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IOS Services Géoscientifiques

SOIL GEOCHEMISTRY SURVEY ON
BOSTON BULLDOG PROJECT
Kirkland Lake Area, Ontario
NTS 42A01, 32D04

Presented to

Michael Rosatelli, P. Geo. M.Sc.
Vice President Exploration

Val-d'Or Mining Corp.

By

Hugues Longuépée, P.Geo. Ph.D.

Date: May 8th, 2023
Project: 1539
Copy 1

Ville de Saguenay

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INTRODUCTION

The Boston Bulldog project is located at the southwestern end of the Abitibi greenstone belt and encompasses a mineral property acquired by Val-d'Or Mining Corp. It covers 302.5 hectares and is located approximately 12 km south of Kirkland Lake, Ontario. This region hosts dozens of historic and currently-producing gold mines, including the Toburn, Sylvanite, Wright-Hargreaves, Lake Shore, Teck-Hughes, KL Gold and Macassa Mines.

IOS Services Géoscientifiques inc. has been mandated by Val-d'Or Mining Corp. to conduct a systematic mineral soil (horizon B or C) sampling program over a portion of the Boston Bulldog property. The survey aimed to delineate gold exploration targets based upon pedochemical anomalies in the secondary environment. The drift overlying the Boston Bulldog project consists predominantly of a fine-grained glaciolacustrine sediment blanket chiefly composed of clays, varved clays, and silt, overlain by thin swamp deposits in the eastern portion of the property and bedrock drift complex (till of indeterminate origin) in the west.

The current report describes this soil sampling program, including a description of the collected samples, a chemical analysis using portable XRF and a brief interpretation. A more complete report using Ionic Leach ICP-MS analysis is to be release in coming weeks.

TERMS OF REFERENCE

Val-d'Or Mining Corp., represented by Michael Rosatelli, Vice President Exploration, contracted IOS Services Géoscientifiques Inc. to conduct a gridded soil sampling program in order to detect mineralized occurrences on the eastern portion of their British Bulldog property.

The services regarding the soil sampling included:

1. Providing technical and professional staff members to carry out a soil sampling program according to the industry standards and sampling pattern.
2. Providing tools, equipment, transportation and all required logistical support to its staff so as to ensure the timely execution of the Program.
3. Perform measurements of physicochemical parameters (pH/Eh/TDS/δph/LOI)
4. Perform a portable XRF analysis using an aliquot of soil sample and loss of ignition.

5. Organizing and managing chemical analysis by Ionic Leach procedure at ALS Minerals and performing QAQC program.
6. Providing a report in a format acceptable for assessment filing, including a procedure description, results and a detailed interpretation.

IOS has no interest or partnerships with Val-d'Or Mining Corp., other than a service agreement on a daily or per sample fee basis. IOS is an independent entity and is not financially involved in the process of acquiring or developing this project. The current report is not written in accordance to NI-43-101 instructions and shall not be used for financial purposes.

Description of the property

Geographic location

The British Bulldog project is located approximately 12 kilometres south of Kirkland Lake, Ontario (***figure 1***), straddling the 42A-01 and 32D-04 NTS map sheets. It covers the central-west part of Boston Township and extends to a small sliver of Otto Township in the west. It lies approximately between latitudes 48°1'12"N and 48°2'27.2"N, and longitudes 80°01'08"W and 79°59'16"W.

Access and infrastructure

The British Bulldog project is somewhat accessible by forestry trails connecting with local highway 112, and crossed by an Ontario Northland Rail line providing access to the region. The sampling grid was accessible from Kirkland Lake by pickup truck by traveling south on Highway 112 (***figure 2***). Room and board for the crew was available in Kirkland Lake.

Land tenure

The British Bulldog Property comprises 14 claims covering 302.5 hectares upon which Val-d'Or Mining Corp. is the claims holder (***map 1***). The survey area covers multiple cell claims located within the Larder Lake Mining Division of Ontario. The prospecting area covers cell claims 564025, 564024, 564023, 564022, 564021, 564020, 564019, 564018, 564017, 564016, 564015, 564014, 564013 and 564012.

1:6 500 000

1539	Project: Boston Bulldog

FIGURE 1: PROJECT LOCATION

Geology from Ontario Geological Survey 2021. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release –Data 126 - Revision 1. Topographic background data from canadian government WMS

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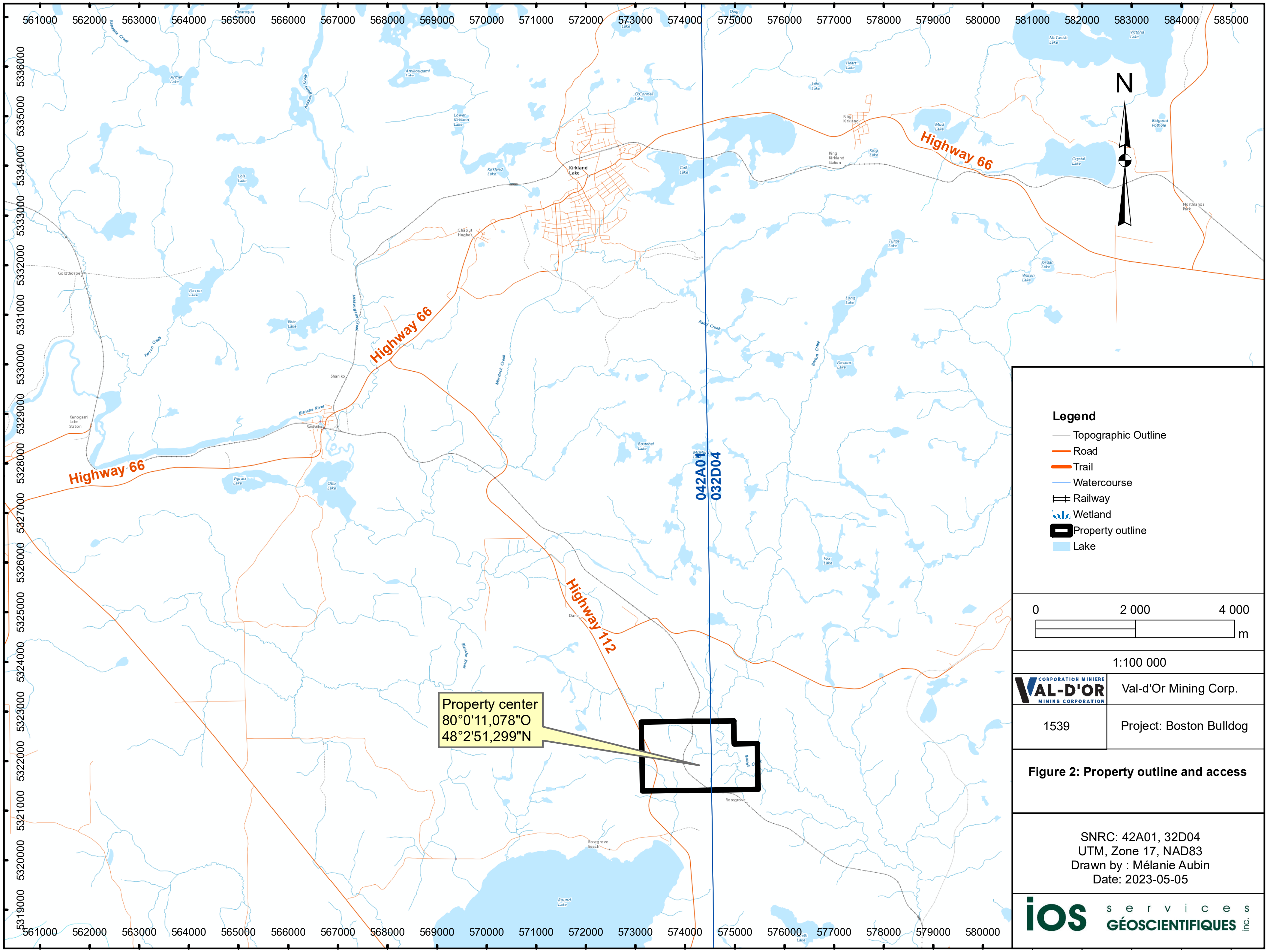
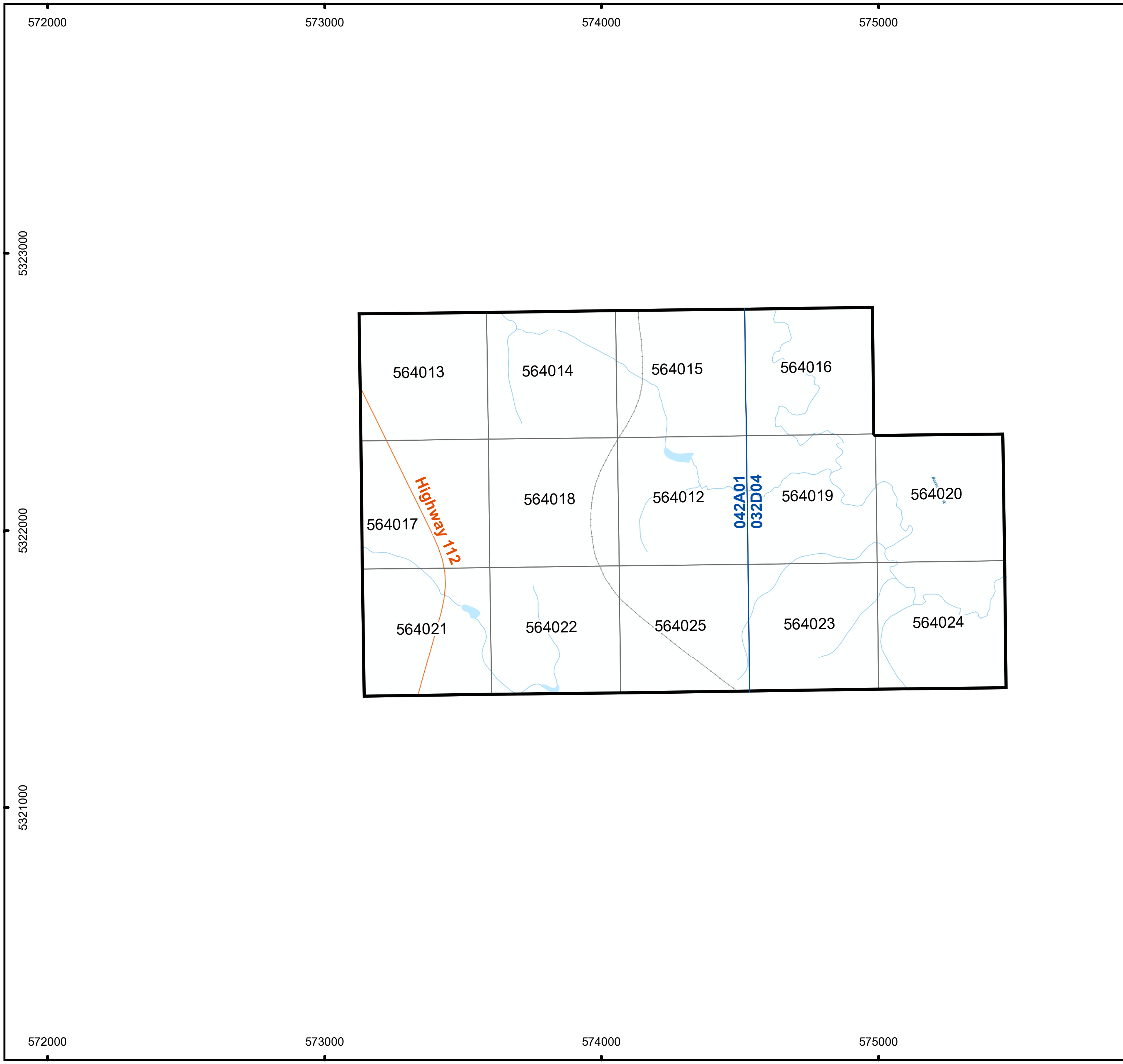


Figure 2: Property outline and access



Legend

- Topographic Outline
- Road
- Watercourse
- Railway
- Operational_Cell_Claims
- Property outline
- Lake

0 425 850 m

1:20 000

CORPORATION MINIÈRE VAL-D'OR MINING CORPORATION	Val-d'Or Mining Corp.
1539	Project: Boston Bulldog

Map 1: Designated claim cells

SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05

Hugues Longuépée, P.Geo., Ph.D.

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Climate and physiography

The British Bulldog project is located in the Lake Abitibi ecological region (3E) (Crins et *al.,* 2009) and Kirkland Lake (3E-6) ecodistrict (Wester et *al.,* 2018). The Larder River is the major river watershed in the ecodistrict and represents both the highest and lowest elevations in the ecodistrict, 503 m ASL east of Larder Lake, and 181 m ASL in the southern portion of the Larder River (Wester et *al*., 2018).

Topography in the Kirkland Lake area ranges from steep-faced cliffs to rolling hills with interceding lows. The western sector of the British Bulldog property study area is generally flat with a rolling landscape. Bedrock exposure is sporadic, generally concentrated on the edges of topographic highs (Bailey, 2009). Glaciolacustrine fine-grained deposits and thin patchy till cover much of the property.

The bioclimatic domain is the Humid Mid-Boreal Ecoclimatic Region (Ecoregions Working Group 1989) (Crins et *al.,* 2009). The forest landscape is dominated by mixed and coniferous forests including black spruce and jack pine but is also associated with different species such as birch, tamarack, balsam fir and poplar (Wester et *al.,* 2018). Mean annual precipitation ranges between 652 and 1029 mm, and mean summer rainfall is 220 to 291 mm (Crins et *al.,* 2009).

Previous work

Exploration in the Kirkland Lake- Larder Lake mining camp has been ongoing for over one hundred years. A large part of the regional mineralization in the camp is known to be associated with Timiskaming syenite and felsic intrusive rocks and is structurally controlled by second- and higher-order splays off the Cadillac-Larder Lake Deformation Zone (CLLDZ), a major deep crustal break in the Abitibi greenstone belt, which controls gold mineralization for over 200 kilometres through Ontario and Quebec (Bailey, 2009).

Thirteen documents are available on the Ontario Mineral Assessment Work database that reference exploration work performed on the British Bulldog claims or on exploration properties formerly overlapping the current property. The earliest documents related to the property date back to 1968 and exploration has been ongoing in this area since then. Assessment reports from companies' reference to work including stripping, prospecting, diamond drilling, magnetics, IP-resistivity, VLF, and geochemistry. The later includes heavy mineral stream sediment surveying, sieve fraction analysis for construction aggregate, and evaluation of the potential to extract building stone from the area.

Only limited systematic geochemical surveying has been collected on small grids in the vicinity of the British Bulldog property and it has historically targeted nearby Kirkland Lake kimberlites.

• 1969: T Martin. (File 32D04SW0363): Diamond Drilling – Boston Township In 1969 Martin drilled 3 drill holes totalling 333 feet.

• 1982-1983: Shiningtree Gold Resources Inc (File 32D04SW0314): Ground Geophysics– Boston Township In 1982 and 1983 Shiningtree performed a magnetometer and VLF survey.

• 1984: Carl Forbes (File 32D04SW0308): Sampling – Boston Township in 1984 Carl Forbes collected and assayed some samples.

• 1984: Canadian Nickel Co Ltd. (File 32D04SW0307): Geological – Boston Township In 1984 Canadian Nickel performed some cut a grid on the east side of the group. They performed geologic mapping on in this area.

• 1990: Jim Walls evaluated a property in Boston Township for potential as a source of building stone (File 42A01SE0105)

• 1996: Panterra Minerals Inc. (File 32D04SW0100): Ground Geophysical and Physical– Boston Township In 1996 Panterra performed an IP survey along with some mag/VLF. They also performed some stripping and trenching.

• 1998-2000: Pancham Mining Group Ltd. (File 32D04SW2023): Physical – Boston Township In 1998 and 1999 Pancham stripped and trenched on the property.

• 2004: Grant Forest Products performed a sieve fraction and rock properties analysis on aggregate found in Boston Township for use as construction aggregate (File 42A01SE2020)

• 2005: Belec and Laing performed a prospecting campaign on their L-1242871 and L-1242872 property in Boston Township (File 32D04SW2041)

• 2007: 6398651 Canada Inc. contracted True North Mineral Laboratories in Timmins ON to collect and evaluate stream sediments and other geochemical media for kimberlite indicator minerals (File 20003847)

• 2014-2015: Jim Forbes (File 20000014111): Physical – Boston Township In 2014 and 2015 Jim Forbes stripped and sampled on the property.

• 2021: Val-d'Or Mining Corporation contracted CXS Ltd to perform a prospecting campaign over the British Bulldog property (File: 20000019722)

REGIONAL GEOLOGY

Geological information has been obtained from the Geology Ontario database and from the Ontario Geological Survey, and includes geology, quaternary geology maps and assesment files.

The British Bulldog project is located in the southwestern Abitibi greenstone belt of the southeastern Superior province. Within the southern part of the Abitibi belt, many steeply-dipping, east-west trending, discontinuous shear zones of undetermined displacement have been identified including the Porcupine-Destor and Cadillac-Larder Lake breaks (Carmichael, 1994) which have been prolific gold exploration targets for over one hundred years. These breaks follow lithofacies boundaries for the most part, including sedimentary-volcanic interfaces. Many of the gold deposits of the area are closely associated with secondary splays originating from these shear zones (Carmichael, 1994).

The Cadillac-Larder Lake Deformation Zone (CLLDZ) is considered to be one of the most important crustal-scale structures in the Abitibi Greenstone belt (Zhang et *al*., 2013). This structural corridor extends for over one-hundred kilometres past Larder Lake to the east (Powell, 1991; and Jensen, 1996).

Rock units within this deformation zone have been subjected to variable degrees of carbonitization, sericitization, talc alteration, albitization, chloritization and silicification (Faber et *al*., 1997). Importantly, the CLLDZ is the host to a number of gold occurrences as well as former and present multi-million ounces gold producers (e.g., Kerr-Addison, Macassa, Young-Davidson) (Faber et *al*., 1997, Zhang et *al*., 2013).

The Kirkland Lake area is dominated by what is called the Upper Volcanic Cycle comprising a lower ultramafic sequence (Larder Lake group) disconformably overlain by a tholeiitic sequence (Kinojevis group) which is in turn disconformably overlain by a calc-alkalic sequence (Blake River group). This entire sequence is unconformably overlain by the late Archean Timiskaming series of clastic sediments and felsic volcanics (Carmichael, 1994).

LOCAL GEOLOGY

The general geology of the Kirkland Lake area was first described in 1967 by Rupert and Lovell at a scale of 1 inch to ½ mile (1:31,680 scale), and again by Pyke et *al*. in 1973 at a scale of 1 inch to 4 miles (1:253,440 scale; OGS Map 2205). The geology of the British Bulldog property is shown on ***figure 3***.

The intrusive stratigraphy underlying the project belongs chiefly to the Keewatin-aged intermediate to mafic flows and pyroclastics. To the south of the British Bulldog property lies a band of Keewatin-aged felsic pyroclastic rocks, and to the north are bands comprised of gabbro, diorite and lamprophyre, and a second comprised of iron formation and syn- to post-volcanic syenite, monzonite and feldspar porphyry. A thin sliver of the western border of the British Bulldog property is underlain by the middle Precambrian Otto Alkaline Syenite. (Rupert and Lovell, 1967; Pyke et *al*., 1973). The property is interpreted to lie along a northwest splay fault off the southern flank of the Kirkland Lake – Larder Lake section of the CLLDZ.

MINERAL OCCURRENCES

One gold and tungsten occurrence is reported on the Geology Ontario mineral occurrence database within the British Bulldog property (***figures 3*** and ***4***). A historic record of a former mine shaft is documented (Latitude: 48° 2' 37.29" Longitude: -80° 0' 18.48"). A second occurrence of uranium is related to an outcropping of syenite (Latitude: 48° 2' 57.3" Longitude: -80° 0' 21.47")

QUATERNARY GEOLOGY

A regional quaternary geology map is available for the area (Baker, 2000) (***figure 4***). Ice-flow indicators in Skead Township and Lebel Township, and the Munro Esker are all generally south-southeastward. The property is mostly covered by a thin blanket of glaciolacustrine material with patches of till surrounding positive topographic features.

The glacial landscape of the Kirkland Lake region was affected by glacial lakes Barlow and Ojibway that first inundated the area nearly 9,600 years ago (Dyke, 2004). As the glacial lakes followed the advance and retreat of the glaciers, wave action and fluctuating lake levels removed surficial mineral material from bedrock and depositing it on the lakebed (Wester et *al*., 2018) (***figure 4***).

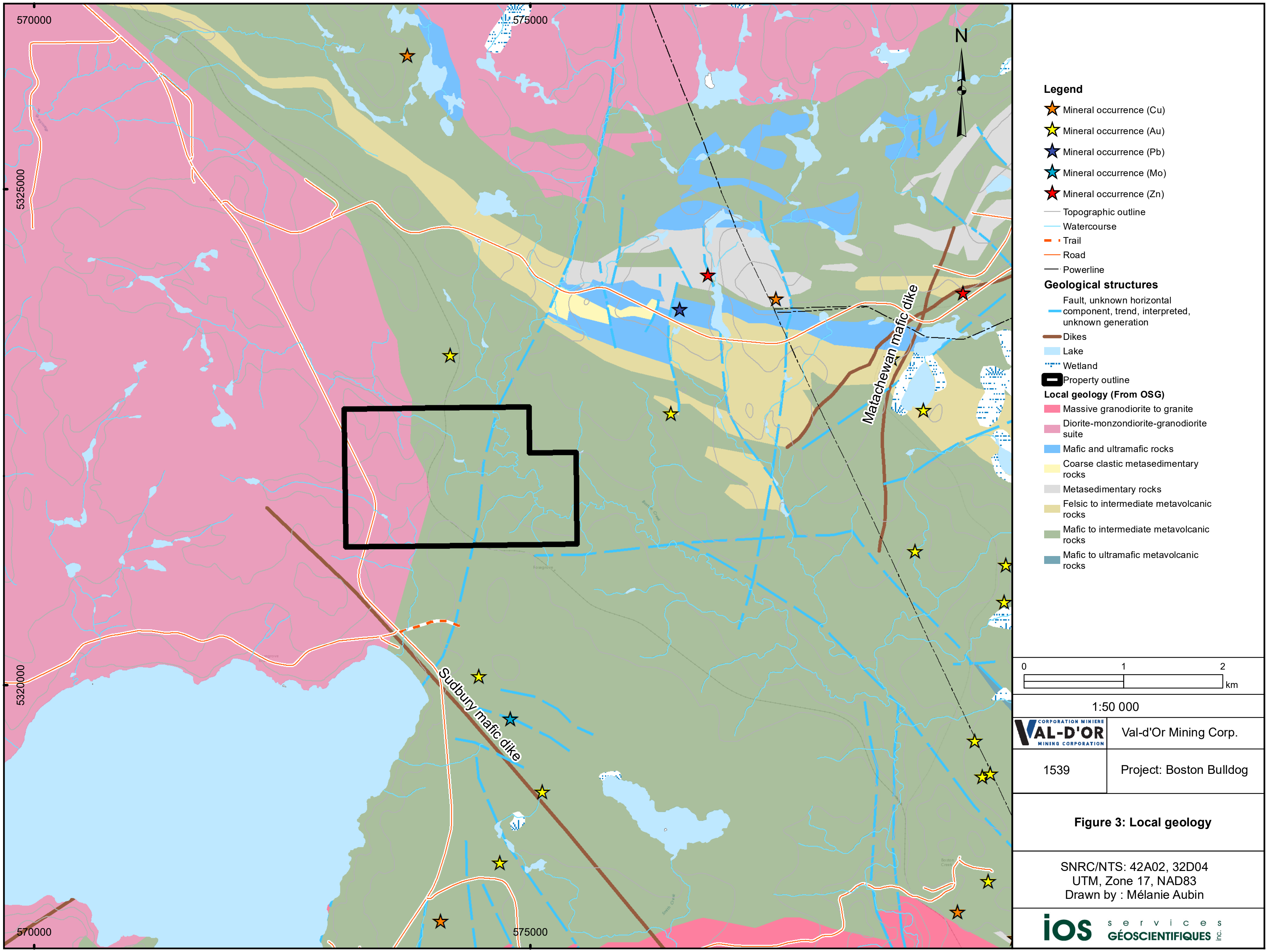
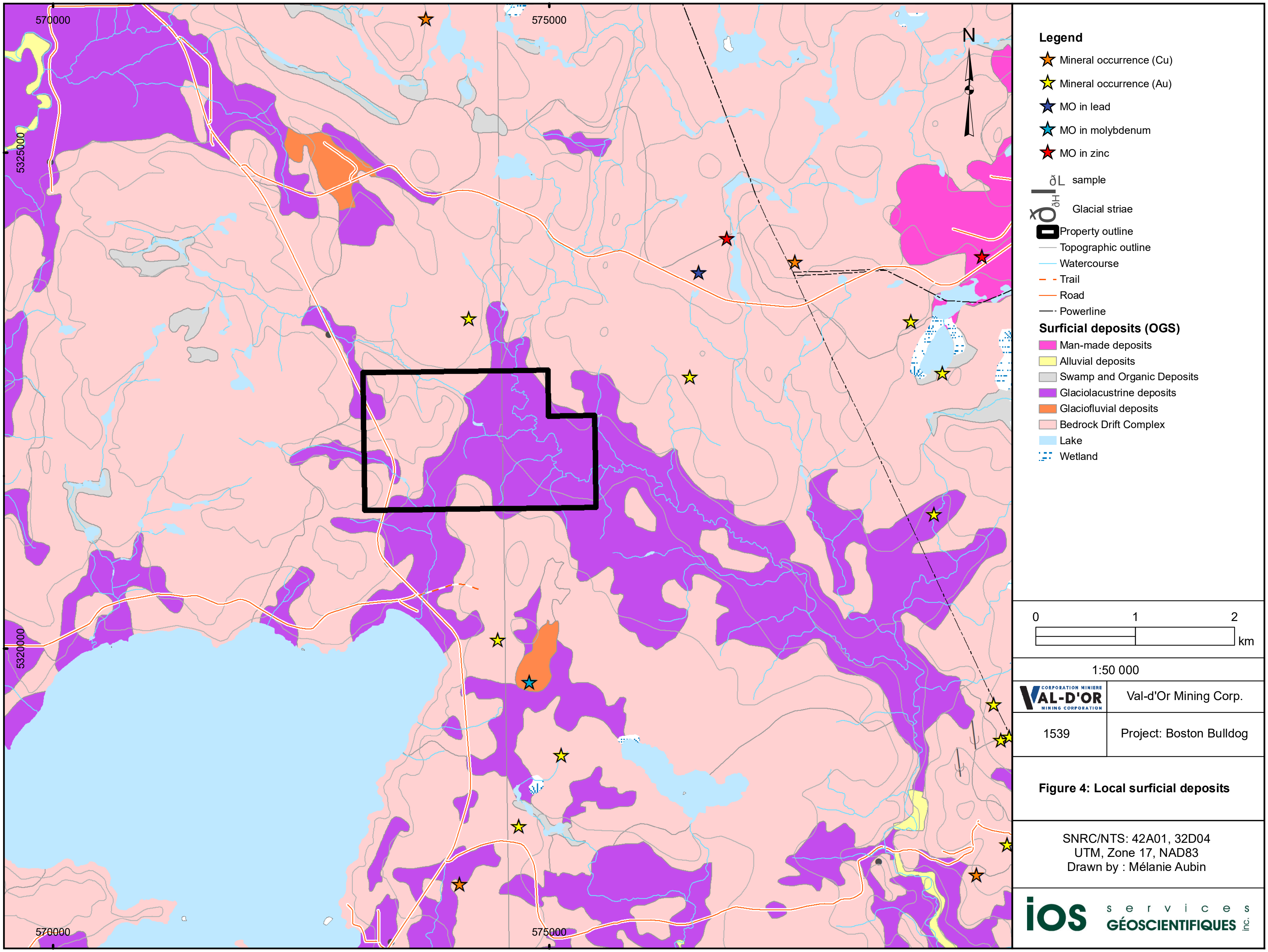


Figure 3: Local geology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Legend
Mineral occurrence (Cu)
Mineral occurrence (Au)
MO in lead
MO in molybdenum
MO in zinc
sample
Glacial striae
Property outline
Topographic outline
Watercourse
Trail
Road
Powerline
Surficial deposits (OGS)
Man-made deposits
Alluvial deposits
Swamp and Organic Deposits
Glaciolacustrine deposits
Glaciofluvial deposits
Bedrock Drift Complex
Lake
Wetland
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CORPORATION MINIÈRE VAL-D'OR MINING CORPORATION
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Figure 4: Local surficial deposits
SNRC/NTS: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
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2021 SOIL SAMPLING PROGRAM

SOIL SAMPLING SURVEY

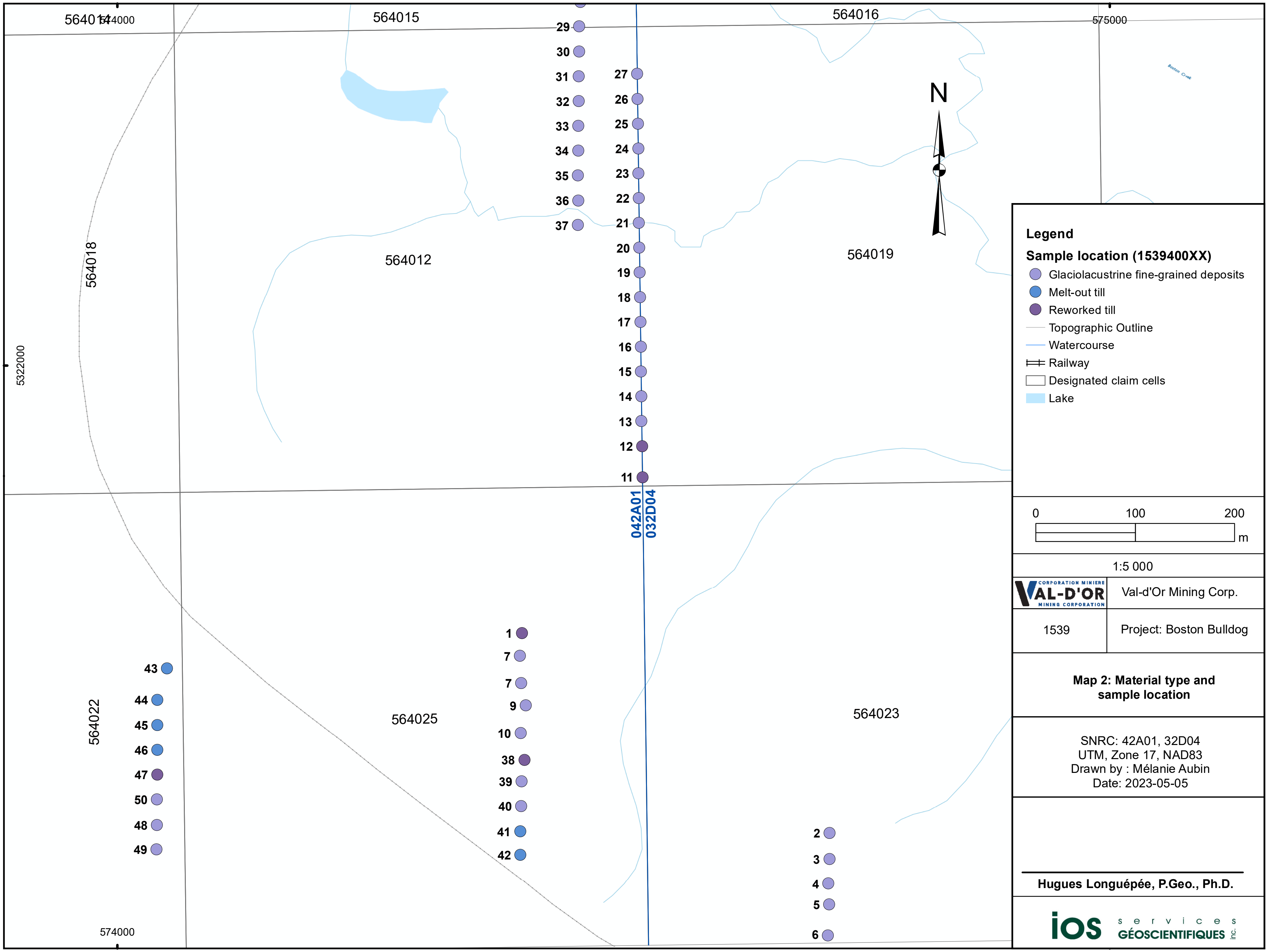
The sampling program aimed at evaluating a portion of the property's potential which is generally not outcropping and obscured by Quaternary sediments, although considered as prospective based on stratigraphy and geophysics as well as the inferred presence of an extension of the Victoria Creek fault.

The sampling grid consisted of collecting 63 samples along a series of N-S oriented grids, with 25 m spacing between samples and approximately 60 m spacing between lines, representing six lines of between 100 m and 400 m (5 to 17 samples) long. The final sampling sites were positioned by field crews according to GPS. No line cutting was required.

The sampling program was conducted by IOS staff Richard Tremblay, geologist in training, Lars Bennedsen, Patrick Larouche and Sam Villeneuve, technicians. The crew stayed at Super 8 Motel in Kirkland Lake.

A total of 50 soil samples were collected from October 22 to October 24, 2022 (see daily reports in ***appendix 1***). All soil samples weigh between 450 to 1,250 g and are free of cobbles. Hand-held XRF chemical analysis was performed on a 10 g aliquot of the sample. Sample locations and field descriptions are presented in ***appendix 2***.

The survey aimed at collecting the mineral soil directly underneath the humic soil, that can be either B or C horizon depending on drainage and permeability. Collected material includes 39 out of 50 samples were categorized as glaciolacustrine fine-grained deposits, 6 melt-out till while the remaining 5 were reworked till (***figure 5*** and ***map 2***).



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Legend
Sample location (1539400XX)
Glaciolacustrine fine-grained deposits
Melt-out till
Reworked till
Topographic Outline
Watercourse
Railway
Designated claim cells
Lake
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200
m
1:5 000
CORPORATION MINIÈRE VAL-D'OR MINING CORPORATION
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Map 2: Material type and sample location
SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05
Hugues Longuépée, P.Geo., Ph.D.
iOS services GÉOSCIENTIFIQUES inc.

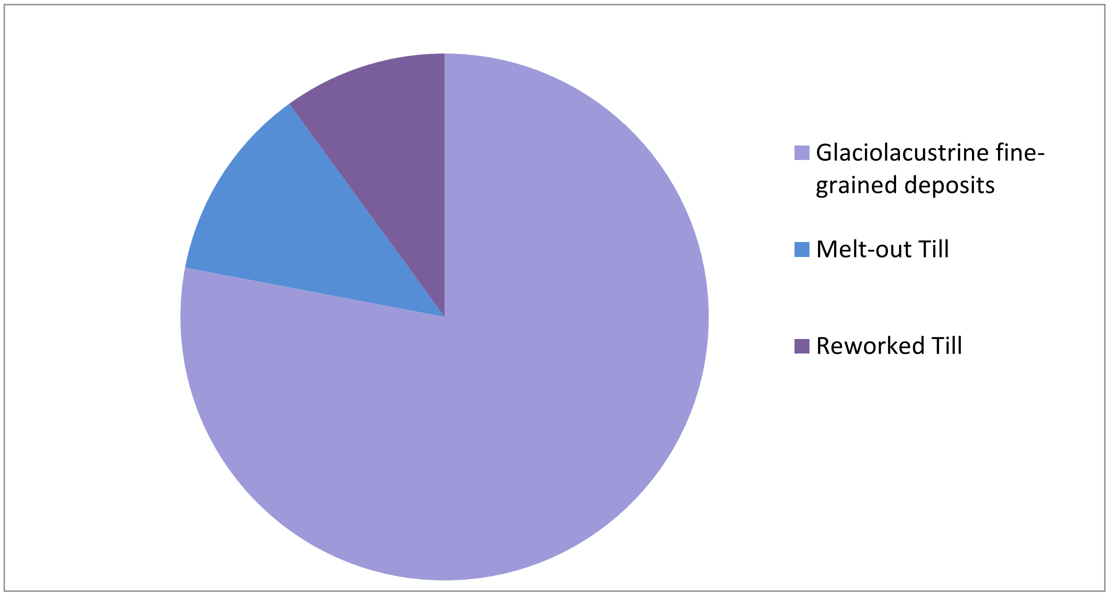


***Figure 5**: Proportion of soil sediment types sampled during the grid geochemistry survey. A total of 50 samples were collected.*

Samples were transported back to IOS facilities in Saguenay by the crew. They were prepared in IOS laboratory and shipped to ALS Minerals in Vancouver for Ionic Leach analysis.

Sampling procedure

B-horizon samples are ideally collected at the top of mineral soil, directly below the humic Ah or eluviated (Ae) horizons, within the podzolization profile (***figure 6***). Ideal material is collected in the oxidized layer which accumulates iron and manganese oxides and illuviated clays from leached minerals from topsoils and eluvial (Ae) horizon, or in the topmost C horizon if podzolization did not develop.

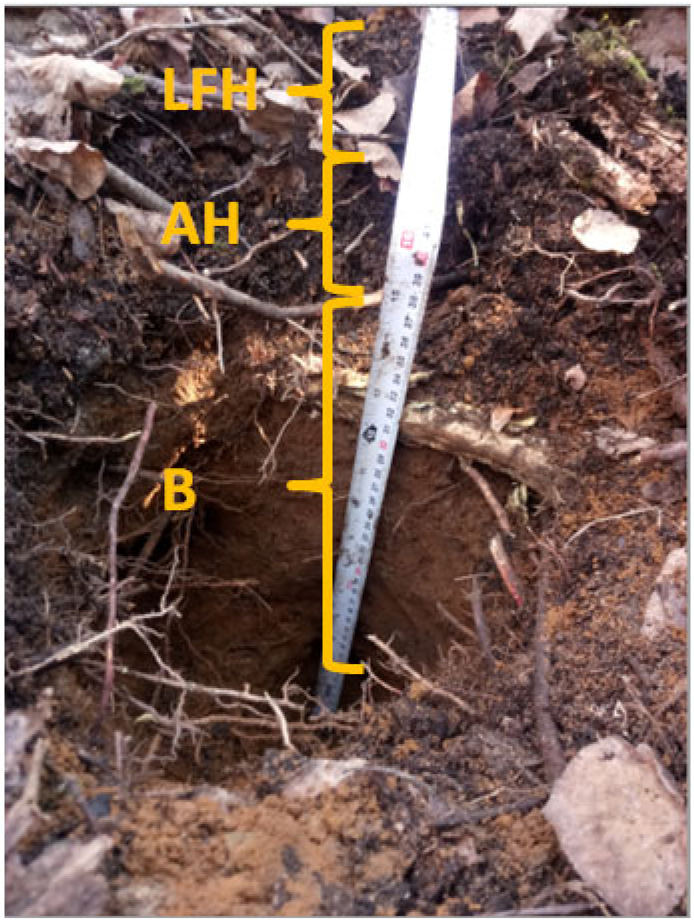


***Figure 6**: Photographs of small sampling hand-dug pit of sample 153940042 where mineral B-horizon soil is visible underneath 4 cm thick LFH horizon, 4 cm thick decomposed organic matter Ah and 1 cm thick elluviated horizon Ae. Sampling depth of this hole was 18 cm.*

Approximate sampling sites were recorded in a GPS device from a pre-selected grid on the property. Exact sites were positioned by samplers in the field according to local physiography, within a few metres of the targeted site. Relevant information from each sample site, such as soil structure, cobble composition, topography, vegetation, drainage, glacial or glaciofluvial landforms, description of surficial boulders and outcrops lithologies and photographs were recorded in a standardized coded form and captured in a numerical pad (***appendix 2**, **table 1***).

Samples were numbered as 1539**4**xxxx. The first four digits indicate the project number; the fifth digit represents the material type, and the last four digits being sequential. Soil samples were collected with a shovel or Dutch auger from 0.11 to 0.47 m deep. The shovel, auger and other equipment were cleaned and then precontaminated with local material before each use to avoid contamination from previous sites.

Sampled material was bagged in a cloth bag, protected by a plastic bag. Sample bags were prepared in advance with sample number written on each cloth bag and red flag tapes with sample number were tied on the cloth bag. Another red flag-tape with a sample number was tied to a tree to indicate sampling site. Finally, every hole was backfilled once all the information was collected, and the sample bagged.

Sample randomization

Samples were collected using sequential number according to their position along profiles. They were renumbered in a random manner prior to preparation or analysis by the laboratory. For such, a new random sample number is attributed to each sample, including the insertions of quality control material. The purpose of randomization is to discriminate sequential, or *“along-the-line*” anomalies caused by analytical issues or cross-contamination, and which could be mistaken for real anomalies in sequential sampling sites. Corresponding sample number sequences are as follows:

	Sample number	**Analysis number**
B-horizon	1539**4**xxxx	1539**8**yyyy

Environmental parameters measurements

Environmental parameters were measured on samples at the laboratory prior to randomization and preparation. The pH, δpH, Eh and TDS (conductivity) were measured on saturated paste according to usual procedures (***appendix 2**, **table 2***). The detailed protocol is presented in ***appendix 2*** and a summary of statistics are presented in ***table 1***. Measuring these parameters on water drained from cohesive clays from C-horizon is not possible. This forced the use of measurement on saturated paste, although it only represents an approximation of the *in-situ* equilibrated pH in the soil. Furthermore, molarity of the solution is modified because of the dilution by the added water or acid. Since the original water content is not measured, the initial molarity (or salinity) of the pore water cannot be calculated accurately. Preparation of the saturated paste on clay-rich material can be tedious, since no flocculation agent can be added.

Acid buffering capacity, or δpH, has been measured on every B-horizon sample by adding hydrochloric acid and measuring the resulting pH. The decrease in pH is not directly indicative of the acid buffering capacity, since such decrease depends on the initial acidity Acid buffering capacity requires to be calculated from molarity variation, and pH needs to be converted to H^+ molarity for such calculation. Therefore, a less important decrease in pH is observed for more acidic samples, such as the calcium-poor ones, which does not mean they are buffered. This phenomenon is caused by the logarithmic scale of pH measurement, compared to molarity, so much more acid is needed to fluctuate an acidic sample. As consequent, the deficiency of carbonate in regard of acid cannot be simply evaluated by the difference in pH. Soils from the current project are slightly acid, with an average acidity of 5.73 pH and a narrow standard deviation of 0.61. Still, these soils are not buffered, recording important acidification with the addition of HCl. Acid buffering capacity is an important factor controlling the metal content since it prevents fluctuation of acidity due to changes in oxygen fugacity in iron rich material.

	pH	δpH	Eh	Conductivity	LOI 700°C
Average	5.60	4.97	198 mV	163 uS/cm	6.5%
Median	5.49	4.87	194 mV	146 uS/cm	5.8%
Std-deviation	0.46	0.68	50 mV	111 uS/cm	4.5%
Coef-variation	0.08	0.14	0.25	0.68	0.69
Coef-asymmetry	1.09	1.04	0.45	2.07	3.60
Maximum	6.94	6.74	306 mV	599 uS/cm	34%
Minimum	4.76	3.81	86 mV	34 uS/cm	1.59%

Table 1*: Statistics on the various environmental parameters measured on B-horizon samples.*

Sample preparation and analysis

Upon reception of the samples and prior to any preparation, a 20 grams aliquot has been separated to perform environmental parameters measurements that require to be conducted on raw material. The remaining material was dedicated to preparation for LOI and chemical analyses.

Sample material dedicated for chemical analysis were air dried and sieved at 250 µm according to usual procedures. The detailed protocol is presented in ***appendix 2***.

Handheld X-ray fluorescence analysis was performed in-house on < 250 µm material (***appendix 3***, ***table 1***) prior to its shipment to ALS Mineral for analysis by ICP-MS methods after Ionic Leach. HH-XRF analysis provides a total determination of metal in the mineral soil, and not only the labile component as for Ionic Leach methods. The HH-XRF analyses were made with an Olympus Vanta VRM instrument, using factory calibration and Compton normalization.

The certificates of analysis are presented in ***appendix 5*** for HH-XRF analysis (IOS).

Quality control of analytical procedures

In order to monitor analyses quality, a strict QAQC program was enforced. The program includes systematic insertion of blanks, certified and internal reference material prior to shipments to the commercial laboratories as well as for the in-house analyses. The blanks are used to detect contamination issues and sample mixing, while the certified and internal reference material served to check respectively accuracy and precision of the analytical technique. Analytical quality control is detailed in ***appendix 4***.

No reference materials exist for B-horizon analysis with Ionic Leach. To circumvent the situation, a large sample was collected in the field specifically for this type of survey and used as internal reference material (MRIHB22). The material has been dried, sieved to 250 microns, homogenized and aliquoted with a riffle splitter. Long term statistics are not available since it has been recently manufactured so precision cannot be accurately monitored for the moment and regional averages are not available yet. Blank material consists of - 90 µm pulverized quartz, used since 2012, although the currently used batch was made in 2020. ALS analytical laboratories inserted their own quality control material including reactant blanks, certified and internal reference materials. Analytical replicates were performed by ALS, and no sample duplicates were collected in the field. ALS quality control will be presented in another report. This quality control protocol is implemented as a routine by the contractor and applied to all similar projects.

HH-XRF analyses were conducted using the factory calibration, without calibration on reference material. Trace elements abundances are calculated using Compton normalization, by which the abundance is a direct function of the normalized peak intensity. Consequently, uncalibrated elemental abundance is expected to be precise (properly replicated with a low variance), but not accurate (potentially deviating from the true value) and can hence be used in a relative manner since peak intensity is a linear function of elemental abundance. On XRF spectrums, measuring abundant elements is more difficult due to matrix (ZAF) corrections and requires Pouchou-Pichoir matrix corrections. Abundance in then not an exact linear function of peak intensity, and results cannot be post-calibrated by simply correcting to a reference material. Severe discrepancies were noted for light elements ($Z<19$ or potassium), due to low-energy X-ray absorption in air, a normal issue with this type of instrument. Consequently, silicium and aluminium are significantly underestimated. Magnesium measurements are qualitative only, while sodium is not measured.

Results

Conventional approach in exploration geochemistry is to assume the metal abundance, in a specific set of samples is indicative of the metal availability, and hence the proximity of a metal source. Metals are assumed to be associated in a similar manner as is mineral deposits, so their association in samples is assumed to be the signature of such deposits. HH-XRF analyses are total measurement of the metal abundance, meaning that it is not sensitive to metal speciation, of if the metal is present as labile or refractory minerals. Samples collected in C horizon are assumed as being essentially made of detrital minerals, and hence the chemical signature is assumed to represent an average composition of the source rock, which signature has been displaced by the various sedimentary and glacial processes. Material from B horizon are made of the same detrital material as C horizon, which however underwent weathering, so destruction of fragile minerals leaving an aluminous-rich clay residue, plus iron-oxide and/or calcium carbonate precipitate. Hydromorphic metals, such as those adsorbed on clays, are not expected to contribute significantly to the metal content of the samples. Total metal abundance in mineral soil is not significantly affected by environmental parameters (pH, Eh, etc.) and these can be neglected in their interpretation, although they are required for the Ionic Leach interpretation.

In order to facilitate selection of anomalies and comparison between various metals, the measured abundances, provided in ppm by the instrument, has been converted into Z-Score of the logarithms. Values must be converted into logarithms since metal abundance for trace elements follows a log-logit distribution, which is approximated by a lognormal distribution for trace metals. The Z-Score represent the number of log-standard-deviation a specific value deviate from its log-average, with values below average being attributed a zero value. Analytical results below detection limits were replaced by the lowest value of the population, considering that detection limits of the methods vary from sample to sample depending on its matrix. Since samples are dominated by detrital material, their homogeneity can be observed by the low variance of major element abundance, such as silica with variation coefficient of 11% and aluminium at 12% and most trace metal with a variation coefficient lesser than 25% (ie, the standard deviation being less than a quarter of the average on the arithmetical scale).

Abundance of significant metals, including copper, nickel, zinc, lead, and chromium, are provided on ***maps 3*** to ***7***, where abundance is indicated by dot size on a Z-Score scale with real abundance in ppm as label (***table 2***). Dot colour relates to overburden type. Since HH-XRF analyses measure the total abundance of the metals, these are assumed being dominated by detrital minerals or their weathered counterparts, plus a certain proportion of precipitates such as ferric iron and carbonates.

Analysis performed by HH-XRF are not very accurate, and significant discrepancies can be induced by improper calibration or sample heterogeneity. The absolute metal abundance measurement shall then be used with caution. Conversion to log-Z-Score minimize this effect, and do not modify their centile distribution.

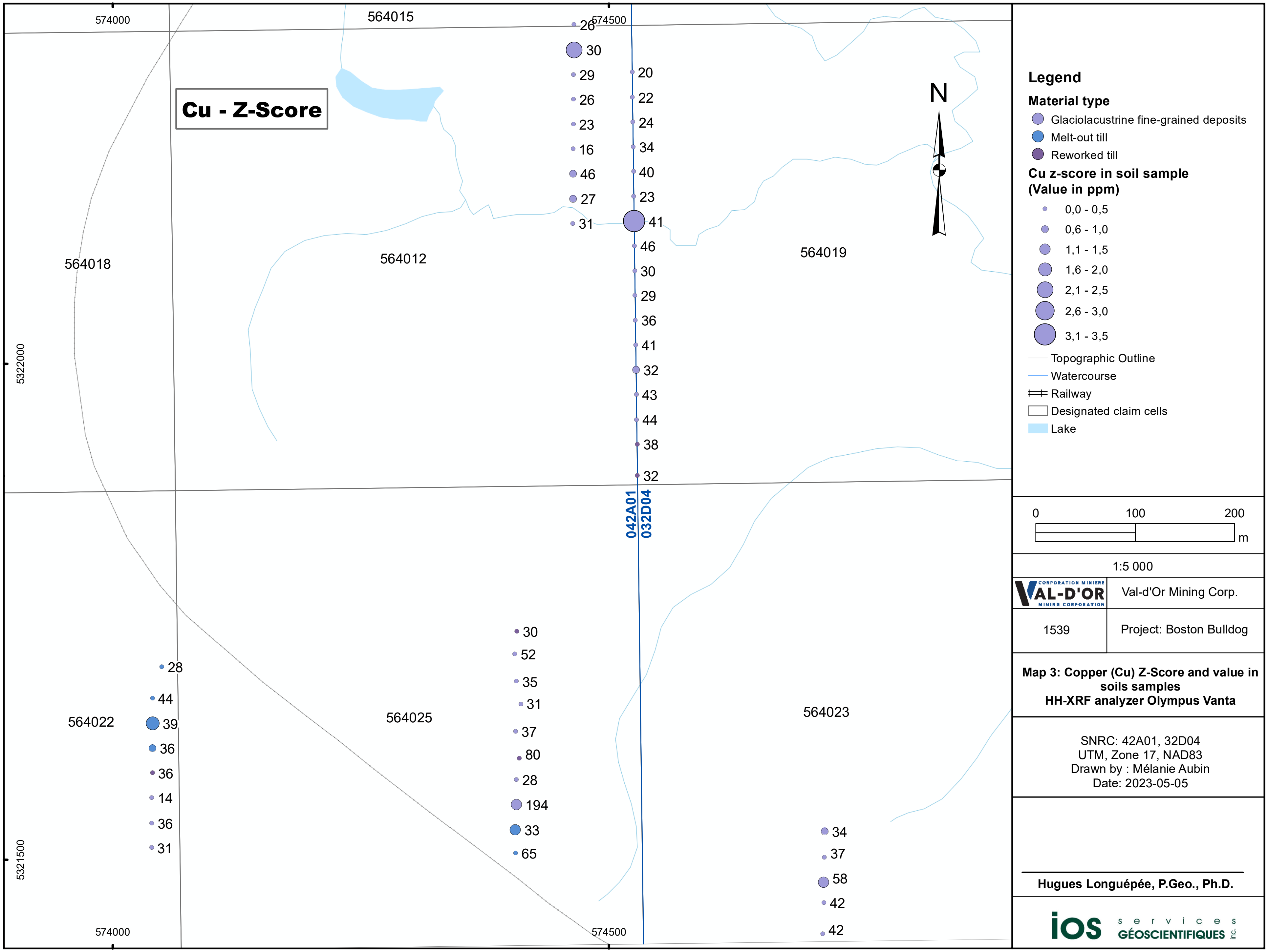
Percentile	Cu	Ni	Zn	Pb	Cr
66^{e}	37,64	71,00	110,28	21,00	104,64
85^{e}	44,05	74,05	130,05	23,05	146,05
95^{e}	60,80	88,80	138,40	28,00	220,40
99^{e}	135,86	109,33	187,64	29,47	253,86
99.8^{e}	182,60	116,30	202,40	30,70	259,60

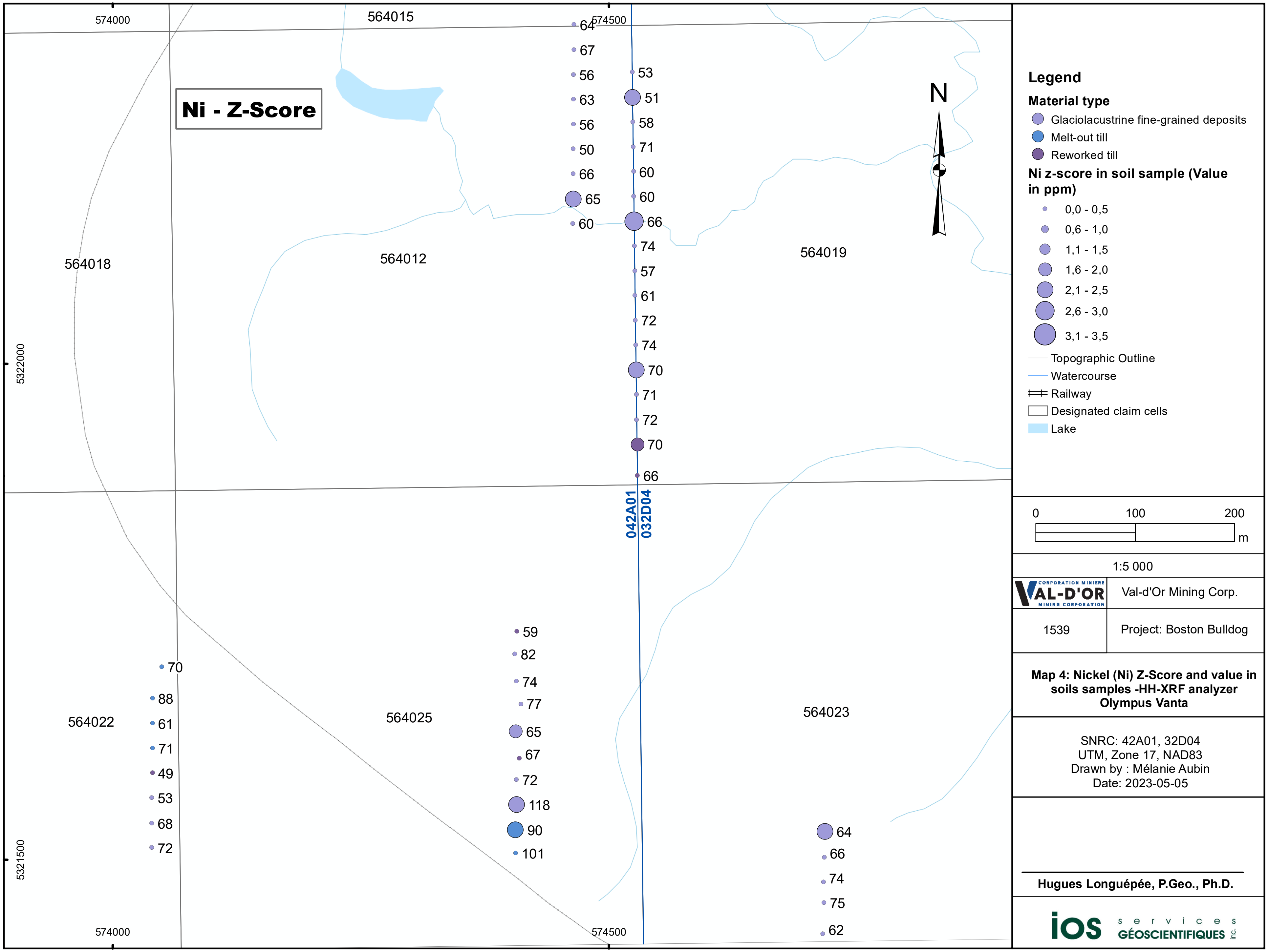
***Table 2**: Percentiles for major metals of interest, expressed as ppm abundances.*

Copper, zinc and nickel are chalcophile elements that typically substitutes to iron in sulphides or to magnesium in ferromagnesian silicate. Although the presence of sulphide cannot be confirmed by the actual method, these can be suspected at the moment these metal abundances exceed what is usually partitioned into silicates or spinels. These metals are typically not accumulation in iron-oxide precipitate, and the contribution of labile cations adsorbed to clays is assumed as negligible.

Copper (***map 3***) is not abundant, spanning from 14 to 194 ppm, with a log-average of 36.3 ppm and a maximum Z-score of 3.24. No extreme values are detected, which could be unequivocally considered as anomalous, despite the variation coefficient being almost 11%, or no order of magnitude higher that what is recorded for major oxides. Enriched samples, in excess of 30 ppm, are variably glaciomarine clays and different type of till. A few tens of ppm of copper are commonly present in ferromagnesian minerals, such as chlorite or amphiboles, and it is likely that the current recorded abundance is from such detrital minerals. The author is reluctant to conclude to the presence of sulphides. Copper is slightly enriched in a few clusters of samples, such as on the northern part of the grid.

Nickel (***map 4***) is not abundant, spanning from 49 to 118 ppm (0.0049 to 0.0118%), with a log-average of 174 ppm and a maximum Z-Score of 2.57. Such abundance can be hosted in ferromagnesian minerals and the presence of sulphides is likely not required even for the richest samples. Highest abundances are dominantly in glaciomarine clays and melt-out till. Its distribution is quite mimics that of copper, supporting a common source from ferromagnesian mineral. The current nickel abundance does not require the presence of nickel sulphides in the sediments and cannot be taken as indicative of nickel mineralization.


Cu - Z-Score
564015
564018
564012
564019
564022
564025
564023
574000
574500
5322000
5321500
042A01
032D04
N
26
30
29
26
23
16
46
27
31
20
22
24
34
40
23
41
46
30
29
36
41
32
43
44
38
32
30
52
35
31
37
80
28
194
33
65
28
44
39
36
36
14
36
31
34
37
58
42
42
Legend
Material type
Glaciolacustrine fine-grained deposits
Melt-out till
Reworked till
Cu z-score in soil sample
(Value in ppm)
0,0 - 0,5
0,6 - 1,0
1,1 - 1,5
1,6 - 2,0
2,1 - 2,5
2,6 - 3,0
3,1 - 3,5
Topographic Outline
Watercourse
Railway
Designated claim cells
Lake
0
100
200
m
1:5 000
CORPORATION MINIÈRE
VAL-D'OR
MINING CORPORATION
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Map 3: Copper (Cu) Z-Score and value in soils samples
HH-XRF analyzer Olympus Vanta
SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05
Hugues Longuépée, P.Geo., Ph.D.
ios
services
GÉOSCIENTIFIQUES inc.



Ni - Z-Score
564015
564018
564012
564019
564022
564025
564023
574000
574500
5322000
5321500
042A01
032D04
N
64
67
56
63
56
50
66
65
60
53
51
58
71
60
60
66
74
57
61
72
74
70
71
72
70
66
59
82
74
77
65
67
72
118
90
101
70
88
61
71
49
53
68
72
64
66
74
75
62
Legend
Material type
Glaciolacustrine fine-grained deposits
Melt-out till
Reworked till
Ni z-score in soil sample (Value in ppm)
0,0 - 0,5
0,6 - 1,0
1,1 - 1,5
1,6 - 2,0
2,1 - 2,5
2,6 - 3,0
3,1 - 3,5
Topographic Outline
Watercourse
Railway
Designated claim cells
Lake
0
100
200
m
1:5 000
CORPORATION MINIÈRE
VAL-D'OR
MINING CORPORATION
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Map 4: Nickel (Ni) Z-Score and value in soils samples -HH-XRF analyzer Olympus Vanta
SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05
Hugues Longuépée, P.Geo., Ph.D.
ios services GÉOSCIENTIFIQUES inc.

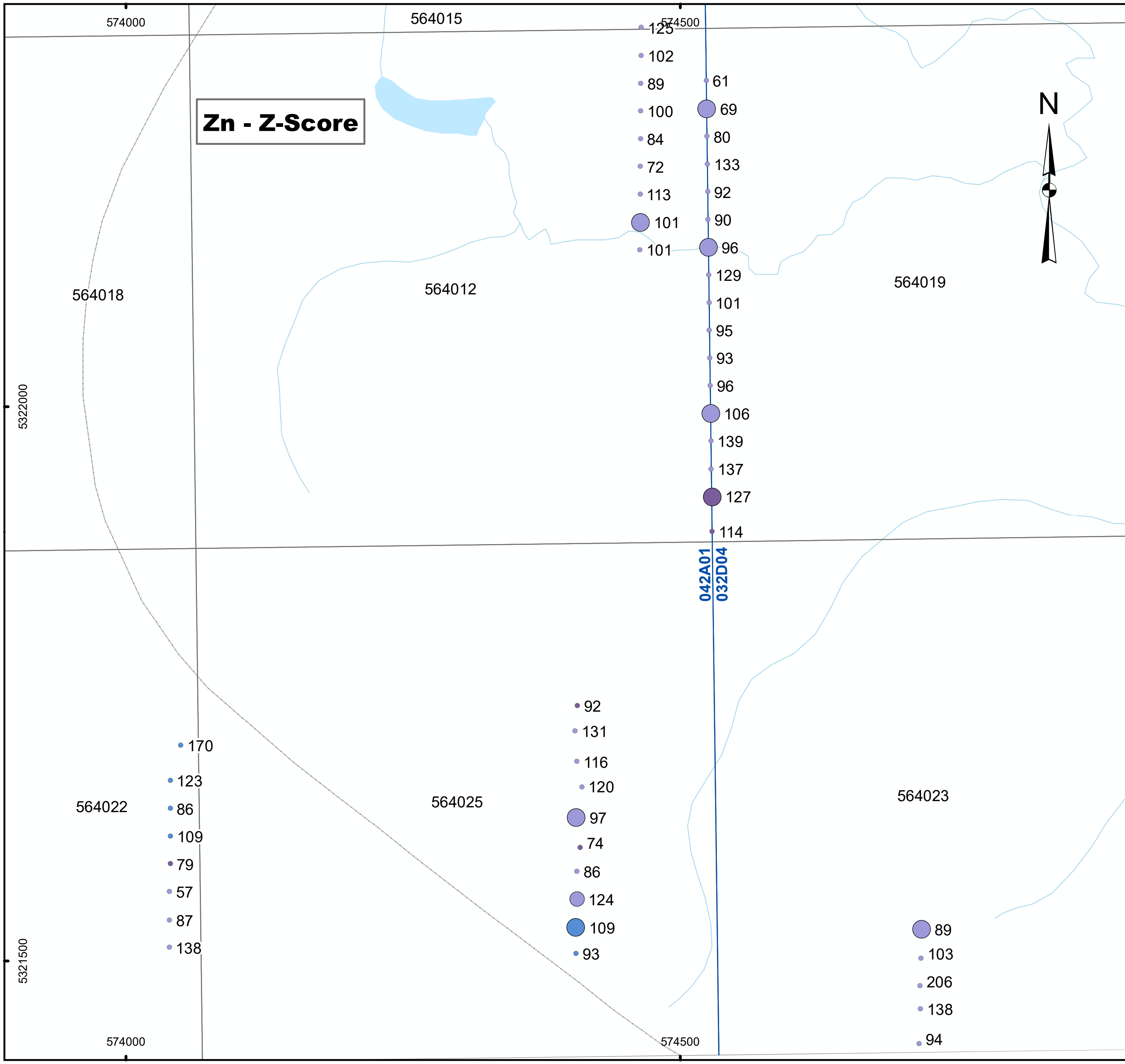
Zinc (***map 5***) is not abundant, spanning from 57 to 206 ppm, with a log-average of 191 ppm and a maximum Z-score of 2.2. Richest samples, in excess of 100 ppm, are variably in glaciolacustrine clays or different type of tills. Zinc is typically present up to a few hundreds of ppm in ferromagnesian minerals, which can easily account for the current values. No zinc mineralization is required to generate the current abundance. Enriched samples occur in clusters, such as in the north of the grid, some of which are also enriched in copper and nickel.

Lead (***map 6***) is not abundant, spanning from 13 to 31 ppm, with a log-average of 26 ppm and a maximum Z-score of 2.47. Enriched samples, in excess of 20 ppm, are dominantly glaciomarine clays or different type of tills. Although commonly associated with copper and zinc in various type of sulphidic mineralization, most of lead in common rock is hosted in feldspar, zircon, and a wide variety of other common minerals. Also, contrary to most other metals, lead is stable as sulphate in acidic environment, and can precipitate in heavily illuviated soils or gossans. Distribution of lead-rich sample is similar of nickel, copper and zinc.

Chromium (***map 7***) is a trivalent transition metal that partition either in iron oxide or to a lesser extent in ferromagnesian minerals. Chromium range up to 247 ppm, with a log-average of 158 ppm and a maximum Z-score of 2.0. Richest samples are variously glaciomarine clay or different type of tills. They form diffuse clusters of samples, the same as for nickel, copper and zinc.

Conclusions

No prominent metallic anomaly is detected with the HH-XRF results in samples from this survey. This method measures the total abundance of the metals regardless of in which mineral they are hosted. Since the samples were either glaciolacustrine clays or unweathered till, it is expected that samples are made dominantly of detrital mineral. Current abundances are comparable to what would be present in a normal sediment. Most transition metals can substitute in ferromagnesian minerals, and the current abundance is comparable to what would be expected in such minerals in a normal proportion of the sediments. No metal abundance requiring the presence of sulphide is detected, which sulphides not being expected to survive the sojourn in surface oxidizing water. The bulk of the metal of interest in then expected to be host is common silicate and iron oxide, the distribution of which being quite homogenized by sedimentation processes Consequently, no mineral occurrence is requires to generate the current abundance.



Legend

Material type

- Glaciolacustrine fine-grained deposits
- Melt-out till
- Reworked till

Zn z-score in soil sample (Value in ppm)

- 0,0 - 0,5
- 0,6 - 1,0
- 1,1 - 1,5
- 1,6 - 2,0
- 2,1 - 2,5
- 2,6 - 3,0
- 3,1 - 3,5

- Topographic Outline
- Watercourse
- Railway
- Designated claim cells
- Lake

0 100 200 m

1:5 000

VAL-D'OR CORPORATION MINIÈRE MINING CORPORATION | Val-d'Or Mining Corp.

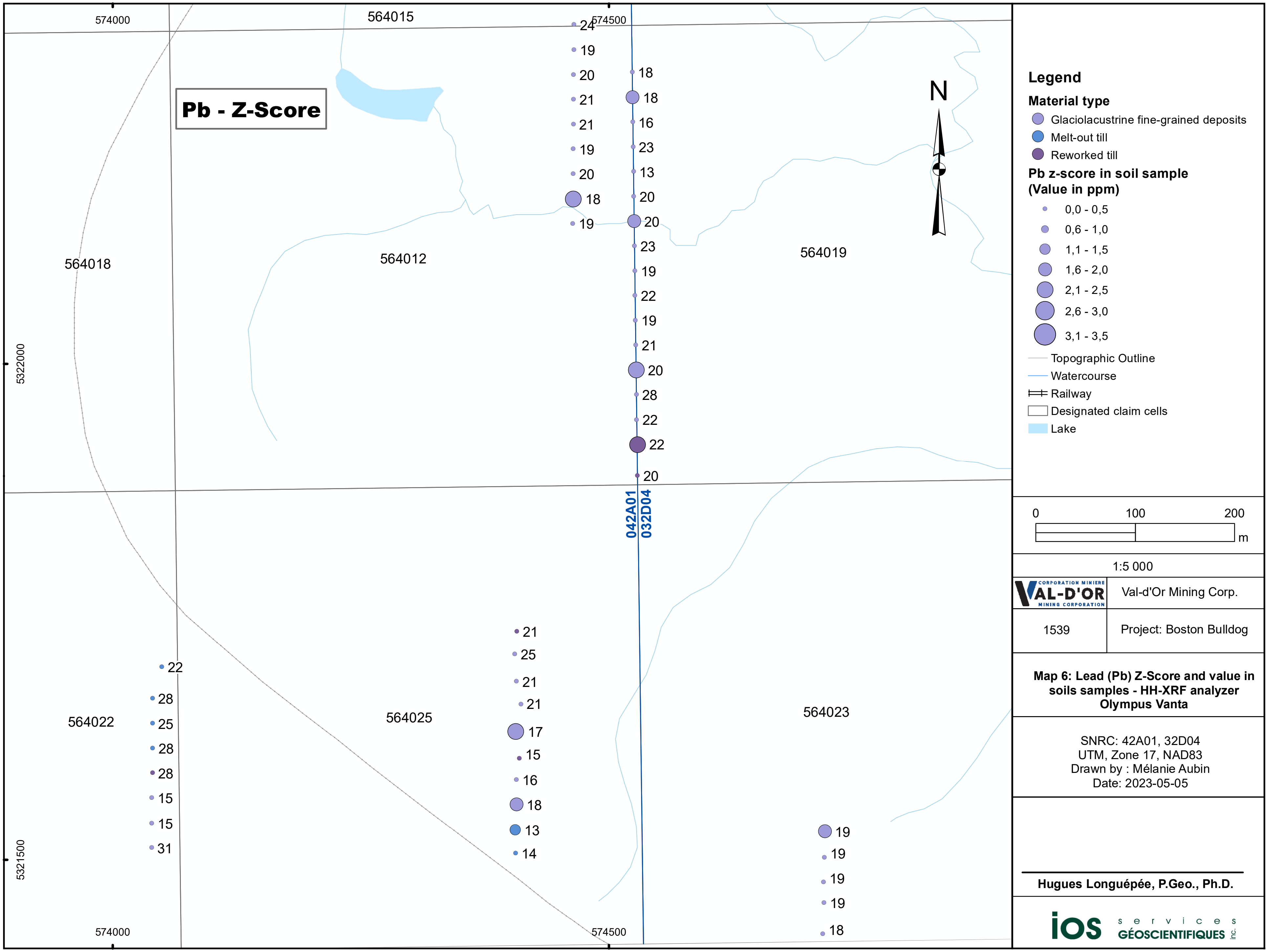
1539 | Project: Boston Bulldog

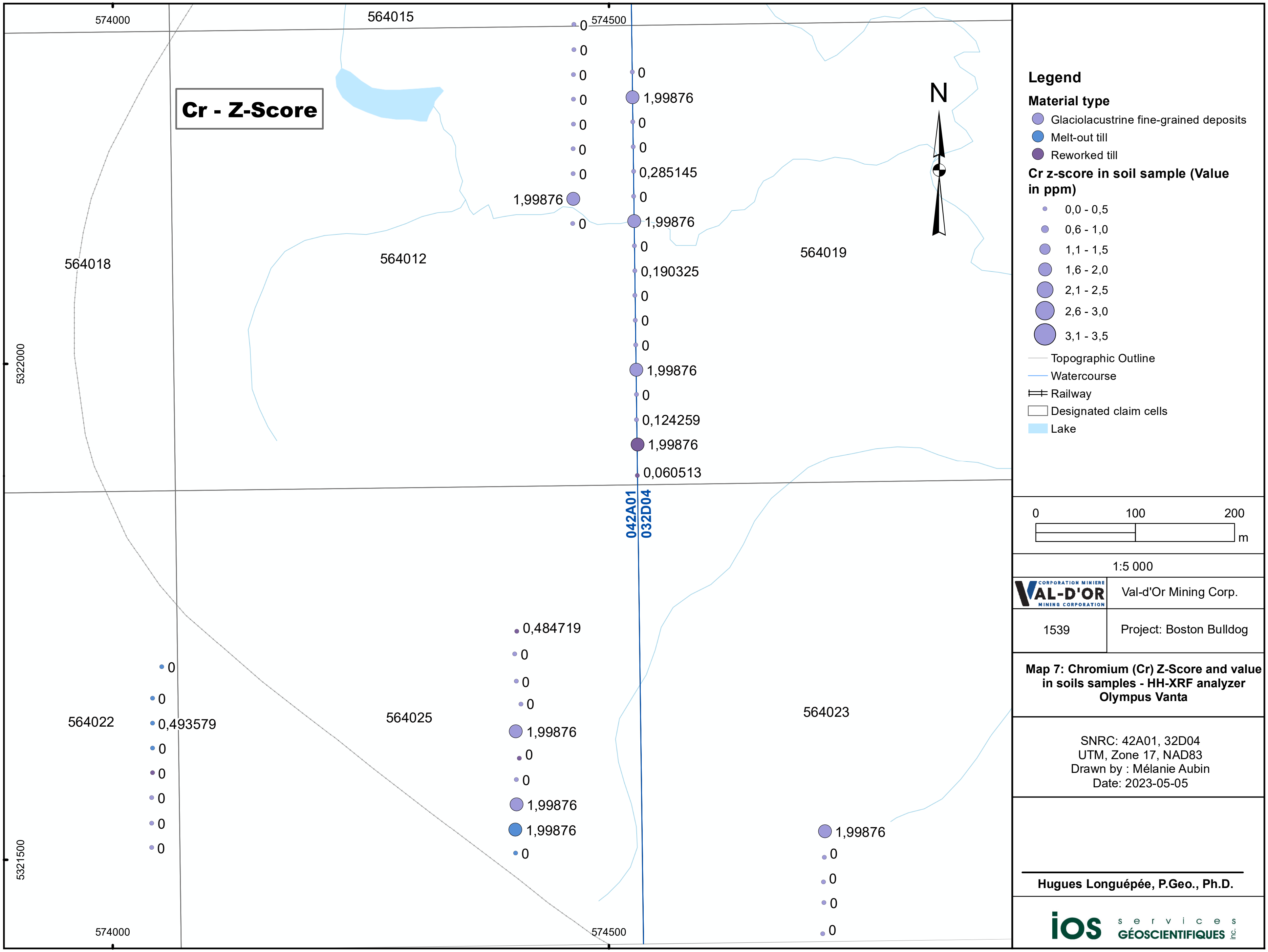
Map 5: Zinc (Zn) Z-Score and value in soils samples - HH-XRF analyzer Olympus Vanta

SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05

Hugues Longuépée, P.Geo., Ph.D.

ios services GÉOSCIENTIFIQUES inc.


Pb - Z-Score
N
574000
574500
5322000
5321500
564015
564018
564012
564019
564022
564025
564023
042A01
032D04
24
19
20
21
21
19
20
18
19
18
18
16
23
13
20
20
23
19
22
19
21
20
28
22
22
20
21
25
21
21
17
15
16
18
13
14
22
28
25
28
28
15
15
31
19
19
19
19
18
Legend
Material type
Glaciolacustrine fine-grained deposits
Melt-out till
Reworked till
Pb z-score in soil sample
(Value in ppm)
0,0 - 0,5
0,6 - 1,0
1,1 - 1,5
1,6 - 2,0
2,1 - 2,5
2,6 - 3,0
3,1 - 3,5
Topographic Outline
Watercourse
Railway
Designated claim cells
Lake
0
100
200
m
1:5 000
VAL-D'OR
CORPORATION MINIERE
MINING CORPORATION
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Map 6: Lead (Pb) Z-Score and value in soils samples - HH-XRF analyzer Olympus Vanta
SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05
Hugues Longuépée, P.Geo., Ph.D.
ios services GÉOSCIENTIFIQUES inc.


Cr - Z-Score
N
574000
574500
5322000
5321500
564015
564018
564012
564019
564022
564025
564023
042A01
032D04
0
1,99876
0,285145
0,190325
0,124259
0,060513
0,484719
0,493579
Legend
Material type
Glaciolacustrine fine-grained deposits
Melt-out till
Reworked till
Cr z-score in soil sample (Value in ppm)
0,0 - 0,5
0,6 - 1,0
1,1 - 1,5
1,6 - 2,0
2,1 - 2,5
2,6 - 3,0
3,1 - 3,5
Topographic Outline
Watercourse
Railway
Designated claim cells
Lake
0
100
200
m
1:5 000
CORPORATION MINIÈRE
VAL-D'OR
MINING CORPORATION
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Map 7: Chromium (Cr) Z-Score and value in soils samples - HH-XRF analyzer Olympus Vanta
SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05
Hugues Longuépée, P.Geo., Ph.D.
ios services GÉOSCIENTIFIQUES inc.

The samples with marginal enrichment in metal are disseminated along the northeastern profile and the middle southern profile, as expressed by the average Z-score of the metal of interest (***map 8***). These samples consist of glaciolacustrine clays or different type of glacial sediments. Tills are more susceptible to be heterogeneous and prone to preserve local metal enrichment, these current abundances are still typical of tills. However, some glaciolacustrine samples show local diffuse enrichments, the meaning of which remains uncertain.

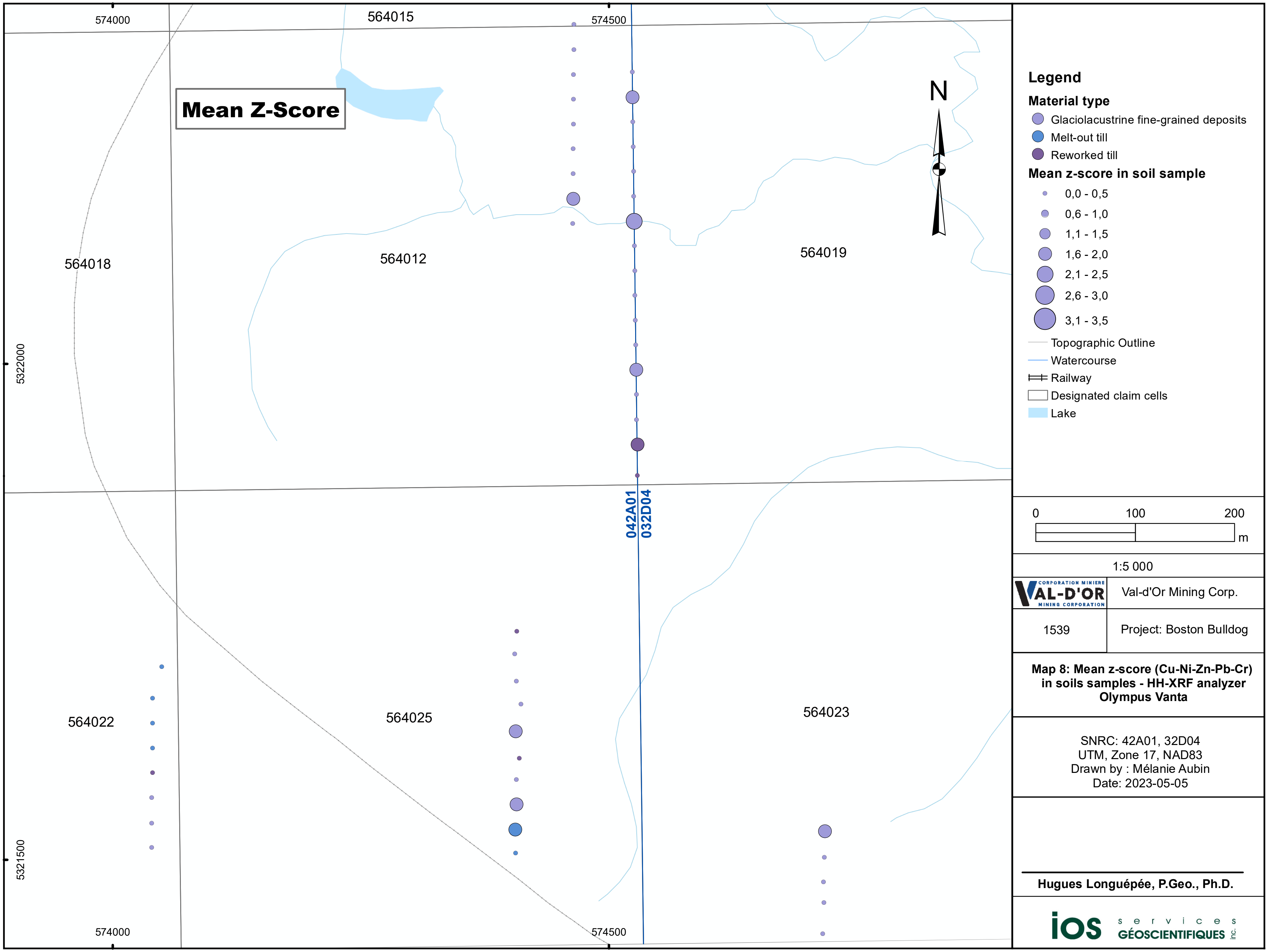
Hydromorphic enrichment of metals is typically not detected by HH-XRF, being two to three orders of magnitude less intense than the background metal abundance in glacial sediments. Ionic Leach analyses, currently pending at the laboratory, will be required to properly evaluate the current survey.

None of the known mineral occurrence within or near the property caused a significant geochemical anomaly in the quaternary sediment detectible with the current method.

Respectfully submitted,

1539-2022_Report_Soils
Boston Bulldog, May 8th, 2023

Hugues Longuépée, P.Geo., Ph.D.
PGO #XXX
Geosciences Manager
IOS Services Géoscientifiques



Mean Z-Score
564015
564018
564012
564019
564022
564025
564023
574000
574500
5322000
5321500
042A01
032D04
N
Legend
Material type
Glaciolacustrine fine-grained deposits
Melt-out till
Reworked till
Mean z-score in soil sample
0,0 - 0,5
0,6 - 1,0
1,1 - 1,5
1,6 - 2,0
2,1 - 2,5
2,6 - 3,0
3,1 - 3,5
Topographic Outline
Watercourse
Railway
Designated claim cells
Lake
0
100
200
m
1:5 000
Val-d'Or Mining Corp.
1539
Project: Boston Bulldog
Map 8: Mean z-score (Cu-Ni-Zn-Pb-Cr) in soils samples - HH-XRF analyzer Olympus Vanta
SNRC: 42A01, 32D04
UTM, Zone 17, NAD83
Drawn by : Mélanie Aubin
Date: 2023-05-05
Hugues Longuépée, P.Geo., Ph.D.
ios services géoscientifiques inc.

Contributions:

Natacha Fournier, P.Geo., scientific revision
Véronique Bouchard, chemist, quality control
Karine Desbiens, edition
Mélanie Aubin, biologist, drawing

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APPENDIX 1

DAILY REPORTS

RAPPORT JOURNALIER	Date : 2022-22-10	PROJET :1539	CAMPEMENT : Prospector Inn	Weather :
		CLIENT : Boston Bouldog	RESP : PL	SIGNATURE :
		APPEL QUOTIDIEN :		

COMMENTAIRES SUR LES TRAVAUX : Mobilisation from Chicoutimi-Kirkland Lake.

PERSONNEL	TACHES	No Projet	Couché	Heures	Hors camps	Echant : De	Echant : A	FACT.
Samuel Villeneuve	Technician	1539	Oui	11.5				
Patrick Larouche	Senior Technician	1539	Oui	11.5				
Richard Tremblay	Geologist-in-Training	1539	Oui	11.5				
Lars Bennedsen	Technician	1539	Oui	11.5				

VOLS D'HYDRAVIONS :		AVARIS MECANIQUES:
TEMPS D'HELICOPTERE :		ACCIDENTS :
VOYAGES DE CAMION : .		TEMPS MORT :
EXPEDITION D'ECHANTILLONS :		AMELIORATIONS A PREVOIR :
ACHATS : Gaz + food		
MOBILISATION :		
DEMOBILISATION : All team Chicoutimi - Kirkland Lake		
FORAGE- # TROU :		VERIFICATION :
BUDGET RESIDUEL :	DEPENSES :	FACTURATION :

IOS Services Géoscientifiques Inc

RAPPORT JOURNALIER	Date : 2022-23-10	PROJET :1539	CAMPEMENT : Prospector Inn	Weather : Sunny all day
		CLIENT : Boston Bouldog	RESP : PL	SIGNATURE :
		APPEL QUOTIDIEN :		

COMMENTAIRES SUR LES TRAVAUX : We start the day at 7:00 am. Lars and Richard took the to big lines of the north. Me and Sam did the south area. All team members meet at target 034. We finish the last line all together. 50 samples was taken. We arrived at the prospector inn around 3:45 pm. I did transfert all the tablets and gps to put the new projet in. The guys prepare evertyhing for leaving tomorrow at 7:00 am. Bill came around 5:00 pm to pickup the standard.

PERSONNEL	TACHES	No Projet	Couché	Heures	Hors camps	Echant : De	Echant : A	FACT.
Samuel Villeneuve	Technician	1539	Oui	11.5				
Patrick Larouche	Senior Technician	1539	Oui	11.5				
Richard Tremblay	Geologist-in-Training	1539	Oui	11.5				
Lars Bennedsen	Technician	1539	Oui	11.5				

VOLS D'HYDRAVIONS :		AVARIS MECANIQUES:
TEMPS D'HELICOPTERE :		ACCIDENTS :
VOYAGES DE CAMION : .		TEMPS MORT :
EXPEDITION D'ECHANTILLONS :		AMELIORATIONS A PREVOIR :
ACHATS : Food		
MOBILISATION :		
DEMOBILISATION :		
FORAGE- # TROU :		VERIFICATION :
BUDGET RESIDUEL :	DEPENSES :	FACTURATION :

IOS Services Géoscientifiques Inc

RAPPORT JOURNALIER	Date : 2022-24-10	PROJET :1539/1467	CAMPEMENT : Prospector Inn / Camp Urbain	Weather : Sunny all day
		CLIENT : Boston Bouldog	RESP : PL	SIGNATURE :
		APPEL QUOTIDIEN :		

COMMENTAIRES SUR LES TRAVAUX : We left Kirkland lake around 7:15 pm. We arrived in Malartic around 9h15. We did start sampling right now. We went to the south east part of the clam. Lars & Richard did the 3 eastern lignes. Me and Samuel did the 3 on the west side. We finish the day around 4:00 pm. We left the trailer and the ATV on the property of a gentle guy.

PERSONNEL	TACHES	No Projet	Couché	Heures	Hors camps	Echant : De	Echant : A	FACT.
Samuel Villeneuve	Technician	1539/1467	Oui	11.5				
Patrick Larouche	Senior Technician	1539/1467	Oui	11.5				
Richard Tremblay	Geologist-in-Training	1539/1467	Oui	11.5				
Lars Bennedsen	Technician	1539/1467	Oui	11.5				

VOLS D'HYDRAVIONS :	AVARIS MECANIQUES:
TEMPS D'HELICOPTERE :	ACCIDENTS :
VOYAGES DE CAMION : .	TEMPS MORT :
EXPEDITION D'ECHANTILLONS :	AMELIORATIONS A PREVOIR :
ACHATS : Food	
MOBILISATION :	
DEMOBILISATION : From Kirkland Lake (1539) to Malartic (1467). 2 hours	
à	VERIFICATION :
BUDGET RESIDUEL : DEPENSES :	FACTURATION :

IOS Services Géoscientifiques Inc

RAPPORT JOURNALIER	Date : 2022-25-10	PROJET : 1467	CAMPEMENT : Camp Urbain	Weather : Sunny all day
		CLIENT : Boston Bouldog	RESP : PL	SIGNATURE :
		APPEL QUOTIDIEN :		

COMMENTAIRES SUR LES TRAVAUX : We left at 6:45 am. We decided to go and leave Lars and Richard doing the North west part. So we pack a ATV and we drop them there. When we return to finish the middle part, Sam forget the key of the pick-up inside. I call CAA. We wait about 2:30. We arrived in the middle part around 11:00 am. We finish this part and went to Lars and Richard. We did 23 samples and Lars & Richard 58. We gonna finish tomorrow the contract.

PERSONNEL	TACHES	No Projet	Couché	Heures	Hors camps	Echant : De	Echant : A	FACT.
Samuel Villeneuve	Technician	1467	Oui	11.5				
Patrick Larouche	Senior Technician	1467	Oui	11.5				
Richard Tremblay	Geologist-in-Training	1467	Oui	11.5				
Lars Bennedsen	Technician	1467	Oui	11.5				

VOLS D'HYDRAVIONS :		AVARIS MECANIQUES:
TEMPS D'HELICOPTERE :		ACCIDENTS :
VOYAGES DE CAMION : .		TEMPS MORT :
EXPEDITION D'ECHANTILLONS :		AMELIORATIONS A PREVOIR :
ACHATS : Food		
MOBILISATION :		
DEMOBILISATION :		
à		VERIFICATION :
BUDGET RESIDUEL :	DEPENSES :	FACTURATION :

IOS Services Géoscientifiques Inc

RAPPORT JOURNALIER	Date : 2022-26-10	PROJET : 1467	CAMPEMENT : Camp Urbain	Weather : Sunny all day
		CLIENT : Boston Bouldog	RESP : PL	SIGNATURE :
		APPEL QUOTIDIEN :		

COMMENTAIRES SUR LES TRAVAUX : We left at 6:45 am. Lars and Richard took the 2 southern ligns and me and Samuel took the north one. We finish around 1:30 pm. We pack everything to leave the next day.

PERSONNEL	TACHES	No Projet	Couché	Heures	Hors camps	Echant : De	Echant : A	FACT.
Samuel Villeneuve	Technician	1467	Oui	11.5				
Patrick Larouche	Senior Technician	1467	Oui	11.5				
Richard Tremblay	Geologist-in-Training	1467	Oui	11.5				
Lars Bennedsen	Technician	1467	Oui	11.5				

VOLS D'HYDRAVIONS :	AVARIS MECANIQUES:
TEMPS D'HELICOPTERE :	ACCIDENTS :
VOYAGES DE CAMION : .	TEMPS MORT :
EXPEDITION D'ECHANTILLONS :	AMELIORATIONS A PREVOIR :
ACHATS : Food	
MOBILISATION :	
DEMOBILISATION :	
à	VERIFICATION :
BUDGET RESIDUEL : DEPENSES :	

IOS Services Géoscientifiques Inc

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RAPPORT JOURNALIER	Date : 2022-25-10	PROJET : 1467	CAMPEMENT : Camp Urbain	Weather : Sunny all day
		CLIENT : Boston Bouldog	RESP : PL	SIGNATURE :
		APPEL QUOTIDIEN :		

COMMENTAIRES SUR LES TRAVAUX : Return to Chicoutimi for all the teams members.

PERSONNEL	TACHES	No Projet	Couché	Heures	Hors camps	Echant : De	Echant : A	FACT.
Samuel Villeneuve	Technician	1467	Oui	11.5				
Patrick Larouche	Senior Technician	1467	Oui	11.5				
Richard Tremblay	Geologist-in-Training	1467	Oui	11.5				
Lars Bennedsen	Technician	1467	Oui	11.5				

VOLS D'HYDRAVIONS :	AVARIS MECANIQUES:
TEMPS D'HELICOPTERE :	ACCIDENTS :
VOYAGES DE CAMION : .	TEMPS MORT :
EXPEDITION D'ECHANTILLONS :	AMELIORATIONS A PREVOIR :
ACHATS : Food	
MOBILISATION :	
DEMOBILISATION : Malartic to Chicoutimi	
à	VERIFICATION :
BUDGET RESIDUEL : DEPENSES :	FACTURATION :

IOS Services Géoscientifiques Inc

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APPENDIX 2

SAMPLE LOCATION AND DESCRIPTION

SAMPLE PROCESSING

pH, pH buffering capacity, Eh and conductivity measurements (B-horizon)

Upon reception, an aliquot of damp sample was used for pH (pH = - log [H_3O^+]), Eh and conductivity (µS/cm) or TDS measurements. These measurements were taken in water saturated paste with the use of a pH-EC-metre (HI 98129 Waterproof pH & EC, *Hanna Instruments*) and oxidoreduction potential with ORP device (HI 98121 Combo pH & ORP Waterproof, *Hanna instruments*). The saturated paste is made by mixing demineralized water to the sample in determined proportion and allowing the paste to equilibrate for 10 minutes. The same paste was used to measure the buffering capacity by adding 0.5 ml hydrochloric acid 1.0 N. The pH-EC meter was calibrated with two buffer solutions for pH and one solution for conductivity, at the beginning of the day and every 20 samples then after. The oxidoreduction potential device is not possible to calibrate but is checked with readings on two buffers solution (240 mV and 470 mV) at the beginning of the day and every 20 samples then after. The results of environmental parameters were presented in ***appendix 2***, ***table 2***.

Time drift and recalibration of pH are discernible on time-charts, which are causes of noise in the measurement. For this project two different sensors were used for the pH and ΔpH measurement. Tests conducted subsequently indicated that demineralized water record significant drift in acidity through time, interpreted as the primary cause of the current issue. The lack of cationic charge in the water is apparently the cause of this instability, not buffering the uptake of carbon dioxide from the air, which can be circumvent by adding some calcium chloride to the water, a procedure which was not applied in the current project. The variation of acidity through the addition of hydrochloric acid is variable, with an average change of 0.63 points of pH from the addition of HCl 1N (0.5 ml). Calculation of buffering capacity and calcium carbonate equivalent will be provided upon request.

Also, pH and Eh of deionized water typically drift through time due to interaction with air, and is typically readjusted only once day.

Oxidoreduction potential has been measured on B-horizon samples on saturated paste. Redox potential measurements are quite tricky, since they are made in a strongly oxidizing atmosphere. Thus, a buffering protocol for the electrode is necessary, but not fully efficient. Redox potential is thus not very precise and diurnal or inter-calibration drift are very difficult to avoid.

Electrolytic conductivity has been measured with same device along with pH in saturated paste. Conductivity is a measure of the ionic content of the sample, and thus a function of the sum of all cations, including H^+. Electrolytes can be thoroughly dissociated, such as for NaCl, or weakly dissociated, such as Ca $(HCO_3)_2$. Thus, contribution of the various cations to the conductivity, at the same concentration, will differ. Therefore, conductivity can be used as a proxy of the abundance of strong electrolyte only, such as H^+, Na^+, K^+.

Drying

Samples were suspended in a forced-air ventilated dry-room until fully dried and slightly heated with an average of 35 °C. It is important to maintain samples at less than 45 °C temperature during drying process in order to avoid losses of volatile elements (mercury, bismuth, bromine, etc.). During the drying process, clay-rich soils tend to cement and become lumpy, and samples require to be hammered with a wooden or rubber mallet. Drying of the samples typically takes about two or three weeks.

Randomization

In order to avoid “along the line” sequential anomalies due to instrumental drift or cross-contamination, sample number were randomized in IOS laboratory prior to processing or analysis. Original field number ranged from 1539**4**0001 to 1539**4**0050. The randomized numbers including numbers of internal reference materials ranged from 1539**8**0001 to 1539**8**0056. The correspondence table is provided in ***appendix 2***. Note that the first four digits are the project number, the fifth is the type of material and the last four are sequential.

Hammering

The samples are placed into a clean bag and hammered on a steel plate with a rubber mallet until enough disaggregated non-fibrous material is available. Samples are transfer in a new bag if needed. Samples are weighted in a clean stainless dish, where a visual description is made (colour, proportions of organic matter, sand, silt and clay). The visual sample description and colour are presented in ***appendix 2***, ***table 2***. Notice that the samples do not need to be entirely disaggregated during the process, as long as sufficient material for the analysis is liberated.

Colour determination

Determining the sample colour is performed by using a Munsell colour chart (*Munsell Soil Colour Chart*) as suggested by the Soil Conservation Service of the US Department of Agriculture (USDA). The Munsell colour system is the standard for the classification of the colour of the soil. The colour classification is based on three variables, hue, brightness and saturation ("tint or hue"), "intensity (value)" and "saturation (chroma)". Each colour is identified successively on the anhydrous samples. To determine the colour, the dry sample and the fraction <250 µm are visually compared to a standardized colour chart. The Munsell colour of the samples is provided in ***appendix 2***, ***table 2***.

Grinding

Disaggregated samples are triturated if necessary, using a porcelain or agate mortar grinder or manually with a porcelain mortar and pestle. The mortar and pestle are decontaminated between each sample using compressed air, by grinding sugar or quartz in powder and cleaned with demineralized water. The working space is cleaned between each sample.

Sieving

Ground samples are hand sieved or with the use of a Retsch sieve shaker at 250 µm (60 US standard meshes) using 8" stainless steel screens. About 50 to 150 grams of samples for ALS analysis and about 15 grams for IOS analysis of sieved material are needed, sieving being halted after. Every portion is weighted, and the mass balance calculated. All size fractions are bagged and placed in separate trays. The remaining coarse material is stored in the cardboard box. Fine fractions (<250 µm) are sent to the analytical laboratories and a part is kept for losses on ignition carried out by IOS. Any equipment that came into contact with the samples is cleaned between each sample using compressed air and demineralized water. After each sample, sieves are cleaned in an ultrasonic bath with demineralized water. Processing measurements are listed in ***table 2*** of ***appendix 2***.

Quality control on preparation

The principal quality control procedure in the preparation is to calculate the mass balance. Weight before and after handling for sample preparation is compiled and weight differential is calculated. Material losses during laboratory manipulations should not exceed 3.0 g. The average weight loss for the samples is 2.1 g much influenced by the loss of 42 g in sample 153980002 due to a manipulation error. No samples were doped or diluted and wearing jewellery was prohibited for technicians throughout the duration of the project, both at work and at home.

Randomized number	Soil Field Number	Material type	UTMX zone	UTMY zone	PARCEL	NTS Sheet	Altitude (m)	Target	Sampler	DATE	Transport Type	Excavation method	Horizon	LFH Thickness (cm)	LFH (%)
153980053	153940001	Reworked	574408	5321730	564025	042A01	0	38	LB RJT	2010-01-01T07:51:37Z	Truck	Auger	C	1	0
153980016	153940002	Glaciolacustrine fine-grained deposits	574718	5321529	564023	032D04	0	34	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	7	0
153980035	153940003	Glaciolacustrine fine-grained deposits	574717	5321502	564023	032D04	0	35	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	9	0
153980009	153940004	Glaciolacustrine fine-grained deposits	574716	5321478	564023	032D04	0	36	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	1	0
153980013	153940005	Glaciolacustrine fine-grained deposits	574717	5321457	564023	032D04	297,4	37	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	1	0
153980028	153940006	Glaciolacustrine fine-grained deposits	574716	5321425	564023	032D04	296,9	40	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	1	0
153980025	153940007	Glaciolacustrine fine-grained deposits	574405	5321707	564025	042A01	296,9	25	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	9	0
153980030	153940008	Glaciolacustrine fine-grained deposits	574407	5321680	564025	042A01	296,9	26	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	2	0
153980007	153940009	Glaciolacustrine fine-grained deposits	574411	5321657	564025	042A01	296,9	27	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	C	1	0
153980020	153940010	Glaciolacustrine fine-grained deposits	574406	5321629	564025	042A01	296,9	28	PL-SV	2022-10-23T07:56:24Z	Truck	Auger	B	1	0
153980049	153940011	Reworked	574529	5321887	564019	032D04	0	39	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	1	0
153980017	153940012	Reworked	574529	5321919	564019	032D04	0	16	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	3	0
153980032	153940013	Glaciolacustrine fine-grained deposits	574528	5321944	564012	042A01	0	15	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	1	0
153980045	153940014	Glaciolacustrine fine-grained deposits	574528	5321969	564019	032D04	0	14	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	3	0
153980023	153940015	Glaciolacustrine fine-grained deposits	574528	5321994	564019	032D04	0	13	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	3	0
153980006	153940016	Glaciolacustrine fine-grained deposits	574527	5322019	564019	032D04	0	12	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	8	0
153980026	153940017	Glaciolacustrine fine-grained deposits	574527	5322044	564012	042A01	0	11	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	4	0
153980010	153940018	Glaciolacustrine fine-grained deposits	574527	5322069	564012	042A01	0	10	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	1	0
153980047	153940019	Glaciolacustrine fine-grained deposits	574526	5322094	564019	032D04	0	9	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	2	0
153980043	153940020	Glaciolacustrine fine-grained deposits	574526	5322119	564019	032D04	0	8	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	3	0
153980019	153940021	Glaciolacustrine fine-grained deposits	574525	5322144	564012	042A01	0	7	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	4	0
153980003	153940022	Glaciolacustrine fine-grained deposits	574525	5322169	564019	032D04	0	6	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	6	0
153980029	153940023	Glaciolacustrine fine-grained deposits	574525	5322194	564019	032D04	0	5	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	5	0
153980040	153940024	Glaciolacustrine fine-grained deposits	574525	5322219	564019	032D04	0	4	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	1	0
153980052	153940025	Glaciolacustrine fine-grained deposits	574524	5322244	564019	032D04	0	3	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	2	0
153980022	153940026	Glaciolacustrine fine-grained deposits	574524	5322269	564019	032D04	0	2	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	2	0
153980014	153940027	Glaciolacustrine fine-grained deposits	574524	5322294	564019	032D04	0	1	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	1	0
153980008	153940028	Glaciolacustrine fine-grained deposits	574467	5322366	564015	042A01	0	41	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	2	0
153980002	153940029	Glaciolacustrine fine-grained deposits	574465	5322342	564015	042A01	0	42	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	1	0
153980033	153940030	Glaciolacustrine fine-grained deposits	574465	5322316	564012	042A01	0	43	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	3	0
153980055	153940031	Glaciolacustrine fine-grained deposits	574465	5322292	564012	042A01	0	44	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	3	0
153980044	153940032	Glaciolacustrine fine-grained deposits	574465	5322266	564012	042A01	0	45	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	3	0
153980037	153940033	Glaciolacustrine fine-grained deposits	574464	5322242	564012	042A01	0	46	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	2	0
153980046	153940034	Glaciolacustrine fine-grained deposits	574464	5322217	564012	042A01	0	47	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	1	0
153980005	153940035	Glaciolacustrine fine-grained deposits	574464	5322192	564012	042A01	0	48	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	1	0
153980024	153940036	Glaciolacustrine fine-grained deposits	574464	5322166	564012	042A01	0	49	LB-RJT	2010-01-01T08:18:20Z	Truck	Hand shovel	C	1	0
153980042	153940037	Glaciolacustrine fine-grained deposits	574464	5322141	564012	042A01	0	50	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	1	0
153980039	153940038	Reworked	574410	5321602	564025	042A01	290,2	29	PL-SV	2022-10-23T10:38:48Z	Truck	Hand shovel	C	2	0
153980048	153940039	Glaciolacustrine fine-grained deposits	574407	5321581	564025	042A01	290,2	30	PL-SV	2022-10-23T10:38:48Z	Truck	Hand shovel	C	2	0
153980015	153940040	Glaciolacustrine fine-grained deposits	574407	5321556	564025	042A01	290,2	31	PL-SV	2022-10-23T10:38:48Z	Truck	Hand shovel	C	1	0
153980018	153940041	Melt-out till	574406	5321530	564025	042A01	290,2	32	PL-SV	2022-10-23T10:38:48Z	Truck	Hand shovel	B	6	0
153980034	153940042	Melt-out till	574406	5321507	564025	042A01	290,2	33	PL-SV	2022-10-23T10:38:48Z	Truck	Hand shovel	B	4	0
153980056	153940043	Melt-out till	574050	5321695	564022	042A01	290,2	24	PL-SV	2022-10-23T10:38:48Z	Truck	Hand shovel	B	5	0
153980054	153940044	Melt-out till	574040	5321663	564022	042A01	290,2	23	PL-SV-LB-RJT	2022-10-23T10:38:48Z	Truck	Hand shovel	B	3	0
153980027	153940045	Melt-out till	574040	5321637	564022	042A01	0	22	PL-LB-SV-RJT	2022-10-23T12:54:09Z	Truck	Auger	B	2	0

Randomized number	Soil Field Number	Ah Thickness (cm)	Ah (%)	Ae Thickness (cm)	Ae (%)	B Thickness (cm)	B (%)	B Color	C Thickness (cm)	C (%)	C Color	Soil Sampling Depth (cm)	Humidity	Compacity	B Blocs (%)	B Pebbles (%)	B Sand (%)	B Silt (%)	B Clay (%)	B organic matter
153980053	153940001	12	0	12	80	3	20	5Y 4/2	0	80		23	Humid	Little compact to loose	0	5	68	22	5	0
153980016	153940002	0	0	0	0	0	0		34	100		17	Humid	Compact	0	0	0	0	0	0
153980035	153940003	0	0	0	0	0	0		32	100		19	Humid	Compact	0	0	0	0	0	0
153980009	153940004	0	0	0	0	0	0		31	100		11	Humid	Compact	0	0	0	0	0	0
153980013	153940005	0	0	0	0	0	0		31	100		11	Humid	Compact	0	0	0	0	0	0
153980028	153940006	0	0	0	0	0	0		31	100		11	Humid	Compact	0	0	0	0	0	0
153980025	153940007	0	0	0	0	0	0		31	100		19	Humid	Compact	0	0	0	0	0	0
153980030	153940008	0	0	0	0	0	0		31	100		12	Humid	Compact	0	0	0	0	0	0
153980007	153940009	0	0	0	0	0	0		35	100		11	Humid	Compact	0	0	0	0	0	0
153980020	153940010	0	0	0	0	38	100	2.5Y 5/4	0	0		11	Humid	Compact	2	0	0	3	95	0
153980049	153940011	25	0	14	100	0	20		0	80		36	Humid	Little compact to loose	0	0	60	30	10	0
153980017	153940012	10	0	23	100	0	20		0	80		23	Humid	Little compact to loose	0	0	60	10	30	0
153980032	153940013	14	0	20	100	0	0		0	0		25	Humid	Little compact to loose	0	0	0	0	0	0
153980045	153940014	7	0	15	100	0	0		0	0		20	Humid	Little compact to loose	0	0	0	0	0	0
153980023	153940015	20	0	27	100	0	0		0	0		33	Humid	Little compact to loose	0	0	0	0	0	0
153980006	153940016	3	0	29	100	0	0		0	100		21	Humid	Little compact to loose	0	0	0	0	0	0
153980026	153940017	11	0	25	100	0	0		0	0		25	Humid	Little compact to loose	0	0	0	0	0	0
153980010	153940018	8	0	36	100	0	0		0	0		19	Humid	Little compact to loose	0	0	0	5	95	0
153980047	153940019	9	0	26	80	3	20	10YR 5/4	0	100		21	Humid	Little compact to loose	0	0	0	0	0	0
153980043	153940020	7	0	30	100	0	0		0	0		20	Humid	Little compact to loose	0	0	0	0	0	0
153980019	153940021	15	0	31	100	0	0		0	0		29	Humid	Little compact to loose	0	0	0	0	0	0
153980003	153940022	8	0	31	100	0	0		0	0		24	Humid	Little compact to loose	0	0	0	0	0	0
153980029	153940023	8	0	0	0	182	100		0	0		23	Humid	Little compact to loose	0	0	0	0	0	0
153980040	153940024	6	0	3	0	30	100	2.5Y 7/4	0	100		17	Humid	Little compact to loose	0	0	0	0	0	0
153980052	153940025	5	0	33	100	0	0		0	100		17	Humid	Little compact to loose	0	0	0	0	0	0
153980022	153940026	6	0	25	70	0	5	10YR 6/3	0	95		18	Humid	Little compact to loose	0	0	0	0	0	0
153980014	153940027	10	0	1	0	10	0		18	100		21	Humid	Little compact to loose	0	0	5	0	95	0
153980008	153940028	35	0	1	0	2	0		15	100		47	Humid	Little compact to loose	0	0	0	0	0	0
153980002	153940029	15	0	1	0	0	0		33	100		26	Humid	Little compact to loose	0	0	0	0	0	0
153980033	153940030	15	0	1	0	1	0		40	100		28	Humid	Little compact to loose	0	0	0	0	0	0
153980055	153940031	8	0	1	0	1	0		27	100		21	Humid	Little compact to loose	0	0	0	0	0	0
153980044	153940032	8	0	1	0	1	0		37	100		21	Humid	Little compact to loose	0	0	0	0	0	0
153980037	153940033	6	0	1	0	1	0		30	100		18	Humid	Little compact to loose	0	0	0	0	0	0
153980046	153940034	7	0	0	0	6	20	10YR 4/6	20	80		18	Humid	Little compact to loose	0	0	0	0	0	0
153980005	153940035	6	0	1	0	0	0		20	100		17	Humid	Little compact to loose	0	0	0	0	0	0
153980024	153940036	1	0	1	0	47	0		0	100		12	Humid	Little compact to loose	0	0	0	0	0	0
153980042	153940037	7	0	1	0	186	0		0	100		18	Humid	Little compact to loose	0	0	0	0	0	0
153980039	153940038	1	0	6	0	10	20	10Y 3/3	20	80		13	Humid	Little compact to compact	0	5	85	10	0	0
153980048	153940039	1	0	6	0	3	0		0	100		13	Humid	Little compact to compact	0	0	0	10	90	0
153980015	153940040	1	0	6	0	10	0		30	100		12	Humid	Little compact to compact	0	0	0	10	90	0
153980018	153940041	4	0	6	0	19	100	10YR 3/6	0	0		20	Dry	Little compact to loose	3	12	75	10	0	0
153980034	153940042	4	0	1	0	32	100	10YR 3/6	0	0		18	Dry	Little compact to loose	15	15	60	9	1	0
153980056	153940043	4	0	0	0	32	100	10YR 4/6	0	0		19	Dry	Little compact to loose	5	15	70	9	1	0
153980054	153940044	2	0	9	0	28	100	7.5YR 4/6	0	0		15	Dry	Little compact to loose	5	15	70	9	1	0
153980027	153940045	2	0	0	0	35	100	7.5YR 4/5.6	0	0		14	Dry	Little compact to loose	0	15	75	10	0	0

Randomized number	Soil Field Number	C Blocs (%)	C Pebbles (%)	C Sand (%)	C Silt (%)	C Clay (%)	Roundness Pebbles	Litho. Pebbles	Forest Cover	Drainage	Sampled Under	Slope	Slope Situation	Slope Shape	Slope Side	Comments
153980053	153940001	0	0	0	0	0	Subangular subrounded	V3	Medium	Really good	Lichen	0	Low slope	Regular	Low	
153980016	153940002	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Convex	Top	C color : 5Y 6/2. No Ah and no Ae.
153980035	153940003	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Convex	Top	C color : 5Y 5/2. No Ah, Ae and B.
153980009	153940004	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Convex	Top	C color : 2.5Y 5/4. No Ah, Ae and B.
153980013	153940005	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Regular	Top	C color : 2.5Y 4/2. No Ah, Ae and B.
153980028	153940006	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Regular	Top	C color : 2.5Y 4/2. No Ah, Ae and B.
153980025	153940007	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Regular	Top	C color : 2.5Y 4/2. No Ah, Ae and B.
153980030	153940008	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Regular	Top	C color : 2.5Y 4/2. No Ah, Ae and B.
153980007	153940009	0	0	0	5	95	-		Medium	Excellent	Dead leaves	0	Low slope	Regular	Top	C color : 2.5Y 4/2. No Ah, Ae and B.
153980020	153940010	0	0	0	0	0	-		Medium	Medium	Dead leaves	0	Low slope	Regular	Top	No Ah and Ae. Black clay under lfh and after that kind of B of clay with a little bit of sand.
153980049	153940011	0	0	0	0	0	Subangular subrounded	V3	Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	
153980017	153940012	0	0	0	0	0	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/4
153980032	153940013	0	0	0	0	100	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/4
153980045	153940014	0	0	0	0	100	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/4
153980023	153940015	0	0	0	0	100	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/4
153980006	153940016	0	0	0	5	95	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/2
153980026	153940017	0	0	0	5	95	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/2
153980010	153940018	0	0	0	5	95	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/2
153980047	153940019	0	0	0	10	90	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/2
153980043	153940020	0	0	0	10	90	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 5/4
153980019	153940021	0	0	0	5	95	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 5/4
153980003	153940022	0	0	0	5	95	-		Medium	Bad	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 5/4
153980029	153940023	0	0	0	5	95	-		Medium	Bad	Dead leaves	0	Flat Field	Regular	Low	b mo noir 7.5YR 2.5/2
153980040	153940024	0	0	0	10	90	-		Medium	Bad	Dead leaves	0	Flat Field	Regular	Low	
153980052	153940025	0	0	0	15	85	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 5Y 7/2 materials
153980022	153940026	0	0	0	10	90	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	ae 2.5Y 7/2
153980014	153940027	0	0	5	15	80	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	c 10YR 6/4
153980008	153940028	0	0	0	10	90	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 5/4
153980002	153940029	0	0	0	10	90	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 5/4 low trace of ah in the materials
153980033	153940030	0	0	0	15	85	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	5Y 6/4
153980055	153940031	0	0	0	15	85	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	5Y 6/4
153980044	153940032	0	0	0	15	85	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	5Y 7/4
153980037	153940033	0	0	0	20	80	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 7/2
153980046	153940034	0	0	0	15	85	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 6/4
153980005	153940035	0	0	0	10	90	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 5/4
153980024	153940036	0	0	0	10	90	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 5/4
153980042	153940037	0	0	0	5	95	-		Medium	Bad	Dead leaves	0	Flat Field	Regular	Low	b mo 5GY 5/1
153980039	153940038	0	15	50	25	10	-		Medium	Good	Dead leaves	0	Low slope	Convex	Medium	C color: 5Y 4/2. Sample collected next to lake created by a beaver.
153980048	153940039	0	0	0	10	90	-		Medium	Good	Dead leaves	0	Mid Slope	Convex	Medium	C color: 2.5Y 5/4
153980015	153940040	0	0	0	10	90	-		Medium	Good	Dead leaves	0	Mid Slope	Convex	Medium	C color: 2.5Y 5/4
153980018	153940041	0	0	0	0	0	Subrounded rounded	V3	Medium	Excellent	Dead leaves	0	Mid Slope	Convex	Top	
153980034	153940042	0	0	0	0	0	Subrounded rounded	V3	Medium	Excellent	Dead leaves	0	Mid Slope	Convex	Top	
153980056	153940043	0	0	0	0	0	Subrounded rounded	V3	Medium	Excellent	Dead leaves	0	Mid Slope	Convex	Top	No Ae layer.
153980054	153940044	0	0	0	0	0	Subrounded rounded	V3, I1	Medium	Excellent	Dead leaves	0	Mid Slope	Convex	Top	No Ae layer.
153980027	153940045	0	0	0	0	0	Subrounded rounded	V3	Medium	Excellent	Dead leaves	0	Low slope	Regular	Medium	

Randomized number	Soil Field Number	Material type	UTMX zone	UTMY zone	PARCEL	NTS Sheet	Altitude (m)	Target	Sampler	DATE	Transport Type	Excavation method	Horizon	LFH Thickness (cm)	LFH (%)
153980036	153940046	Melt-out till	574040	5321612	564022	042A01	0	21	PL-LB-SV-RJT	2022-10-23T12:54:09Z	Truck	Auger	B	2	0
153980004	153940047	Reworked	574040	5321587	564022	042A01	0	20	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	B	2	0
153980012	153940048	Glaciolacustrine fine-grained deposits	574040	5321537	564022	042A01	0	18	LB-RJT	2010-01-01T08:18:20Z	Truck	Auger	C	1	0
153980038	153940049	Glaciolacustrine fine-grained deposits	574039	5321512	564022	042A01	0	17	PL-LB-SV-RJT	2022-10-23T12:54:09Z	Truck	Auger	B	1	0
153980050	153940050	Glaciolacustrine fine-grained deposits	574040	5321563	564022	042A01	0	19	PL-LB-SV-RJT	2022-10-23T12:54:09Z	Truck	Auger	C	2	0

Randomized number	Soil Field Number	Ah Thickness (cm)	Ah (%)	Ae Thickness (cm)	Ae (%)	B Thickness (cm)	B (%)	B Color	C Thickness (cm)	C (%)	C Color	Soil Sampling Depth (cm)	Humidity	Compacity	B Blocs (%)	B Pebbles (%)	B Sand (%)	B Silt (%)	B Clay (%)	B organic matter
153980036	153940046	2	0	0	0	35	100	7.5YR 4/5.6	0	0		14	Dry	Little compact to loose	0	20	65	15	0	0
153980004	153940047	5	0	1	0	32	100	10YR 4/3	0	0		17	Humid	Little compact to loose	0	0	60	25	15	0
153980012	153940048	15	0	0	0	0	0		36	100		26	Humid	Little compact to loose	0	0	0	5	95	0
153980038	153940049	0	0	9	0	30	100	7.5YR 3/4	0	0		11	Dry	Little compact to compact	0	20	70	10	0	0
153980050	153940050	0	0	0	0	10	0	5Y 6/2	0	100		12	Dry	Little compact to loose	0	0	0	0	0	0

Randomized number	Soil Field Number	C Blocs (%)	C Pebbles (%)	C Sand (%)	C Silt (%)	C Clay (%)	Roundness Pebbles	Litho. Pebbles	Forest Cover	Drainage	Sampled Under	Slope	Slope Situation	Slope Shape	Slope Side	Comments
153980036	153940046	0	0	0	0	0	Subrounded rounded	V3	Medium	Excellent	Dead leaves	0	Low slope	Wavy	Medium	
153980004	153940047	0	0	0	0	0	-		Medium	Good	Dead leaves	0	Flat Field	Regular	Low	
153980012	153940048	0	0	0	0	0	-		Medium	Moderated	Dead leaves	0	Flat Field	Regular	Low	c 2.5Y 3.5/2
153980038	153940049	0	0	0	0	0	-		Medium	Excellent	Dead leaves	0	Low slope	Wavy	Top	No AE and AH.
153980050	153940050	0	0	0	10	90	-		Medium	Excellent	Dead leaves	0	Low slope	Wavy	Top	No AE and AB

			WEIGHT MEASUREMENTS					ENVIRONMENTAL PARAMETERS						
PROJECT	ANALYSIS NUMBER	FIELD NUMBER	INITIAL WEIGHT WITH BAG	SOIL FOR pH MEASURE	VOLUME OF WATER	SOIL WITH DEMINERALIZED WATER	COMMENTS	pH	pH WITH 0.5 ml HCl 1 N	CONDUCTIVITY	CONDUCTIVITY TEMPERATURE	Eh	TEMPERATURE Eh (°C)	COMMENTS
50	Nb analys:	50	(g)	(g)	(ml)	(g)				(µS/cm)	(°C)	(mV)		
Count	Count	Historic	2741	2748	2748	2745		2748	2747	2748	2748	2710	2710	
99 Percentile	99 Percentile	Historic	1581,5	20,9	20,0	40,1		7,39	5,38	292	26,1	390	26,1	
Average	Average	Historic	895,8	20,2	10,3	30,4		5,52	2,56	73	19,8	185	20,9	
Std-Dev	Std-Dev	Historic	246,1	0,2	1,6	1,6		0,65	0,99	64	2,5	66	4,2	
Coefficient var.		Historic	0,3	0,0	0,2	0,1		0,12	0,39	1	0,1	0	0,2	
Maximum	Maximum	Historic	2324,4	21,0	20,0	40,4		7,97	6,74	1269	27,8	428	199,0	
Minimum	Minimum	Historic	194,8	19,4	9,9	20,2		2,44	0,91	1	13,3	-480	14,6	
Count	Count	Project	50	50	50	50		50	50	50	50	50	50	
Average	Average	Project	804,3	20,1	14,0	34,1		5,60	4,97	163	18,7	198,36	20,2	
Mediane	Mediane	Project	808,3	20,1	10,0	30,3		5,49	4,87	145,50	18,65	193,50	20,25	
Std. Dev.	Std. Dev.	Project	148,7	0,2	4,9	4,9		0,46	0,68	110,56	0,55	49,95	0,56	
Coefficient var.		Project	0,2	0,0	0,4	0,1		0,08	0,14	0,68	0,03	0,25	0,03	
Coefficient asy.		Project	-0,1	0,4	0,4	0,4		1,09	1,04	2,07	-0,12	0,45	-0,83	
Maximum	Maximum	Project	1201,9	20,6	20,0	40,4		6,94	6,74	599	19,6	306,00	21,3	
Minimum	Minimum	Project	481,4	19,7	10,0	29,7		4,76	3,81	34	17,6	86,00	18,4	
1539	153980002	153940029	913,8	20,1	20,0	40,2		5,27	4,73	122	18,7	212	20,5	
1539	153980003	153940022	932,4	20,3	20,0	40,3		6,94	6,64	280	18,3	113	19,9	
1539	153980004	153940047	844,0	20,0	10,0	30,1		5,09	4,19	78	18,6	189	20,1	
1539	153980005	153940035	1020,3	19,8	20,0	39,8		5,64	5,22	117	18,9	213	20,4	
1539	153980006	153940016	977,4	20,0	10,0	29,9		5,41	4,87	121	19,3	280	20,4	
1539	153980007	153940009	924,6	20,1	10,0	30,0		5,31	4,92	219	19,6	192	20,7	
1539	153980008	153940028	778,2	20,4	20,0	40,4		5,49	4,94	201	18,6	199	20,2	
1539	153980009	153940004	980,1	20,0	10,0	29,9		5,88	5,38	127	19,5	178	20,6	
1539	153980010	153940018	975,8	20,6	10,0	30,6		5,58	5,20	228	18,3	278	19,6	
1539	153980012	153940048	892,5	19,9	20,0	40,0		5,72	5,24	91	19,2	151	20,9	
1539	153980013	153940005	741,2	19,9	10,0	29,8		5,97	5,64	142	19,3	193	20,6	
1539	153980014	153940027	824,0	19,9	20,0	40,0		5,28	4,53	149	18,5	198	20,2	
1539	153980015	153940040	763,1	20,0	20,0	40,0		5,78	4,85	40	17,8	189	19,6	
1539	153980016	153940002	656,8	20,1	10,0	29,9	Rien écrit sur l'étiquette orange.	5,66	4,63	156	19,4	186	21,0	
1539	153980017	153940012	785,6	20,3	10,0	30,3		4,76	4,46	173	18,6	231	20,5	
1539	153980018	153940041	703,4	20,3	10,0	30,2		5,52	3,99	151	17,9	172	19,5	Calibration 3, pH instable
1539	153980019	153940021	956,8	20,1	20,0	39,6	Argile en moins sur tige de verre.	6,73	6,74	412	18,2	137	19,3	Calibration 2
1539	153980020	153940010	766,4	19,9	10,0	29,9		5,37	4,90	89	19,3	202	20,7	
1539	153980022	153940026	833,6	19,9	20,0	39,1		5,49	4,86	89	17,9	158	19,7	
1539	153980023	153940015	834,3	20,4	10,0	30,3		5,43	4,90	96	19,2	287	20,7	
1539	153980024	153940036	701,3	20,1	20,0	40,1		6,18	6,02	157	18,5	195	20,0	
1539	153980025	153940007	991,8	19,7	10,0	29,7		6,44	6,37	466	19,3	196	21,3	
1539	153980026	153940017	836,0	20,0	10,0	29,9		5,52	5,01	224	18,7	278	20,0	
1539	153980027	153940045	893,8	20,0	10,0	30,0		5,35	3,81	47	18,4	173	20,0	
1539	153980028	153940006	681,3	20,1	10,0	30,1		5,44	4,80	102	19,2	188	20,2	
1539	153980029	153940023	481,4	20,2	20,0	40,3		6,78	6,63	419	18,3	86	20,0	
1539	153980030	153940008	662,1	20,0	10,0	30,0		5,49	4,92	179	19,5	201	21,0	
1539	153980032	153940013	842,0	20,2	10,0	30,2		4,88	4,52	163	18,9	296	20,6	
1539	153980033	153940030	850,0	19,9	20,0	39,9		5,74	5,53	175	19,0	190	20,4	
1539	153980034	153940042	1201,9	20,3	10,0	30,3		5,77	4,33	34	18,0	150	19,8	
1539	153980035	153940003	748,9	19,9	10,0	29,9		5,46	4,99	220	19,3	194	20,3	
1539	153980036	153940046	872,0	20,2	10,0	30,3		5,33	4,36	88	18,4	172	20,3	
1539	153980037	153940033	740,7	20,3	20,0	40,3		5,34	5,01	149	19,0	200	20,4	
1539	153980038	153940049	574,9	20,1	10,0	30,1		5,26	4,51	161	18,6	196	20,2	
1539	153980039	153940038	995,1	20,0	20,0	40,0		5,40	4,88	56	17,7	182	19,6	pH instable
1539	153980040	153940024	540,4	20,2	20,0	40,2		6,12	5,15	203	18,7	114	20,3	
1539	153980042	153940037	699,5	20,0	10,0	30,0		6,43	6,30	599	17,9	174	19,5	

			SAMPLE PREPARATION							SAMPLE DESCRIPTION						
PROJECT	ANALYSIS NUMBER	FIELD NUMBER	Initial weight	0-250 µ weight	LOI aliquot 0-250 µ weight	0-250 µ weight for ALS Minerals	> 250 µ weight	Mass balance	Comments	Original sample colour			Dry < 250 µ fraction colour			Fibrous matter
50	Nb analys:	50	(g)	(g)	(g)	(g)	(g)	(g)		Hue	Value	Chroma	Hue	Value	Chroma	(%)
Count	Count	Historic	2746	2747	2748	2748	2748	2746								2745
99 Percentile	99 Percentile	Historic	1254,1	601,5	418,6	256,2	1026,8	0,6								20
Average	Average	Historic	662,6	224,8	68,0	155,6	437,0	-1,7								3
Std-Dev	Std-Dev	Historic	215,3	112,3	81,8	34,0	216,4	8,1								4
Coefficient var.		Historic	0,3	0,5	1,2	0,2	0,5	-4,8								1
Maximum	Maximum	Historic	1993,6	3166,7	586,2	359,1	1935,3	7,3								50
Minimum	Minimum	Historic	86,1	15,9	5,4	0,0	2,1	-398,2								0
Count	Count	Project	50	50	50	50	50	50								50
Average	Average	Project	571,6	104,3	19,2	85,1	465,2	-2,1								1
Mediane	Mediane	Project	569,5	113,1	15,7	100,1	472,7	-1,2								0,0
Std. Dev.	Std. Dev.	Project	134,99	42,86	8,50	39,80	133,17	5,84								1,67
Coefficient var.		Project	0,24	0,41	0,44	0,47	0,29	-2,73								1,35
Coefficient asy.		Project	-0,2	0,7	1,4	0,4	-0,2	-6,9								1,2
Maximum	Maximum	Project	1019,9	195,3	43,5	154,7	823,3	-0,1								5
Minimum	Minimum	Project	108,9	37,0	10,5	0,0	70,2	-42,2								0
1539	153980002	153940029	639,9	60,6	10,5	50,1	537,1	-42,2	Mortier, perte >250 µm.	10 YR	5	2	10 YR	5	2	0
1539	153980003	153940022	658,1	75,3	21,6	51,8	584,2	-0,5	Mortier, blender.	10 YR	6	2	10 YR	6	2	0
1539	153980004	153940047	631,7	167,4	17,2	150,5	463,1	-0,9		10 YR	5	3	10 YR	5	3	5
1539	153980005	153940035	730,5	65,0	13,9	51,1	663,2	-2,3	Blender.	2.5 Y	6	2	2.5 Y	6	2	0
1539	153980006	153940016	693,4	71,2	20,4	50,7	620,6	-1,7	Blender.	2.5 Y	6	2	2.5 Y	6	2	0
1539	153980007	153940009	572,9	70,3	20,3	50,1	501,6	-0,9		2.5 Y	5	2	2.5 Y	5	2	0
1539	153980008	153940028	556,7	136,9	33,6	103,3	418,1	-1,7	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980009	153940004	657,2	177,1	25,8	151,3	478,0	-2,1	Blender.	2.5 Y	5	2	2.5 Y	5	2	0
1539	153980010	153940018	693,5	113,6	13,6	100,1	578,3	-1,5	Blender.	2.5 Y	5	2	2.5 Y	5	2	0
1539	153980012	153940048	669,4	62,2	11,7	50,4	606,1	-1,2	Blender.	2.5 Y	5	2	2.5 Y	5	2	0
1539	153980013	153940005	467,7	65,1	14,6	50,6	402,3	-0,2		10 YR	4	2	10 YR	4	2	0
1539	153980014	153940027	630,9	68,6	18,0	50,7	562,0	-0,2		2.5 Y	7	2	2.5 Y	7	2	2
1539	153980015	153940040	559,5	166,6	16,0	150,5	391,8	-1,2		10 YR	6	2	10 YR	6	2	5
1539	153980016	153940002	476,6	71,9	20,7	51,2	402,8	-1,9	Pas de tag, blender.	2.5 Y	6	2	2.5 Y	6	2	0
1539	153980017	153940012	521,7	77,3	23,8	53,5	441,6	-2,8	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980018	153940041	559,4	189,6	36,3	153,3	369,1	-0,7		10 YR	5	4	10 YR	5	4	2
1539	153980019	153940021	639,7	61,2	10,7	50,4	575,9	-2,7	Blender.	2.5 Y	6	2	10 YR	6	2	2
1539	153980020	153940010	489,8	123,7	23,2	100,5	366,0	-0,1		10 YR	6	2	10 YR	6	2	0
1539	153980022	153940026	602,7	113,8	13,6	100,1	488,4	-0,6	Mortier.	10 YR	7	2	10 YR	7	2	0
1539	153980023	153940015	585,1	116,3	15,3	101,0	467,3	-1,5	Blender.	2.5 Y	5	2	2.5 Y	5	2	2
1539	153980024	153940036	451,6	163,7	13,0	151,0	285,3	-2,3	Blender.	2.5 Y	5	2	2.5 Y	5	2	2
1539	153980025	153940007	656,0	63,3	12,7	50,6	591,4	-1,3	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980026	153940017	575,2	119,0	17,8	101,3	454,1	-2,0	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980027	153940045	699,9	192,3	41,6	150,7	507,0	-0,6		10 YR	5	4	10 YR	5	4	2
1539	153980028	153940006	487,4	187,5	32,8	154,7	298,0	-1,9	Blender.	2.5 Y	6	2	2.5 Y	6	2	2
1539	153980029	153940023	108,9	37,0	36,7	0,0	70,2	-2,0	Blender, pas assez pour analyse.	10 YR	2	2	10 YR	2	2	0
1539	153980030	153940008	450,3	161,0	10,7	150,6	286,6	-2,4	Blender.	10 YR	5	2	10 YR	5	2	0
1539	153980032	153940013	543,5	62,6	12,0	50,5	478,5	-2,5	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980033	153940030	627,7	90,1	35,3	54,9	535,0	-2,5	Blender.	10 YR	5	2	10 YR	5	2	0
1539	153980034	153940042	1019,9	195,3	43,5	151,6	823,3	-1,5		10 YR	5	6	10 YR	6	5	5
1539	153980035	153940003	526,3	116,2	15,9	100,3	408,0	-2,1	Blender.	10 YR	6	2	10 YR	6	2	2
1539	153980036	153940046	703,7	115,3	14,4	100,8	587,7	-0,8		10 YR	5	3	10 YR	5	3	5
1539	153980037	153940033	502,9	65,8	14,9	50,9	436,7	-0,4		10 YR	6	2	10 YR	6	2	0
1539	153980038	153940049	421,6	115,1	14,9	100,2	305,8	-0,7		10 YR	4	4	10 YR	4	4	2
1539	153980039	153940038	762,7	120,4	19,4	101,0	641,6	-0,7		10 YR	6	2	10 YR	6	2	2
1539	153980040	153940024	340,9	114,2	13,3	100,8	224,9	-1,9	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980042	153940037	342,6	65,0	14,1	50,9	276,8	-0,8	Mortier.	10 YR	4	1	10 YR	4	1	2

			SAMPLE DESCRIPTION						LOI	
PROJECT	ANALYSIS NUMBER	FIELD NUMBER	Organic matter	Sand	Silt	Clay	Total	Other (particularities)	CERTIFICATE LOI (IOS)	LOI (700 °C) %
50	Nb analys:	50	(%)	(%)	(%)	(%)	(%)			
Count	Count	Historic	2745	2745	2745	2745	2757			2282
99 Percentile	99 Percentile	Historic	25	83	80	90	100			39
Average	Average	Historic	2	29	31	35	76			6
Std-Dev	Std-Dev	Historic	5	21	15	21	43			7
Coefficient var.		Historic	2	1	1	1	1			1
Maximum	Maximum	Historic	80	94	98	99	110			67
Minimum	Minimum	Historic	0	0	0	0	-100			1
Count	Count	Project	50	50	50	50	50			50
Average	Average	Project	1	16	25	57	100			6,48
Mediane	Mediane	Project	0,0	11,5	25,0	60,0	100,0			5,81
Std. Dev.	Std. Dev.	Project	1,83	10,46	7,33	16,44	0,00			4,46
Coefficient var.		Project	1,43	0,65	0,30	0,29	0,00			0,69
Coefficient asy.		Project	1,7	1,1	0,2	-1,1	#DIV/0!			3,60
Maximum	Maximum	Project	7	40	45	80	100			33,75
Minimum	Minimum	Project	0	2	10	15	100			1,59
1539	153980002	153940029	0	30	15	55	100		IOS22-0062	7,41
1539	153980003	153940022	0	20	20	60	100		IOS22-0062	7,49
1539	153980004	153940047	5	35	20	35	100		IOS22-0062	6,62
1539	153980005	153940035	0	20	20	60	100		IOS22-0062	5,78
1539	153980006	153940016	0	15	25	60	100		IOS22-0062	5,12
1539	153980007	153940009	2	15	18	65	100		IOS22-0062	6,93
1539	153980008	153940028	0	25	25	50	100		IOS22-0062	4,87
1539	153980009	153940004	2	8	25	65	100		IOS22-0062	8,79
1539	153980010	153940018	0	10	30	60	100		IOS22-0062	6,18
1539	153980012	153940048	2	8	20	70	100		IOS22-0062	4,21
1539	153980013	153940005	0	10	30	60	100		IOS22-0062	9,51
1539	153980014	153940027	2	15	21	60	100		IOS22-0062	3,37
1539	153980015	153940040	2	20	20	53	100		IOS22-0062	5,53
1539	153980016	153940002	0	15	25	60	100		IOS22-0062	4,35
1539	153980017	153940012	0	10	20	70	100		IOS22-0062	8,06
1539	153980018	153940041	2	30	45	21	100		IOS22-0062	4,07
1539	153980019	153940021	0	6	20	72	100		IOS22-0062	7,91
1539	153980020	153940010	0	15	30	55	100		IOS22-0062	7,86
1539	153980022	153940026	0	15	25	60	100		IOS22-0062	3,73
1539	153980023	153940015	0	8	25	65	100		IOS22-0062	5,45
1539	153980024	153940036	0	8	20	70	100		IOS22-0062	7,81
1539	153980025	153940007	0	2	18	80	100		IOS22-0062	5,47
1539	153980026	153940017	0	5	15	80	100		IOS22-0062	4,82
1539	153980027	153940045	7	40	30	21	100	Cailloux.	IOS22-0062	4,67
1539	153980028	153940006	0	8	25	65	100		IOS22-0062	3,96
1539	153980029	153940023	2	28	15	55	100		IOS22-0062	33,75
1539	153980030	153940008	0	10	20	70	100		IOS22-0062	7,57
1539	153980032	153940013	0	5	30	65	100		IOS22-0062	7,58
1539	153980033	153940030	2	8	10	80	100		IOS22-0062	5,35
1539	153980034	153940042	5	40	35	15	100	Cailloux.	IOS22-0062	4,98
1539	153980035	153940003	0	13	25	60	100		IOS22-0062	5,55
1539	153980036	153940046	5	30	15	45	100		IOS22-0062	5,10
1539	153980037	153940033	0	10	30	60	100		IOS22-0062	4,53
1539	153980038	153940049	7	35	30	26	100	Cailloux.	IOS22-0062	9,58
1539	153980039	153940038	3	20	25	50	100		IOS22-0062	6,22
1539	153980040	153940024	0	10	25	65	100		IOS22-0062	6,90
1539	153980042	153940037	2	8	28	60	100		IOS22-0062	13,53

			WEIGHT MEASUREMENTS					ENVIRONMENTAL PARAMETERS						
PROJECT	ANALYSIS NUMBER	FIELD NUMBER	INITIAL WEIGHT WITH BAG	SOIL FOR pH MEASURE	VOLUME OF WATER	SOIL WITH DEMINERALIZED WATER	COMMENTS	pH	pH WITH 0.5 ml HCl 1 N	CONDUCTIVITY	CONDUCTIVITY TEMPERATURE	Eh	TEMPERATURE Eh (°C)	COMMENTS
50	Nb analys:	50	(g)	(g)	(ml)	(g)				(µS/cm)	(°C)	(mV)		
Count	Count	Historic	2741	2748	2748	2745		2748	2747	2748	2748	2710	2710	
99 Percentile	99 Percentile	Historic	1581,5	20,9	20,0	40,1		7,39	5,38	292	26,1	390	26,1	
Average	Average	Historic	895,8	20,2	10,3	30,4		5,52	2,56	73	19,8	185	20,9	
Std-Dev	Std-Dev	Historic	246,1	0,2	1,6	1,6		0,65	0,99	64	2,5	66	4,2	
Coefficient var.		Historic	0,3	0,0	0,2	0,1		0,12	0,39	1	0,1	0	0,2	
Maximum	Maximum	Historic	2324,4	21,0	20,0	40,4		7,97	6,74	1269	27,8	428	199,0	
Minimum	Minimum	Historic	194,8	19,4	9,9	20,2		2,44	0,91	1	13,3	-480	14,6	
Count	Count	Project	50	50	50	50		50	50	50	50	50	50	
Average	Average	Project	804,3	20,1	14,0	34,1		5,60	4,97	163	18,7	198,36	20,2	
Mediane	Mediane	Project	808,3	20,1	10,0	30,3		5,49	4,87	145,50	18,65	193,50	20,25	
Std. Dev.	Std. Dev.	Project	148,7	0,2	4,9	4,9		0,46	0,68	110,56	0,55	49,95	0,56	
Coefficient var.		Project	0,2	0,0	0,4	0,1		0,08	0,14	0,68	0,03	0,25	0,03	
Coefficient asy.		Project	-0,1	0,4	0,4	0,4		1,09	1,04	2,07	-0,12	0,45	-0,83	
Maximum	Maximum	Project	1201,9	20,6	20,0	40,4		6,94	6,74	599	19,6	306,00	21,3	
Minimum	Minimum	Project	481,4	19,7	10,0	29,7		4,76	3,81	34	17,6	86,00	18,4	
1539	153980043	153940020	789,3	20,3	10,0	30,4		5,71	5,18	204	17,7	297	18,4	
1539	153980044	153940032	952,8	19,9	20,0	40,0		5,74	5,31	120	18,7	215	20,4	
1539	153980045	153940014	778,8	20,1	10,0	30,2		5,17	4,75	178	18,8	298	20,6	
1539	153980046	153940034	792,6	19,9	20,0	40,1		5,56	4,86	92	19,3	209	20,6	
1539	153980047	153940019	758,9	20,4	10,0	30,3		5,93	4,54	103	18,0	306	18,8	
1539	153980048	153940039	666,4	19,9	20,0	39,9		5,27	4,50	61	17,6	194	19,5	
1539	153980049	153940011	889,2	20,1	10,0	30,0		4,88	4,35	102	18,3	238	20,2	
1539	153980050	153940050	825,3	20,3	10,0	30,4		5,45	4,73	95	19,2	170	20,8	
1539	153980052	153940025	481,6	20,2	20,0	40,2		5,61	4,86	76	18,4	118	20,2	
1539	153980053	153940001	705,6	20,1	10,0	30,1		5,77	4,54	225	19,3	170	20,9	Calibration 1
1539	153980054	153940044	680,9	20,1	10,0	30,1		5,34	4,09	53	18,3	160	19,9	
1539	153980055	153940031	964,4	20,1	20,0	40,1		5,38	4,74	134	18,7	213	20,3	
1539	153980056	153940043	513,8	20,0	10,0	30,0		5,15	3,87	188	18,2	187	19,9	

			SAMPLE PREPARATION							SAMPLE DESCRIPTION						
PROJECT	ANALYSIS NUMBER	FIELD NUMBER	Initial weight	0-250 µ weight	LOI aliquot 0-250 µ weight	0-250 µ weight for ALS Minerals	> 250 µ weight	Mass balance	Comments	Original sample colour			Dry < 250 µ fraction colour			Fibrous matter
50	Nb analys:	50	(g)	(g)	(g)	(g)	(g)	(g)		Hue	Value	Chroma	Hue	Value	Chroma	(%)
Count	Count	Historic	2746	2747	2748	2748	2748	2746								2745
99 Percentile	99 Percentile	Historic	1254,1	601,5	418,6	256,2	1026,8	0,6								20
Average	Average	Historic	662,6	224,8	68,0	155,6	437,0	-1,7								3
Std-Dev	Std-Dev	Historic	215,3	112,3	81,8	34,0	216,4	8,1								4
Coefficient var.		Historic	0,3	0,5	1,2	0,2	0,5	-4,8								1
Maximum	Maximum	Historic	1993,6	3166,7	586,2	359,1	1935,3	7,3								50
Minimum	Minimum	Historic	86,1	15,9	5,4	0,0	2,1	-398,2								0
Count	Count	Project	50	50	50	50	50	50								50
Average	Average	Project	571,6	104,3	19,2	85,1	465,2	-2,1								1
Mediane	Mediane	Project	569,5	113,1	15,7	100,1	472,7	-1,2								0,0
Std. Dev.	Std. Dev.	Project	134,99	42,86	8,50	39,80	133,17	5,84								1,67
Coefficient var.		Project	0,24	0,41	0,44	0,47	0,29	-2,73								1,35
Coefficient asy.		Project	-0,2	0,7	1,4	0,4	-0,2	-6,9								1,2
Maximum	Maximum	Project	1019,9	195,3	43,5	154,7	823,3	-0,1								5
Minimum	Minimum	Project	108,9	37,0	10,5	0,0	70,2	-42,2								0
1539	153980043	153940020	549,1	66,2	15,4	50,9	479,9	-2,9	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980044	153940032	694,8	62,7	12,0	50,8	630,4	-1,6	Blender.	10 YR	5	2	10 YR	5	2	0
1539	153980045	153940014	519,3	79,2	26,7	52,5	437,8	-2,3	Blender.	10 YR	6	2	10 YR	6	2	0
1539	153980046	153940034	610,6	126,0	24,8	101,2	482,8	-1,8	Blender.	10 YR	7	2	10 YR	7	2	2
1539	153980047	153940019	566,0	62,2	11,5	50,6	503,6	-0,3		2.5 Y	7	2	2.5 Y	7	2	0
1539	153980048	153940039	455,6	114,6	13,9	100,6	340,6	-0,5		10 YR	6	3	10 YR	6	3	2
1539	153980049	153940011	592,9	65,3	12,6	52,8	527,1	-0,4		10 YR	6	2	10 YR	6	2	2
1539	153980050	153940050	635,8	116,1	14,9	101,1	519,3	-0,5		2.5 Y	7	2	2.5 Y	7	2	0
1539	153980052	153940025	533,0	112,6	12,4	100,2	419,9	-0,5		2.5 Y	7	2	2.5 Y	7	2	5
1539	153980053	153940001	502,1	61,7	10,9	50,9	439,6	-0,7	Mortier.	10 YR	6	2	10 YR	6	2	2
1539	153980054	153940044	549,4	120,9	20,5	100,4	427,8	-0,7		10 YR	5	4	10 YR	5	4	2
1539	153980055	153940031	721,5	72,4	21,0	51,4	648,3	-0,8		2.5 Y	6	2	2.5 Y	6	2	0
1539	153980056	153940043	394,2	120,0	19,5	100,4	273,6	-0,7		10 YR	5	4	10 YR	5	4	5

			SAMPLE DESCRIPTION						LOI	
PROJECT	**ANALYSIS NUMBER**	**FIELD NUMBER**	**Organic matter**	**Sand**	**Silt**	**Clay**	**Total**	**Other (particularities)**	**CERTIFICATE LOI (IOS)**	**LOI (700 °C) %**
50	**Nb analys:**	**50**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**			
Count	Count	Historic	2745	2745	2745	2745	2757			2282
99 Percentile	99 Percentile	Historic	25	83	80	90	100			39
Average	Average	Historic	2	29	31	35	76			6
Std-Dev	Std-Dev	Historic	5	21	15	21	43			7
Coefficient var.		Historic	2	1	1	1	1			1
Maximum	Maximum	Historic	80	94	98	99	110			67
Minimum	Minimum	Historic	0	0	0	0	-100			1
Count	Count	Project	50	50	50	50	50			50
Average	Average	Project	1	16	25	57	100			6,48
Mediane	Mediane	Project	0,0	11,5	25,0	60,0	100,0			5,81
Std. Dev.	Std. Dev.	Project	1,83	10,46	7,33	16,44	0,00			4,46
Coefficient var.		Project	1,43	0,65	0,30	0,29	0,00			0,69
Coefficient asy.		Project	1,7	1,1	0,2	-1,1	#DIV/0!			3,60
Maximum	Maximum	Project	7	40	45	80	100			33,75
Minimum	Minimum	Project	0	2	10	15	100			1,59
1539	153980043	153940020	0	10	15	75	100		IOS22-0062	7,99
1539	153980044	153940032	2	8	10	80	100		IOS22-0062	5,92
1539	153980045	153940014	0	10	15	75	100		IOS22-0062	8,03
1539	153980046	153940034	2	16	30	50	100		IOS22-0062	3,35
1539	153980047	153940019	0	10	30	60	100		IOS22-0062	3,90
1539	153980048	153940039	2	18	38	40	100		IOS22-0062	6,30
1539	153980049	153940011	0	8	25	65	100		IOS22-0062	5,81
1539	153980050	153940050	0	5	35	60	100		IOS22-0062	1,59
1539	153980052	153940025	2	8	30	55	100		IOS22-0062	2,93
1539	153980053	153940001	2	16	30	50	100		IOS22-0062	3,71
1539	153980054	153940044	2	35	35	26	100		IOS22-0062	5,46
1539	153980055	153940031	0	10	25	65	100		IOS22-0062	3,51
1539	153980056	153940043	2	40	35	18	100		IOS22-0062	4,72

APPENDIX 3

SAMPLES ANALYSIS

Table 1: Hand-held X-ray fluorescence spectrometer analysis (IOS)

XRF ANALYSIS (IOS)

Dried and sieved samples were first analyzed by IOS with a portable X-ay fluorescence spectrometer (Olympus Vanta VMR). The XRF measure the abundance of a vast series of elements, dominantly the transition metals. The material for X-Ray fluorescence analysis is the same as submitted for chemical analysis, <250 µm. Approximately 1 cm^3 of the material is sufficient. A 90 seconds reading was acquired per analysis using the "Geochem (3-Beam) mode" according to Rousseau’s fundamental algorithm for major elements and Compton normalization for trace metals, using factory calibration. Results were provided in ***appendix 3***, ***table 1*** quality control in ***appendix 4*** and certificates in ***appendix 5***. Calibrations were tested every day and blank material was analyzed for quality control. XRF analyses are total determination, providing the abundance of the various elements regardless of their speciation. Numerous issues and limitations are related to this analytical method, and results must be handled with caution, especially for elements lighter than potassium.

PROJECT NUMBER	RANDOMIZED SAMPLE NUMBER	FIELD SAMPLE NUMBER	CERTIFICATE	DATE	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																								
					Mg	Mg Error1s	Al	Al Error1s	Si	Si Error1s	P	P Error1s	S	S Error1s	K	K Error1s	Ca	Ca Error1s	Ti	Ti Error1s	V	V Error1s	Cr	Cr Error1s	Mn	Mn Error1s	Fe	Fe Error1s	Co
Nb Analysis:	Nb Analysis:	50			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte	Compte	Historique			816	3622	3605	3622	3622	3622	3622	3622	1134	3622	3469	3622	3622	3622	3604	3622	1277	3622	2377	3622	3617	3622	3622	3622	1182
99 Percentile	99 Percentile	Historique			8178	27128	45841	374	302769	507	3853	36	7835	502	19252	326	28303	86	6091	97	260	107	205	49	831	15	56895	183	175
Moyenne	Moyenne	Historique			4381	6887	27703	297	139909	370	2902	32	1279	249	9756	54	12996	44	2613	77	88	64	65	21	282	16	21272	71	71
Écart type	Écart type	Historique			1124	4964	9243	68	52847	91	326	2	1602	159	4170	87	5302	15	1132	30	37	34	54	15	220	165	12573	37	30
Coefficient var	Coeff. var.	Historique			0	1	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	1	1	1	1	10	1	1	0
Maximum	Maximum	Historique			15964	50224	53831	1069	314508	533	5371	43	14754	836	22480	3492	44507	131	16053	1537	558	118	1574	58	4597	6409	176141	601	231
Minimum	Minimum	Historique			2747	858	820	126	2915	60	1853	19	69	18	49	11	1139	11	153	31	32	8	22	7	17	4	695	8	15
Compte	Compte	Projet			44	50	50	50	50	50	50	50	2	50	50	50	50	50	50	50	46	50	50	50	50	50	50	50	42
Moyenne	Moyenne	Projet			5374	1816	32704	333	142729	444	2600	31	1672	322	16911	65	13755	52	3409	81	93	28	110	11	612	13	39965	134	97
Écart type	Écart type	Projet			1288	1906	3818	18	16343	36	383	2	974	68	3468	11	4706	14	372	3	16	23	42	0	150	1	6224	22	22
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PROJECT NUMBER	RANDOMIZED SAMPLE NUMBER	FIELD SAMPLE NUMBER	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																											
			Co Error1s	Ni	Ni Error1s	Cu	Cu Error1s	Zn	Zn Error1s	As	As Error1s	Se	Se Error1s	Rb	Rb Error1s	Sr	Sr Error1s	Y	Y Error1s	Zr	Zr Error1s	Nb	Nb Error1s	Mo	Mo Error1s	Ag	Ag Error1s	Cd	Cd Error1s	Sn
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99 Percentile	99 Percentile	Historique	109	120	9	210	10	153	3	43	4	4	3	111	1	453	3	23	4	606	3	9	5	11	7	5	114	22	23	28
Moyenne	Moyenne	Historique	46	31	3	26	3	40	2	6	3	2	2	48	1	305	2	10	1	202	1	4	3	5	4	3	72	15	20	19
Écart type	Écart type	Historique	28	28	2	68	2	30	1	19	1	1	0	24	0	98	1	5	0	125	0	2	2	2	2	1	13	2	4	3
Coefficient var	Coeff. var.	Historique	1	1	1	3	1	1	0	3	0	0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0
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Minimum	Minimum	Projet	15	49	3	14	2	57	2	3	1	0	2	43	1	145	1	9	1	86	1	3	1	4	1	5	1	13	4	17
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1539	153980033	153940030	19	67	3	30	3	102	3	4	1	<LOD	2	118	1	258	2	18	1	143	1	4	1	<LOD	6	<LOD	76	<LOD	21	<LOD
1539	153980034	153940042	102	101	3	65	3	93	2	<LOD	4	<LOD	2	43	1	380	2	11	1	143	1	<LOD	4	<LOD	6	<LOD	69	<LOD	21	22
1539	153980035	153940003	19	66	3	37	3	103	3	6	1	<LOD	2	127	1	235	2	15	1	133	1	7	1	<LOD	6	<LOD	78	17	4	<LOD
1539	153980036	153940046	96	71	3	36	3	109	3	<LOD	4	<LOD	2	75	1	503	2	15	1	288	2	4	1	<LOD	6	<LOD	73	<LOD	21	20
1539	153980037	153940033	18	56	3	23	2	84	2	4	1	<LOD	2	111	1	242	1	10	1	154	1	4	1	<LOD	6	<LOD	74	<LOD	21	<LOD
1539	153980038	153940049	105	72	3	31	3	138	3	<LOD	4	<LOD	2	67	1	427	2	9	1	254	2	5	1	<LOD	6	<LOD	75	<LOD	20	18
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PROJECT NUMBER	RANDOMIZED SAMPLE NUMBER	FIELD SAMPLE NUMBER	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																										
			Sn Error1s	Sb	Sb Error1s	Ba	Ba Error1s	La	La Error1s	Ce	Ce Error1s	Pr	Pr Error1s	Nd	Nd Error1s	W	W Error1s	Hg	Hg Error1s	Pb	Pb Error1s	Bi	Bi Error1s	Th	Th Error1s	U	U Error1s	LE	LE Error1s
Nb Analysis:	Nb Analysis:	50	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte	Compte	Historique	3622	110	3622	3483	3622	986	3622	1401	3622	323	3622	417	3622	28	3622	20	3622	3458	3622	0	3622	3598	3622	2236	3622	3622	3622
99 Percentile	99 Percentile	Historique	32	37	44	525	867	108	2265	128	2471	155	3377	224	4885	21	13	5	9	31	4	#NOMBRE!	36	54	3	17	8	963976	1093
Moyenne	Moyenne	Historique	26	26	38	299	43	64	1315	77	1225	94	2495	151	3541	11	12	4	8	14	1	#DIV/0!	32	19	2	5	3	780593	542
Écart type	Écart type	Historique	7	4	7	119	166	22	802	29	965	21	791	31	1286	3	2	0	1	8	1	#DIV/0!	2	8	1	4	3	57107	229
Coefficient var	Coeff. var.	Historique	0	0	0	0	4	0	1	0	1	0	0	0	0	0	0	0	0	1	1	#DIV/0!	0	0	0	1	1	0	0
Maximum	Maximum	Historique	33	40	46	593	1725	511	3123	833	3513	233	4442	264	7272	23	14	5	10	203	5	0	38	83	12	66	10	979470	1571
Minimum	Minimum	Historique	5	17	6	12	4	28	8	31	9	41	12	54	15	7	2	4	1	2	0	0	17	6	1	2	1	679637	146
Compte	Compte	Projet	50	3	50	50	50	22	50	37	50	4	50	9	50	0	50	1	50	50	50	0	50	50	50	17	50	50	50
Moyenne	Moyenne	Projet	25	30	37	440	12	67	1067	91	552	104	2652	168	3470	#DIV/0!	13	4	9	20	1	#DIV/0!	32	24	2	4	5	740842	926
Écart type	Écart type	Projet	8	6	8	59	1	8	939	18	904	9	783	17	1622	#DIV/0!	0	#DIV/0!	1	4	0	#DIV/0!	1	4	0	1	3	17164	176
Coefficient var	Coeff.var.	Projet	0	0	0	0	0	0	1	0	2	0	0	0	0	#DIV/0!	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	0	1	0	0
Maximum	Maximum	Projet	30	36	41	591	13	82	1966	138	2126	114	3002	195	4397	0	14	4	9	31	1	0	34	32	3	7	8	812979	1105
Minimum	Minimum	Projet	6	26	8	291	10	58	16	65	18	96	31	147	44	0	11	4	1	13	1	0	30	15	2	3	1	713575	457
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1539	153980003	153940022	29	<LOD	40	421	12	<LOD	1912	99	21	<LOD	2888	<LOD	4205	<LOD	13	<LOD	9	20	1	<LOD	33	22	2	<LOD	7	733871	1089
1539	153980004	153940047	6	<LOD	40	518	12	67	19	<LOD	2029	<LOD	2806	<LOD	4089	<LOD	12	<LOD	8	28	1	<LOD	33	18	2	<LOD	7	757599	457
1539	153980005	153940035	28	<LOD	39	442	12	<LOD	1887	<LOD	2076	<LOD	2873	<LOD	4206	<LOD	13	<LOD	8	20	1	<LOD	32	29	2	<LOD	7	732374	1032
1539	153980006	153940016	6	<LOD	39	469	12	58	19	102	22	<LOD	2896	<LOD	4235	<LOD	13	<LOD	9	21	1	<LOD	32	19	2	6	1	734373	1050
1539	153980007	153940009	28	<LOD	39	448	12	61	19	117	21	<LOD	2899	<LOD	4268	<LOD	13	<LOD	9	21	1	<LOD	33	28	2	<LOD	7	734989	1045
1539	153980008	153940028	29	<LOD	40	458	12	59	19	93	22	<LOD	2929	<LOD	4301	<LOD	13	<LOD	9	20	1	<LOD	32	25	2	<LOD	7	735579	1019
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1539	153980025	153940007	27	<LOD	38	482	13	82	21	100	23	114	33	174	50	<LOD	13	<LOD	9	25	1	<LOD	31	29	3	<LOD	7	736425	965
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1539	153980052	153940025	29	<LOD	41	407	11	<LOD	1884	<LOD	2082	<LOD	2869	<LOD	4201	<LOD	13	<LOD	9	16	1	<LOD	34	25	2	<LOD	7	727951	938
1539	153980053	153940001	29	<LOD	40	438	12	<LOD	1854	138	21	<LOD	2837	<LOD	4163	<LOD	13	<LOD	9	21	1	<LOD	33	29	2	<LOD	7	729705	947
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1539	153980055	153940031	29	<LOD	40	429	12	<LOD	1817	82	22	<LOD	2781	<LOD	4094	<LOD	13	<LOD	9	20	1	<LOD	32	18	2	4	1	732381	927
1539	153980056	153940043	28	<LOD	39	529	12	65	20	78	23	<LOD	2824	188	50	<LOD	13	<LOD	9	22	1	<LOD	32	17	2	<LOD	7	760265	961

APPENDIX 4

ANALYTICAL QUALITY CONTROL FOR HH-XRF (IOS)

ANALYTICAL QUALITY CONTROL FOR HH-XRF

The material for X-Ray fluorescence analysis, including the QAQC, is the same as submitted for chemical analysis, <250 µm. Calibrations were tested every day. Blank Vanta and internal reference materials were analysed periodically for quality control. The various tables in ***appendix4*** show the results of analytical quality control for HH-XRF.

Quality analysis can be obtained with HH-XRF, at the moment proper care is taken into calibrating every element, and that proper deconvolution algorithm is used. Light element, with atomic number below magnesium, cannot be measured, while those lighter than potassium are not accurate with this type of device. Elements with spectral interferences (ex.: sulphur, lead and molybdenum) can hardly be deconvoluted accurately. Detection limits are variable depending on elements and host matrix, and calculated for each analysis. Analysis close to detection limits are typically plagued with non-zero discrepancies.

Analyses of light elements such as magnesium, aluminium, and silicium are sensitive to X-ray absorption in air and are commonly discrepant. These elements are too abundant to be calculated from Compton normalization, and are hence sensitive to matrix corrections, itself sensitive to their absolute abundance which is typically underestimated due to adsorption.

Internal reference materials

Two types of internal reference materials have been inserted among samples after the random renumbering. They allow to detect of quality issues affecting the whole analytical process, including bias, instrumental drifts and samples inversion.

The first internal reference material MRIHB22 was analysed three times within this project. This material consists of 33 kg of homogenized B-horizon that has been dried and sieved at 250 µm, mixed and homogenized by quarter split and divided in 150 g aliquots. Results are presented in ***appendix 4***, ***tables 1***. Of these, 3 aliquots were analysed by HH-XRF. It is possible to notice that the Calcium is slightly lower than usual and appears in yellow for the standard number 153980051.

HH-XRF spectrometer has detections limits in the order of a few tens to a few hundred of ppm. Reading below or near the detection limits are abundant for most elements.

The second internal reference material is blanks made of cleaned quartz. It was inserted 4 times among the soil samples for analysis by HH-XRF. These results are presented in ***appendix 4***, ***table 2***. This quartz is from the from the La Galette quartzite (Sitec Amérique du Nord inc.) which was cleaned, pulverized and sieved at 90 microns prior to insertion for analysis and the fraction <90 µm was inserted. Some of the results obtained for blank 153980021 during the November 29, 2022 analysis had outliers for the following elements: Si, Ca, Ti, Mn, Fe, Zr. A handling or cleaning error may be responsible for these outliers. A rework was performed on this blank as well as on a selection of surrounding samples. The second value obtained for 153980021 adequately respected the acceptability criteria and the reanalysed samples replicated the first values obtained.

‘’Blank’’ Vanta

The "Blank Vanta" reference material is a fused quartz glass provided by Olympus for the calibration of the instrument. It was analyzed 2 times for this project and the results are presented in ***table 4*** of ***appendix 3***. No problem was detected.

The instrument was calibrated every day and routinely every 80 analyses. Calibration results is presented in ***table 4*** of ***appendix 4.***

1539-2022_Report_Soils
Boston Bulldog, May 8th, 2023

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Véronique Bouchard, chemist
OCQ nº 2010-057

PROJECT NUMBER	RANDOMIZED SAMPLE NUMBER	DATE	CERTIFICATE	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																												
				Mg	Mg Error1s	Al	Al Error1s	Si	Si Error1s	P	P Error1s	S	S Error1s	K	K Error1s	Ca	Ca Error1s	Ti	Ti Error1s	V	V Error1s	Cr	Cr Error1s	Mn	Mn Error1s	Fe	Fe Error1s	Co	Co Error1s	Ni
Nb Analysis:	**Nb Analysis:**			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte	Compte			4	80	80	80	80	80	80	80	0	80	80	80	80	80	80	80	3	80	80	80	80	80	80	80	9	80	80
99 Percentile	99 Percentile			4559	7124	32495	325	185144	477	3147	33	#NOMBRE!	327	15918	58	16070	54	2316	81	69	99	87	11	320	11	20663	74	61	70	30
Moyenne	Moyenne			3706	5635	30304	304	171752	409	2873	32	#DIV/0!	306	15263	53	15482	49	2022	80	68	94	62	11	286	11	19824	66	46	62	25
Écart type	Écart type			677	1180	962	7	6630	16	104	1	#DIV/0!	12	307	1	307	1	94	1	2	14	11	0	14	0	358	2	7	18	2
Maximum	Maximum			4581	7126	32895	334	185510	486	3164	33	0	329	15927	60	16091	55	2345	82	69	101	89	11	325	11	20680	74	62	70	31
Minimum	Minimum			3028	919	28652	292	159459	392	2693	31	0	277	14521	51	14585	47	1806	78	66	21	35	10	247	11	19051	64	41	13	20
X+2σ	**X+2σ**			**5060**	**7995**	**32229**	**319**	**185011**	**442**	**3082**	**33**	**#DIV/0!**	**331**	**15877**	**56**	**16096**	**52**	**2210**	**81**	**71**	**122**	**85**	**11**	**314**	**11**	**20539**	**70**	**59**	**98**	**30**
X-2σ	**X-2σ**			**2351**	**3274**	**28380**	**289**	**158492**	**377**	**2664**	**31**	**#DIV/0!**	**281**	**14650**	**51**	**14868**	**46**	**1833**	**78**	**65**	**65**	**39**	**11**	**257**	**11**	**19109**	**62**	**33**	**27**	**20**
Compte	Compte			0	3	3	3	3	3	3	3	0	3	3	3	3	3	3	3	0	3	3	3	3	3	3	3	0	3	3
Moyenne	Moyenne			#DIV/0!	6391	29384	309	163700	401	2752	32	#DIV/0!	318	14995	53	15086	48	1954	80	#DIV/0!	96	66	11	270	11	19640	66	#DIV/0!	69	24
Écart type	Écart type			#DIV/0!	110	650	5	3833	5	33	0	#DIV/0!	8	108	1	230	1	30	1	#DIV/0!	1	11	0	9	0	384	1	#DIV/0!	1	1
Coefficient var	Coefficient var.			#DIV/0!	2	2	2	2	1	1	0	#DIV/0!	3	1	1	2	1	2	1	#DIV/0!	1	17	0	3	0	2	2	#DIV/0!	1	5
X+2σ	**X+2σ**			#DIV/0!	6612	30684	319	171367	411	2818	32	#DIV/0!	334	15211	54	15545	49	2015	81	#DIV/0!	98	88	11	287	11	20407	68	#DIV/0!	71	26
X-2σ	**X-2σ**			#DIV/0!	6170	28083	300	156033	391	2686	32	#DIV/0!	302	14778	52	14627	47	1894	79	#DIV/0!	94	43	11	253	11	18873	64	#DIV/0!	67	21
Maximum	Maximum			0	6507	29895	313	166918	404	2782	32	0	325	15076	53	15261	48	1987	80	0	97	75	11	275	11	20022	67	0	70	25
Minimum	Minimum			0	6287	28652	304	159459	395	2717	32	0	309	14872	52	14826	47	1927	79	0	95	53	11	260	11	19255	65	0	68	23
1539	153980011	2022-11-29	IOS22-0060	<LOD	6507	29604	313	166918	404	2757	32	<LOD	309	15036	53	15261	48	1987	79	<LOD	95	53	11	275	11	19255	65	<LOD	68	23
1539	153980031	2022-11-29	IOS22-0060	<LOD	6287	29895	311	164723	403	2717	32	<LOD	320	15076	53	15171	48	1949	80	<LOD	97	75	11	275	11	20022	67	<LOD	70	25
1539	153980051	2022-11-29	IOS22-0060	<LOD	6379	28652	304	159459	395	2782	32	<LOD	325	14872	52	14826	47	1927	80	<LOD	96	69	11	260	11	19644	66	<LOD	69	23

PROJECT NUMBER	RANDOMIZED SAMPLE NUMBER	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																													
		Ni Error1s	Cu	Cu Error1s	Zn	Zn Error1s	As	As Error1s	Se	Se Error1s	Rb	Rb Error1s	Sr	Sr Error1s	Y	Y Error1s	Zr	Zr Error1s	Nb	Nb Error1s	Mo	Mo Error1s	Ag	Ag Error1s	Cd	Cd Error1s	Sn	Sn Error1s	Sb	Sb Error1s	Ba
Nb Analysis:	Nb Analysis:	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte	Compte	80	80	80	80	80	48	80	0	80	80	80	80	80	80	80	80	80	30	80	54	80	1	80	7	80	27	80	7	80	80
99 Percentile	99 Percentile	2	39	2	38	2	5	4	#NOMBRE!	3	72	1	376	2	18	1	406	2	4	5	7	7	3	67	18	23	28	31	27	44	520
Moyenne	Moyenne	2	33	2	33	2	3	2	#DIV/0!	2	70	1	371	2	16	1	385	2	3	4	5	3	3	63	14	21	20	22	25	40	484
Écart type	Écart type	0	3	0	2	0	1	1	#DIV/0!	0	1	0	3	0	1	0	10	0	0	2	1	3	#DIV/0!	7	2	5	3	12	1	10	18
Maximum	Maximum	2	40	2	44	2	5	4	0	3	73	1	377	2	18	1	407	2	4	5	7	7	3	67	18	23	28	31	27	44	523
Minimum	Minimum	2	26	2	27	2	2	1	0	2	67	1	355	2	14	1	357	2	3	1	4	1	3	1	13	4	16	5	24	8	450
X+2σ	**X+2σ**	**2**	**39**	**2**	**37**	**2**	**4**	**5**	**#DIV/0!**	**3**	**72**	**1**	**377**	**2**	**18**	**1**	**405**	**2**	**4**	**7**	**7**	**8**	**#DIV/0!**	**77**	**18**	**31**	**26**	**46**	**28**	**60**	**520**
X-2σ	**X-2σ**	**2**	**27**	**2**	**28**	**2**	**2**	**-1**	**#DIV/0!**	**1**	**68**	**1**	**365**	**2**	**14**	**1**	**364**	**2**	**2**	**0**	**3**	**-2**	**#DIV/0!**	**49**	**11**	**10**	**14**	**-2**	**23**	**20**	**448**
Compte	Compte	3	3	3	3	3	3	3	0	3	3	3	3	3	3	3	3	3	0	3	1	3	0	3	1	3	1	3	2	3	3
Moyenne	Moyenne	2	36	2	32	2	4	1	#DIV/0!	2	70	1	370	2	16	1	387	2	#DIV/0!	5	5	5	#DIV/0!	64	18	16	27	22	27	20	493
Écart type	Écart type	0	4	0	1	0	1	0	#DIV/0!	1	1	0	2	0	1	0	6	0	#DIV/0!	0	#DIV/0!	3	#DIV/0!	1	#DIV/0!	10	#DIV/0!	15	1	20	18
Coefficient var	Coefficient var.	0	12	0	2	0	16	0	#DIV/0!	25	1	0	1	0	4	0	2	0	#DIV/0!	0	#DIV/0!	69	#DIV/0!	1	#DIV/0!	65	#DIV/0!	67	3	103	4
X+2σ	**X+2σ**	2	45	2	33	2	5	1	#DIV/0!	3	72	1	375	2	17	1	399	2	#DIV/0!	5	#DIV/0!	12	#DIV/0!	65	#DIV/0!	37	#DIV/0!	52	28	60	528
X-2σ	**X-2σ**	2	27	2	31	2	3	1	#DIV/0!	1	68	1	366	2	15	1	375	2	#DIV/0!	5	#DIV/0!	-2	#DIV/0!	63	#DIV/0!	-5	#DIV/0!	-8	25	-21	458
Maximum	Maximum	2	39	2	32	2	4	1	0	3	71	1	373	2	16	1	393	2	0	5	5	7	0	64	18	22	27	31	27	43	511
Minimum	Minimum	2	31	2	31	2	3	1	0	2	69	1	369	2	15	1	381	2	0	5	5	1	0	63	18	4	27	5	26	8	476
1539	153980011	2	38	2	31	2	3	1	<LOD	2	71	1	369	2	16	1	386	2	<LOD	5	5	1	<LOD	64	<LOD	22	27	5	26	8	511
1539	153980031	2	39	2	32	2	4	1	<LOD	3	70	1	373	2	16	1	381	2	<LOD	5	<LOD	7	<LOD	64	18	4	<LOD	31	<LOD	43	491
1539	153980051	2	31	2	32	2	4	1	<LOD	2	69	1	369	2	15	1	393	2	<LOD	5	<LOD	7	<LOD	63	<LOD	22	<LOD	31	27	8	476

PROJECT NUMBER	RANDOMIZED SAMPLE NUMBER	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																						
		Ba Error1s	La	La Error1s	Ce	Ce Error1s	Pr	Pr Error1s	Nd	Nd Error1s	W	W Error1s	Hg	Hg Error1s	Pb	Pb Error1s	Bi	Bi Error1s	Th	Th Error1s	U	U Error1s	LE	LE Error1s
Nb Analysis:	**Nb Analysis:**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Compte	Compte	80	31	80	55	80	6	80	15	80	0	80	2	80	80	80	0	80	80	80	35	80	80	80
99 Percentile	99 Percentile	12	89	1742	127	1927	129	2678	220	3930	#NOMBRE!	13	4	9	21	1	#NOMBRE!	35	22	2	6	8	755526	897
Moyenne	Moyenne	12	71	1047	88	603	111	2412	172	3116	#DIV/0!	12	4	9	18	1	#DIV/0!	34	16	2	4	5	740342	482
Écart type	Écart type	0	9	823	16	868	14	683	21	1483	#DIV/0!	0	0	1	1	0	#DIV/0!	0	2	0	1	3	8209	93
Maximum	Maximum	12	90	1742	128	1928	129	2679	224	3947	0	13	4	9	22	1	0	36	22	2	6	8	755849	925
Minimum	Minimum	11	58	19	65	21	96	31	145	46	0	12	4	1	16	1	0	34	9	2	3	1	723407	448
X+2σ	**X+2σ**	**13**	**89**	**2693**	**120**	**2339**	**138**	**3777**	**215**	**6083**	**#DIV/0!**	**13**	**4**	**11**	**20**	**1**	**#DIV/0!**	**35**	**20**	**2**	**5**	**11**	**756760**	**668**
X-2σ	**X-2σ**	**11**	**54**	**-599**	**56**	**-1132**	**83**	**1046**	**129**	**149**	**#DIV/0!**	**11**	**4**	**6**	**16**	**1**	**#DIV/0!**	**33**	**11**	**2**	**2**	**-2**	**723924**	**296**
Compte	Compte	3	2	3	3	3	0	3	0	3	0	3	0	3	3	3	0	3	3	3	0	3	3	3
Moyenne	Moyenne	12	84	569	91	22	#DIV/0!	2592	#DIV/0!	3805	#DIV/0!	12	#DIV/0!	9	17	1	#DIV/0!	34	16	2	#DIV/0!	8	750509	460
Écart type	Écart type	0	3	953	8	0	#DIV/0!	12	#DIV/0!	14	#DIV/0!	1	#DIV/0!	0	1	0	#DIV/0!	0	1	0	#DIV/0!	1	4664	5
Coefficient var	Coefficient var.	0	3	167	9	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	5	#DIV/0!	0	3	0	#DIV/0!	0	6	0	#DIV/0!	8	1	1
X+2σ	**X+2σ**	12	90	2474	107	22	#DIV/0!	2616	#DIV/0!	3833	#DIV/0!	13	#DIV/0!	9	18	1	#DIV/0!	34	18	2	#DIV/0!	9	759838	470
X-2σ	**X-2σ**	12	78	-1336	74	22	#DIV/0!	2568	#DIV/0!	3777	#DIV/0!	11	#DIV/0!	9	16	1	#DIV/0!	34	14	2	#DIV/0!	7	741181	450
Maximum	Maximum	12	86	1669	100	22	0	2599	0	3820	0	13	0	9	18	1	0	34	17	2	0	8	755849	463
Minimum	Minimum	12	82	19	84	22	0	2578	0	3792	0	12	0	9	17	1	0	34	15	2	0	7	747229	454
1539	153980011	12	<LOD	1669	88	22	<LOD	2599	<LOD	3792	<LOD	12	<LOD	9	18	1	<LOD	34	15	2	<LOD	7	747229	463
1539	153980031	12	82	19	84	22	<LOD	2599	<LOD	3820	<LOD	12	<LOD	9	17	1	<LOD	34	16	2	<LOD	8	748450	462
1539	153980051	12	86	19	100	22	<LOD	2578	<LOD	3804	<LOD	13	<LOD	9	17	1	<LOD	34	17	2	<LOD	8	755849	454

PROJECT NUMBER	SAMPLE	DATE	CERTIFICATE	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																								
				Mg	Mg Error1s	Al	Al Error1s	Si	Si Error1s	P	P Error1s	S	S Error1s	K	K Error1s	Ca	Ca Error1s	Ti	Ti Error1s	V	V Error1s	Cr	Cr Error1s	Mn	Mn Error1s	Fe	Fe Error1s	Co
Nb Analysis:	4			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte	Historique			0	165	155	165	165	165	165	165	0	165	1	165	165	165	164	165	2	165	1	165	165	165	165	165	10
Moyenne	Historique			#DIV/0!	5293	1596	227	288111	464	2899	33	#DIV/0!	239	15028	317	1300	15	522	69	55	68	58	37	107	8	968	12	32
Écart type	Historique			#DIV/0!	569	2274	312	22774	12	247	1	#DIV/0!	18	#DIV/0!	30	1086	3	167	23	0	6	#DIV/0!	2	25	1	1473	4	12
Coeff. var.	Historique			#DIV/0!	0	1	1	0	0	0	0	#DIV/0!	0	#DIV/0!	0	1	0	0	0	0	0	#DIV/0!	0	0	0	2	0	0
Maximum	Historique			0	7058	29329	1573	311745	486	3265	35	0	323	15028	420	15131	48	2045	367	55	97	58	40	253	11	19747	66	50
Minimum	Historique			0	4037	461	137	165082	402	2033	30	0	214	15028	53	920	12	204	55	55	16	58	11	72	7	623	9	17
Compte	Projet			0	4	4	4	4	4	4	4	0	4	1	4	4	4	4	4	0	4	1	4	4	4	4	4	0
Moyenne	Projet			#DIV/0!	5681	8442	193	259126	452	2701	33	#DIV/0!	253	15028	255	4694	24	886	71	#DIV/0!	75	58	31	145	9	5581	25	#DIV/0!
Écart type	Projet			#DIV/0!	435	13928	77	62700	34	23	1	#DIV/0!	40	#DIV/0!	134	6958	16	774	6	#DIV/0!	15	#DIV/0!	14	73	1	9444	28	#DIV/0!
Coeff. var.	Projet			#DIV/0!	0	2	0	0	0	0	0	#DIV/0!	0	#DIV/0!	1	1	1	1	0	#DIV/0!	0	#DIV/0!	0	1	0	2	1	#DIV/0!
Maximum	Projet			0	6311	29329	309	291242	473	2732	33	0	313	15028	323	15131	48	2045	80	0	97	58	39	253	11	19747	66	0
Minimum	Projet			0	5312	1098	149	165082	402	2678	32	0	230	15028	53	1185	15	432	67	0	67	58	11	100	8	834	11	0
1539	153980001	2022-11-29	IOS22-0060	<LOD	5577	1098	159	289535	473	2690	33	<LOD	234	<LOD	323	1199	16	520	67	<LOD	67	<LOD	38	100	9	869	11	<LOD
1539	153980021	2022-11-29	IOS22-0060	<LOD	6311	29329	309	165082	402	2678	32	<LOD	313	15028	53	15131	48	2045	80	<LOD	97	58	11	253	11	19747	66	<LOD
1539	153980041	2022-11-29	IOS22-0060	<LOD	5312	1745	149	291242	464	2702	32	<LOD	230	<LOD	319	1185	15	547	69	<LOD	67	<LOD	37	102	8	834	11	<LOD
1539	153980021	2022-12-14	IOS22-0060	<LOD	5525	1594	156	290643	470	2732	33	<LOD	236	<LOD	323	1259	16	432	69	<LOD	69	<LOD	39	125	8	875	11	<LOD

HANDHELD X-RAY FLUORESCENCE SPECTROMETER																														
Co Error1s	Ni	Ni Error1s	Cu	Cu Error1s	Zn	Zn Error1s	As	As Error1s	Se	Se Error1s	Rb	Rb Error1s	Sr	Sr Error1s	Y	Y Error1s	Zr	Zr Error1s	Nb	Nb Error1s	Mo	Mo Error1s	Ag	Ag Error1s	Cd	Cd Error1s	Sn	Sn Error1s	Sb	Sb Error1s
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
165	1	165	56	165	154	165	0	165	11	165	142	165	54	165	165	165	165	165	10	165	48	165	14	165	7	165	13	165	18	165
17	26	8	9	6	6	1	#DIV/0!	3	3	2	2	0	9	2	11	1	81	1	4	4	5	5	7	57	24	21	34	28	42	38
5	#DIV/0!	1	6	3	4	1	#DIV/0!	0	1	1	6	1	50	1	3	0	26	0	1	1	3	2	4	17	9	4	13	7	21	11
0	#DIV/0!	0	1	1	1	1	#DIV/0!	0	0	0	2	2	6	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0
69	26	8	33	9	30	6	0	4	5	2	71	2	367	3	21	1	393	2	5	5	14	7	14	72	36	23	57	31	82	44
3	26	2	5	1	4	1	0	2	2	0	1	0	1	0	6	1	61	1	2	1	3	1	3	1	13	4	15	5	21	7
4	1	4	2	4	4	4	0	4	0	4	4	4	1	4	4	4	4	4	0	4	2	4	0	4	0	4	0	4	0	4
31	26	7	19	5	12	1	#DIV/0!	3	#DIV/0!	2	19	0	367	3	11	1	157	1	#DIV/0!	4	4	4	#DIV/0!	63	#DIV/0!	22	#DIV/0!	30	#DIV/0!	42
26	#DIV/0!	3	20	3	12	1	#DIV/0!	1	#DIV/0!	0	35	1	#DIV/0!	1	3	0	157	1	#DIV/0!	1	1	3	#DIV/0!	1	#DIV/0!	0	#DIV/0!	1	#DIV/0!	1
1	#DIV/0!	0	1	1	1	0	#DIV/0!	0	#DIV/0!	0	2	2	#DIV/0!	0	0	0	1	0	#DIV/0!	0	0	1	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0
69	26	8	33	8	30	2	0	4	0	2	71	1	367	3	15	1	393	2	0	5	5	7	0	65	0	22	0	31	0	43
17	26	2	5	2	6	1	0	3	0	2	1	0	367	2	9	1	76	1	0	4	3	1	0	62	0	22	0	30	0	42
18	<LOD	8	<LOD	8	6	1	<LOD	3	<LOD	2	1	0	<LOD	3	9	1	82	1	<LOD	4	5	1	<LOD	63	<LOD	22	<LOD	30	<LOD	42
69	26	2	33	2	30	2	<LOD	4	<LOD	2	71	1	367	2	15	1	393	2	<LOD	5	<LOD	7	<LOD	65	<LOD	22	<LOD	31	<LOD	43
17	<LOD	8	<LOD	8	6	1	<LOD	3	<LOD	2	2	0	<LOD	3	10	1	77	1	<LOD	4	3	1	<LOD	63	<LOD	22	<LOD	30	<LOD	42
18	<LOD	8	5	2	7	1	<LOD	3	<LOD	2	1	0	<LOD	3	10	1	76	1	<LOD	4	<LOD	6	<LOD	62	<LOD	22	<LOD	30	<LOD	42

HANDHELD X-RAY FLUORESCENCE SPECTROMETER																							
Ba	**Ba Error1s**	**La**	**La Error1s**	**Ce**	**Ce Error1s**	**Pr**	**Pr Error1s**	**Nd**	**Nd Error1s**	**W**	**W Error1s**	**Hg**	**Hg Error1s**	**Pb**	**Pb Error1s**	**Bi**	**Bi Error1s**	**Th**	**Th Error1s**	**U**	**U Error1s**	**LE**	**LE Error1s**
ppm	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
30	165	78	165	112	165	33	165	32	165	3	165	0	165	1	165	5	165	156	165	122	165	165	165
71	705	81	853	91	580	182	1953	291	2860	9	11	#DIV/0!	8	20	4	23	30	12	2	3	2	704165	474
86	329	59	794	60	818	139	967	226	1388	1	1	#DIV/0!	0	#DIV/0!	0	7	4	2	2	1	2	21064	12
1	0	1	1	1	1	1	0	1	0	0	0	#DIV/0!	0	#DIV/0!	0	0	0	0	1	0	1	0	0
483	982	361	1661	491	1825	543	2775	843	4052	10	13	0	9	20	4	35	34	21	11	5	6	790700	498
27	8	50	15	56	17	79	24	125	36	9	2	0	6	20	1	18	5	8	2	2	1	681196	425
1	4	2	4	3	4	0	4	0	4	0	4	0	4	1	4	0	4	4	4	3	4	4	4
483	648	67	815	78	452	#DIV/0!	2474	#DIV/0!	3600	#DIV/0!	12	#DIV/0!	8	20	3	#DIV/0!	32	12	2	4	2	714115	476
#DIV/0!	424	7	920	32	864	#DIV/0!	93	#DIV/0!	164	#DIV/0!	1	#DIV/0!	1	#DIV/0!	2	#DIV/0!	2	4	0	1	3	23280	11
#DIV/0!	1	0	1	0	2	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0	0	0	1	0	0
483	872	72	1623	115	1747	0	2612	0	3845	0	13	0	9	20	4	0	34	17	2	4	6	749004	485
483	12	62	17	59	19	0	2416	0	3505	0	11	0	8	20	1	0	30	9	2	3	1	701475	461
<LOD	872	<LOD	1623	60	19	<LOD	2447	<LOD	3536	<LOD	11	<LOD	8	<LOD	4	<LOD	31	12	2	3	1	703812	485
483	12	72	19	115	22	<LOD	2612	<LOD	3845	<LOD	13	<LOD	9	20	1	<LOD	34	17	2	4	1	749004	461
<LOD	848	62	17	<LOD	1747	<LOD	2422	<LOD	3514	<LOD	11	<LOD	8	<LOD	4	<LOD	30	9	2	<LOD	6	701475	475
<LOD	860	<LOD	1599	59	19	<LOD	2416	<LOD	3505	<LOD	11	<LOD	8	<LOD	4	<LOD	31	10	2	4	1	702168	482

PROJECT NUMBER	DATE	CERTIFICATE	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																															
			Mg	Mg Error1s	Al	Al Error1s	Si	Si Error1s	P	P Error1s	S	S Error1s	K	K Error1s	Ca	Ca Error1s	Ti	Ti Error1s	V	V Error1s	Cr	Cr Error1s	Mn	Mn Error1s	Fe	Fe Error1s	Co	Co Error1s
Nb Analysis:			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte			0	91	1	91	91	91	0	91	0	91	0	91	9	91	0	91	0	91	0	91	16	91	33	91	11	91
99 Percentile			#NOMBRE!	3232	609	746	515027	568	#NOMBRE!	58	#NOMBRE!	115	#NOMBRE!	166	76	137	#NOMBRE!	170	#NOMBRE!	74	#NOMBRE!	41	44	312	59	22	15	13
Moyenne			#DIV/0!	2414	609	620	499059	481	#DIV/0!	47	#DIV/0!	89	#DIV/0!	126	51	97	#DIV/0!	133	#DIV/0!	66	#DIV/0!	36	25	225	24	15	10	12
Écart type			#DIV/0!	257	#DIV/0!	79	10074	72	#DIV/0!	4	#DIV/0!	8	#DIV/0!	12	14	30	#DIV/0!	12	#DIV/0!	5	#DIV/0!	3	6	102	12	8	2	3
Coeff. var.			#DIV/0!	0	#DIV/0!	0	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0	0	0	1	0	0
Maximum			0	4335	609	1147	516102	1158	0	81	0	158	0	226	77	186	0	234	0	109	0	64	47	329	63	22	15	14
Minimum			0	1942	609	125	457963	467	0	45	0	85	0	119	35	11	0	124	0	63	0	35	22	7	14	5	8	3
Compte			0	2	0	2	2	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2
Moyenne			#DIV/0!	2492	#DIV/0!	633	487360	477	#DIV/0!	47	#DIV/0!	90	#DIV/0!	130	#DIV/0!	109	#DIV/0!	136	#DIV/0!	65	#DIV/0!	37	#DIV/0!	280	#DIV/0!	21	#DIV/0!	13
Écart type			#DIV/0!	67	#DIV/0!	4	979	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	0	#DIV/0!	1	#DIV/0!	1	#DIV/0!	0	#DIV/0!	0
Coeff. var.			#DIV/0!	0	#DIV/0!	0	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0
Maximum			0	2539	0	635	488052	477	0	47	0	91	0	131	0	110	0	136	0	65	0	37	0	280	0	21	0	13
Minimum			0	2444	0	630	486668	476	0	46	0	89	0	129	0	108	0	135	0	65	0	36	0	279	0	21	0	13
1539	2022-12-07	IOS022-0060	<LOD	2539	<LOD	635	486668	477	<LOD	47	<LOD	91	<LOD	131	<LOD	110	<LOD	136	<LOD	65	<LOD	37	<LOD	280	<LOD	21	<LOD	13
1539	2022-12-14	IOS022-0060	<LOD	2444	<LOD	630	488052	476	<LOD	46	<LOD	89	<LOD	129	<LOD	108	<LOD	135	<LOD	65	<LOD	36	<LOD	279	<LOD	21	<LOD	13

PROJECT NUMBER	DATE	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																									
		Ni	Ni Error1s	Cu	Cu Error1s	Zn	Zn Error1s	As	As Error1s	Se	Se Error1s	Rb	Rb Error1s	Sr	Sr Error1s	Y	Y Error1s	Zr	Zr Error1s	Nb	Nb Error1s	Mo	Mo Error1s	Ag	Ag Error1s	Cd	Cd Error1s
Nb Analysis:		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte		0	91	17	91	41	91	0	91	13	91	23	91	0	91	1	91	91	91	0	91	6	91	0	91	0	91
99 Percentile		#NOMBRE!	8	12	8	6	6	#NOMBRE!	3	1	2	2	2	#NOMBRE!	3	2	4	7	1	#NOMBRE!	5	4	6	#NOMBRE!	55	#NOMBRE!	24
Moyenne		#DIV/0!	7	6	7	4	4	#DIV/0!	3	1	2	1	2	#DIV/0!	2	2	3	4	1	#DIV/0!	4	3	6	#DIV/0!	53	#DIV/0!	22
Écart type		#DIV/0!	1	2	2	1	3	#DIV/0!	0	0	1	0	1	#DIV/0!	0	#DIV/0!	0	1	0	#DIV/0!	0	0	1	#DIV/0!	2	#DIV/0!	2
Coeff. var.		#DIV/0!	0	0	0	0	1	#DIV/0!	0	0	0	0	1	#DIV/0!	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	#DIV/0!	0
Maximum		0	13	13	8	6	10	0	4	1	4	2	4	0	4	2	6	13	1	0	7	4	10	0	56	0	38
Minimum		0	7	5	2	3	1	0	3	1	0	1	0	0	2	2	1	3	1	0	4	3	1	0	34	0	22
Compte		0	2	0	2	0	2	0	2	1	2	0	2	0	2	0	2	2	2	0	2	0	2	0	2	0	2
Moyenne		#DIV/0!	7	#DIV/0!	8	#DIV/0!	6	#DIV/0!	3	1	1	#DIV/0!	2	#DIV/0!	2	#DIV/0!	3	5	1	#DIV/0!	4	#DIV/0!	6	#DIV/0!	54	#DIV/0!	22
Écart type		#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	1	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	1	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	1	#DIV/0!	0
Coeff. var.		#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	1	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0
Maximum		0	7	0	8	0	6	0	3	1	2	0	2	0	2	0	3	5	1	0	4	0	6	0	54	0	22
Minimum		0	7	0	8	0	6	0	3	1	0	0	2	0	2	0	3	4	1	0	4	0	6	0	53	0	22
1539	2022-12-07	<LOD	7	<LOD	8	<LOD	6	<LOD	3	1	0	<LOD	2	<LOD	2	<LOD	3	5	1	<LOD	4	<LOD	6	<LOD	53	<LOD	22
1539	2022-12-14	<LOD	7	<LOD	8	<LOD	6	<LOD	3	<LOD	2	<LOD	2	<LOD	2	<LOD	3	4	1	<LOD	4	<LOD	6	<LOD	54	<LOD	22

PROJECT NUMBER	DATE	HANDHELD X-RAY FLUORESCENCE SPECTROMETER																											
		Sn	Sn Error1s	Sb	Sb Error1s	Ba	Ba Error1s	La	La Error1s	Ce	Ce Error1s	Pr	Pr Error1s	Nd	Nd Error1s	W	W Error1s	Hg	Hg Error1s	Pb	Pb Error1s	Bi	Bi Error1s	Th	Th Error1s	U	U Error1s	LE	LE Error1s
Nb Analysis:		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Compte		24	91	8	91	4	91	16	90	4	90	10	90	13	90	0	91	0	91	0	91	0	91	21	91	19	91	91	91
99 Percentile		23	34	24	48	54	947	123	1491	101	1665	163	2301	275	3399	#NOMBRE!	12	#NOMBRE!	9	#NOMBRE!	4	#NOMBRE!	33	10	12	3	6	531091	568
Moyenne		17	24	22	39	44	756	82	1202	90	1545	138	2010	207	2837	#DIV/0!	11	#DIV/0!	8	#DIV/0!	4	#DIV/0!	29	7	8	2	5	500833	481
Écart type		2	11	1	11	7	216	14	552	9	330	16	701	30	1148	#DIV/0!	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	2	1	4	0	2	10064	72
Coeff. var.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0	0	0	0	0	0
Maximum		23	52	24	73	54	2149	129	1523	101	1680	163	2336	281	3446	0	19	0	14	0	6	0	50	10	18	3	10	542007	1158
Minimum		14	5	20	7	40	12	70	22	80	26	119	36	177	58	0	10	0	7	0	3	0	29	5	2	2	1	483886	467
Compte		0	2	0	2	0	2	1	2	1	2	1	2	1	2	0	2	0	2	0	2	0	2	0	2	0	2	2	2
Moyenne		#DIV/0!	30	#DIV/0!	42	#DIV/0!	771	87	735	80	816	158	1141	211	1669	#DIV/0!	11	#DIV/0!	8	#DIV/0!	4	#DIV/0!	29	#DIV/0!	10	#DIV/0!	6	512368	477
Écart type		#DIV/0!	0	#DIV/0!	0	#DIV/0!	1	#DIV/0!	1006	#DIV/0!	1117	#DIV/0!	1559	#DIV/0!	2278	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	599	1
Coeff. var.		#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	1	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0	0
Maximum		0	30	0	42	0	771	87	1446	80	1606	158	2243	211	3280	0	11	0	8	0	4	0	29	0	10	0	6	512791	477
Minimum		0	30	0	42	0	770	87	23	80	26	158	38	211	58	0	11	0	8	0	4	0	29	0	10	0	6	511944	476
1539	2022-12-07	<LOD	30	<LOD	42	<LOD	770	87	23	80	26	158	38	211	58	<LOD	11	<LOD	8	<LOD	4	<LOD	29	<LOD	10	<LOD	6	512791	477
1539	2022-12-14	<LOD	30	<LOD	42	<LOD	771	<LOD	1446	<LOD	1606	<LOD	2243	<LOD	3280	<LOD	11	<LOD	8	<LOD	4	<LOD	29	<LOD	10	<LOD	6	511944	476

Numéro de projet	Nom du projet	# Analyse	Date	Heure de calibration	Méthode	Unité	Durée (sec)
1539	Boston Bulldog	1	2022-11-29	09:04:20	Cal Check	ppm	14.8318
1539	Boston Bulldog	1	2022-12-07	15:03:48	Cal Check	ppm	14.8317

APPENDIX 5

CERTIFICATES OF ANALYSIS

Table 1: Certificate of HH-XRF analysis (IOS)

IOS Services Géoscientifiques inc.
1319, boulevard Saint-Paul
Chicoutimi, Québec, Canada
G7J 3Y2
418-698-4498

CERTIFICATE : IOS22-0060

To : Michael Rosatelli
Val D'Or Mining Corp.
2864 Chem. Sullivan, Val-d'Or, QC J9P 0B9

Project :	1539 Boston Bulldog
Date of certificate:	2022-12-14
Number of analyzes:	63 analyzes including quality control and reanalysis
Sample type:	Soil samples: horizon B < 250 µm

Samples preparation:	Drying , sieving at 250 µm
Instrument used:	Microanalyzer XRF Vanta-VMR of Olympus
Analysis mode:	Mode Geochem(3-Beam)

Note: The data in this certificate is informative and unofficial.

Signature:

Véronique Bouchard, Chemist
OCQ 2010-057
Quality control

Sample Échantillon	Field number Numéro terrain	Content Contient	Date Date	Element/Élément Unit/Unité Duration (sec) Durée (sec)	# Analyse/ Analysis #	Mg ppm	Mg Error1s ppm	Al ppm	Al Error1s ppm	Si ppm	Si Error1s ppm	P ppm	P Error1s ppm	S ppm	S Error1s ppm	K ppm	K Error1s ppm	Ca ppm	Ca Error1s ppm	Ti ppm	Ti Error1s ppm	V ppm	V Error1s ppm	Cr ppm	Cr Error1s ppm	Mn ppm	Mn Error1s ppm	Fe ppm	Fe Error1s ppm
153980001	Standard	Quartz < 90 µm 2020	2022-11-29	89	3	<LOD	5577	1098	159	289535	473	2690	33	<LOD	234	<LOD	323	1199	16	520	67	<LOD	67	<LOD	38	100	9	869	11
153980002	153940029		2022-11-29	89	4	4901	1249	35463	365	134019	458	2471	31	<LOD	339	19955	77	8797	39	3811	81	106	21	101	11	571	13	48631	168
153980003	153940022		2022-11-29	89	5	8492	1267	31839	345	148565	487	2515	32	<LOD	317	15702	64	18076	67	3190	81	83	22	98	11	1179	17	34975	126
153980004	153940047		2022-11-29	89	6	<LOD	7571	26327	312	147823	391	2993	33	<LOD	352	13020	49	13806	46	3549	82	73	22	145	11	418	12	32686	98
153980005	153940035		2022-11-29	89	7	5136	1190	34590	352	146212	472	2505	31	<LOD	317	19402	74	11920	48	3537	82	69	21	94	11	716	14	42073	145
153980006	153940016		2022-11-29	89	8	7343	1212	35644	357	139905	464	2451	31	<LOD	332	18641	73	12699	51	3271	81	90	21	88	11	668	14	43288	150
153980007	153940009		2022-11-29	89	9	3820	1201	36802	363	144054	474	2463	31	<LOD	337	18930	74	10947	46	3545	83	79	22	105	11	803	15	41922	146
153980008	153940028		2022-11-29	89	10	3893	1166	34173	350	144755	469	2415	31	<LOD	334	19979	76	10505	44	3516	83	77	22	89	11	560	13	42965	148
153980009	153940004		2022-11-29	89	11	4921	1129	31037	327	146101	458	2661	32	<LOD	320	15622	61	15672	57	3187	78	80	21	129	11	920	15	35914	123
153980010	153940018		2022-11-29	89	12	<LOD	6797	32457	332	151147	398	2451	31	<LOD	320	18220	62	13230	45	3467	81	112	22	77	11	641	14	37942	112
153980011	Standard	MRIHB22	2022-11-29	89	13	<LOD	6507	29604	313	166918	404	2757	32	<LOD	309	15036	53	15261	48	1987	79	<LOD	95	53	11	275	11	19255	65
153980012	153940048		2022-11-29	89	14	4679	1101	33722	333	155714	474	2625	32	<LOD	314	14901	59	15399	56	3074	82	84	22	104	11	542	13	34568	118
153980013	153940005		2022-11-29	89	15	7663	1128	30456	321	137363	440	2561	31	<LOD	339	13324	54	17299	62	2707	75	102	20	105	11	861	14	36633	125
153980014	153940027		2022-11-29	89	16	<LOD	6182	32338	322	169605	411	2587	31	<LOD	301	17814	59	12954	44	3207	83	90	22	76	11	467	12	30591	92
153980015	153940040		2022-11-29	89	17	6842	1146	27594	312	144462	461	2686	32	<LOD	347	11660	51	17256	62	2895	78	<LOD	102	173	12	595	13	35524	124
153980016	153940002		2022-11-29	89	18	<LOD	6557	32027	328	156945	405	2527	31	<LOD	318	18839	63	12914	45	3235	82	96	22	103	11	553	13	35256	105
153980017	ıples: horizon B < 250 µm		2022-11-29	89	19	7098	1145	37231	356	138005	453	2376	30	<LOD	335	20912	79	9326	41	3632	82	77	21	85	11	690	14	50202	169
153980018	153940041		2022-11-29	89	20	5338	1157	24662	299	126400	427	3557	36	<LOD	399	7954	40	16511	61	3289	78	114	21	261	12	428	12	41072	142
153980019	153940021		2022-11-29	89	21	7524	1133	31067	329	126426	420	2364	31	<LOD	286	18014	69	39004	126	3225	84	94	22	97	11	593	14	41147	142
153980020	153940010		2022-11-29	89	22	4103	1075	34371	335	138867	438	2614	31	<LOD	342	16802	64	10913	43	3271	78	75	21	89	11	573	13	40107	134
153980021	Standard	Quartz < 90 µm 2020	2022-11-29	89	23	<LOD	6311	29329	309	165082	402	2678	32	<LOD	313	15028	53	15131	48	2045	80	<LOD	97	58	11	253	11	19747	66
153980022	153940026		2022-11-29	89	24	<LOD	6361	32214	324	164228	410	2496	31	<LOD	313	17581	60	12285	43	3220	82	81	22	74	11	514	13	31649	96
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Sample Échantillon	Field number Numéro terrain	Content Contient	Co ppm	Co Error1s ppm	Ni ppm	Ni Error1s ppm	Cu ppm	Cu Error1s ppm	Zn ppm	Zn Error1s ppm	As ppm	As Error1s ppm	Se ppm	Se Error1s ppm	Rb ppm	Rb Error1s ppm	Sr ppm	Sr Error1s ppm	Y ppm	Y Error1s ppm	Zr ppm	Zr Error1s ppm	Nb ppm	Nb Error1s ppm	Mo ppm	Mo Error1s ppm	Ag ppm	Ag Error1s ppm	Cd ppm	Cd Error1s ppm	Sn ppm
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Sample Échantillon	Field number Numéro terrain	Content Contient	Sn Error1s ppm	Sb ppm	Sb Error1s ppm	Ba ppm	Ba Error1s ppm	La ppm	La Error1s ppm	Ce ppm	Ce Error1s ppm	Pr ppm	Pr Error1s ppm	Nd ppm	Nd Error1s ppm	W ppm	W Error1s ppm	Hg ppm	Hg Error1s ppm	Pb ppm	Pb Error1s ppm	Bi ppm	Bi Error1s ppm	Th ppm	Th Error1s ppm	U ppm	U Error1s ppm	LE ppm	LE Error1s ppm
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