Solid Core Recovery
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	...bedrock highly fractured between 29.8m and 31.1m		29	RC	100	50		31	324				
			30	RC	100	68		32	323				
	...slightly fractured below 32.7m		31	RC	100	92		33	322				
								34	321				
			32	RC	100	93		35	320				
319.4													
35.7	**End of Borehole** at 35.7m Standpipe installed with flush mounted steel casing. Water level(b.g.s): at 0.87m on March 17/2012												

RECORD OF BOREHOLE No. BH11-28

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Open Pit			COMPILED BY	NH
ELEVATION	349.444 m	COORD.	N 5,408,218 E 426,325	BORING DATE	Start: Feb 12, 12 End: Feb 23, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
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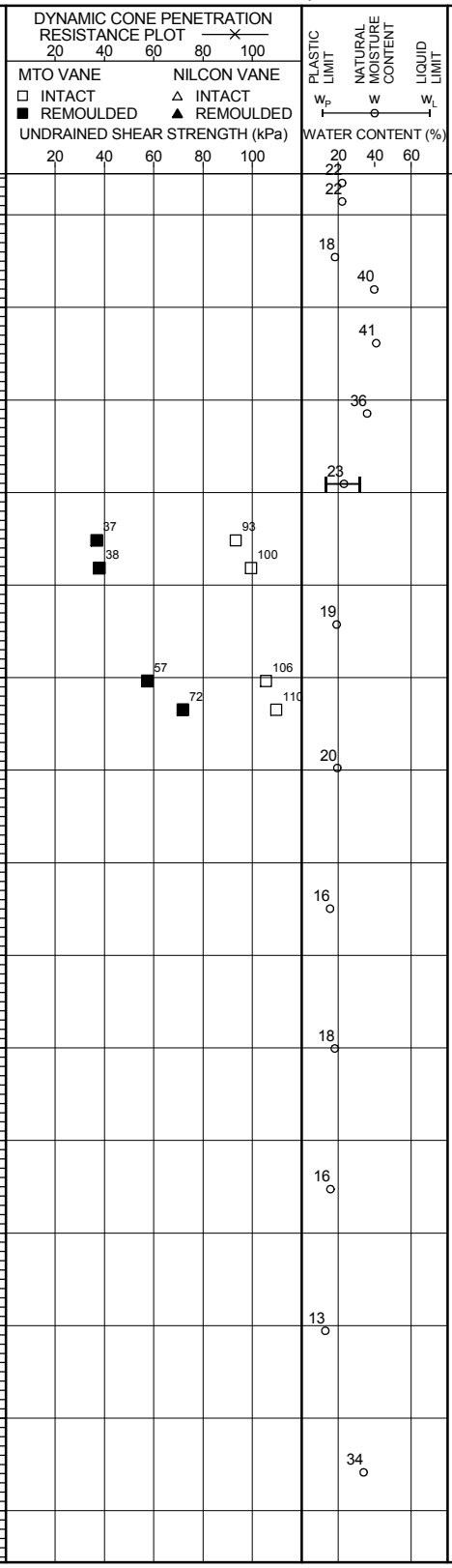
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
349.4	Ground surface					
0.0	**Silty SAND** Light brown silty sand, fine, trace clay, oxidised, woods.	1	AS			
348.6	...organics at top.					...frozen to 1.4m
0.9	**Silty CLAY** Dark brown silty clay, light brown lenses, medium plasticity, stiff, moist [Upper Glaciolacustrine]	2	SS	83	16	
		3	SS	88	9	
		4	SS	96	9	
		5	SS	96	7	
344.9						
4.6	**Silty CLAY** Grey silty clay, trace gravel, trace sand, light grey lenses, medium plasticity, firm, moist [WML Till]	8	SS	100	7	
		11	SS	67	10	
	...below 7.63m, wet, hard	12	SS	21	27	
341.2						
8.2	**GRAVELLY SAND** Grey sand and gravel, trace clay, some silt, poorly graded, compact, wet [Glaciofluvial]	13	AS			
		14	SS	50	20	...heaving sand up to 8.8m
		15	SS	33	34	...at 10.67m, switched to wash boring.
		16	SS	54	42	
335.7						
13.7	**Silty CLAY** Dark grey silty clay, trace light brown lenses, occasional silt pockets, very stiff, medium plasticity [WML Till]	17	SS	100	16	



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RECORD OF BOREHOLE No. BH11-28

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Open Pit			COMPILED BY	NH
ELEVATION	349.444 m	COORD.	N 5,408,218 E 426,325	BORING DATE	Start: Feb 12, 12 End: Feb 23, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
		20	TW	100		16	334, 333	...at 16m PP=49 KPa TV=49 KPa
332.7 / 16.8	**Silty CLAY** Dark grey silty clay, trace gravel, varved, low plasticity, wet [Lower Glaciolacustrine]	23 A&B	SS		25	17	332	
332.1 / 17.4	**BOULDERS** [inferred WS Till]	24	RC			18, 19, 20	331, 330, 329	...at 17.4m, 1m of artesian pressure encountered
329.0 / 20.4	**BEDROCK**	26	RC	97	28	21, 22	328, 327	
		27	RC	98	97	23	326	
325.7 / 23.8	**End of Borehole** Standpipe installed with flush mounted steel casing. Water level(b.g.s): at 3.05m on February 23/2012	25	RC					

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60
Values: 14, 30

PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH11-28

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Open Pit			COMPILED BY	NH
ELEVATION	349.444 m	COORD.	N 5,408,218 E 426,325	BORING DATE	Start: Feb 12, 12 End: Feb 23, 12	CHECKED BY	DGR

SAMPLE TYPES
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SOIL PROFILE		SAMPLES														
ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE: □ INTACT ■ REMOULDED	NILCON VANE: △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS

RECORD OF BOREHOLE No. BH11-29

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Pinewood River			COMPILED BY	NH
ELEVATION	345.784 m	COORD.	N 5,408,528 E 424,526	BORING DATE	Start: Mar 2, 12 End: Mar 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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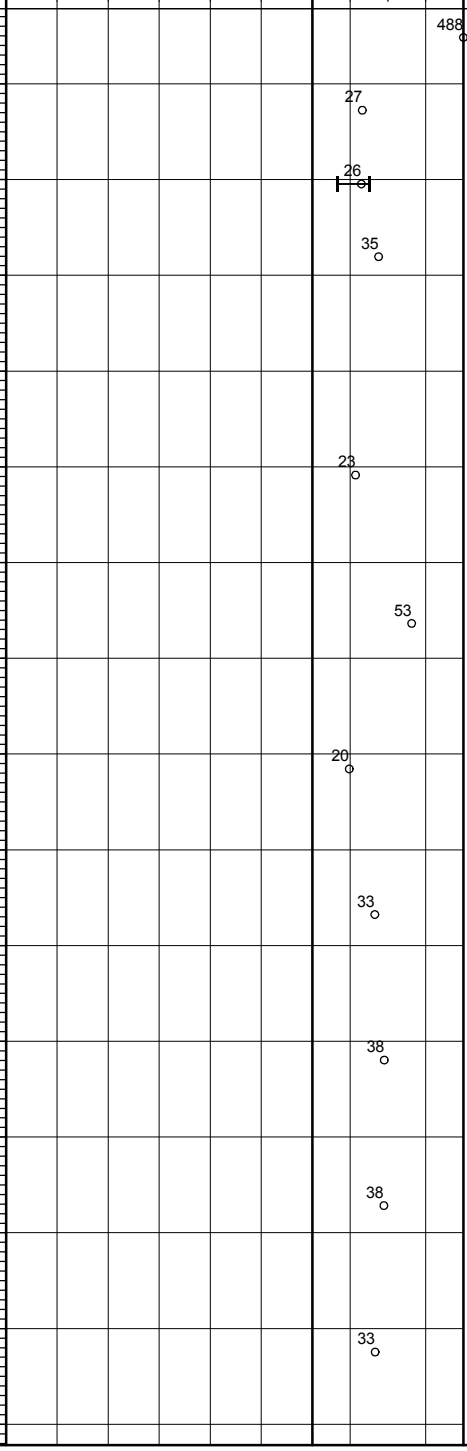
ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
345.8	Ground surface					
0.0	**TOPSOIL** Dark brown fibrous peat.	1	AS			
345.0						
0.8	**Silty CLAY** Light brown silty clay, soft.	2	SS	17	3	...frozen to 0.6m
344.3	...at 0.79m, grey sandy clay, low plasticity, soft.					
1.5	**Silty CLAY** Grey silty clay, some sand, low plasticity, varved, moist, firm, trace oxidised pockets [Upper Glaciolacustrine]	3	SS	63	4	
		4	AS	100		
		5	TW	100		...at 3.35m, TV=25 KPa
341.2						
4.6	**Silty CLAY** Dark grey silty clay, trace sand, medium to high plasticity, stiff, moist. [WML Till]	6	SS	96	6	
		7	SS	100	5	
	...below 7.63m, trace fine gravel.	8	SS	75	5	
		9	SS	100	11	
		10	SS	100	7	...at 10.7m, switched to wash boring.
		11	SS	100	7	
		12	SS	100	12	



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RECORD OF BOREHOLE No. BH11-29

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Pinewood River			COMPILED BY	NH
ELEVATION	345.784 m	COORD.	N 5,408,528 E 424,526	BORING DATE	Start: Mar 2, 12 End: Mar 5, 12	CHECKED BY	DGR

SAMPLE TYPES
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ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
		13	SS	100	10	16	330		35			
		14	SS	100	12	17	329		35			
		15	SS	100	9	18	328		36			
		16	SS	100	9	19	327		35			
		17	SS	100	10	20	326		35			
		18	SS	100	11	21	325	16				
		19	SS	100	13	22	324	25				
	...below 25.9m, stiff to very stiff.	20	SS	100	19	23	323	26				
		21	SS	100	23	24	322	24				
		22	SS	100	14	25	321	37				
						26	320					
						27	319					
						28	318					
						29	317					
						30	316					

Continued on Next Page

RECORD OF BOREHOLE No. BH11-29

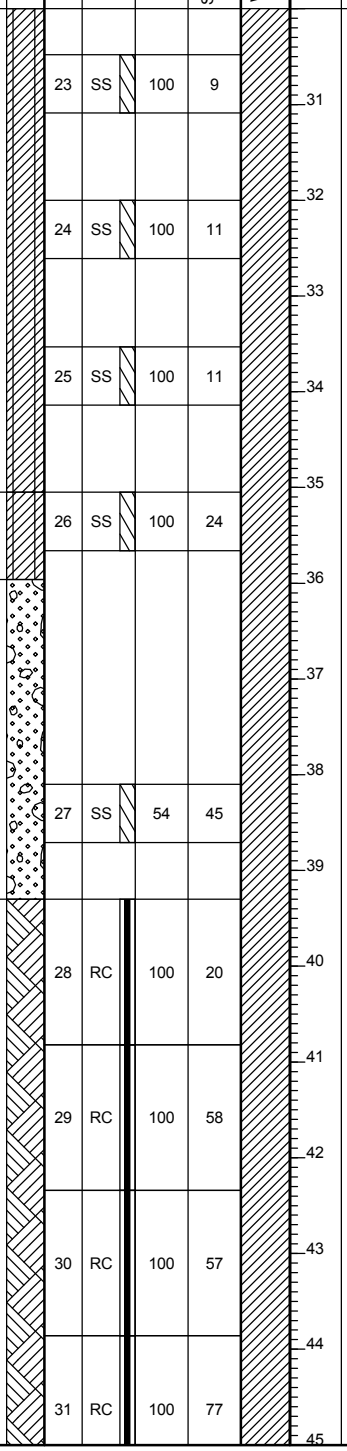
PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Pinewood River			COMPILED BY	NH
ELEVATION	345.784 m	COORD.	N 5,408,528 E 424,526	BORING DATE	Start: Mar 2, 12 End: Mar 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
	...from 30.6m to 30.8m, grey silty sand layer.	23	SS	100	9	
		24	SS	100	11	
		25	SS	100	11	
310.7						
35.1	**Silty CLAY** Dark grey silty clay, trace sand, trace silt, varved, low to medium plasticity, very stiff [Lower Glaciolacustrine]	26	SS	100	24	
309.8						
36.0	**Sandy GRAVEL and BOULDERS** Sandy gravel, silty [inferred WS Till]	27	SS	54	45	...at 36.6m, artesian pressure encountered up to 2.1m
306.5						
39.3	**BEDROCK**	28	RC	100	20	
		29	RC	100	58	
		30	RC	100	57	
		31	RC	100	77	

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) (20 40 60)
PERMEABILITY (cm/s)



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RECORD OF BOREHOLE No. BH11-29

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Pinewood River			COMPILED BY	NH
ELEVATION	345.784 m	COORD.	N 5,408,528 E 424,526	BORING DATE	Start: Mar 2, 12 End: Mar 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L (WATER CONTENT (%) 20 40 60)	PERMEABILITY (cm/s)	REMARKS
			32	RC	100	72		46	300				
			33	RC	100	50		47	299				
			34	RC	100	57		48	298				
			35	RC	100	88		49	297				
			36	RC	100	10		50	296				
			37	RC	100	77		51	295				
								52	294				
								53	293				
								54	292				
291.3													
54.5	**End of Borehole** at 54.35 Standpipe installed with flush mounted steel casing. Water level (b.g.s): at surface on March 05/12												

MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

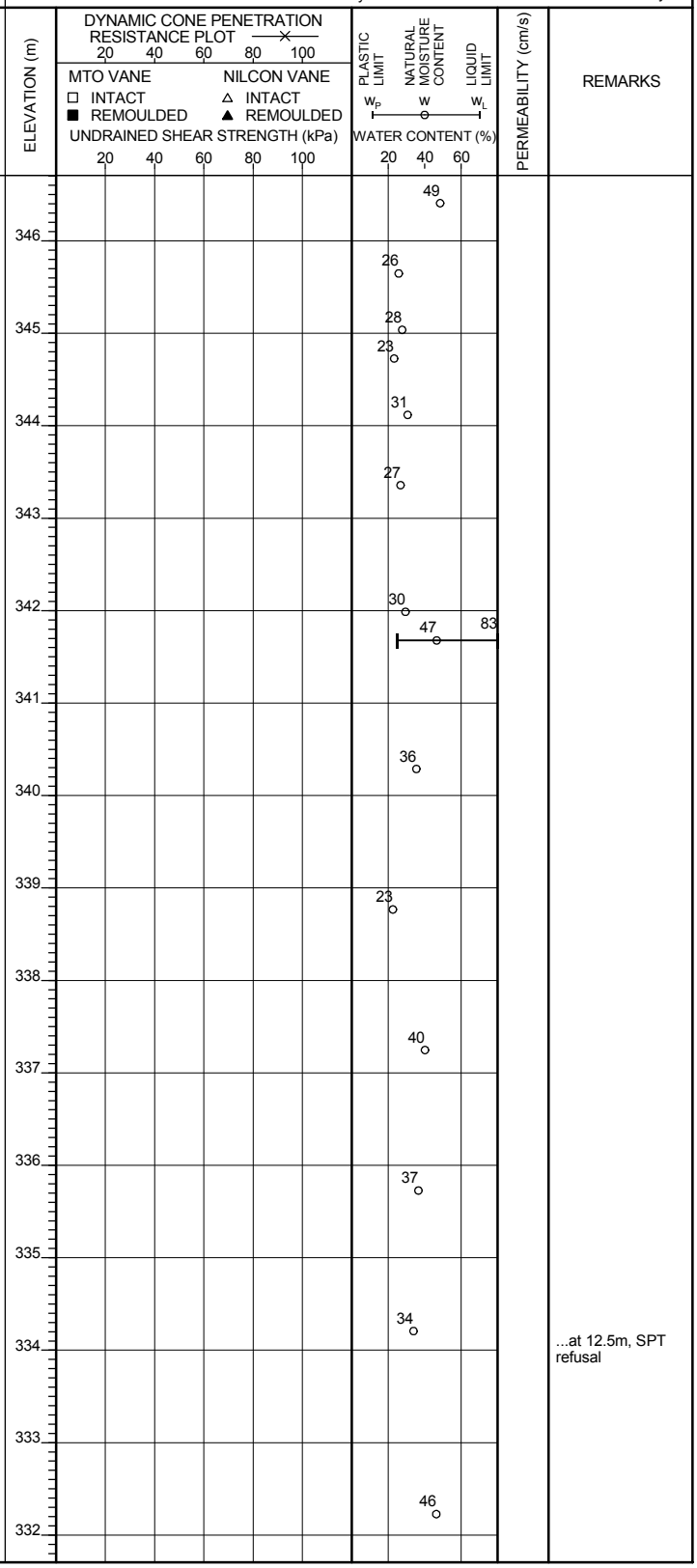
RECORD OF BOREHOLE No. BH11-33

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of River			COMPILED BY	NH
ELEVATION	346.707 m	COORD.	N 5,408,476 E 425,586	BORING DATE	Start: Feb 23, 12 End: Feb 24, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
346.7	Ground surface					
346.6 / 0.1	**TOPSOIL**					
	Silty CLAY Brown silty clay, some sand, slightly oxidised, low plasticity, soft, moist to wet at tip	2	SS	54	4	
		3	SS	79	11	
344.4 / 2.3	...at 1.8m grey silty sand, poorly graded, compact, wet					
	Silty CLAY Dark brown silty clay, some sand, trace gravel, occasional sand laminations, low plasticity, firm, moist [Upper Glaciolacustrine]	4	SS	88	6	
		5	SS	71	4	
341.8 / 4.9	**Silty CLAY** Dark grey silty clay, some sand, firm, medium plasticity, moist	6 A&B	SS	83	3	
	...below 6.1m, sand and gravel laminations	7	SS	100	7	
		8	SS	100	10	
		9	SS	100		
		10	SS	100	10	
		11	SS		9	
	...from 12.5 to 13.7m, boulders	12	RC	19		...at 12.5m, SPT refusal
		13	RC	7		



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RECORD OF BOREHOLE No. BH11-33

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of River			COMPILED BY	NH
ELEVATION	346.707 m	COORD.	N 5,408,476 E 425,586	BORING DATE	Start: Feb 23, 12 End: Feb 24, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
	...below 15.25m very stiff	14	SS	4	36	16	331		37			
		15	SS	100	18	17	330		31			
		16	SS	100	18	18	329		24			
		17	SS	100	13	19	328		22			
	...below 21.34m, occasional silt pockets	18	SS	100	14	20	327		35			
		19	SS	100	15	21	326		37			
		20	SS	100	14	22	325		35			
		21	SS	100	15	23	324		25			
319.3 / 27.4	**Silty CLAY** Grey silty clay, varved, low plasticity, very stiff, moist [Lower Glaciolacustrine]	22	SS	100	17	24	323		35			
317.7 / 29.0	**SAND and GRAVEL** Grey sand and gravel, trace silt, well graded, dense, wet [WS till]	23	SS	100	54	25	322					
						26	321					
						27	320					
						28	319					
						29	318					
						30	317					

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

Continued on Next Page

RECORD OF BOREHOLE No. BH11-33

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of River			COMPILED BY	NH
ELEVATION	346.707 m	COORD.	N 5,408,476 E 425,586	BORING DATE	Start: Feb 23, 12 End: Feb 24, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			24	SS	0	76		31	316				
			25	SS	38	41		32	315				
			26	SS	42	19		33	314				
			27	SS	83	38		34	313				
	...below 36.6m, boulders							35	312				
308.9								36	311				
37.8	**BEDROCK** Highly weathered		28	RC	77	0		37	310				
			29	RC	83	0		38	309				
			30	RC	58	0		39	308				
			31	RC	47	0		40	307				
302.8								41	306				
43.9	**End of Borehole** Standpipe installed with flush mounted steel casing Water level at ground surface upon installation							42	305				
								43	304				
									303				

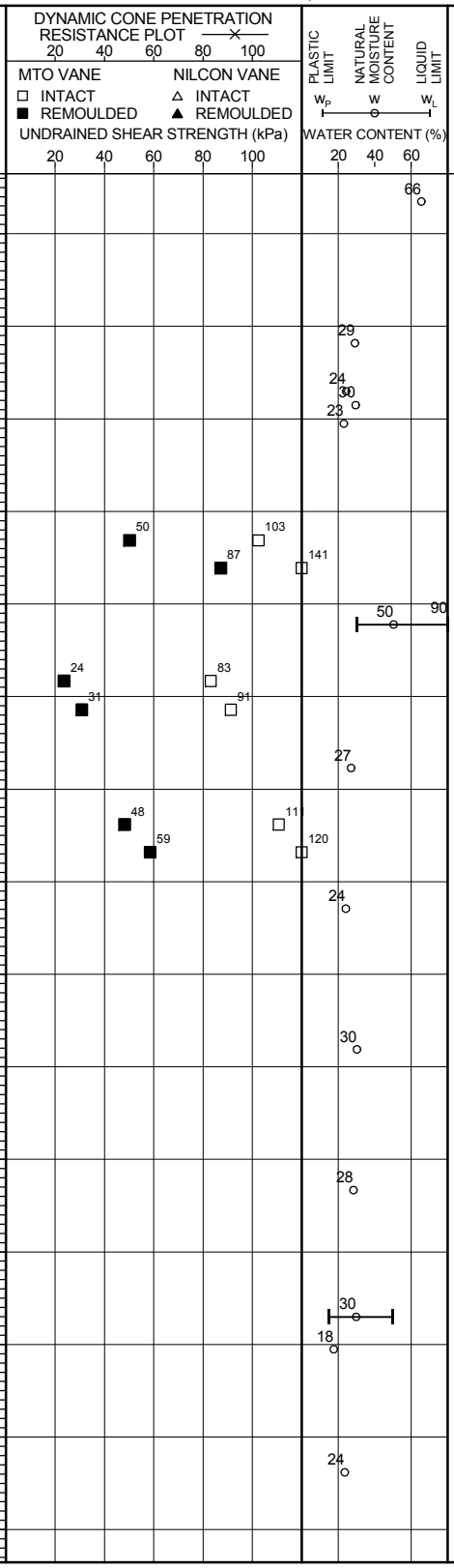
RECORD OF BOREHOLE No. BH11-34

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Open Pit			COMPILED BY	NH
ELEVATION	347.648 m	COORD.	N 5,408,419 E 426,102	BORING DATE	Start: Feb 9, 12 End: Feb 11, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
347.6	Ground surface					
0.0 / 347.3	**TOPSOIL**	1	AS			
0.3	Dark brown peat					...frozen to 0.6m
	Silty CLAY Greyish brown silty clay, trace gravel, grey lenses, trace oxidised pockets, medium plasticity, moist [Upper Glaciolacustrine]	2A B&C	SS	83	7	
	...at 1.26m, sand laminations	3	SS	79	6	
		4A B C	SS	75	5	
		5	TW	100		
343.1						
4.6	**Silty CLAY** Dark grey silty clay, trace sand, medium plasticity, firm to stiff, moist, light grey silt pockets [WML Till]	8	SS	83	7	
		10	SS	100	6	
		13	SS	92	6	
		14	SS	100	10	...at 9.15m, switched to wash boring.
		15	SS	100	11	
	...at sandy layer between 12.65 and 12.8m	6A&B	SS	100	17	
		17	SS	100	9	



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RECORD OF BOREHOLE No. BH11-34

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Open Pit			COMPILED BY	NH
ELEVATION	347.648 m	COORD.	N 5,408,419 E 426,102	BORING DATE	Start: Feb 9, 12 End: Feb 11, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L (WATER CONTENT (%))	PERMEABILITY (cm/s)	REMARKS
		18	SS	100	16	16	332	38		
		19	SS	100	12	17	331	37		
		20	SS	100	8	18	330	26		
328.4 / 19.2	**Sandy GRAVEL** Boulders [inferred WS Till]					19	329			
326.9 / 20.7	**BEDROCK**	22	RC	98	83	20	328			
		23	RC	97	55	21	327			
	...highly fractured	24	RC	95	7	22	326			
		25	RC	98	62	23	325			
		27	RC	95	68	24	324			
		28	RC	98	87	25	323			
						26	322			
						27	321			
						28	320			
						29	319			
						30	318			

Continued on Next Page

RECORD OF BOREHOLE No. BH11-34

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	South of Open Pit			COMPILED BY	NH
ELEVATION	347.648 m	COORD.	N 5,408,419 E 426,102	BORING DATE	Start: Feb 9, 12 End: Feb 11, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	SOIL PROFILE	SAMPLES											
			29	RC	97	80		31	317				
			30	RC	97	87		32	316				
			31	RC	95	55		33	315				
			32	RC	95	80		34	314				
			33	RC	100	62		35	313				
								36	312				
310.6								37	311				
37.0	**End of Borehole** at 37.0m Standpipe installed with flush mounted steel casing. Vibrating wire piezometer [sensor I.D: VW 20396] installed at 19.8 m.												

RECORD OF BOREHOLE No. BH11-35

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Ore Stockpile			COMPILED BY	NH
ELEVATION	368.08 m	COORD.	N 5,410,896 E 426,306	BORING DATE	Start: Jan 10, 12 End: Jan 12, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L)	PERMEABILITY (cm/s)	REMARKS
368.1	Ground surface								
368.0 / 0.2	**TOPSOIL**								
367.5 / 0.6	**SANDY SILT** Light brown sandy silt, some clay, some roots, frozen.	1	SS	79	8				
	SANDY SILT Light brown sandy silt, some clay, trace gravel, some silt laminations, varved, stiff, low to medium plasticity, moist [Upper Glaciolacustrine]	2	SS	75	12	367	18		...frozen to 1.4 m
		3	SS	96	13	366	22		
	...at 2.3m, some to trace clay, very stiff.	4	SS	100	19	365	24		
	...at 3.04m, becoming stiff, occasional sand laminations.	5	SS	100	11	364	24		
363.5 / 4.6	**SILTY SAND** Light brown silty sand, some clay, trace gravel, loose, wet [Glacial Sand]	6	SS	100	6	363	26		
361.7 / 6.4	**CLAY** Dark grey some clay trace to some silt, trace gravel, stiff, medium plasticity, moist, light brown lenses [WML Till]	7	SS	75	6	362			
	...occasional 3mm sand laminations noted below 7.6m.	8	SS	100	8	361	18		
358.9 / 9.1	**SAND AND GRAVEL** Grey sand and gravel, boulders, trace silt, wet [WS Till]	10	RC	95	48	360	19		
358.3 / 9.8	**BEDROCK**	11	RC	88	67	359			
		12	RC	100	75	358			
354.8 / 13.3	**End of Borehole** at 13.3m Standpipe installed with flush mounted steel casing Water level (b.g.s): at 4.24 m on Jan12/12. at 5.70 m on Jan15/12.					357 / 356 / 355			

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

WELL / PIEZOMETER INSTALLATION

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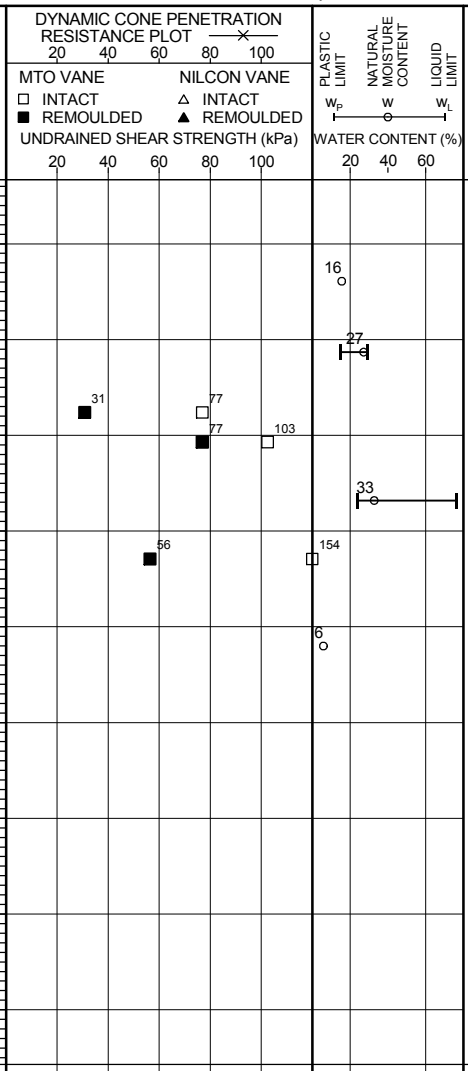
RECORD OF BOREHOLE No. BH11-36

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	SM
ELEVATION	374.669 m	COORD.	N 5,410,792 E 426,936	BORING DATE	Start: Dec 7, 11 End: Dec 9, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
374.7	Ground Surface					
0.0 / 374.4	**TOPSOIL**					
0.3	Dark grey silty clay, trace sand, medium plastic, moist, rootlets					
	SILTY CLAY Light brown silt, varved (grey clay in laminations), firm, low to medium plasticity, damp to moist [Upper Glaciolacustrine]	1	SS	79	8	
	...at 0.3m, non-plastic	2	SS	100	13	
	...at 1.52m, trace mottled brown lenses					
371.6						
3.1	**SILTY CLAY** Drak grey clay, some silt to silty, trace gravel , stiff to very stiff, medium to high plasticity, occasional sand pockets, moist [WML Till]	3	SS	100	12	
369.8	...below 4.6m, becoming silty and gravelly (subrounded)	4	SS	75	21	
4.8	**SAND** Dark grey sand, trace silt and gravel (subrounded), fine to medium, poorly graded, compact to dense, damp to moist					
368.4	...at 6.1 some fine gravel	5	SS	67	8/0.07	
6.2	**BEDROCK** Metamorphic, highly fractured	6	RC	97	19	
365.4						
9.2	**End of Borehole** at 9.2m Stand pipe installed with 0.76m stick up and protected with steel casing; stand pipe pulled up by 0.45m while retrieving auger Water level (bgs): at 5.58m on Dec09/12 No water on De18/12					



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-37

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	SM
ELEVATION	369.991 m	COORD.	N 5,410,528 E 426,658	BORING DATE	Start: Dec 9, 11 End: Dec 13, 11	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
370.0	Ground Surface							
0.0	**TOP SOIL** Light brown silt, trace gravel and cobbles (angular), mottled brown lenses, firm, no plasticity, dry to moist, rootlets at top	1	SS	83	22	1	369	
368.5								
1.5	**BEDROCK** Bluish grey, metamorphic, weathered ...fractured at the top	2	RC	100	65	2	368	
		3	RC	100	56	3	367	
						4	366	
365.2		4	RC	100	96			...UCS strength = 133.9 MPa.
4.8	**End of Borehole** at 4.8m Stand pipe installed with 0.91m stick up, protected with steel casing. Water level (bgs): at 1.88m on Dec 14/12 at 1.90m on Dec 18/12							

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

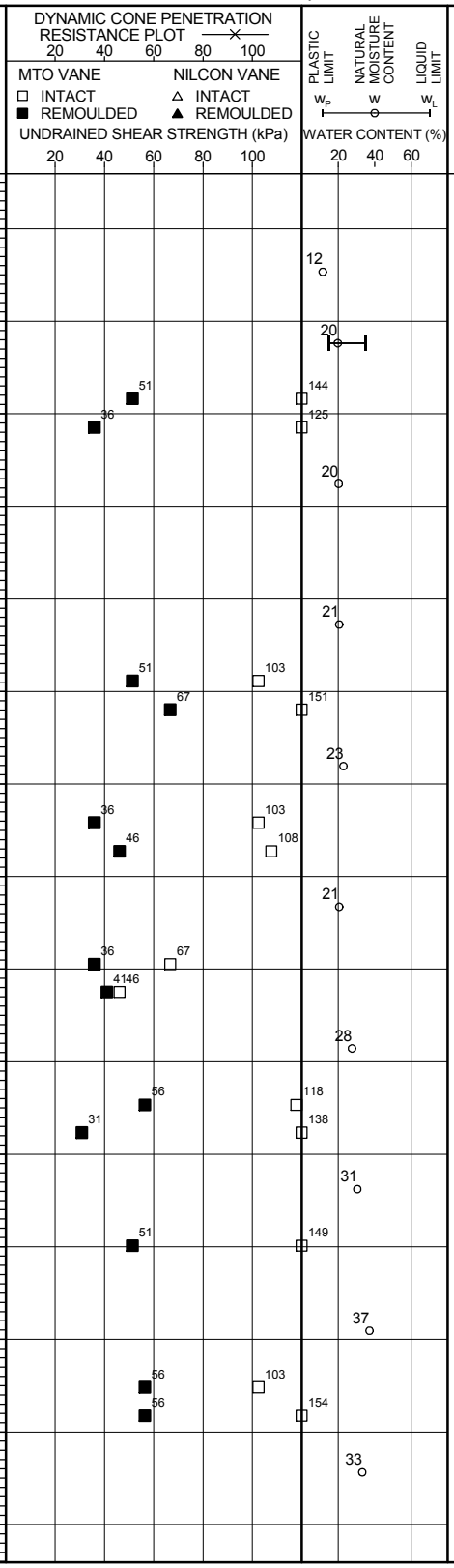
RECORD OF BOREHOLE No. BH11-38

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	NH
ELEVATION	371.593 m	COORD.	N 5,410,377 E 426,928	BORING DATE	Start: Jan 16, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
371.6	Ground surface					
0.0	**TOP SOIL** brown silty clay , organics, rootlets, trace sand, firm, low plasticity, damp to moist					
370.8 / 0.8	**SILTY CLAY** Light brown silt, trace sand and gravel, grey clay lenses, low to medium plasticity, stiff, moist, rootlets [Upper Glaciolacustrine] ...at 1.5m, becoming clayey, moist to wet, no rootlets	1	SS	92	13	
		2	SS	100	9	
		5	SS	100	8	
367.0 / 4.6	**SILTY CLAY** Grey clay, silty, trace sand, trace gravel, occasional silt pocket, stiff , medium to high plasticity, moist [WML Till]	6	SS	100	7	
	... becoming silty, firm, low to medium plastic, wet from 6.1m to 9.14m	7	SS	100	6	
		12	SS	96	6	
		15	SS	100	10	
		18	SS		8	
		20	SS	100	6	
	...at 13.72m, occasional silt pockets, cm scale.	23	SS	100	8	



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RECORD OF BOREHOLE No. BH11-38

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	NH
ELEVATION	371.593 m	COORD.	N 5,410,377 E 426,928	BORING DATE	Start: Jan 16, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
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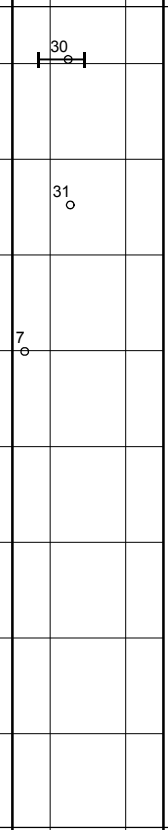
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
		24	SS	100	4	16	356	
	...at 16.8m trace sand and gravel angular to subangular, firm.	25	SS	54	12	17	355, 354	
353.3						18		
18.3	**SANDY GRAVEL** Greenish grey fine gravel, some sand, boulders, well graded ,angular to subangular [WS Till] ...at 18.9m, black greenish grey to light grey boulders, some cobbles, angular to sub angular	26	SS	17	15	19	353	
		27	RC	33		20	352	
350.7		28	RC	100			351	
20.9	**BEDROCK** Grey, metamorphic, fractured	29	RC	100	65	21	350	
		30	RC	98	80	22	349	
348.0		31	RC	100	100	23		
23.6	**End of borehole** at 23.6m Standpipe installed with 0.79m stick up and steel casing Water level (b.g.s): at 3.8m on Dec 19/12 at 3.9m on Jan14/12							

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60



PERMEABILITY (cm/s)

RECORD OF BOREHOLE No. BH11-39

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Plant Site			COMPILED BY	NH
ELEVATION	373.723 m	COORD.	N 5,409,832 E 426,819	BORING DATE	Start: Jan 5, 12 End: Jan 6, 12	CHECKED BY	DGR

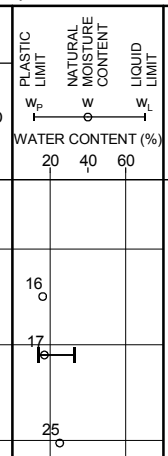
SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
373.7	Ground Surface					
373.0 / 0.2	**TOPSOIL** Dark brown organics, fibrous, rootlets	1	SS	71	7	...frozen to 0.2m
0.8	**SILT AND SAND** Light brown silt and sand, trace gravel, dark brown pockets of organics, damp, rootlets	2	SS	75	10	
	SILTY CLAY Light brown to grey silt, trace sand and gravel, varved (grey clay lamination), firm to stiff, low to medium plasticity, damp to moist, occasional mottled brown lenses [Upper Glaciolacustrine]	3	SS	100	10	
370.9		4	SS	100	10	
2.8	**BEDROCK** Fractured, greyish blue	5	RC	100	74	
		6	RC	86	0	
		7	RC	100	93	...UCS strength = 140.4 MPa.
		8	RC	87	50	
367.8		9	RC	100	75	
5.9	**End of Borehole** at 5.9m Stand pipe installed with 0.81m stick up and protected with steel casing Water level (b.g.s): at 0.2m on Jan 06/12 at 1.8m on Jan 14/12					

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20, 40, 60, 80, 100)

PLASTIC LIMIT (w_P) — NATURAL MOISTURE CONTENT (w) — LIQUID LIMIT (w_L)
WATER CONTENT (%) (20, 40, 60)



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH11-40

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	NH
ELEVATION	370.100 m	COORD.	N 5,411,994 E 425,356	BORING DATE	Start: Feb 2, 12 End: Feb 3, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
370.1	Ground surface					
370.0	**TOPSOIL**					
0.2	**SILT** Brown silt, some clay, trace to some sand, trace gravel, moist, stiff ...at 0.76m, becoming light brown, clayey,	1	SS	67	9	... frozen to 0.6m
		2	SS	75	10	
368.6						
1.5	**SILTY CLAY** Light brown clay, some silt, trace fine gravel, varved, tiny pockets of silt, low plastic, stiff, moist [Upper Glaciolacustrine]	3	SS	83	12	
367.8						
2.3	**SILTY CLAY** Dark brown clay, silty, trace gravel, lensed, tiny pockets of silt, medium to high plasticity, stiff [WML Till]	4	SS	88	14	
		5	SS	100	11	
		6	SS	100	8	
		7	SS	100	10	
		8	TW	75		...at 7.6m PP = 158 KPa TV (standard) = 49KPa
360.9						
9.2	**SILTY CLAY** Silty clay, trace sand, medium to high plastic, stiff [Lower Glaciolacustrine]	9	SS	14	11	
360.4						
9.7	**BOULDERS**	10	RC			...at 9.7m SPT spoon bouncing on possible boulders; switched to NQ coring
		11	RC			
	between 11.7m and 13.26m, silty sand, some gravel, wet	12	RC			
356.5						
13.6	**BEDROCK**	13	RC	75	58	

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RECORD OF BOREHOLE No. BH11-40

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Flotation Tailings			COMPILED BY	NH
ELEVATION	370.100 m	COORD.	N 5,411,994 E 425,356	BORING DATE	Start: Feb 2, 12 End: Feb 3, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; MTO VANE □ INTACT ■ REMOULDED; NILCON VANE △ INTACT ▲ REMOULDED; UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100	PLASTIC LIMIT W_P; NATURAL MOISTURE CONTENT W; LIQUID LIMIT W_L; WATER CONTENT (%) 20 40 60	PERMEABILITY (cm/s)	REMARKS
			14	RC	95	93		16	354				
			15	RC	93	57		17	353				
352.7 17.4	End of Borehole at 17.4m. Standpipe installed with 0.15m stick up and protected with steel casing. Water level(bgs): at 5.7m on Dec17/12												

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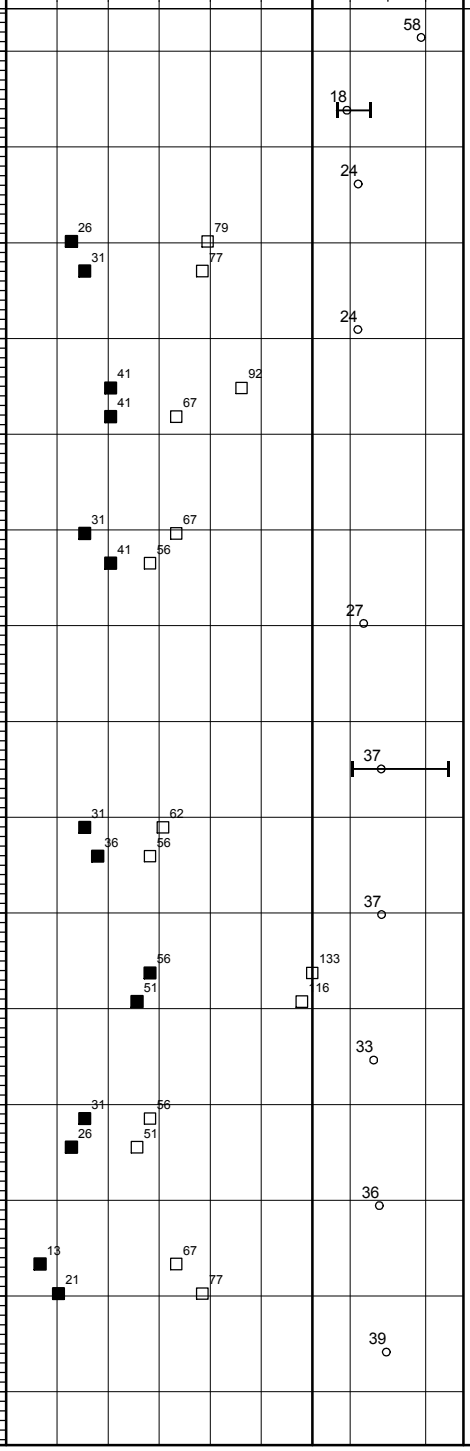
RECORD OF BOREHOLE No. BH11-41

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Satelite Pit			COMPILED BY	NH
ELEVATION	350.444 m	COORD.	N 5,410,296 E 424,215	BORING DATE	Start: Feb 4, 12 End: Feb 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
350.4	Ground surface					
0.0	**Silty SAND** Dark brown silty sand, trace gravel, organics, compact	1	SS	88	13	...frozen to 1.35m
349.7						
0.8	**Silty CLAY** Light brown silty clay, trace gravel, trace organics, medium plasticity, varved [Upper Glaciolacustrine]	2	SS	92	10	
		3	SS	96	7	
		6	SS		4	
		9	TW	83		
344.3						
6.1	**Silty CLAY** Dark grey silty clay, trace gravel, trace silt, moist, medium to high plasticity, firm [WML Till]	12	SS	100	7	
		13	SS	100	6	
		16	SS	100	9	
		19	SS	100	8	
		22	SS		2	
336.7						
13.7	**Sandy Till** [Inferred WS Till]	25	SS	0.04	13	



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RECORD OF BOREHOLE No. BH11-41

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	MM
CLIENT	Rainy River Resources.	LOCATION	Satelite Pit			COMPILED BY	NH
ELEVATION	350.444 m	COORD.	N 5,410,296 E 424,215	BORING DATE	Start: Feb 4, 12 End: Feb 5, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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ABBREVIATIONS
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ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
334.1		26	RC	58		16	335	
16.3	**BEDROCK** Highly fractured	27	RC	28	0	17	334	
		28	RC	50	12	18	333	
		29	RC	80	0	19	332	
		30	RC	100	68	20	331	
328.0						21	330	
22.4	**End of Borehole** at 22.41m. Standpipe installed with flush mounted casing Water Level (b.g.s): at surface upon completion					22	329	

SOIL PROFILE | SAMPLES | WELL / PIEZOMETER INSTALLATION | DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) | MTO VANE □ INTACT ■ REMOULDED | NILCON VANE △ INTACT ▲ REMOULDED | UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100) | PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L | WATER CONTENT (%) (20 40 60) | PERMEABILITY (cm/s)

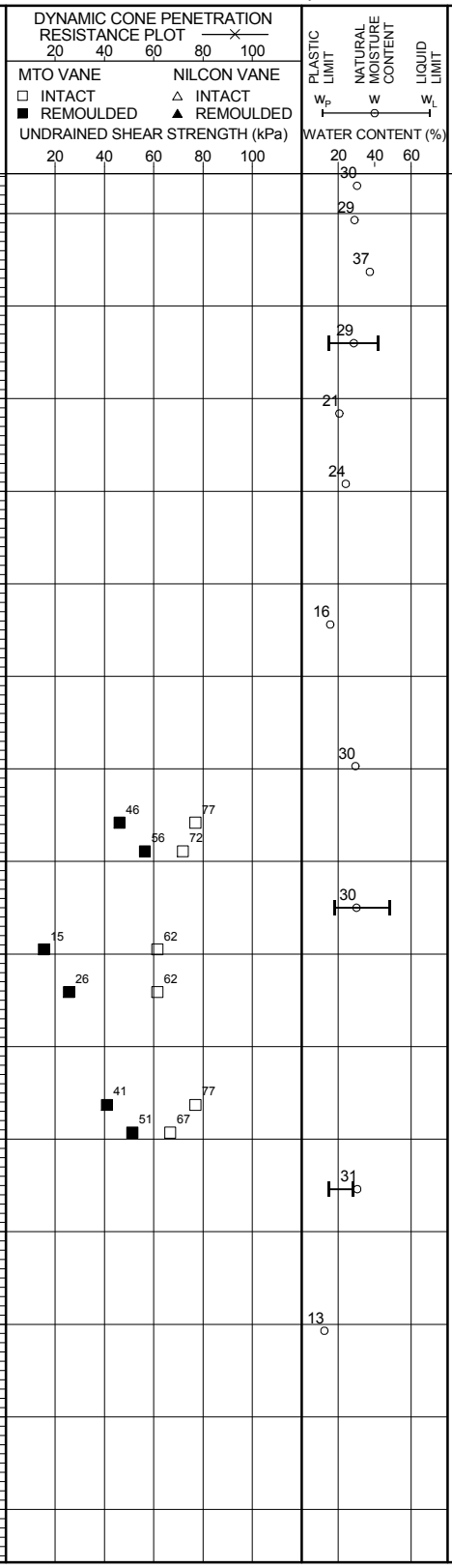
RECORD OF BOREHOLE No. BH11-44

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Pinewood River hydro			COMPILED BY	SM
ELEVATION	351.43 m	COORD.	N 5,408,622 E 426,560	BORING DATE	Start: Mar 13, 12 End: Mar 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
351.4	Ground surface					
351.2 / 0.9	**TOPSOIL** Dark brown organics, fibrous, rootlets	1A&B	SS	96	14	Frozen to 0.61m
349.9 / 1.5	**Silty CLAY to Clayey SILT** Brown silty clay, trace to some sand, trace to some organics, firm to stiff, medium plasticity, occasional rootlets	2	SS	79	9	
	Silty CLAY Brown clayey silt, trace to some sand, grey clay lamination (varved), mottled brown lenses, firm, low to medium plasticity, damp [Upper Glaciolacustrine]	3	SS	96	7	
		4	SS	96	9	
	...at 2.43m, sandy, trace gravel, stiff	5	SS	100	8	
	...at 4.6m, sandy, damp to moist	6	SS	100	15	
345.3 / 6.1	**CLAY** Dark grey clay, some silt, trace sand and gravel , stiff, high plasticity, moist [WML Till]	7	SS	100	8	
	...at 7.6m, becoming firm, moist to wet	10	SS	100	5	
		13	SS	100	6	
340.8 / 10.7	**Clayey SILT** Greyish green clayey silt, silt as green lamination (2-3mm) varved, firm, low plasticity, moist to wet [Lower Glaciolacustrine] ...below 10.9m, sandy	16	SS	100	13	...auger grinding at 11m
339.2 / 12.2	**SAND AND GRAVEL** Grey silty sand and gravel, angular to subangular, compact, well graded, wet [Inferred WS Till] ...below 13.1m, boulders	17	SS	50	29	
336.8 / 14.6						Switched to NQ coring at 14.64



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RECORD OF BOREHOLE No. BH11-44

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Pinewood River hydro			COMPILED BY	SM
ELEVATION	351.43 m	COORD.	N 5,408,622 E 426,560	BORING DATE	Start: Mar 13, 12 End: Mar 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE □ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	BEDROCK Grey bedrock		18	RC	100	67			336			
	...below 16.2m, highly fractured		19	RC	56	0		16	335			
			20	RC	100	0		17	334			
333.5			21	RC	95	20						
18.0	**End of Borehole** Standpipe installed with flushmounted steel casing. Water level(b.g.s): For Piezometer A (bottom sensing zone) at surface on March 14/12 For Piezometer B (top sensing zone) at surface on March 14/12											

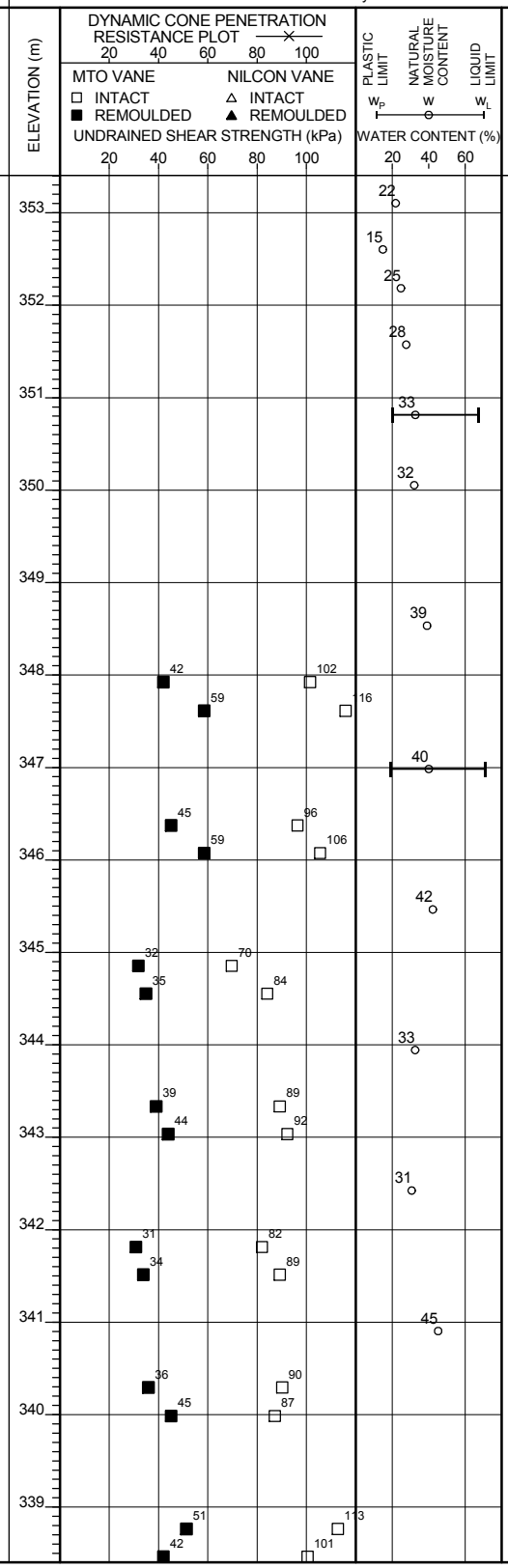
RECORD OF BOREHOLE No. BH11-49

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	353.404 m	COORD.	N 5,411,233 E 419,800	BORING DATE	Start: Mar 19, 12 End: Mar 19, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
353.4	Ground surface					
0.0	**SILTY CLAY** Brown silty clay, trace gravel, stiff, moist, trace rootlets	1	AS			
352.5						
0.9	**SILTY CLAY** Dark brown silty clay, trace sand, trace fine gravel, trace silt pockets, stiff, medium to high plasticity, moist [WML Till]	2 A & B	SS	67	16	
	...at 1.5m, some light brown silt lensing, trace fine gravel, oxidized	3	SS	67	13	
		4	SS	92	8	
		5	SS	96	7	
		6	SS	100	7	
	...becoming dark grey below 6.1m	9	SS	100	6	
		12	SS	100	5	
		15	SS	100	5	
		18	SS	100		
		21	SS	100	6	
		24	TW	100		...at 14.1m PP=24 KPa Torvane=39 KPa



PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH11-49

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	353.404 m	COORD.	N 5,411,233 E 419,800	BORING DATE	Start: Mar 19, 12 End: Mar 19, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	...varved clay below 15.25m [Lower Glaciolacustrine]		27	TW	100			16	338				...at 15.6m Torvane=59 KPa
337.2													
16.2	**BOULDERS** Boulders [Inferred WS Till]		28	RC				17	337				
								18	336				
334.5									335				
18.9	**Bedrock** Greyish blue, highly fractured and weathered		29	RC	60	0		19	334				
	...some quartz between 20.4m and 21.95m		30	RC	33	0		20	333				
								21	332				
			31	RC	90	0		22	331				
329.9								23	330				
23.5	**End of Borehole** at 23.47m Standpipes installed with flush mounted steel casing Water Level (b.g.s): For Piezometer A (bottom sensing zone) at 2 m on March 20/12 For Piezometer B (top sensing zone) at 1.4 m on March 20/12												

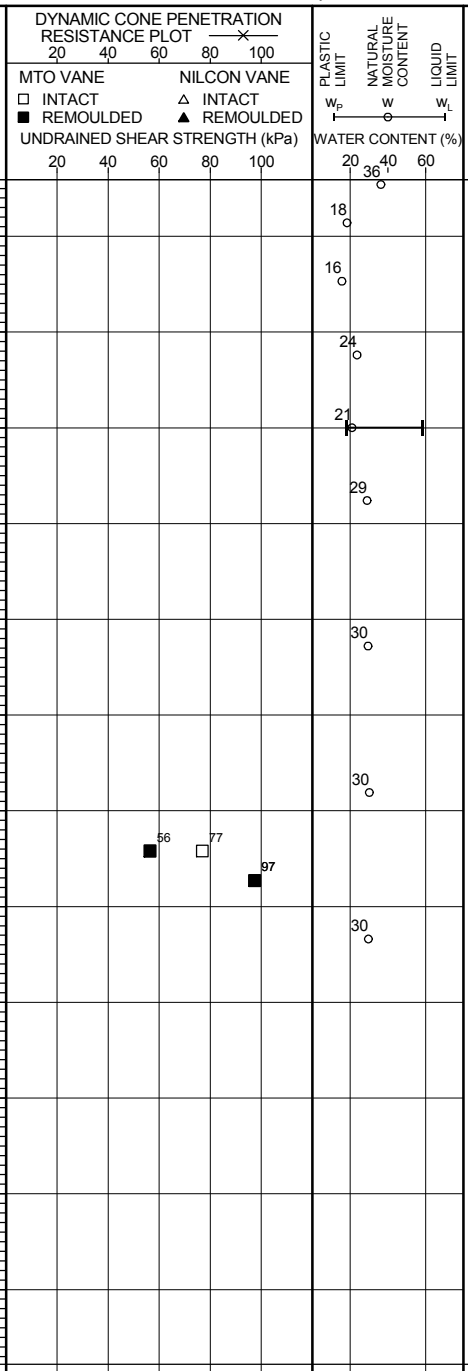
RECORD OF BOREHOLE No. BH11-50

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	361.591 m	COORD.	N 5,411,071 E 421,551	BORING DATE	Start: Mar 19, 12 End: Mar 19, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
361.6	Ground surface					
361.6 / 0.1	**TOPSOIL** Dark brown organics, fibrous, rootlets	1	SS	92	7	...frozen to 0.6m
360.8 / 0.8	**Clayey SILT** Brown clayey silt, some sand and gravel, medium plasticity, rootlets	2	SS	79	10	
	Silty CLAY Light brown silty clay, trace gravel, grey clay lamination (varved), stiff, medium plasticity, damp to moist [Upper Glaciolacustrine]	3	SS	100	10	
359.3 / 2.3	...at 1.7 m trace to some sand and gravel	4	SS	79	12	
	Silty CLAY Greyish brown silty clay, trace sand and gravel, firm to stiff, high plasticity, moist. [WML Till] ...mottled brown lenses at the top	5	SS	100	11	
	...below 4.6m becoming dark grey	6	SS	100	8	
		7	SS	100	6	
	... between 7.62 m and 7.67m, sandy seam	10	SS	92	7	
353.2 / 8.4	**Clayey SILT** Greenish grey Clayey silt, sandy, varved. [Possible Lower Glaciolacustrine]	12	AU			
352.4 / 9.2	**Bedrock** Greyish green, slightly fractured	12	RC	100	95	...at 9.1m switched to NQ coring
		13	RC	100	90	
349.2		14	RC	95	98	
12.4	**End of Borehole** at12.4m Standpipes installed with flush mounted steel casing Water Level (b.g.s): For Piezometer A (bottom sensing zone) at 0.73 m on March 19/12 For Piezometer B (top sensing zone) at surface on March 19/12					



PERMEABILITY (cm/s)

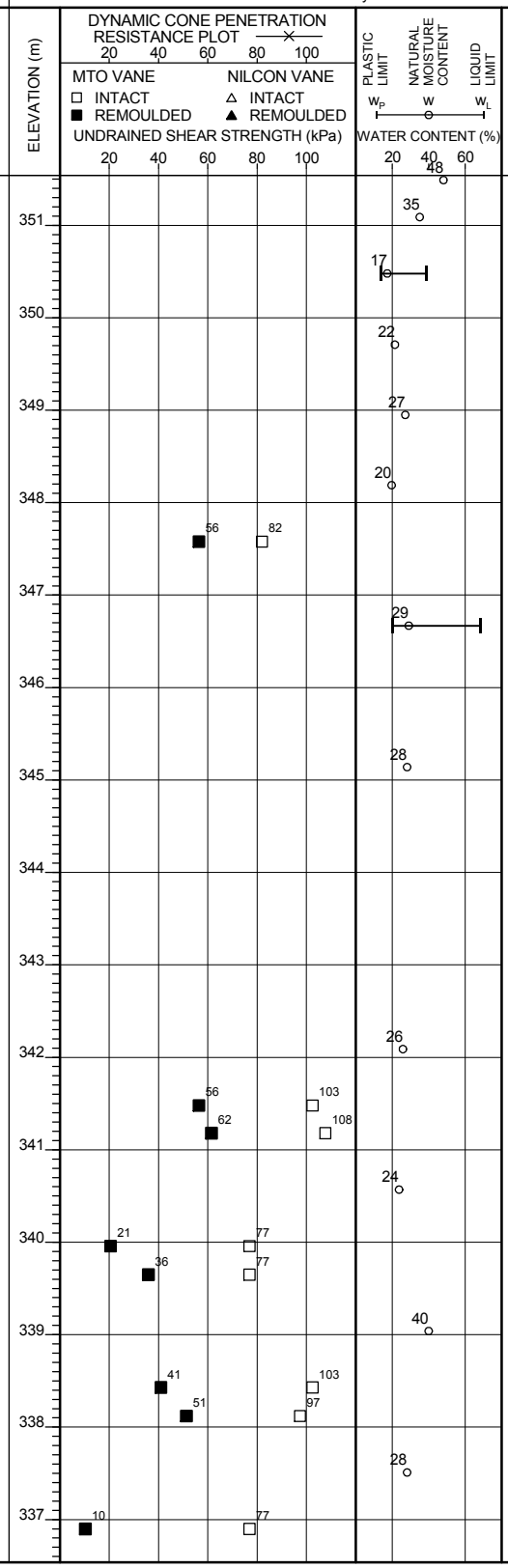
RECORD OF BOREHOLE No. BH11-51

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	351.539 m	COORD.	N 5,410,423 E 421,543	BORING DATE	Start: Mar 17, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
351.5	Ground surface					
350.9 / 0.6	**TOPSOIL** Black organics, fibrous, rootlets	1	SS	75	4	...frozen to 0.6m
	Silty CLAY Light brown silty clay, trace to some sand, trace gravel, trace mottled brown lenses, brown clay lamination (varved), firm, low to medium plasticity, moist [Upper Glacolacustrine]	2	SS	79	12	
		3	SS	100	7	
	...at 2.5m no varving noted	4	SS	83	22	
	...at 3.4m very silty low plasticity	5	SS	88	7	
347.0 / 4.6	**Silty CLAY** Greyish brown silty clay, trace sand and gravel, stiff, high plasticity, moist [WML Till]	8	SS	100	10	
	... at 6.1m becoming grey	9	SS	100	10	
		10	TW	75		...at 7.62m, PP=122 KPa Torvane=69 KPa
		11	SS	100	7	
	...at 10.7m moist to wet, trace to some sand and gravel	14	SS	100	8	
		17	SS	100	5	...at 12.2m switched to washboring
		20	SS	100	6	



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RECORD OF BOREHOLE No. BH11-51

PROJECT	Rainy River - Geotechnical Investigation 2011/2012					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	SM
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	SM
ELEVATION	351.539 m	COORD.	N 5,410,423 E 421,543	BORING DATE	Start: Mar 17, 12 End: Mar 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
U.W. Wet Unit Weight
PT Standard Proctor Test
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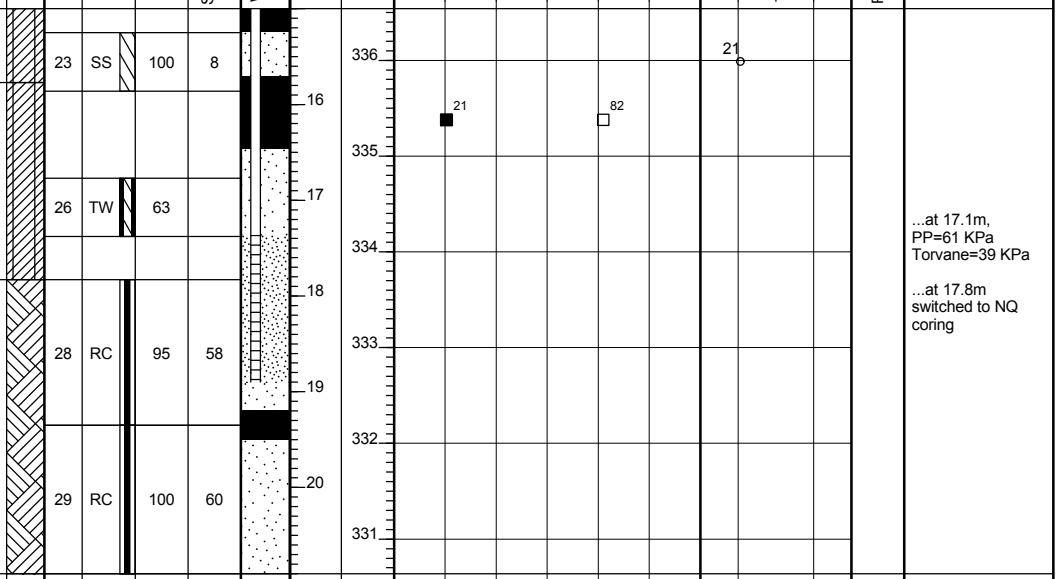
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
335.8		23	SS	100	8	
15.8	**Silty CLAY** Grey silty clay,varved, firm, medium to high plasticity, moist [Lower Glaciolacustrine]	26	TW	63		
333.7						
17.8	**Bedrock** Green, highly fractured and weathered, red veining	28	RC	95	58	...at 17.1m, PP=61 KPa Torvane=39 KPa ...at 17.8m switched to NQ coring
		29	RC	100	60	
330.6						
20.9	**End of Borehole** at 20.9m Standpipes installed with flush mounted steel casing Water Level (b.g.s): For Piezometer A (bottom sensing zone) at surface on March 18/12 For Piezometer B (top sensing zone) at surface on March 18/12					



RECORD OF BOREHOLE No. BH12-01

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	370.44 m	COORD.	N 5,413,954 E 421,733	BORING DATE	Start: Oct 3, 12 End: Oct 4, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	REMARKS
370.4	Ground surface									
370.0 / 0.1	**TOPSOIL** Topsoil, organics, rootlets	1	SS	22	12	370				
	Silty CLAY Brown silty clay, trace to some sand, dry, medium plasticity, stiff [Upper Glaciolacustrine]	2	SS	100	22	369				
		3	SS	100	19	368	20			
	...becoming moist at 2.29m	4	SS	100	21	367	23			
367.4 / 3.1	**Silty CLAY** Grey silty clay, trace sand, trace gravel, moist, high plasticity, firm to stiff [WML Till]	5	TW	100		366				
		6	SS	100	9	365				
		7	SS	100	9	364	36			
361.0 / 9.5	...becoming moist to wet, some sand at 9.14m, possible transition zone	8	SS	83	24	363	32			
	SAND and GRAVEL Grey sand and gravel, saturated [WS Till]					362				
358.6 / 11.9	**End of Borehole** at 11.9m [Inferred bedrock] Standpipe installed with 0.6m stick up Water level at surface upon completion					361				
						360				
						359				

DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)

WATER CONTENT (%) (20 40 60)

PERMEABILITY (cm/s)

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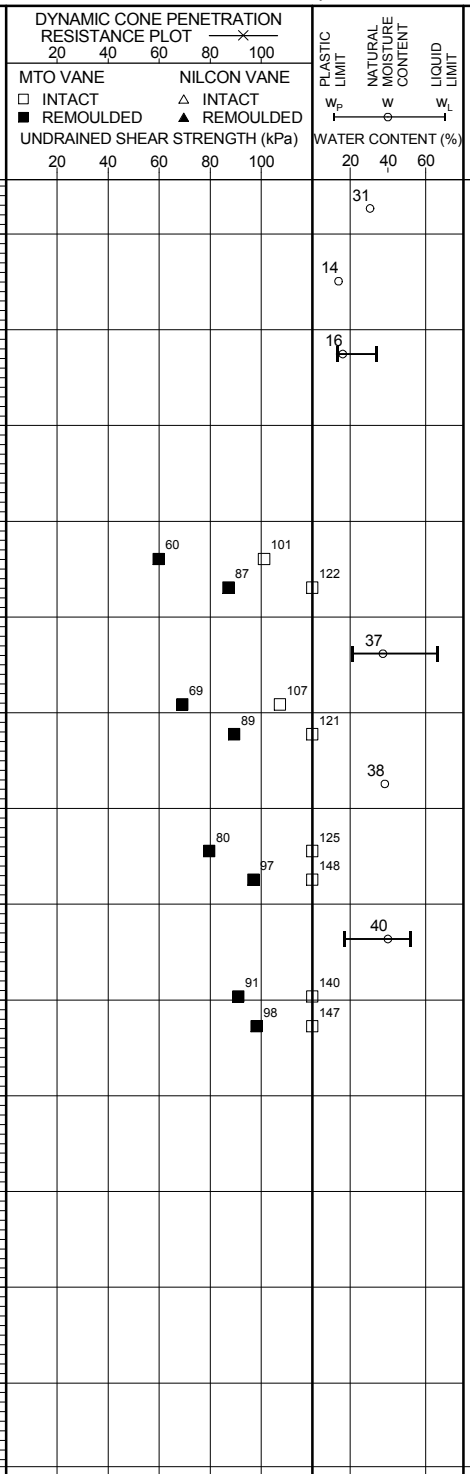
RECORD OF BOREHOLE No. BH12-03

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	362.567 m	COORD.	N 5,411,646 E 420,323	BORING DATE	Start: Sep 14, 12 End: Sep 15, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
362.6	Ground surface					
0.0 / 362.3	**TOPSOIL** Dark brown, organics	1	GS			
0.3	**Silty CLAY** Brown silty clay, some sand, moist, varved, medium plasticity, very stiff [Upper Glaciolacustrine] ...occasional rootlets at top	2	SS	37	18	
		3	SS	58	13	
		4	SS	71	13	
359.5						
3.1	**Silty CLAY** Grey silty clay, trace gravel, ocasional silt pockets, moist, firm [WML Till]	5	TW	65		
		8	SS	100	8	
		11	SS	100	9	
	...occasionlal silt lensing	14	SS	100	6	
353.4						
353.3 / 9.3	**SILT** Grey silt, some clay, wet [Possible Lower Glaciolacustrine]	15	SS	100		...at 9.3m SPT refusal
	BEDROCK Bluish grey bedrock, fractured	16	RC	100	94	
		17	RC	100	94	
349.1		18	RC	100	100	
13.4	**End of Borehole** at 13.44m Standpipe installed with 0.9m stick up Water level at 5m below ground surface upon installation Water Level at 0.8m below ground					



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RECORD OF BOREHOLE No. BH12-03

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	362.567 m	COORD.	N 5,411,646 E 420,323	BORING DATE	Start: Sep 14, 12 End: Sep 15, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	surface on Oct. 30, 2012													

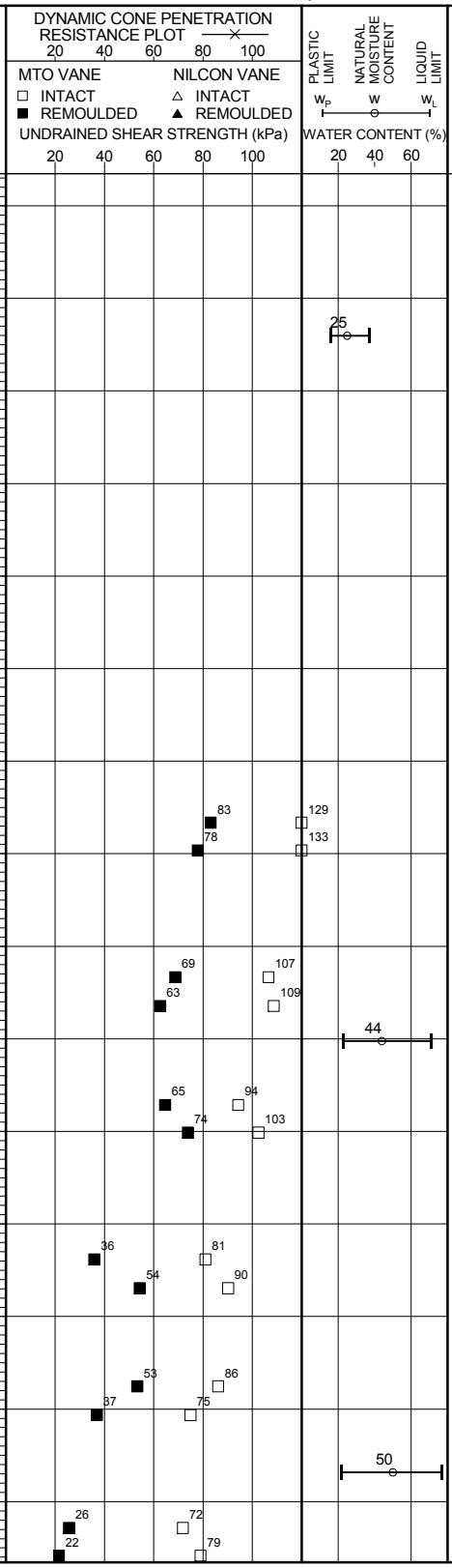
RECORD OF BOREHOLE No. BH12-04

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Talings Management Area			COMPILED BY	DG
ELEVATION	357.346 m	COORD.	N 5,411,848 E 422,926	BORING DATE	Start: Sep 27, 12 End: Sep 29, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD
357.3	Ground surface				
357.2 / 0.0	**PEAT** Dark brown peat, fibrous	1	SS	39	6
0.2	**Silty CLAY** Brown silty clay, trace to some sand, trace gravel, moist, varved, low plasticity [Upper Glaciolacustrine]	2	SS	33	9
		3	SS	100	12
		4	SS	100	12
354.3 / 3.1	**Silty CLAY** Brown silty clay, trace sand, teace gravel, moist, medium to high plasticity [WML Till]	5	SS	100	13
		6	SS	100	10
	...becoming grey below 6.1m	7	SS	5	7
		8	TW	100	
		9	SS	100	7
		10	TW	100	
		11	SS	100	5
		12	SS	100	7



PERMEABILITY (cm/s)

REMARKS

Continued on Next Page

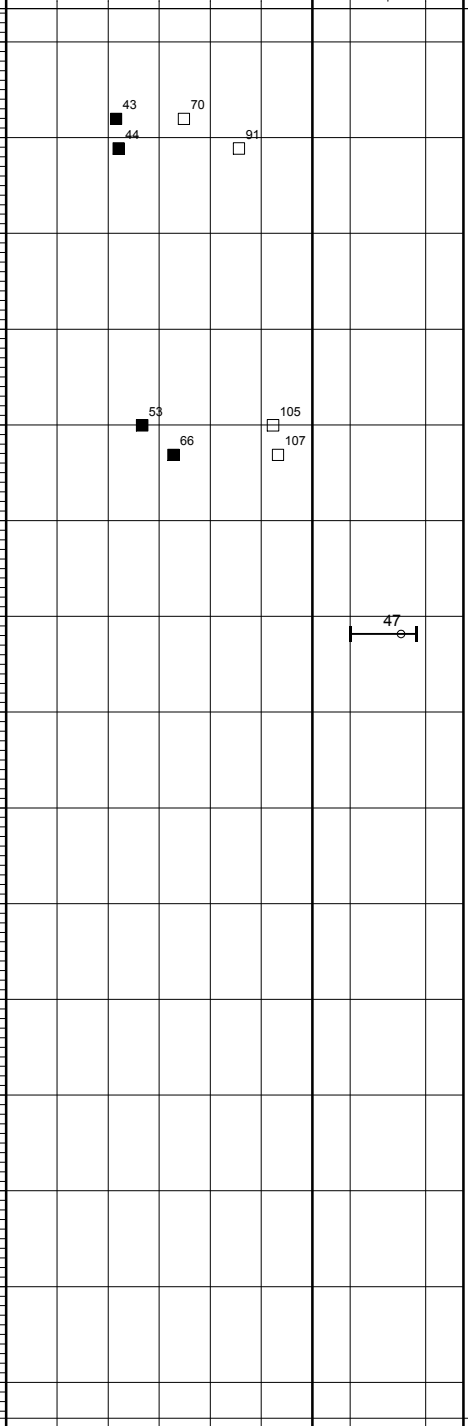
RECORD OF BOREHOLE No. BH12-04

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Talings Management Area			COMPILED BY	DG
ELEVATION	357.346 m	COORD.	N 5,411,848 E 422,926	BORING DATE	Start: Sep 27, 12 End: Sep 29, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
	....some sand, trace gravel, medium to high plasticity at 15.24m	13	SS	100	6	
		14	TW	75		
336.0 / 21.3	**Silty CLAY** Greenish grey silty clay, varved, interbedded silt lenses, moist [Lower Glaciolacustrine]	15	SS	100	12	
333.0 / 24.4	**BOULDERS** [Inferred WS Till]					
331.4 / 25.9	**BEDROCK** Light grey volcanic rock ...weathered rock from 25.9m to 27.3m	16	RC	87	30	
		17	RC	67	53	
		18	RC	95	57	
327.6 / 29.7						



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RECORD OF BOREHOLE No. BH12-04

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Talings Management Area			COMPILED BY	DG
ELEVATION	357.346 m	COORD.	N 5,411,848 E 422,926	BORING DATE	Start: Sep 27, 12 End: Sep 29, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
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RQD Rock Quality Designation
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ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) 20 40 60	PERMEABILITY (cm/s)	REMARKS
	End of Borehole at 29.72m Standpipe installed with 0.76m sitck up Water Level 1.2m below ground surface on completion Water Level 1.2m below ground surface on Oct. 31, 2012																		

RECORD OF BOREHOLE No. BH12-07

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA/AD
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	371.539 m	COORD.	N 5,412,438 E 424,542	BORING DATE	Start: Oct 4, 12 End: Oct 10, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
371.5	Ground surface										
371.4 / 0.1	**TOPSOIL**										
	Silty CLAY Brown silty clay, trace to some sand, dry, firm, medium to high plasticity [WML Till]	1	SS	94	20						
		2	SS	94	16		25				
		3	SS	100	15		28				
	...brown to grey, trace sand, trace gravel at 3.0m	4	SS	100	17						
		5	SS	100	11		33				
		6	SS	100	13						
		7	SS	100	12						
359.3 / 12.2	**Silty CLAY** Dark grey silty clay, trace sand, trace gravel, varved with light grey silt laminations (approximately 3mm thick), damp to moist [Lower Glaciolacustrine]	8	SS	100	9		32				

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

Continued on Next Page

RECORD OF BOREHOLE No. BH12-07

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA/AD
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	371.539 m	COORD.	N 5,412,438 E 424,542	BORING DATE	Start: Oct 4, 12 End: Oct 10, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE □ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
356.3													
15.2	**SAND**												
355.8	Medium to coarse grained sand, some silt, some clay, wet [WS Till]		9	SS	100				356				Sand heave in auger at 15.24m
15.7	**End of Borehole** at 15.7m Standpipe installed with 0.9m stick up Water level at 10.9m below ground surface upon completion Water level at 11m below ground surface on Oct. 31, 2012												

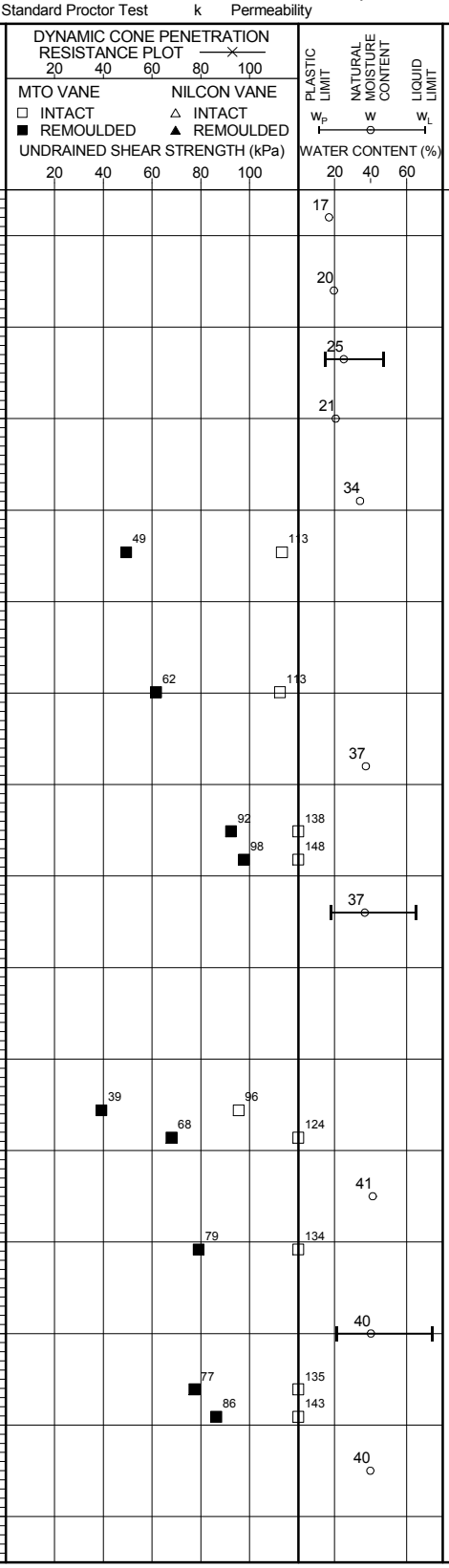
RECORD OF BOREHOLE No. BH12-08

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	359.5 m	COORD.	N 5,411,603 E 425,109	BORING DATE	Start: Sep 13, 12 End: Sep 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
359.5	Ground surface					
359.4 / 0.1	**TOPSOIL**					
	Silty CLAY Brown silty clay, trace gravel, trace sand, moist, varved, firm, low to medium plasticity [Upper Glaciolacustrine]	1	SS	25	8	
		2	SS	79	13	
	...stiff, some oxidized pockets at 0.8m	3	SS	67	12	
	...dark brown below 2.3m	4	SS	83	14	
		5	SS	92	7	
354.9 / 4.6	**Silty CLAY** Grey silty clay, trace sand, firm, medium to high plasticity, occasional silt pockets [WML Till]	8	TW	83		
		11	SS	96	7	
	...becoming stiff at 7.6m	14	SS	87	9	
		17	TW	96		
		20	SS	100	7	
		23	SS	100	8	
		26	SS	100	9	



...at 5.2m
PP= 171.6 kPa
TV= 134.8 kPa

...at 9.8m
PP= 147.1 kPa
TV= 110.3 kPa

Continued on Next Page

RECORD OF BOREHOLE No. BH12-08

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	359.5 m	COORD.	N 5,411,603 E 425,109	BORING DATE	Start: Sep 13, 12 End: Sep 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			27	SS	100	10		16	344		31		
342.9									343				
16.6 / 342.4	**Silty CLAY** Varved silty clay [Lower Glaciolacustrine]		30	TW	100			17					
17.1 / 342.1			31	RC									
17.4	**BOULDERS** [Inferred WS Till]								342				
	BEDROCK Bluish grey bedrock, moderately fractured		32	RC	93	62		18	341				
								19	340				
	...becoming highly fractured at 19.5m		33	RC	100	83		20					
338.6			34	RC	100	100			339				
20.9	**End of Borehole** at 20.9m Standpipe installed Water level at 10.9m below ground surface upon completion Water level at 4.8m below ground surface on Oct. 29, 2012												

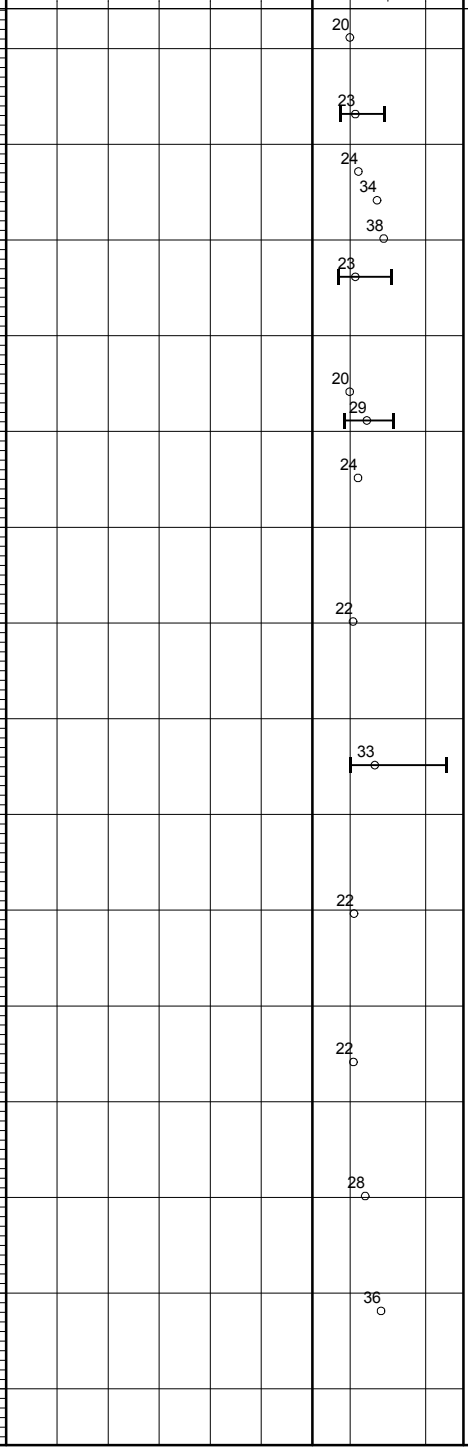
RECORD OF BOREHOLE No. BH12-09

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Overburden Stockpile			COMPILED BY	DG
ELEVATION	347.415 m	COORD.	N 5,409,548 E 422,612	BORING DATE	Start: Sep 16, 12 End: Sep 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
347.4	Ground surface					
347.2 / 0.2	**PEAT** Dark brown peat, some sand, some silt, some clay, fibrous	1	SS	25	2	
	Sandy SILT Light brown sandy silt, damp to moist, soft, low plasticity, trace rootlets, trace oxidation, soft to firm	2	SS	92	4	
345.6 / 1.8	**Silty CLAY** Dark brown silty clay, trace sand, trace gravel, varved, damp to moist, occasional oxidized pockets, soft to firm, low to medium plasticity [Upper Glaciolacustrine]	3	SS	92	5	
		4	SS	92	7	
	...light grey laminations of silt with sand and gravel at 2.6m	5	TW	96		...at 3.4m PP= 76 kPa
		6	SS	100	4	
		7	SS	100	4	
341.3 / 6.2	**Silty SAND** Grey silty sand, fine grained, loose, wet [Glacio Fluvial]	8	SS	75	4	
340.7 / 6.7	**Silty CLAY** Dark grey silty clay, trace sand, trace fine gravel, damp to moist, stiff, medium to high plasticity [WML Till]	9	SS	100	8	
338.3 / 9.1	**Silty SAND** Grey silty sand, fine grained, loose, wet [Glacio Fluvial]	10	SS	92		...spoon dropped under weight of hammer at 9.1m; 0.15m of sand heave in auger
	...becoming moist to wet at 10.7m	11	SS	100		...spoon dropped under weight of hammer, likely heaved sand
334.8 / 12.6	**Silty CLAY** Dark grey silty clay, trace sand, trace fine gravel, damp to moist, stiff, medium to high plasticity [WML Till]	12	SS	83	8	
		13	SS	100	4	
332.5						



WELL / PIEZOMETER INSTALLATION

PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH12-09

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Overburden Stockpile			COMPILED BY	DG
ELEVATION	347.415 m	COORD.	N 5,409,548 E 422,612	BORING DATE	Start: Sep 16, 12 End: Sep 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
14.9	**Silty SAND** Grey silty sand, fine grained, loose, wet [Glacio Fluvial]	14	SS	83	12			
331.0						16	332	
16.5	**Silty CLAY** Dark grey silty clay, trace sand, trace fine gravel, damp to moist, stiff, medium to high plasticity [WML Till]	15	SS	75	5	17	331	
		16	SS	62	5	18	330	
		17	SS	100	8	19	329	
		18	SS	100	8	20	328	
324.6						21	327	
22.9	**Silty CLAY** Light grey silty clay with dark grey clay varves [Lower Glaciolacustrine] ...sandier below 23.2m (possible transition zone)	19	SS	100	11	22	326	
323.3						23	325	
24.1	**BOULDERS and COBBLES** Black to green boulders and cobbles [Inferred WS Till]	20	RC	35	0	24	324	...at 24.1m, 3.0m sand heave
322.2						25	323	
25.2	**BEDROCK** Reddish green to black bands, silver metallic crystals throughout ...becoming red bedrock with blue to green bands, white intrusions	21	RC	100	100	26	322	
		22	RC	93	80	27	321	
		23	RC	100	81	28	320	...artisian flow observed at 27.1m
318.9							319	
28.5	**End of Borehole** at 28.5m Standpipe installed with 1m stick up, artesian pressure condition upon completion Artesian flow noted on Oct. 30, 2012							

STRAT PLOT

WELL / PIEZOMETER INSTALLATION

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) (20 40 60)

PERMEABILITY (cm/s)

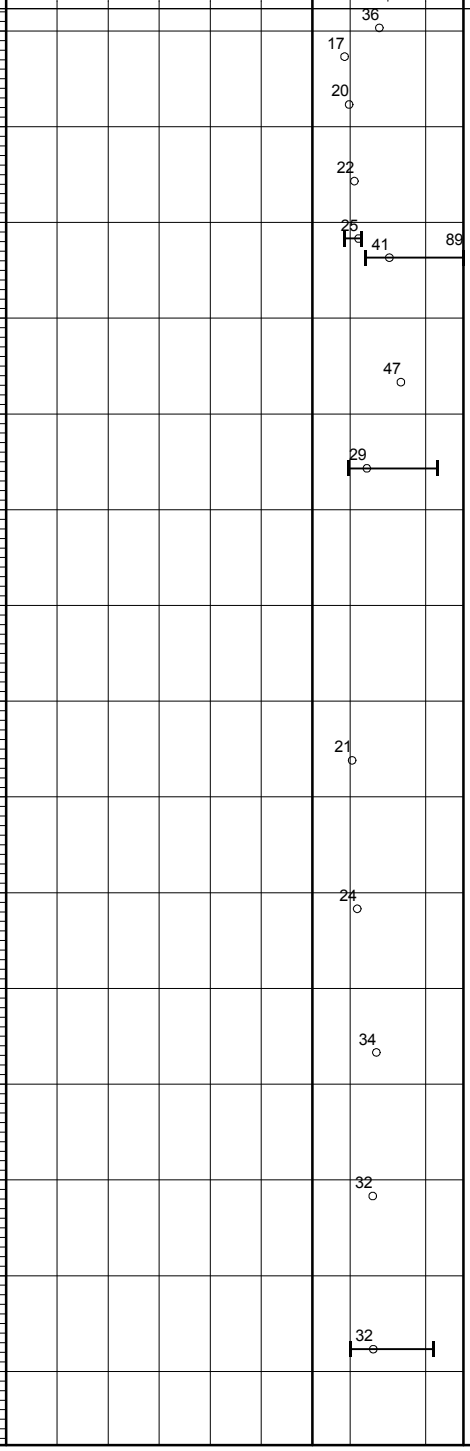
RECORD OF BOREHOLE No. BH12-10

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Overburden Stockpile			COMPILED BY	DG
ELEVATION	345.232 m	COORD.	N 5,409,003 E 424,069	BORING DATE	Start: Aug 24, 12 End: Aug 27, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
345.2	Ground surface					
345.2 / 0.0	**PEAT** Dark brown, fibrous, dry, some rootlets	1	SS	62	5	
	Silty CLAY Some sand, grey to brown, damp, varved, oxidazed staining throughout, firm, occasional rootlets	2	SS	89	6	
		3	SS	100	6	
342.7 / 2.5	**Silty CLAY** Trace sand, trace fine gravel, grey, moist, medium to high plasticity, firm [WML Till]	4	SS	100	3	
		5	TW	62		
		6	SS	100		
	...coarse sand seam at 4.9m	7	SS	100	3	
		8	TW	87		
		9	SS	89	5	
		10	SS	100	4	
		11	SS	100	5	
		12	SS	100	6	
		13	SS	100	7	



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RECORD OF BOREHOLE No. BH12-10

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Overburden Stockpile			COMPILED BY	DG
ELEVATION	345.232 m	COORD.	N 5,409,003 E 424,069	BORING DATE	Start: Aug 24, 12 End: Aug 27, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	WATER CONTENT (%)	REMARKS
		14	SS	100	7	16	329	35	
		15	SS	100	6	17	328	35	
		16	SS	100	6	18	327	33	
	...grey, moist, fine sand seam at 19.5m	17	SS	100	5	19	326	37	
		18	SS	100	7	20	325	36	
		19	SS	100	4	22	323	40	
	...possible sand and gravel seam at 23.9m	20	SS	100	5	23	322	39	
		21	SS	100		25	320	50	...possible slough due to coring at 25.6m
318.1 / 27.1	**Silty CLAY** Grey silty clay, moist, varved with light grey silt lenses, firm [Lower Glaciolacustrine]	22	SS	100	5	27	318	52	...Artisian condition at 27.1m, approximately 4.5m head
316.6 / 28.7	...fine sand, some gravel, wet, soft	23	SS	100	4	28	317	25	
316.1 / 29.1	**Silty SAND** Fine grained silty sand, loose, grey to black, wet [Inferred WS Till]					29	316		

Continued on Next Page

RECORD OF BOREHOLE No. BH12-10

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Overburden Stockpile			COMPILED BY	DG
ELEVATION	345.232 m	COORD.	N 5,409,003 E 424,069	BORING DATE	Start: Aug 24, 12 End: Aug 27, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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TW Thin Walled Open (Shelby)
WS Wash Sample

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C Consolidation
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GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE ☐ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
314.1								31	315			
31.1	**End of Borehole** at 31.1m Standpipe installed with 0.9m stick up Artesian head of 0.7m above ground surface noted on Oct. 31, 2012											

RECORD OF BOREHOLE No. BH12-13

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	352.625 m	COORD.	N 5,409,437 E 425,767	BORING DATE	Start: Sep 8, 12 End: Sep 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
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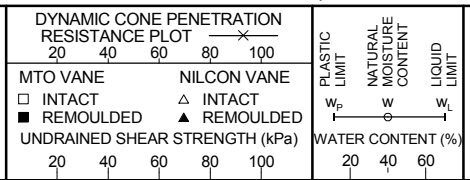
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	REMARKS
352.6	Ground surface						
0.0	**Silty CLAY** Dark brown silty clay, some sand, damp to dry, stiff, trace rootlets	1	SS	46	7		
351.9							
0.8	**Silty CLAY** Brown silty clay, trace sand, varved, light brown sand and gravel lenses, damp, very stiff [Upper Glaciolacustrine]	2	SS	54	7		
		3	SS	100			...102mm diameter split spoon sampler used for SS 3, 4, 5, and, 6
349.6	...oxidized pockets from 2.6m to 3.1m						
3.1	**Silty CLAY** Grey silty clay, some sand, some gravel, trace cobbles, damp, firm to stiff, trace mottled brown oxidized pockets, medium to high plasticity [WML Till]	4	SS	100			
		5	SS	100			
		6	SS	100			
	...greyish black gravel at 7.8m	7	SS	83	18		
	...becoming more silty, coarse sand, wet (possible transition zone)	8	SS	79	4		
342.1							
342.6	**SAND** Coarse grained, angular, some fine gravel, trace grey silty clay, wet [WS Till]	9	SS	100	50		
10.7		10	RC	33	0		
		11	RC	100	63		
	BEDROCK Greyish black bedrock, green bands along fractures	12	RC	100	87		
		13	RC	100	82		
338.7							
13.9	**End of Borehole** at 13.9m Standpipe installed with 0.9m stick up Water level at 3.2m below ground						



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RECORD OF BOREHOLE No. BH12-13

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	352.625 m	COORD.	N 5,409,437 E 425,767	BORING DATE	Start: Sep 8, 12 End: Sep 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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TV Torvane
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P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	PERMEABILITY (cm/s)	REMARKS
	surface on installation Water level at 3.0m below ground surface on Oct. 30, 2012												

RECORD OF BOREHOLE No. BH12-14

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	354.133 m	COORD.	N 5,409,536 E 425,420	BORING DATE	Start: Oct 2, 12 End: Oct 2, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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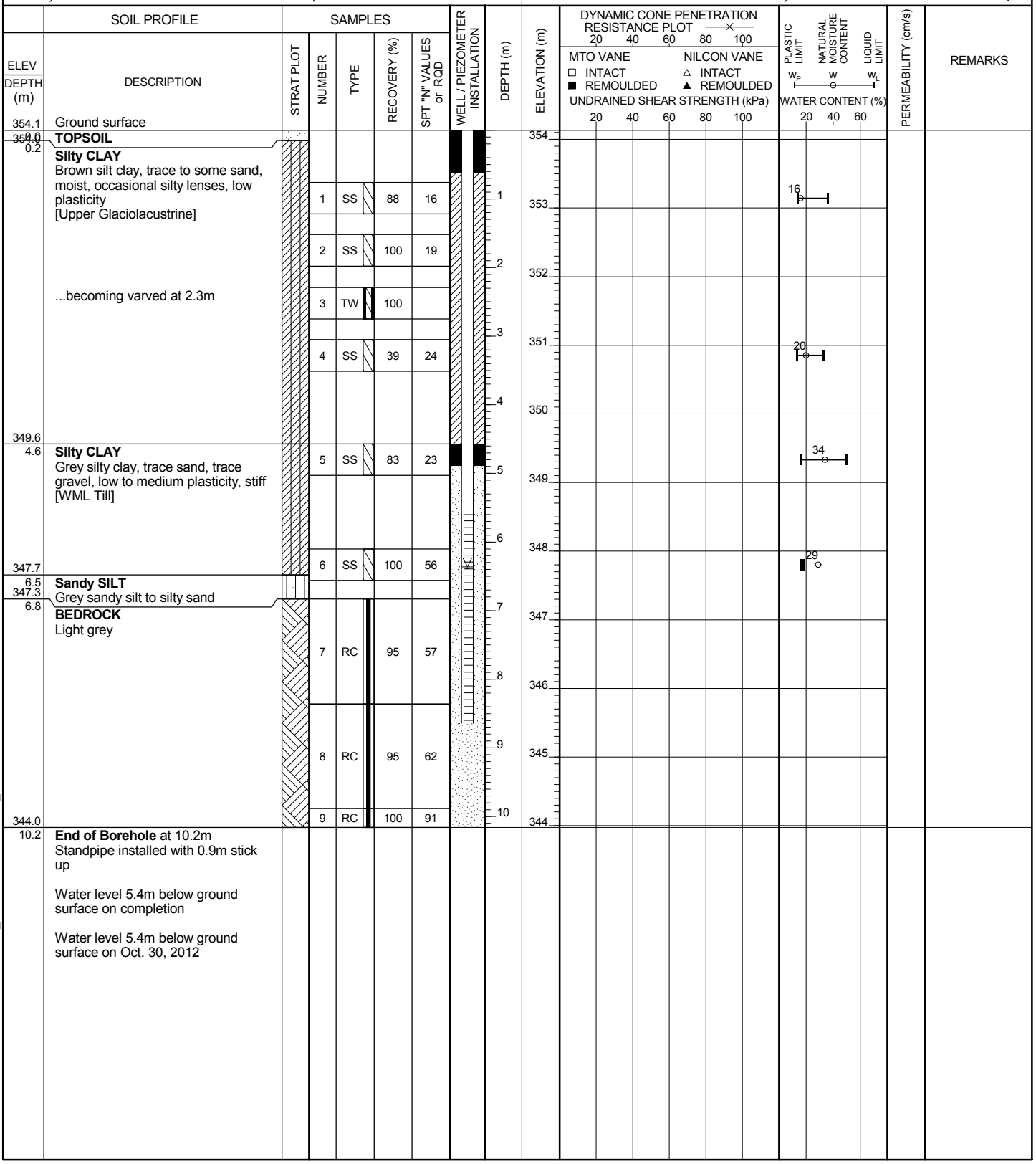
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	REMARKS
354.1	Ground surface						
354.0 / 0.0	**TOPSOIL**						
0.2	**Silty CLAY** Brown silt clay, trace to some sand, moist, occasional silty lenses, low plasticity [Upper Glaciolacustrine]	1	SS	88	16	353	
		2	SS	100	19	352	
	...becoming varved at 2.3m	3	TW	100			
		4	SS	39	24	351	
349.6 / 4.6	**Silty CLAY** Grey silty clay, trace sand, trace gravel, low to medium plasticity, stiff [WML Till]	5	SS	83	23	350	
347.7 / 6.5		6	SS	100	56	349	
347.3 / 6.8	**Sandy SILT** Grey sandy silt to silty sand					348	
	BEDROCK Light grey	7	RC	95	57	347	
		8	RC	95	62	346	
344.0 / 10.2		9	RC	100	91	345	
	End of Borehole at 10.2m Standpipe installed with 0.9m stick up					344	

Water level 5.4m below ground surface on completion

Water level 5.4m below ground surface on Oct. 30, 2012



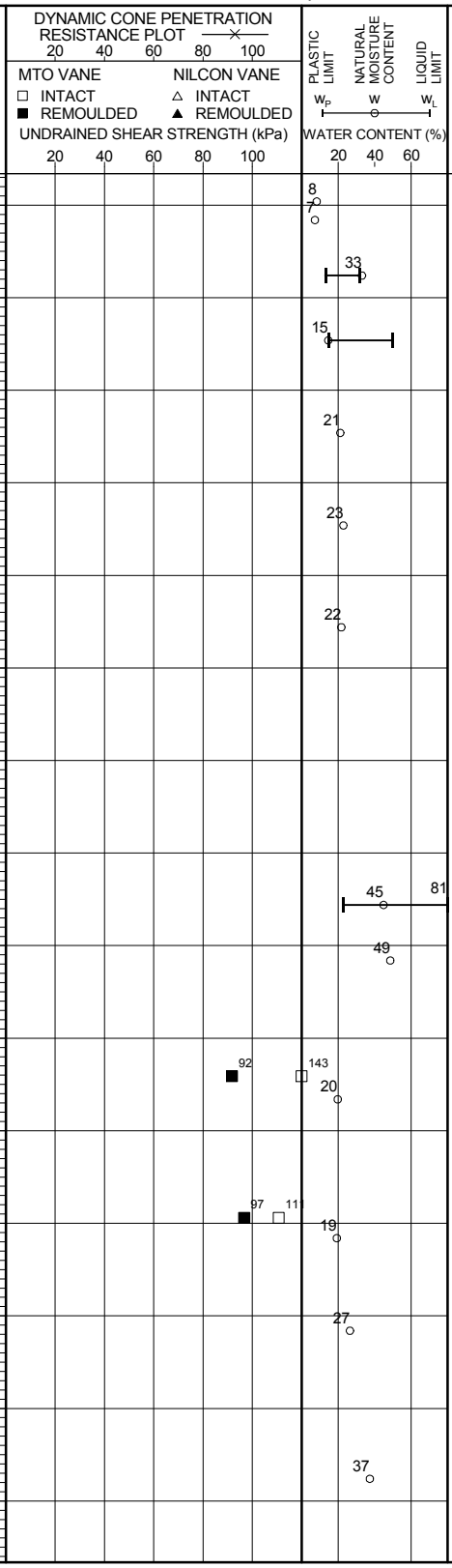
RECORD OF BOREHOLE No. BH12-15

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.339 m	COORD.	N 5,409,732 E 426,116	BORING DATE	Start: Sep 10, 12 End: Sep 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
351.3	Ground surface					
350.9 / 0.2	**PEAT** Dark brown peat, some gravel, fibrous, dry, occasional rootlets	1	SS	42	15	
350.6 / 0.8	**SAND** Light brown sand, fine to coarse, some gravel, dry, possibe road fill	2	SS	46	7	
	Silty CLAY Dark brown sitly clay, some sand, damp to dry, low plasticity, trace rootlets, soft to firm, varved [Upper Glaciolacustrine] ...occasional sand pockets below 1.5m	3	SS	50		
348.3 / 3.1	**Silty CLAY** Light brown to grey silty clay, trace sand, trace gravel, medium to high plasticity, damp to moist, trace oxidized pockets [WML Till]	4	SS	20		...102mm diameter split spoon sampler used for SS 3, 4, 6, 8, 9, and 10
	...becoming grey at 4.6m ...occasional coarse sand pockets throughout, moist to wet	5	SS	71	3	
		6	SS	47		
		7	SS	96	4	
	...at 8.9m light grey silt varves 20mm thick	8	SS	100		
		9	SS	100		
		10	SS	100		
		11	SS	87	6	
		12	SS	92	3	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH12-15

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.339 m	COORD.	N 5,409,732 E 426,116	BORING DATE	Start: Sep 10, 12 End: Sep 13, 12	CHECKED BY	DGR

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ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
		13	SS		4	16	336		37			
							335					
		14	SS	75	6	17	334		41			
						18	333					
		15	SS	92	6				36			
						19	332					
		16	SS	79	7	20	331		46			
						21	330					
		17	SS	79	8	22		24				
							329					
		18	SS		12	23	328		27			
						24	327					
		19	SS	83	9	25			34			
							326					
		20	SS	83	9	26	325		26			
						27	324					
	...trace to some sand, fine gravel below 27.4m	21	SS	100	10	28			29			
							323					
	...sandy silt seam from 29.1m to 29.4m	22	SS	92	9	29	322		31			
						30						

Continued on Next Page

RECORD OF BOREHOLE No. BH12-15

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.339 m	COORD.	N 5,409,732 E 426,116	BORING DATE	Start: Sep 10, 12 End: Sep 13, 12	CHECKED BY	DGR

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ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	REMARKS
		23	SS		11	321	28			
		24	SS		9	320	29			
	...increasing silt and sand content below 33.2m	25	SS	29	14	319	21			
		26	SS		10	318	25			
	...becoming light grey, wet, firm	27	SS	100	9	317	32			
313.5						316				
37.9	**Silty SAND** Grey silty sand, fine to coarse grained, wet [WS Till]	28	SS		50	315	25			...heaving sand at 37.9m
		29	RC	100	0	314				
	...frequent boulders	30	RC	10	0	313				
311.4						312				
39.9	**BEDROCK** Grey bedrock, black banding, highly weathered, soft, faintly cemented	31	RC	45	11	311				
		32	RC	58	13	310				
		33	RC	38	0	309				
		34	RC	100	21	308				
						307				

DEPTH (m): 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

WELL / PIEZOMETER INSTALLATION

Continued on Next Page

RECORD OF BOREHOLE No. BH12-15

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.339 m	COORD.	N 5,409,732 E 426,116	BORING DATE	Start: Sep 10, 12 End: Sep 13, 12	CHECKED BY	DGR

SAMPLE TYPES
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ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE: □ INTACT ■ REMOULDED	NILCON VANE: △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			35	RC	58	0		46	306 305										
304.5																			
46.8	**End of Borehole** at 46.8m Standpipe installed wiht 0.9m stick up Water level 1.2m below ground surface on completion Water level 1.1m below ground surface on Oct. 30, 2012																		

RECORD OF BOREHOLE No. BH12-17

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	346.592 m	COORD.	N 5,409,329 E 424,634	BORING DATE	Start: Aug 28, 12 End: Sep 7, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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TV Torvane
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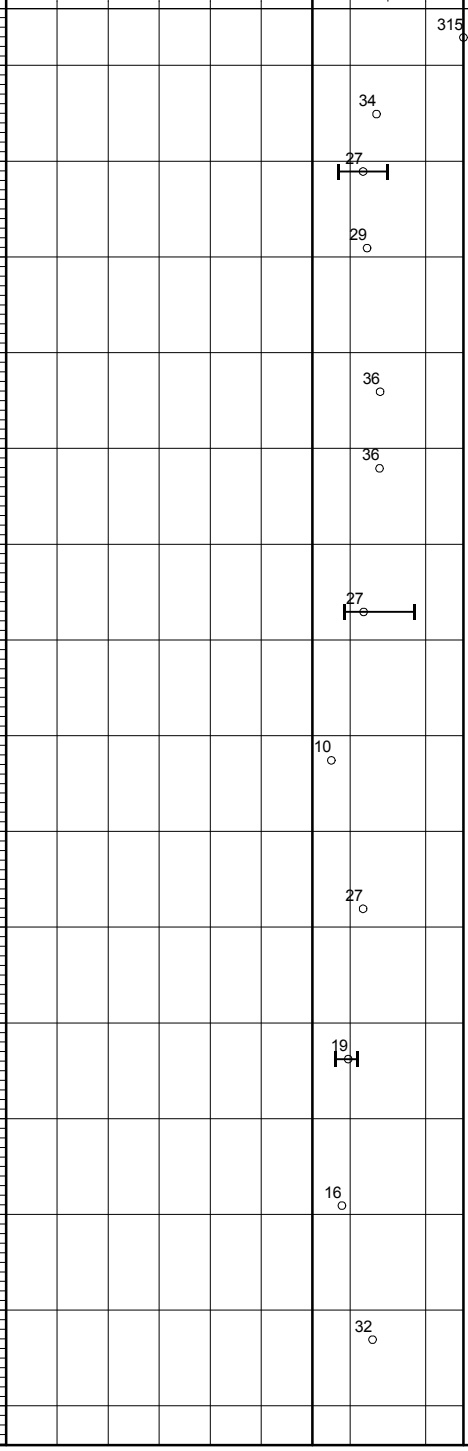
ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
346.6	Ground surface					
0.0	**PEAT** Dark brown peat, trace rootlets, fibrous, damp	1	SS	8	0	
345.8						
0.8	**Clayey SILT** Greyish brown clayey silt, trace sand, damp to moist, low plasticity, soft, trace organics, trace oxidized pockets	2	SS	78	3	
345.1						
1.5	**Silty CLAY** Dark grey silty clay, varved (with light grey silt), soft to firm, moist [Upper Glaciolacustrine]	3	SS	100	3	
		4	SS	100	2	
		5	TW	100		
342.8						
3.8	**Silty CLAY** Light grey silty clay, trace fine gravel, firm, damp to moist, medium to high plasticity [WML Till]	6	SS	100	6	...at 3.7m PP= 118kPa
		7	SS	100	6	
	...dark grey below 6.1m	8	SS	78	9	
	...becoming moist to wet at 7.6m	9	SS	100	4	
		10	SS	100	4	
		11	TW	100		...at 11.3m PP= 147kPa
		12	SS	100	9	
		13	SS	100	6	



PERMEABILITY (cm/s)

WELL / PIEZOMETER INSTALLATION

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RECORD OF BOREHOLE No. BH12-17

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	346.592 m	COORD.	N 5,409,329 E 424,634	BORING DATE	Start: Aug 28, 12 End: Sep 7, 12	CHECKED BY	DGR

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ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
		14	SS	100	7		331	
						16		
							330	
	...sandy layer between 16.8m to 17.2m	15	SS	100	6	17		
							329	
						18		
		16	SS	100	6		328	
						19		
							327	
		17	SS	100	7	20		
							326	
						21		
		18	SS	100	4		325	
						22		
							324	
		19	SS	100	6	23		
							323	
						24		
	...occasional pockets of light grey silty sand below 24.1m	20	SS	100	7		322	
						25		
							321	
320.7 / 25.9	**Silty CLAY** Grey silty clay, trace sand and gravel, light grey silt laminations, low plasticity, moist [Lower Glaciolacustrine]	21	SS	100	6	26		
							320	
319.5 / 27.1	**SAND and GRAVEL** Coarse grained, some silt, angular to semiangular, wet [Inferred WS Till] ....boulders suspected below 28m	22	SS	39	16	27		...approximately 6m of sand heave at 27.1m
							319	
						28		
							318	
						29		
							317	
						30		

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE □ INTACT ■ REMOULDED
NILCON VANE △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

Water content: 27, 28, 26, 38, 43, 39, 40, 55, 17

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RECORD OF BOREHOLE No. BH12-17

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	346.592 m	COORD.	N 5,409,329 E 424,634	BORING DATE	Start: Aug 28, 12 End: Sep 7, 12	CHECKED BY	DGR

SAMPLE TYPES
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BU Bulk
DC Dynamic Cone
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SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

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ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
								31	316				
								32	315				
								33	314				
313.4													
33.2	**BEDROCK** Greyish black to black bedrock		23	RC	71	42		34	313				
	...fractures (shards) from 34.7m to 35.1m		24	RC	87	0		35	312				
			25	RC	100	73		36	311				
309.9									310				
36.7	**End of Borehole** at 36.7m Standpipe installed with 1.5m stick up; artesian condition upon completion Artesian head of 2.3m above ground surface noted on Oct. 30, 2012												

RECORD OF BOREHOLE No. BH12-18

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	348.384 m	COORD.	N 5,409,745 E 424,521	BORING DATE	Start: Aug 11, 12 End: Aug 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
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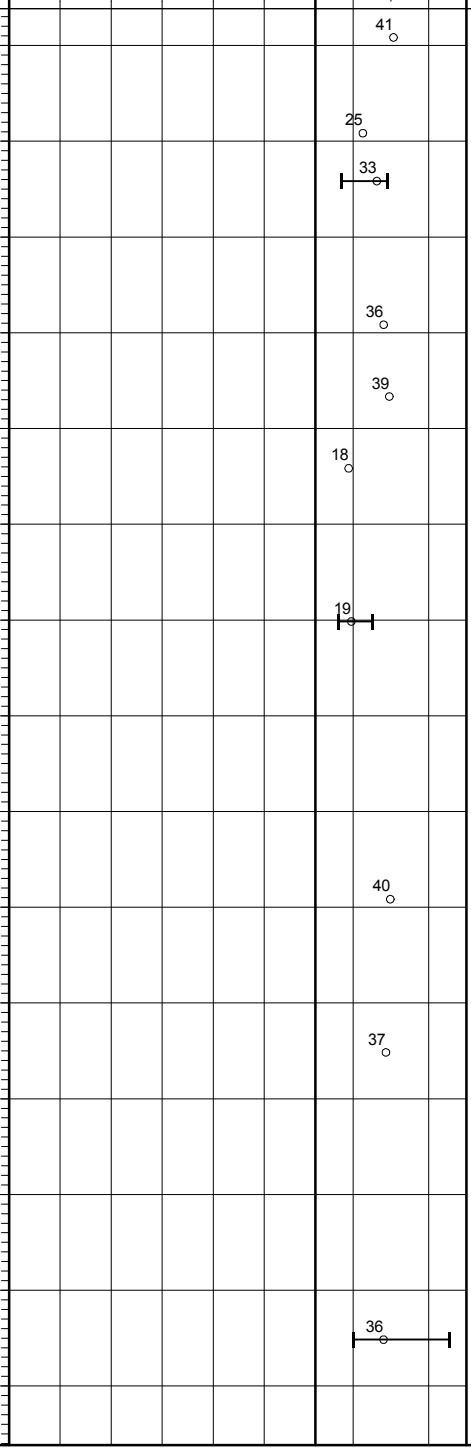
ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
348.4	Ground surface					
0.0 / 347.8	**TOPSOIL**	1	SS	0	6	
0.6 / 345.9	**Silty CLAY** Brown silty clay, trace sand, trace gravel, varved, medium plasticity, firm [Upper Glaciolacustrine]	2	SS	100	5	
		3	SS	100	6	
2.4	**Silty CLAY** Grey silty clay, trace sand, trace greavel, medium to high plasticity, firm [WML Till]	4	TW	96		
		5	SS	100	7	
		6	SS	100	7	
	...sand seam at 4.8m, 30mm thick	7	SS	100	6	
		8	SS	100	4	
		9	TW	100		
		10	SS	100	5	
		11	SS	100	5	
		12	TW	100		
		13	SS	100	5	



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RECORD OF BOREHOLE No. BH12-18

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	348.384 m	COORD.	N 5,409,745 E 424,521	BORING DATE	Start: Aug 11, 12 End: Aug 13, 12	CHECKED BY	DGR

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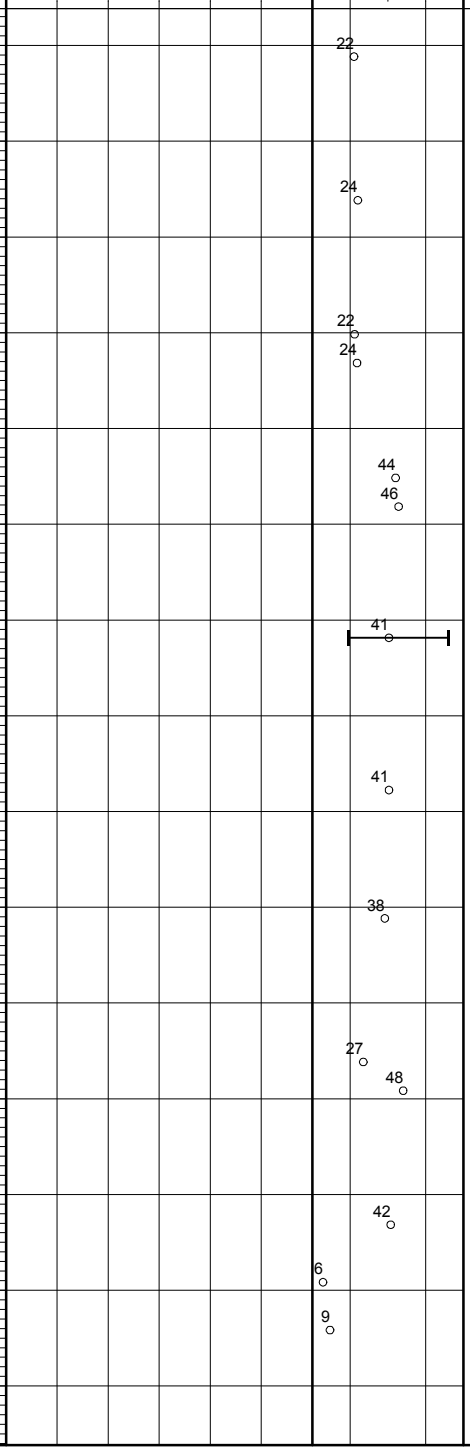
ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
333.1						
15.2	**Silty SAND** Grey silty sand to sandy silt, fine grained, trace clay lenses, saturated, loose [Glacio Fluvial]	14	SS	72	5	
	...silty clay with fine sand at 17m	15	SS	100	5	
	...clayey sand below 18.6m	16	SS	89	2	
328.6						
19.8	**Silty CLAY** Grey silty clay, some sand, occasional sand and silt seams, high plasticity, firm [WML Till]	17	SS	100	6	
		18	SS	100	4	
		19	SS	100	5	
		20	SS	100	4	
		21	SS	100		
321.0						
27.4	**Clayey SILT** Light grey to green clayey silt, trace to some sand, trace gravel, varved [Lower Glaciolacustrine]	22	SS	100	7	
		23	RC	66	6	
319.7						
28.7	**SAND and GRAVEL** Coarse grained, trace silt, grey [Inferred WS Till]	24	SS	33	16	



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RECORD OF BOREHOLE No. BH12-18

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	348.384 m	COORD.	N 5,409,745 E 424,521	BORING DATE	Start: Aug 11, 12 End: Aug 13, 12	CHECKED BY	DGR

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ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			25	SS	0	14		31	318				
									317				
			26	SS	61	24		32					
									316				
								33					
314.7			27	SS	33	13			315				
33.7	**End of Borehole** at 33.7m, no refusal Standpipe installed with 1.0m stick up Water level 2.7m below ground surface on installation. Artesian head 0.4m above ground surface noted on Oct. 20, 2012												

RECORD OF BOREHOLE No. BH12-19

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.189 m	COORD.	N 5,410,368 E 425,255	BORING DATE	Start: Aug 21, 12 End: Aug 23, 12	CHECKED BY	DGR

SAMPLE TYPES
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BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

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TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L)	PERMEABILITY (cm/s)	REMARKS
351.2	Ground surface								
350.0 / 0.2	**PEAT** Dark brown peat, fibrous	1	SS	100	6	351	12 25		
	Silty SAND Brown fine grained silty sand, some organics, trace rootlets ...silty clay at 0.8m	2	SS	39	6	350	20 12		
349.7 / 1.5	**Silty CLAY** Brown to grey silty clay, varved, moist [Upper Glaciolacustrine]	3	SS	94	6	349	27 89		
		4	TW	77					
347.7		5	SS	100	5	348	34		
3.5	**Silty CLAY** Grey silty clay, trace sand, trace gravel, medium to high plasticity, moist, occasional sand seams [WML Till]	6	SS	100	3	347	21		
		7	SS	100	3	346	25		
		8	TW	83		345	35		
		9	SS	100	4	343	32		
		10	SS	100	5	342	35		
		11	SS	100	4	340	34		
		12	TW	96		339	28		
	...grey sandy silt, some clay, wet at 13.7m	13	SS	100	5	337	22		

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

Continued on Next Page

RECORD OF BOREHOLE No. BH12-19

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.189 m	COORD.	N 5,410,368 E 425,255	BORING DATE	Start: Aug 21, 12 End: Aug 23, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger; BU Bulk; DC Dynamic Cone; RC Rock Core; SS Split Spoon; TW Thin Walled Open (Shelby); WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer; TV Torvane; PT Standard Proctor Test; P.L. Point Load Strength Index (I_{50}); RQD Rock Quality Designation; SCR Solid Core Recovery; k Permeability; C Consolidation; DS Direct Shear; GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
		14	SS	100	3	336	27				
	...with trace silt lenses from 16.8m to 18.3m	15	SS	100	3	335	27				
		16	SS	100	3	334	41				
		17	SS	100	3	333	45				
		18	SS	100	3	332	46				
		19	SS	100	4	331	43				
		20	SS	100	4	330	46				
325.3 / 25.9	**Silty CLAY** grey silty clay,trace sand, medium plasticity, varved, moist [Lower Glaciolacustrine]	21	SS	100	7	329	51	82			
	...sandy below 27.4m, wet	22	SS	100	11	328	26				
322.7 / 28.5	**SAND TILL** [Inferred WS Till]	23	RC	53		327					
		24	RC	22		326					
						325					
						324					
						323					
						322					

DEPTH (m): 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

Continued on Next Page

RECORD OF BOREHOLE No. BH12-19

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Open Pit Area			COMPILED BY	DG
ELEVATION	351.189 m	COORD.	N 5,410,368 E 425,255	BORING DATE	Start: Aug 21, 12 End: Aug 23, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			25	RC	100				321				
320.2			26	RC	31			31					
31.0	**BEDROCK** ...0.10m seam at 31.3m		27	RC	87	12			320				
			28	RC	100	98		32	319				
								33	318				
316.9			29	RC	100	36		34	317				
34.3	**End of Borehole** at 34.3m Stand pipe installed with 0.6m stickup Water level at 0.3m below ground upon completion Water level at 0.04m below ground on Oct. 30, 2012												

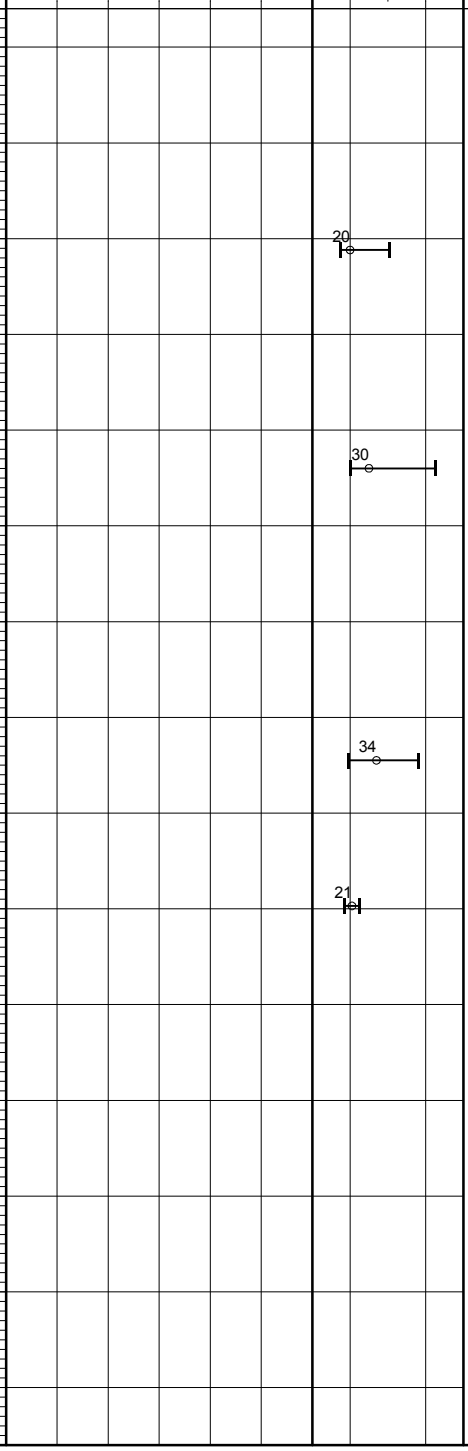
RECORD OF BOREHOLE No. BH12-20

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	362.401 m	COORD.	N 5,411,780 E 421,225	BORING DATE	Start: Sep 30, 12 End: Oct 1, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
362.4	Ground surface					
0.0	**PEAT** Dark brown peat, fibrous	1	SS	22	6	
361.5						
0.9	**Silty CLAY** Brown silty clay, some sand, moist, occasional rootlets	2	SS	0	10	
360.9						
1.5	**Silty CLAY** Brown silty clay, trace sand, low plasticity, varved, moist [Upper Glaciolacustrine]	3	SS	100	15	
		4	SS	100	14	...additional sample taken (thin wall) between 2.1m and 2.7m (TW 22, 0.46m recovery)
		5	SS	11	18	...at 3.0m, SPT sampler hit possible cobble
357.8						
4.6	**Silty CLAY** Grey silty clay, trace sand, trace gravel, moist, medium plasticity [WML Till]	6	SS	100	12	
		7	TW	100		
	...with interbedded silt lenses between 7.6m and 9.1m	8	SS	100	11	
353.3						
9.1	**Sandy SILT** Greenish grey fine sandy silt, trace clay, moist to wet [Lower Glaciolacustrine]	9	SS	100	22	
		10	SS	100	31	
	...trace to some clay, moist at 12.2m	11	SS	100	25	
	...becoming wet, non-plastic, trace clay at 13.7m ...thin stone layer at 13.9m	12	SS	100	62	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH12-20

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	TA
CLIENT	Rainy River Resources.	LOCATION	Tailings Management Area			COMPILED BY	DG
ELEVATION	362.401 m	COORD.	N 5,411,780 E 421,225	BORING DATE	Start: Sep 30, 12 End: Oct 1, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	REMARKS
347.2							
15.2	**BOULDERS and COBBLES** Boulders and cobbles with greenish grey sand and silt [WS Till]	13	RC	0			
		14	RC	12			
		15	RC	0			
		16	RC	0	0		
		17	RC	3			
		18	RC	0			
338.6							
23.9	**BEDROCK** Greenish grey bedrock, highly weathered, very soft	19	RC	87	0		
		20	RC	93	0		
		21	RC	100	12		
334.0							
28.4	**End of Borehole** at 28.42 m Standpipe installed with 0.9m stick up Artesian condition- Water level 0.4m above ground surface at completion Water level 0.8m above ground surface on Oct. 30, 2012						

Depth scale: 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28
Elevation scale: 347, 346, 345, 344, 343, 342, 341, 340, 339, 338, 337, 336, 335, 334

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

RECORD OF BOREHOLE No. BH12-21

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Area			COMPILED BY	DG
ELEVATION	372.765 m	COORD.	N 5,409,431 E 427,995	BORING DATE	Start: Sep 10, 12 End: Sep 10, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
372.8	Ground surface										
372.8 / 0.0	**TOPSOIL**										
0.1	**Silty CLAY** Brown silty clay, trace sand, trace gravel, moist, varved, stiff, some rootlets [Upper Glaciolacustrine]	1	SS	42	9		20	20			
		2	SS	92	17	372	21				
		3	SS	92	13	371	25				
	...very stiff, trace gravelly sand lensing below 2.3m	4	SS	100	19	370	18				
		~~5~~	~~SS~~	~~0~~	~~50~~		27				
	...boulder at 3.2m	6	RC	0		369					
		7	SS	100	12	368					
366.5	...sand and gravel below 6.1m, possible transition zone	8	SS	67	30	367					
366.4 / 6.4	**BOULDERS** [WS Till]	9	RC	67		366					
	BEDROCK Pink granite bedrock, slightly fractured	10	RC	100	83	365					
		11	RC	85	63	364					
363.3 / 9.5	**End of Borehole** at 9.5m Standpipe installed with flush mounted steel casing Water level at 5.6m below ground level upon completion										
	Water level at 7.5m below ground surface on Oct. 3, 2012										

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

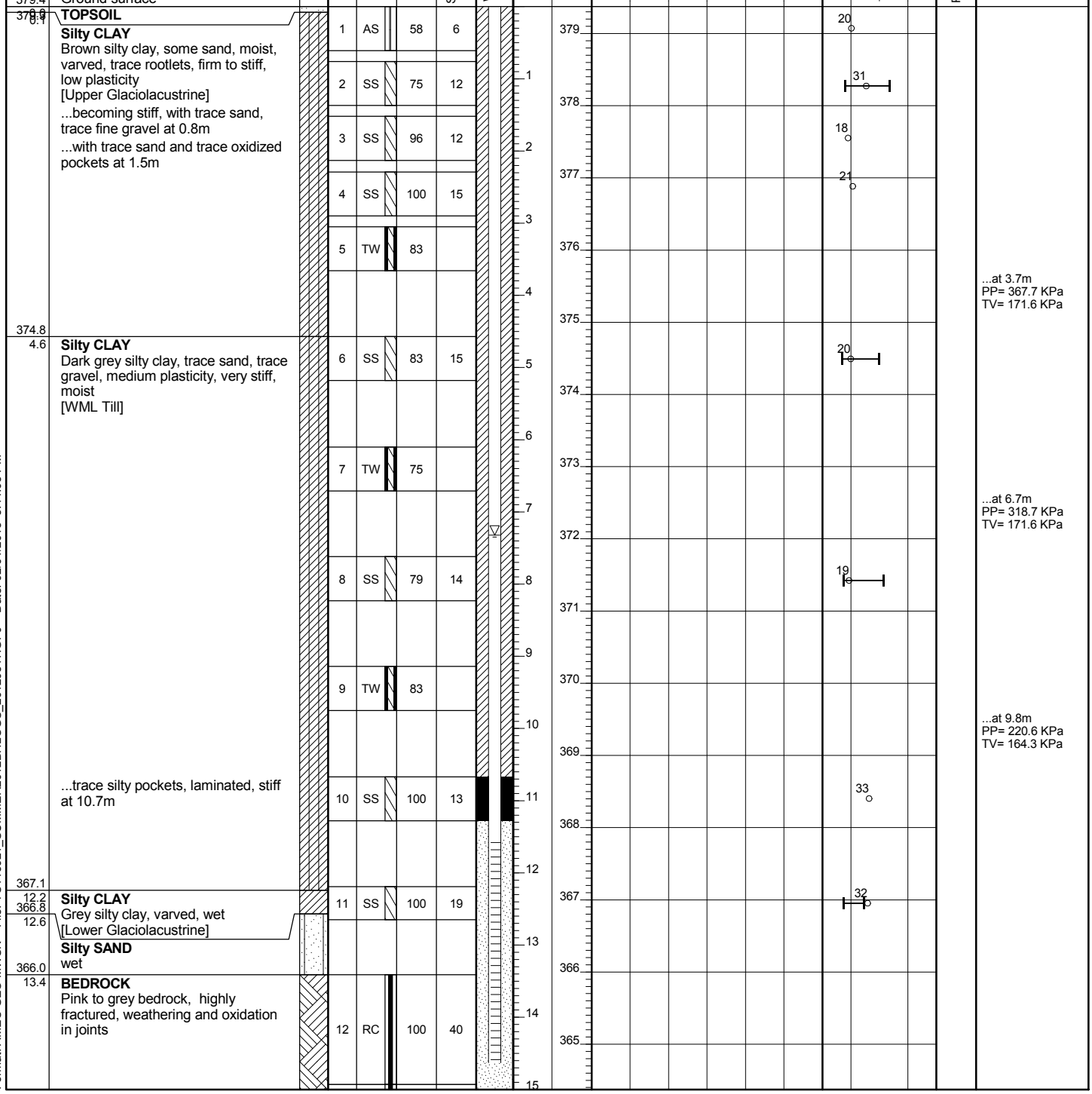
RECORD OF BOREHOLE No. BH12-22

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Area			COMPILED BY	DG
ELEVATION	379.373 m	COORD.	N 5,410,257 E 428,190	BORING DATE	Start: Sep 9, 12 End: Sep 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
379.4	Ground surface					
379.3 / 0.1	**TOPSOIL**					
	Silty CLAY Brown silty clay, some sand, moist, varved, trace rootlets, firm to stiff, low plasticity [Upper Glaciolacustrine]	1	AS	58	6	
	...becoming stiff, with trace sand, trace fine gravel at 0.8m	2	SS	75	12	
	...with trace sand and trace oxidized pockets at 1.5m	3	SS	96	12	
		4	SS	100	15	
		5	TW	83		...at 3.7m PP= 367.7 KPa TV= 171.6 KPa
374.8 / 4.6	**Silty CLAY** Dark grey silty clay, trace sand, trace gravel, medium plasticity, very stiff, moist [WML Till]	6	SS	83	15	
		7	TW	75		...at 6.7m PP= 318.7 KPa TV= 171.6 KPa
		8	SS	79	14	
		9	TW	83		...at 9.8m PP= 220.6 KPa TV= 164.3 KPa
	...trace silty pockets, laminated, stiff at 10.7m	10	SS	100	13	
367.1 / 12.2	**Silty CLAY** Grey silty clay, varved, wet [Lower Glaciolacustrine]	11	SS	100	19	
366.8 / 12.6	**Silty SAND** wet					
366.0 / 13.4	**BEDROCK** Pink to grey bedrock, highly fractured, weathering and oxidation in joints	12	RC	100	40	



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RECORD OF BOREHOLE No. BH12-22

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Mine Rock Area			COMPILED BY	DG
ELEVATION	379.373 m	COORD.	N 5,410,257 E 428,190	BORING DATE	Start: Sep 9, 12 End: Sep 9, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	...becoming moderately fractured, trace oxidized pockets		13	RC				16	364				
362.9									363				
16.5	**End of Borehole** at 16.5m Standppipe installed with flush mounted steel casing Water level at 9.6m below ground upon completion Water level at 7.4m below ground surface on Oct. 3, 2012												

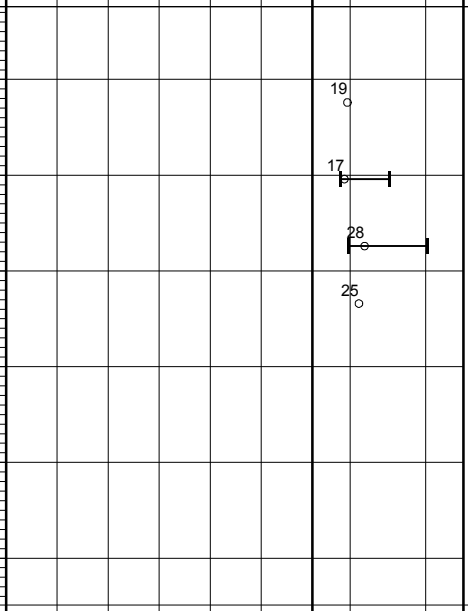
RECORD OF BOREHOLE No. BBAF-BH-2002

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	ARM
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	369.759 m	COORD.	N 5,410,217 E 426,778	BORING DATE	Start: Aug 28, 12 End: Aug 28, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
369.8	Ground surface					
0.0	**TOPSOIL**	1	AS			
369.0 / 0.8	**Silty CLAY** Light brown silty clay, trace sand, medium plasticity, very stiff [Upper Glaciolacustrine]	2	SS	67	17	
		3	SS	75	20	
367.6 / 2.1	**Silty CLAY** Light to dark brown silty clay, trace sand, trace gravel, high plasticity, stiff [WML Till]	4	SS	83	12	
366.6		5	SS	100	50	
3.2	**BEDROCK**	6	RC	100	70	...SPT refusal at 3.2m
		7	RC	100	81	
363.5 / 6.3	**End of Borehole** at 6.3m Standpipe installed with 0.9 m stick up Water level 2.4 m below ground surface on Sept 15, 2012					



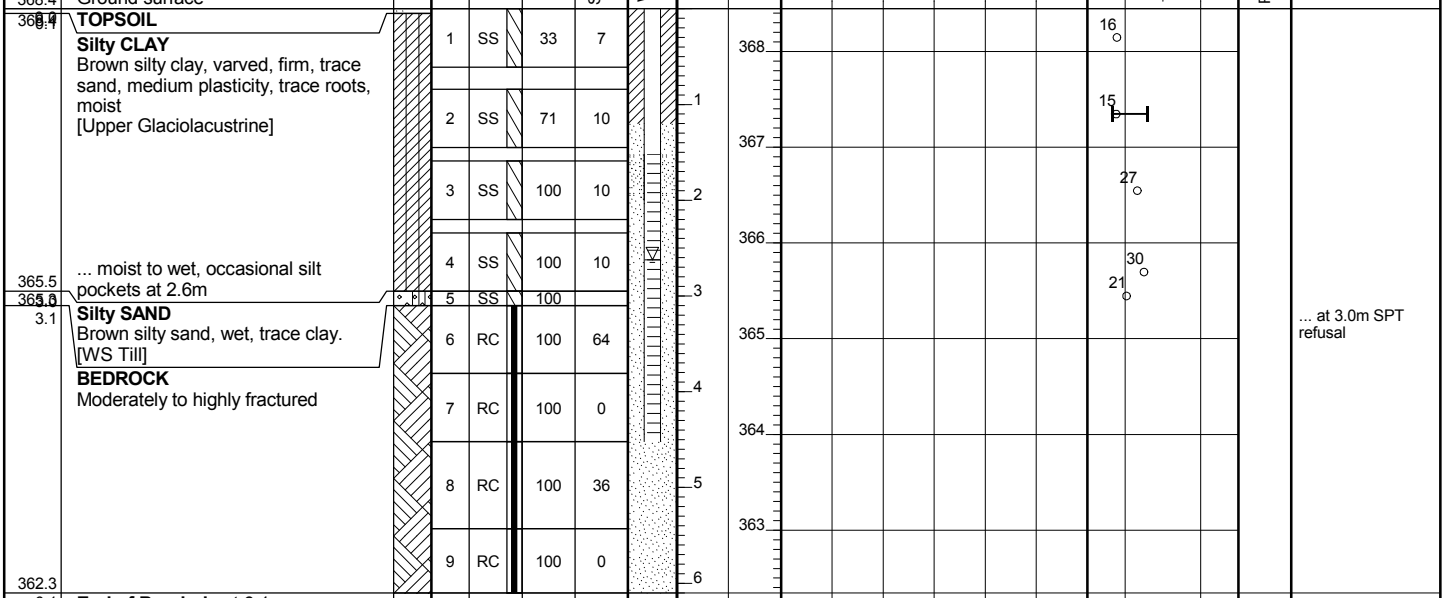
RECORD OF BOREHOLE No. BBAF-BH-2015

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	AD
ELEVATION	368.446 m	COORD.	N 5,410,507 E 426,591	BORING DATE	Start: Aug 11, 12 End: Aug 12, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
368.4	Ground surface					
368.3 / 0.1	**TOPSOIL**					
	Silty CLAY Brown silty clay, varved, firm, trace sand, medium plasticity, trace roots, moist [Upper Glaciolacustrine]	1	SS	33	7	
		2	SS	71	10	
		3	SS	100	10	
		4	SS	100	10	
365.5	... moist to wet, occasional silt pockets at 2.6m					
365.3		5	SS	100		
3.1	**Silty SAND** Brown silty sand, wet, trace clay. [WS Till]	6	RC	100	64	... at 3.0m SPT refusal
	BEDROCK Moderately to highly fractured	7	RC	100	0	
		8	RC	100	36	
362.3		9	RC	100	0	
6.1	**End of Borehole** at 6.1m Stand pipe installed with 0.9m stick up					
	Water level at 2.6 m below ground on Sept. 15, 2012					



RECORD OF BOREHOLE No. BBAF-BH-2051

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	AD
ELEVATION	368.505 m	COORD.	N 5,410,538 E 426,591	BORING DATE	Start: Aug 11, 12 End: Aug 11, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
368.5	Ground surface												
368.4 / 0.1	**TOPSOIL**		1	SS	58	13			368		16 16 11		
367.9 / 0.6	**Silty CLAY** Brown silty clay, varved, stiff, medium plasticity, moist, trace roots [Upper Glaciolacustrine]		2	SS	67	50							
367.7 / 0.8	**Silty SAND** Reddish brown silty sand, trace fine gravel, very dense, moist [WS Till]		3	RC	100	21		1					
			4	RC	100	33		2	367				
	BEDROCK Greenish black bedrock, highly fractured		5	RC	100	17							
	...dark grey below 2.8m		6	RC	97	88		3	366				
364.5			7	RC	100	30			365				
4.0	**End of Borehole** at 3.96m Stand pipe installed with 0.9m stick up Water level at 1.6 m below ground surface on Sept. 15, 2012												

RECORD OF BOREHOLE No. BBAF-BH-2054

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	AD
ELEVATION	372.196 m	COORD.	N 5,410,874 E 426,572	BORING DATE	Start: Aug 10, 12 End: Aug 11, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	REMARKS
372.2	Ground surface						
0.0	**Silty CLAY** Brown silty clay, varved, firm, trace rootlets, moist [Upper Glaciolacustrine]	1	SS	63	5	372	
		2	SS	63	9	371	
	... becoming stiff, fine gravel pockets						
370.7							
1.5	**Silty CLAY** Dark brown to grey silty clay, trace sand, trace fine gravel, occasional silt lenses, stiff, medium to high plasticity, occasional oxidized pockets [WML Till]	3	SS	79	11	370	
		4	SS	83	11		
369.0							
3.2	**Silty CLAY** Dark brown silty clay, trace sand, trace gravel, varved, moist, occasional oxidized pockets [Lower Glaciolacustrine]	5	SS	100	15	369	
368.4							
3.8	**Silty SAND** Brown silty sand, with cobbles and boulders, some gravel, dense, wet [WS Till]	6	RC	67		368	
		7	RC	100			
		8	SS	63	34	367	
366.9							
5.3	**BEDROCK** Greenish grey bedrock	9	RC	100	80	366	
	...highly fractured from 6.1m to 6.9m	10	RC	85	18	365	
		11	RC	100	82	364	
363.7							
8.5	**End of Borehole** at 8.5m Stand pipe installed with 0.9m stick up Water level 4.1m below ground surface on Sept. 15, 2012						

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

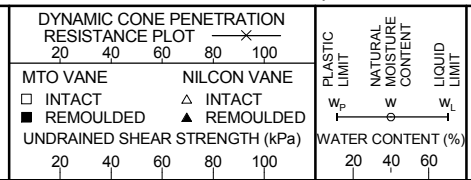
RECORD OF BOREHOLE No. BBAF-BH-2061

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	374.062 m	COORD.	N 5,411,001 E 426,687	BORING DATE	Start: Aug 14, 12 End: Aug 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	DEPTH (m)	REMARKS
374.1	Ground surface							
374.0 / 0.0	**TOPSOIL**							
0.2	**Silty CLAY** Brown to grey silty clay, trace fine sand, firm to stiff, moist, medium to high plasticity [WML Till] ...occasional rootlets at top	1	SS	50	4			
		2	SS	50	9	373	1	
		3	SS	79	14	372	2	
		4	SS	83	12	371	3	
	...100mm thick brown sand layer at 3.2m, compact, wet	5	SS	75	20	370	4	
		8	SS	92	12	369	5	
	...25mm thick grey silty sand layer at 5.0m					368	6	
368.0 / 6.1	**Silty CLAY** Dark Grey silty clay, varved (mm scale), wet, firm [Lower Glaciolacustrine]	11	SS	92	6	367	7	
366.4 / 7.6	**Silty SAND** Brown silty sand, occasional grey silt pockets, very dense, wet [Glaciofluvial]	12	SS	31	49	366	8	
366.0 / 8.1	**BEDROCK** Dark grey to brown, highly fractured	13	RC	100	0			
		14	RC	100	100	365	9	
		15	RC	100	85	364	10	
		16	RC	97	33	363	11	
362.8 / 11.2	**End of Borehole** at 11.2m Standpipe installed with 0.9m stick up. Water level at 2.2m below ground surface on Sept. 15, 2012							



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BBAF-BH-2063

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	AD
ELEVATION	372.395 m	COORD.	N 5,411,008 E 426,562	BORING DATE	Start: Aug 13, 12 End: Aug 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
372.4	Ground surface							
372.4 / 0.0	**TOPSOIL**							
	Silty CLAY Brown silty clay, firm, trace sand and gravel, moist, occasional rootlets [Upper Glaciolacustrine]	1	SS	50	7		372	
		2	SS	81	50	1		
371.1 / 1.3	..becoming sandy, dry at 0.8 m						371	
	BEDROCK Bluish grey, moderately fractured	3	RC	100	87	2	370	
		4	RC	87	58	3	369	
368.1 / 4.3	**End of Borehole** at 4.3m Stand pipe installed with 0.9m stick up					4		

Water level at 2.46 m on Sept. 15 2012

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%) 20 40 60
PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BBAF-BH-2065

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	375.942 m	COORD.	N 5,411,099 E 426,758	BORING DATE	Start: Aug 14, 12 End: Aug 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
375.9	Ground surface										
375.8 / 0.1	**TOPSOIL**										
	Silty CLAY Brown silty clay, trace sand, moist, varved, stiff, occasional rootlets [Upper Glaciolacustrine]	1	SS	66	8		17	24			
		2	SS	58	13	375		28			
374.4 / 1.5	**Silty CLAY** Brown silty clay, trace fine gravel, trace sand, moist, occasional oxidized pockets, medium plasticity, stiff [WML Till]	3	SS	79	12	374		32			
		6	SS	96	14	373		29			
371.4 / 4.6	**Silty SAND** Brown silty sand, well graded, compact, very wet [Possible Glaciofluvial Sand]	9	SS	58	10	372		25			
369.8 / 6.2	**BEDROCK** Dark grey, highly fractured	10	SS	100	12	371		20			
		11	RC	95	0	370					
		12	RC	100	42	369					
		13	RC	100	44	368					
366.8 / 9.2		14	RC	100	73	367					
	End of Borehole at 9.2m Standpipe installed with 0.9m stick up										
	Water Level at 4 m below ground on Sept. 15, 2012										

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

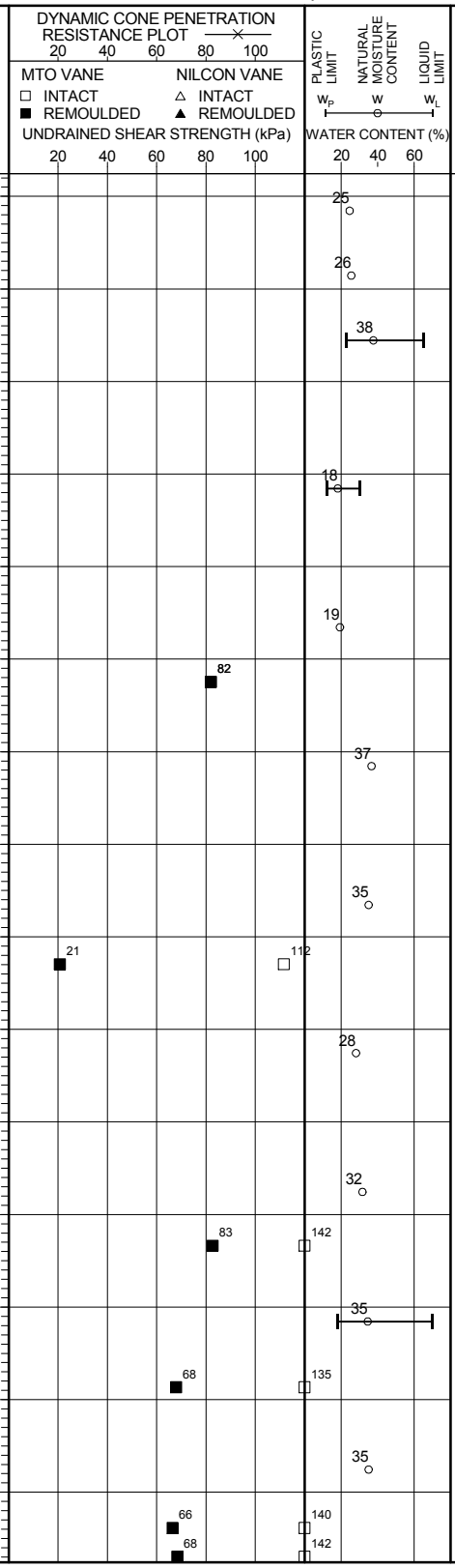
RECORD OF BOREHOLE No. BBAF-BH-2069

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	363.244 m	COORD.	N 5,411,089 E 426,442	BORING DATE		CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
363.2	Ground surface					
363.1 / 0.0	**TOPSOIL** Dark brown topsoil	1	BS			
362.5 / 0.8	**Silty CLAY** Dark greyish brown silty clay, trace sand, trace roots	2	SS	25	6	
	Silty CLAY Grey silty clay, some sand, trace fine gravel, moist, firm, varved [Upper Glaciolacustrine]	3	SS	79	12	
		6	SS	83	9	
	...occasional sand lenses	9	SS		6	
357.1 / 6.1	**Silty CLAY** Dark rey silty clay, trace fine gravel, moist, stiff, medium to high plasticity [WML Till]	12	SS	100	9	
		15	SS	100	9	
		18	SS	50	29	
		21	SS	100	17	
		24	SS	100	7	
		27	SS	100	8	



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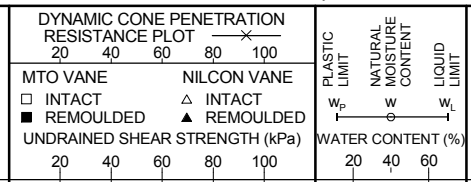
RECORD OF BOREHOLE No. BBAF-BH-2069

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	363.244 m	COORD.	N 5,411,089 E 426,442	BORING DATE		CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
		30	SS	100	10	
		33	SS	100	12	
		36	SS	100	14	
	...ocassional fine sand lenses at 21.3m	37	SS	100	13	
339.6 23.6 339.2	**SAND TILL** [Inferred WS Till]	38	RC	100	33	
24.1 336.1	**BEDROCK**	39	RC	100	50	
		40	RC	100	44	
27.1	**End of Borehole** at 27.1m Standpipe installed with 0.8m stick up Water level 8.0 m below ground surface on Sept. 15, 2012					



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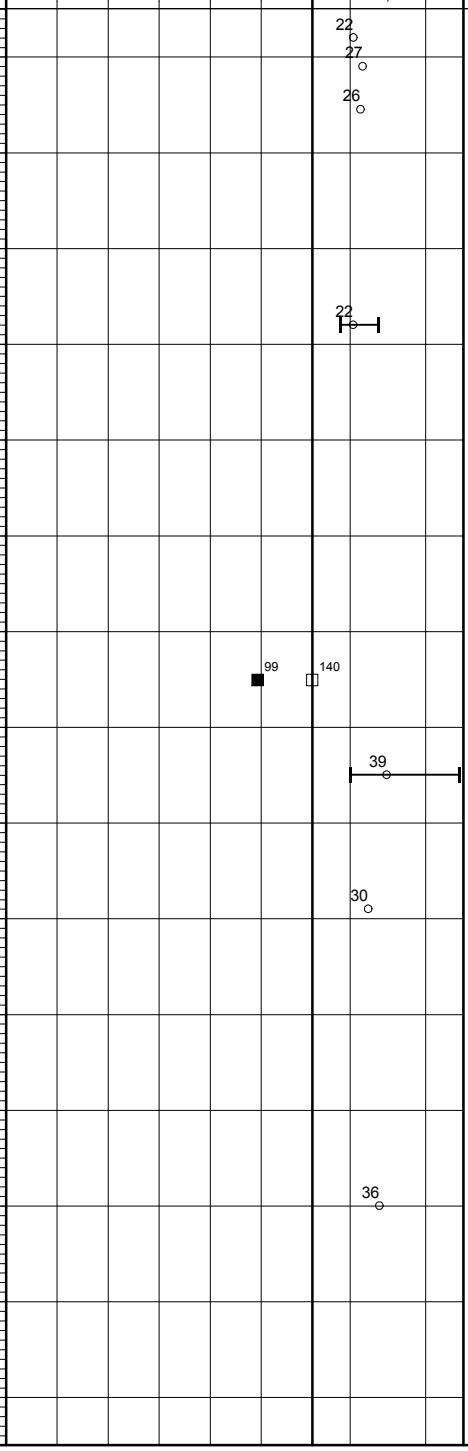
RECORD OF BOREHOLE No. BBAF-BH-2073

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	367.505 m	COORD.	N 5,411,158 E 426,547	BORING DATE	Start: Aug 15, 12 End: Aug 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
367.5	Ground surface					
367.4 / 0.1	**TOPSOIL**					
	Silty CLAY Brown silty clay, trace gravel, occasional oxidized pockets, moist, varved, medium plasticity, stiff [Upper Glaciolacustrine]	1	SS	54	7	
		2	SS	66	15	
		3	TW	37		
		6	SS	100	11	
362.9 / 4.6	**Silty CLAY** Dark grey silty clay, moist, firm to stiff [WML Till]	9	TW	75		...at 4.6m PP=167.4 kPa TV=71.8 kPa
		12	TW	75		...at 6.1m PP=191.3 kPa TV=62.2 kPa
		15	SS	100	6	
		18	SS	100	8	
		21	TW	75		...at 10.7m PP=191.3 kPa TV=119.6 kPa
		24	SS	100	11	
353.8 / 13.7	**BEDROCK** Greenish grey, moderately fractured	28	RC	93	86	



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RECORD OF BOREHOLE No. BBAF-BH-2073

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	PDR
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	367.505 m	COORD.	N 5,411,158 E 426,547	BORING DATE	Start: Aug 15, 12 End: Aug 17, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			29	RC	93	84		16	352 351				
350.6 16.9	**End of Borehole** at 16.9m Stand pipe installed with 0.9m stick up Water level at 11 m below ground on Sept. 15, 2012												

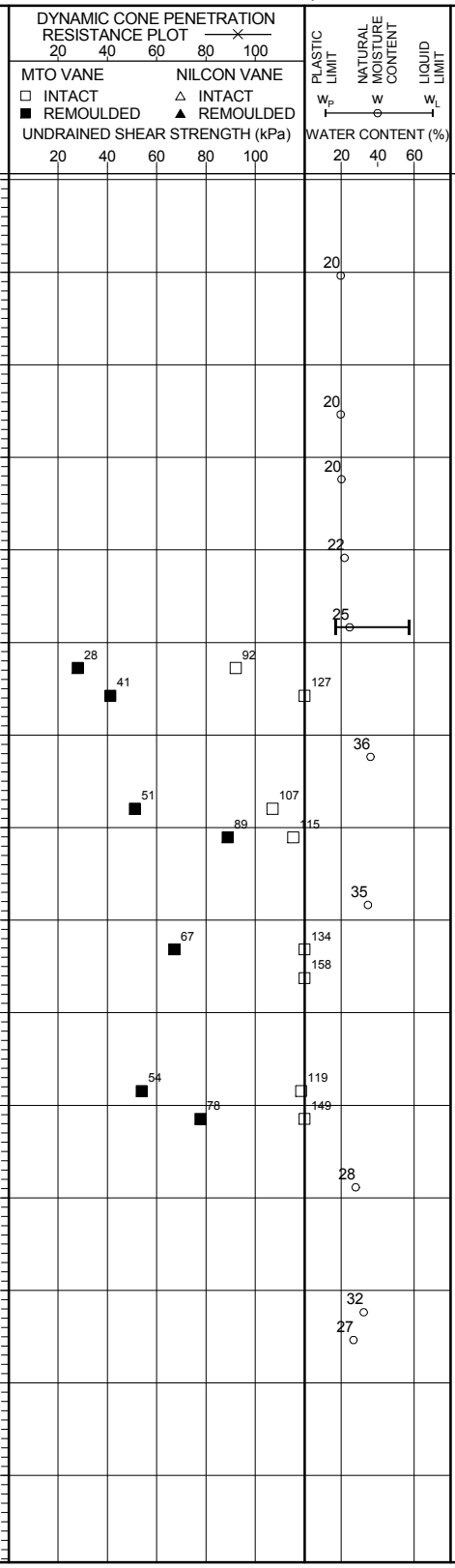
RECORD OF BOREHOLE No. BBAF-BH-2076

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	ARM
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	365.064 m	COORD.	N 5,410,335 E 426,698	BORING DATE	Start: Aug 26, 12 End: Aug 27, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger; BU Bulk; DC Dynamic Cone; RC Rock Core; SS Split Spoon; TW Thin Walled Open (Shelby); WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer; TV Torvane; PT Standard Proctor Test; P.L. Point Load Strength Index (I_{50}); RQD Rock Quality Designation; SCR Solid Core Recovery; k Permeability; C Consolidation; DS Direct Shear; GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
365.1	Ground surface					
0.0	**Topsoil**	1	AS			...water flowing from installation
364.3						
0.8	**Sandy SILT** Brown sandy silt, trace clay, varved, stiff [Upper Glaciolacustrine]	2	SS	54	15	
		3	TW	66		
362.8						
2.3	**Silty CLAY** Dark brown silty clay, trace sand, trace gravel, stiff [WML Till]	4	SS	83	15	
		5	SS	100	16	
		6	SS	100	11	
		7	SS	100	6	
		10	SS	100	8	
		13	SS	100	10	
		14	TW	100		
		17	SS	100	10	
	...increased sand content, gravelly below 12.2m [Possible transition zone to WS Till]	18	SS	100	21	
350.6						...SPt refusal at 13.7m
14.5	**COBBLES and BOULDERS** [Inferred WS Till]	19	RC	0		



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RECORD OF BOREHOLE No. BBAF-BH-2076

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	ARM
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	365.064 m	COORD.	N 5,410,335 E 426,698	BORING DATE	Start: Aug 26, 12 End: Aug 27, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			20	RC	0			16	349				
348.6													
16.5	**BEDROCK** ...subvertical fracture from 16.6m to 17.0m		21	RC	100	67		17	348				
								18	347				
			22	RC	100	90							
346.0								19					
19.1	**End of Borehole** at 19.05m Standpipe installed with 0.9m stick up Artesian flow observed from the well on Sept. 15, 2012												

RECORD OF BOREHOLE No. BH-4

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	369.078 m	COORD.	N 5,410,181 E 426,759	BORING DATE	Start: Oct 13, 12 End: Oct 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L)	PERMEABILITY (cm/s)	REMARKS
369.1	Ground surface								
0.0 / 368.5	**PEAT** Black peat, fiberous, damp to moist, some rootlets								
0.6	**Silty CLAY** Light brown silty clay, some sand, trace gravel, stiff, dry to damp, varved, occasional oxidized pockets [Upper Glaciolacustrine]	1	SS	46	15	368			
		2	SS	100	13	367			
		3	SS	100	12	366	21		
	...trace sand, trace gravel, sand seams at 3.1m	4	SS	100	11	365			
364.5									
4.6	**Silty CLAY** Dark grey silty clay, trace sand, trace gravel, firm, damp, medium plasticity [WML Till]	5	SS	62	12	364			
	...becoming stiffer at 6.1m	6	SS	100	9	363	27		
		7	SS	100	8	362			
		8	SS	100	10	361	25		
356.9						360			
12.2	**Silty CLAY** Dark grey silty clay, trace sand, trace gravel, varved, soft to firm, damp to moist [Lower Glaciolacustrine]	9	SS	100	9	359	34		
354.1						358			
						357			
						356			
						355			

DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

Continued on Next Page

RECORD OF BOREHOLE No. BH-4

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	369.078 m	COORD.	N 5,410,181 E 426,759	BORING DATE	Start: Oct 13, 12 End: Oct 14, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
14.9	**Silty SAND** Coarse grained silty sand, some silt, wet [WS Till] ...boulders and cobbles below 15.5m	10	SS	100				...heaving sand at 14.9m
		11	RC	52	0	16	353	
352.3		12	RC	71	0			
16.7	**BEDROCK** Grey bedrock	13	RC	100	68	17	352	
		14	RC	92	28	18	351	
		15	RC	100	75	19	350	
349.1		16	RC	100	80			
19.9	**End of Borehole** at 19.9m Standpipe installed with flush-mounted steel casing Water level at 1.4m below ground surface upon completion							

SOIL PROFILE | SAMPLES | STRAT PLOT | WELL / PIEZOMETER INSTALLATION

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

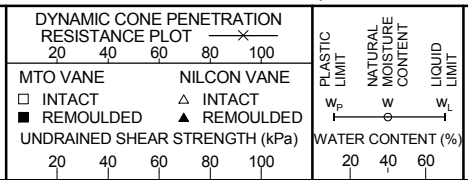
RECORD OF BOREHOLE No. BH-5

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	370.995 m	COORD.	N 5,410,210 E 426,804	BORING DATE	Start: Oct 11, 12 End: Oct 12, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
371.0	Ground surface							
0.0 / 370.4	**Topsoil**							
0.6 / 368.7	**Silty CLAY** Brown silty clay, some sand, some gravel, varved, stiff, damp [Upper Glaciolacustrine]	1	SS	62	14	1	370	
		2	SS	79	15	2	369	
2.3 / 366.4	**Silty CLAY** Dark brown silty clay, trace sand, trave gravel, stiff, damp [WML Till]	3	SS	71	15	3	368	
		4	SS	100	11	4	367	
4.6 / 365.8	**Silty SAND** Grey silt and sand, trace gravel, varved, firm, moist, wet [Lower Glaciolacustrine]	5	SS	46	37	5	366	
5.2	...cobbles at 5.1m	6	RC	61	61			
	BEDROCK Grey to black bedrock	7	RC	25	12	6	365	
		8	RC	90	53	7	364	
		9	RC	100	46	8	363	
361.4		10	RC	94	23	9	362	
9.6	**End of Borehole** at 9.6m Standpipe installed with 0.9m stick up Water level at 3.4 m below ground surface upon completion							



PERMEABILITY (cm/s)

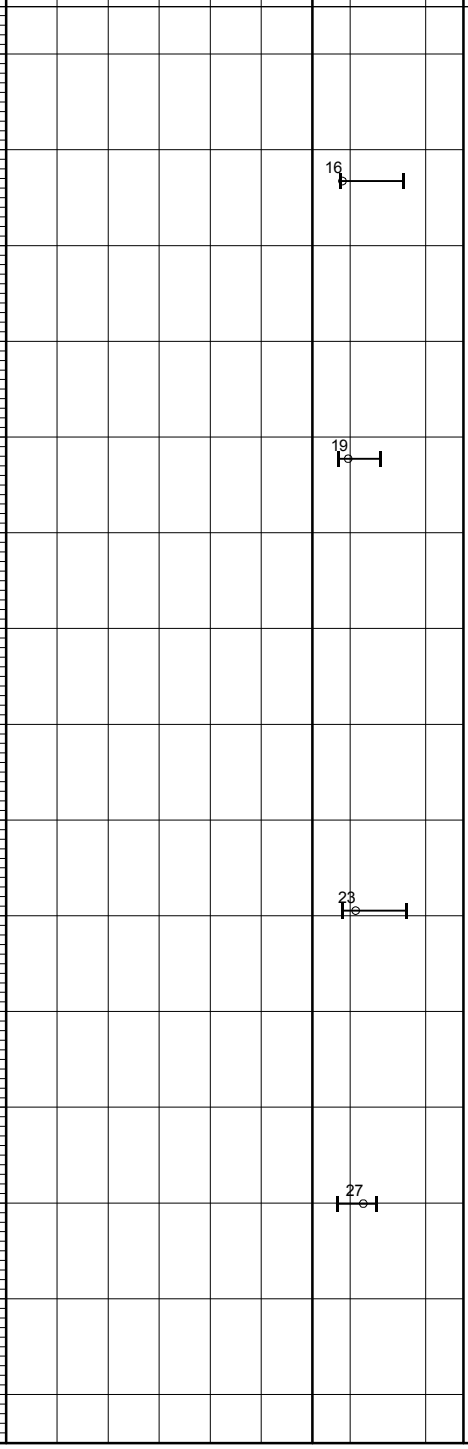
RECORD OF BOREHOLE No. BH-7

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	369.494 m	COORD.	N 5,410,185 E 426,807	BORING DATE	Start: Oct 12, 12 End: Oct 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
369.5	Ground surface					
0.0 / 368.9	**TOPSOIL**					
0.6	**Silty CLAY** Brown silty clay, some sand, trace gravel, occasional light grey silt pockets, firm to stiff, dry to damp, trace organics [Upper Glaciolacustrine]	1	SS	67	13	
		2	SS	87	16	
	...occasional sand seams below 2.4m	3	SS	100	14	
		4	SS	100	9	
364.9						
4.6	**Silty CLAY** Dark grey silty clay, trace sand, trace gravel, stiff, high plasticity, becoming varved, more silty, soft to firm, damp, below 4.83m	5	SS	100	11	
363.4						
6.1	**Silty CLAY** Dark grey silty clay, trave gravel, firm to stiff, damp, medium to high plasticity [WML Till]	6	SS	100	13	
		7	SS	100	13	
		8	SS	100	14	
357.3						
12.2	**Silty CLAY** Dark brown silty clay, trace sand, trace gravel, varved, occasional brown silty sand pockets, soft to firm, damp [Lower Glaciolacustrine]	9	SS	100	11	



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RECORD OF BOREHOLE No. BH-7

PROJECT	Rainy River Gold Project					ENGINEER	MS
PROJECT NO.	TC113921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NQ Coring	LOGGED BY	AD
CLIENT	Rainy River Resources.	LOCATION	Plant Site Area			COMPILED BY	DG
ELEVATION	369.494 m	COORD.	N 5,410,185 E 426,807	BORING DATE	Start: Oct 12, 12 End: Oct 13, 12	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	REMARKS
354.3										
15.2	**BOULDERS** [Inferred WS Till]		10	RC	42	0		16	354	
352.9			11	RC	47	0			353	
16.6	**BEDROCK** Grey to black bedrock, fractured		12	RC	100	83		17	352	
	...vertical fracture from 18.3m to the end of the core		13	RC	100	80		18 19	351	Vertical fracture running from 18.3m to the end of borehole at 20.0m
349.5			14	RC	100	46		20	350	
20.0	**End of Borehole** at 20.02m Standpipe installed with 0.9m stickup Water level 3.4m below ground surface upon completion									

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

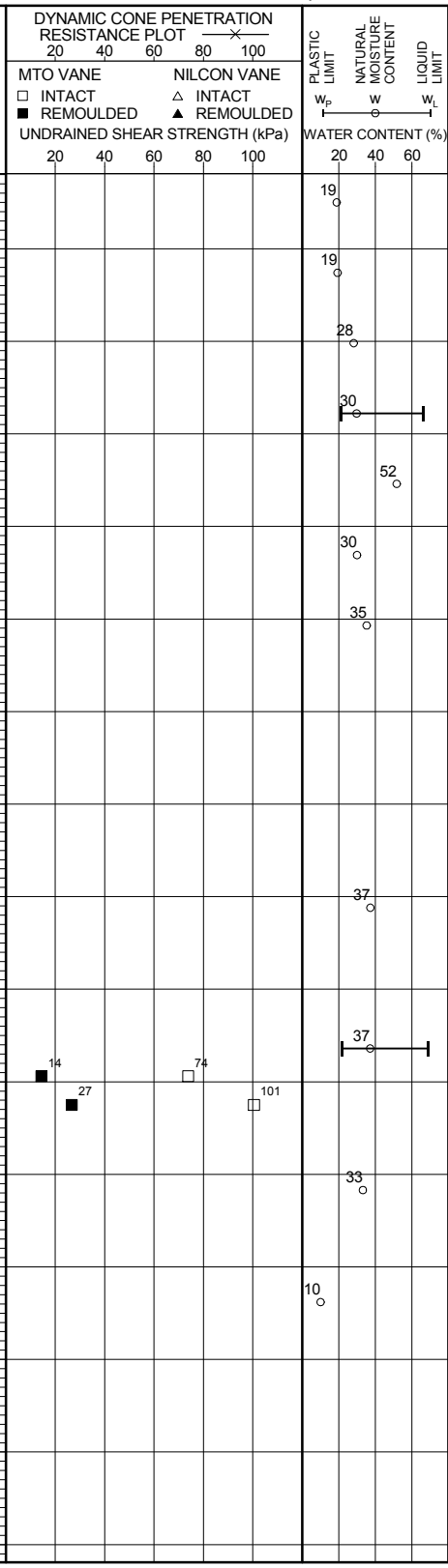
RECORD OF BOREHOLE No. BH13-17

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area			COMPILED BY	MV
ELEVATION	359.81 m	COORD.	N 5,411,974 E 423,956	BORING DATE	Start: 31 Aug 13 End: 1 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
359.8	Ground surface					
359.9 / 0.1	**ORGANICS/TOPSOIL**					
	SILTY CLAY Grey to dark grey silty clay, trace to some silt, trace gravel, high plasticity, firm to stiff, moist to wet [WML Till] ...from 0.1m to 1.5m light brown silty sandy clay	1	SS	71	7	
		2	SS	87	8	
		3	SS	96	9	
		4	SS	100	10	...sieve/hydrometer test done on SS4.
		5	SS	100	9	
		6	SS	100	8	
		7	SS	100	7	
		8	TW	100		
		9	SS	100	6	
		10	SS	100	8	
		11	SS	54	6	
348.5 / 11.3	**SAND & GRAVEL** Grey silty sand and gravel, wet, compact [WS Till]	12	SS	29	50/0.03	
	...boulders and cobbles below 12.8 m	13	RC			
345.5 / 14.3	**BEDROCK** Mafic volcanic, strong chloritic	14	RC	97	78	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH13-17

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area			COMPILED BY	MV
ELEVATION	359.81 m	COORD.	N 5,411,974 E 423,956	BORING DATE	Start: 31 Aug 13 End: 1 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	...felsic, mafic metavolcanic		15	RC	100	80		16	344				
			16	RC	100	94		17	343				
341.7								18	342				
18.1	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, flushmount steel well protector Screen: 11.3 to 12.8 m Riser: 0 to 11.3 m Sand: 10.7 to 12.8 m Bentonite: 12.8 to 18.4 m and 10.1 m to 10.7 m Grout: 0 to 10.7 m WATER LEVELS (bgs) 1.2 m on 03-Sep-2013												

RECORD OF BOREHOLE No. BH13-18

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area			COMPILED BY	MV
ELEVATION	364.83 m	COORD.	N 5,412,057 E 422,688	BORING DATE	Start: 14 Sep 13 End: 15 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	REMARKS
364.8	Ground surface									
364.8 / 0.0	**ORGANICS/TOPSOIL**									
0.2	**CLAYEY/SANDY SILT** Brown to light brown clayey/sandy silt, trace gravel, moist, firm	1	SS	54	7		14			
364.1 / 0.8	**SILTY CLAY** Brown to light brown silty clay, moist, varved, very stiff/compact [Upper Glaciolacustrine]	2	SS	58	23	364	16			...sieve/hydrometer test done on SS2.
362.9 / 2.0	...becoming grey mottled with brown	3	SS	83	18	363	22	25		
	SILTY CLAY Dark grey silty clay, trace silt, trace gravel, high plasticity, moist, very stiff [WML Till]	4	SS	92	18	362	23			...sieve/hydrometer test done on SS4.
361.5 / 3.4	...silt lens at 3.4m	5	SS	54	16		22			
361.2 / 3.7	**SANDY GRAVEL** [WS Till] ...boulders and cobbles	6	RC	32		361				...switched to coring at 3.7m
359.7 / 5.2	**BEDROCK** Quartz feldspar	7	RC	97	65	360 / 359				
		8	RC	97	68	358 / 357				
356.6 / 8.2	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, upright steel well protector, 0.84m stick-up Screen: 4.0 to 5.5 m Riser: 0 to 4.0 m Sand: 3.4 to 5.5 m Bentonite: 0 to 3.4 m and 5.5 to 8.2 m WATER LEVELS (bgs) 4.9 m on 17-Sep-2013 4.4 m on 25-Oct-2013									

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

PERMEABILITY (cm/s)

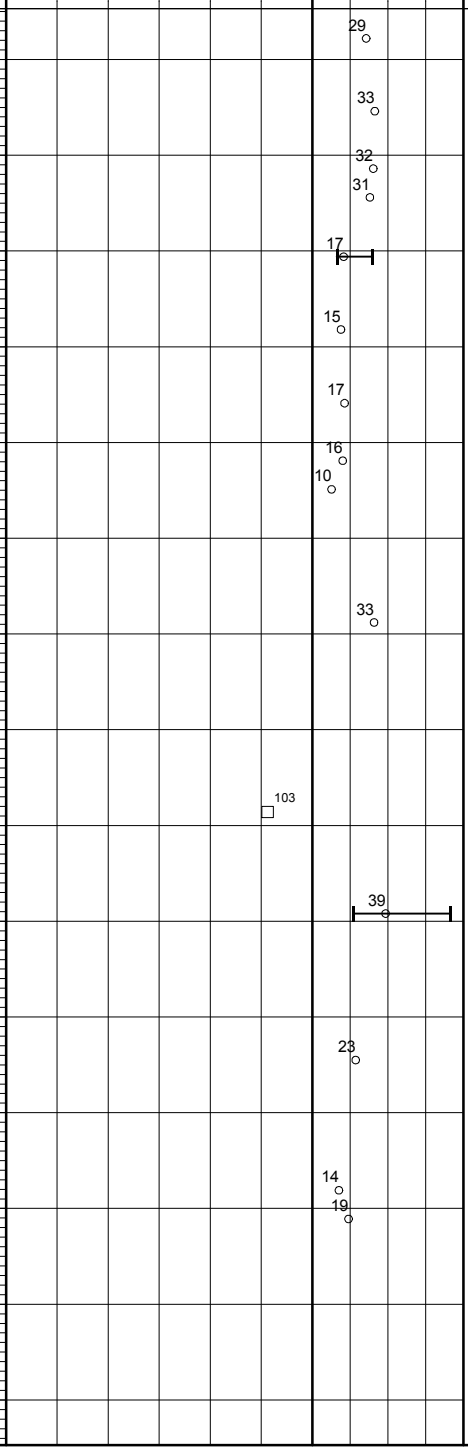
RECORD OF BOREHOLE No. BH13-21

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area / Water Management Pond			COMPILED BY	MV
ELEVATION	362.53 m	COORD.	N 5,412,068 E 421,298	BORING DATE	Start: 4 Sep 13 End: 14 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
362.5	Ground surface					
362.3 / 0.2	**ORGANICS/TOPSOIL**					
	SILTY CLAY Light to dark brown silty clay, trace sand, moist, medium to high plasticity, firm	1	SS	42	3	
		2	SS	75	5	
360.6 / 2.0		3	SS	100	10	
	SANDY SILT AND CLAY Light brown to brown sandy silt and clay, trace gravel, moist, varved, medium to high plasticity, stiff [Upper Glaciolacustrine]	4	SS	100	11	...sieve/hydrometer test done on SS4.
	...becoming dark brown/orange	5	SS	100	9	
358.7 / 3.8	**SILTY CLAY** Dark brown to grey silty clay, some sand, trace gravel, moist, high plasticity, stiff [WML Till]	6	SS	100	11	
		7	SS	100	9	
	...light brown silt and sand lens/layer from 4.6m to 4.8m ...becoming dark grey below 4.8m					
		8	SS	62	6	
		9	TW	100		
		10	SS	100	6	...sieve/hydrometer test done on SS10.
		11	SS	100	9	
349.9 / 12.6	...becoming sandy clayey silt, loose, wet at 12.2m	12	SS	100	8	
	SILT AND CLAY Light grey to grey silt and clay, wet, varved, firm [Lower Glaciolacustrine]					
348.8 / 13.7	**SANDY GRAVEL** Grey sandy gravel, some clay, wet [WS Till]	13	SS	12	25	...artesian pressures encountered at 13.7 m ...large gravel at spoon tip
	...clayey from 13.7m to 14.3m					



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RECORD OF BOREHOLE No. BH13-21

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area / Water Management Pond			COMPILED BY	MV
ELEVATION	362.53 m	COORD.	N 5,412,068 E 421,298	BORING DATE	Start: 4 Sep 13 End: 14 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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TV Torvane
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P.L. Point Load Strength Index (I_{50})
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k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
	...gravel and cobbles below 15.3 m							
		14	RC	30		16	347	
		15	RC	20		17	346	
						18	345	
		16	RC	40		19	344	
	...wet sand below 19.8m						343	
		17	RC	4		20	342	
341.2						21		
21.3	**BEDROCK** Mafic flow with weak carbonate alteration	18	RC	95	53	22	341	
		19	RC	58	27	23	340	
						24	339	
		20	RC	97	97	25	338	
		21	RC	100	88	26	337	
		22	RC	100	100	27	336	
						28	335	
		23	RC	100	67	29	334	
						30	333	

SOIL PROFILE | SAMPLES | STRAT PLOT | WELL / PIEZOMETER INSTALLATION

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (20 40 60)

PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH13-21

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area / Water Management Pond			COMPILED BY	MV
ELEVATION	362.53 m	COORD.	N 5,412,068 E 421,298	BORING DATE	Start: 4 Sep 13 End: 14 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
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TW Thin Walled Open (Shelby)
WS Wash Sample

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ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
									332				
			24	RC	100	67		31	331				
								32	330				
			25	RC	100	67		33	329				
			26	RC	100	100		34	328				
								35	327				
			27	RC	100	97		36	326				
325.9													
36.7	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, upright steel well protector, 0.84m stick-up Screen: 16.8 to 18.3 m Riser: 0 to 16.8 m Sand: 16.2 to 18.3 Bentonite: 15.5 to 16.2 m and 18.3 to 36.7 m Grout: 0 to 15.5 m WATER LEVEL (bgs) Flowing on 14-Sep-2013 Flowing on 31-Mar-2014												

RECORD OF BOREHOLE No. BH13-24

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area / Water Management Pond			COMPILED BY	MV
ELEVATION	360.09 m	COORD.	N 5,412,020 E 420,132	BORING DATE	Start: 16 Sep 13 End: 17 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT ■ REMOULDED) / NILCON VANE (△ INTACT ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
360.1	Ground surface									
359.9 / 0.2	**ORGANICS/TOPSOIL**									
359.3 / 0.8	**SANDY CLAYEY SILT** Brown to dark brown sandy clayey silt, moist, trace organics, soft	1	SS	25	3			28		
358.8 / 1.3	**SILTY CLAY** Brown to dark brown silty clay, some sand, trace gravel, wet, varved, medium plasticity, firm [Upper Glaciolacustrine]	2	SS	100	7	359		25, 18		...sieve/hydrometer test done on SS2A.
		3	SS	92	6	358		16, 29		
357.8 / 2.3	...sand lens at 1.3 m									
	SILTY CLAY Grey mottled with brown silty clay, trace to some sand, trace gravel, moist, high plasticity, stiff [WML Till]	4	SS	92	11	357		27		
	...becoming dark grey, trace sand, trace gravel at 3 m	5	SS	96	10			31		
		6	TW	58		356				
		7	SS	92	8	355		31		...sieve/hydrometer test done on SS7.
		8	SS	100	10	354		23		
352.5						353				
352.6 / 7.8	**SILT** Grey/green silt, trace sand, trace clay, varved, wet, soft [Lower Glaciolacustrine]	9	SS	83	6	352		18, 33		...artesian pressure encountered at 7.9m
351.8 / 8.3	**SAND** Brown sand, coarse, wet	10	RC	100	100	351				
	BEDROCK Mafic flow with weak carbonate alteration, greenish grey	11	RC	98	98	350				
		12	RC	100	100	349 / 348				
		13	RC	100	93	347				
		14	RC	100	93	346				

WELL / PIEZOMETER INSTALLATION — DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Continued on Next Page

RECORD OF BOREHOLE No. BH13-24

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area / Water Management Pond			COMPILED BY	MV
ELEVATION	360.09 m	COORD.	N 5,412,020 E 420,132	BORING DATE	Start: 16 Sep 13 End: 17 Sep 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			15	RC	97	97		16	344				
			16	RC	100	73		17	343				
			17	RC	98	93		18	342				
			18	RC	100	90		19	341				
			19	RC	100	83		20	340				
			20	RC	100	95		21	339				
								22	338				
								23	337				
335.6								24	336				
24.5	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, upright steel well protector, 0.86 m stick-up Screen: 6.8 to 8.3 m Riser: 0 to 6.8 m Sand: 6.2 to 8.3 m Bentonite: 0 to 6.2 m and 8.3 m to 24.5 m WATER LEVELS (bgs) Artesian flow first encountered when drilling at depth 7.9 m Flowing on 17-Sep-2013 Flowing on 31-Mar-2014												

RECORD OF BOREHOLE No. BH13-26

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	MA
CLIENT	New Gold Inc.	LOCATION	Tailings Management Area			COMPILED BY	AD
ELEVATION	364.02 m	COORD.	N 5,412,547 E 420,489	BORING DATE	Start: 18 Mar 14 End: 18 Mar 14	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	DEPTH (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	REMARKS
364.0	Ground surface										
363.9 / 0.1	**ORGANICS/TOPSOIL** Frozen										
	CLAYEY SILT Light grey to brown, trace sand, medium plasticity, soft to firm, trace roots [Upper Glaciolacustrine]	01	SS	50	2	363	1		40		
		02	SS	83	5	362	2		25		...sieve/hydrometer test done on SS2.
	... becoming sandy, low plasticity	03	SS	100	14				18		
360.8 / 3.3	... silty fine sand varved with 10mm thick grey silty clay					361	3				
	SILTY CLAY Dark grey, trace gravel, trace sand, medium to high plasticity, firm to stiff [WML TIII]	04	SS	100	9				15		
		05	TW	50		360	4		37		
		06	SS	100	18	359	5		36		...sieve/hydrometer test done on SS6.
		07	SS	75	10	358	6		45		
		07A	TW	83		357	7	138 / 158			TW07A sample collected from hole 1.5 m west of original hole
356.1 / 7.9		08	SS	100	6	356	8		45		...sieve/hydrometer test done on SS8.
	CLAYEY SILT Greenish grey, varved with thin (<1 mm) grey clay layers, high plasticity, firm [Lower Glaciolacustrine]	09	RC	100	100	355	9				
	BEDROCK Tuff Greenish grey, calcite in veins	10	RC	100	100	354	10				
352.5 / 11.5		11	RC	100	100	353	11				
	END OF BOREHOLE STANDPIPE INSTALLATION flushmount well protector Screen: 6.1 to 7.6 m Riser: 0 to 6.1 m Sand: 5.5 to 7.6 m Bentonite: 7.6 to 11.5 m Grout: 0 to 5.5 m WATER LEVELS (bgs) 0.2 m on 18-Mar-2014 flowing on 31-Mar-2014										

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)
WATER CONTENT (%) (20 40 60)
PERMEABILITY (cm/s)

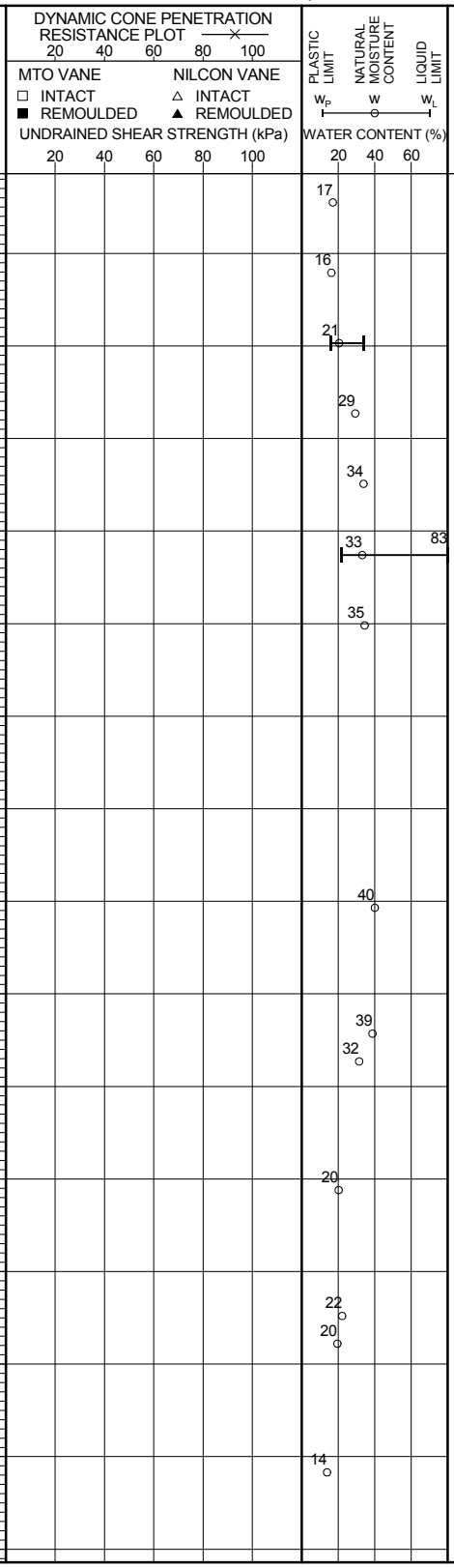
RECORD OF BOREHOLE No. BH13-27

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	MV
ELEVATION	364.86 m	COORD.	N 5,411,062 E 425,700	BORING DATE	Start: 30 Aug 13 End: 30 Aug 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
364.9	Ground surface					
364.8 / 0.1	**ORGANICS/PEAT**					
	SANDY/CLAYEY SILT Brown sandy/clayey silt, trace gravel, moist, varved, low to medium plasticity, firm to very stiff [Upper Glaciolacustrine]	1	SS	79	7	
		2	SS	67	17	
		3	SS	83	14	...sieve/hydrometer test done on SS3.
362.6 / 2.3	**SILTY/SANDY CLAY** Brown to dark grey silty/sandy clay, moist, high plasticity, firm to stiff [WML Till]	4	SS	83	10	
		5	SS	100	11	
	...0.15m seam of orange sand with silt and clay, coarse at 3.5m	6	SS	100	6	...sieve/hydrometer test done on SS6.
	...becoming dark grey at 4.6m, trace sand, trace gravel	7	SS	8	8	
		8	TW	92		
		9	SS	100	6	
355.4 / 9.5	**SANDY/SILTY CLAY** Grey sandy/silty clay, wet, varved, high plasticity, firm [Lower Glaciolacustrine]	10	SS	100	8	
354.2 / 10.7	**SAND** Brown to grey sand, some silt, fine to mediam, wet [Possible Glacial Fluvial]	11	SS	54	7	
	...becoming medium to fine at 12.4m	12	SS	67	16	
		13	SS	54	21	



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RECORD OF BOREHOLE No. BH13-27

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	MV
ELEVATION	364.86 m	COORD.	N 5,411,062 E 425,700	BORING DATE	Start: 30 Aug 13 End: 30 Aug 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	DEPTH (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
		14	SS	40	20	349	16	15				
348.7												
16.2	**BOULDERS AND COBBLES** Grey sandy gravel and cobbles [WS Till]	15	RC	62		348	17	4	25			
		16	RC			347	18					...heaving sand blew up into casing from 18.5m to 17.4m during drilling
		17	RC			346	19	2	29			
	...boulders and cobbles	18	RC									
345.4												
19.5	**BEDROCK** Weak sericite, medium/strong silica alterations	19	RC	100	67	345	20					
		20	RC	88	82	344	21					
342.7						343	22					
22.2	**END OF BOREHOLE**											

STANDPIPE INSTALLATION
2.5 cm PVC pipe, steel upright well protector, 0.83m stick-up
Screen: 17.1 to 18.6 m
Riser: 0 to 17.1 m

Sand: 16.5 to 18.6 m
Bentonite: 15.9 to 16.5 m and 18.6 to 22.2 m
Grout: 0 to 15.9m

WATER LEVELS (bgs)
5.9 m on 10-Sep-2013
5.1 m on 31-Mar-2014

RECORD OF BOREHOLE No. BH13-29

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Mine Rock Stockpile Pond			COMPILED BY	AD
ELEVATION	357.52 m	COORD.	N 5,408,940 E 426,669	BORING DATE	Start: 26 Aug 13 End: 26 Aug 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
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C Consolidation
DS Direct Shear
GS Grain Size Analysis

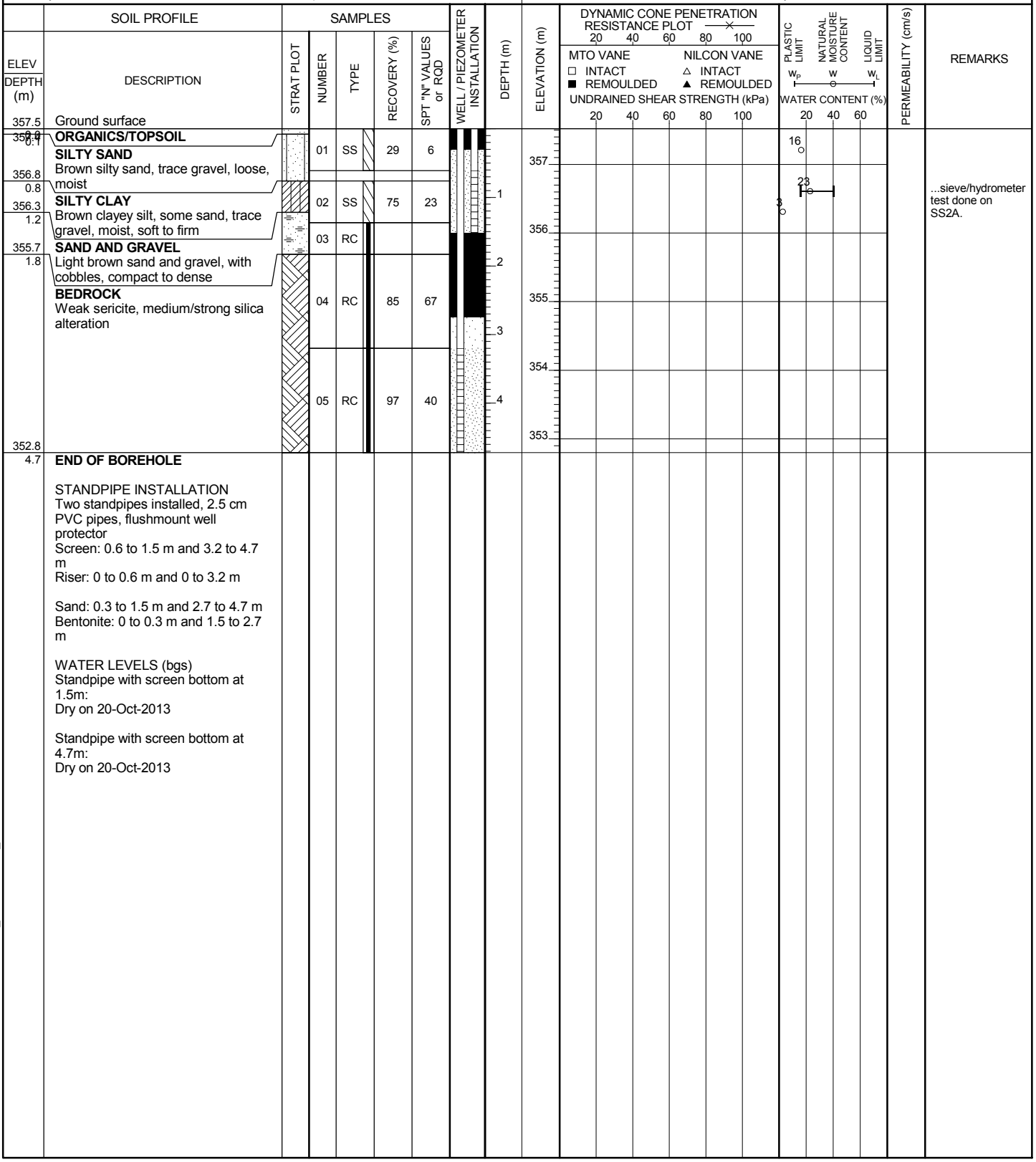
ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
357.5	Ground surface					
357.4 / 0.1	**ORGANICS/TOPSOIL**					
356.8 / 0.8	**SILTY SAND** Brown silty sand, trace gravel, loose, moist	01	SS	29	6	
356.3 / 1.2	**SILTY CLAY** Brown clayey silt, some sand, trace gravel, moist, soft to firm	02	SS	75	23	...sieve/hydrometer test done on SS2A.
355.7 / 1.8	**SAND AND GRAVEL** Light brown sand and gravel, with cobbles, compact to dense	03	RC			
	BEDROCK Weak sericite, medium/strong silica alteration	04	RC	85	67	
		05	RC	97	40	
352.8 / 4.7	**END OF BOREHOLE**					

STANDPIPE INSTALLATION
Two standpipes installed, 2.5 cm PVC pipes, flushmount well protector
Screen: 0.6 to 1.5 m and 3.2 to 4.7 m
Riser: 0 to 0.6 m and 0 to 3.2 m

Sand: 0.3 to 1.5 m and 2.7 to 4.7 m
Bentonite: 0 to 0.3 m and 1.5 to 2.7 m

WATER LEVELS (bgs)
Standpipe with screen bottom at 1.5m:
Dry on 20-Oct-2013

Standpipe with screen bottom at 4.7m:
Dry on 20-Oct-2013



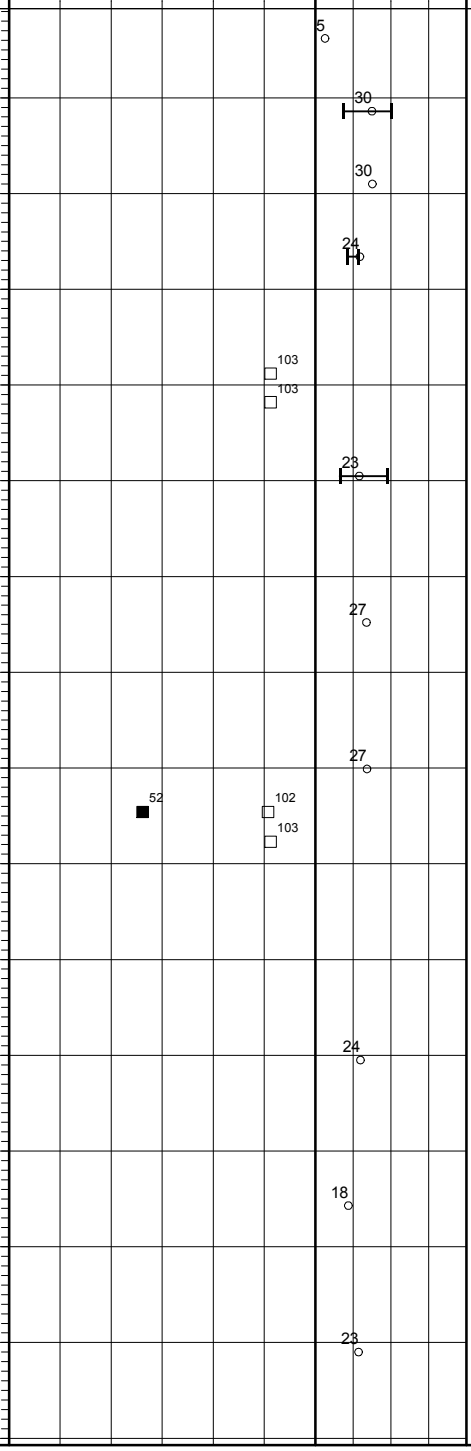
RECORD OF BOREHOLE No. BH13-30

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Mine Rock Stockpile Pond			COMPILED BY	AD
ELEVATION	355.93 m	COORD.	N 5,408,522 E 427,656	BORING DATE	Start: 23 Aug 13 End: 25 Aug 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
355.9	Ground surface					
0.0	**SAND AND GRAVEL** Brown sand and gravel, trace organics, loose to compact, moist [Probably Fill]	01	SS	42	12	
355.2 / 0.8	**SILTY/SANDY CLAY** Brown silty/sandy clay, moist to wet, soft to firm [Upper Glaciolacustrine]	02	SS	71	8	...sieve/hydrometer test done on SS2.
		03	SS	100	6	
	...trace sand below 2.3m	04	SS	100	5	...sieve/hydrometer test done on SS4.
352.6 / 3.4	**SILTY CLAY** Dark grey silty clay, trace to some silt, medium to high plasticity, firm to stiff, moist [WML Till]	05	TW	100		
	...frequent light grey silty clay laminae/layers	08	SS	100	6	...sieve/hydrometer test done on SS8.
		09	SS	100	7	
		10	SS	100	6	
		13	TW	100		
		14	SS	100	10	
	...trace to some sand below 12.2m	15	SS	100	9	
		16	SS	100	13	



PERMEABILITY (cm/s)

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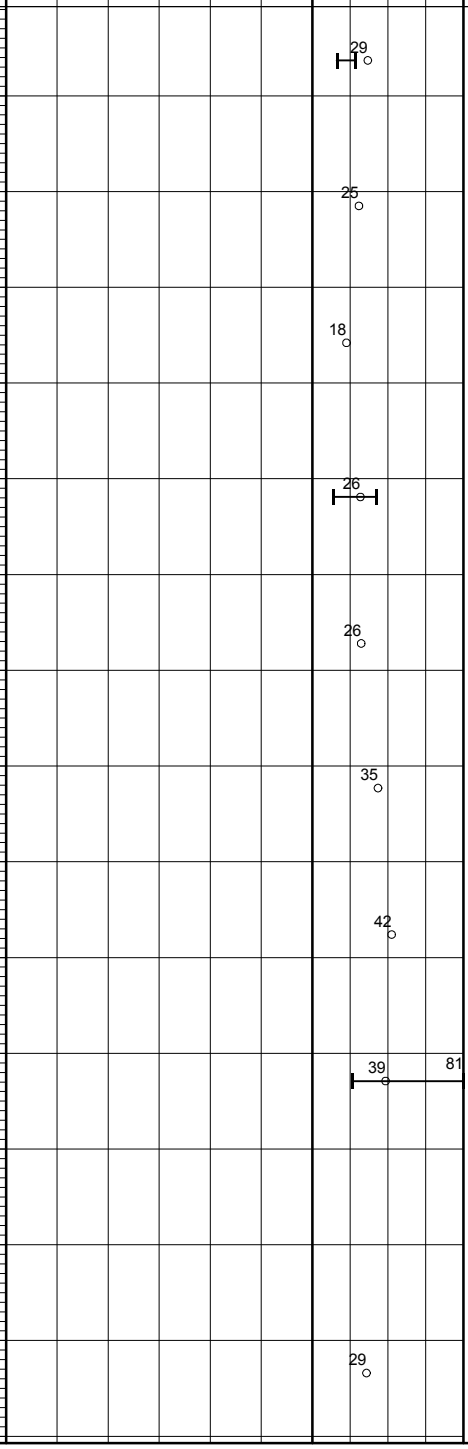
RECORD OF BOREHOLE No. BH13-30

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Mine Rock Stockpile Pond			COMPILED BY	AD
ELEVATION	355.93 m	COORD.	N 5,408,522 E 427,656	BORING DATE	Start: 23 Aug 13 End: 25 Aug 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
340.7						
15.3	**SILTY SAND** Grey silty sand, trace clay, trace silt, compact to dense, wet	17	SS	100	15	...sieve/hydrometer test done on SS17.
		18	SS	100	43	
		19	SS	100	24	
		20	SS	100	12	...sieve/hydrometer test done on SS20.
334.6						
21.3	**SILTY CLAY** Dark grey silty clay, trace gravel, high plasticity, stiff, moist [WML Till] ...coarse sand and gravel at 21.6m	21	SS	100	11	
		22	TW	100		
		25	SS	100	13	
		26	SS	100	12	...sieve/hydrometer test done on SS26.
		27	SS	100	13	



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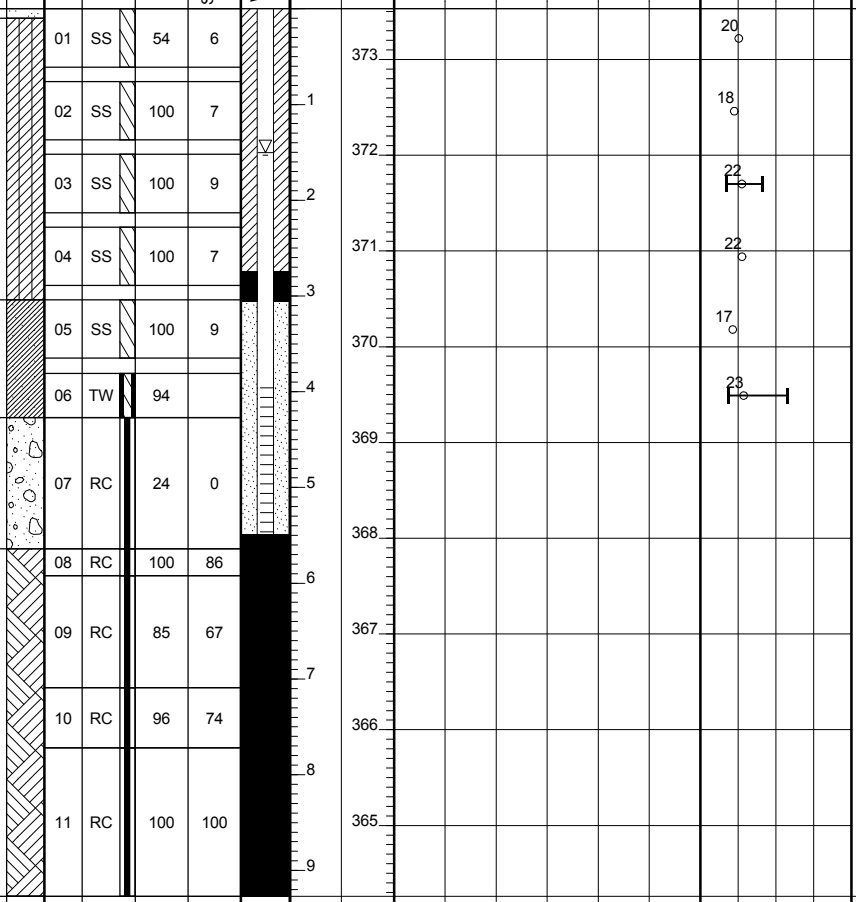
RECORD OF BOREHOLE No. BH13-32

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Substation			COMPILED BY	AD
ELEVATION	373.53 m	COORD.	N 5,411,212 E 426,708	BORING DATE	Start: 16 Nov 13 End: 16 Nov 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
373.5	Ground surface					
373.4 / 0.1	**ORGANICS/TOPSOIL**					
	SILTY CLAY Reddish Brown, trace to some sand, trace gravel, damp to moist, occasional grey silt laminations (3-6mm thick), low to medium plasticity, firm [Upper Glaciolacustrine] ...rootlets and organics from 0 to 0.8m	01	SS	54	6	
		02	SS	100	7	
		03	SS	100	9	...sieve/hydrometer test done on SS3.
		04	SS	100	7	
370.5 / 3.0	**SANDY SILT** Light brown, some clay, trace gravel, low placticity, firm ... 100mm thick sand pocket at 3.4m	05	SS	100	9	
369.3 / 4.3	...Dark grey silty clay, trace sand, trace gravel, moist, high plasticity, firm to stiff [WML Till]	06	TW	94		TW06 Hit refusal on hard material at 4.26m, tube was not damaged
	BOULDERS AND COBBLES [Inferred WS Till]	07	RC	24	0	
367.9 / 5.6	**BEDROCK** Mafic Flow, Fractures, 20° and 40° (measured from vertical axis)	08	RC	100	86	
		09	RC	85	67	
		10	RC	96	74	
		11	RC	100	100	RC sample taken from 8.36m to 8.71m for compression test
364.3 / 9.3	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, upright steel well protector, 0.97 m stick-up Screen: 4 to 5.5 m Riser: 0 to 4 m Sand: 3.1 to 5.5 m Bentonite: 2.7 to 3.1 m and 5.5 to 9.3 m Grout: 0 to 2.7 m WATER LEVELS (bgs) 1.1m on 08-Nov-2013 1.5m on 31-Mar-2014					



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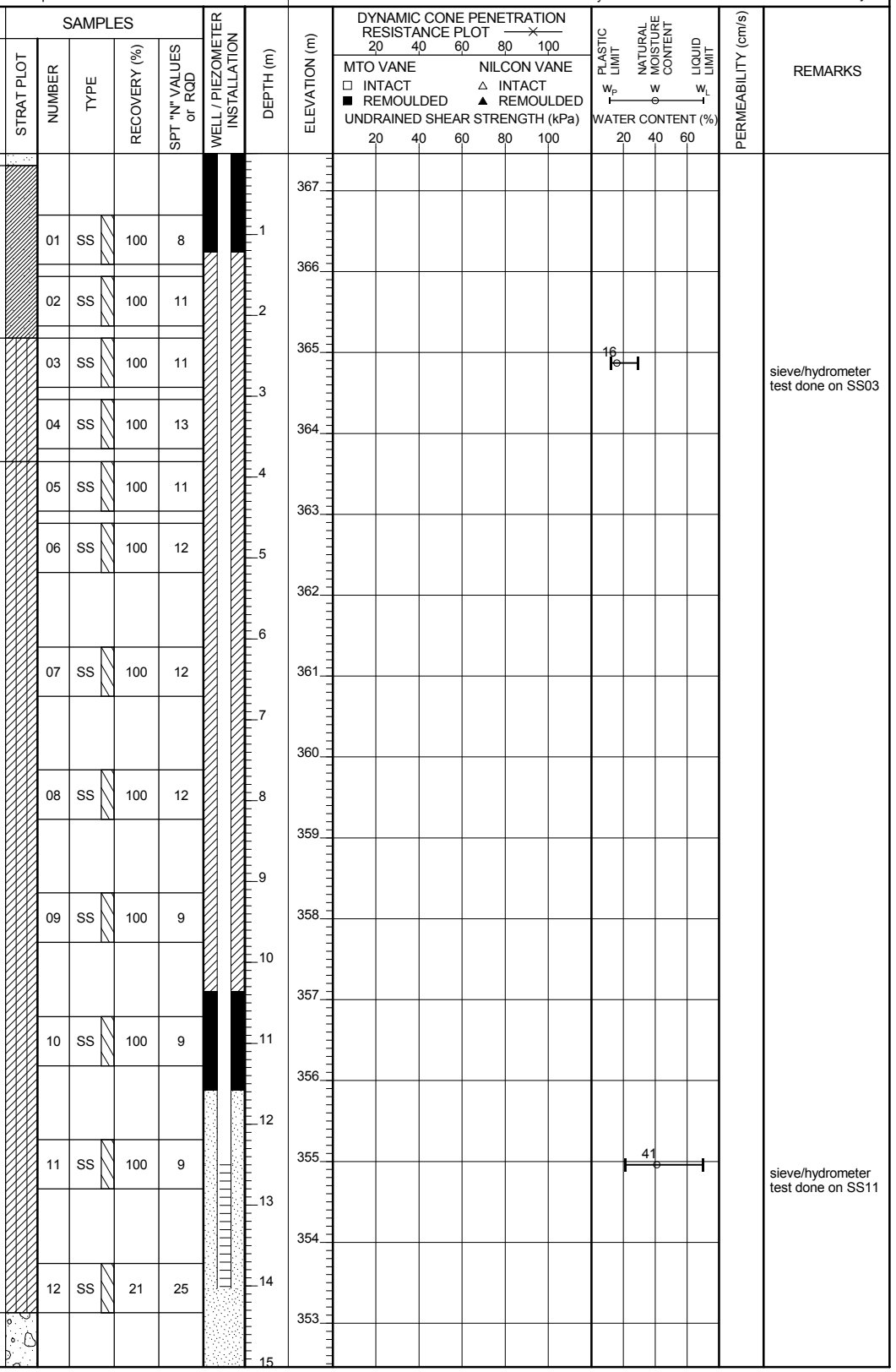
RECORD OF BOREHOLE No. BH13-35

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	DPD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Leach Tanks			COMPILED BY	JAC
ELEVATION	367.46 m	COORD.	N 5,411,078 E 426,496	BORING DATE	Start: 6 Dec 13 End: 9 Dec 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
367.5	Ground surface					
367.4 / 0.0	**ORGANICS/TOPSOIL**					
0.2	**CLAYEY SILT** Brown, trace angular medium and coarse sand, damp to moist, firm [Upper Glaciolacustrine]	01	SS	100	8	
	Laminated in ~0.5 mm thick layers of silt and sand, stiff	02	SS	100	11	
365.2 / 2.3	**SILTY CLAY** Brown mottled with light brown, some angular gravel, damp, stiff	03	SS	100	11	sieve/hydrometer test done on SS03
		04	SS	100	13	
363.7 / 3.8	... possible boulder or cobbles					
	SILTY CLAY Brown to grey, trace sand, trace gravel, moist, stiff [WML Till]	05	SS	100	11	
	... below 4.6 m, dark grey, medium to high plasticity	06	SS	100	12	
		07	SS	100	12	
		08	SS	100	12	
		09	SS	100	9	
		10	SS	100	9	
		11	SS	100	9	sieve/hydrometer test done on SS11
		12	SS	21	25	
353.1 / 14.3	**BOULDERS AND COBBLES** Gravel, possible boulders or weathered rock [WS Till]					



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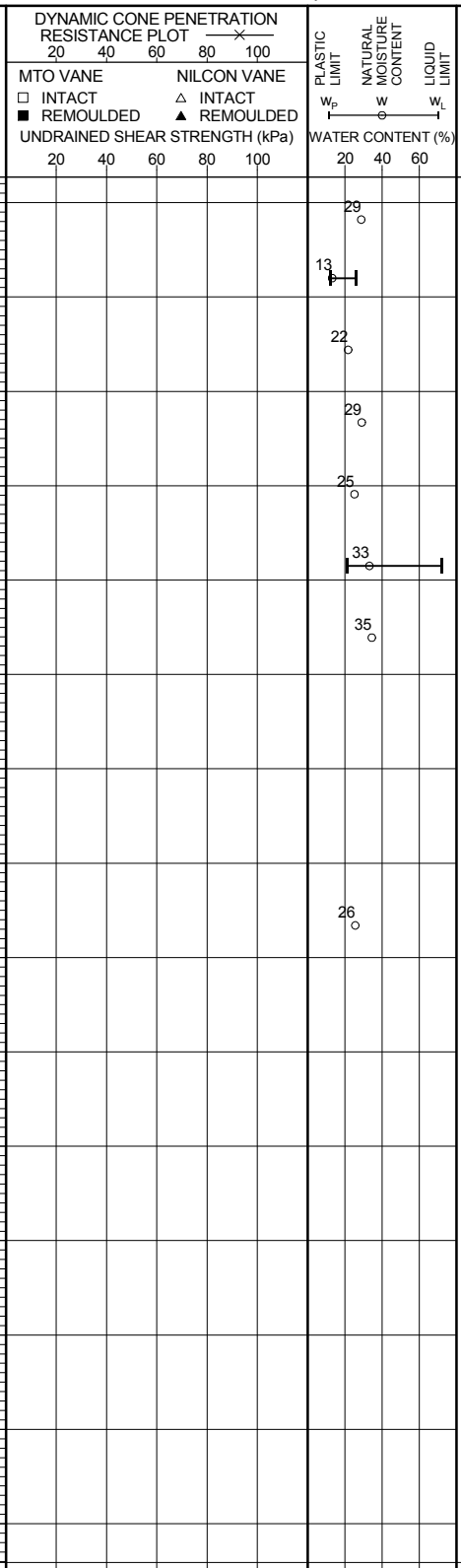
RECORD OF BOREHOLE No. BH14-02

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	HWP/MA
CLIENT	New Gold Inc.	LOCATION	Road crossing - Loslo Creek			COMPILED BY	AD
ELEVATION	359.27 m	COORD.	N 5,411,350 E 423,682	BORING DATE	Start: 10 Mar 14 End: 11 Mar 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
359.3	Ground surface					
359.2 / 0.1	**ORGANICS/TOPSOIL**					
0.4	**SILTY CLAY** Brown, trace sand, trace gravel, occasional grey silt inclusions, moist, medium to high plasticity, firm to stiff, occasional oxidation [Upper Glaciolacustrine]	01	GS			
		02	SS	100	9	...sieve/hydrometer test done on SS2.
	... at 1.2 m, occasional medium grained sand pockets, 10mm thick	03	SS	21	15	
357.0						
2.3	**SILTY CLAY** Grey, trace gravel, trace sand, damp to moist, high plasticity, firm to stiff, occasional oxidation [WML Till]	04	SS	100	11	
	... at 3.1 m, 80 mm thick brown silty clay layer	05	SS	100	10	
		06	SS	100	10	...sieve/hydrometer test done on SS6.
		07	SS	100	8	
	... at 5 m, 15 mm thick sand layer/lens, medium grained, light grey					
		08	TW	73		
351.7						
7.6	**SAND** Dark grey, medium to coarse grained, very dense, wet	09	SS	83	61	
350.7						
8.5	**GRAVEL, COBBLES AND BOULDERS** [Inferred WS Till]	10	RC			
		11	RC			
		12	RC			
347.7						
11.6	**BEDROCK** Intermediate Tuff, Greenish grey, foliated	13	RC	92	84	
		14	RC	93	87	
344.6						
14.7						



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RECORD OF BOREHOLE No. BH14-02

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	HWP/MA
CLIENT	New Gold Inc.	LOCATION	Road crossing - Loslo Creek			COMPILED BY	AD
ELEVATION	359.27 m	COORD.	N 5,411,350 E 423,682	BORING DATE	Start: 10 Mar 14 End: 11 Mar 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	SOIL PROFILE: DESCRIPTION	SAMPLES: STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE (□ INTACT, ■ REMOULDED) / NILCON VANE (△ INTACT, ▲ REMOULDED) / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
	END OF BOREHOLE STANDPIPE INSTALLATION 2.5 cm PVC pipe, flushmount well protector Screen: 10.1 to 11.6 m Riser: 0 to 10.1 m Sand: 9.8 to 11.6 m Grout/bentonite: 0 to 9.8 m WATER LEVELS (bgs) 0.3 m on 25-Mar-2014												

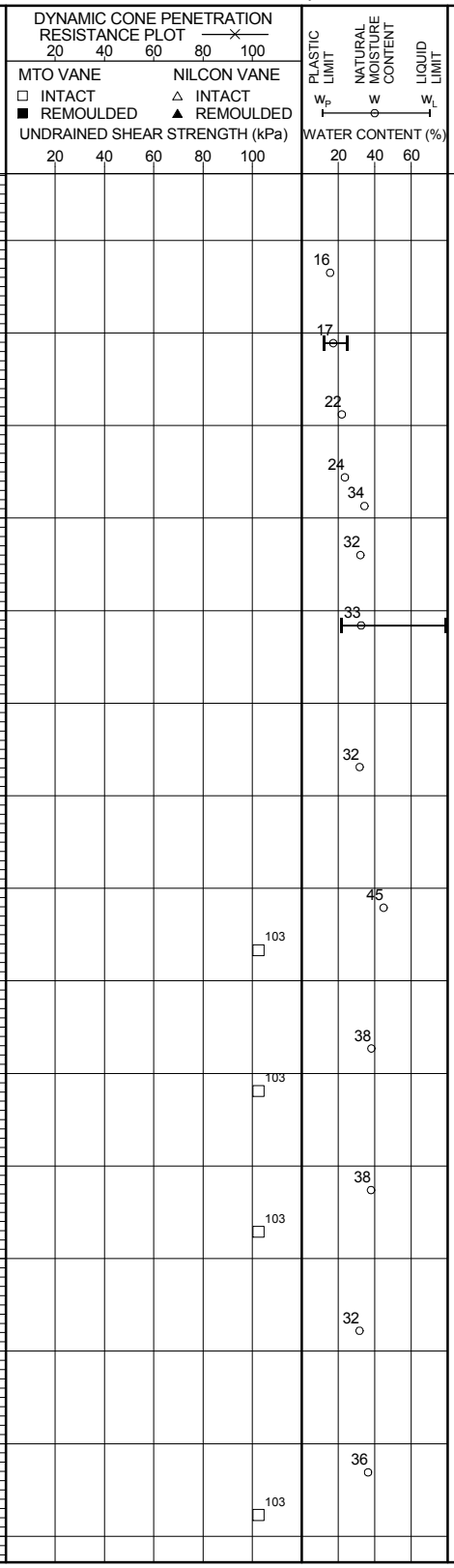
RECORD OF BOREHOLE No. BH14-04

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	AD
ELEVATION	356.72 m	COORD.	N 5,411,031 E 425,752	BORING DATE	Start: 19 Feb 14 End: 20 Feb 14	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
356.7	Ground surface					
356.6 / 0.0	**ORGANICS/TOPSOIL**					
0.2	**CLAYEY SILT** Light brown to grey, some sand, trace gravel, varved (up to 10 mm thick) with silty fine sand [Upper Glaciolacustrine]	01	GS			
		02	SS	88	8	
		03	SS	92	9	...sieve/hydrometer test done on SS3.
		04	SS	100	10	
353.2		05	SS	100	9	
3.5	**SILTY CLAY** Dark grey, trace sand, trace gravel, moist, medium to high plasticity, firm to stiff [WML Till]	06	SS	100	8	
		07	SS	100	9	...sieve/hydrometer test done on SS7.
		08	SS	100	9	
	... becoming moist to wet, firm, less sandy	09	SS	25	10	
		10	SS	100	7	
		11	SS	100	7	
		12	TW	100		
		13	SS	100	9	



PERMEABILITY (cm/s)

WELL / PIEZOMETER INSTALLATION

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RECORD OF BOREHOLE No. BH14-04

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	AD
ELEVATION	356.72 m	COORD.	N 5,411,031 E 425,752	BORING DATE	Start: 19 Feb 14 End: 20 Feb 14	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

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DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	REMARKS
		14	SS	83	8		
		15	SS	79	11		...sieve/hydrometer test done on SS15.
335.9							
20.8	**BEDROCK**	16	RC	85	38		
		17	RC	88	73		
		18	RC	92	89		
332.2							
24.5	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, upright steel well protector, 0.85 m stickup Screen: 19.2 to 20.7 m Riser: 0 to 19.2 m Sand: 18.6 to 20.7 m Bentonite: 20.7 to 24.5 m Grout/bentonite: 0 to 18.6 m WATER LEVELS (bgs) 2.6 m on 25-Mar-2014						

DEPTH (m): 16, 17, 18, 19, 20, 21, 22, 23, 24

ELEVATION (m): 341, 340, 339, 338, 337, 336, 335, 334, 333

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100)

MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20, 40, 60, 80, 100)

PLASTIC LIMIT (w_P) — NATURAL MOISTURE CONTENT (w) — LIQUID LIMIT (w_L)
WATER CONTENT (%) (20, 40, 60)

Plot points: 103 (at 340 m); 36 (at 341 m); 32 (at 338 m)

PERMEABILITY (cm/s)

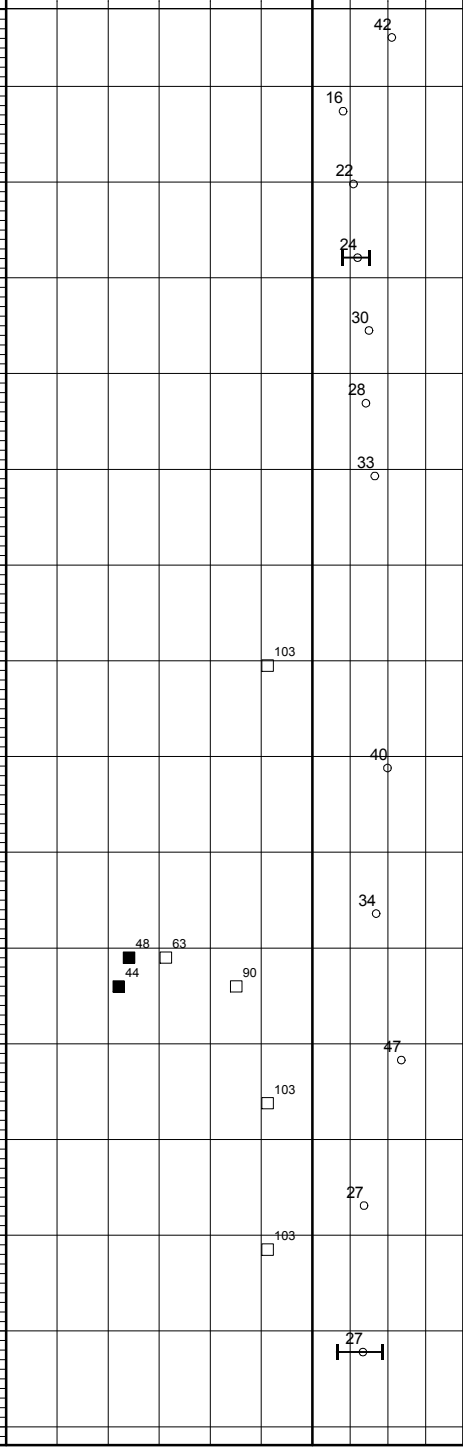
RECORD OF BOREHOLE No. BH14-05

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	AD
ELEVATION	358.81 m	COORD.	N 5,410,955 E 425,803	BORING DATE	Start: 12 Feb 14 End: 15 Feb 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
358.8	Ground surface					
0.0	**SANDY SILT AND SILTY CLAY** Brown, trace to some gravel, trace clay, occasional grey mottling, trace organics [Upper Glaciolacustrine]	01	GS			
		02	SS	92	11	
		03	SS	100	13	
	... below 2.3 m, some dark brown pockets, occasional orange staining	04	SS	100	10	...sieve/hydrometer test done on SS4.
355.8						
3.1	**SILTY CLAY** Dark grey, some sand, trace gravel, moist [WML Till]	05	SS	100	8	
		06	SS	100	10	
		07	SS	100	8	
		08	TW	100		
		09	SS	100	6	
	... occasional sand lenses/pockets	10	SS	75	6	
		11	SS	100	5	
		12	SS	100	6	
345.1						
13.7	**SILTY CLAYEY SAND** Brown to grey, fine, moist to wet, firm to stiff [Keewatin fluvial]	13	SS	67	7	...sieve/hydrometer test done on SS13.



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RECORD OF BOREHOLE No. BH14-05

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	AD
ELEVATION	358.81 m	COORD.	N 5,410,955 E 425,803	BORING DATE	Start: 12 Feb 14 End: 15 Feb 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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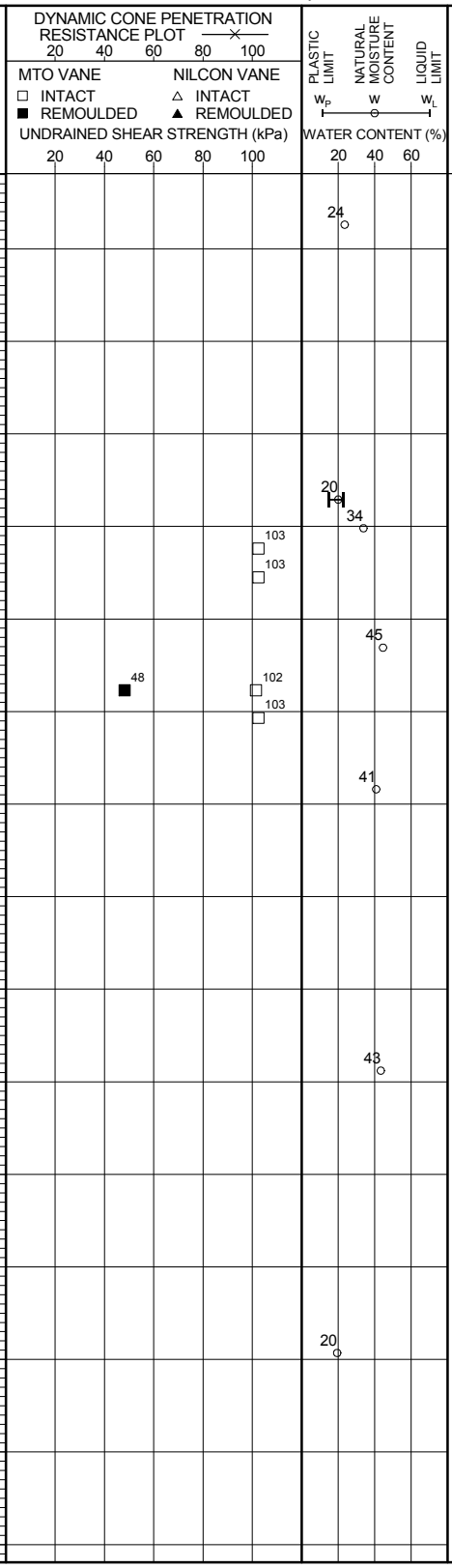
ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
	... possible cobbles/boulders from 16.8 m to 18.3 m	14	SS	71	11	
340.1 / 18.8	**SILTY CLAY** Dark grey, trace sand, trace gravel, moist, medium to high plasticity [WML Till]	15	SS	100	8	...sieve/hydrometer test done on SS15.
		16	SS	100	9	
		17	SS	100	9	
331.4 / 27.4	**SILTY SAND** Grey, fine grained, trace clay, compact, wet to saturated [Glacial Sand]	18	SS	54	9	
		19	SS	54	22	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH14-05

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	West Creek Pond			COMPILED BY	AD
ELEVATION	358.81 m	COORD.	N 5,410,955 E 425,803	BORING DATE	Start: 12 Feb 14 End: 15 Feb 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
325.3		20	SS	50	27	31, 32, 33	328, 327, 326	...sieve/hydrometer test done on SS20. Non- Plastic
33.5 / 324.3	**COBBLES AND BOULDERS** [Inferred WS Till]	21	RC	29	0	34	325	
34.5	**BEDROCK**	22	RC	92	28	35, 36	324, 323	
		23	RC	95	21	37	322	
320.4		24	RC	89	0	38	321	
38.5	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, flushmount protector Screen: 31.7 to 33.2 m Riser: 0 to 31.7 m Sand: 31.1 m to 33.2 m Bentonite: 33.2 to 38.5 m Grout/bentonite: 0 to 31.1 m WATER LEVELS (bgs) 4.1 m on 16-Feb-2014 4.3 m on 31-Mar-2014							

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100

PLASTIC LIMIT (w_P) — NATURAL MOISTURE CONTENT (w) — LIQUID LIMIT (w_L)
WATER CONTENT (%) 20 40 60

19

PERMEABILITY (cm/s)

RECORD OF BOREHOLE No. BH14-06

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	HWP
CLIENT	New Gold Inc.	LOCATION	Mine Rock Stockpile Pond			COMPILED BY	BT
ELEVATION	356.64 m	COORD.	N 5,408,576 E 426,818	BORING DATE	Start: 22 Feb 14 End: 23 Feb 14	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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TV Torvane
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RQD Rock Quality Designation
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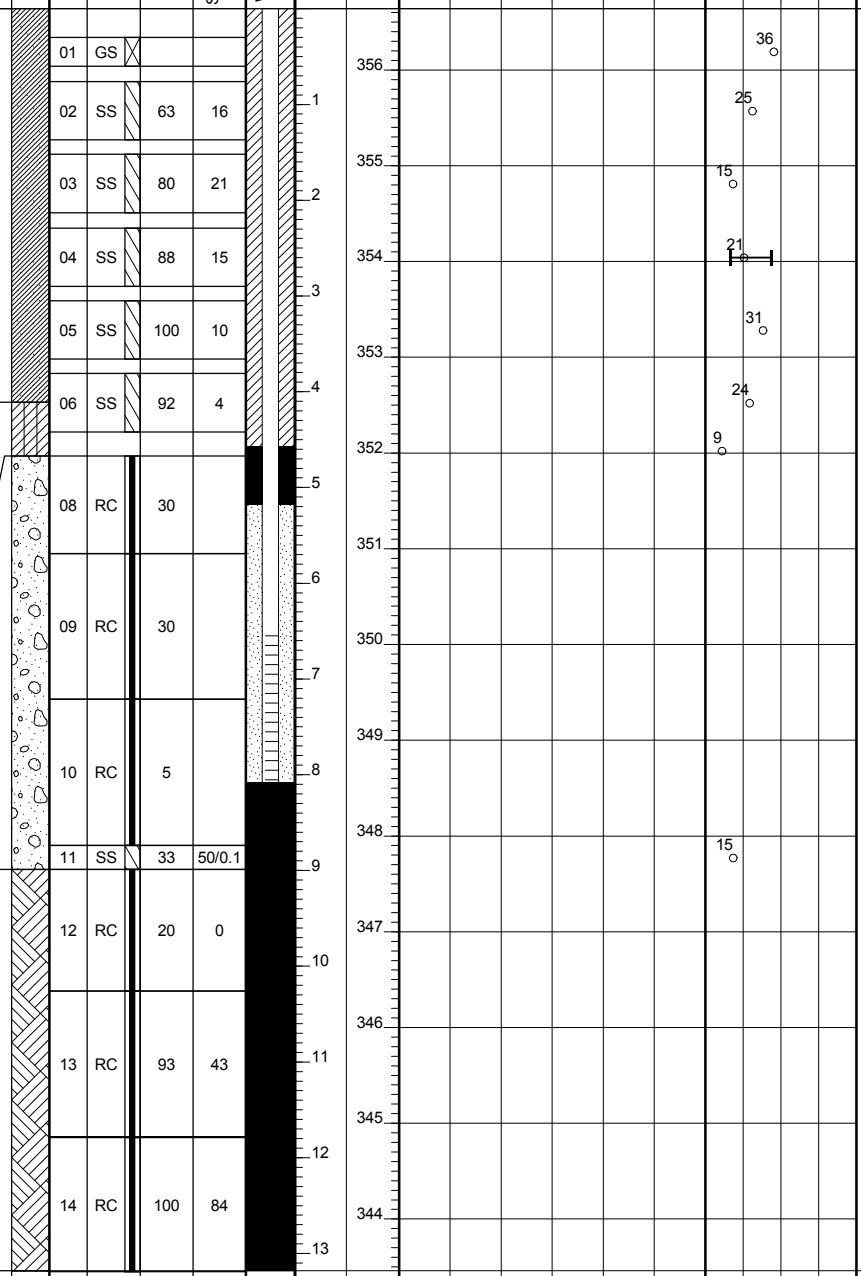
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
356.6	Ground surface					
0.0	**SILTY CLAY** Brown, moist, medium to low plasticity, stiff, trace rootlets, varved [Upper Glaciolacustrine]	01	GS			
		02	SS	63	16	
		03	SS	80	21	
		04	SS	88	15	...sieve/hydrometer test done on SS4.
		05	SS	100	10	
352.5		06	SS	92	4	
4.1	**SILTY CLAY** Dark grey, trace gravel, moist, high plasticity, stiff [WML Till]					
352.0						
4.7	... light grey, rock chips below 4.6 m					
	SANDY TILL Boulders & cobbles [WS Till]	08	RC	30		... SPT refusal at 9.6 m
		09	RC	30		
		10	RC	5		
347.7		11	SS	33	50/0.1	
9.0	**BEDROCK**	12	RC	20	0	
		13	RC	93	43	
		14	RC	100	84	
343.5						
13.2	**END OF BOREHOLE** STANDPIPE INSTALLATION flushmount protector Screen: 6.6 to 8.1 m Riser: 0 to 6.6 m Sand: 5.2 m to 8.1 m Bentonite: 4.6 to 5.2, 8.1 to 13.2 m Grout: 0 to 4.6 m					



RECORD OF BOREHOLE No. BH14-11

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	MA
CLIENT	New Gold Inc.	LOCATION	Mill Foundation			COMPILED BY	AD
ELEVATION	374.07 m	COORD.	N 5,410,956 E 426,600	BORING DATE	Start: 15 Feb 14 End: 16 Feb 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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ELEV DEPTH (m)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
374.1	Ground surface							
0.0 / 373.8	**ORGANICS/TOPSOIL**	01	SS	100	50/0.15			
0.3	**BEDROCK** Mafic Volcanic Dark greenish grey to black, quartz and calcite veins, some iron staining on fractures	02	RC	100	91	1	373	
		03	RC	100	93	2	372	
		04	RC	100	98	3	371	
		05	RC	99	93	4	370	
	... highly fractured core from 5.3 m to 5.4 m, some sub-vertical fractures					5	369	
		06	RC	100	86	6	368	UCS sample taken from 6.5 m to 6.9 m
		07	RC	100	100	7	367	
		08	RC	100	67	8	366	
		09	RC	100	92	9	365	
	... at 10.5 m, becoming dark grey to black					10	364	
		10	RC	100	85	11	363	
		11	RC	100	89	12	362	
						13	361	
						14	360	
						15		

WELL / PIEZOMETER INSTALLATION

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) (20 40 60)

51

PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH14-11

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	MA
CLIENT	New Gold Inc.	LOCATION	Mill Foundation			COMPILED BY	AD
ELEVATION	374.07 m	COORD.	N 5,410,956 E 426,600	BORING DATE	Start: 15 Feb 14 End: 16 Feb 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
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DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
357.9			12	RC	100	100		16	358										
16.2	**END OF BOREHOLE** STANDPIPE INSTALLATION flushmount well protector Screen: 11.7 to 14.8 m Riser: 0 to 11.7 m Sand: 11 to 14.8 m Bentonite: 14.8 to 16.2 m Grout/bentonite: 0 to 11 m WATER LEVELS (bgs) 0.3 m on 31-Mar-2014 1.0 m on 04-Apr-2014																		

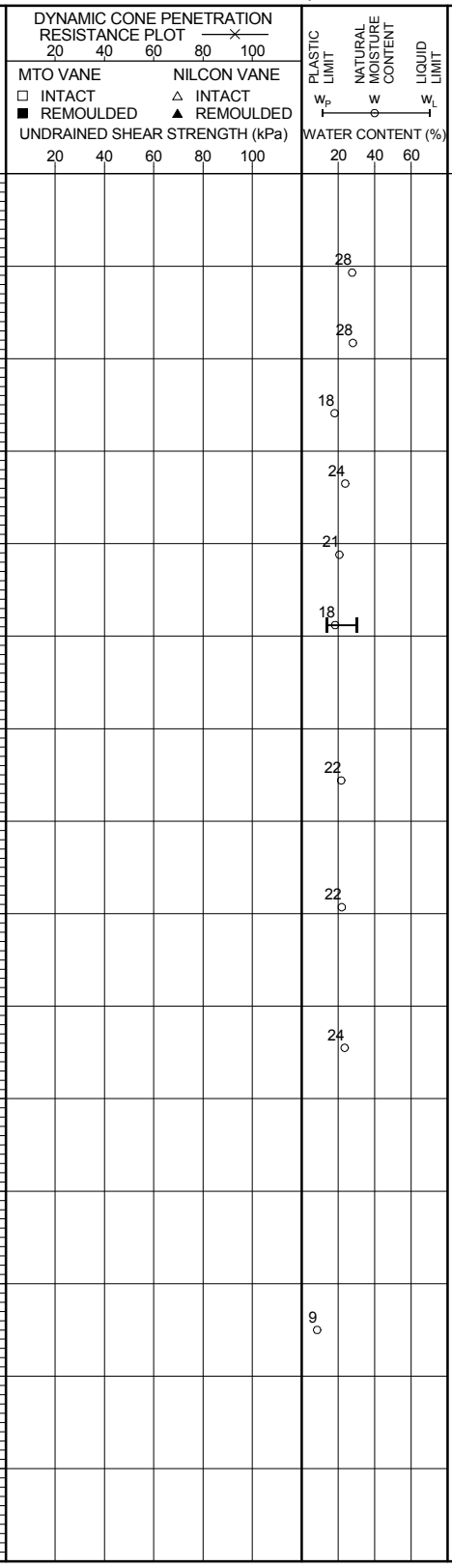
RECORD OF BOREHOLE No. BH503

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher Pad/MSE Wall			COMPILED BY	JAC
ELEVATION	371.00 m	COORD.	N 5,410,189 E 426,830	BORING DATE	Start: 16 Oct 13 End: 17 Oct 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	REMARKS
371.0	Ground surface							
370.9 / 0.1	**ORGANICS/TOPSOIL**							
	SILT AND CLAY Brown and grey, trace sand, trace gravel, damp to moist, occasional mottled red oxidation [Upper Glaciolacustrine]	01	SS	71	4	1	370	
		02	SS	92	6	2	369	
368.7 / 2.3	**SILTY CLAY** Dark brown to grey, trace sand, trace gravel, moist, high plasticity, firm to stiff [WML Till]	03	SS	100	10	3	368	
		04	SS	100	8			
		05	SS	100	8	4	367	
		06	SS	100	10	5	366	...sieve/hydrometer test done on SS6.
		07	SS	100	7	6	365	Started NW washboreing at 6.1m
		08	SS	100	15	7	364	
		09	SS	100	12	8	363	
360.5 / 10.5	**GRAVELLY SAND**	10	RC	75	0	9	362	
		11	RC	15	0	10	361	
	...Silty sand and gravel with boulders, grey, trace clay, well graded, dense to very dense, angular, wet [WS Till]	12	SS	50	74	11	360	
357.8 / 13.2	**BEDROCK** Felsic Tuff	13	RC	69	0	12	359	
		14	RC	100	94	13	358	
		15	RC	97	78	14	357	
						15	356	



PERMEABILITY (cm/s)

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RECORD OF BOREHOLE No. BH503

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher Pad/MSE Wall			COMPILED BY	JAC
ELEVATION	371.00 m	COORD.	N 5,410,189 E 426,830	BORING DATE	Start: 16 Oct 13 End: 17 Oct 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / MTO VANE □ INTACT ■ REMOULDED / NILCON VANE △ INTACT ▲ REMOULDED / UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
			16	RC	97	81		16	355				
354.0 / 17.0	**END OF BOREHOLE** STANDPIPE INSTALLATION 2.5 cm PVC pipe, upright steel well protector, 0.81 m stick-up Screen: 8.2 to 9.8 m Riser: 0 to 8.2 m Sand: 3.8 to 5.6 m Bentonite: 3.5 to 3.8 m and 5.6 to 8.9 m Grout: 0 to 3.5 m WATER LEVELS (bgs) 2.6 m on 17-Oct-2013 (at completion) 2.9 m on 22-Oct-2013 4.0 m on 31-Mar-2014												

RECORD OF BOREHOLE No. BH505

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher Pad/MSE Wall			COMPILED BY	JAC
ELEVATION	367.14 m	COORD.	N 5,410,284 E 426,745	BORING DATE	Start: 20 Oct 13 End: 21 Oct 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
367.1	Ground surface										
367.0 / 0.1	**ORGANICS/TOPSOIL**										
	SILTY CLAY Brown to grey, trace sand, trace gravel, moist, low plasticity, soft to firm, trace organics [Upper Glaciolacustrine]	01	SS	75	3			32			
		02	SS	92	9		20				
		03	SS	100	12		18				
365.2 / 1.9	**SILTY CLAY** Dark brown to dark grey, trace to some sand, trace gravel, damp to moist, high plasticity, firm to stiff [WML Till]										
		04	SS	100	14		19				
		05	SS	100	8			33			
	... soft below 3.8m	06	SS	100	4				56		
363.0 / 4.2	**SILTY CLAY** Grey, trace sand, trace gravel, moist, varved with light grey-green silt (1-5 mm thick) [Lower Glaciolacustrine]										
		07A	SS	70	13			33			
362.1 / 5.0	**SAND AND GRAVEL** Grey, some silt, angular, some pyrite [WS Till]	07B	SS				9				SPT refusal at 5.2m
5.2	**BEDROCK** Intermediate tuff	08	RC	85	71						
		09	RC	94	90						
		10	RC	96	96						
358.2											
8.9	**END OF BOREHOLE** STANDPIPE INSTALLATION 3.8 cm PVC pipe, upright steel well protector, 0.79 m stick-up Screen: 4.1 to 5.6 m Riser: 0 to 4.1 m										

Sand: 3.8 to 5.6 m
Bentonite: 3.5 to 3.8 m and 5.6 to 8.9 m
Grout: 0 to 3.5 m

WATER LEVELS (bgs)
0.4 m above ground on 28-Oct-2013
0.6 m above ground on 31-Mar-2014

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60

RECORD OF BOREHOLE No. BH516

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher Pad/MSE Wall			COMPILED BY	JAC
ELEVATION	365.95 m	COORD.	N 5,410,187 E 426,721	BORING DATE	Start: 29 Oct 13 End: 30 Oct 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	DEPTH (m)	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	REMARKS
366.0	Ground surface										
365.8 / 0.2	**ORGANICS/TOPSOIL**										
	SILTY CLAY Brown to grey, trace sand, damp, low to medium plasticity, firm [Upper Glaciolacustrine]	01	SS	88	5	1	365	19			
	... firm to stiff below 1.5 m	02	SS	38	16	2	364	20			
		03	SS	100	11	3	363	37			
		04	SS	100	12			18			
362.1 / 3.8	**SILTY CLAY** Dark grey, trace sand, trace gravel, damp, high plasticity, firm to stiff [WML Till]	05	SS	100	11	4	362	24			
	... light grey silty seam, 8 cm thick at 4.6 m	06	SS	100	10	5	361	26			
		07	SS	100	10	6	360	30			
		08	SS	100	10	7	359	26			...sieve/hydrometer test done on SS8.
	... light grey silty fine sand seam, trace gravel, 100mm thick, at 9.4 m	09	SS	100	8	8	358	46			switched to NW washboring at 9.7m
355.3 / 10.7	**SILTY CLAY** Dark grey, trace sand, becoming varved with grey-green silt at 10.8 m, 1 to 5 mm thick varves, moist, medium plasticity, firm to stiff [Lower Glaciolacustrine]	10	SS	100	15	9	357	35			artesian pressure at 10.4m
354.4 / 11.6	**BEDROCK** Intermediate Tuff fractures at 35º and 25º (measured from vertical axis)	11	RC	167	44	10	356				switched to NQ coring at 11.6 m
		12	RC	85	85	11	355				
		13	RC	106	96	12	354				
		14	RC	97	94	13	353				
						14	352				
						15	351				

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT ■ REMOULDED
NILCON VANE: △ INTACT ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 100
WATER CONTENT (%) 20 40 60
PERMEABILITY (cm/s)

Continued on Next Page

RECORD OF BOREHOLE No. BH516

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher Pad/MSE Wall			COMPILED BY	JAC
ELEVATION	365.95 m	COORD.	N 5,410,187 E 426,721	BORING DATE	Start: 29 Oct 13 End: 30 Oct 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV / DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	WELL / PIEZOMETER INSTALLATION	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	MTO VANE □ INTACT ■ REMOULDED	NILCON VANE △ INTACT ▲ REMOULDED	UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) (20 40 60)	PERMEABILITY (cm/s)	REMARKS
350.8																			
15.2	**END OF BOREHOLE** STANDPIPE INSTALLATION 3.8 cm PVC pipe, steel upright well protector, 0.97 m stick-up Screen: 8.8 to 10.4 m Riser: 0 to 8.8 m Sand: 8.5 to 10.4 m Bentonite: 7.9 to 8.5 m and 10.4 to 15.2 m Grout: 0 to 7.9 m WATER LEVELS (bgs) 0.2 m above ground surface (artesian) on 30-Oct-2013 0.3m above ground surface on 31-Mar-2014																		

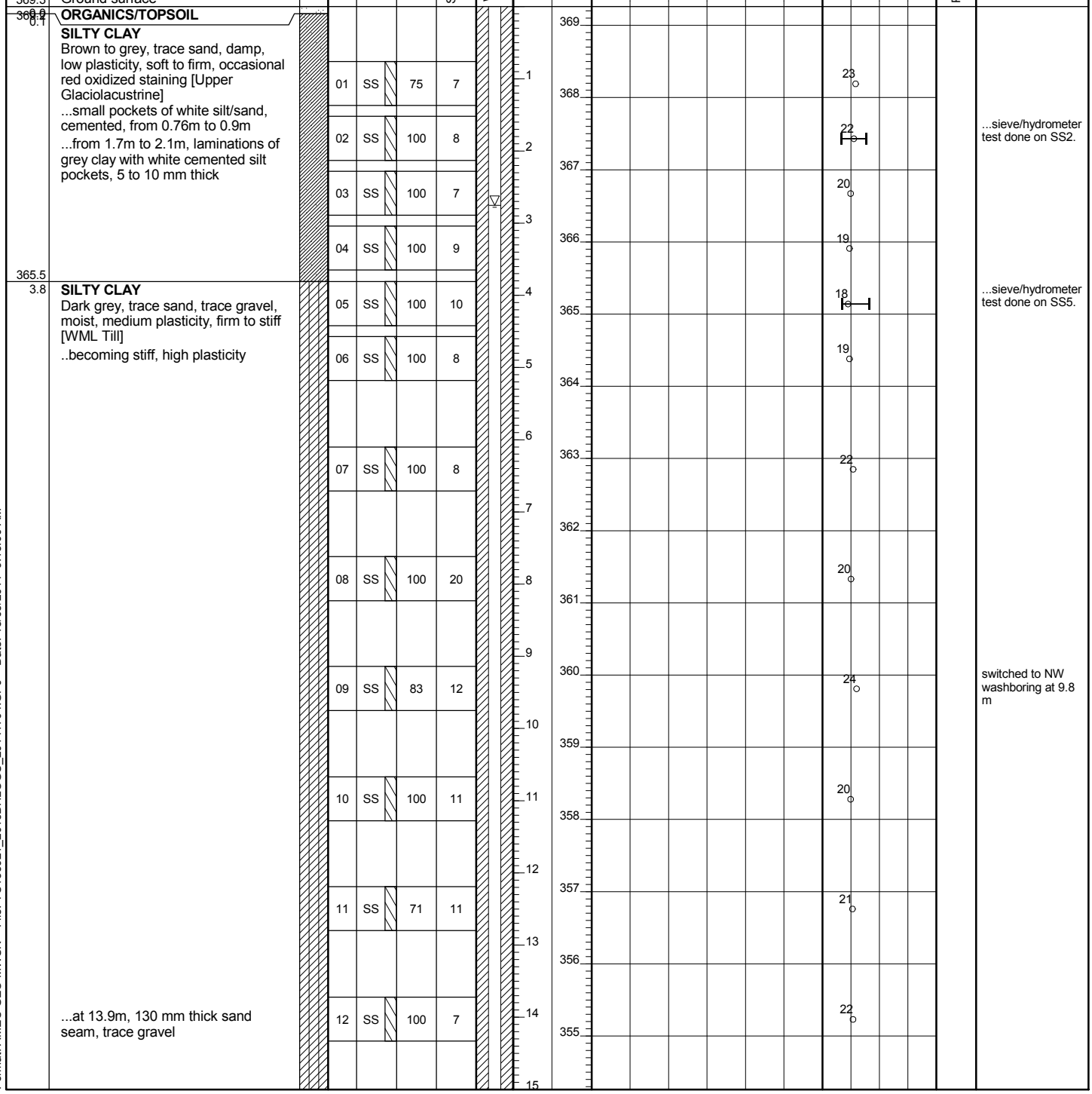
RECORD OF BOREHOLE No. BH520

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher			COMPILED BY	AD
ELEVATION	369.26 m	COORD.	N 5,410,161 E 426,778	BORING DATE	Start: 12 Nov 13 End: 13 Nov 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
369.3	Ground surface					
369.2 / 0.1	**ORGANICS/TOPSOIL**					
	SILTY CLAY Brown to grey, trace sand, damp, low plasticity, soft to firm, occasional red oxidized staining [Upper Glaciolacustrine] ...small pockets of white silt/sand, cemented, from 0.76m to 0.9m ...from 1.7m to 2.1m, laminations of grey clay with white cemented silt pockets, 5 to 10 mm thick	01	SS	75	7	
		02	SS	100	8	...sieve/hydrometer test done on SS2.
		03	SS	100	7	
		04	SS	100	9	
365.5 / 3.8	**SILTY CLAY** Dark grey, trace sand, trace gravel, moist, medium plasticity, firm to stiff [WML Till] ..becoming stiff, high plasticity	05	SS	100	10	...sieve/hydrometer test done on SS5.
		06	SS	100	8	
		07	SS	100	8	
		08	SS	100	20	
		09	SS	83	12	switched to NW washboring at 9.8 m
		10	SS	100	11	
		11	SS	71	11	
	...at 13.9m, 130 mm thick sand seam, trace gravel	12	SS	100	7	



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RECORD OF BOREHOLE No. BH520

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Crusher			COMPILED BY	AD
ELEVATION	369.26 m	COORD.	N 5,410,161 E 426,778	BORING DATE	Start: 12 Nov 13 End: 13 Nov 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

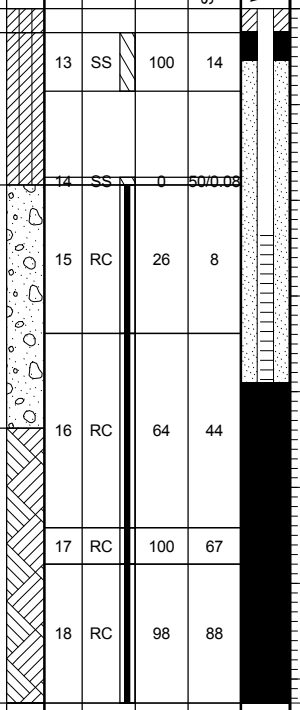
ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

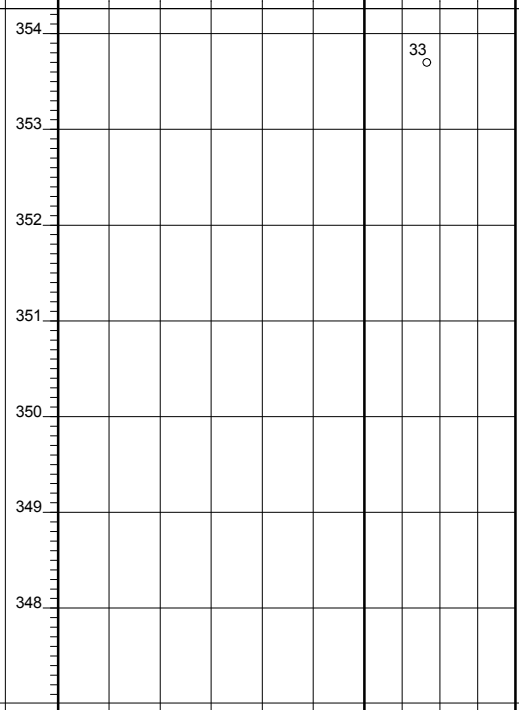
ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
354.0						
15.3	**SILTY CLAY** Dark grey, trace sand, moist, varved with greenish grey silt (1-3mm thick), medium to high plasticity, firm to stiff [Lower Glaciolacustrine]	13	SS	100	14	
352.4		14	SS	0	50/0.08	
16.8	**BOULDERS AND COBBLES** [Inferred WS Till]	15	RC	26	8	SPT refusal at 16.8m
349.9		16	RC	64	44	
19.4	**BEDROCK** Intermediate Flow, fractures at 30° and 40° (measured from vertical axis)	17	RC	100	67	
347.0		18	RC	98	88	
22.3	**END OF BOREHOLE**					

STANDPIPE INSTALLATION
2.5 cm PVC pipe, upright steel well protector, 0.86 m stick-up
Screen: 17.4 to 18.9 m
Riser: 0 to 17.4 m

Sand: 15.5 to 18.9 m
Bentonite: 15.2 to 15.5 m and 18.9 m to 22.3 m
Grout: 0 to 15.2 m

WATER LEVELS (bgs)
1.8m on 13-Nov-2013 (at completion)
2.7m on 31-Mar-2014





PERMEABILITY (cm/s)

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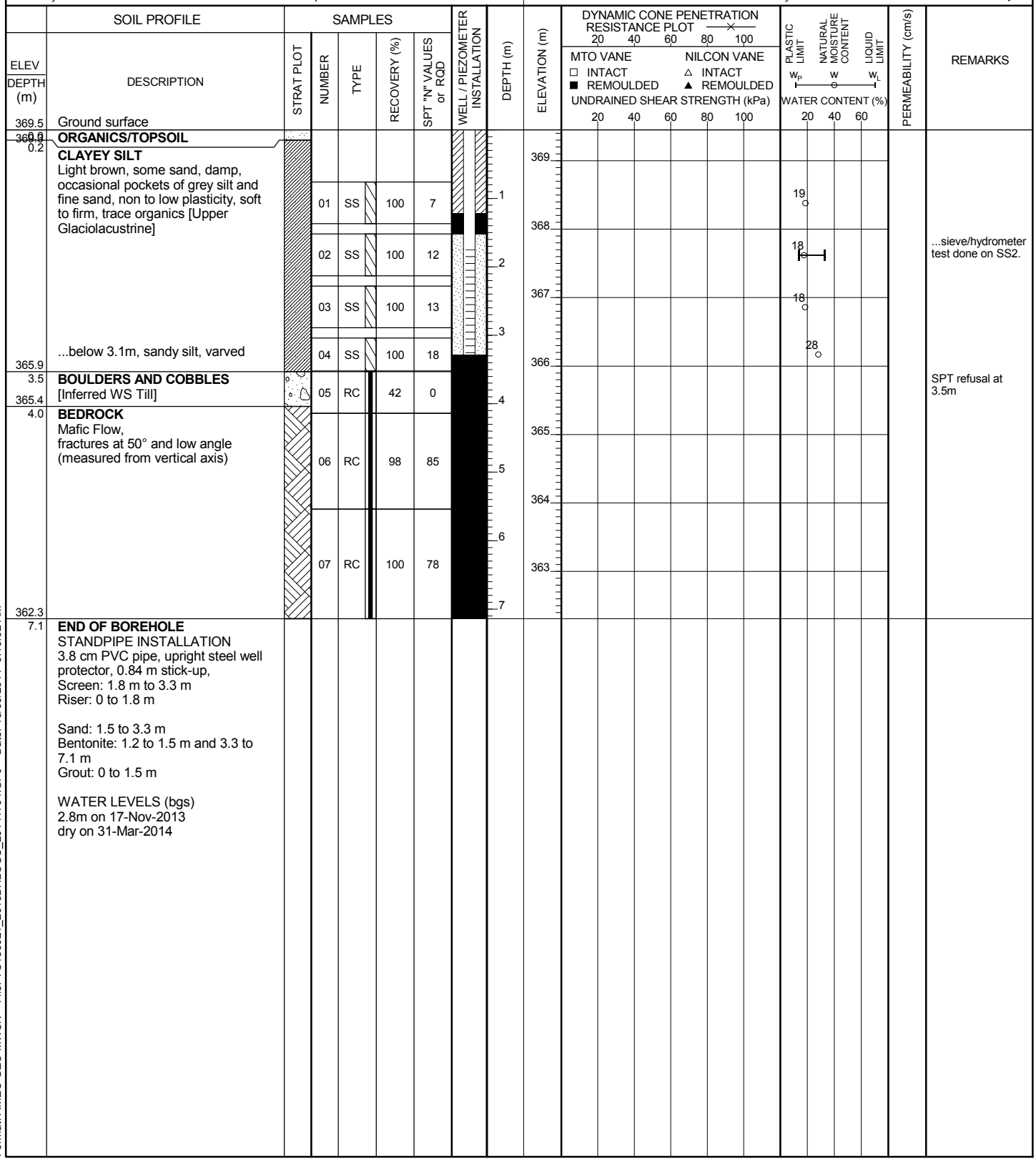
RECORD OF BOREHOLE No. BH532

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	AD
CLIENT	New Gold Inc.	LOCATION	Plant Site - Truck Shop			COMPILED BY	AD
ELEVATION	369.45 m	COORD.	N 5,410,839 E 426,387	BORING DATE	Start: 15 Nov 13 End: 15 Nov 13	CHECKED BY	DGR

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	REMARKS
369.5	Ground surface					
369.3 / 0.2	**ORGANICS/TOPSOIL**					
	CLAYEY SILT Light brown, some sand, damp, occasional pockets of grey silt and fine sand, non to low plasticity, soft to firm, trace organics [Upper Glaciolacustrine]	01	SS	100	7	
		02	SS	100	12	...sieve/hydrometer test done on SS2.
		03	SS	100	13	
	...below 3.1m, sandy silt, varved	04	SS	100	18	
365.9 / 3.5	**BOULDERS AND COBBLES** [Inferred WS Till]	05	RC	42	0	SPT refusal at 3.5m
365.4 / 4.0	**BEDROCK** Mafic Flow, fractures at 50° and low angle (measured from vertical axis)	06	RC	98	85	
		07	RC	100	78	
362.3 / 7.1	**END OF BOREHOLE** STANDPIPE INSTALLATION 3.8 cm PVC pipe, upright steel well protector, 0.84 m stick-up, Screen: 1.8 m to 3.3 m Riser: 0 to 1.8 m Sand: 1.5 to 3.3 m Bentonite: 1.2 to 1.5 m and 3.3 to 7.1 m Grout: 0 to 1.5 m WATER LEVELS (bgs) 2.8m on 17-Nov-2013 dry on 31-Mar-2014					



RECORD OF BOREHOLE No. BH540

PROJECT	Rainy River Project - 2013/2014 Geotechnical Investigation					ENGINEER	MS
PROJECT NO.	TC133921	DRILLER	Marathon Drilling	BORING METHOD	200 mm HSA, NW/NQ Coring	LOGGED BY	ARM
CLIENT	New Gold Inc.	LOCATION	Coarse Ore Storage			COMPILED BY	AD
ELEVATION	371.07 m	COORD.	N 5,410,633 E 426,615	BORING DATE	Start: 8 Feb 14 End: 10 Feb 14	CHECKED BY	

SAMPLE TYPES
AU Auger
BU Bulk
DC Dynamic Cone
RC Rock Core
SS Split Spoon
TW Thin Walled Open (Shelby)
WS Wash Sample

ABBREVIATIONS
P.P. Pocket Penetrometer
TV Torvane
PT Standard Proctor Test
P.L. Point Load Strength Index (I_{50})
RQD Rock Quality Designation
SCR Solid Core Recovery
k Permeability
C Consolidation
DS Direct Shear
GS Grain Size Analysis

ELEV DEPTH (m)	DESCRIPTION	NUMBER	TYPE	RECOVERY (%)	SPT "N" VALUES or RQD	ELEVATION (m)	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	PERMEABILITY (cm/s)	REMARKS
371.1	Ground surface										
0.0	**SILTY SANDY CLAY** Brown to grey, trace roots, moist	01	SS	21	8	370		33			Frozen ground to 0.6 m
369.6											
1.5	**CLAYEY SILT** Brown, some fine sand, trace gravel, moist to wet, occasional light grey silty laminations [Upper Glaciolacustrine]	02	SS	100	6	369		22			
		03	SS	100	7			15			sieve/hydrometer test done on SS03
	... below 3m, more clayey, orange streaks, mottled with grey	04	SS	100	10	368		18			
		05	SS	100	9	367		21			sieve/hydrometer test done on SS05
		06	SS	100	13	366		18			
365.0											
6.1	**SILTY SAND** Brown, trace gravel, compact, wet	07	SS	42	17	365		19			sieve/hydrometer test done on SS07
363.8						364					
7.3	**BEDROCK**	08	RC	98	78	363					
		09	RC	100	85	362					
		10	RC	100	77	361					
359.9						360					
11.2	**END OF BOREHOLE** STANDPIPE INSTALLATION PVC pipe, flushmount well protector Screen: 5.8 to 7.3 m Riser: 0 to 5.8 m Sand: 5.3 to 7.3 m Bentonite: 7.3 to 11.2 m Grout/bentonite: 0 to 5.3 m WATER LEVELS (bgs) 4.0 m on 11-Feb-2014 4.5 m on 25-Mar-2014										

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
MTO VANE: □ INTACT, ■ REMOULDED
NILCON VANE: △ INTACT, ▲ REMOULDED
UNDRAINED SHEAR STRENGTH (kPa) (20 40 60 80 100)
WATER CONTENT (%) (20 40 60)

APPENDIX D

HISTORICAL GROUNDWATER CHEMISTRY AND WATER LEVEL DATA

HISTORICAL GROUNDWATER QUALITY (2011 to 2013)- RAINY RIVER PROJECT

Station	Date Sampled	pH	Conductivity	TDS	Turbidity	Colour	Total Ammonia-N	Total Kjeldahl Nitrogen	Dissolved Chloride	Fluoride	Orthophosphate	Nitrate	Nitrite	Nitrate + Nitrite	Alkalinity	Acidity as CaCO3	Total Cyanide (CN)	WAD Cyanide	Total BOD	Total COD	TOC	D. Aluminum	T. Aluminum	D. Antimony	T. Antimony	D. Arsenic	T. Arsenic	D. Barium	T. Barium	D. Beryllium	T. Beryllium
NR-08-240	24-Oct-2011	8.10	845	456	174	<1.0	0.159	0.41	44.1	0.160	<0.0050	<0.030	<0.020	<0.030	386	8.2	<0.0020	<0.0020	<2.0	<3.0	3.1	<0.0010	0.169	<0.00020	<0.000030	0.000634	0.00428	0.0464	0.0745	<0.000060	<0.000040
NR-08-240	16-Jan-2012	7.56	834	424	135	2.3	0.400	0.424	56.6	0.128	<0.0050	<0.030	<0.020	<0.030	392	6.4	<0.0020	<0.0020	11.7	31.8	3.3	<0.030	2.82	<0.0010	<0.00010	<0.0010	0.00478	0.0495	0.155	<0.00060	<0.000060
NR-08-240	25-Apr-2012	7.83	766	407	168	<1.0	0.247	0.351	59.4	0.059	<0.0050	<0.030	<0.020	<0.030	312	9.6	<0.0020	<0.0020	9.8	40.3	6.1	<0.0030	0.0905	<0.00010	<0.00010	0.00018	0.00065	0.0434	0.0714	<0.000060	<0.000060
NR-08-240	10-Jul-2012	8.00	673	376	64.5	<1.0	0.196	0.424	60.1	<0.030	<0.0050	<0.030	<0.020	<0.030	268	7.2	<0.0020	<0.0020	15.6	36.5	16.8	<0.0050	0.0594	<0.00060	<0.00060	<0.0010	0.0015	0.180	0.154	<0.0010	<0.0010
NR-09-367	24-Oct-2011	8.12	788	436	37.3	<1.0	0.137	0.45	20.6	0.163	<0.0050	<0.030	<0.020	<0.030	396	7.2	<0.0020	<0.0020	<2.0	<3.0	3.0	<0.0010	0.0032	<0.00020	0.000086	0.00158	0.00312	0.0495	0.0587	<0.000060	<0.000040
NR-09-367	16-Jan-2012	7.62	707	358	165	3.0	0.137	0.640	20.9	0.202	<0.0050	<0.030	<0.020	<0.030	377	7.0	<0.0020	<0.0020	70.7	108	3.7	<0.030	0.148	<0.0010	0.00042	<0.0010	0.0315	0.0208	0.0798	<0.00060	<0.000060
NR-09-367	25-Apr-2012	7.52	741	422	37.3	<1.0	0.137	0.332	10.1	0.209	<0.0050	<0.030	<0.020	<0.030	370	15.4	<0.0020	<0.0020	<2.0	3.5	2.2	<0.0030	0.0237	<0.00010	<0.00010	0.00166	0.00359	0.0511	0.0583	<0.000060	<0.000060
NR-09-367	10-Jul-2012	7.67	703	410	143	<1.0	0.147	0.422	0.17	<0.030	<0.0050	<0.030	<0.020	<0.030	380	13.6	<0.0020	<0.0020	<2.0	4.4	2.9	<0.0050	0.0110	<0.00060	<0.00060	<0.0010	0.0032	0.038	0.056	<0.0010	<0.0010
NH-09-428	24-Oct-2011	8.20	713	385	166	<1.0	0.348	0.49	14.7	0.707	<0.0050	<0.030	<0.020	<0.030	386	7.0	<0.0020	<0.0020	7.3	19.1	5.8	<0.0010	0.571	<0.00020	0.000290	0.000819	0.00957	0.0129	0.0332	<0.000060	<0.000040
NR-09-428	25-Apr-2012	7.66	773	440	157	1.6	0.224	0.524	10.5	0.146	<0.0050	<0.030	<0.020	<0.030	387	15.6	<0.0020	<0.0020	<2.0	9.8	3.2	<0.0030	0.0533	<0.00010	0.00019	0.00232	0.0154	0.0252	0.0397	<0.000060	<0.000060
NR-09-428	10-Jul-2012	8.06	594	304	70.8	<1.0	0.227	0.466	14.9	<0.030	<0.0050	<0.030	<0.020	<0.030	305	6.2	<0.0020	<0.0020	11.6	20.0	7.7	<0.0050	0.0112	<0.00060	<0.00060	<0.0010	0.0028	<0.010	0.013	<0.0010	<0.0010
NH-10-12	25-Apr-2012	7.57	758	451	47.0	<1.0	0.241	0.437	2.19	0.162	<0.0050	<0.030	<0.020	<0.030	389	15.2	<0.0020	<0.0020	<2.0	<3.0	2.4	<0.0030	0.0139	<0.00010	<0.00010	0.00593	0.00888	0.0678	0.0765	<0.000060	<0.000060
RR-09-213A	24-Oct-2011	8.03	765	452	244	<1.0	0.210	0.42	7.86	0.081	<0.0050	<0.030	<0.020	<0.030	404	7.8	<0.0020	<0.0020	<2.0	<3.0	3.3	<0.0010	0.337	0.00187	0.00592	0.00287	0.00697	0.0502	0.0590	<0.000060	0.000054
RR-09-213A	25-Apr-2012	7.61	784	457	70.3	1.2	0.234	0.528	8.14	0.178	<0.0050	<0.030	<0.020	<0.030	398	15.6	<0.0020	<0.0020	<2.0	<3.0	2.8	<0.0030	0.638	0.00117	0.00407	0.00248	0.0126	0.0603	0.0656	<0.000060	0.000108
RR-09-213A	10-Jul-2012	7.72	761	442	57.0	2.5	0.230	0.947	7.03	0.117	0.0061	<0.030	<0.020	<0.030	399	16.0	<0.0020	<0.0020	<2.0	10.6	2.9	<0.0050	0.268	0.00123	0.00168	0.0045	0.0103	0.056	0.064	<0.0010	<0.0010
RR-09-214	24-Oct-2011	8.04	753	443	23.7	<1.0	0.190	0.45	5.16	0.085	<0.0050	<0.030	<0.020	<0.030	400	6.8	<0.0020	<0.0020	<2.0	<3.0	3.4	<0.0010	0.0206	<0.00020	0.000077	0.00267	0.00469	0.0735	0.0859	<0.000060	<0.000040
RR-09-214	25-Apr-2012	7.65	763	429	21.7	<1.0	0.196	0.488	5.54	0.136	<0.0050	<0.030	<0.020	<0.030	394	16.4	<0.0020	<0.0020	<2.0	<3.0	2.7	<0.0030	0.0156	<0.00010	<0.00010	0.00265	0.00427	0.0886	0.0922	<0.000060	<0.000060
BH-10-04	24-Oct-2011	8.21	771	446	19.1	<1.0	0.165	0.32	1.34	0.251	<0.0050	<0.030	<0.020	<0.030	417	4.4	<0.0020	<0.0020	<2.0	<3.0	2.8	0.0015	0.127	<0.00020	0.000129	0.0195	0.0244	0.0685	0.0727	<0.000060	<0.000040
BH-10-04	16-Jan-2012	7.50	729	436	12.0	<1.0	0.147	0.365	0.58	0.279	<0.0050	<0.030	<0.020	<0.030	406	6.6	<0.0020	<0.0020	<2.0	5.3	3.2	<0.030	0.0560	<0.0010	<0.00010	0.0188	0.0260	0.0713	0.0796	<0.00060	<0.000060
BH-10-04	25-Apr-2012	7.87	797	458	13.4	<1.0	0.189	0.338	0.56	0.254	0.0074	<0.030	<0.020	<0.030	414	15.4	<0.0020	<0.0020	<2.0	5.1	1.9	<0.0030	0.103	<0.00010	<0.00010	0.0222	0.0318	0.0740	0.0725	<0.000060	<0.000060
BH-10-04	10-Jul-2012	7.83	777	463	13.3	1.0	0.193	0.389	0.57	0.201	<0.0050	<0.030	<0.020	<0.030	416	16.0	<0.0020	<0.0020	<2.0	4.9	2.3	<0.0050	0.118	<0.00060	<0.00060	0.0200	0.0328	0.068	0.075	<0.0010	<0.0010
BH-10-05	24-Oct-2011	8.03	1020	630	1485	2.0	0.075	0.78	1.11	0.288	<0.0050	0.073	<0.020	0.073	465	6.4	<0.0020	<0.0020	<2.0	11.4	3.5	0.0032	17.9	0.00026	0.000329	0.00141	0.0136	0.0492	0.230	<0.000060	0.000986
BH-10-05	16-Jan-2012	7.62	981	692	983	2.5	<0.020	0.642	0.46	0.258	<0.0050	0.080	<0.020	0.080	489	15.2	<0.0020	<0.0020	<2.0	16.3	4.7	<0.030	6.04	<0.0010	0.00020	<0.0010	0.00498	0.0394	0.116	<0.00060	0.000356
BH-10-05	25-Apr-2012	7.49	1050	701	87.8	1.0	<0.020	0.367	0.25	0.226	<0.0050	<0.030	<0.020	<0.030	483	21.2	<0.0020	<0.0020	<2.0	7.1	2.4	<0.0030	1.81	0.00010	0.00012	0.00090	0.00179	0.0422	0.0723	<0.000060	0.000102
BH-10-05	10-Jul-2012	7.70	1030	718	426	3.9	0.044	0.523	0.35	0.125	<0.0050	0.043	<0.020	0.043	486	23.0	<0.0020	<0.0020	<2.0	9.0	3.1	<0.0050	4.74	<0.00060	<0.00060	<0.0010	0.0033	0.045	0.091	<0.0010	<0.0010
BH-10-05	06-Jun-2013	7.69	1000	713	605	<1.0	0.097	0.979	0.54	0.174	<0.0050	<0.030	<0.020	<0.030	463	34.2	<0.0020	<0.0020	2.5	7.9	3.8	<0.0050	14.8	<0.00060	<0.00060	<0.0010	0.0083	0.043	0.184	<0.0010	<0.0010
BH-10-05	22-Oct-2013	7.41	968	653	530	12.4	0.097	0.555	0.45	0.152	<0.0050	0.046	<0.020		499	20.0	<0.0020	<0.0020	<2.0	21.6		0.0016	5.64	0.00010	0.00036	0.00074	0.00465	0.0464	0.103	<0.00050	<0.00050
BH-10-7A	24-Oct-2011	8.01	581	320	16.3	<1.0	0.099	0.34	1.00	0.058	0.0124	<0.030	<0.020	<0.030	293	4.4	<0.0020	<0.0020	<2.0	3.9	2.2	<0.0010	0.654	<0.00020	0.000084	0.00619	0.0118	0.0569	0.0742	<0.000060	<0.000040
BH-10-7A	25-Apr-2012	7.63	570	337	15.6	1.1	0.118	0.372	0.53	0.121	<0.0050	<0.030	<0.020	<0.030	275	7.4	<0.0020	<0.0020	<2.0	7.9	1.7	<0.0030	1.49	<0.00010	<0.00010	0.00666	0.0155	0.0647	0.0754	<0.000060	<0.000060
BH-10-7A	10-Jul-2012	7.79	606	366	36.0	1.5	0.193	1.83	0.58	0.113	<0.0050	<0.030	<0.020	<0.030	300	12.0	<0.0020	<0.0020	<2.0	35.7	2.9	<0.0050	0.570	<0.00060	<0.00060	0.0103	0.0579	0.076	0.091	<0.0010	<0.0010
BH-10-7A	06-Jun-2013	7.83	561	503	12.5	1.4	0.146	0.286	0.55	0.122	<0.0050	<0.030	<0.020	<0.030	278	18.8	<0.0020	<0.0020	<2.0	5.1	2.4	<0.0050	0.0350	<0.00060	<0.00060	0.0088	0.0107	0.064	0.065	<0.0010	<0.0010
BH-10-7A	23-Oct-2013	7.41	550	361	51.8	<1.0	0.161	0.777	0.56	0.123	<0.0050	0.191	<0.020		295	12.0	<0.0020	<0.0020	2.5	24.4	3.9	0.0019	1.29	<0.00010	<0.00010	0.00190	0.0153	0.0577	0.0707	<0.00050	<0.00050
BH-10-11A	24-Oct-2011	7.86	686	402	>4000	<1.0	0.423	51.5	2.15	0.093	<0.0050	<0.030	<0.020	<0.030	447	5.0	<0.0020	<0.0020	12.8	20.5	3.4	0.0011	643	0.00028	0.000242	0.00349	0.180	0.116	9.55	<0.000060	0.00597
BH-10-11A	25-Apr-2012	7.86	732	488	>4000	2.6	0.202	1.08	1.78	0.170	<0.0050	<0.030	<0.020	<0.030	444	10.0	<0.0020	<0.0020	16.0	25.2	3.5	<0.0030	26.6	0.00016	0.00027	0.00478	0.0214	0.118	0.340	<0.000060	0.00115
BH-10-11A	10-Jul-2012	7.74	707	484	>4000	1.8	0.697	18.6	1.72	0.125	<0.0050	0.030	<0.020	0.030	392	8.8	<0.0020	<0.0020	7.6	107	<5.0	0.0052	61.8	<0.00060	<0.00060	0.0031	0.0377	0.126	0.868	<0.0010	0.0028
BH-10-12A	24-Oct-2011	8.08	767	424	27.8	<1.0	0.325	0.64	2.53	0.169	<0.0050	<0.030	<0.020	<0.030	412	6.2	<0.0020	<0.0020	<2.0	<3.0	2.7	<0.0010	0.0077	<0.00020	0.000103	0.00320	0.0191	0.0587	0.0819	<0.000060	<0.000040
BH-10-12A	10-Jul-2012	7.67	753	452	54.1	2.8	0.316	0.513	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	393	14.4	<0.0020	<0.0020	2.0	<3.0	2.8	<0.0050	0.0390	<0.00060	<0.00060	0.0046	0.0113	0.069	0.079	<0.0010	<0.0010
BH-10-14	24-Oct-2011	8.13	795	457	32.4	<1.0	0.305	0.52	4.51	0.100	<0.0050	<0.030	<0.020	<0.030	434	9.8	<0.0020	<0.0020	<2.0	<3.0	2.8	0.0011	0.0057	<0.00020	<0.000030	0.00911	0.0150	0.0687	0.0789	<0.000060	<0.000040
BH-10-14	25-Apr-2012	7.77	836	471	32.7	<1.0	0.314	0.526	4.48	0.152	<0.0050	<0.030	<0.020	<0.030	414	16.2	<0.0020	<0.0020	<2.0	3.8	2.2	<0.0030	0.0113	<0.00010	<0.00010	0.0114	0.0187	0.0770	0.0853	<0.000060	<0.000060
BH-10-14	10-Jul-2012	7.86	782	470	32.0	2.0	0.309	0.524	3.83	0.136	<0.0050	<0.030	<0.020	<0.030	425	16.0	<0.0020	<0.0020	<2.0	7.3	2.8	<0.0050	0.0105	<0.00060	<0.00060	0.0104	0.0178	0.073	0.087	<0.0010	<0.0010
BH-10-20	24-Oct-2011	8.07	765	434	922	<1.0	0.224	0.38	7.68	0.182	<0.0050	<0.030	<0.020	<0.030	405	9.0	<0.0020	<0.0020	<2.0	<3.0	2.7	<0.0010	2.23	0.00290	0.00257	0.00253	0.00936	0.0531	0.0810	<0.000060	0.000454
BH-10-20	16-Jan-2012	7.58	826	516	150	<1.0	0.303	0.479	56.4	0.126	<0.0050	<0.030	<0.020	<0.030	388	9.0	<0.0020	<0.0020	16.8	60.6	4.4	<0.030	0.999	<0.0010	<0.00010	<0.0010	0.00456	0.0860	0.290	<0.00060	<0.000060
BH-10-20	10-Jul-2012	7.82	703	406	135	4.2	0.153	0.349	3.70	0.086	<0.0050	<0.030	<0.020	<0.030	379	16.0	<0.0020	<0.0020	<2.0	7.3	2.4	<0.0050	0.0104	<0.00060	<0.00060	<0.0010	0.0034	0.040	0.058	<0.0010	<0.0010
TRIP BLANK	24-Oct-2011	5.67	<3.0	<10	<0.10	<1.0	<0.020	<0.25	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	<5.0	<2.0	<0.0020	<0.0020	<2.0	<3.0	<1.0	<0.0010	<0.0020	<0.00020	<0.000030	<0.000030	<0.000020	<0.000060	<0.00030	<0.000060	<0.000040
TRIP BLANK	16-Jan-2012	5.92	<3.0	<10	<0.10	<1.0	<0.020	<0.050	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	<5.0	<2.0	<0.0020	<0.0020	<2.0	<3.0	<1.0	<0.0030	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	<0.00030	<0.000060	<0.000060
TRIP BLANK	25-Apr-2012	5.47	<3.0	<10	<0.10	<1.0	<0.020	<0.050	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	<5.0	<2.0	<0.0020	<0.0020	<2.0	<3.0	<1.0	0.0038	0.0042	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	<0.00030	<0.000060	<0.000060
TRIP BLANK	10-Jul-2012	5.60	<3.0	<10	<0.10	<1.0	<0.020	<0.050	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	<5.0	<2.0	<0.0020	<0.0020	<2.0	<3.0	<1.0	<0.0050		<0.00060	<0.00060	<0.0010	<0.0010	<0.010	<0.010	<0.0010	<0.0010
TRIP BLANK	01-Nov-2012	5.73	<3.0	<10	<0.10	<1.0	<0.020	<0.050	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	<5.0	<2.0	<0.0020	<0.0020	<2.0	<3.0	<1.0	<0.0050	<0.0050	<0.00060	<0.00060	<0.0010	<0.0010	<0.010	<0.010	<0.0010	<0.0010
TRIP BLANK	06-Jun-2013	5.71	<3.0	<10	<0.10	<1.0	<0.020	<0.050	<0.10	<0.030	<0.0050	<0.030	<0.020	<0.030	<5.0	<2.0	<0.0020	<0.0020	<2.0	<3.0	<1.0	<0.0050	0.0082	<0.00060	<0.00060	<0.0010	<0.0010	<0.010	<0.010	<0.0010	<0.0010
TRIP BLANK	02-Apr-2014	5.81	<3.0	<10	<0.10	<2.0	<0.020	<0.050	<0.10	<0.030	<0.0030	<0.030	<0.020		<10	<1.0	<0.0020	<0.0020	<2.0	<10	<1.0	0.0104	<0.0050	<0.00060	<0.00060	<0.0010	<0.0010	<0.010	<0.010	<0.0010	<0.0010
BH11-44A	01-Nov-2012	7.82	673	394	406	2.7	0.307	0.864	4.15	0.284	<0.0050	<0.030	<0.020	<0.030	342	18.8	<0.0020	<0.0020	<2.0	14.3	3.8	<0.050	14.2	<0.00060	<0.00060	0.0061	0.0179	0.056	0.297	<0.010	<0.0010
BH11-44A	06-Jun-2013	7.76	654	432	7.49	2.8	0.028	0.489	4.09	0.274	<0.0050	<0.030	<0.020	<0.030	351	30.0	<0.0020	<0.0020	<2.0	7.3	3.5	<0.0050	0.149	<0.00060	<0.00060	0.0076	0.0124	0.059	0.062	<0.0010	<0.0010
BH11-44A	23-Oct-2013	7.30	633	394	17.4	<1.0	0.252	0.416	3.94	0.265	<0.0050	<0.030	<0.020		369	21.0	<0.0020	<0.0020	<2.0	9.2	4.2	0.401	0.0918	<0.00010	<0.00010	0.0126	0.0114	0.0626	0.0590	<0.00050	<0.00050
BH11-41	01-Nov-2012	7.74	737	407	1890	3.1	0.327	0.763	2.03	0.177	<0.0050	<0.030	<0.020	<0.030	390	19.6	<0.0020	<0.0020	<2.0	8.8	3.1	<0.050	17.7	0.00116	0.00216	0.0077	0.0233	0.053	0.176	<0.010	<0.0010
BH11-13A	01-Nov-2012	7.94	726	452	39.1	2.6	0.205	0.343	1.80	0.098	<0.0050	<0.030	<0.020	<0.030	348	16.6	<0.0020	<0.0020	<2.5	6.0	3.1	<0.050	0.277	<0.00060	<0.00060	0.0031	0.0061	0.061	0.071	<0.010	<0.0010
BH11-51A	01-Nov-2012	7.91	906	531	>4000	2.6	0.516	2.62	1.02	0.091	<0.0050	<0.030	<0.020	<0.030	469	13.6	<0.0020	<0.0020	<2.0	87.9	4.2	<0.050	108	<0.0060	<0.00060	<0.010	0.0364	<0.10	0.652	<0.010	0.0016
BH11-51A	06-Jun-2013	7.85	864	573	40.7	<1.0	0.448	1.01	0.83	0.121	<0.0050	<0.030	<0.020	<0.030	462	25.2	<0.0020	<0.0020	<2.0	7.3	3.4	<0.0050	4.80	<0.00060	<0.00060	0.0057	0.0096	0.058	0.083	<0.0010	<0.0010
BH11-51A	21-Oct-2013	7.97	850	507	47.9	8.4	0.447	0.605	0.79	0.116	<0.0050	<0.030	<0.020		488	36.0	<0.0020	<0.0020	<2.0	9.1	3.1	<0.0010	0.444	<0.00010	<0.00010	0.00534	0.00887	0.0583	0.0658	<0.00050	<0.00050
BH12-20	01-Nov-2012	8.21	500	328	>4000	3.5	0.762	11.8	0.84	0.120	<0.0050	<0.030	<0.020	<0.030	261	4.6	<0.0020	<0.0020	4.1	82.3	7.3	0.0078	152	<0.00060	<0.00060	<0.0010	0.0151	0.051	0.560	<0.0010	0.0022
BH11-01B	06-Jun-2013	7.87	969	718	>4000	3.9	0.658	7.86	2.31	0.160	<0.0050	<0.030	<0.020	<0.030	357	14.4	<0.020	<0.020	9.4	8.0	7.7	<0.0050	304	0.00154	<0.0060	0.0183	0.235	0.033	4.14	<0.0010	0.017
BH11-01B	22-Oct-2013	7.87	898	650	>4000	5.1	0.788	16.7	2.22	0.125	0.0058	0.033	<0.020		345	14.0	<0.020	<0.020	11.0	473		<0.0010	206	0.00182	<0.0010	0.00356	0.154	0.0264	3.83	<0.00050	0.0217
BH11-44B	06-Jun-2013	7.98	876	577	>4000	4.8	0.541	30.9	4.50	0.307	<0.0050	<0.030	<0.020	<0.030	458	21.0	<0.020	<0.020	13.9	13.5	5.9	<0.0050	588	<0.00060	<0.0060	0.0095	0.165	0.140	6.61	<0.0010	0.019
BH11-44B	23-Oct-2013	7.42	793	522	>4000	3.8	0.411	3.63	3.71	0.187	0.0079	0.063	<0.020		431	20.0	<0.0020	<0.0020	2.8	109		0.0096	53.5	<0.00010	<0.00050	0.00450	0.0231	0.135	0.781	<0.00050	<0.0025
BH11-49A	06-Jun-2013	7.72	1690	1240	>4000	5.2	0.789	44.9	98.7	0.142	<0.0050	2.64	<0.020	2.64	519	159	<0.020	<0.020	18.8	16.4	4.9	<0.0050	678	0.00088	<0.0060	0.0052	0.232	0.023	8.22	<0.0010	0.030
BH11-49A	22-Oct-2013	7.98	621	378	1610	15.6	0.280	0.667	1.01	0.111	<0.0050	<0.030	<0.020		341	12.0	<0.0020	<0.0020	<2.0	24.3		0.0022	32.1	<0.00010	<0.00050	0.00085	0.00603	0.0477	0.139	<0.00050	<0.0025
BH11-49B	06-Jun-2013	7.97	584	394	12.5	15.8	0.164	0.791	6.50	0.158	<0.0050	1.66	0.157	1.82	262	9.0	<0.0020	<0.0020	<2.0	18.7	6.2	0.104	0.629	0.00064	0.00065	<0.0010	<0.0010	0.065	0.073	<0.0010	<0.0010
BH11-49B	22-Oct-2013	7.52	1510	1180	>4000	35.2	0.893	53.6	44.6	0.123	<0.0050	0.257	0.031		349	28.0	<0.020	<0.020	24.9	584	830	0.0077	301	0.00096	<0.00050	0.00088	0.119	0.0183	5.10	<0.0025	0.0257
BH11-51B	06-Jun-2013	7.83	1200	915	>4000	7.2	0.560	22.0	2.65	0.163	<0.0050	<0.030	<0.020	<0.030	407	20.6	<0.020	<0.020	14.1	6.0	7.0	<0.0050	362	0.00111	<0.0060	0.0125	0.222	0.038	4.40	<0.0010	0.015
BH11-51B	22-Oct-2013	7.89	1200	874	>4000	8.4	0.795	30.8	2.75	0.123	<0.0050	<0.030	<0.020		393	17.0	<0.020	<0.020	12.4	586	353	<0.0010	271	0.00086	<0.00050	0.00552	0.161	0.0379	4.27	<0.00050	0.0159
BH12-08	06-Jun-2013	7.73	806	543	>4000	<1.0	0.173	3.26	2.34	0.174	<0.0050	<0.030	<0.020	<0.030	404	31.8	<0.0020	<0.0020	<2.0	13.7	<5.0	<0.0050	131	<0.00060	<0.00060	0.0019	0.0366	0.065	0.602	<0.0010	0.0014
BH12-08	23-Oct-2013	7.29	775	503	2560	<1.0	0.352	1.16	2.21	0.179	<0.0050	<0.030	<0.020		411	20.0	<0.0020	<0.0020	<2.0	42.3		0.0058	54.2	<0.00010	<0.00050	0.00362	0.0187	0.0593	0.382	<0.00050	<0.0025
BH11-01A	22-Oct-2013	7.74	432	283	22.2	17.4	0.437	0.672	0.54	0.118	0.0133	<0.030	<0.020		254	8.0	<0.0020	<0.0020	<2.0	21.6	5.3	0.0052	6.66	<0.00010	<0.00010	0.0131	0.0167	0.0576	0.100	<0.00050	<0.00050
P16	22-Oct-2013	7.86	703	437	0.32	5.9	0.145	0.320	12.0	0.241	<0.0050	0.137	<0.020		332	10.0	<0.0020	<0.0020	<2.0	12.6	4.3	<0.0010	0.0054	0.00021	0.00021	<0.00010	0.00012	0.0112	0.0117	<0.00050	<0.00050
3880	21-Oct-2013	7.49	890	525	7.40	4.6	0.058	0.300	11.1	0.206	<0.0050	0.064	<0.020		536	49.0	<0.0020	<0.0020	<2.0	10.5	5.6	<0.0010	0.0040	<0.00010	<0.00010	0.00080	0.00257	0.0914	0.0906	<0.00050	<0.00050
3221	21-Oct-2013	7.78	977	582	2.76	5.5	0.265	0.365	5.90	0.113	<0.0050	<0.030	<0.020		540	51.0	<0.0020	<0.0020	<2.0	<3.0	3.6	<0.0010	<0.0030	<0.00010	<0.00010	0.00043	0.00063	0.0237	0.0249	<0.00050	<0.00050
3226	21-Oct-2013	7.70	905	526	18.5	5.7	0.183	0.332	1.32	0.114	<0.0050	<0.030	<0.020		541	50.0	<0.0020	<0.0020	<2.0	3.8	3.2	<0.0010	<0.0030	<0.00010	<0.00010	0.00180	0.00252	0.0563	0.0597	<0.00050	<0.00050
3443-1	23-Oct-2014	7.48	776	479	21.9	1.1	0.206	0.424	22.5	0.145	<0.0050	<0.030	<0.020		406	17.0	<0.0020	<0.0020	<2.0	6.4	5.1	0.0027	0.0056	<0.00010	<0.00010	0.00405	0.00371	0.0481	0.0494	<0.00050	<0.00050
DUP	06-Jun-2013	8.02	444	313	976	6.3	0.335	1.50	0.50	0.135	0.0105	<0.030	<0.020	<0.030	238	9.4	<0.0020	<0.0020	<2.0	12.8	5.1	<0.0050	10.3	<0.00060	<0.00060	0.0163	0.0196	0.063	0.116	<0.0010	<0.0010
DUP	01-Nov-2012	7.79	706	419	40.0	<1.0	0.199	0.378	1.80	0.102	<0.0050	<0.030	<0.020	<0.030	351	16.2	<0.0020	<0.0020	<2.5	11.4	2.9	<0.0050	0.115	<0.00060	<0.00060	0.0032	0.0061	0.062	0.069	<0.0010	<0.0010
BH11-27	01-Nov-2012	7.93	723	410	2360	7.3	0.442	0.891	16.6	0.366	<0.0050	<0.030	<0.020	<0.030	346	15.0	<0.0020	<0.0020	<2.0	<3.0	3.9	<0.050	32.7	<0.00060	<0.00060	0.0048	0.0265	0.082	0.693	<0.010	<0.0010
JOHNSON 1	02-Apr-2014	7.64	671	425	0.45	4.5	0.195	0.317	12.6	0.337	<0.0030	0.301	<0.020		317	<1.0	<0.0020	<0.0020	<2.0	11	4.0	<0.0050	0.0093	<0.00060	<0.00060	<0.0010	<0.0010	0.024	0.028	<0.0010	<0.0010
JOHNSON 2	02-Apr-2014	7.65	666	419	0.46	4.1	0.187	0.360	12.9	0.336	<0.0030	0.258	<0.020		314	<1.0	<0.0020	<0.0020	<2.0	<10	5.1	<0.0050	0.0082	<0.00060	<0.00060	<0.0010	<0.0010	0.024	0.028	<0.0010	<0.0010

Notes

T.: total

D.: dissolved

HISTORICAL GROUNDWATER QUALITY (2011 to 2013)- RAINY RIVER PROJECT

Station	Date Sampled	D. Bismuth	T. Bismuth	D. Boron	T. Boron	D. Cadmium	T. Cadmium	D. Calcium	T. Calcium	D. Chromium	T. Chromium	D. Cobalt	T. Cobalt	D. Copper	T. Copper	D. Iron	T. Iron	D. Lead	T. Lead	D. Lithium	T. Lithium	D. Magnesium	T. Magnesium	D. Manganese	T. Manganese	D. Molybdenum	T. Molybdenum	D. Nickel	T. Nickel
NR-08-240	24-Oct-2011	<0.00010	<0.000020	0.115	0.116	<0.000030	0.0000277	100	98.3	<0.00020	<0.00090	<0.000030	<0.000020	<0.00040	<0.00070	0.0275	14.9	<0.00010	0.000118	0.0223	0.0256	33.5	39.1	0.158	0.218	0.00799	0.00949	0.00115	<0.0010
NR-08-240	16-Jan-2012	<0.0020	<0.00020	0.145	0.129	<0.00010	0.000024	94.9	98.8	<0.0050	0.0267	<0.00050	0.000330	<0.0070	0.00403	0.55	41.2	<0.0010	0.00581	0.023	0.0239	38.0	36.1	0.214	0.258	0.0144	0.0122	<0.010	<0.0010
NR-08-240	25-Apr-2012	<0.00020	<0.00020	0.115	0.128	0.000014	0.000016	70.5	73.7	<0.00050	0.00169	<0.000050	<0.000050	<0.00070	0.00076	<0.010	14.1	<0.00010	0.00196	0.0228	0.0248	39.5	42.1	0.250	0.272	0.0156	0.0160	<0.0010	<0.0010
NR-08-240	10-Jul-2012	<0.0010	<0.0010	0.123	0.122	<0.000017	0.000019	51.8	55.6	<0.0010	0.0036	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	8.80	<0.0010	0.0013	<0.050	<0.050	39.7	39.7	0.152	0.209	0.0333	0.0263	<0.0020	<0.0020
NR-09-367	24-Oct-2011	<0.00010	<0.000020	0.0757	0.0787	<0.000030	0.0000114	96.0	91.1	<0.00020	<0.00090	<0.000030	<0.000020	<0.00040	0.00326	0.0329	3.25	<0.00010	<0.000060	0.0340	0.0367	39.7	42.7	0.122	0.153	0.00348	0.00378	0.00165	<0.0010
NR-09-367	16-Jan-2012	<0.0020	<0.00020	0.059	0.0750	0.00019	0.000161	76.9	91.5	<0.0050	0.851	0.00158	0.00349	<0.0070	0.0632	0.91	59.0	<0.0010	0.0305	0.026	0.0341	35.6	41.1	0.191	0.339	0.0684	0.437	<0.010	0.0155
NR-09-367	25-Apr-2012	<0.00020	<0.00020	0.0642	0.0691	0.000012	0.000027	92.9	92.3	0.00052	0.0352	<0.000050	<0.000050	<0.00070	0.00119	<0.010	3.88	<0.00010	0.00042	0.0349	0.0379	45.1	44.0	0.147	0.147	0.00378	0.00690	<0.0010	0.0011
NR-09-367	10-Jul-2012	<0.0010	<0.0010	0.059	0.061	<0.000017	0.000022	90.1	90.3	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	11.3	<0.0010	<0.0010	<0.050	<0.050	43.9	43.3	0.195	0.207	0.0046	0.0046	<0.0020	<0.0020
NH-09-428	24-Oct-2011	<0.00010	<0.000020	0.130	0.134	<0.000030	<0.0000090	67.4	86.9	<0.00020	0.0181	<0.000030	0.000596	<0.00040	0.00370	0.0306	31.8	<0.00010	0.00408	0.0267	0.0281	32.7	39.0	0.171	0.295	0.00718	0.0110	0.00117	0.0022
NR-09-428	25-Apr-2012	<0.00020	<0.00020	0.103	0.115	0.000010	0.000231	100	103	0.00050	0.0162	<0.000050	0.000074	<0.00070	0.00864	0.054	19.3	<0.00010	0.00527	0.0291	0.0329	40.1	41.9	0.301	0.337	0.00290	0.00650	<0.0010	0.0025
NR-09-428	10-Jul-2012	<0.0010	<0.0010	0.126	0.125	0.000021	0.000094	49.3	36.9	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	10.5	<0.0010	<0.0010	<0.050	<0.050	37.6	35.9	0.128	0.157	0.0659	0.159	<0.0020	<0.0020
NH-10-12	25-Apr-2012	<0.00020	<0.00020	0.0657	0.0706	<0.000010	0.000012	98.4	103	0.00062	<0.00050	<0.000050	<0.000050	<0.00070	<0.00070	0.533	4.18	<0.00010	<0.00010	0.0358	0.0403	44.4	45.6	0.180	0.183	0.00272	0.00271	<0.0010	<0.0010
RR-09-213A	24-Oct-2011	<0.00010	<0.000020	0.0785	0.0751	<0.000030	0.000407	91.6	95.3	<0.00020	<0.00090	0.000727	0.000852	<0.00040	0.00139	0.0309	2.62	0.00060	0.0404	0.0299	0.0327	37.2	42.6	0.175	0.272	0.00291	0.00316	0.00193	0.0010
RR-09-213A	25-Apr-2012	<0.00020	<0.00020	0.0768	0.0801	0.000024	0.000800	99.1	97.3	<0.00050	0.00156	0.000575	0.000881	<0.00070	0.00374	<0.010	4.08	0.00016	0.0645	0.0370	0.0384	44.9	44.7	0.251	0.332	0.00290	0.00299	0.0013	0.0023
RR-09-213A	10-Jul-2012	<0.0010	<0.0010	0.079	0.080	<0.000017	0.000550	99.9	104	<0.0010	<0.0010	0.00055	0.00082	<0.0010	<0.0010	<0.020	3.65	<0.0010	0.0489	<0.050	<0.050	46.2	46.2	0.202	0.444	0.0029	0.0028	<0.0020	<0.0020
RR-09-214	24-Oct-2011	<0.00010	<0.000020	0.0701	0.0704	<0.000030	0.0000195	91.5	87.7	<0.00020	<0.00090	0.00800	0.00858	<0.00040	<0.00070	0.0298	2.76	<0.00010	0.000283	0.0330	0.0348	36.5	41.5	0.143	0.177	0.00535	0.00588	0.00169	<0.0010
RR-09-214	25-Apr-2012	<0.00020	<0.00020	0.0678	0.0782	0.000018	0.000026	95.6	94.4	<0.00050	<0.00050	0.00689	0.00667	<0.00070	<0.00070	<0.010	2.57	<0.00010	0.00052	0.0365	0.0391	40.7	43.0	0.188	0.185	0.00532	0.00561	0.0021	0.0025
BH-10-04	24-Oct-2011	<0.00010	<0.000020	0.175	0.173	<0.000030	0.0000266	64.3	79.1	<0.00020	<0.00090	0.000670	0.000773	0.00050	<0.00070	0.0278	0.784	<0.00010	0.000315	0.0727	0.0810	46.5	48.7	0.103	0.129	0.00596	0.00617	0.00181	0.0012
BH-10-04	16-Jan-2012	<0.0020	<0.00020	0.186	0.176	<0.00010	0.000033	72.5	73.6	<0.0050	0.00079	0.00075	0.000767	<0.0070	<0.00070	<0.10	0.677	<0.0010	0.00044	0.076	0.0812	52.1	48.3	0.0967	0.104	0.0058	0.00581	<0.010	0.0011
BH-10-04	25-Apr-2012	<0.00020	<0.00020	0.176	0.192	0.000018	0.000025	81.9	80.3	<0.00050	<0.00050	0.000723	0.000808	<0.00070	0.00091	<0.010	0.761	<0.00010	0.00020	0.0803	0.0852	53.0	54.5	0.114	0.117	0.00538	0.00522	0.0012	0.0020
BH-10-04	10-Jul-2012	<0.0010	<0.0010	0.193	0.196	0.000020	0.000035	78.4	87.8	<0.0010	<0.0010	0.00072	0.00087	<0.0010	<0.0010	<0.020	0.822	<0.0010	<0.0010	0.079	0.076	52.8	57.2	0.103	0.116	0.0053	0.0055	<0.0020	<0.0020
BH-10-05	24-Oct-2011	<0.00010	0.000235	0.187	0.239	0.000036	0.000391	119	204	<0.00020	0.0497	0.000946	0.0137	0.00072	0.0322	0.0377	30.1	<0.00010	0.0143	0.107	0.156	68.2	93.4	0.152	0.891	0.00639	0.00695	0.00378	0.0356
BH-10-05	16-Jan-2012	<0.0020	<0.00020	0.164	0.145	<0.00010	0.000193	113	145	<0.0050	0.0162	<0.00050	0.00506	<0.0070	0.0120	<0.10	8.89	<0.0010	0.00531	0.095	0.0998	73.3	79.7	0.0267	0.319	0.0070	0.00518	<0.010	0.0148
BH-10-05	25-Apr-2012	<0.00020	<0.00020	0.106	0.0814	0.000026	0.000065	121	132	0.00051	0.00433	<0.000050	0.00169	0.00193	0.00533	<0.010	2.48	<0.00010	0.00166	0.0872	0.0886	79.8	85.9	0.0578	0.160	0.00394	0.00360	0.0028	0.0062
BH-10-05	10-Jul-2012	<0.0010	<0.0010	0.131	0.166	0.000033	0.000147	118	144	<0.0010	0.0102	<0.00050	0.00395	<0.0010	0.0077	<0.020	5.77	<0.0010	0.0034	0.090	0.097	78.0	90.2	0.0439	0.322	0.0040	0.0043	<0.0020	0.0109
BH-10-05	06-Jun-2013	<0.0010	<0.0010	0.171	0.187	0.000205	0.000785	127	213	<0.0010	0.0325	<0.00050	0.0137	<0.0010	0.0229	<0.020	17.3	<0.0010	0.0110	0.095	0.120	74.2	105	0.0995	1.06	0.0041	0.0056	<0.0020	0.0288
BH-10-05	22-Oct-2013	<0.000050	0.000093	0.146	0.143	0.000157	0.000543	114	142	<0.00010	0.0140	<0.00010	0.00493	0.00042	0.0084	<0.010	7.99	<0.000050	0.00515	0.0844	0.0903	65.9	76.1	0.0363	0.391	0.00429	0.00475	0.00176	0.0126
BH-10-7A	24-Oct-2011	<0.00010	<0.000020	0.0493	0.0502	<0.000030	0.0000145	64.9	82.4	<0.00020	0.00148	0.000052	0.000521	<0.00040	0.00121	0.0255	2.52	<0.00010	0.000309	0.0310	0.0330	24.2	25.7	0.209	0.274	0.00157	0.00174	0.00086	0.0012
BH-10-7A	25-Apr-2012	<0.00020	<0.00020	0.0495	0.0507	<0.000010	0.000027	80.1	76.3	<0.00050	0.00426	<0.000050	0.00125	<0.00070	0.00360	<0.010	3.87	<0.00010	0.00100	0.0327	0.0343	27.1	25.5	0.263	0.289	0.00175	0.00168	<0.0010	0.0035
BH-10-7A	10-Jul-2012	<0.0010	<0.0010	0.103	0.106	<0.000017	0.000045	82.8	83.8	<0.0010	0.0014	<0.00050	0.00081	<0.0010	0.0020	<0.020	4.32	<0.0010	<0.0010	<0.050	<0.050	27.7	28.2	0.315	0.446	0.0026	0.0024	<0.0020	<0.0020
BH-10-7A	06-Jun-2013	<0.0010	<0.0010	0.064	0.065	<0.000017	<0.000017	83.9	79.4	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	0.925	<0.0010	<0.0010	<0.050	<0.050	26.1	24.1	0.250	0.241	0.0019	0.0020	<0.0020	<0.0020
BH-10-7A	23-Oct-2013	<0.000050	<0.000050	0.059	0.052	<0.000010	0.000018	73.9	77.1	<0.00010	0.00400	<0.00010	0.00128	<0.00010	0.0021	<0.010	3.32	<0.000050	0.000571	0.0351	0.0355	22.8	23.7	0.154	0.300	0.00199	0.00191	0.00028	0.00302
BH-10-11A	24-Oct-2011	<0.00010	0.00668	0.0652	0.107	<0.000030	0.0182	96.5	3290	<0.00020	0.519	0.000135	0.187	<0.00040	2.38	0.0403	280	<0.00010	0.648	0.0325	0.318	34.2	1120	0.135	9.47	0.00467	0.0253	0.00154	2.33
BH-10-11A	25-Apr-2012	<0.00020	0.00052	0.0603	0.0971	0.000017	0.000600	97.4	193	0.00050	0.0692	0.000113	0.0220	<0.00070	0.0674	<0.010	43.1	<0.00010	0.0193	0.0339	0.0793	40.4	77.8	0.206	1.31	0.00413	0.00492	0.0012	0.0650
BH-10-11A	10-Jul-2012	<0.0010	0.0014	0.058	0.119	<0.000017	0.00139	96.8	697	<0.0010	0.154	<0.00050	0.0499	<0.0010	0.162	<0.020	96.2	<0.0010	0.0470	<0.050	0.122	40.5	138	0.156	4.40	0.0042	0.0057	<0.0020	0.160
BH-10-12A	24-Oct-2011	<0.00010	0.000022	0.0784	0.0885	<0.000030	0.0000144	85.4	94.4	<0.00020	<0.00090	<0.000030	<0.000020	<0.00040	<0.00070	<0.0050	5.03	<0.00010	0.000187	0.0412	0.0489	35.6	39.7	0.154	0.212	0.00325	0.00389	0.00101	<0.0010
BH-10-12A	10-Jul-2012	<0.0010	<0.0010	0.086	0.084	<0.000017	0.000017	92.9	95.8	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	4.23	<0.0010	<0.0010	<0.050	<0.050	41.2	41.2	0.206	0.216	0.0028	0.0029	<0.0020	<0.0020
BH-10-14	24-Oct-2011	<0.00010	<0.000020	0.103	0.103	<0.000030	0.0000114	96.4	97.7	<0.00020	<0.00090	<0.000030	<0.000020	0.00066	<0.00070	0.0230	2.41	<0.00010	<0.000060	0.0331	0.0343	37.3	41.0	0.158	0.189	0.00365	0.00402	0.00109	<0.0010
BH-10-14	25-Apr-2012	<0.00020	<0.00020	0.0982	0.118	0.000013	0.000015	108	104	<0.00050	<0.00050	<0.000050	<0.000050	<0.00070	<0.00070	<0.010	2.73	<0.00010	<0.00010	0.0348	0.0406	39.4	45.0	0.202	0.208	0.00379	0.00400	<0.0010	0.0012
BH-10-14	10-Jul-2012	<0.0010	<0.0010	0.110	0.110	<0.000017	0.000023	94.9	108	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	2.77	<0.0010	<0.0010	<0.050	<0.050	40.5	43.7	0.179	0.207	0.0037	0.0039	<0.0020	<0.0020
BH-10-20	24-Oct-2011	<0.00010	0.000063	0.0809	0.0811	<0.000030	0.00102	94.0	107	<0.00020	0.00187	0.000829	0.00200	0.00052	0.00412	0.0274	5.32	0.00031	0.0695	0.0327	0.0365	39.2	42.8	0.182	0.739	0.00289	0.00280	0.00167	0.0028
BH-10-20	16-Jan-2012	<0.0020	<0.00020	0.137	0.130	<0.00010	0.000021	94.9	100	<0.0050	0.0564	<0.00050	0.000733	<0.0070	0.00381	2.21	43.1	<0.0010	0.00540	0.019	0.0227	37.6	35.5	0.228	0.272	0.0179	0.0198	<0.010	0.0021
BH-10-20	10-Jul-2012	<0.0010	<0.0010	0.063	0.062	<0.000017	0.000023	92.7	93.5	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	0.257	11.5	<0.0010	<0.0010	<0.050	<0.050	43.2	44.1	0.190	0.213	0.0044	0.0049	<0.0020	<0.0020
TRIP BLANK	24-Oct-2011	<0.00010	<0.000020	<0.0010	<0.00090	<0.000030	<0.0000090	<0.020	<0.020	<0.00020	<0.00090	<0.000030	<0.000020	<0.00040	<0.00070	<0.0050	<0.0060	<0.00010	<0.000060	<0.00090	<0.00050	<0.0010	<0.00050	<0.00010	<0.00010	<0.000090	<0.000090	<0.00020	<0.0010
TRIP BLANK	16-Jan-2012	<0.00020	<0.00020	<0.0020	<0.0020	<0.000010	<0.000010	<0.10	<0.10	<0.00050	<0.00050	<0.000050	<0.000050	<0.00070	<0.00070	<0.010	<0.010	<0.00010	<0.00010	<0.0010	<0.0010	<0.010	<0.010	<0.00050	<0.00050	<0.00020	<0.00020	<0.0010	<0.0010
TRIP BLANK	25-Apr-2012	<0.00020	<0.00020	<0.0020	<0.0020	<0.000010	<0.000010	<0.10	<0.10	<0.00050	<0.00050	<0.000050	<0.000050	<0.00070	<0.00070	<0.010	<0.010	<0.00010	<0.00010	<0.0010	<0.0010	<0.020	<0.020	<0.00050	<0.00050	<0.00020	<0.00020	<0.0010	<0.0010
TRIP BLANK	10-Jul-2012	<0.0010	<0.0010	<0.050	<0.050	<0.000017	<0.000017	<0.20	<0.20	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	<0.020	<0.0010	<0.0010	<0.050	<0.050	<0.020	<0.020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020
TRIP BLANK	01-Nov-2012	<0.0010	<0.0010	<0.050	<0.050	<0.000017	<0.000017	<0.20	<0.20	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	<0.020	<0.0010	<0.0010	<0.050	<0.050	<0.020	<0.020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020
TRIP BLANK	06-Jun-2013	<0.0010	<0.0010	<0.050	<0.050	<0.000017	<0.000017	<0.20	<0.20	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	<0.020	<0.0010	<0.0010	<0.050	<0.050	<0.020	<0.020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020
TRIP BLANK	02-Apr-2014	<0.0010	<0.0010	<0.050	<0.050	<0.000017	<0.000017	<0.20	<0.20	<0.0010	<0.0010	<0.00050	<0.00050	0.0052	<0.0010	<0.020	<0.020	<0.0010	<0.0010	<0.050	<0.050	<0.020	<0.020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020
BH11-44A	01-Nov-2012	<0.0010	<0.0010	<0.50	0.081	<0.000017	0.000061	90.5	93.8	<0.0010	0.0168	<0.00050	0.0103	<0.0010	0.0463	<0.020	15.8	<0.0010	0.0149	<0.50	<0.050	28.7	36.5	0.283	0.563	0.0023	0.0029	<0.0020	0.0150
BH11-44A	06-Jun-2013	<0.0010	<0.0010	0.068	0.065	<0.000017	<0.000017	94.1	89.5	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	2.27	<0.0010	<0.0010	<0.050	<0.050	32.0	29.5	0.284	0.276	0.0034	0.0036	<0.0020	<0.0020
BH11-44A	23-Oct-2013	<0.000050	<0.000050	0.061	0.058	<0.000010	<0.000010	86.9	84.5	<0.00010	0.00011	0.00031	0.00033	<0.00010	0.00039	2.26	2.14	0.000155	0.000178	0.0241	0.0209	28.0	28.9	0.266	0.270	0.00356	0.00367	0.00032	0.00038
BH11-41	01-Nov-2012	<0.0010	<0.0010	<0.50	<0.050	0.000199	0.00190	98.3	111	<0.0010	0.0516	0.00085	0.0154	0.0015	0.110	<0.020	32.6	<0.0010	0.0321	<0.50	<0.050	42.3	44.4	0.131	1.68	0.0056	0.0055	0.0063	0.0405
BH11-13A	01-Nov-2012	<0.0010	<0.0010	<0.50	0.056	<0.000017	<0.000017	99.4	96.6	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	3.62	<0.0010	<0.0010	<0.50	<0.050	30.6	34.6	0.229	0.251	0.0016	0.0017	<0.0020	<0.0020
BH11-51A	01-Nov-2012	<0.010	<0.0010	<0.50	0.099	<0.00017	0.000916	109	312	<0.010	0.180	<0.0050	0.0758	<0.010	0.415	<0.20	198	<0.010	0.0366	<0.50	0.142	45.4	145	0.277	4.23	<0.010	0.0032	<0.020	0.235
BH11-51A	06-Jun-2013	<0.0010	<0.0010	0.128	0.125	<0.000017	0.000029	120	117	<0.0010	0.0105	<0.00050	0.00388	<0.0010	0.0124	<0.020	8.59	<0.0010	0.0013	<0.050	<0.050	47.1	45.1	0.354	0.457	0.0021	0.0020	<0.0020	0.0083
BH11-51A	21-Oct-2013	<0.000050	<0.000050	0.115	0.127	<0.000010	<0.000010	116	111	<0.00010	0.00113	0.00012	0.00052	0.00015	0.00174	<0.010	2.64	<0.000050	0.000175	0.0636	0.0535	43.4	39.2	0.371	0.363	0.00218	0.00198	0.00018	0.00104
BH12-20	01-Nov-2012	<0.0010	<0.0010	<0.050	<0.050	<0.000017	0.000170	61.9	116	<0.0010	0.152	<0.00050	0.146	<0.0010	0.214	<0.020	321	<0.0010	0.0327	<0.050	0.133	20.0	111	0.180	1.51	0.0031	0.0058	0.0021	0.280
BH11-01B	06-Jun-2013	<0.0010	<0.010	0.614	0.85	0.000024	0.00830	104	1790	<0.0010	0.610	0.00054	0.219	<0.0010	0.770	<0.020	375	<0.0010	0.334	0.143	0.54	33.7	497	0.169	10.4	0.0085	0.021	<0.0020	0.787
BH11-01B	22-Oct-2013	<0.000050	0.00797	0.473	0.86	0.000011	0.00883	98.1	1560	<0.00010	0.414	0.00040	0.203	0.00011	0.457	<0.010	323	<0.000050	0.316	0.145	0.545	31.9	429	0.0707	10.5	0.0107	0.00939	0.00144	0.590
BH11-44B	06-Jun-2013	<0.0010	<0.010	0.329	0.55	<0.000017	0.00867	84.0	1840	<0.0010	1.16	0.00130	0.350	<0.0010	1.79	<0.020	652	<0.0010	0.415	0.075	0.84	35.6	639	0.453	14.1	0.0145	0.026	0.0035	1.30
BH11-44B	23-Oct-2013	<0.000050	0.00097	0.255	0.308	<0.000010	0.000868	85.9	226	<0.00010	0.140	0.00121	0.0436	0.00057	0.161	0.362	79.6	<0.000050	0.0383	0.0791	0.191	34.6	89.0	0.452	2.09	0.0105	0.00766	0.00343	0.121
BH11-49A	06-Jun-2013	<0.0010	<0.010	0.311	0.64	<0.000017	0.0241	183	4990	<0.0010	1.66	0.00054	0.560	0.0010	2.59	0.021	947	<0.0010	0.700	0.152	1.01	69.4	1640	0.183	27.2	0.0131	0.029	0.0023	2.26
BH11-49A	22-Oct-2013	<0.000050	<0.00025	0.089	0.096	<0.000010	0.000105	79.6	102	<0.00010	0.271	0.00012	0.0263	0.00017	0.161	<0.010	102	<0.000050	0.00502	0.0321	0.058	22.8	36.4	0.262	1.13	0.00976	0.00748	0.00110	0.0739
BH11-49B	06-Jun-2013	<0.0010	<0.0010	0.095	0.092	0.000045	0.000068	61.0	60.4	<0.0010	0.0014	<0.00050	0.00072	0.0101	0.0122	0.164	0.752	<0.0010	0.0013	<0.050	<0.050	21.7	20.0	0.136	0.151	0.0174	0.0178	0.0021	0.0027
BH11-49B	22-Oct-2013	<0.00025	0.00342	0.455	0.884	<0.000050	0.0178	175	4210	<0.00050	0.917	0.00163	0.489	0.00092	1.11	<0.050	596	<0.00025	0.464	0.190	0.869	61.5	1120	0.160	26.8	0.0133	0.0244	0.00340	1.32
BH11-51B	06-Jun-2013	<0.0010	<0.010	0.260	0.58	<0.000017	0.00918	105	2440	<0.0010	0.774	0.00074	0.304	<0.0010	1.03	<0.020	483	<0.0010	0.297	0.079	0.59	37.9	756	0.177	14.5	0.0140	0.032	0.0022	1.01
BH11-51B	22-Oct-2013	<0.000050	0.00615	0.371	0.702	0.000014	0.0103	120	2520	<0.00010	0.707	0.00134	0.349	0.00048	0.873	<0.010	490	<0.000050	0.317	0.123	0.626	43.8	720	0.189	17.6	0.0147	0.0157	0.00314	0.923
BH12-08	06-Jun-2013	<0.0010	<0.0010	0.070	0.072	<0.000017	0.00109	108	433	<0.0010	0.189	<0.00050	0.0900	<0.0010	0.490	<0.020	215	<0.0010	0.0320	<0.050	0.119	48.7	131	0.173	3.69	0.0042	0.0074	<0.0020	0.260
BH12-08	23-Oct-2013	<0.000050	0.00050	0.068	0.085	<0.000010	0.000536	99.5	220	<0.00010	0.137	0.00017	0.0587	0.00053	0.187	1.61	97.5	<0.000050	0.0168	0.0414	0.132	44.6	84.0	0.155	2.29	0.00343	0.00489	0.00064	0.124
BH11-01A	22-Oct-2013	<0.000050	0.000089	0.124	0.124	<0.000010	0.000053	50.9	64.6	<0.00010	0.0162	0.00011	0.00482	0.00022	0.0126	<0.010	8.74	<0.000050	0.00248	0.0281	0.0433	17.8	23.2	0.153	0.352	0.00149	0.00164	0.00032	0.0124
P16	22-Oct-2013	<0.000050	<0.000050	0.249	0.301	<0.000010	<0.000010	25.8	25.8	<0.00010	0.00014	0.00086	0.00086	0.00645	0.00792	<0.010	0.185	0.000060	0.000324	0.0130	0.0127	9.50	8.69	0.0594	0.0597	0.00134	0.00137	0.00324	0.00330
3880	21-Oct-2013	<0.000050	<0.000050	0.055	0.050	<0.000010	<0.000010	117	110	<0.00010	<0.00010	0.00010	0.00011	0.00923	0.0119	<0.010	0.748	<0.000050	0.000617	0.0361	0.0391	52.4	50.3	0.105	0.110	0.00319	0.00310	0.00100	0.00104
3221	21-Oct-2013	<0.000050	<0.000050	0.072	0.082	0.000049	0.000044	133	125	<0.00010	<0.00010	0.00239	0.00226	0.00259	0.00432	<0.010	0.295	<0.000050	<0.000050	0.0616	0.0526	58.3	53.3	0.975	0.936	0.00146	0.00136	0.00061	0.00060
3226	21-Oct-2013	<0.000050	<0.000050	0.053	0.059	<0.000010	<0.000010	127	126	<0.00010	<0.00010	0.00171	0.00160	0.00031	0.00075	0.017	1.41	<0.000050	0.000149	0.0549	0.0482	50.6	47.5	0.600	0.570	0.00144	0.00144	0.00050	0.00046
3443-1	23-Oct-2014	<0.000050	<0.000050	0.084	0.081	<0.000010	<0.000010	99.8	96.7	<0.00010	<0.00010	<0.00010	<0.00010	0.00039	0.00064	2.14	2.16	0.000051	0.000082	0.0371	0.0346	41.3	40.1	0.277	0.281	0.00220	0.00236	0.00037	0.00035
DUP	06-Jun-2013	<0.0010	<0.0010	0.137	0.130	<0.000017	0.000075	64.2	75.6	<0.0010	0.0235	<0.00050	0.00700	<0.0010	0.0214	<0.020	11.4	<0.0010	0.0029	<0.050	<0.050	19.0	23.0	0.155	0.373	0.0017	0.0018	<0.0020	0.0185
DUP	01-Nov-2012	<0.0010	<0.0010	<0.050	<0.050	<0.000017	<0.000017	98.7	107	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.0010	<0.020	3.34	<0.0010	<0.0010	<0.050	<0.050	34.4	32.3	0.227	0.233	0.0016	0.0018	<0.0020	<0.0020
BH11-27	01-Nov-2012	<0.0010	<0.0010	<0.50	0.151	0.000033	0.000277	90.7	104	<0.0010	0.0543	0.00102	0.0258	0.0012	0.166	<0.020	57.8	<0.0010	0.0196	<0.50	<0.050	31.6	40.5	0.238	0.958	0.0035	0.0051	0.0040	0.0619
JOHNSON 1	02-Apr-2014	<0.0010	<0.0010	0.487	0.525	<0.000017	<0.000017	44.2	54.7	<0.0010	<0.0010	<0.00050	<0.00050	0.0045	0.0054	<0.020	0.066	<0.0010	<0.0010	<0.050	<0.050	18.8	20.1	0.0271	0.0376	0.0011	0.0014	<0.0020	<0.0020
JOHNSON 2	02-Apr-2014	<0.0010	<0.0010	0.490	0.533	<0.000017	<0.000017	44.4	53.9	<0.0010	<0.0010	<0.00050	<0.00050	0.0040	0.0054	<0.020	0.063	<0.0010	<0.0010	<0.050	<0.050	19.1	19.8	0.0300	0.0373	0.0011	0.0014	<0.0020	<0.0020

Notes

T.: total

D.: dissolved

HISTORICAL GROUNDWATER QUALITY (2011 to 2013)- RAINY RIVER PROJECT

Station	Date Sampled	D. Phosphorus	D. Potassium	T. Potassium	D. Selenium	T. Selenium	D. Silver	T. Silver	D. Sodium	T. Sodium	D. Strontium	T. Strontium	D. Tellurium
NR-08-240	24-Oct-2011	<0.0050	4.52	4.47	<0.0010	<0.0020	<0.000010	<0.0000070	26.3	24.5	0.579	0.725	<0.000070
NR-08-240	16-Jan-2012	<0.0100	4.48	4.50	<0.0050	<0.00050	<0.00050	0.000052	30.2	30.3	0.761	0.825	<0.00070
NR-08-240	25-Apr-2012	0.0064	5.03	5.06	<0.00050	<0.00050	<0.000050	<0.000050	34.2	35.6	0.503	0.509	<0.000070
NR-08-240	10-Jul-2012	0.0113	4.78	4.87	<0.0010	<0.0010	<0.00010	<0.00010	32.9	33.2	0.352	0.382	<0.0010
NR-09-367	24-Oct-2011	<0.0050	3.57	3.33	<0.0010	<0.0020	<0.000010	<0.0000070	15.0	14.2	0.420	0.480	<0.000070
NR-09-367	16-Jan-2012	<0.0100	3.18	3.65	<0.0050	<0.00050	<0.00050	0.00172	12.3	15.1	0.379	0.486	<0.00070
NR-09-367	25-Apr-2012	<0.0050	3.79	3.73	<0.00050	<0.00050	<0.000050	<0.000050	12.8	12.5	0.417	0.422	<0.000070
NR-09-367	10-Jul-2012	<0.0050	3.76	3.61	<0.0010	<0.0010	<0.00010	<0.00010	10.6	10.4	0.389	0.396	<0.0010
NH-09-428	24-Oct-2011	<0.0050	3.55	3.53	<0.0010	<0.0020	<0.000010	0.000114	19.3	18.4	0.424	0.534	<0.000070
NR-09-428	25-Apr-2012	<0.0050	3.84	3.88	<0.00050	<0.00050	<0.000050	0.000221	17.7	18.5	0.558	0.602	<0.000070
NR-09-428	10-Jul-2012	0.0050	3.67	3.78	<0.0010	<0.0010	<0.00010	<0.00010	20.7	20.7	0.257	0.197	<0.0010
NH-10-12	25-Apr-2012	<0.0050	5.07	5.15	<0.00050	<0.00050	<0.000050	<0.000050	12.3	12.7	0.380	0.391	<0.000070
RR-09-213A	24-Oct-2011	<0.0050	3.33	3.17	<0.0010	<0.0020	<0.000010	0.0000168	13.4	12.1	0.393	0.452	<0.000070
RR-09-213A	25-Apr-2012	<0.0050	3.71	3.70	<0.00050	0.00059	<0.000050	<0.000050	14.0	13.9	0.448	0.451	<0.000070
RR-09-213A	10-Jul-2012	<0.0050	3.66	3.66	<0.0010	<0.0010	<0.00010	<0.00010	13.5	13.5	0.465	0.480	<0.0010
RR-09-214	24-Oct-2011	<0.0050	4.68	4.30	<0.0010	<0.0020	<0.000010	0.0000075	15.2	13.7	0.340	0.397	<0.000070
RR-09-214	25-Apr-2012	<0.0050	5.13	5.14	<0.00050	<0.00050	<0.000050	<0.000050	16.3	17.5	0.384	0.391	<0.000070
BH-10-04	24-Oct-2011	<0.0050	3.62	3.43	<0.0010	<0.0020	<0.000010	<0.0000070	22.3	18.8	0.435	0.480	<0.000070
BH-10-04	16-Jan-2012	<0.0100	3.66	3.60	<0.0050	<0.00050	<0.00050	<0.000050	19.6	18.9	0.495	0.500	<0.00070
BH-10-04	25-Apr-2012	0.0075	3.89	3.80	<0.00050	0.00065	<0.000050	<0.000050	19.9	20.9	0.506	0.482	<0.000070
BH-10-04	10-Jul-2012	0.0076	3.64	3.88	<0.0010	<0.0010	<0.00010	<0.00010	18.4	20.2	0.500	0.541	<0.0010
BH-10-05	24-Oct-2011	<0.0050	3.54	8.97	<0.0010	<0.0020	<0.000010	0.000253	19.4	21.4	0.620	0.828	<0.000070
BH-10-05	16-Jan-2012	<0.0100	2.87	4.39	<0.0050	0.00083	<0.00050	0.000119	16.1	15.2	0.664	0.644	<0.00070
BH-10-05	25-Apr-2012	0.0052	2.73	2.69	<0.00050	<0.00050	<0.000050	0.000052	16.0	14.2	0.623	0.602	<0.000070
BH-10-05	10-Jul-2012	<0.0050	2.87	4.54	<0.0010	<0.0010	<0.00010	<0.00010	15.5	18.6	0.633	0.694	<0.0010
BH-10-05	06-Jun-2013	<0.0050	3.30	7.23	<0.0010	<0.0010	<0.00010	0.00096	18.4	18.2	0.674	0.786	<0.0010
BH-10-05	22-Oct-2013	<0.0050	2.96	4.97	<0.00010	0.00026	<0.000010	0.000126	15.3	16.2	0.670	0.728	<0.00060
BH-10-7A	24-Oct-2011	<0.0050	3.90	3.52	<0.0010	<0.0020	<0.000010	<0.0000070	9.32	8.81	0.217	0.271	<0.000070
BH-10-7A	25-Apr-2012	<0.0050	4.02	4.19	0.00054	0.00068	<0.000050	<0.000050	9.18	8.86	0.267	0.249	<0.000070
BH-10-7A	10-Jul-2012	<0.0050	4.06	4.09	<0.0010	<0.0010	<0.00010	<0.00010	13.6	13.5	0.367	0.360	<0.0010
BH-10-7A	06-Jun-2013	<0.0050	3.99	3.88	<0.0010	<0.0010	<0.00010	<0.00010	10.0	9.40	0.283	0.294	<0.0010
BH-10-7A	23-Oct-2013	<0.0050	3.71	4.18	<0.00010	<0.00010	<0.000010	0.000015	8.81	8.89	0.279	0.293	<0.00060
BH-10-11A	24-Oct-2011	<0.0050	5.79	135	<0.0010	0.0346	<0.000010	0.00148	10.5	24.6	0.350	5.28	<0.000070
BH-10-11A	25-Apr-2012	<0.0050	5.59	12.0	<0.00050	0.00304	<0.000050	0.000305	10.5	12.5	0.393	0.534	<0.000070
BH-10-11A	10-Jul-2012	<0.0050	6.12	19.8	<0.0010	<0.0010	<0.00010	0.00057	10.2	12.1	0.385	1.15	<0.0010
BH-10-12A	24-Oct-2011	<0.0050	4.63	4.39	<0.0010	<0.0020	<0.000010	0.0000156	19.2	20.3	0.343	0.413	<0.000070
BH-10-12A	10-Jul-2012	<0.0050	4.81	4.72	<0.0010	<0.0010	<0.00010	<0.00010	15.7	16.1	0.404	0.401	<0.0010
BH-10-14	24-Oct-2011	<0.0050	4.59	4.19	<0.0010	<0.0020	<0.000010	<0.0000070	17.1	15.9	0.426	0.490	<0.000070
BH-10-14	25-Apr-2012	<0.0050	4.73	5.03	0.00056	<0.00050	<0.000050	<0.000050	16.8	19.1	0.536	0.509	<0.000070
BH-10-14	10-Jul-2012	<0.0050	4.45	4.89	<0.0010	<0.0010	<0.00010	<0.00010	16.2	18.0	0.476	0.548	<0.0010
BH-10-20	24-Oct-2011	<0.0050	3.52	3.59	<0.0010	<0.0020	<0.000010	0.0000489	14.0	11.9	0.393	0.463	<0.000070
BH-10-20	16-Jan-2012	<0.0100	4.61	4.52	<0.0050	<0.00050	<0.00050	<0.000050	29.9	30.3	0.784	0.817	<0.00070
BH-10-20	10-Jul-2012	<0.0050	3.74	3.75	<0.0010	<0.0010	<0.00010	<0.00010	10.2	10.5	0.385	0.417	<0.0010
TRIP BLANK	24-Oct-2011	<0.0050	<0.013	<0.020	<0.0010	<0.0020	<0.000010	<0.0000070	<0.050	<0.0040	<0.000060	<0.000030	<0.000070
TRIP BLANK	16-Jan-2012	<0.0050	<0.050	<0.050	<0.00050	<0.00050	<0.000050	<0.000050	<0.060	<0.060	<0.00030	<0.00030	<0.000070
TRIP BLANK	25-Apr-2012	<0.0050	<0.050	<0.050	<0.00050	<0.00050	<0.000050	<0.000050	<0.060	<0.060	<0.00030	<0.00030	<0.000070
TRIP BLANK	10-Jul-2012	<0.0050	<0.50	<0.50	<0.0010	<0.0010	<0.00010	<0.00010	<0.10	<0.10	<0.0010	<0.0010	<0.0010
TRIP BLANK	01-Nov-2012	<0.0050	<0.50	<0.50	<0.0010	<0.0010	<0.00010	<0.00010	<0.10	<0.10	<0.0010	<0.0010	<0.0010
TRIP BLANK	06-Jun-2013	<0.0050	<0.50	<0.50	<0.0010	<0.0010	<0.00010	<0.00010	<0.10	<0.10	<0.0010	<0.0010	<0.0010
TRIP BLANK	02-Apr-2014	<0.0030	<0.50	<0.50	<0.0010	<0.0010	<0.00010	<0.00010	<0.10	<0.10	<0.0010	<0.0010	<0.0010
BH11-44A	01-Nov-2012	<0.0050	2.30	5.40	<0.0010	<0.0010	<0.00010	0.00150	9.0	12.1	0.360	0.479	<0.0010
BH11-44A	06-Jun-2013	<0.0050	2.85	2.80	<0.0010	<0.0010	<0.00010	<0.00010	15.5	15.5	0.382	0.390	<0.0010
BH11-44A	23-Oct-2013	<0.0050	2.67	2.65	0.00032	<0.00010	<0.000010	<0.000010	15.2	15.2	0.362	0.358	<0.00060
BH11-41	01-Nov-2012	<0.0050	4.77	6.99	<0.0010	<0.0010	<0.00010	0.0292	7.9	8.41	0.320	0.335	<0.0010
BH11-13A	01-Nov-2012	<0.0050	4.12	4.52	<0.0010	<0.0010	<0.00010	<0.00010	9.3	10.9	0.341	0.358	<0.0010
BH11-51A	01-Nov-2012	<0.0050	<5.0	17.4	<0.010	<0.0010	<0.0010	0.0118	28.0	23.7	0.686	1.15	<0.010
BH11-51A	06-Jun-2013	<0.0050	4.78	5.29	<0.0010	<0.0010	<0.00010	0.00038	28.9	27.9	0.666	0.698	<0.0010
BH11-51A	21-Oct-2013	<0.0050	4.80	4.30	<0.00010	<0.00010	<0.000010	0.000049	27.2	24.8	0.660	0.652	<0.00060
BH12-20	01-Nov-2012	<0.0050	4.36	73.1	<0.0010	<0.0010	<0.00010	0.0232	16.0	15.3	0.464	0.828	<0.0010
BH11-01B	06-Jun-2013	0.0059	4.13	71.7	<0.0010	0.034	<0.00010	0.0050	76.8	80.0	0.658	3.70	<0.0010
BH11-01B	22-Oct-2013	0.0091	3.57	57.3	0.00168	0.0090	<0.000010	0.00365	72.5	89.5	0.672	3.41	<0.00060
BH11-44B	06-Jun-2013	0.0068	4.41	92.3	<0.0010	0.043	<0.00010	0.0077	76.1	78.5	0.497	3.46	<0.0010
BH11-44B	23-Oct-2013	0.0167	3.75	15.5	<0.00010	0.00115	<0.000010	0.00152	47.0	47.3	0.511	0.745	<0.00060
BH11-49A	06-Jun-2013	<0.0050	8.68	123	0.0027	0.067	<0.00010	0.0038	154	161	1.20	7.75	<0.0010
BH11-49A	22-Oct-2013	<0.0050	3.70	6.21	<0.00010	<0.00050	<0.000010	0.00277	23.8	26.4	0.506	0.568	<0.00060
BH11-49B	06-Jun-2013	<0.0050	3.25	3.31	<0.0010	0.0011	<0.00010	<0.00010	45.5	43.3	0.353	0.352	<0.0010
BH11-49B	22-Oct-2013	<0.0050	7.51	93.0	0.00096	0.00575	<0.000050	0.00445	111	104	1.20	6.16	<0.0030
BH11-51B	06-Jun-2013	<0.0050	5.05	79.6	<0.0010	0.034	<0.00010	0.0316	68.8	80.4	0.625	3.60	<0.0010
BH11-51B	22-Oct-2013	<0.0050	5.63	77.4	0.00065	0.00895	<0.000010	0.0447	95.9	110	0.826	3.81	<0.00060
BH12-08	06-Jun-2013	<0.0050	4.65	12.8	<0.0010	0.0058	<0.00010	0.0123	11.4	11.9	0.374	0.828	<0.0010
BH12-08	23-Oct-2013	<0.0050	4.11	12.8	0.00010	0.00063	<0.000010	0.00480	11.3	15.9	0.354	0.577	<0.00060
BH11-01A	22-Oct-2013	0.0226	3.13	4.57	<0.00010	<0.00010	<0.000010	0.000096	14.2	15.2	0.387	0.421	<0.00060
P16	22-Oct-2013	<0.0050	1.68	1.57	<0.00010	<0.00010	<0.000010	<0.000010	132	127	0.339	0.334	<0.00060
3880	21-Oct-2013	<0.0050	2.81	2.56	0.00014	0.00011	<0.000010	<0.000010	14.0	13.2	0.387	0.370	<0.00060
3221	21-Oct-2013	<0.0050	4.66	4.07	<0.00010	<0.00010	<0.000010	<0.000010	18.2	16.7	0.722	0.694	<0.00060
3226	21-Oct-2013	<0.0050	4.32	3.83	<0.00010	<0.00010	<0.000010	<0.000010	12.8	11.5	0.610	0.619	<0.00060
3443-1	23-Oct-2014	0.0135	3.39	3.28	<0.00010	<0.00010	<0.000010	<0.000010	19.8	19.5	0.497	0.500	<0.00060
DUP	06-Jun-2013	0.0144	3.43	5.42	<0.0010	<0.0010	<0.00010	0.00011	15.1	15.2	0.369	0.417	<0.0010
DUP	01-Nov-2012	<0.0050	4.18	4.37	<0.0010	<0.0010	<0.00010	<0.00010	10.8	10.6	0.350	0.357	<0.0010
BH11-27	01-Nov-2012	<0.0050	3.49	7.17	<0.0010	0.0029	<0.00010	0.0145	17.8	20.3	0.495	0.703	<0.0010
JOHNSON 1	02-Apr-2014	<0.0030	2.23	2.55	<0.010	<0.0010	<0.0010	<0.00010	90.9	112	0.780	0.958	<0.0010
JOHNSON 2	02-Apr-2014	<0.0030	2.24	2.53	<0.0010	<0.0010	<0.00010	<0.00010	91.9	113	0.773	0.957	<0.0010

Station	Date Sampled	T. Tellurium	D. Thallium	T. Thallium	D. Tin	T. Tin	D. Titanium	T. Titanium	D. Tungsten	T. Tungsten	D. Uranium	T. Uranium	D. Vanadium	T. Vanadium	D. Zinc
NR-08-240	24-Oct-2011	<0.000060	<0.000010	<0.0000040	<0.00010	0.000056	<0.00050	0.00103	0.000494	0.000965	0.000362	0.000320	0.00010	0.000077	<0.0020
NR-08-240	16-Jan-2012	<0.000070	<0.00030	<0.000030	<0.0010	<0.00010	<0.0050	0.00167	<0.0010	0.00143	0.00042	0.00128	<0.0020	0.00053	<0.020
NR-08-240	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	<0.00050	0.00061	0.00073	0.00123	0.000027	0.000042	<0.00020	<0.00020	<0.0020
NR-08-240	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
NR-09-367	24-Oct-2011	<0.000060	<0.000010	<0.0000040	<0.00010	0.000072	0.00071	<0.00060	0.000415	0.000547	0.000556	0.000510	<0.00010	0.000078	<0.0020
NR-09-367	16-Jan-2012	<0.000070	<0.00030	<0.000030	<0.0010	0.00189	<0.0050	<0.00050	<0.0010	0.0113	0.00055	0.00204	<0.0020	0.00446	<0.020
NR-09-367	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	0.00067	0.00071	0.00032	0.00039	0.000496	0.000523	<0.00020	0.00027	<0.0020
NR-09-367	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
NH-09-428	24-Oct-2011	<0.000060	<0.000010	0.0000102	<0.00010	<0.000040	<0.00050	0.00539	0.00271	0.00605	0.0000393	0.000200	<0.00010	0.00139	<0.0020
NR-09-428	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	0.00052	0.00261	0.00193	0.00503	0.000144	0.000178	<0.00020	0.00037	0.0038
NR-09-428	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
NH-10-12	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	0.00075	0.00178	0.00053	0.00059	0.000160	0.000161	<0.00020	<0.00020	<0.0020
RR-09-213A	24-Oct-2011	<0.000060	<0.000010	0.0000305	<0.00010	0.000110	<0.00050	0.00481	0.000533	0.000419	0.000570	0.000579	<0.00010	0.000499	0.0035
RR-09-213A	25-Apr-2012	<0.000070	<0.000030	0.000042	<0.00010	0.00035	0.00059	0.0138	0.00020	0.00036	0.000497	0.000583	<0.00020	0.00099	0.0097
RR-09-213A	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0054	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	0.0067
RR-09-214	24-Oct-2011	<0.000060	<0.000010	<0.0000040	<0.00010	0.000508	<0.00050	0.00110	0.0449	0.0549	0.00142	0.00129	<0.00010	0.000666	<0.0020
RR-09-214	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	0.00037	<0.00050	0.00126	0.0491	0.0544	0.00136	0.00132	<0.00020	0.00042	<0.0020
BH-10-04	24-Oct-2011	<0.000060	<0.000010	0.0000113	<0.00010	0.000171	0.00061	0.00624	0.000111	0.000153	0.00960	0.00878	<0.00010	0.000454	0.0039
BH-10-04	16-Jan-2012	<0.000070	<0.00030	<0.000030	<0.0010	0.00013	<0.0050	0.00388	<0.0010	0.00020	0.00888	0.00902	<0.0020	<0.00020	<0.020
BH-10-04	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	0.00072	0.00508	<0.00010	<0.00010	0.0103	0.00970	<0.00020	0.00039	<0.0020
BH-10-04	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0048	<0.010	<0.010	0.0102	0.0110	<0.0010	<0.0010	<0.0030
BH-10-05	24-Oct-2011	0.000080	<0.000010	0.000352	<0.00010	0.000316	0.00273	0.566	0.00145	0.00125	0.0186	0.0193	0.00075	0.0646	<0.0020
BH-10-05	16-Jan-2012	<0.000070	<0.00030	0.000132	<0.0010	0.00021	<0.0050	0.232	<0.0010	0.00103	0.0145	0.0145	<0.0020	0.0212	<0.020
BH-10-05	25-Apr-2012	<0.000070	<0.000030	0.000044	<0.00010	0.00015	0.00275	0.0708	0.00049	0.00066	0.0152	0.0143	0.00054	0.00599	<0.0020
BH-10-05	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	0.0031	0.163	<0.010	<0.010	0.0162	0.0170	<0.0010	0.0149	<0.0030
BH-10-05	06-Jun-2013	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	0.0029	0.482	<0.010	<0.010	0.0161	0.0178	<0.0010	0.0481	<0.0030
BH-10-05	22-Oct-2013	<0.00060	<0.000050	0.000103	<0.00010	0.00043	<0.00030	0.162			0.0141	0.0166	0.00042	0.0194	<0.0050
BH-10-7A	24-Oct-2011	<0.000060	<0.000010	0.0000071	<0.00010	0.000544	0.00060	0.0415	0.000142	0.000176	0.00139	0.00138	<0.00010	0.00153	<0.0020
BH-10-7A	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	0.00037	0.00075	0.100	0.00033	0.00033	0.00155	0.00153	<0.00020	0.00382	<0.0020
BH-10-7A	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0319	<0.010	<0.010	<0.0050	<0.0050	<0.0010	0.0016	<0.0030
BH-10-7A	06-Jun-2013	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0030	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
BH-10-7A	23-Oct-2013	<0.00060	<0.000050	<0.000050	<0.00010	0.00013	<0.00030	0.0827			0.00150	0.00169	<0.00010	0.00380	<0.0050
BH-10-11A	24-Oct-2011	0.000661	<0.000010	0.0158	<0.00010	0.000305	<0.00050	1.01	0.000068	0.000647	0.00237	0.128	0.00069	0.416	<0.0020
BH-10-11A	25-Apr-2012	0.000096	<0.000030	0.000522	<0.00010	0.00077	0.00067	0.724	<0.00010	0.00022	0.00107	0.00432	0.00046	0.0827	<0.0020
BH-10-11A	10-Jul-2012	<0.0010	<0.00030	0.00130	<0.0010	<0.0010	<0.0020	1.21	<0.010	<0.010	<0.0050	0.0140	0.0010	0.165	<0.0030
BH-10-12A	24-Oct-2011	<0.000060	<0.000010	<0.0000040	<0.00010	0.000224	0.00052	0.00130	0.000431	0.000598	0.000526	0.000583	<0.00010	0.000096	<0.0020
BH-10-12A	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0030	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
BH-10-14	24-Oct-2011	<0.000060	<0.000010	<0.0000040	<0.00010	<0.000040	<0.00050	<0.00060	0.000152	0.000136	0.000740	0.000697	<0.00010	0.000035	<0.0020
BH-10-14	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	0.00052	0.00110	<0.00010	<0.00010	0.000719	0.000741	<0.00020	<0.00020	<0.0020
BH-10-14	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
BH-10-20	24-Oct-2011	<0.000060	0.000019	0.0000979	<0.00010	0.000177	<0.00050	0.0305	0.000659	0.000615	0.000605	0.00117	<0.00010	0.00308	0.0051
BH-10-20	16-Jan-2012	<0.000070	<0.00030	<0.000030	<0.0010	0.00010	<0.0050	0.00137	<0.0010	0.00163	0.00031	0.00101	<0.0020	0.00073	<0.020
BH-10-20	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
TRIP BLANK	24-Oct-2011	<0.000060	<0.000010	<0.0000040	<0.00010	<0.000040	<0.00050	<0.00060	<0.000010	<0.000040	<0.0000030	<0.0000030	<0.00010	<0.000030	<0.0020
TRIP BLANK	16-Jan-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010	<0.000010	<0.000010	<0.00020	<0.00020	<0.0020
TRIP BLANK	25-Apr-2012	<0.000070	<0.000030	<0.000030	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010	<0.000010	<0.000010	<0.00020	<0.00020	<0.0020
TRIP BLANK	10-Jul-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
TRIP BLANK	01-Nov-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
TRIP BLANK	06-Jun-2013	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
TRIP BLANK	02-Apr-2014	<0.0010	<0.00030	<0.00030	0.0012	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	0.0104
BH11-44A	01-Nov-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.287	<0.010	<0.010	<0.0050	0.0051	<0.0010	0.0181	<0.0030
BH11-44A	06-Jun-2013	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0032	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
BH11-44A	23-Oct-2013	<0.00060	<0.000050	<0.000050	0.00038	0.00039	0.00381	0.00200			0.00158	0.00166	0.00017	0.00028	<0.0050
BH11-41	01-Nov-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.468	0.068	0.086	<0.0050	<0.0050	<0.0010	0.0315	0.0126
BH11-13A	01-Nov-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0201	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
BH11-51A	01-Nov-2012	<0.0010	<0.0030	0.00093	<0.010	<0.0010	<0.020	2.53	<0.10	0.018	<0.050	0.0061	<0.010	0.190	<0.030
BH11-51A	06-Jun-2013	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.255	<0.010	<0.010	<0.0050	<0.0050	<0.0010	0.0124	<0.0030
BH11-51A	21-Oct-2013	<0.00060	<0.000050	<0.000050	<0.00010	0.00011	<0.00030	0.0199			0.00105	0.00113	<0.00010	0.00132	<0.0050
BH12-20	01-Nov-2012	<0.0010	<0.00030	0.00049	<0.0010	<0.0010	<0.0020	0.136	0.040	0.043	<0.0050	<0.0050	<0.0010	0.0703	<0.0030
BH11-01B	06-Jun-2013	<0.010	<0.00030	0.0066	<0.0010	<0.010	0.0034	2.42	<0.010	<0.10	0.0214	0.134	0.0012	0.794	<0.0030
BH11-01B	22-Oct-2013	<0.0060	<0.000050	0.00476	<0.00010	<0.0010	<0.00030	0.469			0.0157	0.110	0.00149	0.455	<0.0050
BH11-44B	06-Jun-2013	<0.010	<0.00030	0.0099	<0.0010	<0.010	<0.0020	3.57	<0.010	<0.10	0.0134	0.100	0.0021	1.03	<0.0030
BH11-44B	23-Oct-2013	<0.0030	<0.000050	0.00096	<0.00010	0.00139	<0.00030	1.08			0.0125	0.0184	0.00064	0.141	0.0058
BH11-49A	06-Jun-2013	<0.010	<0.00030	0.0143	<0.0010	<0.010	0.0071	0.938	<0.010	<0.10	0.0231	0.214	0.0014	1.43	<0.0030
BH11-49A	22-Oct-2013	<0.0030	<0.000050	<0.00025	<0.00010	0.00195	<0.00030	0.670			0.000821	0.00149	0.00070	0.325	<0.0050
BH11-49B	06-Jun-2013	<0.0010	<0.00030	<0.00030	0.0018	0.0038	0.0043	0.0172	0.015	0.017	0.0050	0.0051	0.0011	0.0026	0.0052
BH11-49B	22-Oct-2013	<0.0030	<0.00025	0.00820	<0.00050	0.00094	<0.0015	0.291			0.0168	0.131	0.00089	1.01	<0.025
BH11-51B	06-Jun-2013	<0.010	<0.00030	0.0072	<0.0010	<0.010	0.0031	2.64	0.016	<0.10	0.0145	0.091	0.0015	0.826	<0.0030
BH11-51B	22-Oct-2013	<0.0030	<0.000050	0.00713	<0.00010	0.00109	<0.00030	0.756			0.0185	0.0850	0.00191	0.671	<0.0050
BH12-08	06-Jun-2013	<0.0010	<0.00030	0.00099	<0.0010	<0.0010	<0.0020	4.45	<0.010	0.016	<0.0050	0.0147	<0.0010	0.398	<0.0030
BH12-08	23-Oct-2013	<0.0030	<0.000050	0.00056	<0.00010	0.00114	<0.00030	2.60			0.00355	0.0104	0.00018	0.211	<0.0050
BH11-01A	22-Oct-2013	<0.00060	<0.000050	0.000091	<0.00010	0.00076	0.00054	0.377			0.000645	0.00105	0.00041	0.0178	<0.0050
P16	22-Oct-2013	<0.00060	<0.000050	<0.000050	<0.00010	<0.00010	<0.00030	<0.00030			0.000374	0.000429	<0.00010	0.00020	0.0079
3880	21-Oct-2013	<0.00060	<0.000050	<0.000050	<0.00010	<0.00010	<0.00030	<0.00030			0.00443	0.00471	0.00013	0.00049	0.0226
3221	21-Oct-2013	<0.00060	<0.000050	<0.000050	<0.00010	<0.00010	<0.00030	<0.00030			0.00382	0.00408	<0.00010	0.00025	<0.0050
3226	21-Oct-2013	<0.00060	<0.000050	<0.000050	<0.00010	<0.00010	<0.00030	<0.00030			0.00183	0.00213	<0.00010	0.00019	<0.0050
3443-1	23-Oct-2014	<0.00060	<0.000050	<0.000050	<0.00010	<0.00010	<0.00030	0.00063			0.00203	0.00217	<0.00010	0.00015	0.0061
DUP	06-Jun-2013	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.743	<0.010	<0.010	<0.0050	<0.0050	<0.0010	0.0266	<0.0030
DUP	01-Nov-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	0.0066	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0030
BH11-27	01-Nov-2012	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	1.21	0.063	0.086	<0.0050	<0.0050	<0.0010	0.0554	<0.0030
JOHNSON 1	02-Apr-2014	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	0.0035
JOHNSON 2	02-Apr-2014	<0.0010	<0.00030	<0.00030	<0.0010	<0.0010	<0.0020	<0.0020	<0.010	<0.010	<0.0050	<0.0050	<0.0010	<0.0010	0.0034

Notes

T.: total

D.: dissolved

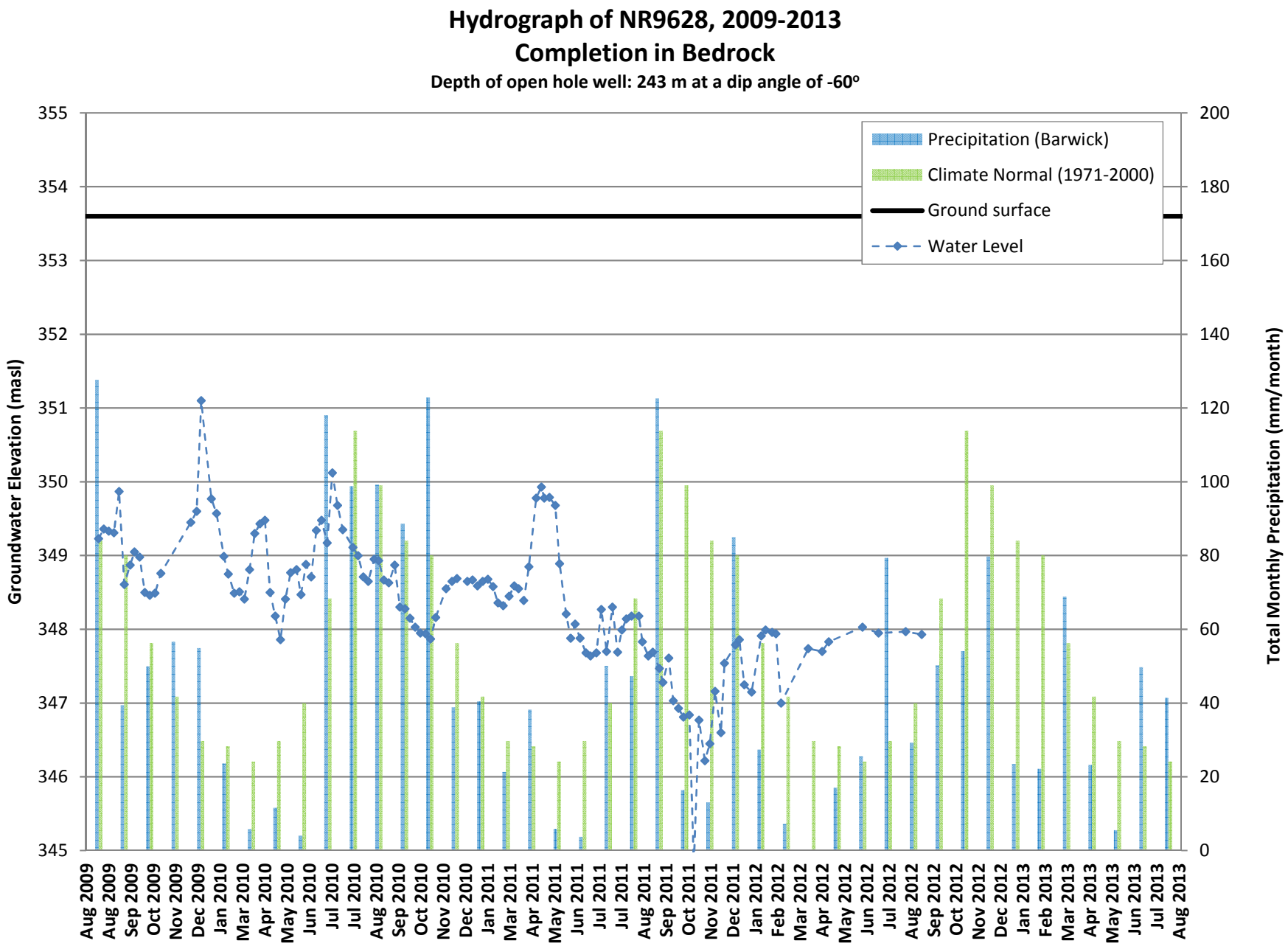
HISTORICAL GROUNDWATER QUALITY (2011 to 2013)- RAINY RIVER PROJECT

Station	Date Sampled	T. Zinc	D. Zirconium	T. Zirconium	D. Mercury	T. Mercury	Hardness	T. Phosphorous	Silca, Reactive	Bicarbonate Alk	Carbonate Alk	Hydroxide Alk
NR-08-240	24-Oct-2011	<0.0030	0.000043	<0.00020	<0.000020	<0.000010		0.0099	14.6	465	<5.0	<5.0
NR-08-240	16-Jan-2012	0.103	<0.0010	0.00031	<0.000010	<0.000010	395	0.0304	12.4	477	<5.0	<5.0
NR-08-240	25-Apr-2012	0.0282	<0.00010	<0.00010	<0.000010	<0.000010		0.0203	3.92	381	<5.0	<5.0
NR-08-240	10-Jul-2012	0.0194	<0.0010	<0.0010	<0.000010	<0.000010		0.0163	2.52			
NR-09-367	24-Oct-2011	<0.0030	0.000065	<0.00020	<0.000020	<0.000010		0.0099	24.6	477	<5.0	<5.0
NR-09-367	16-Jan-2012	0.0204	<0.0010	0.00038	<0.000010	<0.000010	398	0.0818	14.3	458	<5.0	<5.0
NR-09-367	25-Apr-2012	0.0027	<0.00010	0.00017	0.000028	<0.000010		0.0126	16.4	451	<5.0	<5.0
NR-09-367	10-Jul-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0102	15.8			
NH-09-428	24-Oct-2011	0.0374	<0.000020	<0.00020	<0.000020	<0.000010		0.0180	11.1	463	<5.0	<5.0
NR-09-428	25-Apr-2012	0.843	<0.00010	0.00019	<0.000010	<0.000010		0.0244	11.3	472	<5.0	<5.0
NR-09-428	10-Jul-2012	0.0907	<0.0010	<0.0010	<0.000010	<0.000010		0.0057	1.81			
NH-10-12	25-Apr-2012	0.0036	<0.00010	0.00010	<0.000010	<0.000010		0.0224	22.5	475	<5.0	<5.0
RR-09-213A	24-Oct-2011	0.0672	0.000063	0.00040	<0.000020	<0.000010		0.220	21.4	487	<5.0	<5.0
RR-09-213A	25-Apr-2012	0.0793	<0.00010	0.00037	<0.000010	<0.000010		0.124	16.6	486	<5.0	<5.0
RR-09-213A	10-Jul-2012	0.174	<0.0010	<0.0010	<0.000010	<0.000010		0.185	21.4			
RR-09-214	24-Oct-2011	<0.0030	0.000099	0.00031	<0.000020	<0.000010	0.0236	18.8	482	<5.0	<5.0	
RR-09-214	25-Apr-2012	<0.0020	0.00010	0.00021	<0.000010	0.000067		0.0143	12.5	480	<5.0	<5.0
BH-10-04	24-Oct-2011	0.0036	0.000135	0.00024	<0.000020	<0.000010		0.0386	25.5	500	<5.0	<5.0
BH-10-04	16-Jan-2012	0.0060	<0.0010	0.00029	<0.000010	<0.000010	383	0.0388	28.0	493	<5.0	<5.0
BH-10-04	25-Apr-2012	0.0031	<0.00010	0.00024	<0.000010	<0.000010		0.0446	26.9	505	<5.0	<5.0
BH-10-04	10-Jul-2012	0.0046	<0.0010	<0.0010	<0.000010	<0.000010		0.0408	26.2			
BH-10-05	24-Oct-2011	0.0841	0.000195	0.00516	<0.000020	<0.000010		0.410	26.9	562	<5.0	<5.0
BH-10-05	16-Jan-2012	0.0348	<0.0010	0.00205	<0.000010	<0.000010	690	0.442	23.8	594	<5.0	<5.0
BH-10-05	25-Apr-2012	0.0112	0.00017	0.00107	<0.000010	<0.000010		0.165	18.2	589	<5.0	<5.0
BH-10-05	10-Jul-2012	0.0243	<0.0010	0.0016	<0.000010	<0.000010		0.237	19.9			
BH-10-05	06-Jun-2013	0.0608	<0.0010	<0.010	<0.000010	<0.000010		0.367	20.8	463	<5.0	<5.0
BH-10-05	22-Oct-2013	0.0300	<0.0050	<0.0050	<0.00010	<0.00010	557	0.258	22.4	608	<5.0	<5.0
BH-10-7A	24-Oct-2011	0.0041	<0.000020	0.00029	<0.000020	<0.000010		0.0898	21.3	353	<5.0	<5.0
BH-10-7A	25-Apr-2012	0.0135	<0.00010	0.00040	<0.000010	<0.000010		0.114	20.4	335	<5.0	<5.0
BH-10-7A	10-Jul-2012	0.0081	<0.0010	<0.0010	<0.000010	<0.000010		0.308	24.0			
BH-10-7A	06-Jun-2013	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0291	21.0	278	<5.0	<5.0
BH-10-7A	23-Oct-2013	0.0089	<0.0050	<0.0050	<0.00010	<0.00010	279	0.183	20.1	360	<5.0	<5.0
BH-10-11A	24-Oct-2011	4.35	0.000052	0.0152	<0.000020	<0.000010		52.8	18.0	541	<5.0	<5.0
BH-10-11A	25-Apr-2012	0.160	<0.00010	0.00376	<0.000010	<0.000010		0.214	17.3	541	<5.0	<5.0
BH-10-11A	10-Jul-2012	0.371	<0.0010	0.0055	<0.000010	<0.000010		23.7	13.8			
BH-10-12A	24-Oct-2011	<0.0030	0.000054	<0.00020	<0.000020	<0.000010		0.0735	24.8	496	<5.0	<5.0
BH-10-12A	10-Jul-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0594	24.0			
BH-10-14	24-Oct-2011	<0.0030	0.000174	0.00032	<0.000020	<0.000010		0.0082	20.7	523	<5.0	<5.0
BH-10-14	25-Apr-2012	0.0024	<0.00010	0.00016	<0.000010	0.000048		0.0120	16.0	505	<5.0	<5.0
BH-10-14	10-Jul-2012	0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0137	21.3			
BH-10-20	24-Oct-2011	0.142	0.000050	0.00138	<0.000020	<0.000010		0.397	21.4	488	<5.0	<5.0
BH-10-20	16-Jan-2012	0.0931	<0.0010	0.00021	<0.000010	<0.000010	396	0.0493	12.7	471	<5.0	<5.0
BH-10-20	10-Jul-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0099	19.9			
TRIP BLANK	24-Oct-2011	<0.0030	<0.000020	<0.00020	<0.000020	<0.000010		<0.0050	0.0168	<5.0	<5.0	<5.0
TRIP BLANK	16-Jan-2012	<0.0020	<0.00010	<0.00010	<0.000010	<0.000010		<0.0050	0.0067	<5.0	<5.0	<5.0
TRIP BLANK	25-Apr-2012	<0.0020	<0.00010	<0.00010	<0.000010	<0.000010		<0.0050	<0.0050	<5.0	<5.0	<5.0
TRIP BLANK	10-Jul-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		<0.0050	<0.0050			
TRIP BLANK	01-Nov-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		<0.0050	0.0079	<5.0	<5.0	<5.0
TRIP BLANK	06-Jun-2013	<0.0030	<0.0010	0.0016	<0.000010	<0.000010		<0.0050	<0.0050	<5.0	<5.0	<5.0
TRIP BLANK	02-Apr-2014	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		<0.0030	<0.0050	<10	<10	<10
BH11-44A	01-Nov-2012	0.0521	<0.0010	0.0035	<0.000010	<0.000010		1.06	21.4	342	<5.0	<5.0
BH11-44A	06-Jun-2013	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0104	21.4	357	<5.0	<5.0
BH11-44A	23-Oct-2013	<0.0050	<0.0050	<0.0050	<0.00010	<0.00010	330	0.0168	21.9	451	<5.0	<5.0
BH11-41	01-Nov-2012	0.174	<0.0010	0.0037	<0.000010	<0.000010		1.23	21.0	390	<5.0	<5.0
BH11-13A	01-Nov-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0227	21.6	348	<5.0	<5.0
BH11-51A	01-Nov-2012	0.512	<0.010	0.0090	<0.000010	<0.000010		18.6	18.1	469	<5.0	<5.0
BH11-51A	06-Jun-2013	0.0190	<0.0010	<0.010	<0.000010	<0.000010		0.277	18.6	462	<5.0	<5.0
BH11-51A	21-Oct-2013	<0.0050	<0.0050	<0.0050	<0.00010	<0.00010	470	0.0220	18.5	596	<5.0	<5.0
BH12-20	01-Nov-2012	1.25	<0.0010	0.0039	<0.000010	<0.000010		8.89	13.2	261	<5.0	<5.0
BH11-01B	06-Jun-2013	1.70	<0.0010	0.032	<0.000010	0.000016		13.5	20.2	351	<5.0	<5.0
BH11-01B	22-Oct-2013	1.28	<0.0050	<0.050	<0.00010	<0.00010	376	7.47	43.7	421	<5.0	<5.0
BH11-44B	06-Jun-2013	3.17	<0.0010	0.038	<0.000010	0.000078		36.2	17.8	458	<5.0	<5.0
BH11-44B	23-Oct-2013	0.294	<0.0050	<0.025	<0.00010	<0.00010	930	3.35	30.8	526	<5.0	<5.0
BH11-49A	06-Jun-2013	4.44	<0.0010	0.016	<0.000010	0.000019		40.8	17.1	519	<5.0	<5.0
BH11-49A	22-Oct-2013	0.088	<0.0050	<0.025	<0.00010	<0.00010	292	0.523	18.2	416	<5.0	<5.0
BH11-49B	06-Jun-2013	0.0093	<0.0010	<0.0010	<0.000010	<0.000010		0.0190	11.3	262	<5.0	<5.0
BH11-49B	22-Oct-2013	2.67	<0.025	<0.025	<0.00010	<0.00010	690	27.5	47.6	426	<5.0	<5.0
BH11-51B	06-Jun-2013	2.14	<0.0010	0.029	<0.000010	0.000031		15.2	17.0	407	<5.0	<5.0
BH11-51B	22-Oct-2013	1.94	<0.0050	<0.025	<0.00010	<0.00010	480	18.4	193	479	<5.0	<5.0
BH12-08	06-Jun-2013	0.484	<0.0010	0.0145	<0.000010	<0.000010		5.95	18.6	404	<5.0	<5.0
BH12-08	23-Oct-2013	0.234	<0.0050	<0.025	<0.00010	<0.00010	895	4.11	32.0	501	<5.0	<5.0
BH11-01A	22-Oct-2013	0.0243	<0.0050	<0.0050	<0.00010	<0.00010	200	0.157	23.3	310	<5.0	<5.0
P16	22-Oct-2013	0.0099	<0.0050	<0.0050	<0.00010	<0.00010	104	<0.0050	14.9	393	5.7	<5.0
3880	21-Oct-2013	0.0273	<0.0050	<0.0050	<0.00010	<0.00010	509	<0.0050	23.5	653	<5.0	<5.0
3221	21-Oct-2013	<0.0050	<0.0050	<0.0050	<0.00010	<0.00010	572	<0.0050	19.8	659	<5.0	<5.0
3226	21-Oct-2013	<0.0050	<0.0050	<0.0050	<0.00010	<0.00010	526	<0.0050	19.9	660	<5.0	<5.0
3443-1	23-Oct-2014	0.0087	<0.0050	<0.0050	<0.00010	<0.00010	419	0.0305	19.5	495	<5.0	<5.0
DUP	06-Jun-2013	0.0377	<0.0010	0.0037	<0.000010	<0.000010		0.877	23.9	238	<5.0	<5.0
DUP	01-Nov-2012	<0.0030	<0.0010	<0.0010	<0.000010	<0.000010		0.0351	21.9	351	<5.0	<5.0
BH11-27	01-Nov-2012	0.196	<0.0010	0.0151	<0.000010	<0.000010		1.38	20.8	346	<5.0	<5.0
JOHNSON 1	02-Apr-2014	0.0049	<0.0010	<0.0010	<0.000010	<0.000010		<0.0030	15.3	315	<10	<10
JOHNSON 2	02-Apr-2014	0.0044	<0.0010	<0.0010	<0.000010	<0.000010		<0.0030	15.8	313	<10	<10

Notes

T.: total

D.: dissolved


Hydrograph of NR9628, 2009-2013
Completion in Bedrock
Depth of open hole well: 243 m at a dip angle of -60º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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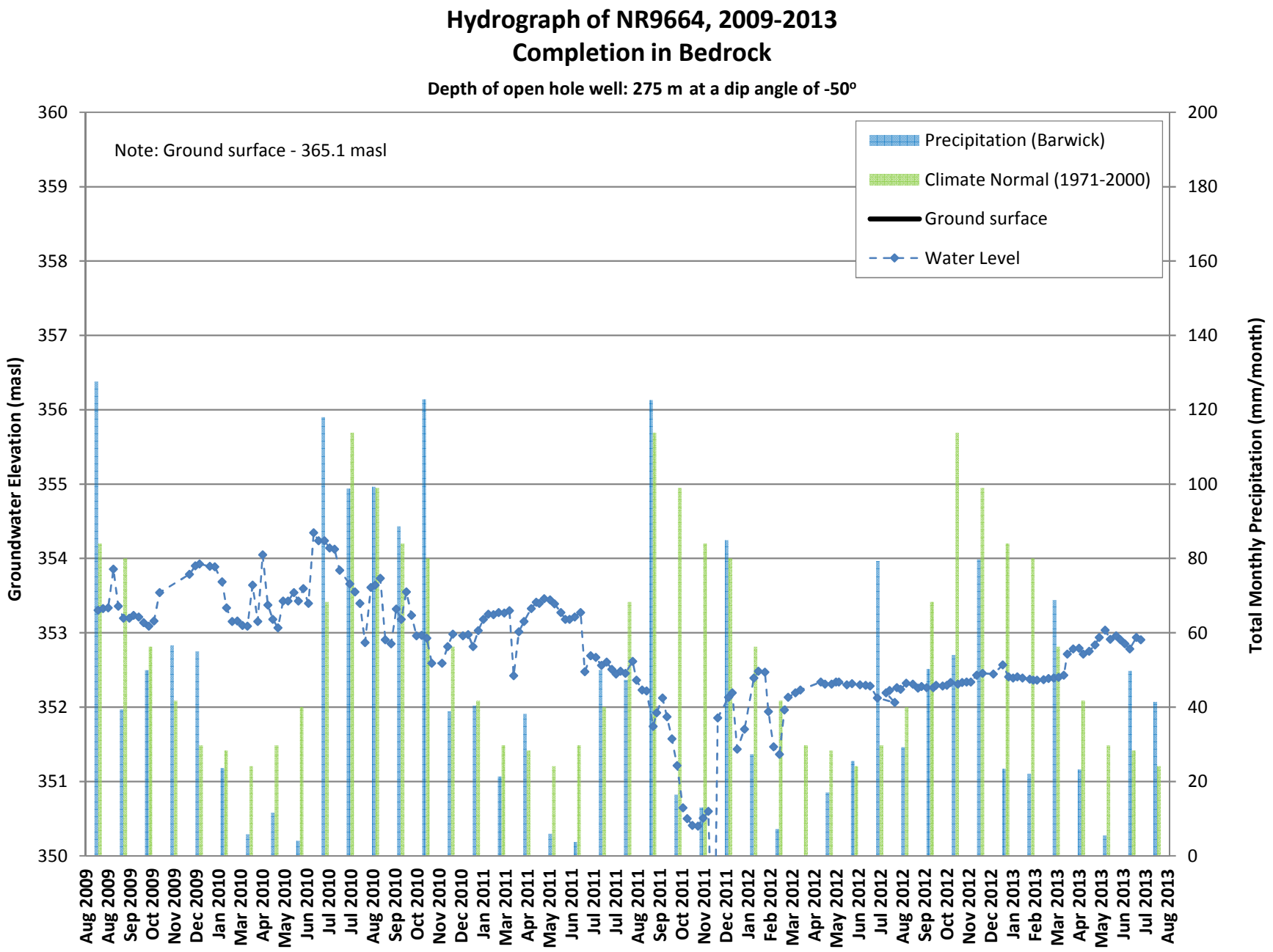
Hydrograph of NR9664, 2009-2013
Completion in Bedrock
Depth of open hole well: 275 m at a dip angle of -50°
Note: Ground surface - 365.1 masl
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
360
359
358
357
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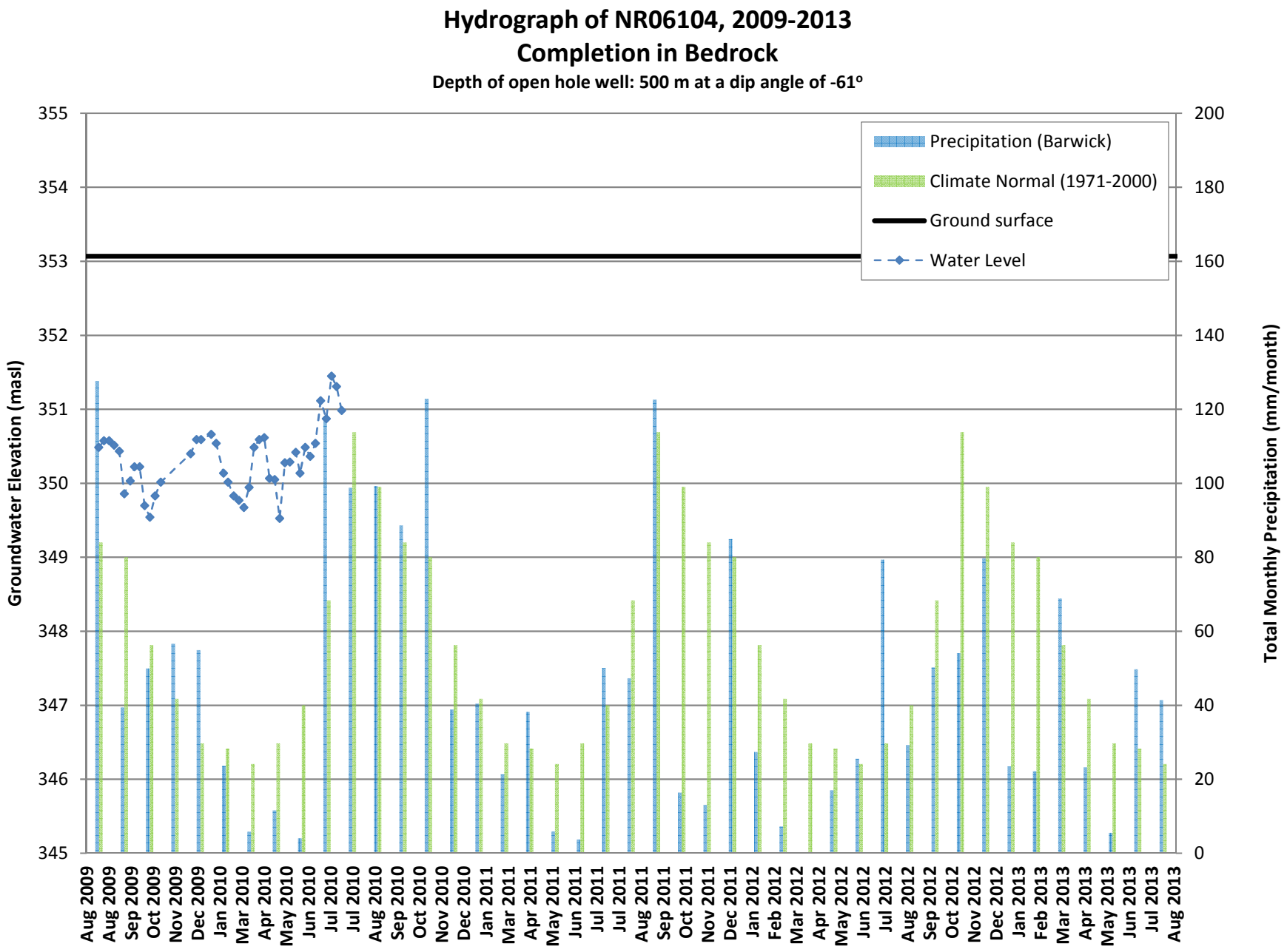
Hydrograph of NR06104, 2009-2013
Completion in Bedrock
Depth of open hole well: 500 m at a dip angle of -61º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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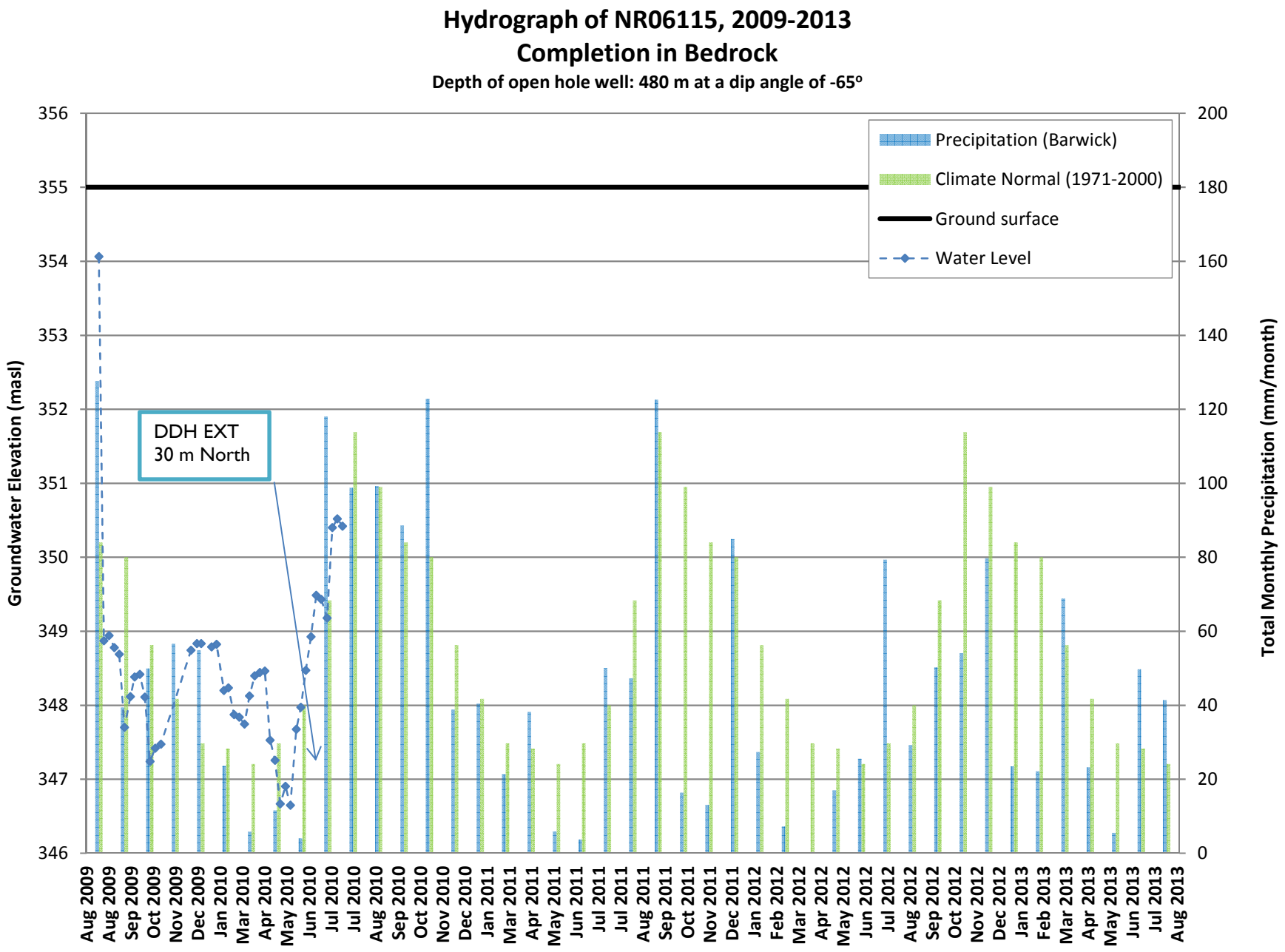
Hydrograph of NR06115, 2009-2013
Completion in Bedrock
Depth of open hole well: 480 m at a dip angle of -65º
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
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30 m North
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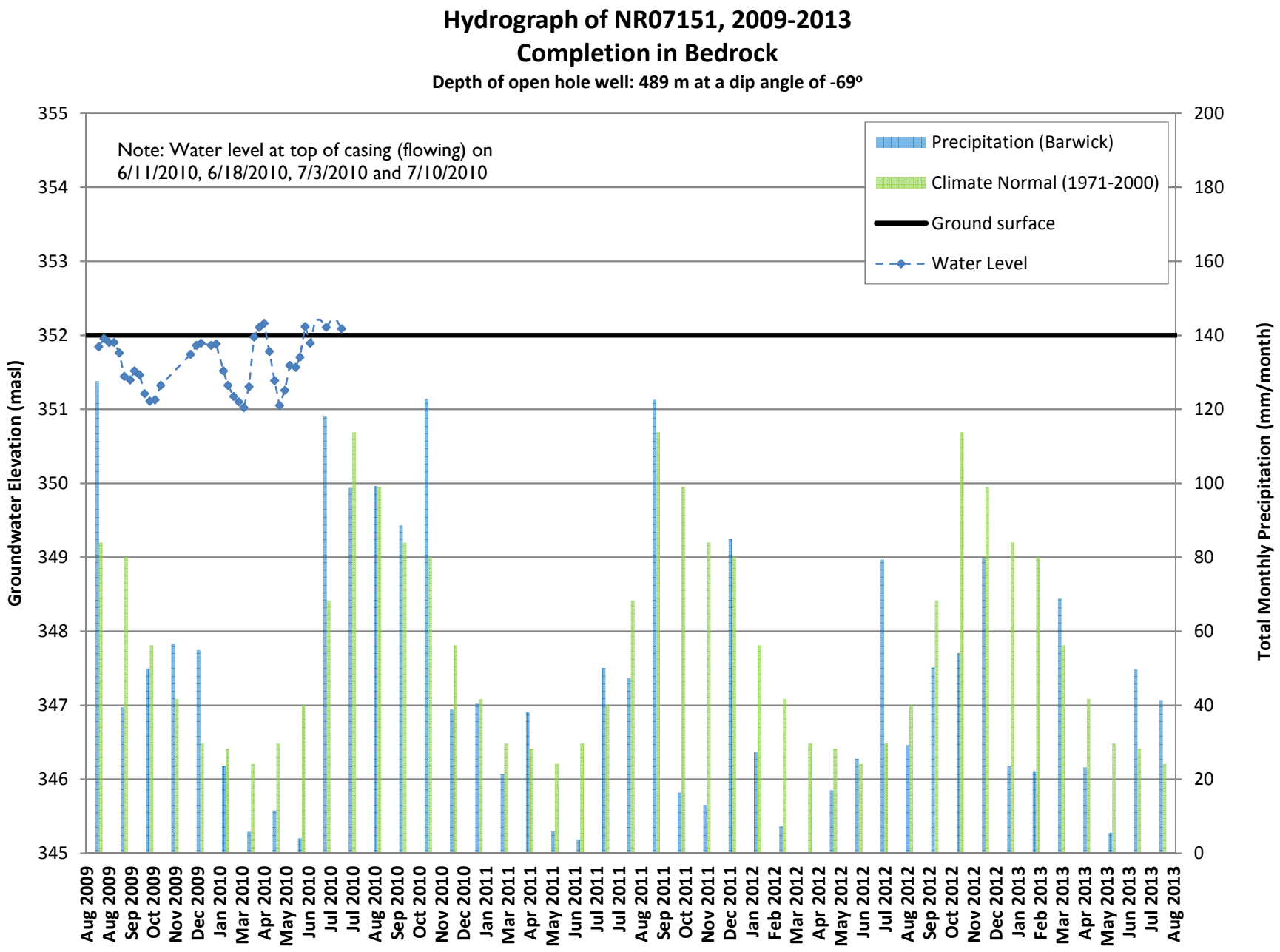
Hydrograph of NR07151, 2009-2013
Completion in Bedrock
Depth of open hole well: 489 m at a dip angle of -69º
Note: Water level at top of casing (flowing) on
6/11/2010, 6/18/2010, 7/3/2010 and 7/10/2010
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
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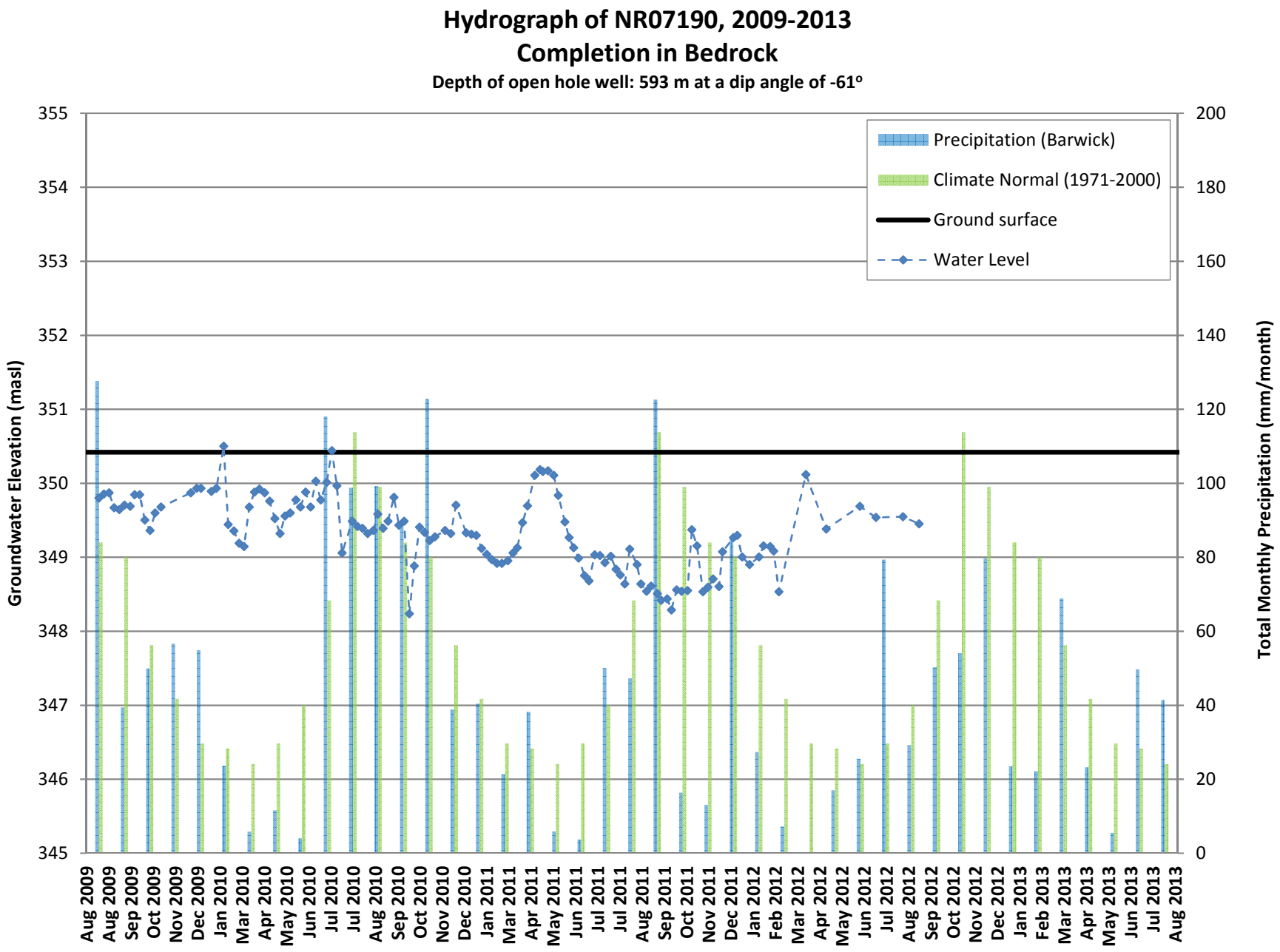
Hydrograph of NR07190, 2009-2013
Completion in Bedrock
Depth of open hole well: 593 m at a dip angle of -61º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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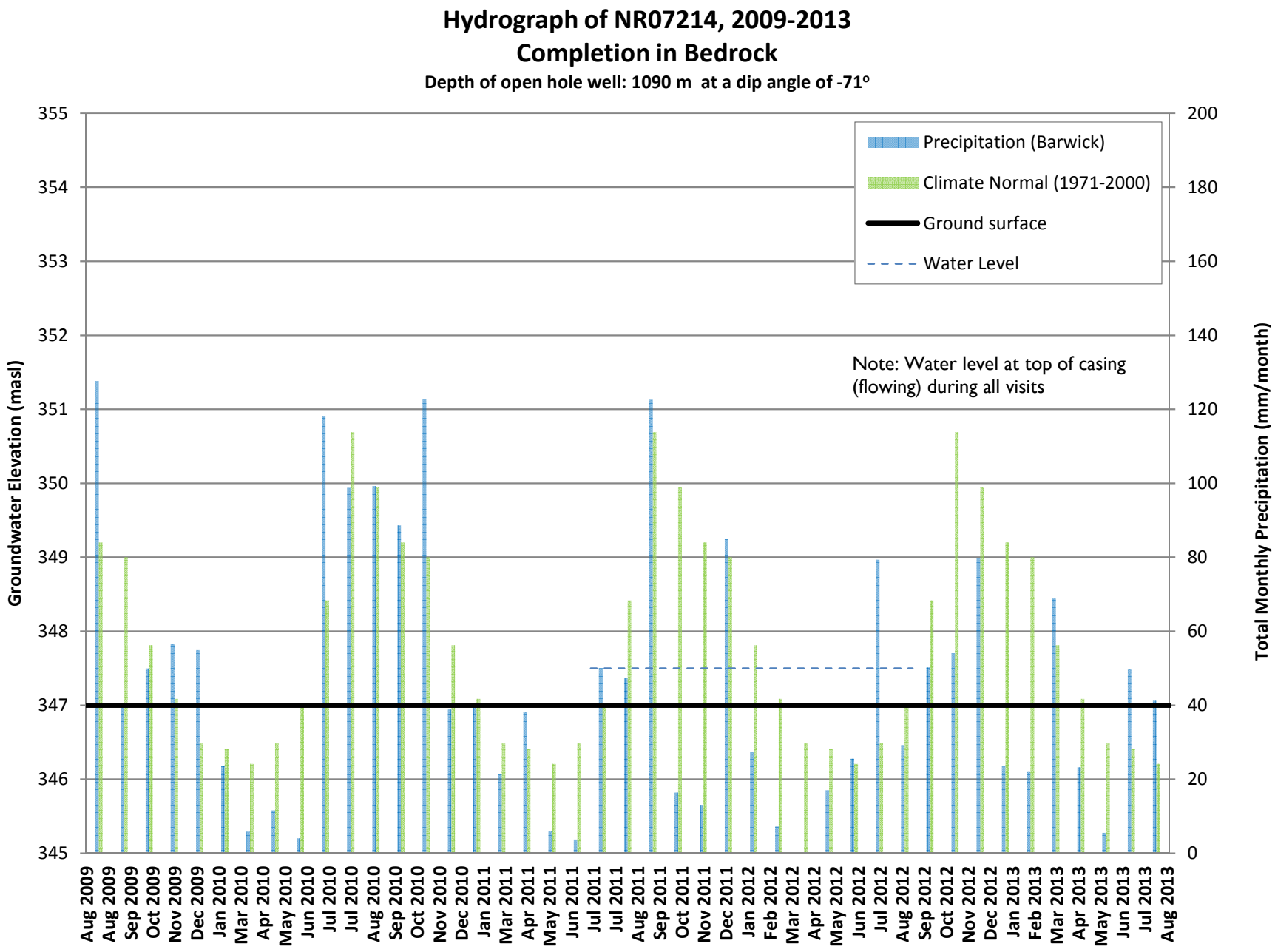
Hydrograph of NR07214, 2009-2013
Completion in Bedrock
Depth of open hole well: 1090 m at a dip angle of -71°
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Note: Water level at top of casing (flowing) during all visits
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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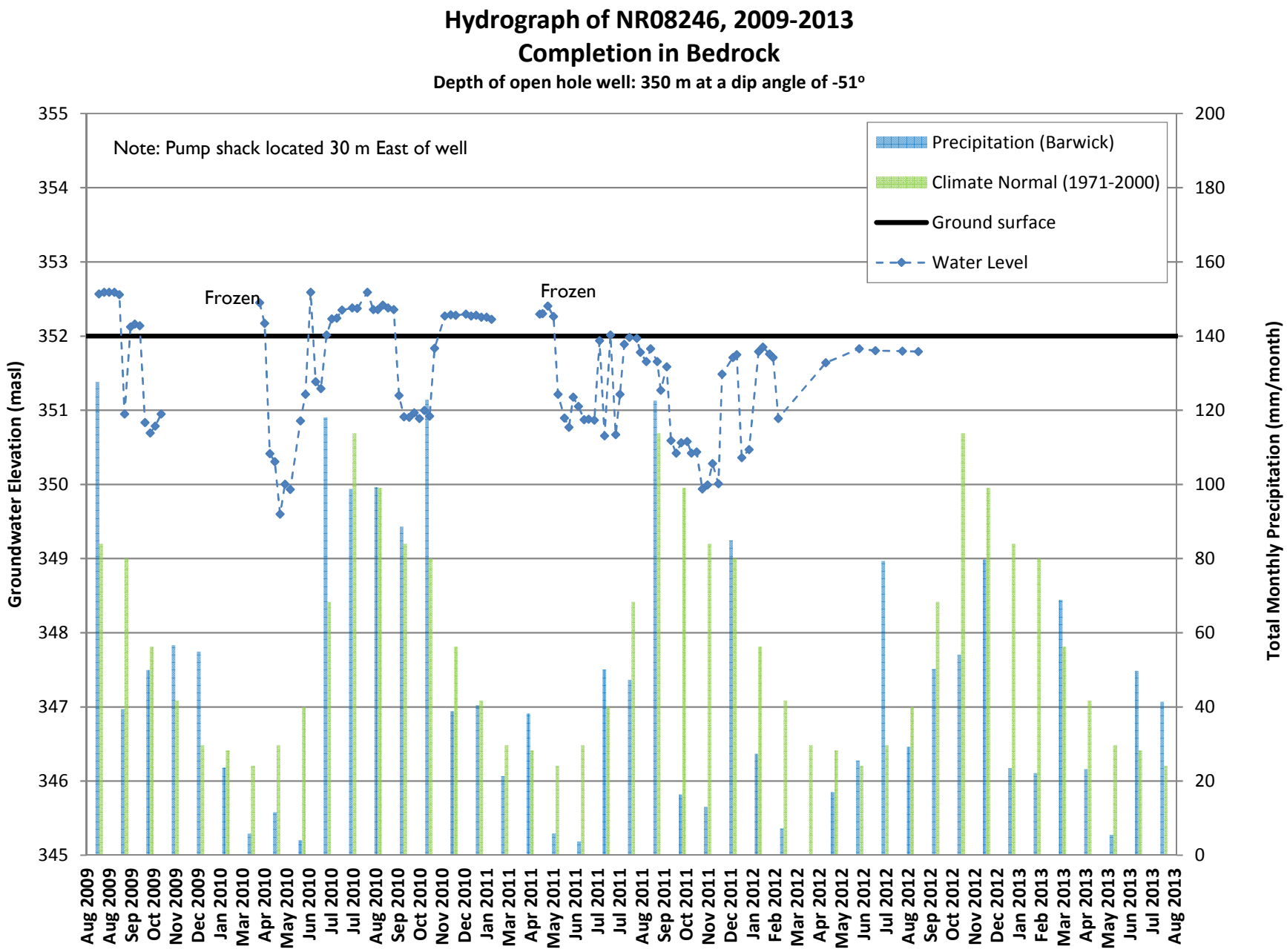
Hydrograph of NR08246, 2009-2013
Completion in Bedrock
Depth of open hole well: 350 m at a dip angle of -51º
Note: Pump shack located 30 m East of well
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Frozen
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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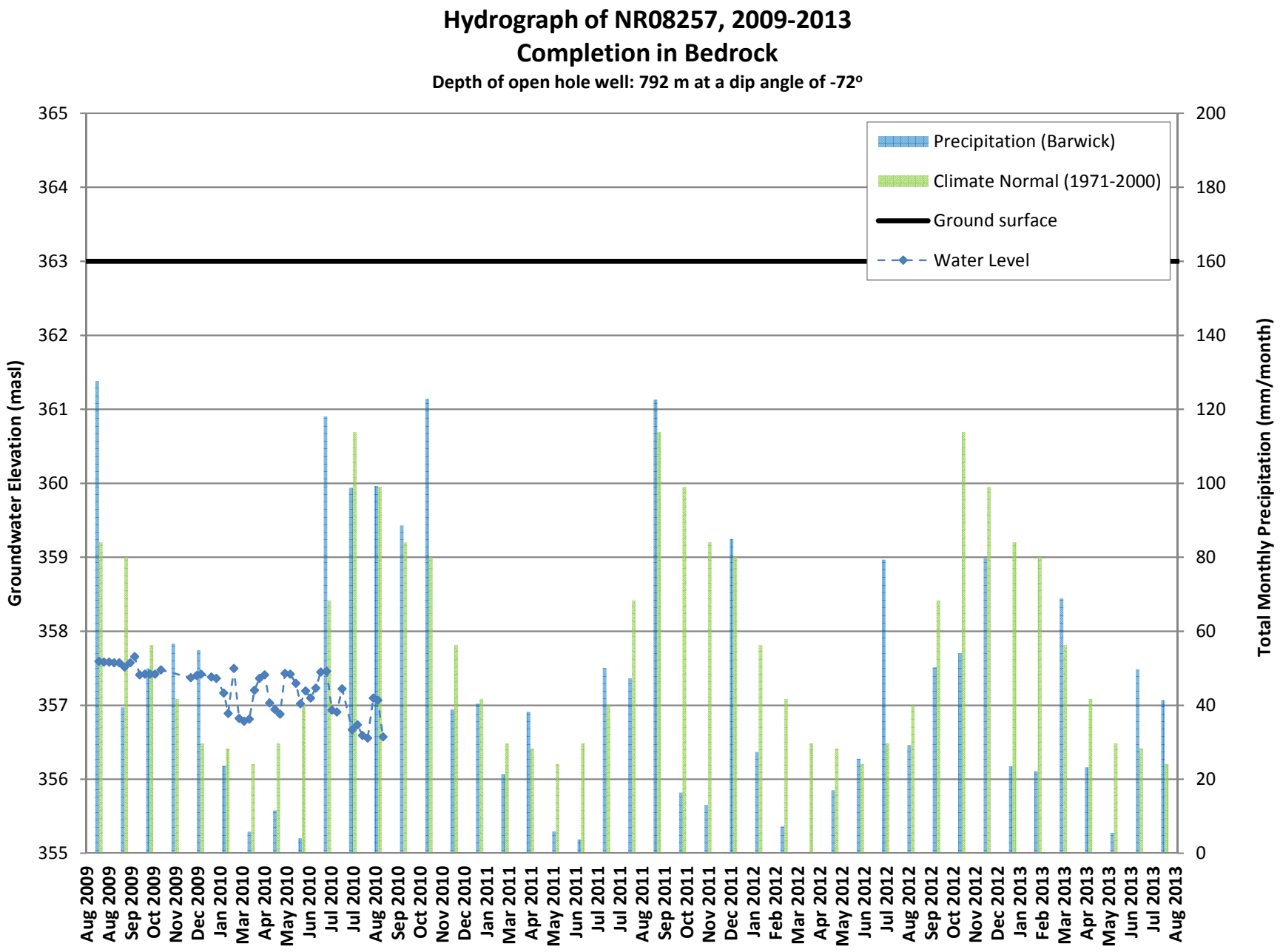
Hydrograph of NR08257, 2009-2013
Completion in Bedrock
Depth of open hole well: 792 m at a dip angle of -72º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
365
364
363
362
361
360
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358
357
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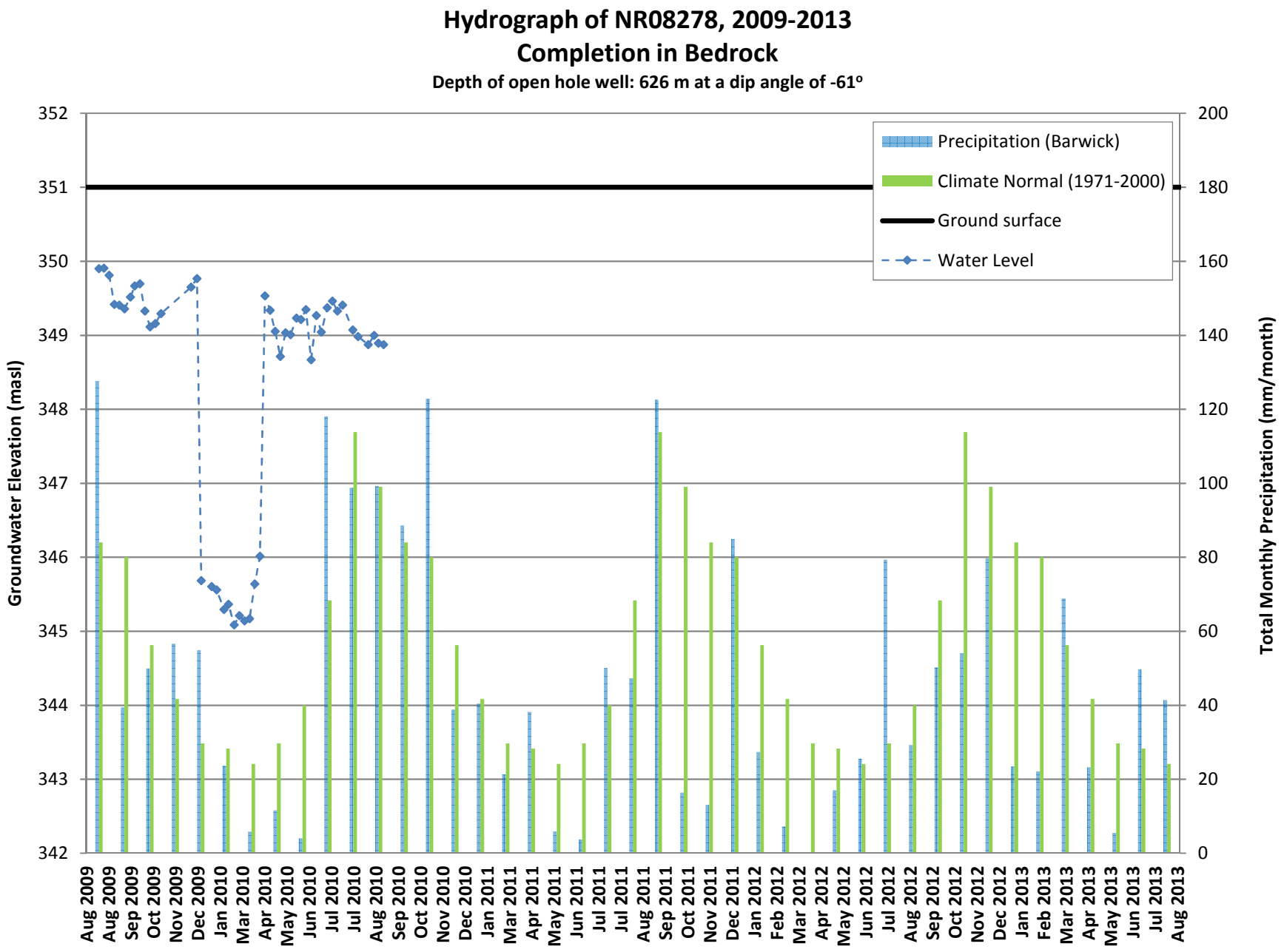
Hydrograph of NR08278, 2009-2013
Completion in Bedrock
Depth of open hole well: 626 m at a dip angle of -61º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
352
351
350
349
348
347
346
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344
343
342
200
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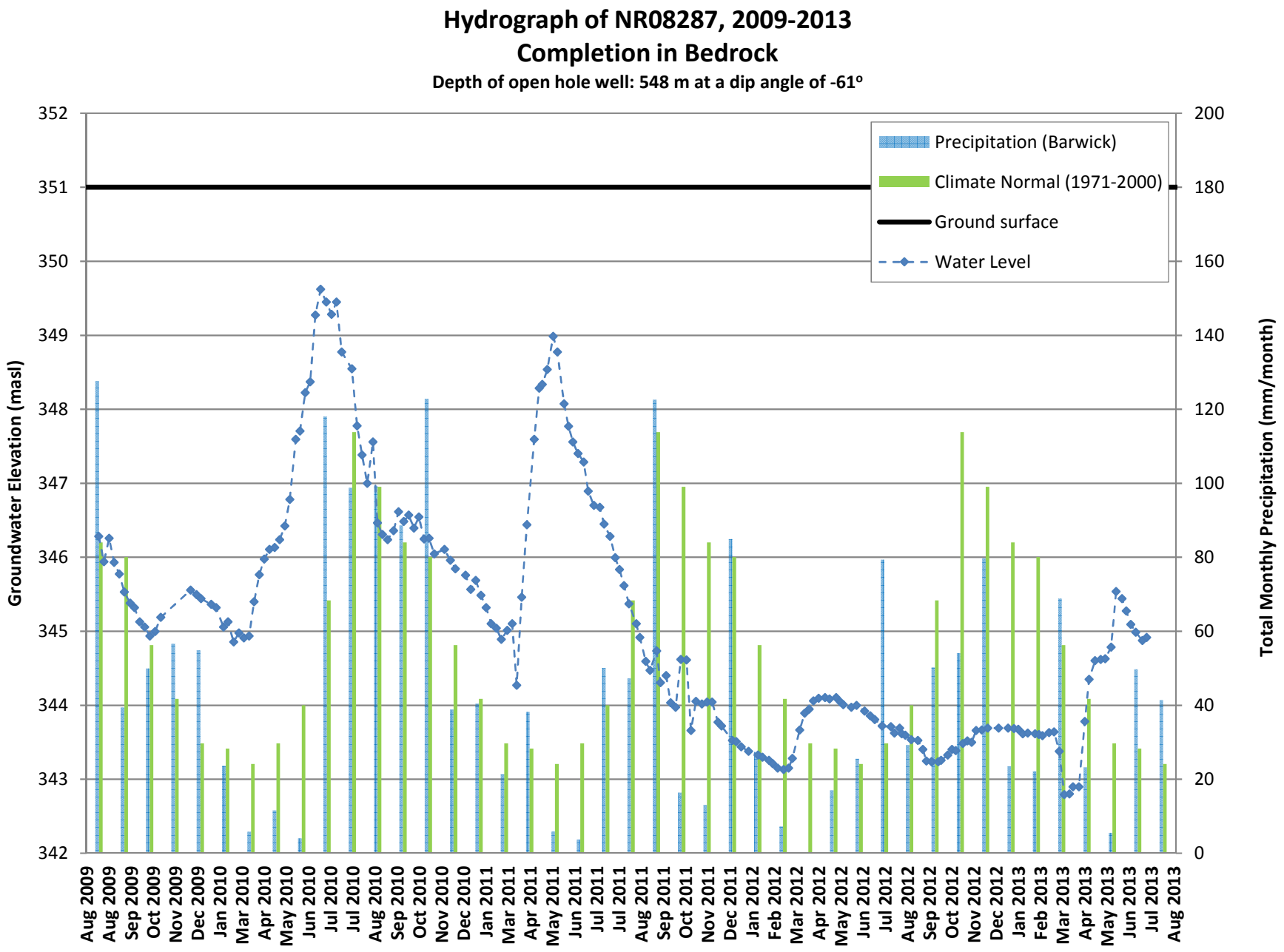
Hydrograph of NR08287, 2009-2013
Completion in Bedrock
Depth of open hole well: 548 m at a dip angle of -61º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
352
351
350
349
348
347
346
345
344
343
342
200
180
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140
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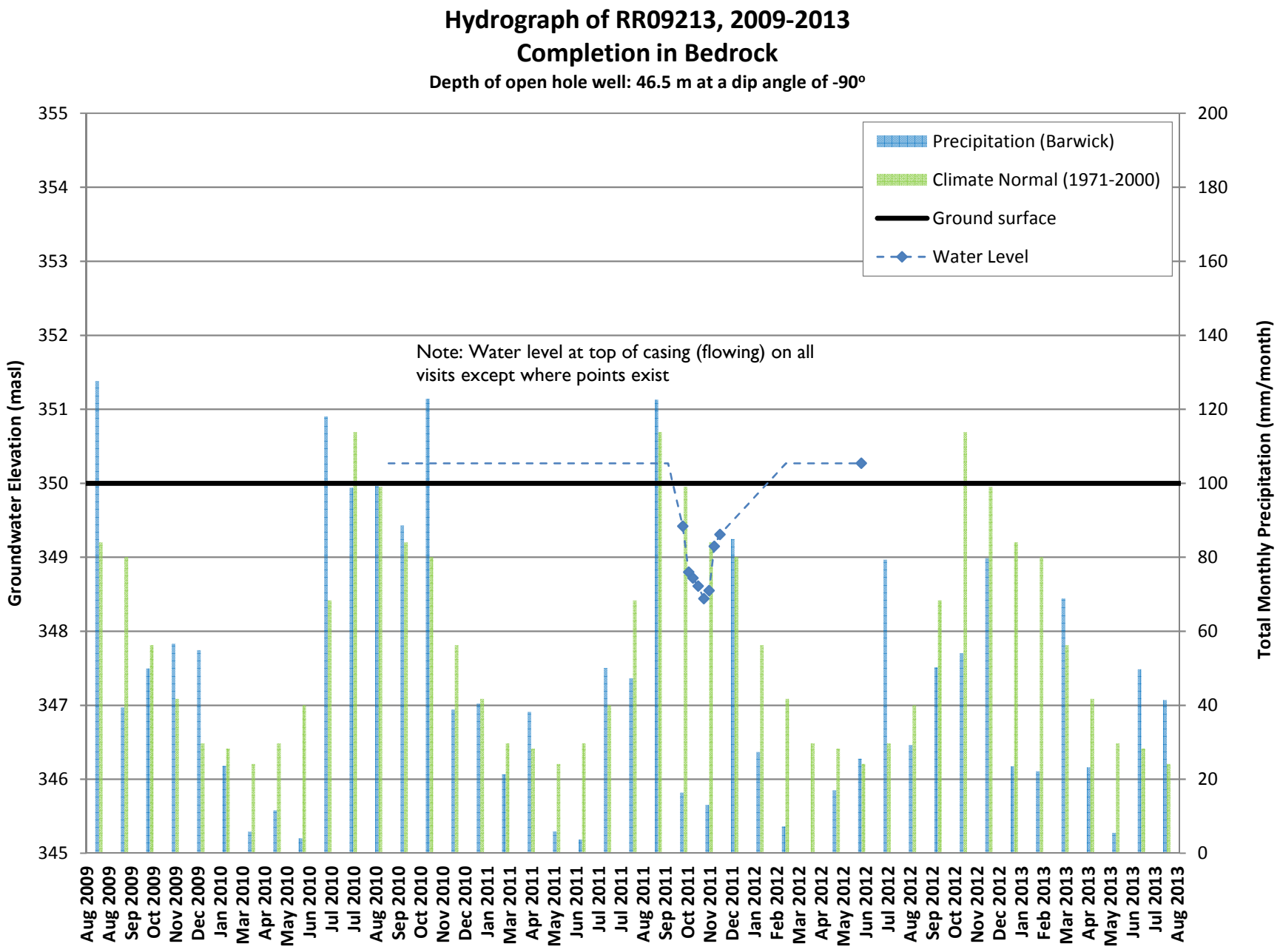
Hydrograph of RR09213, 2009-2013
Completion in Bedrock
Depth of open hole well: 46.5 m at a dip angle of -90°
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Note: Water level at top of casing (flowing) on all visits except where points exist
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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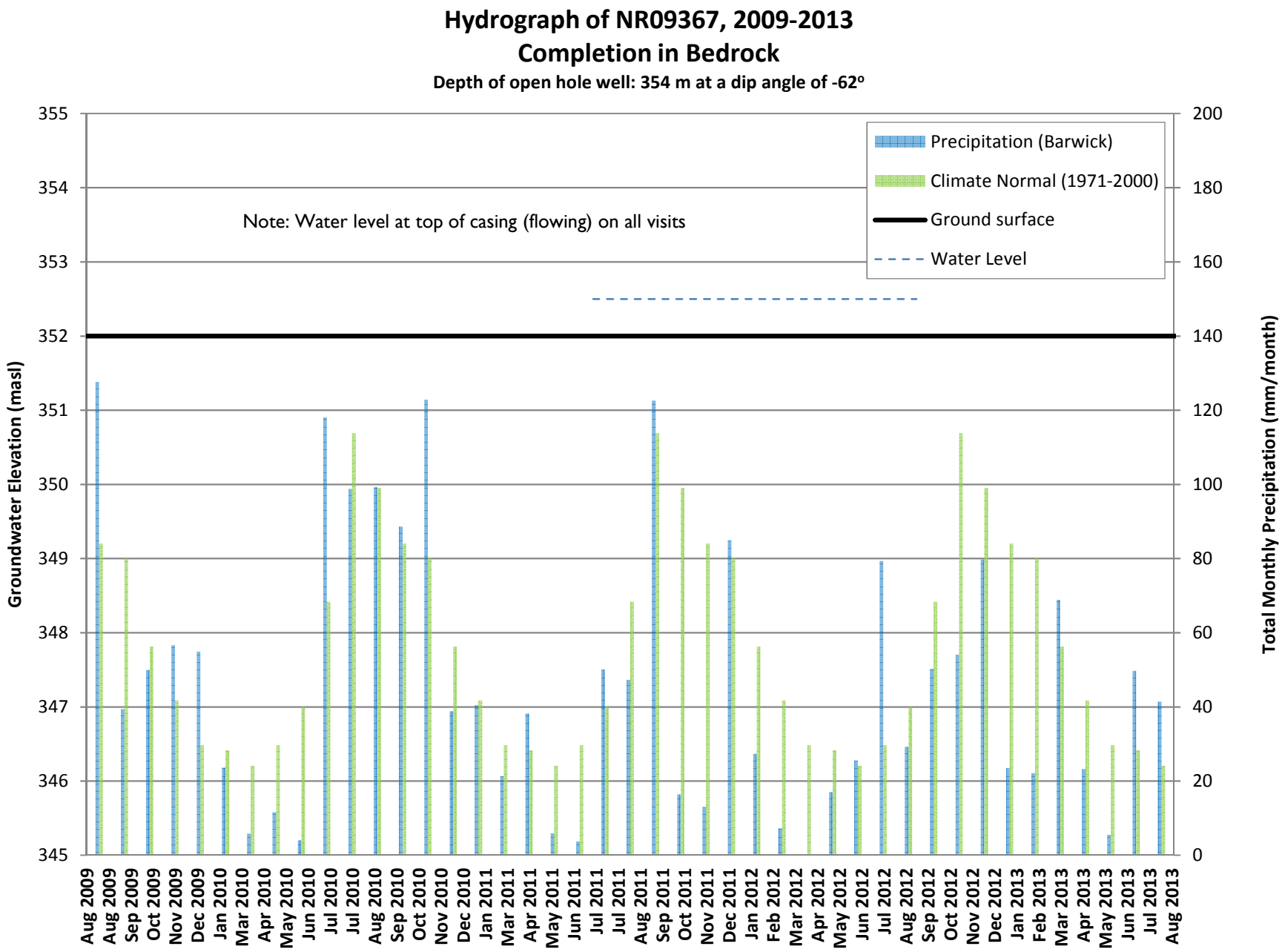
Hydrograph of NR09367, 2009-2013
Completion in Bedrock
Depth of open hole well: 354 m at a dip angle of -62º
Note: Water level at top of casing (flowing) on all visits
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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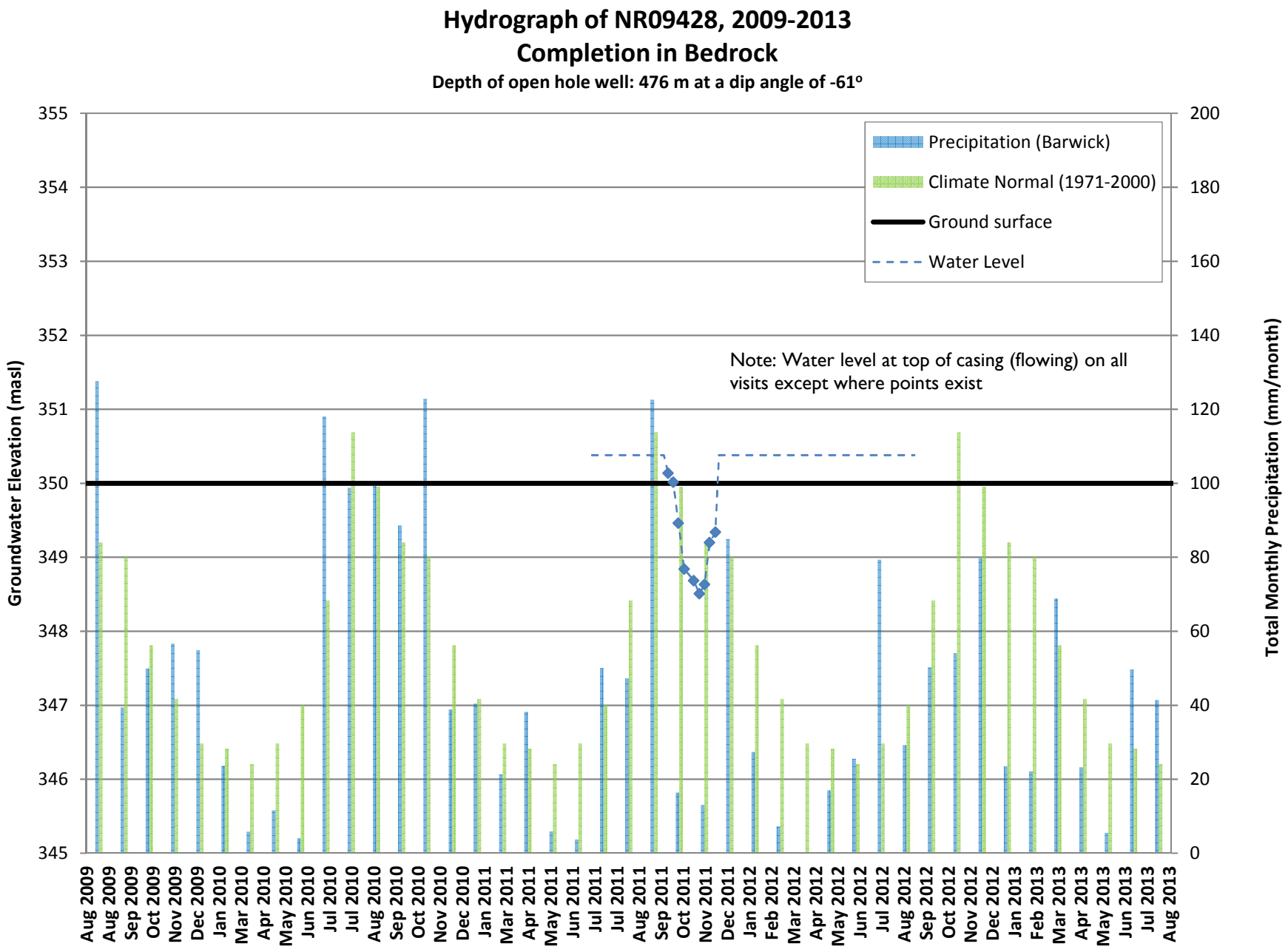
Hydrograph of NR09428, 2009-2013
Completion in Bedrock
Depth of open hole well: 476 m at a dip angle of -61º
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Note: Water level at top of casing (flowing) on all visits except where points exist
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
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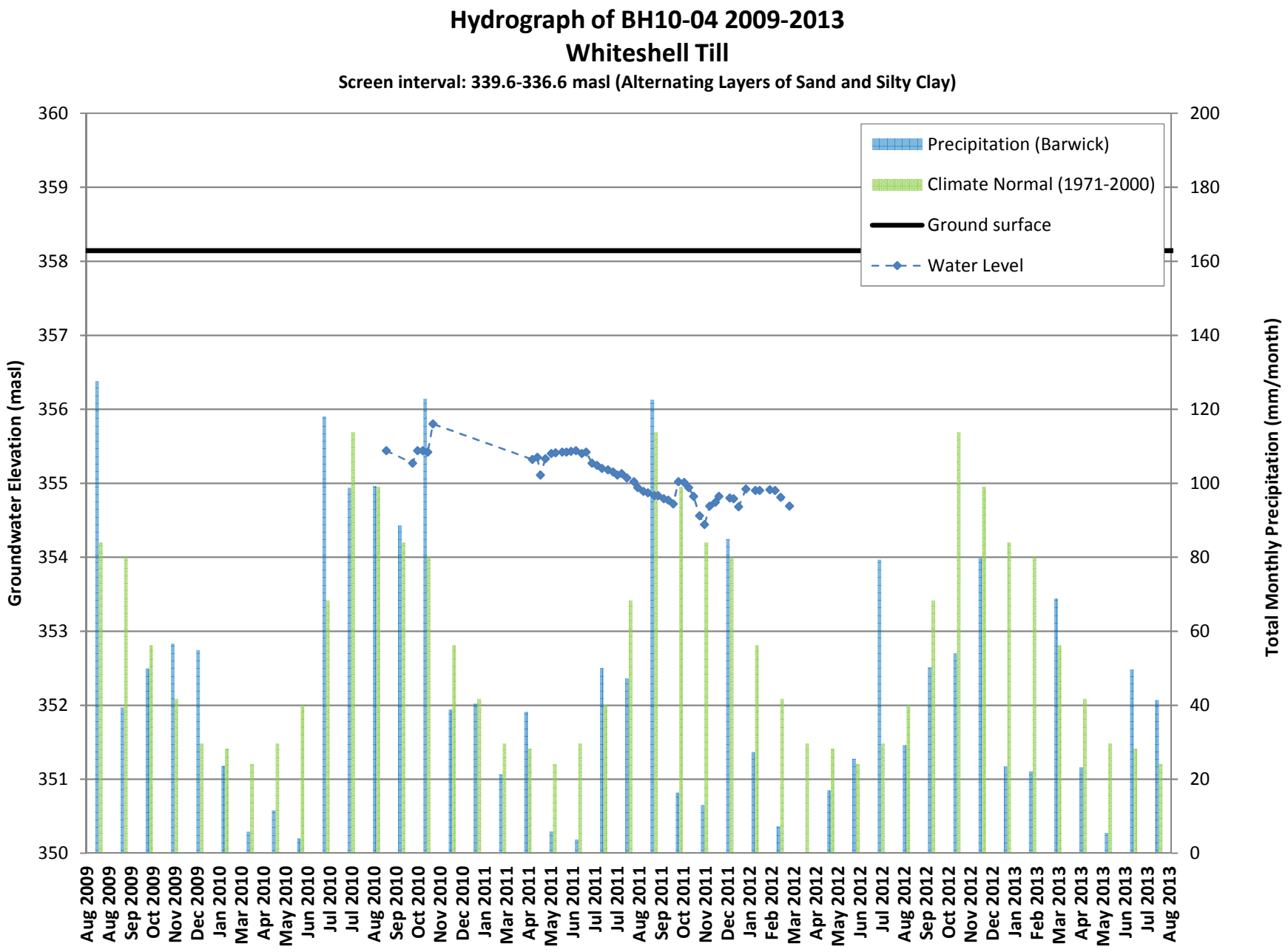
Hydrograph of BH10-04 2009-2013
Whiteshell Till
Screen interval: 339.6-336.6 masl (Alternating Layers of Sand and Silty Clay)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
360
359
358
357
356
355
354
353
352
351
350
200
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140
120
100
80
60
40
20
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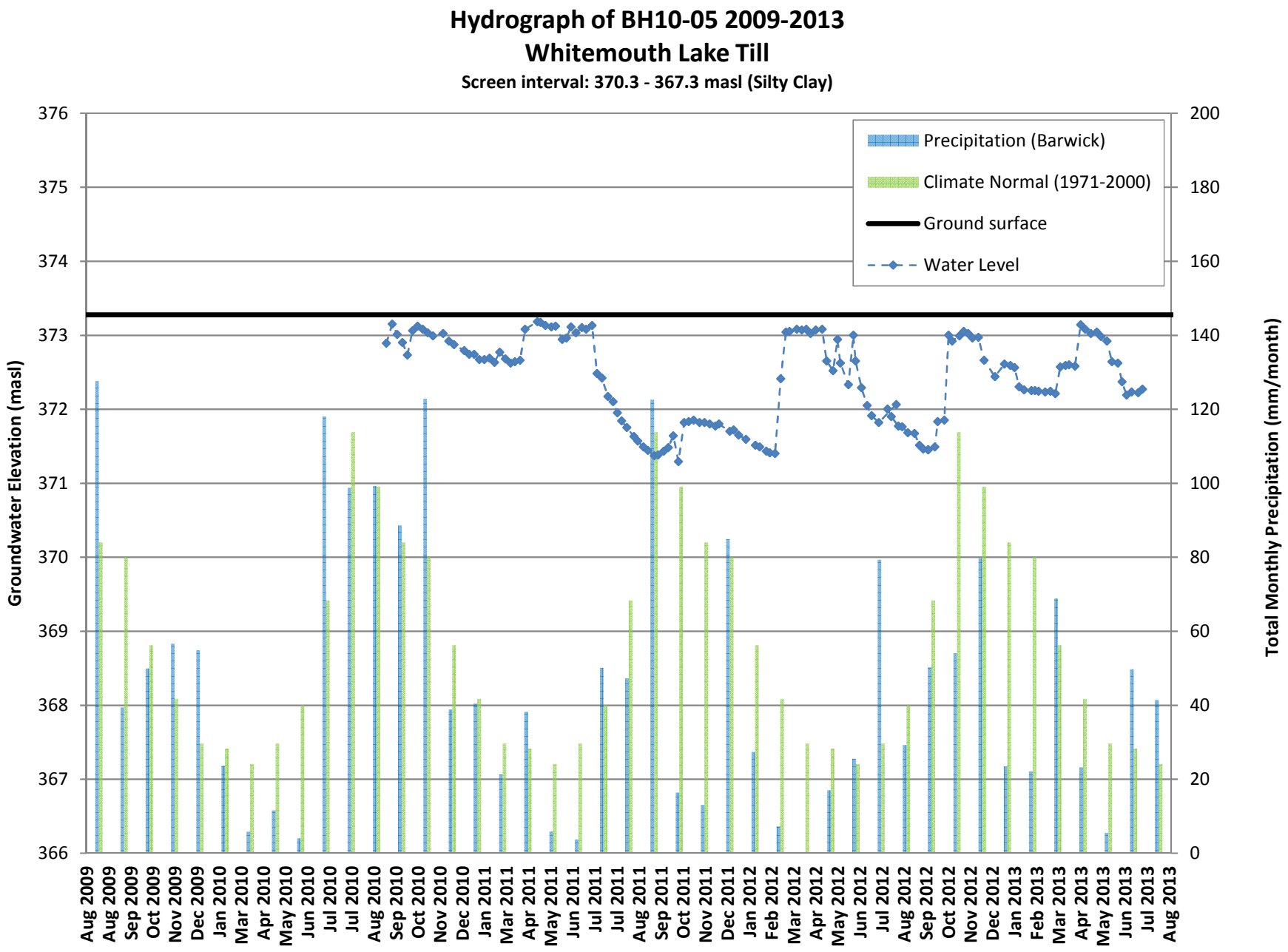
Hydrograph of BH10-05 2009-2013
Whitemouth Lake Till
Screen interval: 370.3 - 367.3 masl (Silty Clay)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
376
375
374
373
372
371
370
369
368
367
366
200
180
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140
120
100
80
60
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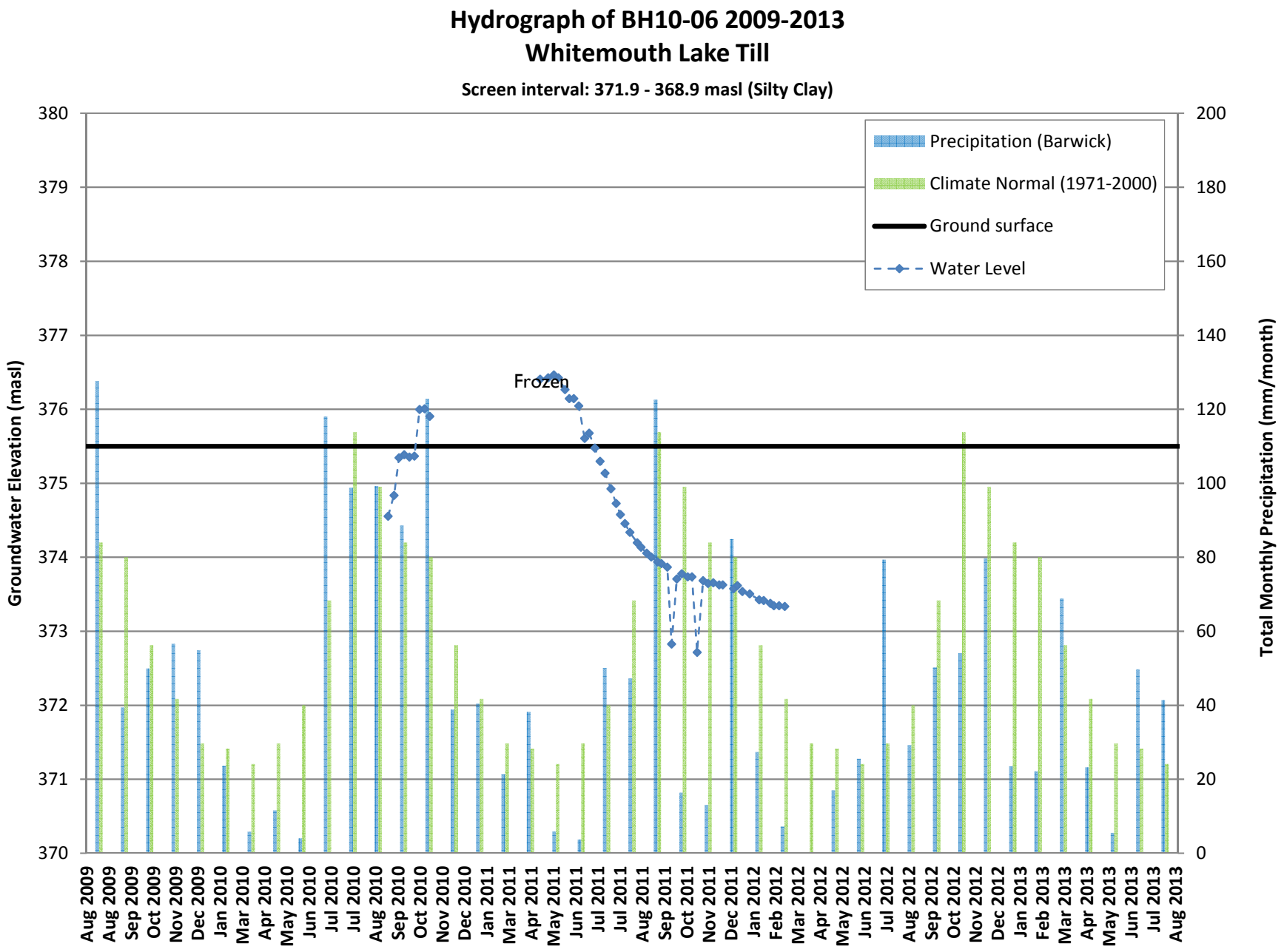
Hydrograph of BH10-06 2009-2013
Whitemouth Lake Till
Screen interval: 371.9 - 368.9 masl (Silty Clay)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
380
379
378
377
376
375
374
373
372
371
370
200
180
160
140
120
100
80
60
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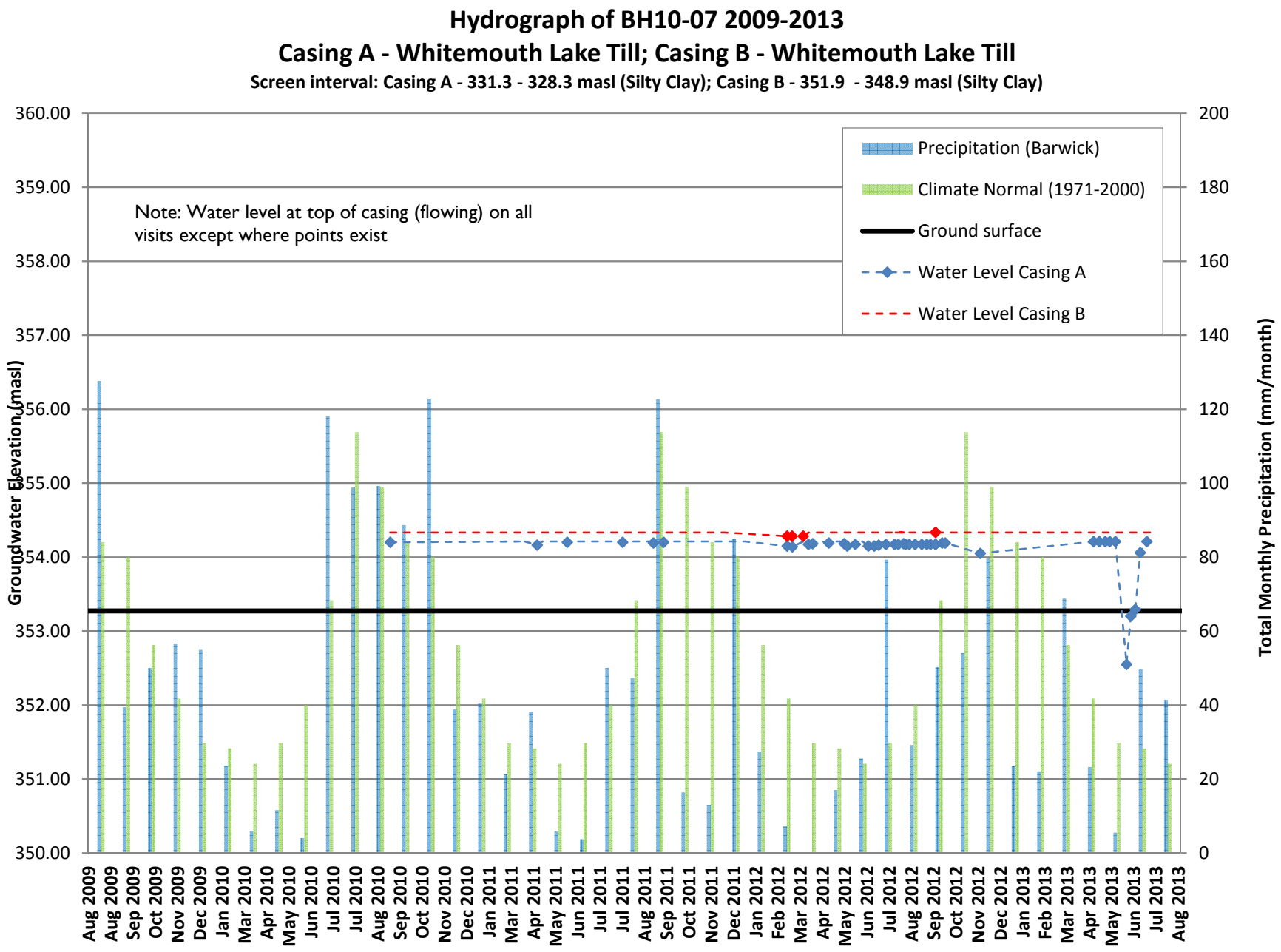
Hydrograph of BH10-07 2009-2013
Casing A - Whitemouth Lake Till; Casing B - Whitemouth Lake Till
Screen interval: Casing A - 331.3 - 328.3 masl (Silty Clay); Casing B - 351.9 - 348.9 masl (Silty Clay)
Note: Water level at top of casing (flowing) on all visits except where points exist
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level Casing A
Water Level Casing B
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
360.00
359.00
358.00
357.00
356.00
355.00
354.00
353.00
352.00
351.00
350.00
200
180
160
140
120
100
80
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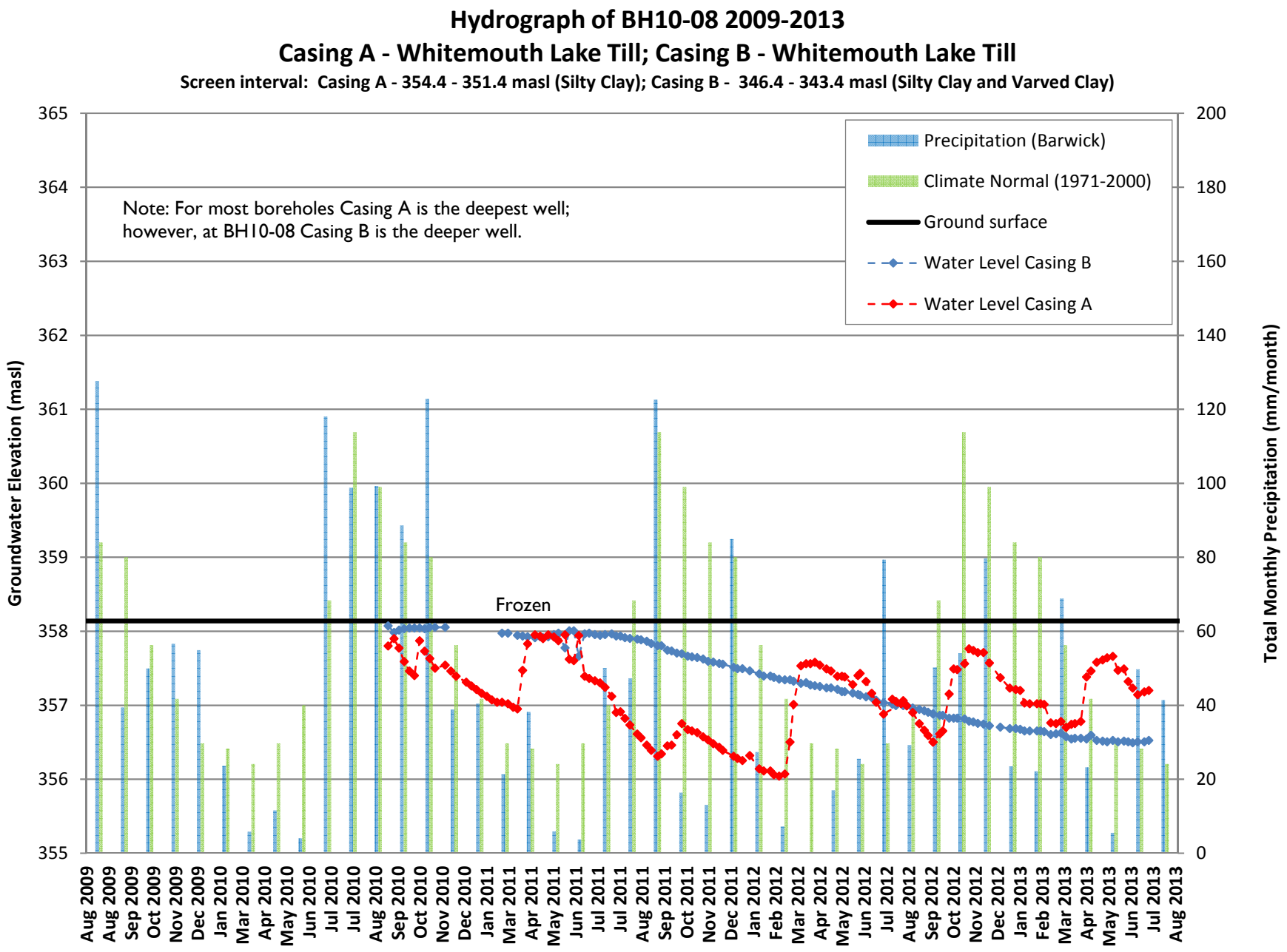
Hydrograph of BH10-08 2009-2013
Casing A - Whitemouth Lake Till; Casing B - Whitemouth Lake Till
Screen interval: Casing A - 354.4 - 351.4 masl (Silty Clay); Casing B - 346.4 - 343.4 masl (Silty Clay and Varved Clay)
Note: For most boreholes Casing A is the deepest well; however, at BH10-08 Casing B is the deeper well.
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level Casing B
Water Level Casing A
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
365
364
363
362
361
360
359
358
357
356
355
200
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140
120
100
80
60
40
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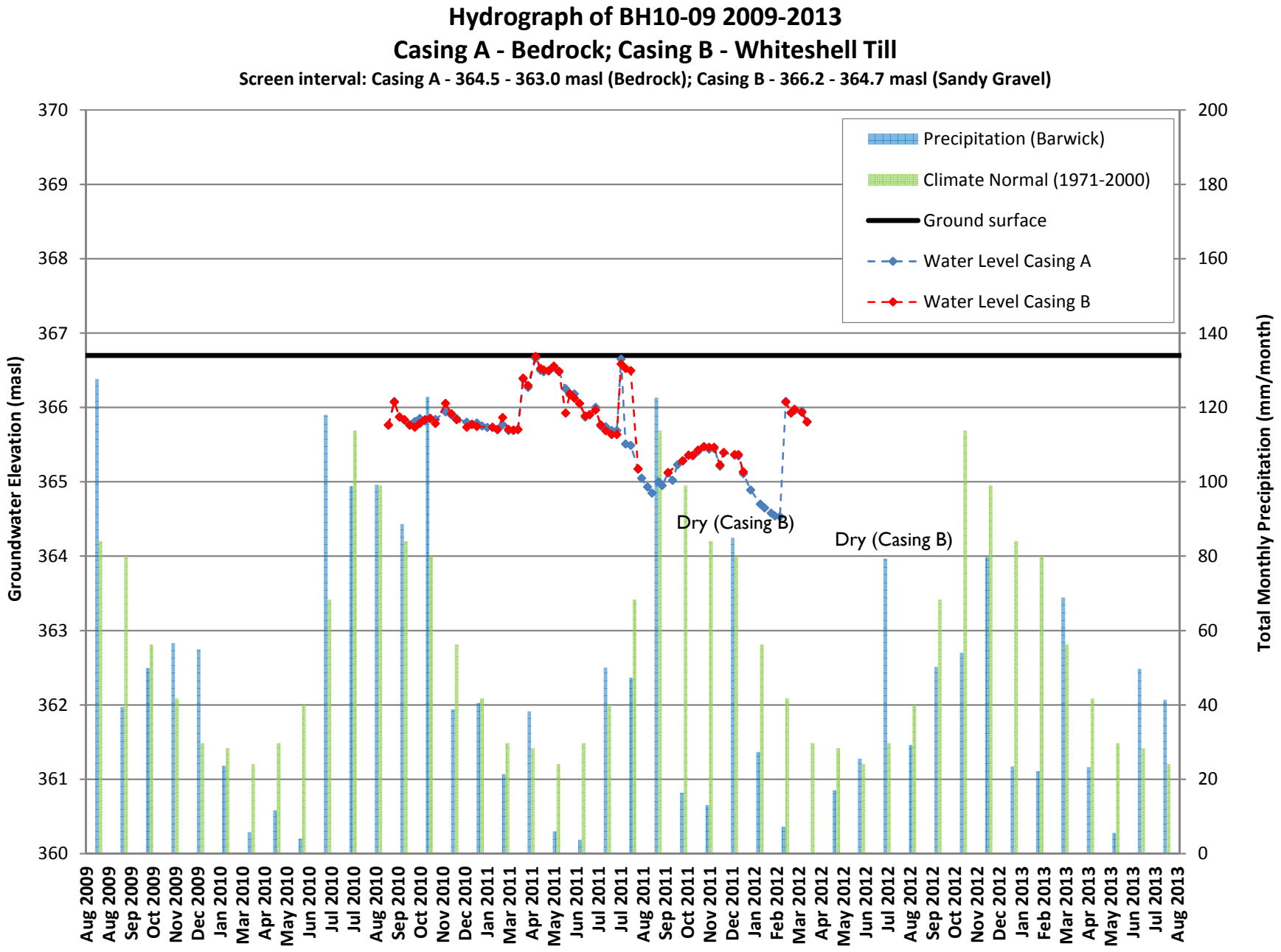
Hydrograph of BH10-09 2009-2013
Casing A - Bedrock; Casing B - Whiteshell Till
Screen interval: Casing A - 364.5 - 363.0 masl (Bedrock); Casing B - 366.2 - 364.7 masl (Sandy Gravel)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level Casing A
Water Level Casing B
Dry (Casing B)
Dry (Casing B)
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
370
369
368
367
366
365
364
363
362
361
360
200
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160
140
120
100
80
60
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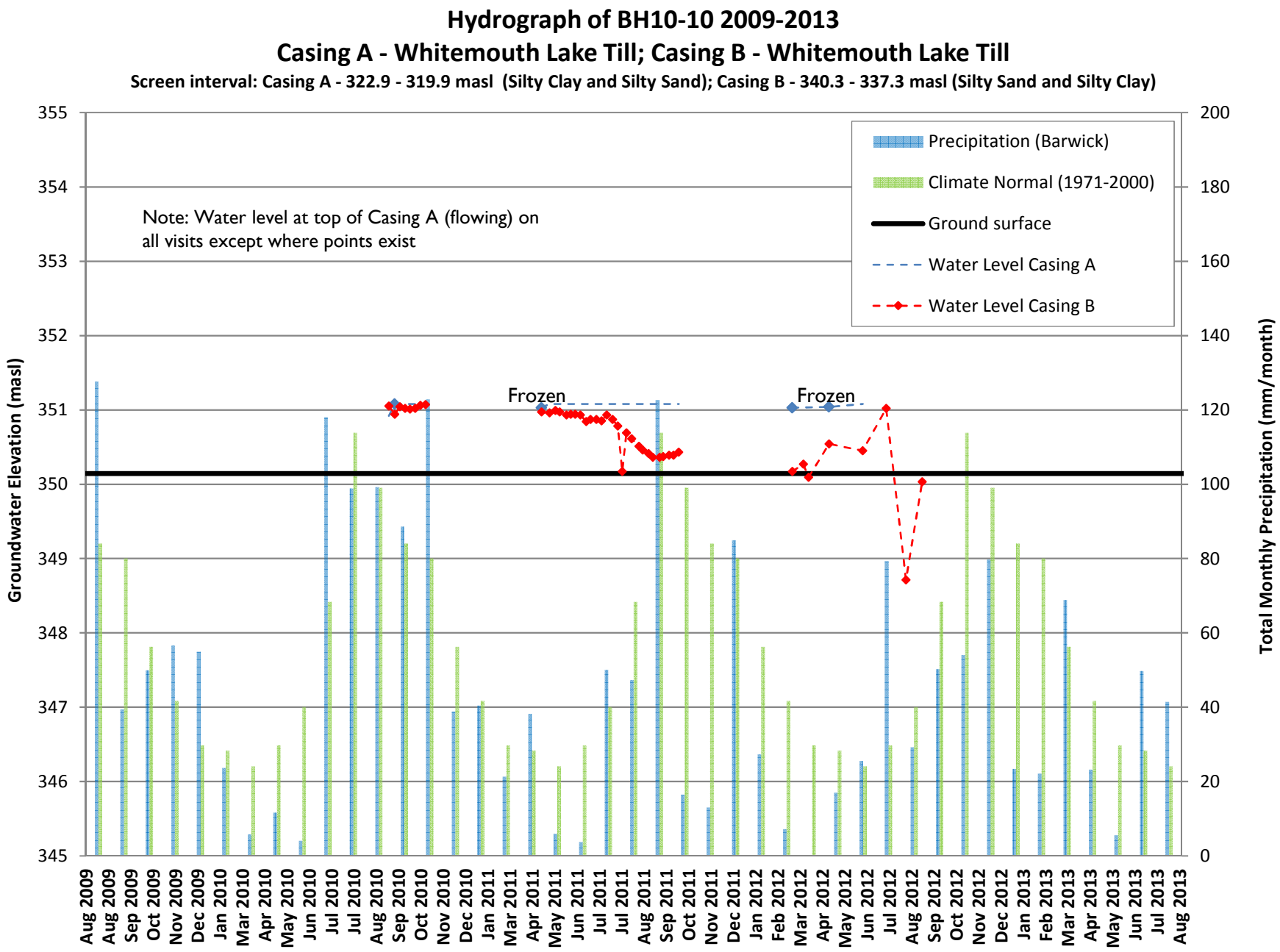
Hydrograph of BH10-10 2009-2013
Casing A - Whitemouth Lake Till; Casing B - Whitemouth Lake Till
Screen interval: Casing A - 322.9 - 319.9 masl (Silty Clay and Silty Sand); Casing B - 340.3 - 337.3 masl (Silty Sand and Silty Clay)
Note: Water level at top of Casing A (flowing) on all visits except where points exist
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level Casing A
Water Level Casing B
Frozen
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
354
353
352
351
350
349
348
347
346
345
200
180
160
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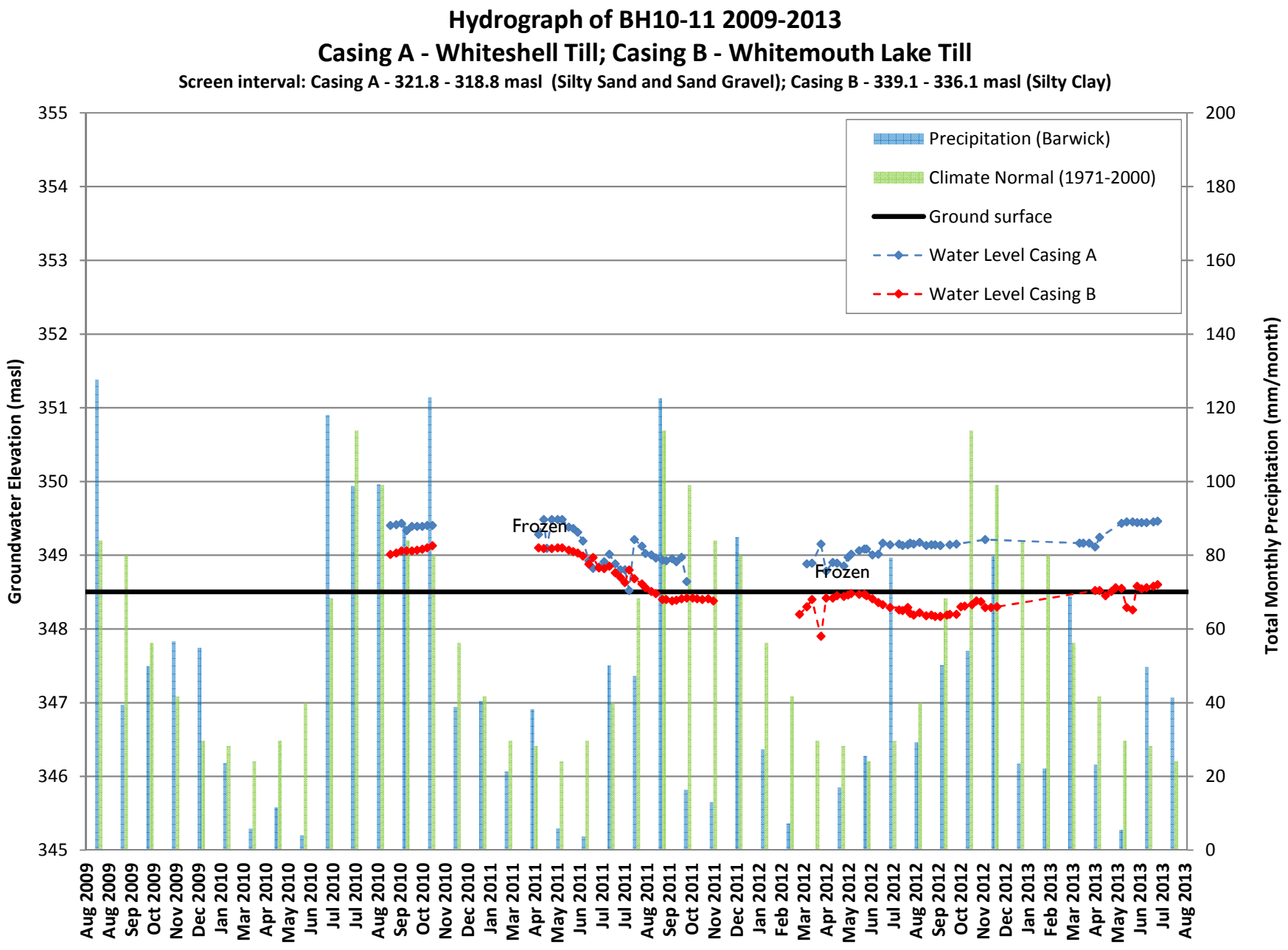
Hydrograph of BH10-11 2009-2013
Casing A - Whiteshell Till; Casing B - Whitemouth Lake Till
Screen interval: Casing A - 321.8 - 318.8 masl (Silty Sand and Sand Gravel); Casing B - 339.1 - 336.1 masl (Silty Clay)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level Casing A
Water Level Casing B
Frozen
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
354
353
352
351
350
349
348
347
346
345
200
180
160
140
120
100
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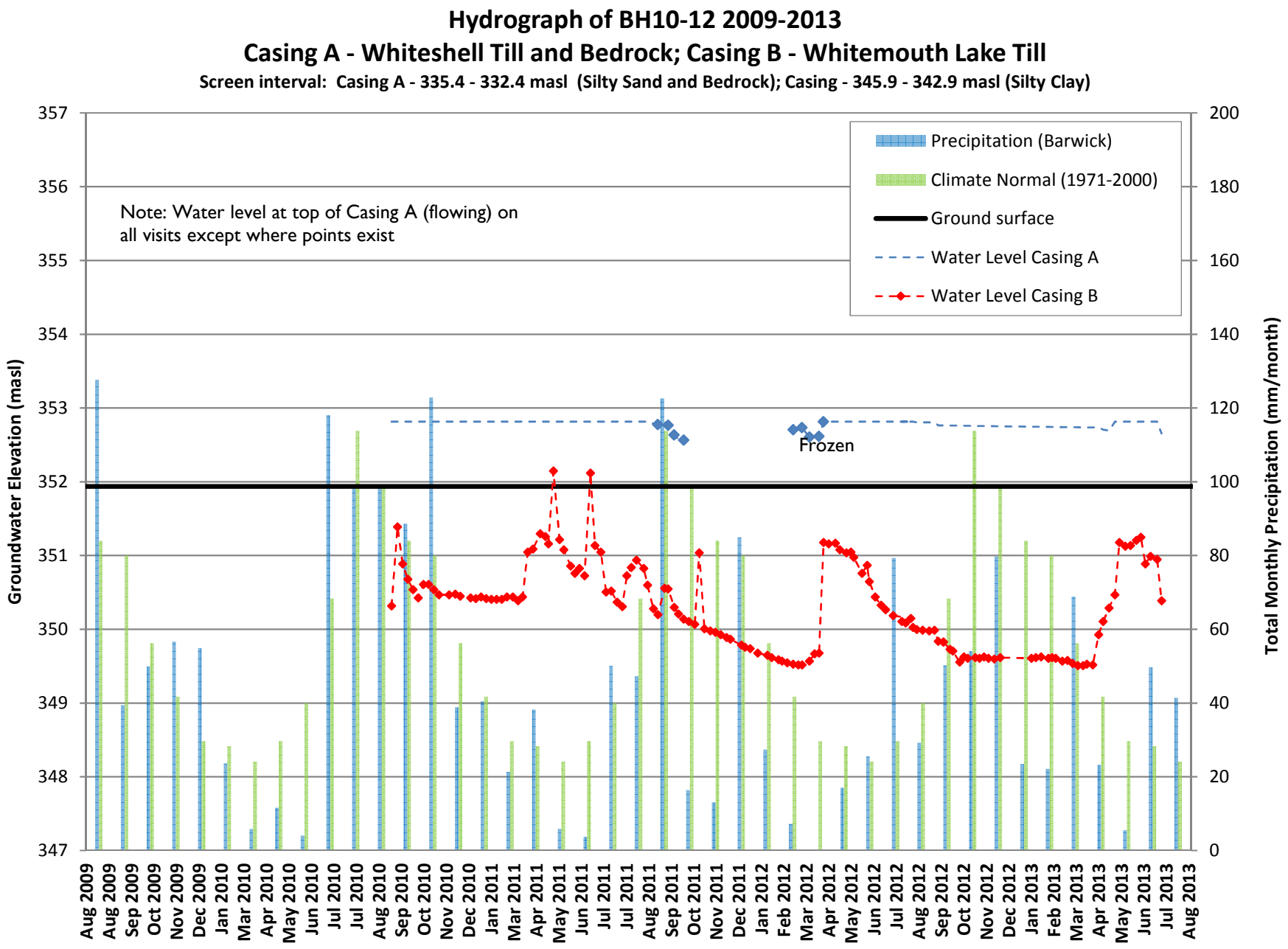
Hydrograph of BH10-12 2009-2013
Casing A - Whiteshell Till and Bedrock; Casing B - Whitemouth Lake Till
Screen interval: Casing A - 335.4 - 332.4 masl (Silty Sand and Bedrock); Casing - 345.9 - 342.9 masl (Silty Clay)
Note: Water level at top of Casing A (flowing) on all visits except where points exist
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level Casing A
Water Level Casing B
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
357
356
355
354
353
352
351
350
349
348
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140
120
100
80
60
40
20
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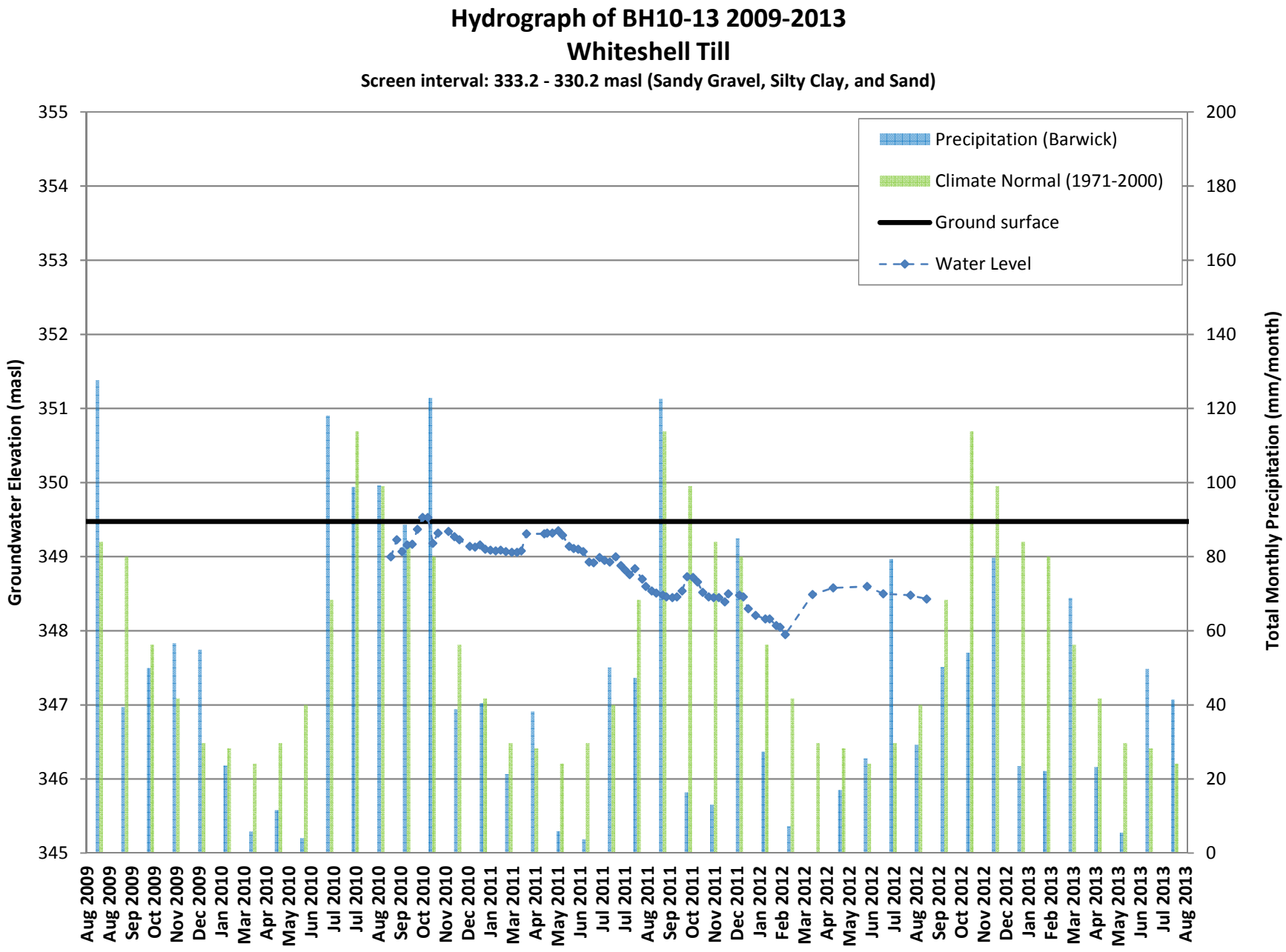
Hydrograph of BH10-13 2009-2013
Whiteshell Till
Screen interval: 333.2 - 330.2 masl (Sandy Gravel, Silty Clay, and Sand)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
354
353
352
351
350
349
348
347
346
345
200
180
160
140
120
100
80
60
40
20
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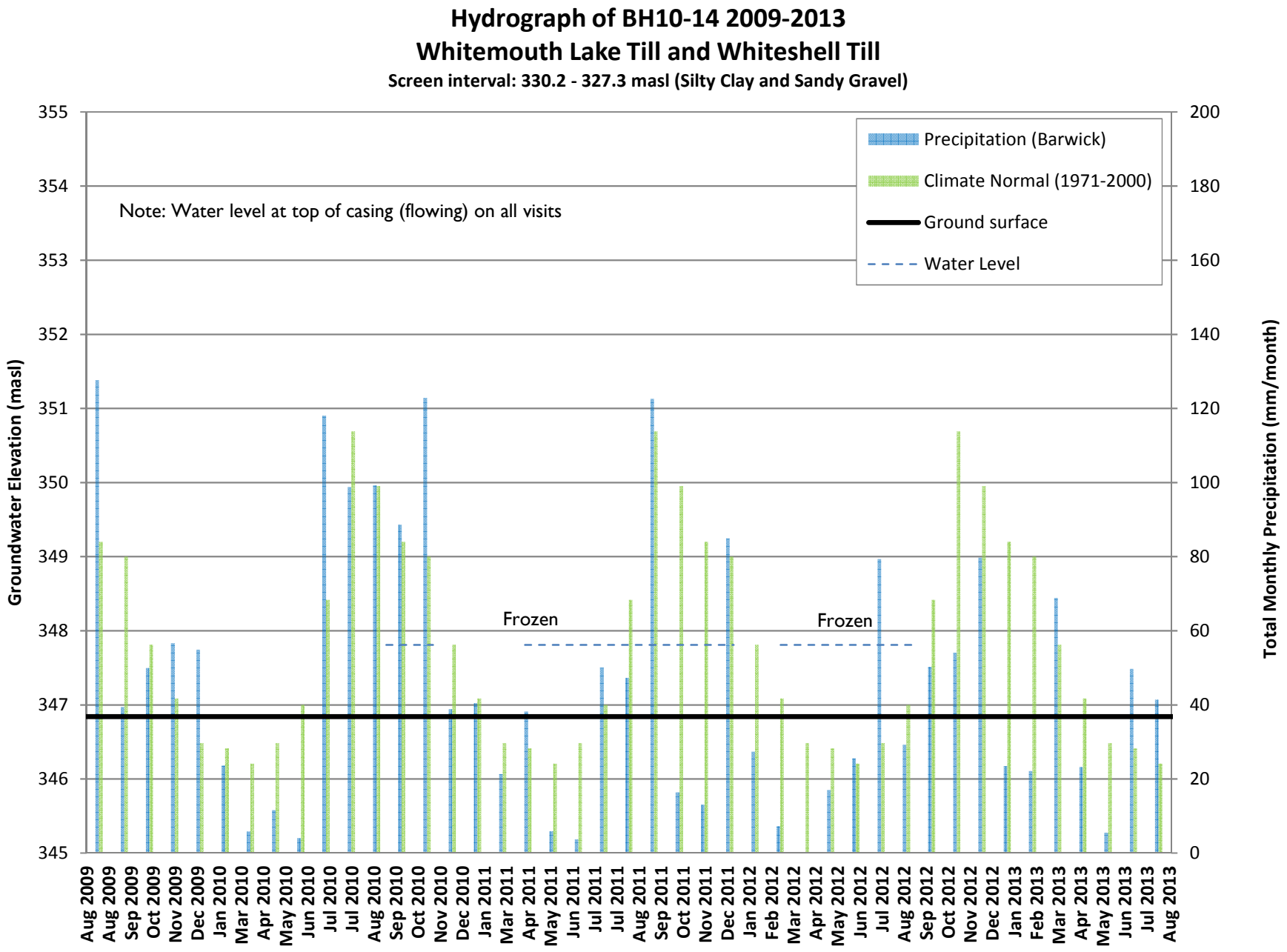
Hydrograph of BH10-14 2009-2013
Whitemouth Lake Till and Whiteshell Till
Screen interval: 330.2 - 327.3 masl (Silty Clay and Sandy Gravel)
Note: Water level at top of casing (flowing) on all visits
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Frozen
Frozen
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
354
353
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347
346
345
200
180
160
140
120
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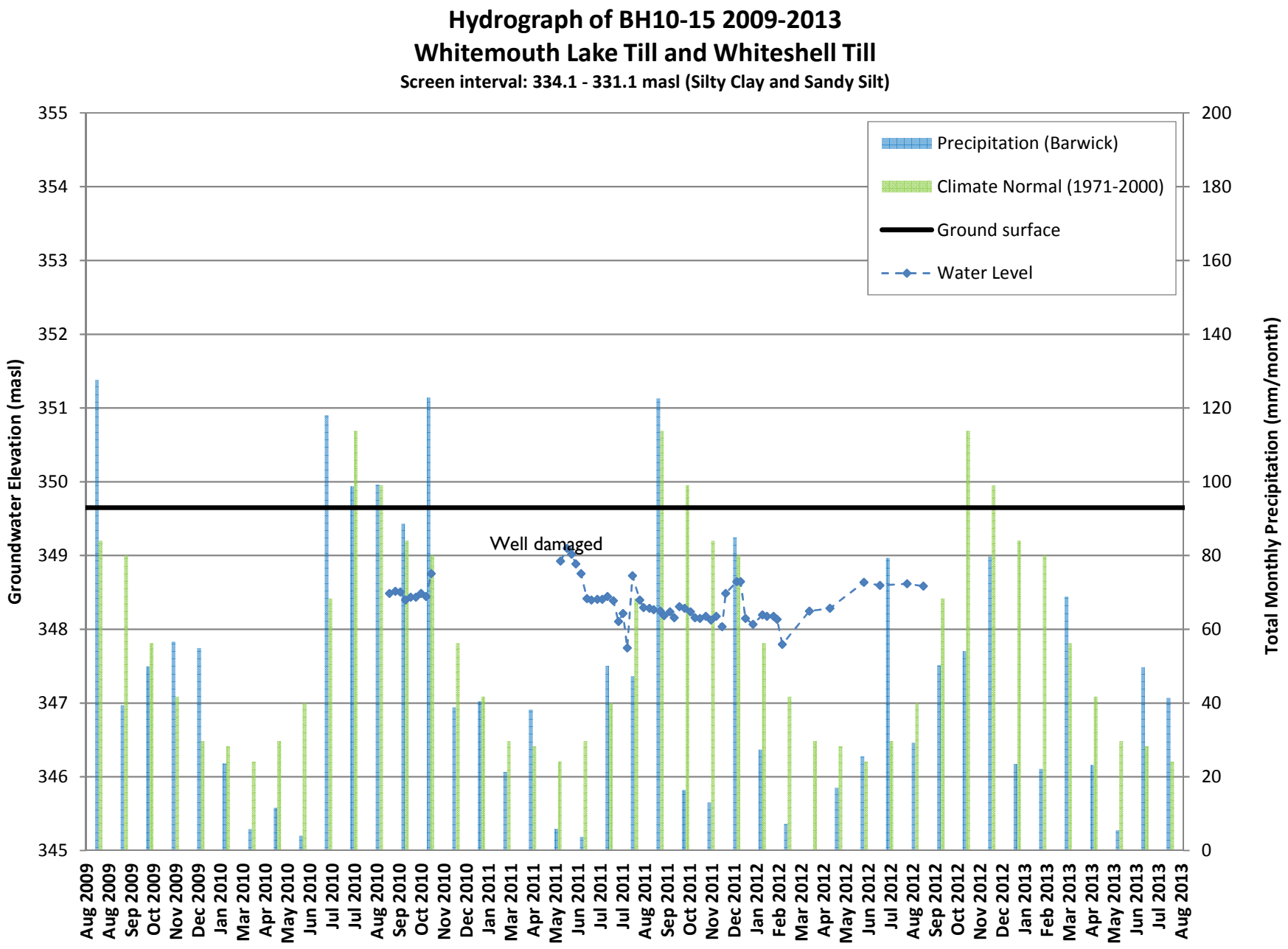
Hydrograph of BH10-15 2009-2013
Whitemouth Lake Till and Whiteshell Till
Screen interval: 334.1 - 331.1 masl (Silty Clay and Sandy Silt)
Precipitation (Barwick)
Climate Normal (1971-2000)
Ground surface
Water Level
Well damaged
Groundwater Elevation (masl)
Total Monthly Precipitation (mm/month)
355
354
353
352
351
350
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140
120
100
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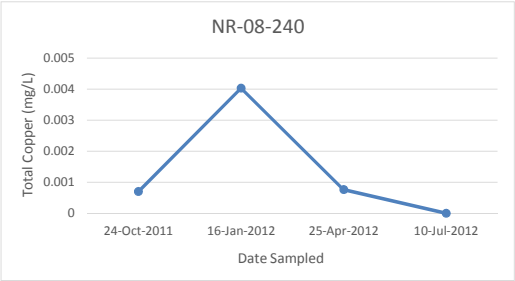
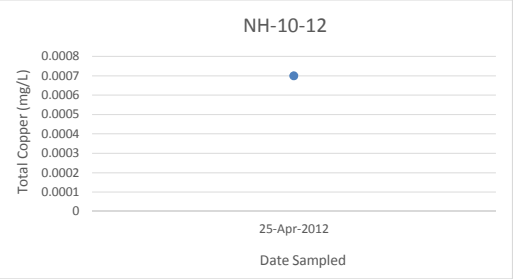
APPENDIX E

HISTORICAL GROUNDWATER CHEMISTRY TREND GRAPHS


NR-08-240
Total Copper (mg/L)
0.005
0.004
0.003
0.002
0.001
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled


NH-10-12
Total Copper (mg/L)
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0.0007
0.0006
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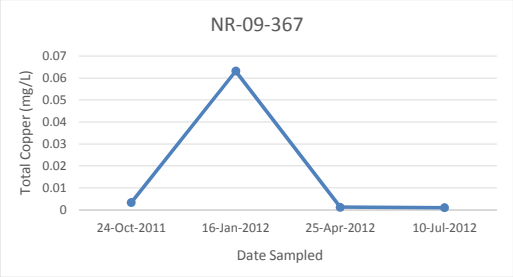
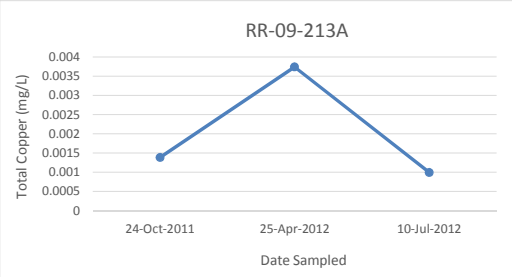
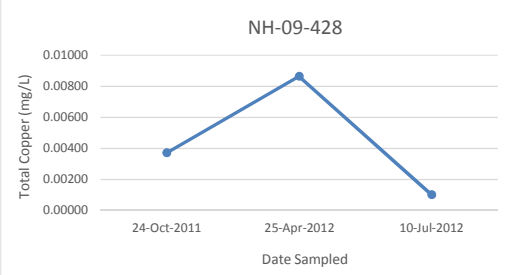
0.0004
0.0003
0.0002
0.0001
0
25-Apr-2012
Date Sampled


NR-09-367
Total Copper (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled


RR-09-213A
Total Copper (mg/L)
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled


NH-09-428
Total Copper (mg/L)
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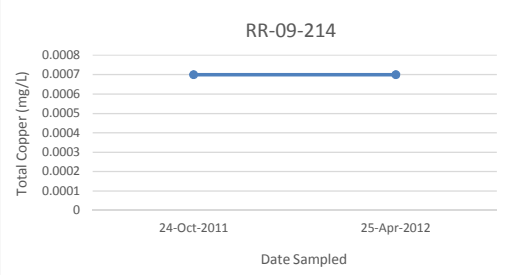
0.00800
0.00600
0.00400
0.00200
0.00000
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled


RR-09-214
Total Copper (mg/L)
0.0008
0.0007
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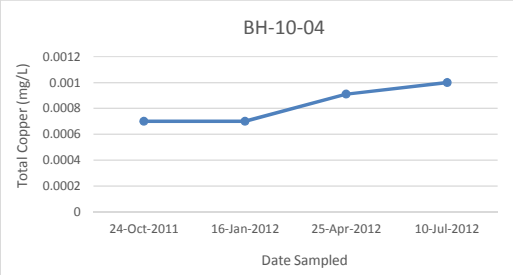
0.0005
0.0004
0.0003
0.0002
0.0001
0
24-Oct-2011
25-Apr-2012
Date Sampled


BH-10-04
Total Copper (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
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24-Oct-2011
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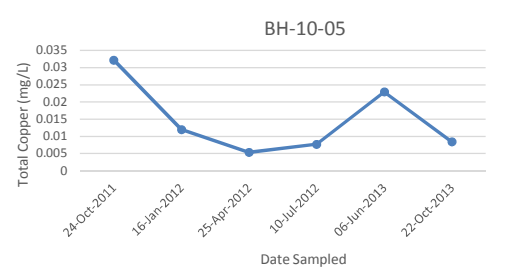
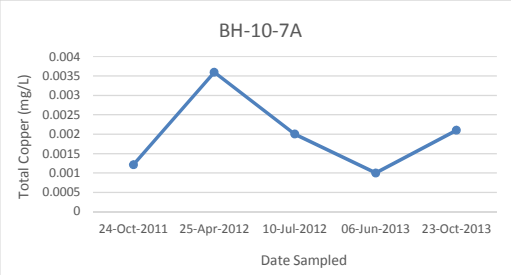
10-Jul-2012
Date Sampled


BH-10-05
Total Copper (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled


BH-10-7A
Total Copper (mg/L)
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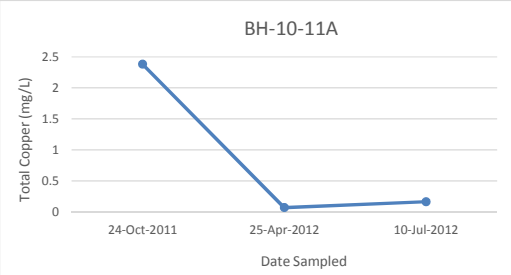
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled


BH-10-11A
Total Copper (mg/L)
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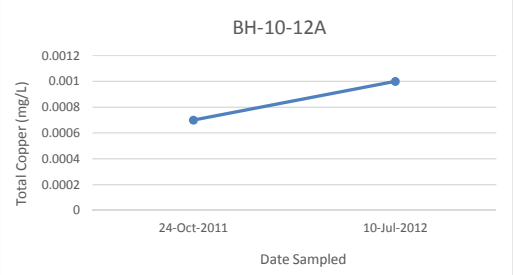
2
1.5
1
0.5
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled


BH-10-12A
Total Copper (mg/L)
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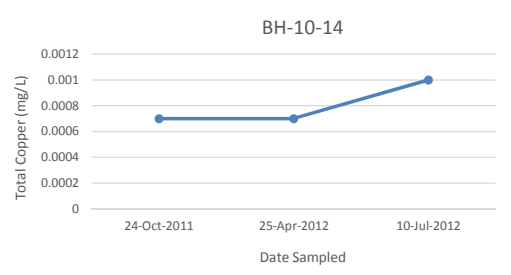
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
10-Jul-2012
Date Sampled


BH-10-14
Total Copper (mg/L)
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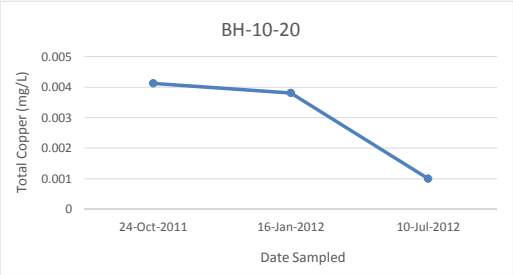
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled


BH-10-20
Total Copper (mg/L)
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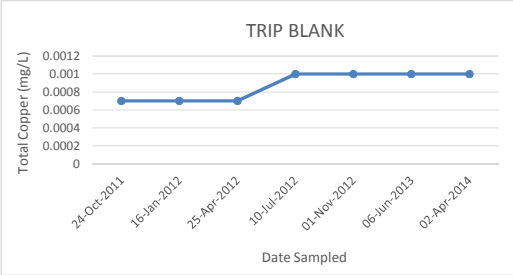
0.004
0.003
0.002
0.001
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled


TRIP BLANK
Total Copper (mg/L)
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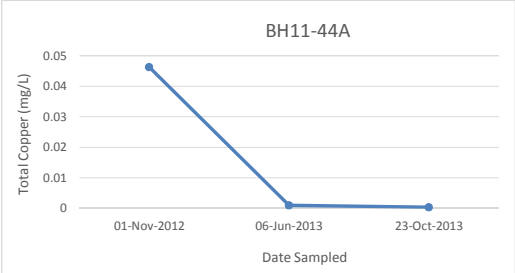
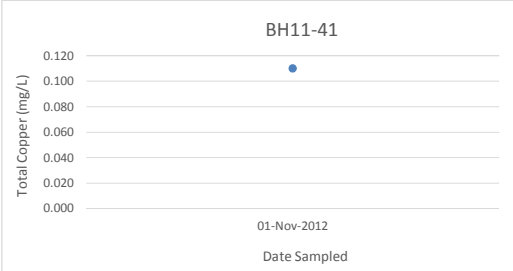
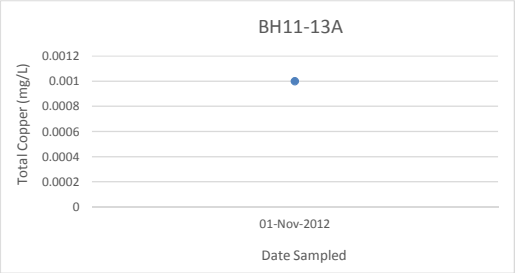
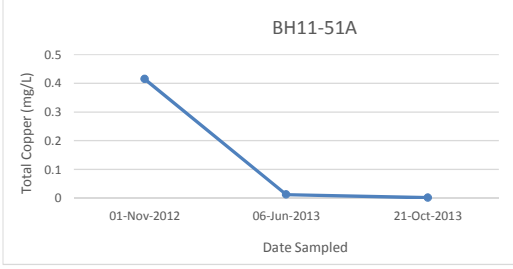
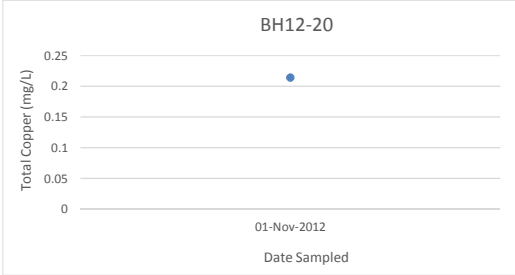
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

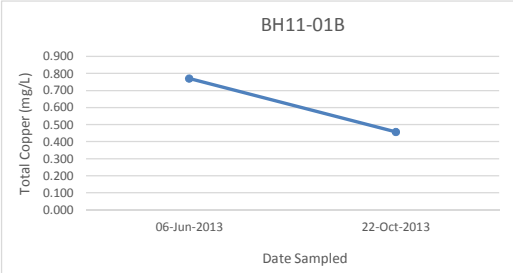

BH11-44A
Total Copper (mg/L)
0.05
0.04
0.03
0.02
0.01
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

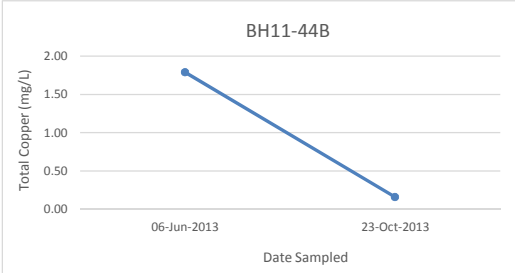

BH11-41
Total Copper (mg/L)
0.120
0.100
0.080
0.060
0.040
0.020
0.000
01-Nov-2012
Date Sampled

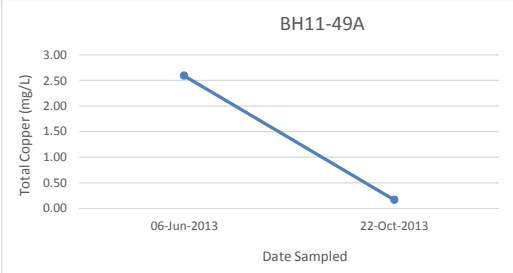

BH11-13A
Total Copper (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
01-Nov-2012
Date Sampled

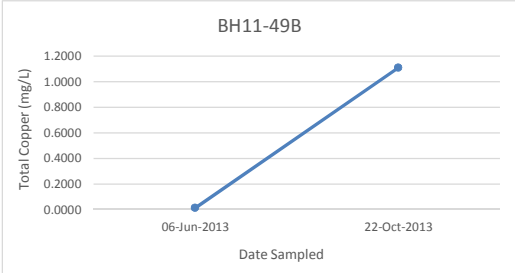

BH11-51A
Total Copper (mg/L)
0.5
0.4
0.3
0.2
0.1
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled


BH12-20
Total Copper (mg/L)
0.25
0.2
0.15
0.1
0.05
0
01-Nov-2012
Date Sampled


BH11-01B
Total Copper (mg/L)
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
06-Jun-2013
22-Oct-2013
Date Sampled


BH11-44B
Total Copper (mg/L)
2.00
1.50
1.00
0.50
0.00
06-Jun-2013
23-Oct-2013
Date Sampled


BH11-49A
Total Copper (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
06-Jun-2013
22-Oct-2013
Date Sampled


BH11-49B
Total Copper (mg/L)
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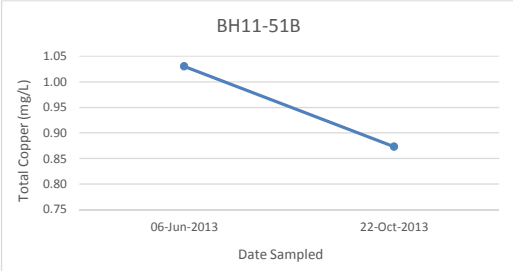
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
06-Jun-2013
22-Oct-2013
Date Sampled


BH11-51B
Total Copper (mg/L)
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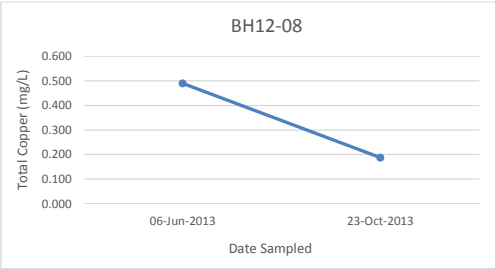
1.00
0.95
0.90
0.85
0.80
0.75
06-Jun-2013
22-Oct-2013
Date Sampled


BH12-08
Total Copper (mg/L)
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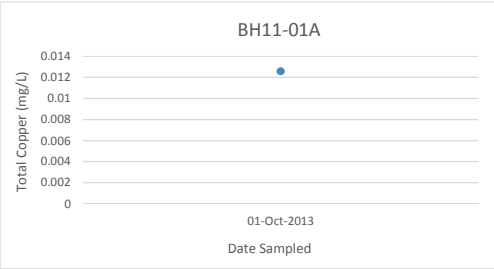
0.500
0.400
0.300
0.200
0.100
0.000
06-Jun-2013
23-Oct-2013
Date Sampled


BH11-01A
Total Copper (mg/L)
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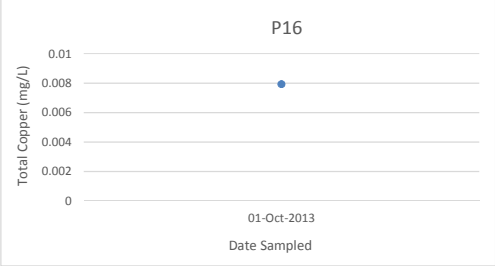
0.012
0.01
0.008
0.006
0.004
0.002
0
01-Oct-2013
Date Sampled


P16
Total Copper (mg/L)
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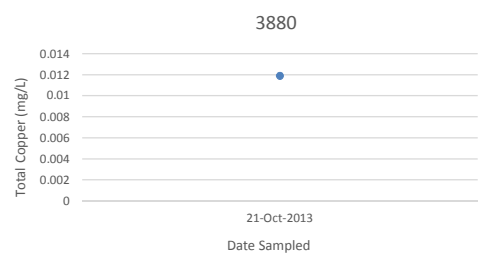
0.008
0.006
0.004
0.002
0
01-Oct-2013
Date Sampled


3880
Total Copper (mg/L)
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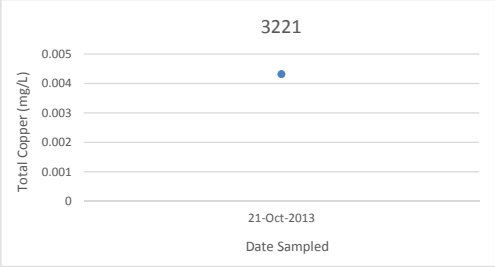
0.012
0.01
0.008
0.006
0.004
0.002
0
21-Oct-2013
Date Sampled


3221
Total Copper (mg/L)
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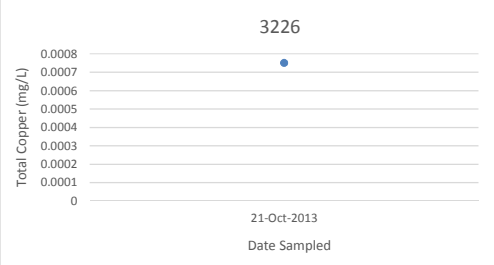
0.004
0.003
0.002
0.001
0
21-Oct-2013
Date Sampled


3226
Total Copper (mg/L)
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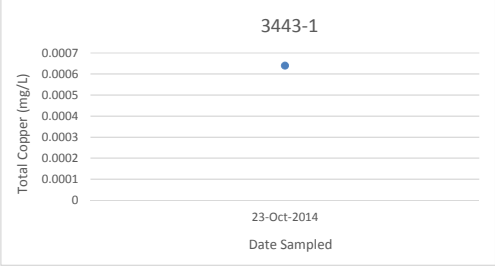
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
21-Oct-2013
Date Sampled


3443-1
Total Copper (mg/L)
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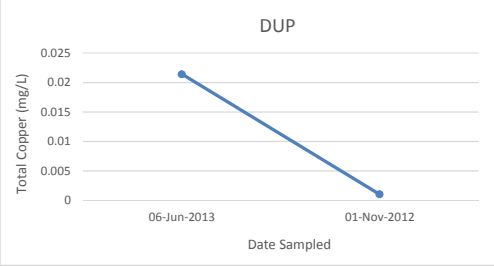
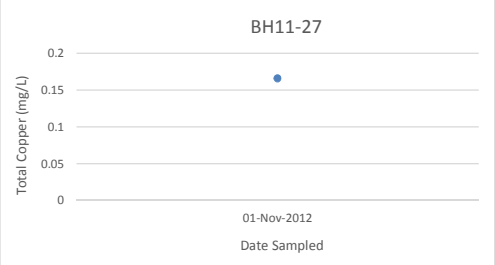
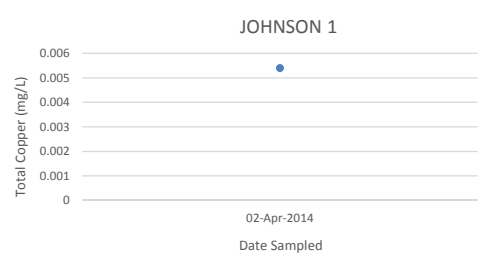
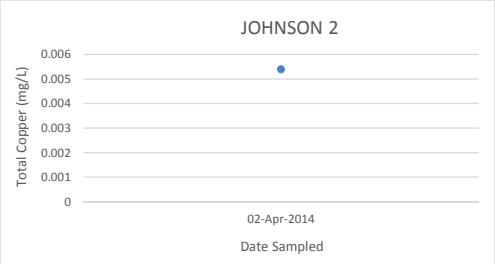
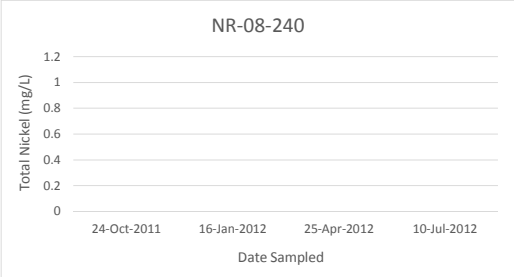
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
23-Oct-2014
Date Sampled

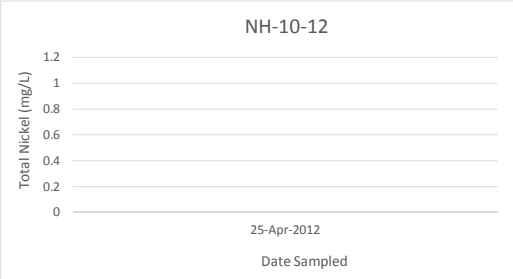

DUP
Total Copper (mg/L)
0.025
0.02
0.015
0.01
0.005
0
06-Jun-2013
01-Nov-2012
Date Sampled

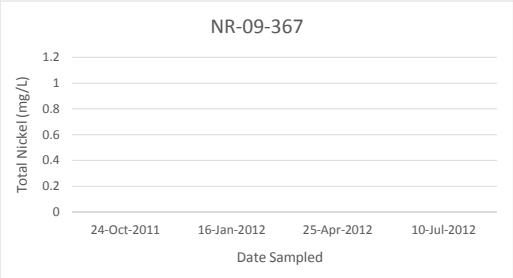

BH11-27
Total Copper (mg/L)
0.2
0.15
0.1
0.05
0
01-Nov-2012
Date Sampled

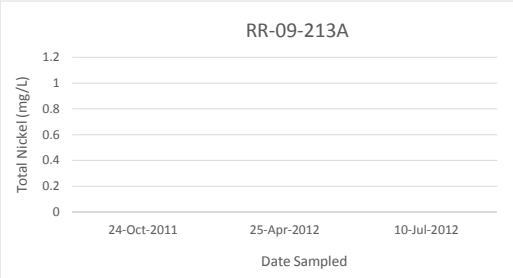

JOHNSON 1
Total Copper (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
02-Apr-2014
Date Sampled

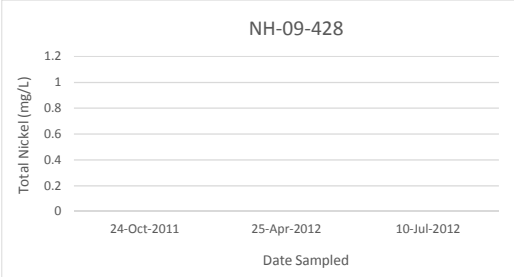

JOHNSON 2
Total Copper (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
02-Apr-2014
Date Sampled

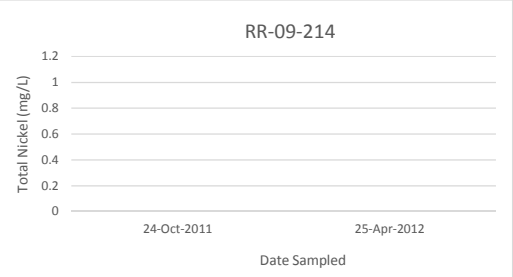

NR-08-240
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

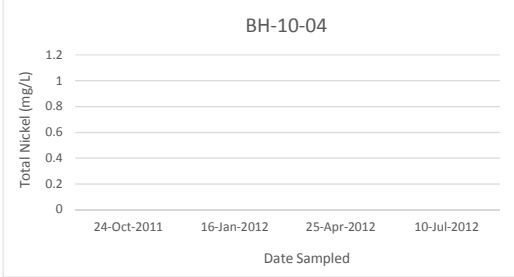

NH-10-12
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
25-Apr-2012
Date Sampled

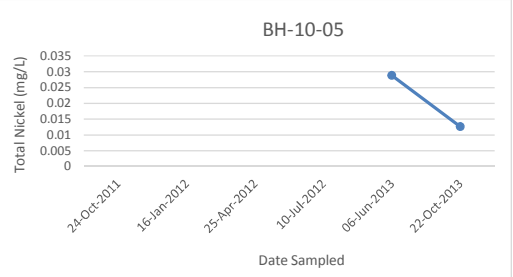

NR-09-367
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

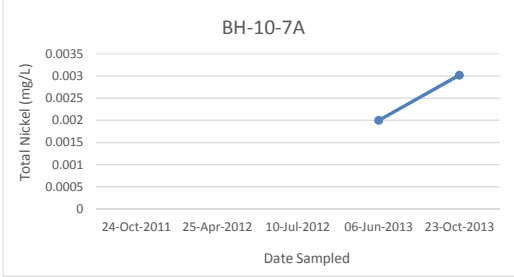

RR-09-213A
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

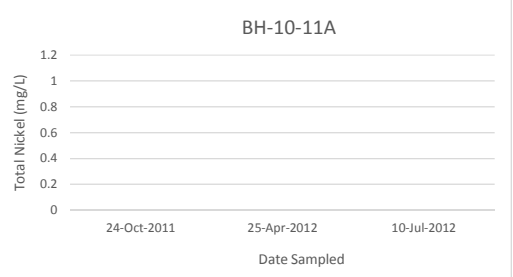

NH-09-428
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

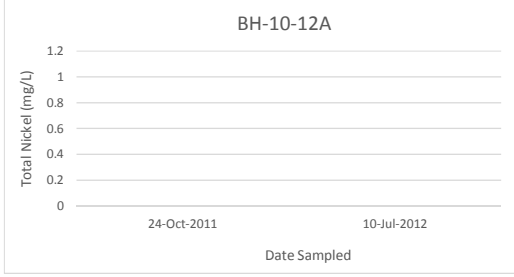

RR-09-214
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
Date Sampled

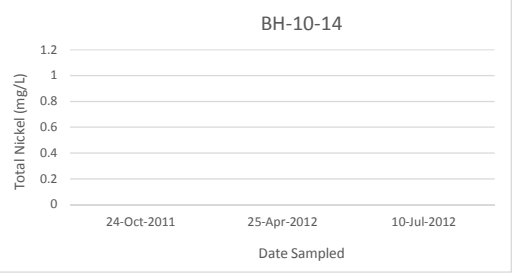

BH-10-04
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

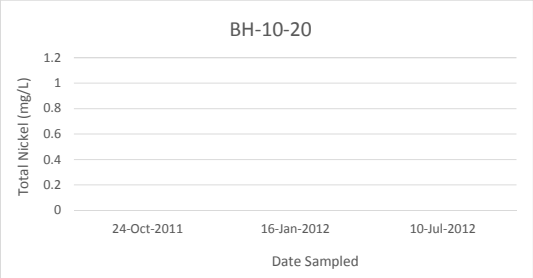

BH-10-05
Total Nickel (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

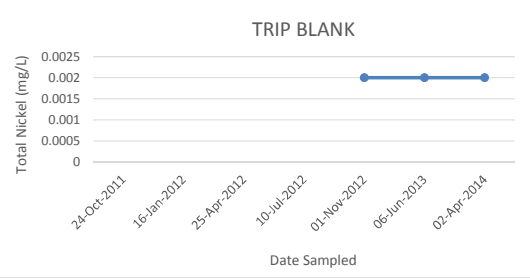

BH-10-7A
Total Nickel (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

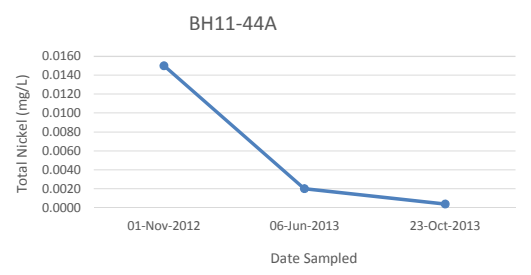

BH-10-11A
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

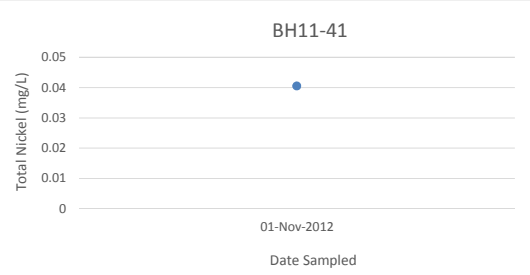

BH-10-12A
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
10-Jul-2012
Date Sampled

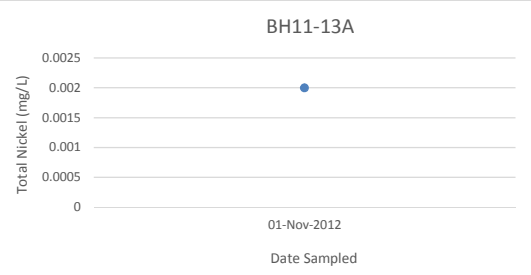

BH-10-14
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

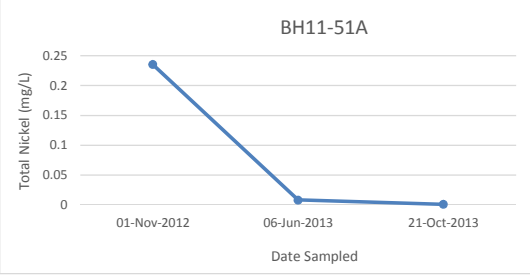

BH-10-20
Total Nickel (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

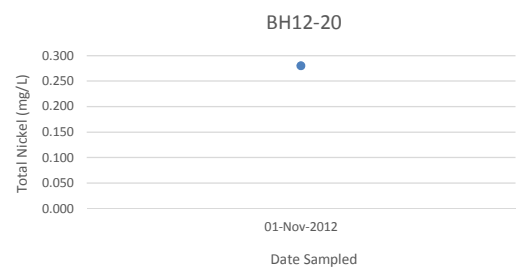

TRIP BLANK
Total Nickel (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

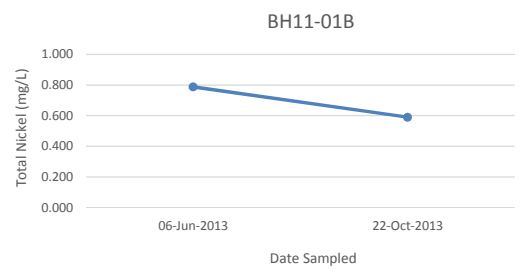

BH11-44A
Total Nickel (mg/L)
0.0160
0.0140
0.0120
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

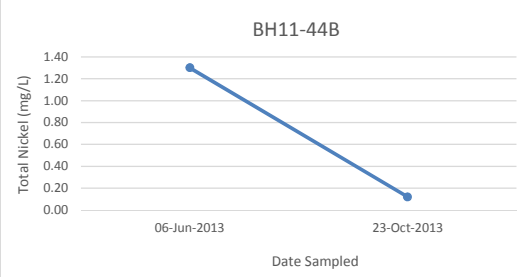

BH11-41
Total Nickel (mg/L)
0.05
0.04
0.03
0.02
0.01
0
01-Nov-2012
Date Sampled

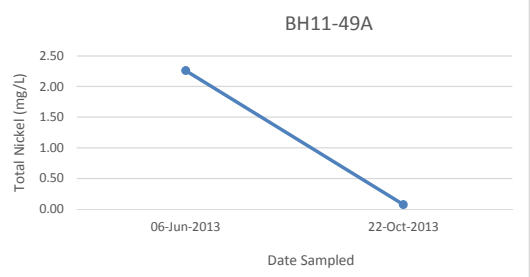

BH11-13A
Total Nickel (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
Date Sampled

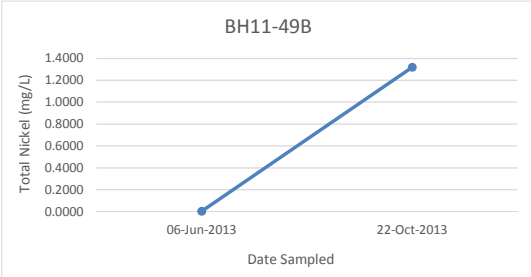

BH11-51A
Total Nickel (mg/L)
0.25
0.2
0.15
0.1
0.05
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled

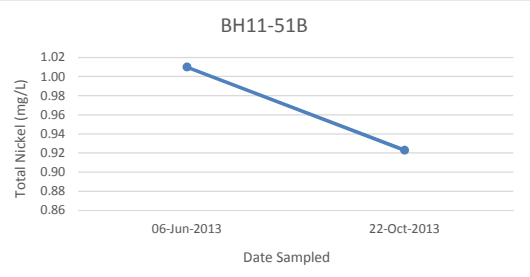

BH12-20
Total Nickel (mg/L)
0.300
0.250
0.200
0.150
0.100
0.050
0.000
01-Nov-2012
Date Sampled

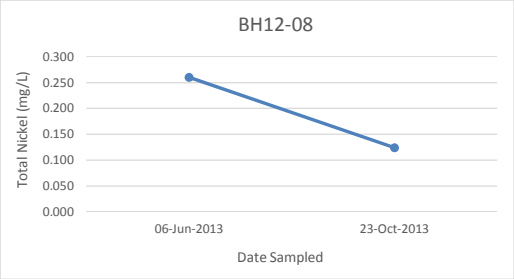

BH11-01B
Total Nickel (mg/L)
1.000
0.800
0.600
0.400
0.200
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

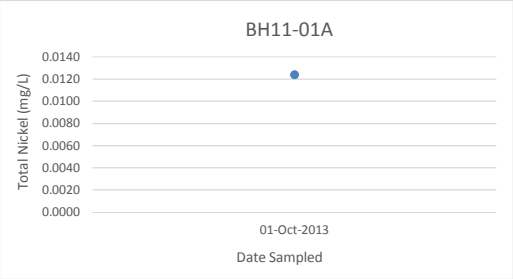

BH11-44B
Total Nickel (mg/L)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
06-Jun-2013
23-Oct-2013
Date Sampled

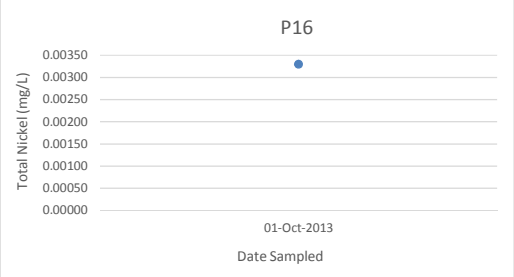

BH11-49A
Total Nickel (mg/L)
2.50
2.00
1.50
1.00
0.50
0.00
06-Jun-2013
22-Oct-2013
Date Sampled

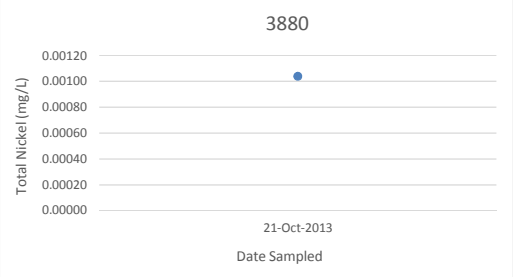

BH11-49B
Total Nickel (mg/L)
1.4000
1.2000
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
06-Jun-2013
22-Oct-2013
Date Sampled

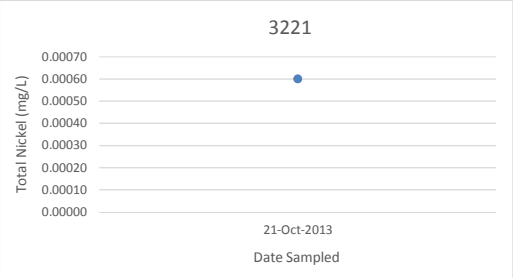

BH11-51B
Total Nickel (mg/L)
1.02
1.00
0.98
0.96
0.94
0.92
0.90
0.88
0.86
06-Jun-2013
22-Oct-2013
Date Sampled

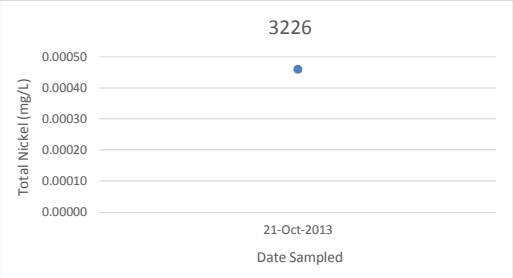

BH12-08
Total Nickel (mg/L)
0.300
0.250
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
23-Oct-2013
Date Sampled

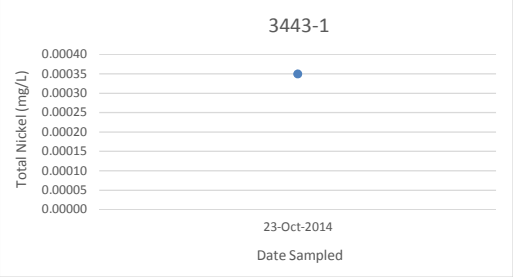

BH11-01A
Total Nickel (mg/L)
0.0140
0.0120
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
01-Oct-2013
Date Sampled

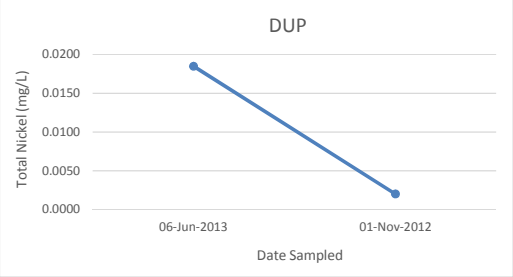

P16
Total Nickel (mg/L)
0.00350
0.00300
0.00250
0.00200
0.00150
0.00100
0.00050
0.00000
01-Oct-2013
Date Sampled

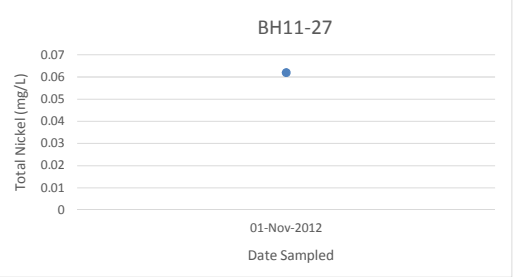

3880
Total Nickel (mg/L)
0.00120
0.00100
0.00080
0.00060
0.00040
0.00020
0.00000
21-Oct-2013
Date Sampled

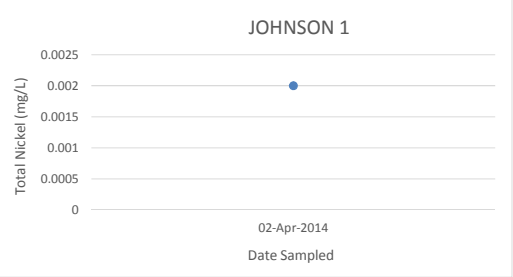

3221
Total Nickel (mg/L)
0.00070
0.00060
0.00050
0.00040
0.00030
0.00020
0.00010
0.00000
21-Oct-2013
Date Sampled

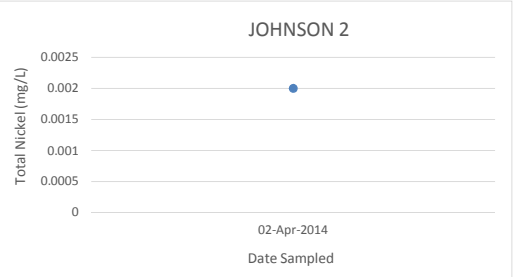

3226
Total Nickel (mg/L)
0.00050
0.00040
0.00030
0.00020
0.00010
0.00000
21-Oct-2013
Date Sampled

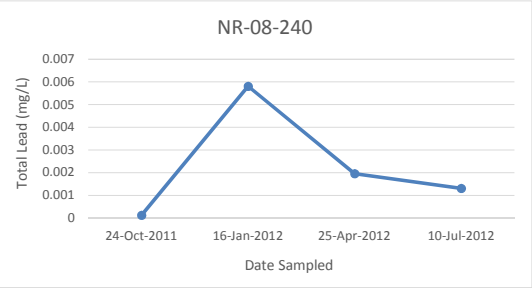

3443-1
Total Nickel (mg/L)
0.00040
0.00035
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
23-Oct-2014
Date Sampled

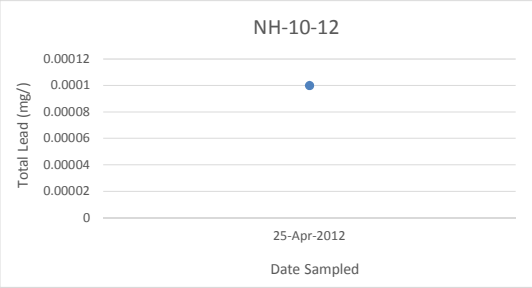

DUP
Total Nickel (mg/L)
0.0200
0.0150
0.0100
0.0050
0.0000
06-Jun-2013
01-Nov-2012
Date Sampled

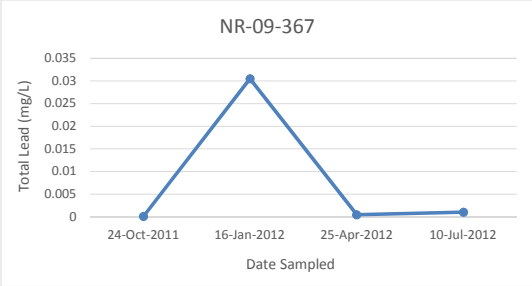

BH11-27
Total Nickel (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
01-Nov-2012
Date Sampled

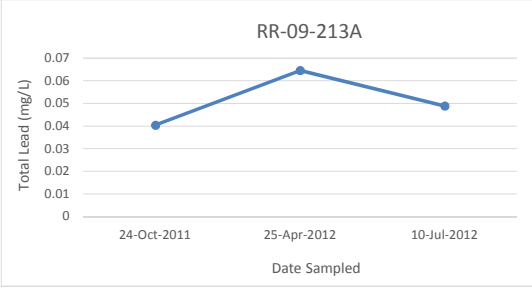

JOHNSON 1
Total Nickel (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
02-Apr-2014
Date Sampled

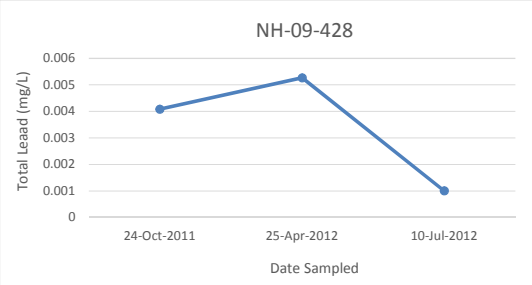

JOHNSON 2
Total Nickel (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
02-Apr-2014
Date Sampled

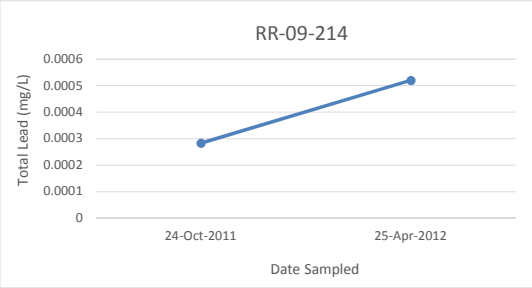

NR-08-240
Total Lead (mg/L)
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

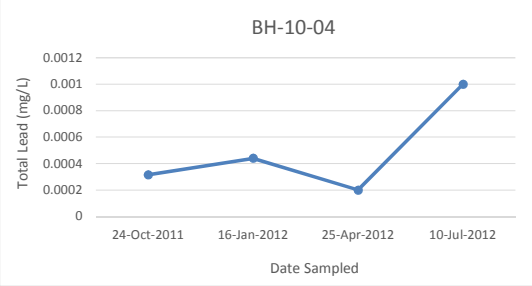

NH-10-12
Total Lead (mg/)
0.00012
0.0001
0.00008
0.00006
0.00004
0.00002
0
25-Apr-2012
Date Sampled

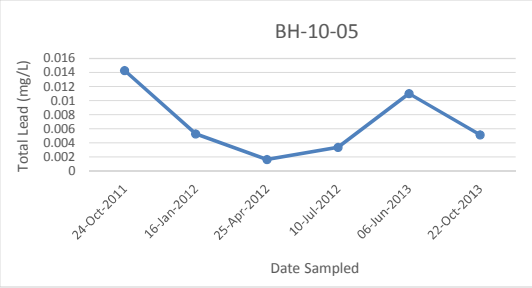

NR-09-367
Total Lead (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

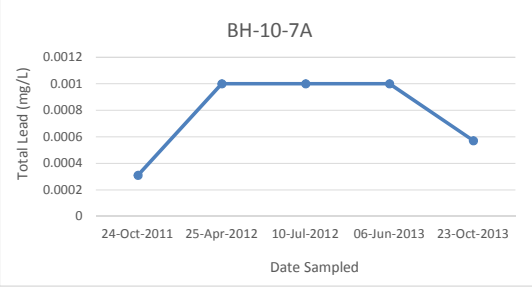

RR-09-213A
Total Lead (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

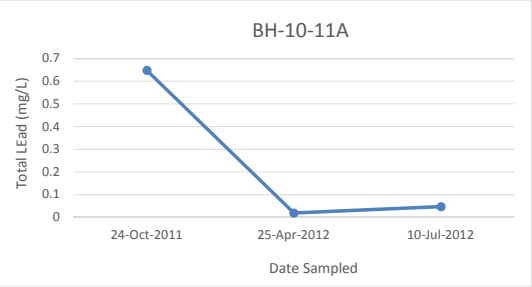

NH-09-428
Total Leaad (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

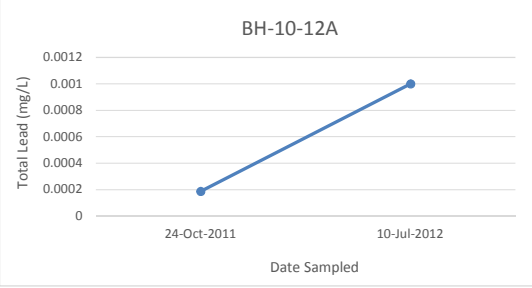

RR-09-214
Total Lead (mg/L)
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
24-Oct-2011
25-Apr-2012
Date Sampled

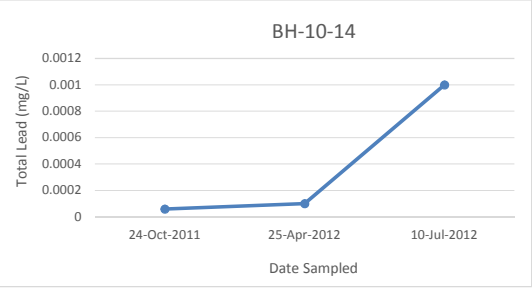

BH-10-04
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

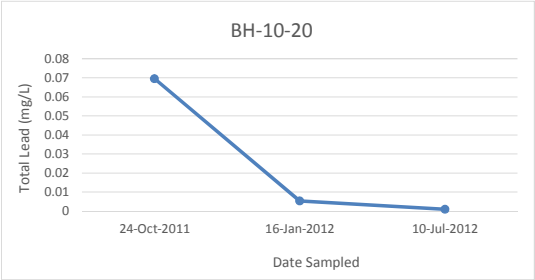

BH-10-05
Total Lead (mg/L)
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

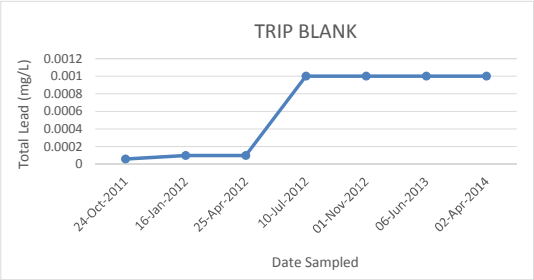

BH-10-7A
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

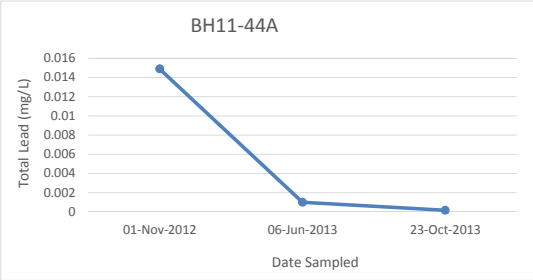

BH-10-11A
Total LEad (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

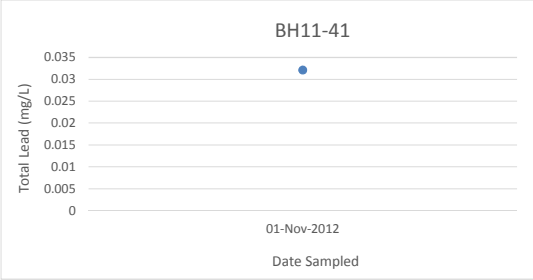

BH-10-12A
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
10-Jul-2012
Date Sampled

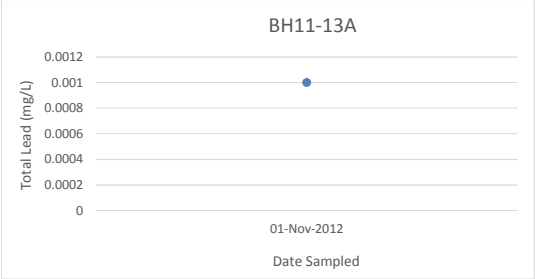

BH-10-14
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

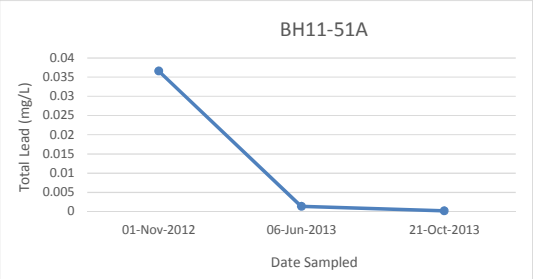

BH-10-20
Total Lead (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

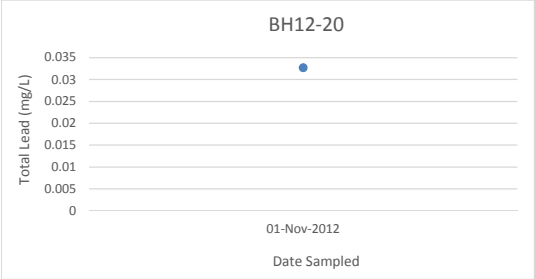

TRIP BLANK
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

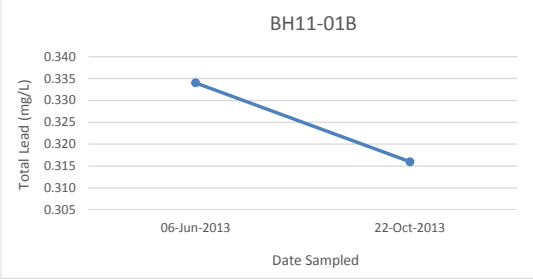

BH11-44A
Total Lead (mg/L)
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

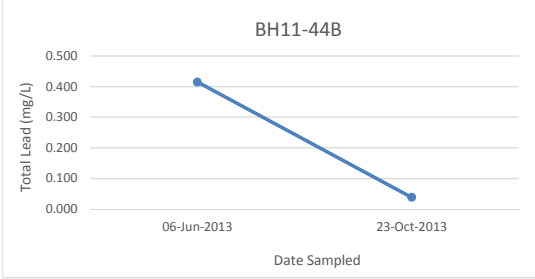

BH11-41
Total Lead (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
Date Sampled

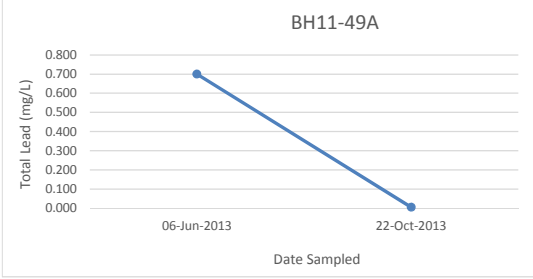

BH11-13A
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
01-Nov-2012
Date Sampled

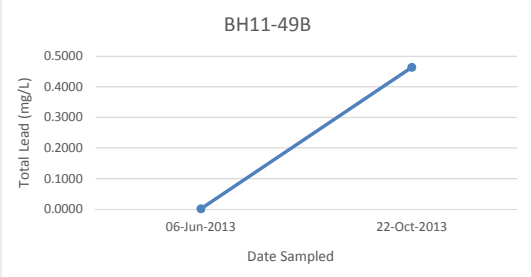

BH11-51A
Total Lead (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled

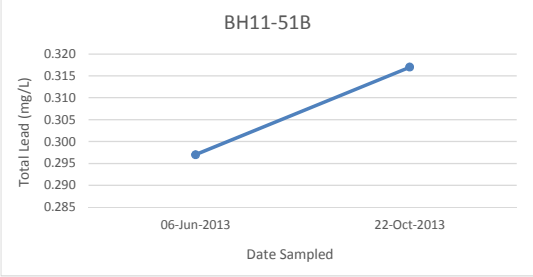

BH12-20
Total Lead (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
Date Sampled

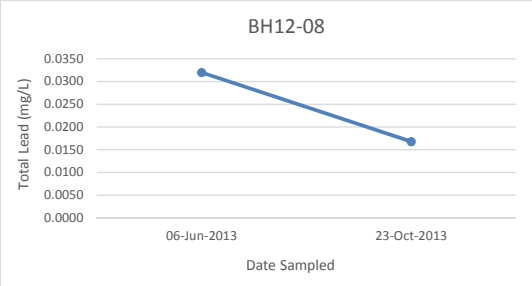

BH11-01B
Total Lead (mg/L)
0.340
0.335
0.330
0.325
0.320
0.315
0.310
0.305
06-Jun-2013
22-Oct-2013
Date Sampled

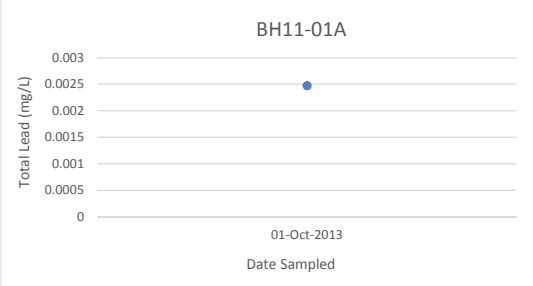

BH11-44B
Total Lead (mg/L)
0.500
0.400
0.300
0.200
0.100
0.000
06-Jun-2013
23-Oct-2013
Date Sampled

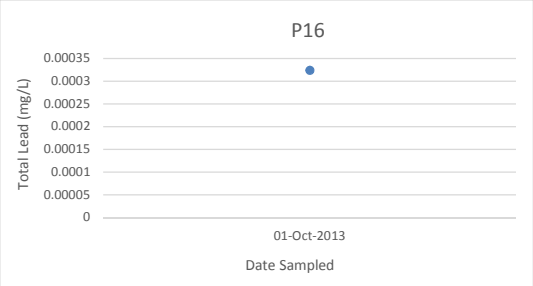

BH11-49A
Total Lead (mg/L)
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

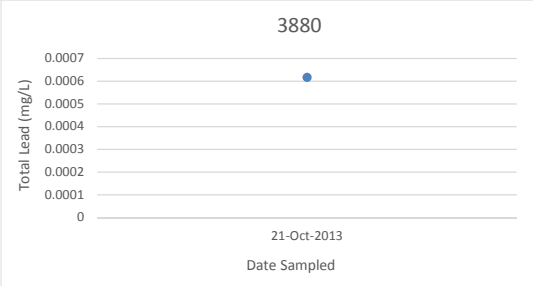

BH11-49B
Total Lead (mg/L)
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
06-Jun-2013
22-Oct-2013
Date Sampled

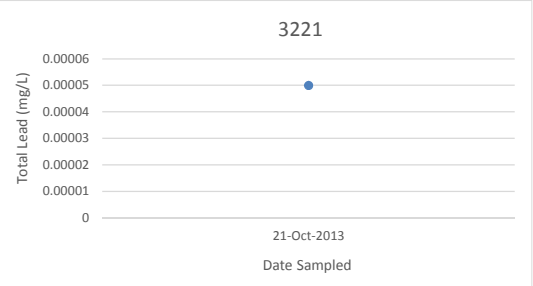

BH11-51B
Total Lead (mg/L)
0.320
0.315
0.310
0.305
0.300
0.295
0.290
0.285
06-Jun-2013
22-Oct-2013
Date Sampled

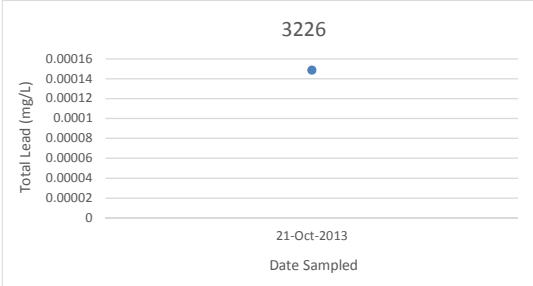

BH12-08
Total Lead (mg/L)
0.0350
0.0300
0.0250
0.0200
0.0150
0.0100
0.0050
0.0000
06-Jun-2013
23-Oct-2013
Date Sampled

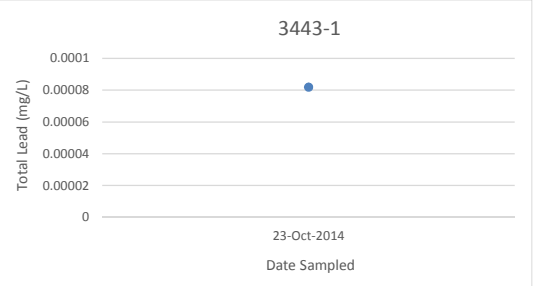

BH11-01A
Total Lead (mg/L)
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
01-Oct-2013
Date Sampled

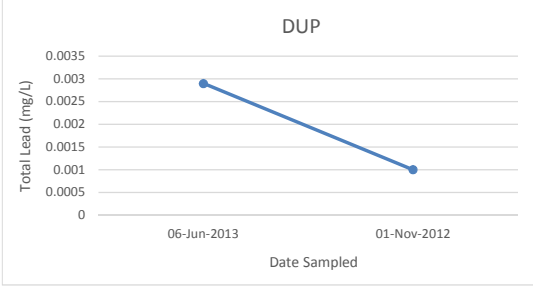

P16
Total Lead (mg/L)
0.00035
0.0003
0.00025
0.0002
0.00015
0.0001
0.00005
0
01-Oct-2013
Date Sampled

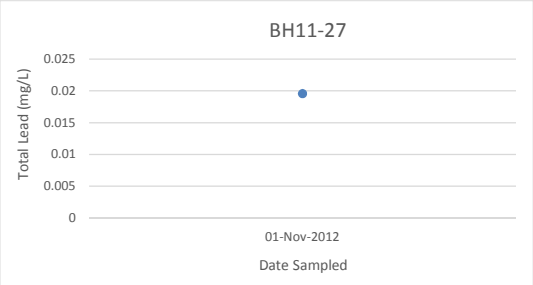

3880
Total Lead (mg/L)
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
21-Oct-2013
Date Sampled

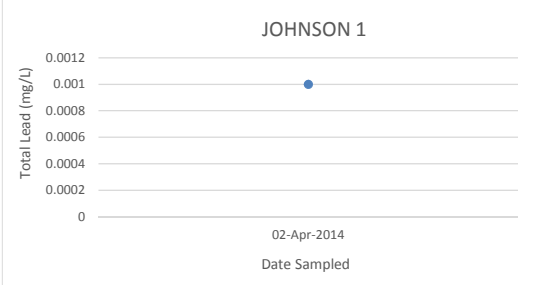

3221
Total Lead (mg/L)
0.00006
0.00005
0.00004
0.00003
0.00002
0.00001
0
21-Oct-2013
Date Sampled

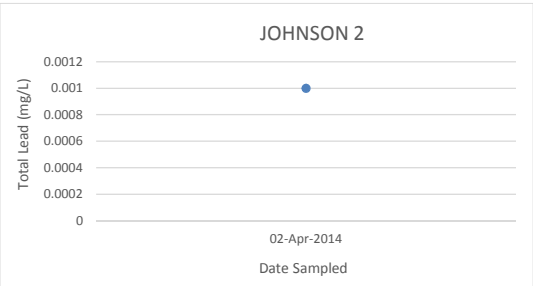

3226
Total Lead (mg/L)
0.00016
0.00014
0.00012
0.0001
0.00008
0.00006
0.00004
0.00002
0
21-Oct-2013
Date Sampled

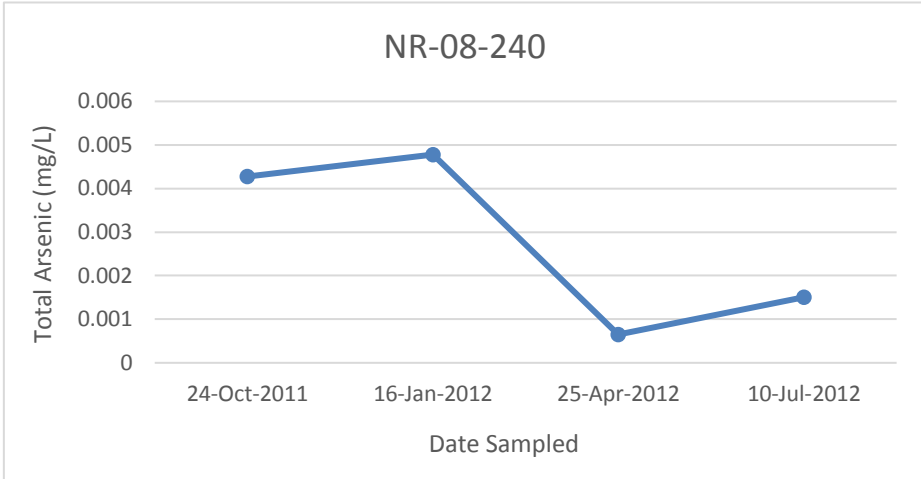

3443-1
Total Lead (mg/L)
0.0001
0.00008
0.00006
0.00004
0.00002
0
23-Oct-2014
Date Sampled

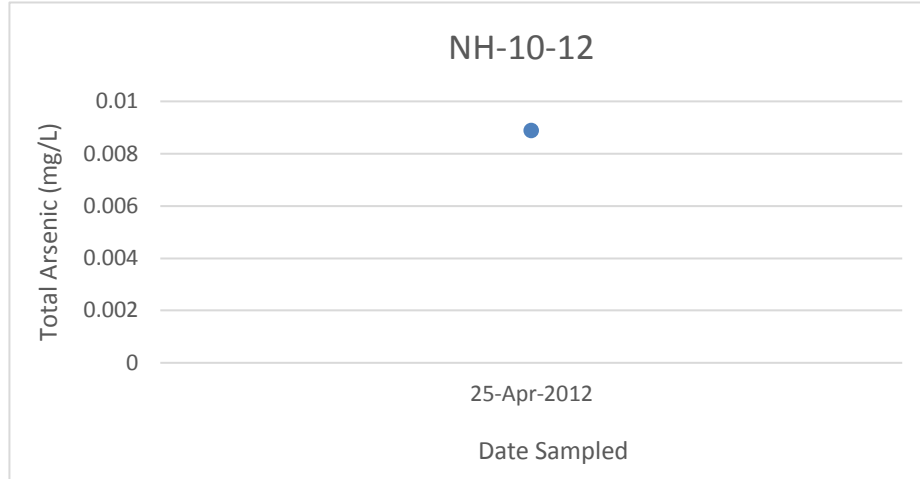

DUP
Total Lead (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
06-Jun-2013
01-Nov-2012
Date Sampled

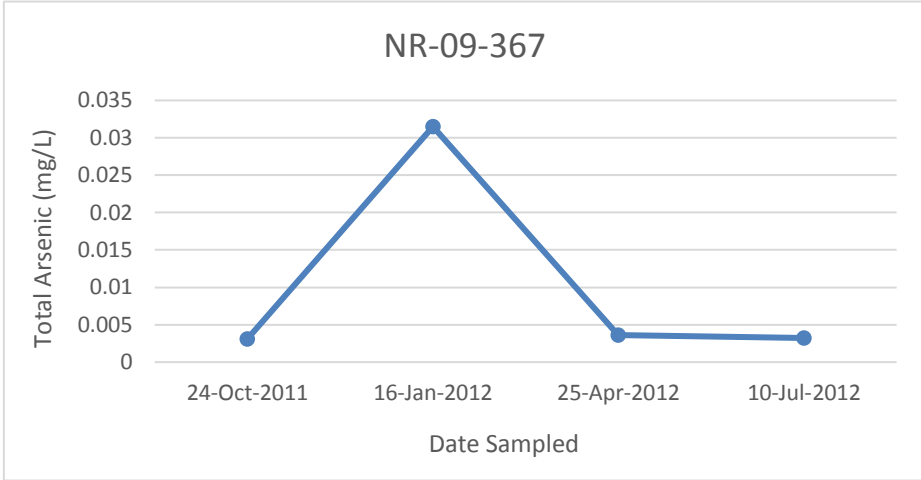

BH11-27
Total Lead (mg/L)
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
Date Sampled

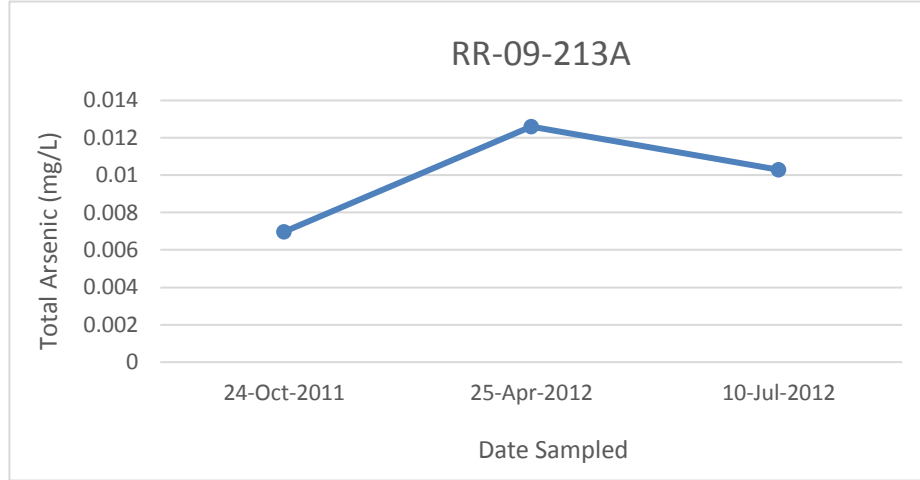

JOHNSON 1
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
02-Apr-2014
Date Sampled

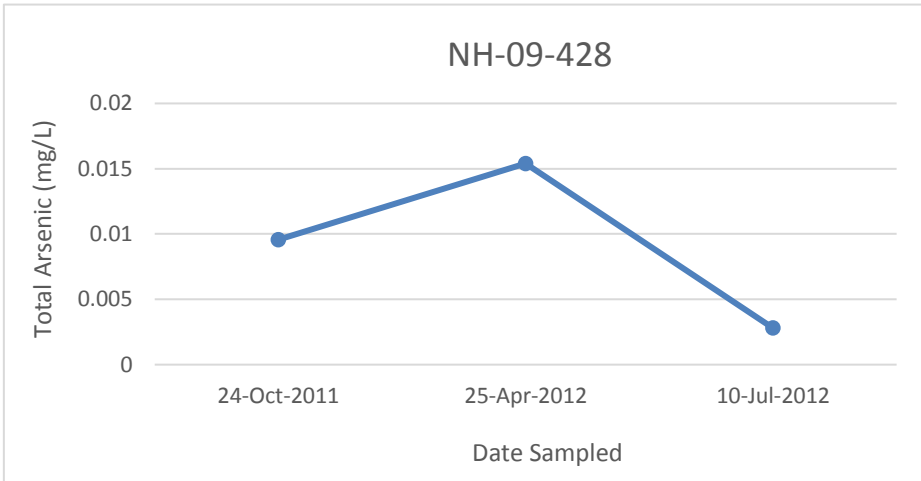

JOHNSON 2
Total Lead (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
02-Apr-2014
Date Sampled

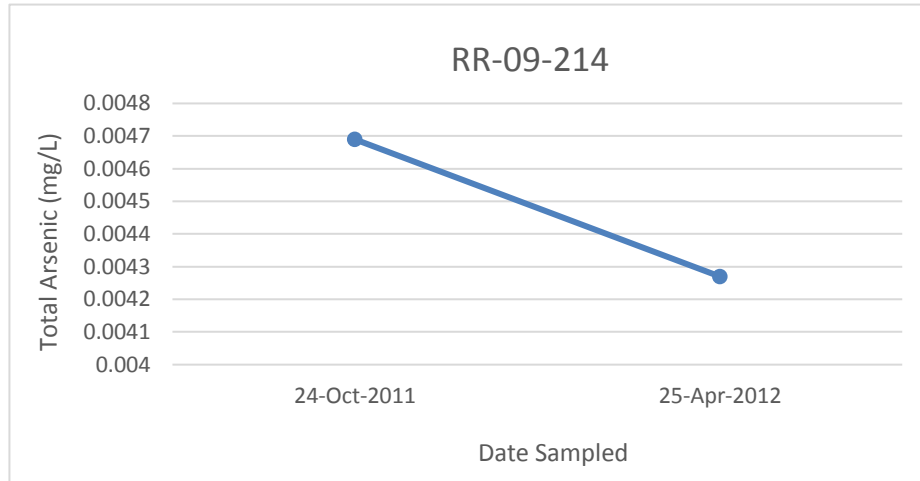

NR-08-240
Total Arsenic (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

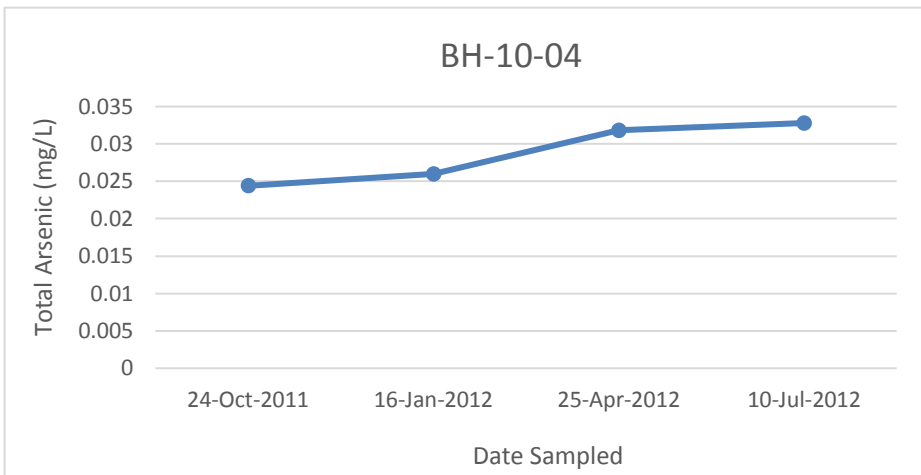

NH-10-12
Total Arsenic (mg/L)
0.01
0.008
0.006
0.004
0.002
0
25-Apr-2012
Date Sampled

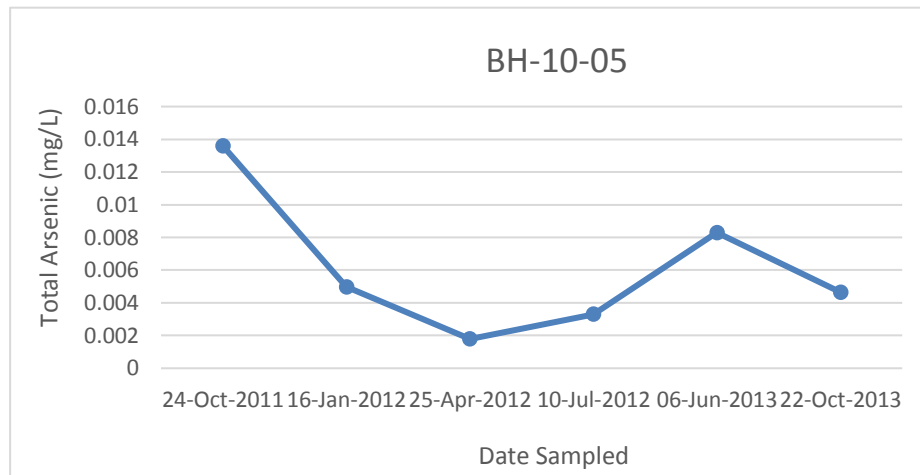

NR-09-367
Total Arsenic (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

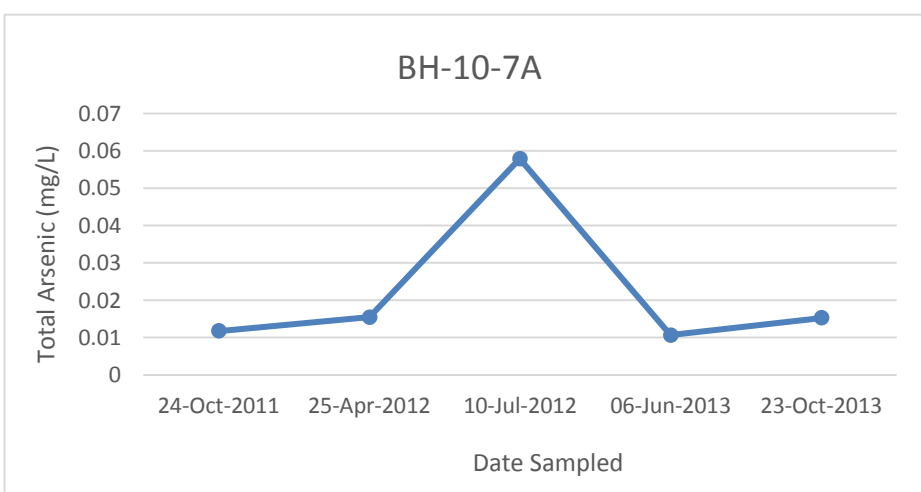

RR-09-213A
Total Arsenic (mg/L)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

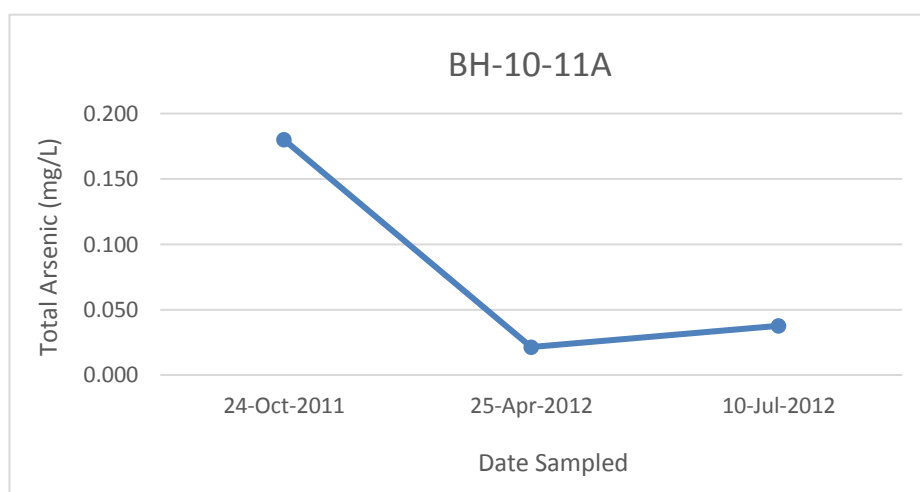

NH-09-428
Total Arsenic (mg/L)
0.02
0.015
0.01
0.005
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

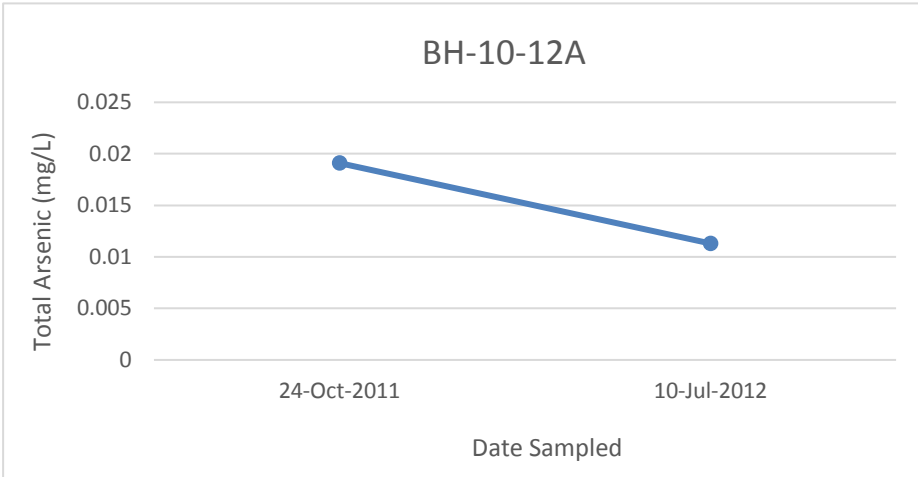

RR-09-214
Total Arsenic (mg/L)
0.0048
0.0047
0.0046
0.0045
0.0044
0.0043
0.0042
0.0041
0.004
24-Oct-2011
25-Apr-2012
Date Sampled

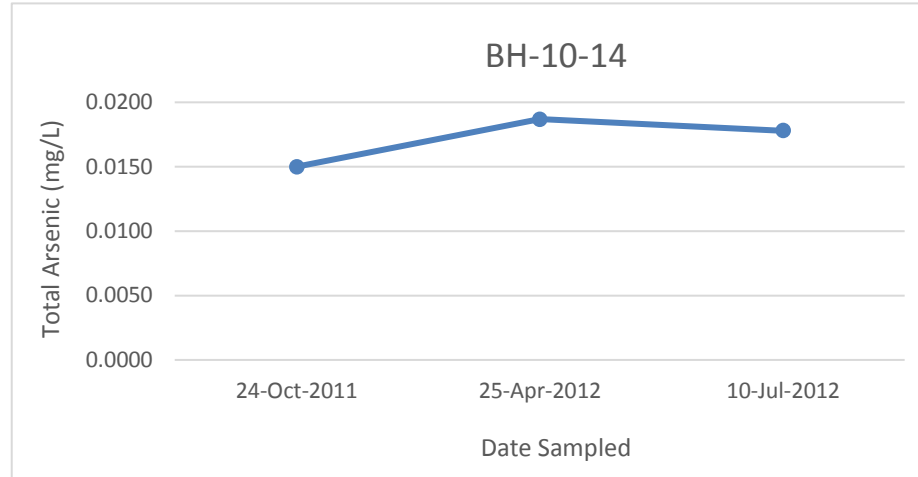

BH-10-04
Total Arsenic (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

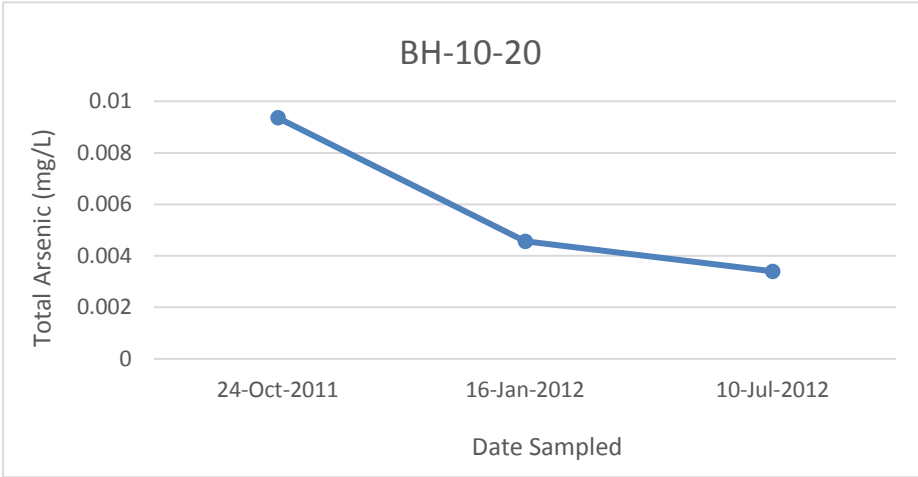

BH-10-05
Total Arsenic (mg/L)
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

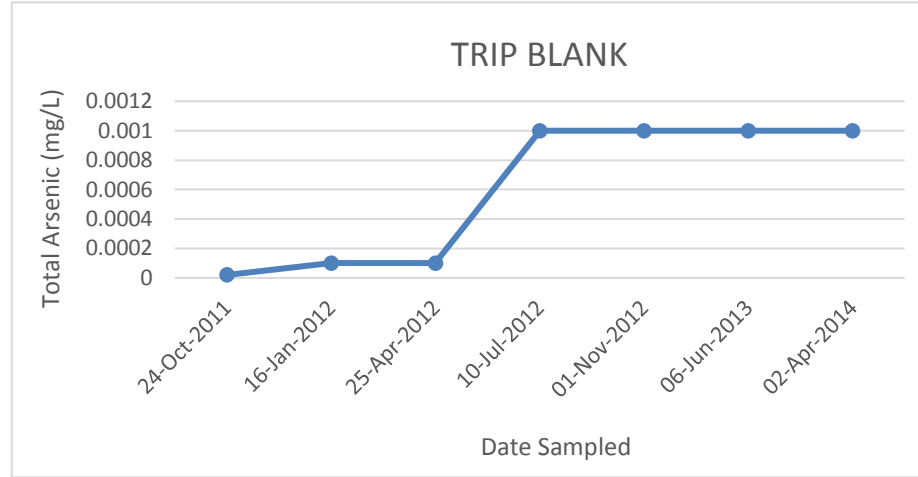

BH-10-7A
Total Arsenic (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

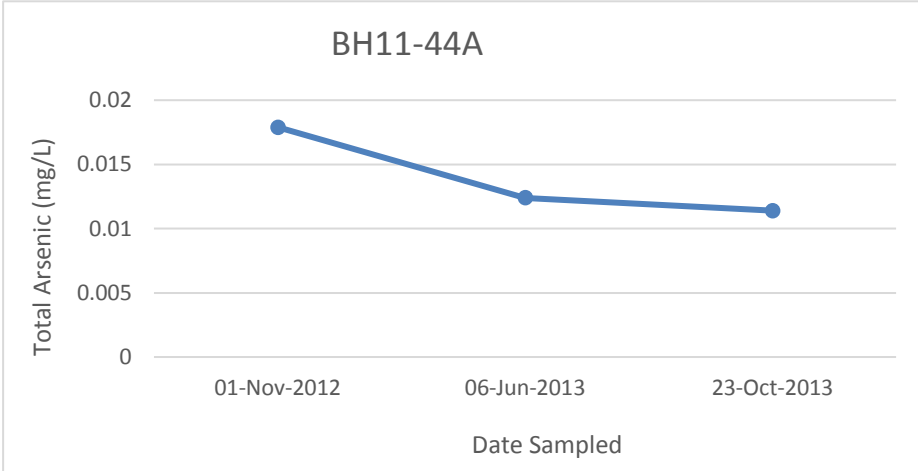

BH-10-11A
Total Arsenic (mg/L)
0.200
0.150
0.100
0.050
0.000
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

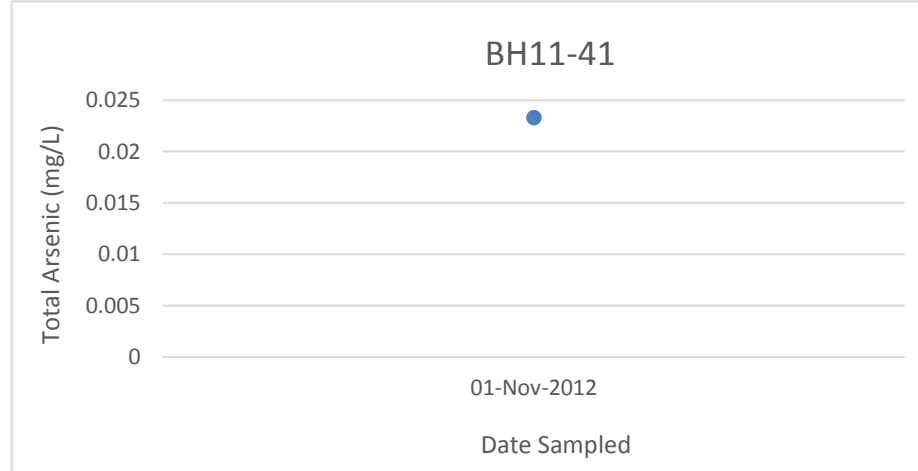

BH-10-12A
Total Arsenic (mg/L)
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
10-Jul-2012
Date Sampled

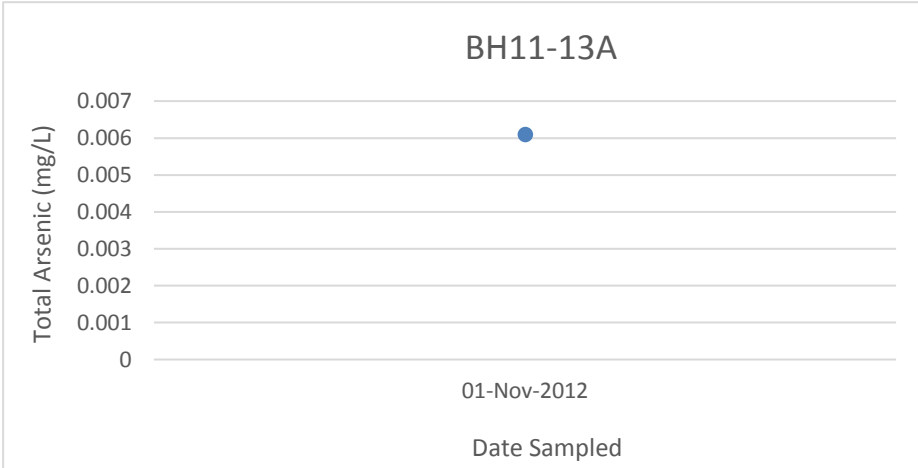

BH-10-14
Total Arsenic (mg/L)
0.0200
0.0150
0.0100
0.0050
0.0000
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

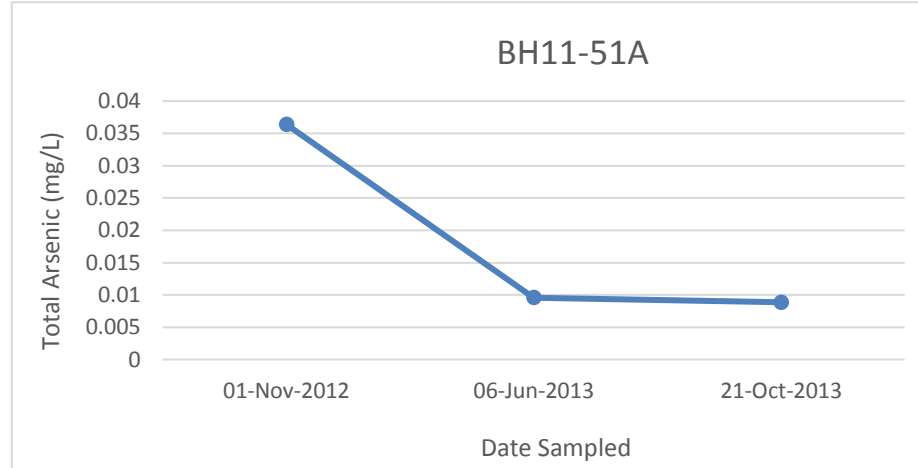

BH-10-20
Total Arsenic (mg/L)
0.01
0.008
0.006
0.004
0.002
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

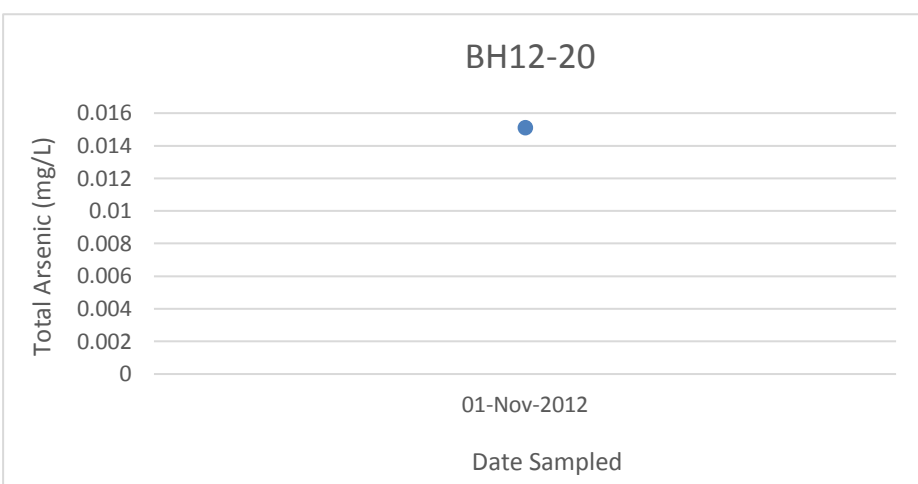

TRIP BLANK
Total Arsenic (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

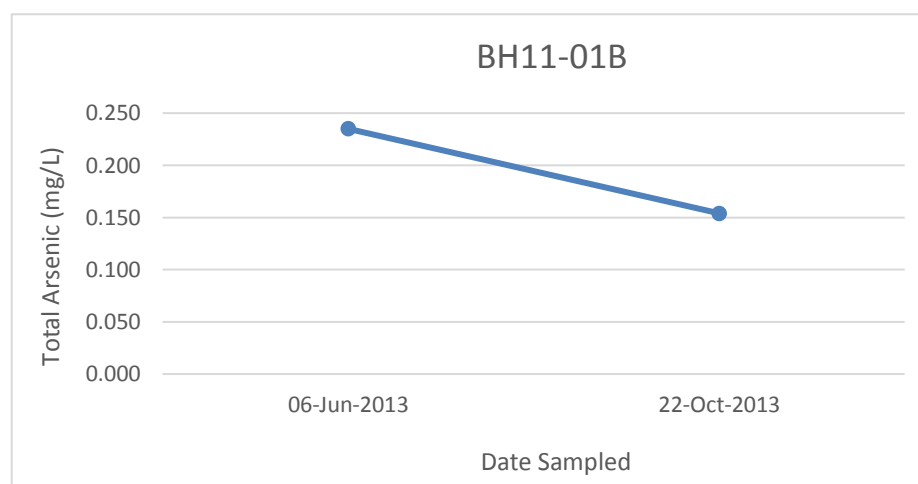

BH11-44A
Total Arsenic (mg/L)
0.02
0.015
0.01
0.005
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

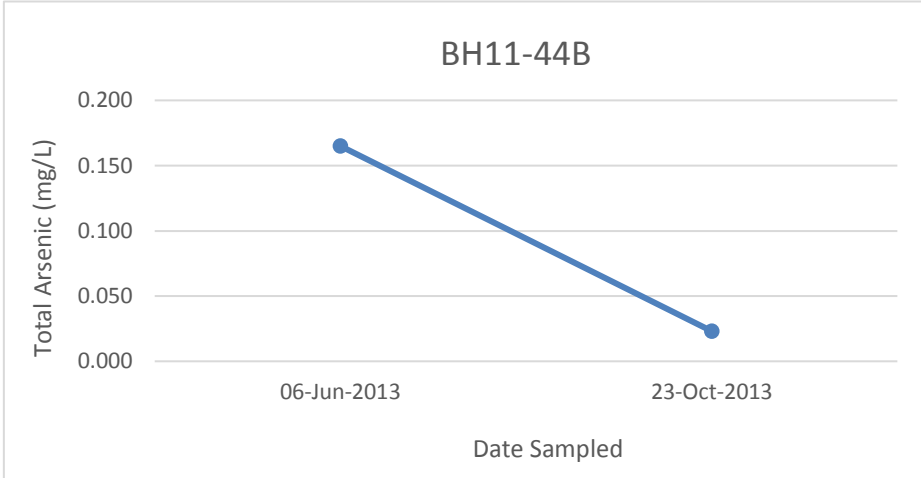

BH11-41
Total Arsenic (mg/L)
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
Date Sampled

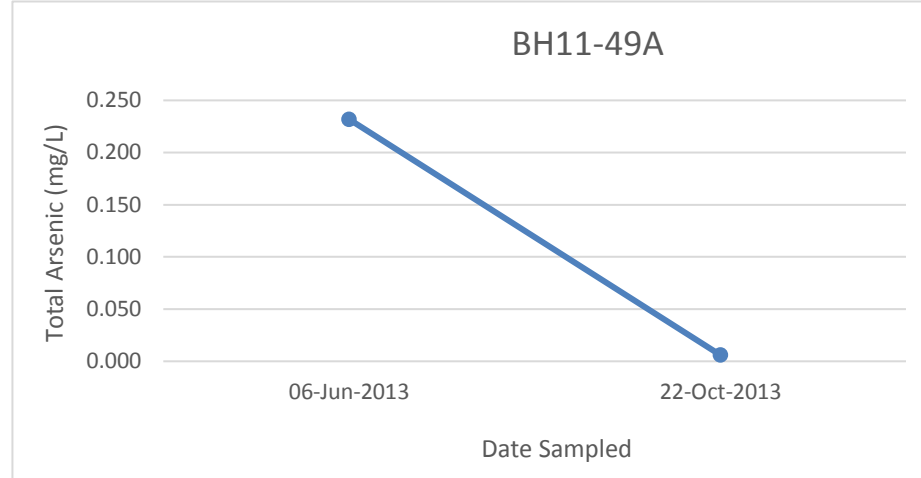

BH11-13A
Total Arsenic (mg/L)
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
01-Nov-2012
Date Sampled

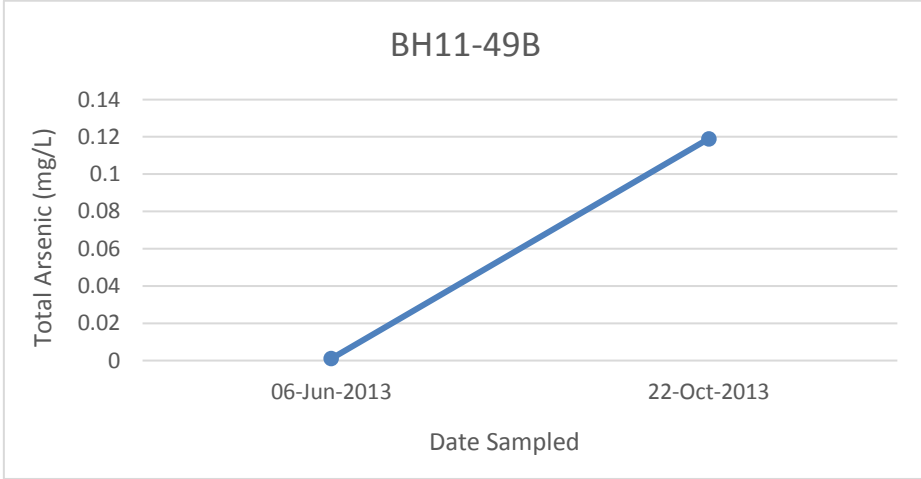

BH11-51A
Total Arsenic (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled

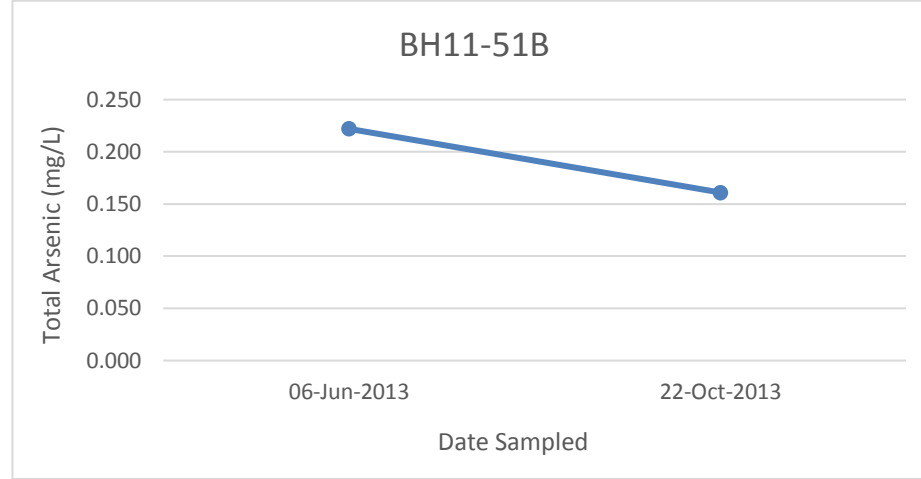

BH12-20
Total Arsenic (mg/L)
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
01-Nov-2012
Date Sampled

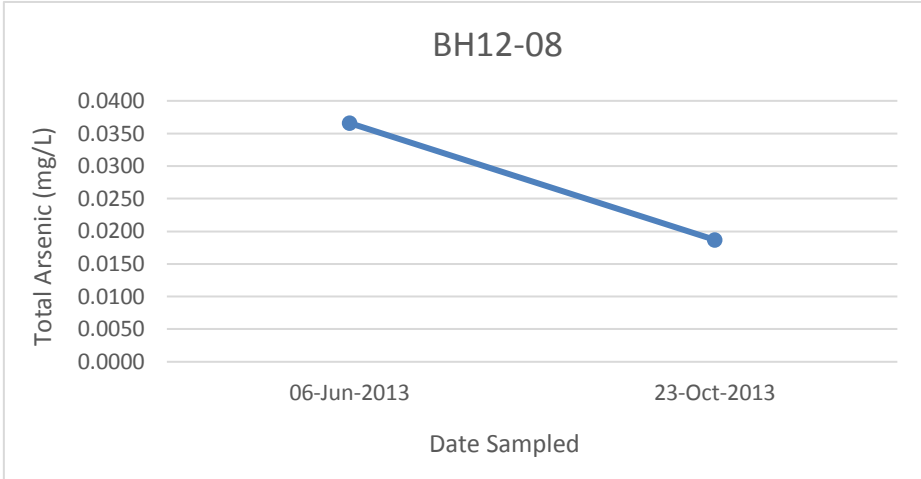

BH11-01B
Total Arsenic (mg/L)
0.250
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

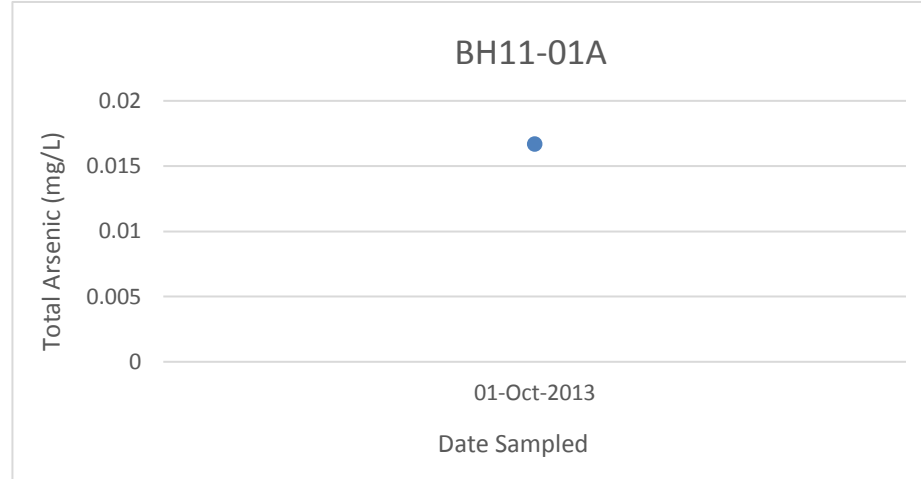

BH11-44B
Total Arsenic (mg/L)
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
23-Oct-2013
Date Sampled

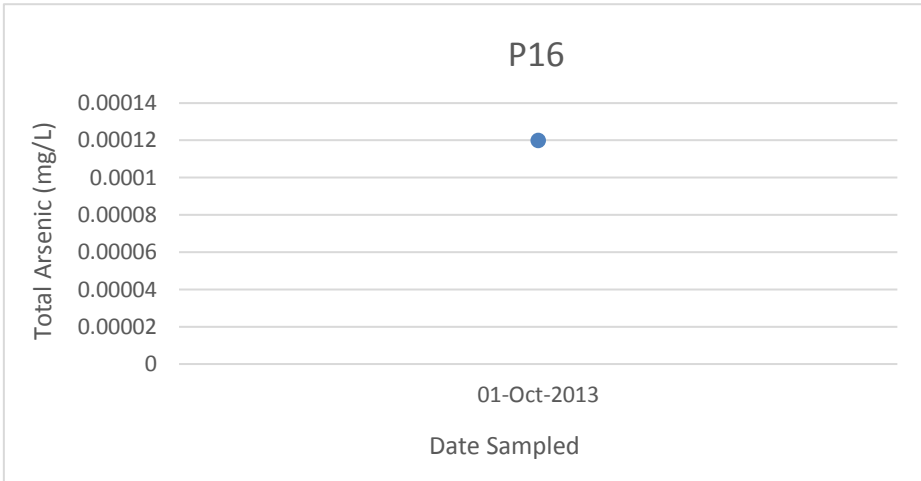

BH11-49A
Total Arsenic (mg/L)
0.250
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

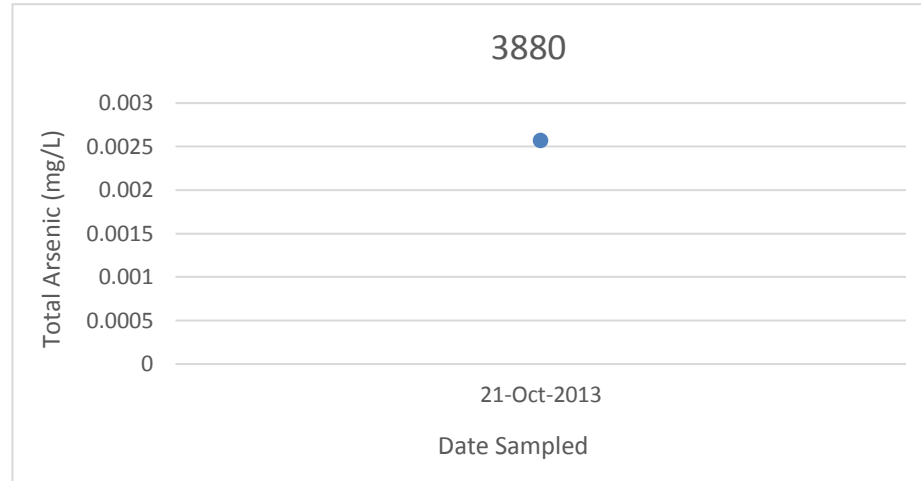

BH11-49B
Total Arsenic (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
06-Jun-2013
22-Oct-2013
Date Sampled

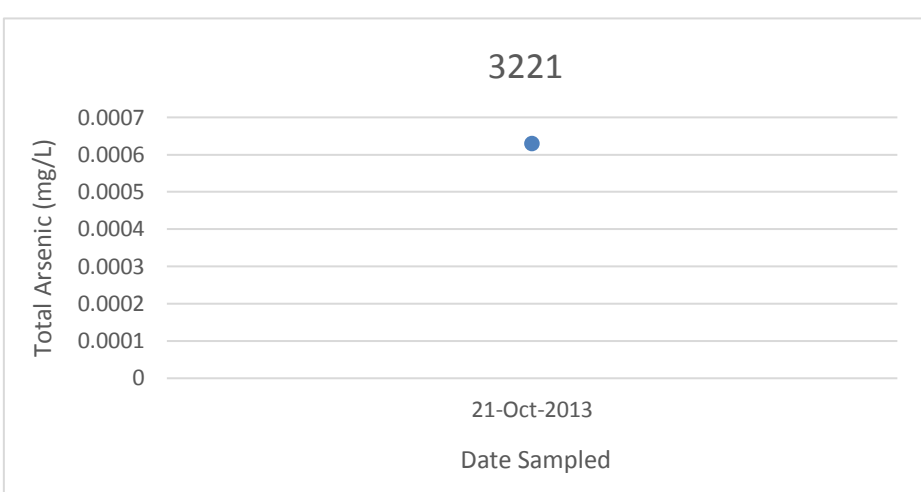

BH11-51B
Total Arsenic (mg/L)
0.250
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

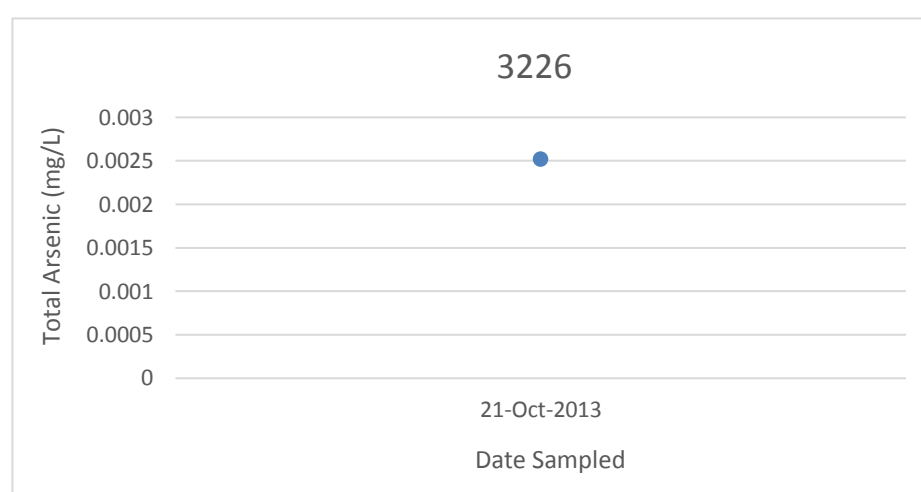

BH12-08
Total Arsenic (mg/L)
0.0400
0.0350
0.0300
0.0250
0.0200
0.0150
0.0100
0.0050
0.0000
06-Jun-2013
23-Oct-2013
Date Sampled

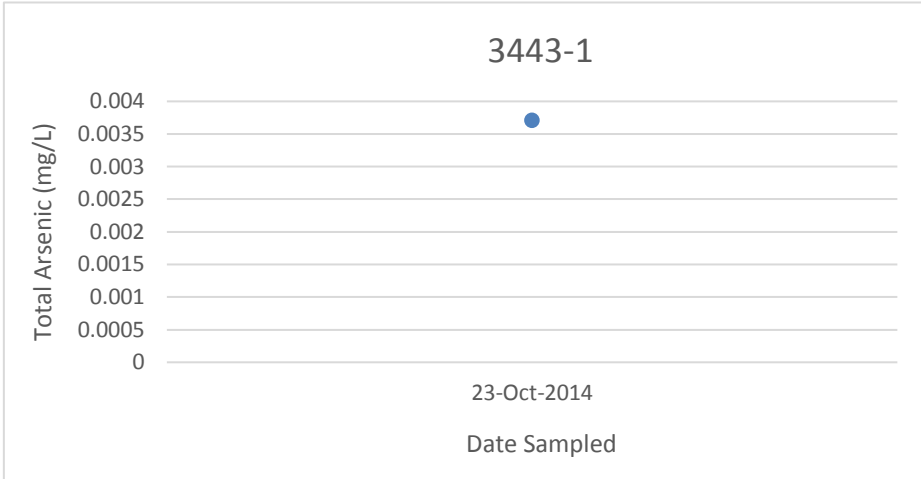

BH11-01A
Total Arsenic (mg/L)
0.02
0.015
0.01
0.005
0
01-Oct-2013
Date Sampled

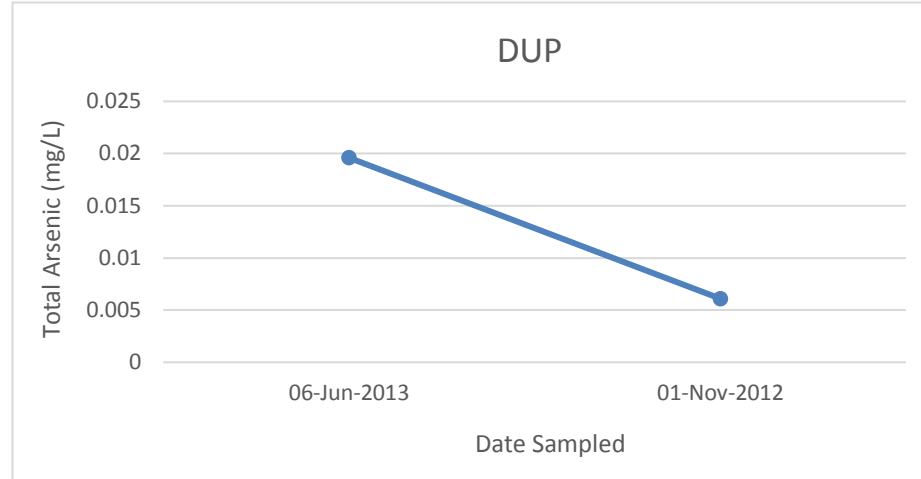

P16
Total Arsenic (mg/L)
0.00014
0.00012
0.0001
0.00008
0.00006
0.00004
0.00002
0
01-Oct-2013
Date Sampled

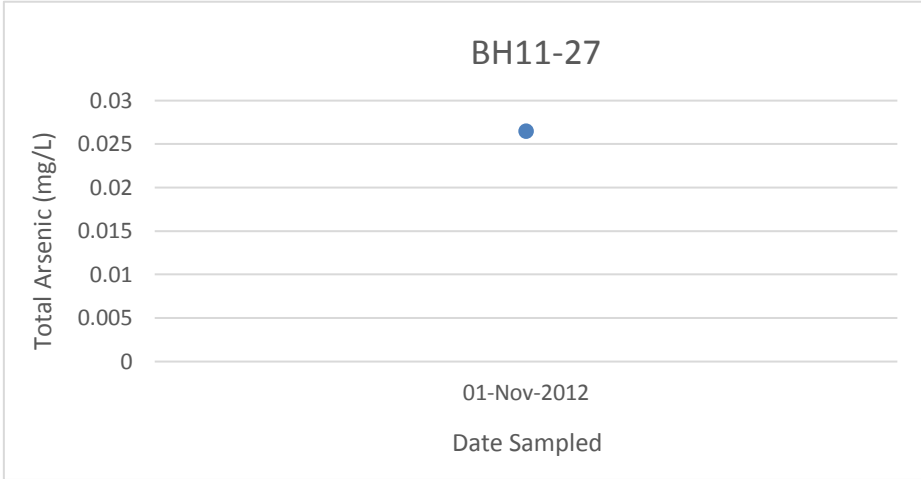

3880
Total Arsenic (mg/L)
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
21-Oct-2013
Date Sampled

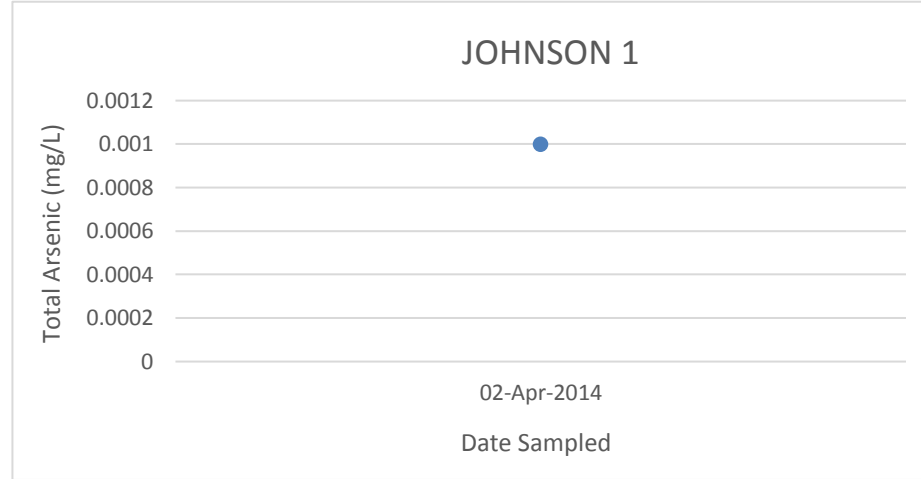

3221
Total Arsenic (mg/L)
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
21-Oct-2013
Date Sampled

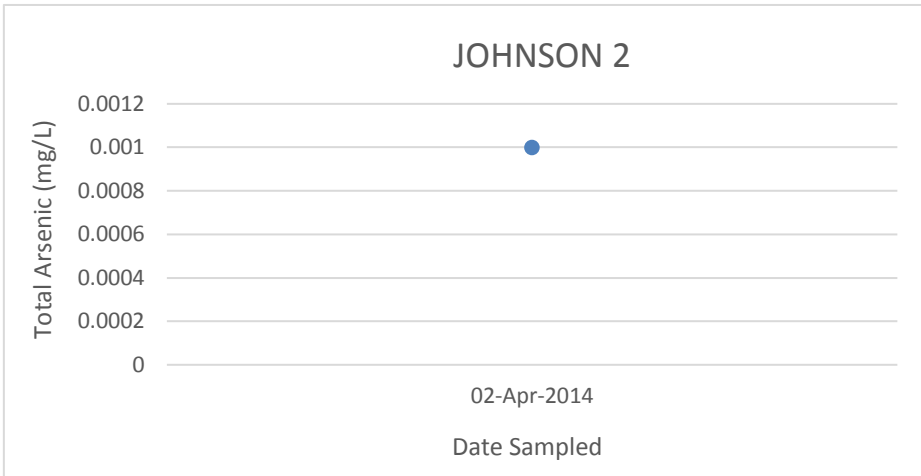

3226
Total Arsenic (mg/L)
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
21-Oct-2013
Date Sampled

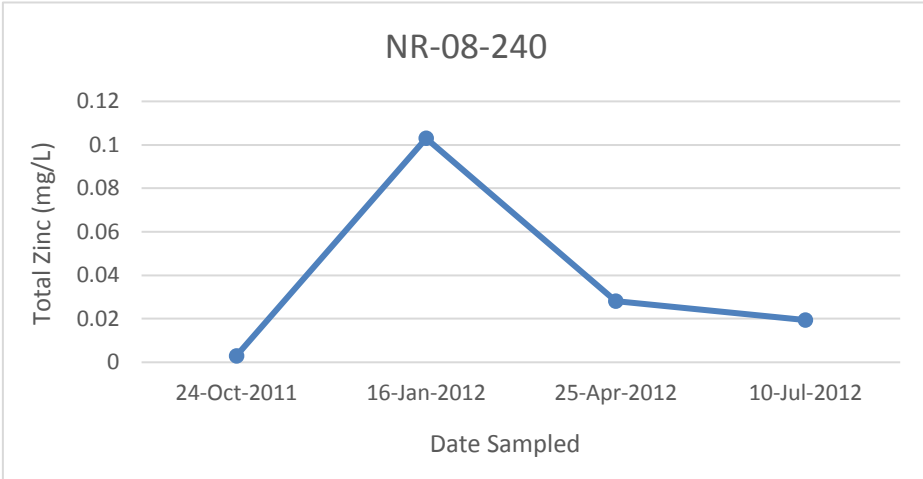

3443-1
Total Arsenic (mg/L)
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
23-Oct-2014
Date Sampled

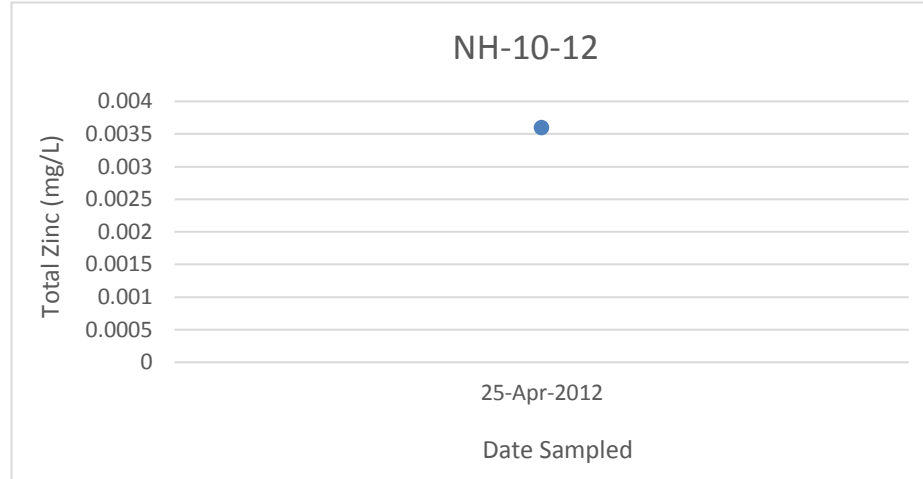

DUP
Total Arsenic (mg/L)
0.025
0.02
0.015
0.01
0.005
0
06-Jun-2013
01-Nov-2012
Date Sampled

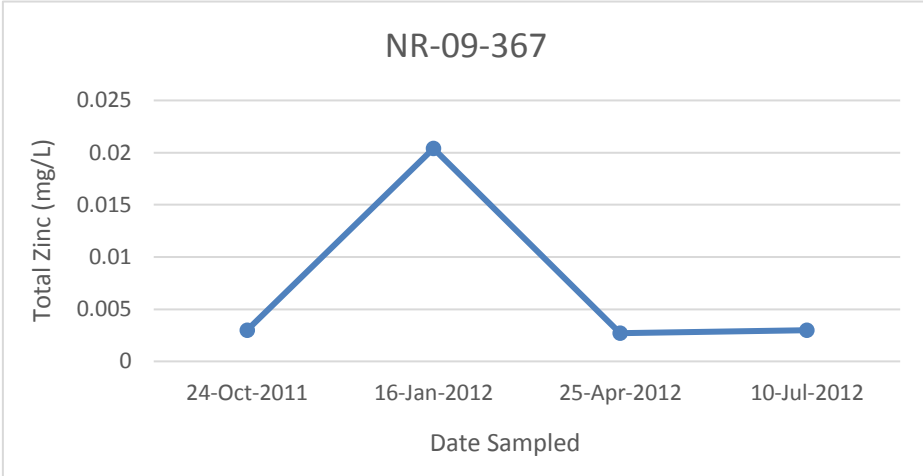

BH11-27
Total Arsenic (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
Date Sampled

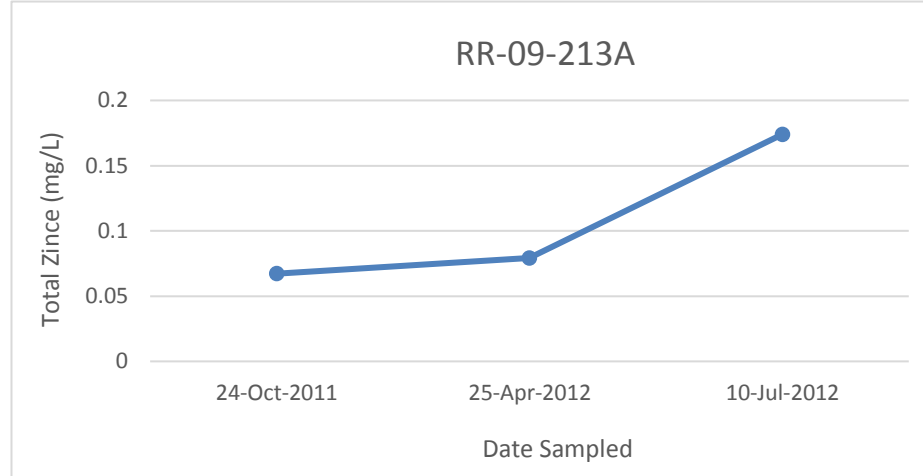

JOHNSON 1
Total Arsenic (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
02-Apr-2014
Date Sampled

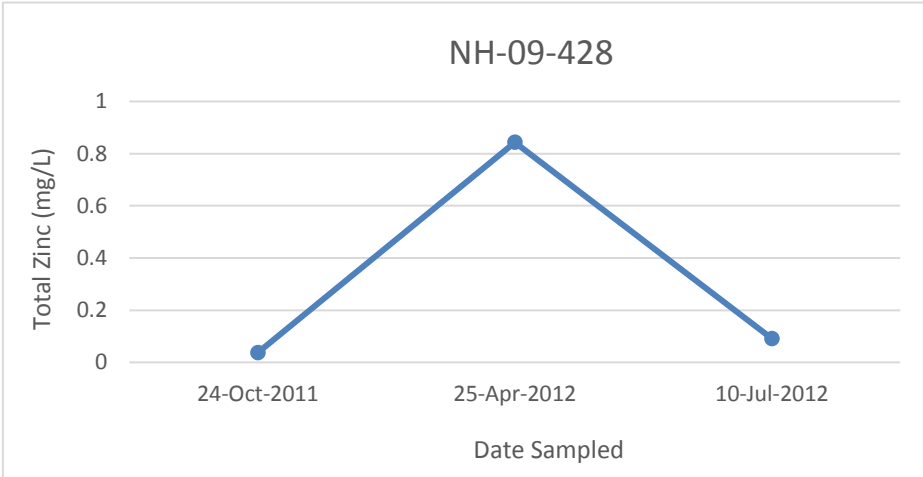

JOHNSON 2
Total Arsenic (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
02-Apr-2014
Date Sampled

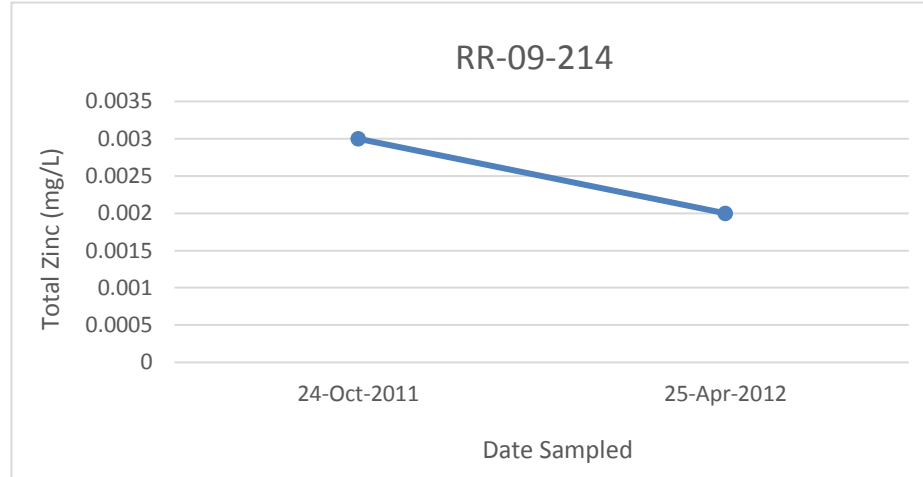

NR-08-240
Total Zinc (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

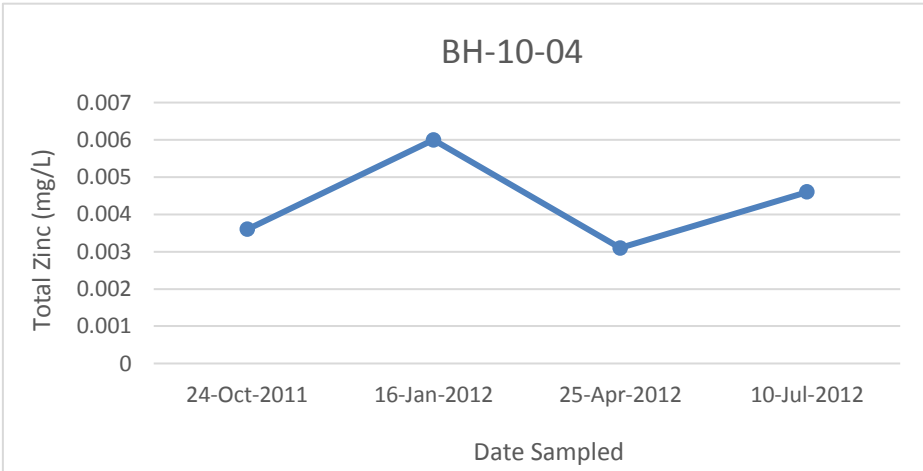

NH-10-12
Total Zinc (mg/L)
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
25-Apr-2012
Date Sampled

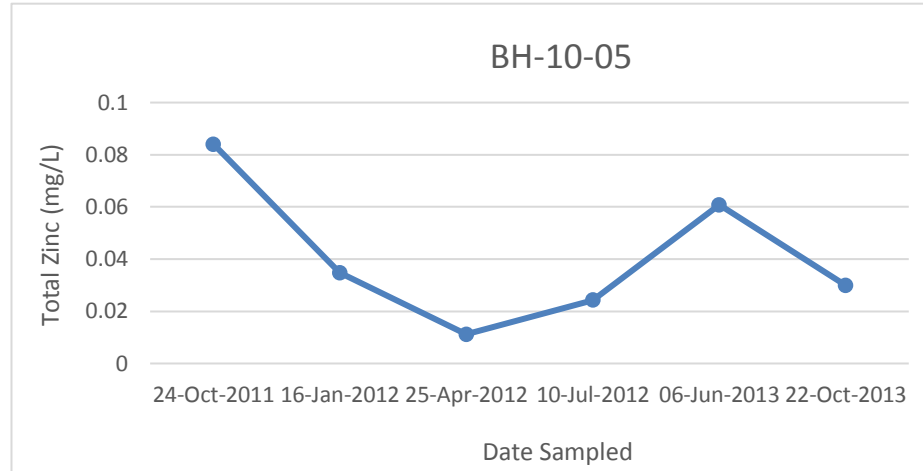

NR-09-367
Total Zinc (mg/L)
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

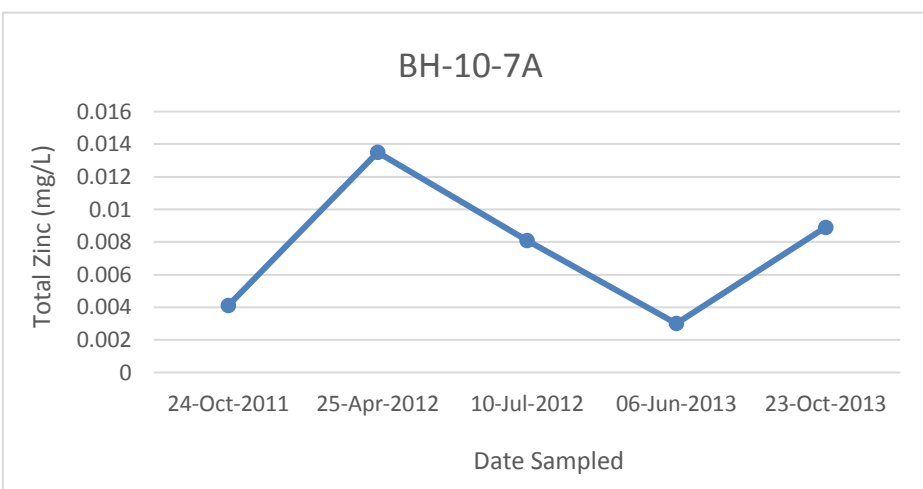

RR-09-213A
Total Zince (mg/L)
0.2
0.15
0.1
0.05
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

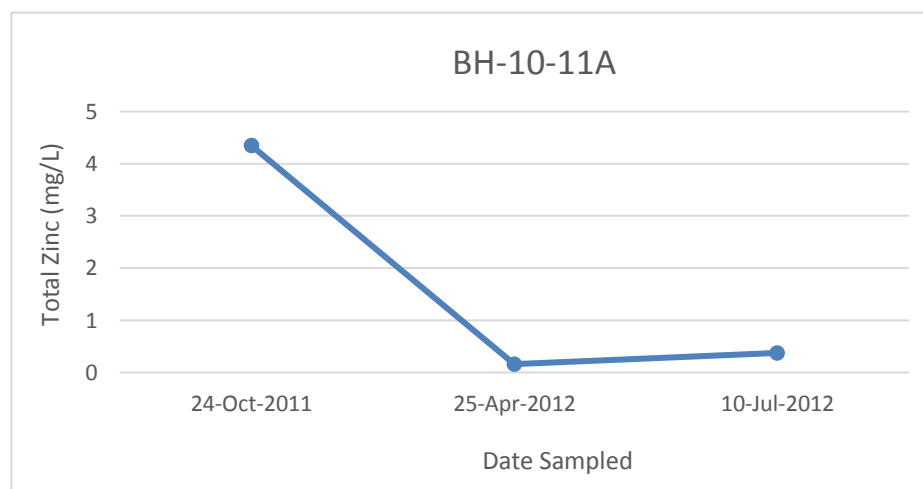

NH-09-428
Total Zinc (mg/L)
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

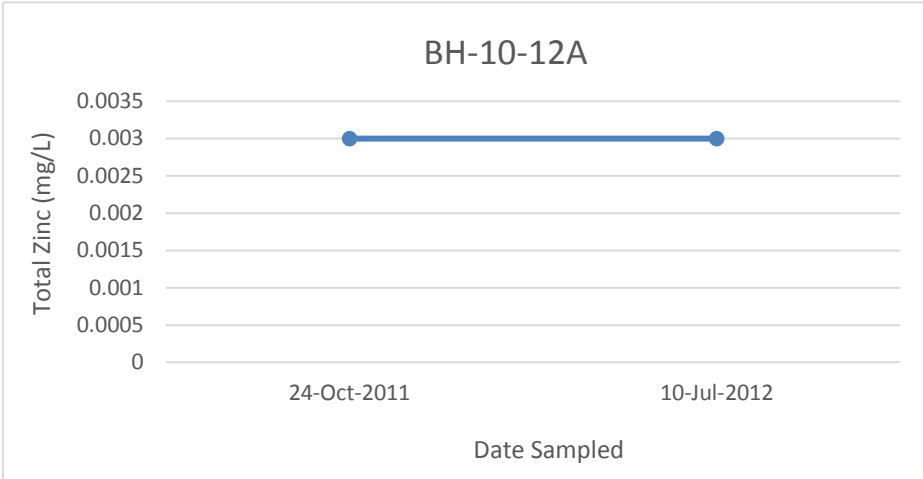

RR-09-214
Total Zinc (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
25-Apr-2012
Date Sampled

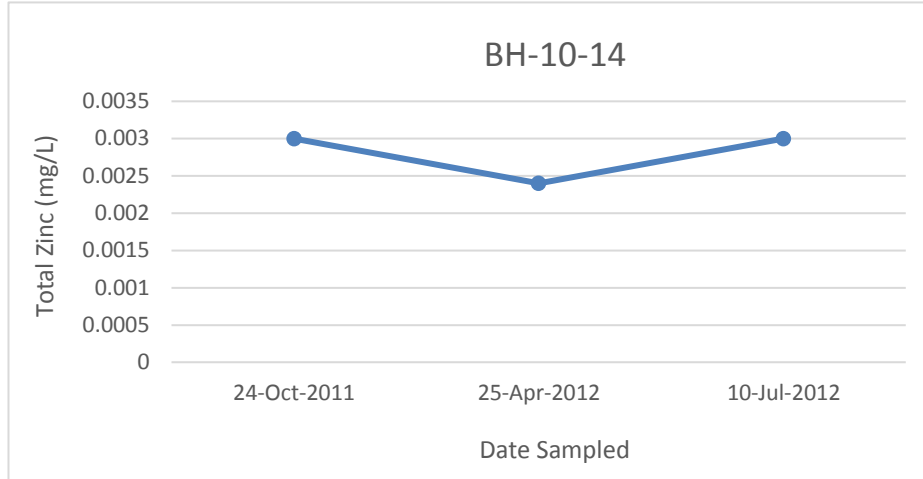

BH-10-04
Total Zinc (mg/L)
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

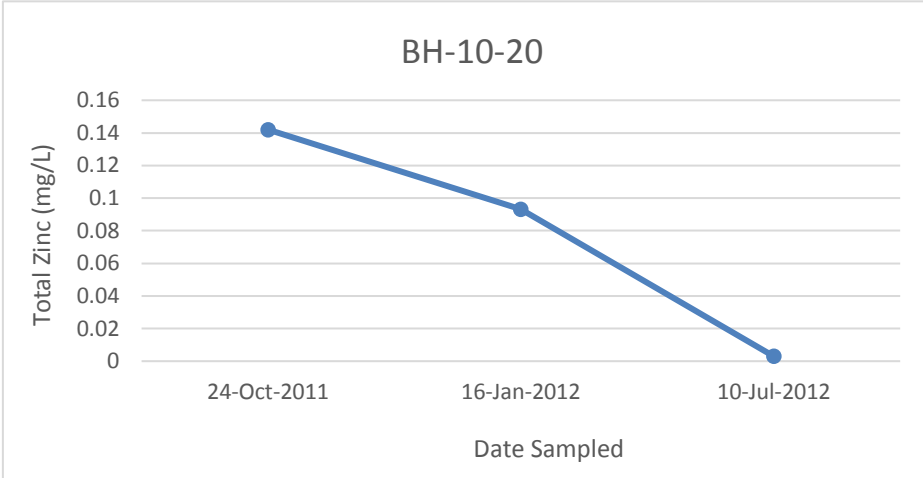

BH-10-05
Total Zinc (mg/L)
0.1
0.08
0.06
0.04
0.02
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

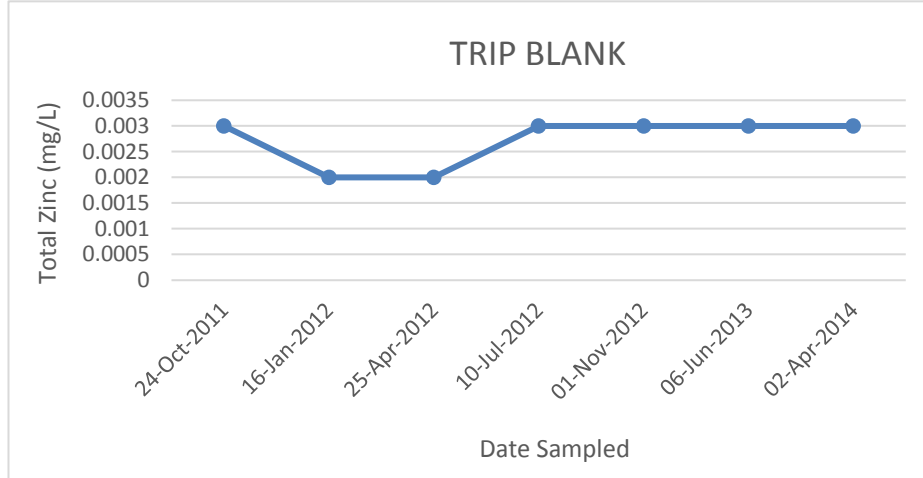

BH-10-7A
Total Zinc (mg/L)
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

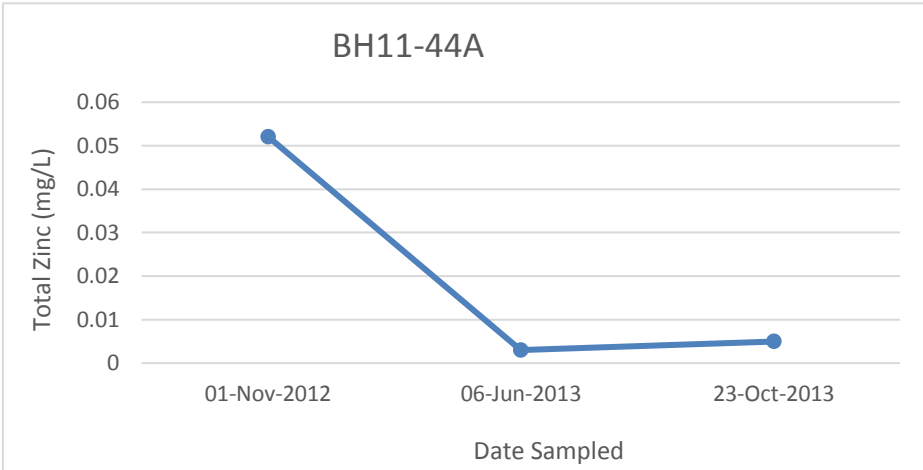

BH-10-11A
Total Zinc (mg/L)
5
4
3
2
1
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

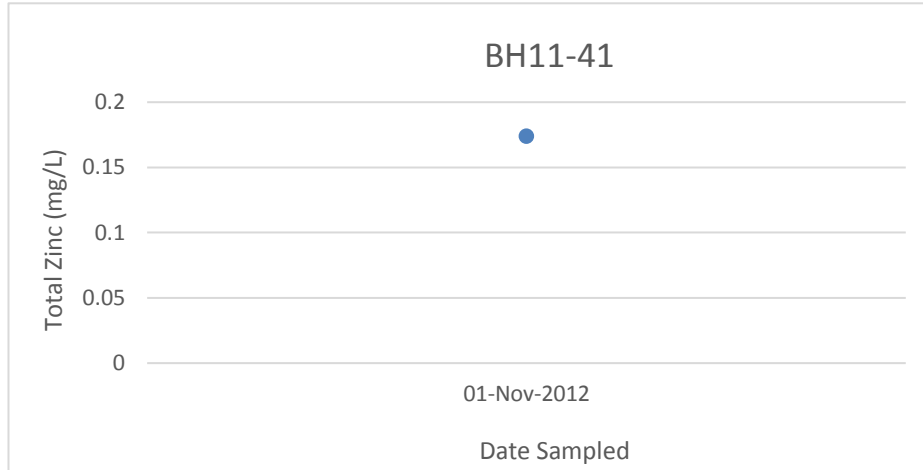

BH-10-12A
Total Zinc (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
10-Jul-2012
Date Sampled

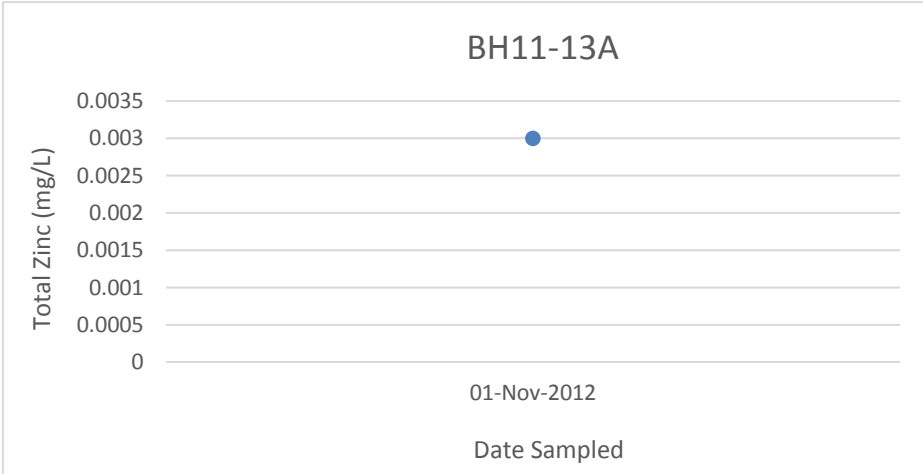

BH-10-14
Total Zinc (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

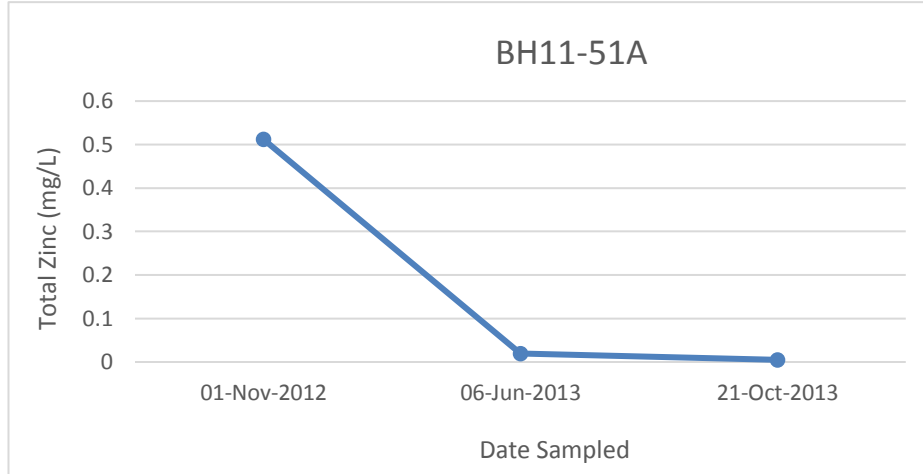

BH-10-20
Total Zinc (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

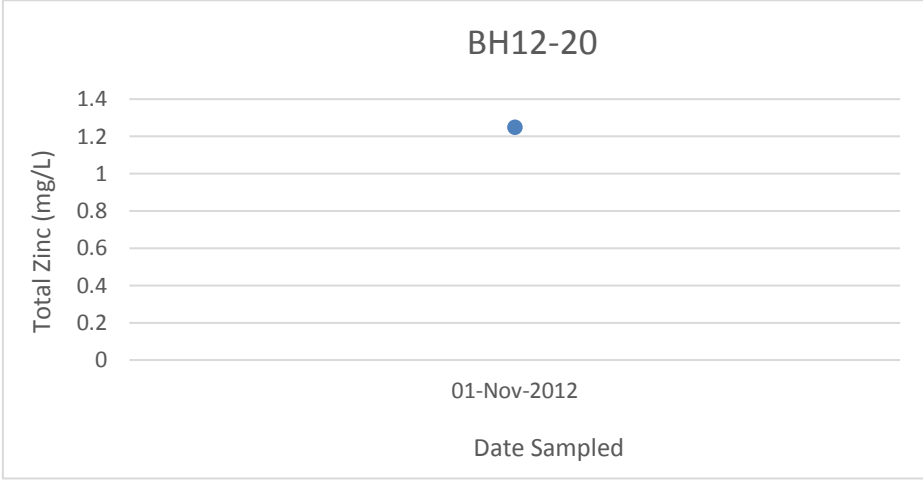

TRIP BLANK
Total Zinc (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

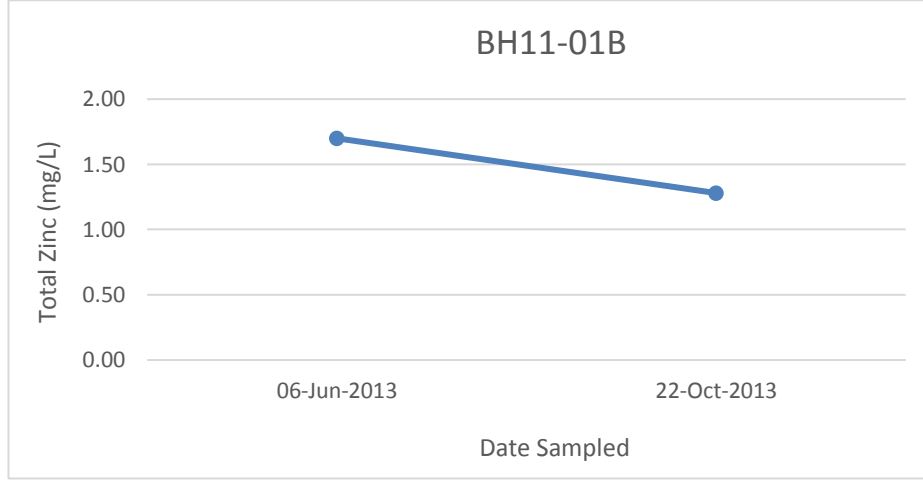

BH11-44A
Total Zinc (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

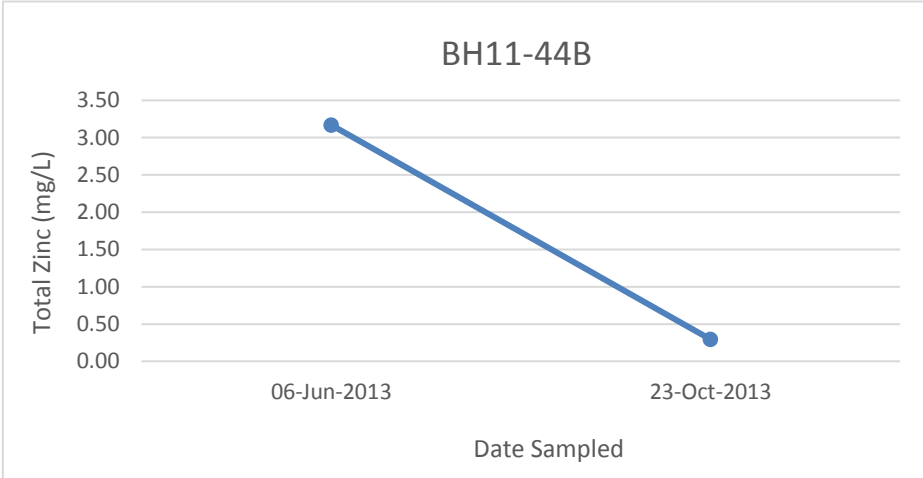

BH11-41
Total Zinc (mg/L)
0.2
0.15
0.1
0.05
0
01-Nov-2012
Date Sampled

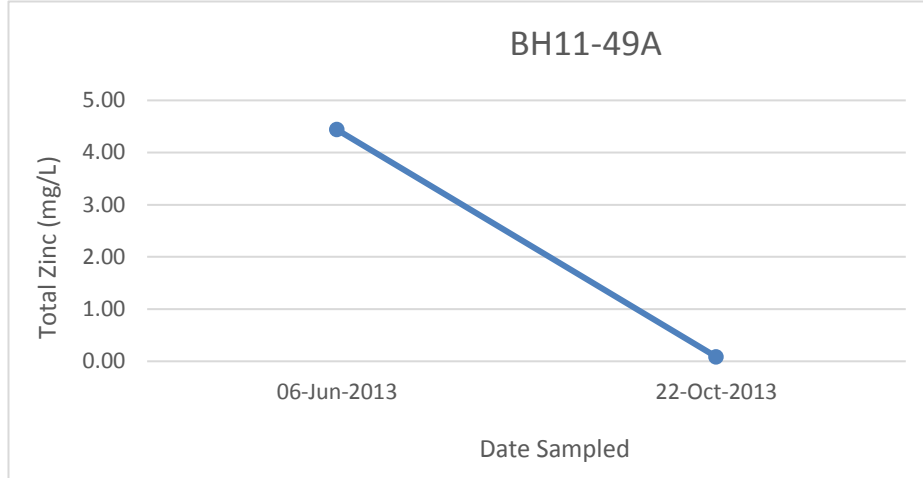

BH11-13A
Total Zinc (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
Date Sampled

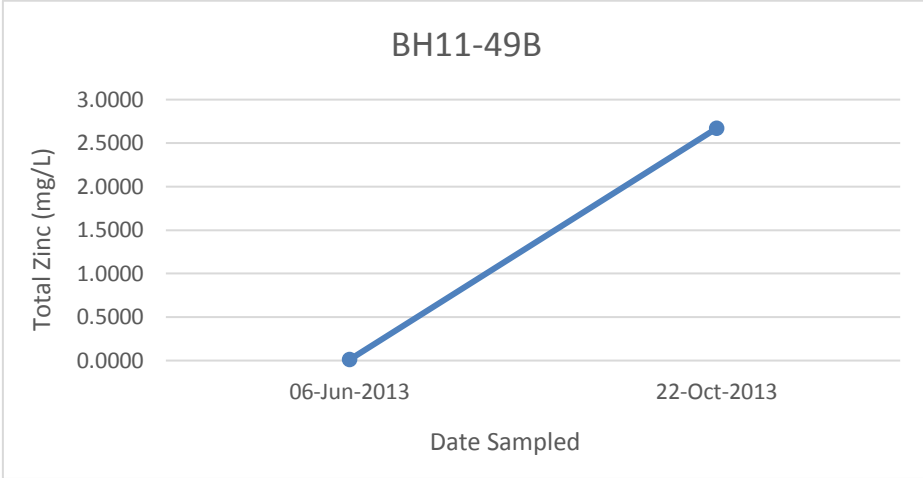

BH11-51A
Total Zinc (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled

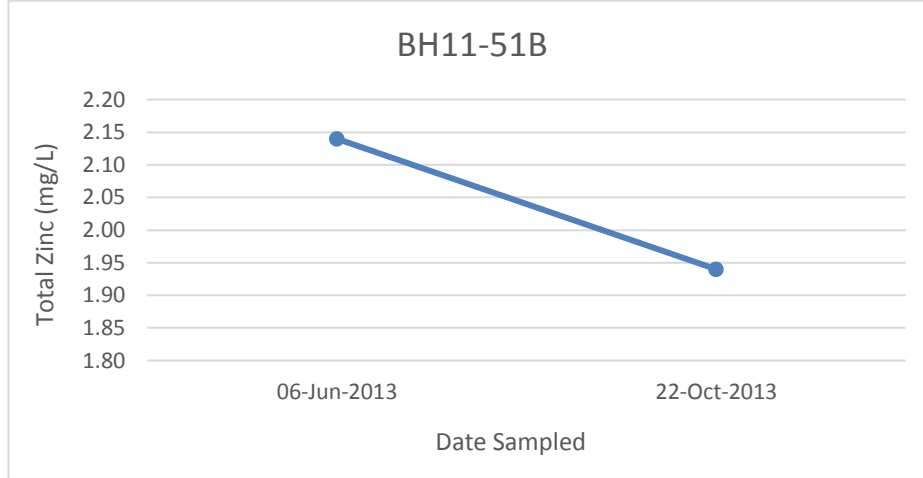

BH12-20
Total Zinc (mg/L)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
01-Nov-2012
Date Sampled

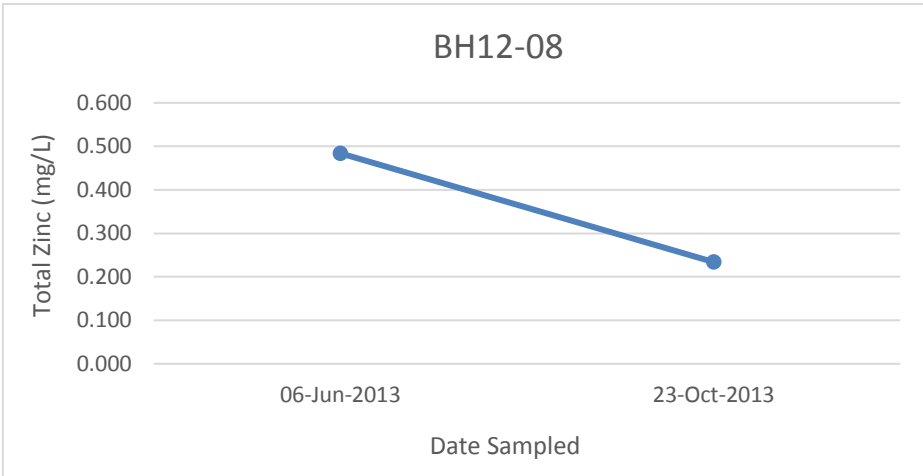

BH11-01B
Total Zinc (mg/L)
2.00
1.50
1.00
0.50
0.00
06-Jun-2013
22-Oct-2013
Date Sampled

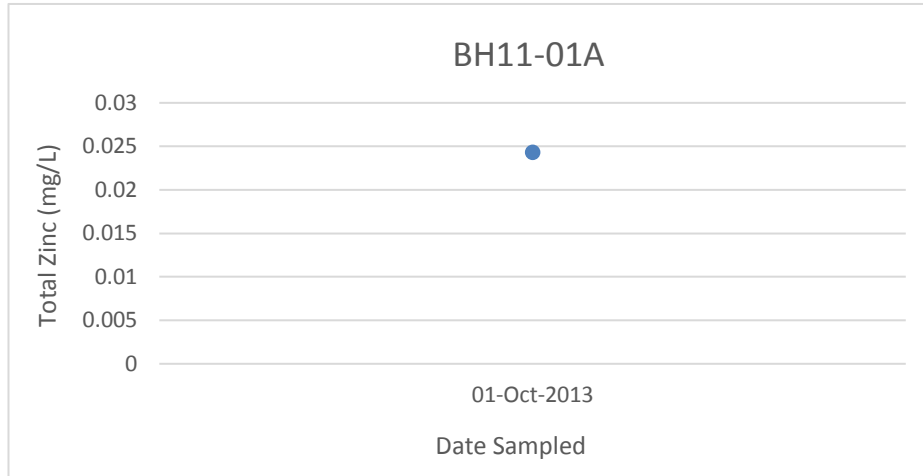

BH11-44B
Total Zinc (mg/L)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
06-Jun-2013
23-Oct-2013
Date Sampled

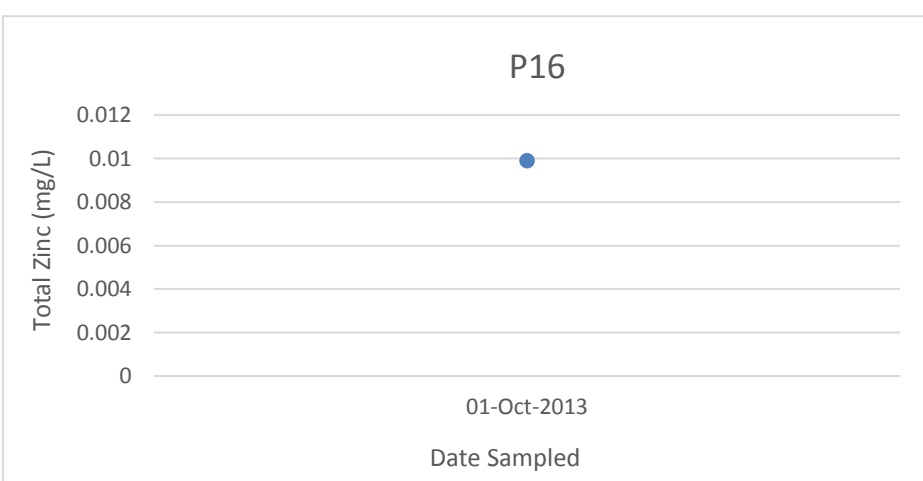

BH11-49A
Total Zinc (mg/L)
5.00
4.00
3.00
2.00
1.00
0.00
06-Jun-2013
22-Oct-2013
Date Sampled

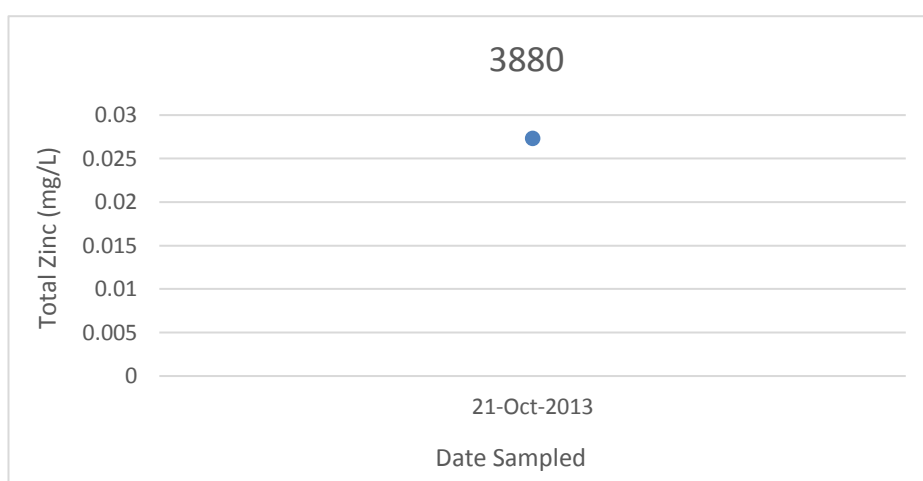

BH11-49B
Total Zinc (mg/L)
3.0000
2.5000
2.0000
1.5000
1.0000
0.5000
0.0000
06-Jun-2013
22-Oct-2013
Date Sampled

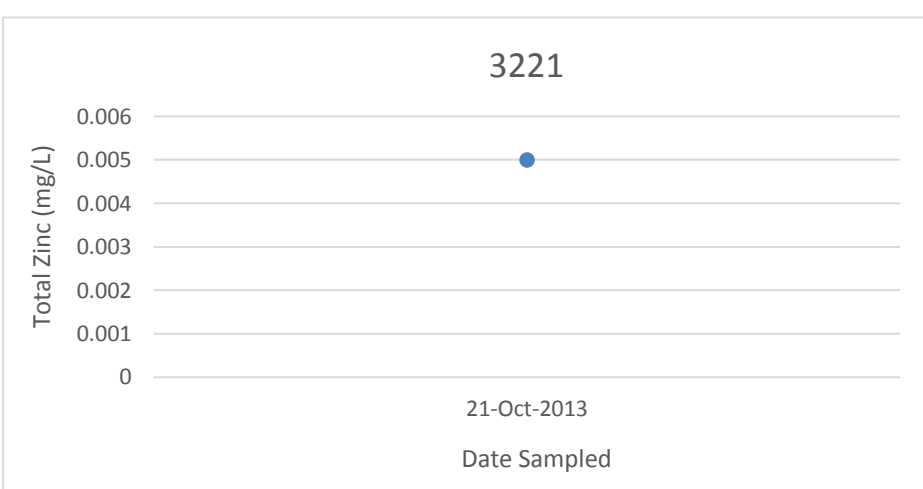

BH11-51B
Total Zinc (mg/L)
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
06-Jun-2013
22-Oct-2013
Date Sampled

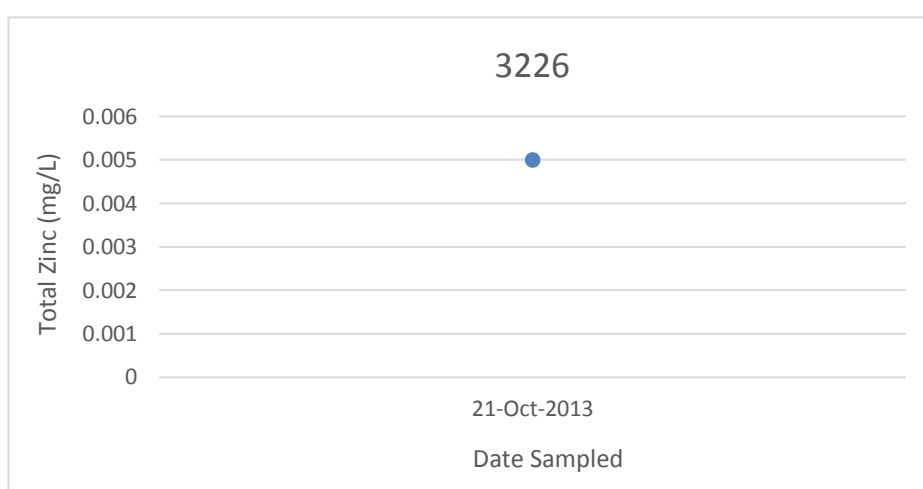

BH12-08
Total Zinc (mg/L)
0.600
0.500
0.400
0.300
0.200
0.100
0.000
06-Jun-2013
23-Oct-2013
Date Sampled

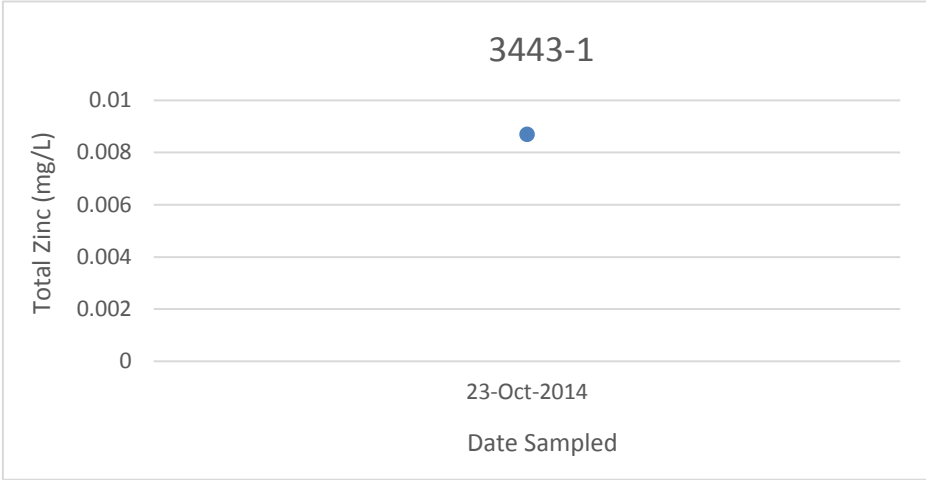

BH11-01A
Total Zinc (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
01-Oct-2013
Date Sampled

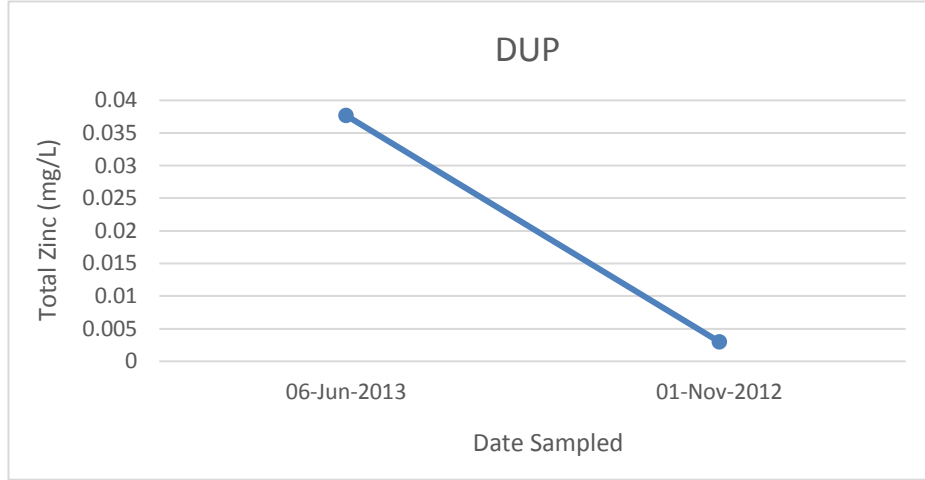

P16
Total Zinc (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
01-Oct-2013
Date Sampled

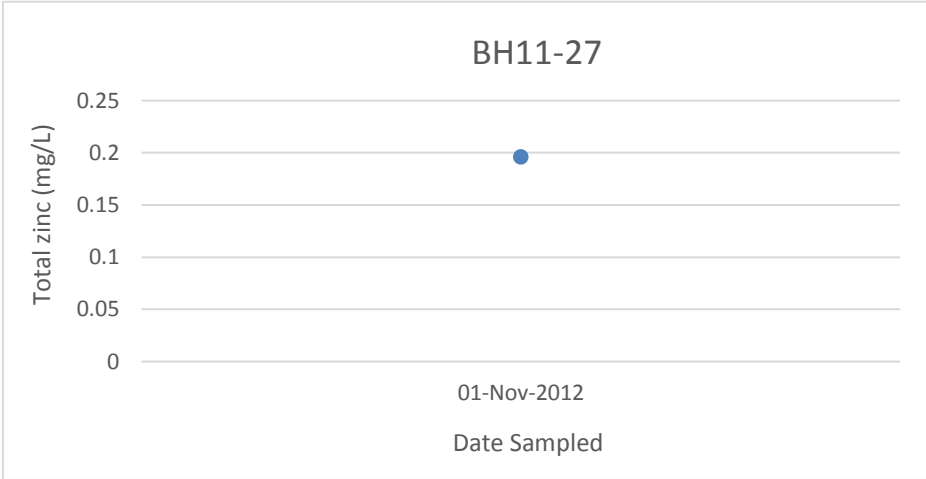

3880
Total Zinc (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
21-Oct-2013
Date Sampled

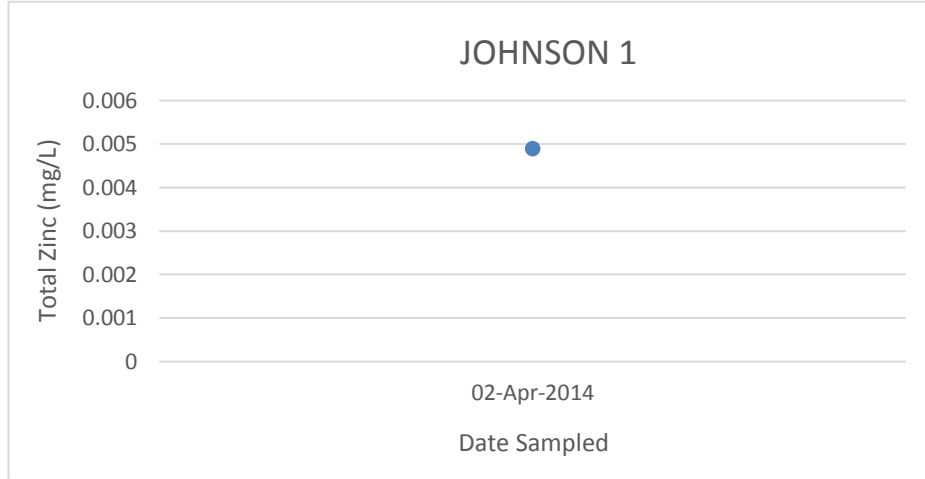

3221
Total Zinc (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
21-Oct-2013
Date Sampled

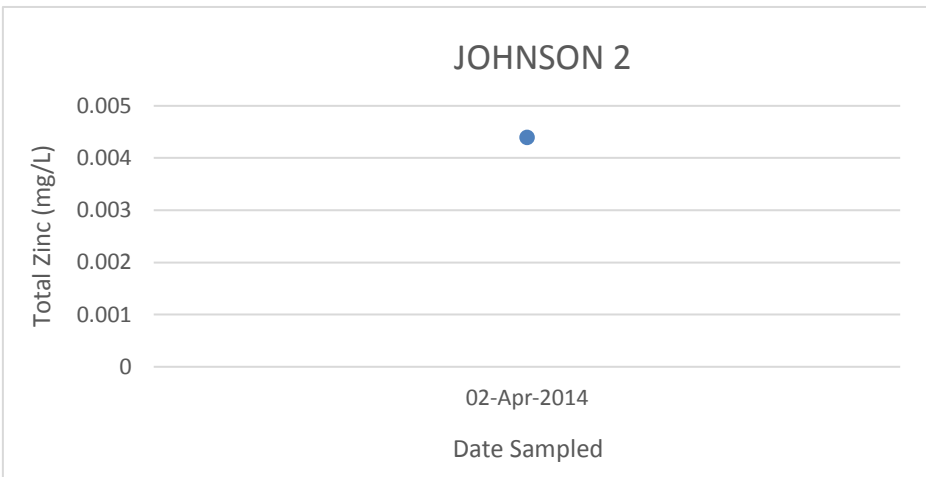

3226
Total Zinc (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
21-Oct-2013
Date Sampled

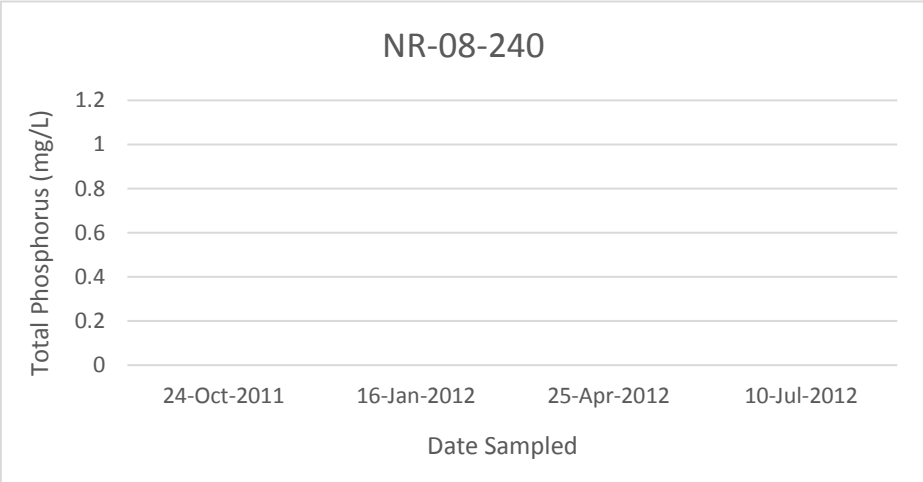

3443-1
Total Zinc (mg/L)
0.01
0.008
0.006
0.004
0.002
0
23-Oct-2014
Date Sampled

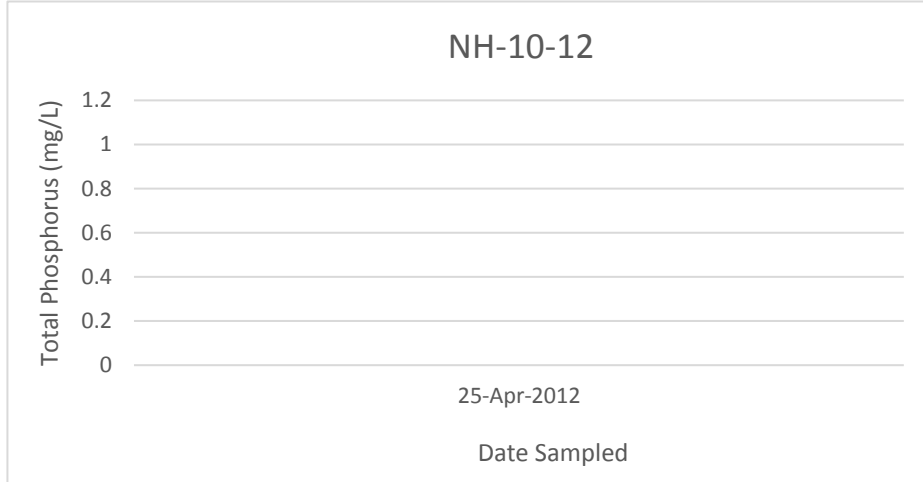

DUP
Total Zinc (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
06-Jun-2013
01-Nov-2012
Date Sampled

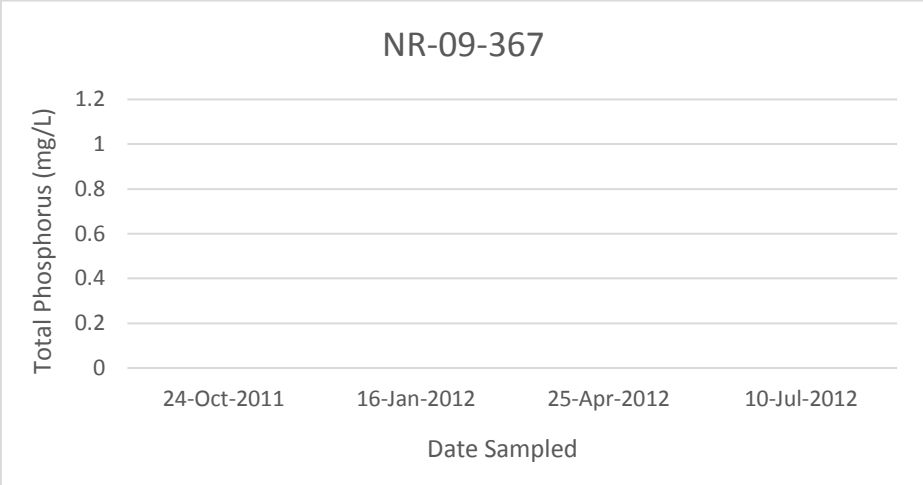

BH11-27
Total zinc (mg/L)
0.25
0.2
0.15
0.1
0.05
0
01-Nov-2012
Date Sampled

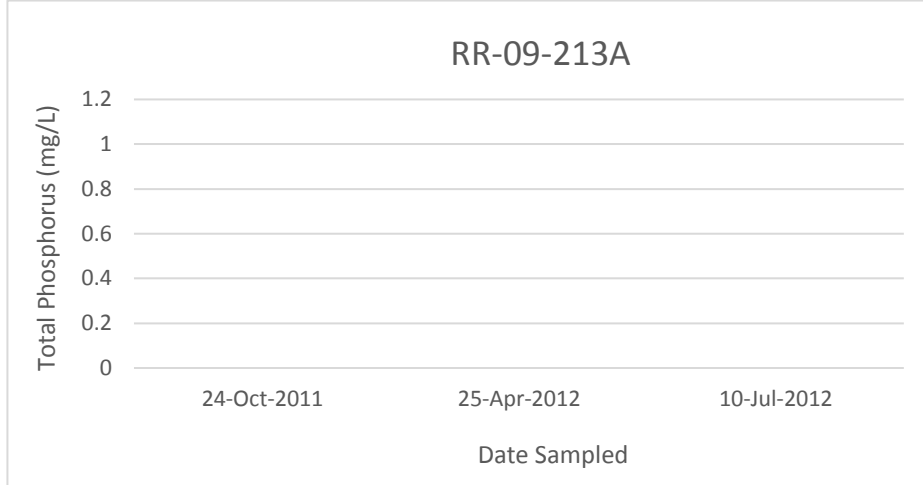

JOHNSON 1
Total Zinc (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
02-Apr-2014
Date Sampled

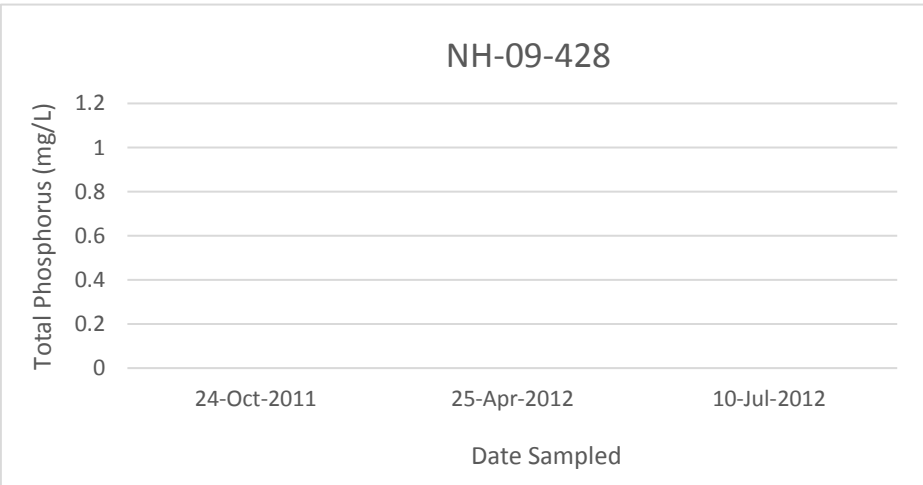

JOHNSON 2
Total Zinc (mg/L)
0.005
0.004
0.003
0.002
0.001
0
02-Apr-2014
Date Sampled

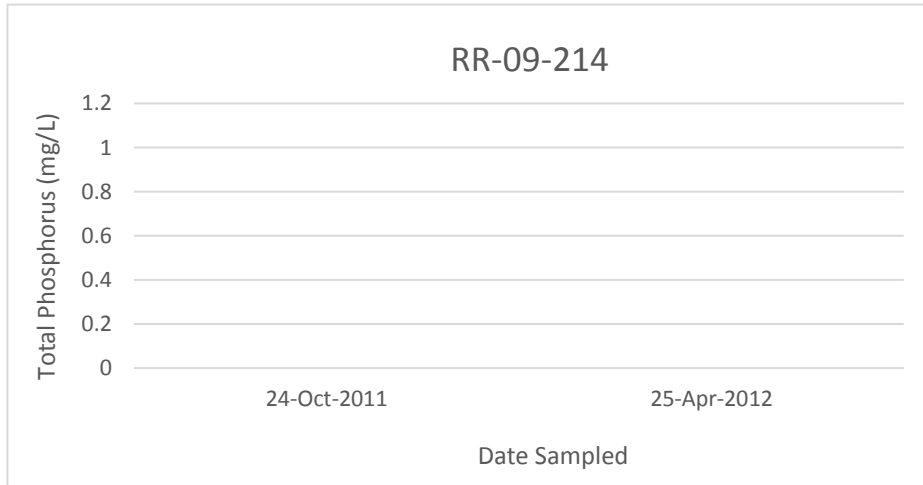

NR-08-240
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

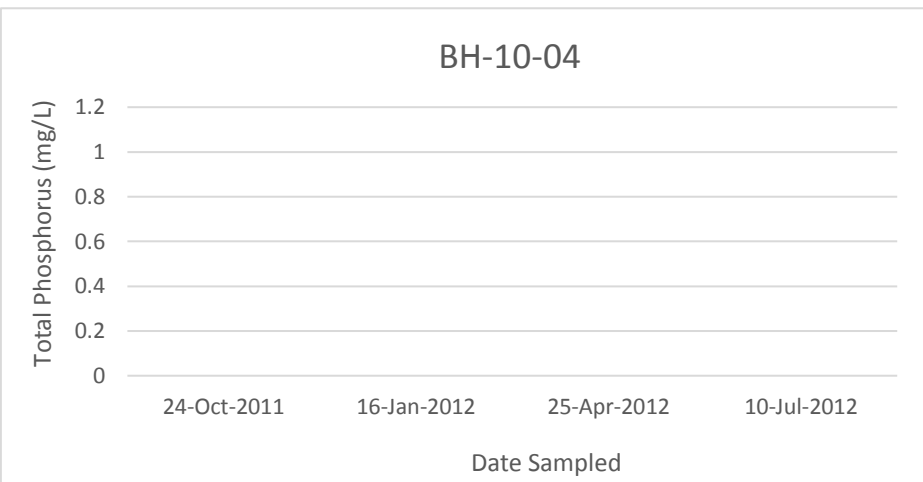

NH-10-12
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
25-Apr-2012
Date Sampled

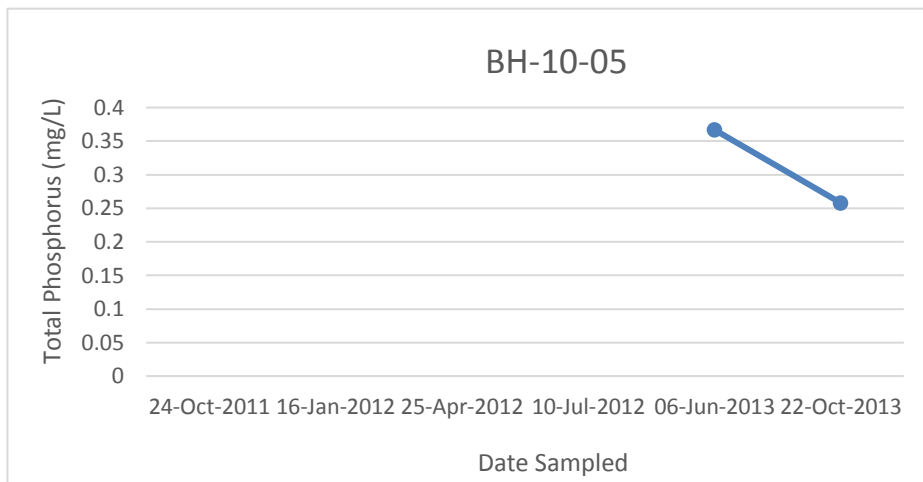

NR-09-367
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

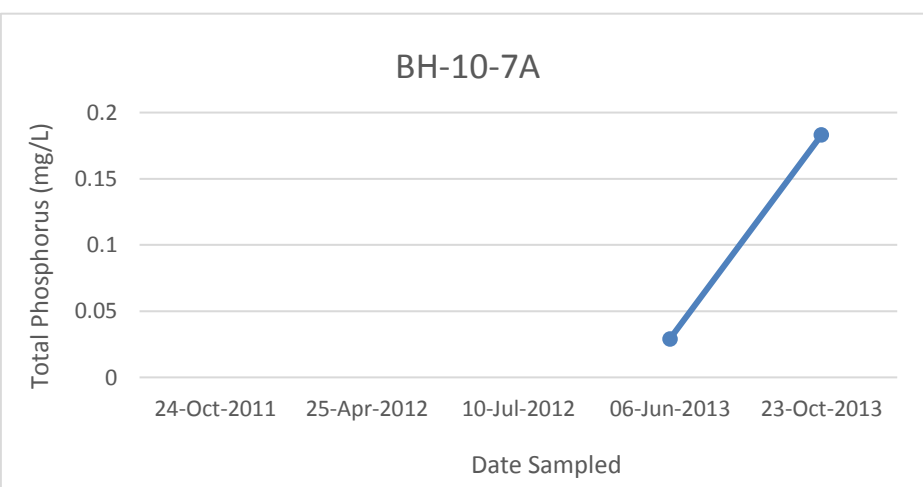

RR-09-213A
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

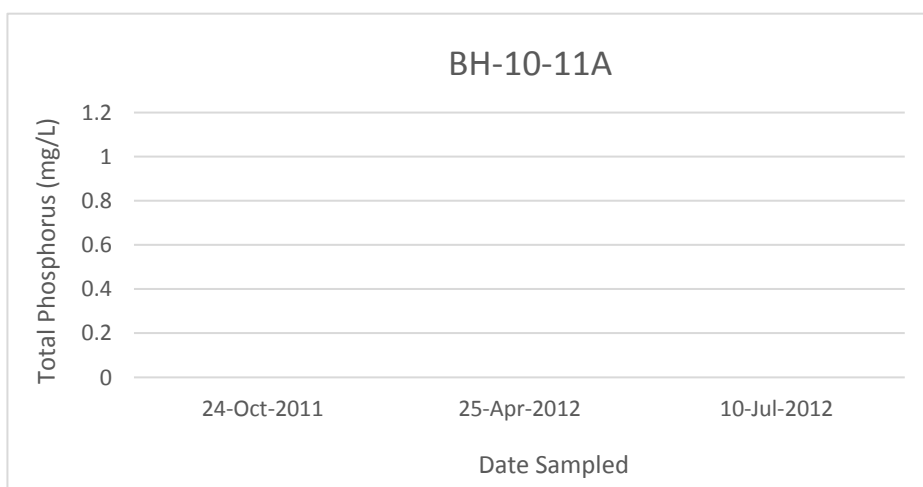

NH-09-428
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

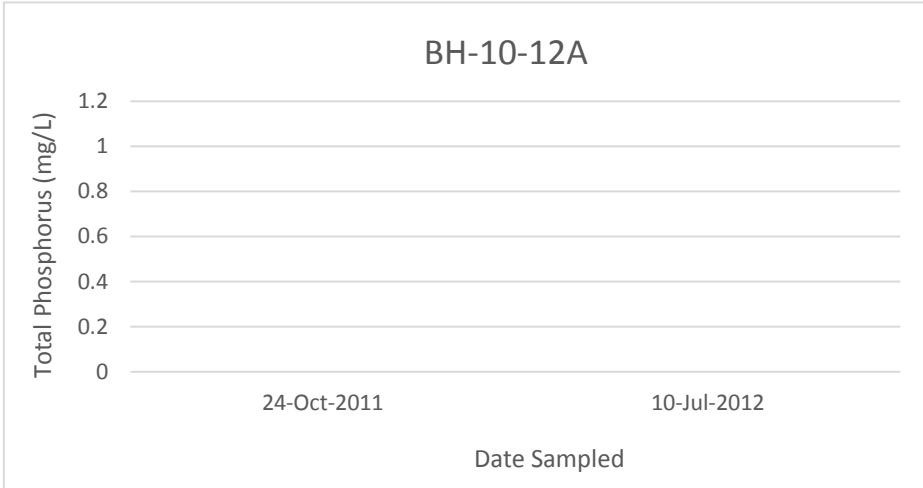

RR-09-214
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
Date Sampled

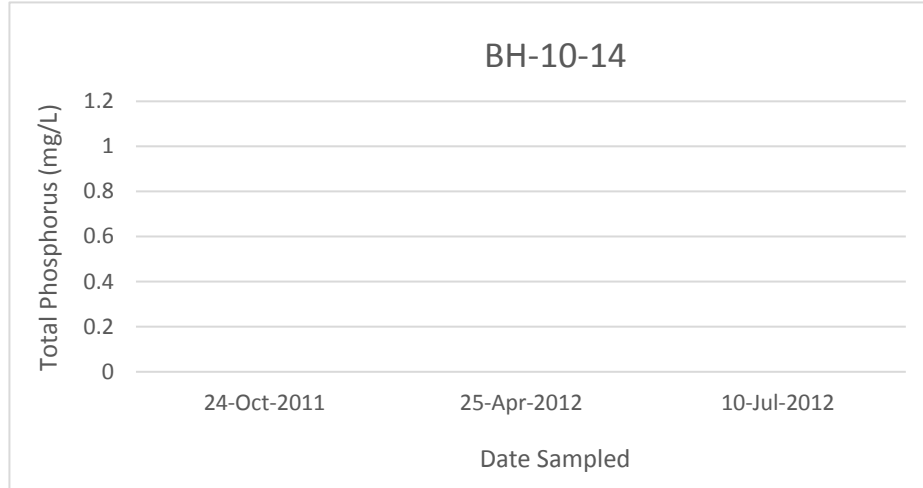

BH-10-04
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

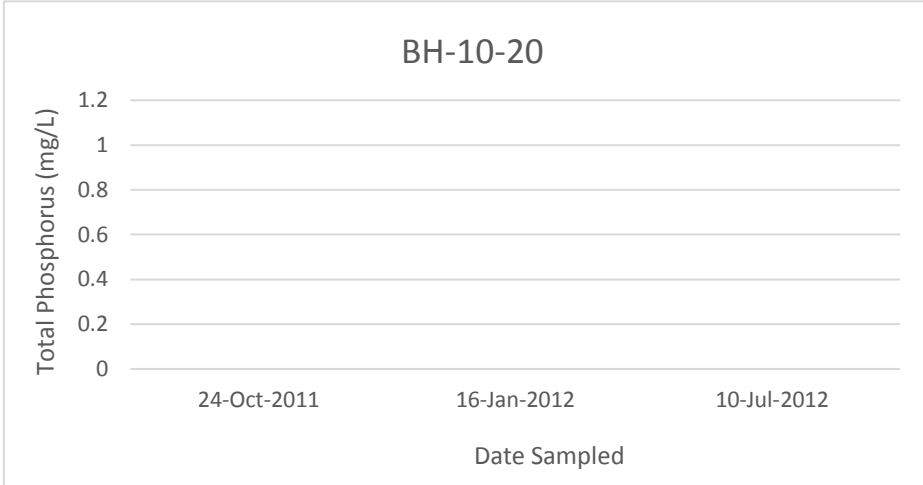

BH-10-05
Total Phosphorus (mg/L)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

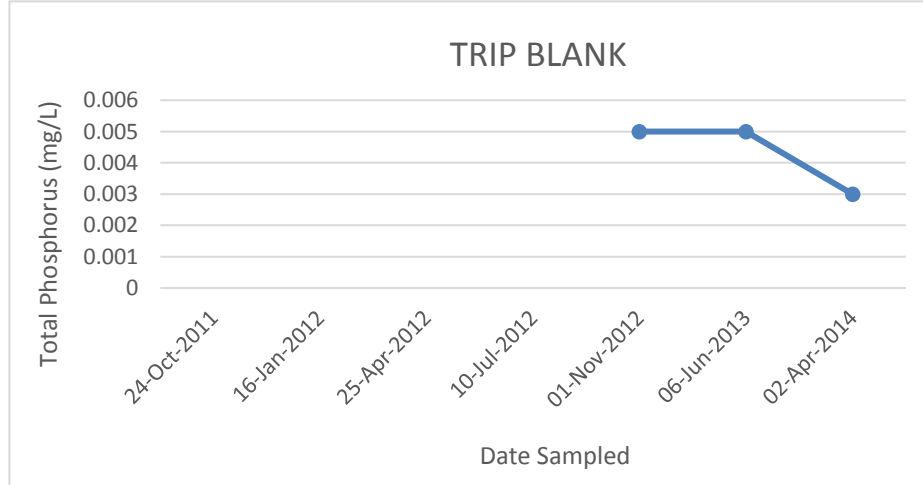

BH-10-7A
Total Phosphorus (mg/L)
0.2
0.15
0.1
0.05
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

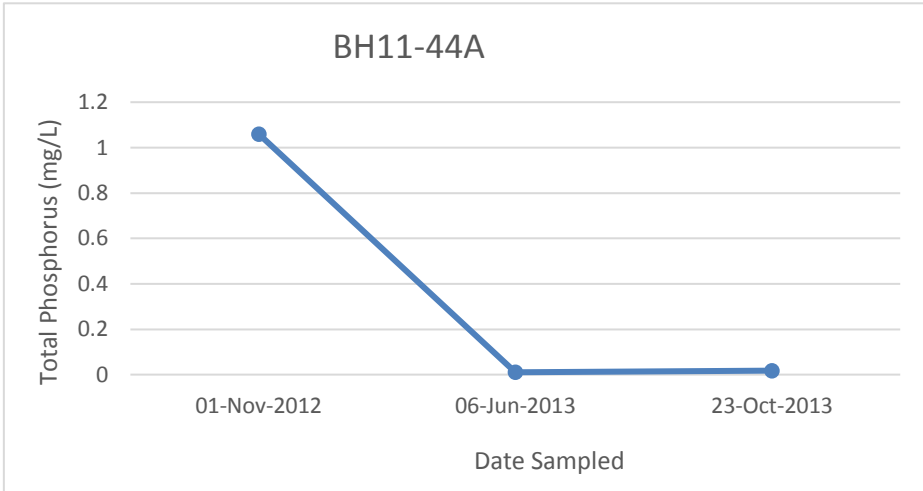

BH-10-11A
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

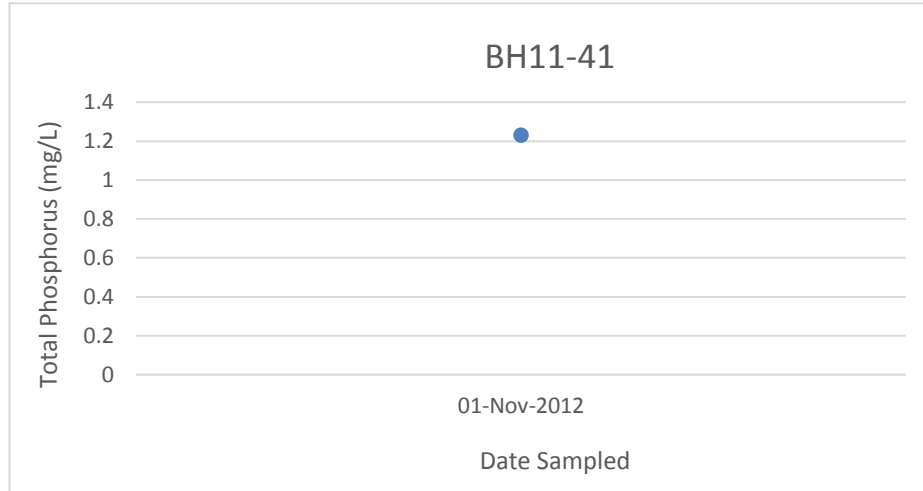

BH-10-12A
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
10-Jul-2012
Date Sampled

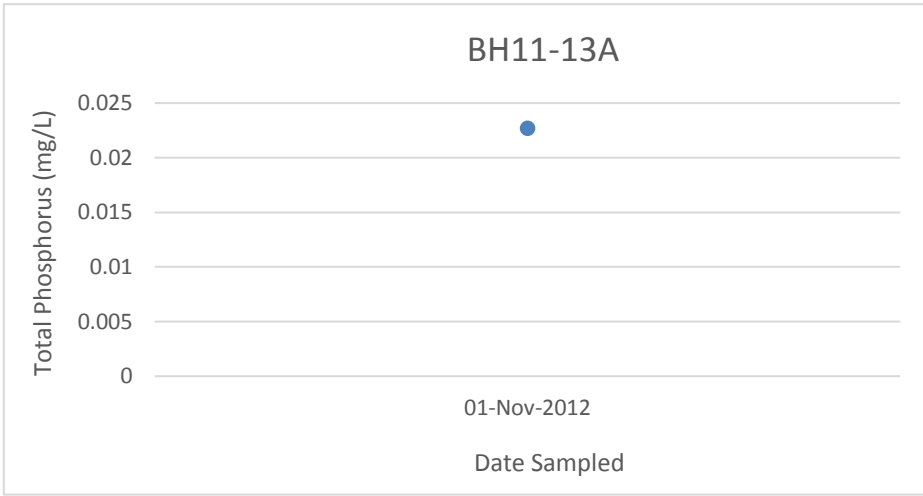

BH-10-14
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

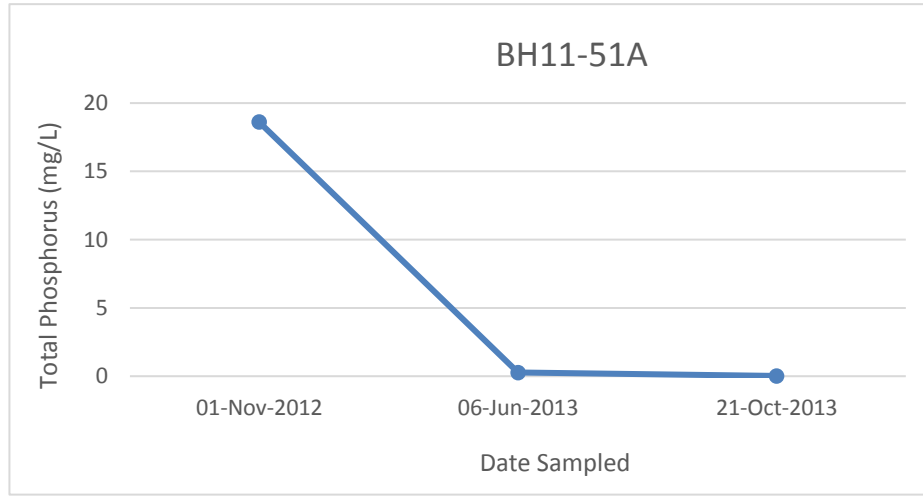

BH-10-20
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

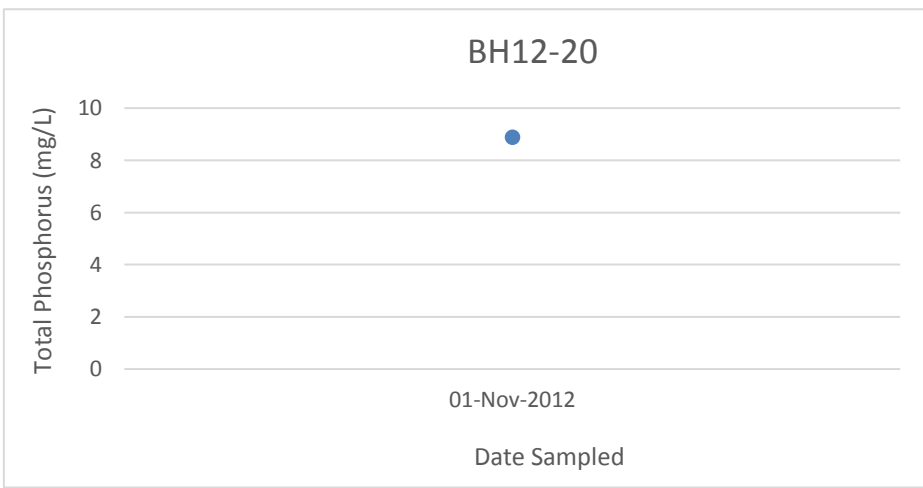

TRIP BLANK
Total Phosphorus (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

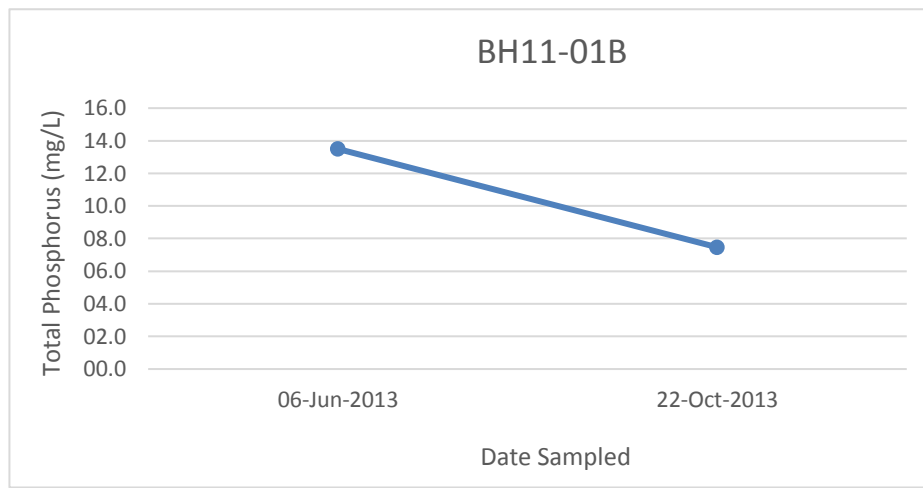

BH11-44A
Total Phosphorus (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

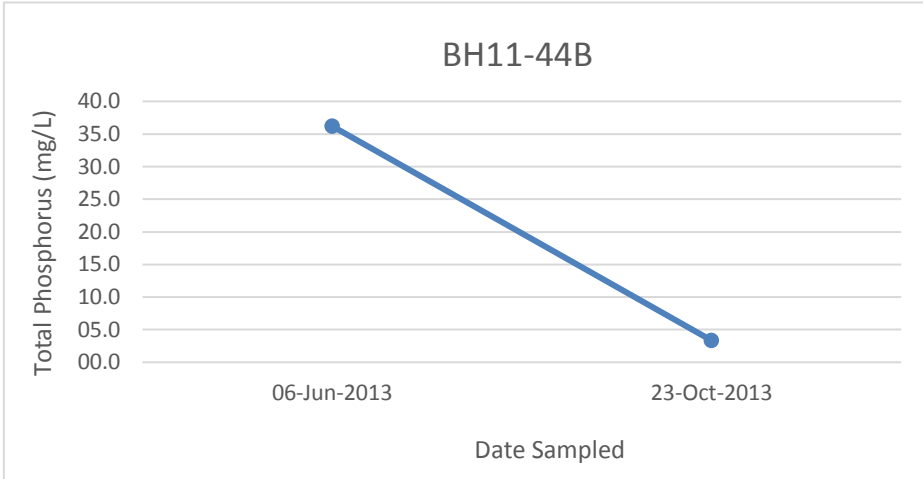

BH11-41
Total Phosphorus (mg/L)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
01-Nov-2012
Date Sampled

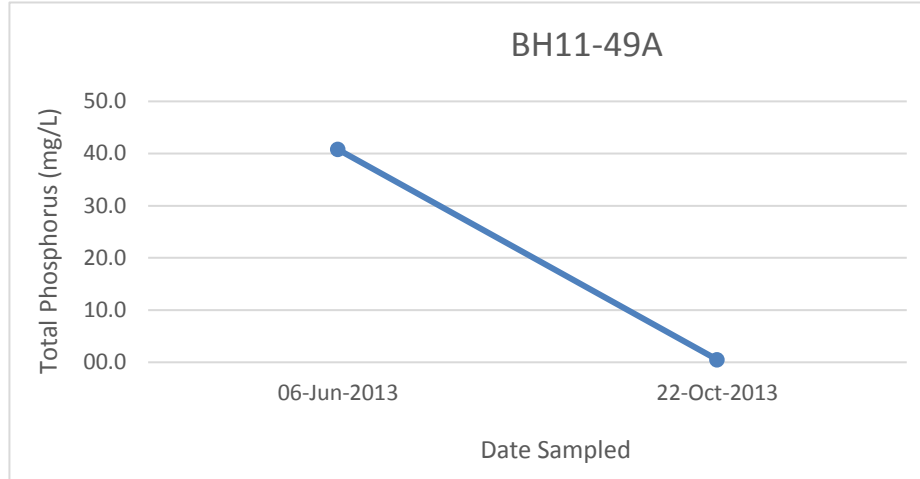

BH11-13A
Total Phosphorus (mg/L)
0.025
0.02
0.015
0.01
0.005
0
01-Nov-2012
Date Sampled

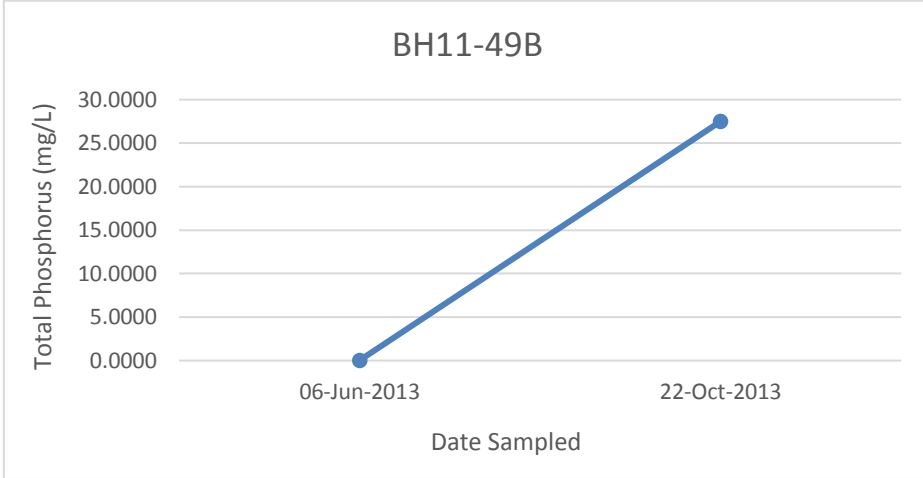

BH11-51A
Total Phosphorus (mg/L)
20
15
10
5
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled

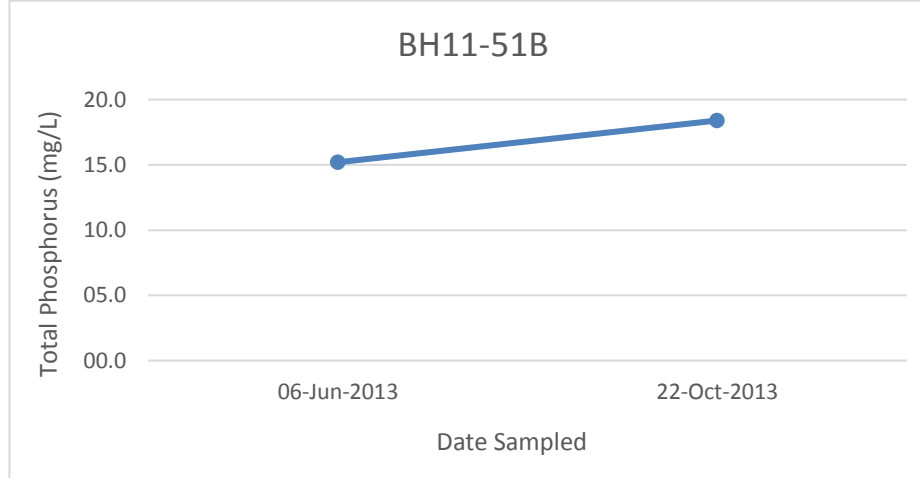

BH12-20
Total Phosphorus (mg/L)
10
8
6
4
2
0
01-Nov-2012
Date Sampled

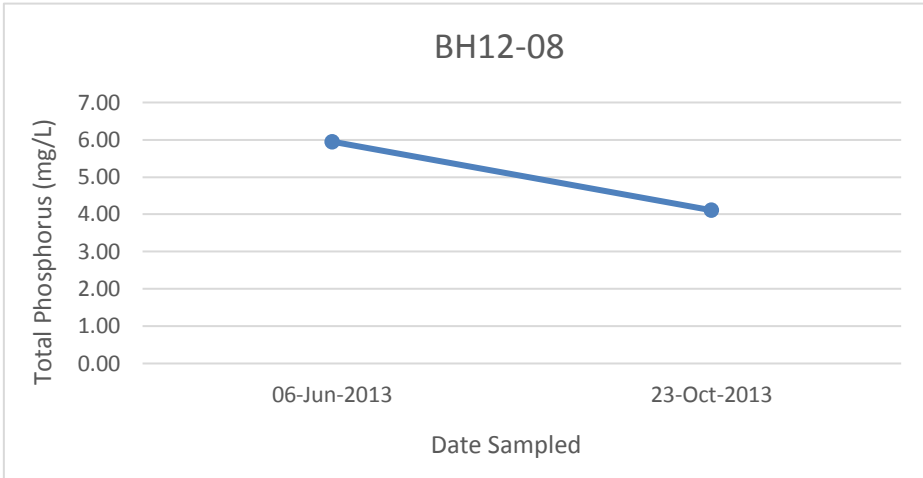

BH11-01B
Total Phosphorus (mg/L)
16.0
14.0
12.0
10.0
08.0
06.0
04.0
02.0
00.0
06-Jun-2013
22-Oct-2013
Date Sampled

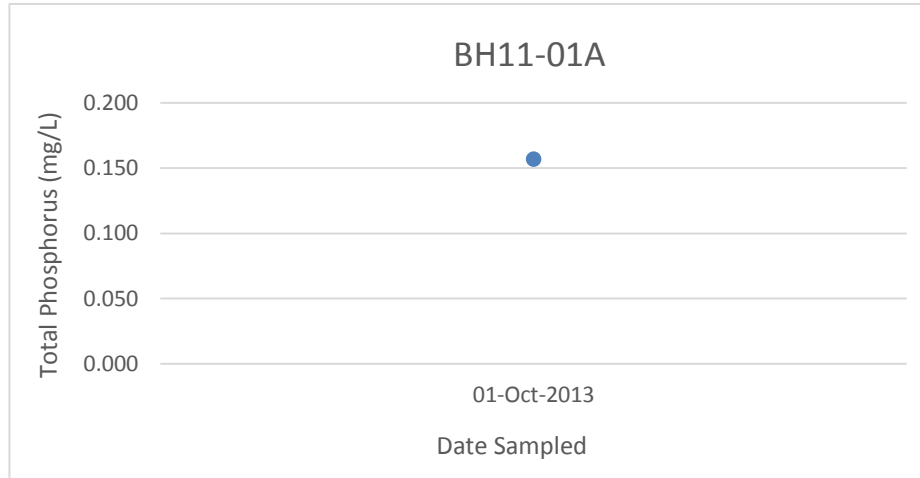

BH11-44B
Total Phosphorus (mg/L)
40.0
35.0
30.0
25.0
20.0
15.0
10.0
05.0
00.0
06-Jun-2013
23-Oct-2013
Date Sampled

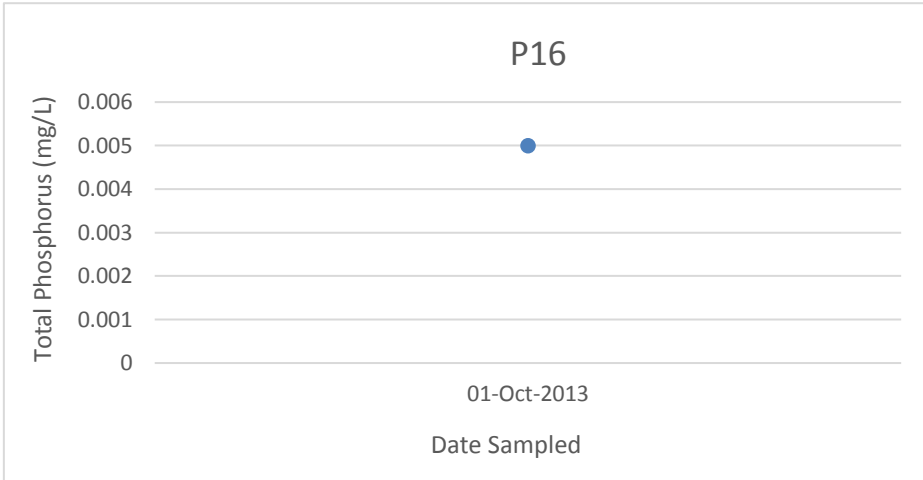

BH11-49A
Total Phosphorus (mg/L)
50.0
40.0
30.0
20.0
10.0
00.0
06-Jun-2013
22-Oct-2013
Date Sampled

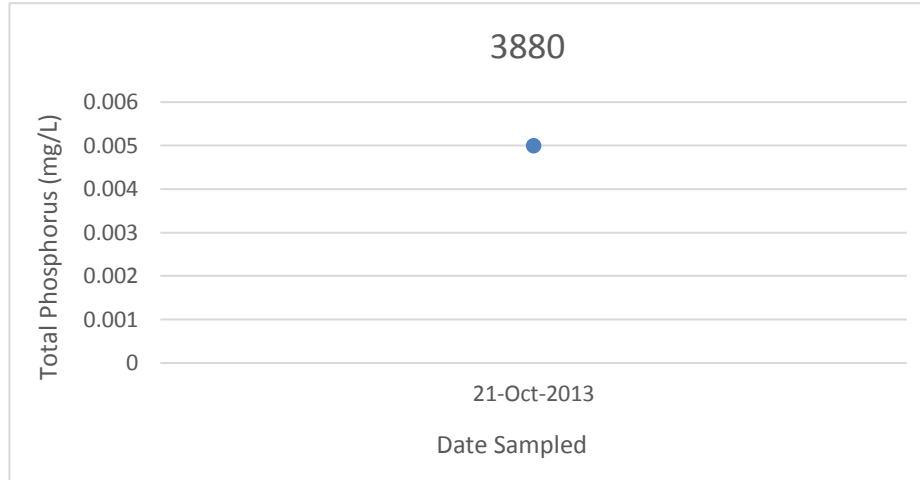

BH11-49B
Total Phosphorus (mg/L)
30.0000
25.0000
20.0000
15.0000
10.0000
5.0000
0.0000
06-Jun-2013
22-Oct-2013
Date Sampled

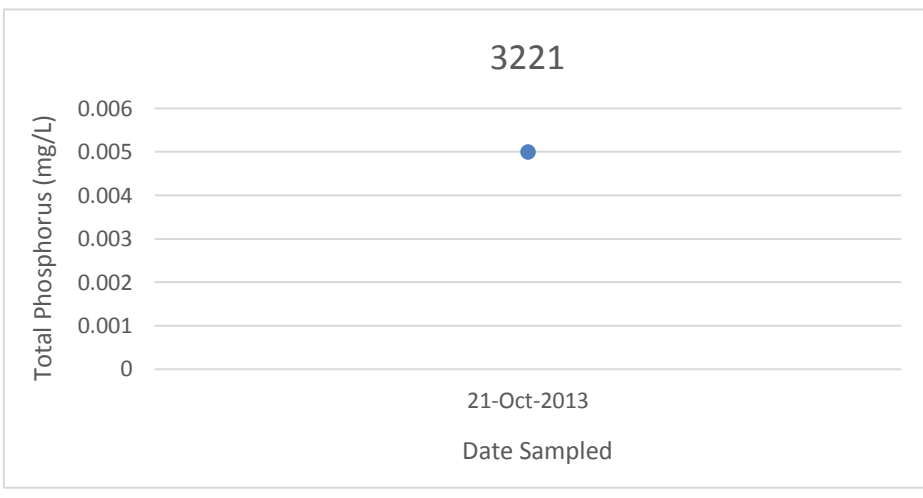

BH11-51B
Total Phosphorus (mg/L)
20.0
15.0
10.0
05.0
00.0
06-Jun-2013
22-Oct-2013
Date Sampled

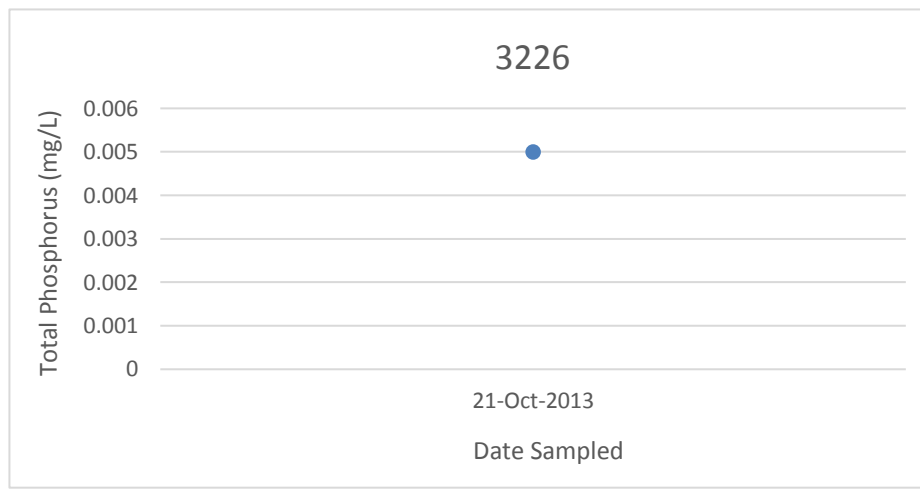

BH12-08
Total Phosphorus (mg/L)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
06-Jun-2013
23-Oct-2013
Date Sampled

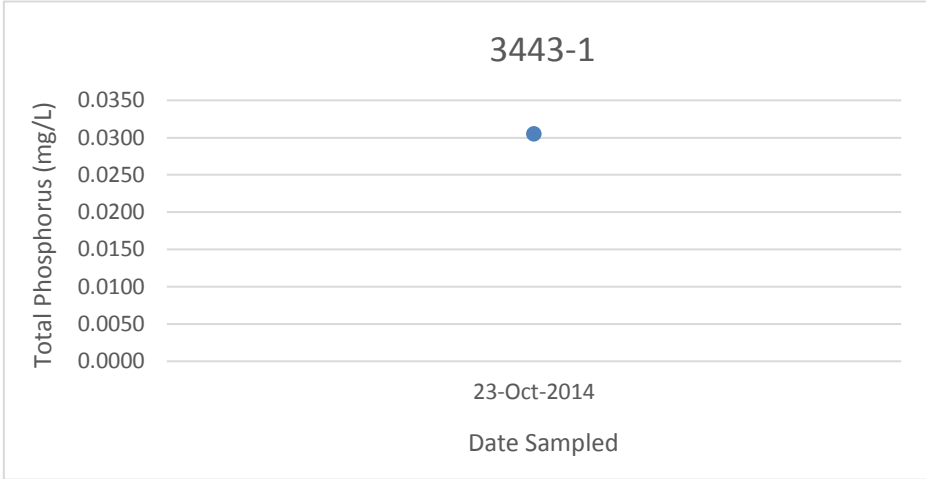

BH11-01A
Total Phosphorus (mg/L)
0.200
0.150
0.100
0.050
0.000
01-Oct-2013
Date Sampled

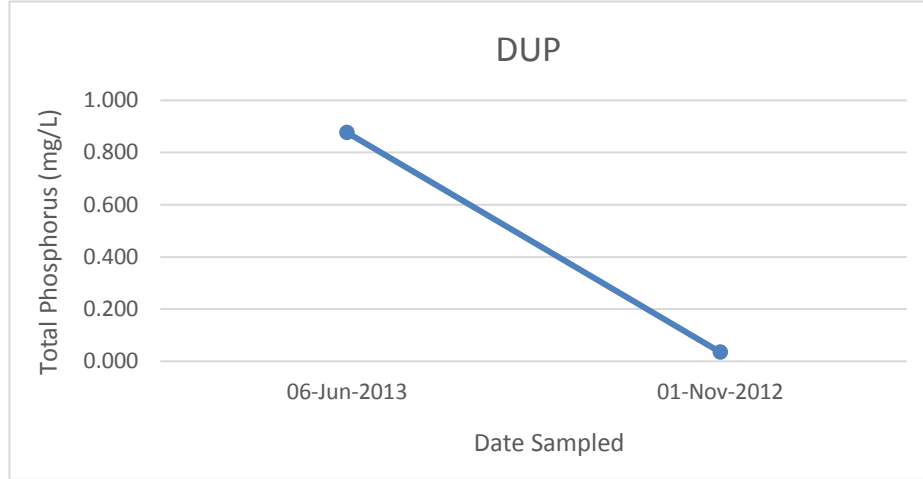

P16
Total Phosphorus (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
01-Oct-2013
Date Sampled

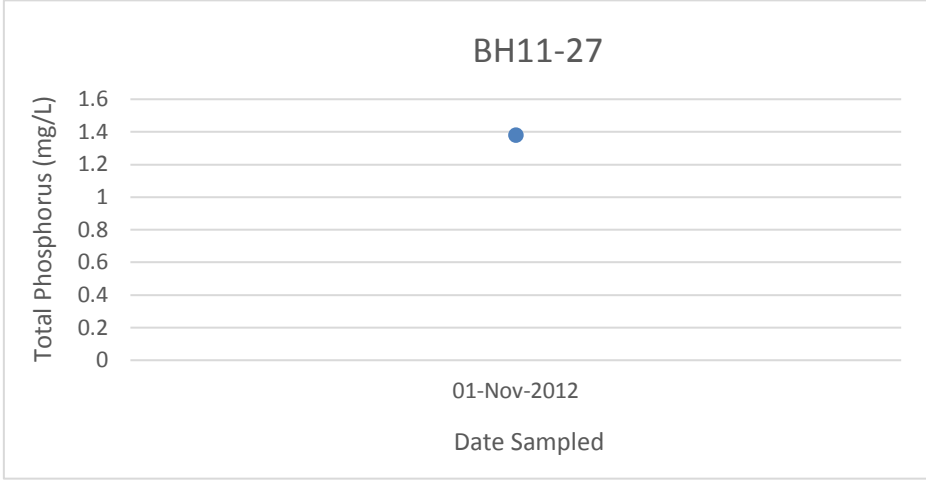

3880
Total Phosphorus (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
21-Oct-2013
Date Sampled

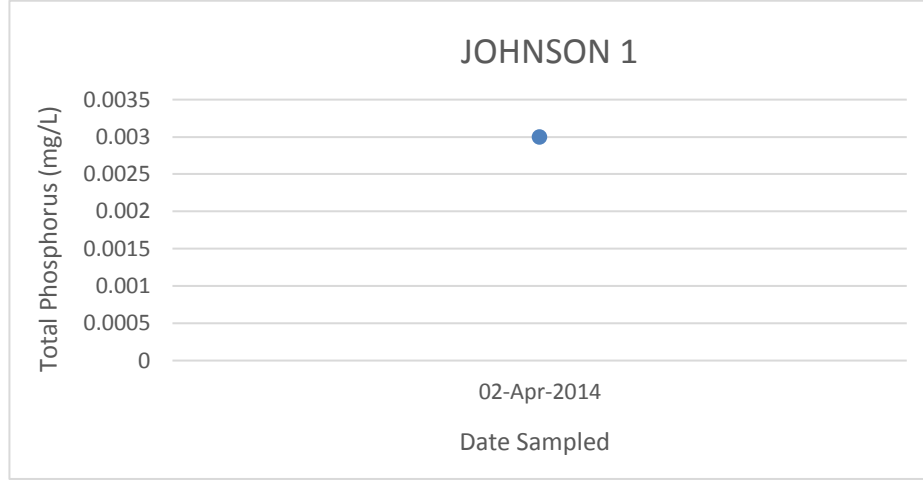

3221
Total Phosphorus (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
21-Oct-2013
Date Sampled

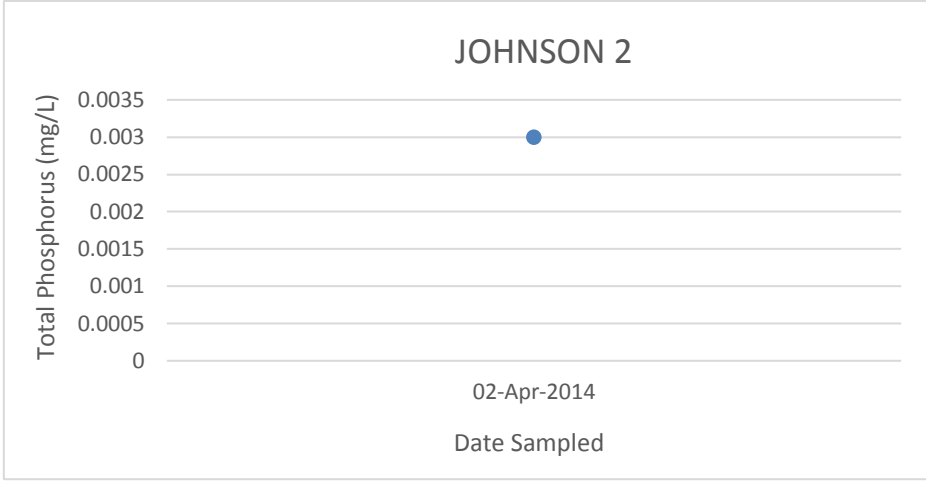

3226
Total Phosphorus (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
21-Oct-2013
Date Sampled

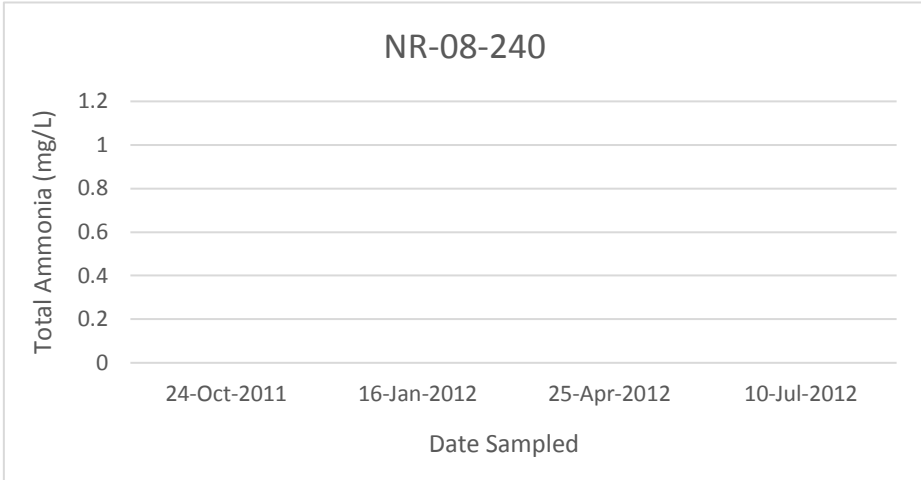

3443-1
Total Phosphorus (mg/L)
0.0350
0.0300
0.0250
0.0200
0.0150
0.0100
0.0050
0.0000
23-Oct-2014
Date Sampled

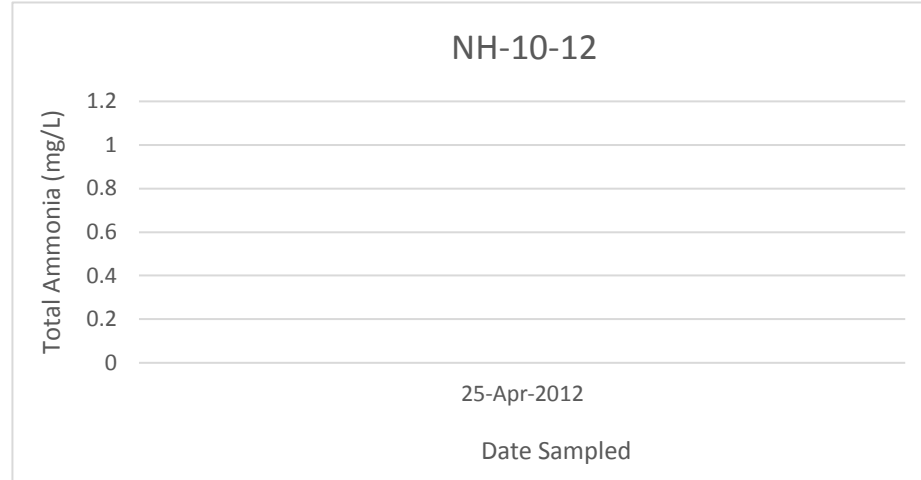

DUP
Total Phosphorus (mg/L)
1.000
0.800
0.600
0.400
0.200
0.000
06-Jun-2013
01-Nov-2012
Date Sampled

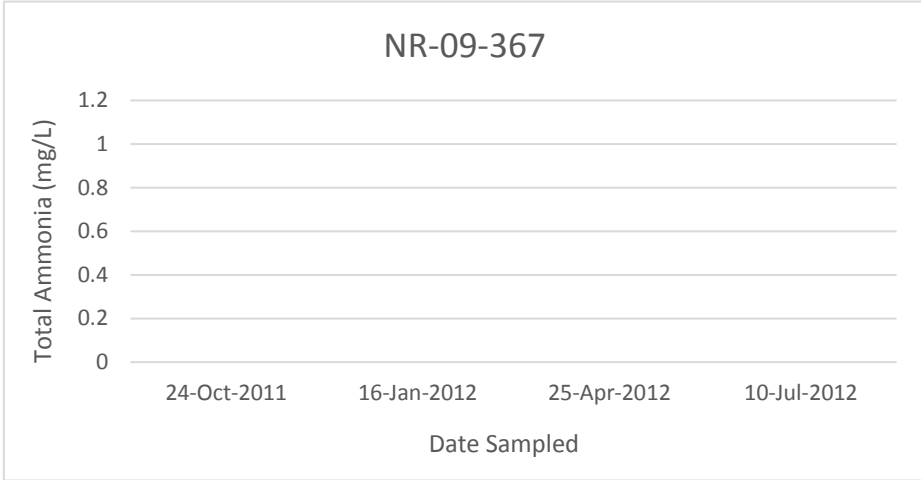

BH11-27
Total Phosphorus (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
01-Nov-2012
Date Sampled

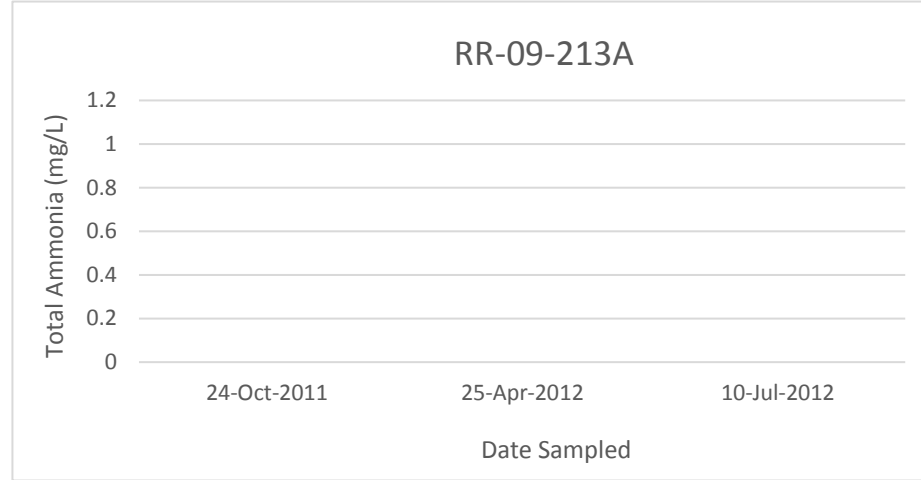

JOHNSON 1
Total Phosphorus (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
02-Apr-2014
Date Sampled

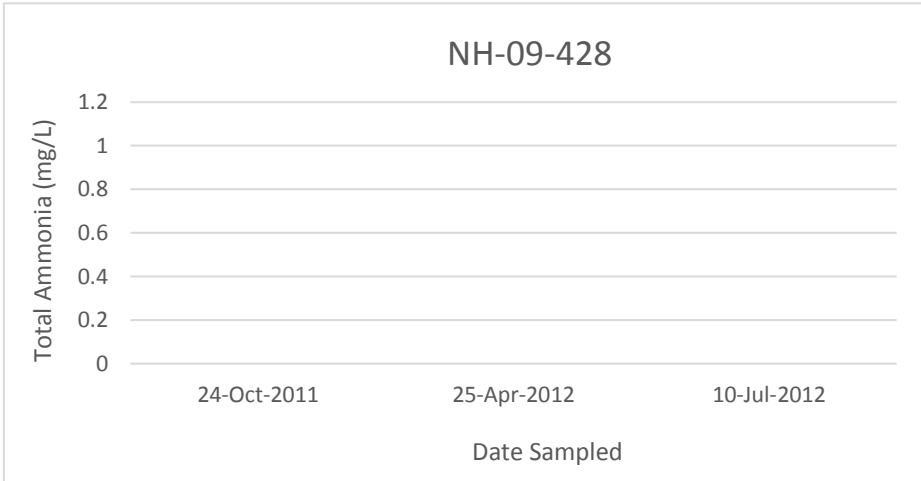

JOHNSON 2
Total Phosphorus (mg/L)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
02-Apr-2014
Date Sampled

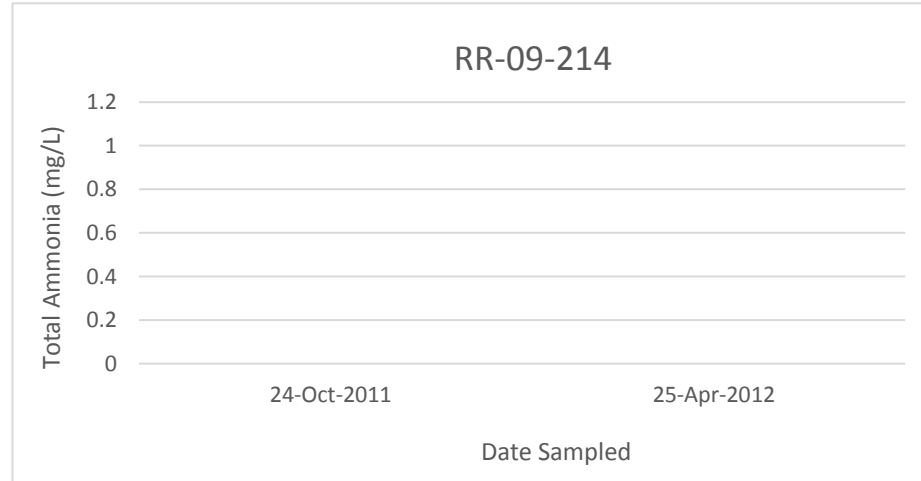

NR-08-240
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

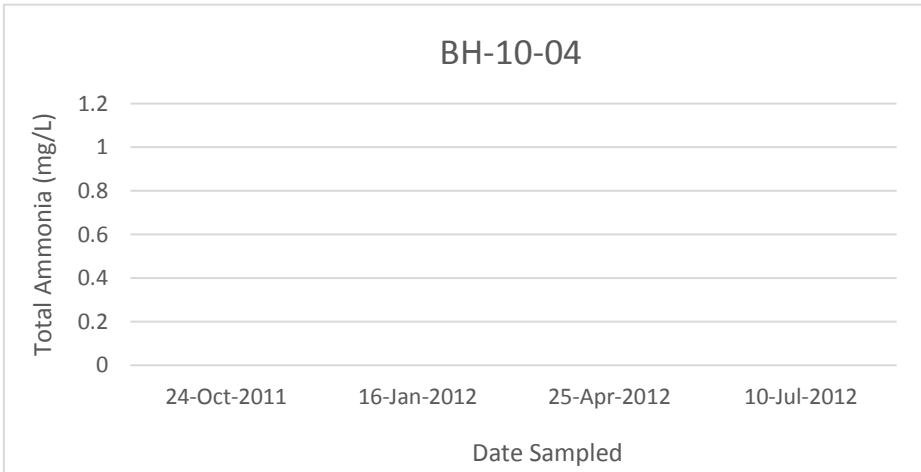

NH-10-12
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
25-Apr-2012
Date Sampled

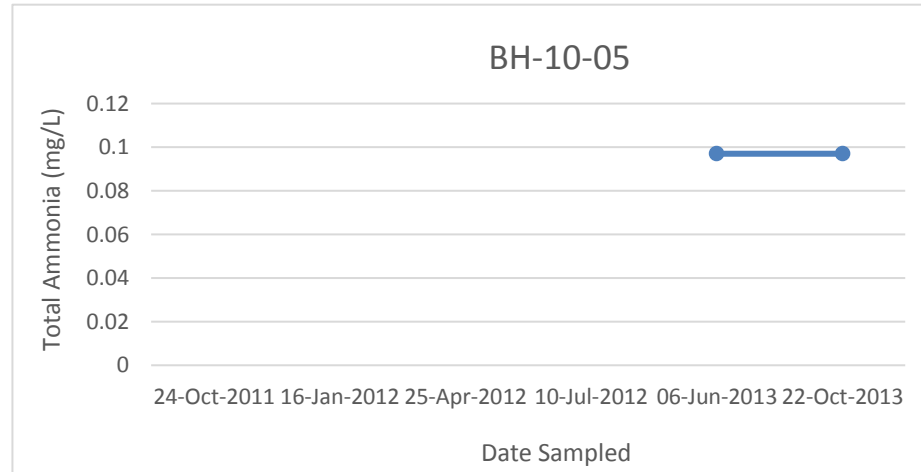

NR-09-367
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

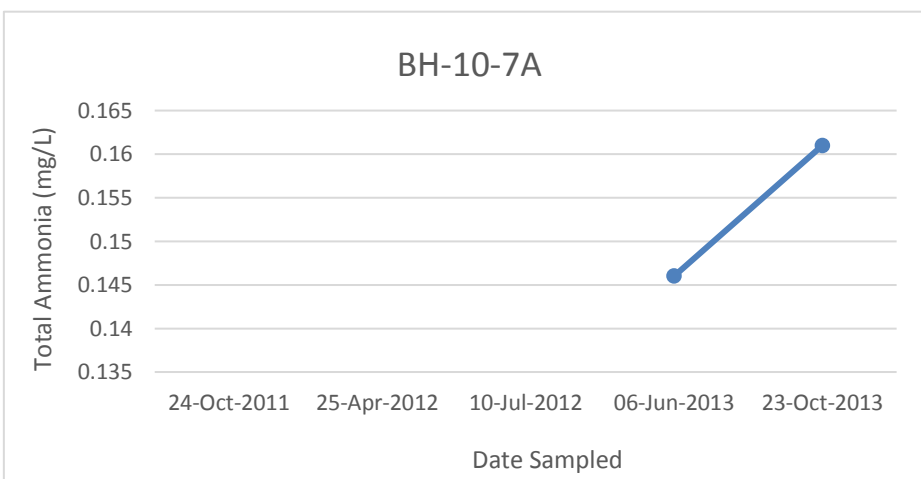

RR-09-213A
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

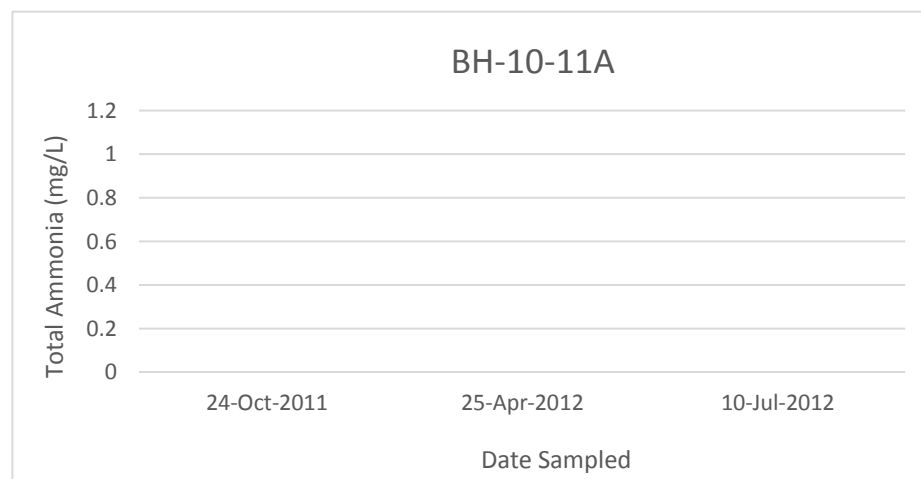

NH-09-428
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

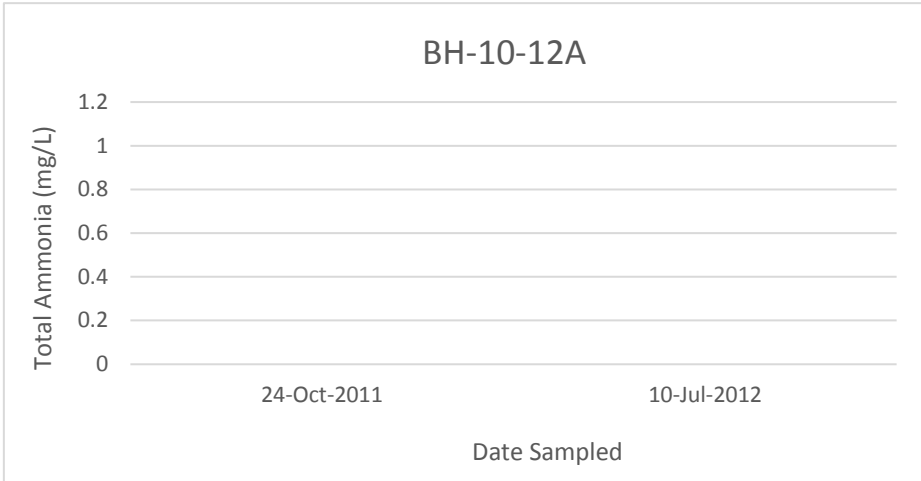

RR-09-214
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
Date Sampled

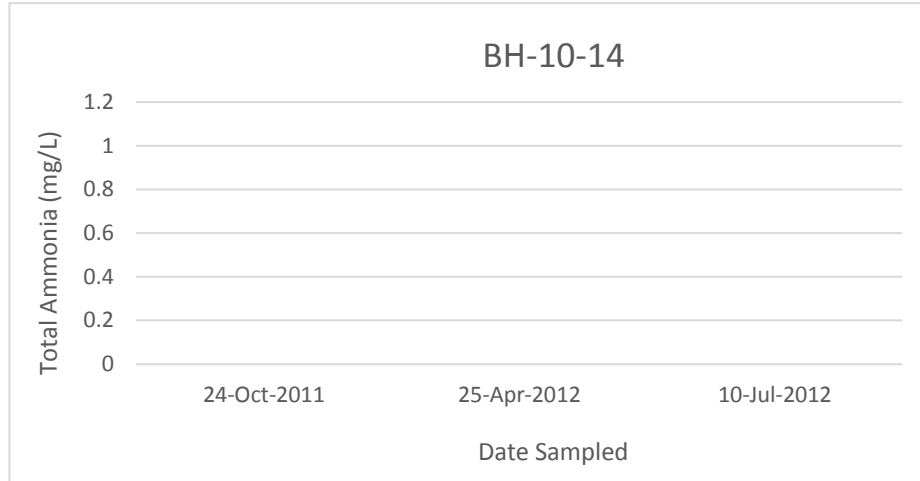

BH-10-04
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

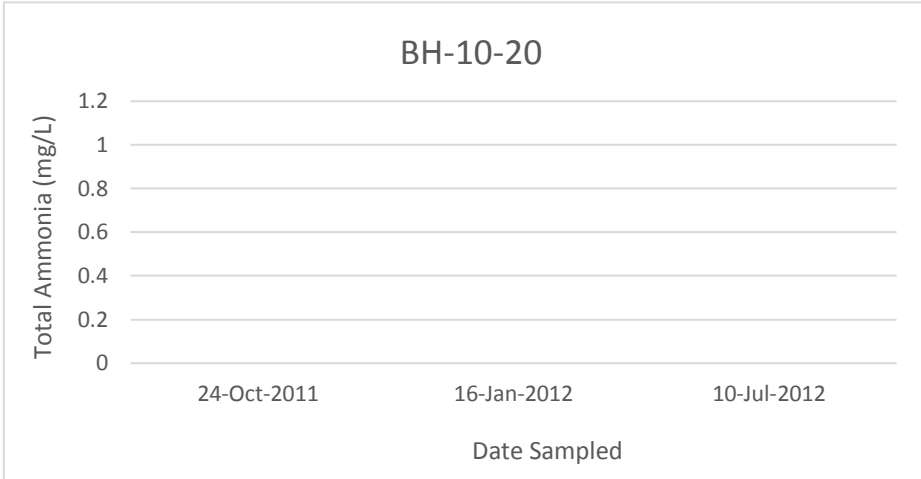

BH-10-05
Total Ammonia (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

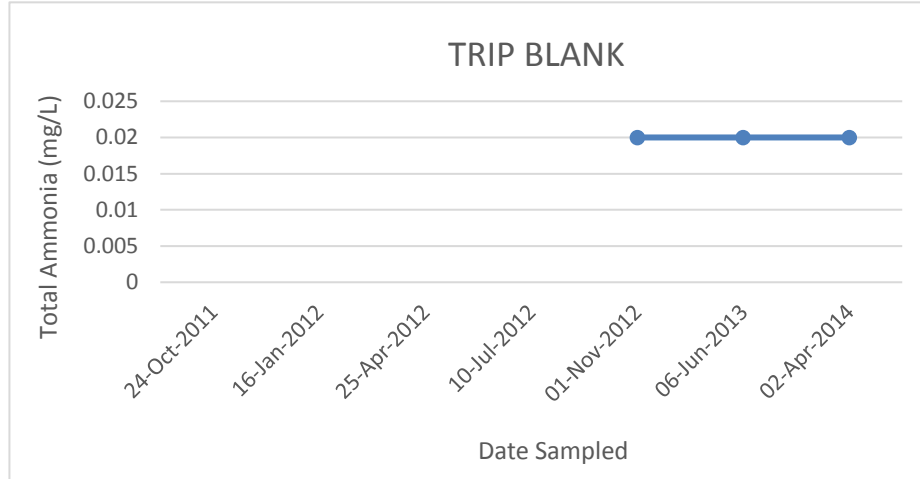

BH-10-7A
Total Ammonia (mg/L)
0.165
0.16
0.155
0.15
0.145
0.14
0.135
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

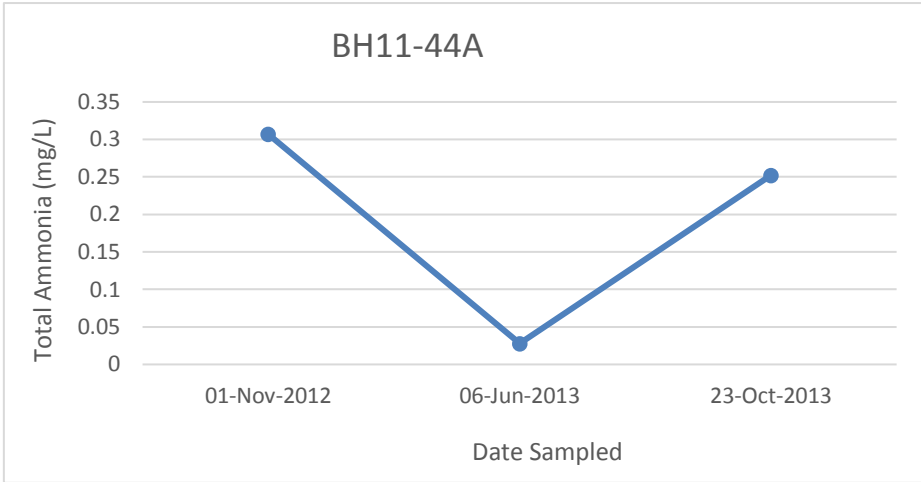

BH-10-11A
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

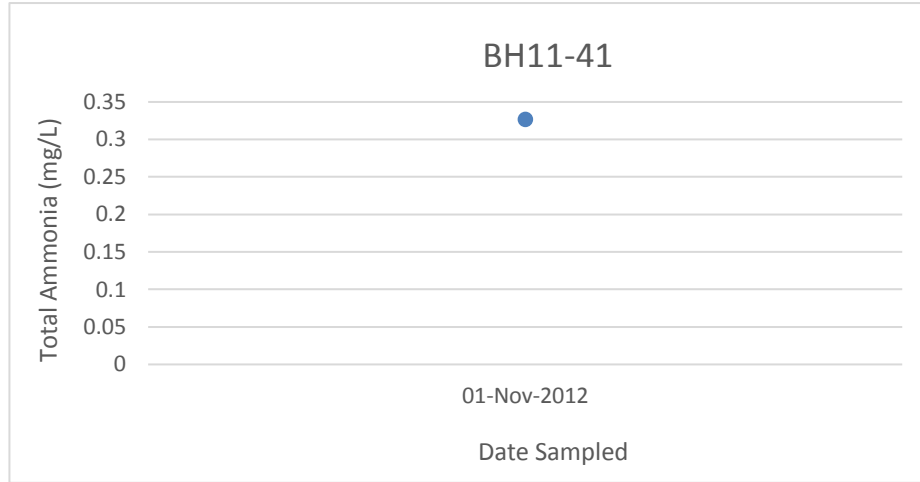

BH-10-12A
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
10-Jul-2012
Date Sampled

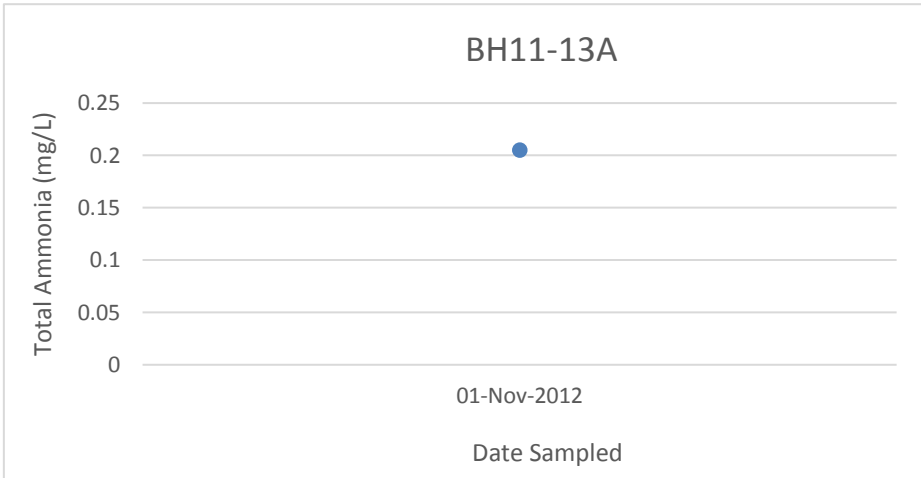

BH-10-14
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

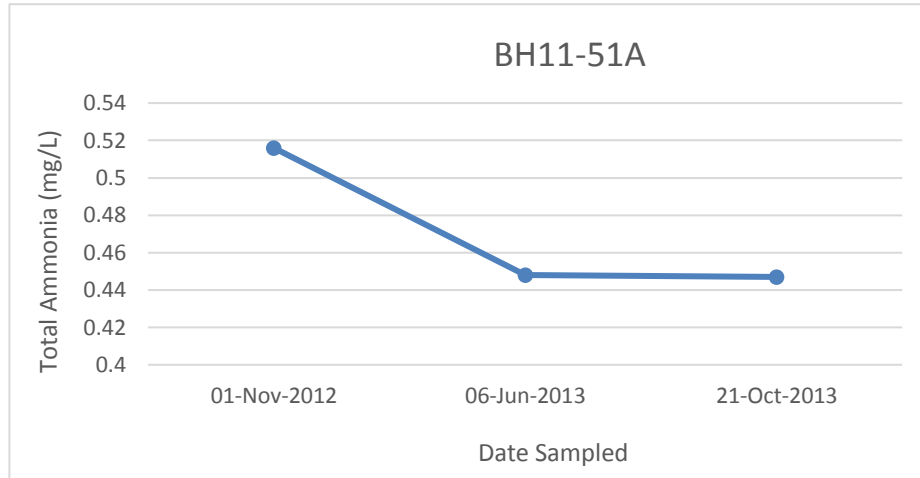

BH-10-20
Total Ammonia (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

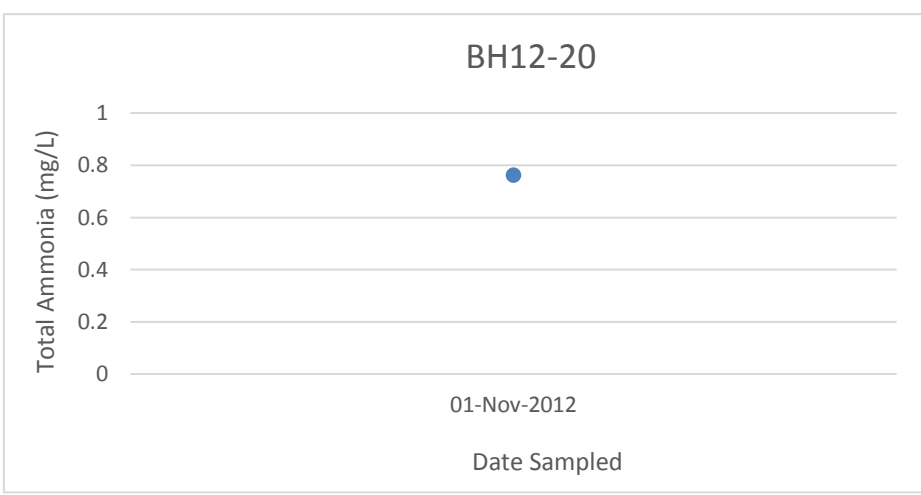

TRIP BLANK
Total Ammonia (mg/L)
0.025
0.02
0.015
0.01
0.005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

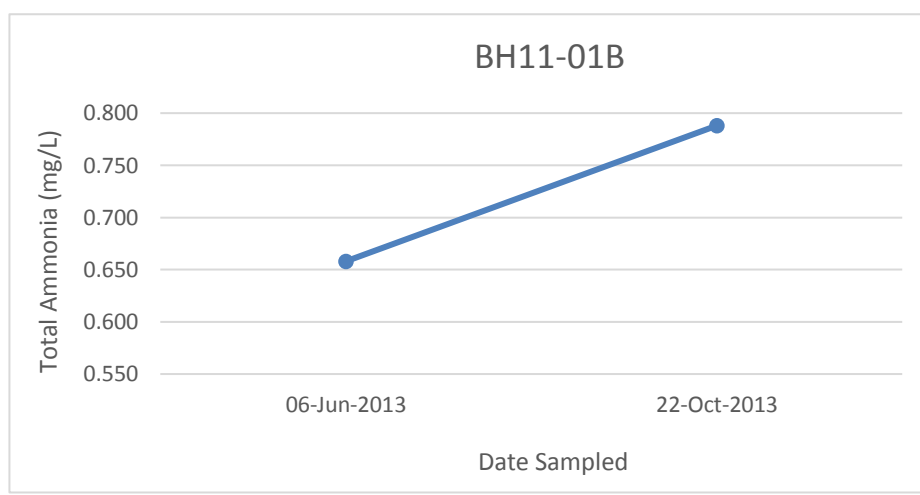

BH11-44A
Total Ammonia (mg/L)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

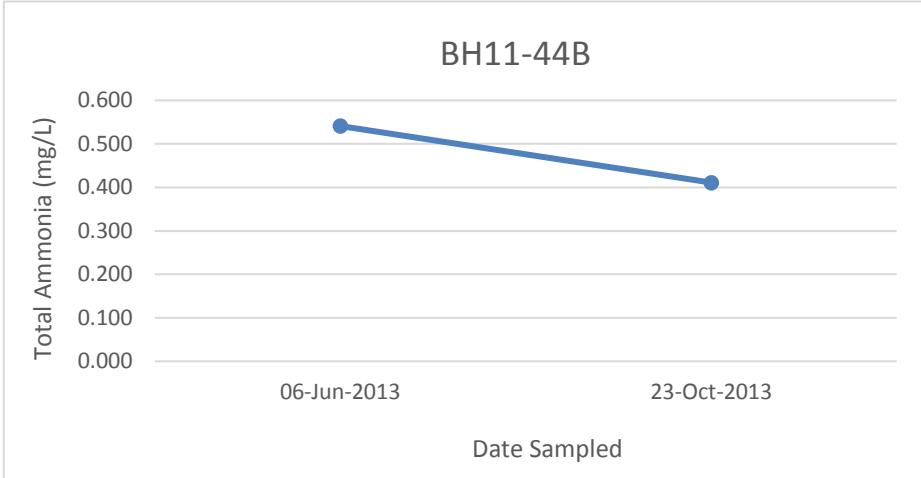

BH11-41
Total Ammonia (mg/L)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
01-Nov-2012
Date Sampled

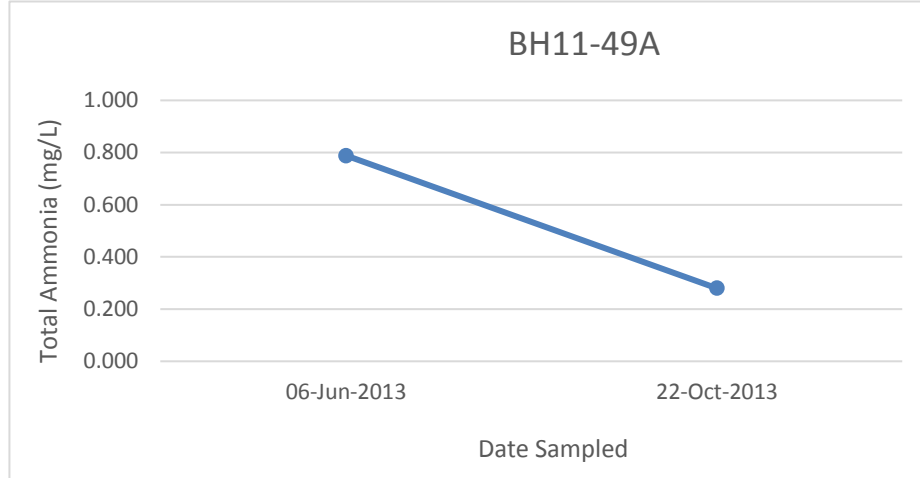

BH11-13A
Total Ammonia (mg/L)
0.25
0.2
0.15
0.1
0.05
0
01-Nov-2012
Date Sampled

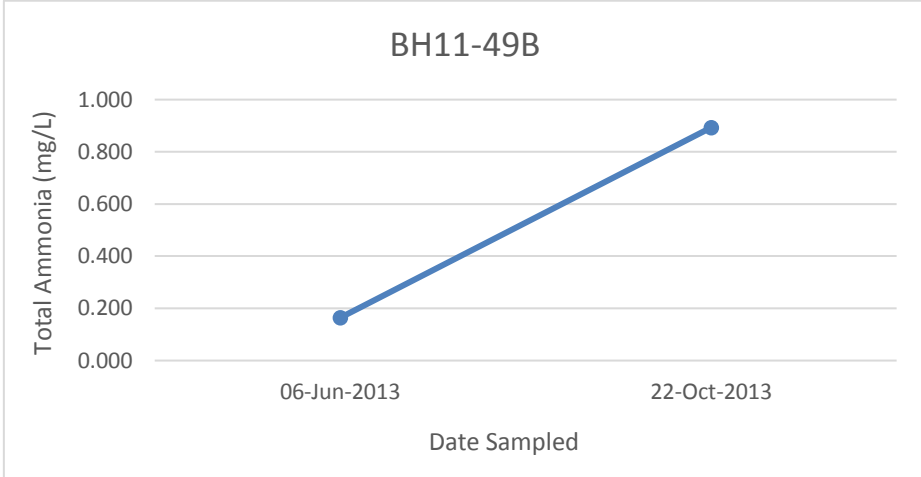

BH11-51A
Total Ammonia (mg/L)
0.54
0.52
0.5
0.48
0.46
0.44
0.42
0.4
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled

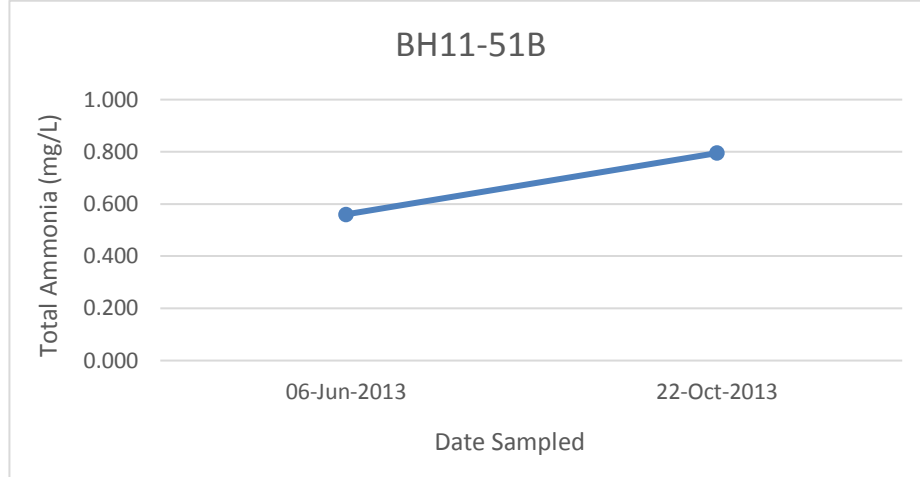

BH12-20
Total Ammonia (mg/L)
1
0.8
0.6
0.4
0.2
0
01-Nov-2012
Date Sampled

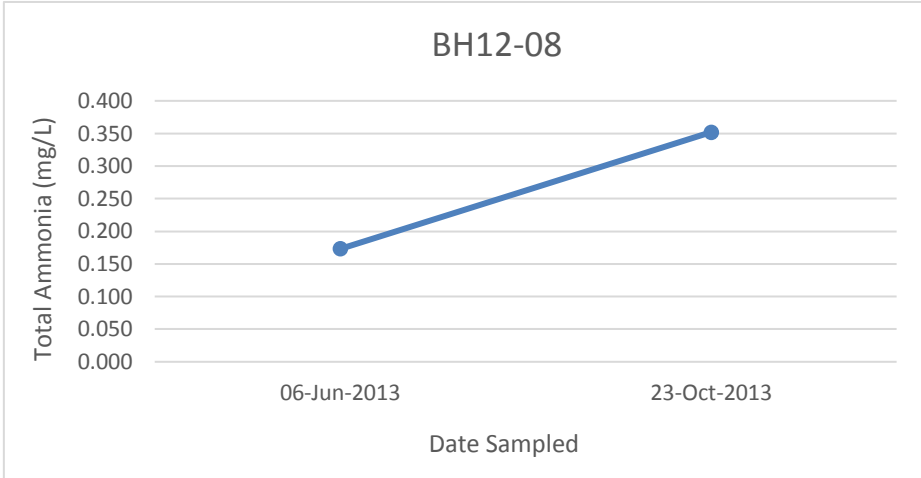

BH11-01B
Total Ammonia (mg/L)
0.800
0.750
0.700
0.650
0.600
0.550
06-Jun-2013
22-Oct-2013
Date Sampled

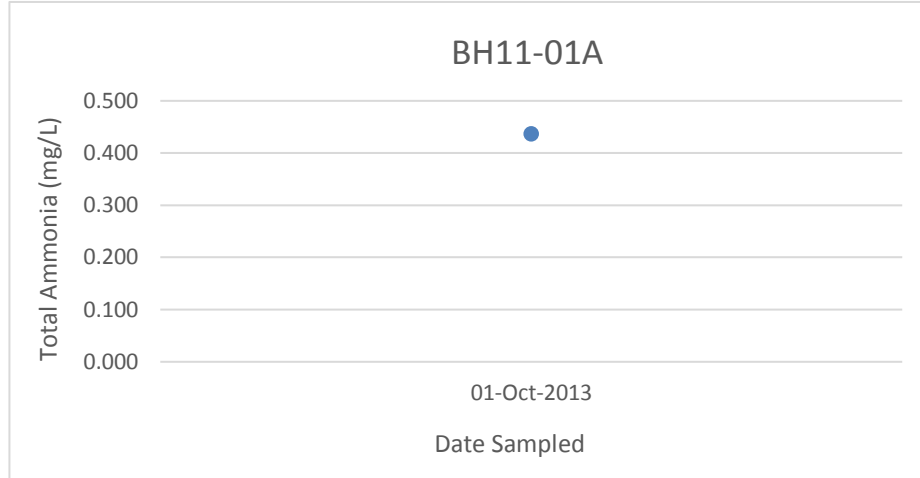

BH11-44B
Total Ammonia (mg/L)
0.600
0.500
0.400
0.300
0.200
0.100
0.000
06-Jun-2013
23-Oct-2013
Date Sampled

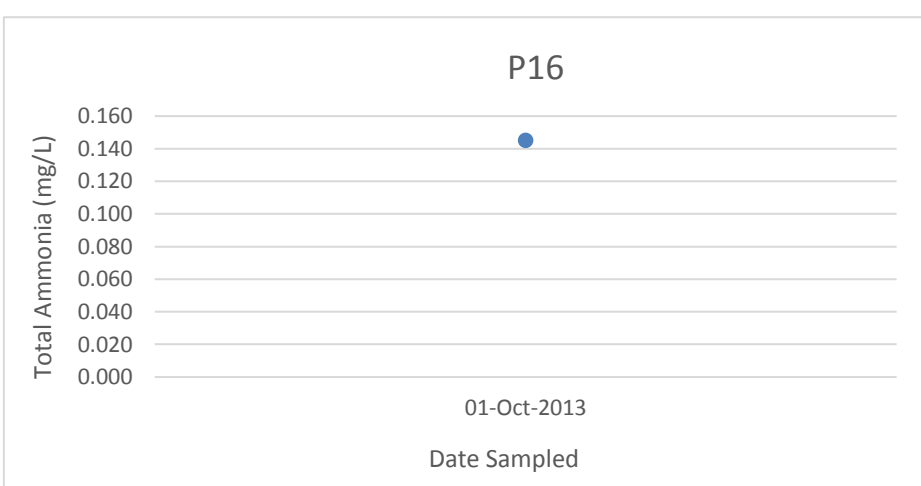

BH11-49A
Total Ammonia (mg/L)
1.000
0.800
0.600
0.400
0.200
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

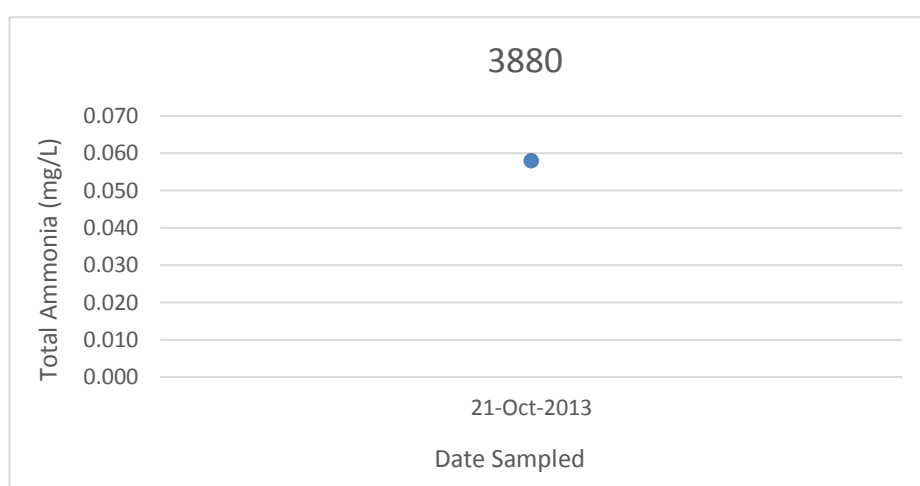

BH11-49B
Total Ammonia (mg/L)
1.000
0.800
0.600
0.400
0.200
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

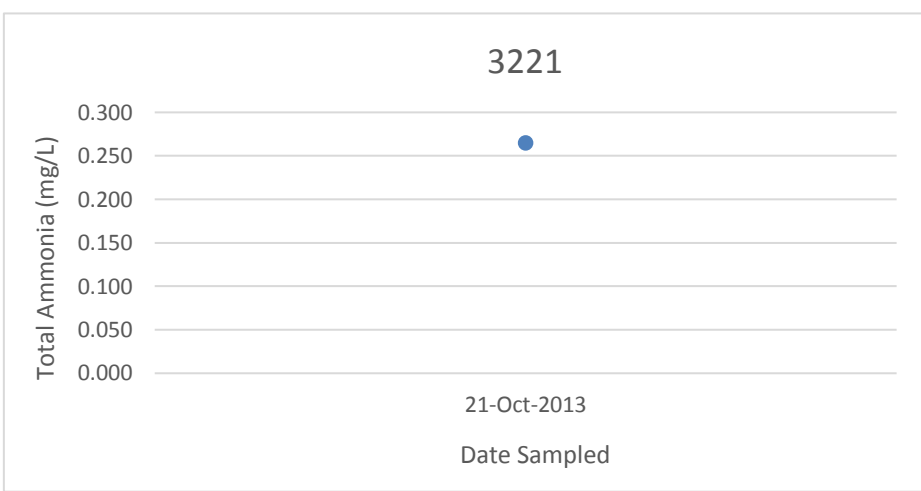

BH11-51B
Total Ammonia (mg/L)
1.000
0.800
0.600
0.400
0.200
0.000
06-Jun-2013
22-Oct-2013
Date Sampled

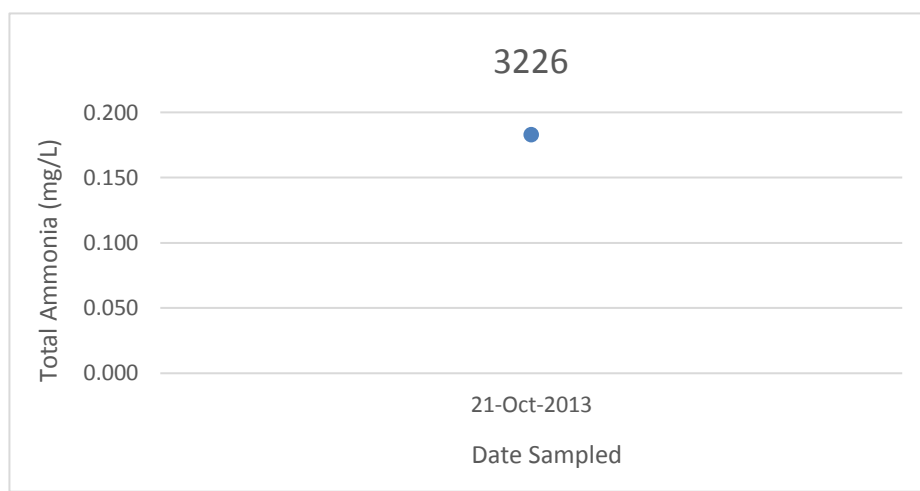

BH12-08
Total Ammonia (mg/L)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
23-Oct-2013
Date Sampled

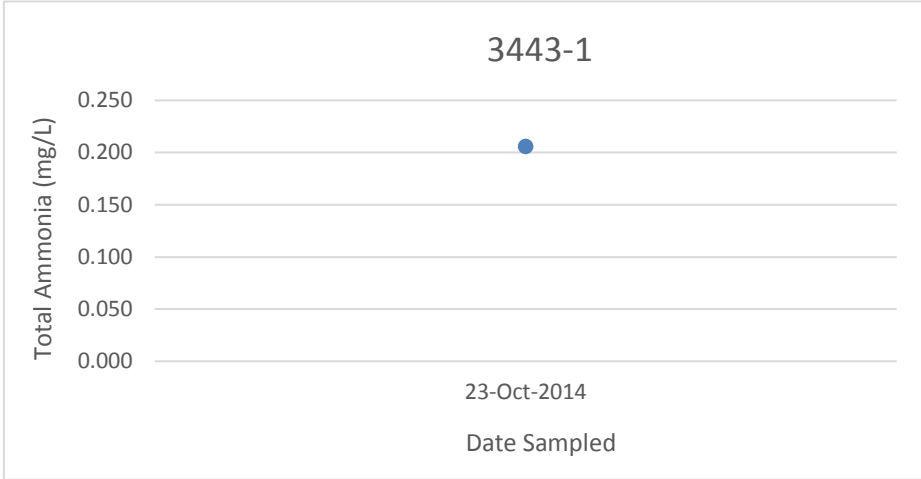

BH11-01A
Total Ammonia (mg/L)
0.500
0.400
0.300
0.200
0.100
0.000
01-Oct-2013
Date Sampled

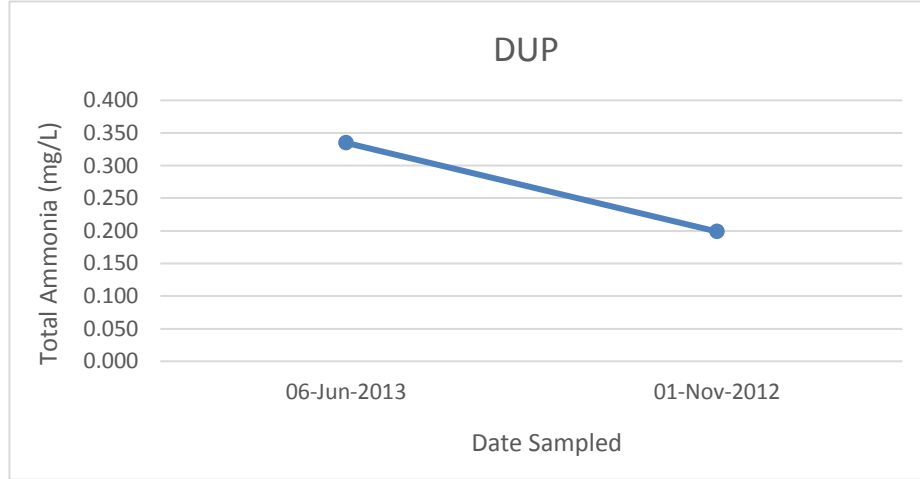

P16
Total Ammonia (mg/L)
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
01-Oct-2013
Date Sampled

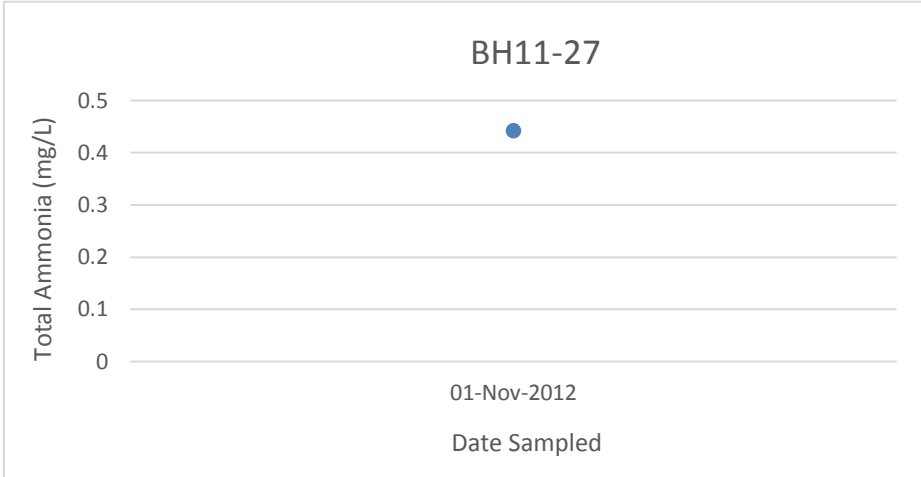

3880
Total Ammonia (mg/L)
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
21-Oct-2013
Date Sampled

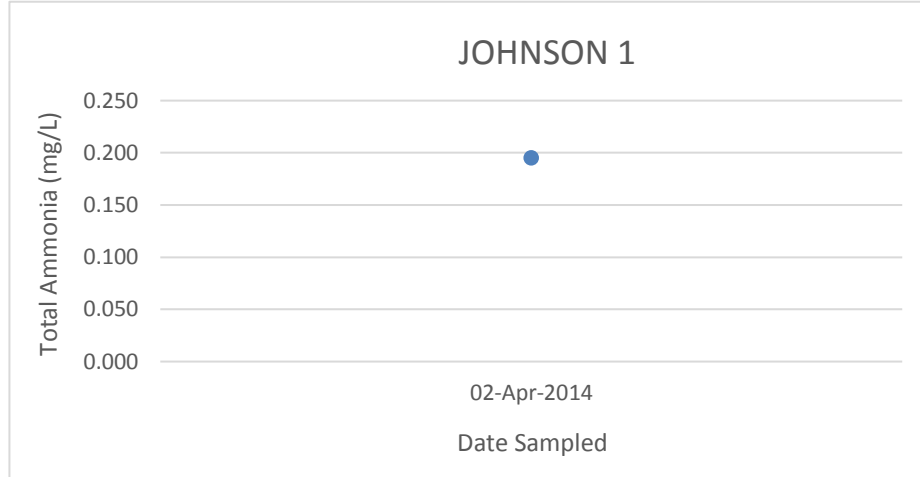

3221
Total Ammonia (mg/L)
0.300
0.250
0.200
0.150
0.100
0.050
0.000
21-Oct-2013
Date Sampled

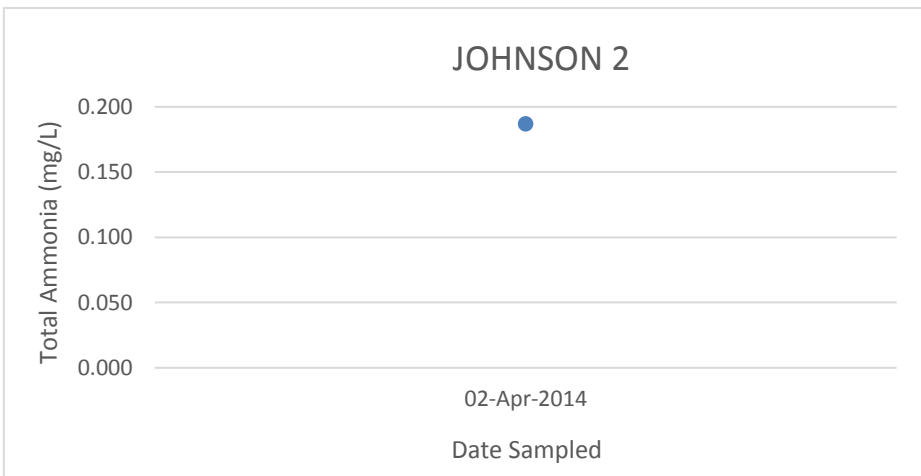

3226
Total Ammonia (mg/L)
0.200
0.150
0.100
0.050
0.000
21-Oct-2013
Date Sampled

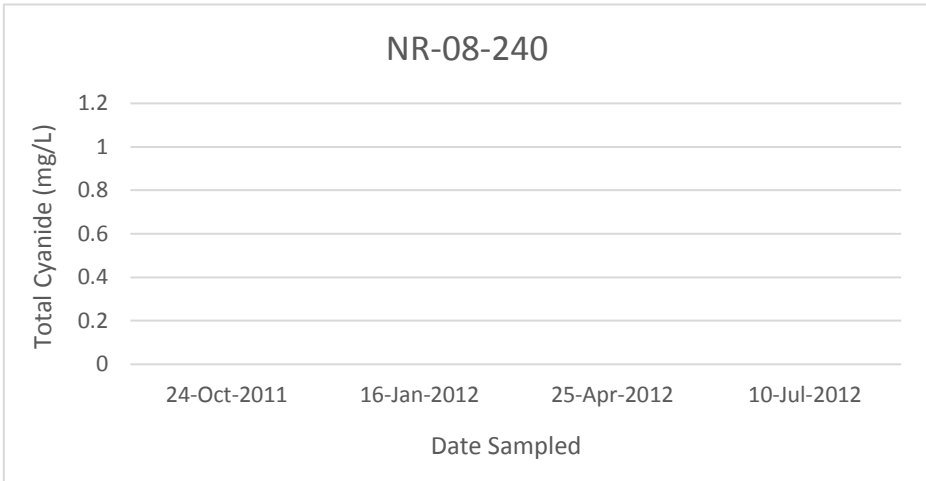

3443-1
Total Ammonia (mg/L)
0.250
0.200
0.150
0.100
0.050
0.000
23-Oct-2014
Date Sampled

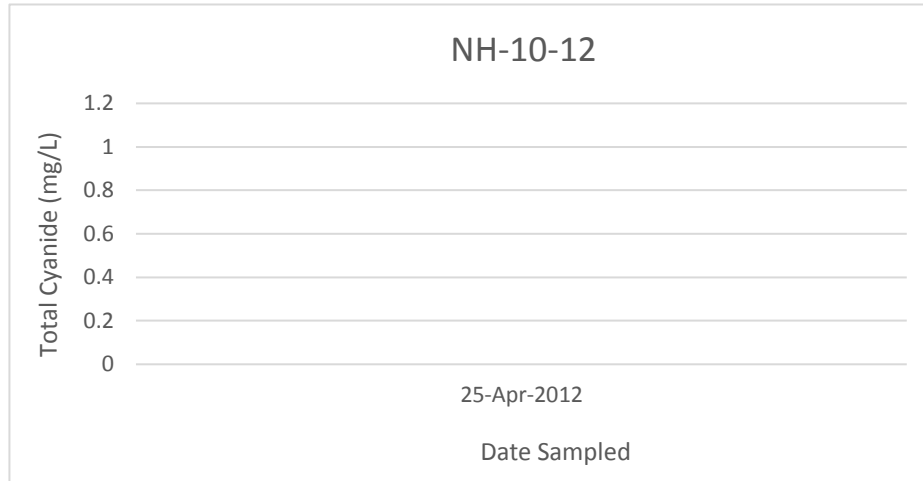

DUP
Total Ammonia (mg/L)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
06-Jun-2013
01-Nov-2012
Date Sampled

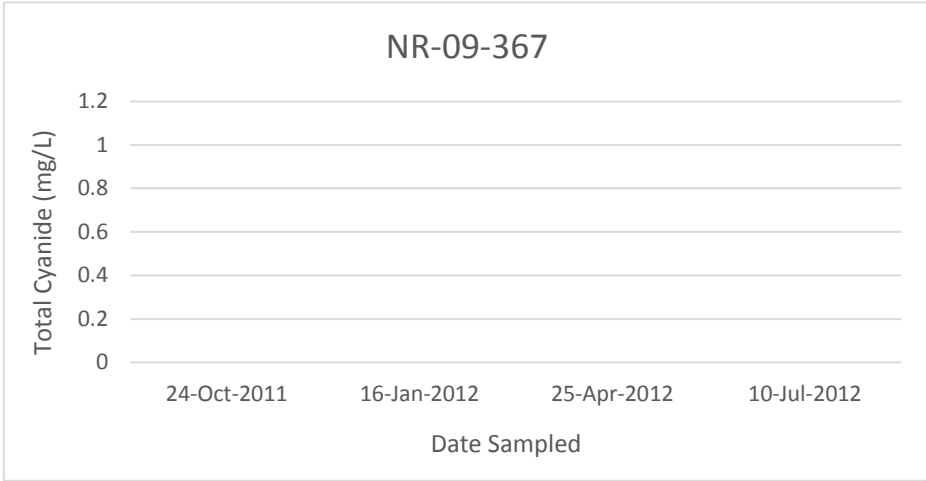

BH11-27
Total Ammonia (mg/L)
0.5
0.4
0.3
0.2
0.1
0
01-Nov-2012
Date Sampled

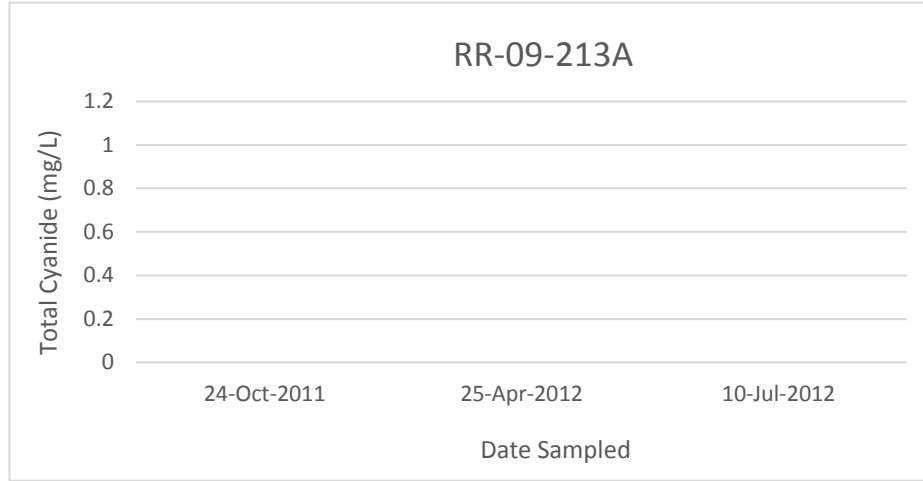

JOHNSON 1
Total Ammonia (mg/L)
0.250
0.200
0.150
0.100
0.050
0.000
02-Apr-2014
Date Sampled

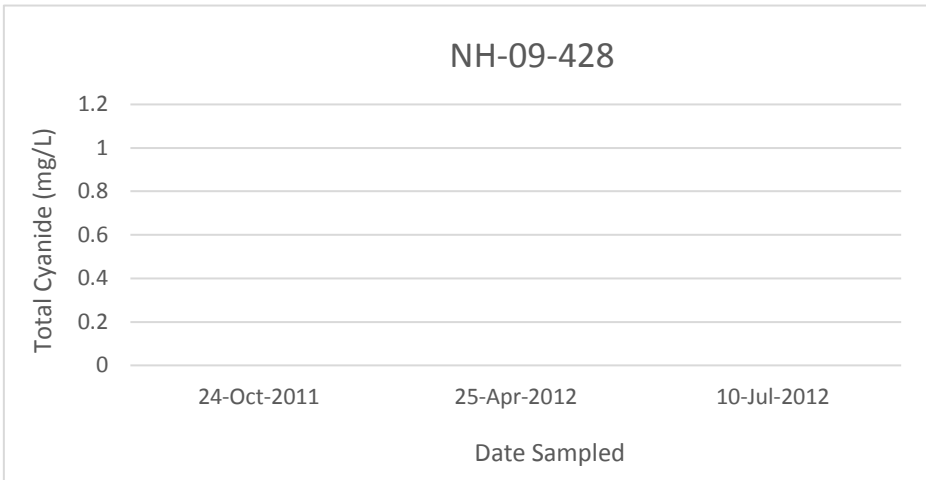

JOHNSON 2
Total Ammonia (mg/L)
0.200
0.150
0.100
0.050
0.000
02-Apr-2014
Date Sampled

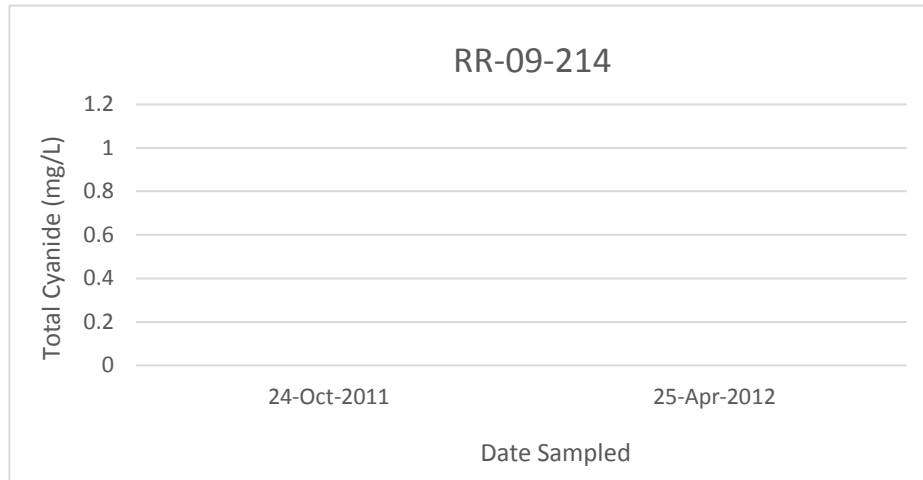

NR-08-240
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

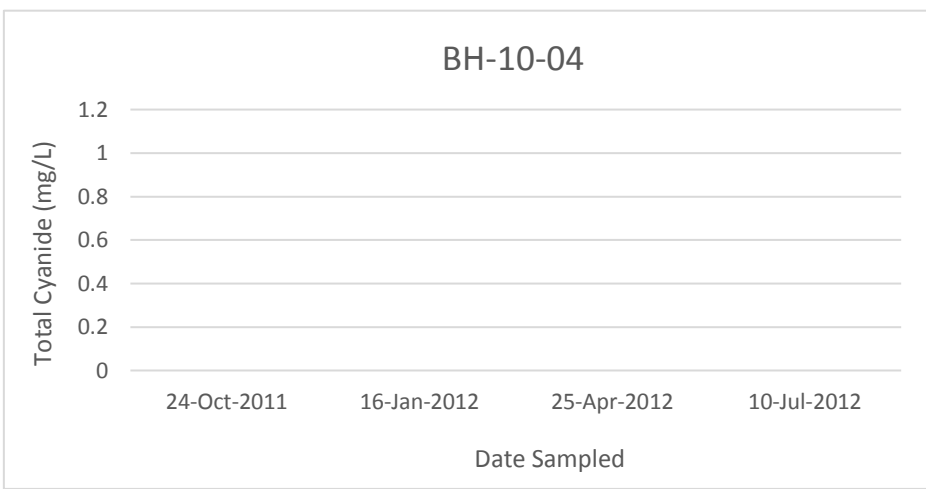

NH-10-12
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
25-Apr-2012
Date Sampled

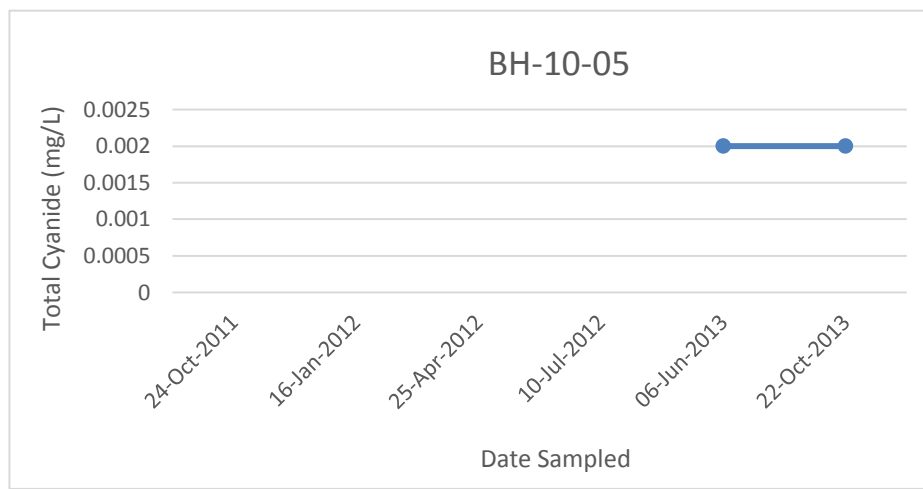

NR-09-367
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

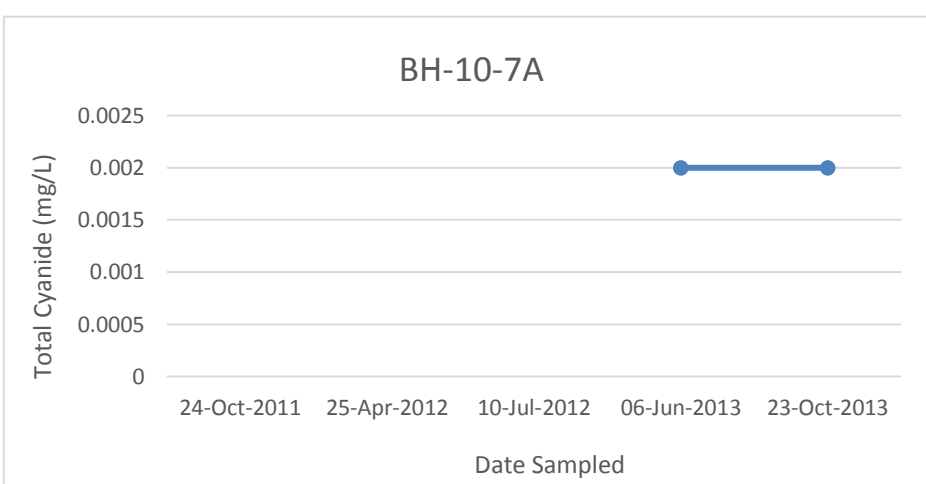

RR-09-213A
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

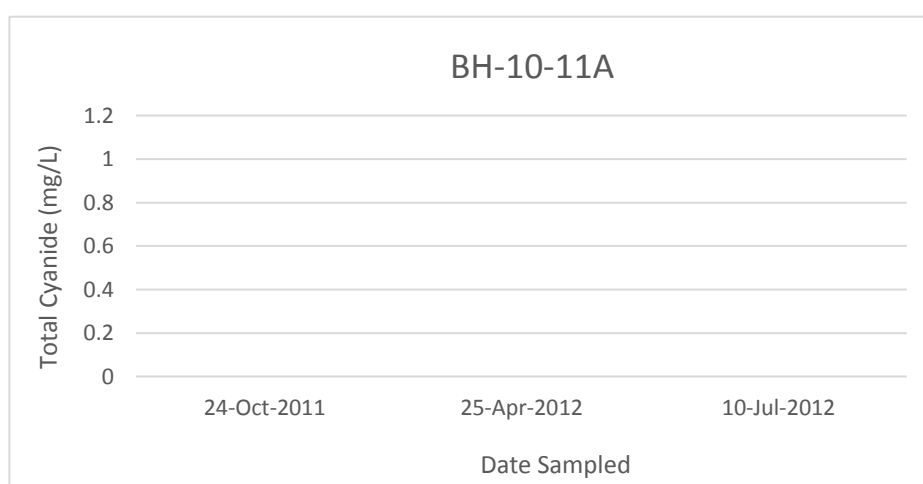

NH-09-428
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

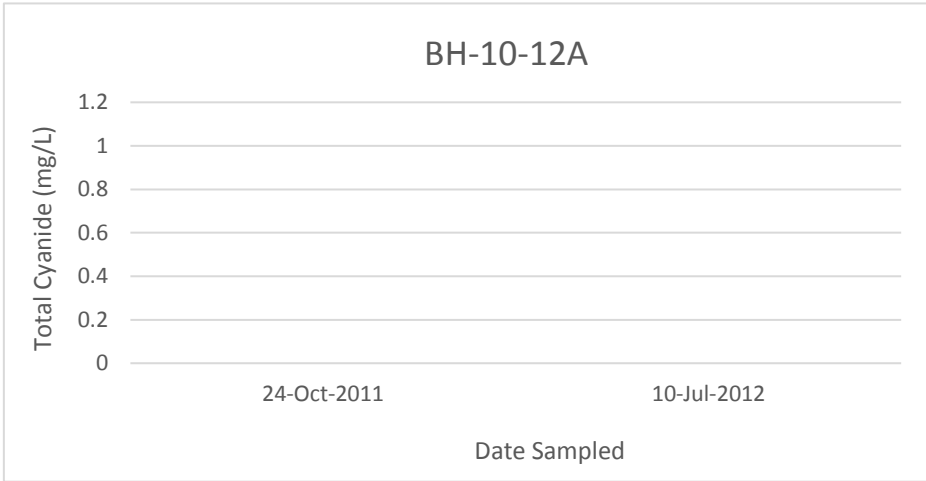

RR-09-214
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
Date Sampled

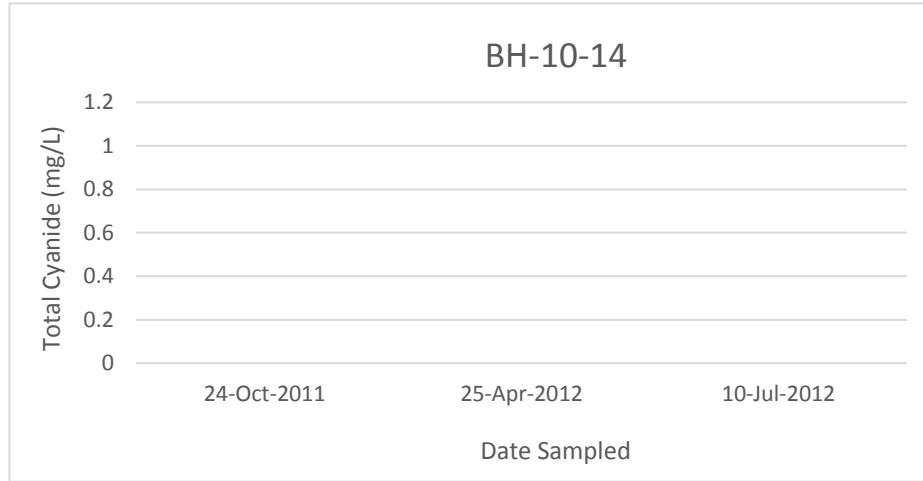

BH-10-04
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
Date Sampled

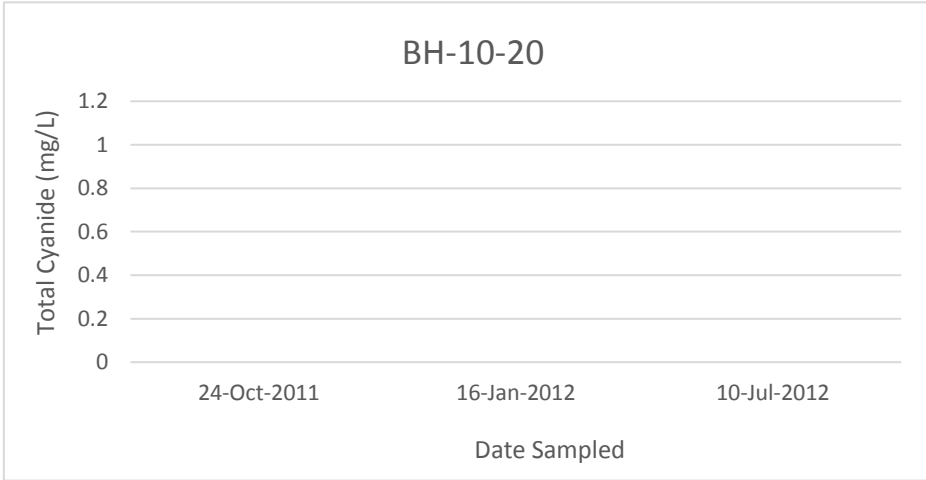

BH-10-05
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
06-Jun-2013
22-Oct-2013
Date Sampled

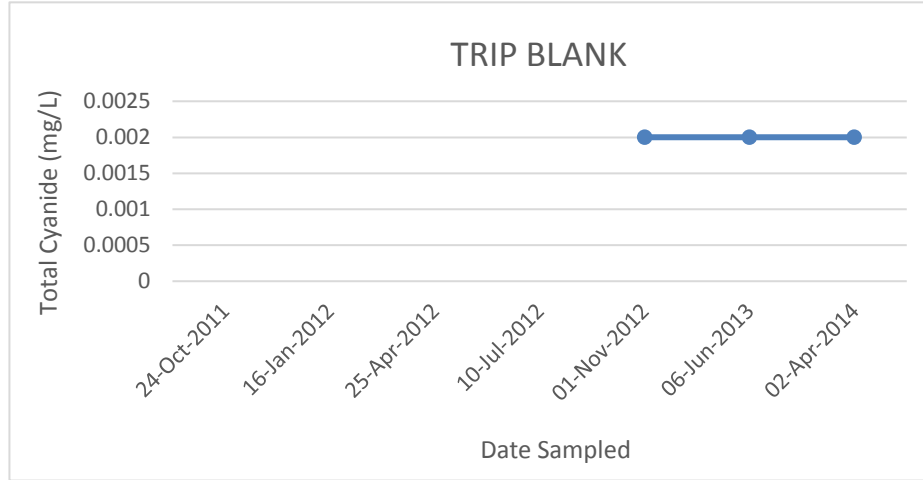

BH-10-7A
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
06-Jun-2013
23-Oct-2013
Date Sampled

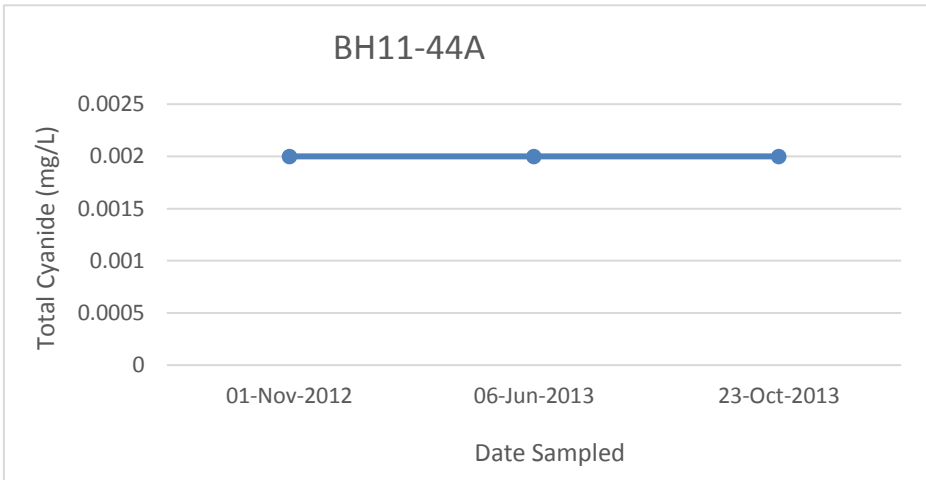

BH-10-11A
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

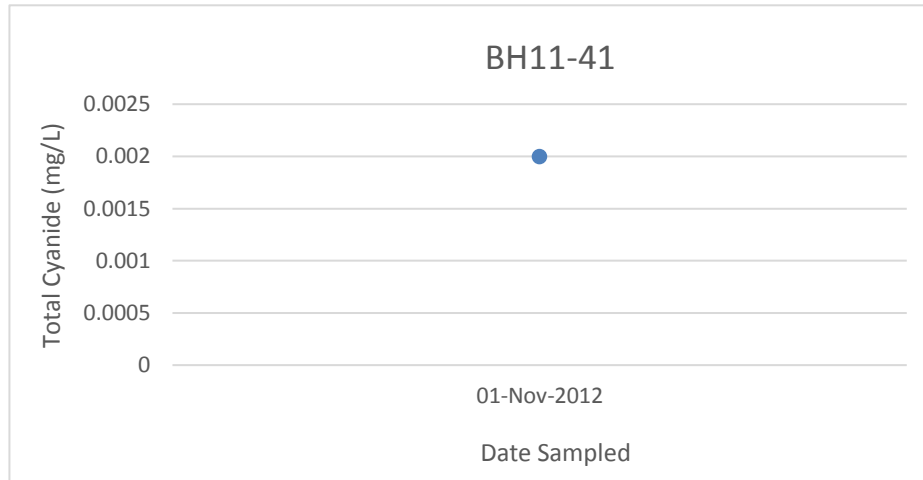

BH-10-12A
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
10-Jul-2012
Date Sampled

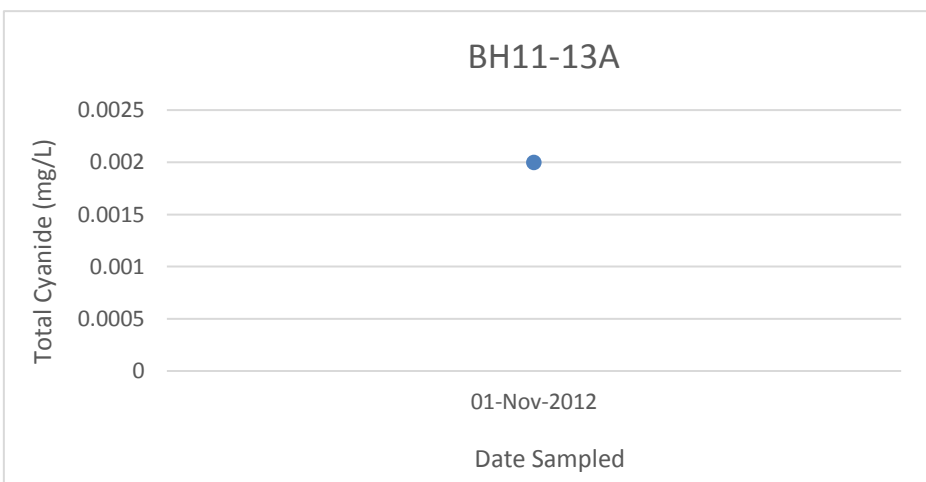

BH-10-14
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
25-Apr-2012
10-Jul-2012
Date Sampled

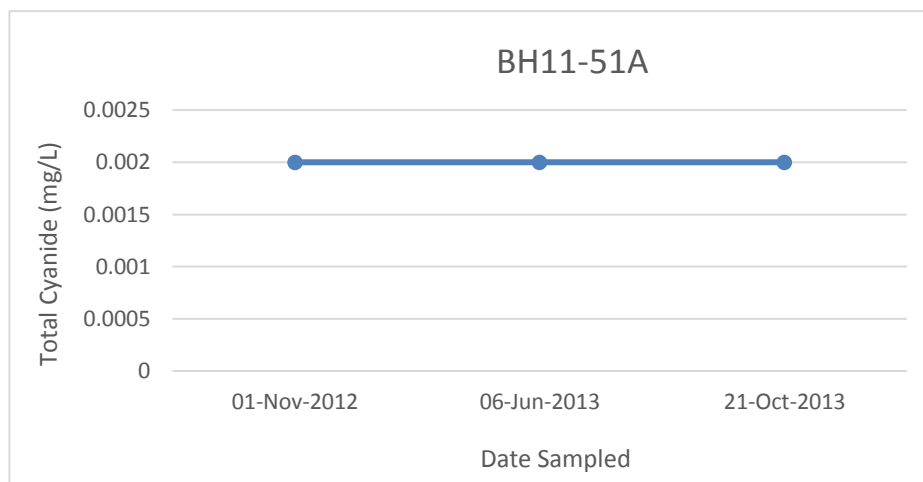

BH-10-20
Total Cyanide (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
24-Oct-2011
16-Jan-2012
10-Jul-2012
Date Sampled

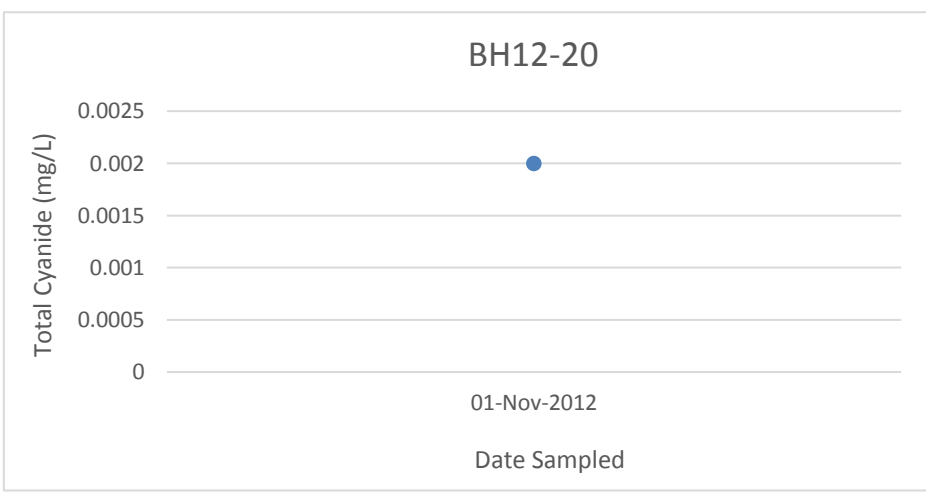

TRIP BLANK
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
24-Oct-2011
16-Jan-2012
25-Apr-2012
10-Jul-2012
01-Nov-2012
06-Jun-2013
02-Apr-2014
Date Sampled

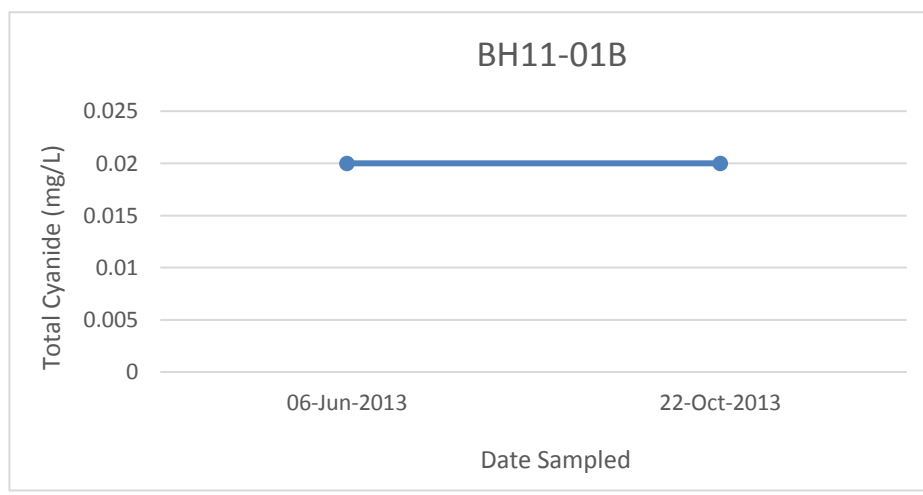

BH11-44A
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
06-Jun-2013
23-Oct-2013
Date Sampled

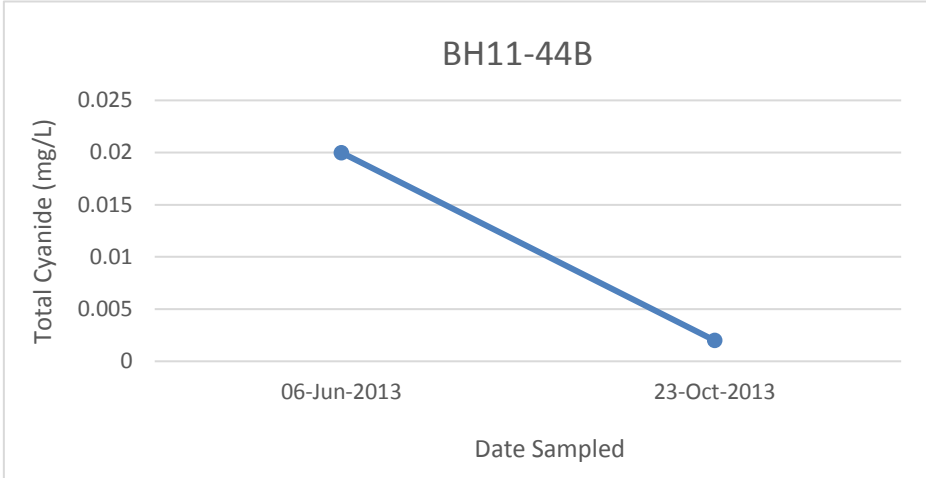

BH11-41
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
Date Sampled


BH11-13A
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
Date Sampled


BH11-51A
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
06-Jun-2013
21-Oct-2013
Date Sampled


BH12-20
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
Date Sampled


BH11-01B
Total Cyanide (mg/L)
0.025
0.02
0.015
0.01
0.005
0
06-Jun-2013
22-Oct-2013
Date Sampled


BH11-44B
Total Cyanide (mg/L)
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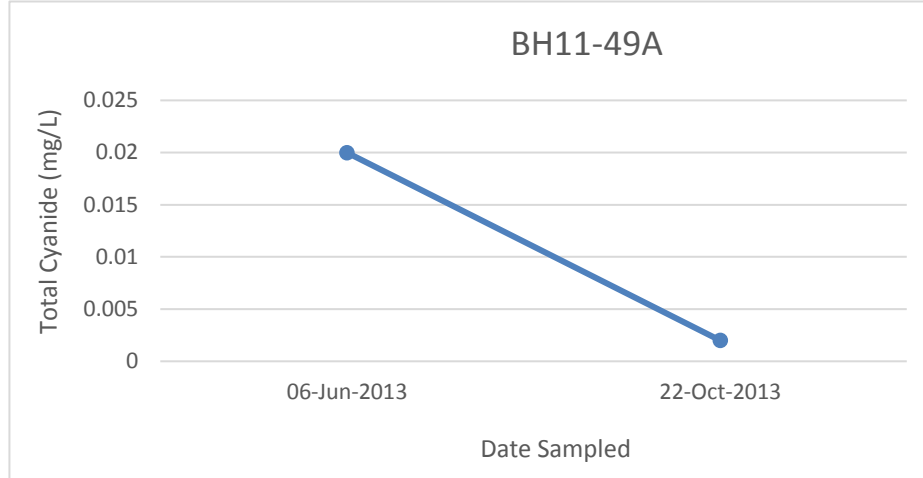
0.02
0.015
0.01
0.005
0
06-Jun-2013
23-Oct-2013
Date Sampled


BH11-49A
Total Cyanide (mg/L)
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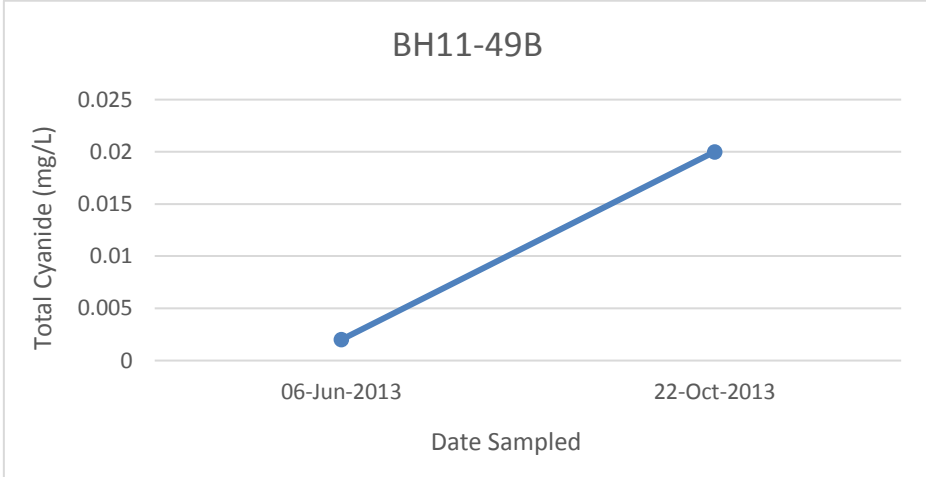
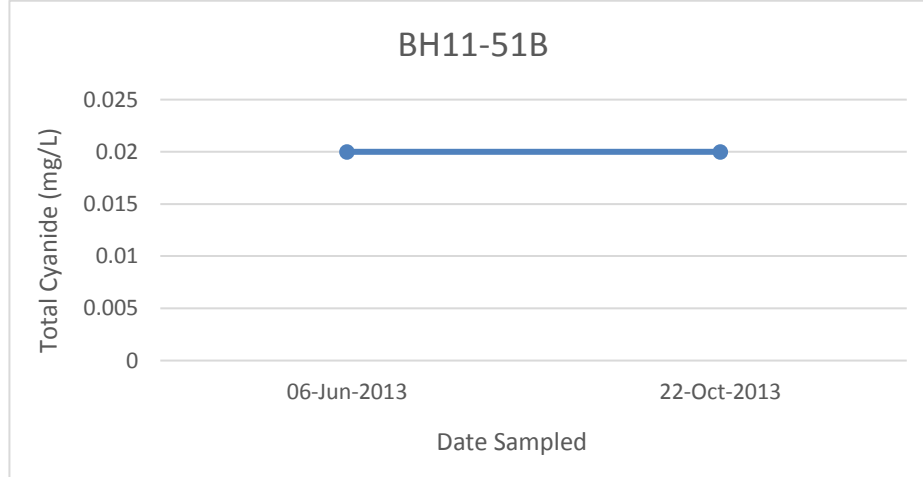
0.02
0.015
0.01
0.005
0
06-Jun-2013
22-Oct-2013
Date Sampled


BH11-49B
Total Cyanide (mg/L)
0.025
0.02
0.015
0.01
0.005
0
06-Jun-2013
22-Oct-2013
Date Sampled


BH11-51B
Total Cyanide (mg/L)
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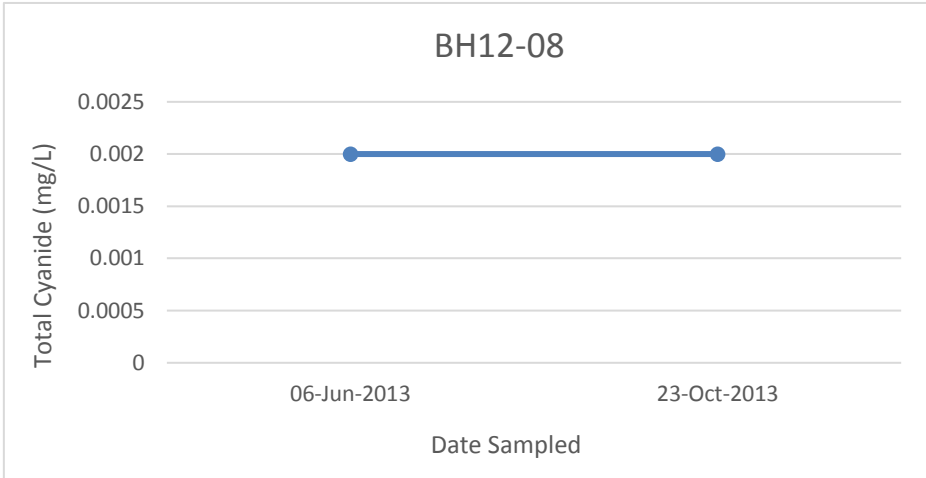
0.02
0.015
0.01
0.005
0
06-Jun-2013
22-Oct-2013
Date Sampled


BH12-08
Total Cyanide (mg/L)
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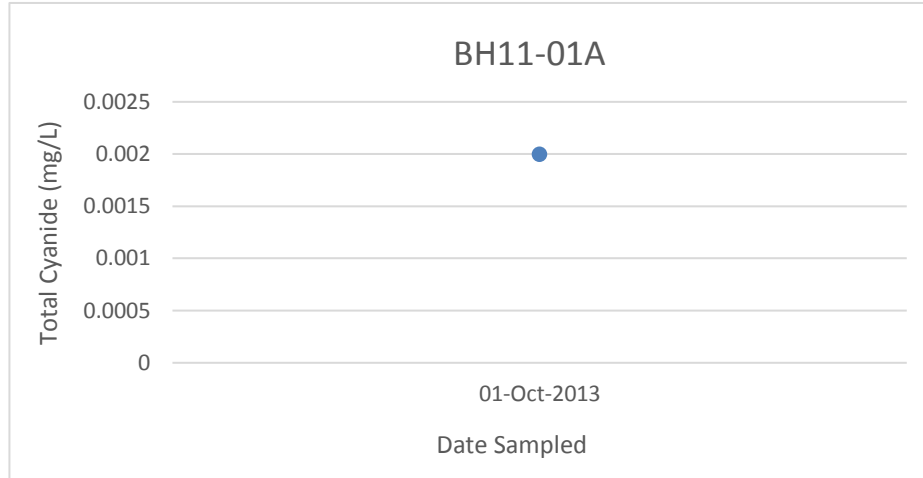
0.002
0.0015
0.001
0.0005
0
06-Jun-2013
23-Oct-2013
Date Sampled


BH11-01A
Total Cyanide (mg/L)
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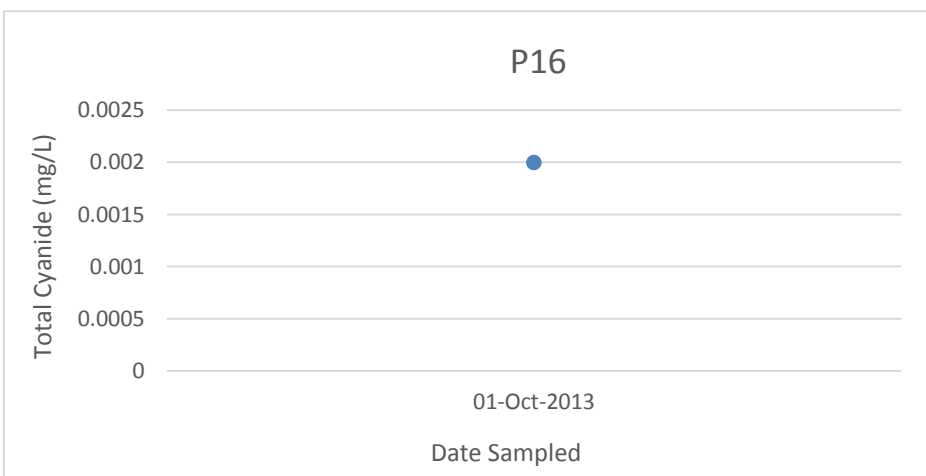
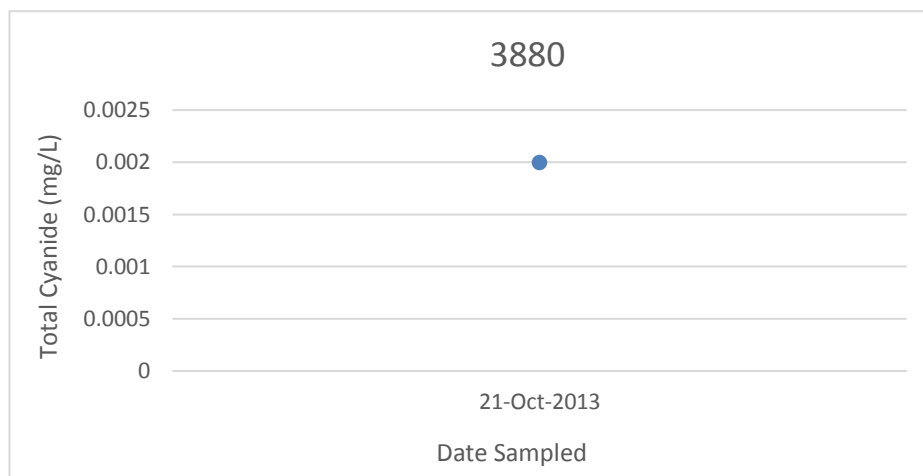
0.002
0.0015
0.001
0.0005
0
01-Oct-2013
Date Sampled


P16
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Oct-2013
Date Sampled


3880
Total Cyanide (mg/L)
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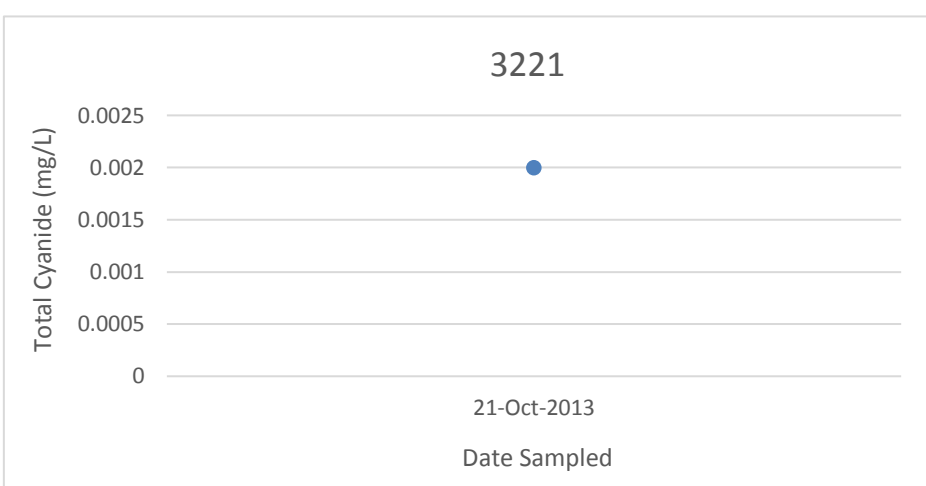
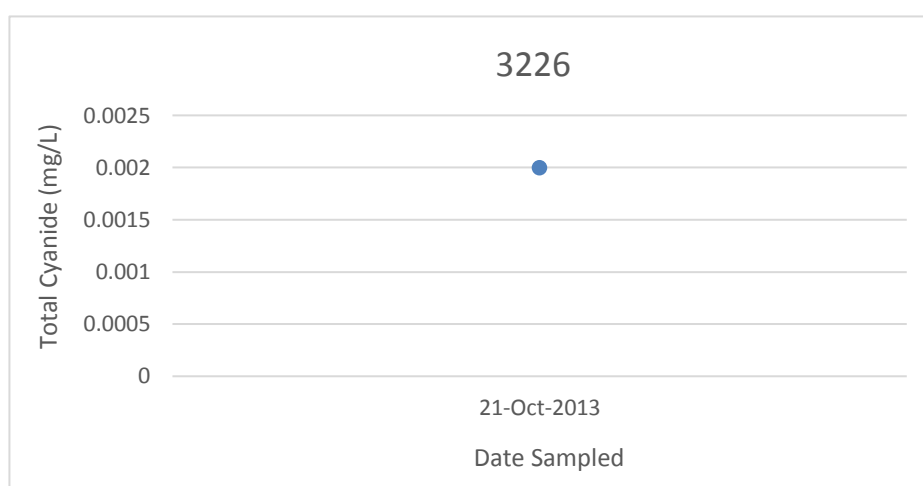
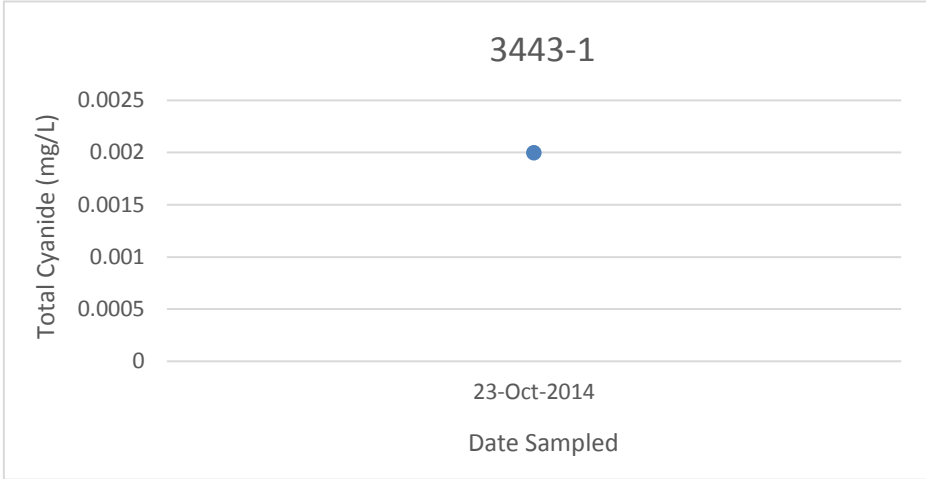
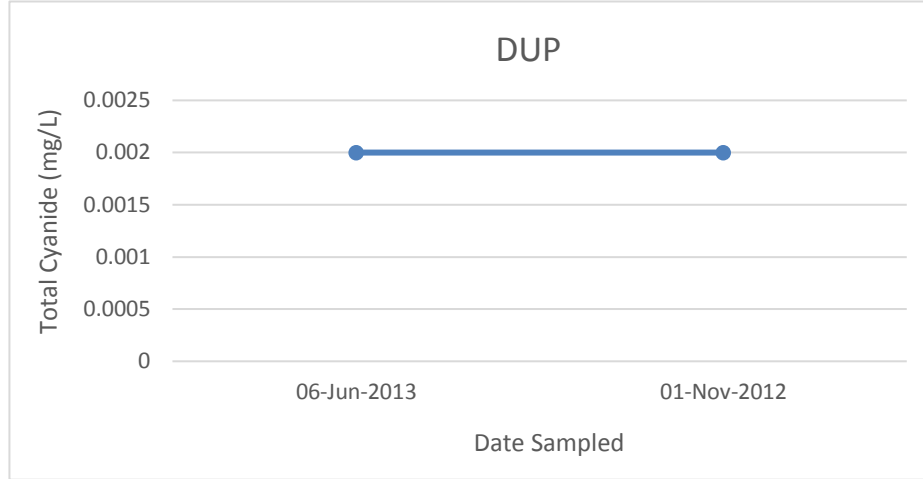
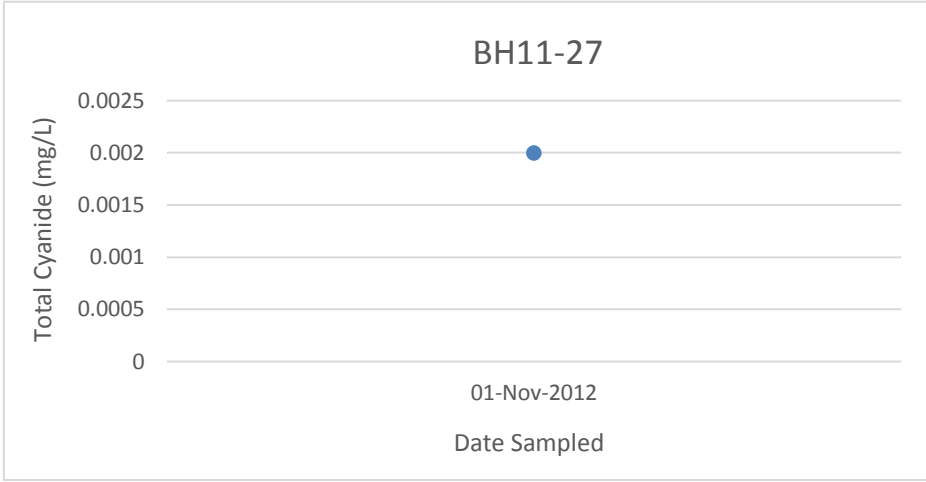
0.002
0.0015
0.001
0.0005
0
21-Oct-2013
Date Sampled

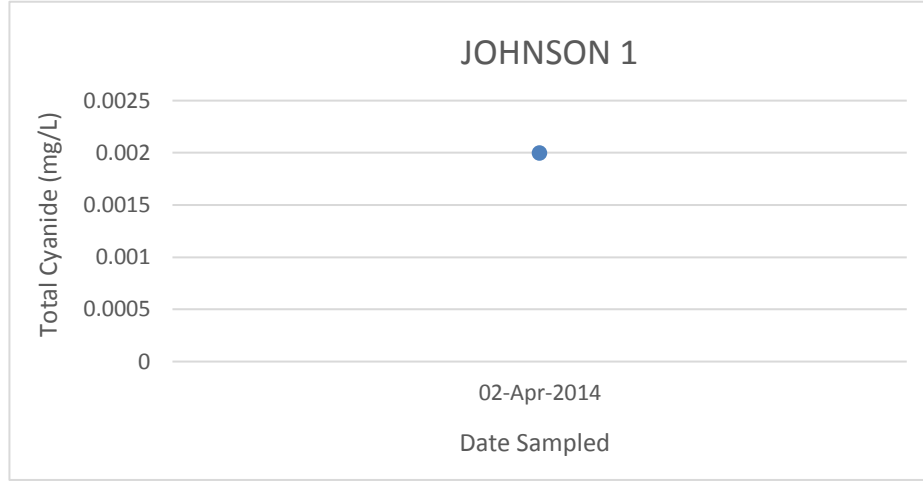

3221
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
21-Oct-2013
Date Sampled

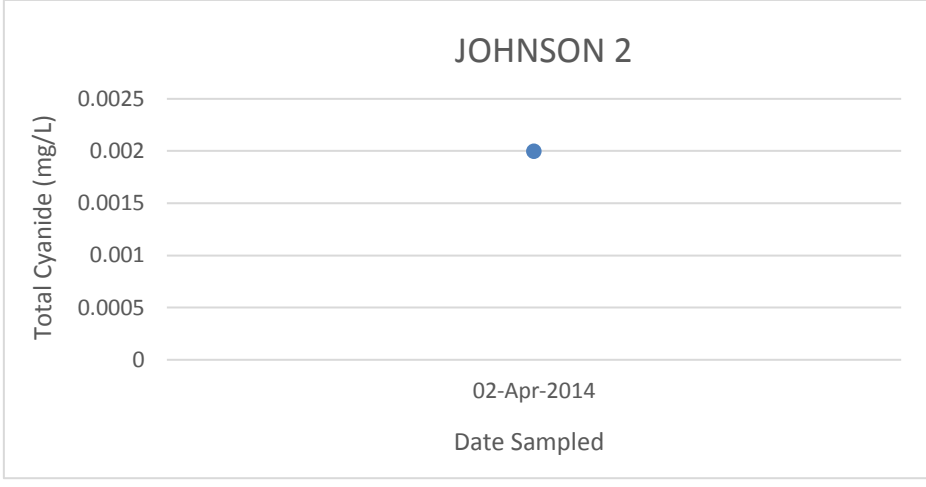

3226
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
21-Oct-2013
Date Sampled


3443-1
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
23-Oct-2014
Date Sampled


DUP
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
06-Jun-2013
01-Nov-2012
Date Sampled


BH11-27
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
01-Nov-2012
Date Sampled


JOHNSON 1
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
02-Apr-2014
Date Sampled


JOHNSON 2
Total Cyanide (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
02-Apr-2014
Date Sampled

APPENDIX F

2015 GROUNDWATER CHEMISTRY

Results Summary L1632725

Job Reference	GROUND WATER
Report To	Mark Vancook / Jesse Tom, New Gold Inc. Rainy River Project
Date Received	25-Jun-2015 12:40
Report Date	10-Jul-2015 14:02
Report Revision	1

Client Sample ID			PIT 3A	PIT 3B	DUP	TMA 4A	TMA 4B	PIT 1	FIELD BLANK	P16	TMA3A	TMA3B	TMA5A	TRIP BLANK
Date Sampled			24-Jun-2015	24-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015
Time Sampled			9:00	8:30	10:26	12:45	15:00	11:24	11:35	10:26	8:00	13:00	14:00	0:01
ALS Sample ID			L1632725-1	L1632725-2	L1632725-3	L1632725-4	L1632725-5	L1632725-6	L1632725-7	L1632725-8	L1632725-9	L1632725-10	L1632725-11	L1632725-12
Parameter	Lowest Detection Limit	Units	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent
Physical Tests (Water)														
Hardness (as CaCO3)	10	mg/L	331	380	149	333	623	583	<10	149	205	409	423	<10
Anions and Nutrients (Water)														
Chloride (Cl)	0.10	mg/L	4.11	2.95	15.2	1.64	10.8	<0.50	<0.10	15.0	0.52	1.71	1.22	<0.10
Physical Tests (Effluent)														
Conductivity (EC)	3.0	uS/cm	650	804	703	694	1400	1060	0.6	705	471	966	867	1.8
pH	0.10	pH	7.56	7.27	8.05	7.58	7.25	7.41	6.21	8.05	7.79	7.51	7.52	5.24
Total Dissolved Solids	10	mg/L	330	390	405	385	885	710	<5	395	275	575	505	<5
Anions and Nutrients (Effluent)														
Alkalinity, Total (as CaCO3)	2.0	mg/L	365	432	313	349	545	510	1.2	300	252	380	467	<0.2
Ammonia, Total (as N)	0.020	mg/L	0.202	0.272	0.424	0.376	0.726	0.098	<0.002	0.440	0.348	0.652	0.602	0.344
Nitrate (as N)	0.020	mg/L	0.005	0.005	0.025	<0.005	<0.005	0.05	<0.005	0.020	0.010	0.04	<0.005	<0.005
Nitrite (as N)	0.010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.001	<0.001	<0.001	<0.001	0.001
Sulfate (SO4)	0.30	mg/L	13.4	46.6	62.3	59.9	326	149	0.02	61.6	10.2	195	58.0	0.14
Cyanides (Effluent)														
Cyanide, Weak Acid Diss	0.0020	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide, Total	0.0020	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Cyanide, Free	0.0050	mg/L	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001
Total Metals (Effluent)														
Aluminum (Al)-Total	0.0050	mg/L	26.5	136	0.0025	24.7	325	11.8	0.0015	0.0020	0.0690	313	0.0010	0.0005
Antimony (Sb)-Total	0.00060	mg/L	0.0016	0.0006	0.00002	0.0002	0.0002500	0.0018	<0.00001	0.00002	<0.00001	0.002	0.00002	<0.00001
Arsenic (As)-Total	0.0010	mg/L	0.032	0.061	<0.0001	0.005	0.14	0.005	<0.0001	<0.0001	0.0198	0.26	0.0096	<0.0001
Barium (Ba)-Total	0.010	mg/L	0.32	1.49	0.020	0.13	7.3	0.16	<0.00002	0.020	0.056	4.9	0.052	<0.00002
Beryllium (Be)-Total	0.0010	mg/L	0.0003200	0.006	<0.00001	0.0006	0.05	0.0005	<0.00001	<0.00001	<0.00001	0.03	<0.00001	<0.00001
Bismuth (Bi)-Total	0.0010	mg/L	0.0001800	0.002	<0.00002	0.0001200	0.000300	0.0001400	<0.00002	<0.00002	<0.00002	0.010	<0.00002	<0.00002
Boron (B)-Total	0.050	mg/L	0.09	0.5	0.500	0.12	1.8	0.17	0.001	0.498	0.124	1.3	0.143	0.002
Cadmium (Cd)-Total	0.000017	mg/L	0.00006	0.00211	<0.000005	0.00008	0.0420	0.00266	<0.000005	<0.000005	<0.000005	0.0109	<0.000005	<0.000005
Calcium (Ca)-Total	0.20	mg/L	101	406	36.5	113	9010	177	0.04	36.1	59.2	1930	102	0.04
Chromium (Cr)-Total	0.0010	mg/L	0.047	0.352	0.0002	0.198	0.93	0.030	<0.0001	0.0003	0.0002	0.60	<0.0001	<0.0001
Cobalt (Co)-Total	0.00050	mg/L	0.0123	0.107	0.00004	0.0186	0.759	0.0075	0.00001	0.00003	0.00014	0.284	0.00011	<0.00001
Copper (Cu)-Total	0.0010	mg/L	0.056	0.408	0.0018	0.126	2.02	0.019	<0.0001	0.0028	0.0001	0.68	0.0002	0.0001
Iron (Fe)-Total	0.020	mg/L	18.2	194	0.030	75.3	494	14.8	<0.01	0.030	0.490	458	1.61	<0.01
Lead (Pb)-Total	0.0010	mg/L	0.006	0.098	0.0001	0.004	0.78	0.012	<0.00001	0.0002	0.000020000	0.54	<0.00001	<0.00001
Lithium (Li)-Total	0.050	mg/L	0.04	0.30	0.006	0.03	1.2	0.11	<0.0002	0.006	0.039	0.6	0.031	<0.0002
Magnesium (Mg)-Total	0.020	mg/L	39.8	184	15.0	36.9	2570	94.0	<0.002	15.1	18.1	628	41.7	<0.002
Manganese (Mn)-Total	0.0010	mg/L	0.540	4.36	0.0550	0.783	48.8	0.439	<0.0001	0.0552	0.154	14.0	0.262	<0.0001
Mercury (Hg)-Total	0.000010	mg/L	0.000006	0.000024	<0.000002	0.000012	0.00008	<0.000002	<0.000002	<0.000002	<0.000002	0.0000980000	<0.000002	<0.000002
Molybdenum (Mo)-Total	0.0010	mg/L	0.006	0.012	0.0010	0.009	0.01	0.006	<0.00002	0.0010	0.0019	0.02	0.0020	<0.00002
Nickel (Ni)-Total	0.0020	mg/L	0.026	0.292	0.0003	0.053	2.20	0.020	<0.0001	0.0005	0.0005	0.82	0.0001	<0.0001
Potassium (K)-Total	0.50	mg/L	4.7	31.7	1.91	5.9	96	6.0	<0.01	1.93	3.19	83	4.63	<0.01
Selenium (Se)-Total	0.0010	mg/L	<0.0002	0.003	<0.0002	<0.0002	0.01	0.0004000	<0.0002	<0.0002	<0.0002	0.01	<0.0002	<0.0002
Silver (Ag)-Total	0.00010	mg/L	0.0077	0.0039	<0.00001	0.0020	0.0001500	0.0003	<0.00001	<0.00001	<0.00001	0.001	<0.00001	<0.00001
Sodium (Na)-Total	0.50	mg/L	10.2	33	103	21.8	128	17.9	<0.02	95.7	16.0	81	31.9	<0.02
Strontium (Sr)-Total	0.0010	mg/L	0.488	1.18	0.694	0.783	10.5	0.751	<0.0001	0.710	0.383	4.74	0.702	<0.0001
Thallium (Tl)-Total	0.00030	mg/L	0.0004	0.0025	<0.000002	0.0001	0.010	0.0002	<0.000002	<0.000002	<0.000002	0.009	<0.000002	<0.000002
Tin (Sn)-Total	0.0010	mg/L	0.0001400	0.0008	0.000020000	0.0005	0.000800	0.0006	0.000040000	<0.00002	0.000020000	0.000800	0.000020000	<0.00002
Titanium (Ti)-Total	0.0020	mg/L	0.156	2.60	0.0002	0.609	0.11	0.409	0.0001	0.0002	0.0047	0.88	0.00005	0.00005
Tungsten (W)-Total	0.010	mg/L	0.05	0.02	0.009870	0.01	0.0013	0.00275	<0.00001	0.009610	0.0002100	0.00038	<0.00001	<0.00001
Uranium (U)-Total	0.0050	mg/L	0.001	0.027	0.0001	0.0009	0.24	0.017	<0.000001	0.0001	0.0009	0.19	0.0008	<0.000001
Vanadium (V)-Total	0.0010	mg/L	0.026	0.374	0.0001	0.239	0.48	0.038	<0.00005	0.0001	0.0004	0.73	0.00005	0.0001
Zinc (Zn)-Total	0.0030	mg/L	0.052	0.712	0.0025	0.056	4.12	0.052	<0.0005	0.0085	0.0005	1.89	0.0005	0.0010
Zirconium (Zr)-Total	0.0010	mg/L	0.010	0.016	0.0005	0.003	0.005	0.007	<0.00002	0.0005	0.0001	0.02	0.0001	<0.00002

Results Summary L1632725

Job Reference	GROUND WATER
Report To	Mark Vancook / Jesse Tom, New Gold Inc. Rainy River Project
Date Received	25-Jun-2015 12:40
Report Date	10-Jul-2015 14:02
Report Revision	1

Client Sample ID			PIT 3A	PIT 3B	DUP	TMA 4A	TMA 4B	PIT 1	FIELD BLANK	P16	TMA3A	TMA3B	TMA5A	TRIP BLANK
Date Sampled			24-Jun-2015	24-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015	23-Jun-2015
Time Sampled			9:00	8:30	10:26	12:45	15:00	11:24	11:35	10:26	8:00	13:00	14:00	0:01
ALS Sample ID			L1632725-1	L1632725-2	L1632725-3	L1632725-4	L1632725-5	L1632725-6	L1632725-7	L1632725-8	L1632725-9	L1632725-10	L1632725-11	L1632725-12
Parameter	Lowest Detection Limit	Units	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent
Dissolved Metals (Effluent)														
Dissolved Mercury Filtration Location		-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	0.0050	mg/L	0.0450	0.0050	0.0010	0.0010	0.0040	0.0020	<0.001	0.0020	0.0010	0.0050	<0.001	<0.001
Antimony (Sb)-Dissolved	0.00060	mg/L	0.00006	0.00010	0.00002	0.00001	0.00061	0.00015	<0.00001	0.00002	<0.00001	0.00121	0.00001	<0.00001
Arsenic (As)-Dissolved	0.0010	mg/L	0.0092	0.0043	0.00006	0.0034	0.0168	0.0006	<0.00001	0.00006	0.0194	0.0101	0.0096	<0.00001
Barium (Ba)-Dissolved	0.010	mg/L	0.073	0.094	0.021	0.061	0.022	0.042	0.0001800	0.021	0.059	0.025	0.052	<0.00002
Beryllium (Be)-Dissolved	0.0010	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth (Bi)-Dissolved	0.0010	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Boron (B)-Dissolved	0.050	mg/L	0.059	0.305	0.468	0.097	0.417	0.119	0.006	0.463	0.130	0.606	0.137	0.007
Cadmium (Cd)-Dissolved	0.000017	mg/L	<0.000005	0.000010	<0.000005	<0.000005	0.000005	0.000360	<0.000005	<0.000005	<0.000005	0.000015	<0.000005	<0.000005
Calcium (Ca)-Dissolved	0.20	mg/L	84.1	88.5	35.5	90.2	158	116	0.02	35.6	54.3	106	103	<0.02
Chromium (Cr)-Dissolved	0.0010	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)-Dissolved	0.00050	mg/L	0.00010	0.00121	0.00003	0.00005	0.00040	0.00051	<0.00001	0.00003	0.00009	0.00045	0.00009	<0.00001
Copper (Cu)-Dissolved	0.0010	mg/L	0.0002	0.0006	0.0044	<0.0001	0.0006	0.0005	<0.0001	0.0032	<0.0001	0.0006	<0.0001	<0.0001
Iron (Fe)-Dissolved	0.020	mg/L	2.52	0.770	<0.01	2.78	0.420	0.060	<0.01	<0.01	0.370	0.040	1.42	<0.01
Lead (Pb)-Dissolved	0.0010	mg/L	0.000010000	0.000040000	0.0003	<0.00001	0.000040000	0.000030000	<0.00001	0.0002	<0.00001	0.00005	<0.00001	<0.00001
Lithium (Li)-Dissolved	0.050	mg/L	0.016	0.083	0.006	0.018	0.154	0.085	<0.0002	0.006	0.037	0.150	0.033	<0.0002
Magnesium (Mg)-Dissolved	0.020	mg/L	29.5	38.7	14.7	26.1	55.3	71.0	0.010	14.6	16.9	35.2	40.2	0.004
Manganese (Mn)-Dissolved	0.0010	mg/L	0.281	0.405	0.0534	0.229	0.191	0.117	<0.0001	0.0532	0.145	0.211	0.264	<0.0001
Mercury (Hg)-Dissolved	0.000010	mg/L	<0.000002	<0.000002	<0.000002	0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002
Molybdenum (Mo)-Dissolved	0.0010	mg/L	0.0028	0.0051	0.0009	0.0031	0.0075	0.0035	<0.00002	0.0009	0.0016	0.0064	0.0017	<0.00002
Nickel (Ni)-Dissolved	0.0020	mg/L	0.0003	0.0026	0.0004	0.0002	0.0015	0.0016	<0.0001	0.0003	0.0003	0.0013	<0.0001	<0.0001
Potassium (K)-Dissolved	0.50	mg/L	3.11	3.69	1.98	4.11	6.95	2.67	<0.01	1.99	3.27	4.28	4.84	<0.01
Selenium (Se)-Dissolved	0.0010	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (Ag)-Dissolved	0.00010	mg/L	0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium (Na)-Dissolved	0.10	mg/L	8.50	34.0	97.5	19.5	88.5	15.5	<0.5	97.0	15.5	55.5	30.5	<0.5
Strontium (Sr)-Dissolved	0.0010	mg/L	0.356	0.509	0.653	0.632	1.03	0.620	0.0001	0.643	0.331	0.662	0.627	<0.0001
Thallium (Tl)-Dissolved	0.00030	mg/L	<0.000002	0.00000200000	<0.000002	<0.000002	<0.000002	0.00000400000	<0.000002	<0.000002	<0.000002	0.00001	<0.000002	<0.000002
Tin (Sn)-Dissolved	0.0010	mg/L	<0.00002	0.000020000	<0.00002	<0.00002	<0.00002	0.000020000	<0.00002	<0.00002	<0.00002	0.000040000	<0.00002	<0.00002
Titanium (Ti)-Dissolved	0.0020	mg/L	0.0003	0.0002	<0.00005	<0.00005	0.0002	0.0001	<0.00005	0.0001	<0.00005	<0.00005	<0.00005	<0.00005
Tungsten (W)-Dissolved	0.010	mg/L	0.005	0.002	0.009	0.002	0.0009	0.0003200	<0.00001	0.009	0.0002100	0.0003900	0.00003000	<0.00001
Uranium (U)-Dissolved	0.0050	mg/L	0.0007	0.0091	0.0001	0.0004	0.0160	0.0150	0.0000090000	0.0001	0.0008	0.0120	0.0008	0.0000030000
Vanadium (V)-Dissolved	0.0010	mg/L	0.0001	0.0004	<0.00005	0.00005	0.0004	0.0004	<0.00005	0.00005	0.0002	0.0004	<0.00005	<0.00005
Zinc (Zn)-Dissolved	0.0030	mg/L	0.0005	0.0045	0.0055	0.0010	0.0045	0.0025	0.0015	0.0050	0.0005	0.0050	0.0005	<0.0005
Zirconium (Zr)-Dissolved	0.0010	mg/L	0.0002	0.0002	0.0004	0.000020000	0.0001	0.0001	<0.00002	0.0004	0.000040000	0.00006	0.00006	<0.00002

Qualifier Legend

<T	A Measurable Trace Amount: Interpret With Caution
<DL	Recorded value = measured amount <LMDL (non-zero)
<W	No Measurable Response (Zero): < Reported Value
DLA	Detection Limit adjusted for required dilution

Results Summary L1701294

Job Reference	GROUND WATER
Report To	Garnet Cornell / Jesse Tom, New Gold Inc. Rainy River Project
Date Received	12-Nov-2015 9:30
Report Date	20-Nov-2015 14:26
Report Version	1

Client Sample ID			TMA 4A	TMA 3A	PIT 1	PIT 3A	PIT 3B	TMA 3B	TMA 5A	TMA 5B	SEALED TRAVEL BLANK
Date Sampled			11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015
Time Sampled			11:45	12:10	9:15	14:30	14:35	12:45	10:30	10:45	15:00
ALS Sample ID			L1701294-1	L1701294-2	L1701294-3	L1701294-4	L1701294-5	L1701294-6	L1701294-7	L1701294-8	L1701294-9
Parameter	Lowest Detection Limit	Units	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent
Anions and Nutrients (Water)											
Chloride (Cl)	0.10	mg/L	1.71	0.69	<0.50	4.19	4.15	1.58	0.66	1.82	<0.10
Physical Tests (Effluent)											
Conductivity (EC)	3.0	uS/cm	706	484	1070	666	667	979	909	1290	0.4
Hardness (as CaCO3)	0.51	mg/L	355	229	601	355	394	414	470	560	<0.51
pH	0.10	pH	7.61	7.81	7.24	7.33	7.41	7.63	7.46	7.44	6.67
Total Dissolved Solids	10	mg/L	415	290	680	380	425	610	525	895	<5
Anions and Nutrients (Effluent)											
Alkalinity, Total (as CaCO3)	2.0	mg/L	345	262	502	361	363	376	503	432	<0.2
Ammonia, Total (as N)	0.020	mg/L	0.466	0.428	0.022	0.244	0.402	1.33	0.478	0.710	0.010
Nitrate (as N)	0.020	mg/L	0.010	0.035	0.31	<0.005	0.080	0.080	<0.005	0.03	<0.005
Nitrite (as N)	0.010	mg/L	<0.001	<0.001	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	<0.001
Sulfate (SO4)	0.30	mg/L	57.6	10.6	150	14.9	18.0	202	40.9	295	<0.02
Cyanides (Effluent)											
Cyanide, Weak Acid Diss	0.0020	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Cyanide, Total	0.0020	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide, Free	0.0050	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Metals (Effluent)											
Aluminum (Al)-Total	0.0050	mg/L	14.4	4.10	2.27	0.375	51.4	524	0.0035	116	0.0025
Antimony (Sb)-Total	0.00060	mg/L	0.00010	0.00015	0.00040	0.00006	0.0008	0.00373	0.00001	0.009	<0.00001
Arsenic (As)-Total	0.0010	mg/L	0.0053	0.0214	0.0020	0.0106	0.03	0.3	0.0102	0.2	<0.0001
Barium (Ba)-Total	0.010	mg/L	0.112	0.095	0.068	0.072	0.6	9	0.057	1	0.00004000
Beryllium (Be)-Total	0.0010	mg/L	0.0004	0.0001	0.0001	<0.00001	0.00285	0.044	<0.00001	0.0066	<0.00001
Bismuth (Bi)-Total	0.0010	mg/L	0.00008	0.00006	0.000040000	<0.00002	0.00130	0.021	<0.00002	<0.00002	0.000020000
Boron (B)-Total	0.050	mg/L	0.104	0.144	0.154	0.065	0.4	2	0.119	10	<0.0005
Cadmium (Cd)-Total	0.000017	mg/L	0.000065	0.000045	0.000740	<0.000005	0.0009	0.014	<0.000005	0.004	<0.000005
Calcium (Ca)-Total	0.20	mg/L	104	67.9	130	86.3	236	2430	111	720	<0.02
Chromium (Cr)-Total	0.0010	mg/L	0.112	0.0093	0.0059	0.0007	0.13	0.8	<0.0001	0.2	<0.0001
Cobalt (Co)-Total	0.00050	mg/L	0.0106	0.00308	0.00178	0.00021	0.040	0.35	0.00010	0.09	<0.00001
Copper (Cu)-Total	0.0010	mg/L	0.0704	0.0081	0.0039	0.0010	0.16	0.9	<0.0001	1.0	<0.0001
Iron (Fe)-Total	0.020	mg/L	43.3	5.38	2.97	2.64	75.7	654	1.94	176	<0.01
Lead (Pb)-Total	0.0010	mg/L	0.0031	0.0019	0.0021	0.0001	0.04	0.7	0.000010000	0.10	<0.00001
Lithium (Li)-Total	0.050	mg/L	0.029	0.044	0.110	0.018	0.2	1	0.041	0.1	<0.0002
Magnesium (Mg)-Total	0.020	mg/L	32.8	22.8	81.8	31.6	99.4	787	45.9	264	<0.002
Manganese (Mn)-Total	0.0010	mg/L	0.539	0.270	0.116	0.270	1.69	16.6	0.319	4.3	<0.0001
Mercury (Hg)-Total	0.000010	mg/L	0.000004	0.000002	0.000004	<0.000002	0.000030	0.000016	<0.000002	0.000006	<0.000002
Molybdenum (Mo)-Total	0.0010	mg/L	0.0055	0.0024	0.0046	0.0027	0.006	0.039	0.0021	0.07	<0.00002
Nickel (Ni)-Total	0.0020	mg/L	0.0291	0.0074	0.0054	0.0005	0.11	1.0	0.0001	0.3	<0.0001
Potassium (K)-Total	0.50	mg/L	5.64	4.53	4.02	3.12	15	170	4.63	50	<0.01
Selenium (Se)-Total	0.0010	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.00120	0.017	<0.0002	0.010	<0.0002
Silver (Ag)-Total	0.00010	mg/L	0.00128	0.00007	0.00009	0.00011	0.002	0.006	<0.00001	0.01	<0.00001
Sodium (Na)-Total	0.10	mg/L	20.5	18.5	18.1	9.08	27	100	26.9	410	<0.02
Strontium (Sr)-Total	0.0010	mg/L	0.706	0.446	0.674	0.364	0.82	6.7	0.652	1.7	<0.0001
Tellurium (Te)-Total	0.0010	mg/L	0.0001	0.00008	0.0001	0.00007	0.00132	0.0057	0.00009	<0.00001	<0.00001
Thallium (Tl)-Total	0.00030	mg/L	0.00007	0.00005	0.00005	0.000006	0.001	0.01	<0.000002	0.007	<0.000002
Tin (Sn)-Total	0.0010	mg/L	0.0006	0.0008	0.0003	0.000020000	0.000880	0.0093	0.00006	<0.00002	0.000020000
Titanium (Ti)-Total	0.0020	mg/L	0.264	0.214	0.0777	0.0027	0.77	3.1	0.0002	2.4	<0.00005
Tungsten (W)-Total	0.010	mg/L	0.008	0.001	0.0007	0.004	0.0061	0.01	0.00009000	0.02	<0.00001
Uranium (U)-Total	0.0050	mg/L	0.0011	0.0014	0.0168	0.0008	0.01	0.2	0.0011	0.031	<0.000001
Vanadium (V)-Total	0.0010	mg/L	0.137	0.0119	0.0080	0.0004	0.11	1.2	<0.00005	0.4	<0.00005
Zinc (Zn)-Total	0.0030	mg/L	0.0360	0.0155	0.0115	0.0015	0.30	2.7	0.0010	1.0	<0.0005
Zirconium (Zr)-Total	0.0010	mg/L	0.00096000	0.0013	0.0011	0.0003	0.005	0.019	0.00006	0.019	<0.00002

Results Summary L1701294

Job Reference	GROUND WATER
Report To	Garnet Cornell / Jesse Tom, New Gold Inc. Rainy River Project
Date Received	12-Nov-2015 9:30
Report Date	20-Nov-2015 14:26
Report Version	1

Client Sample ID			TMA 4A	TMA 3A	PIT 1	PIT 3A	PIT 3B	TMA 3B	TMA 5A	TMA 5B	SEALED TRAVEL BLANK
Date Sampled			11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015	11-Nov-2015
Time Sampled			11:45	12:10	9:15	14:30	14:35	12:45	10:30	10:45	15:00
ALS Sample ID			L1701294-1	L1701294-2	L1701294-3	L1701294-4	L1701294-5	L1701294-6	L1701294-7	L1701294-8	L1701294-9
Parameter	Lowest Detection Limit	Units	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent
Dissolved Metals (Effluent)											
Dissolved Mercury Filtration Location		-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	0.0050	mg/L	0.0010	0.0020	0.0010	0.0050	0.0030	0.0080	0.0020	0.0020	<0.001
Antimony (Sb)-Dissolved	0.00060	mg/L	0.00001	0.00003	0.00014	0.00002	0.00038	0.00047	<0.00001	0.00030	<0.00001
Arsenic (As)-Dissolved	0.0010	mg/L	0.0042	0.0173	0.0009	0.0104	0.0038	0.0144	0.0098	0.0465	<0.00001
Barium (Ba)-Dissolved	0.010	mg/L	0.058	0.065	0.048	0.070	0.099	0.026	0.058	0.041	<0.00002
Beryllium (Be)-Dissolved	0.0010	mg/L	0.000020000	0.000020000	0.000010000	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth (Bi)-Dissolved	0.0010	mg/L	0.0002	0.0001	0.000040000	0.000020000	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Boron (B)-Dissolved	0.050	mg/L	0.092	0.134	0.142	0.063	0.246	0.524	0.115	0.460	<0.0005
Cadmium (Cd)-Dissolved	0.000017	mg/L	0.000005	<0.000005	0.000335	0.000010	0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Calcium (Ca)-Dissolved	0.20	mg/L	97.1	59.3	119	88.6	91.0	104	111	137	<0.02
Chromium (Cr)-Dissolved	0.0010	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)-Dissolved	0.00050	mg/L	0.00006	0.00034	0.00015	0.00005	0.00102	0.00044	0.00011	0.00134	<0.00001
Copper (Cu)-Dissolved	0.0010	mg/L	0.0002	<0.0001	0.0007	<0.0001	0.0002	0.0002	0.0001	0.0002	<0.0001
Iron (Fe)-Dissolved	0.020	mg/L	3.13	0.550	0.020	2.35	0.360	0.050	1.63	1.02	<0.01
Lead (Pb)-Dissolved	0.0010	mg/L	0.000020000	0.000010000	0.000020000	0.000010000	0.000020000	0.00006	0.000020000	0.000020000	<0.00001
Lithium (Li)-Dissolved	0.050	mg/L	0.021	0.040	0.103	0.019	0.076	0.151	0.041	0.156	<0.0002
Magnesium (Mg)-Dissolved	0.020	mg/L	27.4	19.7	73.9	32.4	40.5	37.3	46.9	52.5	0.004
Manganese (Mn)-Dissolved	0.0010	mg/L	0.239	0.187	0.0255	0.269	0.378	0.224	0.332	0.238	<0.0001
Mercury (Hg)-Dissolved	0.000010	mg/L	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002
Molybdenum (Mo)-Dissolved	0.0010	mg/L	0.0032	0.0020	0.0041	0.0027	0.0048	0.0050	0.0020	0.0055	<0.00002
Nickel (Ni)-Dissolved	0.0020	mg/L	0.0003	0.0004	0.0018	0.0002	0.0021	0.0016	0.0002	0.0025	<0.0001
Potassium (K)-Dissolved	0.50	mg/L	4.09	3.43	3.24	3.05	3.94	4.35	4.59	5.75	<0.01
Selenium (Se)-Dissolved	0.0010	mg/L	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (Ag)-Dissolved	0.00010	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium (Na)-Dissolved	0.10	mg/L	19.6	18.0	17.4	9.36	26.5	57.8	28.6	90.1	<0.02
Strontium (Sr)-Dissolved	0.0010	mg/L	0.671	0.399	0.637	0.368	0.514	0.646	0.610	0.850	<0.0001
Tellurium (Te)-Dissolved	0.0010	mg/L	0.0001	0.00006	0.00007	0.000040000	0.00005	0.00007	0.00006	0.00006	<0.00001
Thallium (Tl)-Dissolved	0.00030	mg/L	<0.000002	<0.000002	0.00001	<0.000002	0.000006	0.00001	<0.000002	<0.000002	<0.000002
Tin (Sn)-Dissolved	0.0010	mg/L	0.000040000	0.0001	0.000020000	<0.00002	0.000040000	0.000020000	<0.00002	<0.00002	<0.00002
Titanium (Ti)-Dissolved	0.0020	mg/L	0.00005	0.0001	0.00005	0.0002	0.0001	0.0002	0.00005	<0.00005	<0.00005
Tungsten (W)-Dissolved	0.010	mg/L	0.002	0.002	0.0003000	0.003	0.003	0.0003300	0.0001000	0.002	<0.00001
Uranium (U)-Dissolved	0.0050	mg/L	0.0004	0.0009	0.0163	0.0009	0.0083	0.0102	0.0011	0.0111	<0.000001
Vanadium (V)-Dissolved	0.0010	mg/L	0.0002	0.0003	0.0005	0.0001	0.0015	0.0004	<0.00005	0.0006	<0.00005
Zinc (Zn)-Dissolved	0.0030	mg/L	0.0020	0.0020	0.0025	0.0095	0.0015	0.0020	0.0020	0.0020	<0.0005
Zirconium (Zr)-Dissolved	0.0010	mg/L	0.00006	0.00008	0.0001	0.0001	0.0001	0.00006	0.00008	0.00008	<0.00002

Qualifier Legend

<DL	Recorded value = measured amount <LMDL (non-zero)
<W	No Measurable Response (Zero): < Reported Value
<T	A Measurable Trace Amount: Interpret With Caution
DLM	Detection Limit Adjusted due to sample matrix effects.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.

Newgold Inc. Rainy River Project
Groundwater Sampling Field Sheet

Date:		Jun-23-15			Time on site	6:45 Am to 5:15 pm		
Weather		sunny +10 c to + 24 C				V = pi(r2)H		
original Monitoring Well No.	Current Monitoring Well No.	Water Level mbtc*	Depth of Well (mbtc)	Length of Water in Well (m)	Diameter of Well (m)	Volume of Water L/m	Volume Purged Calculated	Volume Purged Actual (L)
BH 10-05	Pit 1	1.29	6.94	5.65	0.05	2.0	33.9	15
BH 10-07A	TMA 1	destroyed by tree clearing crew			0.035	1.0		
BH 11-1A	TMA 3A	> 2.17	17.53	17.53	0.25	0.5	flw	
BH 11 -1B	TMA 3B	0.01	9.24	9.23	0.25	0.5	13.8	4
BH 11-44A	Pit 3 MRS 1A				0.25	0.5		
BH 11-44B	Pit 3 MRS 1B				0.25	0.5		
BH 11-49A	TMA 4A	0.94	21.51	20.57	0.25	0.5	30.3	33
BH 11-49 B	TMA 4B	1.02	10.75	9.73	0.25	0.5	14.6	6
BH 11-51A	TMA 5A	1.07			0.25	0.5	flw	
BH 11-51B	TMA 5 B	monitoring well under water			0.25	0.5		
BH 12-08	Pit2/TMA 2	destroyed by tree clearing crew			0.25	0.5		
P3	TMA 6	cannot access						
P16	P 16	>30.4 m	do not know	could not calc	0.15	17.7		

Date	Jun-23-15				weather			
		pH	Temp	cond	DO	ORP		
		pH units	o C	ms/cm	mg/L			
BH 10-05	Pit 1	6.98	8.88	0.803	5.06	192.7		
BH 10-07A	TMA 1	could not sample, well destroyed						
BH 11-1A	TMA 3A	6.83	8.57	0.370	1.43	9.2		
BH 11 -1B	TMA 3B	7.25	9.81	0.816	4.10	9.5		
BH 11-44A	Pit 3 MRS 1A							
BH 11-44B	Pit 3 MRS 1B							
BH 11-49A	TMA 4A	6.85	8.63	0.583	1.2	-27.1		
BH 11-49 B	TMA 4B	7.1	10.19	1.125	1.09	-14.8		
BH 11-51A	TMA 5A	7.04	7.60	0.656	0.58	-66.9		
BH 11-51B	TMA 5 B							
BH 12-08	Pit2/TMA 2							
P16	P16	7.55	8.16	0.511	3.11	189.7		

Notes

metres above top of well casing

duplicate sample taken at P16

Field blank with di-ionized water prepared at Pit 1

P 16 water ran at 1 L/10 sec for 20 min prior to sampling=120 L purged

amec foster wheeler

PRIVATE WELLS WITH ZOI

(envelope of all sensitivity runs)

MODEL PREDICTED 1M ZOI
(ENVELOPE OF ALL SENSITIVITY RUNS)

PRIVATE WELL LOCATIONS:

- **ON NGD LANDS, WITHIN ZOI**
- ON NGD LANDS, OUTSIDE OF ZOI
- NOT ON NGD LANDS

ESA PROJECT SITE BOUNDARY, MNRF

NGD LANDS (PATENTED, LEASED)

MINE FOOTPRINT

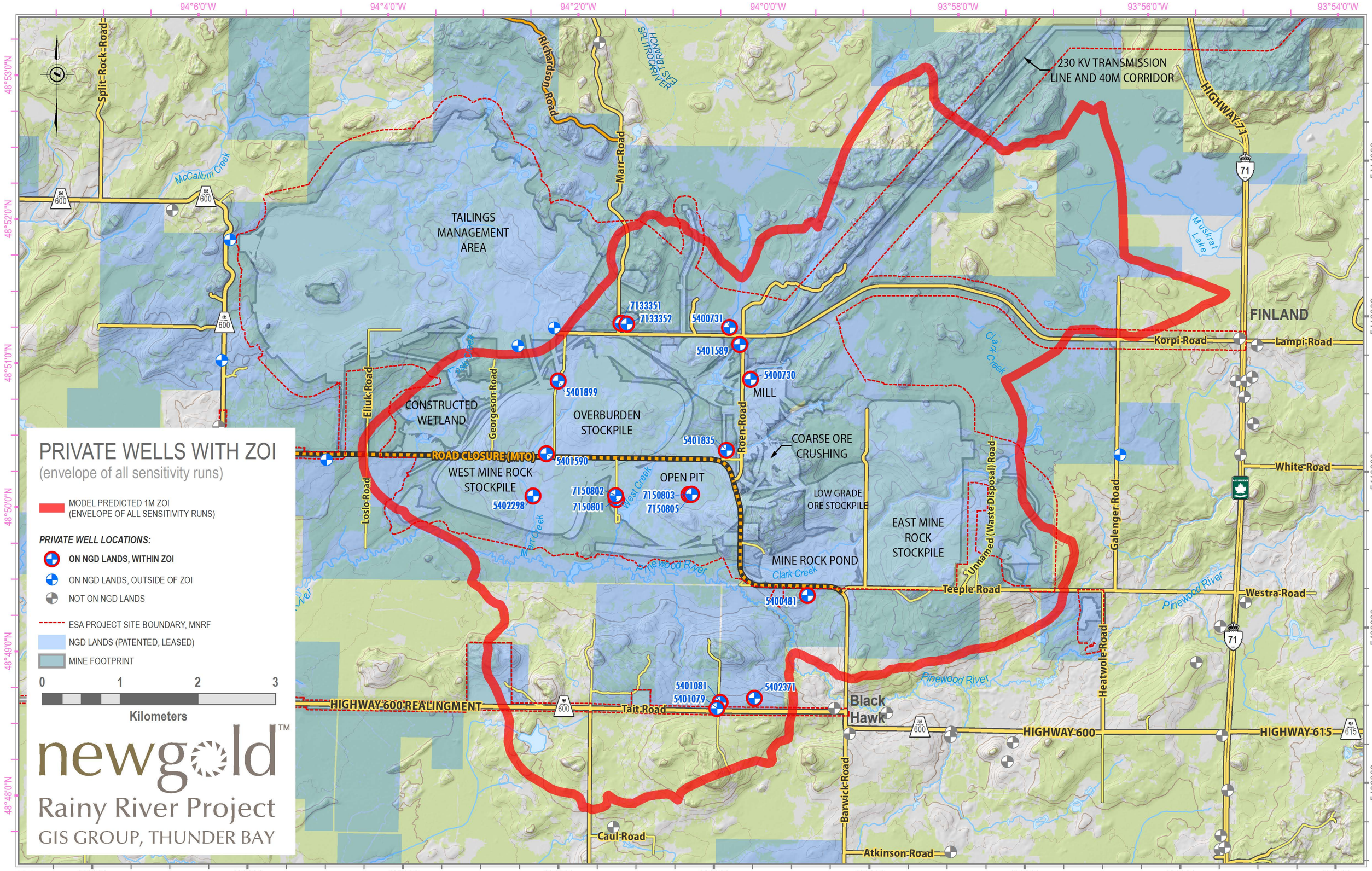
0 1 2 3

Kilometers

newgold™

Rainy River Project

GIS GROUP, THUNDER BAY



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Rainy River Project
2015 Fish Tissue
Monitoring Program

Prepared For:
New Gold Inc.
Thunder Bay, ON

Prepared By:
Minnow Environmental Inc.
Georgetown, ON

February 2016

Rainy River Project
2015 Fish Tissue Monitoring Program

Report Prepared for:

New Gold Inc.
Rainy River Project

Report Prepared by:
Minnow Environmental Inc.

Jess Tester, B.Sc.
Project Manager

Pierre Stecko, M.Sc., EP, RPBio
Project Principal

February 2016

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1.0 INTRODUCTION

1.1 Site Description

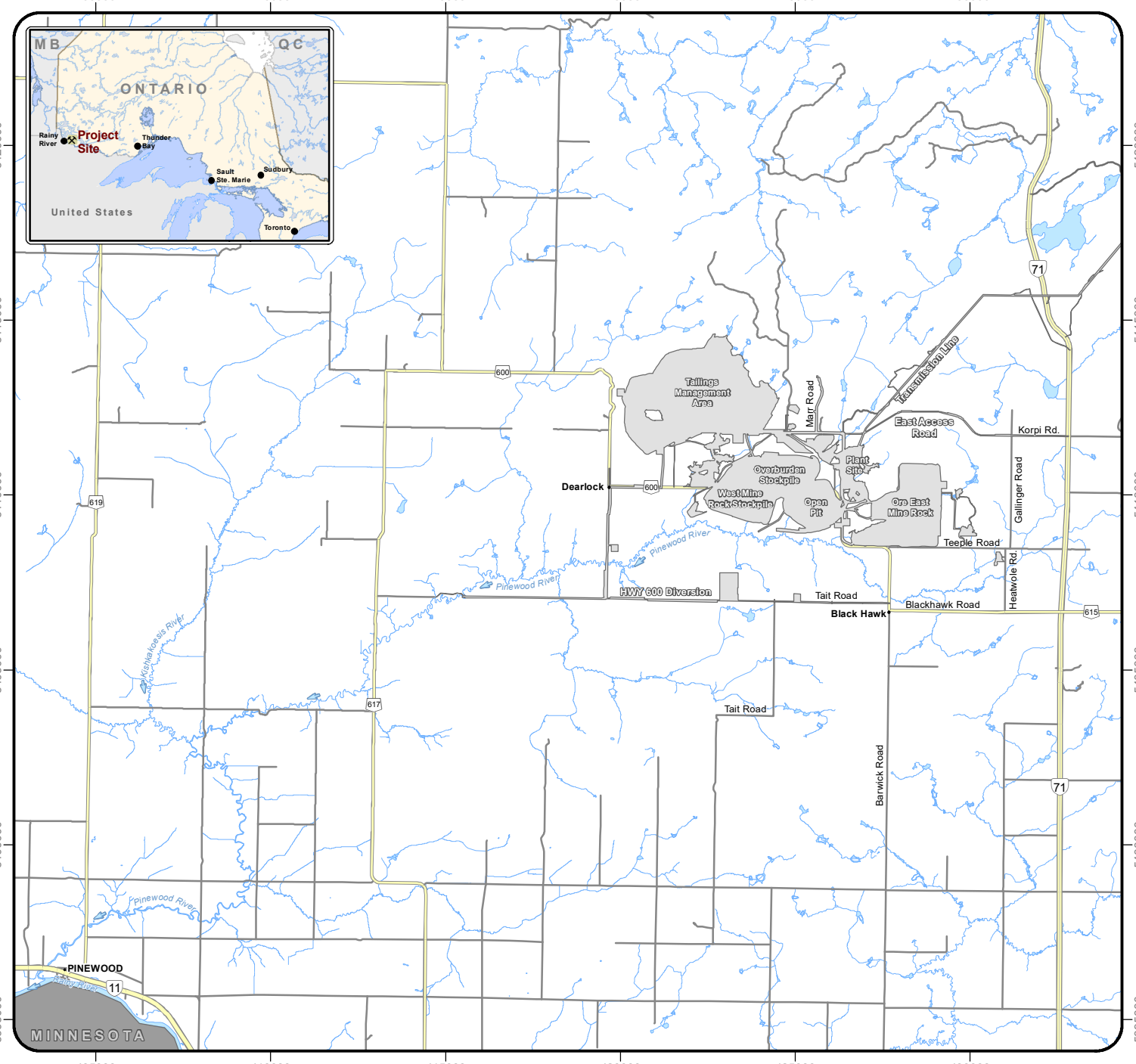
New Gold Inc. owns the Rainy River Project (RRP) in northwestern Ontario, located in the Township of Chapple and District of Rainy River, approximately 42 kilometers east of the Town of Rainy River, Ontario (Figure 1.1). The RRP is located within the Pinewood River watershed. The Pinewood River flows through the site and drains into the Rainy River (approximately 37 km downstream from the site). Exploration of the RRP began in 1967. The Project was acquired by New Gold Inc. in 2013 and an Environmental Assessment (EA) report was submitted in 2014 (AMEC 2014). Site construction began following provincial and federal EA approvals in 2015, and is ongoing. The RRP site construction includes an underground gold mine portal and crusher, a process plant, ore storage facilities, and a Tailings Management Area (TMA; Figure 1.1). Mine commissioning is predicted for 2017.

1.2 Project Background and Objective

The fish tissue monitoring program is one part of RRP's comprehensive environmental monitoring activities and is a requirement of the Federal EA Approval to monitor for key contaminants. The objective of the fish tissue monitoring is to characterize concentrations of contaminants of potential concern (COPC; arsenic, boron, cadmium, cobalt, copper, chromium, iron, lead, manganese, mercury, molybdenum, nickel, selenium and zinc) in muscle and liver tissues of two sport fish species, northern pike (*Esox lucius*) and walleye (*Sander vitreus*), collected in the Pinewood River. COPC concentration data will be used to determine whether the RRP has affected these concentrations, and, if it has, to communicate any potential risk to human health from the consumption of the sentinel sport fish. Fish tissue COPC concentrations are to be monitored starting one year after the start of commercial production, and at three year intervals thereafter. Although the RRP is presently pre-commercial production, the mine decided to collect data in order to characterize current conditions and monitor fish tissue quality during the mine construction phase.

1.3 Study Design

The 2015 study included fish assessment throughout the Pinewood River downstream of the RRP extending to approximately 450 m upstream of the confluence with the Rainy River (Figure 1.2). The study focused on the collection of tissue samples from two sport fish species, northern pike and walleye. Three types of tissue were sampled: muscle and liver samples were collected to meet regulatory requirements, while additional ovary tissues were sampled (as available), as it has yet to be confirmed whether roe is regularly eaten from fish caught in



Features

- Mine Infrastructure
- Waterbody
- Watercourse

Road Network

- Local Roads
- Highway
- Water Flow Direction
- Town

N
W E
S

0 1.75 3.5 7
Kilometers

MAP INFORMATION
Map Projection: UTM Zone 15N NAD 1983
Data Source: Reproduced under licence from Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.
Creation Date: February 2016
Project No.: 157202.0075

Figure 1.1 : Location and Layout of the Rainy River Project.

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the Pinewood River. Fifteen individuals of each species (i.e., northern pike and walleye) were targeted. Data were compared to provincial, federal and international health-based criteria (Health Canada 2007, Health Canada 2010, MOECC 2015, IRIS 2016) as well as baseline concentration values (AMEC 2013).

1.4 Report Overview

This report is presented in five sections, the first of which is this introduction (Section 1.0). Section 2.0 provides an overview of the methods used in this study and Section 3.0 provides the results and discussion of the fish tissue monitoring. Section 4.0 provides the conclusions and recommendations of the monitoring, while Section 5.0 provides all the references cited throughout the report.

2.0 METHODS

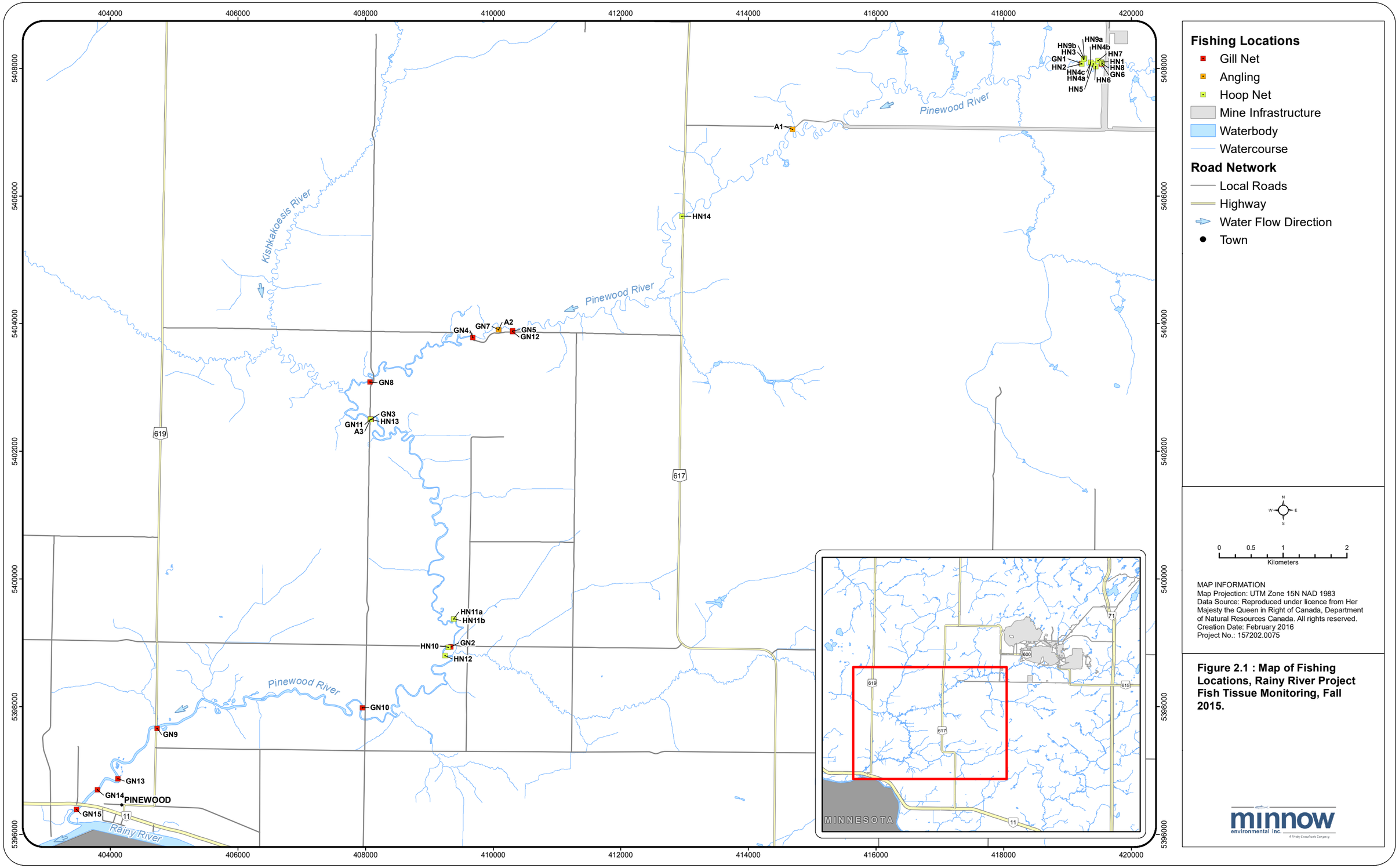
The RRP Fish Tissue Monitoring Program was conducted from September 29nd to October 3rd, 2015. The program focused on fish tissue assessment, targeting northern pike and walleye in the Pinewood River downstream of the RRP. All fish collection locations were recorded using handheld GPS and maps, and were chosen based on habitat characteristics preferred by the target species.

2.1 Field Data Collection

Fish sampling was performed under an Ontario Ministry of Natural Resources Licence to Collect Fish for Scientific Purposes (Licence No. 1081405; Appendix B). Fishing was conducted throughout the Pinewood River downstream of the RRP using gill nets, hoop nets, and angling (Figure 2.1). Gill nets were standard 100 and 200-ft lengths with mesh sizes of 2”, 3”, and 4”. Both medium (0.75 m diameter hoops, 1” 2.5 cm stretched mesh) and small (0.61 m diameter hoops, 1.3 cm stretched mesh) hoop nets were used. Time of deployment and retrieval were recorded for every net set. Start and end times were recorded for each angling effort.

Upon retrieval of each net, captured fish were identified and counted, and results were recorded on catch data sheets. Only northern pike and walleye of edible size were retained for sampling (>30 cm total length, based on the Ministry of the Environment and Climate Change [MOECC] recommendations for Rainy River; MOECC 2015). A total of 17 northern pike and one walleye were retained for detailed assessment. Any live by-catch or additional target species captured were released.

All retained northern pike and walleye were measured to determine length (fork and total) and weight. Lengths were measured to the nearest millimetre on a fish board while weights were recorded to the nearest 1 to 5% of total weight using Pesola™ spring scales. Two ageing structures (scales and either cleithra [northern pike] or dorsal spines [walleye]) were collected from each sacrificed fish. Livers and gonads were removed using clean implements (cutting boards, fillet knives and tweezers) and weighed to the nearest 0.001 g (with ± 1% precision) using a Scout Pro balance. Tissue samples of boneless, skinless muscle tissue, whole livers, and whole ovaries (where present and developed) were collected from each fish and placed in clean, labeled Whirl-Pak™ bags and frozen until analysis. Quality Assurance/Quality Control (QA/QC) measures included 10% field duplicate samples (duplicate fillets, split liver, and split ovary samples). Upon completion of the sampling program, tissue samples were submitted to ALS Environmental in Burnaby, British Columbia, along with a chain-of-custody record, a list of expected Method Detection Limits (MDLs) and laboratory QA/QC requirements



MAP INFORMATION
Map Projection: UTM Zone 15N NAD 1983
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Creation Date: February 2016
Project No.: 157202.0075

Figure 2.1 : Map of Fishing Locations, Rainy River Project Fish Tissue Monitoring, Fall 2015.

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(Appendix A). Ageing structures were shipped to North Shore Environmental Services in Thunder Bay, Ontario, along with a chain-of-custody record for determination of fish ages.

2.2 Analysis of Catch and Meristic Data

Fish catch data were compiled and summarized. The catch compilations, along with data on the gill net set, hoop net set, and angling durations were used to calculate total and species-specific catch-per-unit effort (CPUE) for each capture method in the Pinewood River.

2.3 Analysis of Chemical Data

Upon receipt of the chemical data from ALS, a data quality assessment (DQA) was performed. This included the assessment of field precision, laboratory precision and laboratory accuracy against data quality objectives (DQOs) established at the outset of the project (Appendix A). A minimum of 10% of the analyses represented quality control samples. In instances where the DQA revealed potential issues with data quality, results were verified with the laboratory. Overall, the DQA indicated excellent data quality. After DQA, summary statistics were calculated for each analyte (i.e., mean, standard deviation, minimum, and maximum).

Mercury is the only metal[1] for which a commercial guideline and various consumption level advisories have been established for fish muscle tissue (Health Canada 2007, MOECC 2015). Health Canada has established a standard of 0.5 mg/kg wet weight (w.w.) as the maximum acceptable concentration of mercury in commercially sold fish, enforceable by the Canadian Food Inspection Agency (Health Canada 2007). Although this guideline is only applicable to commercially sold fish, 0.5 mg/kg w.w. is also the level at which a complete consumption restriction is advised for vulnerable populations (i.e., women of child-bearing age and children under 15; Table 2.1; MOECC 2015). Accordingly, this is the main benchmark used in this study to evaluate concentrations of mercury in fish tissue. In addition to evaluating mercury concentrations relative to health criteria, relationships between mercury concentrations in fish muscle tissue and age were explored graphically. Mercury concentrations were also compared to baseline data (AMEC 2013).

Concentrations of other metals in muscle, liver, and ovary tissue were evaluated relative to consumption benchmarks (Table 2.2). These benchmarks were derived based on the lowest reported tolerable daily intake (TDI; Health Canada 2010, IRIS 2016) and established consumption rates for fish eating populations (Richardson 1997, USEPA 1997, OHM 1990, Health Canada 2010), assuming a typical adult body weight of 70 kg where:

Fish Consumption Limit Benchmark = TDL mg/kg x 70 kg/ consumption rate (kg).

[1] Here and elsewhere in this document, “metal” includes metalloids, such as arsenic and selenium.

Table 2.1: Fish consumption advisories for vulnerable populations and for the general population based on fish tissue mercury concentrations (MOECC 2015).

Advisory recommended maximum number of meals per month	Fish tissue mercury concentration (mg/kg w.w.)	
	As consumed by vulnerable populations[a]	As consumed by the general population
32	0	0
16	0.06	0.15
12	0.12	0.3
8	0.16	0.4
4	0.25	0.6
2	-	1.2
0	0.5	1.8

[a] i.e., women of child-bearing age and children under 15.
w.w. - wet weight.

Table 2.2: Consumption benchmarks for metals (including all COPC) in fish tissue (mg/kg).

Analyte	Tolerable Daily Intake (mg/kg day)[1]	Fish Concentration Benchmarks (mg/kg) Based on		
		6.5 g/day[2]	21.8 g/day[3]	111 g/day[4]
Antimony	0.0004 [5]	4.3	1.3	0.3
Arsenic	0.0003 [5]	3.2	1.0	0.2
Barium	0.2 [5,6]	2,153.8	642.2	126
Beryllium	0.002 [5]	21.5	6.4	1.3
Boron	0.1 [5]	1,076.9	321.1	63.1
Cadmium	0.001 [5,6]	10.8	3.2	0.6
Chromium	0.001 [6]	10.8	3.2	0.6
Cobalt	none available	-	-	-
Copper	0.091 [6,8]	980.0	292.2	57.4
Iron	none available	-	-	-
Lead	0.0036 [6]	38.8	11.6	2.3
Manganese	0.122 [6,8]	1,313.8	391.7	76.9
Molybdenum	0.005 [5]	53.8	16.1	3.2
Nickel	0.0011 [6,7]	11.8	3.5	0.7
Selenium	0.005 [5]	53.8	16.1	3.2
Silver	0.005 [5]	53.8	16.1	3.2
Strontium	0.6 [5]	6,462	1,927	378
Uranium	0.0006 [6]	6.5	1.9	0.4
Zinc	0.3 [5]	3,231	963	189

Selected benchmark.

COPC - Contaminants of Potential Concern.

[1] Where values were reported by both IRIS (2014) and Health Canada (2010), the lowest value was used to derive a conservative benchmark.

[2] USEPA (1997) mean consumption rate for general population; mean value for anglers is 8.0 g/day, 95th percentile for anglers is 25 g/day.

[3] Upper limit consumption rate for Canadian population based on high caloric intake (OHM 1990). Also the highest consumption level considered in development of fish advisories in Ontario.

[4] Health Canada (2010) consumption rate for screening level risk assessments, from Richardson (1997). Exceeds the average value for fishing subsistence populations (70 g/day; USEPA 1997).

[5] IRIS (2016).

[6] Health Canada (2010).

[7] Based on nickel chloride.

[8] Most conservative concentration (tolerable daily intakes are defined on an age-group specific basis).

Investigations during the EA determined that the RRP area does not support a significant commercial or recreational fishery and that no traditional activities are currently undertaken within the RRP area by local First Nation and Métis people (AMEC 2014). However, in order to use the most conservative benchmark values, the highest consumption rate category of 111 g/d was used in deriving the benchmarks (Table 2.1; Richardson 1997). Benchmarks were derived for antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, molybdenum, nickel, selenium, silver, strontium, uranium, and zinc. Of the COPC, only cobalt and iron do not have applicable health criteria or TDI values (i.e., benchmarks could not be calculated), so concentrations were only compared to baseline data.

3.0 RESULTS

3.1 Fish Communities and Catch-per-unit-effort

A total of eight fish species were captured using gill nets and hoop nets in the Pinewood River (Table 3.1). Northern pike were the most abundant fish in the Pinewood River, followed by black crappie and white sucker (Table 3.1). Consistent with previous findings, monitoring indicated low catch-per-unit-effort (CPUE) for walleye, but moderately high CPUE for northern pike (Table 3.1; AMEC 2013). Only one of the desired 15 walleye was caught, despite targeted effort of the Pinewood close to the confluence with Rainy River (where walleye have been caught in the past; AMEC 2013) and the use of overnight net sets to take advantage of the nocturnal feeding habits of walleye (Holmes et al. 2010, Scott and Crossman 1998).

3.2 Tissue Chemistry

3.2.1 Muscle Tissue Chemistry

Muscle tissue samples contained metal concentrations that were well below human consumption benchmarks (established in Section 2.3) except for three samples which were above the mercury benchmark (Tables 3.2 and C.5). Despite these three exceptions, average muscle tissue mercury concentrations were below benchmark in both species (Table 3.2). It should be noted that this benchmark is the guideline for commercially sold fish and is also the complete consumption restriction level for women of child-bearing age and children under 15. Consumption of fish with muscle tissue concentrations above this benchmark is still permissible for the general population (Table 2.1; Health Canada 2007, MOECC 2015). For the general population, the advisory recommends a maximum of four fish meals per month when fish mercury concentrations are between 0.6 mg/kg and 1.2 mg/kg (i.e., for the highest concentration observed in this study, 0.73 mg/kg; Table 2.1; MOECC 2015). All fish muscle tissue mercury concentrations were well below the complete consumption restriction level for the general population (1.8 mg/kg; Table 2.1, Figures 3.1 and 3.2; MOECC 2015).

Naturally elevated mercury concentrations are often observed in predatory fish species in northern lakes and depositional rivers due to naturally high mercury levels, atmospheric deposition of mercury, and biogeochemical conditions that favour mercury methylation (Evers et al. 2011). Methylated mercury is biomagnified through the food chain resulting in elevated concentrations in predatory fish species such as walleye and northern pike (Evers et al. 2011). In addition to this, methylated mercury has a long residence time in tissues and, with continued exposure, will bioaccumulate over the organism's lifetime (Evers et al. 2011). Bioaccumulation

Table 3.1: Summary of fishing effort in the Pinewood River, Rainy River Project Fish Monitoring, 2015.

a) Fish catch numbers by sampling method.

Species	Gill Nets	Medium Hoop Nets	Small Hoop Nets	Angling	Total Catch
Northern Pike	20	11	0	0	31
Walleye	0	1	0	0	1
Brown Bullhead	0	0	2	0	2
Black Crappie	25	0	0	0	25
Mimic Shiner	0	0	1	0	1
Rock Bass	2	0	0	0	2
Trout-perch	0	0	1	0	1
White Sucker	1	15	2	0	18

b) Catch-per-unit-effort (CPUE) by sampling method.

Species	Gill Nets (fish per 100 m*hr)	Medium Hoop Nets (fish per trap*day)	Small Hoop Nets (fish per trap*day)	Angling (fish per hr)
Northern Pike	0.49	1.13	0	0
Walleye	0	0.10	0	0
Brown Bullhead	0	0	0.30	0
Black Crappie	0.61	0	0	0
Mimic Shiner	0	0	0.15	0
Rock Bass	0.05	0	0	0
Trout-perch	0	0	0.15	0
White Sucker	0.02	1.55	0.30	0
Total CPUE	41.1	9.7	6.7	0.5

Table 3.2: Metal concentrations in fish tissue, Rainy River Project Fish Tissue Monitoring, 2015.

	Parameter	Lowest Detection Limit	Units	Benchmark[1,2]	Northern Pike												Walleye	
					Muscle				Liver				Ovary				Muscle	Liver
					Average	SD	Minimum	Maximum	Average	SD	Minimum	Maximum	Average	SD	Minimum	Maximum		
	% Moisture	0.25	%	-	77.8	1.07	76.1	79.6	71.7	5.77	60.6	79.2	78.1	2.64	74.4	82.4	79.1	69.4
Total Metals	Aluminum (Al)	2.0	mg/kg w.w.	-	0.9	0.62	<0.45	2.7	1.3	0.64	<0.49	2.6	0.60	0.25	<0.43	1.1	0.5	<1.5
	Antimony (Sb)	0.010	mg/kg w.w.	0.3	0.0022	0.00015	<0.0020	0.0026	0.0047	0.0046	<0.0024	0.020	0.0023	0.00033	<0.0018	0.0029	<0.0021	<0.0031
	Arsenic (As)	0.020	mg/kg w.w.	0.2	0.0934	0.0211	0.0637	0.133	0.0435	0.0202	0.0172	0.0812	0.025	0.0056	0.017	0.034	0.102	0.060
	Barium (Ba)	0.050	mg/kg w.w.	126	0.0406	0.0221	0.0120	0.0890	0.0149	0.00289	0.0104	0.0197	0.0675	0.0441	0.0133	0.134	0.018	<0.015
	Beryllium (Be)	0.010	mg/kg w.w.	1.3	<0.0022	0.00011	<0.0020	<0.0024	<0.0028	0.00058	<0.0021	<0.0039	<0.0022	0.00026	<0.0018	<0.0026	<0.0021	<0.0031
	Bismuth (Bi)	0.010	mg/kg w.w.	-	0.0025	0.00044	<0.0020	0.0034	0.0047	0.0031	<0.0025	0.012	0.0023	0.00028	<0.0018	0.0027	<0.0021	<0.0031
	Boron (B)	1.0	mg/kg w.w.	63.1	<0.22	0.011	<0.20	<0.24	<0.28	0.058	<0.21	<0.39	<0.22	0.026	<0.18	<0.26	<0.21	<0.31
	Cadmium (Cd)	0.0050	mg/kg w.w.	0.6	0.0018	0.0016	<0.0010	0.0073	0.054	0.038	0.0074	0.136	0.0076	0.0026	0.0044	0.013	<0.0010	0.58
	Calcium (Ca)	20	mg/kg w.w.	-	280	146	114	557	39.4	10.1	26.7	64.7	136	26.0	94.5	174	127	119
	Cesium (Cs)	0.0050	mg/kg w.w.	-	0.00582	0.00263	0.00295	0.0120	0.00314	0.00155	0.00176	0.00659	0.00347	0.00102	0.00212	0.00483	0.00640	0.00444
	Chromium (Cr)	0.050	mg/kg w.w.	0.6	0.024	0.023	<0.010	0.088	0.039	0.039	<0.010	0.15	0.017	0.012	<0.0088	0.044	<0.010	<0.061
	Cobalt (Co)	0.020	mg/kg w.w.	-	0.0045	0.00024	<0.0042	0.0051	0.043	0.017	0.020	0.081	0.067	0.015	0.043	0.089	<0.0042	0.234
	Copper (Cu)	0.10	mg/kg w.w.	57.4	0.183	0.0406	0.122	0.275	25.0	12.4	9.65	54.0	1.18	0.160	0.926	1.49	0.146	3.12
	Iron (Fe)	3.0	mg/kg w.w.	-	4.29	6.08	1.14	26.1	122	112	15.9	449	54.9	11.1	38.4	71.5	2.15	120
	Lead (Pb)	0.020	mg/kg w.w.	2.3	0.012	0.018	<0.0043	0.074	0.044	0.13	<0.0049	0.50	0.0076	0.0071	<0.0040	0.026	0.0067	<0.015
	Lithium (Li)	0.50	mg/kg w.w.	-	<0.11	0.0054	<0.10	<0.12	<0.14	0.03	<0.10	<0.20	<0.11	0.013	<0.088	<0.13	<0.10	<0.15
	Magnesium (Mg)	2.0	mg/kg w.w.	-	345	31.9	297	437	175	21.7	128	212	288	39.2	229	340	368	203
	Manganese (Mn)	0.050	mg/kg w.w.	76.9	0.441	0.254	0.192	1.02	1.44	0.576	0.845	2.88	35.4	11.8	22.4	56.4	0.163	4.22
	Mercury (Hg)	0.0050	mg/kg w.w.	0.5	0.342	0.198	0.142	0.731	0.139	0.103	0.0587	0.386	0.0310	0.0176	0.0175	0.0666	0.299	0.128
	Molybdenum (Mo)	0.020	mg/kg w.w.	3.2	0.0056	0.0020	<0.0041	0.0096	0.15	0.042	0.079	0.23	0.042	0.0073	0.028	0.051	<0.0042	0.13
	Nickel (Ni)	0.20	mg/kg w.w.	0.7	<0.044	0.0021	<0.041	<0.048	<0.057	0.012	<0.042	<0.079	<0.044	0.0053	<0.035	<0.051	<0.042	<0.061
	Phosphorus (P)	10	mg/kg w.w.	-	2,486	230	2,136	2,990	2,974	424	2,259	3,687	3,208	193	2,928	3,558	2,508	3,152
	Potassium (K)	20	mg/kg w.w.	-	4,325	377	3,870	5,037	2,983	356	2,439	3,615	3,627	261	3,392	4,151	4,514	2,751
	Rubidium (Rb)	0.050	mg/kg w.w.	-	5.05	0.589	4.22	6.15	5.99	1.40	3.75	8.43	4.74	0.481	3.76	5.42	7.0	4.7
	Selenium (Se)	0.050	mg/kg w.w.	3.2	0.207	0.0313	0.173	0.266	1.51	0.376	0.985	2.34	1.17	0.287	0.796	1.70	0.29	1.13
	Sodium (Na)	20	mg/kg w.w.	-	294	34.1	228	346	692	121	541	1,000	754	124	630	983	249	1,013
	Strontium (Sr)	0.050	mg/kg w.w.	378	0.154	0.0752	0.0329	0.283	0.0306	0.00784	0.0218	0.0447	0.117	0.0438	0.0540	0.172	0.047	0.05
	Tellurium (Te)	0.020	mg/kg w.w.	-	<0.0044	0.00021	<0.0041	<0.0048	0.0058	0.0011	<0.0045	0.0079	<0.0044	0.00053	<0.0035	<0.0051	<0.0042	<0.0061
	Thallium (Tl)	0.0020	mg/kg w.w.	-	0.00289	0.000794	0.00200	0.00481	0.00454	0.00191	0.00242	0.0101	0.0049	0.00072	0.0038	0.0059	0.0051	0.0161
	Tin (Sn)	0.10	mg/kg w.w.	-	0.062	0.028	0.033	0.14	0.087	0.060	0.039	0.27	0.041	0.030	<0.022	0.12	0.08	0.20
	Uranium (U)	0.0020	mg/kg w.w.	0.4	<0.00044	0.000021	<0.00041	<0.00048	0.00061	0.00016	<0.00042	0.0010	<0.00044	0.000053	<0.00035	<0.00051	0.00052	<0.00061
	Vanadium (V)	0.10	mg/kg w.w.	-	<0.022	0.0011	<0.020	<0.024	0.15	0.15	0.039	0.61	0.033	0.020	<0.021	0.084	<0.021	0.046
	Zinc (Zn)	0.50	mg/kg w.w.	189	4.55	2.57	2.93	13.6	46.9	15.6	26.0	83.3	80.0	19.8	64.2	127	3.16	45.6
	Zirconium (Zr)	0.20	mg/kg w.w.	-	<0.044	0.0021	<0.041	<0.048	<0.057	0.012	<0.042	<0.079	<0.044	0.0053	<0.035	<0.051	<0.042	<0.061

Indicates value greater than benchmark.

w.w. - wet weight

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1, MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

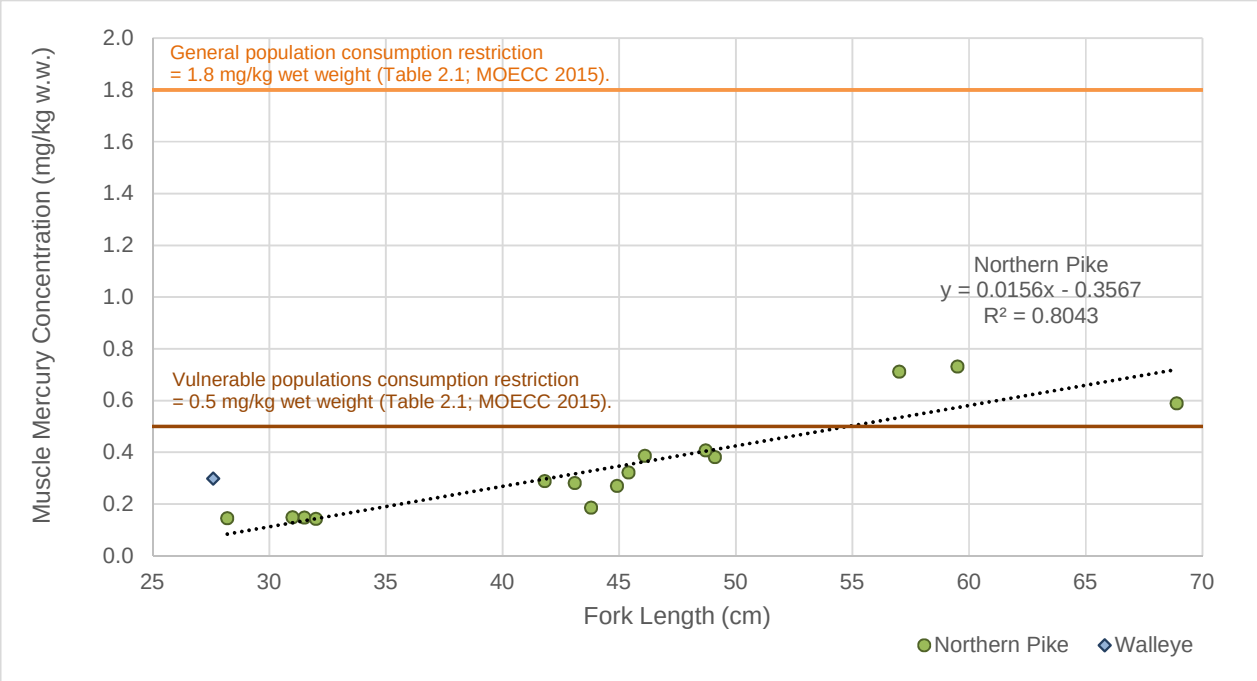

Figure 3.1: Muscle mercury concentration vs fork length of fish from the Pinewood River, Rainy River Project Fish Tissue Monitoring, 2015.

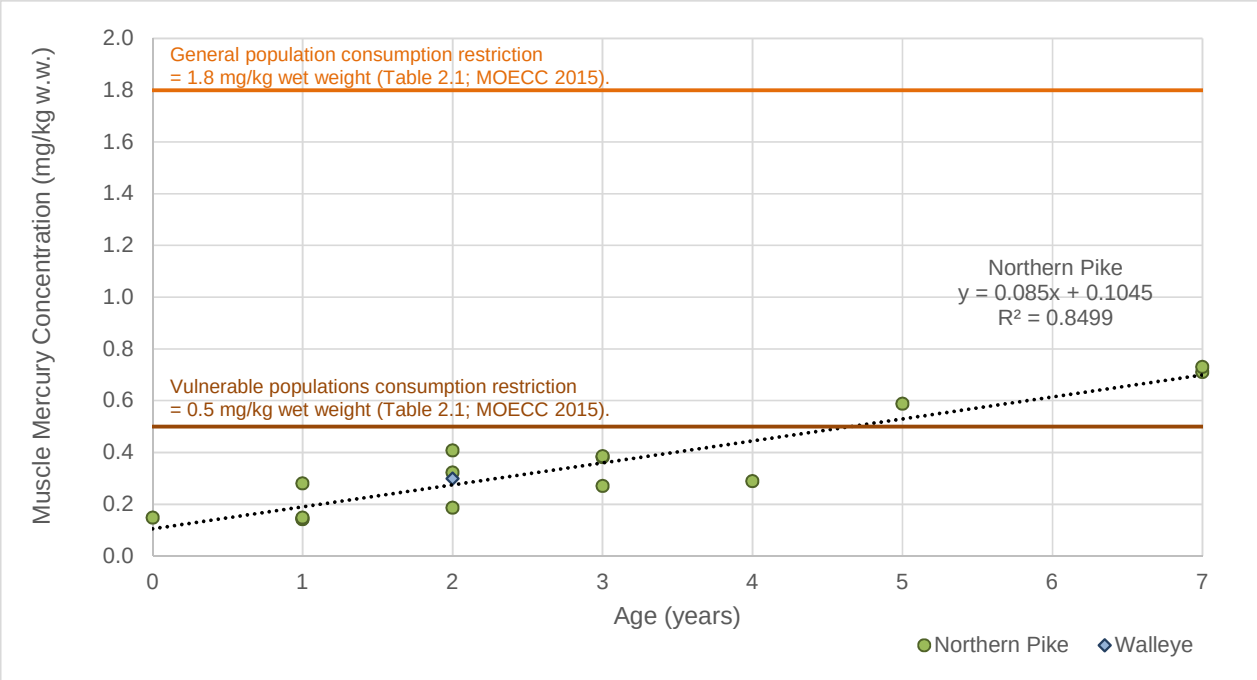

Figure 3.2: Muscle mercury concentration vs age of fish from the Pinewood River, Rainy River Project Fish Tissue Monitoring, 2015.

in northern pike in the Pinewood River is characterized by the relationship between mercury concentration in muscle tissue and fish size (i.e., fork length and age; Figures 3.1 and 3.2).

The 2015 muscle mercury concentrations were also compared to baseline data. The assessment was made by comparing concentrations at length, due to the established relationship between mercury concentrations and fish size. Comparison with baseline data showed that concentrations have generally remained within the same range, despite vastly different sample sizes (Figure 3.3; AMEC 2013). Notably, the longest and oldest fish captured for baseline were only 54 cm and 5 years old, while the 2015 data set included fish up to 69 cm long and 7 years old. Generally, average muscle concentrations were within the range of baseline 2012 data for all metals (Table 3.3; AMEC 2013).

Overall, the majority of metal concentrations in fish muscle were below human consumption benchmarks. Mercury concentrations in three muscle samples were above the consumption restriction guideline for vulnerable populations, but not for the general population. Based on comparison to baseline data, it appears that ongoing construction at the RRP has not influenced metal concentrations in tissues of in exposed northern pike.

3.2.2 Liver Tissue Chemistry

Fish liver tissue is not recommended for human consumption (MOECC 2015); however, since it has yet to be confirmed whether organs of fish caught in the Pinewood River are regularly eaten, concentrations of metals in livers have been screened against benchmarks. Additionally, many metals are known to accumulate to higher concentrations in liver tissue than in muscle tissue (e.g., chromium, lead), and liver is more likely to contain quantifiable chemical concentrations.

Liver tissue samples contained metal concentrations that were well below human consumption benchmarks for metals with established tolerable daily intake (TDI) values (Tables 3.2 and C.6). Generally, average liver concentrations were within the range of baseline 2012 data for all metals (Table 3.4; AMEC 2013).

3.2.3 Ovary Tissue Chemistry

It has yet to be confirmed whether organs of fish caught in the Pinewood River are regularly eaten, however, concentrations of metals in ovaries have been screened against benchmarks as a precaution. Additionally, some metals are known to accumulate to higher concentrations in ovary tissue than in muscle tissue (e.g., selenium).

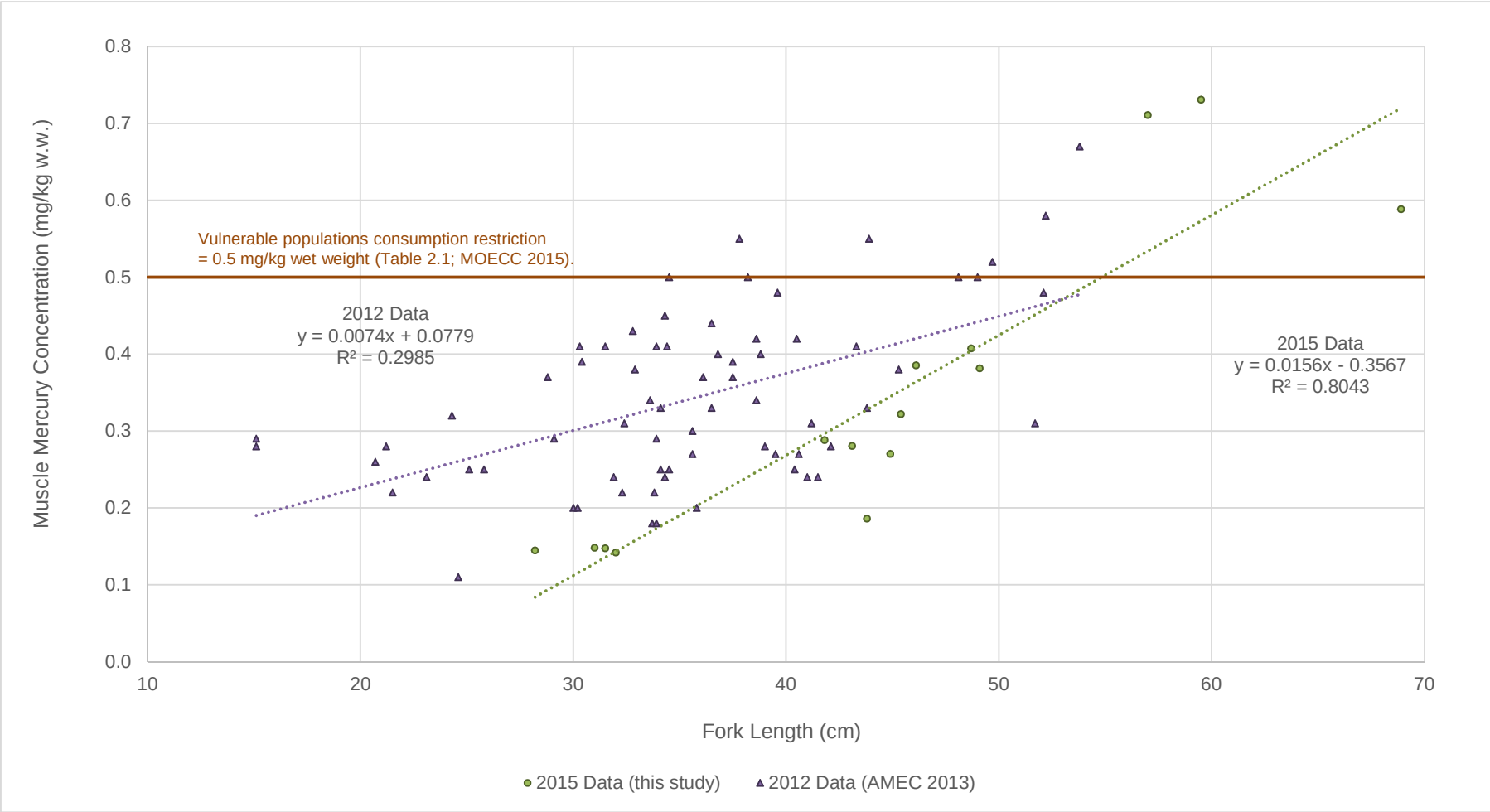

Figure 3.3: Muscle mercury concentration vs fork length of fish from the Pinewood River, comparing fish caught in 2012 (n = 70) and 2015 (n = 15), Rainy River Project Fish Tissue Monitoring, 2015.

Table 3.3: Average (mean ± standard deviation) concertations of contaminants of potential concern (COPC) in fish muscle tissue, comparing baseline (2012) and 2015 data, Rainy River Project Fish Tissue Monitoring.

COPC	Units	Benchmark[1,2]	Muscle Tissue Average ± SD	
			Baseline 2012 Data (n = 70; AMEC 2013)	2015 Data (n = 15; This Study)
Arsenic (As)	mg/kg w.w.	0.2	0.10 ± 0	0.093 ± 0.021
Boron (B)	mg/kg w.w.	63.1	<0.50 ± 0	<0.22 ± 0.011
Cadmium (Cd)	mg/kg w.w.	0.6	<0.01 ± 0	0.0018 ± 0.0016
Chromium (Cr)	mg/kg w.w.	0.6	<0.30 ± 0	0.024 ± 0.023
Cobalt (Co)	mg/kg w.w.	-	0.01 ± 0.00051	0.0045 ± 0.00024
Copper (Cu)	mg/kg w.w.	57.4	0.51 ± 0.048	0.18 ± 0.041
Iron (Fe)	mg/kg w.w.	-	3.23 ± 0.52	2.76 ± 0.88
Lead (Pb)	mg/kg w.w.	2.3	0.03 ± 0	0.012 ± 0.018
Manganese (Mn)	mg/kg w.w.	76.9	0.78 ± 0.73	0.44 ± 0.25
Mercury (Hg)	mg/kg w.w.	0.5	0.34 ± 0.11	0.34 ± 0.20
Molybdenum (Mo)	mg/kg w.w.	3.2	0.05 ± 0.012	0.0056 ± 0.0020
Nickel (Ni)	mg/kg w.w.	0.7	0.10 ± 0.44	<0.044 ± 0.0021
Selenium (Se)	mg/kg w.w.	3.2	0.20 ± 0.017	0.21 ± 0.031
Zinc (Zn)	mg/kg w.w.	189	5.0 ± 1.8	4.6 ± 2.6

w.w. - wet weight.

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1; MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

Table 3.4: Average (mean ± standard deviation) concertations of contaminants of potential concern (COPC) in fish liver tissue, comparing baseline (2012) and 2015 data, Rainy River Project Fish Tissue Monitoring.

COPC	Units	Benchmark[1,2]	Liver Tissue Average ± SD	
			Baseline 2012 Data (n = 64; AMEC 2013)	2015 Data (n = 15; This Study)
Arsenic (As)	mg/kg w.w.	0.2	0.10 ± 0.013	0.044 ± 0.020
Boron (B)	mg/kg w.w.	63.1	<0.50 ± 0	<0.28 ± 0.058
Cadmium (Cd)	mg/kg w.w.	0.6	0.051 ± 0.050	0.054 ± 0.038
Chromium (Cr)	mg/kg w.w.	0.6	<0.30 ± 0	0.039 ± 0.039
Cobalt (Co)	mg/kg w.w.	-	0.056 ± 0.057	0.043 ± 0.017
Copper (Cu)	mg/kg w.w.	57.4	13 ± 9.3	25 ± 12
Iron (Fe)	mg/kg w.w.	-	112 ± 73	122 ± 112
Lead (Pb)	mg/kg w.w.	2.3	0.031 ± 0.0075	0.044 ± 0.13
Manganese (Mn)	mg/kg w.w.	76.9	1.5 ± 0.49	1.4 ± 0.58
Mercury (Hg)	mg/kg w.w.	0.5	0.18 ± 0.16	0.14 ± 0.10
Molybdenum (Mo)	mg/kg w.w.	3.2	0.17 ± 0.046	0.15 ± 0.042
Nickel (Ni)	mg/kg w.w.	0.7	0.05 ± 0	<0.057 ± 0.012
Selenium (Se)	mg/kg w.w.	3.2	1.3 ± 0.39	1.5 ± 0.38
Zinc (Zn)	mg/kg w.w.	189	34 ± 13	47 ± 16

w.w. - wet weight.

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1; MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

Screening of ovary tissue samples showed that ovaries contained metal concentrations that were well below human consumption benchmarks for metals with established tolerable daily intake (TDI) values (Tables 3.2 and C.7). Ovaries have not been previously sampled, so concentrations could not be compared to baseline data.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Conclusions of the fish assessment undertaken in the Pinewood River downstream from the Rainy River Project in the fall of 2015 are listed below.

1. Fish communities and CPUE were consistent with the results of previous sampling efforts. Monitoring indicated low CPUE for walleye, but moderately high CPUE for northern pike.

2. Muscle, liver, and ovary tissue samples contained metal concentrations that were well below human consumption benchmarks for metals with established tolerable daily intake (TDI) values, except for mercury in a few muscle samples. Mean concentrations of mercury were below the benchmark for all tissue sample types and within the range of baseline for muscle and liver samples.

3. Screening of metal concentrations in fish muscle tissue indicated that mercury in northern pike occurs at concentrations above consumption benchmarks in larger fish (greater than approximately 55 cm in length). These concentrations are consistent with baseline values. Mercury concentrations in fish muscle tissue of larger predatory fish are often naturally high in northern environments and do not indicate that the RRP has influenced fish tissue quality.

Overall, the data indicate that the Rainy River Project has not had any influence effect on the concentrations of metals in muscle and liver tissues of sentinel fish species (northern pike and walleye).

4.2 Recommendations

Based on information acquired during the 2015 fish tissue monitoring study, recommendations for future monitoring include:

1. Organize a discussion with local First Nation and Métis people prior to planning the next fish tissue field program in order to determine whether the Pinewood River is regularly used for fishing, and if so:

    a. Whether fishing frequency varies with season;
    b. Which fish species are caught and consumed;
    c. What is considered an edible size of fish;
    d. Which fish tissues (fillet, organs, roe) are consumed; and,

   e. What is a typical consumption rate of Pinewood River fish.

2. Use the information gathered in discussion with local Nation and Métis people to inform future study design and to best tailor the project to its human health-focused objective. This may include some of the following approaches:

   a. Switch the sampling season to reflect use by fisherpersons and to maximize CPUE of target species (e.g., walleye residency in the Pinewood River may increase during the spring);

   b. If other fish species are regularly consumed, following discussion with appropriate regulatory agencies, switch the target species to northern pike and a fish with greater CPUE rates than walleye (e.g., white sucker, black crappie) to provide a larger sample size;

   c. Target fish only of a size considered edible by local fisherpersons. Fish at the current length minimum (as recommended by MOECC 2015) may be considered too small for the amount to effort required to clean and fillet the fish;

   d. Discontinue the monitoring of roe if not regularly consumed; and,

   e. Reassess benchmark levels. Previous investigations have determined that the Pinewood River is not a significant commercial, recreational, or traditional Aboriginal fishery (AMEC 2014). Therefore it may be more appropriate to select benchmarks based on the average Canadian fish consumption rate rather than on the rate for subsistence populations. Comparison to higher benchmarks would not change the conclusions in this report.

3. A reference river could be selected in order to use a BACI approach in the next study design. This would allow future fish tissue concentrations to be assessed in the context of local levels as well as by temporal trends.

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APPENDIX A

Data Quality Assessment

APPENDIX A: DATA QUALITY ASSESSMENT

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A1.0 INTRODUCTION

Data Quality Assessment (DQA) was conducted on data collected as part of the Rainy River Project (RRP) 2015 Fish Tissue Monitoring Program. The objective of DQA is to define the overall quality of the data presented in the report, and, by extension, the confidence with which the data can be used to derive conclusions.

A1.1 Background

A variety of factors can influence the physical, chemical and biological measurements made in an environmental study and thus affect the accuracy and/or precision of the data. Depending on the magnitude of the problem, inaccuracy or imprecision have the potential to affect the reliability of any conclusions made from the data. Therefore, it is important to ensure that programs incorporate appropriate steps to control the non-natural sources of data variability (i.e., minimize the variability that does not reflect natural spatial and temporal variability in the environment) and thus assure the quality of the data.

Data quality as a concept is meaningful only when it relates to the intended use of the data. That is, one must know the context in which the data will be interpreted in order to establish a relevant basis for judging whether or not the data set is adequate. DQA involves comparison of actual field and laboratory measurement performance to data quality objectives (DQOs) established for a particular study, such as evaluation of method detection limits, blank sample data, data precision (based on field and laboratory duplicate samples), and data accuracy (based on matrix spike recoveries and/or analysis of standards or certified reference materials). A trusted analytical laboratory certified by Canadian Association for Laboratory Accreditation (CALA) with a rigorous internal quality assurance program was selected to ensure the highest possible quality.

DQOs were established a-priori to reflect reasonable and achievable performance expectations. Programs involving a large number of samples and analytes usually yield some results that exceed the DQOs. This is particularly so for multi-element scans since the analytical conditions are not necessarily optimal for every element included in the scan. Generally, scan results may be considered acceptable if no more than 20% of the parameters fail to meet the DQOs. Overall, the intent of DQA is not to reject any measurement that did not meet a DQO, but to ensure that any questionable data received more scrutiny to determine what effect, if any, this had on interpretation of results within the context of this project.

A1.2 Types of Quality Control Samples

Several types of quality control (QC) samples were assessed based on samples collected (or prepared) in the field and laboratory. These samples include the following:

- **Blanks** are samples of de-ionized water and/or appropriate reagent(s) that are handled and analyzed the same way as regular samples. These samples will reflect any contamination that occurred in the laboratory (in the case of laboratory or method blanks). Analyte concentrations should be non-detectable, although a data quality objective of twice the method detection limit allows for slight "noise" around the detection limit.
- **Field Duplicates** are sub-sample pairs collected from a randomly selected field station using identical collection and handling methods that are then analyzed separately in the laboratory. The duplicate samples are handled and analyzed in an identical manner in the laboratory. The data from field duplicate samples reflect natural variability, as well as the variability associated with sample collection methods, and therefore provide a measure of field precision.
- **Laboratory Duplicates** are sub-sample pairs created in the laboratory from randomly selected field samples which are sub-sampled and then analyzed independently using identical analytical methods. The laboratory duplicate sample results reflect any variability introduced during laboratory sample handling and analysis and thus provide a measure of laboratory precision.
- **Certified Reference Materials and QC Standards** are samples containing known chemical concentrations that are processed and analyzed along with batches of environmental samples. The sample results are then compared to target results to provide a measure of analytical accuracy. The results are reported as the percent of the known amount that was recovered in the analysis.

A2.0 FISH TISSUE SAMPLES

A2.1 Holding Time and General Laboratory Flags

All tissue analyses were conducted within ALS Environmental's recommended hold times. There were no general laboratory flags associated with the analytical report (i.e., ALS Environmental Report L1704817; Appendix C).

A2.2 Method Detection Limits

The analytical laboratory report (Appendix C) was examined to provide an inventory of analytes for which sample results were less than the method detection limit (MDL). Nineteen of 35 analytes had results reported as less than MDL (Table A.1). All of the achieved MDL were lower than applicable benchmarks. Thus, the achieved MDLs were appropriate for the study and instances of results reported as <MDL did not adversely affect data interpretability.

A2.3 Laboratory Blank Sample Analysis

All of the reported method blank results were non-detectable (Appendix C). Thus, the method blank results for this study suggest no inadvertent sample contamination within the laboratory.

A2.4 Data Precision

Investigation of Erroneous Data

One northern pike muscle tissue sample (PINR-NP8-M) had an iron concentration that was exceptionally higher than all other muscle tissue samples (i.e., 5- to 20-times greater than all other muscle tissue samples; Appendix C). To investigate the causes, this sample was re-analyzed twice by the laboratory. In both instances, re-analysis showed the iron concentrations to be within the range of other muscle samples. All other metal concentrations from reanalysis match the original concentrations, indicating no sample mix-up. The lab investigated potential sources of contamination and concluded that this was not the cause of variation. It is concluded that sample heterogeneity was the cause (possibly from a relatively blood-rich area of the tissue, as blood is high in iron). The original iron concentration was treated as erroneous, and so the reanalysis value was used in this report. All other analytes showed typical population variability for each tissue type and required no further investigation (Tables C.2 to C.4).

Table A.1: Laboratory method detection limit (MDL) evaluation for tissue chemistry analyses relative to criteria. Only analytes with <MDL values are reported. Highlighted values indicate MDL greater than Benchmark.

Analyte		Benchmark[1,2]	MDL Achieved	
			mg/kg dry weight	mg/kg wet weight[3]
Total Metals	Aluminum (Al)	-	2.0	0.42
	Antimony (Sb)	0.3	0.010	0.0018
	Barium (Ba)	10.1	0.050	0.010
	Beryllium (Be)	1.3	0.010	0.0018
	Bismuth (Bi)	-	0.010	0.0018
	Boron (B)	11	1.0	0.18
	Cadmium (Cd)	0.5	0.0050	0.0010
	Chromium (Cr)	0.6	0.050	0.0088
	Cobalt (Co)	-	0.020	0.0042
	Lead (Pb)	2.3	0.020	0.0040
	Lithium (Li)	-	0.50	0.088
	Molybdenum (Mo)	3.2	0.020	0.0041
	Nickel (Ni)	0.8	0.20	0.035
	Strontium (Sr)	378.4	0.10	0.020
	Tellurium (Te)	-	0.020	0.0035
	Tin (Sn)	-	0.10	0.022
	Uranium (U)	0.4	0.0020	0.00035
	Vanadium (V)	-	0.10	0.020
	Zirconium (Zr)	-	0.20	0.035

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1, MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

[3] Calculated from mg/kg dry weight results.

Laboratory Duplicate Samples

Three laboratory duplicate samples were evaluated for moisture and another three laboratory duplicate samples were evaluated for metals (Appendix C). Almost all laboratory duplicate results (106 in total) met ALS Environmental's applicable DQOs. The only exceptions were six results (arsenic, barium, calcium, manganese, strontium, and vanadium; Appendix C) in one muscle tissue sample. This occurred due to sample tissue heterogeneity despite laboratory homogenization by digestion with nitric and hydrochloric acids in combination with addition of hydrogen peroxide. Of these analytes, only arsenic and manganese are considered contaminants of potential concern (COPC). Arsenic achieved an RPD of 40%, and so was only barely above the DQO of <40% RPD. Muscle tissue manganese concentrations were so small relative to the benchmark (i.e., the benchmark was at least 75-times greater than all muscle manganese concentrations) that potential sample heterogeneity should not impact the human health-related interpretation of results (Table C.6). Overall, laboratory precision achieved in this study is considered good.

Field Duplicate Samples

Four field duplicate samples (two muscle tissue, one liver, and one ovary) were collected for quality assurance (Table A.2). The ovary duplicate samples had excellent agreement, with only one analyte, calcium, slightly exceeding the DQO of ≤40% RPD (Table A.2). This is not a COPC and so does not affect the interpretation of results. The three muscle and liver samples collectively failed to meet the DQO for 13 analytes (Table A.2). Although results for barium, bismuth, iron, lead, strontium, thallium, tin, and vanadium did not always achieve the DQO, the absolute differences in concentration between duplicate samples were low, particularly considering that concentrations were approaching the corresponding MDLs (i.e., within 10-times the MDL). Concentrations of calcium, copper, manganese, mercury and sodium were well above the MDLs (Table A.2; Appendix C). Of these, copper, manganese and mercury are all COPC, but only failed to meet the DQO in one of four field duplicates and had excellent agreement in the other three samples. Samples were split in the field prior to laboratory homogenization, so the differences between duplicate samples may reflect natural spatial variability of fish tissues. However, it is more likely to be due to apparent laboratory difficulty with complete sample homogenization of muscle tissue (Laboratory Duplicate Samples; Appendix C). Overall, the data suggest that reported sample data were reasonably precise representations of tissue conditions at the time of sampling.

Table A.2: Field duplicate results. Highlighted values did not meet the data quality objective of ≤ 40% Relative Percent Difference (RPD).

Lab Report L1704817														
		Client Sample ID:	PINR-NP17-M	PINR-NPX-M	RPD (%)	PINR-NP12-M	PINR-NPY-M	RPD (%)	PINR-NP2-L	PINR-NPX-L	RPD (%)	PINR-NP16-G	PINR-NPX-G	RPD (%)
		Date Sampled:	3-Oct-2015	3-Oct-2015		2-Oct-2015	2-Oct-2015		1-Oct-2015	3-Oct-2015		3-Oct-2015	3-Oct-2015	
		ALS Sample ID:	L1704817-15	L1704817-16		L1704817-10	L1704817-17		L1704817-19	L1704817-33		L1704817-42	L1704817-43	
Analytes	**Units**	**Lowest MDL**												
% Moisture	%	0.25	77.7	77.8	0.1	78.8	77.5	2	75.2	78.8	5	79.2	79.2	0
Aluminum (Al)	mg/kg d.w.	2.0	2.2	<2.0	10	<2.0	3.0	40	2.7	3.4	23	2.4	<2.0	18
Antimony (Sb)	mg/kg d.w.	0.010	<0.010	<0.010	0	<0.010	0.014	33	<0.010	0.012	18	0.010	<0.010	0
Arsenic (As)	mg/kg d.w.	0.020	0.457	0.437	4	0.419	0.392	7	0.123	0.092	29	0.113	0.115	2
Barium (Ba)	mg/kg d.w.	0.050	0.24	0.063	117	0.060	<0.050	18	<0.050	<0.050	0	0.241	0.220	9
Beryllium (Be)	mg/kg d.w.	0.010	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0
Bismuth (Bi)	mg/kg d.w.	0.010	0.014	0.016	13	0.011	0.020	58	<0.010	0.019	62	0.013	0.011	17
Boron (B)	mg/kg d.w.	1.0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0
Cadmium (Cd)	mg/kg d.w.	0.0050	<0.005	<0.005	0	<0.0050	<0.0050	0	0.154	0.192	22	0.0293	0.0341	15
Calcium (Ca)	mg/kg d.w.	20	1,740	426	121	675	380	56	142	158	11	1,020	656	43
Cesium (Cs)	mg/kg d.w.	0.0050	0.0393	0.0377	4	0.0288	0.0266	8	0.0179	0.0250	33	0.0241	0.0217	10
Chromium (Cr)	mg/kg d.w.	0.050	<0.2	<0.15	29	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0
Cobalt (Co)	mg/kg d.w.	0.020	<0.020	<0.020	0	<0.020	<0.020	0	0.122	0.124	2	0.223	0.226	1
Copper (Cu)	mg/kg d.w.	0.10	0.88	0.81	8	0.59	0.58	2	42.7	65.2	42	4.88	5.11	5
Iron (Fe)	mg/kg d.w.	3.0	14.5	7.9	59	4.9	5.5	12	74.1	174	81	252	253	0.4
Lead (Pb)	mg/kg d.w.	0.020	0.021	<0.020	5	<0.020	<0.020	0	0.067	<0.020	108	0.021	<0.020	5
Lithium (Li)	mg/kg d.w.	0.50	<0.5	<0.5	0	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	0
Magnesium (Mg)	mg/kg d.w.	2.0	1,560	1,470	6	1570	1,440	9	700	642	9	1290	1340	4
Manganese (Mn)	mg/kg d.w.	0.050	2.06	0.587	111	1.04	0.729	35	9.94	8.83	12	104	111	7
Mercury (Hg)	mg/kg d.w.	0.0050	3.21	3.36	5	1.85	1.88	2	0.372	0.908	84	0.256	0.268	5
Molybdenum (Mo)	mg/kg d.w.	0.020	<0.020	<0.020	0	<0.020	<0.020	0	0.419	0.370	12	0.137	0.136	0.7
Nickel (Ni)	mg/kg d.w.	0.20	<0.20	<0.20	0	<0.20	<0.20	0	<0.20	<0.20	0	<0.20	<0.20	0
Phosphorus (P)	mg/kg d.w.	10	11,900	11,100	7	11,800	10,700	10	12,800	11,400	12	14,600	15,000	3
Potassium (K)	mg/kg d.w.	20	19,700	19,300	2	21,300	19,100	11	14,500	13,100	10	17,300	16,900	2
Rubidium (Rb)	mg/kg d.w.	0.050	28.0	27.3	3	26.2	24.9	5	38.9	29.8	26	24.9	24.3	2
Selenium (Se)	mg/kg d.w.	0.050	0.888	0.901	1	0.826	0.782	5	4.65	4.66	0.2	5.93	5.84	2
Sodium (Na)	mg/kg d.w.	20	1,210	1,100	10	1,120	970	14	2,340	3,820	48	4,510	4,940	9
Strontium (Sr)	mg/kg d.w.	0.050	0.834	0.135	144	0.218	0.087	86	0.093	0.097	4	0.710	0.528	29
Tellurium (Te)	mg/kg d.w.	0.020	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0
Thallium (Tl)	mg/kg d.w.	0.0020	0.0115	0.0115	0	0.0147	0.0224	42	0.0164	0.0158	4	0.0185	0.0176	5
Tin (Sn)	mg/kg d.w.	0.10	0.15	0.22	38	0.21	0.52	85	0.27	0.20	30	0.17	0.22	26
Uranium (U)	mg/kg d.w.	0.0020	<0.0020	<0.0020	0	<0.0020	<0.0020	0	<0.0020	<0.0020	0	<0.0020	<0.0020	0
Vanadium (V)	mg/kg d.w.	0.10	<0.10	<0.10	0	<0.1	<0.1	0	0.19	0.46	83	<0.10	<0.10	0
Zinc (Zn)	mg/kg d.w.	0.50	61.7	60.7	2	14.4	12.5	14	114	112	2	312	311	0.3
Zirconium (Zr)	mg/kg d.w.	0.20	<0.20	<0.20	0	<0.20	<0.20	0	<0.20	<0.20	0	<0.20	<0.20	0

d.w. - dry weight.
MDL - Method Detection Limit.

A2.5 Data Accuracy

Data accuracy was evaluated based on results of certified reference materials (CRM), and laboratory control samples (LCS; Appendix C). Almost all CRM and LCS results (268 in total) met ALS Environmental's data quality objectives for accuracy, except for chromium in one CRM analysis (Appendix C). All results associated with this CRM were non-detect results; therefore, the results for chromium are considered reliable. Laboratory accuracy achieved in this study is considered excellent.

A3.0 DATA QUALITY STATEMENT

Data collected for the 2015 fish tissue monitoring at the Rainy River Project was of good quality as characterized by good detectability, negligible analyte concentrations in method blanks, good laboratory and field precision, and good laboratory accuracy. Therefore, associated data can be used with a high level of confidence in the derivation of conclusions.

APPENDIX B

Fish Catch and Meristic Data

Fish Catch Data
Fish Meristic Data
Fish Permit

Table B.1: Summary of gill net catch records in the Pinewood River, Rainy River Project Fish Tissue Monitoring, 2015.

Net Set ID	Mesh Size (in)	Length (m)	UTM (NAD83, 15U)		Set Date	Lift Date	Set Time	Lift Time	Time (hrs)	Effort (m*hrs/ 100 m)	Northern Pike		Black Crappie		Rock Bass		White Sucker	
			Easting	Northing							Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
GN1	4	30.48	419219	5408077	30-Sep-15	30-Sep-15	11:04	17:40	6.60	2.01	0	0	0	0	0	0	0	0
GN2	3	45.72	409335	5398936	01-Oct-15	01-Oct-15	7:55	9:15	1.33	0.61	1	1.64	0	0	0	0	0	0
GN3	3	45.72	408086	5402502	01-Oct-15	01-Oct-15	10:00	14:29	4.48	2.05	1	0.49	0	0	0	0	0	0
GN4	4	30.48	409679	5403786	01-Oct-15	01-Oct-15	10:40	14:50	4.17	1.27	0	0	0	0	0	0	0	0
GN5	3	45.72	410302	5403889	01-Oct-15	01-Oct-15	11:30	15:00	3.50	1.60	2	1.25	0	0	0	0	0	0
GN6	3	45.72	419535	5408068	01-Oct-15	01-Oct-15	12:28	17:10	4.70	2.15	0	0	0	0	0	0	0	0
GN7	3	45.72	410082	5403907	01-Oct-15	01-Oct-15	15:21	18:05	2.73	1.25	0	0	0	0	0	0	0	0
GN8	3	45.72	408068	5403083	01-Oct-15	01-Oct-15	15:50	18:38	2.80	1.28	0	0	0	0	0	0	0	0
GN9	3	45.72	404735	5397659	02-Oct-15	02-Oct-15	8:25	17:23	8.97	4.10	1	0.24	1	0.24	0	0	0	0
GN10	3	45.72	407948	5397979	02-Oct-15	02-Oct-15	9:03	17:09	8.10	3.70	4	1.08	0	0	0	0	0	0
GN11	2,3,4	30.48	408072	5402501	02-Oct-15	02-Oct-15	12:20	16:37	4.28	1.31	1	0.77	0	0	0	0	0	0
GN12	3	45.72	410306	5403879	02-Oct-15	02-Oct-15	12:50	16:18	3.47	1.58	2	1.26	0	0	0	0	0	0
GN13	3	45.72	404116	5396869	02-Oct-15	03-Oct-15	18:07	9:05	14.97	6.84	2	0.29	8	1.17	1	0.15	0	0
GN14	4	30.48	403797	5396696	02-Oct-15	03-Oct-15	18:21	8:21	14.00	4.27	2	0.47	2	0.47	0	0	0	0
GN15	3	45.72	403469	5396389	02-Oct-15	03-Oct-15	18:30	9:55	15.42	7.05	4	0.57	14	1.99	1	0.14	1	0.14
									Total	**41.1**	**20**	**0.49**	**25**	**0.61**	**2**	**0.05**	**1**	**0.02**

CPUE = catch-per-unit-effort, expressed as the number of fish per 100 m/hr.

Table B.2: Summary of hoop net catch records in the Pinewood River, Rainy River Project Fish Tissue Monitoring, 2015.

a) Medium sized hoop nets (2.5' [0.75 m] diameter hoops, 1" [2.5 cm] stretched mesh).

Net Set ID	Net Size	UTM (NAD83, 15U)		Set Date	Lift Date	Set Time	Lift Time	Time (hrs)	Effort (trap*days)	Northern Pike		Walleye		White Sucker		Brown Bullhead		Trout-perch		Mimic Shiner	
		Easting	Northing							Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
HN1	m	419530	5408098	29-Sep-15	30-Sep-15	14:38	9:05	18.45	0.77	0	0	0	0	1	1.30	0	0	0	0	0	0
HN2	m	419225	5408071	29-Sep-15	30-Sep-15	15:22	9:50	18.47	0.77	0	0	0	0	0	0	0	0	0	0	0	0
HN4a	m	419365	5408089	29-Sep-15	30-Sep-15	16:57	9:22	16.42	0.68	4	5.85	0	0	8	11.70	0	0	0	0	0	0
HN4b	m	419365	5408089	30-Sep-15	01-Oct-15	9:37	12:50	27.22	1.13	1	0.88	0	0	0	0	0	0	0	0	0	0
HN4c	m	419365	5408089	01-Oct-15	02-Oct-15	13:00	14:12	25.20	1.05	0	0	0	0	0	0	0	0	0	0	0	0
HN5	m	419405	5408070	29-Sep-15	30-Sep-15	17:12	9:15	16.05	0.67	0	0	0	0	1	1.50	0	0	0	0	0	0
HN9a	m	419261	5408155	30-Sep-15	01-Oct-15	10:02	13:00	26.97	1.12	2	1.78	0	0	2	1.78	0	0	0	0	0	0
HN9b	m	419261	5408155	01-Oct-15	02-Oct-15	13:17	14:23	25.10	1.05	2	1.91	0	0	2	1.91	0	0	0	0	0	0
HN10	m	409295	5398932	30-Sep-15	01-Oct-15	15:42	7:58	16.27	0.68	0	0	0	0	0	0	0	0	0	0	0	0
HN11a	m	409381	5399377	30-Sep-15	01-Oct-15	16:07	8:24	16.28	0.68	1	1.47	1	1.47	1	1.47	0	0	0	0	0	0
HN11b	m	409381	5399377	01-Oct-15	02-Oct-15	8:35	11:00	26.42	1.10	1	0.91	0	0	0	0	0	0	0	0	0	0
HN12[a]	m	409246	5398800	01-Oct-15	02-Oct-15	9:05	10:36	25.52	1.06	0	0	0	0	0	0	0	0	0	0	0	0
								Total	**9.7**	**11**	**1.13**	**1**	**0.10**	**15**	**1.55**	**0**	**0**	**0**	**0**	**0**	**0**

b) Small sized hoop nets (2' [0.61 m] diameter hoops, 0.5" [1.3 cm] stretched mesh).

Net Set ID	Net Size	UTM (NAD83, 15U)		Set Date	Lift Date	Set Time	Lift Time	Time (hrs)	Effort (trap*days)	Northern Pike		Walleye		White Sucker		Brown Bullhead		Trout-perch		Mimic Shiner	
		Easting	Northing							Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
HN3	s	419252	5408148	29-Sep-15	30-Sep-15	16:37	9:40	17.05	0.71	0	0	0	0	1	1.41	0	0	0	0	0	0
HN6	s	419440	5408032	29-Sep-15	30-Sep-15	17:40	9:09	15.48	0.65	0	0	0	0	0	0	0	0	0	0	0	0
HN7	s	419478	5408119	29-Sep-15	30-Sep-15	17:53	9:06	15.22	0.63	0	0	0	0	0	0	0	0	0	0	0	0
HN8	s	419544	5408076	29-Sep-15	30-Sep-15	18:03	10:37	16.57	0.69	0	0	0	0	0	0	2	2.90	0	0	0	0
HN13	s	408078	5402503	01-Oct-15	03-Oct-15	10:00	11:04	49.07	2.04	0	0	0	0	0	0	0	0	0	0	0	0
HN14	s	412958	5405686	01-Oct-15	03-Oct-15	11:00	11:20	48.33	2.01	0	0	0	0	1	0.50	0	0	1	0.50	1	0.50
								Total	**6.74**	**0**	**0.00**	**0**	**0.00**	**2**	**0.30**	**2**	**0.30**	**1**	**0.15**	**1**	**0.15**

CPUE = catch-per-unit-effort, expressed as the number of fish per trap*day.

[a] A large hole was found in the net at the time of retrieval (likely chewed by snapping turtle). Any fish in the net would have escaped. This net set is excluded from CPUE calculations

Table B.3: Summary of angling catch records in the Pinewood River, Rainy River Project Fish Tissue Monitoring, 2015.

Attempt ID	Number of Fishing Rods	UTM (NAD83, 15U)		Date	Start Time	End Time	Time (hrs)	Northern Pike	
		Easting	Northing					Catch	CPUE
A1	1	414691	5407046	30-Sep-15	14:00	14:10	0.17	0	0
A2	1	410082	5403907	01-Oct-15	17:50	18:00	0.17	0	0
A3	1	408077	5402504	03-Oct-15	11:20	11:30	0.17	0	0
							0.50	**0**	**0**

CPUE = catch-per-unit-effort, expressed as the number of fish per hour.

Table B.4: Northern pike data for fish caught in the Pinewood River, Rainy River Project Fish Monitoring, 2015.

Date	Fish ID	Sex	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Mercury Concentration (mg/kg w.w.)			Age	Abnormalities
						Muscle	Liver	Ovary		
01-Oct-15	PINR-NP01	F	49.1	52.1	755	0.382	0.0911	0.0282	3	-
01-Oct-15	PINR-NP02	F	44.9	48.0	705	0.270	0.142	0.0238	3	-
01-Oct-15	PINR-NP03	F	46.1	49.1	800	0.386	0.149	0.0299	3	-
01-Oct-15	PINR-NP04	F	43.1	46.2	570	0.281	0.0894	0.0175	1	-
01-Oct-15	PINR-NP05	F	45.4	48.5	665	0.322	0.0865	0.0193	2	-
01-Oct-15	PINR-NP06	M	31.0	33.1	205	-	-	-	-	-
01-Oct-15	PINR-NP07	M	31.5	33.6	195	0.148	0.0684	-	0	-
01-Oct-15	PINR-NP08	M	32.0	33.8	210	0.142	0.0587	-	1	-
02-Oct-15	PINR-NP09	M	43.8	46.2	510	0.186	0.0736	-	2	-
02-Oct-15	PINR-NP10	M	41.8	44.1	460	0.288	0.0927	-	4	-
02-Oct-15	PINR-NP11	M	44.3	47.1	610	-	-	-	-	-
02-Oct-15	PINR-NP12	F	48.7	51.8	835	0.408	0.123	0.0192	2	-
02-Oct-15	PINR-NP13	F	57.0	62.1	1,420	0.711	0.386	0.0666	7	-
02-Oct-15	PINR-NP14	M	28.2	30.3	149	0.145	0.0867	-	1	-
02-Oct-15	PINR-NP15	F	31.0	33.1	175	0.148	0.0755	0.0197	1	-
03-Oct-15	PINR-NP16	F	68.9	73.0	2,200	0.589	0.206	0.0545	5	-
03-Oct-15	PINR-NP17	M	59.5	63.3	1,450	0.731	0.362	-	7	-
		Mean	43.9	46.8	701	0.342	0.139	0.0310	3	-
		Minimum	28.2	30.3	149	0.142	0.0587	0.0175	0	-
		Maximum	68.9	73.0	2,200	0.731	0.386	0.0666	7	-
		Standard Deviation	11.1	11.9	548	0.198	0.103	0.0176	2	-

w.w. - wet weight.

Table B.5: Walleye data for fish caught in the Pinewood River, Rainy River Project Fish Monitoring, 2015.

Date	Fish ID	Sex	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Mercury Concentration (mg/kg w.w.)		Age	Abnormalities
						Muscle	Liver		
01-Oct-15	PINR-Wa01	undev. F	27.6	30.0	220	0.299	0.128	2	-

w.w. - wet weight.

Ontario

Ministry of Natural Resources

Ministère des Richesses naturelles

Licence to Collect Fish for Scientific Purposes
Permis pour faire la collecte de poissons à des fins scientifiques

Licence No. / N° de permis	1081405
Local Reference No. / N° de référence local	2015-875
Issuer Account No. / N° de compte du délivreur de permis.	10003004

This licence is issued under Part I of the Fish Licensing Regulation made under the Fish and Wildlife Conservation Act, 1997 to:

Ce permis est délivré en vertu de la Partie I du règlement sur la délivrance de permis de pêche formulé conformément à la Loi sur la protection du poisson et de la faune de 1997 à:

Name of Licencee / Nom du titulaire du permis	Last Name / Nom de famille: Mr. Tester	First Name / Prénom: Jess	Middle Name / Second Prénom:
	Name of Business/Organization/Affiliation (if applicable) / Nom de l'entreprise/de l'organisme/de l'affiliation (le cas échéant): Minnow Environmental Inc		
Mailing address of Licencee / *Adresse postale du titulaire du permis*	Street Name & No./PO Box/RR#/Gen. Del./ N° rue/C.P./R.R./poste restante: 2 Lamb Street		
	City/Town/Municipality / Ville/village/municipalité: Georgetown	Province/State / Province/État: ON	Postal Code/Zip Code / Code Postal/Zip: L7G 3M9

to collect the species, size and quantites of fish from the waters as set out below.
Pour faire la collecte des espèces suivantes (stade et nombre indiqués ci-dessous):

Species / Espèces	Eggs / Oeuf X	Juvenile / Fretin X	Adults / Adulte X	Numbers / Nombre	Name of Waterbody / Nom de l'étendue d'eau
Northern Pike			X	15	Pinewood River
Walleye			X	15	Pinewood River

Yes/Oui ☐ Additional species/Waterbody list attached / Liste d'espèces/d'étendue d'eau additionnelles ci-jointe

Purpose of collection / *But de la collecte*: Fish tissue monitoring as a requirement of the Federal ESA approval

Licence Dates / *Dates du permis*	Effective Date / Date d'entrée en vigueur (YYYY-MM-DD): 2015-09-27	Expiry Date / Date d'expiration (YYYY-MM-DD): 2015-10-31

Licence conditions: This licence is subject to the conditions contained in Schedule A if included. / Ce permis doit respecter les conditions de l'annexe A si celle-ci est jointe.

Conditions du permis: Yes/Oui ☒ No/Non ☐ Schedule A included. / Annexe A ci-jointe

Issued by (please print) / Délivré par (veuillez écrire en caractères d'imprimerie): Matt Myers	Signature of issuer / Signature du délivreur	Date of Issue/Date de délivrance (YYYY-MM-DD): 2015-09-15
Signature of Licencee / Signature du titulaire du permis: Jess Tester		Date (YYYY-MM-DD): 2015-09-15

Personal information contained on this form is collected under the authority of the Fish and Wildlife Conservation Act, 1997 and will be used for the purpose of licencing, identification, enforcement, resource management and customer service surveys. Please direct further inquiries to the District Manager of the MNR issuing district.

Les renseignements personnels dans ce formulaire sont recueillis conformément à la Loi sur la protection du poisson de la faune, 1997, et ils seront utilisés aux fins de délivrance de permis, d'identification, d'application des règlements, de gestion des ressources et de sondage sur les services à la clientèle. Veuillez communiquer avec le chef du district du MRN qui délivré le permis si vous avez des questions.

FW0032 (04/00)

Ontario

Licence to Collect Fish for Scientific Purposes
Schedule A – Licence Conditions

Licence No. **1081405**
Local Reference No. **2015-875**
Issuer Account No. **10003004**

This licence is subject to the conditions listed below.

1. Mandatory report forms documenting the sampling conducted under this licence must be submitted to the licence issuer within 30 days of the termination date, but in no case later than January 31 next following the year of issue. The digital Mandatory Report form (Part 1) must be completed for each Sampling Program and the digital Site Collection Reports (Part 2) must be completed for each collection site. A separate map clearly indicating the location of each collection site must be attached to the Site Collection Reports. Submit Mandatory Report forms to the Fort Frances District MNRF office. The submission of a satisfactory report is a prerequisite to any subsequent renewals.

2. Sampling locations must be reported using GPS location data using: Projection: Universal Transverse Mercator (UTM); Datum: North American 1983 (NAD83), Canadian Transformation (CNT); Zone: 15 N; Units: metres.

3. Before carrying out any operation under this licence, any person authorized under this licence is required to consult with the Fort Frances Ministry of Natural Resources District Manager at least one week prior to anticipated start of sampling and obtain approval from the respective Manager for the proposed sampling activity. Also, any person authorized under this licence must advise the respective Manager of the date, time and location of all sampling.

4. A copy of the signed original licence must be carried by the licenced person when working at the designated sites. An assistant of the licenced person who is carrying out activities under this licence during the absence of the licenced person shall carry the licence on his or her person.

5. All collection gear shall be clearly marked with the licenced person's and the organization's name.

6. This licence is not valid in Provincial Parks, park reserves, Conservation Authority property or National Parks without written permission from the authorized person in charge of the area concerned. http://www.ontarioparks.com/email/research

7. Capture gear shall be inspected regularly and live holding traps must be inspected at least once daily.

8. This licence does not allow access to any property without permission of the landowner.

9. The licensee shall follow the best management practices for the collection, handling, transportation and holding of fish identified in **FPS Technical Bulletin (Dec. 15, 2011)** included with the licence in order to minimize the risk of spreading aquatic invasive species and diseases.

10. All field equipment must be de-contaminated prior to use on each water body in order to prevent the spread of exotic species and disease.

11. This licence does not authorize any activity that is prohibited under the federal ***Species at Risk Act*** or the provincial ***Endangered Species Act.***

12. All SAR fish and mussels must also be reported to the OMNR Natural Heritage Information Centre on the appropriate form at: http://nhic.mnr.gov.on.ca/MNR/nhic/species/species_report.cfm

13. This licence does not authorize the possession of specially protected fish under the ***Ontario Fishery Regulations.***

14. This licence does not authorize the collection of any species of fish protected under the ***Species at Risk Act, Endangered Species Act, or Ontario Fishery Regulations.*** If these species are accidentally captured they must be returned to the water immediately.

15. **This licence ONLY allows for the following capture gear to be used:**

    Hoop net, Gill net, Angling gear

16. **Persons authorized under this licence include the following:**

    Jess Tester, Michael White

17. ***The following MNRF Class Animal Care Protocols will be adhered to as appropriate for the project activity:***
    - ***Capture Methods- Electrofishing***
    - ***Capture Methods- Seining***
    - ***Capture Methods- Impounding Gear***
    - ***Handling and Marking- Biological Sampling***
    - ***Containment- Short term Containment***

Signature of Licensee

X Jess Tester

Date

24-Sept-15.

APPENDIX C

Fish Tissue Quality

Fish Tissue Chemistry
Laboratory Analytical Data Report

Table C.1: Average dry weight (d.w.) metal concentrations in fish tissue, Rainy River Project Fish Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Northern Pike												Walleye	
				Muscle				Liver				Ovary				Muscle	Liver
				Average (n=15)	SD	Minimum	Maximum	Average (n=15)	SD	Minimum	Maximum	Average (n=9)	SD	Minimum	Maximum		
% Moisture		0.25	%	77.8	1.1	76.1	79.6	72.0	5.8	60.6	79.2	78.3	2.5	74.4	82.4	79.1	69.4
Total Metals	Aluminum (Al)	2.0	µg/g d.w.	4.3	2.9	<2.0	13.0	4.2	1.9	2.0	9.1	2.8	1.3	2.0	5.1	2.4	<5.0
	Antimony (Sb)	0.010	µg/g d.w.	0.010	0.0005	<0.010	0.012	0.018	0.021	0.010	0.088	0.011	0.0019	0.010	0.0160	<0.010	<0.010
	Arsenic (As)	0.020	µg/g d.w.	0.423	0.102	0.271	0.586	0.150	0.062	0.062	0.286	0.118	0.0339	0.0680	0.184	0.489	0.197
	Barium (Ba)	0.050	µg/g d.w.	0.183	0.097	0.055	0.392	0.0531	0.00861	0.0500	0.0800	0.292	0.173	0.0600	0.576	0.0870	<0.050
	Beryllium (Be)	0.010	µg/g d.w.	<0.010	0	<0.010	<0.010	<0.010	0	<0.010	<0.010	<0.010	0	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)	0.010	µg/g d.w.	0.011	0.0021	<0.010	0.016	0.018	0.015	0.010	0.054	0.011	0.0014	0.010	0.014	<0.010	<0.010
	Boron (B)	1.0	µg/g d.w.	<1.0	0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)	0.0050	µg/g d.w.	0.0080	0.0078	<0.0050	0.0352	0.201	0.153	0.0304	0.600	0.0350	0.0119	0.0190	0.0600	<0.0050	1.9
	Calcium (Ca)	20	µg/g d.w.	1,254	632	528	2,420	144	45	81	285	643	141	537	1,020	607	388
	Cesium (Cs)	0.0050	µg/g d.w.	0.0263	0.0121	0.0137	0.0530	0.0123	0.00728	0.00540	0.0302	0.0171	0.00643	0.00830	0.0264	0.0306	0.0145
	Chromium (Cr)	0.050	µg/g d.w.	0.11	0.098	<0.050	0.370	0.12	0.10	0.050	0.37	0.072	0.050	0.050	0.20	<0.050	<0.20
	Cobalt (Co)	0.020	µg/g d.w.	0.0203	0.000704	<0.020	0.0220	0.158	0.0740	0.0710	0.357	0.307	0.0980	0.169	0.484	<0.020	0.764
	Copper (Cu)	0.10	µg/g d.w.	0.823	0.169	0.580	1.15	87.0	46.6	34.7	238	5.40	0.620	4.72	6.69	0.7	10.2
	Iron (Fe)	3.0	µg/g d.w.	12.5	4.0	5.2	19.0	420	460	57	1,980	253	52.0	168	333	10.3	393
	Lead (Pb)	0.020	µg/g d.w.	0.057	0.084	<0.020	0.35	0.17	0.54	0.020	2.21	0.035	0.038	0.020	0.14	0.032	<0.050
	Lithium (Li)	0.50	µg/g d.w.	<0.50	0	<0.50	<0.50	<0.50	0	<0.50	<0.50	<0.50	0	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)	2.0	µg/g d.w.	1,555	107	1,370	1,830	641	136	446	878	1,316	71.5	1,200	1,430.0	1,760	665
	Manganese (Mn)	0.050	µg/g d.w.	1.97	1.07	0.885	4.28	5.59	2.69	2.79	10.2	156	48.8	104	245	0.778	13.8
	Mercury (Hg)	0.0050	µg/g d.w.	1.57	0.940	0.594	3.370	0.548	0.447	0.175	1.70	0.160	0.101	0.0752	0.364	1.43	0.419
	Molybdenum (Mo)	0.020	µg/g d.w.	0.0250	0.00826	<0.020	0.040	0.520	0.140	0.285	0.834	0.189	0.0518	0.132	0.277	<0.020	0.433
	Nickel (Ni)	0.20	µg/g d.w.	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)	10	µg/g d.w.	11,220	943	9,050	13,000	11,029	2,862	7,160	15,300	14,800	1,183	13,800	17,600	12,000	10,300
	Potassium (K)	20	µg/g d.w.	19,520	1,548	16,400	22,100	11,218	2,992	6,440	15,200	16,920	2,856	13,400	22,200	21,600	8,990
	Rubidium (Rb)	0.050	µg/g d.w.	22.8	2.63	18.6	27.65	22.8	7.57	10.4	38.9	22.4	3.94	14.7	27.6	33.4	15.5
	Selenium (Se)	0.050	µg/g d.w.	0.931	0.116	0.804	1.170	5.44	1.66	3.56	10.3	5.47	1.53	3.91	8.42	1.41	3.68
	Sodium (Na)	20	µg/g d.w.	1,328	157	1,045	1,580	2,571	726	1,650	4,040	3,655	960	2,460	4,940	1190	3310
	Strontium (Sr)	0.050	µg/g d.w.	0.696	0.335	0.153	1.230	0.108	0.0230	0.080	0.1590	0.535	0.161	0.307	0.748	0.225	0.17
	Tellurium (Te)	0.020	µg/g d.w.	<0.020	0	<0.020	<0.020	0.021	0.0015	0.020	0.025	<0.20	0	<0.20	<0.20	<0.020	<0.020
	Thallium (Tl)	0.0020	µg/g d.w.	0.0131	0.00364	0.00900	0.0212	0.0171	0.0100	0.00870	0.0487	0.0223	0.00441	0.0173	0.02930	0.0245	0.0525
	Tin (Sn)	0.10	µg/g d.w.	0.28	0.13	0.14	0.65	0.32	0.26	0.14	1.2	0.19	0.13	0.10	0.53	0.39	0.64
	Uranium (U)	0.0020	µg/g d.w.	<0.0020	0	<0.0020	<0.0020	0.0022	0.00065	0.0020	0.0046	<0.20	0	<0.20	<0.20	0.0025	<0.0020
	Vanadium (V)	0.10	µg/g d.w.	<0.10	0	<0.10	<0.10	0.56	0.63	0.12	2.67	0.15	0.11	0.10	0.46	<0.10	0.15
	Zinc (Zn)	0.50	µg/g d.w.	20.5	11.5	13.5	61.2	162	44.7	112	274	365	93.6	260	571	15.1	149
	Zirconium (Zr)	0.20	µg/g d.w.	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	<0.20

SD - Standard Deviation.

Table C.2: Dry weight (d.w.) metal concentrations in fish muscle tissue, Rainy River Project Fish Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Northern Pike															Walleye
				PINR-NP1-M	PINR-NP2-M	PINR-NP3-M	PINR-NP4-M	PINR-NP5-M	PINR-NP7-M	PINR-NP8-M	PINR-NP9-M	PINR-NP10-M	PINR-NP12-M	PINR-NP13-M	PINR-NP14-M	PINR-NP15-M	PINR-NP16-M	PINR-NP17-M	PINR-WA1-M
				1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	3-Oct-2015	3-Oct-2015	1-Oct-2015
	% Moisture	0.25	%	78.2	77.1	79.6	78.9	76.5	78.0	76.1	78.3	77.3	78.2	78.9	77.0	76.4	79.2	77.8	79.1
Total Metals	Aluminum (Al)	2.0	µg/g d.w.	3.3	8.3	13.0	3.2	2.7	<5.0	<5.0	2.2	<2.0	2.5	3.8	<2.0	<5.0	3.9	2.1	2.4
	Antimony (Sb)	0.010	µg/g d.w.	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Arsenic (As)	0.020	µg/g d.w.	0.576	0.355	0.586	0.304	0.271	0.320	0.337	0.412	0.585	0.406	0.502	0.448	0.373	0.429	0.447	0.489
	Barium (Ba)	0.050	µg/g d.w.	0.187	0.279	0.243	0.157	0.085	0.151	0.149	0.226	0.392	0.055	0.096	0.343	0.105	0.124	0.152	0.087
	Beryllium (Be)	0.010	µg/g d.w.	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)	0.010	µg/g d.w.	0.010	<0.010	<0.010	0.012	<0.010	0.010	<0.010	<0.010	0.010	0.016	0.015	<0.010	<0.010	0.011	0.015	<0.010
	Boron (B)	1.0	µg/g d.w.	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)	0.0050	µg/g d.w.	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	0.0055	<0.0050	<0.010	0.0352	<0.0050	<0.0050
	Calcium (Ca)	20	µg/g d.w.	1,140	1,350	1,840	1,210	744	628	1,990	1,220	2,390	528	681	2,420	968	618	1,083	607
	Cesium (Cs)	0.0050	µg/g d.w.	0.0269	0.0205	0.0203	0.0140	0.0169	0.0214	0.0232	0.0137	0.0530	0.0277	0.0437	0.0206	0.0141	0.0406	0.0385	0.0306
	Chromium (Cr)	0.050	µg/g d.w.	<0.050	<0.10	0.056	<0.050	<0.050	<0.20	0.37	<0.050	<0.050	<0.050	<0.050	<0.050	0.25	<0.050	<0.18	<0.050
	Cobalt (Co)	0.020	µg/g d.w.	<0.020	<0.020	0.022	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.022	<0.020	<0.020	<0.020	<0.020
	Copper (Cu)	0.10	µg/g d.w.	0.76	0.86	0.86	0.75	0.60	0.86	1.15	1.02	0.69	0.59	0.58	1.00	0.81	0.98	0.85	0.70
	Iron (Fe)	3.0	µg/g d.w.	14.5	19.0	15.7	10.0	6.6	10.3	13.2	13.0	14.3	5.2	17.0	7.5	15.6	14.2	11.2	10.3
	Lead (Pb)	0.020	µg/g d.w.	0.039	0.052	0.084	0.021	0.023	<0.050	0.059	<0.020	<0.020	<0.020	0.353	<0.020	<0.050	0.022	0.021	0.032
	Lithium (Li)	0.50	µg/g d.w.	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)	2.0	µg/g d.w.	1,510	1,430	1,610	1,610	1,490	1,530	1,830	1,370	1,560	1,505	1,580	1,670	1,520	1,590	1,515	1,760
	Manganese (Mn)	0.050	µg/g d.w.	1.59	2.40	2.79	1.35	1.19	1.17	4.28	1.66	3.58	0.88	1.19	3.48	1.48	1.14	1.32	0.778
	Mercury (Hg)	0.0050	µg/g d.w.	1.75	1.18	1.89	1.33	1.37	0.671	0.594	0.858	1.27	1.87	3.37	0.629	0.628	2.83	3.29	1.43
	Molybdenum (Mo)	0.020	µg/g d.w.	<0.020	<0.020	<0.020	<0.020	<0.020	<0.040	<0.040	0.023	<0.020	<0.020	0.021	<0.020	<0.040	0.031	<0.020	<0.020
	Nickel (Ni)	0.20	µg/g d.w.	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)	10	µg/g d.w.	10,800	10,800	11,300	12,400	11,800	10,100	10,900	10,700	12,100	11,250	11,300	13,000	9,050	11,300	11,500	12,000
	Potassium (K)	20	µg/g d.w.	18,300	18,300	19,000	22,100	21,300	18,100	19,000	18,400	20,100	20,200	19,900	21,900	16,400	20,300	19,500	21,600
	Rubidium (Rb)	0.050	µg/g d.w.	20.9	21.3	20.7	23.6	19.3	22.2	24.2	22.4	24.1	25.6	20.7	23.9	18.6	26.7	27.7	33.4
	Selenium (Se)	0.050	µg/g d.w.	1.08	0.979	0.873	0.821	0.925	0.85	0.81	0.934	1.17	0.804	0.861	1.00	1.12	0.846	0.895	1.41
	Sodium (Na)	20	µg/g d.w.	1,380	1,510	1,430	1,580	1,390	1,260	1,390	1,250	1,080	1,045	1,490	1,250	1,280	1,430	1,155	1,190
	Strontium (Sr)	0.050	µg/g d.w.	0.806	0.849	1.01	0.762	0.232	0.32	0.75	0.979	1.19	0.153	0.351	1.23	0.63	0.697	0.485	0.225
	Tellurium (Te)	0.020	µg/g d.w.	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)	0.0020	µg/g d.w.	0.0134	0.0130	0.0156	0.0167	0.0109	0.0091	0.0113	0.0147	0.0212	0.0186	0.0097	0.0117	0.0090	0.0097	0.0115	0.0245
	Tin (Sn)	0.10	µg/g d.w.	0.65	0.32	0.37	0.28	0.23	0.38	0.14	0.27	0.18	0.37	0.26	0.20	0.14	0.23	0.19	0.39
	Uranium (U)	0.0020	µg/g d.w.	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0025
	Vanadium (V)	0.10	µg/g d.w.	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Zinc (Zn)	0.50	µg/g d.w.	18.5	18.5	17.1	17.6	23.1	17.6	17.6	19.5	15.9	13.5	18.4	16.7	17.5	14.8	61.2	15.1
	Zirconium (Zr)	0.20	µg/g d.w.	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table C.3: Dry weight (d.w.) metal concentrations in fish liver tissue, Rainy River Project Fish Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Northern Pike															Walleye
				PINR-NP1-L	PINR-NP2-L	PINR-NP3-L	PINR-NP4-L	PINR-NP5-L	PINR-NP7-L	PINR-NP8-L	PINR-NP9-L	PINR-NP10-L	PINR-NP12-L	PINR-NP13-L	PINR-NP14-L	PINR-NP15-L	PINR-NP16-L	PINR-NP17-L	PINR-WA1-L
				1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	3-Oct-2015	3-Oct-2015	1-Oct-2015
	% Moisture	0.25	%	75.5	77.0	75.9	75.5	72.2	60.9	67.4	69.6	66.4	75.0	77.3	60.6	70.4	79.2	71.9	69.4
Total Metals	Aluminum (Al)	2.0	µg/g d.w.	3.9	3.1	2.5	<2.0	2.1	<5.0	<5.0	<5.0	<5.0	2.6	6.5	<5.0	<5.0	3.1	9.1	<5.0
	Antimony (Sb)	0.010	µg/g d.w.	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.088	<0.010	<0.010	0.046	0.017	<0.010
	Arsenic (As)	0.020	µg/g d.w.	0.286	0.108	0.159	0.104	0.062	0.175	0.125	0.110	0.118	0.114	0.237	0.206	0.239	0.126	0.121	0.197
	Barium (Ba)	0.050	µg/g d.w.	<0.050	<0.050	0.069	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.080	<0.050	<0.050	<0.050	<0.050	<0.050
	Beryllium (Be)	0.010	µg/g d.w.	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)	0.010	µg/g d.w.	<0.010	0.0145	0.011	0.012	<0.010	0.010	<0.010	<0.010	<0.010	0.016	0.051	0.012	<0.010	0.054	0.031	<0.010
	Boron (B)	1.0	µg/g d.w.	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)	0.0050	µg/g d.w.	0.251	0.173	0.279	0.0304	0.148	0.072	0.073	0.083	0.282	0.170	0.600	0.069	0.112	0.237	0.458	1.90
	Calcium (Ca)	20	µg/g d.w.	126	150	171	109	126	130	118	131	81	126	285	126	126	180	163	388
	Cesium (Cs)	0.0050	µg/g d.w.	0.0127	0.0215	0.0073	0.0072	0.0073	0.0056	0.0090	0.0064	0.0196	0.0104	0.0132	0.0054	0.0110	0.0302	0.0093	0.0145
	Chromium (Cr)	0.050	µg/g d.w.	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.20	<0.20	<0.20	<0.050	<0.050	0.37	<0.20	<0.050	0.065	<0.20
	Cobalt (Co)	0.020	µg/g d.w.	0.171	0.123	0.236	0.130	0.071	0.090	0.103	0.163	0.104	0.240	0.357	0.139	0.100	0.149	0.224	0.764
	Copper (Cu)	0.10	µg/g d.w.	101	54.0	59.1	78.0	34.7	70.9	49.0	111	84.2	82.8	238	121	81.7	85.5	87.5	10.2
	Iron (Fe)	3.0	µg/g d.w.	266	124.1	594	202	57.1	286	189	486	513	112	1980	588	320	198	675	393
	Lead (Pb)	0.020	µg/g d.w.	0.021	0.044	0.037	<0.020	0.032	<0.050	<0.050	<0.050	<0.050	<0.020	2.21	<0.050	<0.050	0.027	0.022	<0.050
	Lithium (Li)	0.50	µg/g d.w.	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)	2.0	µg/g d.w.	654	671	878	763	671	446	502	587	472	738	825	491	686	742	457	665
	Manganese (Mn)	0.050	µg/g d.w.	6.34	9.39	6.76	4.23	3.18	3.57	2.79	4.08	4.51	3.38	5.21	3.37	9.74	10.2	3.24	13.8
	Mercury (Hg)	0.0050	µg/g d.w.	0.372	0.640	0.620	0.365	0.311	0.175	0.180	0.242	0.276	0.493	1.70	0.220	0.255	0.992	1.29	0.419
	Molybdenum (Mo)	0.020	µg/g d.w.	0.495	0.395	0.565	0.560	0.285	0.439	0.448	0.768	0.522	0.541	0.834	0.458	0.488	0.462	0.660	0.433
	Nickel (Ni)	0.20	µg/g d.w.	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)	10	µg/g d.w.	11,500	12,100	15,300	13,900	11,800	7,510	7,590	9,140	7,160	13,900	15,000	7,530	10,800	13,100	8,040	10,300
	Potassium (K)	20	µg/g d.w.	13,300	13,800	15,000	12,500	11,600	6,440	7,780	9,870	7,710	11,300	15,200	7,110	10,800	14,600	8,680	8,990
	Rubidium (Rb)	0.050	µg/g d.w.	28.8	34.4	24.5	20.3	13.5	10.4	15.3	25.2	25.1	21.6	23.6	14.0	22.4	32.9	18.6	15.5
	Selenium (Se)	0.050	µg/g d.w.	6.51	4.66	6.68	4.02	3.56	4.35	4.02	5.99	5.19	5.77	10.3	3.78	5.23	5.48	6.81	3.68
	Sodium (Na)	20	µg/g d.w.	2,530	3,080	3,180	2,210	2,150	1,840	2,280	2,530	1,730	2,250	2,820	1,650	2,210	4,040	3,560	3,310
	Strontium (Sr)	0.050	µg/g d.w.	0.096	0.095	0.129	0.089	0.080	<0.10	<0.10	0.13	<0.10	0.088	0.153	0.10	<0.10	0.112	0.159	0.17
	Tellurium (Te)	0.020	µg/g d.w.	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.024	0.025	<0.020
	Thallium (Tl)	0.0020	µg/g d.w.	0.0148	0.0161	0.0150	0.0164	0.0087	0.0108	0.0087	0.0125	0.0173	0.0191	0.0311	0.0089	0.0140	0.0487	0.0159	0.0525
	Tin (Sn)	0.10	µg/g d.w.	0.16	0.24	0.17	0.53	0.15	0.14	0.24	0.28	0.34	0.42	1.20	0.19	0.41	0.24	0.17	0.64
	Uranium (U)	0.0020	µg/g d.w.	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0046	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)	0.10	µg/g d.w.	0.71	0.33	0.43	0.16	0.16	0.22	0.12	0.41	0.56	0.34	2.67	0.36	0.32	0.55	1.28	0.15
	Zinc (Zn)	0.50	µg/g d.w.	153	113	179	135	112	131	169	274	171	138	231	153	199	135	184	149
	Zirconium (Zr)	0.20	µg/g d.w.	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table C.4: Dry weight (d.w.) metal concentrations in fish ovaries, Rainy River Project Fish Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Northern Pike								
				PINR-NP1-G	PINR-NP2-G	PINR-NP3-G	PINR-NP4-G	PINR-NP5-G	PINR-NP12-G	PINR-NP13-G	PINR-NP15-G	PINR-NP16-G
				1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	3-Oct-2015
% Moisture		0.25	%	82.4	75.6	76.8	77.0	74.4	78.4	81.7	77.8	79.2
Total Metals	Aluminum (Al)	2.0	µg/g d.w.	3.1	<2.0	<2.0	<2.0	<2.0	<2.0	5.1	<5.0	2.2
	Antimony (Sb)	0.010	µg/g d.w.	<0.010	0.010	0.010	<0.010	<0.010	<0.010	0.016	<0.010	0.010
	Arsenic (As)	0.020	µg/g d.w.	0.184	0.139	0.113	0.085	0.068	0.099	0.155	0.105	0.114
	Barium (Ba)	0.050	µg/g d.w.	0.102	0.251	0.576	0.570	0.344	0.352	0.208	0.060	0.231
	Beryllium (Be)	0.010	µg/g d.w.	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)	0.010	µg/g d.w.	<0.010	0.011	<0.010	<0.010	<0.010	0.010	0.014	<0.010	0.012
	Boron (B)	1.0	µg/g d.w.	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)	0.0050	µg/g d.w.	0.0472	0.0292	0.0249	0.0190	0.0356	0.0295	0.0409	0.0600	0.0317
	Calcium (Ca)	20	µg/g d.w.	537	681	663	576	555	577	594	572	838
	Cesium (Cs)	0.0050	µg/g d.w.	0.0227	0.0138	0.0111	0.0094	0.0083	0.0166	0.0264	0.0173	0.0229
	Chromium (Cr)	0.050	µg/g d.w.	<0.050	<0.050	<0.050	<0.050	0.116	<0.050	<0.050	<0.20	<0.20
	Cobalt (Co)	0.020	µg/g d.w.	0.408	0.261	0.289	0.287	0.169	0.403	0.484	0.323	0.225
	Copper (Cu)	0.10	µg/g d.w.	5.26	4.72	5.32	5.49	4.72	5.86	5.92	6.69	5.00
	Iron (Fe)	3.0	µg/g d.w.	218	201	252	311	168	237	333	309	253
	Lead (Pb)	0.020	µg/g d.w.	0.023	<0.020	<0.020	<0.020	<0.020	<0.020	0.140	<0.050	0.021
	Lithium (Li)	0.50	µg/g d.w.	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)	2.0	µg/g d.w.	1340	1320	1200	1410	1330	1430	1250	1250	1315
	Manganese (Mn)	0.050	µg/g d.w.	149	122	153	245	130	198	128	222	108
	Mercury (Hg)	0.0050	µg/g d.w.	0.160	0.0976	0.129	0.0762	0.0752	0.0889	0.364	0.0889	0.262
	Molybdenum (Mo)	0.020	µg/g d.w.	0.264	0.158	0.205	0.197	0.132	0.211	0.277	0.173	0.137
	Nickel (Ni)	0.20	µg/g d.w.	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)	10	µg/g d.w.	17,600	13,900	13,800	14,600	13,900	14,500	16,000	14,100	14,800
	Potassium (K)	20	µg/g d.w.	22,200	13,900	15,100	15,300	13,400	15,800	20,600	18,700	17,100
	Rubidium (Rb)	0.050	µg/g d.w.	27.6	18.1	20.0	20.4	14.7	23.8	25.4	24.4	24.6
	Selenium (Se)	0.050	µg/g d.w.	8.42	5.25	4.02	4.63	3.91	4.70	4.35	7.68	5.89
	Sodium (Na)	20	µg/g d.w.	4,590	3,160	3,070	2,760	2,460	2,930	4,890	3,240	4,725
	Strontium (Sr)	0.050	µg/g d.w.	0.307	0.620	0.674	0.748	0.551	0.539	0.322	0.35	0.619
	Tellurium (Te)	0.020	µg/g d.w.	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)	0.0020	µg/g d.w.	0.0293	0.0219	0.0256	0.0225	0.0182	0.0246	0.0279	0.0173	0.0181
	Tin (Sn)	0.10	µg/g d.w.	0.24	0.14	0.11	0.15	<0.10	<0.10	0.14	0.53	0.20
	Uranium (U)	0.0020	µg/g d.w.	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)	0.10	µg/g d.w.	0.20	<0.10	0.14	<0.10	<0.10	<0.10	0.46	0.12	<0.10
	Zinc (Zn)	0.50	µg/g d.w.	385	263	335	396	260	364	449	571	312
	Zirconium (Zr)	0.20	µg/g d.w.	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table C.5: Wet weight (w.w.) metal concentrations in fish muscle tissue, Rainy River Project Fish Tissue Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Benchmark[1,2]	Northern Pike															Walleye
					PINR-NP1-M	PINR-NP2-M	PINR-NP3-M	PINR-NP4-M	PINR-NP5-M	PINR-NP7-M	PINR-NP8-M	PINR-NP9-M	PINR-NP10-M	PINR-NP12-M	PINR-NP13-M	PINR-NP14-M	PINR-NP15-M	PINR-NP16-M	PINR-NP17-M	PINR-WA1-M
					1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	3-Oct-2015	3-Oct-2015	1-Oct-2015
% Moisture		0.25	%	-	78.2	77.1	79.6	78.9	76.5	78.0	76.1	78.3	77.3	78.2	78.9	77.0	76.4	79.2	77.8	79.1
Total Metals	Aluminum (Al)	2.0	mg/kg w.w.	-	0.7	1.9	2.7	0.7	0.6	<1.1	<1.2	0.5	<0.45	0.55	0.8	<0.46	<1.2	0.8	0.5	0.5
	Antimony (Sb)	0.010	mg/kg w.w.	0.3	<0.0022	<0.0023	<0.0020	<0.0021	<0.0024	<0.0022	<0.0024	<0.0022	<0.0023	0.0026	<0.0021	<0.0023	<0.0024	<0.0021	<0.0022	<0.0021
	Arsenic (As)	0.020	mg/kg w.w.	0.2	0.126	0.081	0.120	0.064	0.064	0.070	0.081	0.089	0.133	0.089	0.106	0.103	0.088	0.089	0.099	0.102
	Barium (Ba)	0.050	mg/kg w.w.	126	0.041	0.064	0.050	0.033	0.020	0.033	0.036	0.049	0.089	0.012	0.020	0.079	0.025	0.026	0.034	0.018
	Beryllium (Be)	0.010	mg/kg w.w.	1.3	<0.0022	<0.0023	<0.0020	<0.0021	<0.0024	<0.0022	<0.0024	<0.0022	<0.0023	<0.0022	<0.0021	<0.0023	<0.0024	<0.0021	<0.0022	<0.0021
	Bismuth (Bi)	0.010	mg/kg w.w.	-	0.002	<0.0023	<0.0020	0.003	<0.0024	0.002	<0.0024	<0.0022	0.002	0.003	0.003	<0.0023	<0.0024	0.002	0.003	<0.0021
	Boron (B)	1.0	mg/kg w.w.	63.1	<0.22	<0.23	<0.20	<0.21	<0.24	<0.22	<0.24	<0.22	<0.23	<0.22	<0.21	<0.23	<0.24	<0.21	<0.22	<0.21
	Cadmium (Cd)	0.0050	mg/kg w.w.	0.6	<0.0011	<0.0011	<0.0010	<0.0011	<0.0012	<0.0022	<0.0024	<0.0011	<0.0011	<0.0011	0.0012	<0.0012	<0.0024	0.0073	0.0011	<0.0010
	Calcium (Ca)	20	mg/kg w.w.	-	249	309	375	255	175	138	476	265	543	114	144	557	228	129	241	127
	Cesium (Cs)	0.0050	mg/kg w.w.	-	0.0059	0.0047	0.0041	0.0030	0.0040	0.0047	0.0055	0.0030	0.0120	0.0060	0.0092	0.0047	0.0033	0.0084	0.0086	0.0064
	Chromium (Cr)	0.050	mg/kg w.w.	0.6	<0.011	<0.023	0.011	<0.011	<0.012	<0.044	0.09	<0.011	<0.011	<0.011	<0.011	<0.012	0.06	<0.010	<0.039	<0.010
	Cobalt (Co)	0.020	mg/kg w.w.	-	<0.0044	<0.0046	0.004	<0.0042	<0.0047	<0.0044	<0.0048	<0.0043	<0.0045	<0.0044	<0.0042	0.005	<0.0047	<0.0042	<0.0045	<0.0042
	Copper (Cu)	0.10	mg/kg w.w.	57.4	0.17	0.20	0.18	0.16	0.14	0.19	0.27	0.22	0.16	0.13	0.12	0.23	0.19	0.20	0.19	0.15
	Iron (Fe)	3.0	mg/kg w.w.	-	3.2	4.4	3.2	2.1	1.6	2.3	3.2	2.8	3.2	1.1	3.6	1.7	3.7	3.0	2.5	2.2
	Lead (Pb)	0.020	mg/kg w.w.	2.3	0.009	0.012	0.017	0.004	0.005	<0.011	0.014	<0.0043	<0.0045	<0.0044	0.074	<0.005	<0.012	0.005	0.005	0.007
	Lithium (Li)	0.50	mg/kg w.w.	-	<0.11	<0.11	<0.10	<0.11	<0.12	<0.11	<0.12	<0.11	<0.11	<0.11	<0.11	<0.12	<0.12	<0.10	<0.11	<0.10
	Magnesium (Mg)	2.0	mg/kg w.w.	-	329	327	328	340	350	337	437	297	354	328	333	384	359	331	337	368
	Manganese (Mn)	0.050	mg/kg w.w.	76.9	0.35	0.55	0.57	0.28	0.28	0.26	1.02	0.36	0.81	0.19	0.25	0.80	0.35	0.24	0.29	0.163
	Mercury (Hg)	0.0050	mg/kg w.w.	0.5	0.382	0.270	0.386	0.281	0.322	0.148	0.142	0.186	0.288	0.408	0.711	0.145	0.148	0.589	0.731	0.299
	Molybdenum (Mo)	0.020	mg/kg w.w.	3.2	<0.0044	<0.0046	<0.0041	<0.0042	<0.0047	<0.0088	<0.0096	0.005	<0.0045	<0.0044	0.004	<0.0046	<0.0094	0.006	<0.0045	<0.0042
	Nickel (Ni)	0.20	mg/kg w.w.	0.7	<0.044	<0.046	<0.041	<0.042	<0.047	<0.044	<0.048	<0.043	<0.045	<0.044	<0.042	<0.046	<0.047	<0.042	<0.045	<0.042
	Phosphorus (P)	10	mg/kg w.w.	-	2,354	2,473	2,305	2,616	2,773	2,222	2,605	2,322	2,747	2,455	2,384	2,990	2,136	2,350	2,559	2,508
	Potassium (K)	20	mg/kg w.w.	-	3,989	4,191	3,876	4,663	5,006	3,982	4,541	3,993	4,563	4,407	4,199	5,037	3,870	4,222	4,339	4,514
	Rubidium (Rb)	0.050	mg/kg w.w.	-	4.6	4.9	4.2	5.0	4.5	4.9	5.8	4.9	5.5	5.6	4.4	5.5	4.4	5.6	6.2	7.0
	Selenium (Se)	0.050	mg/kg w.w.	3.2	0.24	0.224	0.178	0.173	0.217	0.19	0.19	0.203	0.27	0.176	0.182	0.23	0.26	0.176	0.199	0.29
	Sodium (Na)	20	mg/kg w.w.	-	301	346	292	333	327	277	332	271	245	228	314	288	302	297	257	249
	Strontium (Sr)	0.050	mg/kg w.w.	378	0.176	0.194	0.21	0.161	0.055	0.07	0.18	0.212	0.27	0.033	0.074	0.28	0.15	0.145	0.108	0.047
	Tellurium (Te)	0.020	mg/kg w.w.	-	<0.0044	<0.0046	<0.0041	<0.0042	<0.0047	<0.0044	<0.0048	<0.0043	<0.0045	<0.0044	<0.0042	<0.0046	<0.0047	<0.0042	<0.0045	<0.0042
	Thallium (Tl)	0.0020	mg/kg w.w.	-	0.0029	0.0030	0.0032	0.0035	0.0026	0.0020	0.0027	0.0032	0.0048	0.0041	0.0020	0.0027	0.0021	0.0020	0.0026	0.0051
	Tin (Sn)	0.10	mg/kg w.w.	-	0.14	0.07	0.08	0.06	0.05	0.08	0.03	0.06	0.04	0.08	0.05	0.05	0.03	0.05	0.04	0.08
	Uranium (U)	0.0020	mg/kg w.w.	0.4	<0.00044	<0.00046	<0.00041	<0.00042	<0.00047	<0.00044	<0.00048	<0.00043	<0.00045	<0.00044	<0.00042	<0.00046	<0.00047	<0.00042	<0.00045	0.0005
	Vanadium (V)	0.10	mg/kg w.w.	-	<0.022	<0.023	<0.020	<0.021	<0.024	<0.022	<0.024	<0.022	<0.023	<0.022	<0.021	<0.023	<0.024	<0.021	<0.022	<0.021
	Zinc (Zn)	0.50	mg/kg w.w.	189	4.0	4.2	3.5	3.7	5.4	3.9	4.2	4.2	3.6	2.9	3.9	3.8	4.1	3.1	13.6	3.2
	Zirconium (Zr)	0.20	mg/kg w.w.	-	<0.044	<0.046	<0.041	<0.042	<0.047	<0.044	<0.048	<0.043	<0.045	<0.044	<0.042	<0.046	<0.047	<0.042	<0.045	<0.042

Indicates value greater than benchmark.

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1, MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

Table C.6: Wet weight (w.w.) metal concentrations in fish liver tissue, Rainy River Project Fish Tissue Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Benchmark[1,2]	Northern Pike															Walleye
					PINR-NP1-L	PINR-NP2-L	PINR-NP3-L	PINR-NP4-L	PINR-NP5-L	PINR-NP7-L	PINR-NP8-L	PINR-NP9-L	PINR-NP10-L	PINR-NP12-L	PINR-NP13-L	PINR-NP14-L	PINR-NP15-L	PINR-NP16-L	PINR-NP17-L	PINR-WA1-L
					1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	3-Oct-2015	3-Oct-2015	1-Oct-2015
% Moisture		0.25	%	-	75.5	77.0	75.9	75.5	72.2	60.9	67.4	69.6	66.4	75.0	77.3	60.6	70.4	79.2	71.9	69.4
Total Metals	Aluminum (Al)	2.0	mg/kg w.w.	-	1.0	0.7	0.6	<0.49	0.6	<2.0	<1.6	<1.5	<1.7	0.7	1.5	<2.0	<1.5	0.6	2.6	<1.5
	Antimony (Sb)	0.010	mg/kg w.w.	0.3	<0.0025	0.0025	<0.0024	<0.0025	<0.0028	<0.0039	<0.0033	<0.0030	<0.0034	0.003	0.020	<0.0039	<0.0030	0.010	0.005	<0.0031
	Arsenic (As)	0.020	mg/kg w.w.	0.2	0.070	0.025	0.038	0.025	0.017	0.068	0.041	0.033	0.040	0.029	0.054	0.081	0.071	0.026	0.034	0.060
	Barium (Ba)	0.050	mg/kg w.w.	126	<0.012	<0.012	0.017	<0.012	<0.014	<0.020	<0.016	<0.015	<0.017	<0.013	0.018	<0.020	<0.015	<0.010	<0.014	<0.015
	Beryllium (Be)	0.010	mg/kg w.w.	1.3	<0.0025	<0.0023	<0.0024	<0.0025	<0.0028	<0.0039	<0.0033	<0.0030	<0.0034	<0.0025	<0.0023	<0.0039	<0.0030	<0.0021	<0.0028	<0.0031
	Bismuth (Bi)	0.010	mg/kg w.w.	-	<0.0025	0.0033	0.003	0.003	<0.0028	0.004	<0.0033	<0.0030	<0.0034	0.004	0.012	0.005	<0.0030	0.011	0.009	<0.0031
	Boron (B)	1.0	mg/kg w.w.	63.1	<0.25	<0.23	<0.24	<0.25	<0.28	<0.39	<0.33	<0.30	<0.34	<0.25	<0.23	<0.39	<0.30	<0.21	<0.28	<0.31
	Cadmium (Cd)	0.0050	mg/kg w.w.	0.6	0.061	0.039	0.067	0.0074	0.041	0.028	0.024	0.025	0.095	0.043	0.136	0.027	0.033	0.049	0.129	0.58
	Calcium (Ca)	20	mg/kg w.w.	-	31	34	41	27	35	51	38	40	27	32	65	50	37	37	46	119
	Cesium (Cs)	0.0050	mg/kg w.w.	-	0.0031	0.0049	0.0018	0.0018	0.0020	0.0022	0.0029	0.0019	0.0066	0.0026	0.0030	0.0021	0.0033	0.0063	0.0026	0.0044
	Chromium (Cr)	0.050	mg/kg w.w.	0.6	<0.012	<0.012	<0.012	<0.012	<0.014	<0.078	<0.065	<0.061	<0.067	<0.013	<0.011	0.15	<0.059	<0.010	0.018	<0.061
	Cobalt (Co)	0.020	mg/kg w.w.	-	0.042	0.028	0.057	0.032	0.020	0.035	0.034	0.050	0.035	0.060	0.081	0.055	0.030	0.031	0.063	0.234
	Copper (Cu)	0.10	mg/kg w.w.	57.4	25	12.2	14.2	19.1	9.6	27.7	16.0	34	28.3	20.7	54	48	24.2	17.8	24.6	3.1
	Iron (Fe)	3.0	mg/kg w.w.	-	65	27.6	143	49	15.9	112	62	148	172	28	449	232	95	41	190	120
	Lead (Pb)	0.020	mg/kg w.w.	2.3	0.005	0.010	0.009	<0.005	0.009	<0.020	<0.016	<0.015	<0.017	<0.0050	0.50	<0.020	<0.015	0.006	0.006	<0.015
	Lithium (Li)	0.50	mg/kg w.w.	-	<0.12	<0.12	<0.12	<0.12	<0.14	<0.20	<0.16	<0.15	<0.17	<0.13	<0.11	<0.20	<0.15	<0.10	<0.14	<0.15
	Magnesium (Mg)	2.0	mg/kg w.w.	-	160	155	212	187	187	174	164	178	159	185	187	193	203	154	128	203
	Manganese (Mn)	0.050	mg/kg w.w.	76.9	1.55	2.17	1.63	1.04	0.88	1.40	0.91	1.24	1.52	0.85	1.18	1.33	2.88	2.1	0.91	4.2
	Mercury (Hg)	0.0050	mg/kg w.w.	0.5	0.091	0.142	0.149	0.0894	0.0865	0.0684	0.0587	0.0736	0.0927	0.123	0.386	0.0867	0.0755	0.206	0.362	0.128
	Molybdenum (Mo)	0.020	mg/kg w.w.	3.2	0.121	0.091	0.136	0.137	0.079	0.172	0.146	0.233	0.175	0.135	0.189	0.180	0.144	0.096	0.185	0.132
	Nickel (Ni)	0.20	mg/kg w.w.	0.7	<0.049	<0.046	<0.048	<0.049	<0.056	<0.078	<0.065	<0.061	<0.067	<0.050	<0.045	<0.079	<0.059	<0.042	<0.056	<0.061
	Phosphorus (P)	10	mg/kg w.w.	-	2,818	2,796	3,687	3,406	3,280	2,936	2,474	2,779	2,406	3,475	3,405	2,967	3,197	2,725	2,259	3,152
	Potassium (K)	20	mg/kg w.w.	-	3,259	3,187	3,615	3,063	3,225	2,518	2,536	3,000	2,591	2,825	3,450	2,801	3,197	3,037	2,439	2,751
	Rubidium (Rb)	0.050	mg/kg w.w.	-	7.1	8.0	5.9	5.0	3.8	4.1	5.0	7.7	8.4	5.4	5.4	5.5	6.6	6.8	5.2	4.7
	Selenium (Se)	0.050	mg/kg w.w.	3.2	1.59	1.07	1.61	0.98	0.99	1.70	1.31	1.82	1.74	1.44	2.3	1.49	1.55	1.14	1.91	1.13
	Sodium (Na)	20	mg/kg w.w.	-	620	695	766	541	598	719	743	769	581	563	640	650	654	840	1,000	1,013
	Strontium (Sr)	0.050	mg/kg w.w.	378	0.024	0.022	0.031	0.022	0.022	<0.0391	<0.0326	0.04	<0.0336	0.022	0.035	0.04	<0.0296	0.023	0.045	0.05
	Tellurium (Te)	0.020	mg/kg w.w.	-	<0.0049	<0.0046	<0.0048	<0.0049	<0.0056	<0.0078	<0.0065	<0.0061	<0.0067	<0.0050	<0.0045	<0.0079	<0.0059	0.005	0.007	<0.0061
	Thallium (Tl)	0.0020	mg/kg w.w.	-	0.0036	0.0037	0.0036	0.0040	0.0024	0.0042	0.0028	0.0038	0.0058	0.0048	0.0071	0.0035	0.0041	0.0101	0.0045	0.0161
	Tin (Sn)	0.10	mg/kg w.w.	-	0.04	0.05	0.04	0.13	0.04	0.05	0.08	0.09	0.11	0.11	0.27	0.07	0.12	0.05	0.05	0.20
	Uranium (U)	0.0020	mg/kg w.w.	0.4	<0.00049	<0.00046	<0.00048	<0.00049	<0.00056	<0.00078	<0.00065	<0.00061	<0.00067	<0.00050	0.0010	<0.00079	<0.00059	<0.00042	<0.00056	<0.00061
	Vanadium (V)	0.10	mg/kg w.w.	-	0.17	0.07	0.10	0.04	0.04	0.09	0.04	0.12	0.19	0.09	0.61	0.14	0.09	0.11	0.36	0.05
	Zinc (Zn)	0.50	mg/kg w.w.	189	37	26	43	33	31	51	55	83	57	35	52	60	59	28	52	46
	Zirconium (Zr)	0.20	mg/kg w.w.	-	<0.049	<0.046	<0.048	<0.049	<0.056	<0.078	<0.065	<0.061	<0.067	<0.050	<0.045	<0.079	<0.059	<0.042	<0.056	<0.061

Indicates value greater than benchmark.

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1, MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

Table C.7: Wet weight (w.w.) metal concentrations in fish ovaries, Rainy River Project Fish Tissue Monitoring, 2015.

Parameter		Lowest Detection Limit	Units	Benchmark[1,2]	Northern Pike								
					PINR-NP1-G	PINR-NP2-G	PINR-NP3-G	PINR-NP4-G	PINR-NP5-G	PINR-NP12-G	PINR-NP13-G	PINR-NP15-G	PINR-NP16-G
					1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	1-Oct-2015	2-Oct-2015	2-Oct-2015	2-Oct-2015	3-Oct-2015
% Moisture		0.25	%	-	82.4	75.6	76.8	77.0	74.4	78.4	81.7	77.8	79.2
Total Metals	Aluminum (Al)	2.0	mg/kg w.w.	-	0.5	<0.49	<0.46	<0.46	<0.51	<0.43	0.9	<1.1	0.46
	Antimony (Sb)	0.010	mg/kg w.w.	0.3	<0.0018	0.002	0.002	<0.0023	<0.0026	<0.0022	0.003	<0.0022	0.0021
	Arsenic (As)	0.020	mg/kg w.w.	0.2	0.032	0.034	0.026	0.020	0.017	0.021	0.028	0.023	0.024
	Barium (Ba)	0.050	mg/kg w.w.	126	0.018	0.061	0.134	0.131	0.088	0.076	0.038	0.013	0.048
	Beryllium (Be)	0.010	mg/kg w.w.	1.3	<0.0018	<0.0024	<0.0023	<0.0023	<0.0026	<0.0022	<0.0018	<0.0022	<0.0021
	Bismuth (Bi)	0.010	mg/kg w.w.	-	<0.0018	0.003	<0.0023	<0.0023	<0.0026	0.002	0.003	<0.0022	0.0025
	Boron (B)	1.0	mg/kg w.w.	63.1	<0.18	<0.24	<0.23	<0.23	<0.26	<0.22	<0.18	<0.22	<0.21
	Cadmium (Cd)	0.0050	mg/kg w.w.	0.6	0.0083	0.0071	0.0058	0.0044	0.0091	0.0064	0.0075	0.013	0.0066
	Calcium (Ca)	20	mg/kg w.w.	-	95	166	154	132	142	125	109	127	174
	Cesium (Cs)	0.0050	mg/kg w.w.	-	0.0040	0.0034	0.0026	0.0022	0.0021	0.0036	0.0048	0.0038	0.0048
	Chromium (Cr)	0.050	mg/kg w.w.	0.6	<0.0088	<0.012	<0.012	<0.012	0.030	<0.011	<0.0092	<0.044	<0.010
	Cobalt (Co)	0.020	mg/kg w.w.	-	0.072	0.064	0.067	0.066	0.043	0.087	0.089	0.072	0.047
	Copper (Cu)	0.10	mg/kg w.w.	57.4	0.93	1.15	1.23	1.26	1.21	1.27	1.08	1.49	1.04
	Iron (Fe)	3.0	mg/kg w.w.	-	38	49	58	72	43	51	61	69	52.5
	Lead (Pb)	0.020	mg/kg w.w.	2.3	0.004	<0.0049	<0.0046	<0.0046	<0.0051	<0.0043	0.026	<0.011	0.0043
	Lithium (Li)	0.50	mg/kg w.w.	-	<0.09	<0.12	<0.12	<0.12	<0.13	<0.11	<0.09	<0.11	<0.10
	Magnesium (Mg)	2.0	mg/kg w.w.	-	236	322	278	324	340	309	229	278	273.5
	Manganese (Mn)	0.050	mg/kg w.w.	76.9	26	30	35	56	33	43	23	49	22.4
	Mercury (Hg)	0.0050	mg/kg w.w.	0.5	0.0282	0.0238	0.0299	0.0175	0.0193	0.0192	0.0666	0.0197	0.0545
	Molybdenum (Mo)	0.020	mg/kg w.w.	3.2	0.046	0.039	0.048	0.045	0.034	0.046	0.051	0.038	0.028
	Nickel (Ni)	0.20	mg/kg w.w.	0.7	<0.035	<0.049	<0.046	<0.046	<0.051	<0.043	<0.037	<0.044	<0.042
	Phosphorus (P)	10	mg/kg w.w.	-	3,098	3,392	3,202	3,358	3,558	3,132	2,928	3,130	3,078
	Potassium (K)	20	mg/kg w.w.	-	3,907	3,392	3,503	3,519	3,430	3,413	3,770	4,151	3,557
	Rubidium (Rb)	0.050	mg/kg w.w.	-	4.9	4.4	4.6	4.7	3.8	5.1	4.6	5.4	5.12
	Selenium (Se)	0.050	mg/kg w.w.	3.2	1.48	1.28	0.93	1.06	1.00	1.02	0.80	1.70	1.22
	Sodium (Na)	20	mg/kg w.w.	-	808	771	712	635	630	633	895	719	982.8
	Strontium (Sr)	0.050	mg/kg w.w.	378	0.054	0.151	0.156	0.172	0.141	0.116	0.059	0.08	0.129
	Tellurium (Te)	0.020	mg/kg w.w.	-	<0.0035	<0.0049	<0.0046	<0.0046	<0.0051	<0.0043	<0.0037	<0.0044	<0.0042
	Thallium (Tl)	0.0020	mg/kg w.w.	-	0.0052	0.0053	0.0059	0.0052	0.0047	0.0053	0.0051	0.0038	0.00375
	Tin (Sn)	0.10	mg/kg w.w.	-	0.04	0.03	0.03	0.03	<0.0256	<0.0216	0.03	0.12	0.041
	Uranium (U)	0.0020	mg/kg w.w.	0.4	<0.00035	<0.00049	<0.00046	<0.00046	<0.00051	<0.00043	<0.00037	<0.00044	<0.00042
	Vanadium (V)	0.10	mg/kg w.w.	-	0.04	<0.024	0.03	<0.023	<0.026	<0.022	0.08	0.03	0.0208
	Zinc (Zn)	0.50	mg/kg w.w.	189	68	64	78	91	67	79	82	127	64.8
	Zirconium (Zr)	0.20	mg/kg w.w.	-	<0.035	<0.049	<0.046	<0.046	<0.051	<0.043	<0.037	<0.044	<0.042

Indicates value greater than benchmark.

[1] Mercury guideline for women of child-bearing age and children under 15 (see Table 2.1, MOECC 2015).

[2] See Table 2.2 for Consumption Benchmark References.

MINNOW ENVIRONMENTAL INC.
ATTN: Jess Tester
2 Lamb Street
Georgetown ON L7G 3M9

Date Received: 19-NOV-15
Report Date: 18-FEB-16 16:28 (MT)
Version: FINAL REV. 2

Client Phone: 905-873-3371

Certificate of Analysis

Lab Work Order #: L1704817
Project P.O. #: NOT SUBMITTED
Job Reference: 157202.0075
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 17-FEB-16 16:10

18-FEB-2016 Revision 2: This revision includes additional iron data obtained via re-analysis of the sample ALS identify as L1704817-7 as requested.

Can Dang
Senior Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-1	L1704817-2	L1704817-3	L1704817-4	L1704817-5
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	01-OCT-15	01-OCT-15	01-OCT-15	01-OCT-15	01-OCT-15
	Sampled Time					
	Client ID	PINR-NP1-M	PINR-NP2-M	PINR-NP3-M	PINR-NP4-M	PINR-NP5-M
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	78.2	77.1	79.6	78.9	76.5
Metals	Aluminum (Al)-Total (mg/kg)	3.3	8.3	13.0	3.2	2.7
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.576	0.355	0.586	0.304	0.271
	Barium (Ba)-Total (mg/kg)	0.187	0.279	0.243	0.157	0.085
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	0.010	<0.010	<0.010	0.012	<0.010
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Total (mg/kg)	1140	1350	1840	1210	744
	Cesium (Cs)-Total (mg/kg)	0.0269	0.0205	0.0203	0.0140	0.0169
	Chromium (Cr)-Total (mg/kg)	<0.050	<0.10 DLB	0.056	<0.050	<0.050
	Cobalt (Co)-Total (mg/kg)	<0.020	<0.020	0.022	<0.020	<0.020
	Copper (Cu)-Total (mg/kg)	0.76	0.86	0.86	0.75	0.60
	Iron (Fe)-Total (mg/kg)	14.5	19.0	15.7	10.0	6.6
	Lead (Pb)-Total (mg/kg)	0.039	0.052	0.084	0.021	0.023
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	1510	1430	1610	1610	1490
	Manganese (Mn)-Total (mg/kg)	1.59	2.40	2.79	1.35	1.19
	Mercury (Hg)-Total (mg/kg)	1.75	1.18	1.89	1.33	1.37
	Molybdenum (Mo)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	10800	10800	11300	12400	11800
	Potassium (K)-Total (mg/kg)	18300	18300	19000	22100	21300
	Rubidium (Rb)-Total (mg/kg)	20.9	21.3	20.7	23.6	19.3
	Selenium (Se)-Total (mg/kg)	1.08	0.979	0.873	0.821	0.925
	Sodium (Na)-Total (mg/kg)	1380	1510	1430	1580	1390
	Strontium (Sr)-Total (mg/kg)	0.806	0.849	1.01	0.762	0.232
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0134	0.0130	0.0156	0.0167	0.0109
	Tin (Sn)-Total (mg/kg)	0.65	0.32	0.37	0.28	0.23
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Zinc (Zn)-Total (mg/kg)	18.5	18.5	17.1	17.6	23.1
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-6	L1704817-7	L1704817-8	L1704817-9	L1704817-10
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	01-OCT-15	01-OCT-15	02-OCT-15	02-OCT-15	02-OCT-15
	Sampled Time					
	Client ID	PINR-NP7-M	PINR-NP8-M	PINR-NP9-M	PINR-NP10-M	PINR-NP12-M
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	78.0	76.1	78.3	77.3	78.8
Metals	Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	2.2	<2.0	<2.0
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.320	0.337	0.412	0.585	0.419
	Barium (Ba)-Total (mg/kg)	0.151	0.149	0.226	0.392	0.060
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	0.010	<0.010	<0.010	0.010	0.011
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	<0.010	<0.010	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Total (mg/kg)	628	1990	1220	2390	675
	Cesium (Cs)-Total (mg/kg)	0.0214	0.0232	0.0137	0.0530	0.0288
	Chromium (Cr)-Total (mg/kg)	<0.20	0.37	<0.050	<0.050	<0.050
	Cobalt (Co)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Copper (Cu)-Total (mg/kg)	0.86	1.15	1.02	0.69	0.59
	Iron (Fe)-Total (mg/kg)	10.3	109	13.0	14.3	4.9
	Lead (Pb)-Total (mg/kg)	<0.050	0.059	<0.020	<0.020	<0.020
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	1530	1830	1370	1560	1570
	Manganese (Mn)-Total (mg/kg)	1.17	4.28	1.66	3.58	1.04
	Mercury (Hg)-Total (mg/kg)	0.671	0.594	0.858	1.27	1.85
	Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	0.023	<0.020	<0.020
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	10100	10900	10700	12100	11800
	Potassium (K)-Total (mg/kg)	18100	19000	18400	20100	21300
	Rubidium (Rb)-Total (mg/kg)	22.2	24.2	22.4	24.1	26.2
	Selenium (Se)-Total (mg/kg)	0.85	0.81	0.934	1.17	0.826
	Sodium (Na)-Total (mg/kg)	1260	1390	1250	1080	1120
	Strontium (Sr)-Total (mg/kg)	0.32	0.75	0.979	1.19	0.218
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0091	0.0113	0.0147	0.0212	0.0147
	Tin (Sn)-Total (mg/kg)	0.38	0.14	0.27	0.18	0.21
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Zinc (Zn)-Total (mg/kg)	17.6	17.6	19.5	15.9	14.4
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-11	L1704817-12	L1704817-13	L1704817-14	L1704817-15
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	02-OCT-15	02-OCT-15	02-OCT-15	03-OCT-15	03-OCT-15
	Sampled Time					
	Client ID	PINR-NP13-M	PINR-NP14-M	PINR-NP15-M	PINR-NP16-M	PINR-NP17-M
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	78.9	77.0	76.4	79.2	77.7
Metals	Aluminum (Al)-Total (mg/kg)	3.8	<2.0	<5.0	3.9	2.2
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.502	0.448	0.373	0.429	0.457
	Barium (Ba)-Total (mg/kg)	0.096	0.343	0.105	0.124	0.240
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	0.015	<0.010	<0.010	0.011	0.014
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	0.0055	<0.0050	<0.010	0.0352	<0.0050
	Calcium (Ca)-Total (mg/kg)	681	2420	968	618	1740
	Cesium (Cs)-Total (mg/kg)	0.0437	0.0206	0.0141	0.0406	0.0393
	Chromium (Cr)-Total (mg/kg)	<0.050	<0.050	0.25	<0.050	<0.20
	Cobalt (Co)-Total (mg/kg)	<0.020	0.022	<0.020	<0.020	<0.020
	Copper (Cu)-Total (mg/kg)	0.58	1.00	0.81	0.98	0.88
	Iron (Fe)-Total (mg/kg)	17.0	7.5	15.6	14.2	14.5
	Lead (Pb)-Total (mg/kg)	0.353	<0.020	<0.050	0.022	0.021
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	1580	1670	1520	1590	1560
	Manganese (Mn)-Total (mg/kg)	1.19	3.48	1.48	1.14	2.06
	Mercury (Hg)-Total (mg/kg)	3.37	0.629	0.628	2.83	3.21
	Molybdenum (Mo)-Total (mg/kg)	0.021	<0.020	<0.040	0.031	<0.020
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	11300	13000	9050	11300	11900
	Potassium (K)-Total (mg/kg)	19900	21900	16400	20300	19700
	Rubidium (Rb)-Total (mg/kg)	20.7	23.9	18.6	26.7	28.0
	Selenium (Se)-Total (mg/kg)	0.861	1.00	1.12	0.846	0.888
	Sodium (Na)-Total (mg/kg)	1490	1250	1280	1430	1210
	Strontium (Sr)-Total (mg/kg)	0.351	1.23	0.63	0.697	0.834
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0097	0.0117	0.0090	0.0097	0.0115
	Tin (Sn)-Total (mg/kg)	0.26	0.20	0.14	0.23	0.15
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Zinc (Zn)-Total (mg/kg)	18.4	16.7	17.5	14.8	61.7
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-16	L1704817-17	L1704817-18	L1704817-19	L1704817-20
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	03-OCT-15	02-OCT-15	01-OCT-15	01-OCT-15	01-OCT-15
	Sampled Time					
	Client ID	PINR-NPX-M	PINR-NPY-M	PINR-NP1-L	PINR-NP2-L	PINR-NP3-L
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	77.8	77.5	75.5	75.2	75.9
Metals	Aluminum (Al)-Total (mg/kg)	<2.0	3.0	3.9	2.7	2.5
	Antimony (Sb)-Total (mg/kg)	<0.010	0.014	<0.010	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.437	0.392	0.286	0.123	0.159
	Barium (Ba)-Total (mg/kg)	0.063	<0.050	<0.050	<0.050	0.069
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	0.016	0.020	<0.010	<0.010	0.011
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	<0.0050	<0.0050	0.251	0.154	0.279
	Calcium (Ca)-Total (mg/kg)	426	380	126	142	171
	Cesium (Cs)-Total (mg/kg)	0.0377	0.0266	0.0127	0.0179	0.0073
	Chromium (Cr)-Total (mg/kg)	<0.15 DLB	<0.050	<0.050	<0.050	<0.050
	Cobalt (Co)-Total (mg/kg)	<0.020	<0.020	0.171	0.122	0.236
	Copper (Cu)-Total (mg/kg)	0.81	0.58	101	42.7	59.1
	Iron (Fe)-Total (mg/kg)	7.9	5.5	266	74.1	594
	Lead (Pb)-Total (mg/kg)	<0.020	<0.020	0.021	0.067	0.037
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	1470	1440	654	700	878
	Manganese (Mn)-Total (mg/kg)	0.587	0.729	6.34	9.94	6.76
	Mercury (Hg)-Total (mg/kg)	3.36	1.88	0.372	0.372	0.620
	Molybdenum (Mo)-Total (mg/kg)	<0.020	<0.020	0.495	0.419	0.565
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	11100	10700	11500	12800	15300
	Potassium (K)-Total (mg/kg)	19300	19100	13300	14500	15000
	Rubidium (Rb)-Total (mg/kg)	27.3	24.9	28.8	38.9	24.5
	Selenium (Se)-Total (mg/kg)	0.901	0.782	6.51	4.65	6.68
	Sodium (Na)-Total (mg/kg)	1100	970	2530	2340	3180
	Strontium (Sr)-Total (mg/kg)	0.135	0.087	0.096	0.093	0.129
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0115	0.0224	0.0148	0.0164	0.0150
	Tin (Sn)-Total (mg/kg)	0.22	0.52	0.16	0.27	0.17
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	0.71	0.19	0.43
	Zinc (Zn)-Total (mg/kg)	60.7	12.5	153	114	179
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-21	L1704817-22	L1704817-23	L1704817-24	L1704817-25
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	01-OCT-15	01-OCT-15	01-OCT-15	01-OCT-15	02-OCT-15
	Sampled Time					
	Client ID	PINR-NP4-L	PINR-NP5-L	PINR-NP7-L	PINR-NP8-L	PINR-NP9-L
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	75.5	72.2	60.9	67.4	69.6
Metals	Aluminum (Al)-Total (mg/kg)	<2.0	2.1	<5.0	<5.0	<5.0
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.104	0.062	0.175	0.125	0.110
	Barium (Ba)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	0.012	<0.010	0.010	<0.010	<0.010
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	0.0304	0.148	0.072	0.073	0.083
	Calcium (Ca)-Total (mg/kg)	109	126	130	118	131
	Cesium (Cs)-Total (mg/kg)	0.0072	0.0073	0.0056	0.0090	0.0064
	Chromium (Cr)-Total (mg/kg)	<0.050	<0.050	<0.20	<0.20	<0.20
	Cobalt (Co)-Total (mg/kg)	0.130	0.071	0.090	0.103	0.163
	Copper (Cu)-Total (mg/kg)	78.0	34.7	70.9	49.0	111
	Iron (Fe)-Total (mg/kg)	202	57.1	286	189	486
	Lead (Pb)-Total (mg/kg)	<0.020	0.032	<0.050	<0.050	<0.050
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	763	671	446	502	587
	Manganese (Mn)-Total (mg/kg)	4.23	3.18	3.57	2.79	4.08
	Mercury (Hg)-Total (mg/kg)	0.365	0.311	0.175	0.180	0.242
	Molybdenum (Mo)-Total (mg/kg)	0.560	0.285	0.439	0.448	0.768
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	13900	11800	7510	7590	9140
	Potassium (K)-Total (mg/kg)	12500	11600	6440	7780	9870
	Rubidium (Rb)-Total (mg/kg)	20.3	13.5	10.4	15.3	25.2
	Selenium (Se)-Total (mg/kg)	4.02	3.56	4.35	4.02	5.99
	Sodium (Na)-Total (mg/kg)	2210	2150	1840	2280	2530
	Strontium (Sr)-Total (mg/kg)	0.089	0.080	<0.10	<0.10	0.13
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0164	0.0087	0.0108	0.0087	0.0125
	Tin (Sn)-Total (mg/kg)	0.53	0.15	0.14	0.24	0.28
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	0.16	0.16	0.22	0.12	0.41
	Zinc (Zn)-Total (mg/kg)	135	112	131	169	274
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-26	L1704817-27	L1704817-28	L1704817-29	L1704817-30
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	02-OCT-15	02-OCT-15	02-OCT-15	02-OCT-15	02-OCT-15
	Sampled Time					
	Client ID	PINR-NP10-L	PINR-NP12-L	PINR-NP13-L	PINR-NP14-L	PINR-NP15-L
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	66.4	75.0	77.3	60.6	70.4
Metals	Aluminum (Al)-Total (mg/kg)	<5.0	2.6	6.5	<5.0	<5.0
	Antimony (Sb)-Total (mg/kg)	<0.010	0.010	0.088	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.118	0.114	0.237	0.206	0.239
	Barium (Ba)-Total (mg/kg)	<0.050	<0.050	0.080	<0.050	<0.050
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	<0.010	0.016	0.051	0.012	<0.010
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	0.282	0.170	0.600	0.069	0.112
	Calcium (Ca)-Total (mg/kg)	81	126	285	126	126
	Cesium (Cs)-Total (mg/kg)	0.0196	0.0104	0.0132	0.0054	0.0110
	Chromium (Cr)-Total (mg/kg)	<0.20	<0.050	<0.050	0.37	<0.20
	Cobalt (Co)-Total (mg/kg)	0.104	0.240	0.357	0.139	0.100
	Copper (Cu)-Total (mg/kg)	84.2	82.8	238	121	81.7
	Iron (Fe)-Total (mg/kg)	513	112	1980	588	320
	Lead (Pb)-Total (mg/kg)	<0.050	<0.020	2.21	<0.050	<0.050
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	472	738	825	491	686
	Manganese (Mn)-Total (mg/kg)	4.51	3.38	5.21	3.37	9.74
	Mercury (Hg)-Total (mg/kg)	0.276	0.493	1.70	0.220	0.255
	Molybdenum (Mo)-Total (mg/kg)	0.522	0.541	0.834	0.458	0.488
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	7160	13900	15000	7530	10800
	Potassium (K)-Total (mg/kg)	7710	11300	15200	7110	10800
	Rubidium (Rb)-Total (mg/kg)	25.1	21.6	23.6	14.0	22.4
	Selenium (Se)-Total (mg/kg)	5.19	5.77	10.3	3.78	5.23
	Sodium (Na)-Total (mg/kg)	1730	2250	2820	1650	2210
	Strontium (Sr)-Total (mg/kg)	<0.10	0.088	0.153	0.10	<0.10
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0173	0.0191	0.0311	0.0089	0.0140
	Tin (Sn)-Total (mg/kg)	0.34	0.42	1.20	0.19	0.41
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	0.0046	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	0.56	0.34	2.67	0.36	0.32
	Zinc (Zn)-Total (mg/kg)	171	138	231	153	199
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-31	L1704817-32	L1704817-33	L1704817-34	L1704817-35
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	03-OCT-15	03-OCT-15	03-OCT-15	01-OCT-15	01-OCT-15
	Sampled Time					
	Client ID	PINR-NP16-L	PINR-NP17-L	PINR-NPX-L	PINR-NP1-G	PINR-NP2-G
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	79.2	71.9	78.8	82.4	75.6
Metals	Aluminum (Al)-Total (mg/kg)	3.1	9.1	3.4	3.1	<2.0
	Antimony (Sb)-Total (mg/kg)	0.046	0.017	0.012	<0.010	0.010
	Arsenic (As)-Total (mg/kg)	0.126	0.121	0.092	0.184	0.139
	Barium (Ba)-Total (mg/kg)	<0.050	<0.050	<0.050	0.102	0.251
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	0.054	0.031	0.019	<0.010	0.011
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	0.237	0.458	0.192	0.0472	0.0292
	Calcium (Ca)-Total (mg/kg)	180	163	158	537	681
	Cesium (Cs)-Total (mg/kg)	0.0302	0.0093	0.0250	0.0227	0.0138
	Chromium (Cr)-Total (mg/kg)	<0.050	0.065	<0.050	<0.050	<0.050
	Cobalt (Co)-Total (mg/kg)	0.149	0.224	0.124	0.408	0.261
	Copper (Cu)-Total (mg/kg)	85.5	87.5	65.2	5.26	4.72
	Iron (Fe)-Total (mg/kg)	198	675	174	218	201
	Lead (Pb)-Total (mg/kg)	0.027	0.022	<0.020	0.023	<0.020
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	742	457	642	1340	1320
	Manganese (Mn)-Total (mg/kg)	10.2	3.24	8.83	149	122
	Mercury (Hg)-Total (mg/kg)	0.992	1.29	0.908	0.160	0.0976
	Molybdenum (Mo)-Total (mg/kg)	0.462	0.660	0.370	0.264	0.158
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	13100	8040	11400	17600	13900
	Potassium (K)-Total (mg/kg)	14600	8680	13100	22200	13900
	Rubidium (Rb)-Total (mg/kg)	32.9	18.6	29.8	27.6	18.1
	Selenium (Se)-Total (mg/kg)	5.48	6.81	4.66	8.42	5.25
	Sodium (Na)-Total (mg/kg)	4040	3560	3820	4590	3160
	Strontium (Sr)-Total (mg/kg)	0.112	0.159	0.097	0.307	0.620
	Tellurium (Te)-Total (mg/kg)	0.024	0.025	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0487	0.0159	0.0158	0.0293	0.0219
	Tin (Sn)-Total (mg/kg)	0.24	0.17	0.20	0.24	0.14
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	0.55	1.28	0.46	0.20	<0.10
	Zinc (Zn)-Total (mg/kg)	135	184	112	385	263
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-36	L1704817-37	L1704817-38	L1704817-39	L1704817-40
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	01-OCT-15	01-OCT-15	01-OCT-15	02-OCT-15	02-OCT-15
	Sampled Time					
	Client ID	PINR-NP3-G	PINR-NP4-G	PINR-NP5-G	PINR-NP12-G	PINR-NP13-G
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	76.8	77.0	74.4	78.4	81.7
Metals	Aluminum (Al)-Total (mg/kg)	<2.0	<2.0	<2.0	<2.0	5.1
	Antimony (Sb)-Total (mg/kg)	0.010	<0.010	<0.010	<0.010	0.016
	Arsenic (As)-Total (mg/kg)	0.113	0.085	0.068	0.099	0.155
	Barium (Ba)-Total (mg/kg)	0.576	0.570	0.344	0.352	0.208
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.010	0.014
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	0.0249	0.0190	0.0356	0.0295	0.0409
	Calcium (Ca)-Total (mg/kg)	663	576	555	577	594
	Cesium (Cs)-Total (mg/kg)	0.0111	0.0094	0.0083	0.0166	0.0264
	Chromium (Cr)-Total (mg/kg)	<0.050	<0.050	0.116	<0.050	<0.050
	Cobalt (Co)-Total (mg/kg)	0.289	0.287	0.169	0.403	0.484
	Copper (Cu)-Total (mg/kg)	5.32	5.49	4.72	5.86	5.92
	Iron (Fe)-Total (mg/kg)	252	311	168	237	333
	Lead (Pb)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	0.140
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	1200	1410	1330	1430	1250
	Manganese (Mn)-Total (mg/kg)	153	245	130	198	128
	Mercury (Hg)-Total (mg/kg)	0.129	0.0762	0.0752	0.0889	0.364
	Molybdenum (Mo)-Total (mg/kg)	0.205	0.197	0.132	0.211	0.277
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	13800	14600	13900	14500	16000
	Potassium (K)-Total (mg/kg)	15100	15300	13400	15800	20600
	Rubidium (Rb)-Total (mg/kg)	20.0	20.4	14.7	23.8	25.4
	Selenium (Se)-Total (mg/kg)	4.02	4.63	3.91	4.70	4.35
	Sodium (Na)-Total (mg/kg)	3070	2760	2460	2930	4890
	Strontium (Sr)-Total (mg/kg)	0.674	0.748	0.551	0.539	0.322
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0256	0.0225	0.0182	0.0246	0.0279
	Tin (Sn)-Total (mg/kg)	0.11	0.15	<0.10	<0.10	0.14
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Vanadium (V)-Total (mg/kg)	0.14	<0.10	<0.10	<0.10	0.46
	Zinc (Zn)-Total (mg/kg)	335	396	260	364	449
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-41	L1704817-42	L1704817-43	L1704817-44	L1704817-45
	Description	Tissue	Tissue	Tissue	Tissue	Tissue
	Sampled Date	02-OCT-15	03-OCT-15	03-OCT-15	01-OCT-15	01-OCT-15
	Sampled Time					
	Client ID	PINR-NP15-G	PINR-NP16-G	PINR-NPX-G	PINR-WA1-M	PINR-WA1-L
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	77.8	79.2	79.2	79.1	69.4
Metals	Aluminum (Al)-Total (mg/kg)	<5.0	2.4	<2.0	2.4	<5.0
	Antimony (Sb)-Total (mg/kg)	<0.010	0.010	<0.010	<0.010	<0.010
	Arsenic (As)-Total (mg/kg)	0.105	0.113	0.115	0.489	0.197
	Barium (Ba)-Total (mg/kg)	0.060	0.241	0.220	0.087	<0.050
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg)	<0.010	0.013	0.011	<0.010	<0.010
	Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Cd)-Total (mg/kg)	0.060	0.0293	0.0341	<0.0050	1.90
	Calcium (Ca)-Total (mg/kg)	572	1020	656	607	388
	Cesium (Cs)-Total (mg/kg)	0.0173	0.0241	0.0217	0.0306	0.0145
	Chromium (Cr)-Total (mg/kg)	<0.20	<0.050	<0.050	<0.050	<0.20
	Cobalt (Co)-Total (mg/kg)	0.323	0.223	0.226	<0.020	0.764
	Copper (Cu)-Total (mg/kg)	6.69	4.88	5.11	0.70	10.2
	Iron (Fe)-Total (mg/kg)	309	252	253	10.3	393
	Lead (Pb)-Total (mg/kg)	<0.050	0.021	<0.020	0.032	<0.050
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Magnesium (Mg)-Total (mg/kg)	1250	1290	1340	1760	665
	Manganese (Mn)-Total (mg/kg)	222	104	111	0.778	13.8
	Mercury (Hg)-Total (mg/kg)	0.0889	0.256	0.268	1.43	0.419
	Molybdenum (Mo)-Total (mg/kg)	0.173	0.137	0.136	<0.020	0.433
	Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Phosphorus (P)-Total (mg/kg)	14100	14600	15000	12000	10300
	Potassium (K)-Total (mg/kg)	18700	17300	16900	21600	8990
	Rubidium (Rb)-Total (mg/kg)	24.4	24.9	24.3	33.4	15.5
	Selenium (Se)-Total (mg/kg)	7.68	5.93	5.84	1.41	3.68
	Sodium (Na)-Total (mg/kg)	3240	4510	4940	1190	3310
	Strontium (Sr)-Total (mg/kg)	0.35	0.710	0.528	0.225	0.17
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Thallium (Tl)-Total (mg/kg)	0.0173	0.0185	0.0176	0.0245	0.0525
	Tin (Sn)-Total (mg/kg)	0.53	0.17	0.22	0.39	0.64
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	0.0025	<0.0020
	Vanadium (V)-Total (mg/kg)	0.12	<0.10	<0.10	<0.10	0.15
	Zinc (Zn)-Total (mg/kg)	571	312	311	15.1	149
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1704817-46				
	Description	Tissue				
	Sampled Date	01-OCT-15				
	Sampled Time					
	Client ID	PINR-NP8-M (RECHECK)				
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	76.1 RRV				
Metals	Aluminum (Al)-Total (mg/kg)					
	Antimony (Sb)-Total (mg/kg)					
	Arsenic (As)-Total (mg/kg)					
	Barium (Ba)-Total (mg/kg)					
	Beryllium (Be)-Total (mg/kg)					
	Bismuth (Bi)-Total (mg/kg)					
	Boron (B)-Total (mg/kg)					
	Cadmium (Cd)-Total (mg/kg)					
	Calcium (Ca)-Total (mg/kg)					
	Cesium (Cs)-Total (mg/kg)					
	Chromium (Cr)-Total (mg/kg)					
	Cobalt (Co)-Total (mg/kg)					
	Copper (Cu)-Total (mg/kg)					
	Iron (Fe)-Total (mg/kg)	13.2				
	Lead (Pb)-Total (mg/kg)					
	Lithium (Li)-Total (mg/kg)					
	Magnesium (Mg)-Total (mg/kg)					
	Manganese (Mn)-Total (mg/kg)					
	Mercury (Hg)-Total (mg/kg)					
	Molybdenum (Mo)-Total (mg/kg)					
	Nickel (Ni)-Total (mg/kg)					
	Phosphorus (P)-Total (mg/kg)					
	Potassium (K)-Total (mg/kg)					
	Rubidium (Rb)-Total (mg/kg)					
	Selenium (Se)-Total (mg/kg)					
	Sodium (Na)-Total (mg/kg)					
	Strontium (Sr)-Total (mg/kg)					
	Tellurium (Te)-Total (mg/kg)					
	Thallium (Tl)-Total (mg/kg)					
	Tin (Sn)-Total (mg/kg)					
	Uranium (U)-Total (mg/kg)					
	Vanadium (V)-Total (mg/kg)					
	Zinc (Zn)-Total (mg/kg)					
	Zirconium (Zr)-Total (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Arsenic (As)-Total	DUP-H	L1704817-13, -23, -24, -25, -26, -29, -30, -41, -45, -6, -7
Duplicate	Calcium (Ca)-Total	DUP-H	L1704817-13, -23, -24, -25, -26, -29, -30, -41, -45, -6, -7
Duplicate	Manganese (Mn)-Total	DUP-H	L1704817-13, -23, -24, -25, -26, -29, -30, -41, -45, -6, -7
Duplicate	Strontium (Sr)-Total	DUP-H	L1704817-13, -23, -24, -25, -26, -29, -30, -41, -45, -6, -7
Duplicate	Vanadium (V)-Total	DUP-H	L1704817-13, -23, -24, -25, -26, -29, -30, -41, -45, -6, -7
Duplicate	Barium (Ba)-Total	DUP-H	L1704817-13, -23, -24, -25, -26, -29, -30, -41, -45, -6, -7
Certified Reference Material	Chromium (Cr)-Total	RM-H	L1704817-1, -10, -11, -12, -14, -16, -18, -19, -2, -21, -3, -4, -5, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
RM-H	Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-DRY-CVAFS-N-VA	Tissue	Mercury in Tissue by CVAFS (DRY)	EPA 200.3, EPA 245.7

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

HG-DRY-MICR-CVAF-VA	Tissue	Mercury in Tissue by CVAFS Micro (DRY)	EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

MET-DRY-CCMS-N-VA	Tissue	Metals in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020A

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-DRY-MICR-HRMS-VA	Tissue	Metals in Tissue by HR-ICPMS Micro (DRY)	EPA 200.3/200.8

Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on dry weight basis.

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MOISTURE-TISS-VA	Tissue	% Moisture in Tissues	ASTM D2974-00 Method A

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

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

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

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DRY-CVAFS-N-VA	**Tissue**							
Batch R3334433								
WG2231245-5 CRM		**VA-NRC-TORT3**						
Mercury (Hg)-Total			86.0		%		70-130	15-DEC-15
WG2231245-6 CRM		**VA-NIST-1566B**						
Mercury (Hg)-Total			102.7		%		70-130	15-DEC-15
WG2231245-3 DUP		**L1704817-22**						
Mercury (Hg)-Total		0.311	0.311		mg/kg	0.1	40	15-DEC-15
WG2231245-7 LCS								
Mercury (Hg)-Total			109.4		%		70-130	15-DEC-15
WG2231245-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	15-DEC-15
WG2231245-2 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	15-DEC-15
Batch R3342534								
WG2235323-3 CRM		**VA-NIST-1566B**						
Mercury (Hg)-Total			84.9		%		70-130	21-DEC-15
WG2235323-2 DUP		**L1704817-31**						
Mercury (Hg)-Total		0.992	0.824		mg/kg	18	40	21-DEC-15
WG2235323-4 LCS								
Mercury (Hg)-Total			101.0		%		70-130	21-DEC-15
WG2235323-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	21-DEC-15
HG-DRY-MICR-CVAF-VA	**Tissue**							
Batch R3335894								
WG2228104-4 CRM		**VA-NIST-1566B**						
Mercury (Hg)-Total			90.0		%		70-130	16-DEC-15
WG2228104-3 DUP		**L1704817-6**						
Mercury (Hg)-Total		0.671	0.680		mg/kg	1.3	30	16-DEC-15
WG2228104-5 LCS								
Mercury (Hg)-Total			103.2		%		70-130	16-DEC-15
WG2228104-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	16-DEC-15
WG2228104-2 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	16-DEC-15
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3334294								
WG2231245-5 CRM		**VA-NRC-TORT3**						
Arsenic (As)-Total			101.9		%		70-130	15-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3334294								
WG2231245-5 CRM		**VA-NRC-TORT3**						
Cadmium (Cd)-Total			91.7		%		70-130	15-DEC-15
Cobalt (Co)-Total			95.5		%		70-130	15-DEC-15
Copper (Cu)-Total			91.9		%		70-130	15-DEC-15
Iron (Fe)-Total			101.3		%		70-130	15-DEC-15
Lead (Pb)-Total			93.1		%		70-130	15-DEC-15
Manganese (Mn)-Total			87.9		%		70-130	15-DEC-15
Molybdenum (Mo)-Total			94.5		%		70-130	15-DEC-15
Nickel (Ni)-Total			117.9		%		70-130	15-DEC-15
Selenium (Se)-Total			89.7		%		70-130	15-DEC-15
Strontium (Sr)-Total			88.6		%		70-130	15-DEC-15
Vanadium (V)-Total			92.4		%		70-130	15-DEC-15
Zinc (Zn)-Total			88.6		%		70-130	15-DEC-15
WG2231245-6 CRM		**VA-NIST-1566B**						
Antimony (Sb)-Total			0.009		mg/kg		0-0.018	15-DEC-15
Arsenic (As)-Total			100.8		%		70-130	15-DEC-15
Barium (Ba)-Total			100.7		%		70-130	15-DEC-15
Boron (B)-Total			104.1		%		70-130	15-DEC-15
Cadmium (Cd)-Total			102.5		%		70-130	15-DEC-15
Calcium (Ca)-Total			98.2		%		70-130	15-DEC-15
Chromium (Cr)-Total			102.5		%		70-130	15-DEC-15
Cobalt (Co)-Total			98.3		%		70-130	15-DEC-15
Copper (Cu)-Total			97.9		%		70-130	15-DEC-15
Iron (Fe)-Total			102.0		%		70-130	15-DEC-15
Lead (Pb)-Total			106.6		%		70-130	15-DEC-15
Magnesium (Mg)-Total			99.2		%		70-130	15-DEC-15
Manganese (Mn)-Total			97.8		%		70-130	15-DEC-15
Molybdenum (Mo)-Total			105.5		%		70-130	15-DEC-15
Nickel (Ni)-Total			106.8		%		70-130	15-DEC-15
Phosphorus (P)-Total			109.2		%		70-130	15-DEC-15
Potassium (K)-Total			100.5		%		70-130	15-DEC-15
Rubidium (Rb)-Total			103.2		%		70-130	15-DEC-15
Selenium (Se)-Total			102.1		%		70-130	15-DEC-15
Sodium (Na)-Total			95.6		%		70-130	15-DEC-15
Strontium (Sr)-Total			92.9		%		70-130	15-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3334294								
WG2231245-6 CRM		**VA-NIST-1566B**						
Uranium (U)-Total			99.6		%		70-130	15-DEC-15
Vanadium (V)-Total			100.2		%		70-130	15-DEC-15
Zinc (Zn)-Total			96.4		%		70-130	15-DEC-15
WG2231245-7 LCS								
Aluminum (Al)-Total			102.6		%		70-130	15-DEC-15
Antimony (Sb)-Total			105.7		%		70-130	15-DEC-15
Arsenic (As)-Total			103.1		%		70-130	15-DEC-15
Barium (Ba)-Total			102.7		%		70-130	15-DEC-15
Beryllium (Be)-Total			100.1		%		70-130	15-DEC-15
Bismuth (Bi)-Total			98.5		%		70-130	15-DEC-15
Boron (B)-Total			99.9		%		70-130	15-DEC-15
Cadmium (Cd)-Total			101.2		%		70-130	15-DEC-15
Calcium (Ca)-Total			101.3		%		70-130	15-DEC-15
Cesium (Cs)-Total			100.6		%		70-130	15-DEC-15
Chromium (Cr)-Total			101.1		%		70-130	15-DEC-15
Cobalt (Co)-Total			100.4		%		70-130	15-DEC-15
Copper (Cu)-Total			100.6		%		70-130	15-DEC-15
Iron (Fe)-Total			97.2		%		70-130	15-DEC-15
Lead (Pb)-Total			99.0		%		70-130	15-DEC-15
Lithium (Li)-Total			99.7		%		70-130	15-DEC-15
Magnesium (Mg)-Total			98.9		%		70-130	15-DEC-15
Manganese (Mn)-Total			100.1		%		70-130	15-DEC-15
Molybdenum (Mo)-Total			103.7		%		70-130	15-DEC-15
Nickel (Ni)-Total			99.2		%		70-130	15-DEC-15
Phosphorus (P)-Total			114.2		%		70-130	15-DEC-15
Potassium (K)-Total			100.9		%		70-130	15-DEC-15
Rubidium (Rb)-Total			103.4		%		70-130	15-DEC-15
Selenium (Se)-Total			102.9		%		70-130	15-DEC-15
Sodium (Na)-Total			99.5		%		70-130	15-DEC-15
Strontium (Sr)-Total			99.7		%		70-130	15-DEC-15
Tellurium (Te)-Total			103.5		%		70-130	15-DEC-15
Thallium (Tl)-Total			99.2		%		70-130	15-DEC-15
Tin (Sn)-Total			104.5		%		70-130	15-DEC-15
Uranium (U)-Total			98.6		%		70-130	15-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3334294								
WG2231245-7 LCS								
Vanadium (V)-Total			102.0		%		70-130	15-DEC-15
Zinc (Zn)-Total			96.8		%		70-130	15-DEC-15
Zirconium (Zr)-Total			97.9		%		70-130	15-DEC-15
WG2231245-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	15-DEC-15
Antimony (Sb)-Total			<0.010		mg/kg		0.01	15-DEC-15
Arsenic (As)-Total			<0.020		mg/kg		0.02	15-DEC-15
Barium (Ba)-Total			<0.050		mg/kg		0.05	15-DEC-15
Beryllium (Be)-Total			<0.010		mg/kg		0.01	15-DEC-15
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	15-DEC-15
Boron (B)-Total			<1.0		mg/kg		1	15-DEC-15
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	15-DEC-15
Calcium (Ca)-Total			<20		mg/kg		20	15-DEC-15
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	15-DEC-15
Chromium (Cr)-Total			<0.050		mg/kg		0.05	15-DEC-15
Cobalt (Co)-Total			<0.020		mg/kg		0.02	15-DEC-15
Copper (Cu)-Total			<0.10		mg/kg		0.1	15-DEC-15
Iron (Fe)-Total			<3.0		mg/kg		3	15-DEC-15
Lead (Pb)-Total			<0.020		mg/kg		0.02	15-DEC-15
Lithium (Li)-Total			<0.50		mg/kg		0.5	15-DEC-15
Magnesium (Mg)-Total			<2.0		mg/kg		2	15-DEC-15
Manganese (Mn)-Total			<0.050		mg/kg		0.05	15-DEC-15
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	15-DEC-15
Nickel (Ni)-Total			<0.20		mg/kg		0.2	15-DEC-15
Phosphorus (P)-Total			<10		mg/kg		10	15-DEC-15
Potassium (K)-Total			<20		mg/kg		20	15-DEC-15
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	15-DEC-15
Selenium (Se)-Total			<0.050		mg/kg		0.05	15-DEC-15
Sodium (Na)-Total			<20		mg/kg		20	15-DEC-15
Strontium (Sr)-Total			<0.050		mg/kg		0.05	15-DEC-15
Tellurium (Te)-Total			<0.020		mg/kg		0.02	15-DEC-15
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	15-DEC-15
Tin (Sn)-Total			<0.10		mg/kg		0.1	15-DEC-15
Uranium (U)-Total			<0.0020		mg/kg		0.002	15-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch	**R3334294**							
WG2231245-1	**MB**							
Vanadium (V)-Total			<0.10		mg/kg		0.1	15-DEC-15
Zinc (Zn)-Total			<0.50		mg/kg		0.5	15-DEC-15
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	15-DEC-15
WG2231245-2	**MB**							
Aluminum (Al)-Total			<2.0		mg/kg		2	15-DEC-15
Antimony (Sb)-Total			<0.010		mg/kg		0.01	15-DEC-15
Arsenic (As)-Total			<0.020		mg/kg		0.02	15-DEC-15
Barium (Ba)-Total			<0.050		mg/kg		0.05	15-DEC-15
Beryllium (Be)-Total			<0.010		mg/kg		0.01	15-DEC-15
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	15-DEC-15
Boron (B)-Total			<1.0		mg/kg		1	15-DEC-15
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	15-DEC-15
Calcium (Ca)-Total			<20		mg/kg		20	15-DEC-15
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	15-DEC-15
Chromium (Cr)-Total			<0.050		mg/kg		0.05	15-DEC-15
Cobalt (Co)-Total			<0.020		mg/kg		0.02	15-DEC-15
Copper (Cu)-Total			<0.10		mg/kg		0.1	15-DEC-15
Iron (Fe)-Total			<3.0		mg/kg		3	15-DEC-15
Lead (Pb)-Total			<0.020		mg/kg		0.02	15-DEC-15
Lithium (Li)-Total			<0.50		mg/kg		0.5	15-DEC-15
Magnesium (Mg)-Total			<2.0		mg/kg		2	15-DEC-15
Manganese (Mn)-Total			<0.050		mg/kg		0.05	15-DEC-15
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	15-DEC-15
Nickel (Ni)-Total			<0.20		mg/kg		0.2	15-DEC-15
Phosphorus (P)-Total			<10		mg/kg		10	15-DEC-15
Potassium (K)-Total			<20		mg/kg		20	15-DEC-15
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	15-DEC-15
Selenium (Se)-Total			<0.050		mg/kg		0.05	15-DEC-15
Sodium (Na)-Total			<20		mg/kg		20	15-DEC-15
Strontium (Sr)-Total			<0.050		mg/kg		0.05	15-DEC-15
Tellurium (Te)-Total			<0.020		mg/kg		0.02	15-DEC-15
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	15-DEC-15
Tin (Sn)-Total			<0.10		mg/kg		0.1	15-DEC-15
Uranium (U)-Total			<0.0020		mg/kg		0.002	15-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3334294								
WG2231245-2 MB								
Vanadium (V)-Total			<0.10		mg/kg		0.1	15-DEC-15
Zinc (Zn)-Total			<0.50		mg/kg		0.5	15-DEC-15
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	15-DEC-15
Batch R3337856								
WG2231245-5 CRM		**VA-NRC-TORT3**						
Chromium (Cr)-Total			186.8	RM-H	%		70-130	16-DEC-15
Batch R3341738								
WG2235975-3 CRM		**VA-NIST-1566B**						
Antimony (Sb)-Total			0.006		mg/kg		0-0.018	18-DEC-15
Arsenic (As)-Total			91.9		%		70-130	18-DEC-15
Barium (Ba)-Total			92.2		%		70-130	18-DEC-15
Boron (B)-Total			102.9		%		70-130	18-DEC-15
Cadmium (Cd)-Total			89.4		%		70-130	18-DEC-15
Calcium (Ca)-Total			91.9		%		70-130	18-DEC-15
Chromium (Cr)-Total			106.1		%		70-130	18-DEC-15
Cobalt (Co)-Total			86.2		%		70-130	18-DEC-15
Copper (Cu)-Total			88.2		%		70-130	18-DEC-15
Iron (Fe)-Total			95.2		%		70-130	18-DEC-15
Lead (Pb)-Total			91.6		%		70-130	18-DEC-15
Magnesium (Mg)-Total			94.4		%		70-130	18-DEC-15
Manganese (Mn)-Total			89.0		%		70-130	18-DEC-15
Molybdenum (Mo)-Total			88.7		%		70-130	18-DEC-15
Nickel (Ni)-Total			94.8		%		70-130	18-DEC-15
Phosphorus (P)-Total			99.4		%		70-130	18-DEC-15
Potassium (K)-Total			93.1		%		70-130	18-DEC-15
Rubidium (Rb)-Total			90.3		%		70-130	18-DEC-15
Selenium (Se)-Total			91.7		%		70-130	18-DEC-15
Sodium (Na)-Total			91.0		%		70-130	18-DEC-15
Strontium (Sr)-Total			83.9		%		70-130	18-DEC-15
Uranium (U)-Total			86.5		%		70-130	18-DEC-15
Vanadium (V)-Total			93.3		%		70-130	18-DEC-15
Zinc (Zn)-Total			84.8		%		70-130	18-DEC-15
WG2235975-2 DUP		**L1704817-22**						

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3341738								
WG2235975-2 DUP		**L1704817-22**						
Aluminum (Al)-Total		2.1	2.5		mg/kg	17	40	18-DEC-15
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	18-DEC-15
Arsenic (As)-Total		0.062	0.067		mg/kg	8.2	40	18-DEC-15
Barium (Ba)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	18-DEC-15
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	18-DEC-15
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	18-DEC-15
Boron (B)-Total		<1.0	<1.0	RPD-NA	mg/kg	N/A	40	18-DEC-15
Cadmium (Cd)-Total		0.148	0.143		mg/kg	3.8	40	18-DEC-15
Calcium (Ca)-Total		126	126		mg/kg	0.2	60	18-DEC-15
Cesium (Cs)-Total		0.0073	0.0070		mg/kg	4.6	40	18-DEC-15
Chromium (Cr)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	18-DEC-15
Cobalt (Co)-Total		0.071	0.068		mg/kg	4.0	40	18-DEC-15
Copper (Cu)-Total		34.7	34.9		mg/kg	0.3	40	18-DEC-15
Iron (Fe)-Total		57.1	57.1		mg/kg	0.0	40	18-DEC-15
Lead (Pb)-Total		0.032	0.029		mg/kg	12	40	18-DEC-15
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	18-DEC-15
Magnesium (Mg)-Total		671	667		mg/kg	0.5	40	18-DEC-15
Manganese (Mn)-Total		3.18	3.07		mg/kg	3.5	40	18-DEC-15
Molybdenum (Mo)-Total		0.285	0.297		mg/kg	4.4	40	18-DEC-15
Nickel (Ni)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	18-DEC-15
Phosphorus (P)-Total		11800	11700		mg/kg	0.8	40	18-DEC-15
Potassium (K)-Total		11600	11700		mg/kg	1.0	40	18-DEC-15
Rubidium (Rb)-Total		13.5	13.8		mg/kg	2.1	40	18-DEC-15
Selenium (Se)-Total		3.56	3.54		mg/kg	0.6	40	18-DEC-15
Sodium (Na)-Total		2150	2180		mg/kg	1.2	40	18-DEC-15
Strontium (Sr)-Total		0.080	0.080		mg/kg	0.8	60	18-DEC-15
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	18-DEC-15
Thallium (Tl)-Total		0.0087	0.0086		mg/kg	1.1	40	18-DEC-15
Tin (Sn)-Total		0.15	0.16		mg/kg	8.2	40	18-DEC-15
Uranium (U)-Total		<0.0020	<0.0020	RPD-NA	mg/kg	N/A	40	18-DEC-15
Vanadium (V)-Total		0.16	0.15		mg/kg	2.6	40	18-DEC-15
Zinc (Zn)-Total		112	109		mg/kg	2.4	40	18-DEC-15
Zirconium (Zr)-Total		<0.20	<0.20		mg/kg			18-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3341738								
WG2235975-2 DUP		**L1704817-22**						
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	18-DEC-15
WG2235975-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	18-DEC-15
Antimony (Sb)-Total			<0.010		mg/kg		0.01	18-DEC-15
Arsenic (As)-Total			<0.020		mg/kg		0.02	18-DEC-15
Barium (Ba)-Total			<0.050		mg/kg		0.05	18-DEC-15
Beryllium (Be)-Total			<0.010		mg/kg		0.01	18-DEC-15
Boron (B)-Total			<1.0		mg/kg		1	18-DEC-15
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	18-DEC-15
Calcium (Ca)-Total			<20		mg/kg		20	18-DEC-15
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	18-DEC-15
Chromium (Cr)-Total			<0.050		mg/kg		0.05	18-DEC-15
Cobalt (Co)-Total			<0.020		mg/kg		0.02	18-DEC-15
Copper (Cu)-Total			<0.10		mg/kg		0.1	18-DEC-15
Iron (Fe)-Total			<3.0		mg/kg		3	18-DEC-15
Lead (Pb)-Total			<0.020		mg/kg		0.02	18-DEC-15
Lithium (Li)-Total			<0.50		mg/kg		0.5	18-DEC-15
Magnesium (Mg)-Total			<2.0		mg/kg		2	18-DEC-15
Manganese (Mn)-Total			<0.050		mg/kg		0.05	18-DEC-15
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	18-DEC-15
Nickel (Ni)-Total			<0.20		mg/kg		0.2	18-DEC-15
Phosphorus (P)-Total			<10		mg/kg		10	18-DEC-15
Potassium (K)-Total			<20		mg/kg		20	18-DEC-15
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	18-DEC-15
Selenium (Se)-Total			<0.050		mg/kg		0.05	18-DEC-15
Sodium (Na)-Total			<20		mg/kg		20	18-DEC-15
Strontium (Sr)-Total			<0.050		mg/kg		0.05	18-DEC-15
Tellurium (Te)-Total			<0.020		mg/kg		0.02	18-DEC-15
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	18-DEC-15
Tin (Sn)-Total			<0.10		mg/kg		0.1	18-DEC-15
Uranium (U)-Total			<0.0020		mg/kg		0.002	18-DEC-15
Vanadium (V)-Total			<0.10		mg/kg		0.1	18-DEC-15
Zinc (Zn)-Total			<0.50		mg/kg		0.5	18-DEC-15
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	18-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3342421								
WG2235323-3 CRM		**VA-NIST-1566B**						
Antimony (Sb)-Total			0.010		mg/kg		0-0.018	20-DEC-15
Arsenic (As)-Total			90.5		%		70-130	20-DEC-15
Barium (Ba)-Total			91.1		%		70-130	20-DEC-15
Boron (B)-Total			100.6		%		70-130	20-DEC-15
Cadmium (Cd)-Total			93.2		%		70-130	20-DEC-15
Calcium (Ca)-Total			93.1		%		70-130	20-DEC-15
Chromium (Cr)-Total			103.0		%		70-130	20-DEC-15
Cobalt (Co)-Total			91.6		%		70-130	20-DEC-15
Copper (Cu)-Total			89.1		%		70-130	20-DEC-15
Iron (Fe)-Total			89.6		%		70-130	20-DEC-15
Lead (Pb)-Total			100.2		%		70-130	20-DEC-15
Magnesium (Mg)-Total			88.2		%		70-130	20-DEC-15
Manganese (Mn)-Total			90.4		%		70-130	20-DEC-15
Molybdenum (Mo)-Total			99.0		%		70-130	20-DEC-15
Nickel (Ni)-Total			95.6		%		70-130	20-DEC-15
Phosphorus (P)-Total			98.3		%		70-130	20-DEC-15
Potassium (K)-Total			90.7		%		70-130	20-DEC-15
Rubidium (Rb)-Total			95.0		%		70-130	20-DEC-15
Selenium (Se)-Total			87.4		%		70-130	20-DEC-15
Sodium (Na)-Total			86.6		%		70-130	20-DEC-15
Strontium (Sr)-Total			89.5		%		70-130	20-DEC-15
Uranium (U)-Total			91.3		%		70-130	20-DEC-15
Vanadium (V)-Total			89.4		%		70-130	20-DEC-15
Zinc (Zn)-Total			86.1		%		70-130	20-DEC-15
WG2235323-2 DUP		**L1704817-31**						
Aluminum (Al)-Total		3.1	3.3		mg/kg	4.0	40	20-DEC-15
Antimony (Sb)-Total		0.046	0.029	J	mg/kg	0.017	0.02	20-DEC-15
Arsenic (As)-Total		0.126	0.111		mg/kg	13	40	20-DEC-15
Barium (Ba)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	20-DEC-15
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	20-DEC-15
Bismuth (Bi)-Total		0.054	0.038		mg/kg	34	40	20-DEC-15
Boron (B)-Total		<1.0	<1.0	RPD-NA	mg/kg	N/A	40	20-DEC-15
Cadmium (Cd)-Total		0.237	0.225		mg/kg	5.4	40	20-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3342421								
WG2235323-2 DUP		**L1704817-31**						
Calcium (Ca)-Total		180	163		mg/kg	10	60	20-DEC-15
Cesium (Cs)-Total		0.0302	0.0267		mg/kg	12	40	20-DEC-15
Chromium (Cr)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	20-DEC-15
Cobalt (Co)-Total		0.149	0.138		mg/kg	8.1	40	20-DEC-15
Copper (Cu)-Total		85.5	82.1		mg/kg	4.1	40	20-DEC-15
Iron (Fe)-Total		198	192		mg/kg	3.3	40	20-DEC-15
Lead (Pb)-Total		0.027	0.020		mg/kg	30	40	20-DEC-15
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	20-DEC-15
Magnesium (Mg)-Total		742	685		mg/kg	8.1	40	20-DEC-15
Manganese (Mn)-Total		10.2	9.44		mg/kg	7.4	40	20-DEC-15
Molybdenum (Mo)-Total		0.462	0.448		mg/kg	3.1	40	20-DEC-15
Nickel (Ni)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	20-DEC-15
Phosphorus (P)-Total		13100	12300		mg/kg	6.2	40	20-DEC-15
Potassium (K)-Total		14600	14100		mg/kg	3.5	40	20-DEC-15
Rubidium (Rb)-Total		32.9	32.1		mg/kg	2.7	40	20-DEC-15
Selenium (Se)-Total		5.48	4.85		mg/kg	12	40	20-DEC-15
Sodium (Na)-Total		4040	3920		mg/kg	3.0	40	20-DEC-15
Strontium (Sr)-Total		0.112	0.102		mg/kg	9.6	60	20-DEC-15
Tellurium (Te)-Total		0.024	<0.020	RPD-NA	mg/kg	N/A	40	20-DEC-15
Thallium (Tl)-Total		0.0487	0.0340		mg/kg	35	40	20-DEC-15
Tin (Sn)-Total		0.24	0.24		mg/kg	0.9	40	20-DEC-15
Uranium (U)-Total		<0.0020	<0.0020	RPD-NA	mg/kg	N/A	40	20-DEC-15
Vanadium (V)-Total		0.55	0.51		mg/kg	9.0	40	20-DEC-15
Zinc (Zn)-Total		135	120		mg/kg	12	40	20-DEC-15
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	20-DEC-15
WG2235323-4 LCS								
Aluminum (Al)-Total			99.9		%		70-130	20-DEC-15
Antimony (Sb)-Total			88.0		%		70-130	20-DEC-15
Arsenic (As)-Total			98.9		%		70-130	20-DEC-15
Barium (Ba)-Total			99.4		%		70-130	20-DEC-15
Beryllium (Be)-Total			84.5		%		70-130	20-DEC-15
Bismuth (Bi)-Total			84.2		%		70-130	20-DEC-15
Boron (B)-Total			88.8		%		70-130	20-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3342421								
WG2235323-4 LCS								
Cadmium (Cd)-Total			93.9		%		70-130	20-DEC-15
Calcium (Ca)-Total			82.9		%		70-130	20-DEC-15
Cesium (Cs)-Total			84.1		%		70-130	20-DEC-15
Chromium (Cr)-Total			98.0		%		70-130	20-DEC-15
Cobalt (Co)-Total			99.0		%		70-130	20-DEC-15
Copper (Cu)-Total			96.4		%		70-130	20-DEC-15
Iron (Fe)-Total			91.2		%		70-130	20-DEC-15
Lead (Pb)-Total			84.0		%		70-130	20-DEC-15
Lithium (Li)-Total			84.3		%		70-130	20-DEC-15
Magnesium (Mg)-Total			99.4		%		70-130	20-DEC-15
Manganese (Mn)-Total			95.5		%		70-130	20-DEC-15
Molybdenum (Mo)-Total			86.3		%		70-130	20-DEC-15
Nickel (Ni)-Total			97.2		%		70-130	20-DEC-15
Potassium (K)-Total			112.5		%		70-130	20-DEC-15
Rubidium (Rb)-Total			112.6		%		70-130	20-DEC-15
Selenium (Se)-Total			92.5		%		70-130	20-DEC-15
Sodium (Na)-Total			99.4		%		70-130	20-DEC-15
Strontium (Sr)-Total			83.9		%		70-130	20-DEC-15
Tellurium (Te)-Total			86.2		%		70-130	20-DEC-15
Thallium (Tl)-Total			85.1		%		70-130	20-DEC-15
Tin (Sn)-Total			85.4		%		70-130	20-DEC-15
Uranium (U)-Total			80.6		%		70-130	20-DEC-15
Vanadium (V)-Total			100.6		%		70-130	20-DEC-15
Zinc (Zn)-Total			95.2		%		70-130	20-DEC-15
Zirconium (Zr)-Total			81.6		%		70-130	20-DEC-15
WG2235323-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	20-DEC-15
Antimony (Sb)-Total			<0.010		mg/kg		0.01	20-DEC-15
Arsenic (As)-Total			<0.020		mg/kg		0.02	20-DEC-15
Barium (Ba)-Total			<0.050		mg/kg		0.05	20-DEC-15
Beryllium (Be)-Total			<0.010		mg/kg		0.01	20-DEC-15
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	20-DEC-15
Boron (B)-Total			<1.0		mg/kg		1	20-DEC-15
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	20-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-N-VA	**Tissue**							
Batch R3342421								
WG2235323-1 MB								
Calcium (Ca)-Total			<20		mg/kg		20	20-DEC-15
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	20-DEC-15
Chromium (Cr)-Total			<0.050		mg/kg		0.05	20-DEC-15
Cobalt (Co)-Total			<0.020		mg/kg		0.02	20-DEC-15
Copper (Cu)-Total			<0.10		mg/kg		0.1	20-DEC-15
Iron (Fe)-Total			<3.0		mg/kg		3	20-DEC-15
Lead (Pb)-Total			<0.020		mg/kg		0.02	20-DEC-15
Lithium (Li)-Total			<0.50		mg/kg		0.5	20-DEC-15
Magnesium (Mg)-Total			<2.0		mg/kg		2	20-DEC-15
Manganese (Mn)-Total			<0.050		mg/kg		0.05	20-DEC-15
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	20-DEC-15
Nickel (Ni)-Total			<0.20		mg/kg		0.2	20-DEC-15
Phosphorus (P)-Total			<10		mg/kg		10	20-DEC-15
Potassium (K)-Total			<20		mg/kg		20	20-DEC-15
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	20-DEC-15
Selenium (Se)-Total			<0.050		mg/kg		0.05	20-DEC-15
Sodium (Na)-Total			<20		mg/kg		20	20-DEC-15
Strontium (Sr)-Total			<0.050		mg/kg		0.05	20-DEC-15
Tellurium (Te)-Total			<0.020		mg/kg		0.02	20-DEC-15
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	20-DEC-15
Tin (Sn)-Total			<0.10		mg/kg		0.1	20-DEC-15
Uranium (U)-Total			<0.0020		mg/kg		0.002	20-DEC-15
Vanadium (V)-Total			<0.10		mg/kg		0.1	20-DEC-15
Zinc (Zn)-Total			<0.50		mg/kg		0.5	20-DEC-15
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	20-DEC-15
Batch R3346673								
WG2235323-4 LCS								
Phosphorus (P)-Total			104.3		%		70-130	21-DEC-15
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch R3338775								
WG2228104-4 CRM		**VA-NIST-1566B**						
Antimony (Sb)-Total			0.005		mg/kg		0-0.018	16-DEC-15
Arsenic (As)-Total			80.8		%		70-130	16-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch R3338775								
WG2228104-4 CRM		**VA-NIST-1566B**						
Barium (Ba)-Total			83.6		%		70-130	16-DEC-15
Boron (B)-Total			76.8		%		70-130	16-DEC-15
Cadmium (Cd)-Total			104.5		%		70-130	16-DEC-15
Calcium (Ca)-Total			80.8		%		70-130	16-DEC-15
Chromium (Cr)-Total			0.20		mg/kg		0.06-0.46	16-DEC-15
Cobalt (Co)-Total			71.1		%		70-130	16-DEC-15
Copper (Cu)-Total			123.7		%		70-130	16-DEC-15
Iron (Fe)-Total			91.1		%		70-130	16-DEC-15
Lead (Pb)-Total			72.4		%		70-130	16-DEC-15
Magnesium (Mg)-Total			86.0		%		70-130	16-DEC-15
Manganese (Mn)-Total			122.9		%		70-130	16-DEC-15
Molybdenum (Mo)-Total			73.8		%		70-130	16-DEC-15
Nickel (Ni)-Total			88.2		%		70-130	16-DEC-15
Phosphorus (P)-Total			84.4		%		70-130	16-DEC-15
Potassium (K)-Total			80.0		%		70-130	16-DEC-15
Rubidium (Rb)-Total			90.9		%		70-130	16-DEC-15
Selenium (Se)-Total			82.0		%		70-130	16-DEC-15
Sodium (Na)-Total			86.7		%		70-130	16-DEC-15
Strontium (Sr)-Total			98.1		%		70-130	16-DEC-15
Uranium (U)-Total			88.3		%		70-130	16-DEC-15
Vanadium (V)-Total			80.4		%		70-130	16-DEC-15
Zinc (Zn)-Total			127.9		%		70-130	16-DEC-15
WG2228104-3 DUP		**L1704817-6**						
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	16-DEC-15
Arsenic (As)-Total		0.320	0.483	DUP-H	mg/kg	40	40	16-DEC-15
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	16-DEC-15
Cadmium (Cd)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	16-DEC-15
Calcium (Ca)-Total		628	1280	DUP-H	mg/kg	68	60	16-DEC-15
Chromium (Cr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	16-DEC-15
Cobalt (Co)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	16-DEC-15
Copper (Cu)-Total		0.86	0.91		mg/kg	5.3	40	16-DEC-15
Iron (Fe)-Total		10.3	14.9		mg/kg	36	40	16-DEC-15
Lead (Pb)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	16-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch	**R3338775**							
WG2228104-3	**DUP**	**L1704817-6**						
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	16-DEC-15
Magnesium (Mg)-Total		1530	1770		mg/kg	15	40	16-DEC-15
Manganese (Mn)-Total		1.17	2.21	DUP-H	mg/kg	62	40	16-DEC-15
Molybdenum (Mo)-Total		<0.040	<0.040	RPD-NA	mg/kg	N/A	40	16-DEC-15
Nickel (Ni)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	16-DEC-15
Phosphorus (P)-Total		10100	10600		mg/kg	5.3	40	16-DEC-15
Potassium (K)-Total		18100	19200		mg/kg	5.9	40	16-DEC-15
Rubidium (Rb)-Total		22.2	23.1		mg/kg	4.2	40	16-DEC-15
Selenium (Se)-Total		0.85	0.91		mg/kg	6.2	40	16-DEC-15
Sodium (Na)-Total		1260	1350		mg/kg	6.8	40	16-DEC-15
Strontium (Sr)-Total		0.32	0.66	DUP-H	mg/kg	69	60	16-DEC-15
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	16-DEC-15
Thallium (Tl)-Total		0.0091	0.0105		mg/kg	14	40	16-DEC-15
Vanadium (V)-Total		<0.10	0.23	DUP-H	mg/kg	N/A	40	16-DEC-15
Zinc (Zn)-Total		17.6	18.0		mg/kg	2.3	40	16-DEC-15
WG2228104-5	**LCS**							
Aluminum (Al)-Total			82.1		%		70-130	16-DEC-15
Antimony (Sb)-Total			110.7		%		70-130	16-DEC-15
Arsenic (As)-Total			129.4		%		70-130	16-DEC-15
Barium (Ba)-Total			103.4		%		70-130	16-DEC-15
Beryllium (Be)-Total			127.5		%		70-130	16-DEC-15
Bismuth (Bi)-Total			122.8		%		70-130	16-DEC-15
Boron (B)-Total			103.7		%		70-130	16-DEC-15
Cadmium (Cd)-Total			128.5		%		70-130	16-DEC-15
Calcium (Ca)-Total			104.6		%		70-130	16-DEC-15
Cesium (Cs)-Total			99.0		%		70-130	16-DEC-15
Chromium (Cr)-Total			96.2		%		70-130	16-DEC-15
Cobalt (Co)-Total			123.9		%		70-130	16-DEC-15
Copper (Cu)-Total			118.1		%		70-130	16-DEC-15
Iron (Fe)-Total			102.4		%		70-130	16-DEC-15
Lead (Pb)-Total			106.1		%		70-130	16-DEC-15
Lithium (Li)-Total			86.1		%		70-130	16-DEC-15
Magnesium (Mg)-Total			100.5		%		70-130	16-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch	**R3338775**							
WG2228104-5	**LCS**							
Molybdenum (Mo)-Total			99.0		%		70-130	16-DEC-15
Nickel (Ni)-Total			108.7		%		70-130	16-DEC-15
Potassium (K)-Total			92.2		%		70-130	16-DEC-15
Rubidium (Rb)-Total			96.2		%		70-130	16-DEC-15
Selenium (Se)-Total			95.0		%		70-130	16-DEC-15
Sodium (Na)-Total			100.7		%		70-130	16-DEC-15
Thallium (Tl)-Total			110.7		%		70-130	16-DEC-15
Tin (Sn)-Total			101.2		%		70-130	16-DEC-15
Uranium (U)-Total			100.8		%		70-130	16-DEC-15
Zinc (Zn)-Total			127.4		%		70-130	16-DEC-15
Zirconium (Zr)-Total			104.7		%		70-130	16-DEC-15
WG2228104-1	**MB**							
Aluminum (Al)-Total			<5.0		mg/kg		5	16-DEC-15
Antimony (Sb)-Total			<0.010		mg/kg		0.01	16-DEC-15
Arsenic (As)-Total			<0.030		mg/kg		0.03	16-DEC-15
Barium (Ba)-Total			<0.050		mg/kg		0.05	16-DEC-15
Beryllium (Be)-Total			<0.010		mg/kg		0.01	16-DEC-15
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	16-DEC-15
Boron (B)-Total			<1.0		mg/kg		1	16-DEC-15
Cadmium (Cd)-Total			<0.010		mg/kg		0.01	16-DEC-15
Calcium (Ca)-Total			<20		mg/kg		20	16-DEC-15
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	16-DEC-15
Chromium (Cr)-Total			<0.20		mg/kg		0.2	16-DEC-15
Cobalt (Co)-Total			<0.020		mg/kg		0.02	16-DEC-15
Copper (Cu)-Total			<0.20		mg/kg		0.2	16-DEC-15
Iron (Fe)-Total			<5.0		mg/kg		5	16-DEC-15
Lead (Pb)-Total			<0.050		mg/kg		0.05	16-DEC-15
Lithium (Li)-Total			<0.50		mg/kg		0.5	16-DEC-15
Magnesium (Mg)-Total			<2.0		mg/kg		2	16-DEC-15
Manganese (Mn)-Total			<0.050		mg/kg		0.05	16-DEC-15
Molybdenum (Mo)-Total			<0.040		mg/kg		0.04	16-DEC-15
Nickel (Ni)-Total			<0.20		mg/kg		0.2	16-DEC-15
Phosphorus (P)-Total			<10		mg/kg		10	16-DEC-15
Potassium (K)-Total			<20		mg/kg		20	16-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch	**R3338775**							
WG2228104-1	**MB**							
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	16-DEC-15
Selenium (Se)-Total			<0.10		mg/kg		0.1	16-DEC-15
Sodium (Na)-Total			<20		mg/kg		20	16-DEC-15
Strontium (Sr)-Total			<0.10		mg/kg		0.1	16-DEC-15
Tellurium (Te)-Total			<0.020		mg/kg		0.02	16-DEC-15
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	16-DEC-15
Tin (Sn)-Total			<0.10		mg/kg		0.1	16-DEC-15
Uranium (U)-Total			<0.0020		mg/kg		0.002	16-DEC-15
Vanadium (V)-Total			<0.10		mg/kg		0.1	16-DEC-15
Zinc (Zn)-Total			<1.0		mg/kg		1	16-DEC-15
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	16-DEC-15
WG2228104-2	**MB**							
Aluminum (Al)-Total			<5.0		mg/kg		5	16-DEC-15
Antimony (Sb)-Total			<0.010		mg/kg		0.01	16-DEC-15
Arsenic (As)-Total			<0.030		mg/kg		0.03	16-DEC-15
Barium (Ba)-Total			<0.050		mg/kg		0.05	16-DEC-15
Beryllium (Be)-Total			<0.010		mg/kg		0.01	16-DEC-15
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	16-DEC-15
Boron (B)-Total			<1.0		mg/kg		1	16-DEC-15
Cadmium (Cd)-Total			<0.010		mg/kg		0.01	16-DEC-15
Calcium (Ca)-Total			<20		mg/kg		20	16-DEC-15
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	16-DEC-15
Chromium (Cr)-Total			<0.20		mg/kg		0.2	16-DEC-15
Cobalt (Co)-Total			<0.020		mg/kg		0.02	16-DEC-15
Copper (Cu)-Total			<0.20		mg/kg		0.2	16-DEC-15
Iron (Fe)-Total			<5.0		mg/kg		5	16-DEC-15
Lead (Pb)-Total			<0.050		mg/kg		0.05	16-DEC-15
Lithium (Li)-Total			<0.50		mg/kg		0.5	16-DEC-15
Magnesium (Mg)-Total			<2.0		mg/kg		2	16-DEC-15
Manganese (Mn)-Total			<0.050		mg/kg		0.05	16-DEC-15
Molybdenum (Mo)-Total			<0.040		mg/kg		0.04	16-DEC-15
Nickel (Ni)-Total			<0.20		mg/kg		0.2	16-DEC-15
Phosphorus (P)-Total			<10		mg/kg		10	16-DEC-15
Potassium (K)-Total			<20		mg/kg		20	16-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch R3338775								
WG2228104-2 MB								
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	16-DEC-15
Selenium (Se)-Total			<0.10		mg/kg		0.1	16-DEC-15
Sodium (Na)-Total			<20		mg/kg		20	16-DEC-15
Strontium (Sr)-Total			<0.10		mg/kg		0.1	16-DEC-15
Tellurium (Te)-Total			<0.020		mg/kg		0.02	16-DEC-15
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	16-DEC-15
Tin (Sn)-Total			<0.10		mg/kg		0.1	16-DEC-15
Uranium (U)-Total			<0.0020		mg/kg		0.002	16-DEC-15
Vanadium (V)-Total			<0.10		mg/kg		0.1	16-DEC-15
Zinc (Zn)-Total			<1.0		mg/kg		1	16-DEC-15
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	16-DEC-15
Batch R3343154								
WG2228104-3 DUP		**L1704817-6**						
Aluminum (Al)-Total		<5.0	8.4	RPD-NA	mg/kg	N/A	40	19-DEC-15
Barium (Ba)-Total		0.151	0.970	DUP-H	mg/kg	146	40	19-DEC-15
Bismuth (Bi)-Total		0.010	<0.010	RPD-NA	mg/kg	N/A	40	19-DEC-15
Boron (B)-Total		<1.0	<1.0	RPD-NA	mg/kg	N/A	40	19-DEC-15
Cesium (Cs)-Total		0.0214	0.0176		mg/kg	19	40	19-DEC-15
Tin (Sn)-Total		0.38	0.38		mg/kg	1.5	40	19-DEC-15
Uranium (U)-Total		<0.0020	<0.0020	RPD-NA	mg/kg	N/A	40	19-DEC-15
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	19-DEC-15
Batch R3354401								
WG2238912-4 CRM		**VA-NIST-1566B**						
Chromium (Cr)-Total			0.21		mg/kg		0.06-0.46	22-DEC-15
WG2238912-3 DUP		**L1704817-15**						
Chromium (Cr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	22-DEC-15
WG2238912-5 LCS								
Chromium (Cr)-Total			102.6		%		70-130	22-DEC-15
WG2238912-1 MB								
Chromium (Cr)-Total			<0.20		mg/kg		0.2	22-DEC-15
WG2238912-2 MB								
Chromium (Cr)-Total			<0.20		mg/kg		0.2	22-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9

Contact: Jess Tester

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-MICR-HRMS-VA	**Tissue**							
Batch R3404164								
WG2262884-4	**CRM**	**VA-NIST-1566B**						
Iron (Fe)-Total			81.0		%		70-130	10-FEB-16
WG2262884-3	**DUP**	**L1704817-46**						
Iron (Fe)-Total		13.2	7.0	J	mg/kg	6.2	10	10-FEB-16
WG2262884-5	**LCS**							
Iron (Fe)-Total			113.6		%		70-130	10-FEB-16
WG2262884-1	**MB**							
Iron (Fe)-Total			<5.0		mg/kg		5	10-FEB-16
WG2262884-2	**MB**							
Iron (Fe)-Total			<5.0		mg/kg		5	10-FEB-16
MOISTURE-TISS-VA	**Tissue**							
Batch R3325553								
WG2226466-3	**DUP**	**L1704817-40**						
% Moisture		81.7	82.0		%	0.4	20	04-DEC-15
Batch R3325554								
WG2226458-3	**DUP**	**L1685945-42**						
% Moisture		86.8	86.1		%	0.8	20	04-DEC-15
Batch R3332714								
WG2228105-1	**DUP**	**L1704817-6**						
% Moisture		78.0	78.9		%	1.1	20	11-DEC-15

Quality Control Report

Workorder: L1704817 Report Date: 18-FEB-16

Client: MINNOW ENVIRONMENTAL INC.
2 Lamb Street
Georgetown ON L7G 3M9
Contact: Jess Tester

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.
RM-H	Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

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

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

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

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

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1704817-COFC

COC Number: 14 -

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Minnow Environmental Inc.	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Jess Tester	Quality Control (QC) Report with Report ☑ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2 Lamb Street Georgetown, ON, L7G 3M9	☐ Criteria on Report - provide details below if box checked Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	905-873-3371 x227	Email 1 or Fax jtester@minnow.ca Email 2	Specify Date Required for E2,E or P:

Invoice To	Same as Report To ☐ Yes ☑ No	Invoice Distribution	
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Company:	Calley Anderson, New Gold, 5967 Highway 11/71,	Email 1 or Fax	
Contact:	P.O. Box 5, Emo, ON, P0W IE0. T: (807) 707-3058	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q52338	Approver ID:	Cost Center:
Job #:	157202.0075	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: JT/MW

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ICPMS Metals (Dry)	Total Mercury (Dry)	Moisture Content	Number of Containers
	PINR-NP1-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP2-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP3-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP4-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP5-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP7-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP8-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP9-M	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP10-M	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP12-M	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP13-M	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP14-M	2-Oct-15	-	Tissue	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☐ No

Are samples for human drinking water use? ☐ Yes ☐ No

Special Instructions / Specify Criteria to add on report (client Use)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INIITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	1.1 °C [illegible]

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Jess Tester	Date: 18-Nov-15	Time: 1pm	Received by:	Date:	Time:	Received by: [illegible]	Date: NOV 19 2015	Time: 9 Am

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

NA-FM-0326e v09 Front/04 January 2014

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1704817-COFC

COC Number: 14 -

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Minnow Environmental Inc.	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Jess Tester	Quality Control (QC) Report with Report	☑ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2 Lamb Street Georgetown, ON, L7G 3M9	☐ Criteria on Report - provide details below if box checked Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	905-873-3371 x227	Email 1 or Fax	jtester@minnow.ca	Specify Date Required for E2,E or P:
		Email 2		

Invoice To	Same as Report To ☐ Yes ☑ No	Invoice Distribution	
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Company:	Cailey Anderson, New Gold, 5967 Highway 11/71,	Email 1 or Fax	
Contact:	P.O. Box 5, Emo, ON, P0W IE0. T: (807) 707-3058	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q52338	Approver ID:	Cost Center:
Job #:	157202.0075	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: JT/MW

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ICPMS Metals (Dry)	Total Mercury (Dry)	Moisture Content	Number of Containers
	PINR-NP9-L	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP10-L	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP12-L	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP13-L	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP14-L	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP15-L	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP16-L	3-Oct-15	-	Tissue	R	R	R	1
	PINR-NP17-L	3-Oct-15	-	Tissue	R	R	R	1
	PINR-NPX-L	3-Oct-15	-	Tissue	R	R	R	1
	PINR-NP1-G	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP2-G	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP3-G	1-Oct-15	-	Tissue	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☐ No

Are samples for human drinking water use? ☐ Yes ☐ No

Special Instructions / Specify Criteria to add on report (client Use)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C	
				1.1 °C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: Kaly	Date: NOV 19 2015	Time: 9AM

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NA-FM-0328e v09 Front/04 January 2014

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Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1704817-COFC

COC Number: 14 -

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Minnow Environmental Inc.	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Jess Tester	Quality Control (QC) Report with Report ☑ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2 Lamb Street Georgetown, ON, L7G 3M9	☐ Criteria on Report - provide details below if box checked Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	905-873-3371 x227	Email 1 or Fax jtester@minnow.ca Email 2	Specify Date Required for E2,E or P:

Invoice To	Same as Report To ☐ Yes ☑ No	Invoice Distribution	
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Company:	Calley Anderson, New Gold, 5967 Highway 11/71,	Email 1 or Fax	
Contact:	P.O. Box 5, Emo, ON, P0W IE0. T: (807) 707-3058	Email 2	
Project Information		**Oil and Gas Required Fields (client use)**	
ALS Quote #:	Q52338	Approver ID:	Cost Center:
Job #:	157202.0075	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: JT/MW

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ICPMS Metals (Dry)	Total Mercury (Dry)	Moisture Content	Number of Containers
	PINR-NP4-G	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP5-G	1-Oct-15	-	Tissue	R	R	R	1
	PINR-NP12-G	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP13-G	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP15-G	2-Oct-15	-	Tissue	R	R	R	1
	PINR-NP16-G	3-Oct-15	-	Tissue	R	R	R	1
	PINR-NPX-G	3-Oct-15	-	Tissue	R	R	R	1
	PINR-Wa1-M	1-Oct-15	-	Tissue	R	R	R	1
	PINR-Wa1-L	1-Oct-15	-	Tissue	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☐ No

Are samples for human drinking water use? ☐ Yes ☐ No

Special Instructions / Specify Criteria to add on report (client Use)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C	
			1.1 °C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: lady	Date: NOV 19 2015	Time: 9Am

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NA-FM-0326e v08 Front/04 January 2014

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.