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Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Geological, Geochemical, Diamond Drilling

TOTAL COST: 96,255.77

AUTHOR(S): Andris Kikauka

SIGNATURE(S): A. Kikauka

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): 1641286

YEAR OF WORK: 2017

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5676656

PROPERTY NAME: Longworth Silica

CLAIM NAME(S) (on which the work was done): Snow 1022943, Ultra 1023010

COMMODITIES SOUGHT: Silica

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 093H.038

MINING DIVISION: Cariboo

NTS/BCGS: 093H 14/W, 093H.093

LATITUDE: 53 ° 58 ' 48 " **LONGITUDE:** 121 ° 29 ' 30 " (at centre of work)

OWNER(S):
1) Jared Lazerson
2)

MAILING ADDRESS:
303-1080 Howe St
Vancouver, BC V6C 2T1

OPERATOR(S) [who paid for the work]:
1) same
2)

MAILING ADDRESS:
same

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
Silurian Nonda Fm high purity quartzite occurs as a 200-400 meter wide folded (double wide) synform trending west-northwest dipping steeply. There is considerable (Cretaceous?) thrust faulting and entire sequence is tilted and/or tectonically rotated High purity quartzite encountered in 3 diamond drill holes (total 186.08 m depth),average SiO_2 values =99.5%,impurities include trace muscovite & limonite, minor calcite (DDH17LW-2, 45-48 m), quartzite has 1-30% metamorphic, recrystallized qtz vn sweats

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: 14815

Next Page

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping	1:5000 12 hectares	Snow 1022943, Ultra 1023010	5,250.00
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil			
Silt			
Rock	65 ME-ICP06 Whole Rock	Snow 1022943	23,210.77
Other			
DRILLING (total metres; number of holes, size)			
Core	186.08 m, 3 diamond drill holes	Snow 1022943	67,795.00
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other			
		TOTAL COST:	96,255.77

NTS 093H 14/W, TRIM 093H.093
LAT. 53 58' 43" N
LONG. 121 29' 30" W

CORE DRILLING, GEOLOGICAL, & GEOCHEMICAL REPORT ON LONGWORTH MINERAL PROPERTY SNOW ZONE

SINCLAIR MILLS, BC
in proximity to:
PRINCE GEORGE, BC

Cariboo Mining Division

by

Andris Kikauka, P.Geo.
4199 Highway 101,
Powell River, BC V8A 0C7

36834

Dec 15, 2017

TABLE OF CONTENTS AND LIST OF FIGURES

LIST OF FIGURES

SUMMARY

The Longworth property is located about 80 kilometers east-northeast of Prince George, BC. The Longworth silica property consists of a total area of approximately 1,197.8 hectares (2,958.6 acres) located approximately 8 km (5 miles) east of CNR rail siding near Sinclair Mills and about 20 km (12 miles) east-southeast of McGregor, BC (Fig 1, 2). Nonda Formation quartzite is exposed on the southwest flank of Bearpaw Ridge. The quartzite beds exhibit minor faulting and folding. Quartzite bedding trends parallel to west-northwest trending ridge axis (sub-vertical dip), with jointing trends perpendicular and parallel to ridge axis (sub-vertical dip). The Nonda Fm high purity quartzite unit outcrops intermittently over a 20 km strike length at approximately 1,250-1,550 m elevation (Fig 3, 4). The Longworth property features 4 zones (each zone approximately 300 to 800 m strike length, collectively over 7,000 m strike length) of high purity silica zones referred to as 'Snow, Rain, Long & Doll' (Fig 2). Lower Silurian Nonda Fm white coloured quartzite is approximately 100-400 meters wide, trends northwest, dips steeply to the northeast, and outcrops prominently where numerous localized topographic highs occur on southwest facing slopes. Impurities in quartzite include trace amounts of limonite, calcite and muscovite along fractures and joints. Quartzite in the central portion of the Snow Zone exhibit pure white, northeast trending metamorphic quartz vein sweats, with en echelon pattern (sigmoidal) strain shadows. Metamorphic origin (re-crystallized) quartz veins exhibit sigmoidal strain shadows referred to as ladder veining. The observed sigmoidal texture is the result of deep burial re-crystallization subjected to extension-shortening stress-strain regime. Quartz veining is interpreted as syngenetic in origin, i.e. relatively pure sandstones (i.e. *Orthoquartzite*, a very pure quartz sandstone composed of usually well-rounded quartz grains cemented by silica), are subjected to metamorphism and partial melting (i.e. minor metamorphic re-crystallized vein quartz, not of hydrothermal origin).

In 2017, core drilling was performed by Neil's Mining (contract for MGX Minerals Inc) using a Longyear 28 wireline core drill (BTW diameter core). Yellowhead Helicopters A-Star helicopter was chartered to mobilize drill equipment and core mobilization. Geological descriptions and geochemical sampling of split core samples (3 meter sample intervals) were carried out, as well as geological mapping on the Snow Zone (lithology, alteration, & structure of Snow Zone surface & drill core), of the Longworth silica mineral property between August 16-September 2, 2017. Fieldwork is recorded in this assessment report, and reported as MEM Event number 5676656. A total of 186.08 meters total depth, BTW size core drilling done at 3 sites (DDH 17LW-1, 2 & 3, spaced approximately 50 meters apart) carried out on Snow Zone ridge at 1,551-1,558 meters elevation, described as follows:

DDH 17LW-1, 2 & 3 Location & Direction

DDH #	Zone Name	Easting NAD 83	Northing NAD 83	Elevation m	Elevation ft
17LW-1	Snow	595625	5985369	1558	5110.2
17LW-2	Snow	595675	5985335	1551	5087.3
17LW-3	Snow	595725	5985283	1552	5090.6

DDH #	Zone Name	Azimuth	Dip	Depth ft	Depth m
17LW-1	Snow		-90	226.5	69.04
17LW-2	Snow	205	-75	169	51.51
17LW-3	Snow	205	-70	215	65.53

Geological mapping outlines the surface trace of high purity quartzite a 200 meter wide X 500 meter long area referred to as 'Snow Zone' (Fig 5, & 6). The diamond drill holes were collared in the central portion of the Snow Zone along a ridge top on solid bedrock. Rock samples were analyzed by ALS Minerals, North Vancouver, BC, using modified Prep 31 (& Pul 33): a special tungsten carbide ring pulverization disc was used versus chrome steel pulverization disc, in order to minimize iron contamination, and finished using whole rock analysis fused bead lithium borate fusion method (ME-ICP-06, Appendix A, & B). Standards and blanks (CDN Resource Lab Ltd) were inserted to sample stream for QC/QA purposes. The quartzite in drill holes 17LW-1, 2, & 3 was variably fractured and faulted (Fig 7, 8, & 9). Drill holes 17LW-1, 2, & 3, overall recoveries were good (>97% core recovery), but the fracture zones were numerous and DDH 17LW-1 was the only hole that ended in relatively high RQD (rock quality designation) values. The quartzite, especially where fractured, wore out the matrix of the diamond drill bits and made drilling with BTW core size not the optimum core diameter. Future core drilling requires large volumes of barite mud additive, and the start of the hole is recommended HQ core diameter with reduction to NQ2, as well as a larger more powerful core drill (e.g. Hydracore 2000, Hy-Tech JKS-300). The core from DDH 17LW-1, 2, & 3 was logged and stored at end of Boulder FSR km 9 (UTM Zone 10, 593,517 E, 5,985,864 N, 1,067 m elev, Lat 54.012581 N, Long -121.57286 W, Lat 54 00' 45.29" N, Long 121 34' 22.31" W). The logging of core identified a prophryblast metamorphic re-crystallized quartz texture in the center of DDH 17LW-1, and near the start of DDH 17LW-3. The quartz porphyryblasts are 0.1-1.5 cm (metamorphic origin) re-crystallized subhedral habit, quartz clots. Where porphyryblast texture is prevalent, there is no metamorphic en echolon pattern (sigmoidal) quartz veining. The porphyryblast texture in quartzite is minor in volume and most of the quartzite is cut by pure white quartz veins (metamorphic quartz sweats). Variation of texture does not appear to affect whole rock geochemical analysis results, as major oxide analysis results of split diamond drill core samples taken from DDH 17LW-1, 2 & 3 Longworth Snow Zone average 99.5% SiO2/Total from top to bottom of all 3 holes (except DDH 17LW-2 45-48 m depth, 3% calcite 0.1-2 cm veins). This table shows the consistent grade of 99.5% SiO2/% Total in DDH 17LW-1, 2, & 3.

DDH 17LW-1, 2 & 3 Snow Zone

DDH	From (m)	To (m)	Interval (m)	SiO2	Al2O3	Fe2O3	Na2O	K2O	LOI	Total	SiO2/Total
1	0.6	69.04	68.44	98.92	0.12	0.05	0.07	0.07	0.12	99.41	99.5
2	0.2	45	44.8	99.41	0.18	0.06	0.05	0.09	0.07	99.94	99.45
3	0.3	65.53	65.23	98.8	0.21	0.06	0.01	0.07	0.06	99.3	99.51

The 2017 drill results are consistent with 99.5% SiO2/% total average results from 2015 & 2106 Snow Zone surface rock chip samples (3 meter width) taken by MGX Minerals Inc.

Based on the range of relatively high purity %SiO2 and relatively low impurity values such as Al2O3, Fe2O3, MgO, CaO, Na2O, K2O, it is possible that the Longworth quartzite silica is suitable for use as a raw material for ferrosilicon production as well as other high purity uses (e.g. silicon metal for solar energy use). Based on relatively high silica content (95.5% SiO2/%Total), from geochemical analysis of Longworth Snow Zone drill core and surface rock sampling, MGX Minerals is planning further evaluation of commercial applications for Longworth silica. The Longworth Snow Zone (200 X 500 m area, to a depth of approximately 80 m) has potential for the development of a high purity quartzite deposit (in the order of several million tonnes of high purity silica). The Snow Zone is centered on a WNW trending ridge crest where it is best exposed between 1,500-1,565 meters elevation (MTO tenure number 1022943 & 1023010, Fig 5, & 6).

1.0 Introduction

This technical report has been prepared on behalf of MGX Minerals Inc, and describes property history and core drilling, geological and geochemical fieldwork performed on the Longworth Silica mineral occurrence in August-September, 2017.

British Columbia has not been a major producer of silica. Some quartz, especially from veins, has been used as a flux in smelter operations. The Gypo quartz vein near Oliver produced about 600,000 tonnes of quartz up to 1968 when the main mining operations ceased. Most of this material was used in the building industry and to produce ferrosilicon. In more recent years a significant amount of production has taken place from the Moberly Mountain and Hunt deposits, in quartzite of the Mount Wilson Formation, near Golden. Silica sand from the Moberly Mountain deposit is sold for a variety of uses. Quarrying was begun in 1980 and the 1984 production was 85,000 to 90.000 tonnes. The Hunt deposit has produced intermittently since 1980 at approximately 30,000 tonnes per year, with much of the product being shipped to a ferrosilicon plant in Wenatchee, Washington. Some of the fines have been used by cement producers in British Columbia and Alberta.

2.0 Location, Access, Infrastructure, & Physiography

The property is located on NTS map sheet 093H/14W and on TRIM map sheet 093H093. The Longworth Silica occurrence is located at latitude 53°58' 48" N and longitude 121°29' 30" W. The property covers a series of northwest trending ridges of relatively pure quartzite (found over a range of 1,300-1,565 m elevation) that are located between Bearpaw Ridge (1,700-1,850 m elevation) to the NE and CNR rail line (650 m elevation) to SW.

The Longworth property is located in the Cariboo Mining Division of central British Columbia, Canada. The Longworth Silica property encompasses a 2 X 8 kilometer area aligned with northwest trending topography, located roughly 85 km east-northeast of Prince George, B.C., and approximately 30 km northwest of the property lies the community of Upper Fraser, while the community of Sinclair Mills is located roughly 10 km west of the property (Fig. 1).

From Prince George the property can be accessed by travelling east on Highway 16 for approximately 30 km, and then north and westward for 50 km on Upper Fraser Road (Fig. 1). Upper Fraser Road crosses Fraser River at McGregor and continues southeast for 30 km to Longworth, running parallel to Fraser River. From Upper Fraser Road, property access is by way of logging roads and internal access was by 4WD vehicle on Boulder FSR logging road to Km 9, and follow 2 km access trail that starts at 593,950 E, and 5,985,390 N, elevation 1,090 meters (Fig. 5). Alternate access is via helicopter from Prince George base. Access is affected by ecologically sensitive cariboo habitat and restrictions apply. MGX Minerals has retained a Professional Biologist to assess cariboo habitat and ecology.

The CNR main cross Canada rail line runs parallel to Upper Fraser Road and is located less than 4 km from the Property (Fig 1, 3, & 3B). Roughly 75 km northwest of the property, the main 500 kV transmission lines from the Peace River Hydro Power Project run through the region.

Topography in the Prince George region is characterized by rolling hills separated by swamps. The most prominent topographical feature on the Longworth Silica Property is 1,840 meter elevation Bearpaw Ridge which flattens to 1,650 meters elevation to the northwest. The Property is situated on the southwestern flank of Bearpaw Ridge; topography on the Property ranges from 1,060 m in the southwest corner to 1800 m in the northeast. Vegetstion on top of and along the flanks of Bearpaw Ridge consists predominantly of tall spruces, along with some alder. There is a distinct black lichen that forms exclusively on the Longworth quartzite. It is a diagnostic thin black coloured vegetation that also occurs in quartzite of the Mount Wilson Formation (Golden Mining Division). Shrubs, including Devil's Club, are abundant along drainages. The climate in the region is temperate, reaching extremes of 34 degrees C in summer and -50 degrees C in winter. Precipitation is variable and dependent on elevation. Mean annual precipitation ranges from 44 to 90 cm. Snow can be expected in late October or early November and remains until April or May. Total accumulations of snowfall in the region averages 240 om, with higher accumulations on Bearpaw Ridge due to its elevation. Topography is moderate except locally steep, NW trending cliffs with maximum dimensions of 5 m (16.5 ft) in height occur in the vicinity of the Longworth property Snow, Rain, Long and Doll Zones. Elevations on the claim block range from 960 to 1,800 meters (3,149-5,094 feet).

Quartzite weathers prominently and the Longworth silica deposit is well exposed at 1,250-1,550 meter elevation, as a series of NW trending ridge crests within relatively low valley bottom topography. A series of northeast trending, cross-cutting fracturing/jointing has resulted in some small scale offsets (in the order of several meters) of geologic contacts.

The nearest towns are Sinclair Mills and McGregor on Upper Fraser Road where the CNR rail line with sidings can provide transportation link to markets. The nearest population center with significant services is Prince George which has suitable infrastructure to support mining and mineral processing.

3.0 Property Status

The Longworth silica property consists of a total area of approximately 1,197.8 hectares (2,958.6 acres) located approximately 8 km (5 miles) east of CNR rail siding near Sinclair Mills and about 20 km (12 miles) east-southeast of McGregor, BC (Fig 1, 2). Property status data obtained from MTO website indicates the Longworth property is registered 100% to Jared Lazerson (Free Miner Certificate number 249963) on behalf of MGX Minerals Inc. The Longworth silica claims consists of fifteen (15) mineral tenures (listed below) located within the Cariboo Mining Division (Figure 2).

Longworth Property List of MTO Mineral Tenures

Tenure number	Claim Name	Issue Date	Good To Date	Area in hectares
1022782	Silver Standard Silica #2	2013/oct/03	2025/apr/12	380.36
1022943	Snow	2013/oct/11	2025/apr/12	38.01
1022944	Rain	2013/oct/11	2025/apr/12	114.08
1022945	Snowjob	2013/oct/11	2025/apr/12	76.03
1022946	Big Snow	2013/oct/11	2025/apr/12	38.01
1022947	Lookout	2013/oct/11	2025/apr/12	19.01
1023010	Ultra	2013/oct/12	2025/apr/12	95.02
1023011	Sinclair Silica	2013/oct/12	2025/apr/12	19.01
1023075	Silicon 11	2013/oct/15	2025/apr/12	152.16
1023094	$$$Silicapitrd	2013/oct/16	2025/apr/12	19.01
1023096	Max'ssilica	2013/oct/16	2025/apr/12	19.01
1023101	Realrain1&2	2013/oct/16	2025/apr/12	19.01
1023102	Silicastarridge	2013/oct/16	2025/apr/12	19.01
1023103	Silex	2013/oct/16	2025/apr/12	19.01
1023122	Superflux	2013/oct/17	2025/apr/12	57.03

The total area of the mineral tenures that comprise the property is 1,197.8 hectares (2,958.6 acres). Details of the status of tenure ownership for the Longworth Silica property were obtained from the Mineral-Titles-Online (MTO) electronic staking system managed by the Mineral Titles Branch of the Province of British Columbia. This system is based on mineral tenures acquired electronically online using a grid cell selection system. Tenure boundaries are based on lines of latitude and longitude. There is no requirement to mark claim boundaries on the ground as these can be determined with reasonable accuracy using a GPS. The Longworth silica claim has not been surveyed. The mineral tenures comprising the Longworth Silica mineral property are shown in Figure 2. The claim map shown in Figure 2 was generated from GIS spatial data downloaded from the Government of BC GeoBC website. These spatial layers are the same as those incorporated into the Mineral-Titles-Online (MTO) electronic staking system that is used to locate and record mineral tenures in British Columbia.

4.0 Longworth Silica Property History

High purity quartzite was discovered in the Sinclair Mills and Longworth area in the 1970's by Consolidated Silver Standard Ltd. The Longworth tenures were first staked in 1974 by Consolidated Silver Standard Mines Limited (Silver Standard) for production of ferrosilicon and silicon metal. In 1981 Silver Standard carried out a two week blasting and sampling program (Quartermain, 1985).

In 1981 and 1982, the British Colombia Geological Survey Branch collected samples from four of the southeastern tenures and published analytical results for eight samples, which returned SiO_2 values between 98.76% and 99.40% (Foye, 1987). In 1985, Silver Standard carried out another program of blasting, trenching and sampling. In addition to the geochemical analysis of these samples, some material was also sent to the University of British Colombia Metallurgical Engineering Lab for thermal shock testing. The samples yielded favourable results, with some exceeding Silver Standard's metallurgical grade specifications for raw quartzite, SiO_2 99.5%, Al_2O_3 0.25%, Fe_2O_3 0.10%, CaO nil, and L.O.I, 0.20% (Quartermain,1985). Some of these samples were collected from within MGX's current tenures (Rain and Snow Zones). Thermal breakdown testing by Consolidated Silver Standard was performed on 4" X 4" X 4" sized samples from Snow, Rain, Doll & Long Zones was reported in AR 14,815 (Quartermain, 1985). Thermal tests performed on 16 samples of quartzite in 1985 displayed cracking in all samples at both 1,000 and 1,300 degree temperatures over a 2 hour period. Based on breaking into numerous pieces, a total of 4 samples from the Snow Zone were considered not acceptable, out of 16 total samples tested at UBC Engineering Dept ceramic lab, reported in AR 14,815, Table 2 (Quartermain, 1985).

In 2007, Card JM Resources Inc staked 38 tenures surrounding the Silver Standards Longworth tenures. In 2008, a vertical drill hole was drilled to a depth of 100.6 m on Tenure 559360, then logged and assayed. Three composite samples (roughly 100 ft. each) yielded silica values between 97.90% and 98.83% (Duncan and Childs, 2008).

The Longworth Silica Property, was acquired by Zimtu Capital Corp. (Zimtu) in 2013 covering zones of high purity Nonda Formation quartzite. Dahrouge Geological Consulting (Dahrouge) and Zimtu carried out prospecting and sampling on the Longworth mineral property in 2014.

Quartzite outcrops were mapped and 2 surface samples were collected from the property. In 2014, Dahrouge and Zimtu conducted a prospecting program within the Longworth Silica Property. A total of 2 hand samples were examined and collected from the northern end of the Longworth Silica Property along Bearpaw Ridge. The samples were collected from within outcrops of Nonda Formation white quartzite.

In 2015, MGX Minerals Inc performed geological mapping and geochemical sampling of the Snow Zone. Results from 2015 fieldwork confirmed the presence of high purity quartzite in the northwest portion of the Snow Zone, with better grade of silica in the core area of the Snow Zone which also forms a resistant and competent, topographic high.

Table 6: Rock chip samples taken in 2015 by MGX Minerals from the Snow Zone are summarized as follows:

Sample ID	% SiO2	% Fe2O3	% CaO	% MgO	% Al2O3	% Na2O	% K2O	% LOI	%Total
901	98.9	0.04	0.03	0.04	0.44	0.03	0.14	0.21	99.85
902	99.1	0.02	0.02	0.01	0.14	0.03	0.04	0.08	99.45
903	99.5	0.02	0.01	0.01	0.13	0.04	0.04	0.09	99.85
904	99.4	0.04	0.01	0.01	0.11	0.04	0.03	0.04	99.7
905	99.3	0.02	0.01	0.01	0.13	0.05	0.04	0.06	99.63
906	99.2	0.02	0.01	0.01	0.12	0.05	0.03	0.11	99.56
907	99.6	0.03	0.01	0.01	0.27	0.01	0.06	0.23	100.24
908	99.9	0.03	0.01	0.01	0.14	0.06	0.04	0.07	100.27
909	99.8	0.03	<0.01	0.01	0.17	0.01	0.05	0.15	100.23
910	98.7	0.03	0.01	0.02	0.4	0.07	0.13	0.18	99.56

Samples 901-910 are all 300 centimeter outcrop chip channel

In 2016, MGX Minerals submitted quartzite samples to Kemetco Research Inc, Richmond, BC, in order to perform thermal shock tests described as follows: A quartz sample (approximately 4"x4"x4', 10.2 X 10.2 X 10.2 cm) was placed in a furnace which has been preheated to 600℃. The temperature was then raised to 1000℃ over a period of 2 hours. At the end of this 2-hour period, the sample was observed in the furnace and if the sample has cracked apart the test was terminated and the quartz was not accepted. For the sample still in one piece, the test was continued by raising the temperature to 1300℃ over another 2 hour period. At the end of this two hours period, the sample was removed from the furnace and cooled down to room temperature. The sample was examined again and the results were tabulated.
exposed on the west and southwest facing slopes of Bearpaw Ridge.

In addition to whole geochemical analysis of rock chip samples, a total of four large blocks of high purity quartzite were tested for thermal breakdown at Kemetco Research Inc, Richmond BC. Samples of quartzite for thermal breakdown tests were selected on competence, pure white colour, and size exceeding 10.2 cm squared. Three of the four samples for thermal tests are from the west portion of the Snow Zone at 1,546-1,564 m elevation. A single sample for thermal breakdown was taken from the Rain Zone.

Previous thermal breakdown testing of Snow, Rain, Doll & Long Zones was reported in AR 14,815 (Quartermain, 1985). Thermal tests performed on 16 samples of quartzite in 1985 displayed cracking in all samples at both 1,000 and 1,300 degree temperatures over a 2 hour period. Based on breaking into numerous pieces, a total of 4 samples from the Snow Zone were considered not acceptable, out of 16 total samples tested at UBC Engineering Dept ceramic lab, reported in AR 14,815 (Quartermain, 1985).

Thermal shock tests performed by Kemetco Research Inc on 2016 sampling of Snow Zone indicated some cracking occurred upon 2 hour exposure to 1,000 and additional 2 hour exposure at 1,300 degree centigrade temperature in test oven. 1 of the 3 rock samples (# 902), fractured into 2 pieces at 1,000 degrees C and is considered not suitable for ferrosilicon. 2 out of 3 rock samples (# 901 & 903), exhibited 1 crack after 2 hour exposures to 1,000 and 2 hours exposure at 1,300 degree centigrade temperature in oven, and are considered probable and likely suitable for ferrosilicon. The 1 piece tested on the Rain Zone withstood 2 hour exposure to 1,000 and additional 2 hour exposure at 1,300 degree centigrade temperature in test oven with only 1 large crack, but fractured into 4 pieces after cooldown, and is considered possible (but not likely) suitable for ferrosilicon production.

In 2016, Geochemical sampling was carried out on exposed surface bedrock of SE extension of Snow Zone & NW extension of Rain Zone. These zones of high purity quartzite lithology are located in close proximity to historic surface sampling and trenching performed by Consolidated Silver Standard Mines Ltd in 1986. A total of 11 rock chip samples were collected from surface outcrop from an area of approximately 150 X 50 meters covering the SE portion of the Snow Zone, and a 300 X 50 m area covering the NW portion of the Rain Zone. Major oxide analysis results of 11 rock chip samples taken from the Longworth Rain & Snow Zone are listed as follows:

Rain & Snow Zone 2016 Rock Chip Sample ME-ICP06 Geochemical Analysis Results:

Sample ID	Zone name	% SiO2	% Fe2O3	% CaO	% MgO	% Al2O3	% Na2O	% K2O	% LOI	%Total
1615	Rain NW	99.1	0.04	<0.01	0.04	0.27	0.01	0.1	0.18	99.77
1616	Rain NW	100	0.03	<0.01	0.02	0.23	0.01	0.08	0.18	100.57
1617	Rain NW	98.9	0.03	<0.01	0.01	0.17	0.01	0.09	0.08	99.31
1618	Rain NW	99.7	0.03	<0.01	0.02	0.21	0.01	0.08	0.11	100.19
1619	Rain NW	97.6	0.03	<0.01	0.02	0.26	0.01	0.23	0.1	98.28
1620	Rain NW	97.4	0.03	<0.01	0.05	0.71	0.01	0.24	0.21	98.71
1621	Rain NW	99.2	0.03	<0.01	0.01	0.22	0.01	0.11	0.1	99.71
1622	Rain NW	98.2	0.04	<0.01	0.01	0.21	0.01	0.12	0.06	98.69
1651	Snow SE ext	98.5	0.06	<0.01	0.01	0.13	0.01	0.07	0.05	98.85
1652	Snow SE ext	97.7	0.03	<0.01	0.01	0.27	0.01	0.12	0.07	98.24
1653	Snow SE ext	100	0.03	0.01	0.01	0.14	0.02	0.06	0.13	100.41

Average values from 8 Rock Chip Samples, NW Rain Zone, Geochemical analysis by ALS Minerals Whole Rock ME-ICP06:

%SiO2	%Fe2O3	%CaO	%MgO	%Al2O3	%K2O	%LOI	%TOTAL	%SiO2/ %Total
98.8	0.03	0.01	0.02	0.285	0.06	0.127	99.4	99.39

Average values from 3 Rock Chip Samples, SE Snow Zone Geochemical analysis by ALS Minerals Whole Rock ME-ICP06:

%SiO2	%Fe2O3	%CaO	%MgO	%Al2O3	%K2O	%LOI	%TOTAL	%SiO2/ %Total
98.73	0.04	0.01	0.01	0.18	0.08	0.08	99.17	99.56

The Snow Zone has relatively higher SiO2 content (% SiO2/%TOTAL=99.56%) than the Rain Zone (% SiO2/%TOTAL=99.39%). The Snow Zone also is exposed on a ridge crest over 200 meters width and 500 meter strike length, whereas the Rain Zone outcrops intermittently over approximately 50-100 meters variable width along 600 meter strike length. The Rain Zone is exposed on the west and southwest facing slopes of Bearpaw Ridge.

5.0 Regional Geology

The region is dominated by Upper Proterozoic and Paleozoic sedimentary and metamorphic rocks separated by a series of northwest-southeast trending faults. In general, the Upper Proterozoic succession is represented by a clastic-dominated sequence on a carbonate shelf environment lying directly on top of Archean and Proterozoic crystalline basement (Lickorish, 1993). This sediment sequence is related to Upper Proterozoic rifting along the western North American margin (Lickorish and Simony, 1995). Overlying the Proterozoic clastics, the Paleozoic deposits, which thicken westwards from southwest Alberta to northeastern British Colombia, represent the shallow water carbonates passing to the west to deep water slope and basinal facies of the Canadian Cordillera passive margin (Pyle and Barnes, 2003). Lithological units and stratigraphy in the area of Longworth Silica are described as follows:

Miette Group

The oldest rocks in the area are that of the Proterozoic Miette Group. The Miette Group can be divided in three separate units (Lickorish, 1993). The lowermost unit is made up of recrystallized dolomite and limestone. The middle unit is comprised of a thick package (2 km) of coarse sandstone and conglomerate, with minor slate. The uppermost unit of the Miette Group is a thin package of black argillites (Taylor, 1971). The metamorphosed equivalent of the Miette Group was classified as the Misinchinka Group by Stott and Taylor (1979), and generally consist of quartzite, schist, slate and phyllite metamorphosed to greenschist grade.

Gog Group

Overlying the Miette Group is the Lower Cambrian Gog Group, which consists of 1 – 2 km of thick-bedded quartzites with minor interbedded shale and limestone (Lickorish, 1993). Similar to the Miette Group, the Gog Group can be sub-divided into three distinct units, with the lower quartzites of the McNaughton Formation being separated from the upper quartzites of the Mahto Formation by the middle shale and limestone unit of the Mural Formation.

Kaza Group

The Kaza Group, which is more prominent in the Kaza Mountain area roughly 150 km southeast of Prince George, is comprised of alternating gritty micaceous quartzites and schists, regionally metamorphosed to greenschist facies (Sutherland Brown, 1963). Although reported to be roughly 3.5 km thick, only 1.75 km is exposed at Kaza Mountain itself.

Cariboo Group

The Cariboo Group, with an estimated thickness of 3 km, is comprised of phyllites, micaeous quartzites, and limestones. It is divided into six separate formations, the Issac (grey phyllites), Cunningham (medium-grey thickly bedded limestone), Yankee Bells (light grey-green phyllites and minor fine quartzites), Yank's Peak (thick bedded pure quartzite with minor phyllite interbeds), Midas (dark grey to black phyllite, slate and argillite) and Snowshow Formation (coarse and fine clastics with minor carbonates) (Sutherland Brown, 1963).

Kechika Group

The Late Cambrian to Early Ordovician, Kechika Gronp, consists of ealcareous shale with light-grey to brown weathering, and limestone interbeds. It's lateral facies change represents a change in deposition from a platform to a broad gently dipping ramp (Pyle and Barnes, 2003). This formation thickens westward (400 – 1200 m) from the McDonald Platform to the Kechika Trough.

Skoki Formation

The Skoki Formation, locally recorded up to 1,000 m thick, is typically thick-bedded to massive, and consists of grey weathering dolostone, limestone and shale (Pyle and Barnes, 2003). In the Wilcox Pass area, Pyle and Barnes (2003) recognised two members of the Skoki Formation. The lower Sikanni Chief member is a 126 m thick succession of medium grey thin to thick bedded dolostone with discontinuous chert beds and stringers. The Upper Keily Member is a dark grey mottled massive lime mudstone. Overall, the Skoki Formation represents a shallow water platform succession and conformably overlies the Kechika Group.

Nonda Formation

The Nonda Formation, also a shallow water succession, consists of medium grey weathering, siliceous dolostone, dolomitic siltstone, sandstone and quartzite, with rare limestone beds. It is massive to thick-bedded, and is recorded as 335 m thick (Pyle and Barnes, 2003). The relatively pure white quartzite that occurs within the Nonda Fm is approximately 100-300 meters in width and laterally extensive in the Longworth area. The continuity of the quartzite is intermittent over a 20 kilometer strike length, and appears to have repeated sequence in areas of complex parallel northwest trending faults, and terminates to the southeast in a regional north trending fault.

Slide Mountain Group
The Slide Mountain Group, is represented in the region by the Mississippian Antler Formation. It is comprised of dark green-grey fine-grained basalt pillow lavas and thinly interbedded cherts and argillite. It has a thickness of 1 km at it's type locality, Slide Mountain, but has been reported to be thicker at Palmer Mountain (Sutherland Brown, 1963).

The Nonda Formation quartzite unit is extensive throughout the local area and forms a resistant unit located at 1,400-1,550 meters elevation. High purity quartzite (Snq) Silurian Nonda Formation quartzite occurs as outcrop with relatively strong topographic relief on the Snow Zone covering an area of approximately 500 meters strike length, and 200 meters wide. The Snow Zone white quartzite has an approximate width of 200 meters. The Rain Zone, where 2016 mapping took place is exposed on a sidehill and would be more difficult to access and develop. The Snow Zone forms a resistant ridge crest, and may be continuous quartzite to Rain Zone but intervening area does not have exposed bedrock. Silurian Nonda Fm quartzite has been metamorphosed by deep burial, and deformed by Late Cretaceous Laramide Orogeny, mountain building, and severe tectonic disruptive events (e.g. dextral displacement in the order of hundreds of kilometers along Rocky Mountain Trench), and subsequent Tertiary tectonic and thermal events. The widening of the Snow Zone quartzite from 50 to 200 meters in the central portion of the Snow Zone is postulated to be a result of Late Cretaceous/Tertiary folding (open, synform structure) and faulting (brittle failure, resulting in conjugate fractures, joints, gaps, cracks and caves). The widening may be a result of a fold hinge that has effectively doubled the width of the Nonda Fm quartzite. The main planes of weakness of quartzite in the Snow Zone are oriented WNW (paleo-stratigraphy trend) & NNE (fracture/joint trend), and both orientations have steep dips.

STRATIGRAPHIC UNITS OF LONGWORTH AREA (Sutherland-Brown, 1963):

Lower Carboniferous Slide Mountain Antler conglomerate, pillow basalts, bedded chert

Silurian – Nonda Fm dolostone, dolomitic siltstone, sandstone, quartzite

Middle Ordovician - Skoki dolostone, limestone, shale

Late Cambrian to Early Ordovician Kechika - calcareous argillites and argillites

Late Proterozoic to Ordovician?* Cariboo Snowshoe clastics with minor carbonates
Midas phyllite, slate, argillite Yanks Peak quartzite with minor phyllite Yankee Bell phyllites and minor quartzite
Cunningham limestone Issac phyllites

Late Proterozoic Kaza - micaceous quartzites and schists

Late Proterozoic to Early Cambrian Gog Mahto quartzite Mural shale and limestone
McNaughton quartzite

Late Proterozoic Misichinka unnamed quartzite, schist, slate, phyllite (metamorphosed equivalent of Miette Group)

Proterozoic Miette Upper argillites Middle sandstone, conglomerate, slate Lower recrystallized dolomite and limestone

The Longworth Silica Property lies within the western margin of the Foreland Belt east of the the Rocky Mountain Trench. The Foreland Belt is fault-bounded to the Omineca Belt to the west, which covers the Prince George area. The rocks in this area have been folded and faulted during Mesozoic-Tertiary orogenic activity, with sheets of Proterozoic and Paleozoic rocks being thrust, imbricated in an eastward direction.

Regional mapping by the Geological Survey of Canada (Muller and Tipper, 1968), at a scale of 1 inch to 4 miles covering the area north and east of Prince George, has been superseded by that of Struik (1994). Struik (1989) indicates there are two strike-slip fault trends in the region One trend follows the McLeod Lake Fault Zone at approximately 160°. Movement along this feature is interpreted as mid-Tertiary. The other set includes the older northern Rocky Mountain Trench fault system, which trends approximately 140°. Glacial deposits of various types, exceeding 100 m in places, cover much of the area around Prince George, Upper Fraser and Longworth. As a result, outcrop exposure on the property is scarce and is limited to the high ridges of Bearpaw Ridge which run in a northwest direction, roughly parallel to the Fraser River. The Longworth Silica Property is underlain by Nonda Fm folded sequence of Lower Silurian carbonates, volcanics and quartzites. The primary target for high purity silica on the Property is the Silurian quartzite, which has been recorded in bands approximately 100-300 meters in width along the western flank of the Bearpaw Ridge, reaching a thickness of up to 400 m (Foye, 1987). It is described as pure, massive and homogenous, and is composed of well-sorted and well-rounded quartz grains averaging 0.5 mm in diameter (Quartermain, 1986). The carbonates and volcanics are comprised of dolostone, calcareous shale and volcanic greenstone fragmentals and flows. Brachiopods and corals occur in the carbonates of Bearpaw Ridge (Quartermain, 1986). Bedding in the area has been reported as trending northwest and steeply dipping (70-80°) to the northeast. The quartzite bands are slightly folded and faulted, and trace a synformal structure which opens to the northwest (Foye, 1987).

6.0 2017 Field Program

6.1 Scope & Purpose

The 2017 core drilling geological and geochemical sampling was carried out in order to evaluate mineral potential of the central portion of the Snow Zone, located in the northwest portion of Longworth Silica property in the area where quartzite is well exposed at 1,500-1,560 meter elevation above sea level, located on a west-flanking low relief, WNW trending shoulder ridge (sub-ordinate to Bearpaw Ridge). The data collected by core drilling will be used to evaluate a resource estimate and update NI 43-101 compliant technical reporting.

6.2 Methods and Procedures

Geological descriptions, geochemical sampling of split core samples, as well as geological surface mapping were carried out on the Snow Zone (lithology, alteration, & structure of Snow Zone surface & drill eore), of the Longworth silica mineral property between August 16- September 2, 2017. Fieldwork is recorded in this assessment report, and reported as MEM Event number 5676656. A total of 186.08 meters total depth, BTW size core drilling done at 3 sites Diamond drill hole 17LW-1, 2 & 3 are located on Snow Zone at 1,551-1,558 meters elevation (Fig 5. & 6). Geological descriptions are summarized in geological drill logs (Appendix C). Photos were taken before and after core splitting. A total of 62 split core samples were taken across 3 meter intervals from DDH 17LW-1, 17LW-2, and 17LW-3 (Appendix D- drill core geochemical record). Split core samples were taken with a screw vise splitter and consist of split 50% (half sampled, half returned & oriented in core box), drill core bedrock pieces forming a total weight ranging from 3-5 kgs for each 3 meter interval. The split diamond drill core (sampled continuously at 3 meter intervals the entire length of drill hole, was shipped to ALS Global (N Vancouver, BC) for whole rock geochemical ME-ICP06 analysis (at 3 meter intervals), in order to determine purity of quartzite, and impurities (e.g. calcite or muscovite).

Sample material was placed in marked poly ore bags, tagged and shipped to ALS Minerals, North Vancouver. Standards and blanks (from CDN Resource Lab Ltd, Langley, BC) were inserted every 15th sample into the sample stream for QC/QA purposes. The core from DDH 17LW-1, 2, & 3 was logged and stored at end of Boulder FSR km 9 (UTM Zone 10, 593,517 E, 5,985,864 N, 1,067 m elev, Lat 54.012581 N, Long -121.57286 W, Lat 54 00' 45.29" N, Long 121 34' 22.31" W).

ALS Minerals crushed better than 70% passing a 2 mm screen split and pulverized rock chip samples. A split of 250 grams is pulverized to better than 85% passing a 75 micron screen. The pulverizing ring was made from tungsten carbide and does not contain iron (prep code PUL33), in order to reduce contamination from iron. The sample pulp is analyzed using ALS Minerals Ltd ME-ICP-06 (ICP-06) Li borate flux major oxide whole rock geochemical analytical methods (Appendix B).

Geological mapping was carried out over 12 hectares of exposed qnartzite in the Snow Zone (Fig 4, & 5). Geological lithology changes were noted and mapped at a scale of 1:5,000 and based on the outline of quartzite outcrop the drill hole collars were selected and geology of drill core was compared to surface mapping. Diamond drill hole logs (geological descriptions, e.g. lithology, alteration, minerals, fault/fracture) are summarized in Appendix C.

6.3 Diamond Drill Core Geology, & Geochemistry

Based on geological mapping of the outline of Snow Zone quartzite, a total of 3 drill sites, were located near the center of the quartzite (spaced approximately 50 meters apart). Location and orientation data of 2017 core drilling is listed as follows|

DDH #	Zone Name	Easting NAD 83	Northing NAD 83	Elevation m	Elevation ft
17LW-1	Snow	595625	5985369	1558	5110.2
17LW-2	Snow	595675	5985335	1551	5087.3
17LW-3	Snow	595725	5985283	1552	5090.6

DDH #	Location	Description
17LW-1	Snow ridge	near helipad
17LW-2	Snow ridge	ESE of helipad
17LW-3	Snow ridge	ESE of helipad

DDH #	Zone Name	Azimuth	Dip	Depth ft	Depth m
17LW-1	Snow		-90	226.5	69.04
17LW-2	Snow	205	-75	169	51.51
17LW-3	Snow	205	-70	215	65.53

2017 core drilling was performed by Neil's Mining (contract for MGX Minerals Inc) using a Longyear 28 wireline core drill (BTW diameter core). Yellowhead Helicopters A-Star helicopter was chartered to mobilize drill equipment and core mobilization. Geological descriptions and geochemical sampling of split core samples (3 meter sample intervals) were carried out, as well as geological mapping on the Snow Zone (lithology, alteration, & structure of Snow Zone surface & drill core), of the Longworth silica mineral property. A total of 186.08 meters total depth, BTW size core drilling done at 3 sites (DDH 17LW-1, 2 & 3, spaced approximately 50 meters apart) carried out on Snow Zone ridge at 1,551-1,558 meters elevation (Fig 5, & 6).

Geological mapping outlines the surface trace of high purity quartzite a 200 meter wide X 500 meter long area referred to as 'Snow Zone' (Fig 5, & 6). The diamond drill holes were collared in the central portion of the Snow Zone along a ridge top on solid bedrock. Rock samples were analyzed by ALS Minerals, North Vancouver, BC, using modified Prep 31 (& Pul 33): a special tungsten carbide ring pulverization disc was used versus chrome steel pulverization disc, in order to minimize iron contamination, and finished using whole rock analysis fused bead lithium borate fusion method (ME-ICP-06, Appendix A, & B). Standards and blanks (CDN Resource Lab Ltd) were inserted to sample stream for QC/QA purposes. The quartzite in drill holes 17LW-1, 2, & 3 was variably fractured and faulted (Fig 7, 8, & 9). Drill holes 17LW-1, 2, & 3, overall recoveries were good (>97% core recovery), but the fracture zones were numerous and DDH 17LW-1 was the only hole that ended in relatively high RQD (rock quality designation) values. The quartzite, especially where fractured, wore out the matrix of the diamond drill bits and made drilling with BTW core size not the optimum core diameter. Future core drilling requires large volumes of barite mud additive, and HQ core diameter is recommended at the start of proposed drill hole, with reduction to NQ2, as well as a using a larger, more powerful core drill (e.g. Hydracore 2000, Hy-Tech JKS-300).

The core from DDH 17LW-1, 2, & 3 was logged, photographed before and after splitting and stored at end of Boulder FSR. The logging of core identified a prophryblast metamorphic re-crystallized quartz texture in the center of DDH 1,7LW-1, and near the start of DDH 17LW-3. The quartz porphyryblasts are 0.1-1.5 cm (metamorphic origin) re-crystallized subhedral habit, quartz clots. Where porphyryblast texture is prevalent, there is no metamorphic en echelon pattern (sigmoidal) quartz veining. The porphyryblast texture in quartzite is minor in volume and most of the quartzite is cut by pure white quartz veins (metamorphic quartz sweats). Variation of texture does not appear to affect whole rock geochemical analysis results, as major oxide analysis results of split diamond drill core samples taken from DDH 17LW-1, 2 & 3 Longworth Snow Zone average 99.5% SiO2/Total from top to bottom of all 3 holes (except DDH 17LW-2 45-48 m depth, 3% calcite 0.1-2 cm veins). This table shows the average grade of 99.45-99.51% SiO2/% Total in DDH 17LW-1, 2, & 3:

DDH 17LW-1, 2 & 3 Snow Zone

DDH	From (m)	To (m)	Interval (m)	SiO2	Al2O3	Fe2O3	Na2O	K2O	LOI	Total	SiO2/Total
1	0.6	69.04	68.44	98.92	0.12	0.05	0.07	0.07	0.12	99.41	99.5
2	0.2	45	44.8	99.41	0.18	0.06	0.05	0.09	0.07	99.94	99.45
3	0.3	65.53	65.23	98.8	0.21	0.06	0.01	0.07	0.06	99.3	99.51

Geochemical analysis results from Snow Zone 2017 core drilling are consistent with Snow Zone 2015 & 2016 surface rock chip samples (3 meter width).

7.0 Discussion of Results

Based on the range of relatively high purity %SiO2 and relatively low impurity values such as Al2O3, Fe2O3, MgO, CaO, Na2O, K2O, it is possible that the Longworth quartzite silica is suitable for use as a raw material for ferrosilicon production as well as other high purity uses (e.g. silicon metal for solar energy use, quartzite countertops). Based on relatively high silica content (95.5% SiO2/%Total), from geochemical analysis of Longworth Snow Zone drill core and surface rock sampling, the Longworth Snow Zone (200 X 500 m area, to a depth of approximately 80 m) has potential for the development of a high purity quartzite deposit (in the order of several million tonnes of silica). The Snow Zone is centered on a WNW trending ridge crest where it is best exposed between 1,500-1,565 meters elevation (MTO tenure number 1022943 & 1023010, Fig 5, & 6). MGX Minerals will be further evaluating metallurgical and thermal shock testing. and commercial applications for Longworth silica, focussing on the Snow Zone.

The geochemical analysis of quartzite from the Snow and Rain Zones compare favourably with other silica producers such as Moberly, Hunt and HCJ Properties near Golden, BC. Impurity compounds of interest (Al_2O_3, MgO, CaO, Fe_2O_3) approach specifcications required for producing ferrosilicon alloy, and other industrial applications. Manufacturers of glass and fiberglass have listed specifications for the purity of silica as follows:

Minimum and Maximum Values Specified for Silica Used in Glass & Fiberglass:

Silica	99.1 % minimum
Calcium Carbonate	0.3 % maximum
Magnesium Carbonate	0.3 % maximum
Iron Oxides	0.3 % maximum
Aluminum Oxides	0.3 % maximum

Whole rock geochemical analysis of Longworth Snow and Rain Zone high purity quartzite is within the specifications for minimum SiO_2, and maximum $CaCO_3$, $MgCO_3$, Fe_2O_3 & Fe_3O_4, Al_2O_3 for use in industrial glass products.

The Longworth silica deposit has potential to contain several million tonnes of near surface high purity quartzite in the range of 99.0-99.5% SiO_2. In order to assess marketability and technical requirements of quartzite, further metallurgical testing is required to determine the viability of using the raw material for production of ferrosilicon. Additional metallurgical testing would include thermal shock testing of large, 20-25 cm (3-4 kilogram) sized pure quartzite blocks. A program of core drilling is proposed to determine the vertical extent of the quartzite to a depth of 50-100 meters and covering the 200 X 500 meter surface area of the Snow Zone. Ideally, 50-100 meter deep exploration drill holes should be spaced at 50 meter intervals, with -60 degree dip, and azimuth directed in a southeast direction in order to cut the dominant fracture/jointing pattern. Core samples in the order of 3 meter interval lengths should be reported with whole rock geochemical analysis and composite samples of 20 meter length should be applied for metallurgy test runs.

8.0 Conclusion

Reviewing available data, the writer offers the following interpretations & conclusions. The Longworth quartzite is a significant silica resource, comparing favourably in size with other deposits in BC e.g. Moberly Mountain, Hunt, & HCJ.

Access to the property is relatively good with a reasonable access road connecting Longworth Silica. There is good infrastructure in the form of a paved highway, CNR rail line and major powerline all of which are located in close proximity to the property.

Silurian Nonda Formation sandstone, shale, carbonate sedimentary sequence and intercalated volcanic rocks have been subjected to regional metamorphism (heat and pressure from deep burial during Cretaceous orogeny events, and subsequent erosion) has resulted in recrystallization of the sediments into quartzite, greenstone and other metamorphic equivalents.

The Longworth property features exposed Nonda Formation silica bearing quartzite lithology that follows a segmented ridge crest that strikes northwest, and dips sub-vertically. Quartzite exposed along the crest of the ridge is accessible by logging roads to 1,150 m elevation, and a 2 km foot trail to 1,500 m elevation gives aecess to the northwest end of the Snow Zone. The orientation of the deposit along the crest of a ridge is amenable to open pit mining with a relatively low stripping ratio. The grade of 99.5% SiO2/% total in DDH 17LW-1, 2, & 3, geochemical analysis results from Snow Zone 2017 core drilling are consistent with Snow Zone 2015 & 2016 surface rock chip samples (3 meter width).

9.0 Recommendations

Based on the range of relatively high purity %SiO2 and relatively low impurity values such as MgO, CaO, Na2O, K2O and Fe2O3, it is possible that the Longworth quartzite silica is suitable for use as a raw material for ferrosilicon production as well as other high purity uses. Based on relatively high geochemical analysis results for SiO2 from rock chip sampling on the Snow & Rain Zone in 2016, MGX Minerals is planning further evaluation of commercial applications for Longworth silica. The Longworth Snow Zone has potentiai for the development of a high purity quartzite quarry centered on the ridge crest where it is best exposed. The Snow Zone is recommended for core drilling (1,000 m total), and geochemical analysis (in order to determine grade and tonnage). Thermal breakdown tests such as Hanover Drum Test of the core area of the Snow Zone is also recommended.

Future exploration and development of Longworth Silica should be focused on defining the extensions of known quartzite formations of primarily the Snow Zone and secondarily of the Rain Zone. In order to outline exploration and development of Longworth property zones of high purity quartzite, geochemical data should be collected from the Snow, Rain, Long and Doll Zones, and can be used to interpret economics of projected cost vs benefit preliminary economic analysis of mining, mineral processing and marketing. Core drilling, geological mapping, and geochemical sampling is also recommended

Further metallurgical testing for use in ferrosilicon production and other end uses is warranted. Silicon production for the Aluminum or chemical market is another possible end use. The SiO2-reactivity test, also known as the Hanover drum test measures the thermal stability of quartz, and tests for the reducing agents is an important one for choosing the right material; improper material will reduce the effectiveness of the processing. For a feasible furnace operation, it is very important that the SiO_2 is stable in the lower furnace part. This property of thermal stability is tested by the Hanover drum test. Future detailed testing of deeper and less oxidized high purity quartzite outcrop of central Snow Zone using drum test method is recommended.

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CERTIFICATE AND DATE

I, Andris Kikauka, of 4199 Highway, Powell River, BC am a self-employed professional geoscientist. I hereby certify that:

1. I am a graduate of Brock University, St. Catharines, Ont., with an Honours Bachelor of Science Degree in Geological Sciences, 1980.
2. I am a Fellow in good standing with the Geological Association of Canada.
3. I am registered in the Province of British Columbia as a Professional Geoscientist.
4. I have practiced my profession for thirty five years in precious and base metal exploration in the Cordillera of Western Canada, U.S.A., Mexico, Central America, and South America, as well as for three years in uranium exploration in the Canadian Shield.
5. The information, opinions, and recommendations in this report are based on fieldwork carried out in my presence on the subject property during which time a technical evaluation consisting of geological core logging & mapping, surveying, geochemical core sampling carried during August and September, 2017
6. I have a direct interest in the Longworth Property and MGX Minerals Inc. The recommendations in this report cannot be used for the purpose of public financing.
7. I am not aware of any material fact or material change with respect to the subject matter of this Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
8. This technical work report supports requirements of BCEMPR for Exploration and Development Work/Expiry Date Change.

Andris Kikauka, P. Geo.,

A. Kikauka

December 15, 2017

ITEMIZED COST STATEMENT-
LONGWORTH GROUP OF ADJOINING MINERAL TENURES:
1022782, 1022943, 1022944, 1022945, 1022946, 1022947, 1023010, 1023011, 1023075, 1023094, 1023096, 1023101, 1023102, 1023103 & 1023122
FIELDWORK, SAMPLING PERFORMED August 16-Sept 2, 2017,
WORK PERFORMED ON MINERAL TENURES 1022943 & 1023010
CARIBOO MINING DIVISION, NTS 93H 14W (TRIM 093H 093)

FIELD CREW:

A. Kikauka (Geologist) 18 days (surveying, core logging)	$ 9,900.00
S. Apted (Geotechnician) 14 days (core handling, splitting, sampling)	4,410.00

FIELD COSTS:

Mob/demob/preparation	2,545.90
Meals and accommodations	1,481.20
Excavator (Kubota 161, 47 HP, 5,230 Kg) operator & rental (84 hours @ $160.00/hour)	13,440.00
Neil's Drilling Ltd (Burns Lk, BC) 3 X BTW core size, 3 drill holes total 186.08 meters, basic cost $125/meter	23,260.15
Core drilling, cost plus for diamond drill bits added to total cost of drilling	7,854.90
Helicopter charters (A-star, Yellowhead Helicopters Ltd) 13.3 hrs total	25,236.75
Truck mileage & fuel	2,705.10
Standards & Blanks (CDN Resource Lab Ltd, Langley, BC)	125,00
Niton XL3T-500 analyser rental 14 days	840.00
Shipping (Prince George, BC)	575.35
Li Borate Fusion ICP AES geochemical analysis (66 split core samples)	2,631.42
Report	1,250.00
Total=	**$ 96,255.77**

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www.alsglobal.com/geochemistry

To: **MGX MINERALS INC**
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 1-OCT-2017
Account: MGXMIN

Appendix A ALS Global Geochemical Analysis Certificate

CERTIFICATE VA17186466

Project: Longworth

This report is for 42 Drill Core samples submitted to our lab in Vancouver, BC, Canada on 1-SEP-2017.

The following have access to data associated with this certificate:

ANDRIS KIKAUKA	MGX MINERALS	

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-24	Pulp Login - Rcd w/o Barcode
LOG-22	Sample login - Rcd w/o BarCode
CRU-31	Fine crushing - 70% <2mm
SPL-21	Split sample - riffle splitter
PUL-33	Pulverise in Tungsten Carbide

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
OA-GRA08	Specific Gravity - Bulk Sample	WST-SEQ
ME-ICP06	Whole Rock Package - ICP-AES	ICP-AES
OA-GRA05	Loss on Ignition at 1000C	WST-SEQ
TOT-ICP06	Total Calculation for ICP06	ICP-AES

To: **MGX MINERALS INC**
ATTN: ANDRIS KIKAUKA
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

ALS Canada Ltd.

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To: **MGX MINERALS INC**
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 1-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17186466

Sample Description	Method Analyte Units LOR	WEI-21 Recvd Wt. kg 0.02	OA-GRA08 S.G. Unity 0.01	ME-ICP06 SiO2 % 0.01	ME-ICP06 Al2O3 % 0.01	ME-ICP06 Fe2O3 % 0.01	ME-ICP06 CaO % 0.01	ME-ICP06 MgO % 0.01	ME-ICP06 Na2O % 0.01	ME-ICP06 K2O % 0.01	ME-ICP06 Cr2O3 % 0.01	ME-ICP06 TiO2 % 0.01	ME-ICP06 MnO % 0.01	ME-ICP06 P2O5 % 0.01	ME-ICP06 SrO % 0.01	ME-ICP06 BaO % 0.01
1		2.76		98.7	0.14	0.05	0.06	0.02	0.05	0.09	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
2		3.56		97.7	0.11	0.03	0.03	0.01	0.04	0.10	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
3		4.42		99.5	0.13	0.03	0.02	0.01	0.01	0.02	0.01	0.02	<0.01	<0.01	<0.01	<0.01
4		4.30	2.64	97.9	0.19	0.03	0.02	0.02	0.05	0.10	0.01	0.04	<0.01	<0.01	<0.01	<0.01
5		4.76		99.7	0.14	0.04	0.01	0.01	0.01	0.02	0.01	0.03	<0.01	0.01	<0.01	<0.01
6		4.46		97.9	0.10	0.04	0.01	0.01	0.06	0.06	0.01	0.02	<0.01	<0.01	<0.01	<0.01
7		4.16		99.3	0.12	0.05	0.01	0.01	0.07	0.06	0.01	0.03	<0.01	<0.01	<0.01	<0.01
8		4.28	2.63	98.6	0.09	0.04	0.02	0.01	0.06	0.08	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
9		5.30		97.9	0.07	0.04	0.01	0.01	0.08	0.04	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
10		4.70		99.1	0.07	0.04	0.01	0.01	0.10	0.06	0.01	0.01	<0.01	<0.01	<0.01	<0.01
11		4.14		99.4	0.17	0.05	0.01	0.02	0.11	0.09	0.01	0.03	<0.01	<0.01	<0.01	<0.01
12		4.06	2.64	99.3	0.17	0.06	0.02	0.02	0.10	0.09	0.01	0.03	<0.01	<0.01	<0.01	<0.01
13		3.54		98.9	0.19	0.05	0.02	0.02	0.10	0.11	0.01	0.04	<0.01	<0.01	<0.01	<0.01
14		5.04		99.3	0.13	0.07	0.01	0.01	0.11	0.08	0.01	0.03	<0.01	<0.01	<0.01	<0.01
15		0.08		68.9	10.55	8.63	1.99	1.94	2.25	1.37	0.01	0.43	0.23	0.10	0.02	0.07
16		4.06	2.64	99.7	0.10	0.05	0.01	0.01	0.10	0.08	0.01	0.02	<0.01	<0.01	<0.01	<0.01
17		3.84		99.9	0.08	0.04	0.01	0.01	0.01	0.06	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
18		4.74		99.4	0.11	0.07	0.01	0.01	0.11	0.15	0.01	0.03	<0.01	<0.01	<0.01	<0.01
19		3.36		98.7	0.12	0.07	<0.01	0.01	0.01	0.05	0.01	0.03	<0.01	<0.01	<0.01	<0.01
20		4.70	2.65	99.2	0.13	0.05	0.01	0.01	0.11	0.08	0.01	0.02	<0.01	<0.01	<0.01	<0.01
21		4.70		99.4	0.12	0.03	0.01	<0.01	0.01	0.02	0.01	0.03	<0.01	<0.01	<0.01	<0.01
22		5.26		98.9	0.10	0.07	0.01	0.01	0.11	0.08	0.01	0.03	<0.01	<0.01	<0.01	<0.01
23		4.34		97.9	0.12	0.04	0.02	0.01	0.10	0.09	0.01	0.02	<0.01	<0.01	<0.01	<0.01
24		4.64	2.62	98.8	0.11	0.04	0.01	0.01	0.09	0.06	0.01	0.03	<0.01	<0.01	<0.01	<0.01
25		4.88		99.0	0.31	0.04	0.01	0.02	0.10	0.13	0.01	0.03	<0.01	<0.01	<0.01	<0.01
26		4.52		99.4	0.34	0.05	0.01	0.02	0.10	0.14	<0.01	0.03	<0.01	<0.01	<0.01	<0.01
27		4.84		98.9	0.23	0.05	0.01	0.02	0.10	0.17	0.01	0.03	<0.01	<0.01	<0.01	<0.01
28		4.46	2.63	99.1	0.14	0.06	0.01	0.01	0.09	0.08	0.01	0.02	<0.01	<0.01	<0.01	<0.01
29		4.30		99.4	0.16	0.05	0.01	0.01	0.07	0.09	0.01	0.03	<0.01	<0.01	<0.01	<0.01
30		0.42		46.2	14.15	13.05	9.31	9.95	3.00	1.00	0.06	1.99	0.17	0.03	0.06	0.04
31		4.54		99.9	0.20	0.17	0.04	0.05	0.02	0.08	0.01	0.03	<0.01	<0.01	<0.01	<0.01
32		5.48	2.64	100.0	0.14	0.04	0.02	0.02	0.01	0.05	0.01	0.02	<0.01	<0.01	<0.01	<0.01
33		5.10		99.2	0.19	0.03	0.01	0.02	0.07	0.11	0.01	0.02	<0.01	<0.01	<0.01	<0.01
34		4.84		99.7	0.13	0.03	0.01	0.01	0.07	0.08	0.01	0.02	<0.01	<0.01	<0.01	<0.01
35		4.34		98.4	0.19	0.04	0.02	0.02	<0.01	0.08	<0.01	0.03	<0.01	<0.01	<0.01	<0.01
36		4.20	2.64	99.9	0.19	0.05	0.01	0.02	0.07	0.11	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
37		3.38		99.9	0.16	0.06	0.01	0.01	0.01	0.05	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
38		3.52		99.6	0.13	0.21	<0.01	<0.01	0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
39		2.44		99.3	0.13	0.05	0.02	0.01	0.01	0.07	0.01	0.02	<0.01	0.01	<0.01	<0.01
40		3.24	2.63	99.5	0.13	0.04	0.02	0.01	0.01	0.06	<0.01	0.03	<0.01	0.02	<0.01	<0.01

***** See Appendix Page for comments regarding this certificate *****

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www.alsglobal.com/geochemistry

To: MGX MINERALS INC
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 1-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17186466

Sample Description	Method / Analyte / Units / LOR	OA-GRA05 LOI % 0.01	TOT-ICP06 Total % 0.01
1		0.21	99.34
2		0.24	98.28
3		0.14	99.89
4		0.16	98.52
5		0.14	100.12
6		0.12	98.33
7		0.11	99.77
8		0.16	99.08
9		0.11	98.28
10		0.23	99.64
11		0.17	100.06
12		0.21	100.01
13		0.11	99.55
14		0.06	99.81
15		4.10	100.59
16		0.06	100.14
17		0.05	100.18
18		0.10	100.00
19		0.06	99.06
20		-0.03	99.59
21		0.08	99.71
22		0.12	99.44
23		0.05	98.36
24		0.14	99.30
25		0.09	99.74
26		0.19	100.28
27		0.11	99.63
28		0.01	99.53
29		0.06	99.89
30		-0.24	99.07
31		0.10	100.60
32		0.00	100.31
33		0.00	99.66
34		0.03	100.09
35		0.06	98.84
36		0.00	100.37
37		0.19	100.41
38		0.24	100.23
39		0.20	99.83
40		0.18	100.00

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To: MGX MINERALS INC
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VANCOUVER BC V6Z 2T1

Finalized Date: 1-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17186466

Sample Description	Method Analyte Units LOR	WEI-21 Recvd Wt. kg 0.02	OA-GRA08 S.G. Unity 0.01	ME-ICP06 SiO2 % 0.01	ME-ICP06 Al2O3 % 0.01	ME-ICP06 Fe2O3 % 0.01	ME-ICP06 CaO % 0.01	ME-ICP06 MgO % 0.01	ME-ICP06 Na2O % 0.01	ME-ICP06 K2O % 0.01	ME-ICP06 Cr2O3 % 0.01	ME-ICP06 TiO2 % 0.01	ME-ICP06 MnO % 0.01	ME-ICP06 P2O5 % 0.01	ME-ICP06 SrO % 0.01	ME-ICP06 BaO % 0.01
41		2.94		95.2	0.29	0.10	1.64	0.65	0.02	0.07	<0.01	0.04	<0.01	0.01	<0.01	<0.01
42		3.58		99.7	0.20	0.03	0.01	0.01	0.02	0.06	0.01	0.02	<0.01	<0.01	<0.01	<0.01

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Finalized Date: 1-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17186466

Sample Description	Method Analyte Units LOR	OA-GRA05 LOI % 0.01	TOT-ICP06 Total % 0.01
41		2.27	100.29
42		0.22	100.28

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VANCOUVER BC V6Z 2T1

Finalized Date: 1-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17186466

CERTIFICATE COMMENTS

LABORATORY ADDRESSES

Processed at ALS Vancouver located at 2103 Dollarton Hwy, North Vancouver, BC, Canada.

Applies to Method:	CRU-31	LOG-22	LOG-24	ME-ICP06
	OA-GRA05	OA-GRA08	PUL-33	SPL-21
	TOT-ICP06	WEI-21		

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To: **MGX MINERALS INC**
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 7-OCT-2017
Account: MGXMIN

CERTIFICATE VA17194346

Project: Longworth

This report is for 24 Rock samples submitted to our lab in Vancouver, BC, Canada on 11-SEP-2017.

The following have access to data associated with this certificate:

ANDRIS KIKAUKA	MGX MINERALS	

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
CRU-31	Fine crushing - 70% <2mm
PUL-33	Pulverise in Tungsten Carbide
SPL-21	Split sample - riffle splitter

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
OA-GRA08	Specific Gravity - Bulk Sample	WST-SEQ
ME-ICP06	Whole Rock Package - ICP-AES	ICP-AES
OA-GRA05	Loss on Ignition at 1000C	WST-SEQ
TOT-ICP06	Total Calculation for ICP06	ICP-AES

To: **MGX MINERALS INC**
ATTN: ANDRIS KIKAUKA
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

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To: **MGX MINERALS INC**
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 7-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17194346

Sample Description	Method	WEI-21	OA-GRA08	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
	Analyte	Recvd Wt.	S.G.	SiO2	Al2O3	Fe2O3	CaO	MgO	Na2O	K2O	Cr2O3	TiO2	MnO	P2O5	SrO	BaO
	Units	kg	Unity	%	%	%	%	%	%	%	%	%	%	%	%	%
	LOR	0.02	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	0.01
43		3.64		99.0	0.28	0.05	0.02	0.03	0.01	0.07	0.01	0.04	<0.01	0.01	<0.01	<0.01
44		4.44		99.4	0.24	0.04	0.01	0.02	0.01	0.06	0.01	0.03	<0.01	0.01	<0.01	<0.01
45		Not Recvd														
46		4.22	2.59	98.8	0.09	0.03	<0.01	0.01	0.01	0.02	0.01	0.02	<0.01	0.01	<0.01	<0.01
47		5.26		99.1	0.11	0.05	0.01	0.01	0.02	0.04	0.01	0.02	<0.01	0.01	<0.01	<0.01
48		4.42		98.2	0.17	0.07	0.01	0.02	0.01	0.04	0.01	0.05	<0.01	<0.01	<0.01	<0.01
49		4.66		98.9	0.15	0.05	0.01	0.01	0.02	0.06	0.01	0.03	<0.01	0.01	<0.01	<0.01
50		2.96	2.64	99.4	0.14	0.05	0.01	0.01	0.02	0.06	0.01	0.03	<0.01	<0.01	<0.01	<0.01
51		3.14		97.7	0.13	0.06	0.01	0.01	0.01	0.04	0.01	0.03	<0.01	<0.01	<0.01	<0.01
52		4.40		99.6	0.15	0.06	0.01	0.01	0.01	0.05	0.01	0.03	<0.01	<0.01	<0.01	<0.01
53		3.54		98.3	0.14	0.07	0.01	0.01	0.01	0.04	0.01	0.03	<0.01	0.01	<0.01	<0.01
54		4.74	2.64	99.2	0.12	0.04	<0.01	0.01	0.01	0.04	0.01	0.02	<0.01	<0.01	<0.01	<0.01
55		4.36		98.2	0.18	0.04	<0.01	0.01	0.01	0.13	0.01	0.02	<0.01	0.02	<0.01	<0.01
56		3.48		99.8	0.40	0.06	0.03	0.03	<0.01	0.16	0.01	0.04	<0.01	<0.01	<0.01	<0.01
57		4.02	2.64	99.4	0.22	0.04	<0.01	0.02	0.01	0.08	0.01	0.02	<0.01	0.01	<0.01	<0.01
58		4.80		99.5	0.18	0.04	0.01	0.01	0.01	0.05	0.01	0.02	<0.01	<0.01	<0.01	<0.01
59		4.70		97.6	0.19	0.05	0.01	0.01	<0.01	0.06	0.01	0.02	<0.01	0.01	<0.01	<0.01
60		0.34		45.1	13.65	13.50	9.31	11.30	2.64	0.99	0.06	2.09	0.18	0.35	0.06	0.04
61		4.80		98.3	0.33	0.12	0.06	0.07	0.03	0.09	0.01	0.04	<0.01	0.01	<0.01	<0.01
62		5.04	2.64	99.8	0.19	0.06	0.02	0.02	<0.01	0.07	0.01	0.03	<0.01	<0.01	<0.01	<0.01
63		3.54		99.7	0.16	0.08	0.02	0.01	0.01	0.07	0.01	0.02	<0.01	<0.01	<0.01	<0.01
64		3.16		98.2	0.25	0.05	0.02	0.02	0.02	0.09	0.01	0.02	<0.01	<0.01	<0.01	<0.01
65		4.58		96.8	0.46	0.06	0.02	0.03	0.01	0.16	0.01	0.04	<0.01	<0.01	<0.01	<0.01
66		2.52	2.64	99.0	0.27	0.04	0.02	0.02	0.01	0.11	0.01	0.03	<0.01	<0.01	<0.01	<0.01

***** See Appendix Page for comments regarding this certificate *****

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To: **MGX MINERALS INC**
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 7-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17194346

Sample Description	Method / Analyte / Units / LOR	OA-GRA05 LOI % 0.01	TOT-ICP06 Total % 0.01
43		0.01	99.53
44		0.28	100.11
45			
46		0.00	99.00
47		0.07	99.45
48		0.14	98.72
49		0.04	99.29
50		0.05	99.78
51		0.00	98.00
52		0.02	99.95
53		0.09	98.72
54		0.00	99.45
55		0.09	98.71
56		0.01	100.54
57		0.07	99.88
58		-0.01	99.82
59		0.10	98.06
60		0.00	99.27
61		0.08	99.14
62		-0.09	100.11
63		0.02	100.10
64		0.10	98.78
65		0.18	97.77
66		0.14	99.65

***** See Appendix Page for comments regarding this certificate *****

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To: MGX MINERALS INC
303-1080 HOWE STREET
VANCOUVER BC V6Z 2T1

Finalized Date: 7-OCT-2017
Account: MGXMIN

Project: Longworth

CERTIFICATE OF ANALYSIS VA17194346

CERTIFICATE COMMENTS

LABORATORY ADDRESSES

Processed at ALS Vancouver located at 2103 Dollarton Hwy, North Vancouver, BC, Canada.

Applies to Method:	CRU-31	LOG-22	ME-ICP06	OA-GRA05
	OA-GRA08	PUL-33	SPL-21	TOT-ICP06
	WEI-21			

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Appendix B Longworth 2017 DDH Geochemical Analysis Methods and Procedures

WHOLE ROCK GEOCHEMISTRY

ME- XRF06

SAMPLE DECOMPOSITION

50% - 50% $Li_2 B_4 O_7$ - $LiBO_2$ (WEI- GRA06)

ANALYTICAL METHOD

X-Ray Fluorescence Spectroscopy (XRF)

A calcined or ignited sample (0.9 g) is added to 9.0g of Lithium Borate Flux (50 % - 50 % $Li_2 B_4 O_7$ - $LiBO_2$), mixed well and fused in an auto fluxer between 1050 - 1100°C. A flat molten glass disc is prepared from the resulting melt. This disc is then analysed by X-ray fluorescence spectrometry.

ELEMENT	SYMBOL	UNITS	LOWER LIMIT	UPPER LIMIT
Aluminum Oxide	$Al_2 O_3$	%	0.01	100
Barium Oxide	BaO	%	0.01	100
Calcium Oxide	CaO	%	0.01	100
Chromium Oxide	$Cr_2 O_3$	%	0.01	100
Ferric Oxide	$Fe_2 O_3$	%	0.01	100
Potassium Oxide	$K_2 O$	%	0.01	100
Magnesium Oxide	MgO	%	0.01	100
Manganese Oxide	MgO	%	0.01	100
Sodium Oxide	$Na_2 O$	%	0.01	100
Phosphorus Oxide	P_2O_2	%	0.01	100
Silicon Oxide	SiO_2	%	0.01	100
Strontium Oxide	SrO_2	%	0.01	100
Titanium Oxide	TiO_2	%	0.01	100
Loss On Ignition	LOI	%	0.01	100
	Total	%	0.01	101

NOTE: Since samples that are high in sulphides or base metals can damage Platinum crucibles, a ME- ICP06 finish method can be selected as an alternative method.

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SAMPLE PREPARATION PACKAGE

PREP- 31

STANDARD SAMPLE PREPARATION: DRY, CRUSH, SPLIT AND PULVERIZE

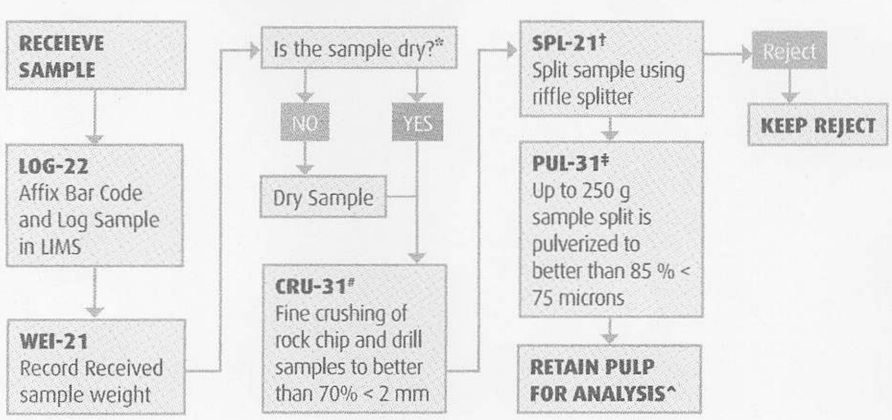
Sample preparation is the most critical step in the entire laboratory operation. The purpose of preparation is to produce a homogeneous analytical sub-sample that is fully representative of the material submitted to the laboratory.

The sample is logged in the tracking system, weighed, dried and finely crushed to better than 70 % passing a 2 mm (Tyler 9 mesh, US Std. No.10) screen. A split of up to 250 g is taken and pulverized to better than 85 % passing a 75 micron (Tyler 200 mesh, US Std. No. 200) screen. This method is appropriate for rock chip or drill samples.

METHOD CODE	DESCRIPTION
LOG-22	Sample is logged in tracking system and a bar code label is attached.
DRY-21	Drying of excessively wet samples in drying ovens. This is the default drying procedure for most rock chip and drill samples.
CRU-31	Fine crushing of rock chip and drill samples to better than 70% of the sample passing 2 mm.
SPL-21	Split sample using riffle splitter.
PUL-31	A sample split of up to 250 g is pulverized to better than 85% of the sample passing 75 microns.

PUL-33 Pulzerize in Tungsten Carbide (to avoid Fe contamination)

FLOW CHART - SAMPLE PREPARATION PACKAGE – PREP-31
STANDARD SAMPLE PREPARATION: DRY, CRUSH, SPLIT AND PULVERIZE



*If samples air-dry overnight, no charge to client. If samples are excessively wet, the sample should be dried to a maximum of 120°C. (**DRY-21**)

#QC testing of crushing efficiency is conducted on random samples (**CRU-QC**).

†The sample reject is saved or dumped pending client instructions. Prolonged storage (> 45 days) of rejects will be charged to the client.

‡QC testing of pulverizing efficiency is conducted on random samples (**PUL-QC**).

^Lab splits are required when analyses must be performed at a location different than where samples received.

DDH17LW-1 Drill Log Geological Description

ID #	ddh no	from (m)	to (m)	int. (m)	lithology	SiO2 %	Al2O3 %	CaO %	Fe2O3 %	RQD %
1	17 1	0.6	3	2.4	Nonda Fm orthoquartzite	98.7	0.14	0.06	0.05	41
2	17 1	3	6	3	Nonda Fm orthoquartzite	97.7	0.11	0.03	0.03	77
3	17 1	6	9	3	Nonda Fm orthoquartzite	99.5	0.13	0.02	0.03	70
4	17 1	9	12	3	Nonda Fm orthoquartzite	97.9	0.19	0.02	0.03	66
5	17 1	12	15	3	Nonda Fm orthoquartzite	99.7	0.14	0.01	0.04	68
6	17 1	15	18	3	Nonda Fm orthoquartzite	97.9	0.1	0.01	0.04	80
7	17 1	18	21	3	Nonda Fm orthoquartzite	98.3	0.12	0.01	0.05	53
8	17 1	21	24	3	Nonda Fm orthoquartzite	98.6	0.09	0.02	0.04	72
9	17 1	24	27	3	Nonda Fm orthoquartzite	97.9	0.07	0.01	0.04	80
10	17 1	27	30	3	Nonda Fm orthoquartzite	99.1	0.07	0.01	0.04	81
11	17 1	30	33	3	Nonda Fm orthoquartzite	98.4	0.17	0.01	0.05	70
12	17 1	33	36	3	Nonda Fm orthoquartzite	99.3	0.17	0.02	0.06	68
13	17 1	36	39	3	Nonda Fm orthoquartzite	98.9	0.19	0.02	0.05	18
14	17 1	39	42	3	Nonda Fm orthoquartzite	99.3	0.13	0.01	0.07	60
15		Std-1				68.9	10.55	1.99	0.03	
16	17 1	42	45	3	Nonda Fm orthoquartzite	99.7	0.1	0.01	0.05	60
17	17 1	45	48	3	Nonda Fm orthoquartzite	99.9	0.08	0.01	0.04	49
18	17 1	48	51	3	Nonda Fm orthoquartzite	99.4	0.11	0.01	0.07	54
19	17 1	51	54	3	Nonda Fm orthoquartzite	98.7	0.12	<0.01	0.07	22
20	17 1	54	57	3	Nonda Fm orthoquartzite	99.2	0.13	0.01	0.05	80
21	17 1	57	60	3	Nonda Fm orthoquartzite	99.4	0.12	0.01	0.03	79
22	17 1	60	63	3	Nonda Fm orthoquartzite	98.9	0.1	0.01	0.07	82
23	17 1	63	66	3	Nonda Fm orthoquartzite	97.9	0.12	0.02	0.04	70
24	17 1	66	69.04	3.04	Nonda Fm orthoquartzite	98.8	0.11	0.01	0.04	70

Appendix C Longworth 2017 Diamond Drill Hole Logs (Geological Description)

ID #	ddh no	from (m)	to (m)	int. (m)	alteration	lithology, minerals
1	17 1	0.6	3	2.4	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
2	17 1	3	6	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
3	17 1	6	9	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
4	17 1	9	12	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
5	17 1	12	15	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
6	17 1	15	18	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
7	17 1	18	21	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
8	17 1	21	24	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
9	17 1	24	27	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
10	17 1	27	30	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
11	17 1	30	33	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
12	17 1	33	36	3	quartz veining (as metamorphic sweats), 0.1% limonite, muscovite	massive equigranular quartzite
13	17 1	36	39	3	quartz veining (as metamorphic sweats), 0.1% limonite, muscovite	massive equigranular quartzite
14	17 1	39	42	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
15		Std-1			CDN Res Lab Ltd, ME-6A	
16	17 1	42	45	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
17	17 1	45	48	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
18	17 1	48	51	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
19	17 1	51	54	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
20	17 1	54	57	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
21	17 1	57	60	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
22	17 1	60	63	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
23	17 1	63	66	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
24	17 1	66	69.04	3.04	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite

ID #	ddh no	from (m)	to (m)	int. (m)	comments	fault & or fracture (% recov)
1	17 1	0.6	3	2.4	trace carbonaceous (black) fracture fill coatings & streaks	
2	17 1	3	6	3	trace carbonaceous (black) fracture fill coatings & streaks	
3	17 1	6	9	3	trace carbonaceous (black) fracture fill coatings & streaks	
4	17 1	9	12	3		
5	17 1	12	15	3		broken ground 13.15-13.56 m (85% recov)
6	17 1	15	18	3		
7	17 1	18	21	3		broken ground 20-20.85 m (90% recov)
8	17 1	21	24	3		
9	17 1	24	27	3		broken ground 24.25-24.4 m (85% recov)
10	17 1	27	30	3		
11	17 1	30	33	3		broken ground 31-31.25 m (80% recov)
12	17 1	33	36	3		fault (trace clay) 34.2-38.5 m (88% recov)
13	17 1	36	39	3	mottled texture, sugary & recrystallized quartz porphyryblast	fault (trace clay) 34.2-38.5 m (88% recov)
14	17 1	39	42	3	mottled texture, sugary & recrystallized quartz porphyryblast	
15	Std-1					
16	17 1	42	45	3	mottled texture, sugary & recrystallized quartz porphyryblast	
17	17 1	45	48	3	mottled texture, sugary & recrystallized quartz porphyryblast	fault (trace clay) m (88% recov)
18	17 1	48	51	3	mottled texture, sugary & recrystallized quartz porphyryblast	
19	17 1	51	54	3	trace-minor vuggy recrytallized quartz	fault (trace clay) 50.6-53.2 m (88% recov)
20	17 1	54	57	3	trace-minor vuggy recrytallized quartz	
21	17 1	57	60	3	trace-minor vuggy recrytallized quartz	
22	17 1	60	63	3	trace-minor vuggy recrytallized quartz	
23	17 1	63	66	3	trace-minor vuggy recrytallized quartz	
24	17 1	66	69.04	3.04	trace-minor vuggy recrytallized quartz	

ID #	ddh no	from (m)	to (m)	int. (m)	metamorphic fabric (fracture cleavage, & dominant qtz sweat)
1	17 1	0.6	3	2.4	0.6-17.2 m (0.1-3%, 0.1-0.8 cm metamorphic qtz sweat veinlets) @10-35 degrees to c.a.
2	17 1	3	6	3	0.6-17.2 m (0.1-3%, 0.1-0.8 cm metamorphic qtz sweat veinlets) @10-35 degrees to c.a.
3	17 1	6	9	3	0.6-17.2 m (0.1-3%, 0.1-0.8 cm metamorphic qtz sweat veinlets) @10-35 degrees to c.a.
4	17 1	9	12	3	0.6-17.2 m (0.1-3%, 0.1-0.8 cm metamorphic qtz sweat veinlets) @10-35 degrees to c.a.
5	17 1	12	15	3	0.6-17.2 m (0.1-3%, 0.1-0.8 cm metamorphic qtz sweat veinlets) @10-35 degrees to c.a.
6	17 1	15	18	3	17.2-34.2 m (0.1-5%, 0.1-1 cm metamorphic qtz sweat veinlets) @30-70 degrees to c.a.
7	17 1	18	21	3	17.2-34.2 m (0.1-5%, 0.1-1 cm metamorphic qtz sweat veinlets) @30-70 degrees to c.a.
8	17 1	21	24	3	17.2-34.2 m (0.1-5%, 0.1-1 cm metamorphic qtz sweat veinlets) @30-70 degrees to c.a.
9	17 1	24	27	3	17.2-34.2 m (0.1-5%, 0.1-1 cm metamorphic qtz sweat veinlets) @30-70 degrees to c.a.
10	17 1	27	30	3	17.2-34.2 m (0.1-5%, 0.1-1 cm metamorphic qtz sweat veinlets) @30-70 degrees to c.a.
11	17 1	30	33	3	17.2-34.2 m (0.1-5%, 0.1-1 cm metamorphic qtz sweat veinlets) @30-70 degrees to c.a.
12	17 1	33	36	3	34.2-38.5 m (0.1-1%, 0.1-0.6 cm metamorphic qtz sweat veinlets) @10-30 degrees to c.a.
13	17 1	36	39	3	34.2-38.5 m (0.1-1%, 0.1-0.6 cm metamorphic qtz sweat veinlets) @10-30 degrees to c.a.
14	17 1	39	42	3	38.5-49.25 m (0.1-1%, 0.1-0.7 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
15		Std-1			38.5-49.25 m (0.1-1%, 0.1-0.7 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
16	17 1	42	45	3	38.5-49.25 m (0.1-1%, 0.1-0.7 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
17	17 1	45	48	3	38.5-49.25 m (0.1-1%, 0.1-0.7 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
18	17 1	48	51	3	49.25-50.6 m (0.5-10%, 0.1-1.8 cm metamorphic qtz sweat veinlets) @20-75 degrees to c.a.
19	17 1	51	54	3	50.6-53.2 m (0.5-10%, 0.1-1.8 cm metamorphic qtz sweat veinlets) @20-55 degrees to c.a.
20	17 1	54	57	3	53.2-69.04 m (0.2-4%, 0.1-3.5 cm metamorphic qtz sweat veinlets) @10-80 degrees to c.a.
21	17 1	57	60	3	53.2-69.04 m (0.2-4%, 0.1-3.5 cm metamorphic qtz sweat veinlets) @10-80 degrees to c.a.
22	17 1	60	63	3	53.2-69.04 m (0.2-4%, 0.1-3.5 cm metamorphic qtz sweat veinlets) @10-80 degrees to c.a.
23	17 1	63	66	3	53.2-69.04 m (0.2-4%, 0.1-3.5 cm metamorphic qtz sweat veinlets) @10-80 degrees to c.a.
24	17 1	66	69.04	3.04	53.2-69.04 m (0.2-4%, 0.1-3.5 cm metamorphic qtz sweat veinlets) @10-80 degrees to c.a.

ID #	ddh no	from (m)	to (m)	int. (m)	Remarks
1	17 1	0.6	3	2.4	massive texture, pure white on fresh surface, trace limonite on fractures
2	17 1	3	6	3	massive texture, pure white on fresh surface, trace limonite on fractures
3	17 1	6	9	3	massive texture, pure white on fresh surface, trace limonite on fractures
4	17 1	9	12	3	massive texture, pure white on fresh surface, trace limonite on fractures
5	17 1	12	15	3	massive texture, pure white on fresh surface, trace limonite on fractures
6	17 1	15	18	3	massive texture, pure white on fresh surface, trace limonite on fractures
7	17 1	18	21	3	massive texture, pure white on fresh surface, trace limonite on fractures
8	17 1	21	24	3	massive texture, pure white on fresh surface, trace limonite on fractures
9	17 1	24	27	3	massive texture, pure white on fresh surface, trace limonite on fractures
10	17 1	27	30	3	massive texture, pure white on fresh surface, trace limonite on fractures
11	17 1	30	33	3	massive texture, pure white on fresh surface, trace limonite on fractures
12	17 1	33	36	3	massive texture, pure white on fresh surface, trace limonite on fractures
13	17 1	36	39	3	mottled texture, sugary & recrystallized quartz porphyryblast
14	17 1	39	42	3	mottled texture, sugary & recrystallized quartz porphyryblast
15		Std-1			
16	17 1	42	45	3	mottled texture, sugery & recrystallized quartz porphyryblast
17	17 1	45	48	3	mottled texture, sugary & recrystallized quartz porphyryblast
18	17 1	48	51	3	mottled texture, sugary & recrystallized quartz porphyryblast
19	17 1	51	54	3	massive texture, pure white on fresh surface, trace limonite on fractures
20	17 1	54	57	3	massive texture, pure white on fresh surface, trace limonite on fractures
21	17 1	57	60	3	massive texture, pure white on fresh surface, trace limonite on fractures
22	17 1	60	63	3	massive texture, pure white on fresh surface, trace limonite on fractures
23	17 1	63	66	3	massive texture, pure white on fresh surface, trace limonite on fractures
24	17 1	66	69.04	3.04	massive texture, pure white on fresh surface, trace limonite on fractures
					massive texture, pure white on fresh surface, trace limonite on fractures

DDH17LW-2 Drill Log Geological Description

ID #	ddh no	from (m)	to (m)	int. (m)	lithology	SiO2 %	Al2O3 %	CaO %	Fe2O3 %	RQD %
25	17 2	0.2	3	2.8	Nonda Fm orthoquartzite	99	0.31	0.01	0.04	81
26	17 2	3	6	3	Nonda Fm orthoquartzite	99.4	0.34	0.01	0.05	69
27	17 2	6	9	3	Nonda Fm orthoquartzite	98.9	0.23	0.01	0.05	60
28	17 2	9	12	3	Nonda Fm orthoquartzite	99.1	0.14	0.01	0.06	58
29	17 2	12	15	3	Nonda Fm orthoquartzite	99.4	0.16	0.01	0.05	70
30		Blk-basA			Basalt	46.2	14.15	13.05	0.31	
31	17 2	15	18	3	Nonda Fm orthoquartzite	99.9	0.2	0.04	0.17	71
32	17 2	18	21	3	Nonda Fm orthoquartzite	100	0.14	0.02	0.04	92
33	17 2	21	24	3	Nonda Fm orthoquartzite	99.2	0.19	0.01	0.03	94
34	17 2	24	27	3	Nonda Fm orthoquartzite	99.7	0.13	0.01	0.03	87
35	17 2	27	30	3	Nonda Fm orthoquartzite	98.4	0.19	0.02	0.04	68
36	17 2	30	33	3	Nonda Fm orthoquartzite	99.9	0.19	0.01	0.05	36
37	17 2	33	36	3	Nonda Fm orthoquartzite	99.9	0.16	0.01	0.06	14
38	17 2	36	39	3	Nonda Fm orthoquartzite	99.6	0.13	<0.01	0.21	27
39	17 2	39	42	3	Nonda Fm orthoquartzite	99.3	0.13	0.02	0.05	38
40	17 2	42	45	3	Nonda Fm orthoquartzite	99.5	0.13	0.02	0.04	47
41	17 2	45	48	3	Nonda Fm orthoquartzite	95.2	0.29	1.64	0.1	22
42	17 2	48	51.51	3.51	Nonda Fm orthoquartzite	99.7	0.2	0.01	0.03	12

ID #	ddh no	from (m)	to (m)	int. (m)	alteration	lithology, minerals
25	17 2	0.2	3	2.8	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
26	17 2	3	6	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
27	17 2	6	9	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
28	17 2	9	12	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
29	17 2	12	15	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
30		Blk-basA			Blank basalt sample	
31	17 2	15	18	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
32	17 2	18	21	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
33	17 2	21	24	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
34	17 2	24	27	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
35	17 2	27	30	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
36	17 2	30	33	3	quartz veining (as metamorphic sweats), 0.1% limonite, muscovite	massive equigranular quartzite
37	17 2	33	36	3	quartz veining (as metamorphic sweats), 0.1% limonite, muscovite	massive equigranular quartzite
38	17 2	36	39	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
39	17 2	39	42	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
40	17 2	42	45	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
41	17 2	45	48	3	quartz-calcite veining (meta-sweats), trace limonite, muscovite	massive equigranular quartzite
42	17 2	48	51.51	3.51	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite

ID #	ddh no	from (m)	to (m)	int. (m)	comments	fault & or fracture (% recov)
25	17 2	0.2	3	2.8		broken ground 3.65-3.89 m (92% recov)
26	17 2	3	6	3		
27	17 2	6	9	3		broken ground 7.5-8 m (90% recov)
28	17 2	9	12	3		broken ground 11-11.29 m (90% recov)
29	17 2	12	15	3	weak vuggy texture of quartz veining	
30		Blk-basA				
31	17 2	15	18	3	trace carbonaceous (black) fracture fill coatings & streaks	broken ground 16.85-17.4 m (92% recov)
32	17 2	18	21	3		
33	17 2	21	24	3		
34	17 2	24	27	3		
35	17 2	27	30	3		broken ground 28.3-30.1 m (86% recov)
36	17 2	30	33	3		broken ground 31.3-31.85m (92% recov)
37	17 2	33	36	3		
38	17 2	36	39	3	trace carbonaceous (black) fracture fill coatings & streaks	fault 38.77-38.9 m (70% recov, 0.2% clay, 0.1% limonite)
39	17 2	39	42	3	void at 40-40.31 (no core)	broken ground 40.31-41.5 m (94% recov, 0.1% limonite)
40	17 2	42	45	3		fault (trace clay) 42-43.2 m (60% recov, 0.1% limonite)
41	17 2	45	48	3		broken ground 45.5-50.5 m (94% recov)
42	17 2	48	51.51	3.51		broken ground 51-51.51 m (90% recov)

ID #	ddh no	from (m)	to (m)	int. (m)	metamorphic fabric (fracture cleavage, & dominant qtz sweat)
25	17 2	0.2	3	2.8	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
26	17 2	3	6	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
27	17 2	6	9	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
28	17 2	9	12	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
29	17 2	12	15	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
30		Blk-basA			0.2-36 m (0.1-0.5%, 0.1-0.4 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
31	17 2	15	18	3	0.2-36 m (0.1-0.5%, 0.1-0.4 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
32	17 2	18	21	3	0.2-36 m (0.1-0.3%, 0.1-0.4 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
33	17 2	21	24	3	0.2-36 m (0.1-0.5%, 0.1-0.4 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
34	17 2	24	27	3	0.2-36 m (0.1-0.5%, 0.1-0.4 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
35	17 2	27	30	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
36	17 2	30	33	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
37	17 2	33	36	3	0.2-36 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @30-65 degrees to c.a.
38	17 2	36	39	3	36-38.15 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
39	17 2	39	42	3	38.15-38.45 m 28 cm wide quartz breccia, increased limonite, carbonaceous matter fract fill
40	17 2	42	45	3	38.45-51.51 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
41	17 2	45	48	3	38.45-51.51 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.
42	17 2	48	51.51	3.51	38.45-51.51 m (0.1-0.3%, 0.1-0.2 cm metamorphic qtz sweat veinlets) @10-65 degrees to c.a.

ID #	ddh no	from (m)	to (m)	int. (m)	Remarks
25	17 2	0.2	3	2.8	massive texture, pure white on fresh surface, trace limonite on fractures
26	17 2	3	6	3	massive texture, pure white on fresh surface, trace limonite on fractures
27	17 2	6	9	3	massive texture, pure white on fresh surface, trace limonite on fractures
28	17 2	9	12	3	massive texture, pure white on fresh surface, trace limonite on fractures
29	17 2	12	15	3	massive texture, pure white on fresh surface, trace limonite on fractures
30		Blk-basA			massive texture, pure white on fresh surface, trace limonite on fractures
31	17 2	15	18	3	massive texture, pure white on fresh surface, trace limonite on fractures
32	17 2	18	21	3	massive texture, pure white on fresh surface, trace limonite on fractures
33	17 2	21	24	3	massive texture, pure white on fresh surface, trace limonite on fractures
34	17 2	24	27	3	massive texture, pure white on fresh surface, trace limonite on fractures
35	17 2	27	30	3	massive texture, pure white on fresh surface, trace limonite on fractures
36	17 2	30	33	3	massive texture, pure white on fresh surface, trace limonite on fractures
37	17 2	33	36	3	massive texture, pure white on fresh surface, trace limonite on fractures
38	17 2	36	39	3	massive texture, pure white on fresh surface, trace limonite on fractures
39	17 2	39	42	3	quartz vein with recrystallized quartz clasts, trace limonite and carbonaceous matter
40	17 2	42	45	3	massive texture, pure white on fresh surface, trace limonite on fractures
41	17 2	45	48	3	massive texture, pure white on fresh surface, trace limonite on fractures
42	17 2	48	51.51	3.51	massive texture, pure white on fresh surface, trace limonite on fractures

DDH17LW-3 Drill Log Geological Description

ID #	ddh no	from (m)	to (m)	int. (m)	lithology	SiO2 %	Al2O3 %	CaO %	Fe2O3 %	RQD %
43	17 3	0.3	3	2.7	Nonda Fm orthoquartzite	99	0.28	0.02	0.05	70
44	17 3	3	6	3	Nonda Fm orthoquartzite	99.4	0.24	0.01	0.04	33
45	Std ME-6B				not received, no analysis					
46	17 3	6	9	3	Nonda Fm orthoquartzite	98.8	0.09	<0.01	0.03	78
47	17 3	9	12	3	Nonda Fm orthoquartzite	99.1	0.11	0.01	0.05	92
48	17 3	12	15	3	Nonda Fm orthoquartzite	98.2	0.17	0.01	0.07	69
49	17 3	15	18	3	Nonda Fm orthoquartzite	98.9	0.15	0.01	0.05	71
50	17 3	18	21	3	Nonda Fm orthoquartzite	99.4	0.14	0.01	0.06	21
51	17 3	21	24	3	Nonda Fm orthoquartzite	97.7	0.13	0.01	0.06	62
52	17 3	24	27	3	Nonda Fm orthoquartzite	99.6	0.15	0.01	0.06	78
53	17 3	27	30	3	Nonda Fm orthoquartzite	98.3	0.14	0.01	0.07	69
54	17 3	30	33	3	Nonda Fm orthoquartzite	99.2	0.12	<0.01	0.06	72
55	17 3	33	36	3	Nonda Fm orthoquartzite	98.2	0.18	<0.01	0.04	54
56	17 3	36	39	3	Nonda Fm orthoquartzite	99.8	0.4	0.03	0.06	55
57	17 3	39	42	3	Nonda Fm orthoquartzite	98.4	0.12	<0.01	0.04	74
58	17 3	42	45	3	Nonda Fm orthoquartzite	99.5	0.18	0.01	0.04	90
59	17 3	45	48	3	Nonda Fm orthoquartzite	97.6	0.19	0.01	0.05	89
60	Blk-basB					45.1	13.65	9.31	13.5	
61	17 3	48	51	3	Nonda Fm orthoquartzite	98.3	0.33	0.06	0.12	69
62	17 3	51	54	3	Nonda Fm orthoquartzite	99.8	0.19	0.02	0.06	68
63	17 3	54	57	3	Nonda Fm orthoquartzite	99.7	0.16	0.02	0.08	52
64	17 3	57	60	3	Nonda Fm orthoquartzite	98.2	0.25	0.02	0.05	26
65	17 3	60	63	3	Nonda Fm orthoquartzite	98.8	0.46	0.02	0.06	72
66	17 3	63	65.53	2.53	Nonda Fm orthoquartzite	99	0.27	0.02	0.04	50

ID #	ddh no	from (m)	to (m)	int. (m)	alteration	lithology, minerals
43	17 3	0.3	3	2.7	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
44	17 3	3	6	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
45	Std ME-6B				CDN Res Lab Ltd, ME-6B pulp	
46	17 3	6	9	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
47	17 3	9	12	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
48	17 3	12	15	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
49	17 3	15	18	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
50	17 3	18	21	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
51	17 3	21	24	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
52	17 3	24	27	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
53	17 3	27	30	3	quartz veining (as metamorphic sweats), 0.1% limonite, muscovite	massive equigranular quartzite
54	17 3	30	33	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
55	17 3	33	36	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
56	17 3	36	39	3	quartz veining (as metamorphic sweats), 0.1% limonite, muscovite	massive equigranular quartzite
57	17 3	39	42	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
58	17 3	42	45	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
59	17 3	45	48	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
60	Blk-basB				Blank basalt sample	
61	17 3	48	51	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
62	17 3	51	54	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
63	17 3	54	57	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
64	17 3	57	60	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
65	17 3	60	63	3	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite
66	17 3	63	65.53	2.53	quartz veining (as metamorphic sweats), trace limonite, muscovite	massive equigranular quartzite

ID #	ddh no	from (m)	to (m)	int. (m)	comments	fault & or fracture (% recov)
43	17 3	0.3	3	2.7	mottled texture, sugary & recrystallized quartz porphyryblast	broken ground 2.8-3 m (0.1% lim, 90% recov)
44	17 3	3	6	3	mottled texture, sugary & recrystallized quartz porphyryblast	
45		Std ME-6B				
46	17 3	6	9	3	mottled texture, sugary & recrystallized quartz porphyryblast	broken ground 6.2-6.4 m (0.1% lim, 85% recov)
47	17 3	9	12	3	mottled texture, sugary & recrystallized quartz porphyryblast	
48	17 3	12	15	3		fault (trace clay) 13.8-14.25 m (0.1% clay, tr lim, 88% recov)
49	17 3	15	18	3		broken ground 15-15.25 m (0.1% lim, 90% recov)
50	17 3	18	21	3		fracture cleavage @27 degrees to core axis 18-19.2 m
51	17 3	21	24	3	trace-minor vuggy recrytallized quartz	broken ground 22.4-23.3 m (0.1% lim, tr clay, 90% recov)
52	17 3	24	27	3	trace-minor vuggy recrytallized quartz	25.4-25.6 Void (core loss in large vug)
53	17 3	27	30	3	trace carbonaceous (black) fracture fill coatings & streaks	broken ground 27-28 m (0.2% lim, tr clay & carbon, 90% recov)
54	17 3	30	33	3	mottled texture, sugary & recrystallized quartz porphyryblast 31.46-32 m	
55	17 3	33	36	3	trace-minor vuggy recrytallized quartz	
56	17 3	36	39	3		broken ground 38.5-38.6 m (0.1% lim, 92% recov)
57	17 3	39	42	3		broken ground 40.4-40.6 m (0.1% lim, 92% recov)
58	17 3	42	45	3		broken ground 41.5-42 m (0.1% lim, 86% recov)
59	17 3	45	48	3		
60		Blk-basB				
61	17 3	48	51	3		broken ground 49.7-51 m (tr lim, 95% recov)
62	17 3	51	54	3		broken ground 52.9-53.7 m (0.1% lim, 92% recov)
63	17 3	54	57	3		
64	17 3	57	60	3		broken ground 57.3-59.65 m (tr lim, 90% recov)
65	17 3	60	63	3		broken ground 62.6-62.9 m (tr lim, 92% recov)
66	17 3	63	65.53	2.53		broken ground 64.3-65.53 m (tr lim, 95% recov)

ID #	ddh no	from (m)	to (m)	int. (m)	metamorphic fabric (fracture cleavage, & dominant qtz sweat)
43	17 3	0.3	3	2.7	0.3-10.6 m (0.1-0.5%, 0.1-0.5 cm metamorphic qtz sweat veinlets) @10-45 degrees to c.a.
44	17 3	3	6	3	0.3-10.6 m (0.1-0.5%, 0.1-0.5 cm metamorphic qtz sweat veinlets) @10-45 degrees to c.a.
45		Std ME-6B			
46	17 3	6	9	3	0.3-10.6 m (0.1-0.5%, 0.1-0.5 cm metamerphic qtz sweat veinlets) @10-45 degrees to c.a.
47	17 3	9	12	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
48	17 3	12	15	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
49	17 3	15	18	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
50	17 3	18	21	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
51	17 3	21	24	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
52	17 3	24	27	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
53	17 3	27	30	3	10.6-31.46 m (0.1-3%, 0.1-1 cm metamorphic qtz sweat veinlets) @15-70 degrees to c.a.
54	17 3	30	33	3	31.46-32 m (15%, 0.1-0.6 cm sugary texture porphyrybasts, weak limonite stain)
55	17 3	33	36	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
56	17 3	36	39	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
57	17 3	39	42	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
58	17 3	42	45	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
59	17 3	45	48	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
60		Blk-basB			
61	17 3	48	51	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
62	17 3	51	54	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
63	17 3	54	57	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
64	17 3	57	60	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
65	17 3	60	63	3	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.
66	17 3	63	65.53	2.53	32-65.53 m (0.1-1%, 0.1-1 cm metamorphic qtz sweat veinlets) @10-60 degrees to c.a.

ID #	ddh no	from (m)	to (m)	int. (m)	Remarks
43	17 3	0.3	3	2.7	mottled texture, sugary & recrystallized quartz porphyryblast
44	17 3	3	6	3	mottled texture, sugary & recrystallized quartz porphyryblast
45		Std ME-6B			
46	17 3	6	9	3	mottled texture, sugary & recrystallized quartz porphyryblast
47	17 3	9	12	3	mottled texture, sugary & recrystallized quartz porphyryblast
48	17 3	12	15	3	massive texture, pure white on fresh surface, trace limonite on fractures
49	17 3	15	18	3	massive texture, pure white on fresh surface, trace limonite on fractures
50	17 3	18	21	3	massive texture, pure white on fresh surface, trace limonite on fractures
51	17 3	21	24	3	massive texture, pure white on fresh surface, trace limonite on fractures
52	17 3	24	27	3	massive texture, pure white on fresh surface, trace limonite on fractures
53	17 3	27	30	3	massive texture, pure white on fresh surface, trace limonite on fractures
54	17 3	30	33	3	mottled texture, sugary & recrystallized quartz porphyryblast
55	17 3	33	36	3	massive texture, pure white on fresh surface, trace limonite on fractures
56	17 3	36	39	3	massive texture, pure white on fresh surface, trace limonite on fractures
57	17 3	39	42	3	massive texture, pure white on fresh surface, trace limonite on fractures
58	17 3	42	45	3	massive texture, pure white on fresh surface, trace limonite on fractures
59	17 3	45	48	3	massive texture, pure white on fresh surface, trace limonite on fractures
60		Blk-basB			
61	17 3	48	51	3	massive texture, pure white on fresh surface, trace limonite on fractures
62	17 3	51	54	3	massive texture, pure white on fresh surface, trace limonite on fractures
63	17 3	54	57	3	massive texture, pure white on fresh surface, trace limonite on fractures
64	17 3	57	60	3	massive texture, pure white on fresh surface, trace limonite on fractures
65	17 3	60	63	3	massive texture, pure white on fresh surface, trace limonite on fractures
66	17 3	63	65.53	2.53	massive texture, pure white on fresh surface, trace limonite on fractures

DDH #	Zone Name	Easting NAD 83	Northing NAD 83	Elevation m	Elevation ft
17LW-1	Snow	595625	5985369	1558	5110.2
17LW-2	Snow	595675	5985335	1551	5087.3
17LW-3	Snow	595725	5985283	1552	5090.6

DDH #	Location	Description
17LW-1	Snow ridge	near helipad
17LW-2	Snow ridge	ESE of helipad
17LW-3	Snow ridge	ESE of helipad

DDH #	Zone Name	Azimuth	Dip	depth ft	depth meters
17LW-1	Snow		90	226.5	69.04
17LW-2	Snow	205	75	169	51.51
17LW-3	Snow	205	70	215	65.53
					186.08

DDH	From (m)	To (m)	Interval (m)	SiO2	Al2O3	Fe2O3	CaO	MgO	Na2O	K2O	LOI	Total	SiO2/Total
1	0.6	69.04	68.44	98.92	0.12	0.05	0.01	0.01	0.07	0.07	0.12	99.41	99.5
2	0.2	45	44.8	99.41	0.18	0.06	0.01	0.02	0.05	0.09	0.07	99.94	99.45
3	0.3	65.53	65.23	98.8	0.21	0.06	0.01	0.02	0.01	0.07	0.06	99.3	99.51

DDH17LW-1 Drill Core Geochemical Record

SAMPLE DESCRIPTION	S.G. Unity	SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	Cr2O3 %
1LW-1 0.6-3 m		98.7	0.14	0.05	0.06	0.02	0.05	0.09	<0.01
2LW-1 3-6 m		97.7	0.11	0.03	0.03	0.01	0.04	0.1	<0.01
3LW-1 6-9 m		99.5	0.13	0.03	0.01	0.01	0.01	0.02	0.01
4LW-1 9-12 m	2.64	97.9	0.19	0.03	0.02	0.02	0.05	0.1	0.01
5LW-1 12-15 m		99.7	0.14	0.04	0.01	0.01	0.01	0.02	0.01
6LW-1 15-18 m		97.9	0.1	0.04	0.01	0.01	0.06	0.06	0.01
7LW-1 18-21 m		99.3	0.12	0.05	0.01	0.01	0.07	0.06	0.01
8LW-1 21-24 m	2.63	98.6	0.09	0.04	0.02	0.01	0.06	0.08	<0.01
9LW-1 24-27 m		97.9	0.07	0.04	0.01	0.01	0.08	0.04	<0.01
10LW-1 27-30 m		99.1	0.07	0.04	0.01	0.01	0.1	0.06	0.01
11LW-1 30-33 m		99.4	0.17	0.05	0.01	0.02	0.11	0.09	0.01
12LW-1 33-36 m	2.64	99.3	0.17	0.06	0.02	0.02	0.1	0.09	0.01
13LW-1 36-39 m		98.9	0.19	0.05	0.02	0.02	0.1	0.11	0.01
14LW-1 39-42 m		99.3	0.13	0.07	0.01	0.01	0.11	0.08	0.01
16LW-1 42-45 m	2.64	99.7	0.1	0.05	0.01	0.01	0.1	0.08	0.01
17LW-1 45-48 m		99.9	0.08	0.04	0.01	0.01	0.01	0.06	<0.01
18LW-1 48-51 m		99.4	0.11	0.07	0.01	0.01	0.11	0.15	0.01
19LW-1 51-54 m		98.7	0.12	0.07	<0.01	0.01	0.01	0.05	0.01
20LW-1 54-57 m	2.65	99.2	0.13	0.05	0.01	0.01	0.11	0.08	0.01
21LW-1 57-60 m		99.4	0.12	0.03	0.01	<0.01	0.01	0.02	0.01
22LW-1 60-63 m		98.9	0.1	0.07	0.01	0.01	0.11	0.08	0.01
23LW-1 63-66 m		97.9	0.12	0.04	0.02	0.01	0.1	0.09	0.01
24LW-1 66-69.04 m	2.62	98.8	0.11	0.04	0.01	0.01	0.09	0.06	0.01
Average		98.92	0.12	0.05	0.01	0.01	0.07	0.07	0.01

Appendix D Longworth 2017 Diamond Drill Hole Sample (Geochemical Records)

SAMPLE DESCRIPTION	S.G. Unity	TiO2 %	MnO %	P2O5 %	SrO %	BaO %	LOI %	Total %	SiO2/Total
1LW-1 0.6-3 m		0.02	<0.01	<0.01	<0.01	<0.01	0.21	99.34	99.36
2LW-1 3-6 m		0.02	<0.01	<0.01	<0.01	<0.01	0.24	98.28	99.41
3LW-1 6-9 m		0.02	<0.01	<0.01	<0.01	<0.01	0.14	99.89	99.61
4LW-1 9-12 m	2.64	0.04	<0.01	<0.01	<0.01	<0.01	0.16	98.52	99.37
5LW-1 12-15 m		0.03	<0.01	0.01	<0.01	<0.01	0.14	100.12	99.59
6LW-1 15-18 m		0.02	<0.01	<0.01	<0.01	<0.01	0.12	98.33	99.56
7LW-1 18-21 m		0.03	<0.01	<0.01	<0.01	<0.01	0.11	99.77	99.53
8LW-1 21-24 m	2.63	0.02	<0.01	<0.01	<0.01	<0.01	0.16	99.08	99.52
9LW-1 24-27 m		0.02	<0.01	<0.01	<0.01	<0.01	0.11	98.28	99.61
10LW-1 27-30 m		0.01	<0.01	<0.01	<0.01	<0.01	0.23	99.64	99.46
11LW-1 30-33 m		0.03	<0.01	<0.01	<0.01	<0.01	0.17	109.06	99.34
12LW-1 33-36 m	2.64	0.03	<0.01	<0.01	<0.01	<0.01	0.21	100.01	99.29
13LW-1 36-39 m		0.04	<0.01	<0.01	<0.01	<0.01	0.11	99.55	99.35
14LW-1 39-42 m		0.03	<0.01	<0.01	<0.01	<0.01	0.06	99.81	99.49
16LW-1 42-45 m	2.64	0.02	<0.01	<0.01	<0.01	<0.01	0.06	109.14	99.56
17LW-1 45-48 m		0.02	<0.01	<0.01	<0.01	<0.01	0.05	100.18	99.72
18LW-1 48-51 m		0.03	<0.01	<0.01	<0.01	<0.01	0.1	100	99.4
19LW-1 51-54 m		0.03	<0.01	<0.01	<0.01	<0.01	0.06	99.06	99.64
20LW-1 54-57 m	2.65	0.02	<0.01	<0.01	<0.01	<0.01	-0.03	99.59	99.61
21LW-1 57-60 m		0.03	<0.01	<0.01	<0.01	<0.01	0.08	99.71	99.46
22LW-1 60-63 m		0.03	<0.01	<0.01	<0.01	<0.01	0.12	99.44	99.46
23LW-1 63-66 m		0.02	<0.01	<0.01	<0.01	<0.01	0.05	98.36	99.53
24LW-1 66-69.04 m	2.62	0.03	<0.01	<0.01	<0.01	<0.01	0.14	99.3	99.5
Average		0.03	<0.01	<0.01	<0.01	<0.01	0.12	99.41	99.5

DDH17LW-2 Drill Core Geochemical Record

SAMPLE DESCRIPTION	S.G. Unity	SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	Cr2O3 %
25LW-2 0.2-3 m		99	0.31	0.04	0.01	0.02	0.1	0.13	0.01
26LW-2 3-6 m		99.4	0.34	0.05	0.01	0.02	0.1	0.14	<0.01
27LW-2 6-9 m		98.9	0.23	0.05	0.01	0.02	0.1	0.17	0.01
28LW-2 9-12 m	2.63	99.1	0.14	0.06	0.01	0.01	0.09	0.08	0.01
29LW-2 12-15 m		99.4	0.16	0.05	0.01	0.01	0.07	0.09	0.01
31LW-2 15-18 m		99.9	0.2	0.17	0.04	0.05	0.02	0.08	0.01
32LW-2 18-21 m	2.64	100	0.14	0.04	0.02	0.02	0.01	0.05	0.01
33LW-2 21-24 m		99.2	0.19	0.03	0.01	0.02	0.07	0.11	0.01
34LW-2 24-27 m		99.7	0.13	0.03	0.01	0.01	0.07	0.08	0.01
35LW-2 27-30 m		98.4	0.19	0.04	0.02	0.02	<0.01	0.08	<0.01
36LW-2 30-33 m	2.64	99.9	0.19	0.05	0.01	0.02	0.07	0.11	<0.01
37LW-2 33-36 m		99.9	0.16	0.06	0.01	0.01	0.01	0.05	<0.01
38LW-2 36-39 m		99.6	0.13	0.21	<0.01	<0.01	0.01	0.02	<0.01
39LW-2 39-42 m		99.3	0.13	0.05	0.02	0.01	0.01	0.07	0.01
40LW-2 42-45 m	2.63	99.5	0.13	0.04	0.02	0.01	0.01	0.06	<0.01
41LW-2 45-48 m		95.2	0.29	0.1	1.64	0.65	0.02	0.07	<0.01
42LW-2 48-51.51 m		99.7	0.2	0.03	0.01	0.01	0.02	0.06	0.01
Average		99.18	0.19	0.06	0.11	0.05	0.05	0.09	0.01

DH17LW-2, 0.3-45m

SAMPLE DESCRIPTION	S.G. Unity	SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	Cr2O3 %
25LW-2 0.2-3 m		99	0.31	0.04	0.01	0.02	0.1	0.13	0.01
26LW-2 3-6 m		99.4	0.34	0.05	0.01	0.02	0.1	0.14	<0.01
27LW-2 6-9 m		98.9	0.23	0.05	0.01	0.02	0.1	0.17	0.01
28LW-2 9-12 m	2.63	99.1	0.14	0.06	0.01	0.01	0.09	0.08	0.01
29LW-2 12-15 m		99.4	0.16	0.05	0.01	0.01	0.07	0.09	0.01
31LW-2 15-18 m		99.9	0.2	0.17	0.04	0.05	0.02	0.08	0.01
32LW-2 18-21 m	2.64	100	0.14	0.04	0.02	0.02	0.01	0.05	0.01
33LW-2 21-24 m		99.2	0.19	0.03	0.01	0.02	0.07	0.11	0.01
34LW-2 24-27 m		99.7	0.13	0.03	0.01	0.01	0.07	0.08	0.01
35LW-2 27-30 m		98.4	0.19	0.04	0.02	0.02	<0.01	0.08	<0.01
36LW-2 30-33 m	2.64	99.9	0.19	0.05	0.01	0.02	0.07	0.11	<0.01
37LW-2 33-36 m		99.9	0.16	0.06	0.01	0.01	0.01	0.05	<0.01
38LW-2 36-39 m		99.6	0.13	0.21	<0.01	<0.01	0.01	0.02	<0.01
39LW-2 39-42 m		99.3	0.13	0.05	0.02	0.01	0.01	0.07	0.01
40LW-2 42-45 m	2.63	99.5	0.13	0.04	0.02	0.01	0.01	0.06	<0.01
Average		99.41	0.18	0.06	0.01	0.02	0.05	0.09	0.01

SAMPLE DESCRIPTION	S.G. Unity	TiO2 %	MnO %	P2O5 %	SrO %	BaO %	LOI %	Total %	SiO2/Total
25LW-2 0.2-3 m		0.03	<0.01	<0.01	<0.01	<0.01	0.09	99.74	99.26
26LW-2 3-6 m		0.03	<0.01	<0.01	<0.01	<0.01	0.19	100.28	99.12
27LW-2 6-9 m		0.03	<0.01	<0.01	<0.01	<0.01	0.11	09.63	99.27
28LW-2 9-12 m	2.63	0.02	<0.01	<0.01	<0.01	<0.01	0.01	99.53	99.57
29LW-2 12-15 m		0.03	<0.01	<0.01	<0.01	<0.01	0.06	99.89	99.51
31LW-2 15-18 m		0.03	<0.01	<0.01	<0.01	<0.01	0.1	100.6	99.3
32LW-2 18-21 m	2.64	0.02	<0.01	<0.01	<0.01	<0.01	0	100.31	99.09
33LW-2 21-24 m		0.02	<0.01	<0.01	<0.01	<0.01	0	99.66	99.54
34LW-2 24-27 m		0.02	<0.01	<0.01	<0.01	<0.01	0.03	100.09	99.61
35LW-2 27-30 m		0.03	<0.01	<0.01	<0.01	<0.01	0.06	98.84	99.55
36LW-2 30-33 m	2.64	0.02	<0.01	<0.01	<0.01	<0.01	0	100.37	99.53
37LW-2 33-36 m		0.02	<0.01	<0.01	<0.01	<0.01	0.19	100.41	99.49
38LW-2 36-39 m		0.02	<0.01	<0.01	<0.01	<0.01	0.24	100.23	99.37
39LW-2 39-42 m		0.02	<0.01	0.01	<0.01	<0.01	0.2	99.83	99.47
40LW-2 42-45 m	2.63	0.03	<0.01	0.02	<0.01	<0.01	0.18	100	99.5
41LW-2 45-48 m		0.04	<0.01	0.01	<0.01	<0.01	2.27	100.29	94.92
42LW-2 48-51.51 m		0.02	<0.01	<0.01	<0.01	<0.01	0.22	100.28	99.42
Average		0.03	<0.01	<0.01	<0.01	<0.01	0.23	100	99.18

DH17LW-2, 0.2-45m

SAMPLE DESCRIPTION	S.G. Unity	TiO2 %	MnO %	P2O5 %	SrO %	BaO %	LOI %	Total %	SiO2/Total
25LW-2 0.2-3 m		0.03	<0.01	<0.01	<0.01	<0.01	0.09	99.74	99.26
26LW-2 3-6 m		0.03	<0.01	<0.01	<0.01	<0.01	0.19	100.28	99.12
27LW-2 6-9 m		0.03	<0.01	<0.01	<0.01	<0.01	0.11	99.63	99.27
28LW-2 9-12 m	2.63	0.02	<0.01	<0.01	<0.01	<0.01	0.01	09.53	99.57
29LW-2 12-15 m		0.03	<0.01	<0.01	<0.01	<0.01	0.06	99.89	99.51
31LW-2 15-18 m		0.03	<0.01	<0.01	<0.01	<0.01	0.1	100.6	99.3
32LW-2 18-21 m	2.64	0.02	<0.01	<0.01	<0.01	<0.01	0	100.31	99.69
33LW-2 21-24 m		0.02	<0.01	<0.01	<0.01	<0.01	0	99.66	99.54
34LW-2 24-27 m		0.02	<0.01	<0.01	<0.01	<0.01	0.03	100.09	98.61
35LW-2 27-30 m		0.03	<0.01	<0.01	<0.01	<0.01	0.06	98.84	99.55
36LW-2 30-33 m	2.64	0.02	<0.01	<0.01	<0.01	<0.01	0	100.37	99.53
37LW-2 30-35 m		0.02	<0.01	<0.01	<0.01	<0.01	0.19	100.41	99.49
38LW-2 36-39 m		0.02	<0.01	<0.01	<0.01	<0.01	0.24	100.23	99.37
39LW-2 39-42 m		0.02	<0.01	0.01	<0.01	<0.01	0.2	99.83	99.47
40LW-2 42-45 m	2.63	0.03	<0.01	0.02	<0.01	<0.01	0.18	100	99.5
Average		0.01	<0.01	<0.01	<0.01	<0.01	0.07	99.94	99.45

DDH17LW-3 Drill Core Geochemical Record

ID #	ddh no	from (m)	to (m)	int. (m)	S.G. Unity	SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	Cr2O3 %
43	17 3	0.3	3	2.7		99	0.28	0.05	0.02	0.03	0.01	0.07	0.01
44	17 3	3	6	3		99.4	0.24	0.04	0.01	0.02	0.01	0.06	0.01
45		Std ME-6B	not	received									
46	17 3	6	9	3	2.59	98.8	0.09	0.03	<0.01	0.01	0.01	0.02	0.01
47	17 3	9	12	3		99.1	0.11	0.05	0.01	0.01	0.02	0.04	0.01
48	17 3	12	15	3		98.2	0.17	0.07	0.01	0.02	0.01	0.04	0.01
49	17 3	15	18	3		98.9	0.15	0.05	0.01	0.01	0.02	0.06	0.01
50	17 3	18	21	3	2.64	99.4	0.14	0.05	0.01	0.01	0.02	0.06	0.01
51	17 3	21	24	3		97.7	0.13	0.06	0.01	0.01	0.01	0.04	0.01
52	17 3	24	27	3		99.6	0.15	0.06	0.01	0.01	0.01	0.09	0.01
53	17 3	27	30	3		98.3	0.14	0.07	0.01	0.01	0.01	0.08	0.01
54	17 3	30	33	3	2.64	99.2	0.12	0.04	<0.01	0.01	0.01	0.04	0.01
55	17 3	33	36	3		98.2	0.18	0.04	<0.01	0.01	0.01	0.13	0.01
56	17 3	36	39	3		99.8	0.4	0.06	0.03	0.03	<0.01	0.16	0.01
57	17 3	39	42	3	2.64	99.4	0.22	0.04	<0.01	0.02	0.01	0.08	0.01
58	17 3	42	45	3		99.5	0.18	0.04	0.01	0.01	0.01	0.05	0.01
59	17 3	45	48	3		97.6	0.19	0.05	0.01	0.01	<0.01	0.06	0.01
60		Blk-basB				45.1	13.65	13.5	9.31	11.3	2.64	0.99	0.06
61	17 3	48	51	3		98.3	0.33	0.12	0.06	0.07	0.03	0.08	0.01
62	17 3	51	54	3	2.64	99.8	0.19	0.06	0.02	0.02	<0.01	0.07	0.01
63	17 3	54	57	3		99.7	0.16	0.08	0.02	0.01	0.01	0.07	0.01
64	17 3	57	60	3		98.2	0.25	0.05	0.02	0.02	0.02	0.09	0.01
65	17 3	60	63	3		96.8	0.46	0.06	0.02	0.03	0.01	0.16	0.01
66	17 3	63	65.53	2.53	2.64	99	0.27	0.04	0.02	0.02	0.01	0.11	0.01
				average		98.81	0.21	0.06	0.01	0.02	0.01	0.07	0.01

ID #	ddh no	from (m)	to (m)	int. (m)	TiO2 %	MnO %	P2O5 %	SrO %	BaO %	LOI %	Total %	SiO2/Total
43	17 3	0.3	3	2.7	0.04	<0.01	0.01	<0.01	<0.01	0.01	99.53	99
44	17 3	3	6	3	0.03	<0.01	0.01	<0.01	<0.01	0.28	100.11	99.29
45		Std ME-6B	not	received								
46	17 3	6	9	3	0.02	<0.01	0.01	<0.01	<0.01	0	99	99.79
47	17 3	9	12	3	0.02	<0.01	0.01	<0.01	<0.01	0.07	99.45	99.65
48	17 3	12	15	3	0.05	<0.01	<0.01	<0.01	<0.01	0.14	98.72	99.47
49	17 3	15	18	3	0.03	<0.01	0.01	<0.01	<0.01	0.04	99.29	99.61
50	17 3	18	21	3	0.03	<0.01	<0.01	<0.01	<0.01	0.05	99.78	99.62
51	17 3	21	24	3	0.03	<0.01	<0.01	<0.01	<0.01	0	98	99.69
52	17 3	24	27	3	0.03	<0.01	<0.01	<0.01	<0.01	0.02	98.85	99.65
53	17 3	27	30	3	0.03	<0.01	0.01	<0.01	<0.01	0.09	98.72	99.67
54	17 3	30	33	3	0.02	<0.01	<0.01	<0.01	<0.01	0	99.45	99.75
55	17 3	33	36	3	0.02	<0.01	0.02	<0.01	<0.01	0.09	98.71	99.48
56	17 3	36	39	3	0.04	<0.01	<0.01	<0.01	<0.01	0.01	100.04	99.26
57	17 3	39	42	3	0.02	<0.01	0.01	<0.01	<0.01	0.07	99.88	99.62
58	17 3	42	45	3	0.02	<0.01	<0.01	<0.01	<0.01	-0.01	99.82	99.7
59	17 3	45	48	3	0.02	<0.01	0.01	<0.01	<0.01	0.1	98.06	99.53
60		Blk-basB			2.09	0.18	0.35	0.06	0.04	0	98.27	
61	17 3	48	51	3	0.04	<0.01	0.01	<0.01	<0.01	0.08	99.14	99.15
62	17 3	51	54	3	0.03	<0.01	<0.01	<0.01	<0.01	-0.09	100.11	99.69
63	17 3	54	57	3	0.02	<0.01	<0.01	<0.01	<0.01	0.02	100.1	99.6
64	17 3	57	60	3	0.02	<0.01	<0.01	<0.01	<0.01	0.1	98.78	99.41
65	17 3	60	63	3	0.04	<0.01	<0.01	<0.01	<0.01	0.18	97.77	99.61
66	17 3	63	65.53	2.53	0.03	<0.01	<0.01	<0.01	<0.01	0.14	99.65	99.35
				average	0.03	0.01	0.01	0.01	0.01	0.06	99.3	99.51

Appendix E Minfile Description

MINFILE Record Summary

MINFILE No 093H 038

File Created: 24-Jul-85 by BC Geological Survey (BCGS)
Last Edit: 24-Feb-89 by David G. Bailey(DGB)

SUMMARY

		NMI	
Name	LONGWORTH, NONDA QUARTZITE, SNOW, RAIN, LONG, DOLL	**Mining Division**	Cariboo
		BCGS Map	093H093
Status	Prospect	**NTS Map**	093H14W
Latitude	53º 58' 48" N	**UTM**	10 (NAD 83)
Longitude	121º 29' 30" W	**Northing**	5982350
		Easting	598914
Commodities	Silica	**Deposit Types**	R07 : Silica sandstone
Tectonic Belt	Foreland	**Terrane**	Ancestral North America

Capsule Geology

The Longworth prospect is located about 80 kilometres east of Prince George. The claims were staked originally in 1974 and blasting, trenching and sampling has been completed on the property

The prospect is hosted by a folded sequence of sedimentary and volcanic rocks which underlie Bearspaw Ridge. They are all, or in part, Lower Silurian in age and equivalent to the Nonda Formation.

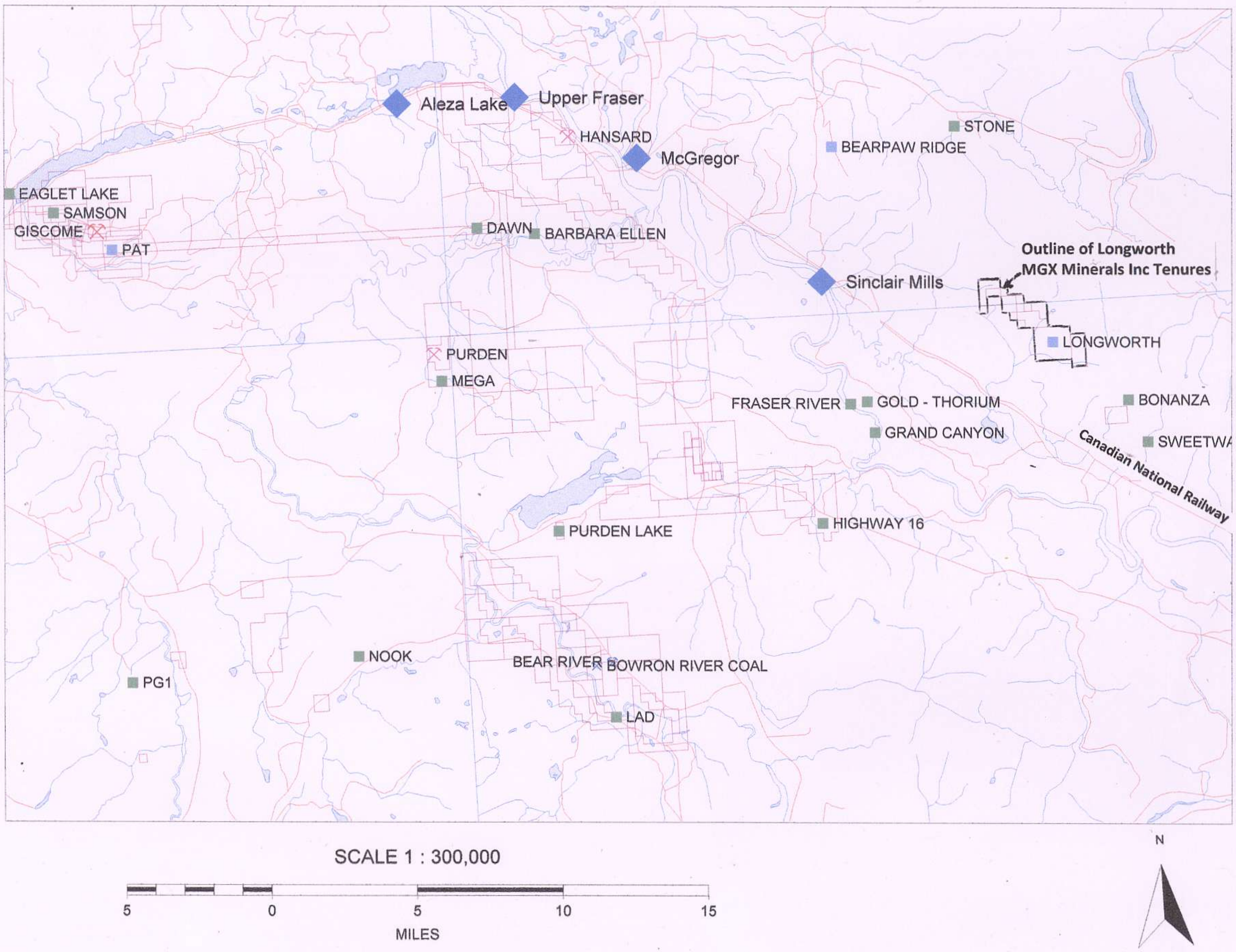
At least four northwest trending bands of quartzite have been mapped along the western flank of Bearpaw Ridge. Thicknesses reach up to about 400 metres. The main quartzite band outlines a synformal structure open to the northwest. Rare bedding observed in outcrop dips 70 to 80 degrees east. The quartzite is very pure, massive and homogeneous. It is composed of extremely well-rounded and well- sorted quartz grains, averaging 0.5 millimetre in diameter, which are cemented by silica. The quartzite is pinkish white to buff on fresh surfaces and weathers grey to white. Impurities include muscovite in cavities, limonite on microfractures, minor calcite and possible hydrocarbons. Eight chip samples collected in 1982 by the Geological Survey Branch averaged 99.5 per cent silica (Open File 1987-15).

Consolidated Silver Standard Mines Ltd. evaluated the property in 1985 for the production of ferrosilicon and silicon metal. They took 42 samples of which 28 had the required chemical specifications, SiO_2 was from 98.84 to 99.80 per cent and 16 samples had acceptable thermal shock results (Open File 1987-15).

Bibliography

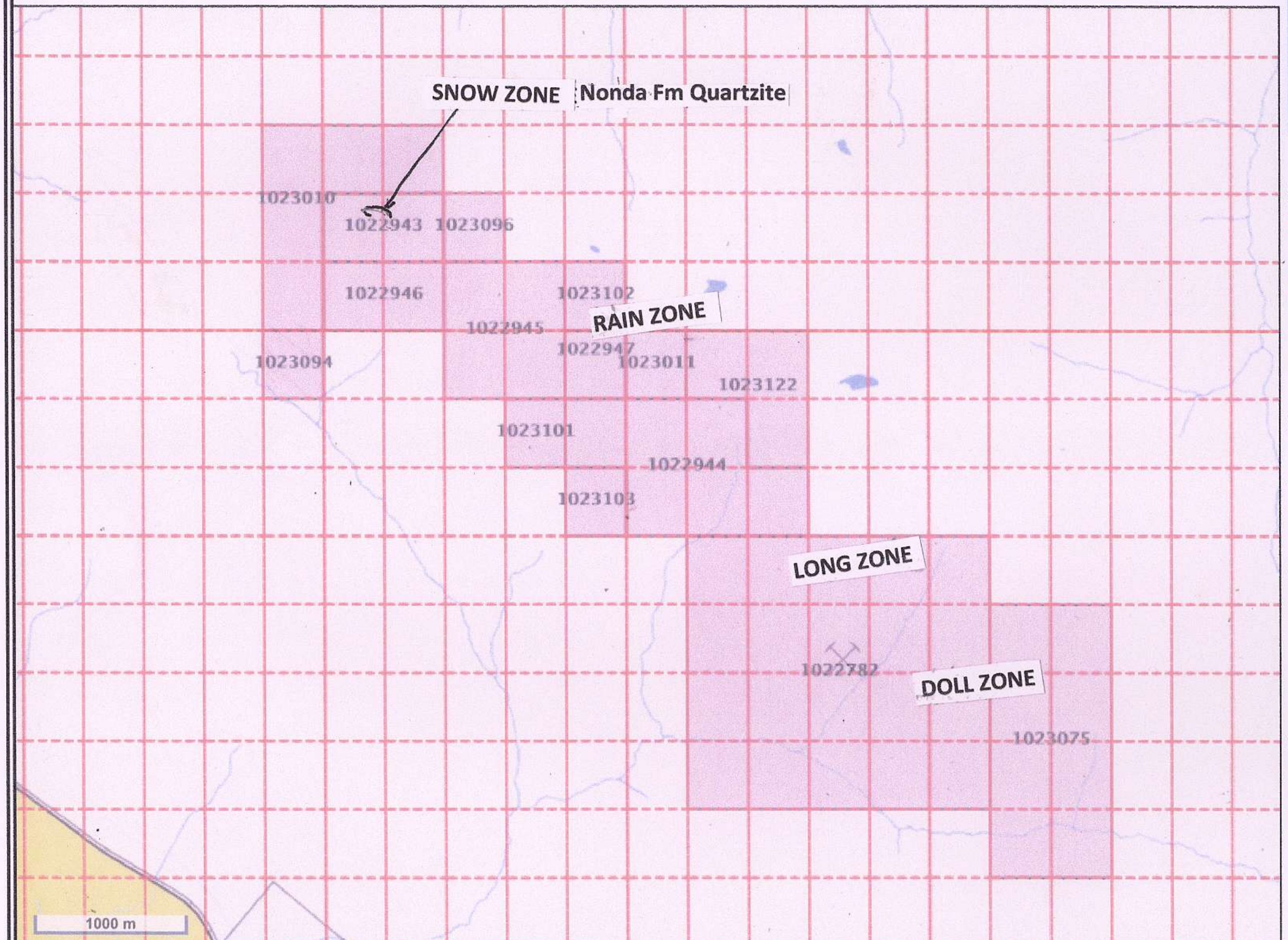
EMPR AR 1965-274
EMPR FIELDWORK 1982, p. 196
EMPR ASS RPT *14815
EMPR OF 1987-15, pp. 13-15
EMPR PF (Consolidated Silver Standard Mines Ltd. Annual Report 1988)
EMPR EXPL 1986-C342,343
GSC P 72-35, p. 89
GSC MAP 1424A

Fig 1 Longworth Silica Project General Location



BRITISH COLUMBIA

Fig 2 Longworth MTO Mineral Titles



Legend

Mineral Titles (MTO)

MTO Grid

Title (current)
- LEASE
- CLAIM

Reserves
- No Registration
- Conditional
- Heritage/Historic Site

Other Mining Layers

Mineral Occurrences (MINFILE)
- Producer
- Past Producer
- Developed Prospect
- Other

Crown Land Layers (Tantalis)

Land Act Survey Parcels - Tantalis - Legal Descriptions
- Label Text

Land Act Survey Parcels - Tantalis - Outlined

Administrative Boundaries

Federal Transfer Lands - Outlined

Federal Transfer Lands - Colour Filled

National Parks - Outlined
- National Parks

National Parks - Colour Filled

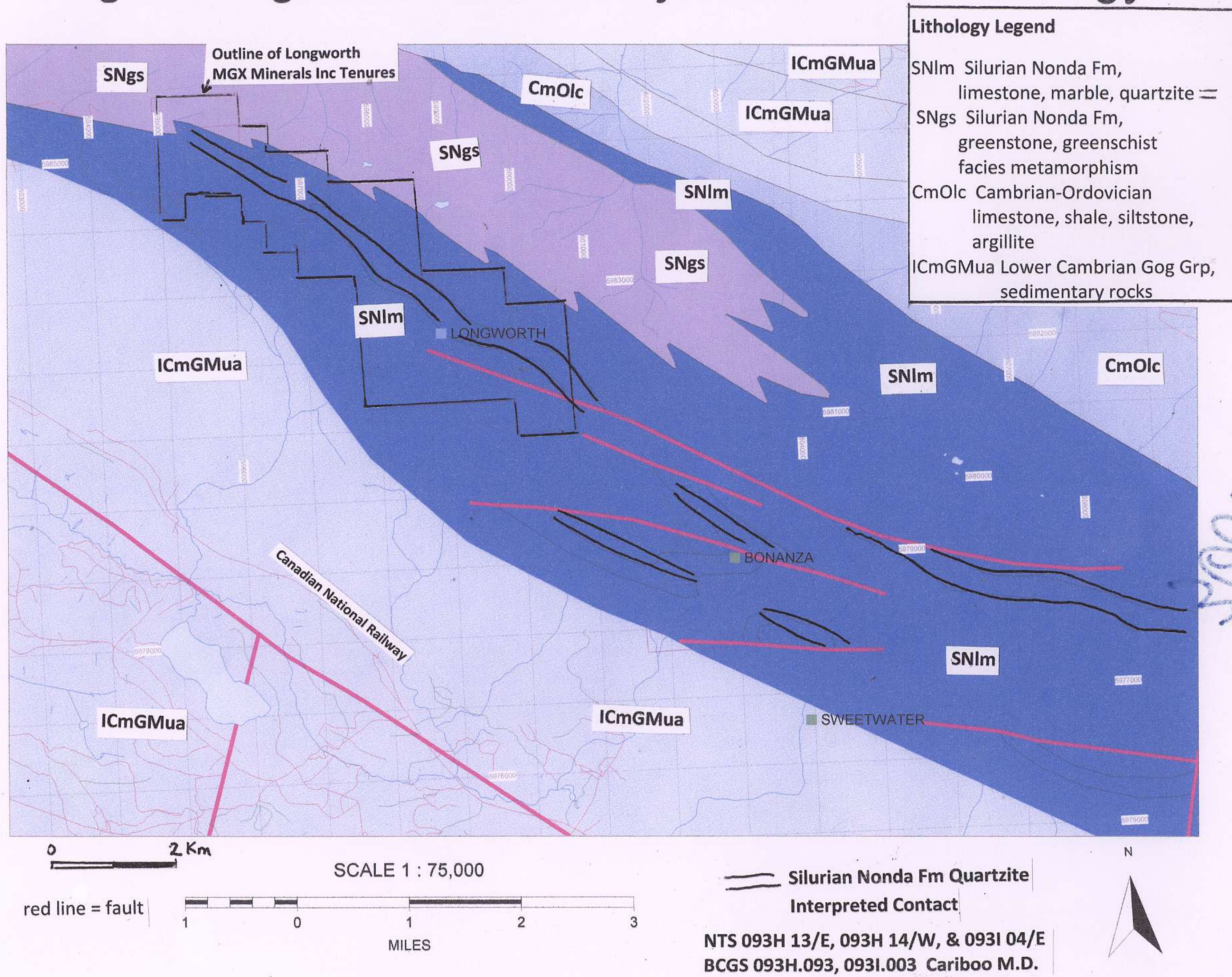
This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Printed using the Mineral Titles Online (MTO) application. NTS 093H 14/W, BCGS 093H.093, Cariboo Mining Division

Center: 53°59'28", -121°30'43"
Scale: 1 : 67,710
SRS: EPSG:3857
UTM Zone: 10

N

Fig 3 Longworth Silica Project General Geology



NTS 093H 13/E, 093H 14/W, & 093I 04/E

BCGS 093H.093, 093I.003 Cariboo M.D.

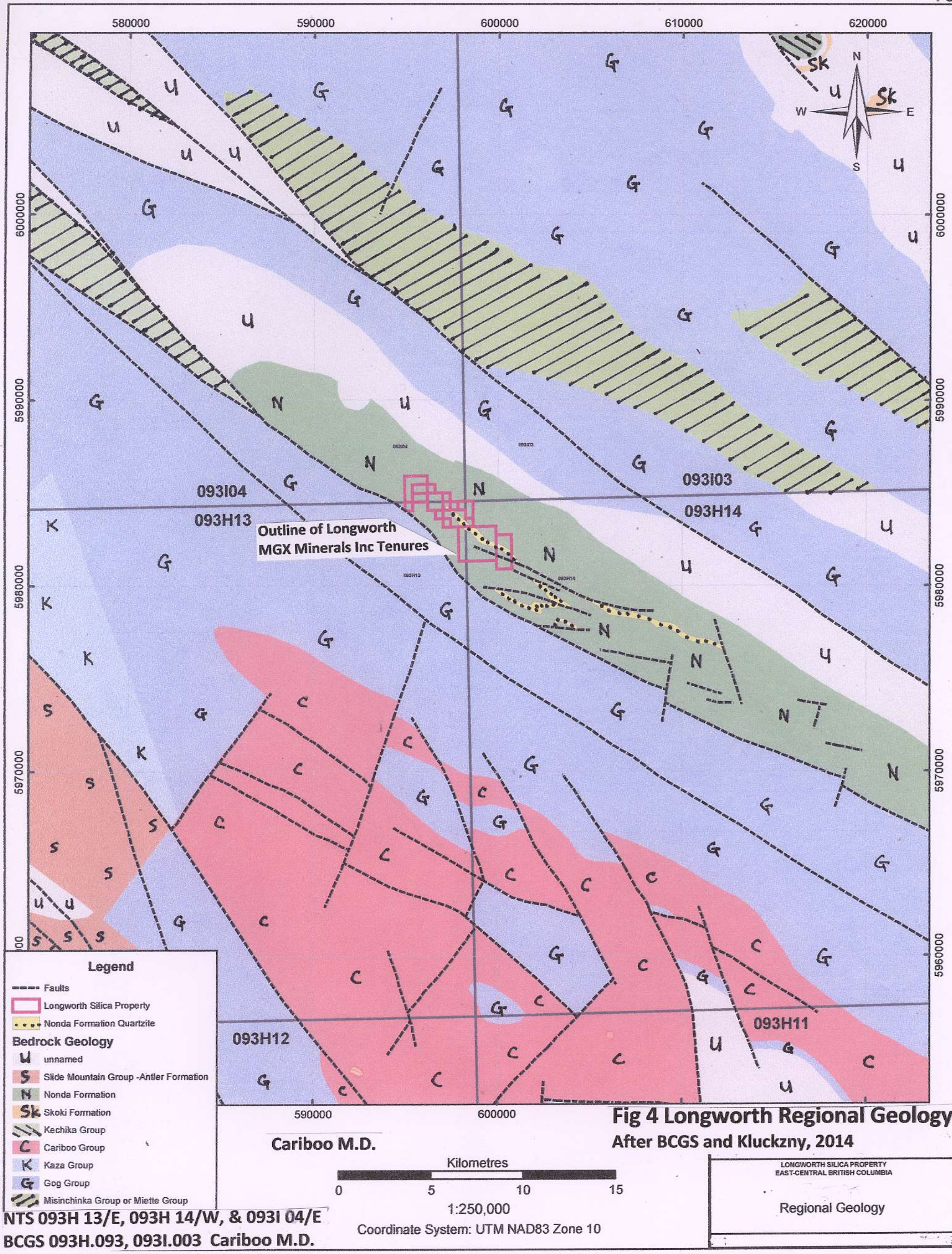
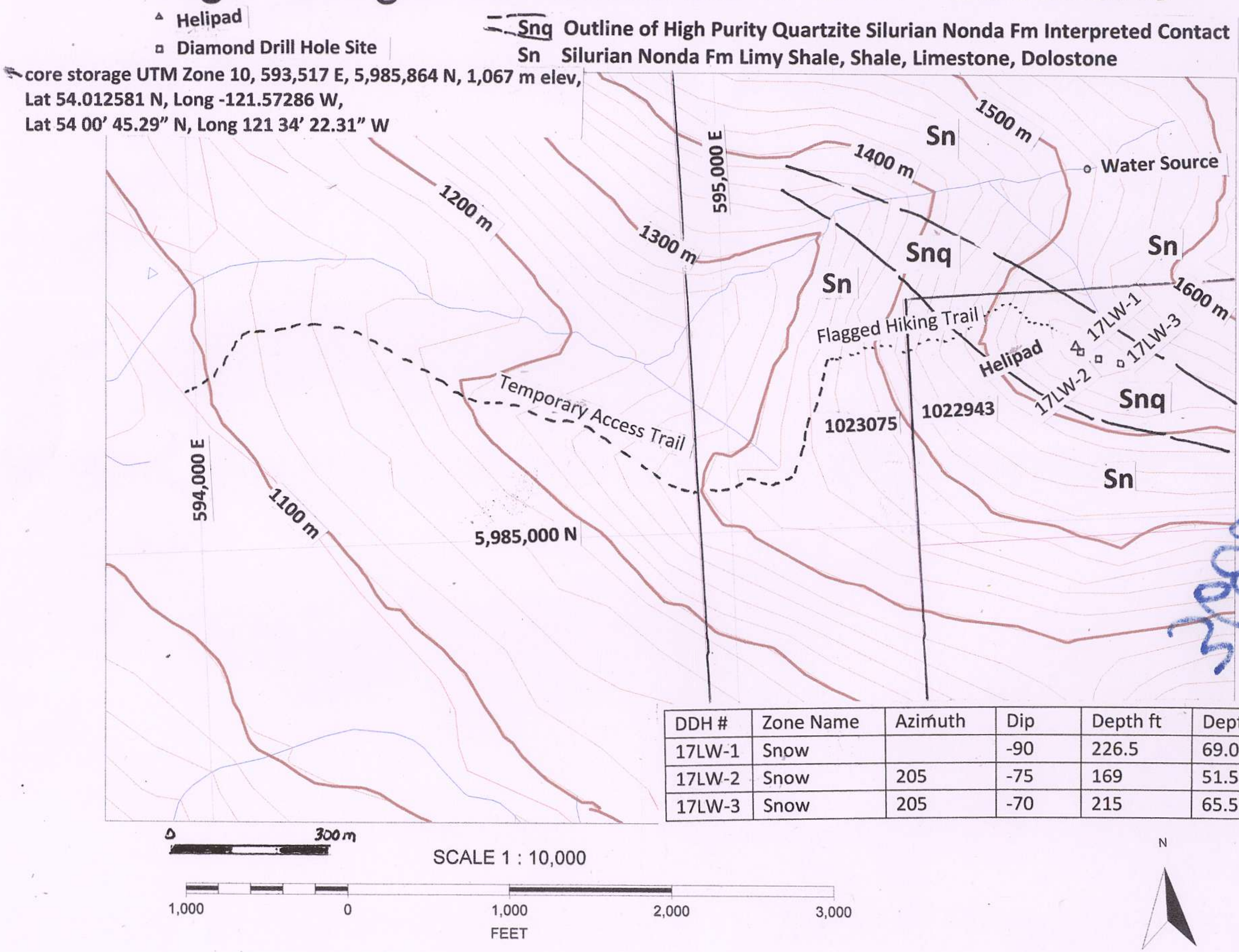


Fig 4 Longworth Regional Geology
After BCGS and Kluckzny, 2014

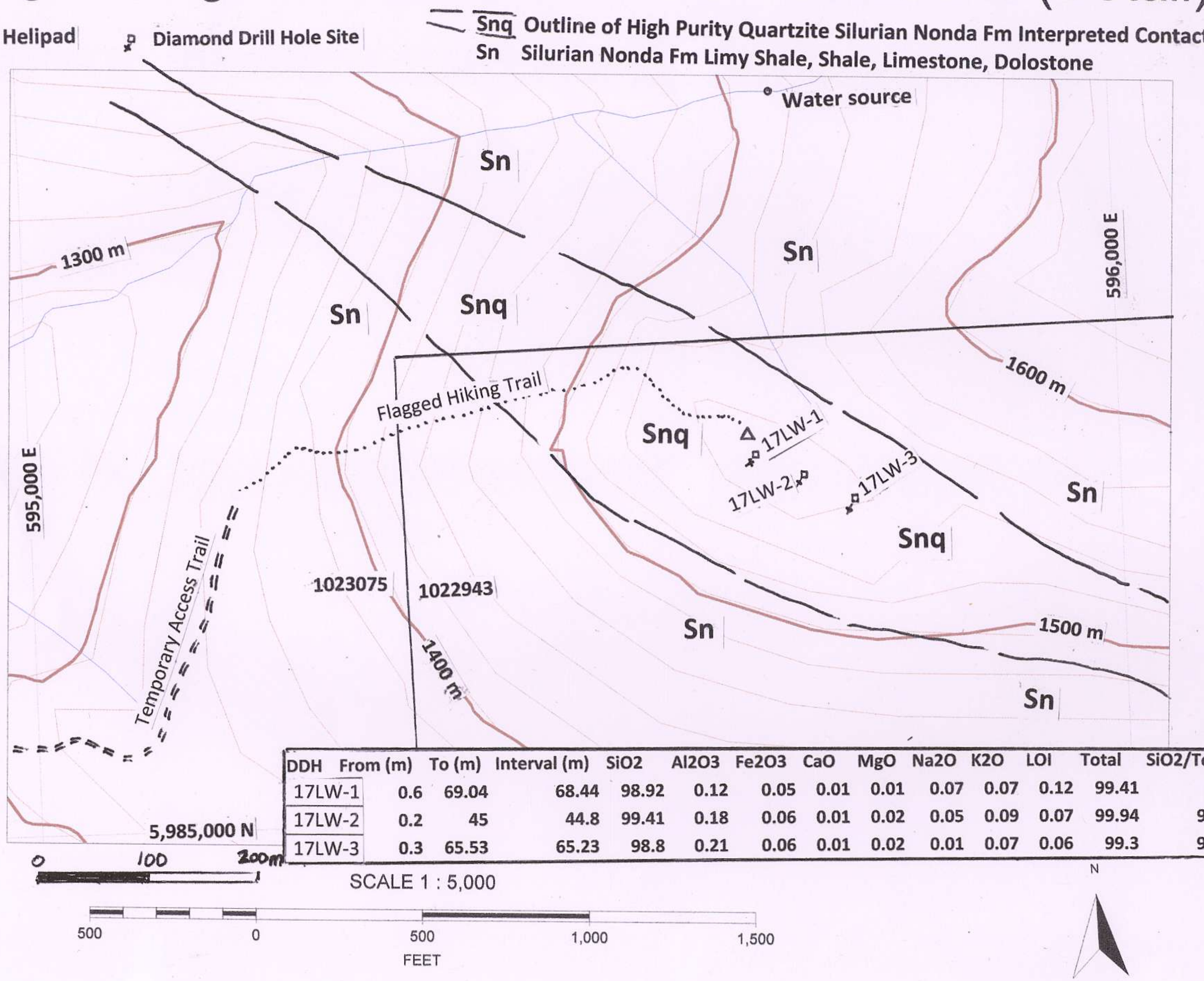
NTS 093H 13/E, 093H 14/W, & 093I 04/E
BCGS 093H.093, 093I.003 Cariboo M.D.

Fig 5 Longworth Silica 2017 DDH Locations

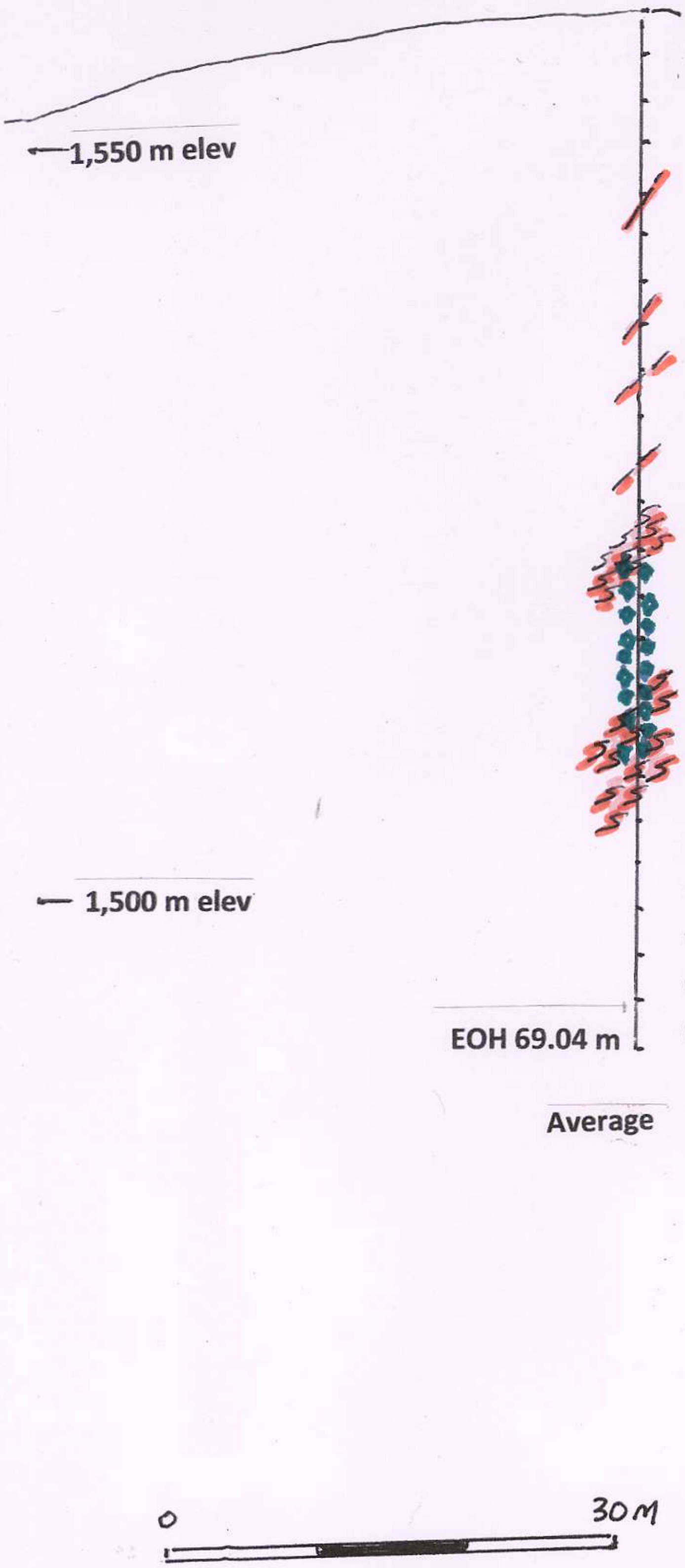


DDH #	Zone Name	Azimuth	Dip	Depth ft	Depth m
17LW-1	Snow		-90	226.5	69.04
17LW-2	Snow	205	-75	169	51.51
17LW-3	Snow	205	-70	215	65.53

Fig 6 Longworth Silica 2017 DDH Locations (Detail)



DDH	From (m)	To (m)	Interval (m)	SiO2	Al2O3	Fe2O3	CaO	MgO	Na2O	K2O	LOI	Total	SiO2/Total
17LW-1	0.6	69.04	68.44	98.92	0.12	0.05	0.01	0.01	0.07	0.07	0.12	99.41	99.5
17LW-2	0.2	45	44.8	99.41	0.18	0.06	0.01	0.02	0.05	0.09	0.07	99.94	99.45
17LW-3	0.3	65.53	65.23	98.8	0.21	0.06	0.01	0.02	0.01	0.07	0.06	99.3	99.51



SiO2 %	Al2O3 %	Fe2O3 %	LOI %	Total %	SiO2/Total
98.7	0.14	0.05	0.21	99.34	99.36
97.7	0.11	0.03	0.24	98.28	99.41
99.5	0.13	0.03	0.14	99.89	99.61
97.9	0.19	0.03	0.16	98.52	99.37
99.7	0.14	0.04	0.14	100.12	99.59
97.9	0.1	0.04	0.12	98.33	99.56
99.3	0.12	0.05	0.11	99.77	99.53
98.6	0.09	0.04	0.16	99.08	99.52
97.9	0.07	0.04	0.11	98.28	99.61
99.1	0.07	0.04	0.23	99.64	99.46
99.4	0.17	0.05	0.17	100.06	99.34
99.3	0.17	0.06	0.21	100.01	99.29
98.9	0.19	0.05	0.11	99.55	99.35
99.3	0.13	0.07	0.06	99.81	99.49
99.7	0.1	0.05	0.06	100.14	99.56
99.9	0.08	0.04	0.05	100.18	99.72
99.4	0.11	0.07	0.1	100	99.4
98.7	0.12	0.07	0.06	99.06	99.64
99.2	0.13	0.05	-0.03	99.59	99.61
99.4	0.12	0.03	0.08	99.71	99.46
98.9	0.1	0.07	0.12	99.44	99.46
97.9	0.12	0.04	0.05	98.36	99.53
98.8	0.11	0.04	0.14	99.3	99.5
Average 99	0.12	0.05	0.12	99.41	99.5

Fig 7 Longworth DDH 17LW-1 Cross-Section (Looking WNW, Az 295)

Scale 1:500 (1 cm equivalent to 5 m), MTO Tenure Snow 1022943, Cariboo M.D.

Fault — Broken Ground — Re-crystallized quartz porphyryblast

Geochemical Analysis ALS Global ME-ICP06 Certificate VA17186466

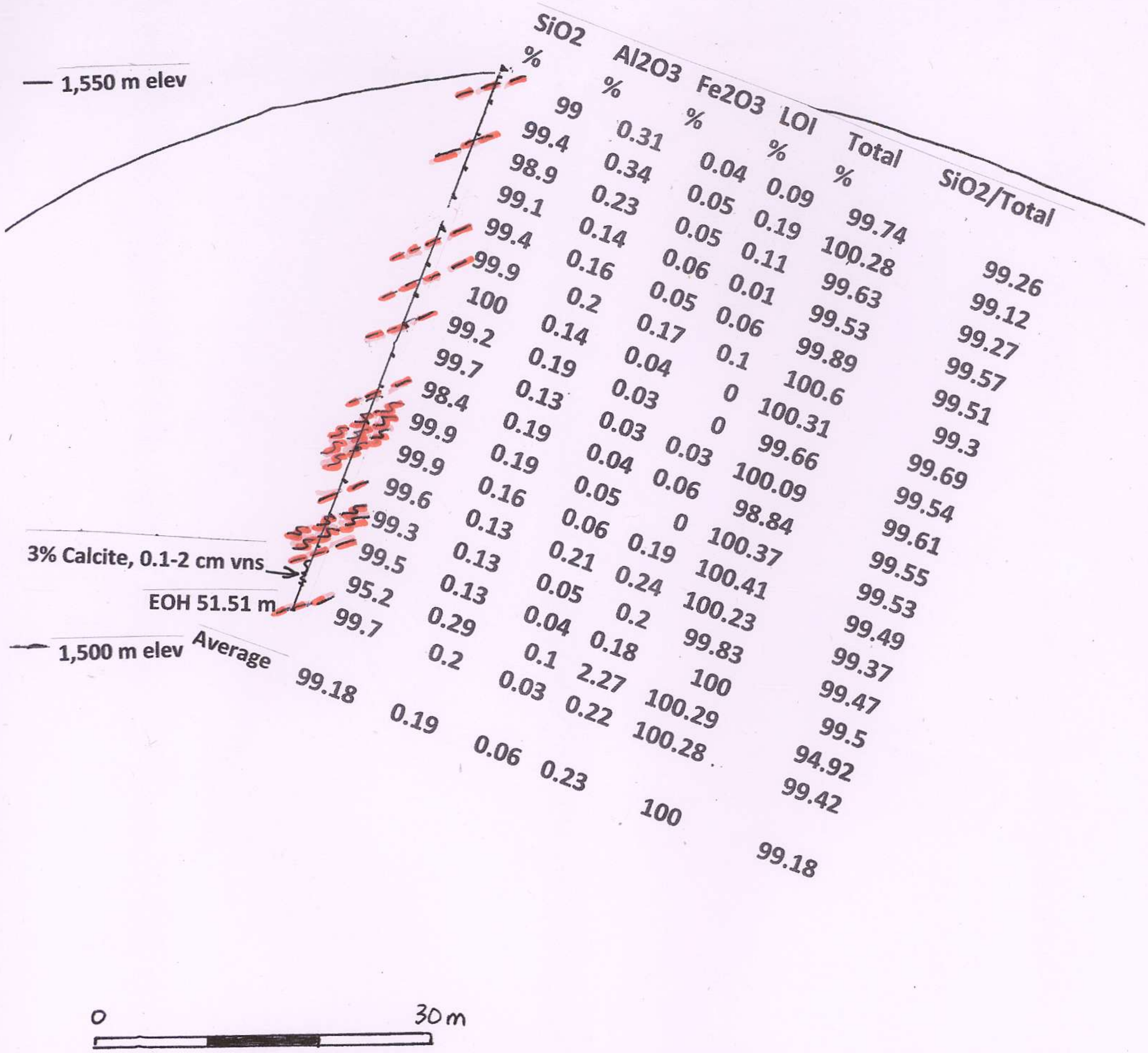
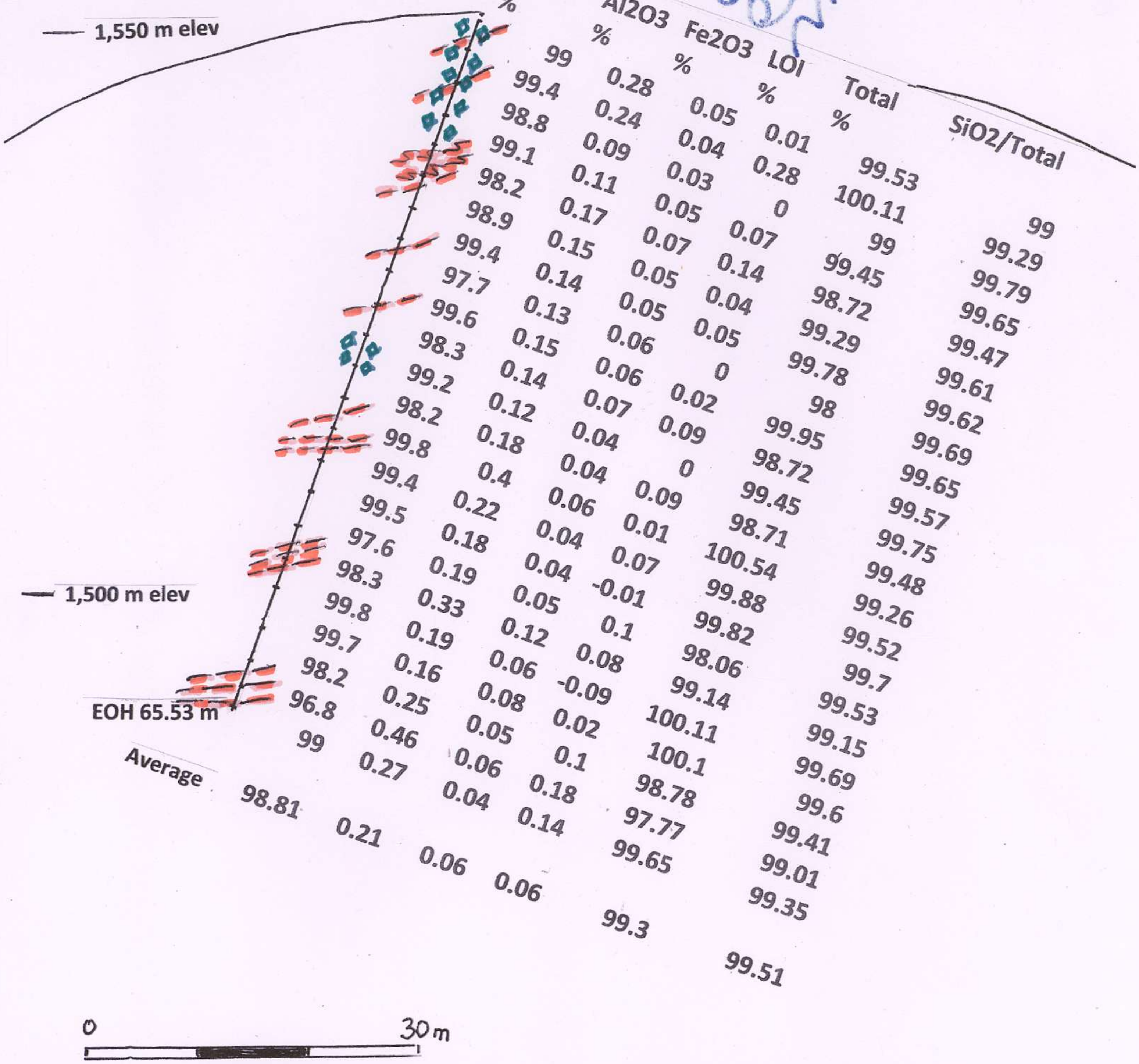


Fig 8 Longworth DDH 17LW-2 Cross-Section (Looking WNW, Az 295)

Scale 1:500 (1 cm equivalent to 5 m), MTO Tenure Snow 1022943, Cariboo M.D.

Fault — Broken Ground — Re-crystallized quartz porphyryblast

Geochemical Analysis ALS Global ME-ICP06 Certificate VA17186466



SiO2 %	Al2O3 %	Fe2O3 %	LOI %	Total %	SiO2/Total
99	0.28	0.05	0.01	99.53	99
99.4	0.24	0.04	0.28	100.11	99.29
98.8	0.09	0.03	0	99	99.79
99.1	0.11	0.05	0.07	99.45	99.65
98.2	0.17	0.07	0.14	98.72	99.47
98.9	0.15	0.05	0.04	99.29	99.61
99.4	0.14	0.05	0.05	99.78	99.62
97.7	0.13	0.06	0	98	99.69
99.6	0.15	0.06	0.02	99.95	99.65
98.3	0.14	0.07	0.09	98.72	99.57
99.2	0.12	0.04	0	99.45	99.75
98.2	0.18	0.04	0.09	98.71	99.48
99.8	0.4	0.06	0.01	100.54	99.26
99.4	0.22	0.04	0.07	99.88	99.52
99.5	0.18	0.04	-0.01	99.82	99.7
97.6	0.19	0.05	0.1	98.06	99.53
98.3	0.33	0.12	0.08	99.14	99.15
99.8	0.19	0.06	-0.09	100.11	99.69
99.7	0.16	0.08	0.02	100.1	99.6
98.2	0.25	0.05	0.1	98.78	99.41
96.8	0.46	0.06	0.18	97.77	99.01
99	0.27	0.04	0.14	99.65	99.35
Average 98.81	0.21	0.06	0.06	99.3	99.51

Fig 9 Longworth DDH 17LW-3 Cross-Section (Looking WNW, Az 295)

Scale 1:500 (1 cm equivalent to 5 m), MTO Tenure Snow 1022943, Cariboo M.D.

Fault — Broken Ground — Re-crystallized quartz porphyryblast

Geochemical Analysis ALS Global ME-ICP06 Certificate VA17194346