We are committed to providing accessible customer service.
If you need accessible formats or communications supports, please contact us.

Nous tenons à améliorer l’accessibilité des services à la clientèle.
Si vous avez besoin de formats accessibles ou d’aide à la communication, veuillez nous contacter.

Ontario

CANADIAN MALARTIC CORPORATION

Report on Geochemistry at Claim 4272931 on the Kirkland Lake North Property Teck Township Larder Lake Mining Division

KIRKLAND LAKE PROJECT

Christopher Clarke M.Sc., P.Geo

4/22/2016

Table of Contents

List of Figures

List of Tables

Introduction

This report is written for submission to the Ministry of Northern Development and Mines to fulfill the assessment work requirements for part of the historic Federal Mine property. This report summarizes the activities completed in the period of May 8, 2015 and May 11, 2015 on the un-patented mining claim 4272931. This report was prepared by Christopher A. L. Clarke P.Geo under supervision from Mark Masson, P.Geo, both of whom are employees of Canadian Malartic Corporation.

Twenty-seven samples were analysed for major and trace elements on claims 4273901 and 427931 (Appendix 1 &2), of the twenty-seven samples nine samples were taken within claim 4273901 and eighteen on claim 427931(Appendix 1& 2). According to the mapping the sample set is composed of eight basalts, seven gabbros, eight conglomerates, one trachyte and one meta-sediment. Two additional samples were taken that were primarily composed of vein material in a gabbro map unit. Overall the sample series defines a temporal-spatial relationship between Keewatin aged volcanics and Temiskaming aged sediments.

Summary

The claim 4272931 in Teck Township is associated with the historic Federal Mine property, whose shaft is located on claim 1222223. The claim is held by Canadian Malartic Corporation and it is contiguous with other claims on the Federal Mine property which Canadian Malartic also holds. Claim 4272931 was newly staked in 2013 and as such has no assessment work filed. Workers for Canadian Malartic conducted a prospecting and sampling program to fulfill the work requirements of the claim.

Historically, the Federal Mine property has been the focus of extensive exploration both above and below ground.

Property Descriptions and Access

The claim 4272931 in Teck Township is associated with the historic Federal Mine property, whose shaft is located on claim 1222223. The claim is held by Canadian Malartic Corporation and it is contiguous with other claims on the Federal Mine property which Canadian Malartic also holds. Claim 4272931 was newly staked in 2013 and as such has no assessment work filed. Workers for Canadian Malartic conducted a prospecting and sampling program to fulfill the work requirements of the claim. Historically, the Federal Mine property has been the focus of extensive exploration both above and below ground.

Figure 1: Location of Teck Township relative to the Province of Ontario; where the claims 4272931 and 4273901 are located.

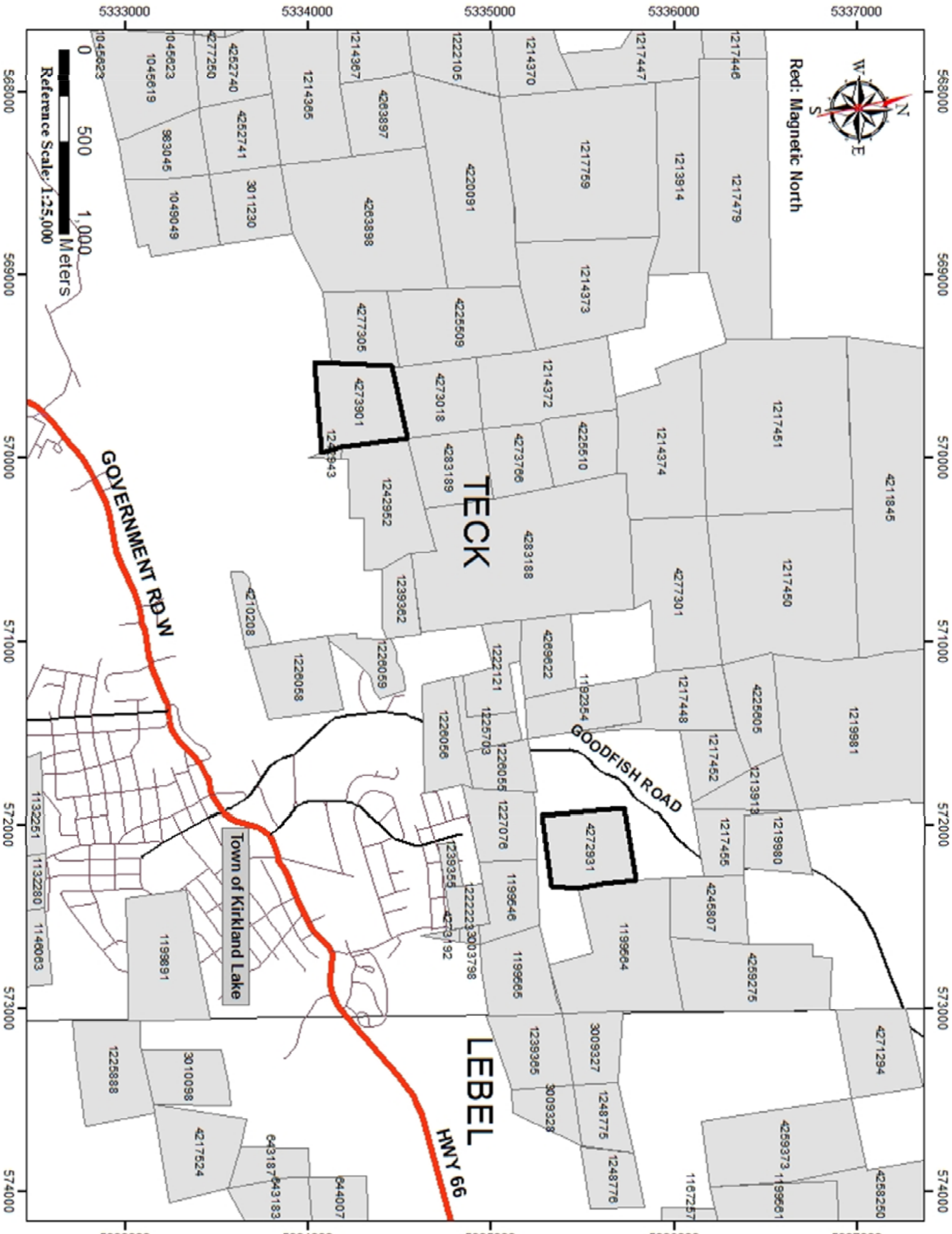

Figure 2: A 1:25,000 scale map showing MNDM listed mining claims for the Teck and Lebel Townships in the area of the Municipality of Kirkland Lake. The claims 4272931 and 4273901 are highlighted, each have a separate file for submission.

History

Claim 4272931 was staked on June 24, 2013. No previous assessment has been reported on this claim, but the property has been part of previous claims and an active Mine. The most recent work conducted immediately adjacent to claim 4272931 was reported by Vault Minerals in 2006 and published in 2013 under assessment files AFRI# 20000001685 and 20000001686. The Vault Minerals work was designed to assess the Kirkland Basin and Federal Kirkland historic properties. Vault Minerals was 100% acquired by Queenston Mining Inc. which in turn was 100% acquired by Osisko Mining Ltd and was then acquired by a 50-50% agreement between Agnico Eagle and Yamana Gold who formed the Osisko properties into the Canadian Malartic Corporation. Vault Minerals conducted a mapping and sampling program on their claims on the Federal Mine property.

Historically, The Federal Mine property has had extensive and near continuous work conducted on it, most notably a 745 ft shaft which is currently capped in the northeast corner of claim #1222223. The underground workings consist of four levels situated at 200, 400, 500 and 700 feet below surface with pervasive drifting. Another notable period in the Federal Mine property was in 1986 and 1987, when a drill program was initiated by Goldhunter Explorations Inc. The drill program consisted of 27 diamond drill holes primarily targeting the mine workings on claim #1222223 and 1227076.

None of the historic drilling or stripping programs listed by Goldhunter Explorations Inc. or other assessment files appears to have been situated on claim 4272931. Only limited prospecting and mapping appears to have been reported on the claim area.

Property Geology

The claim 4272931 is situated within the prolific Kirkland Lake gold camp which is part of the Abitibi Greenstone belt in the Superior Province. The Abitibi Greenstone belt is Archean in age and is composed of greenschist facies volcanic and sedimentary rocks with localized syn-post tectonic intrusions of granitic to dioritic dykes to batholiths. The Abitibi Greenstone belt forms an east plunging synclinorium between the Abitibi batholith, northeast of Timmins and the Round Lake batholith, south of Kirkland Lake. Mesozoic aged kimberlitic dykes are also present in the Kirkland Lake Camp but are rare in occurrence. The Kirkland Lake Camp hosts Keewatin (2750-2700 Ma) and Temiskaming (2690-2670 Ma) aged assemblages associated with the Abitibi Greenstone belt. The Keewatin assemblages within the Kirkland Lake Camp are composed of the greenschist facies volcanco-sedimentary lithologies of the: Pacaud, Deloro, Stoughton-Roquemaure, Kidd-Munro, Tisdale, Kinojevis, and Blake River groups. The Temiskaming assemblage within the Kirkland Lake camp is the Temiskaming group, noted for its non-marine, variably metamorphosed, pyroclastic and clastic-sedimentary (conglomerate) lithological units. Temiskaming group meta-sedimentary rocks form along the north facing side of the Larder Lake-Cadillac Deformation Zone (LLCDZ), a major east-west structural control associated with chemical alteration and sulphide mineralization. The LLCDZ length coincides with a folded and deformed sinuous belt of sedimentary rocks of Temiskaming age.

Claim 4272931 hosts Temiskaming meta-sediments (conglomerate) and a Kinojevis mafic intrusive suite (gabbro, Figure 3). The Temiskaming sediments are present in the south of the claim while the mafic intrusives are in the north of the claim. The inferred contact from Ontario Geological Survey maps is striking northeast, through the centre of the claim. Both map units host various degrees of structural deformation from brittle (faults) to ductile (foliation/shearing).

To the North of the claim are a series of Keewatin aged basic volcanics (greenstone) of the Kinojevis Group. To the south are a series of Temiskaming meta-sedimentary units and felsic-intermediate intrusives (syenite-diorite).

General Description of Sampled Rock Units

Greenstone facies gabbro
Grain Size: Fine to medium, euhedral and equigranular
Texture: massive
Alteration: Generally fresh with weak chlorite-carbonate alteration
Mineralization: <1-1mm anhedral pyrite disseminated within matrix
Magnetism: weak
Veining: There are <1% abundant, <1-3mm thick, milky quartz-carbonate stringers and <1% abundant discontinuous black chlorite fracture-fill

Deformed polymict conglomerate
Clasts: Polymict; various igneous and volcanic pebble to cobble sized clasts which are matrix supported
Sorting: Moderately sorted, clasts form strata which can be gradational or sharply change in size
Matrix: Tuffaceous with fine bedding/deformation
Deformation: clasts display pressure shadows and elongation parallel to bedding; the matrix also displays a bedding/foliation along this same plane roughly striking NE-SW with weak undulations.
Alteration: Beige-Red colouration suggests sericite-hematite; <1% abundant bright red jasperoid alteration clasts
Mineralization: trace abundant**,** 1-2mm anhedral disseminations of pyrite within the tuffaceous matrix and around the red jasper
Magnetism: weak to moderate
Veining: There <1% abundant milky quartz-carbonate veins

Trachyte
Grain size: aphanitic
Texture: massive, sub-conchoidal fracturing
Alteration: purplish-brown weathering colour, weak patches of red hematite alteration
Mineralization: 0.5% abundant, 1-2mm disseminations of anhedral pyrite
Magnetism: weak-moderate
Veining: isolated, sub-planar stringers of <2mm thick quartz-carbonate which are <<1% abundant.

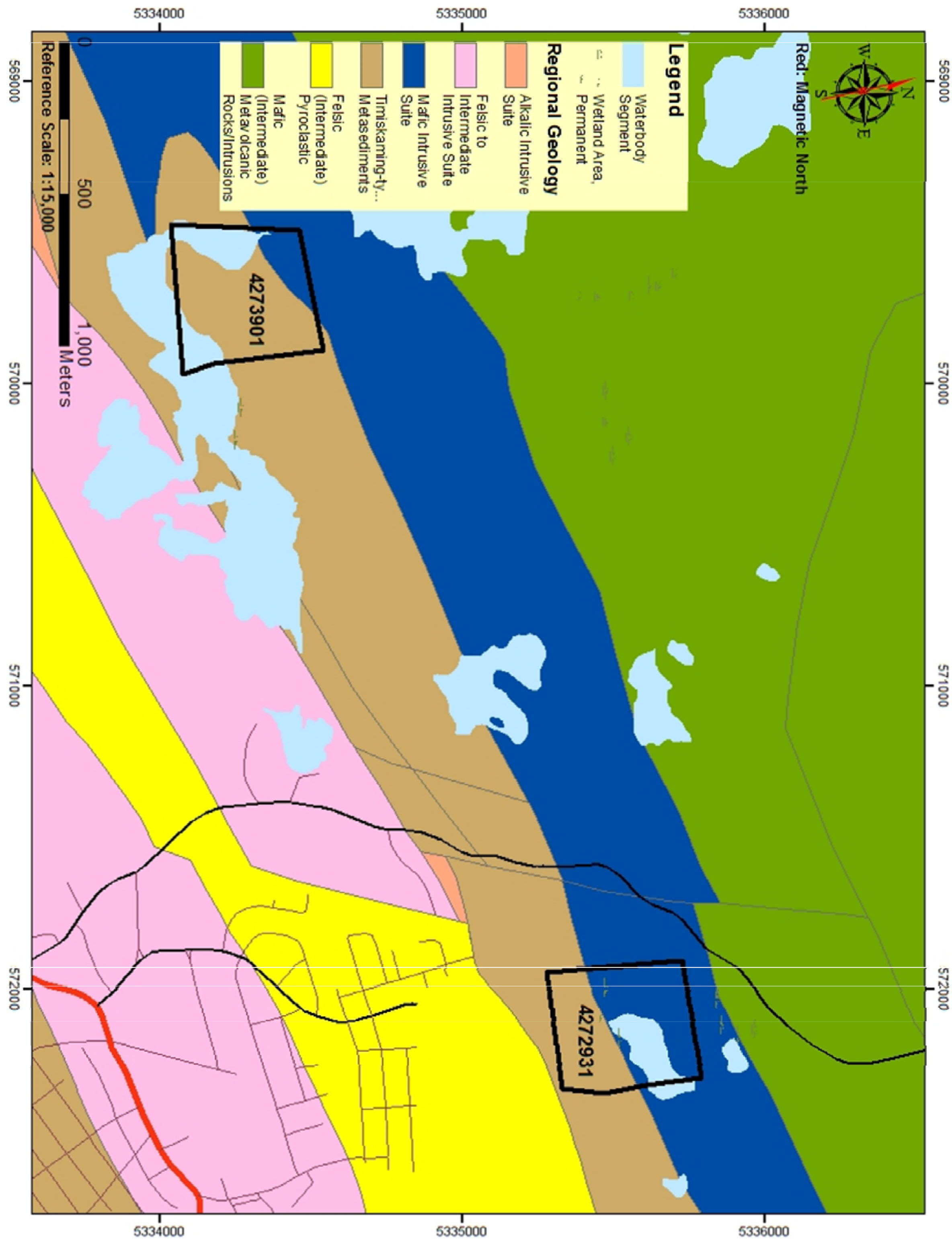

Figure 3: Local Geology in the Claim area north of Kirkland Lake. The map shows the bands of Temiskaming meta-sediments intruded with felsic-intermediate intrusives and Keewatin volcanics in contact to the north of the Temiskaming sediments.

Description of Recent Work

The work conducted by Canadian Malartic was prospecting, sampling and limited mapping. The goal of the work was to gain an understanding of the geology of the claim, identify historic trenches and pits, map outcrops, gather samples for gold and major-trace element abundances, and recording the locations using a GPS. By referring to the prospecting section; one can see the geology is primarily a gabbro situated in the north of the claim and greenstone facies basalt in the south of the claim. The contacts between the gabbro and basalt are hidden beneath the pond/swamp which dominates the centre and northeast of the claim. A total of 9 grab samples (plus a blank and standard for QA/QC purposes) were collected on the property and sent for major oxide, trace element (reported separately) and gold assay to ALS minerals (see attached certificates).

Geochemical Methods

Rock samples were collected in the field using a hardened steel rock hammer and placed in clear plastic bags which were secured with a zip-tie and flagging tape. The sample tag number and UTM co-ordinates were written the plastic bags with a permanent marker. The samples were then packaged together into rice bags at the Dobie work site which were secured with security tags and shipped via courier to ALS Minerals.

ALS Minerals analyzed the samples using their ME-MS81d package which included their ME-ICP06 method for majors, their ME-MS81 for trace elements and their ME-4ACD81 base metals add-on. The ME-ICP06 method was a fused bead, acid digestion with a ICP-AES pass while the ME-MS81 method utilized a fused bead, acid digestion and Lithium Borate Fusion with a ICP-MS pass and the ME-4ACD81 method which used a four acid digestion and ICP-AES pass.

Table 1: Table showing ALS Minerals ME-ICP06 major oxide analytical ranges

ANALYTES AND RANGES (%)								DESCRIPTION	CODE
Al_2O_3	0.01-100	Fe_2O_3	0.01-100	Na_2O	0.01-100	TiO_2	0.01-100	Fused bead, acid digestion and ICP-AES	ME-ICP06
BaO	0.01-100	K_2O	0.01-100	P_2O_5	0.01-100	LOI	0.01-100		
CaO	0.01-100	MgO	0.01-100	SiO_2	0.01-100				
Cr_2O_3	0.01-100	MnO	0.01-100	SrO	0.01-100				

Table 2: Table showing ALS Minerals ME-MS81 trace element analytical ranges

ANALYTES AND RANGES (ppm)								DESCRIPTION	CODE
Ba	0.5-10,000	Hf	0.2-10,000	Sn	1-10,000	Y	0.5-10,000	Fused bead, acid digestion and ICP-MS	ME-MS81
Ce	0.5-10,000	Ho	0.01-1,000	Sr	0.1-10,000	Yb	0.03-1,000		
Cr	10-10,000	La	0.5-10,000	Ta	0.1-2,500	Zr	2-10,000		
Cs	0.01-10,000	Lu	0.01-1,000	Tb	0.01-1,000				
Dy	0.05-1,000	Nb	0.2-2,500	Th	0.05-1,000				
Er	0.03-1,000	Nd	0.1-10,000	Tm	0.01-1,000				
Eu	0.03-1,000	Pr	0.03-1,000	U	0.05-1,000				
Ga	0.1-1,000	Rb	0.2-10,000	V	5-10,000				
Gd	0.05-1,000	Sm	0.03-1,000	W	1-10,000				

Table 3: Table showing ALS Minerals ME-4ACD81 base metal analytical ranges

Ag	0.5-100	Co	1-10,000	Mo	1-10,000	Sc	1-10,000	Four acid digestion and ICP-AES	ME-4ACD81 Add-on only
As	5-10,000	Cu	1-10,000	Ni	1-10,000	Tl	10-10,000		
Cd	0.5-1,000	Li	10-10,000	Pb	2-10,000	Zn	2-10,000		

Geochemistry: Major Element & Trace Element Results

Twenty-seven samples were analysed for major and trace elements on claims 4273901 and 4272931 (Appendix 1 &2), of the twenty-seven samples nine samples were taken within claim 4273901 and eighteen on claim 427931(Appendix 1& 2). According to the mapping the sample set is composed of eight basalts, seven gabbros, eight conglomerates, one trachyte and one meta-sediment. Two additional samples were taken that were primarily composed of vein material in a gabbro map unit. Overall the sample series defines a temporal-spatial relationship between Keewatin aged volcanics and Temiskaming aged sediments. The samples from both claims were analyzed together given their relative proximity to each other. A geochemical classification of the collected rock samples is presented below.

The Total Alkali Silica (TAS) diagram is a result of the International Union of Geological Sciences (IUGS) trying to create a workable classification scheme for igneous rock nomenclature namely the quartz-alkali feldspar-plagioclase-feldspathoid (QAPF) diagram. The QAPF diagram cannot make easy distinctions between andesite and basalt (a color index is used but it is highly subjective since it involves looking at a hand specimen), the essential point being that volcanic rocks like basalt and andesite are typically aphanitic and therefore one cannot visually discern the minerals even if they are well developed. Because of this, the IUGS recommends the use of the TAS developed by LeBas et al., (1986) which uses geochemical data to provide a more reliable classification. The TAS is a simple Harker style diagram comparing total alkalis (Na_2O+K_2O) versus silica normalized to a non-volatile basis and is divided into 15 fields defining various aphanitic volcanic rocks. According to the Total Alkali Silica (TAS) diagram (Figure 4) the Kirkland North sample set is composed of seven basalts (three are alkali while the rest are sub-alkaline), one andesite, two picro-basalts one phono-tephrite and two foidites. The mapped gabbro samples displayed an interesting variation compared to the mapped basalt samples; three gabbro samples plotted within the basalt field while two plotted within the picro-basalt field and an additional two plotted within the foidite field. The volcanic silica values ranged from 35.3 to 61.3 wt% and total alkalis ranged from 1.53 to 9.18 wt% this formed a non-linear trend with the samples clustering primarily within the basalt field. The meta-sediment sample was also plotted because there was some debate if it was sediment given that the sample was very fine grained, had a purplish hue and had a rust weathering/alteration. The meta-sediment sample plotted very close to the trachyte sample in the phono-tephrite field. The conglomerate samples were plotted primarily for comparative purposes and to generally evaluate the influence/protolith clasts composed within the conglomerate. The conglomerate samples had a wide scattering in terms of plotting, indicative of their heterogenous composition and varied from trachy-basalt, basaltic andesite, andesite and trachy-andesite fields.

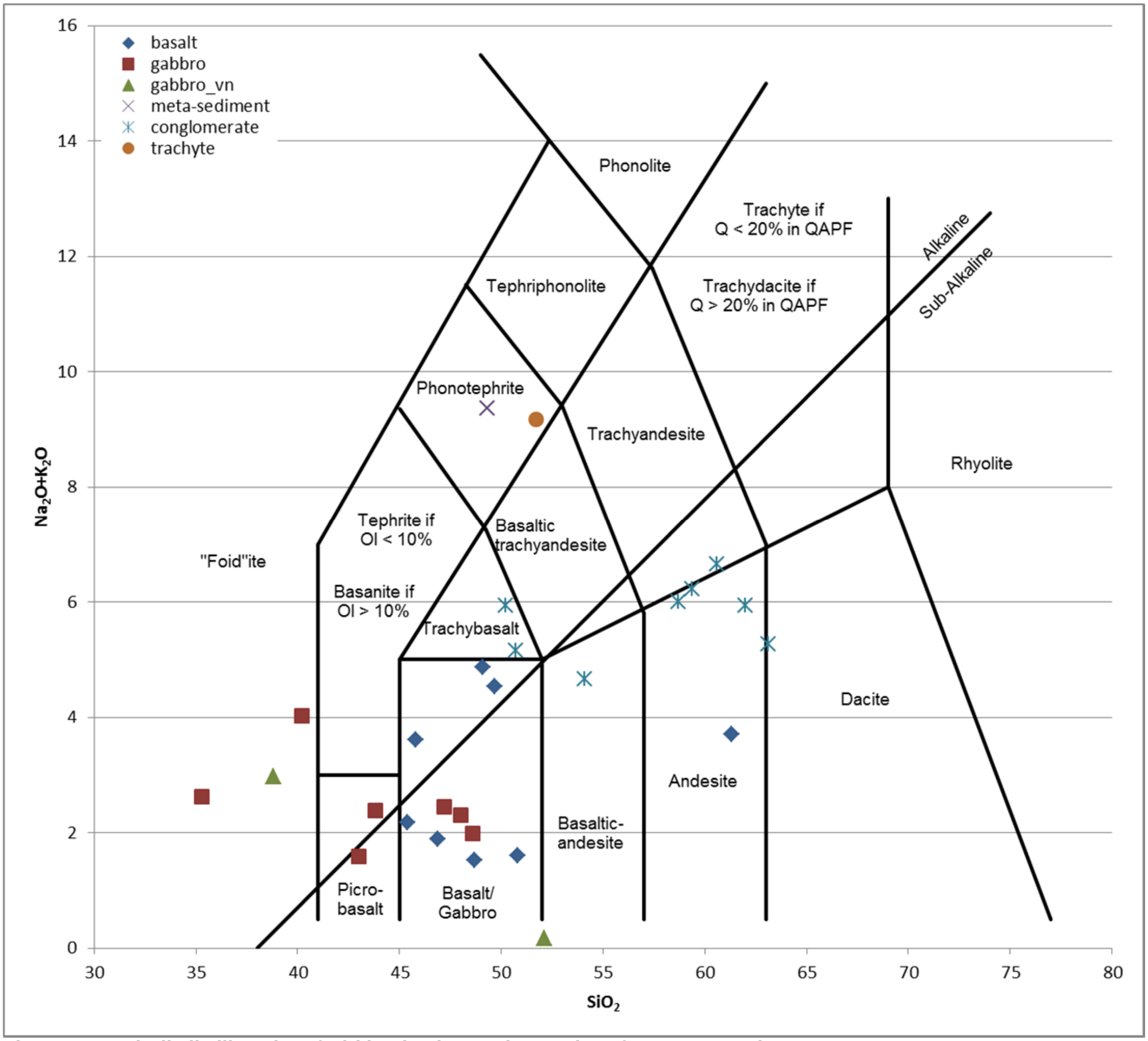

Figure 4: Total Alkali silica plot of Kirkland Lake North samples after LeBas et al., 1986.

The Alkali-Iron-Magnesium (Alkalis: Na_2O+K_2O, Iron FeO $+Fe_2O_3$, Magnesium: MgO) diagram or AFM diagram is one of the most common triangular variation diagrams used by igneous petrologists. An AFM diagram is plotted using a wt% or using only the cations; the relative proportions of Na and K are believed to not affect each other and that the total alkali content is more important than the individual cations (Irvine &

Barager, 1971). For most mafic minerals Mg/Fe abundances are higher in the solid phase than in the coexisting melt, so removal of solidified mafic minerals from the melt will increase the relative iron contents in the AFM. Parental magmas will be closer to the MgO corner while more evolved magmas will plot near the Alkali apex. This is because alkalis are generally more enriched in fluids and so will enter the solid phase later in later stages of crystallization (remember water content lowers the melting point). Suites of samples that plot with high iron are considered to be tholeiitic while lower iron contents are considered calc-alkaline. Overall the volcanic sample set is tholeiitic when plotted according to the AFM diagram (Figure 5) with the few exceptions being the trachyte and a basalt and gabbro sample. The basalts and gabbros generally plot near the Fe_2O_3+FeO corner while conglomerate samples trend towards the alkali corner with a calc-alkaline trend.

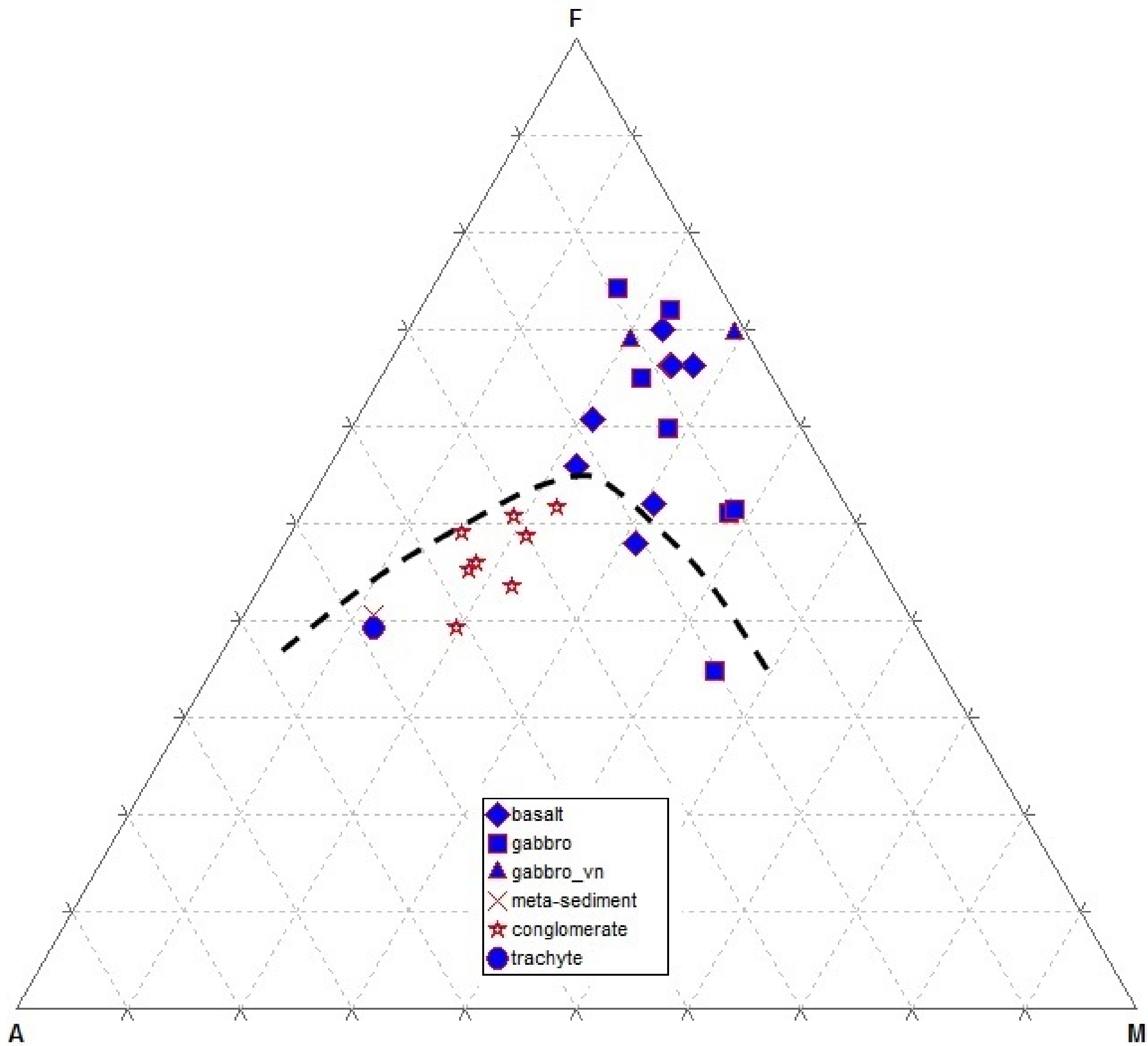

Figure 5: AFM diagram of Kirkland Lake North samples showing a primarily enriched tholeiitic character, the dashed line represents the boundary between tholeiitic (above dashed line) and calc-alkaline (below dashed line, values are in percent after Irvine & Barager, 1971.

A good method of evaluating chemical trends within a rock series are bivariate diagrams, notably, Harker diagrams named after Alfred Harker (1909). A Harker diagram is a simple x-y plot which plots silica along the x-axis while a major oxide or trace element or a ratio of major oxides or trace elements is plotted along the y-axis. Because silica content generally indicates magmatic evolution, a plot comparing silica content can suggest which samples/rocks are derived from parental magmas or are evolved. Samples with low silica are considered to be parental magmas while samples with high silica experienced some sort of chemical differentiation is considered to be evolved. Decreases in CaO with respect to silica can indicate that CaO was removed from the melt by either a calcic plagioclase and/or clinopyroxene. A typical Al_2O_3 Harker diagram for a volcanic rock suite will at first increase but then decreases, this can be reconciled by assuming olivine is removed early followed by plagioclase removing both Ca and Al. A plot of SiO_2 versus CaO/Al_2O_3 can therefore be used to exclusively distinguish pyroxene fractionation from plagioclase from the melt (Figure 6). Figure 6 shows two distinct groups, with the volcanic samples having a generally higher CaO/Al_2O_3 ratio compared to the conglomerate samples, The both the volcanic and conglomerate samples follow a weak negative linear trend with the two groups overlapping each other from 45-55 wt% SiO_2. The CaO/Al_2O_3 ratio values range from 0.03 to 1.3 with the volcanic units having the higher values while the conglomerates have the lower values. The gabbro and basalt samples when considered alone also appear to follow a separate linear trend which is steeply positive. The plot of P_2O_5 versus SiO_2 used to observe potential apatite fractionation shows two distinct groups: one is primarily composed of the gabbro and two basalt samples with generally flat P_2O_5 values while the second group is composed of two close clusters of conglomerate and basalt and trachyte samples (Figure 7) and ranges in values from 0.005 wt% to 0.36 wt%. The plot of TiO_2 versus SiO_2 indicates the level of fractionation of titanomagnetite and opaque mineral phases (Figure 8). Values of TiO_2 range from 0.06 to 2.15 wt% with the conglomerates having the lower TiO_2 values and the basalts and some of the gabbros having the higher TiO_2 values. Overall the conglomerates have a tighter clustering verging on a shallowly negative linear trend of TiO_2 values while the basalt and gabbro samples show a negative linear trend suggesting Ti is fractionating from the melt.

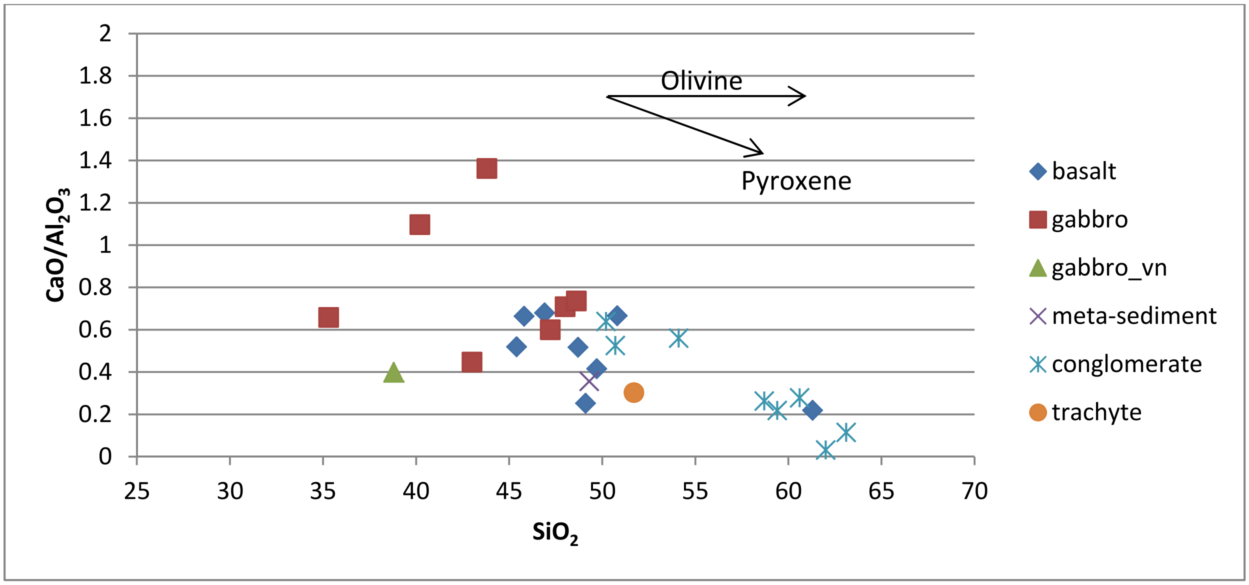

Figure 6: A plot of CaO/Al_2O_3 versus SiO2 for the Kirkland Lake North samples showing pyroxene fractionation. The negative linear trend of the Kirkland Lake North samples suggests pyroxene fractionation.

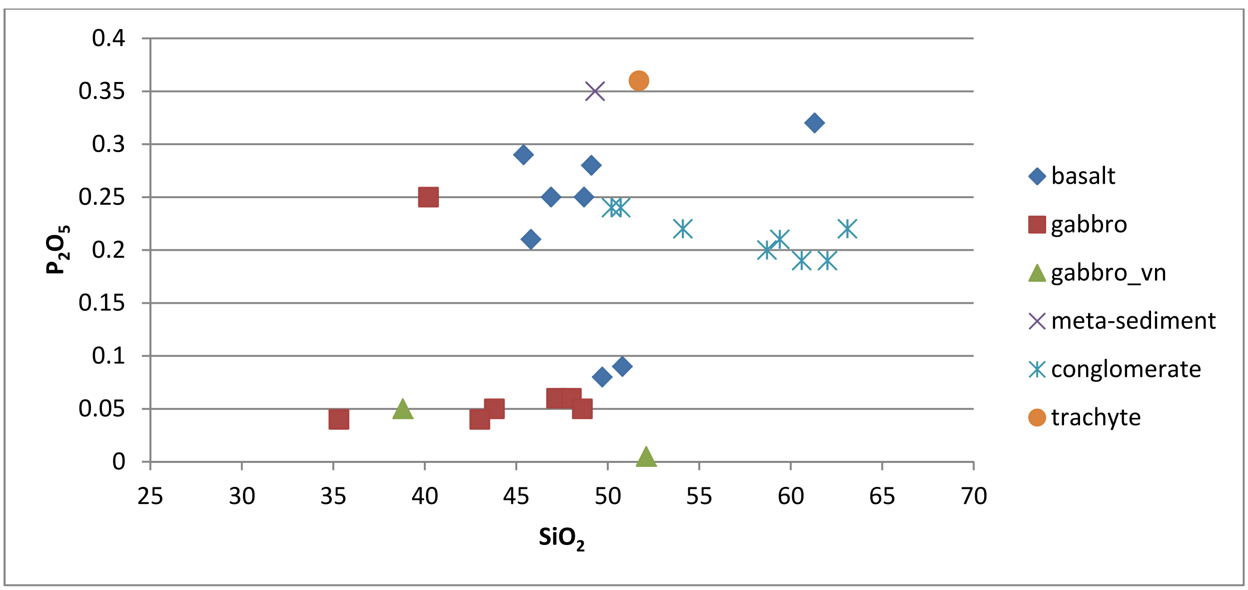

Figure 7: Plot of P_2O_5 versus SiO_2 which can be used to indicate apatite fractionation: apatite indicates an alkaline setting. Kirkland Lake volcanic samples show a flat P_2O_5 pattern indicating apatite is not a major fractionating mineral phase and that the volcanic samples are subalkaline. The conglomerate samples show a partial apatite influence.

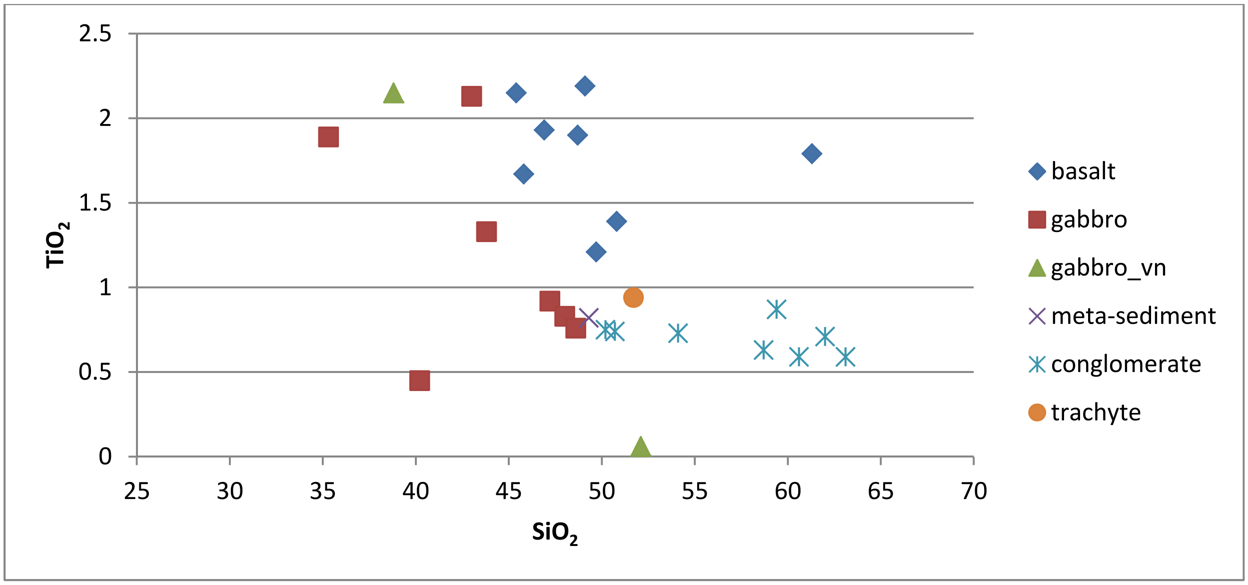

Figure 8: Plot of TiO_2 versus SiO_2 which is used here to show compatibility if Ti within the arc and if titanomagnetite is crystallizing from the melt. The Kirkland Lake North basalt and gabbro samples show a negative linear trend suggesting Ti is fractionating from the melt.

Distinctions between tholeiites and calc-alkaline magma series can be difficult, there are several classification diagrams each with their own boundaries for tholeiite/calc-alkaline rocks (TAS, AFM) making classifications of tholeiites and calc-alkaline lava series based on one diagram spurious. Also, originally calc-alkaline series were considered to be exclusive to subduction zones while tholeiites were considered to be part of established continental volcanic provinces but this is not always the case. Gill (1981) further complicates this by defining andesite suites along K_2O vs. SiO_2; because K_2O is considered separately from Na_2O, this classification cannot use tholeiite or calc-alkaline as a descriptor alone. Gill (1981) defines four broad categories for andesites based on K_2O vs. SiO_2 Low-K, Med-K, High-K and Shoshonites (Higher-K). Low-K type rocks are dominantly tholeiitic (island arc tholeiites) while Med-K rocks are primarily calc-alkaline (convergent margin), High-K corresponds to mixtures of both tholeiites and calc-alkaline rocks. Values of K_2O in Kirkland Lake North volcanic samples range from 0.04 to 1.7 wt% and follow a non-linear trend. When the volcanic samples were plotted on a K_2O

vs. SiO_2 graph the majority of the samples plotted in the low-K field which is a strong indicator of tholeiitic lava sources while the trachyte sample plotted within the med-K field which is calc-alkaline (Figure 9). The conglomerate plots well within the med-K field and do not display any trend.

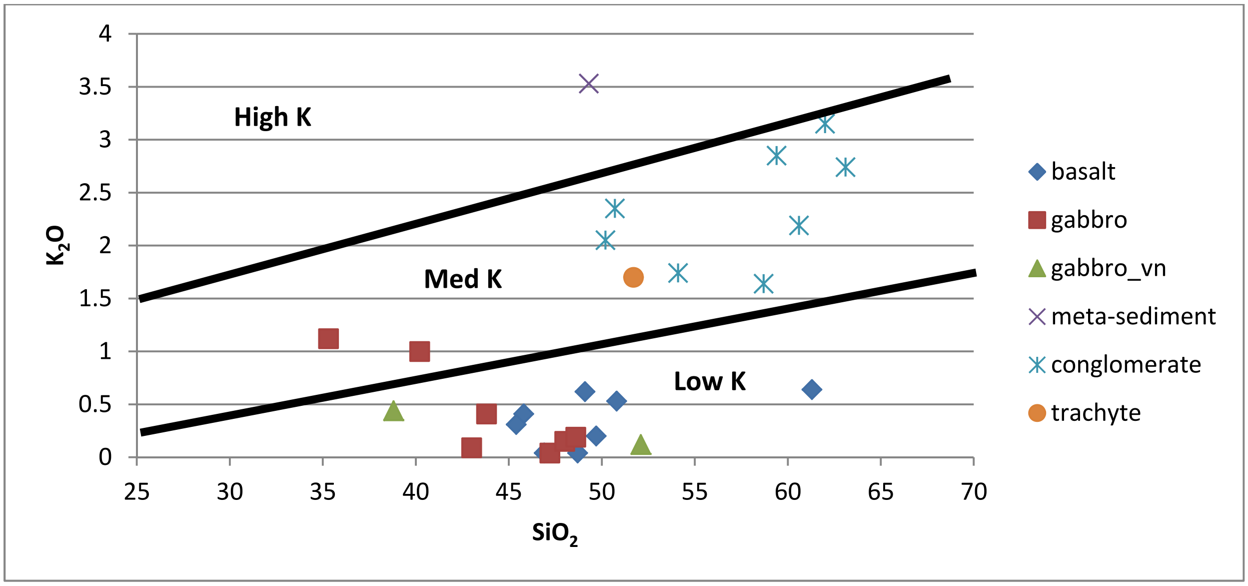

Figure 9: A plot of K_2O versus SiO_2 of SVC samples used to infer crustal thickness. The Kirkland Lake samples are divided into two groups one follows a low-K trend (volcanics) while the other a med-K trend (conglomerate). Low-K rocks are typically derived from tholeiitic magmas while med-K rocks suggest calc-alkaline magmas. Increases in K_2O relative to SiO_2 are typical of continental arc rocks passing through and assimilating crust. The alkali trachyte is more K-rich than all other basalts.

Compatible trace element abundances plotted against silica give a good window into fractionation phases within the rock sample. Compatible elements will readily concentrate into solid phase quickly while incompatible elements will prefer to concentrate in the melt (liquid). The incompatible elements are subdivided into two groups: 1) *High field strength elements* (REE, Th, U, Ce, Pb^{4+}, Zr, Hf, Ti, Nb and Ta) which are smaller and more highly charged and 2) *Light ion lithophile elements* (K, Rb, Cs, Ba, Pb^{2+}, Sr, Eu^{2+}) which have high ionic radii and are more mobile, especially in fluid phases. Ni, Sc and Cr are highly compatible elements with Ni concentrated in olivine, Sc in clinopyroxene and Cr in spinel and clinopyroxene. High concentrations of these elements indicate a mantle source, limited fractionation and/or crystal accumulation. The Ni abundances in the Kirkland North samples range from 33 to 216 ppm and follow a generally steep negative linear trend with the volcanic samples forming a distinct trend with the gabbro samples hosting relatively more Ni than the basalt samples. The conglomerate samples do not form a trend and are scattered but have relatively higher Ni abundances than the basalt samples. The Cr abundances in the Kirkland North samples range from <20 (below detection limit) to 540 ppm the samples do not display a distinct trend but the basalt and conglomerate samples generally have higher abundances of Cr relative to the other units. The Sc abundances in the Kirkland North samples range from 7 to 62 ppm form two distinct groups with the volcanic samples forming a cluster of high Sc while the conglomerate samples form a low Sc cluster. The relative homogeneity in abundances of Ni and Sc versus increasing silica within the volcanic samples indicates olivine and clinopyroxene are not being fractionated out of the melt (Figure 10, Figure 11, Figure 12). The abundances within the conglomerate samples indicate that the samples were influenced by mafic inclusions or protoliths.

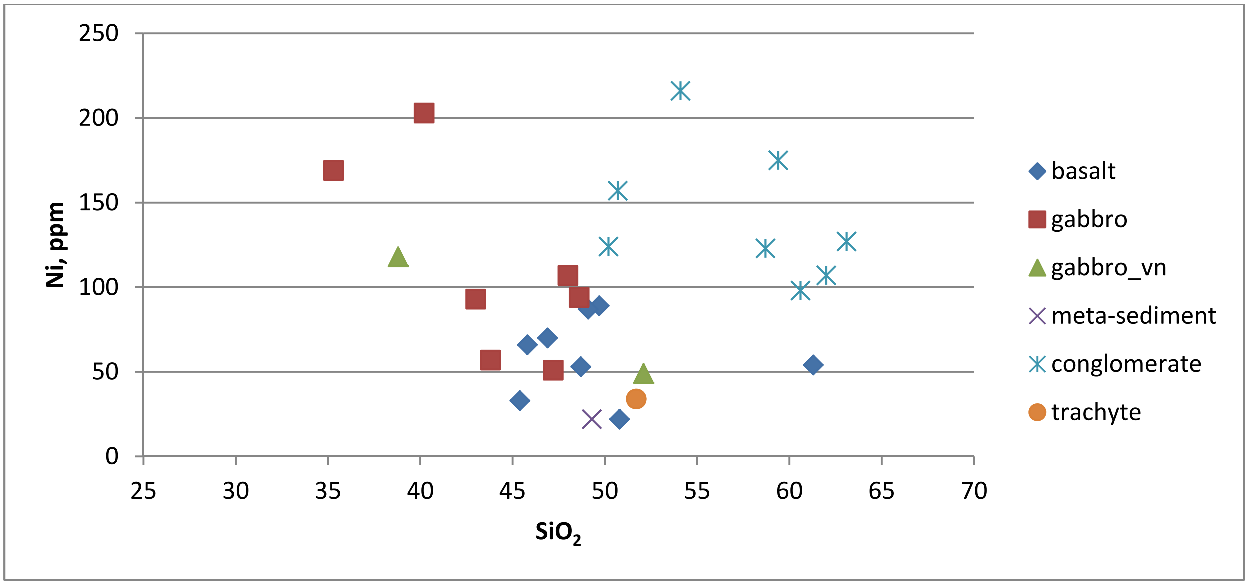

Figure 10: Compatible trace elements (ppm) versus silica showing fractionation patterns. The element Ni represents olivine. Nickel levels decrease with increasing silica (gabbro to basalt). Note: all lavas are low in compatible elements; therefore, fractionation of olivine, Cr spinel & clinopyroxene should be present.

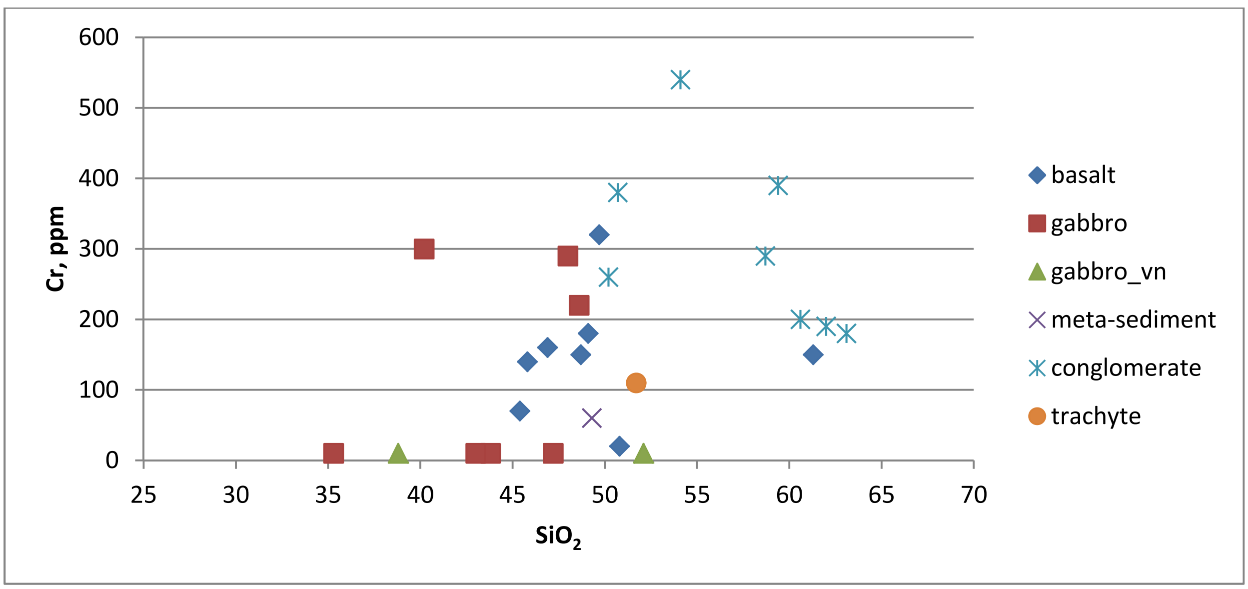

Figure 11: Compatible trace elements (ppm) versus silica showing fractionation patterns. The element Cr represents Cr-spinel. Chromium levels are split into two different groups with the basalts forming a positive linear trend while the conglomerates define a scattered pattern of relatively enriched Cr relative to the other samples. Note: all lavas are low in compatible elements; therefore, fractionation of olivine, Cr-spinel & clinopyroxene should be present.

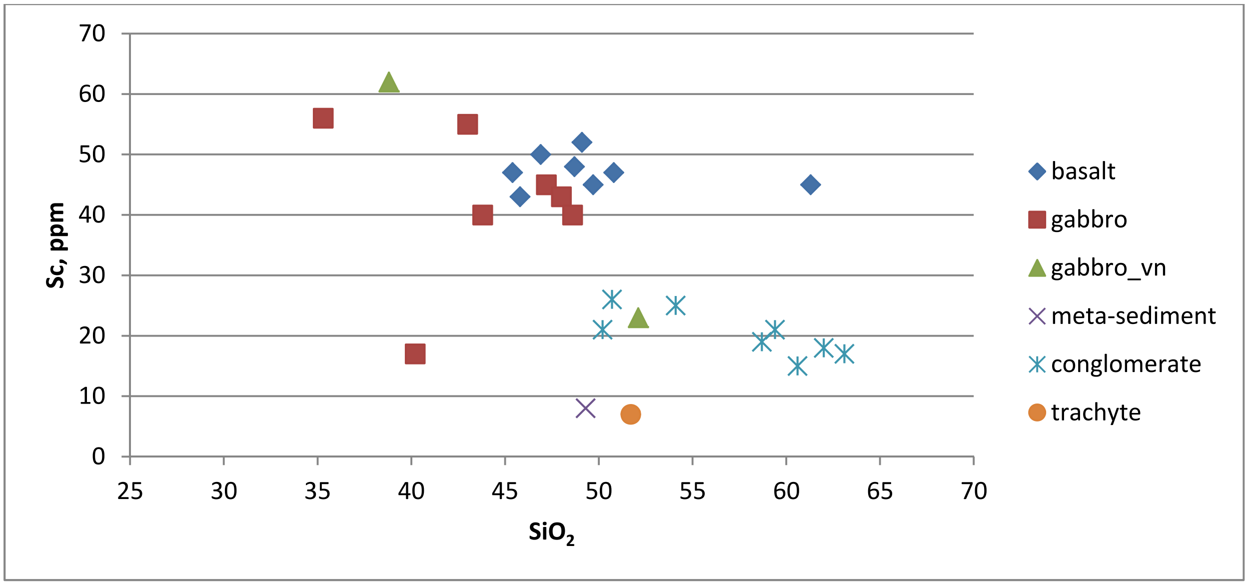

Figure 12: Compatible trace elements (ppm) versus silica showing fractionation patterns. The element Sc represents clinopyroxene. Scandium levels decrease with increasing silica with the volcanic samples clustering together with high Sc while the conglomerate samples cluster together with low Sc. Note: all lavas are low in compatible elements; therefore, fractionation of olivine, Cr-spinel & clinopyroxene should be present.

Incompatible trace element plots versus silica of La, Ba, Nb and Th versus SiO_2 also show consistent trends (Figure 13, Figure 14, Figure 15, Figure 16). Lanthanum is a REE, specifically, is a light rare earth element (LREE) therefore it does not partition strongly into most minerals, it is also mobile in fluids. Lanthanum abundances range from 0.25 to 203 ppm with both the volcanic and conglomerate samples forming two separate flat linear trends. The volcanics have relatively lower La abundances compared to the conglomerates. Barium is an incompatible element that substitutes for K in hornblende. Barium abundances range from 20.6 to 6350 ppm with both the volcanic and conglomerate samples forming two separate flat linear trends. The volcanics have relatively lower Ba abundances (average = 137ppm) compared to the conglomerates (average = 782ppm) but the trachyte sample has the highest Ba value (6350 ppm). Niobium is a high field strength element (HFSE) and is strongly influenced by rutile, ilmenite or sphene mineral phases. Niobium abundances range from 0.1 to 21.8 ppm and follow a weak positive linear trend with the volcanic and conglomerate samples. The trachyte and meta-sediment samples do not follow this trend and have relatively higher Nb abundances. Thorium is a highly immobile element and is highly insoluble in water/fluids, it is generally found in K-feldspar rich granites, pegmatites and syenites. Thorium abundances range from 0.3 to 41.4 ppm with both the volcanic and conglomerate samples forming two separate flat linear trends. The volcanics have relatively lower Th abundances compared to the conglomerates. The elements La, Ba, Nb and Th all have relatively weak relative increases in abundance with increasing silica and show generally flat linear trends with volcanic members belonging to the lower end of the trend and conglomerate members belonging to the higher end of the trend.

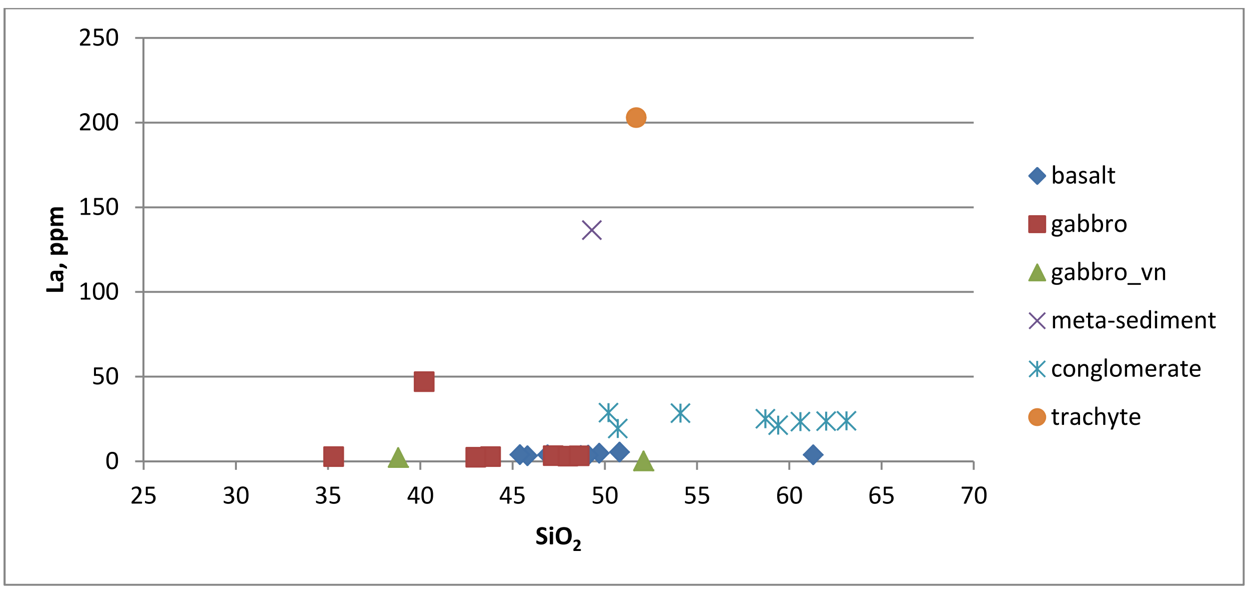

Figure 13: Incompatible trace elements (ppm) versus silica within the Kirkland Lake North property. La is highly fluid mobile. Both the volcanic and conglomerate samples define two separate flat linear trends. The flat trends suggest that the element does not have much influence on the samples. All the elements in the samples are behaving the same from basalt to andesite except for the trachyte and meta-sediment. The trachyte and meta-sediment could therefore be part of a different parental magma and/or fractionation history.

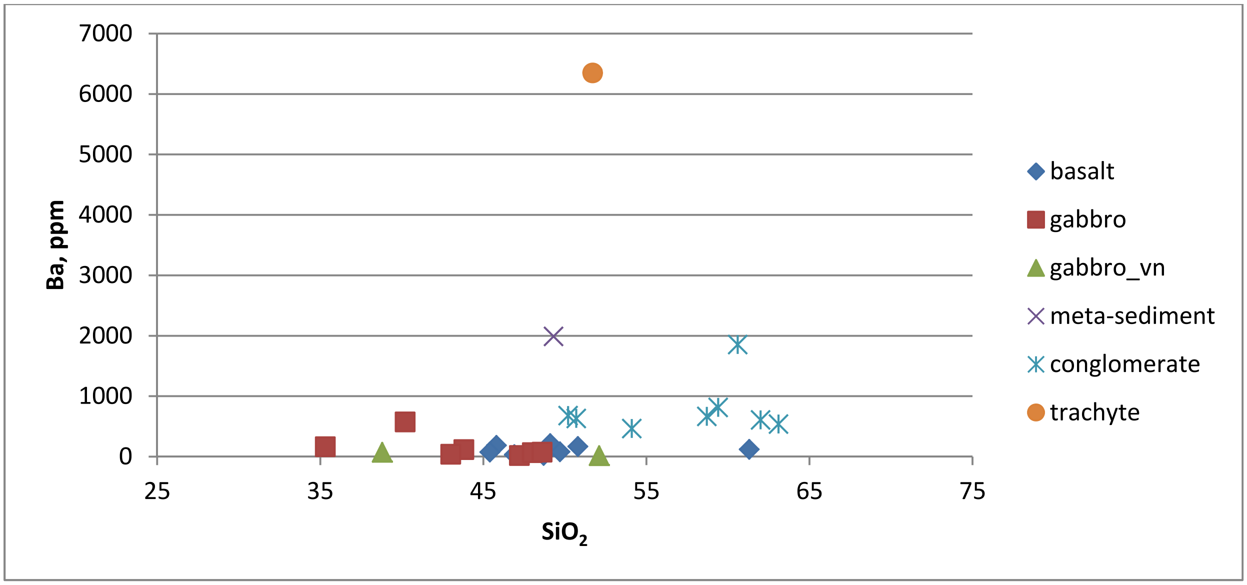

Figure 14: Incompatible trace elements (ppm) versus silica within the Kirkland Lake North property. Barium is an incompatible element that substitutes for K in hornblende. Both the volcanic and conglomerate samples define two separate flat linear trends. The flat trends suggest that the element does not have much influence on the samples. All the elements in the samples are behaving the same from basalt to andesite except for the trachyte and meta-sediment. The trachyte and meta-sediment could therefore be part of a different parental magma and/or fractionation history.

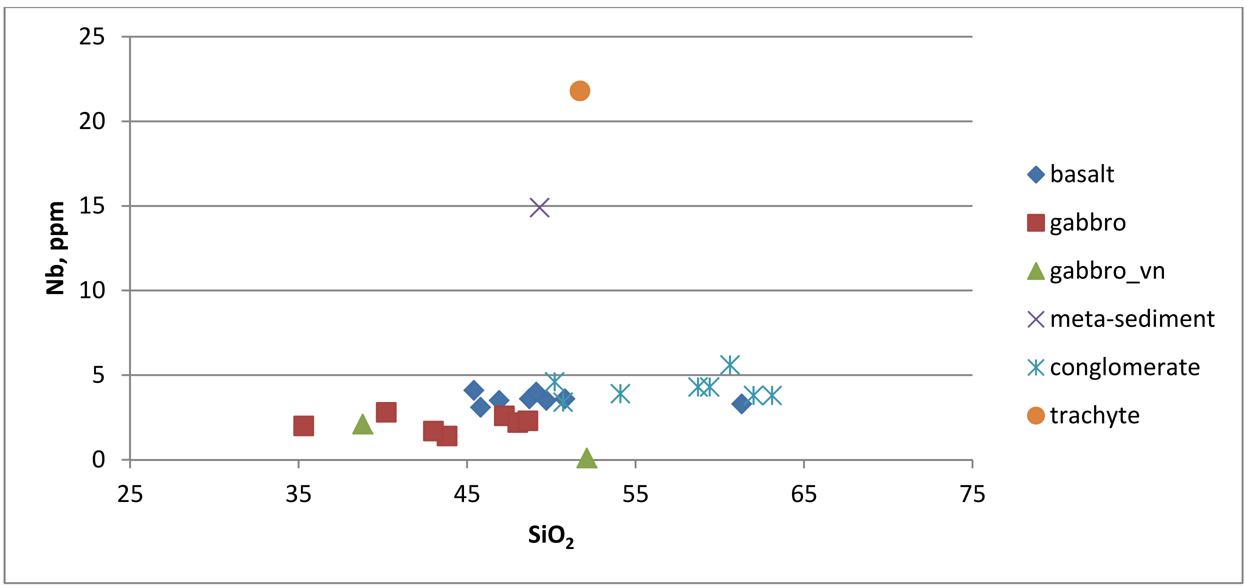

Figure 15: Incompatible trace elements (ppm) versus silica within the Kirkland Lake North property. Niobium is a high field strength element (HFSE) and is strongly influenced by rutile, ilmenite or sphene mineral phases. Both the volcanic and conglomerate samples define two separate flat linear trends. The flat trends suggest that the element does not have much influence on the samples. All the elements in the samples are behaving the same from basalt to andesite except for the trachyte and meta-sediment. The trachyte and meta-sediment could therefore be part of a different parental magma and/or fractionation history.

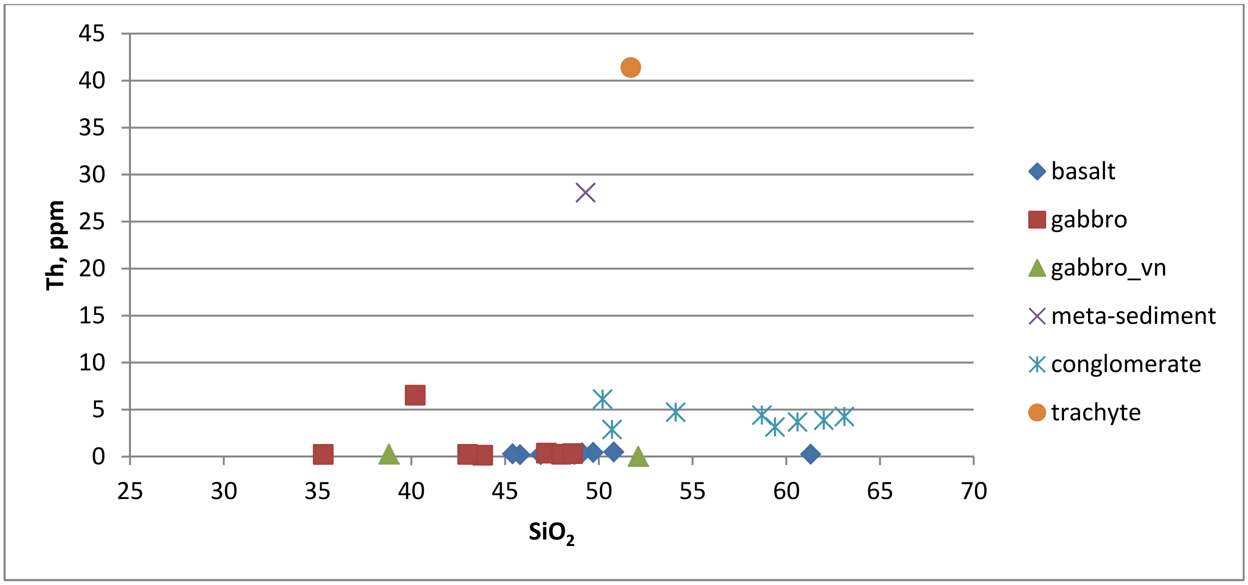

Figure 16: Incompatible trace elements (ppm) versus silica within the Kirkland Lake North property. Thorium is a highly immobile element and is highly insoluble in water/fluids, it is generally found in K-feldspar rich granites, pegmatites and syenites. Both the volcanic and conglomerate samples define two separate flat linear trends. The flat trends suggest that the element does not have much influence on the samples. All the elements in the samples are behaving the same from basalt to andesite except for the trachyte and meta-sediment. The trachyte and meta-sediment could therefore be part of a different parental magma and/or fractionation history.

Trace element abundances were normalized to primitive mantle after Sun and McDonough (1989). The samples can be subdivided into two main groups based on relative elemental abundances (Figure 17). The first group is composed of samples that were collected as basalt and gabbro; these samples have a relatively flat pattern with relative enrichment in Ba, Sr and Ti and troughs in Th and Nb. The first group can also be subdivided into the basalt and gabbro samples given that the basalt samples have relatively higher elemental abundances but the patterns are effectively the same with only a variation in La, Ce and Sr abundances. The second group is composed of the conglomerate samples with consistent elemental abundances with the exception of Pb which is highly variable. The conglomerate samples have a flat trend along the LREE's equivalent to the first group but there is a negative slope along the HREE's with a strong Nb trough. The trachyte and meta-sediment samples form a distinct pattern separate from the two main groups and displays enrichments in the HREE's with a Nb and Ti trough and relative enrichments in Gd and Tb relative to the other LREE's . The vein samples display a wildly different pattern with an overall depleted pattern relative to the other samples and enrichments in Pb, Sr and Sm and a flat LREE trend.

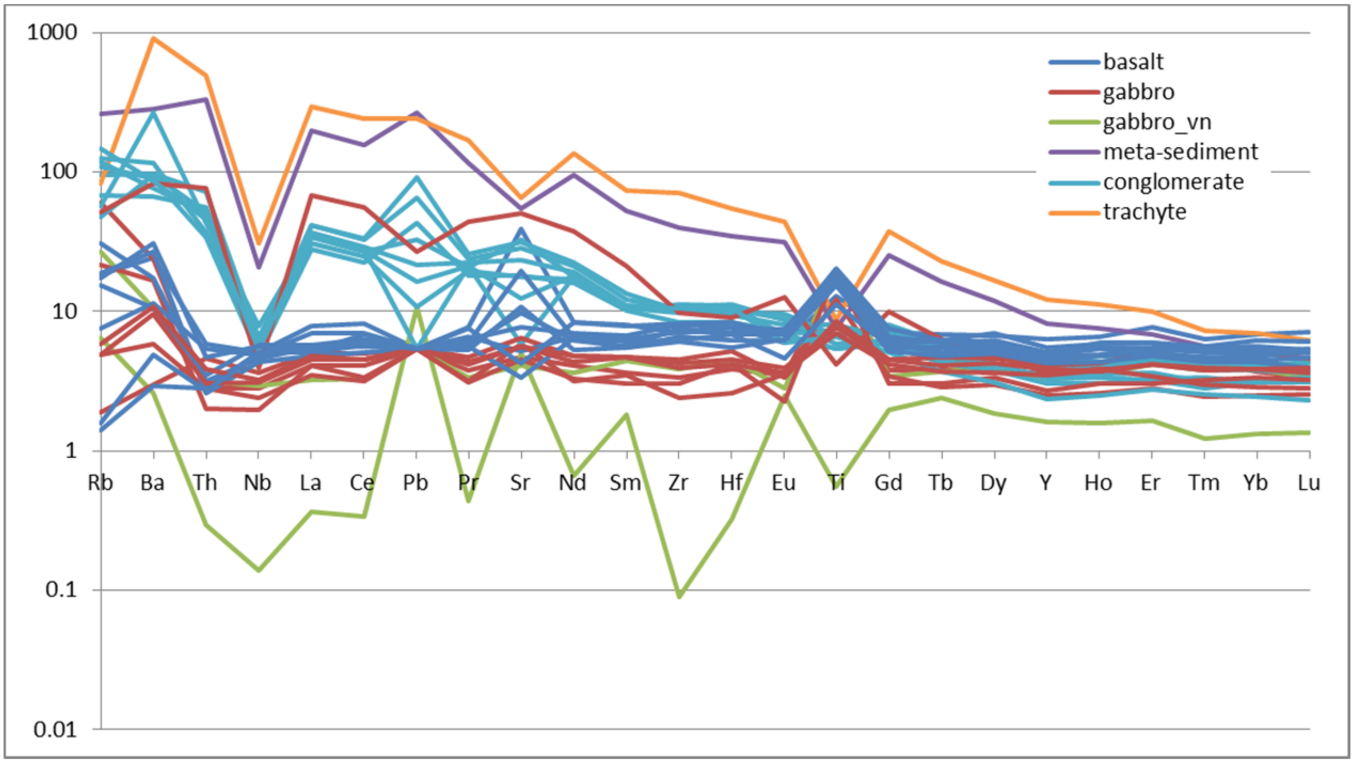

Figure 17: Primitive Mantle Normalized incompatible element diagram of Kirkland Lake North samples. The basalt and gabbro samples form relatively flat patterns with Ba and Ti peaks. The basalts have a variable Sr peak suggestive of age variation. The conglomerate samples form a negative linear trend in the HREE's which flattens moving into the LREE's; there is a steep Nb trough and variable peaks/trough of Pb (metamorphic or hydrothermal fluid influence).

Plots based on Drummond and Defant (1990) which looked at mafic crustal melts, using La/$Yb_{chondrite}$ vs. $Yb_{chondrite}$, Sr/Y_{ppm} vs. Y_{ppm}, and Sr/Y_{pmn} vs. SiO_2 for Kirkland Lake North lavas show that the basalts do not have a eclogitic or pure amphibolite character (Figure 18, Figure 19, Figure 20). The plots indicate that the source melt was not from the garnet stability field but was instead from a 75-85 km hydrous spinel source (Drummond & Defant, 1990). Amphibolitic melts can only produce dacite, not basalt. A plot of Tb/Yb_{pmn}

vs. Ce/Sm_{pmn} also shows that the Kirkland Lake North volcanic samples plot well within the spinel stability field (Figure 21). Likewise, middle to heavy REE patterns do not show a steep garnet stability field pattern but a curved concave-up hydrous amphibole-spinel stability field pattern which does not conform to intraplate patterns. Finally, Cr abundances within the basalts suggests that a spinel peridotite is the likely source of partial melts given the highly compatible nature of Cr and similarly because we have established garnet phases are not present. For the conglomerate samples the influences from amphibolite could actually be an expression of metamorphic processes given the high degree of ductile deformation within the Temiskaming locally. In summary, the likely source of partial melts that generated the basaltic samples in the Kirkland Lake North basalts and gabbros was likely derived from a subduction modified spinel peridotite.

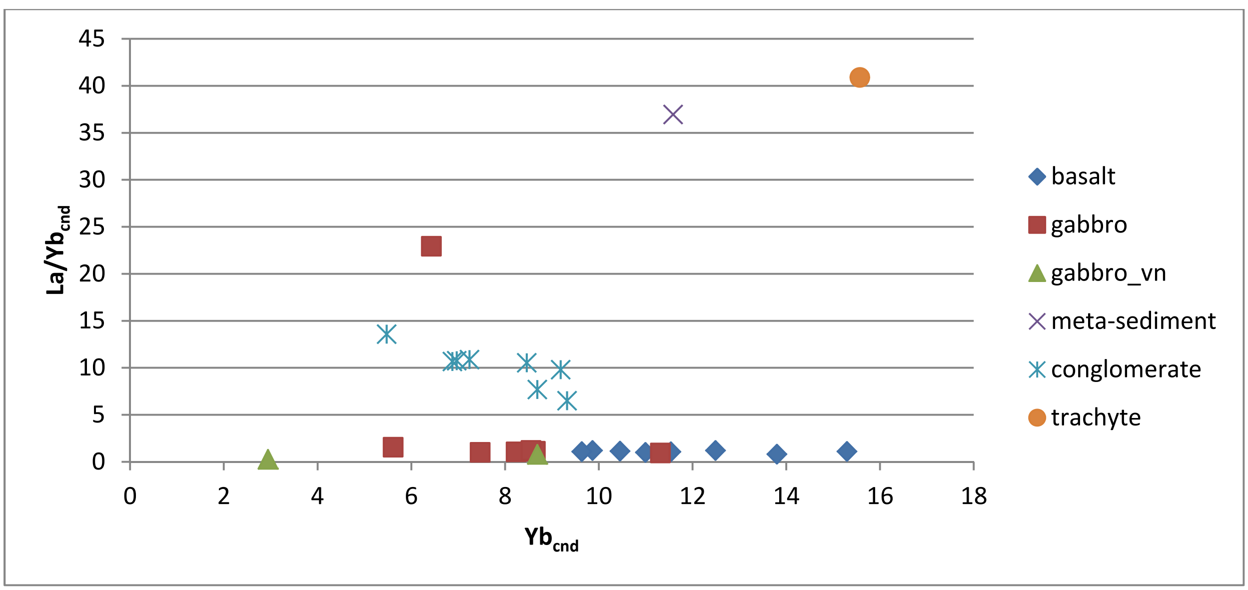

Figure 18: Chondrite normalized plot of Yb versus La/Yb from Drummond & Defant (1990). The Kirkland Lake North samples plot near the amphibolite fractionation. The trend of the volcanic samples is flat indicating they are not mixing with a hypothetical dacitic end-member but the conglomerates have a trend that could indicate dacite or garnet amphibolite influences.

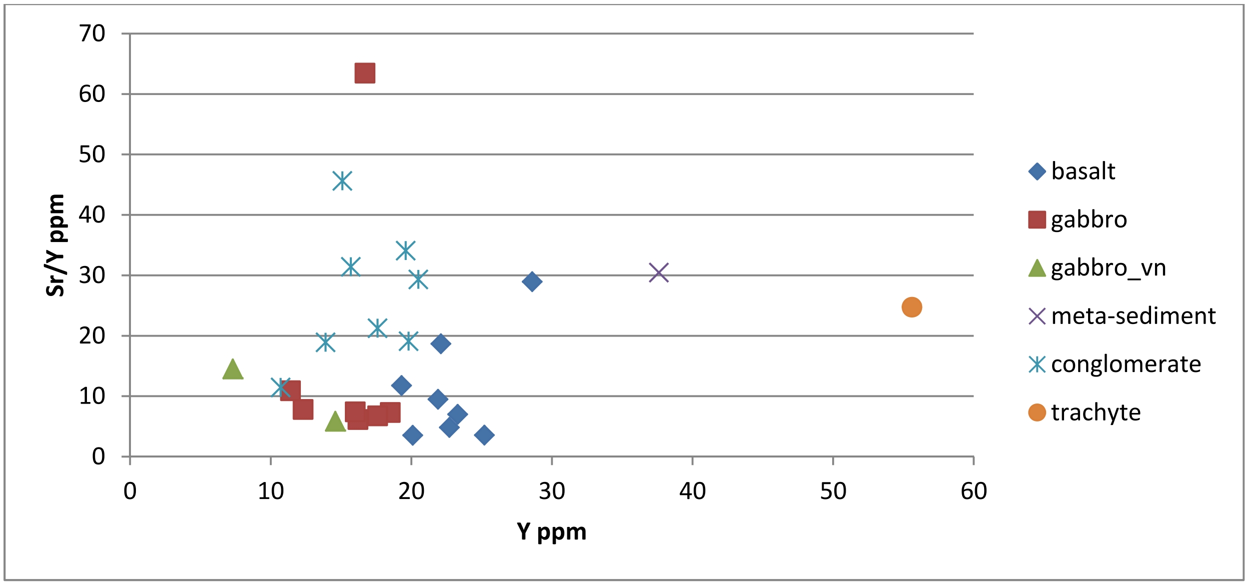

Figure 19: A plot of Y versus Sr/Y from Drummond & Defant (1990). The Kirkland Lake samples plot below the overlapping fields of eclogite and 10% amphibolite; they have a negative linear trend.

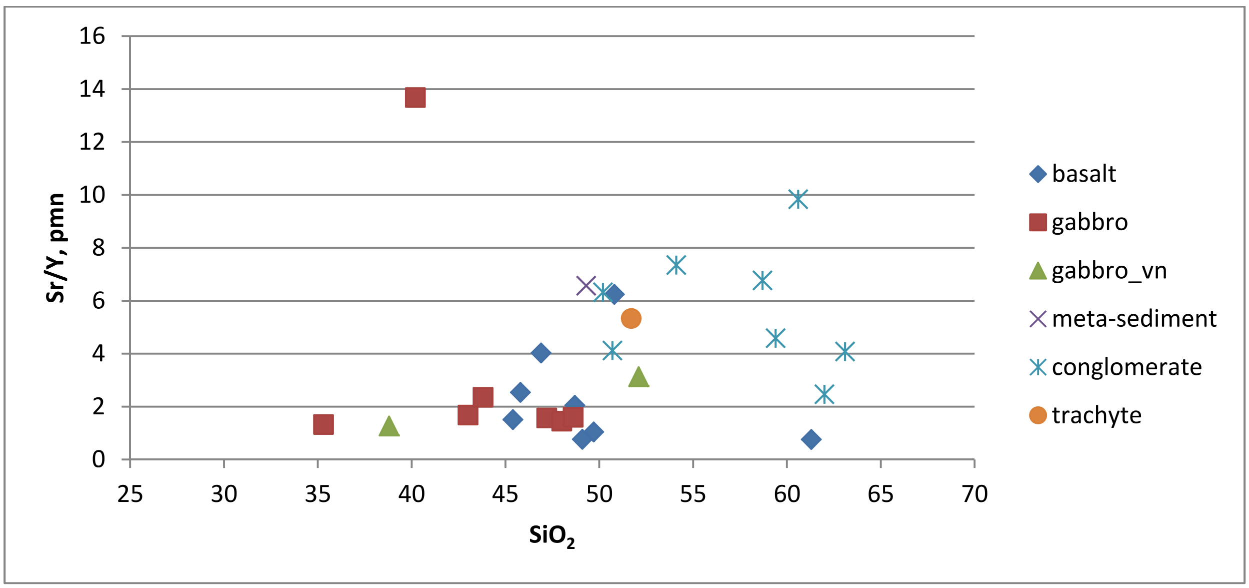

Figure 20: A plot primitive mantle normalized Sr/Y versus SiO_2 wt% from Cousens et al., (2011). The Kirkland Lake gabbro samples do not show a linear trend with increasing silica, indicating that mixing from felsic melts is not likely for those samples. However, some of the basalt samples follow a positive linear trend suggesting melt mixing.

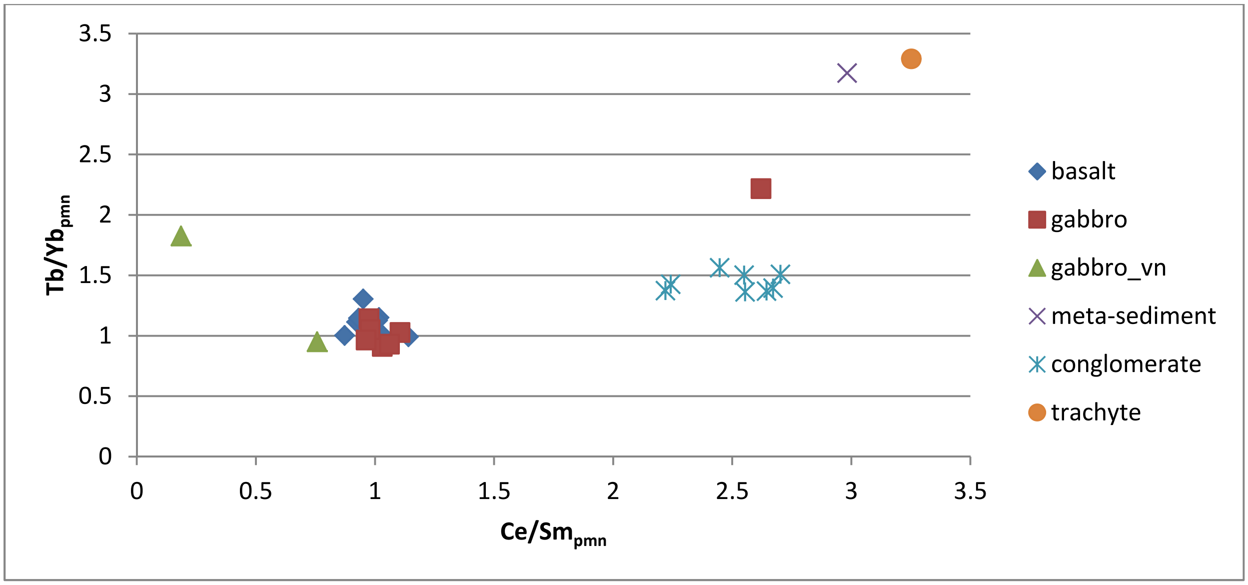

Figure 21: Primitive mantle normalized ratios of Ce/Sm versus Tb/Yb. The plot shows Kirkland Lake samples plotting in the garnet stability field (plot area). There is a distinct separation of the basaltic samples with the conglomerate samples along the Ce/Sm_{pmn} axis suggesting crustal assimilation is not occurring in the volcanic samples given that the conglomerates would invariably host crustal material given their sedimentary origin. The one exception is a gabbro sample which was sampled near the contact with the conglomerate.

Conclusions and Recommendations

This report is written for submission to the Ministry of Northern Development and Mines to fulfill the assessment work requirements for part of the historic Federal Mine property. This report summarizes the geochemical sampling completed in the period of May 8, 2015 and May 11, 2015 on the un-patented mining claim 4272931. This report was prepared by Christopher A. L. Clarke P.Geo under supervision from Mark Masson, P.Geo, both of whom are employees of Canadian Malartic Corporation.

Twenty-seven samples were analysed for major and trace elements on claims 4273901 and 4272931 (Appendix 1 &2), of the twenty-seven samples nine samples were taken within claim 4273901 and eighteen on claim 427931(Appendix 1& 2). According to the mapping the sample set is composed of eight basalts, seven gabbros, eight conglomerates, one trachyte and one meta-sediment. Two additional samples were taken that were primarily composed of vein material in a gabbro map unit. Overall the sample series defines a temporal-spatial relationship between Keewatin aged volcanics and Temiskaming aged sediments.

The geochemical data shows a clear delineation between the Keewatin aged basalt and gabbro samples and the Temiskaming aged conglomerates. The trachyte and meta-sediment samples were taken in areas mapped as Temiskaming aged but they display distinctly different geochemical signatures compared to the Temiskaming conglomerates. The volcanic samples appear to have nil to minor crustal influences and appear to be generally unaltered. The conglomerate samples instead display amphibolite influences which could be interpreted as being indicative of metamorphism given the observed degree of ductile deformation within conglomerate outcroppings.

The classification diagrams also clearly show that the basalt and gabbro samples broadly conform to the mapping with the outlier samples possibly influenced by their proximity to the contact with the Temiskaming sediments (metamorphic influences). The conglomerates, given their heterogeneous natures could not be conclusively classified with chemical data but the conglomerates all appear to have broadly consistent trace element patterns given their clustering in various diagrams which suggest the samples all underwent similar alteration/metamorphic influences.

It is recommended that thin sections be made with the goal of identifying mineral phases within the Keewatin and Temiskaming rocks.

Respectfully Submitted,

Christopher A. L. Clarke, P.Geo

STATEMENT OF QUALIFICATIONS

I, Christopher Angus Leo Clarke, hereby declare that:

1. I am a licensed geoscientist with the APGO with residence in Larder Lake, Ontario and am presently employed as a Geologist with Canadian Malartic Corporation working on the Kirkland Lake Project based in Dobie, Ontario.

2. I graduated with a Bachelor of Science degree in Earth Sciences with a focus on geochemistry from Carleton University, in Ottawa Ontario, in 2009.

3. I graduated with a Master of Science degree in Earth Sciences with a focus on geochemistry from the University of Ottawa, in Ottawa Ontario, in 2012.

4. I have practiced my profession continuously since graduation in Canada.

5. I am a member of the Ontario Prospectors Association.

6. I own shares of Agnico Eagle and Yamana Gold who jointly own Canadian Malartic Corporation

7. I am responsible for the final processing and validation of the survey results and the compilation of the presentation of this report. The statements made in this report represent my professional opinion based on my consideration of the information available to me at the time of writing this report.

Dobie, ON
April 2016
Christopher Angus Leo Clarke, B.Sc., M.Sc., P.Geo
Geologist for Canadian Malartic Corporation

References

Cousens, B., C. D. Henry, B. J. Harvey, T. Brownrigg, J. Prytulak and J. F. Allan (2011). "Secular variations in magmatism during a continental arc to post-arc transition: Plio- Pleistocene volcanism in the Lake Tahoe/Truckee area, Northern Sierra Nevada, California." Lithos **123**: 225-242.

Drummond, M. S. and M. J. Defant (1990). "A Model for Trondhjemite-Tonalite-Dacite Genesis and Crustal Growth via Slab Melting: Archean to Modern Comparisons." Journal of Geophysical Research **95**(B13): 21,503-21,521.

Gill, J.B. (1981). “Orogenic Andesites and Plate Tectonics.” Springer-Verlag. Berlin.

Irvine, T.N. and W.R.A. Barager (1971). "A guide to the chemical classification of the common volcanic rocks. Canadian Journal of Earth Sciences **8**: 523-548.

Harker A (1909) The natural history of igneous rocks. Macmillan, New York

LeBas, M.J., LeMaitre, R.W., Streckeisen, A., and Zanettin, B., (1986). “A chemical classification of volcanic rocks based on the total alkali-silica diagram.” Journal of Petrology, **27**: 745-750.

Sun, S. and W. F. McDonough (1989). "Chemical and isotopic systematics of oceanic basalts: implications for mantle composition and processes." Geological Society Special Publication (42): 313-345.

Appendix 1: Field Notes

Prospecting Diary for claim 4273901

The work was carried out as follows:

Field:

Prospecting May 10, 2015

Office:

Report May 14, 2015

Persons who carried out the work:

Prospecting:

Christopher A.L. Clarke Larder Lake, On

Report:

Christopher A.L. Clarke

Sample List Sample List (UTM zone 17 NAD 83)

Waypoint	Northing	Easting	Rock Type
L767589	5334083.093	569678.6293	Basalt
L767590	5334111.025	569772.2306	Basalt
L767591	5334263.002	569764.4263	Basalt
L767592	5334203.703	569641.9045	Basalt
L767593	5334133.193	569584.4497	Basalt
L767594	5334329.423	569677.8595	Gabbro
L767595	5334447.742	569672.1042	Gabbro
L767596	5334420.103	569575.0088	Basalt
L767597	5334294.602	569657.4581	Basalt

May 10, 2015 – 1 Day Prospecting

Workers: Christopher Clarke

Weather: Sunny/overcast (rained during the night), cold (12°C), feels like fall

We arrived at the claim following the dirt road off Goodfish Rd and drove to the southwestern corner of the claim. We parked the truck adjacent to a gravel dyke crossing Kirkland Lake. We then proceeded south from the road and performed a series of south-north traverses south of the southern road with roughly 100m spacing and took several grab samples (L767589 to L767590). The samples and outcrop were all basaltic. The former tailings, slimes, removal of tailings and spring floods have severely degraded outcrop exposure near the Kirkland Lake Basin. We could not locate the Gabbro and Temiskaming outcrops on the north shore they appeared to be buried under swamp/rubble. Moving north of the southern road we performed a series of north-south traverses at 100m spacing. Our traverses were blocked by a wide (>10m) man-made ravine with basaltic scree/fill lining the slopes. We took another set of sample composed of basalt (L767591-L767592) paying extra care to sample from true outcrop given the human deposition of basaltic rubble. Heading back to the truck we took another basalt sample (L767593) from the 10m ridge by the truck.

We then moved the truck to the northern road in the claim which was north of the ravine. We then proceeded to traverse a set of north-south lines in the northwest quadrant of the claim. Moving north, we first encountered basalt similar to what we encountered in the south of the claim. Then, continuing north we encountered a wooded swamp. On the northern edge of the swamp we intersected a 5-10m high ridgeline of gabbro. We sampled the gabbro on the ridgeline (L767594 to L767595). Moving back south on a line west of our position we encountered extensive flooding and swamp leading us to move eastward closer to our original line. At the end of our south line we sampled an outcrop of basalt (L767596). We then relocated to the northeast quadrant of the claim and performed a north and south line traverse. The northeast quadrant was primarily flooded swamp with poplar tag alders. An outcrop/ridge of basalt was encountered but no sample could be broken off the ridge. At the end of the traverse we exited onto the road and sampled a road cut we previously passed in the truck. The road cut is on claim 1242952, which we hold. The road cut outcrop is composed of pillow basalt. We returned to the truck and returned to Dobie.

Prospecting Diary for Christopher Clarke, B.Sc, M.Sc, GIT

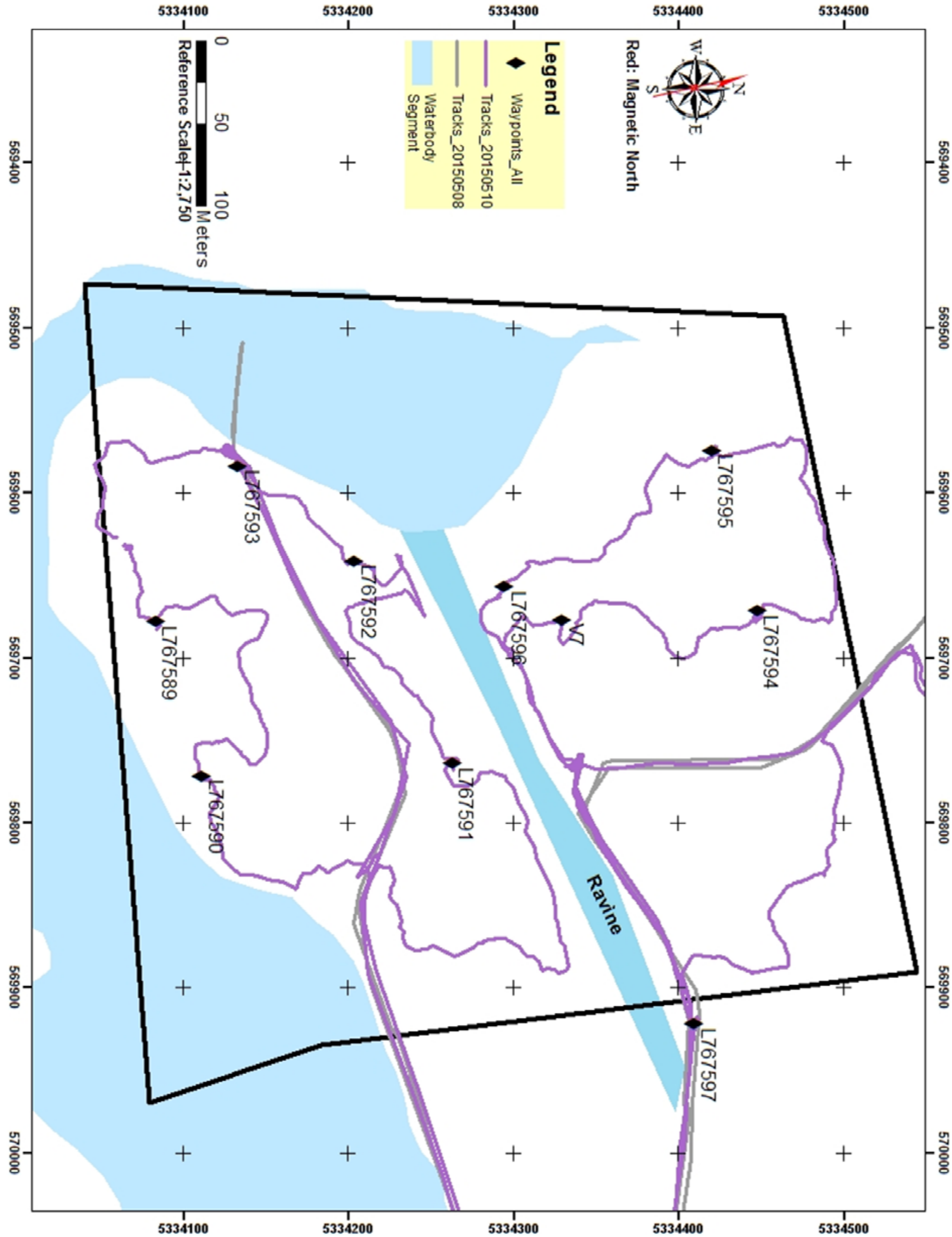

Figure 22: Map showing the GPS tracks for the worker's traverses on May 10, 2015 for claim 4273901.

Figure 23: A 1:5,000 scale satellite map showing access and traverse tracks for claim 4273901.

Prospecting Diary for Claim 427931

The work was carried out as follows:

Field:

Prospecting May 8, 2015 and May 11, 2015

Office:

Report May 13, 2015

Persons who carried out the work:

Prospecting:

Christopher A.L. Clarke Larder Lake, On

Martyn Harrington Kirkland Lake, On

Report:

Christopher A.L. Clarke

Sample List (UTM zone 17 NAD 83)

Waypoint	Northing	Easting	Rock Type
L767579	5335684.09	572144.89	Gabbro
TRENCH	5335768.60	572287.34	
L767580	5335754.53	572264.76	Gabbro
L767581	5335754.87	572264.91	Gabbro
PIT	5335726.98	572028.35	
L767582	5335297.60	572005.80	Gabbro
L767583	5335322.88	572264.71	Gabbro
L767584	5335496.49	572297.69	Conglomerate
L767585	5335405.43	572094.12	Conglomerate
L767586	5335372.73	572039.43	Conglomerate
L767587	5335374.86	572014.42	Conglomerate

Waypoint	Northing	Easting	Rock Type
L767598	5335533.85	572307.48	Conglomerate
RED JASPER	5335603.39	572321.10	
L767599	5335628.43	572340.42	Conglomerate
L767600	5335504.56	572224.27	Conglomerate
R324838	5335548.50	572182.07	Trachyte
CLAIMPST 2	5335446.91	572244.85	
R324839	5335341.53	572219.34	Gabbro
R324840	5335318.85	572341.66	Gabbro
R324841	5335667.53	571950.57	Conglomerate
R324842	5335669.95	571913.21	Gabbro

May 8, 2015 – 1 Day Prospecting

Workers: Christopher Clarke; Martyn Harrington

Weather: Sunny/overcast (rained during the night), hot (28°C) and humid

We entered the property at the northwest corner of the claim along a dirt road off Goodfish Rd. There are signs of illegal dumping (residential trash). The northwest corner is primarily composed of tag alders (poplar). We walked south, south east along a trail to the pond shoreline. We then proceeded east following the shoreline of the pond, taking one sample (L767579). The sample came from a 2x2m outcrop identified as basalt.

Moving east we encountered an overgrown trench with an azimuth: 208°, 1-2m wide, and 8.5-9m long. We took two samples: L767580 (gabbro) and L767581 (gabbro with quartz vein). After finding the trench we performed a search of the surrounding area and located a pit (2x4m). We took two additional samples from the pit: L767582 and L767583, both were identified as gabbro.

We then returned to our line and walked east, and then north, to the northeast claim post. We then headed west along the northern boundary back to the truck in the northwest corner of the claim. Walking along the ridgeline on the northern edge of the claim, the exposures are all grey, barren fine-medium grained gabbro.

Returning to the truck we had lunch and relocated the truck to the southwestern entrance of the claim and parked the truck along Goodfish Rd at the closest point to the southwest corner of the claim.

We then traversed along the southern margin of the claim. The southern portion of the claim hosts older growth trees (various pines, cedars). There are regular traces of abandoned human habitation (half buried vehicles/dwellings/pipes). The overburden is soil rich and water saturated. We located an outcrop in deadfall and sampled it (L767584); the unit appeared to be a sand-pebble sized meta-sediment. Nearing the southeast corner of the property we turned north and proceeded along the eastern edge of the claim. Conifer trees give way to tag alders (poplar). We encountered a stand of pine trees which revealed an outcrop of conglomerate; we sampled the outcrop (L767585). We continued north until the pond shoreline blocked our path and we then headed west. We found an outcrop 4m in diameter, relatively flat and adjacent to a slime pipe (a rotten wooden pipe). We sampled the outcrop (L767586) which was a conglomerate and continued west following the edge of the pond/swamp. Next, we encountered a broken, washed out beaver dam which exposed a glaciated conglomerate with many red jasper clasts. The outcrop area was polished so no sample could be taken. The outcrop showed various bedding planes (layers of conglomerate and tuff). Moving 15m west from the Beaver Dam, we sampled the same conglomerate from the beaver dam (L767587). This outcrop took us to the western edge of the claim. We returned to the truck.

May 11, 2015 – Day 2 Prospecting

We parked the truck in a residential lot ~150m southeast of the #2 claim post with the objective of further sampling the southeast corner of the claim. We walked north from the claim post, to the edge of the pond, along the way we sampled an outcrop of conglomerate (L767598). Exploring the shoreline we noted several bedding orientations and red jasper in the polished outcrop which could not be sampled given the shear drop into the pond. From the shore we moved west and followed the ridgeline of conglomerate outcrop and sampled again (L767599). Looking north from the L767599 outcrop we noticed a semi-drained spit which lead to a small island in the pond. We crossed the spit to the island which had a beaver lodge on it and noted the conglomerate outcrop. Heading due south we sampled another conglomerate outcrop (L767600). The ridgeline with conglomerate hosts tag alders (poplar). Moving south again we crossed out of the poplars and back into pine and cedar woods. We came across a deadfall exposing an outcrop and sampled it (R324838). The outcrop appeared to be trachyte. We walked to the end of our line and headed back to the truck and ate lunch.

After lunch we moved the truck back to the northwest corner of the claim (our first stop). We exited the vehicle and proceeded to sample the northwest corner of the claim. The northwest corner was composed of a gabbro which formed a hillock which dipped into the swamp and pond. We sampled the ridge (R324839) and headed south into the swamp, which was semi-drained, in an attempt to cross it. Crossing the swamp we encountered a foliated gabbro and sampled it (R324840). We succeeded in crossing the swamp and reached the beginnings of a low ridgeline; we sampled the ridgeline which was a conglomerate (R324841). We reached our line from Day 1 and retraced our steps across the swamp until we could move onto a new line east of our position. On this line we encountered more gabbro and sampled it (R324842). Finishing the line we returned to the truck and returned to Dobie.

Prospecting Diary for Christopher Clarke, B.Sc, M.Sc, GIT

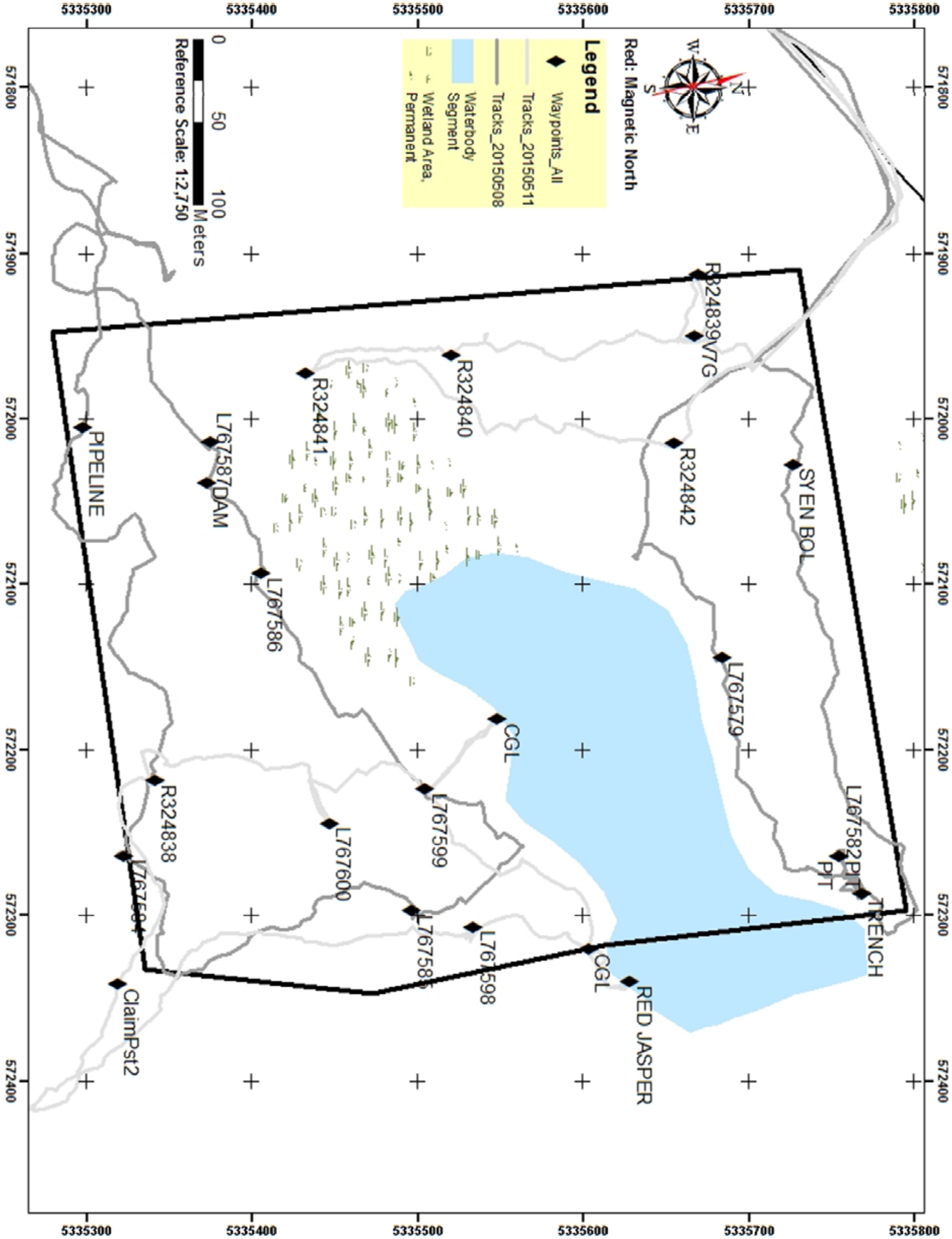

Figure 24: Map showing the GPS tracks and waypoints for the worker's traverses over two days for claim 4272931.

Figure 25: A 1:5,000 scale satellite map showing access and traverse tracks for claim 4272931.

Appendix 2: Geochemical Data

Appendix 1: Field Notes

Prospecting Diary for claim 4273901

The work was carried out as follows:

Field:

Prospecting May 10, 2015

Office:

Report May 14, 2015

Persons who carried out the work:

Prospecting:

Christopher A.L. Clarke Larder Lake, On

Report:

Christopher A.L. Clarke

Sample List Sample List (UTM zone 17 NAD 83)

Waypoint	Northing	Easting	Rock Type
L767589	5334083.093	569678.6293	Basalt
L767590	5334111.025	569772.2306	Basalt
L767591	5334263.002	569764.4263	Basalt
L767592	5334203.703	569641.9045	Basalt
L767593	5334133.193	569584.4497	Basalt
L767594	5334329.423	569677.8595	Gabbro
L767595	5334447.742	569672.1042	Gabbro
L767596	5334420.103	569575.0088	Basalt
L767597	5334294.602	569657.4581	Basalt

May 10, 2015 – 1 Day Prospecting

Workers: Christopher Clarke

Weather: Sunny/overcast (rained during the night), cold (12°C), feels like fall

We arrived at the claim following the dirt road off Goodfish Rd and drove to the southwestern corner of the claim. We parked the truck adjacent to a gravel dyke crossing Kirkland Lake. We then proceeded south from the road and performed a series of south-north traverses south of the southern road with roughly 100m spacing and took several grab samples (L767589 to L767590). The samples and outcrop were all basaltic. The former tailings, slimes, removal of tailings and spring floods have severely degraded outcrop exposure near the Kirkland Lake Basin. We could not locate the Gabbro and Temiskaming outcrops on the north shore they appeared to be buried under swamp/rubble. Moving north of the southern road we performed a series of north-south traverses at 100m spacing. Our traverses were blocked by a wide (>10m) man-made ravine with basaltic scree/fill lining the slopes. We took another set of sample composed of basalt (L767591-L767592) paying extra care to sample from true outcrop given the human deposition of basaltic rubble. Heading back to the truck we took another basalt sample (L767593) from the 10m ridge by the truck.

We then moved the truck to the northern road in the claim which was north of the ravine. We then proceeded to traverse a set of north-south lines in the northwest quadrant of the claim. Moving north, we first encountered basalt similar to what we encountered in the south of the claim. Then, continuing north we encountered a wooded swamp. On the northern edge of the swamp we intersected a 5-10m high ridgeline of gabbro. We sampled the gabbro on the ridgeline (L767594 to L767595). Moving back south on a line west of our position we encountered extensive flooding and swamp leading us to move eastward closer to our original line. At the end of our south line we sampled an outcrop of basalt (L767596). We then relocated to the northeast quadrant of the claim and performed a north and south line traverse. The northeast quadrant was primarily flooded swamp with poplar tag alders. An outcrop/ridge of basalt was encountered but no sample could be broken off the ridge. At the end of the traverse we exited onto the road and sampled a road cut we previously passed in the truck. The road cut is on claim 1242952, which we hold. The road cut outcrop is composed of pillow basalt. We returned to the truck and returned to Dobie.

Prospecting Diary for Christopher Clarke, B.Sc, M.Sc, GIT

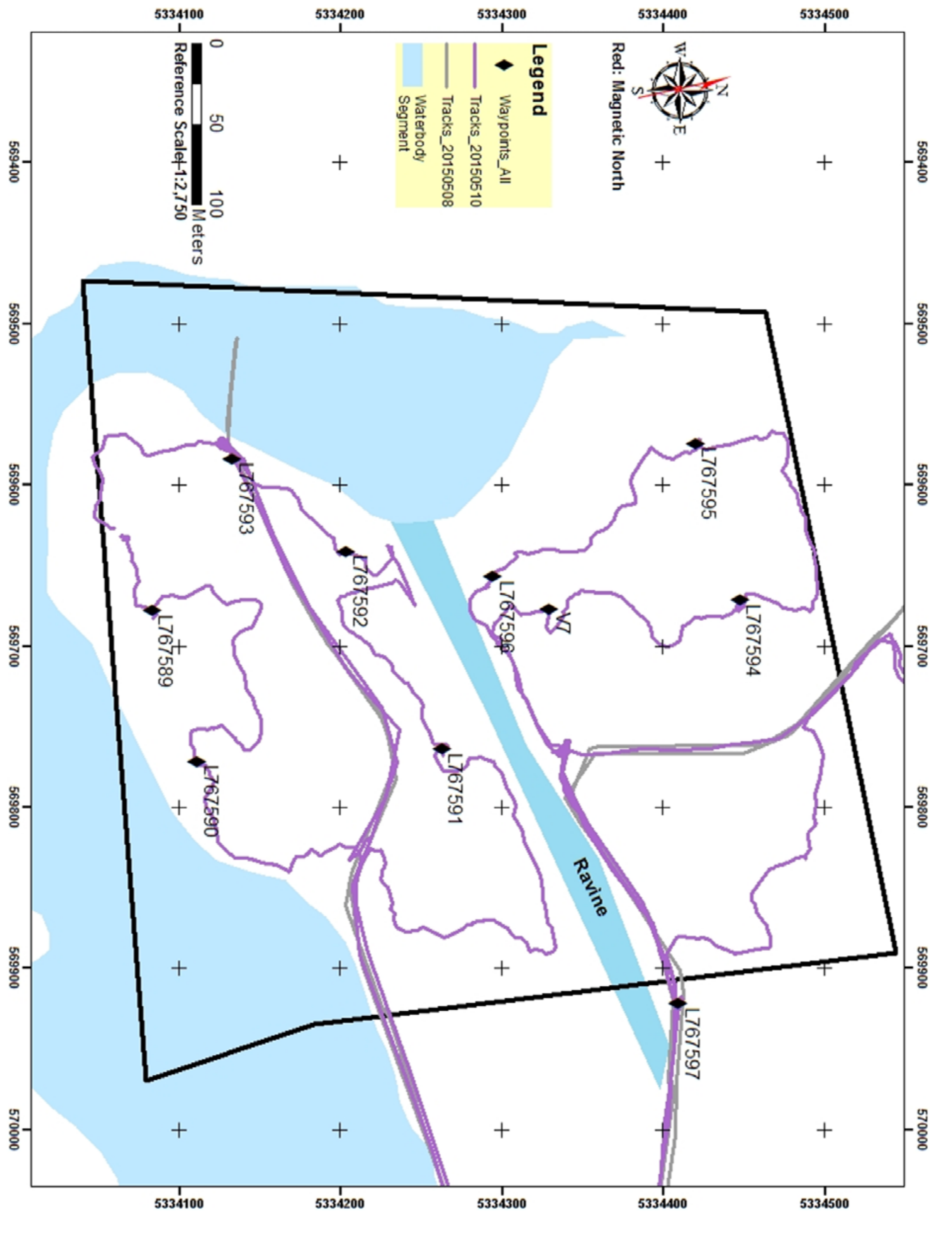

Figure 22: Map showing the GPS tracks for the worker's traverses on May 10, 2015 for claim 4273901.

Figure 23: A 1:5,000 scale satellite map showing access and traverse tracks for claim 4273901.

Prospecting Diary for Claim 427931

The work was carried out as follows:

Field:

Prospecting May 8, 2015 and May 11, 2015

Office:

Report May 13, 2015

Persons who carried out the work:

Prospecting:

Christopher A.L. Clarke Larder Lake, On

Martyn Harrington Kirkland Lake, On

Report:

Christopher A.L. Clarke

Sample List (UTM zone 17 NAD 83)

Waypoint	Northing	Easting	Rock Type
L767579	5335684.09	572144.89	Gabbro
TRENCH	5335768.60	572287.34	
L767580	5335754.53	572264.76	Gabbro
L767581	5335754.87	572264.91	Gabbro
PIT	5335726.98	572028.35	
L767582	5335297.60	572005.80	Gabbro
L767583	5335322.88	572264.71	Gabbro
L767584	5335496.49	572297.69	Conglomerate
L767585	5335405.43	572094.12	Conglomerate
L767586	5335372.73	572039.43	Conglomerate
L767587	5335374.86	572014.42	Conglomerate

Waypoint	Northing	Easting	Rock Type
L767598	5335533.85	572307.48	Conglomerate
RED JASPER	5335603.39	572321.10	
L767599	5335628.43	572340.42	Conglomerate
L767600	5335504.56	572224.27	Conglomerate
R324838	5335548.50	572182.07	Trachyte
CLAIMPST 2	5335446.91	572244.85	
R324839	5335341.53	572219.34	Gabbro
R324840	5335318.85	572341.66	Gabbro
R324841	5335667.53	571950.57	Conglomerate
R324842	5335669.95	571913.21	Gabbro

May 8, 2015 – 1 Day Prospecting

Workers: Christopher Clarke; Martyn Harrington

Weather: Sunny/overcast (rained during the night), hot (28°C) and humid

We entered the property at the northwest corner of the claim along a dirt road off Goodfish Rd. There are signs of illegal dumping (residential trash). The northwest corner is primarily composed of tag alders (poplar). We walked south, south east along a trail to the pond shoreline. We then proceeded east following the shoreline of the pond, taking one sample (L767579). The sample came from a 2x2m outcrop identified as basalt.

Moving east we encountered an overgrown trench with an azimuth: 208°, 1-2m wide, and 8.5-9m long. We took two samples: L767580 (gabbro) and L767581 (gabbro with quartz vein). After finding the trench we performed a search of the surrounding area and located a pit (2x4m). We took two additional samples from the pit: L767582 and L767583, both were identified as gabbro.

We then returned to our line and walked east, and then north, to the northeast claim post. We then headed west along the northern boundary back to the truck in the northwest corner of the claim. Walking along the ridgeline on the northern edge of the claim, the exposures are all grey, barren fine-medium grained gabbro.

Returning to the truck we had lunch and relocated the truck to the southwestern entrance of the claim and parked the truck along Goodfish Rd at the closest point to the southwest corner of the claim.

We then traversed along the southern margin of the claim. The southern portion of the claim hosts older growth trees (various pines, cedars). There are regular traces of abandoned human habitation (half buried vehicles/dwellings/pipes). The overburden is soil rich and water saturated. We located an outcrop in deadfall and sampled it (L767584); the unit appeared to be a sand-pebble sized meta-sediment. Nearing the southeast corner of the property we turned north and proceeded along the eastern edge of the claim. Conifer trees give way to tag alders (poplar). We encountered a stand of pine trees which revealed an outcrop of conglomerate; we sampled the outcrop (L767585). We continued north until the pond shoreline blocked our path and we then headed west. We found an outcrop 4m in diameter, relatively flat and adjacent to a slime pipe (a rotten wooden pipe). We sampled the outcrop (L767586) which was a conglomerate and continued west following the edge of the pond/swamp. Next, we encountered a broken, washed out beaver dam which exposed a glaciated conglomerate with many red jasper clasts. The outcrop area was polished so no sample could be taken. The outcrop showed various bedding planes (layers of conglomerate and tuff). Moving 15m west from the Beaver Dam, we sampled the same conglomerate from the beaver dam (L767587). This outcrop took us to the western edge of the claim. We returned to the truck.

May 11, 2015 – Day 2 Prospecting

We parked the truck in a residential lot ~150m southeast of the #2 claim post with the objective of further sampling the southeast corner of the claim. We walked north from the claim post, to the edge of the pond, along the way we sampled an outcrop of conglomerate (L767598). Exploring the shoreline we noted several bedding orientations and red jasper in the polished outcrop which could not be sampled given the shear drop into the pond. From the shore we moved west and followed the ridgeline of conglomerate outcrop and sampled again (L767599). Looking north from the L767599 outcrop we noticed a semi-drained spit which lead to a small island in the pond. We crossed the spit to the island which had a beaver lodge on it and noted the conglomerate outcrop. Heading due south we sampled another conglomerate outcrop (L767600). The ridgeline with conglomerate hosts tag alders (poplar). Moving south again we crossed out of the poplars and back into pine and cedar woods. We came across a deadfall exposing an outcrop and sampled it (R324838). The outcrop appeared to be trachyte. We walked to the end of our line and headed back to the truck and ate lunch.

After lunch we moved the truck back to the northwest corner of the claim (our first stop). We exited the vehicle and proceeded to sample the northwest corner of the claim. The northwest corner was composed of a gabbro which formed a hillock which dipped into the swamp and pond. We sampled the ridge (R324839) and headed south into the swamp, which was semi-drained, in an attempt to cross it. Crossing the swamp we encountered a foliated gabbro and sampled it (R324840). We succeeded in crossing the swamp and reached the beginnings of a low ridgeline; we sampled the ridgeline which was a conglomerate (R324841). We reached our line from Day 1 and retraced our steps across the swamp until we could move onto a new line east of our position. On this line we encountered more gabbro and sampled it (R324842). Finishing the line we returned to the truck and returned to Dobie.

Prospecting Diary for Christopher Clarke, B.Sc, M.Sc, GIT

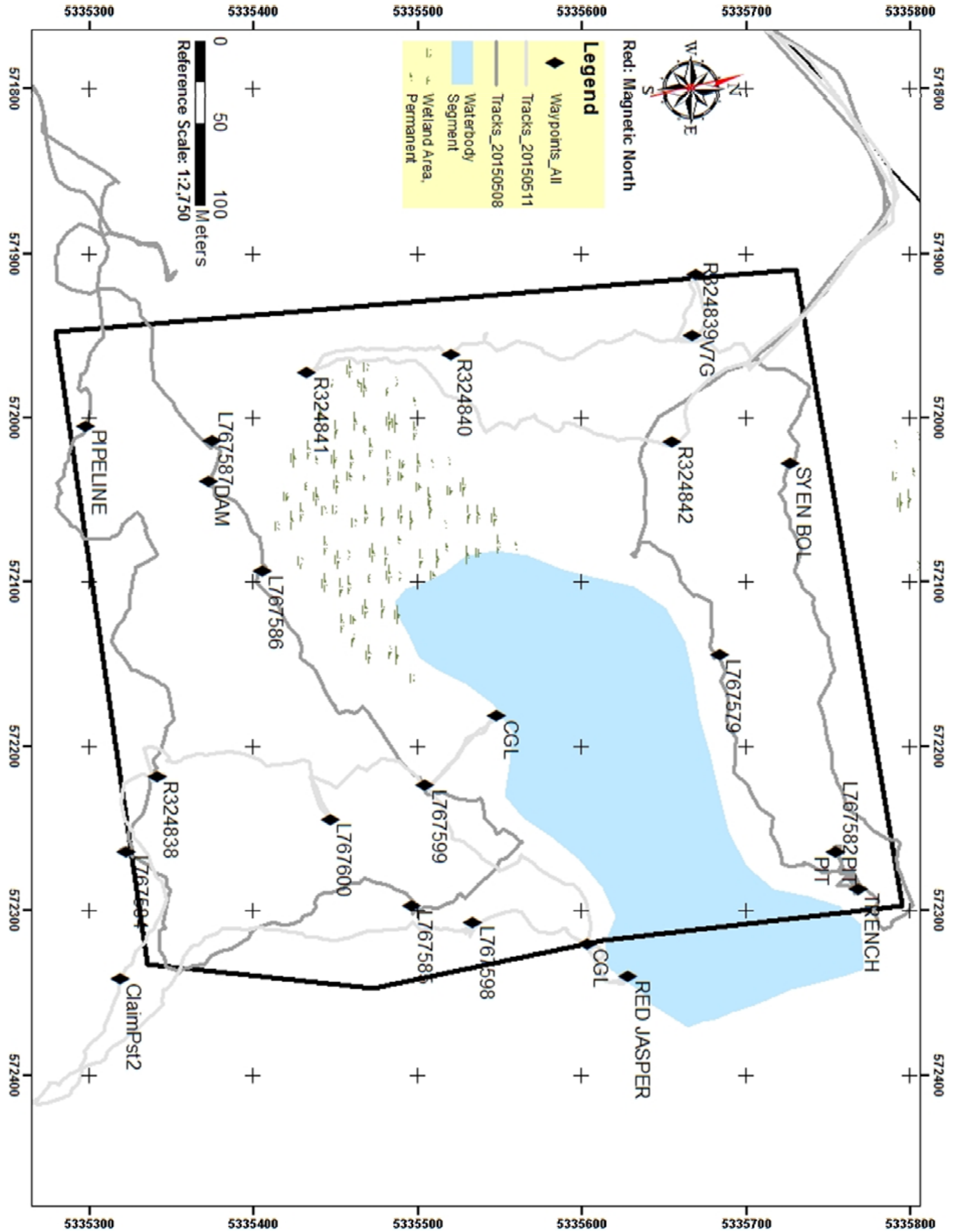

Figure 24: Map showing the GPS tracks and waypoints for the worker's traverses over two days for claim 4272931.

Figure 25: A 1:5,000 scale satellite map showing access and traverse tracks for claim 4272931.

SD15069623 - Finalized
CLIENT : OSIKLI - Canadian Malartic Corporation
# of SAMPLES : 20
DATE RECEIVED : 2015-05-13 DATE FINALIZED : 2015-05-16
PROJECT : CLAIM 4279231
CERTIFICATE COMMENTS :
PO NUMBER : KL001031

	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81
SAMPLE	Ba	Ce	Cr	Cs	Dy	Er	Eu	Ga	Gd	Hf	Ho	La	Lu	Nb	Nd	Pr	Rb	Sm	Sn	Sr	Ta
DESCRIPT	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
L767579	169	14.6	20	0.52	4.98	3.7	1	19.5	4.25	2.4	1.09	5.4	0.53	3.6	11.4	2.13	11.6	3.53	1	828	0.2
BLANK	<0.5	<0.5	<10	<0.01	<0.05	<0.03	<0.03	0.1	<0.05	<0.2	<0.01	<0.5	0.01	<0.2	<0.1	<0.03	<0.2	<0.03	<1	<0.1	<0.1
BLANK																					
BLANK																					
L767580	165.5	7.2	10	2.7	2.84	2.19	0.59	19.4	2.25	1.2	0.65	2.8	0.25	2	5.5	1.04	38.7	1.63	1	99.9	<0.1
OREAS-10	1315	97.9	50	3.57	7.63	4.02	1.19	24.3	8.88	6.2	1.35	45.2	0.46	29.4	49.4	11.9	120	10.8	8	111.5	2.8
OREAS 90																					
L767581	18	0.6	10	0.49	1.38	0.79	0.42	4.9	1.17	<0.2	0.26	<0.5	0.1	<0.2	0.9	0.12	4.1	0.81	<1	106	<0.1
SRM88B	5.7	3.9	10	0.11	0.64	0.39	0.12	0.7	0.66	0.2	0.15	4.9	0.05	0.3	3.5	0.79	2.9	0.52	<1	61.5	<0.1
L767582	73.3	5.9	10	1.43	2.96	2.01	0.47	21.2	2.06	1.4	0.58	2.2	0.25	2.1	4.9	0.93	16.9	1.95	1	85.7	0.1
L767583	117	6	10	0.9	2.2	1.35	0.6	10.2	2.04	0.8	0.43	2.8	0.19	1.4	4.3	0.88	13.8	1.54	<1	124.5	<0.1
L767584	1990	279	60	1.12	8.73	3.3	5.25	22.7	14.95	10.7	1.25	136.5	0.32	14.9	129	32.3	167	23.4	3	1145	0.6
L767585	679	58.2	260	2.94	3.72	2.26	1.48	14.7	4.61	3.2	0.71	28.7	0.32	4.6	28.5	6.63	59.9	5.45	1	601	0.2
L767586	1855	47.3	200	2.31	3.16	1.55	1.13	17.3	3.67	3.4	0.55	23.4	0.23	5.6	24	5.77	36.3	4.64	1	689	0.2
AMIS0085	368	72.5	590	3.91	11.5	8.68	1.01	14.3	7.61	4.6	2.54	36.7	1.36	11	28.8	7.77	222	6.74	3	102.5	1.4
L767587	667	52	290	1.68	3.02	1.74	1.45	17.7	3.72	3.5	0.58	25.1	0.25	4.3	25.9	6.15	30.5	4.92	1	493	0.2
L767588	539	48.4	180	4.15	2.8	1.57	1.14	18.1	3.5	3.1	0.5	23.9	0.23	3.8	24.6	5.83	75	4.74	1	263	0.1
L767598	814	44	390	5.99	3.52	2.03	1.35	18.1	3.84	2.9	0.68	21.3	0.28	4.3	23.1	5.41	80.2	4.91	1	374	0.2
GBM908-5																					
L767599	465	58.7	540	3.2	3.81	2.16	1.61	16.2	4.76	3.1	0.71	28.4	0.27	3.9	30.4	7.1	43.2	6	1	668	0.1
L767600	631	40.2	380	3.11	3.62	2.19	1.2	15.5	4.13	2.6	0.78	19.3	0.3	3.4	21.8	5.01	69.8	4.53	1	378	0.2
R324838	6350	429	110	0.82	12.2	4.79	7.46	20.9	22.2	16.8	1.86	203	0.46	21.8	182.5	47	52.4	33	3	1375	0.9
STSD-3																					
R324839	41.1	5.6	10	0.82	2.48	1.45	0.38	18.9	1.83	1.3	0.5	2.4	0.24	1.7	4.5	0.86	3.1	1.36	1	96.2	0.1
R324840	575	99.3	300	2	3.64	1.64	2.12	14	5.99	2.8	0.63	47	0.21	2.8	50.9	12.1	32.6	9.48	1	1060	0.1
R324841	608	49.7	190	4.84	2.28	1.33	1	18.9	3.05	3.3	0.41	23.7	0.17	3.8	24.2	5.88	93.4	4.6	1	122.5	0.2
R324842	20.7	8.9	10	0.23	3.42	2.47	0.56	16.3	2.68	1.6	0.7	3.4	0.34	2.6	6.5	1.31	1.2	2.1	<1	135.5	0.1
R324844	352	26.6	50	7.81	2.73	1.66	0.83	16.1	2.92	2.5	0.51	13.3	0.27	6.6	14	3.26	85.2	2.97	2	159.5	0.3
R324845	37	1	10	0.03	0.28	0.2	0.04	0.6	0.19	<0.2	0.05	1.1	0.02	<0.2	0.8	0.18	0.9	0.22	<1	73.2	<0.1
AMIS0304	2700	8490	90	0.41	138	35.1	146.5	57.2	342	26.5	17.5	3500	1.97	>2500	4210	>1000	10.3	617	25	3480	12.6
OGGeo08																					

ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06	ME-ICP06
Tb	Th	Tm	U	V	W	Y	Yb	Zr	SiO2	Al2O3	Fe2O3	CaO	MgO	Na2O	K2O	Cr2O3	TiO2	MnO	P2O5	SrO	BaO
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%	%	%	%
0.74	0.5	0.47	0.14	510	<1	28.6	3.38	79	50.8	14	15.25	9.32	4.94	1.07	0.53	<0.01	1.39	0.2	0.09	0.1	0.02
<0.01	<0.05	0.01	<0.05	<5	<1	<0.5	0.03	<2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.41	0.24	0.32	0.11	1610	73	16.2	1.82	38	35.3	12.15	21	8	4.69	1.5	1.12	<0.01	1.89	0.19	0.04	0.01	0.02
1.31	143	0.56	116.5	18	2	36.2	3.56	227	72.8	14.45	2.86	1.46	0.65	4.61	2.93	0.01	0.29	0.03	0.27	0.01	0.15
0.26	<0.05	0.09	<0.05	194	4	7.3	0.65	<2	52.1	2.42	11.3	11.9	4.74	0.05	0.12	<0.01	0.06	0.33	<0.01	0.01	<0.01
0.09	0.34	0.09	0.15	<5	<1	7.5	0.33	5	1.18	0.32	0.28	31	21.5	0.03	0.11	<0.01	0.02	0.02	<0.01	<0.01	<0.01
0.4	0.27	0.28	0.09	1440	14	14.6	1.92	43	38.8	14.55	19.25	5.81	5.71	2.54	0.44	<0.01	2.15	0.17	0.05	0.01	0.01
0.31	0.17	0.18	0.06	779	33	11.4	1.24	27	43.8	7.63	13.15	10.4	4.72	1.97	0.41	<0.01	1.33	0.21	0.05	0.02	0.01
1.78	28.1	0.42	5.29	348	2	37.6	2.56	449	49.3	15.05	7.96	5.36	2.27	5.83	3.53	0.01	0.82	0.19	0.35	0.14	0.22
0.62	6.12	0.35	6.81	163	4	20.5	2.03	119	50.2	12.95	7.57	8.27	2.97	3.89	2.05	0.04	0.75	0.29	0.24	0.07	0.08
0.5	3.69	0.21	1.48	118	2	15.1	1.52	125	60.6	14.25	6.35	3.96	3.19	4.47	2.19	0.03	0.59	0.13	0.19	0.08	0.21
1.49	50.8	1.34	249	35	2	70.1	9.75	158	71.9	11.35	3.62	3.4	1.83	1.8	4.88	0.08	0.22	0.07	0.07	0.01	0.04
0.48	4.42	0.23	1.47	146	2	15.7	1.6	120	58.7	14.25	7.68	3.75	3.96	4.36	1.64	0.04	0.63	0.14	0.2	0.06	0.07
0.46	4.26	0.25	2.6	146	10	13.9	1.54	109	63.1	13.5	8.82	1.55	3.3	2.53	2.74	0.03	0.59	0.1	0.22	0.03	0.06
0.6	3.16	0.28	3.25	179	8	17.6	1.92	111	59.4	14.5	7.58	3.16	2.99	3.37	2.85	0.05	0.87	0.13	0.21	0.05	0.09
0.64	4.72	0.31	2.56	175	6	19.6	1.87	114	54.1	12.2	9.27	6.83	4.03	2.92	1.74	0.08	0.73	0.2	0.22	0.08	0.05
0.62	2.89	0.3	7.21	179	3	19.8	2.06	94	50.7	12.3	8.32	6.46	3.61	2.8	2.35	0.05	0.74	0.22	0.24	0.05	0.07
2.48	41.4	0.54	10.75	171	6	55.6	3.44	793	51.7	15.05	7.42	4.56	2.32	7.48	1.7	0.02	0.94	0.17	0.36	0.17	0.68
0.33	0.24	0.24	0.08	1625	1	12.3	1.65	34	43	12.35	20.7	5.53	6.41	1.5	0.09	<0.01	2.13	0.17	0.04	0.01	0.01
0.69	6.54	0.22	1.46	123	5	16.7	1.42	109	40.2	9.75	6.94	10.7	8.92	3.03	1	0.04	0.45	0.2	0.25	0.13	0.06
0.4	3.88	0.19	2.27	153	10	10.7	1.21	118	62	15.15	8.12	0.48	2.52	2.78	3.15	0.03	0.71	0.06	0.19	0.01	0.07
0.51	0.39	0.32	0.05	316	1	18.5	2.5	51	47.2	13.25	12.2	7.95	5.76	2.4	0.04	<0.01	0.92	0.18	0.06	0.02	<0.01
0.42	3.82	0.24	1.12	78	9	15.1	1.66	87	65.5	13.8	7.73	1.75	1.41	0.8	3.13	0.01	0.46	0.13	0.18	0.02	0.04
0.04	0.09	0.03	0.15	<5	<1	2.1	0.15	<2	10.9	0.19	0.17	47.1	2.73	0.03	0.02	<0.01	0.01	0.01	0.02	0.01	<0.01
33.3	439	3.5	22.8	363	6	413	16.55	1160	12.25	1.53	21.5	28.6	2.87	0.09	0.29	0.01	1.78	0.46	18.1	0.43	0.3

OA-GRA05	TOT-ICP06	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD8	ME-4ACD81
LOI	Total	Ag	As	Cd	Co	Cu	Li	Mo	Ni	Pb	Sc	Tl	Zn
%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
3.48	101.19	<0.5	<5	<0.5	42	115	10	<1	22	<2	47	<10	85
	<0.01												
0.08													
		<0.5	<5	<0.5	1	<1	<10	<1	<1	2	<1	<10	<2
13.95	99.86	<0.5	6	<0.5	64	692	40	<1	169	<2	56	<10	83
	100.52												
3.42													
17.7	100.73	<0.5	<5	0.5	30	15	10	<1	49	2	23	<10	39
	101.44												
11.2	100.69	<0.5	5	<0.5	75	603	50	<1	118	<2	62	10	101
16.2	99.9	<0.5	<5	<0.5	43	184	10	<1	57	<2	40	<10	55
7.57	98.6	<0.5	8	<0.5	16	130	10	<1	22	49	8	<10	141
10.75	100.12	<0.5	8	<0.5	31	63	30	<1	124	12	21	<10	73
4.51	100.75	<0.5	6	<0.5	24	36	20	<1	98	6	15	<10	69
	101.81												
4.73	100.21	<0.5	9	<0.5	29	40	30	<1	123	4	19	10	83
3.95	100.52	<0.5	5	<0.5	24	40	50	<1	127	3	17	<10	90
4.74	99.99	<0.5	11	<0.5	39	80	70	<1	175	2	21	<10	89
		61.1	6	<0.5	10	481	10	53	453	383	7	<10	238
7.63	100.08	<0.5	6	<0.5	41	60	50	<1	216	17	25	<10	101
10.45	98.36	<0.5	5	<0.5	38	66	30	<1	157	8	26	<10	108
6.96	99.53	0.5	6	<0.5	15	103	10	<1	34	45	7	<10	145
23.3													
8.5	100.44	<0.5	<5	<0.5	80	333	50	<1	93	<2	55	10	88
18.05	99.72	<0.5	<5	<0.5	33	4	20	<1	203	5	17	<10	88
3.45	98.72	<0.5	<5	<0.5	30	42	50	<1	107	<2	18	<10	96
10.15	100.13	<0.5	<5	<0.5	44	8	60	<1	51	<2	45	<10	56
4.92	99.88	4.3	31	4.6	13	3580	20	19	23	112	8	<10	927
37.1	98.29	<0.5	<5	<0.5	<1	5	<10	<1	<1	2	<1	<10	4
	88.21												
		20.5	111	19	96	8190	30	935	8550	7120	9	<10	7150