2014 YMEP Target Evaluation Assessment Report

Livingstone Property,
Whitehorse Mining District

YMEP No. 14-093

Goldspike Exploration Inc.

Author: D. Ferraro, HBSc.
Date: January 10th, 2015
Claims: 'LIV' 1-66 (YD119011 – YD119076), 'LT' 1-3 (YD155673 - YD155675),
'LT' 5-8 (YD155677 – YD155680), 'LT' 9 (YD155690), 'LTE' 1-8 (YD155681-YD155688), 'LTE' 9-18 (YD155985-YD155994), 'LTE' 19-26 (YE77275-YE77282)
NTS Mapsheet: 105E08
UTM Coordinates: E538000, N6805000 (NAD83, Zone 8)
Owner: Goldspike Exploration Inc.

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1.0 SUMMARY

This document contains a summary of information necessary to evaluate a Yukon Mineral Exploration Program (YMEP) grant application for a 2014 exploration program on the Livingstone Property in the Whitehorse Mining District that is owned by Goldspike Exploration Inc.

The Livingstone Property is located approximately 85 km northeast of Whitehorse, YT. The property is accessible by fixed-wing aircraft using the Livingstone airstrip (30-40 minute flight time) or a helicopter out of Whitehorse. There are 4x4 trails on the property including one that extends from the airstrip to the southern boundary. There is also a winter road that sees some use. It is approximately a 121 km drive to Whitehorse via Lake Laberge.

Geologically, the property is located within the Yukon-Tanana Terrane; a composite of crustal blocks including former volcanic island arc and continental shelf depositional environments. The present claims extend far enough east to cover the contact between an Early Mississippian intrusion and Devonian metaquartzite and schist at the headwaters of Lake and Cottoneva Creeks. Glacial overburden is abundant in the area, especially within the creek valleys.

The area has an extensive placer history dating back to the 1880s. Hardrock exploration has been limited. The property was acquired by Goldspike Exploration Inc. in 2011, worked by Goldstrike Resources Ltd., and returned to Goldspike in 2013.

The 2014 work program consisted of 3 phases:

- Phase 1: Prospecting and geochemical sampling
- Phase 2: IP and ground magnetometer surveys
- Phase 3: Airborne magnetic and radiometric surveys

Two distinct, NNW-trending, 800m long IP anomalies were uncovered at the Main Zone (a quartz vein showing assaying 10 g/t Au with anomalous Ag, Pb, Cu, Hg, Te and Se). A geochemical grid showed anomalous gold and base metals following the geophysical anomalies, the most correlative element being selenium. Magnetic data shows the geological contact to the orthogneiss unit to the east as well as a series of NW to NNW- trending structures. Geochemical evidence and literature support an epithermal depositional model, possibly low sulfidation. A drill program is recommended on the Main Zone as a series of ENE-azimuth holes dipping 45-60 degrees along both IP anomalies.

The North Zone did not display any continuous magnetic or geochemical features, however new gossanous units were found assaying 643 ppb Au. A saddle to the northwest of the Main Zone displayed gold-in-soil values up to 86 ppb and displays similar magnetic, topographical, and geochemical traits to the Main Zone. Pending results at the Main Zone, a second IP survey is recommended here. Further prospecting and potentially staking is recommended to the north of the claim block in the Little Violet Creek area.

2.0 INTRODUCTION

This document contains a summary of information necessary to evaluate a Yukon Mineral Exploration Program (YMEP) grant application for a 2014 exploration program on the Livingstone Property, Whitehorse Mining District, Yukon that is owned by Goldspike Exploration Inc. of Toronto, ON. Field work was performed by Druid Exploration Inc. of Dawson City, Yukon; the author of this report; Aurora Geophysics of Whitehorse, Yukon; and Precision Geophysics of Vancouver, BC. The report text and maps were produced by D. Ferraro, of Ferraro Consulting Ltd. of Woodstock, ON and Daithi MacGearailt of Druid Exploration Inc.

3.0 PROPERTY LOCATION AND ACCESS

The Livingstone Property is located approximately 85 km northeast of Whitehorse, YT (Figure 1). The property is accessible by fixed-wing aircraft using the Livingstone airstrip (30-40 minute flight time) or a helicopter out of Whitehorse. There are 4x4 trails on the property including one that extends from the airstrip, up Lake Creek, and to the southern boundary. There is also a winter road from Whitehorse to the airstrip and the Little Violet Creek placer camp that sees some use. It is approximately a 121 km drive to Whitehorse via Lake Laberge.

The approximate center of the property is located at UTM coordinates E538000, N6805000 (NAD83, Zone 8).

4.0 TOPOGRAPHY, VEGETATION, AND CLIMATE

The Livingstone Property is located in a sparsely forested area of high rolling hills to rough mountainous terrain. It covered numerous large creek drainage systems including Cottoneva Creek, Summit Creek and Lake Creek. Topographically, the property ranges from 1500 m at peaks to 1000 m in the creek drainages. The airstrip is at ~800 m elevation.

Vegetation in the area is relatively sparse. Moss, lichen, grasses and buck brush cover much of the higher slopes throughout the property. Willow, buck-brush and black spruce are found spread-out through the valleys, along with other varieties of moss and long grasses.

The Yukon has a subarctic continental climate with a mean summer temperature of 10 degrees celcius and a mean winter temperature of -23 degrees celcius. Temperature extremes of 35 degrees and -55 degrees celcius are common in the summer and winter, respectively.

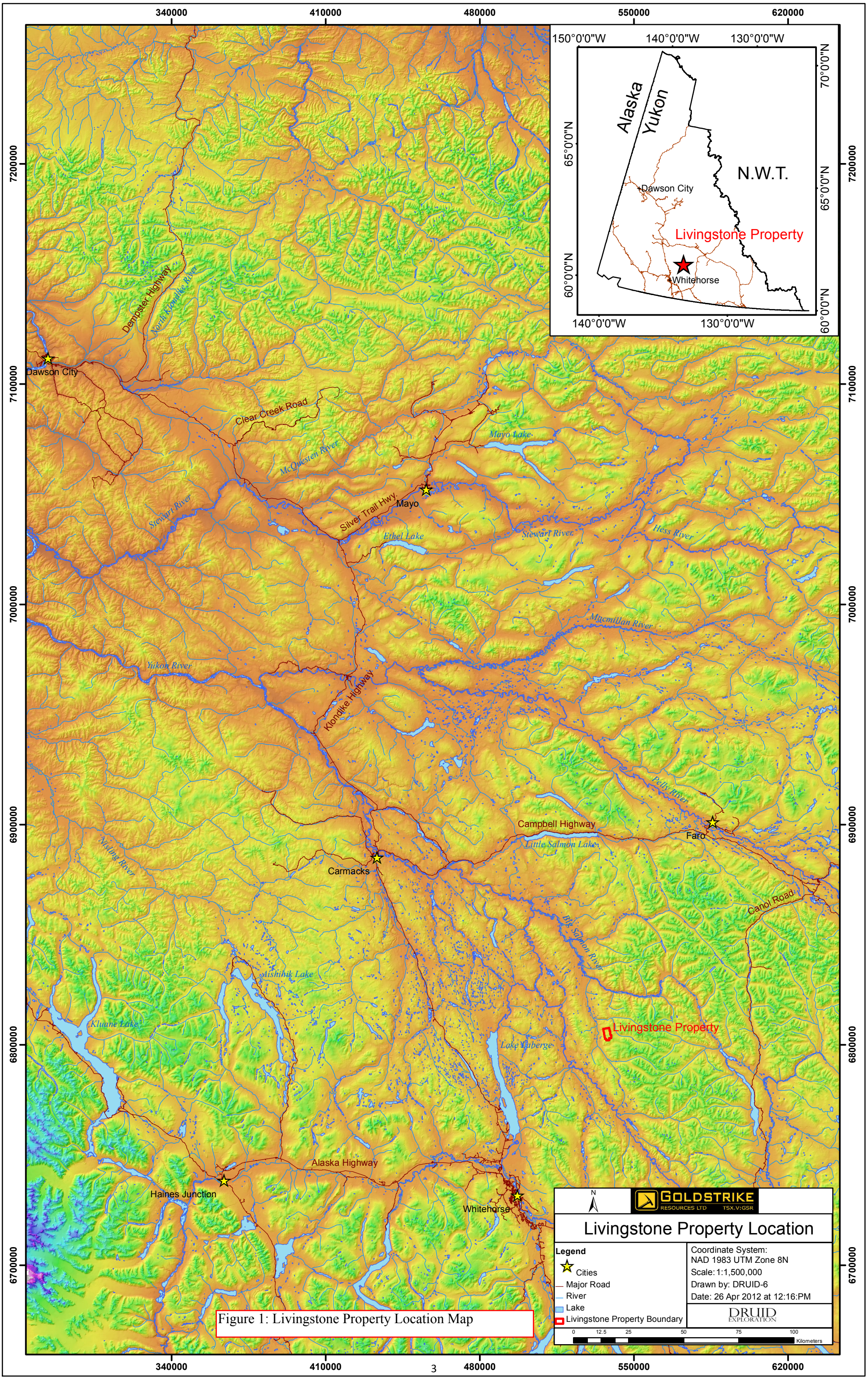

Figure 1: Livingstone Property Location Map

5.0 PROPERTY DESCRIPTION

The Livingstone Property consists of 100 contiguous quartz claims in the Whitehorse Mining District, mapsheet 105E08 (see Figure 2 for claim map). The 74 'LIV' and 'LT' claims were staked in 2011 and have been briefly worked by Goldstrike Resources Ltd. (under option from Goldspike) and Goldspike Exploration Inc. The 26 'LTE' claims were staked in 2013 and were worked by Goldspike in 2014. All claims are owned 100% by Goldspike Exploration Inc. of Toronto, Ontario. A complete list of the mining claims that make up the Livingstone Property is as follows:

Table 1: Claims comprising the Livingstone Property.

Claim name	Claim No.	Grant No.	Claim Owner	%	Claim Expiry Date	Status
LIV	1	YD119011	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	2	YD119012	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	3	YD119013	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	4	YD119014	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	5	YD119015	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	6	YD119016	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	7	YD119017	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	8	YD119018	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	9	YD119019	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	10	YD119020	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	11	YD119021	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	12	YD119022	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	13	YD119023	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	14	YD119024	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	15	YD119025	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	16	YD119026	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	17	YD119027	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	18	YD119028	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	19	YD119029	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	20	YD119030	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	21	YD119031	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	22	YD119032	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	23	YD119033	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	24	YD119034	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	25	YD119035	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	26	YD119036	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	27	YD119037	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	28	YD119038	Goldspike Exploration Inc.	100	30/11/2021	Active

LIV	29	YD119039	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	30	YD119040	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	31	YD119041	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	32	YD119042	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	33	YD119043	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	34	YD119044	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	35	YD119045	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	36	YD119046	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	37	YD119047	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	38	YD119048	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	39	YD119049	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	40	YD119050	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	41	YD119051	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	42	YD119052	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	43	YD119053	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	44	YD119054	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	45	YD119055	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	46	YD119056	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	47	YD119057	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	48	YD119058	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	49	YD119059	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	50	YD119060	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	51	YD119061	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	52	YD119062	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	53	YD119063	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	54	YD119064	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	55	YD119065	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	56	YD119066	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	57	YD119067	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	58	YD119068	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	59	YD119069	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	60	YD119070	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	61	YD119071	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	62	YD119072	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	63	YD119073	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	64	YD119074	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	65	YD119075	Goldspike Exploration Inc.	100	30/11/2021	Active
LIV	66	YD119076	Goldspike Exploration Inc.	100	30/11/2021	Active
LT	1	YD155673	Goldspike Exploration Inc.	100	28/09/2021	Active
LT	2	YD155674	Goldspike Exploration Inc.	100	28/09/2021	Active
LT	3	YD155675	Goldspike Exploration Inc.	100	28/09/2021	Active

LT	5	YD155677	Goldspike Exploration Inc.	100	28/09/2021	Active
LT	6	YD155678	Goldspike Exploration Inc.	100	28/09/2021	Active
LT	7	YD155679	Goldspike Exploration Inc.	100	28/09/2021	Active
LT	8	YD155680	Goldspike Exploration Inc.	100	28/09/2021	Active
LT	9	YD155690	Goldspike Exploration Inc.	100	28/09/2021	Active
LTE	1	YD155681	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	2	YD155682	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	3	YD155683	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	4	YD155684	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	5	YD155685	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	6	YD155686	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	7	YD155687	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	8	YD155688	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	9	YD155985	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	10	YD155986	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	11	YD155987	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	12	YD155988	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	13	YD155989	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	14	YD155990	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	15	YD155991	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	16	YD155992	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	17	YD155993	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	18	YD155994	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	19	YE77275	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	20	YE77276	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	21	YE77277	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	22	YE77278	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	23	YE77279	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	24	YE77280	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	25	YE77281	Goldspike Exploration Inc.	100	22/08/2019	Active
LTE	26	YE77282	Goldspike Exploration Inc.	100	22/08/2019	Active

Livingstone Property

Fig. 2: Claim Location Map

Goldspike Exploration Inc.

Cottoneva Creek area,
Whitehorse Mining District

Legend

- LIV claims
- LT claims
- LTE claims
- Yukon quartz claims

1:25,000

0 187.5 375 750 1,125 1,500 Meters

Date: November, 2014
Mapsheets: 105E08
Datum: UTM NAD83 Zone 8

535000 536000 537000 538000 539000 540000 541000 542000

6807000 6806000 6805000 6804000 6803000 6802000

Mendocina Creek
Lake Creek
Summit Creek

LIV1 YD119011
LIV2 YD119012
LIV3 YD119013
LIV4 YD119014
LIV5 YD119015
LIV6 YD119016
LIV7 YD119017
LIV8 YD119018
LIV9 YD119019
LIV10 YD119020
LIV11 YD119021
LIV12 YD119022
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LIV65 YD119075
LIV66 YD119076

LT1 YD155673
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LT3 YD155675
LT4 YD155676
LT5 YD155677
LT6 YD155678
LT7 YD155679
LT8 YD155680
LT9 YD155690

LTE1 YD155681
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LTE3 YD155683
LTE4 YD155684
LTE5 YD155685
LTE6 YD155686
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LTE21 YE77277
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LTE23 YE77279
LTE24 YE77280
LTE25 YE77281
LTE26 YE77282

6.0 PROPERTY HISTORY

Exploration in the Livingstone Creek area began in the 1880s when early prospectors found placer gold in river bars while travelling the Big Salmon River. As more substantial amounts were found on the Yukon River to the northwest, more prospectors began to explore the area. Livingstone Creek itself was first prospected by Joseph E. Peters in 1894. However the first major discovery in the area was in Cottoneva Creek in 1898 which led to the establishment of the Livingstone Camp (Levson, 1992). The other creeks in the area also were shown to host significant amounts of course gold. In 1905 a 39 ounce nugget was found on Summit Creek, a drainage immediately north of Livingstone. Although the camp hosted as many as 1500 people, placer production for the entire area almost ceased for about 20 years after WWI. After this period, production resumed and the creeks of the Livingstone camp have been continuously mined up to the present.

Little is known about early hard rock exploration in the area. It is assumed that some efforts to locate the lode source were made, and some small veins mined, but no significant find has been recorded. During the 1970s prospectors began to stake quartz claims in the area and carry out exploration. Gold prices during the 1980s led to junior exploration companies taking an interest. Table 2 below highlights some of the more recent hardrock exploration in the Livingstone area.

Table 2: Recent hardrock exploration in the Livingstone area.
:

Year	Company	Type of Work	Description/Results
1981	DuPont Exploration	Regional stream sediment survey	DuPont Exploration of Canada conducted a large widespread regional stream sediment survey across approximately 20,000 sq. km of land in southern Yukon and northern British Columbia. The Livingstone area was detected in that survey as having an anomalous gold and copper signature.
1983	Archer, Cathro & Associates	Trenching	Trenching was performed on the Horseshoe claim on Livingstone Creek to excavate an old adit on the claims (origin unknown). Adit was of interest due to mineralized vein quartz piled on surface with Au values up to 1.58 oz/ton and silver values up to 35 oz/ton. Adit was found to be small and caved in with discontinuous quartz veins with traces of galena-sphalerite mineralization. A fault was found across the face of the adit which is presumed to have terminated the Au mineralized vein (Cathro, 1983).
1992	Stroink and Friedrich	Geological report	In the early 1990's two German geologists conducted research on mineralized quartz-carbonate veins in the Livingstone area. They determined the mineralization is structurally controlled by NNE-striking faults and a set of NNW-trending joints. They concluded that veins carrying gold in the area were of epithermal origin and could be the

			source for the coarse placer gold at Livingstone because of chemical similarities between placer gold and gold from local quartz veins (Stroink and Friedrich, 1992).
1996	Edward Kosmonko	Grassroots prospecting, hand trenching	Kosmonko performed numerous traverses around the Livingstone area. Located a quartz field which he was unable to sample due to conditions. Located some small galena in quartz boulder showings (Kosmonko, 1996).
1997-present	Larry Carlyle	Rock, soil, stream sediment sampling; trenching; VLF-EM survey,	Geologist and prospector Larry Carlyle holds the CAM claims that cover numerous creeks adjacent to the west of Goldspike's property. Claims also cover the Horseshoe adit. Economic gold grades have been located at the Horseshoe adit over a strike length of 200m. Silicification is strongest at Livingstone Creek and gets weaker towards the north. Skarn mineralization was located at Little Violet Creek. Gold-in-soil anomalies were found but may have experienced glacial transport (Carlyle, 2000).
2005	Cordilleran Minerals Ltd.	Soil sampling	A soil sampling program was conducted on the large Liv Property (slightly north of Goldspike's property) to test for gold and copper mineralization associated with a large, circular landsat feature (interpreted to be a radial dike structure caused by recessive weathering over a buried intrusion). Five hundred and fifty-nine samples were taken, but sampling conditions were not ideal. "Assay results from the soil survey show anomalous enrichment in intrusion related mineralization over the central part of the circular structural. The most significant geochemical values occur, and appear to be directly associated, with the ring structures. Assay values as high as 100 ppb Au, 12.5 ppm Ag, 208 ppm Cu, 2222 ppm Pb, 3470 ppm Zn, 4328 ppm Mn, 170 ppm As, 12 ppm Sb, 4.5 ppm Bi, and 320 ppb Hg were encountered during the survey.." Further geophysical surveys recommended (Lindsay, 2005).
2004-2006	Maurice Colpron	Geological mapping	Colpron has produced numerous reports for the Yukon government as well as a detailed regional geological map for the Livingstone area.
2011-2012	Goldstike Reources Ltd.	Ground Magnetometer, ground spectrometer, geochemical survey	One >8 g/t Au rock sample of float. Magnetic data showed mag lows and highs consistent with mapped geology. Radiometric data indicated distinct areas of potassic alteration and, in the area of the high-Au rock sample looks related to a linear potassic feature 350m in length. Another prospective zone of mineralization at the central-east boundary yielded 802 ppb Au in a galena-chalcopyrite-malachite-azurite quartz vein.
2013	Goldspike Exploration Inc.	Prospecting, geological reconnaissance	Goldstrike's 8g/t Au float sample was followed up upon. Bedrock was located and a 10 g/t Au sample was retrieved with a similar geochemical signature. Sample was found to be at a contact of biotite schist and silicified gneiss.

7.0 GEOLOGY

7.1 Regional Geology

The Livingstone Property is located within the Yukon-Tanana Terrane; a middle to Upper Paleozoic metamorphosed assemblage which extends from central Alaska though central Yukon to northern British Columbia. It consists of polymetamorphosed and polydeformed metasediments, metavolcanics, and metaplutonic rocks. The terrane is cut by the Tintina Fault, a right-lateral strike-slip fault which occurs along the suture zone between the Yukon Tanana Terrane to the southwest and ancestral North America to the northeast.

Colpron (2006) describes the geology of the area as follows:
"The Yukon-Tanana Terrane in the Livingstone Creek area comprises five successions of metasedimentary and metavolcanic rocks which range in age from pre-Upper Devonian to lower Mississippian. They are correlated with Lower Mississippian and older strata in the Glenlyon and Finlayson Lake areas. Yukon-Tanana rocks are intruded by at least five plutonic suites, ranging in age from Late Devonian to Late Cretaceous. The structural style of the area is dominated by a transportation foliation which is axial planar to isoclinal folds of an earlier foliation. The transportation foliation is itself folded by northeast-verging open fold." (Figure 3)

The Livingstone area has been glaciated on at least 3 separate occasions, termed pre-Reid, Reid and McConnell. The onset of the most recent glaciation, the McConnell, has been dated at less than 29 Ka, and the retreat dated at 10.3 Ka (Lebarge, 1996). Placer gold at the Livingstone camp was spared the usual scouring and erosive action of glaciation due to the east-west trending valleys, which are transverse to the direction of ice movement. Auriferous interglacial gravels formed between the Reid and McConnell glaciations and were buried by several meters of glacial drift, later to be uncovered by post-glacial fluvial reworking (Levson, 1992).

7.2 Property Geology

Geological observations on the property generally conform to Colpron's (2006) map. The property is dominantly underlain by Upper Devonian biotite-muscovite-chlorite schist of the Snowcap Complex. It strikes 150-180 degrees and dips 40-70 degrees to the west. Large quartz veins up to 5 meters wide are present in this unit, often bearing minor pyrite. This unit is bounded to the east by Early Mississipian orthogneiss, generally felsic in nature. Minor hornfels and skarnification was observed near contacts with the mica schist. The orthogneiss typically strikes 140-160 degrees and dips west; however, some areas of contact between the schist and gneiss at the North Zone dip to the east. An ENE-trending fault is mapped in the northeast area of the property, offsetting the orthogneiss. Slickenslides were observed in outcrop in this area.

There are small outcroppings of black phyllite, specifically around the Main Zone. This unit is part of the Snowcap Complex and occurs as lenses within mica schist. It is locally silicious which

is likely related to hydrothermal activity. Auriferous quartz veins occur within this unit, often with graphite indicating a shear zone. Outcroppings of Snowcap Complex marble and limestone were also observed within the mica schist.

Unmapped outcrops of ultramafic intrusive were found during prospecting and reconnaissance. These rocks grade from gabbro to serpentinite. Outcrops are generally less than 5m wide and often contain a contact to host rock. They occur on the boundary between the biotite schist and orthogneiss, usually with an orthogneiss host. In the North Zone area, quartz stockwork with medium grained pyrite was observed with the ultramafics.

Also unmapped in the North Zone are outcrops of quartzite within the mica schist, likely part of the Snowcap Complex. Small seams (0.5 -2m) of pyritiferous gossan were observed within these units.

Livingstone Property

Figure 3: Geology of the Livingstone area

Goldspike Exploration Inc.

Cottoneva Creek area, Whitehorse Mining District

1:40,000

Mapsheets: 105E08
Datum: UTM NAD83 Zone 8

Modified from Colpron (2006)
See next page for legend

530525 532525 534525 536525 538525 540525 542525 544525 546525

6809719 6807719 6805719 6803719 6801719 6799719

Livingstone Property

LEGEND

QUATERNARY

Q — QUATERNARY: unconsolidated glacial, glaciofluvial and glaciolacustrine deposits; fluviatile silt, sand, and gravel, and local volcanic ash, in part with cover of soil and organic deposits

INTRUSIVE ROCKS

LATE CRETACEOUS

LKg — LAST PEAK GRANITE: fine- to medium-grained, weakly foliated biotite granite, locally K-feldspar porphyritic, commonly protomylonitic (U/Pb monazite - 96 ± 1 Ma).

EARLY CRETACEOUS

EKg — DYCER CREEK STOCK: medium- to coarse-grained, unfoliated, biotite quartz monzonite (U/Pb monazite - 112 ± 1 Ma).

PERMIAN

Pfs — fine-grained, rusty weathering, strongly foliated felsic schist (U/Pb zircon - 260 ± 2 Ma).

Pg — variably foliated, medium- to coarse-grained muscovite-biotite leucogranite, locally pegmatitic (U/Pb zircon - ca. 285 Ma).

EARLY MISSISSIPPIAN

EMt — strongly foliated, light to medium grey, fine-grained tonalite gneiss; medium-grained, equigranular, strongly foliated hornblende-biotite granodiorite gneiss (U/Pb zircon - 351 ± 1 Ma).

LATE DEVONIAN - EARLY MISSISSIPPIAN

DMg — moderately to strongly foliated, K-feldspar augen two-mica granite; protomylonitic to mylonitic near d'Abbadie fault (U/Pb zircon - 355 ± 7 Ma, 358 ± 1 Ma). South of Mendocina Creek, variably foliated, fine- to medium-grained hornblende-biotite diorite, locally K-feldspar porphyritic granodiorite (U/Pb zircon - ca. 369 Ma).

LAYERED ROCKS

STIKINIA

UPPER TRIASSIC - JURASSIC?

Semenof formation (Simard, 2003)

uTSf — PORPHYRITIC FLOW MEMBER: light to medium grey/green clinopyroxene-plagioclase-phyric basalt, locally brecciated and/or amygdaloidal (uTSfc); medium to dark green amphibole-clinopyroxene-plagioclase-phyric basalt, locally brecciated (uTSfa).

uTSv — VOLCANICLASTIC MEMBER: massive dark green, brown, purple and/or red, pebble to cobble volcanic conglomerate (uTSvc); well-bedded, light green, coarse-grained crystal and lithic tuff grading into fine-grained ash-tuff, minor lapilli tuff (uTSvt); massive, light to dark grey volcanic sandstone, minor black argillite, clast-supported pebble to cobble breccia (uTSve).

uTSl — LIMESTONE MEMBER: massive, light grey to beige, recrystallized limestone (uTSlm); clast-supported, pebble to cobble limestone conglomerate, contains up to 30% angular basalt and ribbon-chert clasts (uTSlc).

BOSWELL ASSEMBLAGE

PENNSYLVANIAN

Boswell formation (Simard, 2003)

PBl — beige to grey limestone, commonly bioclastic.

PBq — rusty-weathering, medium-grained quartz sandstone.

PBc — calcareous, massive, poorly sorted polymictic conglomerate and litharenite; clasts include angular fragments of black chert, argillite, mafic and felsic volcanic rocks and limestone.

MISSISSIPPIAN AND OLDER

Moose formation (Simard, 2003)

lMMr — rusty-weathering, pink quartz-feldspar-phyric rhyolite (U-Pb zircon - 359 ± 3 Ma).

uDMb — dark green, fine-grained, massive and pillowed basalt.

uDMl — light grey, massive limestone.

uDMs — green conglomeratic sandstone with volcanic and sedimentary clasts.

DMc — massive red chert.

YUKON-TANANA TERRANE

PALEOZOIC (?)

Loon Lake succession (Barresi, 2004)

Pq — foliated, intercalated quartzite, siltstone and phyllite.

Ps — dark grey carbonaceous siltstone, quartz sandstone.

UPPER DEVONIAN AND OLDER

Snowcap complex

PSCv — light to medium green, variably siliceous, fine- to medium-grained calcareous chloritic schist; locally contains layers of buff-weathering siliceous marble.

PSCm — marble.

PSCq — quartzite, micaceous quartzite, quartz-muscovite-biotite schist, minor carbonaceous schist; locally quartz-pebble conglomerate.

PSCp — dark grey to black carbonaceous phyllite and schist, locally graphitic.

PSCa — dark green to black, fine-grained garnet amphibolite.

DEVONIAN-MISSISSIPPIAN ?

Livingstone Creek succession

DMLCv — light green to light grey quartzite, quartz-muscovite-plagioclase-chlorite schist, minor greenstone.

DMLCm — buff-weathering dolomitic marble and quartzite; light grey marble.

DMLCf — fine-grained, quartz-muscovite-plagioclase white schist.

DEVONIAN-MISSISSIPPIAN ?

Mendocina succession

DMMu — serpentinized peridotite, metagabbro.

DMMm — marble.

DMMv — fine-grained phyllitic greenstone, rarely massive; locally, medium- to coarse-grained plagioclase-hornblende metagabbro.

DMMp — graphitic phyllite.

UPPER DEVONIAN AND OLDER ?

Last Peak succession

PLPc — coarse-grained, strongly foliated arkosic grit, polymictic pebble to cobble metaconglomerate.

PLPm — light grey to white marble; along contact with K-feldspar augen granite (DMg), brown-weathering, medium-grey, fine-grained silicified marble.

PLPv — strongly foliated and lineated siliceous chloritic phyllite, quartzofeldspathic and epidote layers along foliation.

PLPq — tan-weathering micaceous and calcareous quartzite and quartz-muscovite±chlorite schist; black, grey and white quartzite, locally gritty; tan marble horizons; minor carbonaceous phyllite.

PLPp — black graphitic phyllite and quartzite; minor light grey quartz-muscovite schist and micaceous quartzite; minor buff-weathering marble.

MISSISSIPPIAN AND YOUNGER ?

Dycer Creek upper succession

MDCq — light greenish-grey, fine- to medium-grained quartzite, locally gritty and arkosic (detrital zircons [U/Pb] - ca. 360, 450, 560, 1790, 2500 Ma); minor recessive grey phyllite.

MDCv — green chloritic phyllite/schist, Mt-rich; local intercalations of graphitic phyllite and quartzite.

MDCp — graphitic phyllite and black calcareous metasiltstone.

UPPER DEVONIAN AND OLDER ?

Dycer Creek lower succession

PDCm — light grey to white, medium- to coarse-grained marble; locally garnet-diopside-epidote skarn.

PDClc — LOWER CLASTIC SUCCESSION: medium grey quartz-plagioclase-muscovite-biotite schist, locally quartz-plagioclase-biotite-hornblende-epidote schist; coarse-grained andalusite-biotite schist; calc-silicate schist, marble, quartzite; intruded by sheets of K-feldspar augen granite gneiss (Mg).

SYMBOLS

geologic contacts (defined, approximate, inferred, covered [grey])

fault; movement not known (defined, approximate, inferred, covered)

thrust fault (inferred)

dextral strike-slip fault (defined, approximate, inferred, covered)

normal fault (defined)

bedding — 34

foliation (dominant) — 83

elongation or mineral lineation — 23

intersection lineation — 54

fold axis (dominant phase) — 12

radiometric date (U/Pb, Ar/Ar, U/Pb detrital zircons) — 351 ± 1 Ma U/Pb zircon; 191 ± 1 Ma Ar/Ar muscovite; 361 Ma youngest detrital zircon (U/Pb)

field station

placer potential (past-producing stream, proven or potential gold-bearing stream)

trail

NOTES

1) Geology of the Semenof Hills, west of the South Big Salmon River, is after Simard (2003).

2) Selected Ar/Ar dates and two Devonian-Mississippian U/Pb dates are from Hansen et al. (1989, 1991). The remaining U/Pb dates are unpublished data by S.D. Carr; three additional Ar/Ar muscovite dates are unpublished data by M. Colpron. Older, less reliable K/Ar and Rb/Sr dates reported in Hansen et al. (1989) are not shown on this map.

3) Detrital zircon dates from a quartzite of the Dycer Creek succession (MDCq) is unpublished data by M. Colpron.

4) Compilation of the geology of Yukon-Tanana Terrane has benefited from unpublished map and notes by J.L. Harvey, provided by S.D. Carr, and mapping by Gallagher (1999).

4) Metasedimentary rocks of the Loon Lake succession were studied in detail by Barresi (2004).

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Simard, R.-L., 2003, Geological map of southern Semenof Hills (part of NTS 105E/1,7,8), south-central Yukon (1:50 000 scale), Yukon Geological Survey, Open File 2003-12.

RECOMMENDED CITATION

Colpron, M., 2005. Geological map of Livingstone Creek area (NTS 105E/8), Yukon (1:50 000 scale). Yukon Geological Survey, Open File 2005-9.

Digital cartography and drafting by Maurice Colpron, Yukon Geological Survey.

Any revisions or additional geological information known to the user would be welcomed by the Yukon Geological Survey.

Paper copies of this map, the accompanying report and Yukon MINFILE may be purchased from Geoscience Information and Sales, c/o Whitehorse Mining Recorder, Energy, Mines and Resources, Yukon Government, Room 102 - 300 Main St., Whitehorse, Yukon, Y1A 2B5. Ph. 867-667-5200, Fx. 867-667-5150, Email geosales@gov.yk.ca.

A digital PDF (Portable Document File) file of this map may be downloaded free of charge from the Yukon Geological Survey website: http://www.geology.gov.yk.ca.

Modified from Colpron, 2006

8.0 2014 WORK PROGRAM – PROSPECTING & GEOCHEMICAL SURVEY

8.1 Sampling Method and Approach

An eleven day geochemical sampling and geological reconnaissance program was conducted on the Livingstone Property between July 24th, 2014 and August 6th, 2014. Flying out of Whitehorse, a crew of 2 geologists collected 55 rock samples and 458 soil samples (see Figure 4 in the back folder for sample locations).

Rock samples were taken based on mineralogy, structure and lithology. Samples were placed inside labeled plastic poly bags with the corresponding sample tag. Sample descriptions were recorded in a field notebook and the location recorded by GPS unit. Sample locations were marked with flagging tape labeled with the sample number.

Although the area has seen glaciation, soil sampling appears to be a viable means of exploration in the area. Overburden is thin especially on topographic highs, and with proper note taking of surroundings, even till sampling is useful. Soil samples were taken at two grids as well as on typical ridge and spur lines. The Main Zone grid was intended to follow the IP survey at 50m by 200m spacings. The North Zone grid was at 100m by 100m spacings. Samplers use Dutch augurs to collect an adequate soil sample, preferably from the 'C' horizon, placing it in a Kraft paper bag, marking the location with GPS, and marking the location with flagging tape labeled with the sample number. Sample conditions, environment and attributes were recorded in a field notebook. The GPS units were downloaded daily for plotting in ArcGIS. Soil samples were hung up to dry, then packed and shipped to the lab.

All sample descriptions can be found in Appendices I and II.

8.2 Sample Preparation, Analysis, and QA/QC

The soil and silt samples were dried at 60° C and sieved to -80 mesh (<177 microns). A 15.0 gram sub-sample was digested in hot (95° C) aqua regia (HCl-HNO3-H2O); following this, the samples were analysed by inductively-coupled plasma mass spectrometry (ICP-MS) techniques (Acme's Group 1DX2). Multi-elemental analysis of 36 elements was made.

The rock samples were crushed, split to 250 g, pulverized, and a split was sieved to -200 mesh. The same analytical procedure (Acme's Group 1DX2) was used.

Quality control samples from the lab include control blanks, duplicates and standards. Sample blanks (BLK), pulp duplicates and standards (STD DS8) were run with the batch analysis; no problems were noted with analytical accuracy or precision.

8.3 Results

Main Zone

The 2014 program on the Livingstone Property showed prospective results. During the brief 2011-2013 programs, a zone of significant gold mineralization was discovered (Main Zone). Assays yielded up to 10.7 g/t Au with >100 ppm silver and anomalous Pb, Cu, Mo, Bi, Hg, Se and Te. This rock was recorded as quartz vein breccia with oxidized sulphides and graphite. The vein shows a rough orientation of 160-180/40/W. It is bordered by graphitic sediments extending ~1m on either side and dark grey, silicious phyllite and schist in the immediate area. Further prospecting at this vein yielded an extension 20m to the south with fresh pyrite and abundant galena mineralization (see Photo 1 for rock sample locations at the Main Zone). The vein appears to be roughly 0.6m wide. Chips samples along the vein yielded sporadic results, often less than 1 g/t Au. Galena-bearing samples often graded >1% Pb and >100 ppm Se with the same suite of anomalous elements (Photo 2).

A small, parallel vein about 10 cm wide was uncovered about 2m east of the aforementioned vein. Assays revealed a similar suite of anomalous elements, however there were no significant gold results.

Prospecting to the east of the showing uncovered quartz veins up to 2m wide approaching the contact between biotite schist and orthogneiss. Veins often carry pyrite mineralization but do not yield significant gold or base metal assays.

Soil sampling on the Main Zone grid yielded gold values up to 668 ppb around the Main Zone showing following a trend to the north. However, high values do not extend further south. Base metal values and arsenic follow a similar trend, but show extension of anomalous values to the east. Antimony and selenium show 2 distinct NNW trends, one following the Main Zone, and another 400-600m to the east.

North Zone

The North Zone is located in the central eastern area of the claim block. It consists of a sulphide-rich quartz vein outcrop discovered in 2011 and not returned to until 2014. The quartz vein contains coarse grained galena, chalcopyrite, malachite and azurite. Further prospecting in the immediate area yielded values up to 588 ppb Au, 6997 ppm Pb, 1342 ppm Cu, and 28.7 ppm Se. A new showing was discovered 140m to the northeast. This was a small outcrop of quartzite gossan with abundant (5%) very fine-fine grained disseminated pyrite. A grab sample, 1768021, yielded 643 ppm Au, 37 ppm As, and 3524 ppm Cu (Photo 3).

Prospecting around the North Zone also revealed the presence of numerous small serpentinite outcroppings within the quartzite and schist bedrock, often with pyrite-bearing quartz stockwork. These samples failed to return any significant values.

A 100x100m soil geochemical survey grid was conducted on the zone. Gold values reached 19 ppb, while lead values reached 30 ppm. Weak base metal anomalies appear to be linear, possibly following a geological contact.

Ridges and spurs

Prospecting to the northeast of the North Zone uncovered two small gossanous seams within silicified quartzite and biotite schist, trending 350/50/E (samples 1768025 and 1768026). The seams, about 8-10" bear abundant disseminated pyrite (up to 10%) and specular hematite and assayed up to 323 ppm Cu. A soil line in the immediate vicinity picked up 33 ppb Au, as well as anomalous Cu and Pb.

One soil line extending from a west central peak crosses a saddle to second peak and extends down in to a valley. Outcrop is very sparse in this area, however, a large bull quartz vein was discovered in the saddle in 2013 and again prospected in 2014. No significant values resulted from prospecting, however numerous anomalous gold values up to 86 ppb were found in soil sample assays. There were also weak base metal anomalies as well as a presence of selenium.

Rock sample results are displayed on Figure 5 (back folder). Colour contoured soil sample results for Ag, As, Au, Cu, Hg, Pb, Sb, Se, and Te are displayed on Figures 6 to 14. It should be noted that for each element and zone, the sample population is kriged separately.

Assay results and certificates can be found in appendices III and I.

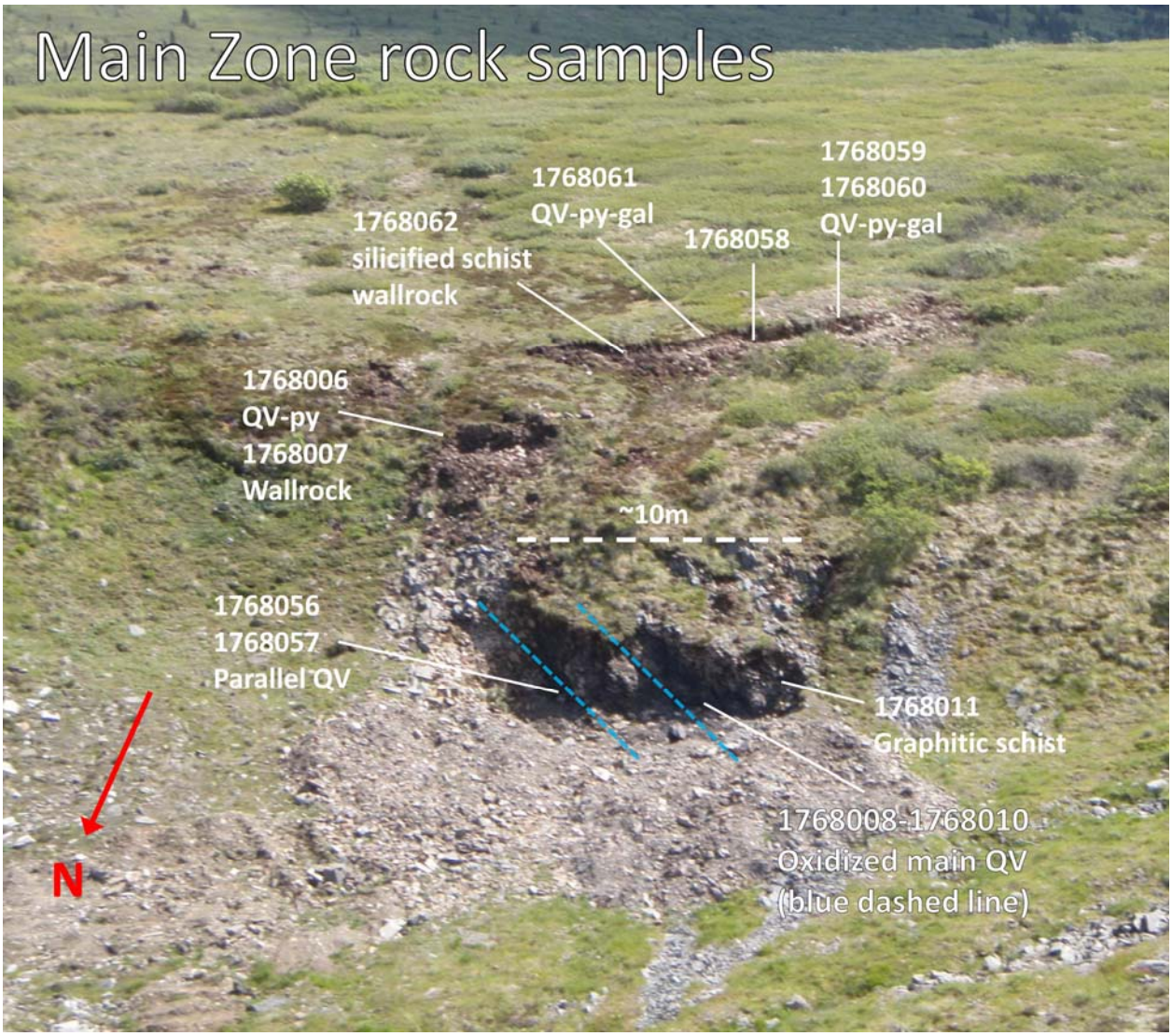


Photo 1: Rock sample locations at the Main Zone

Photo 2: Rock sample 1768058 from the Main Zone. Galena and pyrite mineralization in quartz vein yielding 231 ppb Au, 57 ppm Ag, 225 ppm As, >1% Pb, >100 ppm Se and anomalous Mo, Cu, Bi, Hg, Te.


Photo 3: Rock sample 1768021 from the North Zone. Pyrite-rich quartzite yielding 643 ppm Au, 37 ppm As, and 3524 ppm Cu (sample is about 5" across).

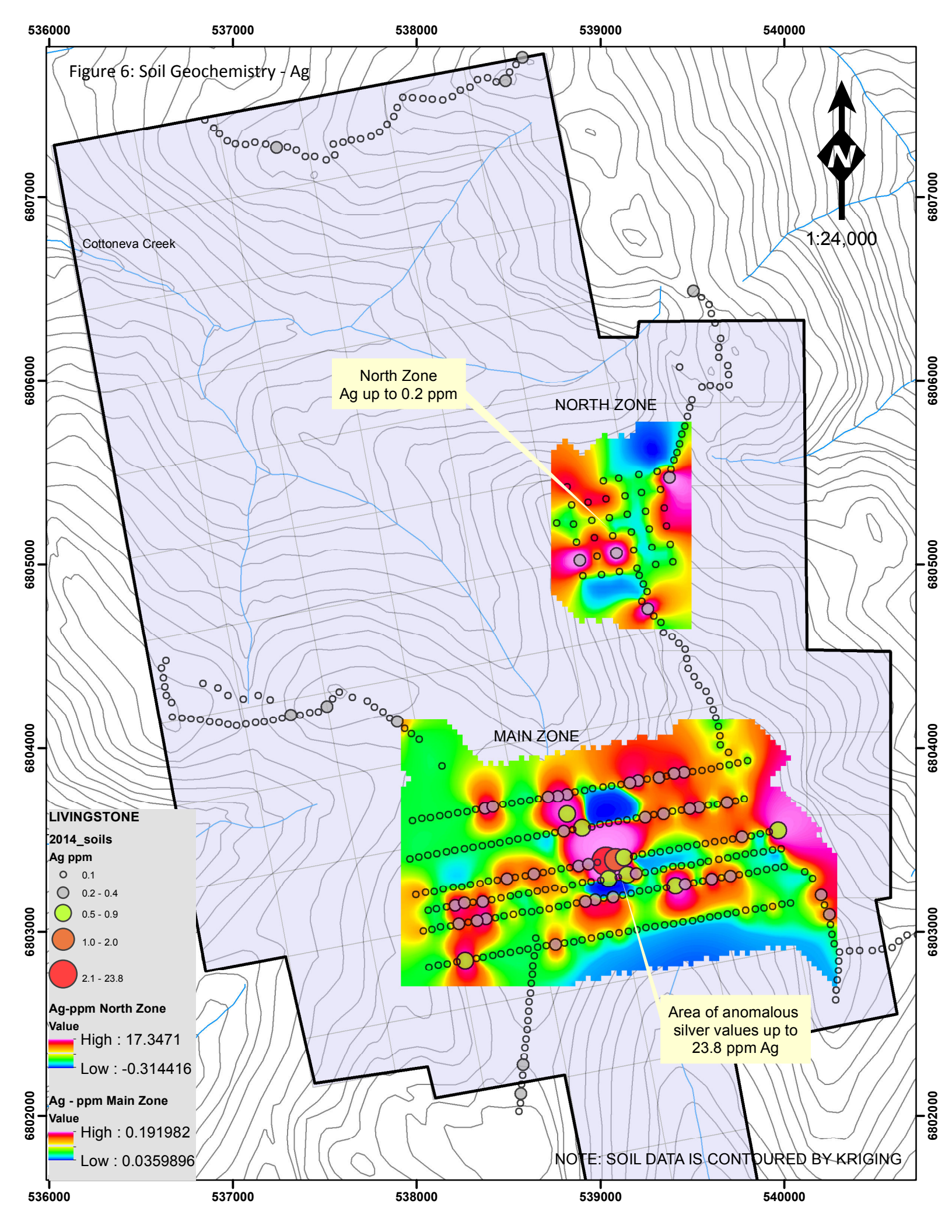


Figure 6: Soil Geochemistry - Ag
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
North Zone
Ag up to 0.2 ppm
NORTH ZONE
MAIN ZONE
Area of anomalous silver values up to 23.8 ppm Ag
LIVINGSTONE
2014_soils
Ag ppm
0.1
0.2 - 0.4
0.5 - 0.9
1.0 - 2.0
2.1 - 23.8
Ag-ppm North Zone
Value
High : 17.3471
Low : -0.314416
Ag - ppm Main Zone
Value
High : 0.191982
Low : 0.0359896
NOTE: SOIL DATA IS CONTOURED BY KRIGING

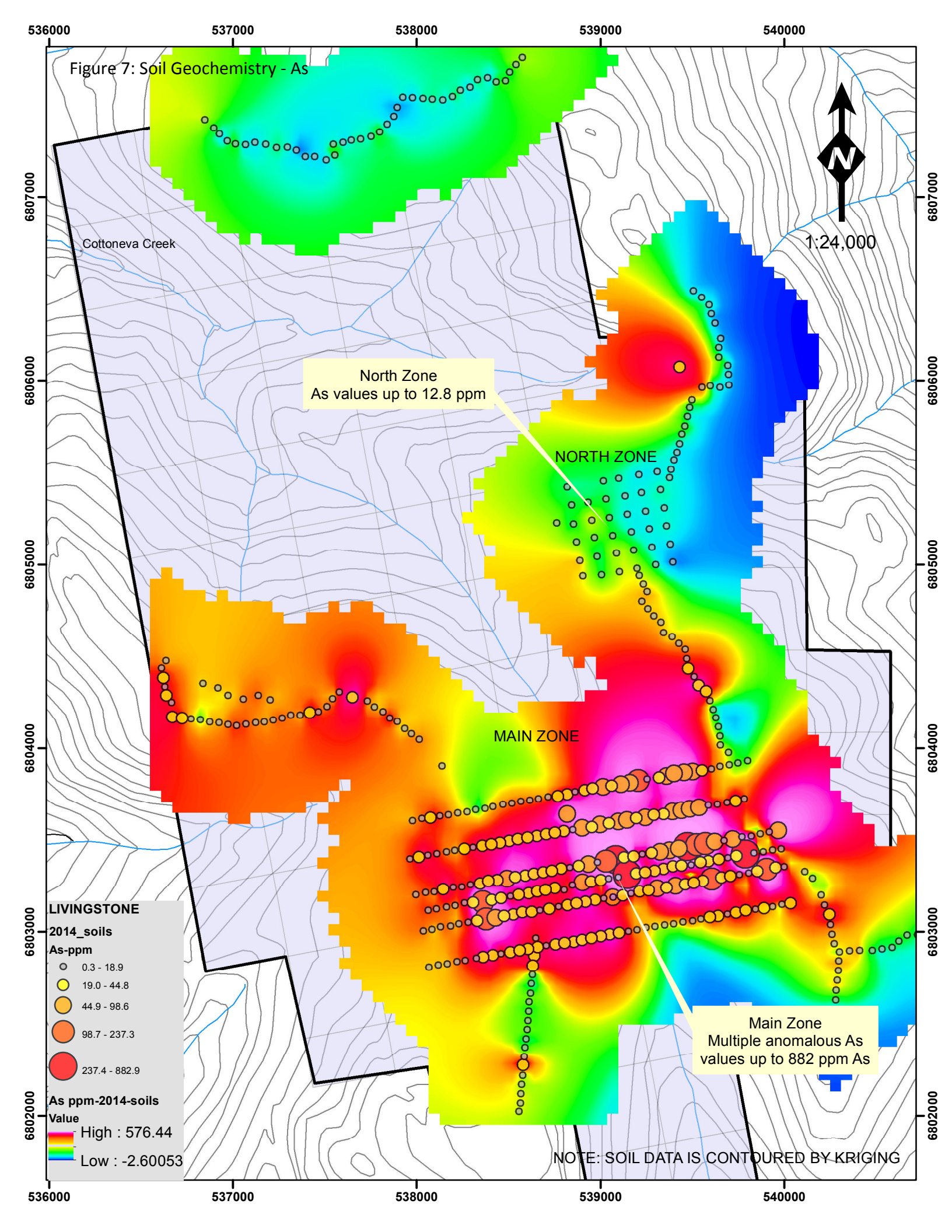


Figure 7: Soil Geochemistry - As
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
North Zone
As values up to 12.8 ppm
NORTH ZONE
MAIN ZONE
Main Zone
Multiple anomalous As
values up to 882 ppm As
LIVINGSTONE
2014_soils
As-ppm
0.3 - 18.9
19.0 - 44.8
44.9 - 98.6
98.7 - 237.3
237.4 - 882.9
As ppm-2014-soils
Value
High : 576.44
Low : -2.60053
NOTE: SOIL DATA IS CONTOURED BY KRIGING

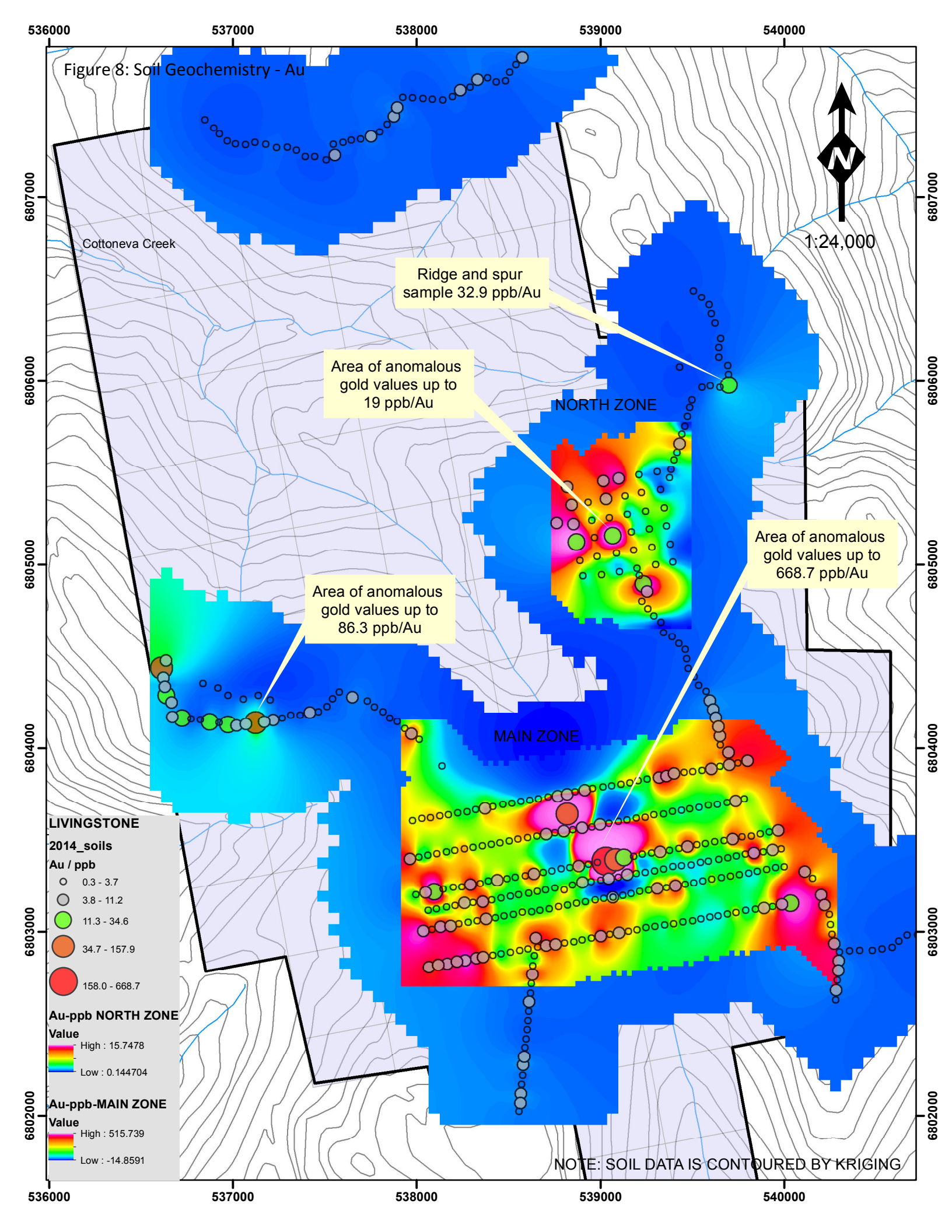


Figure 8: Soil Geochemistry - Au
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
Ridge and spur sample 32.9 ppb/Au
Area of anomalous gold values up to 19 ppb/Au
NORTH ZONE
Area of anomalous gold values up to 668.7 ppb/Au
Area of anomalous gold values up to 86.3 ppb/Au
MAIN ZONE
LIVINGSTONE
2014_soils
Au / ppb
0.3 - 3.7
3.8 - 11.2
11.3 - 34.6
34.7 - 157.9
158.0 - 668.7
Au-ppb NORTH ZONE
Value
High : 15.7478
Low : 0.144704
Au-ppb-MAIN ZONE
Value
High : 515.739
Low : -14.8591
NOTE: SOIL DATA IS CONTOURED BY KRIGING

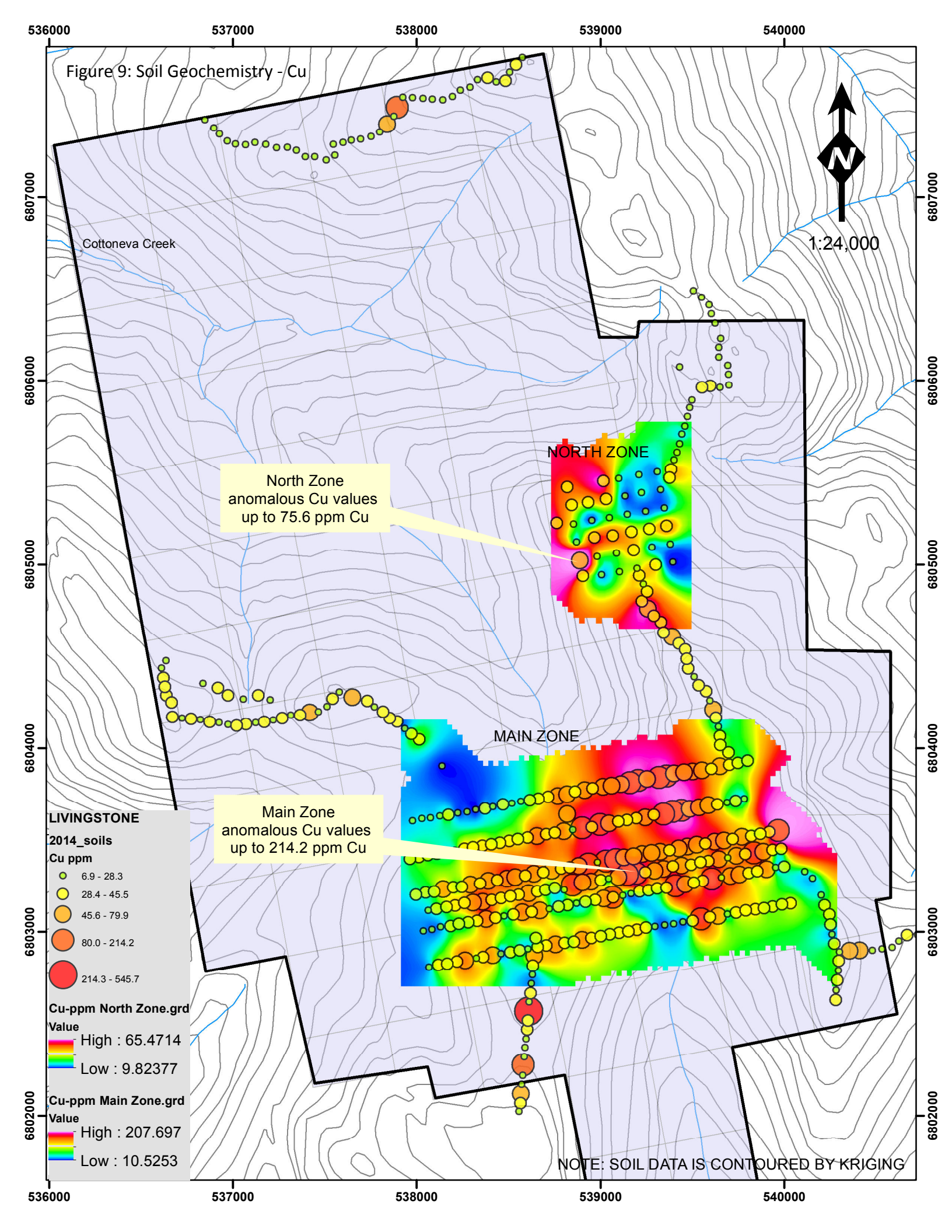


Figure 9: Soil Geochemistry - Cu
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
NORTH ZONE
North Zone
anomalous Cu values
up to 75.6 ppm Cu
MAIN ZONE
Main Zone
anomalous Cu values
up to 214.2 ppm Cu
LIVINGSTONE
2014_soils
Cu ppm
6.9 - 28.3
28.4 - 45.5
45.6 - 79.9
80.0 - 214.2
214.3 - 545.7
Cu-ppm North Zone.grd
Value
High : 65.4714
Low : 9.82377
Cu-ppm Main Zone.grd
Value
High : 207.697
Low : 10.5253
NOTE: SOIL DATA IS CONTOURED BY KRIGING

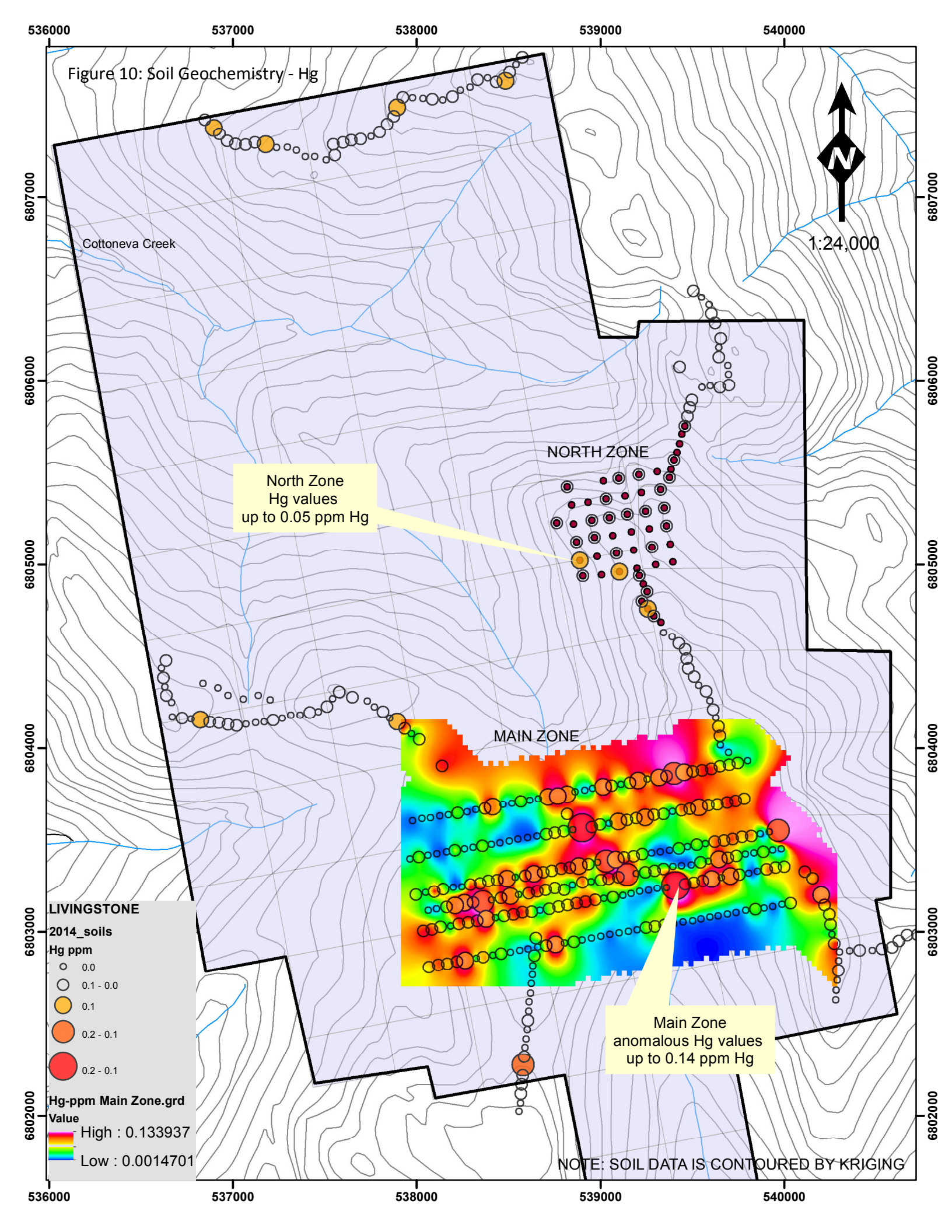


Figure 10: Soil Geochemistry - Hg
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
NORTH ZONE
North Zone
Hg values
up to 0.05 ppm Hg
MAIN ZONE
Main Zone
anomalous Hg values
up to 0.14 ppm Hg
LIVINGSTONE
2014_soils
Hg ppm
0.0
0.1 - 0.0
0.1
0.2 - 0.1
0.2 - 0.1
Hg-ppm Main Zone.grd
Value
High : 0.133937
Low : 0.0014701
NOTE: SOIL DATA IS CONTOURED BY KRIGING

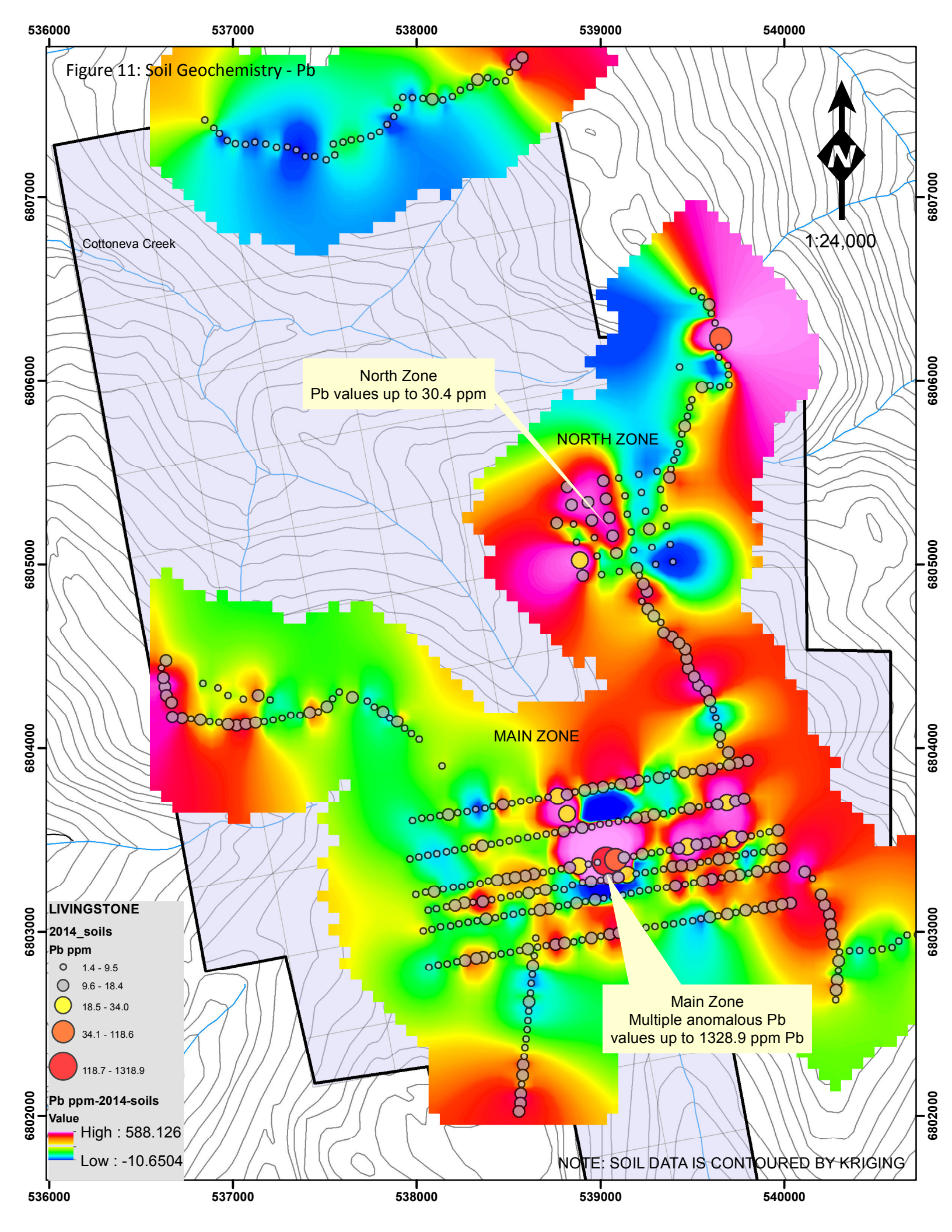


Figure 11: Soil Geochemistry - Pb
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
North Zone
Pb values up to 30.4 ppm
NORTH ZONE
MAIN ZONE
Main Zone
Multiple anomalous Pb
values up to 1328.9 ppm Pb
LIVINGSTONE
2014_soils
Pb ppm
1.4 - 9.5
9.6 - 18.4
18.5 - 34.0
34.1 - 118.6
118.7 - 1318.9
Pb ppm-2014-soils
Value
High : 588.126
Low : -10.6504
NOTE: SOIL DATA IS CONTOURED BY KRIGING

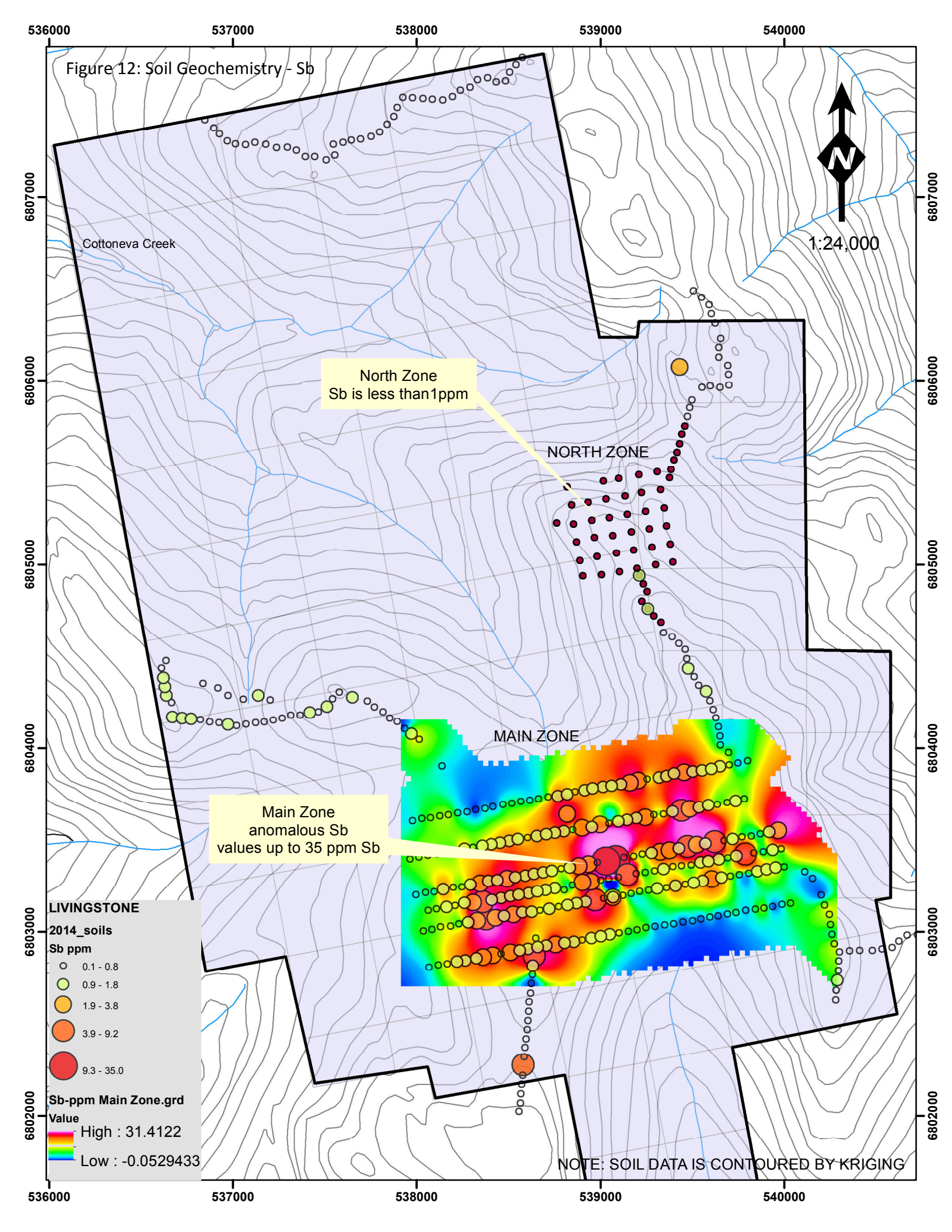


Figure 12: Soil Geochemistry - Sb
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
North Zone
Sb is less than1ppm
NORTH ZONE
MAIN ZONE
Main Zone
anomalous Sb
values up to 35 ppm Sb
LIVINGSTONE
2014_soils
Sb ppm
0.1 - 0.8
0.9 - 1.8
1.9 - 3.8
3.9 - 9.2
9.3 - 35.0
Sb-ppm Main Zone.grd
Value
High : 31.4122
Low : -0.0529433
NOTE: SOIL DATA IS CONTOURED BY KRIGING

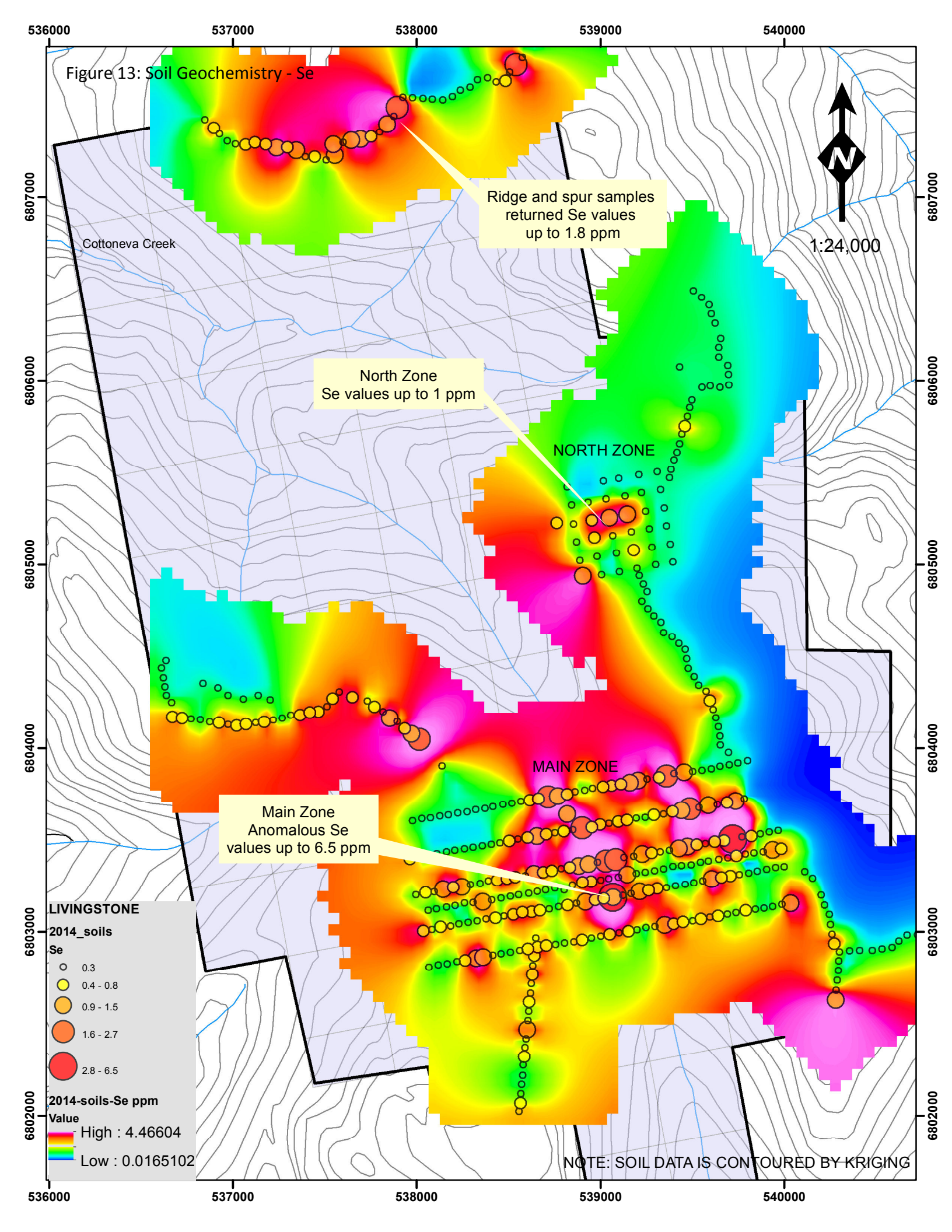


Figure 13: Soil Geochemistry - Se
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Ridge and spur samples returned Se values up to 1.8 ppm
Cottoneva Creek
1:24,000
North Zone Se values up to 1 ppm
NORTH ZONE
MAIN ZONE
Main Zone Anomalous Se values up to 6.5 ppm
LIVINGSTONE
2014_soils
Se
0.3
0.4 - 0.8
0.9 - 1.5
1.6 - 2.7
2.8 - 6.5
2014-soils-Se ppm
Value
High : 4.46604
Low : 0.0165102
NOTE: SOIL DATA IS CONTOURED BY KRIGING

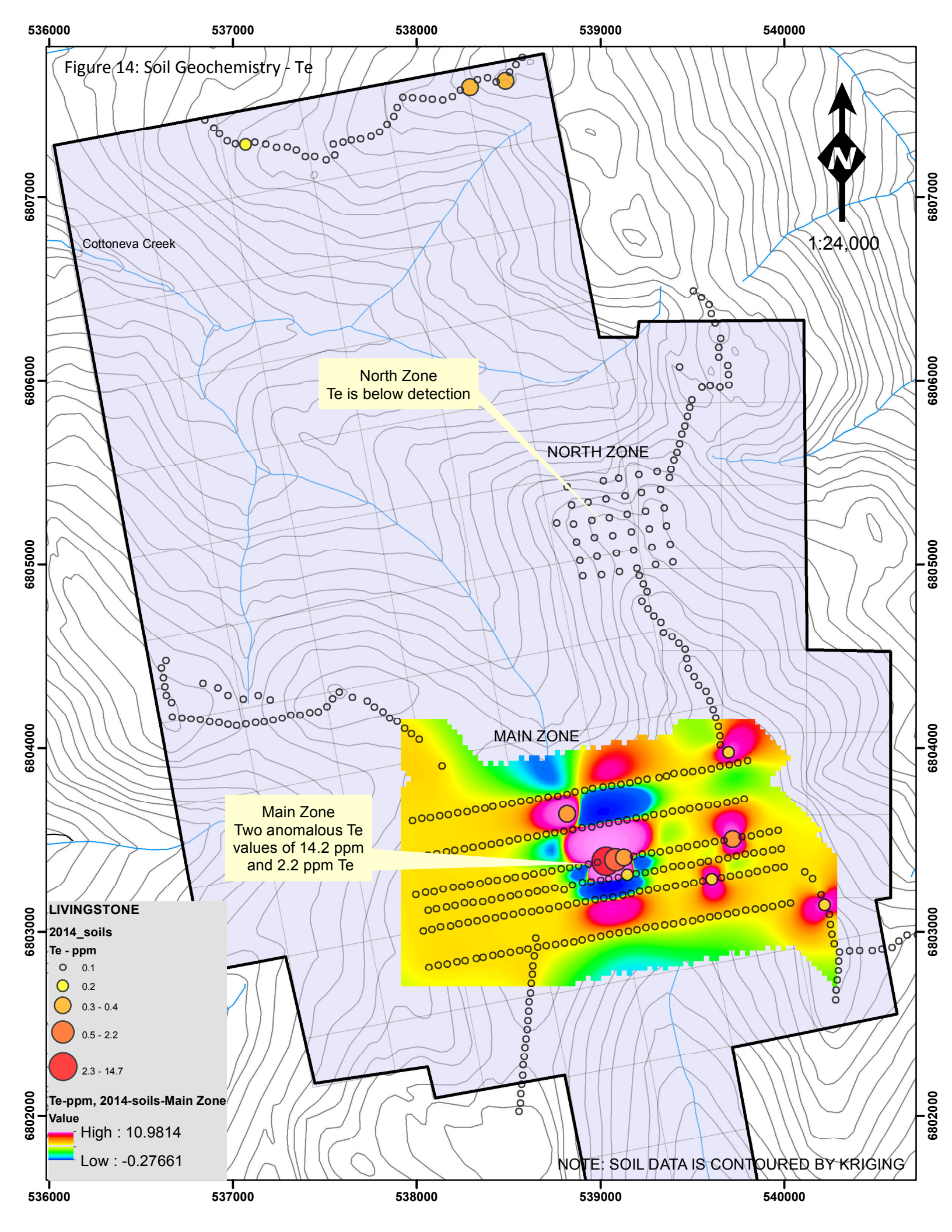


Figure 14: Soil Geochemistry - Te
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
N
1:24,000
North Zone
Te is below detection
NORTH ZONE
MAIN ZONE
Main Zone
Two anomalous Te
values of 14.2 ppm
and 2.2 ppm Te
LIVINGSTONE
2014_soils
Te - ppm
0.1
0.2
0.3 - 0.4
0.5 - 2.2
2.3 - 14.7
Te-ppm, 2014-soils-Main Zone
Value
High : 10.9814
Low : -0.27661
NOTE: SOIL DATA IS CONTOURED BY KRIGING

9.0 2014 WORK PROGRAM – GEOPHYSICAL SURVEYS

The 2014 program included an IP survey, a ground magnetometer survey and airborne magnetic and radiometric surveys.

9.1 Induced Polarity and Resistivity Survey

Aurora Geophysics out of Whitehorse, YT was contracted to carry out the ground geophysical surveys. Additional support and supervision was provided by the author of this report. The IP survey was carried out in the southeastern area of the property. Five ENE trending lines were surveyed totalling 9.4 km. The purpose of the survey was to cover a gold-bearing quartz vein, originally discovered in 2011 and interpreted to be indicative of a larger fault system (Main Zone). It was extended to the east to cover further large quartz veins and geological contacts. The survey was very successful in highlighting a strong resistivity low and chargeable anomaly at 900-1100E (gold showing) and a weaker anomaly at 1600-1700E. The anomalies extend across all 5 lines with fairly consistent strength. Figures 15 and 16 represent plan views of the chargeability and resistivity results.

9.2 Ground Magnetometer Survey

The ground magnetometer survey was conducted in two areas, totalling 24.3 line kilometers. The first was around the Main Zone, filling in gaps left by a previous small survey conducted in 2011. This data was merged by Aurora and compiled into the final map. The second area surveyed was surrounding North Showing.

The mag survey was successful in outlining a NNW contact between biotite schist and what is likely the orthogneiss unit at the Main Zone. The North Zone survey was less conclusive; highs likely represent small ultramafic intrusions found during field work.

The Aurora Geophysics report and figures can be found in Appendix V.

9.3 Airborne Magnetic and Radiometric Surveys

Airborne magnetic and radiometric surveys were conducted by Precision Geophysics during September, 2014. A total of 284 line kilometers were flown. The magnetic survey was very successful in outlining a series of northwest trending structures as well as the geological contact between schist and orthogneiss on the east side of the property. Potassium radiometric results appear to highlight areas of orthogneiss bedrock, but also display some correlation to the northwest structures found in the magnetic data. With additional groundtruthing, the radiometric data will be open to further interpretation.

The Precision Geophysics report and figures can be found in Appendix VI.

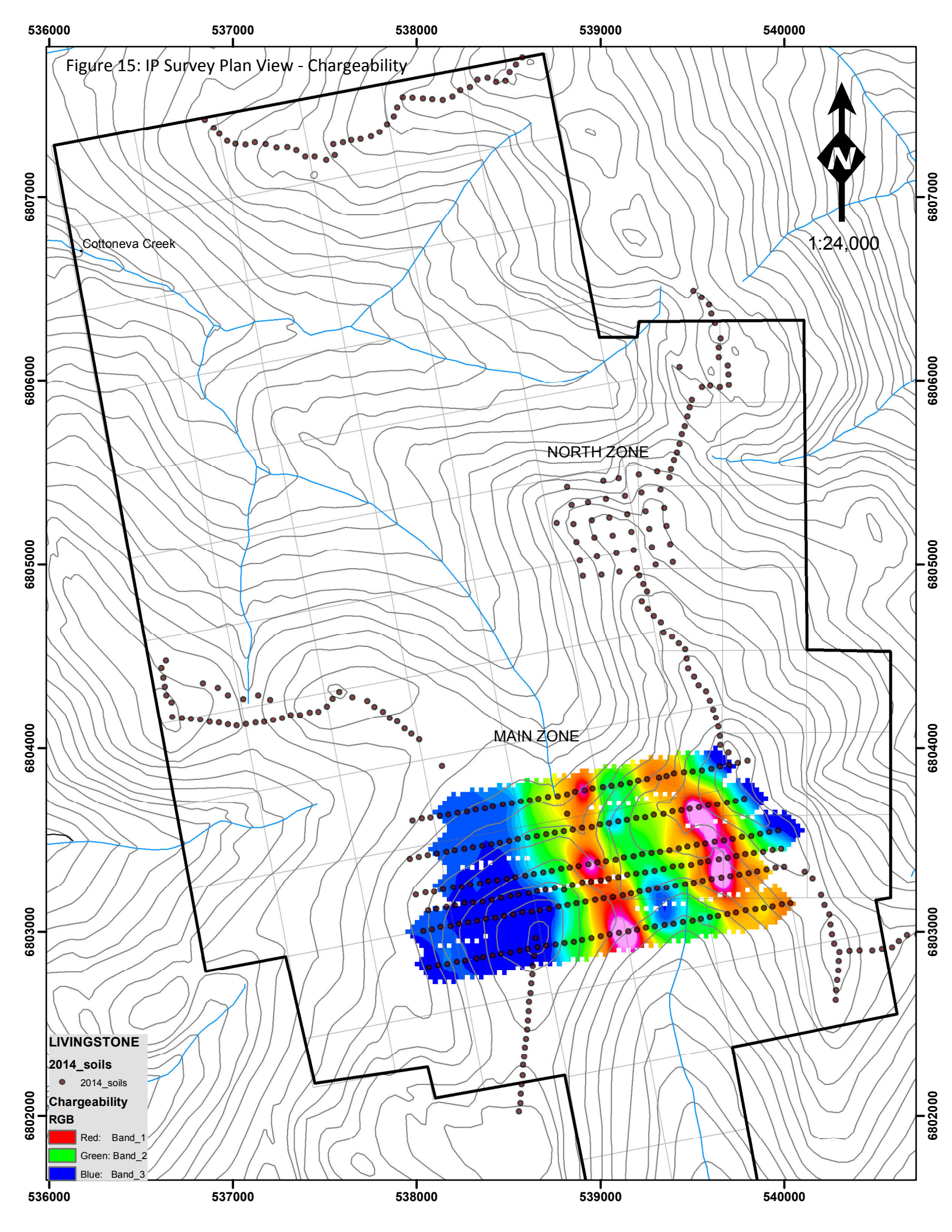
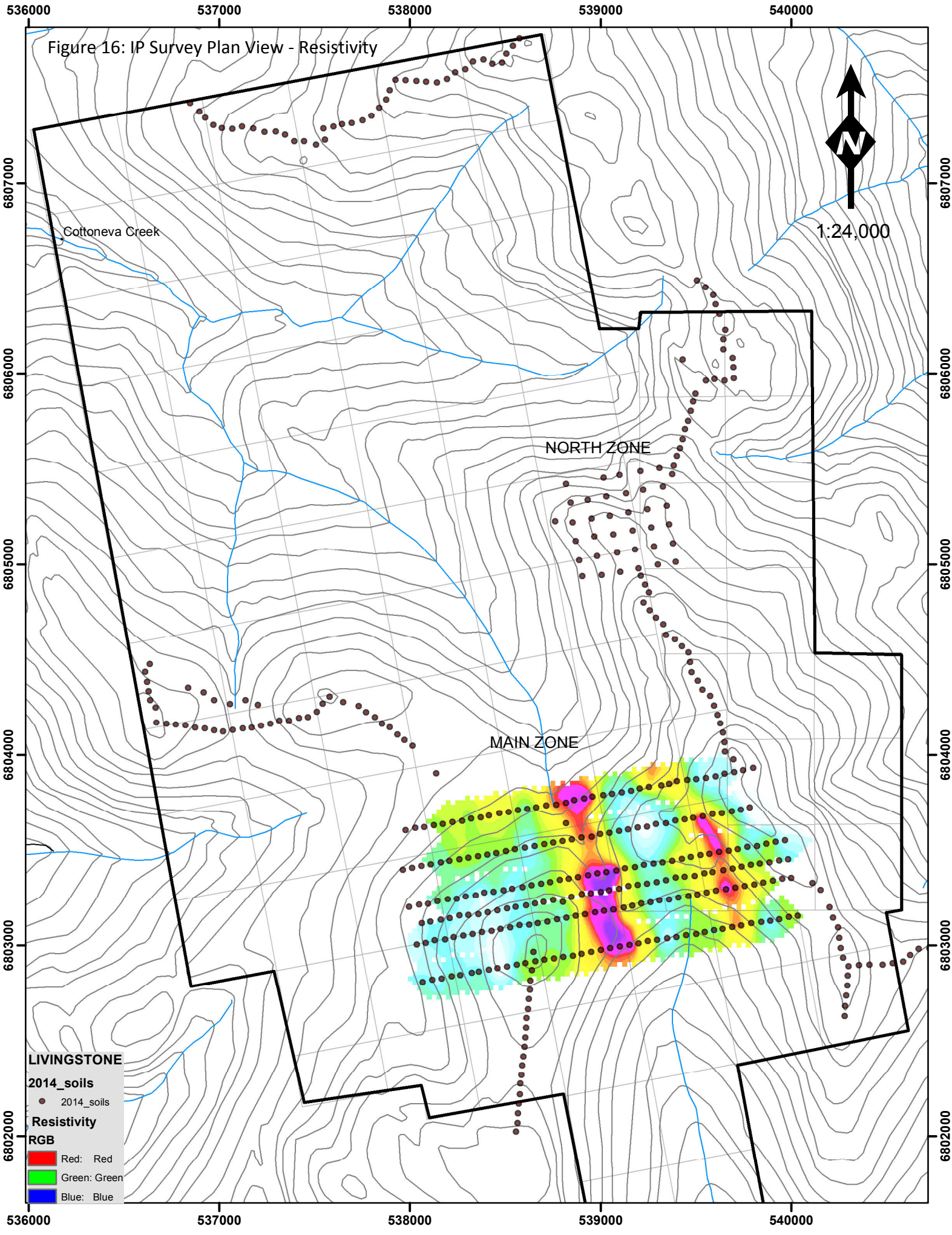


Figure 15: IP Survey Plan View - Chargeability
536000
537000
538000
539000
540000
6807000
6806000
6805000
6804000
6803000
6802000
Cottoneva Creek
NORTH ZONE
MAIN ZONE
N
1:24,000
LIVINGSTONE
2014_soils
2014_soils
Chargeability
RGB
Red: Band_1
Green: Band_2
Blue: Band_3

Figure 16: IP Survey Plan View - Resistivity



10.0 DISCUSSION

Data from the geochemical and geophysical surveys at the Livingstone Property supports an epithermal depositional model. Furthermore, the presence of a high silver to gold ratio (in Main Zone quartz vein samples from 2011-2014 programs), abundance of lead over copper, lack of arsenic, and lack of gold within the surrounding host rock may point to a low sulfidation (LS) epithermal deposit (Einaudi et al., 2003).

Selenium has long been associated with epithermal deposits. Selenium is postulated to be liberated from magma during crystallization and made available for deposition with ore metals (Davidson, 1960). Although the Main Zone is set within sedimentary derived schists, it is possible the veins present on the property are related to the Early Mississippian orthogneiss to the east, or more recent buried Cretaceous intrusions which are found in the Livingstone area. When viewing the geochemical selenium map and the IP plan maps is it clear there is a correlation (Figures 13, 15, 16).

The induced polarization survey was successful in identifying a strongly conductive and chargeable anomaly at the Main Zone, as well as a weaker, similarly linear anomaly to the east. From prospecting, it is obvious that graphite plays a role in the resistivity lows at the Main Zone, so it can be said with confidence there is a fault extending at least 800m NNW through this area. The second IP anomaly ~600m to the east appears to have less graphite and overall sulphides in the bedrock, yet is still a strong anomaly, especially around L200N to L600N. At L800N the anomaly is offset slightly further to the west, possibly related to ENE trending faults in the areas or the NW trending structure seen in the airborne magnetics

Tellurium also plays a role in this area. While not as abundant as Se in soil sampling, Te values are high in Main Zone rock samples. In a 1992 study, Stroink and Friedrich studied placer gold from multiple Livingstone area camps and found gold to be in the form of Au-Ag tellurides, often as inclusions in galena (which is in abundance in the Main Zone). Studying other bedrock quartz veins around the camps, they determined mineralization is structurally controlled by a series of NNE-striking faults and NNW-trending joints. They concluded that veins carrying gold in the area were of epithermal origin and could be the source for the coarse placer gold at Livingstone because of chemical similarities between placer gold and gold from local quartz veins.

Magnetic data ascertained from the ground and airborne surveys shows a distinct magnetic high running along the eastern side of the property. This is likely representative of the schist-orthogneiss contact. The data also shows a series of NNW to NW trending structures. What is interesting is that many appear to partially follow topographic lows, specifically the Cottoneva Creek valley. Stroink and Friedrich (1992) also pointed out the abundance of magnetite in Livingstone camp placer gold. It is possible the magnetic survey is picking up placer magnetite accumulation or epithermal-related magnetiferous minerals in fault structures.

11.0 CONCLUSIONS AND RECOMMENDATIONS

The Livingstone Property is located in a geological setting favourable to gold mineralization. The local geology, geochemical and geophysical survey results, and placer history point to the potential for a significant gold deposit.

As noted in the discussion section, there are numerous indicators of an epithermal depositional environment at the Main Zone, possibly of the low sulfidation type. The IP survey demonstrated that the gold-bearing, NNW-trending structure extends for at least 800m and is open ended on each side. Furthermore, a second IP anomaly 600m to the east allows for further width to the unit. While this second anomaly did not display significant geochemical gold values, the presence of selenium and base metals makes it a viable additional target.

The North Zone, while found to have gold-lead-copper-bearing veins and gossans did not display any continuous geochemical or geophysical features.

The topographical saddle in the west-central area of the property remains prospective. A magnetic high as well as anomalous gold, selenium and base metal soil samples indicate similarities to the Main Zone.

It is recommended that a drill program be conducted on the Main Zone. A fence of holes extending along the NNW IP anomaly at an ENE azimuth (roughly 70 degrees) and dipping at -45 to -60 degrees would be ideal. Pending results, another set of holes with the same azimuth and dip would be drilled along the second, weaker IP anomaly to the east.

A second IP program could be conducted on the aforementioned west-central saddle to see if it produces as similar anomaly to the Main Zone.

With a helicopter in use for a potential drill program, further prospecting around the North Zone and peaks to the north is recommended. Prospecting and potential claim staking should be done to the north of the property boundary in the Little Violet Creek area. This would cover a high-production placer creek's headwaters and expand the potential of the property.

REFERENCES

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STATEMENT OF EXPENDITURES

Livingstone Property Expenditures
July 24th to August 20th, 2014
Phase 1: Prospecting and geochemical sampling program
Phase 2: Ground geophysical surveys
Phase 3: Airborne geophysical surveys

Type	Item	Unit	Cost
Daily field expenses	For Phase 1 and 2. Food, camp costs, packs, sampling equipment, GPS, radios, sat phones, camera, computer, firearm, consumables.	$100/70 man days	$7,000.00
Wages	Geologists (Phase 1)	$400/2 men/15 days	$12,000.00
	Geologist (Phase 2)	$400/1 man/13 days	$5,200.00
Air travel within Yukon	Caravan for Phase 1 mob	by receipt	$1,234.00
	Cessna 206 for Phase 1 partial demob	by receipt	$566.00
	Flight for 1 geo returning to Dawson after Phase 1	by receipt	$266.00
	Caravan for Phase 2 mob	by receipt	$1,234.00
	Cessna 172 for Phase 2 man demob	by receipt	$336.00
	Twin Otter for Phase 1+2 demob	by receipt	$1,713.00
	Helicopter for Phase 2 mob/demob	by receipt	$4,057.00
Assays	Rock sample assays (Phase 1)	by receipt	$2,004.00
	Soil sample assays (Phase 1)	$30*458	$13,740.00
Report	YMEP report	$400/7 days	$2,800.00
Fuel	For generator, truck, ATV	by receipt	$554.00
Truck within Yukon	Commerical rental	$100/28 days	$2,800.00
ATV rental + tub trailer	Commerical rental	$60/28 days	$1,680.00
Accommodation	Hotels	$597 Whitehorse + $270 Dawson	$867.00
Geophysics	Custom contract with Aurora Geosciences for IP and mag survey including wages and report NOT including camp costs, expenses, etc.	Service invoice	$27,673.00
Geophysics	Precision Geophysics airborne mag and radiometrics		$34,020.00
		TOTAL	**$119,744.00**

CERTIFICATE OF QUALIFICATIONS

I, Daniel Ferraro, of 835 Berkshire Dr., Woodstock, Ontario, Canada, certify that:

1. I am a graduate of Lakehead University, 2008, and a hold an H. B.Sc. Geology degree.

2. I am an independent geological consultant.

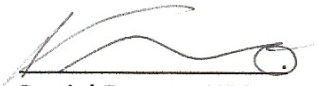
3. I am a member of the Ontario Prospectors Association (2010).

4. I have been employed as a geological assistant for the Ontario Geological Survey and the Geological Survey of Canada during the summers of, respectively, 2006 and 2007.

5. I have been working in the mineral exploration industry since 2008 consulting for Pacific North West Capital Corporation, East West Resources Corporation, Rainy Mountain Royalty Corporation, Black Panther Mining Corporation, White Tiger Mining Corporation, Trillium North Minerals Ltd., Nebu Resources Inc., Goldstrike Resources Ltd., and Goldspike Exploration Inc.

6. This report was prepared by myself.

7. I have no personal knowledge from the date of this certificate of any material fact or change not reflected in this report.



Date: Jan 25, 2015

Daniel Ferraro, HBSc.

Appendix I: Soil Sample Descriptions

Soil Sample Descriptions

UTM NAD83 Zone 8

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768301	539146	6803311	1768301	26-Jul-14	Clayton Jones	LIV	75	C	orange	weathered bedrock
1768302	539097	6803297	1768302	26-Jul-14	Clayton Jones	LIV	80	B/C	brown	weathered bedrock
1768303	539045	6803290	1768303	26-Jul-14	Clayton Jones	LIV	20	C	brown	weathered bedrock
1768304	539002	6803282	1768304	26-Jul-14	Clayton Jones	LIV	40	B	brown	weathered bedrock
1768305	538948	6803272	1768305	26-Jul-14	Clayton Jones	LIV	50	B	brown	silt/clay - Till
1768306	538902	6803269	1768306	26-Jul-14	Clayton Jones	LIV	50	B/C	brown	weathered bedrock
1768307	538846	6803254	1768307	26-Jul-14	Clayton Jones	LIV	50	C	grey/green	weathered bedrock; mafic schist blocks
1768308	538803	6803228	1768308	26-Jul-14	Clayton Jones	LIV	20	C	brown	weathered bedrock; silty talus
1768309	538752	6803239	1768309	26-Jul-14	Clayton Jones	LIV	60	B/C	brown	silt/clay - Till
1768310	538701	6803228	1768310	26-Jul-14	Clayton Jones	LIV	60	B/C	brown	weathered bedrock
1768311	538655	6803221	1768311	26-Jul-14	Clayton Jones	LIV	80	B/C	brown	weathered bedrock
1768312	538609	6803210	1768312	26-Jul-14	Clayton Jones	LIV	50	B/C	brown	weathered bedrock
1768313	538555	6803202	1768313	26-Jul-14	Clayton Jones	LIV	20	C	brown	weathered bedrock
1768314	538510	6803193	1768314	26-Jul-14	Clayton Jones	LIV	80	C	grey	permafrost
1768315	538459	6803183	1768315	26-Jul-14	Clayton Jones	LIV	60	C	brown	weathered bedrock
1768316	538407	6803174	1768316	26-Jul-14	Clayton Jones	LIV	40	B/C	brown	weathered bedrock
1768317	538360	6803164	1768317	26-Jul-14	Clayton Jones	LIV	80	C	brown	permafrost
1768318	538307	6803159	1768318	26-Jul-14	Clayton Jones	LIV	50	B/C	brown	weathered bedrock
1768319	538260	6803157	1768319	26-Jul-14	Clayton Jones	LIV	50	B/C	brown	weathered bedrock
1768320	538208	6803143	1768320	26-Jul-14	Clayton Jones	LIV	80	B	brown	silty/clay - Till
1768321	538161	6803134	1768321	26-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768322	538108	6803124	1768322	26-Jul-14	Clayton Jones	LIV	30	B	brown	till
1768323	538063	6803116	1768323	26-Jul-14	Clayton Jones	LIV	30	B	brown	till
1768324	539195	6803317	1768324	27-Jul-14	Clayton Jones	LIV	60	C	brown	schist , weathered bedrock
1768325	539244	6803323	1768325	27-Jul-14	Clayton Jones	LIV	70	B/C	brown	schist
1768326	539294	6803332	1768326	27-Jul-14	Clayton Jones	LIV	60	B	brown	weathered bedrock
1768327	539343	6803342	1768327	27-Jul-14	Clayton Jones	LIV	50	B	brown	weathered bedrock
1768328	539394	6803356	1768328	27-Jul-14	Clayton Jones	LIV	80	C	brown	weathered bedrock
1768329	539440	6803360	1768329	27-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768330	539493	6803365	1768330	27-Jul-14	Clayton Jones	LIV	60	C	brown	weathered bedrock; schist
1768331	539543	6803378	1768331	27-Jul-14	Clayton Jones	LIV	50	C	brown	weathered bedrock; schist
1768332	539587	6803385	1768332	27-Jul-14	Clayton Jones	LIV	60	C	brown	weathered bedrock
1768333	539643	6803394	1768333	27-Jul-14	Clayton Jones	LIV	100	B	grey	marsh and permafrost
1768334	539692	6803403	1768334	27-Jul-14	Clayton Jones	LIV	20	C	brown	dark schist
1768335	539739	6803413	1768335	27-Jul-14	Clayton Jones	LIV	60	B/C	brown	weathered bedrock; schist
1768336	539788	6803422	1768336	27-Jul-14	Clayton Jones	LIV	90	C	orange	weathered bedrock
1768337	539834	6803430	1768337	27-Jul-14	Clayton Jones	LIV	40	C	brown	weathered bedrock; schist
1768338	539886	6803436	1768338	27-Jul-14	Clayton Jones	LIV	30	C	dark brown	weathered bedrock; mafic schist
1768339	539936	6803446	1768339	27-Jul-14	Clayton Jones	LIV	30	B	brown	till
1768340	539984	6803451	1768340	27-Jul-14	Clayton Jones	LIV	40	B	brown	till
1768341	539967	6803551	1768341	27-Jul-14	Clayton Jones	LIV	50	C	orange	weathered bedrock
1768342	539919	6803543	1768342	27-Jul-14	Clayton Jones	LIV	60	B/C	brown	weathered bedrock
1768343	539870	6803534	1768343	27-Jul-14	Clayton Jones	LIV	50	B/C	brown	weathered bedrock
1768344	539821	6803521	1768344	27-Jul-14	Clayton Jones	LIV	10	C	dark brown	weathered bedrock; mafic schist

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768345	539770	6803517	1768345	27-Jul-14	Clayton Jones	LIV	60	B	brown	till; permafrost/wet
1768346	539719	6803505	1768346	27-Jul-14	Clayton Jones	LIV	40	B/C	brown	till
1768347	539671	6803497	1768347	27-Jul-14	Clayton Jones	LIV	30	B	brown	till
1768348	539622	6803490	1768348	27-Jul-14	Clayton Jones	LIV	90	C	orange	weathered bedrock; swampy
1768349	539570	6803480	1768349	27-Jul-14	Clayton Jones	LIV	40	B	brown	till
1768350	539524	6803475	1768350	27-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768351	539166	6803207	1768351	26-Jul-14	Dan Ferraro	LIV	40-50	c	lt brown	
1768352	539122	6803197	1768352	26-Jul-14	Dan Ferraro	LIV	20-30	b-c	lt brown	talusy
1768353	539068	6803187	1768353	26-Jul-14	Dan Ferraro	LIV	30-40	b	brown	not good sample
1768354	539017	6803182	1768354	26-Jul-14	Dan Ferraro	LIV	40-50	c	brwn-grey	clay-y
1768355	538971	6803173	1768355	26-Jul-14	Dan Ferraro	LIV	60-70	c?	brown-yellow	frost heave area. Yellowish clay-mud. Unique appearance
1768356	538918	6803164	1768356	26-Jul-14	Dan Ferraro	LIV	30	b-c	brown	lots of rock chips
1768357	538870	6803154	1768357	26-Jul-14	Dan Ferraro	LIV	50-60	c	brown	
1768358	538820	6803144	1768358	26-Jul-14	Dan Ferraro	LIV	30-40	c	brown	talusy
1768359	538772	6803137	1768359	26-Jul-14	Dan Ferraro	LIV	30	b	brown	
1768360	538721	6803125	1768360	26-Jul-14	Dan Ferraro	LIV	30	c	brown	clay-y
1768361	538671	6803117	1768361	26-Jul-14	Dan Ferraro	LIV	30	c	brown	rocky
1768362	538625	6803107	1768362	26-Jul-14	Dan Ferraro	LIV	50-60	c	brown	
1768363	538575	6803106	1768363	26-Jul-14	Dan Ferraro	LIV	40-50	c	brown	rocky
1768364	538526	6803094	1768364	26-Jul-14	Dan Ferraro	LIV	30-40	c	brown	rocky
1768365	538476	6803086	1768365	26-Jul-14	Dan Ferraro	LIV	40-50	c	brown	clayish. Taken in 5m sq depression
1768366	538428	6803075	1768366	26-Jul-14	Dan Ferraro	LIV	30-40	c	brown	
1768367	538378	6803069	1768367	26-Jul-14	Dan Ferraro	LIV	20-30	c	brown	
1768368	538328	6803059	1768368	26-Jul-14	Dan Ferraro	LIV	40-50	c	brown	
1768369	538279	6803050	1768369	26-Jul-14	Dan Ferraro	LIV	40-50	b	brown	muddy
1768370	538230	6803043	1768370	26-Jul-14	Dan Ferraro	LIV	30-40	b	brown	muddy
1768371	538184	6803031	1768371	26-Jul-14	Dan Ferraro	LIV	30-40	b	brown	
1768372	538130	6803027	1768372	26-Jul-14	Dan Ferraro	LIV	40-50	b-c?	brown	sandy
1768373	538083	6803013	1768373	26-Jul-14	Dan Ferraro	LIV	30-40	b	brown	
1768374	538035	6803005	1768374	26-Jul-14	Dan Ferraro	LIV	40-50	b	brown	
1768375	539212	6803220	1768375	27-Jul-14	Dan Ferraro	LIV	40-50	c	brwn-grey	sandy. Greyish
1768376	539262	6803226	1768376	27-Jul-14	Dan Ferraro	LIV	30-40	c	brwn-grey	sandy. Greyish
1768377	539309	6803236	1768377	27-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	
1768378	539359	6803240	1768378	27-Jul-14	Dan Ferraro	LIV	40-50	c	brwn-grey	
1768379	539407	6803250	1768379	27-Jul-14	Dan Ferraro	LIV	50-60	b	brown	hit permafrost. Greenish chl or mica
1768380	539462	6803258	1768380	27-Jul-14	Dan Ferraro	LIV	60-70	b	brown	drainage area
1768381	539508	6803268	1768381	27-Jul-14	Dan Ferraro	LIV	40-50	b	brown	
1768382	539557	6803278	1768382	27-Jul-14	Dan Ferraro	LIV	20-30	b	brown	
1768383	539605	6803288	1768383	27-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	clay-y
1768384	539657	6803296	1768384	27-Jul-14	Dan Ferraro	LIV	60-70	b-c	brown	
1768385	539706	6803303	1768385	27-Jul-14	Dan Ferraro	LIV	50-60	c	brown	
1768386	539755	6803312	1768386	27-Jul-14	Dan Ferraro	LIV	50-60	b-c	brown	near OC. Rocky bottom
1768387	539806	6803320	1768387	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	sandy
1768388	539854	6803329	1768388	27-Jul-14	Dan Ferraro	LIV	30-40	c	brown	sandy rocky
1768389	539903	6803340	1768389	27-Jul-14	Dan Ferraro	LIV	60-70	b-c	brown	
1768390	539952	6803351	1768390	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	in between pyroxenite and bt schist
1768391	540000	6803355	1768391	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	
1768392	540035	6803155	1768392	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	
1768393	539986	6803149	1768393	27-Jul-14	Dan Ferraro	LIV	20-30	b-c	brown	
1768394	539937	6803136	1768394	27-Jul-14	Dan Ferraro	LIV	40-50	c	brwn-grey	clay-y

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768395	539889	6803128	1768395	27-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	
1768396	539843	6803123	1768396	27-Jul-14	Dan Ferraro	LIV	30-40	b	brown	
1768397	539790	6803116	1768397	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	
1768398	539737	6803104	1768398	27-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	drainage area but nice clay
1768399	539690	6803096	1768399	27-Jul-14	Dan Ferraro	LIV	30-40	b-c	brown	
1768400	539639	6803086	1768400	27-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	small depression maybe old drainage
1768401	539596	6803079	1768401	27-Jul-14	Dan Ferraro	LIV	40-50	b	brown	
1768402	539547	6803070	1768402	27-Jul-14	Dan Ferraro	LIV	50-60	c	brown-yellow	nice sample yellowish rocky soil
1768403	539501	6803060	1768403	27-Jul-14	Dan Ferraro	LIV	30-40	b-c	brown	clay-y, wet
1768404	539449	6803054	1768404	27-Jul-14	Dan Ferraro	LIV	60-70	b-c	brown	clay-y
1768405	539398	6803044	1768405	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	
1768406	539348	6803036	1768406	27-Jul-14	Dan Ferraro	LIV	40-50	c	brown	
1768407	539297	6803028	1768407	27-Jul-14	Dan Ferraro	LIV	60-70	c	brown	clay-y
1768408	539247	6803022	1768408	27-Jul-14	Dan Ferraro	LIV	40-50	c	brwn-grey	greyish dry dirt
1768409	539199	6803011	1768409	27-Jul-14	Dan Ferraro	LIV	30-40	c	brwn-grey	greyish dry dirt
1768410	539151	6803003	1768410	27-Jul-14	Dan Ferraro	LIV	50-60	c	brwn-grey	
1768411	539102	6802993	1768411	27-Jul-14	Dan Ferraro	LIV	30-40	b-c	brown	clay-y
1768412	539050	6802985	1768412	27-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	tillish
1768413	538556	6802023	1768413	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown	micaceous, nice sample
1768414	538564	6802069	1768414	28-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	bedrock source
1768415	538566	6802118	1768415	28-Jul-14	Dan Ferraro	LIV	40-50	b	brown	talus and till, tough to get good sample
1768416	538571	6802170	1768416	28-Jul-14	Dan Ferraro	LIV	20-30	b	brown	talus and till, poor sample
1768417	538577	6802217	1768417	28-Jul-14	Dan Ferraro	LIV	30-40	b	brown	talus and till, poor sample
1768418	538578	6802274	1768418	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	sandy. Sampled through sandy layer to micaceous c horizon
1768419	538585	6802320	1768419	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	tillish
1768420	538588	6802370	1768420	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown	
1768421	538595	6802417	1768421	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	clay-y
1768422	538601	6802468	1768422	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown	sandy
1768423	538605	6802518	1768423	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	sandy
1768424	538610	6802567	1768424	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	sandy, micaceous
1768425	538612	6802618	1768425	28-Jul-14	Dan Ferraro	LIV	30-40	b-c	brown	dirt+sand, till
1768426	538618	6802665	1768426	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	micaceous and sandy, nice sample
1768427	538624	6802718	1768427	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown	sandy, till
1768428	538630	6802766	1768428	28-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	nice sample, orange upper layer, grey micaceous lower layer
1768429	538631	6802816	1768429	28-Jul-14	Dan Ferraro	LIV	50-60	c	brown	sandy, till
1768430	538639	6802870	1768430	28-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	sandy, till, till covering slope, some bedrock source
1768431	538649	6802966	1768431	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	sandy, till
1768432	538658	6802916	1768432	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown	sandy, dirt, till
1768433	538705	6802925	1768433	28-Jul-14	Dan Ferraro	LIV	30-40	b-c	brown	till
1768434	538756	6802931	1768434	28-Jul-14	Dan Ferraro	LIV	50-60	c	brown	micaceous, clay, bedrock
1768435	538803	6802939	1768435	28-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	sand, dirt, till
1768436	538855	6802945	1768436	28-Jul-14	Dan Ferraro	LIV	70-80	b-c	brown	till, dirt
1768437	538901	6802956	1768437	28-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	till, dirt
1768438	538950	6802966	1768438	28-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	till, dirt
1768439	538606	6802907	1768439	28-Jul-14	Dan Ferraro	LIV	40-50	b	brown	till
1768440	538561	6802898	1768440	28-Jul-14	Dan Ferraro	LIV	40-50	b	brown	till
1768441	538509	6802890	1768441	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	till?
1768442	538459	6802881	1768442	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown	micaceous, sandy
1768443	538414	6802873	1768443	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	till, micaceous, on top of small ledge
1768444	538362	6802863	1768444	28-Jul-14	Dan Ferraro	LIV	50-60	b	brown	muddy, till

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768445	538324	6802856	1768445	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown	till, some red buck bush over top
1768446	538263	6802845	1768446	28-Jul-14	Dan Ferraro	LIV	20-30	b	brown	muddy, till, permafrost? Poor sample
1768447	538219	6802838	1768447	28-Jul-14	Dan Ferraro	LIV	60-70	b-c	brown	tillish
1768448	538165	6802827	1768448	28-Jul-14	Dan Ferraro	LIV	40-50	c	brown-grey	grey, clay-y, sandy, maybe till
1768449	538117	6802821	1768449	28-Jul-14	Dan Ferraro	LIV	30-40	b-c	brown	till, dry, sandy
1768450	538066	6802808	1768450	28-Jul-14	Dan Ferraro	LIV	30-40	c	brown-grey	grey, till
1768451	539474	6803464	1768451	27-Jul-14	Clayton Jones	LIV	40	B/C	brown	weathered bedrock
1768452	539426	6803454	1768452	27-Jul-14	Clayton Jones	LIV	75	B	brown	till
1768453	539375	6803444	1768453	27-Jul-14	Clayton Jones	LIV	80	C	brown	weathered bedrock
1768454	539325	6803436	1768454	27-Jul-14	Clayton Jones	LIV	60	B/C	brown	weathered bedrock
1768455	539278	6803429	1768455	27-Jul-14	Clayton Jones	LIV	60	B	brown	till
1768456	539228	6803424	1768456	27-Jul-14	Clayton Jones	LIV	70	B/C	brown	permafrost
1768457	539179	6803412	1768457	27-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768458	539128	6803405	1768458	27-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768459	539082	6803393	1768459	27-Jul-14	Clayton Jones	LIV	75	C	orange	weathered bedrock; qrtz clasts
1768460	539030	6803384	1768460	27-Jul-14	Clayton Jones	LIV	100	C	red/orange	weathered bedrock; qrtz clasts
1768461	539002	6802977	1768461	27-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768462	539066	6803188	1768462	27-Jul-14	Clayton Jones	LIV	30	C	brown	sample retaken for Dan, graphite schist bedrock
1768463	538899	6803566	1768463	28-Jul-14	Clayton Jones	LIV	100	B	grey	till; swampy
1768464	538849	6803556	1768464	28-Jul-14	Clayton Jones	LIV	50	B	brown	till; beige fluffy ash material encountered in A horizon.
1768465	538801	6803548	1768465	28-Jul-14	Clayton Jones	LIV	60	B	brown	weathered bedrock
1768466	538751	6803539	1768466	28-Jul-14	Clayton Jones	LIV	75	C	brown	weathered bedrock; schist fragments
1768467	538704	6803531	1768467	28-Jul-14	Clayton Jones	LIV	50	C	brown	weathered bedrock
1768468	538653	6803521	1768468	28-Jul-14	Clayton Jones	LIV	70	C	orange	weathered bedrock; qrtz fragments
1768469	538603	6803512	1768469	28-Jul-14	Clayton Jones	LIV	60	B	brown	till
1768470	538550	6803505	1768470	28-Jul-14	Clayton Jones	LIV	70	B	brown	till
1768471	538504	6803494	1768471	28-Jul-14	Clayton Jones	LIV	60	B	brown/red	
1768472	538453	6803485	1768472	28-Jul-14	Clayton Jones	LIV	60	B	brown	
1768473	538407	6803477	1768473	28-Jul-14	Clayton Jones	LIV	70	B	brown	
1768474	538357	6803467	1768474	28-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768475	538259	6803453	1768475	28-Jul-14	Clayton Jones	LIV	60	C	brown	till
1768476	538306	6803460	1768476	28-Jul-14	Clayton Jones	LIV	50	B	brown	
1768477	538206	6803443	1768477	28-Jul-14	Clayton Jones	LIV	70	B	brown	
1768478	538163	6803435	1768478	28-Jul-14	Clayton Jones	LIV	60	B	brown	
1768479	538109	6803426	1768479	28-Jul-14	Clayton Jones	LIV	60	B	brown	
1768480	538060	6803417	1768480	28-Jul-14	Clayton Jones	LIV	60	B	brown	
1768481	538012	6803406	1768481	28-Jul-14	Clayton Jones	LIV	60	B	brown	
1768482	537962	6803398	1768482	28-Jul-14	Clayton Jones	LIV	50	B	brown	
1768483	537996	6803202	1768483	28-Jul-14	Clayton Jones	LIV	50	B	brown	very wet
1768484	538048	6803214	1768484	28-Jul-14	Clayton Jones	LIV	60	B	grey	till; clay rich
1768485	538096	6803218	1768485	28-Jul-14	Clayton Jones	LIV	60	B	grey	till; clay rich
1768486	538143	6803232	1768486	28-Jul-14	Clayton Jones	LIV	60	B	brown	till
1768487	538198	6803242	1768487	28-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768488	538245	6803245	1768488	28-Jul-14	Clayton Jones	LIV	70	B	brown	
1768489	538292	6803256	1768489	28-Jul-14	Clayton Jones	LIV	50	B	brown	
1768490	538345	6803263	1768490	28-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768491	538390	6803276	1768491	28-Jul-14	Clayton Jones	LIV	50	B	brown	
1768492	538439	6803280	1768492	28-Jul-14	Clayton Jones	LIV	80	B	brown	
1768493	538491	6803289	1768493	28-Jul-14	Clayton Jones	LIV	70	B	grey	till; clay rich
1768494	538537	6803297	1768494	28-Jul-14	Clayton Jones	LIV	60	B	brown	

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1768495	538592	6803305	1768495	28-Jul-14	Clayton Jones	LIV	40	B	brown	
1768496	538638	6803315	1768496	28-Jul-14	Clayton Jones	LIV	50	B	brown	till; permafrost
1768497	538688	6803324	1768497	28-Jul-14	Clayton Jones	LIV	40	B	grey	till; permafrost
1768498	538736	6803332	1768498	28-Jul-14	Clayton Jones	LIV	80	B	grey	frost heave (clay rich)
1768499	538786	6803344	1768499	28-Jul-14	Clayton Jones	LIV	70	C	brown	weathered bedrock; very wet
1768500	538832	6803350	1768500	28-Jul-14	Clayton Jones	LIV	60	B	brown	
1768501	538882	6803357	1768501	28-Jul-14	Clayton Jones	LIV	50	B	brown	schist
1768502	538935	6803368	1768502	28-Jul-14	Clayton Jones	LIV	60	C	brown	weathered bedrock; permafrost
1768503	538983	6803379	1768503	28-Jul-14	Clayton Jones	LIV	50	B	brown	
1768504	539635	6803694	1768504	30-Jul-14	Clayton Jones	LIV	60	B	brown	
1768505	539536	6803678	1768505	30-Jul-14	Clayton Jones	LIV	30	C	brown	marmot hole in talus, weathered bedrock
1768506	539440	6803661	1768506	30-Jul-14	Clayton Jones	LIV	80	B	orange	in linear nnw saddle, permafrost
1768507	539343	6803641	1768507	30-Jul-14	Clayton Jones	LIV	70	B	brown	
1768508	539096	6803600	1768508	30-Jul-14	Clayton Jones	LIV	20	A	dark brown	permafrost, poor sample quality
1768509	539143	6803607	1768509	30-Jul-14	Clayton Jones	LIV	60	B	brown	permafrost, poor sample quality
1768510	538567	6803709	1768510	30-Jul-14	Clayton Jones	LIV	60	B	brown	
1768511	538614	6803716	1768511	30-Jul-14	Clayton Jones	LIV	60	B	brown	
1768512	538662	6803725	1768512	30-Jul-14	Clayton Jones	LIV	60	B	brown	permafrost
1768513	538714	6803735	1768513	31-Jul-14	Clayton Jones	LIV	100	B	grey	mica rich, very wet and permafrost
1768514	538952	6803569	1768514	31-Jul-14	Clayton Jones	LIV	80	B	brown	
1768515	538998	6803584	1768515	31-Jul-14	Clayton Jones	LIV	70	B	brown	
1768516	539046	6803589	1768516	31-Jul-14	Clayton Jones	LIV	70	B	brown	permafrost
1768517	539748	6803919	1768517	31-Jul-14	Clayton Jones	LIV	40	C	brown	weathered bedrock
1768518	539651	6803901	1768518	31-Jul-14	Clayton Jones	LIV	50	C	green/grey	weathered bedrock
1768519	539552	6803879	1768519	31-Jul-14	Clayton Jones	LIV	60	C	green/brown	weathered bedrock
1768520	539455	6803869	1768520	31-Jul-14	Clayton Jones	LIV	70	B/C	brown/orange	weathered bedrock
1768521	539359	6803848	1768521	31-Jul-14	Clayton Jones	LIV	10	C	dark brown	weathered bedrock, talus
1768522	539205	6803823	1768522	31-Jul-14	Clayton Jones	LIV	30	C	brown	min'd dark biotite schist bedrock
1768523	539254	6803832	1768523	31-Jul-14	Clayton Jones	LIV	30	A/B	brown	moss covered talus, poor soil formation
1768524	539161	6803812	1768524	31-Jul-14	Clayton Jones	LIV	50	B/C	brown	
1768525	539110	6803803	1768525	31-Jul-14	Clayton Jones	LIV	60	B	brown	
1768526	539060	6803796	1768526	31-Jul-14	Clayton Jones	LIV	70	B	brown	
1768527	539014	6803790	1768527	31-Jul-14	Clayton Jones	LIV	60	B	brown	permafrost
1768532	539736	6803712	1768528	31-Jul-14	Clayton Jones	LIV	50	B/C	brown	
1768533	539782	6803724	1768529	31-Jul-14	Clayton Jones	LIV	50	B	brown	till
1768528	536670	6804170	1768530	1-Aug-14	Clayton Jones	LIV	70	B	brown	till; permafrost
1768529	536723	6804163	1768531	1-Aug-14	Clayton Jones	LIV	60	B	brown	till
1768530	536772	6804159	1768532	1-Aug-14	Clayton Jones	LIV	50	B	brown	till
1768531	536822	6804156	1768533	1-Aug-14	Clayton Jones	LIV	10	B	brown	
1768534	536873	6804144	1768534	1-Aug-14	Clayton Jones	LIV	90	B	brown	
1768535	536923	6804138	1768535	1-Aug-14	Clayton Jones	LIV	70	B	grey/brown	till
1768536	536973	6804129	1768536	1-Aug-14	Clayton Jones	LIV	60	B	orange	till
1768537	537019	6804123	1768537	1-Aug-14	Clayton Jones	LIV	60	B	brown	till
1768538	537071	6804130	1768538	1-Aug-14	Clayton Jones	LIV	60	B	brown	till; dark grey schist clasts
1768539	537123	6804138	1768539	1-Aug-14	Clayton Jones	LIV	30	B	grey	till
1768540	537170	6804142	1768540	1-Aug-14	Clayton Jones	LIV	40	B	brown	
1768541	537218	6804154	1768541	1-Aug-14	Clayton Jones	LIV	70	B	brown	
1768542	537268	6804162	1768542	1-Aug-14	Clayton Jones	LIV	60	B	brown	till
1768543	537365	6804180	1768543	1-Aug-14	Clayton Jones	LIV	50	B	brown	
1768544	537464	6804198	1768544	1-Aug-14	Clayton Jones	LIV	60	B	brown	

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768545	537543	6804268	1768545	1-Aug-14	Clayton Jones	LIV	60	B	brown	till
1768546	537650	6804278	1768546	1-Aug-14	Clayton Jones	LIV	80	B	grey	clay rich, permafrost
1768547	537769	6804224	1768547	1-Aug-14	Clayton Jones	LIV	60	B	grey	permafrost
1768548	537853	6804163	1768548	1-Aug-14	Clayton Jones	LIV	70	B	grey	till
1768549	537934	6804107	1768549	1-Aug-14	Clayton Jones	LIV	90	B	grey	till; very wet
1768550	538014	6804046	1768550	1-Aug-14	Clayton Jones	LIV	70	B	grey	till; light grey sand overtop brown till, in flat muskeg ridge top.
1768551	539688	6803705	1768551	30-Jul-14	Dan Ferraro	LIV	40-50	b	brown	till
1768552	539586	6803690	1768552	30-Jul-14	Dan Ferraro	LIV	30-40	b	brown	till
1768553	539486	6803669	1768553	30-Jul-14	Dan Ferraro	LIV	50-60	c	orangeish	orangish soil, beside large 4m quartz vein
1768554	539392	6803655	1768554	30-Jul-14	Dan Ferraro	LIV	50-60	c	brown	nice sample. Greenish chlorite
1768555	539291	6803636	1768555	30-Jul-14	Dan Ferraro	LIV	40-50	b	brown	
1768556	539244	6803623	1768556	30-Jul-14	Dan Ferraro	LIV	80-90	b	brown	muddy
1768557	539195	6803617	1768557	30-Jul-14	Dan Ferraro	LIV	50-60	b-c	brown	
1768558	538957	6803781	1768558	31-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	till
1768559	538915	6803770	1768559	31-Jul-14	Dan Ferraro	LIV	50-60	b	brown	grey, till
1768560	538861	6803763	1768560	31-Jul-14	Dan Ferraro	LIV	70-80	b-c	brown	fine mica
1768561	538818	6803749	1768561	31-Jul-14	Dan Ferraro	LIV	120	b	brown	drainage area, more of a silt sample
1768562	538768	6803739	1768562	31-Jul-14	Dan Ferraro	LIV	120	b	brown	drainage area, more of a silt sample
1768563	538818	6803642	1768563	31-Jul-14	Dan Ferraro	LIV	40-50	b	brown	on hump of till in valley
1768564	538517	6803699	1768564	31-Jul-14	Dan Ferraro	LIV	80-90	b-c	brown	light and dark grey, till
1768565	538468	6803693	1768565	31-Jul-14	Dan Ferraro	LIV	50-60	c	brown	nice sample, micaceous
1768566	538414	6803682	1768566	31-Jul-14	Dan Ferraro	LIV	120	b	brown	drainage are, muddy, some clay
1768567	538371	6803671	1768567	31-Jul-14	Dan Ferraro	LIV	90-100	b	brown	lighter brown
1768568	538321	6803665	1768568	31-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	decent sample, some till
1768569	538275	6803654	1768569	31-Jul-14	Dan Ferraro	LIV	50-60	b-c	brown	decent sample, micaceous
1768570	538224	6803647	1768570	31-Jul-14	Dan Ferraro	LIV	40-50	b	brown	till
1768571	538172	6803636	1768571	31-Jul-14	Dan Ferraro	LIV	40-50	c	brown	micaceous
1768572	538126	6803631	1768572	31-Jul-14	Dan Ferraro	LIV	50-60	c	brown	micaceous
1768573	538075	6803621	1768573	31-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	some till
1768574	538028	6803615	1768574	31-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	till but nice mica
1768575	537977	6803605	1768575	31-Jul-14	Dan Ferraro	LIV	40-50	b-c	brown	till but nice mica
1768576	536665	6804249	1768576	1-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	till, some mica
1768577	536638	6804287	1768577	1-Aug-14	Dan Ferraro	LIV	30-40	c	brown	till, mica
1768578	536629	6804334	1768578	1-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till
1768579	536622	6804382	1768579	1-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	till, clay-y
1768580	536611	6804436	1768580	1-Aug-14	Dan Ferraro	LIV	50-60	b	brown	muddy, some mica, poor sample
1768581	536636	6804477	1768581	1-Aug-14	Dan Ferraro	LIV	60-70	b	brown	till
1768582	536836	6804352	1768582	1-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	decent sample, orangish
1768583	536918	6804327	1768583	1-Aug-14	Dan Ferraro	LIV	40-50	b-c	brwn-orange	orangish or till
1768584	536972	6804287	1768584	1-Aug-14	Dan Ferraro	LIV	30-40	c	brown	greyish, mica, flat linear
1768585	537055	6804266	1768585	1-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	bedrock source?
1768586	537138	6804287	1768586	1-Aug-14	Dan Ferraro	LIV	30-40	c	brwn-orange	orangish soil, 4m from large QV
1768587	537202	6804262	1768587	1-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	till, mica
1768588	537315	6804180	1768588	1-Aug-14	Dan Ferraro	LIV	90-100	b	brown	dirt
1768589	537418	6804194	1768589	1-Aug-14	Dan Ferraro	LIV	50-60	c	brown	frost heave, greyish clay, till
1768590	537511	6804226	1768590	1-Aug-14	Dan Ferraro	LIV	50-60	b	brown	dirt, till
1768591	537578	6804306	1768591	1-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	dirt and till at peak
1768592	537732	6804257	1768592	1-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown-grey	till, grey, brown
1768593	537816	6804198	1768593	1-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	till, mica
1768594	537894	6804145	1768594	1-Aug-14	Dan Ferraro	LIV	40-50	b	brown	brown dirt

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768595	537971	6804077	1768595	1-Aug-14	Dan Ferraro	LIV	50-60	c	brown	clay-y, decent sample
1768596	538138	6803903	1768596	1-Aug-14	Dan Ferraro	LIV	30-40	b	brown	gravelly, poor sample
1768597	539393	6805013	1768597	2-Aug-14	Dan Ferraro	LIV	30-40	b	brown	permafrost but decent sample
1768598	539300	6804998	1768598	2-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	sandy, micaceous
1768599	539199	6804979	1768599	2-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till, nice mica
1768600	539102	6804960	1768600	2-Aug-14	Dan Ferraro	LIV	40-50	b-c	brwn-orange	mica, till, some orange oxidized soil
1768601	539005	6804944	1768601	2-Aug-14	Dan Ferraro	LIV	60-70	b	brwn-orange	mica, till, some orange oxidized soil
1768602	538903	6804938	1768602	2-Aug-14	Dan Ferraro	LIV	30-40	b	brown	permafrost
1768603	538761	6805226	1768603	2-Aug-14	Dan Ferraro	LIV	30-40	b	brown	till, but right near outcrop
1768604	538853	6805220	1768604	2-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	ridge near OC. Till, dirt.
1768605	538952	6805240	1768605	2-Aug-14	Dan Ferraro	LIV	30-40	c	brwn-orange	grey and orange, clay-y
1768606	539048	6805255	1768606	2-Aug-14	Dan Ferraro	LIV	30-40	b	brown	dirt , till, some mica
1768607	539145	6805273	1768607	2-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till, some mica
1768608	539246	6805288	1768608	2-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	between rusty outcrops on cliff wall
1768609	539346	6805307	1768609	2-Aug-14	Dan Ferraro	LIV	50-60	b	brwn-orange	some orange soil, green mica, till
1768610	539308	6805505	1768610	2-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till, mica
1768611	539209	6805488	1768611	2-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	till, some clay
1768612	539099	6805467	1768612	2-Aug-14	Dan Ferraro	LIV	30-40	b	brown	dirt, permafrost
1768613	539015	6805453	1768613	2-Aug-14	Dan Ferraro	LIV	30-50	a-b	brown	permafrost but some mica
1768614	538818	6805421	1768614	2-Aug-14	Dan Ferraro	LIV	50-60	b	brown	dirt, mica, rock chips, decent sample
1768615	538843	6805324	1768615	2-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	decent mica, some till
1768616	539506	6806490	1768616	3-Aug-14	Dan Ferraro	LIV	40-50	b-c	brwn-orange	orangish, micaceous
1768617	539550	6806454	1768617	3-Aug-14	Dan Ferraro	LIV	30-40	c	olive-orange	olive-orange, mica, bedrock source
1768618	539590	6806413	1768618	3-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	till, dirt
1768619	539604	6806364	1768619	3-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till, talus source, orangish, mica
1768620	539622	6806314	1768620	3-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	till, bedrock
1768621	539654	6806231	1768621	3-Aug-14	Dan Ferraro	LIV	60-70	b-c	brown	till, clay-y, 5m from edge of outcrop
1768622	539644	6806182	1768622	3-Aug-14	Dan Ferraro	LIV	60-70	c	brwn-orange	orange, micaceous, bedrock source
1768623	539644	6806128	1768623	3-Aug-14	Dan Ferraro	LIV	40-50	b-c	brwn-orange	orangish, clay-y, bedrock
1768624	539692	6806084	1768624	3-Aug-14	Dan Ferraro	LIV	30-40	b-c	brwn-orange	orangish, till
1768625	539696	6806035	1768625	3-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	on top of hump, outcrop close, olive-grey, clay
1768626	539698	6805977	1768626	3-Aug-14	Dan Ferraro	LIV	60-70	b	brown	dirt w some mica
1768627	539650	6805965	1768627	3-Aug-14	Dan Ferraro	LIV	40-50	c	brown	brown-orange-grey, some till
1768628	539430	6805657	1768628	3-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till, dirt
1768629	539399	6805570	1768629	3-Aug-14	Dan Ferraro	LIV	60-70	b	brown	some mica
1768630	539375	6805472	1768630	3-Aug-14	Dan Ferraro	LIV	30-40	b	brown	talus area, some permafrost, greenish mica, poor sample
1768631	541312	6802951	1768631	4-Aug-14	Dan Ferraro	LIV	30-40	c	brown	nica sample, micaceous
1768632	541262	6802967	1768632	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	till, mica
1768633	541210	6802981	1768633	4-Aug-14	Dan Ferraro	LIV	40-50	c	brown	some till
1768634	541154	6802988	1768634	4-Aug-14	Dan Ferraro	LIV	40-50	c	brown	sandy
1768635	541103	6802984	1768635	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	till+angular rock
1768636	541048	6802974	1768636	4-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	some till
1768637	540993	6802960	1768637	4-Aug-14	Dan Ferraro	LIV	40-50	c?	brown	grey clay, wet area
1768638	540940	6802961	1768638	4-Aug-14	Dan Ferraro	LIV	30-40	c	brown	bedrock
1768639	540887	6802975	1768639	4-Aug-14	Dan Ferraro	LIV	30-40	c	brown	till, talus
1768640	540832	6802981	1768640	4-Aug-14	Dan Ferraro	LIV	40-50	b	brown	till
1768641	540779	6802986	1768641	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	sandy till
1768642	540724	6802985	1768642	4-Aug-14	Dan Ferraro	LIV	30-40	c	brown	some till
1768643	540669	6802981	1768643	4-Aug-14	Dan Ferraro	LIV	60-70	b	brown	muddy till
1768644	540624	6802951	1768644	4-Aug-14	Dan Ferraro	LIV	50-60	c	brown	very micaceous, bedrock source

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768645	540587	6802916	1768645	4-Aug-14	Dan Ferraro	LIV	40-50	c	brown	micaceous, sandy, till and bedrock
1768646	540533	6802906	1768646	4-Aug-14	Dan Ferraro	LIV	90-100	b	brown	muddy, some angular rock
1768647	540478	6802899	1768647	4-Aug-14	Dan Ferraro	LIV	70-80	b-c	brown	through mud layer to clay, some orange soil, bedrock?
1768648	540410	6802899	1768648	4-Aug-14	Dan Ferraro	LIV	30-40	c	brown	small plateau on sidehill. Angular chips, green chl and mica
1768649	540355	6802897	1768649	4-Aug-14	Dan Ferraro	LIV	40-50	c	brown	micaceous, green chl
1768650	540299	6802892	1768650	4-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	till, dirt
1768651	539380	6805110	1768651	2-Aug-14	Clayton Jones	LIV	30	B	brown	till; permafrost (poor sample)
1768652	539281	6805094	1768652	2-Aug-14	Clayton Jones	LIV	60	B	brown	till; permafrost
1768653	539180	6805077	1768653	2-Aug-14	Clayton Jones	LIV	40	B	grey	till; pebble/cobbles
1768654	539087	6805062	1768654	2-Aug-14	Clayton Jones	LIV	50	B	brown	
1768655	538981	6805044	1768655	2-Aug-14	Clayton Jones	LIV	60	C	green/brown	weathered bedrock
1768656	538888	6805020	1768656	2-Aug-14	Clayton Jones	LIV	60	B	grey	till; wet gravel
1768657	538869	6805122	1768657	2-Aug-14	Clayton Jones	LIV	20	C	brown	weathered bedrock
1768658	538966	6805147	1768658	2-Aug-14	Clayton Jones	LIV	50	B	brown	
1768659	539067	6805157	1768659	2-Aug-14	Clayton Jones	LIV	40	C	brown	weathered bedrock
1768660	539169	6805178	1768660	2-Aug-14	Clayton Jones	LIV	40	B	brown	
1768661	539266	6805193	1768661	2-Aug-14	Clayton Jones	LIV	50	B	brown/black	moss covered talus, poor soil development
1768662	539359	6805209	1768662	2-Aug-14	Clayton Jones	LIV	40	B	brown	
1768663	539326	6805408	1768663	2-Aug-14	Clayton Jones	LIV	40	C	brown	weathered bedrock
1768664	539222	6805391	1768664	2-Aug-14	Clayton Jones	LIV	60	B	brown	
1768665	539134	6805373	1768665	2-Aug-14	Clayton Jones	LIV	40	C	brown	weathered bedrock; talus
1768666	539031	6805357	1768666	2-Aug-14	Clayton Jones	LIV	60	A/B	brown	moss covered talus (poor soil development)
1768667	538932	6805338	1768667	2-Aug-14	Clayton Jones	LIV	60	B	brown	
1768668	539430	6806076	1768668	3-Aug-14	Clayton Jones	LIV	30	C	red/brown	weathered bedrock; random soil at gossanous ridge, very abundant along ridge
1768669	539597	6805972	1768669	3-Aug-14	Clayton Jones	LIV	60	C	orange	weathered bedrock; gulley bottom
1768670	539553	6805964	1768670	3-Aug-14	Clayton Jones	LIV	30	C	red/orange	weathered bedrock; gossanous ridge
1768671	539211	6804940	1768671	4-Aug-14	Clayton Jones	LIV	50	C	brown	weathered bedrock
1768672	539497	6805895	1768672	3-Aug-14	Clayton Jones	LIV	50	C	brown	weathered bedrock
1768673	539486	6805854	1768673	3-Aug-14	Clayton Jones	LIV	50	B	brown	
1768674	539473	6805805	1768674	3-Aug-14	Clayton Jones	LIV	60	B	brown	
1768675	539459	6805753	1768675	3-Aug-14	Clayton Jones	LIV	50	C	orange brown	weathered bedrock
1768676	539443	6805709	1768676	3-Aug-14	Clayton Jones	LIV	60	B	brown	moss covered talus, poor soil
1768677	539415	6805611	1768677	3-Aug-14	Clayton Jones	LIV	50	B	brown	
1768678	539384	6805516	1768678	3-Aug-14	Clayton Jones	LIV	30	C	dark brown	weathered bedrock
1768679	539233	6804894	1768679	4-Aug-14	Clayton Jones	LIV	50	C	dark brown	
1768680	539253	6804851	1768680	4-Aug-14	Clayton Jones	LIV	50	B/C	brown	
1768681	539224	6804800	1768681	4-Aug-14	Clayton Jones	LIV	50	C	brown	
1768682	539257	6804759	1768682	4-Aug-14	Clayton Jones	LIV	80	B	greenish grey	unique green grey clay, possible fault gouge?
1768683	539289	6804720	1768683	4-Aug-14	Clayton Jones	LIV	60	B	green brown	Till
1768684	539329	6804686	1768684	4-Aug-14	Clayton Jones	LIV	50	B	dark brown	
1768685	539343	6804628	1768685	4-Aug-14	Clayton Jones	LIV	50	B	brown	
1768686	539390	6804607	1768686	4-Aug-14	Clayton Jones	LIV	50	C	brown	weathered bedrock; schist particles
1768687	539425	6804570	1768687	4-Aug-14	Clayton Jones	LIV	30	C	brown	weathered bedrock
1768688	539461	6804537	1768688	4-Aug-14	Clayton Jones	LIV	80	B	brown	frost heave
1768689	539468	6804486	1768689	4-Aug-14	Clayton Jones	LIV	70	B	brown	
1768690	539476	6804433	1768690	4-Aug-14	Clayton Jones	LIV	60	B	brown	
1768691	539509	6804389	1768691	4-Aug-14	Clayton Jones	LIV	60	C	brown	weathered bedrock
1768692	539535	6804341	1768692	4-Aug-14	Clayton Jones	LIV	30	C	brown	weathered bedrock
1768693	539575	6804309	1768693	4-Aug-14	Clayton Jones	LIV	70	C	grey brown	weathered bedrock

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768694	539595	6804259	1768694	4-Aug-14	Clayton Jones	LIV	60	B	brown	frost heave
1768695	539612	6804211	1768695	4-Aug-14	Clayton Jones	LIV	60	C	green brown	weathered bedrock
1768696	539628	6804165	1768696	4-Aug-14	Clayton Jones	LIV	50	C	greenish brown	weathered bedrock
1768697	539642	6804116	1768697	4-Aug-14	Clayton Jones	LIV	60	B	brown	poor sample, moss covered talus
1768698	539650	6804066	1768698	4-Aug-14	Clayton Jones	LIV	50	B	brown	frost heave
1768699	539653	6804016	1768699	4-Aug-14	Clayton Jones	LIV	60	C	dark brown	weathered bedrock
1768700	539696	6803976	1768700	4-Aug-14	Clayton Jones	LIV	60	C	brown	weathered bedrock
1768701	539800	6803932	1768701	4-Aug-14	Clayton Jones	LIV	50	C	brown	weathered bedrock
1768702	539700	6803908	1768702	4-Aug-14	Clayton Jones	LIV	40	C	brown	weathered bedrock
1768703	539603	6803887	1768703	4-Aug-14	Clayton Jones	LIV	50	C	brown	weathered bedrock
1768704	539502	6803873	1768704	4-Aug-14	Clayton Jones	LIV	50	C	orange brown	weathered bedrock
1768705	539400	6803862	1768705	4-Aug-14	Clayton Jones	LIV	20	B	brown	poor sample, talus
1768706	539318	6803839	1768706	4-Aug-14	Clayton Jones	LIV	30	C	brown	weathered bedrock; gossanous outcrop
1768707	540279	6802629	1768707	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	orange brown	DS01 (labelled as such in the field) orange-brwn, some till
1768708	540283	6802682	1768708	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	DS02: some till, clay-y
1768709	540288	6802737	1768709	4-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	DS03: dirt, some till
1768710	540294	6802789	1768710	4-Aug-14	Dan Ferraro	LIV	60-70	b-c	brown	DS04: small depression, old drainage, dirt, some till
1768711	540295	6802842	1768711	4-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	DS05: till, mica
1768712	540273	6802936	1768712	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	DS06: till, angular rock mix
1768713	540260	6802987	1768713	4-Aug-14	Dan Ferraro	LIV	30-40	b	brown	DS07: till and bedrock, too much talus to get deeper
1768714	540251	6803039	1768714	4-Aug-14	Dan Ferraro	LIV	40-50	c	brown	DS08: micaceous, some till, nice sample
1768715	540245	6803095	1768715	4-Aug-14	Dan Ferraro	LIV	30-40	b-c	brown	DS09: talus, till
1768716	540220	6803145	1768716	4-Aug-14	Dan Ferraro	LIV	50-60	b-c	orange brown	DS10: orange-brwn soil, some till
1768717	540201	6803199	1768717	4-Aug-14	Dan Ferraro	LIV	40-50	b	brown	DS11: clay-y
1768718	540154	6803290	1768718	4-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	DS12: till, mica
1768719	540110	6803328	1768719	4-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	DS13: angular rocks, clay, till
1768720	538431	6807627	1768720	5-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	lots of rock. Till and talus (taken after 8722)
1768721	538574	6807758	1768721	5-Aug-14	Dan Ferraro	LIV	30-40	c	brown-grey	grey, angular rock
1768722	538505	6807679	1768722	5-Aug-14	Dan Ferraro	LIV	30-40	c	brown-grey	grey, lots of rock, till, angular
1768723	538331	6807638	1768723	5-Aug-14	Dan Ferraro	LIV	40-50	b-c	olive-grey	Angular rocks. Seems like thin layer of till then down to bedrock c horizon in this area
1768724	538237	6807582	1768724	5-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown	clay-y
1768725	538142	6807528	1768725	5-Aug-14	Dan Ferraro	LIV	30-40	c	brown-grey	sandy, grey, micaceous
1768726	538034	6807537	1768726	5-Aug-14	Dan Ferraro	LIV	40-50	c	brown-grey	greyish, micaceous, angular rock
1768727	537924	6807543	1768727	5-Aug-14	Dan Ferraro	LIV	30-40	c	brown-grey	sandy, grey, micaceous
1768728	537874	6807439	1768728	5-Aug-14	Dan Ferraro	LIV	40-50	c	brown-grey	sandy, grey, micaceous
1768729	537797	6807355	1768729	5-Aug-14	Dan Ferraro	LIV	50-60	b-c	brown-grey	lt brown-grey dirt, clay, till
1768730	537695	6807315	1768730	5-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown-grey	lt brown-grey dirt, clay, till
1768731	537598	6807297	1768731	5-Aug-14	Dan Ferraro	LIV	40-50	b-c	brown	sandy
1768732	537554	6807228	1768732	5-Aug-14	Dan Ferraro	LIV	30-40	b	brown	sandy soil, difficult to get deeper, too much rock
1768733	537445	6807221	1768733	5-Aug-14	Dan Ferraro	LIV	50-60	c	brown-grey	grey-brown, very micaceous, sandy
1768734	537344	6807255	1768734	5-Aug-14	Dan Ferraro	LIV	50-60	c	brown-grey	grey, lt brown, micaceous, sandy
1768735	537236	6807269	1768735	5-Aug-14	Dan Ferraro	LIV	40-50	b	brown	too much rock to get deeper
1768736	538541	6807720	1768736	5-Aug-14	Clayton Jones	LIV	40	B	brown	
1768737	538484	6807633	1768737	5-Aug-14	Clayton Jones	LIV	50	B	brown	weathered bedrock; schist fragments (mica rich)
1768738	538385	6807648	1768738	5-Aug-14	Clayton Jones	LIV	60	B/C	light green brown	weathered bedrock; schist fragments (mica rich)
1768739	538291	6807599	1768739	5-Aug-14	Clayton Jones	LIV	50	C	orange/brown	weathered bedrock; schist fragments (mica rich)
1768740	538195	6807548	1768740	5-Aug-14	Clayton Jones	LIV	60	B	orange	
1768741	538085	6807533	1768741	5-Aug-14	Clayton Jones	LIV	70	B	grey/brown	

Sample ID	Easting	Northing	Sample	Date	Sampler	Property	Sample Depth	Horizon	Colour	Parent Material and Comments
1768742	537978	6807540	1768742	5-Aug-14	Clayton Jones	LIV	60	B/C	grey green pale	weathered bedrock; sandy texture? Leached? Oxidized bright orange A (till) horizon on top?
1768743	537895	6807488	1768743	5-Aug-14	Clayton Jones	LIV	80	C	red/orange	decomposed bedrock, very soft mica rich schist
1768744	537840	6807396	1768744	5-Aug-14	Clayton Jones	LIV	60	C	red orange	weathered bedrock; schist fragments
1768745	537750	6807329	1768745	5-Aug-14	Clayton Jones	LIV	60	B/C	brown	
1768746	537644	6807310	1768746	5-Aug-14	Clayton Jones	LIV	70	B	brown	till
1768747	537545	6807286	1768747	5-Aug-14	Clayton Jones	LIV	50	B	brown/orange	poor sample (vey bouldery and hard to penatrate surface till)
1768748	537507	6807202	1768748	5-Aug-14	Clayton Jones	LIV	50	B/C	grey/brown	schist fragments
1768749	537393	6807219	1768749	5-Aug-14	Clayton Jones	LIV	60	B	orange/brown	till
1768750	537296	6807272	1768750	5-Aug-14	Clayton Jones	LIV	70	B	brown	till
1768751	537178	6807287	1768751	5-Aug-14	Clayton Jones	LIV	60	B	grey/brown	till; deet spilt on sample bag
1768752	537068	6807285	1768752	5-Aug-14	Clayton Jones	LIV	75	B	brown	till
1768753	536970	6807305	1768753	5-Aug-14	Clayton Jones	LIV	75	B	brown	till
1768754	536895	6807377	1768754	5-Aug-14	Clayton Jones	LIV	70	B	brown	till
1768755	536847	6807421	1768755	5-Aug-14	Dan Ferraro	LIV	30-40	b	brown	weathered bedrock; brown dirt, too much rock (taken after 8758)
1768756	537119	6807297	1768756	5-Aug-14	Dan Ferraro	LIV	70-80	c	brown	grey, micaceous, bedrock chips
1768757	537014	6807290	1768757	5-Aug-14	Dan Ferraro	LIV	30-40	b	brown	till; dirt, difficult to get deeper
1768758	536925	6807343	1768758	5-Aug-14	Dan Ferraro	LIV	40-50	b	lt brown	lt brown, some till

Appendix II: Rock Sample Descriptions

Rock Sample Descriptions

UTM NAD83 Zone 8

Abbreviations: qtz - quartz, py - pyrite, cpy - chalcopyrite, po - pyrrhotite, aspy - arsenopyrite, chl - chlorite, fg - fine grained, mg - medium grained, metased - metasedimentary, min - mineralization, OC - outcrop

Sample ID	Easting	Northing	Date Taken	Sampler	Rock Source	Description
1768001	539040	6803204	26-Jul-14	Dan Ferraro	outcrop	Small biotite schist outcrop. Rusty weathered surface. Abundant subhedral py (5%) in <1cm qtz vein and in wallrock.
1768002	539829	6803320	27-Jul-14	Dan Ferraro	outcrop	Sample of 10cm qtz vein within biotite schist. Qtz vein somewhat oxidized with minor MnO.
1768003	540017	6803355	27-Jul-14	Dan Ferraro	outcrop	Biotite shist with 6" qtz vein. 2x2m outcrop. Chlorite infill. Sample is of qtz vein. Oxidized with weathered out sulphides. 190/50/W.
1768004	538563	6802912	28-Jul-14	Dan Ferraro	float	1m qtz boulder float. Small rare weathered out sulphides. Minor oxidation. Trace aspy?
1768005	538412	6802869	28-Jul-14	Dan Ferraro	float	Mica schist with qtz vein float. Oxidized, mg cubic weathered out sulphides.
1768006	539087	6803264	29-Jul-14	Dan Ferraro	outcrop/ subcrop	Dug out area above main showing. Found upper expression of quartz vein. Sampled vein with abundant py and brecciated sections of silicious schist.
1768007	539086	6803264	29-Jul-14	Dan Ferraro	outcrop	Wallrock beside vein of 1768006. Silicious dark grey schist, graphitic with sulfur staining. Tr py.
1768008	539073	6803267	29-Jul-14	Dan Ferraro	outcrop	Chip sample of Main Zone qtz vein. Upper 1st meter (of 3m). Oxidized quartz vein breccia.
1768009	539073	6803267	29-Jul-14	Dan Ferraro	outcrop	Chip sample of main vein. Middle 2nd meter (of 3m). Oxidized quartz vein breccia.
1768010	539073	6803267	29-Jul-14	Dan Ferraro	outcrop	Chip sample of main vein. Lower 3rd meter (of 3m). Oxidized quartz vein breccia.
1768011	539074	6803266	29-Jul-14	Dan Ferraro	outcrop	Multiple pieces of wallrock above vein on west side. Dark grey graphitic schist. Minor py. Sulfur staining.
1768012	539609	6803723	30-Jul-14	Dan Ferraro	float	Marble/limestone float from nearby mapped unit. Trace fine grained pyrite.
1768013	538823	6803621	31-Jul-14	Dan Ferraro	float	Quartz vein float, likely from main vein at showing. Minor py in fragments of black metased. Minor malachite staining on oxidized surface as well as trace in fresh quartz vein (previously unseen at this showing).
1768014	536888	6804184	1-Aug-14	Dan Ferraro	float	Angular quartz float. Oxdizied, weathered out sulphides, graphitic interlayers. Smells of sulfur when broken.
1768015	538990	6804949	2-Aug-14	Dan Ferraro	subcrop	Sugary biotite schist with 5cm quartz vein. Sample is 50% quartz vein.
1768016	538763	6805216	2-Aug-14	Dan Ferraro	float	Gossan float. Semi rounded, possible till. 1 ft boulder. Black, rusty, sulfurous weathered surface. Fresh surface is dark grey with a weak foliation, and fine seams of pyrite. Likely metasediment.
1768017	538756	6805216	2-Aug-14	Dan Ferraro	outcrop	Ultramafic intrusive with quartz stockwork. Serpentinite or pyroxenite. 1-6cm quartz veining with up to 2% f-mg euhedral py.
1768018	538756	6805216	2-Aug-14	Dan Ferraro	outcrop	Same outcrop as 1768017. Sample more focused on rusty red quartz vein material with medium grained cubic pyrite.
1768019	539188	6805281	2-Aug-14	Dan Ferraro	talus	Talus coming off of cliff wall (source very close). Qtz veining (possible stockwork) in partial skarn quartzite. Veining has rusty oxidation, pits of weathered out sulphides. Reddish potassic alteration.
1768020	539241	6805295	2-Aug-14	Dan Ferraro	outcrop	4-6" quartz vein in quartzite cliff wall. Rusty. Minor py in vein. Vein looks parallel to foliation at ~135 degrees.

Sample ID	Easting	Northing	Date Taken	Sampler	Rock Source	Description
1768021	539152	6805467	2-Aug-14	Dan Ferraro	outcrop	Quartzite gossan. Small outcrop. Loaded (5%) with fine grained disseminated pyrite. Rusty red weathered surface. Silicious.
1768022	538859	6805430	2-Aug-14	Dan Ferraro	outcrop	8-10" quartz vein in quartzite outcrop. <1% fine grained pyrite in oxidized metasediment seams within vein. Minor green mineral in vein, beryl?
1768023	539500	6805786	3-Aug-14	Dan Ferraro	outcrop	Biotite schist outcrop with rusty reddish qtz veins and silicified wallrock. Veins trending roughly 230 degrees. Minor fine sulphides.
1768024	539647	6806249	3-Aug-14	Dan Ferraro	outcrop	Red gossanous wallrock (biotite schist) beside 4" folded quartz vein. Schist has seem contact metamorphism. Sample is 50% QV, 50% wallrock. NVS.
1768025	539646	6805960	3-Aug-14	Dan Ferraro	outcrop	8" seam of gossan within biotite schist and quartzite outcrop. Trending 350/50/E. Gossan is rusty, dark, chloritic and full of disseminated pyrite (10%). Gossan beside a 5" bull QV.
1768026	539642	6805950	3-Aug-14	Dan Ferraro	outcrop	Outcrop ledge below 1768025. Another gossan seam, likely related to first but unable to connect. Seam at the bottom of 2m ledge. Outcrop more quartzite as opposed to schist above. Gossan is silicified quartzite, less chlorite than 1768025. Abundant pyrite disseminated and in seams. Patches of silvery specular hematite.
1768027	540263	6802843	4-Aug-14	Dan Ferraro	float/subcrop	Large angular boulder/subcrop. Dark grey, very silicious schist/quartzite. Rusty gossanous seams. Minor specular hematite. Epidote alteration.
1768028	540241	6802856	4-Aug-14	Dan Ferraro	float	Quartz stockwork in ultramafic intrusive? Green chloritized wallrock. 1-5cm quartz veins. Rusty weathered out sulphides. MnO staining. Just down the hill from large 1m bull qtz boulder.
1768029	540222	6802931	4-Aug-14	Dan Ferraro	outcrop	Large quartz vein outcrop. At least 1m wide. Very rusty with weathered out sulphides as well as minor fresh fg pyrite. Mg limonitic pyrite as well. Fragments of carbonate in qtz. Vein appears to have orientation of 340/45/E. In biotite schist.
1768030	537271	6807274	5-Aug-14	Dan Ferraro	float	Piece of quartz vein float beside trail. Semi-angular. Brecciated fragments of chloritic material. Oxidized pits. Minor fresh fg pyrite.
1768051	538975	6803283	26-Jul-14	Clayton Jones	float	Smooth block of quartz vein in orthogneiss, dark hematite staining, minor pyrite (cubic and diss'd).
1768052	539820	6803540	27-Jul-14	Clayton Jones	outcrop	Mafic schist with units of course textured and less metamorphic fabric, cubic pyrite along calcite veinlet fractures, 145/52/W.
1768053	539718	6803506	27-Jul-14	Clayton Jones	subcrop	Large 1.5 m block of biotite qtz schist, diss'd and blebs of pyrite.
1768054	539064	6803185	27-Jul-14	Clayton Jones	subcrop	Taken at soil pit, rotten qtz vein blocks hosted in graphite schist.
1768055	538389	6803273	28-Jul-14	Clayton Jones	float	40 by 20 cm angular beige intrusive with qtz stock work, limonite veins and oxidized pyrite cubes throughout.
1768056	539076	6803272	29-Jul-14	Clayton Jones	outcrop	Smaller (5 - 10 cm wide) qtz vein/breccia, clasts of wall rock (dark grey graphitic schist), min'd with galena and pyrite, unique void (weathered out sulphide) containing crystalline silver mineral (native silver or tellurium?), strikes same as main showing vein, 180/46/W
1768057	539077	6803272	29-Jul-14	Clayton Jones	outcrop	Same vein material as previous sample, more galena
1768058	539086	6803249	29-Jul-14	Clayton Jones	subcrop	Possibly outcrop, very close to source, taken in hand trench, refer to Dan's map for exact location, qtz vein with blebs and stock work galena veinlets (<2mm).
1768059	539086	6803249	29-Jul-14	Clayton Jones	outcrop	Qtz vein/breccia (1-1.5 ft. wide) , very similar to showing and maybe same qtz vein outcropping on strike?, exposed in hand trench, diss'd and blebs of pyrite and galena, appears to be striking different from original showing vein (12/40/SE) but exposure is not great and difference may be attributed to hillside sloughing.
1768060	539086	6803249	29-Jul-14	Clayton Jones	outcrop	Same vein a 1768058 -59, sample of soft grey vuggy clasts in vein.

Sample ID	Easting	Northing	Date Taken	Sampler	Rock Source	Description
1768061	539088	6803253	29-Jul-14	Clayton Jones	outcrop	Smaller qtz breccia vein in trench, 4 m north of qtz vein sample 1768058-59-60 in hand trench, see Dan's map. Same strike and dip as original showing (180/40/W) and appears to be same vein on strike, minor galena and pyrite.
1768062	539087	6803253	29-Jul-14	Clayton Jones	outcrop	Mineralized wallrock of qtz vein in trench (1768061), fine disseminated pyrite in dark grey very silicified schist.
1768063	539061	6803479	31-Jul-14	Clayton Jones	outcrop	Mafic dike, very oxidized section along joint (223/70/N), diss'd and blebs of pyrite, foliation @ 110/85/E, very similar to mafic dike on other side of depression (100 m west).
1768064	539071	6805342	31-Jul-14	Clayton Jones	float	Float in moss covered talus, directly above Lewis showing, ultramafic (serpentinite) veinlets, diss'd cubic pyrite <1mm, assumed to be late stage mineralization.
1768065	539217	6803824	31-Jul-14	Clayton Jones	outcrop	Gossanous outcrop and talus, gabbro/diabase, medium to course textured, silicified, dark grey with fine diss'd sulphide throughout, highly oxidized with magnesium staining along fractures and outer exposed edges.
1768066	539217	6803824	31-Jul-14	Clayton Jones	outcrop	Fine textured felsic material along joint surface in gabbro outcrop (sample 1768065), white to beige with fine disseminated sulphide and highly oxidized cooked up outer edges and fracture surfaces.
1768067	539086	6803249	31-Jul-14	Clayton Jones	subcrop	High-grade sample of 1768058.
1768068	539224	6805234	2-Aug-14	Clayton Jones	outcrop	Fractured 5 - 30 cm barite (heavy beige to light brown material) vein with minor cubic pyrite, oxidized throughout, vein follows joint surface of beige to pale green quartzite. 115/50/SE.
1768069	539061	6805383	2-Aug-14	Clayton Jones	outcrop	60 - 100 cm limestone bed with fine diss'd pyrrhotite and pyrite, green-grey color, stronger min along joint surface 284/85/NE.
1768070	539087	6805352	3-Aug-14	Clayton Jones	outcrop	Lewis showing, high-grade sample, galena, chalco, pyrite, minor malachite, qtz vein 072/48/S.
1768071	539453	6805931	3-Aug-14	Clayton Jones	float	Angular boulder, 30 by 20 cm, highly oxidized, dark grey quartzite, fine diss'd pyrite.
1768072	539508	6806239	3-Aug-14	Clayton Jones	outcrop	Rep sample, oxidized schist, gossanous outcrop, no visible sulphides.
1768073	539511	6805944	3-Aug-14	Clayton Jones	outcrop	Dark grey fine textured limestone with very fine diss'd pyrite, gossanous ridge, 20 cm soil cover.
1768074	539524	6804196	4-Aug-14	Clayton Jones	outcrop	Gossanous outcrop, porphyritic diorite with k-spar phenocrysts up to 10 mm, locally oxidized with very fine diss'd pyrite, 346/83/E joint, located at edge of fault.
1768075	539521	6804177	4-Aug-14	Clayton Jones	float	Angular block of ultramafic (altered pyroxinite), several blocks around large ultramafic intrusive outcrop but not found in outcrop, slickenslide surface, minor amount of diss'd pyrite.

Appendix III: Soil Sample Assay Certificates

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Bureau Veritas Commodities Canada Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Goldspike Exploration Inc.**
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Toronto ON M5H 1B6 CANADA

Submitted By: Bruce Durham
Receiving Lab: Canada-Whitehorse
Received: August 07, 2014
Report Date: September 05, 2014
Page: 1 of 12

CERTIFICATE OF ANALYSIS WHI14000091.1

CLIENT JOB INFORMATION

Project: LIV
Shipment ID: LIV_SOILS_2014
P.O. Number
Number of Samples: 320

SAMPLE DISPOSAL

DISP-PLP Dispose of Pulp After 90 days
DISP-RJT-SOIL Immediate Disposal of Soil Reject

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
Dry at 60C	320	Dry at 60C			WHI
SS80	320	Dry at 60C sieve 100g to -80 mesh			WHI
AQ201	320	1:1:1 Aqua Regia digestion ICP-MS analysis	15	Completed	VAN
DISP2	320	Heat treatment of Soils and Sediments			VAN

ADDITIONAL COMMENTS

Invoice To: Goldspike Exploration Inc.
4 King Street West, Suite 1500
Toronto ON M5H 1B6
CANADA

CC: Daniel Ferraro

BRITISH COLUMBIA CERTIFIED ASSAYER
MARCUS LAU
Geochemical Laboratory Manager

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

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Project: LIV
Report Date: September 05, 2014

CERTIFICATE OF ANALYSIS WHI14000091.1

		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
		Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
		MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768301	Soil		2.9	100.2	25.1	103	0.6	93.6	23.4	1540	7.30	536.5	6.0	12.9	35	0.5	9.2	0.3	47	0.61	0.123	49
1768302	Soil		0.4	48.9	10.4	124	0.1	60.8	23.6	920	3.94	9.5	2.7	9.0	66	0.2	0.4	0.1	29	2.72	0.058	27
1768303	Soil		3.2	26.0	10.6	63	0.6	26.0	11.4	735	3.36	18.5	6.1	0.6	20	0.3	0.6	0.4	75	0.18	0.082	14
1768304	Soil		1.4	31.7	8.2	54	<0.1	40.2	13.5	354	2.38	19.8	1.1	3.6	16	0.2	0.7	0.2	49	0.25	0.083	15
1768305	Soil		1.7	55.2	9.9	94	0.1	67.9	18.2	524	3.37	25.4	0.6	6.7	25	0.5	2.5	0.2	71	0.52	0.132	27
1768306	Soil		1.9	50.1	8.6	64	0.1	48.8	21.5	742	3.27	52.8	3.9	6.2	18	0.1	2.2	0.2	51	0.41	0.154	31
1768307	Soil		0.5	86.3	5.1	63	<0.1	149.8	37.6	930	4.66	11.1	1.7	2.6	23	0.3	0.4	<0.1	108	0.59	0.160	15
1768308	Soil		1.1	27.3	9.4	61	0.1	31.5	11.6	440	2.40	14.6	3.6	1.2	13	0.3	0.7	0.2	53	0.18	0.071	13
1768309	Soil		1.1	28.5	7.9	60	0.1	42.4	20.0	932	2.84	25.7	1.1	4.8	18	0.1	0.9	0.2	53	0.32	0.091	15
1768310	Soil		1.2	32.7	9.9	67	0.1	39.0	13.7	445	2.76	19.2	1.3	3.4	15	0.2	0.9	0.2	56	0.28	0.084	16
1768311	Soil		0.9	34.6	8.9	58	0.1	31.7	11.9	257	2.70	19.5	2.3	3.1	13	0.1	0.9	0.2	59	0.24	0.076	14
1768312	Soil		0.9	48.8	10.8	82	<0.1	52.3	18.6	753	3.47	43.0	1.7	4.1	16	0.2	1.5	0.2	66	0.29	0.090	16
1768313	Soil		0.8	38.1	7.1	53	<0.1	30.4	15.6	613	2.54	22.5	1.5	2.7	15	0.1	1.3	0.1	49	0.28	0.082	12
1768314	Soil		0.8	37.4	9.5	64	<0.1	35.6	12.5	236	2.47	13.9	1.0	5.4	14	0.1	1.4	0.2	60	0.27	0.080	16
1768315	Soil		1.0	42.3	8.7	58	0.1	42.8	14.6	392	2.86	41.1	1.4	1.7	14	0.2	1.8	0.1	54	0.22	0.081	15
1768316	Soil		1.0	44.9	9.0	66	<0.1	58.1	19.3	579	3.02	42.5	1.7	5.6	17	0.2	1.8	0.1	55	0.31	0.106	17
1768317	Soil		1.3	68.4	15.1	92	0.3	54.1	16.2	575	3.91	136.0	7.6	2.9	16	0.2	5.7	0.3	78	0.27	0.084	15
1768318	Soil		0.9	54.4	9.1	68	<0.1	61.1	15.1	349	2.67	21.1	1.4	5.7	18	0.1	2.1	0.2	54	0.37	0.109	17
1768319	Soil		0.9	40.0	10.1	73	0.2	70.3	12.0	233	2.44	12.6	3.9	4.7	13	0.2	0.9	0.3	57	0.27	0.076	15
1768320	Soil		1.1	43.2	10.0	52	0.3	44.9	8.7	370	2.24	13.1	3.1	0.4	12	0.2	0.8	0.2	57	0.18	0.078	19
1768321	Soil		1.0	31.3	9.1	69	<0.1	52.2	12.9	399	2.11	14.5	1.5	4.6	16	0.3	0.9	0.2	45	0.36	0.116	15
1768322	Soil		0.9	32.5	7.4	56	<0.1	54.1	14.9	438	2.29	15.3	0.8	5.7	18	0.2	0.7	0.1	49	0.39	0.127	14
1768323	Soil		1.1	26.0	8.5	54	<0.1	43.0	14.0	367	2.06	17.2	1.4	4.6	14	0.3	0.7	0.2	44	0.32	0.106	13
1768324	Soil		1.1	162.4	6.4	73	0.2	204.5	38.7	1509	5.61	41.3	2.8	5.8	20	0.2	0.8	<0.1	80	0.53	0.118	22
1768325	Soil		0.9	44.8	8.3	54	<0.1	48.1	16.0	379	3.06	29.1	<0.5	4.9	18	0.1	0.7	0.1	60	0.38	0.089	14
1768326	Soil		1.0	49.5	8.1	53	<0.1	50.3	15.4	419	2.65	33.3	1.2	4.6	18	0.1	0.8	0.1	56	0.43	0.085	17
1768327	Soil		1.2	62.8	9.5	62	<0.1	59.0	17.4	546	3.07	34.5	0.9	5.4	21	0.2	0.9	0.1	64	0.45	0.111	21
1768328	Soil		1.2	43.0	10.9	54	<0.1	43.9	16.6	465	2.85	29.2	<0.5	3.9	17	0.1	0.8	0.4	64	0.32	0.076	14
1768329	Soil		1.4	49.6	9.8	65	<0.1	61.4	17.8	497	2.88	28.3	<0.5	2.8	17	0.1	0.8	0.1	66	0.37	0.085	11
1768330	Soil		1.2	41.6	10.3	74	<0.1	56.6	20.3	542	3.00	15.5	<0.5	4.8	15	0.3	0.7	0.1	68	0.29	0.072	13

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		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768301	Soil		50	0.58	378	0.021	5	1.06	0.006	0.18	0.1	0.08	11.6	0.2	<0.05	3	1.3	0.2
1768302	Soil		39	1.31	267	0.104	2	2.09	0.005	0.64	<0.1	0.02	3.1	0.5	<0.05	5	<0.5	<0.2
1768303	Soil		43	0.53	444	0.067	2	1.28	0.006	0.14	<0.1	0.03	2.7	0.1	<0.05	6	<0.5	<0.2
1768304	Soil		45	0.67	129	0.059	1	1.28	0.007	0.13	0.2	0.02	2.8	0.1	<0.05	4	<0.5	<0.2
1768305	Soil		75	1.03	217	0.073	<1	1.43	0.009	0.15	0.2	0.01	4.8	0.1	<0.05	5	0.7	<0.2
1768306	Soil		43	0.76	122	0.034	1	1.38	0.006	0.09	0.1	0.03	4.4	0.1	<0.05	4	0.6	<0.2
1768307	Soil		172	2.23	193	0.083	1	2.44	0.013	0.20	<0.1	<0.01	4.8	0.1	<0.05	8	<0.5	<0.2
1768308	Soil		40	0.52	107	0.047	2	1.12	0.006	0.09	0.1	0.02	2.4	0.1	<0.05	4	<0.5	<0.2
1768309	Soil		54	0.92	174	0.054	2	1.42	0.007	0.14	<0.1	0.02	4.0	0.1	<0.05	4	<0.5	<0.2
1768310	Soil		45	0.72	165	0.065	1	1.19	0.007	0.14	0.2	0.02	3.3	0.1	<0.05	4	<0.5	<0.2
1768311	Soil		48	0.82	156	0.047	1	1.50	0.007	0.11	0.1	0.03	4.2	0.2	<0.05	5	<0.5	<0.2
1768312	Soil		61	1.05	176	0.061	2	1.77	0.009	0.16	0.2	0.03	5.3	0.2	<0.05	5	<0.5	<0.2
1768313	Soil		39	0.75	97	0.048	1	1.11	0.006	0.11	0.1	0.01	3.3	<0.1	<0.05	4	<0.5	<0.2
1768314	Soil		51	0.89	165	0.063	1	1.55	0.008	0.10	0.2	0.04	5.1	0.1	<0.05	5	<0.5	<0.2
1768315	Soil		58	0.82	149	0.041	<1	1.47	0.007	0.08	<0.1	0.03	3.5	0.1	<0.05	4	<0.5	<0.2
1768316	Soil		56	0.94	140	0.063	1	1.40	0.007	0.13	<0.1	0.01	4.1	0.1	<0.05	4	<0.5	<0.2
1768317	Soil		65	0.95	234	0.038	3	1.99	0.009	0.14	0.2	0.08	5.4	0.3	<0.05	6	0.9	<0.2
1768318	Soil		59	0.97	179	0.062	1	1.37	0.009	0.14	0.2	0.03	4.8	0.1	<0.05	4	<0.5	<0.2
1768319	Soil		61	0.85	144	0.071	1	1.55	0.008	0.15	0.3	0.05	4.0	0.2	<0.05	5	<0.5	<0.2
1768320	Soil		44	0.47	209	0.029	1	1.52	0.007	0.08	0.2	0.04	1.8	0.2	<0.05	6	<0.5	<0.2
1768321	Soil		41	0.62	109	0.050	1	0.91	0.007	0.11	0.3	0.02	2.8	0.1	<0.05	3	<0.5	<0.2
1768322	Soil		49	0.80	102	0.061	<1	1.00	0.008	0.13	0.2	<0.01	3.1	0.1	<0.05	3	<0.5	<0.2
1768323	Soil		41	0.53	66	0.046	<1	0.90	0.006	0.10	0.3	0.01	2.5	<0.1	<0.05	3	<0.5	<0.2
1768324	Soil		148	1.48	381	0.022	<1	2.38	0.005	0.13	<0.1	0.01	11.9	0.1	<0.05	6	<0.5	<0.2
1768325	Soil		64	0.95	143	0.055	1	1.43	0.008	0.11	0.2	0.02	3.7	<0.1	<0.05	4	<0.5	<0.2
1768326	Soil		64	0.89	144	0.062	1	1.34	0.009	0.12	0.2	0.02	4.1	0.1	<0.05	4	<0.5	<0.2
1768327	Soil		73	1.04	158	0.066	1	1.49	0.009	0.14	0.2	0.02	4.7	0.1	<0.05	5	<0.5	<0.2
1768328	Soil		61	0.87	106	0.069	<1	1.34	0.008	0.11	0.2	0.01	3.8	<0.1	<0.05	5	<0.5	<0.2
1768329	Soil		76	0.96	147	0.064	<1	1.50	0.009	0.17	0.2	<0.01	3.7	0.1	<0.05	5	<0.5	<0.2
1768330	Soil		78	0.96	102	0.084	1	1.74	0.009	0.12	0.2	<0.01	3.8	0.1	<0.05	5	<0.5	<0.2

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Project: LIV
Report Date: September 05, 2014

CERTIFICATE OF ANALYSIS WHI14000091.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768331	Soil	1.4	36.4	9.5	68	<0.1	44.0	17.2	546	3.22	33.5	<0.5	2.0	17	0.2	1.0	0.2	73	0.29	0.109	12
1768332	Soil	1.1	41.4	8.9	51	<0.1	44.2	19.3	487	2.76	43.5	0.9	5.5	22	0.2	0.9	0.1	54	0.38	0.110	15
1768333	Soil	1.7	64.6	10.1	79	0.1	61.3	17.7	633	2.94	29.6	1.1	7.2	22	0.3	1.1	0.1	63	0.49	0.097	19
1768334	Soil	2.4	28.2	11.6	39	<0.1	24.1	10.6	307	2.36	9.2	1.6	2.7	11	0.2	0.4	0.2	86	0.20	0.032	15
1768335	Soil	1.6	56.6	8.5	62	<0.1	55.8	20.3	655	3.43	24.3	1.0	3.1	28	0.2	1.4	0.2	69	0.69	0.146	16
1768336	Soil	1.6	43.1	4.4	151	<0.1	219.1	63.9	1735	10.39	425.7	1.6	3.8	59	0.3	4.4	<0.1	119	1.55	0.379	20
1768337	Soil	0.8	92.4	7.4	63	<0.1	129.5	22.5	732	3.25	8.2	11.2	3.9	19	<0.1	0.8	0.2	63	0.43	0.088	14
1768338	Soil	0.7	50.9	8.1	51	<0.1	37.6	12.7	447	3.17	7.5	0.9	1.9	12	0.1	0.5	0.2	83	0.22	0.060	8
1768339	Soil	1.1	40.1	10.4	64	<0.1	38.4	16.7	547	2.88	8.8	4.0	6.1	16	0.3	0.9	0.2	50	0.23	0.058	18
1768340	Soil	0.8	29.2	10.0	48	<0.1	26.9	13.2	462	2.45	6.9	2.9	3.8	14	0.1	0.6	0.2	50	0.21	0.047	15
1768341	Soil	1.3	214.2	10.5	92	0.9	282.8	35.7	1541	5.29	98.6	5.4	3.0	12	0.6	3.8	0.1	80	0.19	0.062	17
1768342	Soil	1.4	41.2	8.6	61	<0.1	46.9	16.3	927	2.73	9.0	<0.5	5.5	17	0.3	1.1	0.1	51	0.27	0.076	15
1768343	Soil	1.0	31.8	9.0	54	<0.1	36.9	13.5	429	2.81	7.9	2.5	2.2	15	0.3	0.5	0.2	59	0.22	0.061	13
1768344	Soil	1.2	35.4	8.6	56	<0.1	32.8	12.3	340	2.91	9.0	3.2	2.8	11	0.1	0.6	0.2	69	0.13	0.033	10
1768345	Soil	1.3	48.1	11.5	77	0.2	46.6	18.7	676	3.09	12.6	3.4	5.2	20	0.3	0.7	0.2	63	0.45	0.064	14
1768346	Soil	6.2	43.2	20.5	68	0.1	73.9	48.9	1147	7.75	72.4	5.9	3.4	15	0.5	0.9	0.3	73	0.30	0.120	12
1768347	Soil	1.2	50.7	8.1	63	0.1	50.8	14.1	508	2.73	15.3	1.6	1.8	22	<0.1	0.5	0.1	57	0.44	0.084	16
1768348	Soil	3.5	77.8	13.5	119	0.1	109.7	18.3	1548	6.08	50.8	2.4	17.1	18	0.3	7.6	0.3	11	0.47	0.043	57
1768349	Soil	1.5	44.7	12.1	60	0.1	47.4	16.2	513	2.82	137.7	1.9	4.4	20	0.3	1.7	0.2	58	0.34	0.100	21
1768350	Soil	1.2	51.0	11.3	71	<0.1	49.5	17.1	602	3.11	237.3	2.8	3.9	20	0.2	2.9	0.2	56	0.37	0.105	24
1768351	Soil	1.0	19.3	8.0	40	<0.1	21.3	7.7	272	2.15	17.2	0.6	2.2	21	0.1	0.5	0.2	47	0.39	0.055	11
1768352	Soil	0.8	26.3	7.6	46	<0.1	34.4	12.1	378	2.15	28.0	1.2	3.5	16	0.3	0.8	0.1	41	0.30	0.094	12
1768353	Soil	3.3	40.4	8.3	49	0.2	18.2	4.8	295	2.10	13.0	<0.5	0.5	22	0.3	0.9	0.1	52	0.12	0.094	18
1768354	Soil	1.5	48.1	8.0	76	<0.1	59.8	18.2	462	2.72	16.6	1.8	5.3	23	0.4	0.8	0.2	49	0.32	0.107	23
1768355	Soil	1.5	34.0	10.7	59	0.2	31.3	10.4	630	4.43	44.8	3.1	3.4	32	0.2	4.7	0.2	69	0.34	0.128	26
1768356	Soil	1.6	29.0	9.3	45	0.2	28.4	9.8	290	2.47	34.0	1.0	0.4	19	0.1	1.3	0.2	49	0.27	0.082	17
1768357	Soil	1.3	26.7	9.6	54	0.1	36.7	11.4	396	2.55	29.3	2.8	3.4	18	0.3	1.1	0.2	49	0.30	0.105	15
1768358	Soil	1.1	34.1	7.4	65	<0.1	59.0	15.8	472	2.98	30.8	1.5	4.2	23	0.2	1.1	0.1	49	0.35	0.127	18
1768359	Soil	1.1	29.3	7.8	51	<0.1	49.5	13.6	445	2.40	13.4	3.3	3.8	17	0.3	0.7	0.1	42	0.32	0.095	16
1768360	Soil	1.4	28.2	10.1	64	0.1	38.1	13.6	474	2.92	29.2	1.6	3.3	20	0.2	1.2	0.2	59	0.38	0.085	15

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768331	Soil	64	0.81	113	0.058	1	1.66	0.007	0.13	0.2	0.02	3.3	0.1	<0.05	5	<0.5	<0.2
1768332	Soil	60	0.80	126	0.061	<1	1.37	0.009	0.10	0.3	0.01	3.5	<0.1	<0.05	4	<0.5	<0.2
1768333	Soil	65	0.93	161	0.076	3	1.49	0.009	0.18	0.2	0.05	5.8	0.2	<0.05	5	<0.5	<0.2
1768334	Soil	59	0.45	74	0.120	1	1.09	0.008	0.10	0.3	0.02	2.5	0.1	<0.05	7	<0.5	<0.2
1768335	Soil	72	0.99	180	0.061	2	1.68	0.009	0.15	0.2	0.02	4.4	0.1	<0.05	5	0.6	<0.2
1768336	Soil	260	2.60	413	0.157	3	3.97	0.008	0.59	0.2	0.01	9.9	0.2	<0.05	12	<0.5	<0.2
1768337	Soil	68	1.40	119	0.064	<1	1.46	0.008	0.15	0.3	0.01	5.1	<0.1	<0.05	5	<0.5	<0.2
1768338	Soil	75	1.07	81	0.091	2	1.61	0.009	0.15	0.2	0.02	3.3	0.2	<0.05	6	<0.5	<0.2
1768339	Soil	41	0.84	133	0.054	2	1.59	0.007	0.16	0.3	0.01	3.9	0.1	<0.05	4	0.9	<0.2
1768340	Soil	39	0.66	109	0.052	2	1.29	0.008	0.08	0.4	<0.01	3.5	0.1	<0.05	4	0.6	<0.2
1768341	Soil	116	1.22	159	0.039	2	1.86	0.007	0.12	0.3	0.09	10.7	<0.1	<0.05	5	<0.5	<0.2
1768342	Soil	52	0.78	122	0.050	<1	1.25	0.008	0.12	0.3	0.01	4.8	<0.1	<0.05	3	<0.5	<0.2
1768343	Soil	66	0.90	92	0.057	1	1.66	0.008	0.12	0.2	<0.01	3.6	<0.1	<0.05	5	<0.5	<0.2
1768344	Soil	61	0.87	58	0.080	<1	1.61	0.009	0.09	0.6	0.03	3.6	<0.1	<0.05	6	0.5	<0.2
1768345	Soil	63	0.96	195	0.070	2	1.63	0.012	0.19	0.3	0.02	5.2	0.1	<0.05	5	<0.5	<0.2
1768346	Soil	63	0.98	71	0.064	2	1.71	0.009	0.08	0.3	0.03	4.3	<0.1	<0.05	5	5.8	0.3
1768347	Soil	66	0.95	178	0.047	2	1.53	0.010	0.12	0.2	0.02	3.6	0.1	<0.05	5	0.7	<0.2
1768348	Soil	10	0.34	314	<0.001	2	1.19	0.005	0.10	<0.1	0.03	8.0	<0.1	<0.05	2	0.7	<0.2
1768349	Soil	54	0.86	159	0.065	<1	1.36	0.008	0.09	0.6	0.01	4.3	0.1	<0.05	5	<0.5	<0.2
1768350	Soil	57	0.88	182	0.055	1	1.43	0.010	0.10	0.2	0.02	4.7	0.1	<0.05	4	0.8	<0.2
1768351	Soil	36	0.58	133	0.057	<1	1.03	0.008	0.08	0.3	0.01	2.2	<0.1	<0.05	5	<0.5	<0.2
1768352	Soil	41	0.62	67	0.058	<1	1.02	0.007	0.08	0.3	0.01	2.7	<0.1	<0.05	3	<0.5	<0.2
1768353	Soil	35	0.40	263	0.016	<1	0.98	0.007	0.09	<0.1	0.02	1.7	<0.1	<0.05	4	1.3	<0.2
1768354	Soil	51	0.77	183	0.061	<1	1.21	0.010	0.11	0.2	0.01	3.9	0.1	<0.05	3	0.7	<0.2
1768355	Soil	39	0.63	182	0.022	<1	1.35	0.008	0.08	<0.1	0.03	4.3	0.1	<0.05	5	0.8	<0.2
1768356	Soil	40	0.53	222	0.025	1	1.08	0.007	0.09	<0.1	0.03	1.9	0.1	<0.05	5	1.0	<0.2
1768357	Soil	41	0.62	126	0.058	<1	1.23	0.008	0.10	0.2	0.03	3.0	0.1	<0.05	4	<0.5	<0.2
1768358	Soil	61	0.95	145	0.079	<1	1.35	0.010	0.15	0.1	0.02	3.6	<0.1	<0.05	4	0.6	<0.2
1768359	Soil	50	0.81	99	0.065	<1	1.14	0.008	0.11	0.1	0.02	3.0	<0.1	<0.05	3	<0.5	<0.2
1768360	Soil	53	0.94	265	0.060	1	1.51	0.010	0.14	0.1	0.02	4.5	0.1	<0.05	5	<0.5	<0.2

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		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
		Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
		MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768361	Soil		0.5	58.5	10.1	145	<0.1	40.3	14.4	681	3.70	13.1	1.7	3.0	13	0.3	0.6	0.2	78	0.27	0.088	11
1768362	Soil		1.0	34.6	9.3	65	<0.1	43.5	13.6	483	3.11	29.4	1.3	3.2	17	0.1	1.3	0.2	62	0.26	0.086	16
1768363	Soil		0.9	66.1	7.6	78	<0.1	39.0	16.9	710	4.21	33.8	2.7	3.3	16	0.1	1.4	0.1	66	0.34	0.091	15
1768364	Soil		0.9	32.3	6.0	57	0.1	26.8	9.6	453	2.56	38.6	1.2	0.4	15	0.2	3.2	0.1	45	0.23	0.099	13
1768365	Soil		0.8	27.0	8.6	51	<0.1	33.0	9.3	336	2.94	37.5	1.8	2.5	13	<0.1	1.6	0.2	59	0.15	0.046	13
1768366	Soil		0.7	41.9	7.4	70	<0.1	53.4	14.6	574	2.86	59.2	1.3	4.6	20	0.2	2.9	0.1	49	0.32	0.115	19
1768367	Soil		1.1	65.7	10.3	67	0.3	36.0	12.3	544	3.58	125.8	5.2	1.0	15	0.3	6.3	0.2	56	0.35	0.078	19
1768368	Soil		0.7	34.2	7.3	56	0.2	33.0	11.4	434	2.53	31.3	2.5	3.0	17	<0.1	2.8	0.1	48	0.32	0.107	14
1768369	Soil		0.8	31.2	8.0	64	0.1	66.4	13.0	369	2.39	16.4	2.1	4.5	17	0.2	0.9	0.2	46	0.33	0.092	16
1768370	Soil		0.9	28.8	8.3	62	0.2	62.2	11.2	305	2.23	10.3	3.2	2.5	15	0.2	0.6	0.2	46	0.29	0.086	20
1768371	Soil		1.0	33.8	8.1	73	<0.1	89.0	15.1	538	2.70	14.6	3.9	4.1	20	0.2	0.8	0.2	51	0.40	0.103	15
1768372	Soil		0.5	22.2	7.5	43	<0.1	38.4	6.8	272	1.95	16.4	8.6	4.6	14	<0.1	0.8	0.2	35	0.27	0.093	21
1768373	Soil		0.9	19.6	8.6	39	<0.1	29.2	5.7	198	1.62	9.8	2.9	1.5	13	0.1	0.6	0.3	39	0.20	0.048	14
1768374	Soil		0.6	23.3	9.3	50	0.1	42.3	8.3	281	1.99	14.1	10.0	2.5	14	0.2	0.7	0.3	39	0.26	0.079	18
1768375	Soil		0.8	34.6	8.2	56	<0.1	44.0	11.0	336	2.40	21.3	2.2	5.2	20	0.2	0.7	0.2	47	0.39	0.112	20
1768376	Soil		0.9	34.6	8.2	53	<0.1	43.6	11.1	416	2.38	19.7	1.4	5.6	21	0.1	0.7	0.2	45	0.39	0.109	19
1768377	Soil		1.4	34.5	9.2	71	<0.1	39.5	24.9	950	5.10	57.0	6.4	3.9	20	0.2	0.9	0.2	63	0.37	0.094	14
1768378	Soil		1.1	33.0	7.1	56	<0.1	41.8	13.2	450	2.42	29.8	1.0	3.9	19	0.2	0.7	0.1	44	0.35	0.110	14
1768379	Soil		4.3	100.4	15.6	154	0.8	116.5	25.6	1661	5.19	81.5	7.5	4.1	23	0.2	1.5	0.3	92	0.33	0.120	44
1768380	Soil		1.0	54.5	7.9	79	0.3	88.2	19.7	437	3.92	35.0	1.3	3.9	27	<0.1	0.8	0.1	70	0.55	0.127	28
1768381	Soil		1.4	34.0	7.9	55	<0.1	39.7	10.7	384	2.60	27.0	0.8	2.0	24	0.3	0.9	0.2	55	0.35	0.100	12
1768382	Soil		1.7	34.6	10.4	63	<0.1	45.3	16.7	541	3.68	28.3	<0.5	3.2	17	0.2	1.0	0.2	56	0.28	0.092	14
1768383	Soil		2.6	134.7	14.7	95	0.3	123.9	28.4	1238	5.18	116.7	3.2	5.2	26	0.1	2.1	0.2	100	0.49	0.095	27
1768384	Soil		1.2	25.8	9.3	68	<0.1	43.9	17.3	621	3.46	25.6	0.8	2.3	25	0.2	0.9	0.2	62	0.38	0.144	14
1768385	Soil		1.6	66.6	9.7	59	0.2	63.8	13.4	542	2.68	24.9	2.4	1.4	23	0.1	0.8	0.1	52	0.50	0.050	28
1768386	Soil		1.4	49.8	12.0	49	0.1	33.2	12.9	490	2.80	9.5	1.5	0.8	26	<0.1	0.5	0.2	60	0.64	0.083	12
1768387	Soil		0.8	35.1	7.0	50	<0.1	132.8	19.3	488	2.85	12.3	<0.5	3.6	25	0.2	0.4	<0.1	67	0.60	0.105	14
1768388	Soil		1.4	34.8	11.0	51	<0.1	50.3	15.3	463	3.10	24.1	0.7	2.6	20	0.1	1.0	0.2	60	0.36	0.053	12
1768389	Soil		0.7	57.7	9.3	67	<0.1	28.5	9.8	558	2.60	164.1	2.6	0.8	23	0.1	0.9	0.2	49	0.36	0.087	24
1768390	Soil		1.2	22.2	11.5	50	<0.1	32.0	13.2	651	3.48	24.1	<0.5	3.6	17	0.2	0.9	0.2	58	0.30	0.053	14

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Project: LIV
Report Date: September 05, 2014

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768361	Soil	57	1.99	192	0.086	<1	2.17	0.008	0.36	<0.1	<0.01	5.7	0.2	<0.05	7	0.6	<0.2
1768362	Soil	52	0.96	192	0.070	1	1.56	0.010	0.14	0.1	0.02	4.8	0.1	<0.05	5	0.7	<0.2
1768363	Soil	44	1.31	195	0.063	<1	1.83	0.009	0.25	0.1	0.03	6.3	0.1	<0.05	6	0.6	<0.2
1768364	Soil	31	0.74	175	0.018	<1	1.35	0.006	0.11	<0.1	0.03	2.5	0.1	<0.05	5	0.8	<0.2
1768365	Soil	43	0.71	140	0.055	<1	1.66	0.008	0.08	0.1	0.02	3.7	0.1	<0.05	6	<0.5	<0.2
1768366	Soil	51	1.03	176	0.060	1	1.43	0.008	0.14	0.1	0.01	4.3	0.1	<0.05	4	0.7	<0.2
1768367	Soil	40	0.86	446	0.025	1	1.62	0.007	0.12	0.1	0.06	5.3	0.2	<0.05	5	<0.5	<0.2
1768368	Soil	42	0.96	171	0.056	<1	1.48	0.008	0.13	0.2	0.03	4.1	0.1	<0.05	4	<0.5	<0.2
1768369	Soil	52	0.87	116	0.072	<1	1.31	0.009	0.15	0.3	0.02	3.4	0.1	<0.05	4	<0.5	<0.2
1768370	Soil	51	0.80	119	0.058	<1	1.42	0.008	0.13	0.2	0.03	3.4	0.1	<0.05	5	<0.5	<0.2
1768371	Soil	65	0.99	141	0.076	<1	1.31	0.010	0.18	0.4	0.01	3.7	0.1	<0.05	5	<0.5	<0.2
1768372	Soil	35	0.61	92	0.047	<1	1.03	0.007	0.09	0.5	0.02	2.7	0.1	<0.05	4	0.8	<0.2
1768373	Soil	32	0.43	143	0.053	<1	0.89	0.006	0.08	0.3	0.03	2.0	<0.1	<0.05	4	<0.5	<0.2
1768374	Soil	33	0.61	126	0.047	<1	1.23	0.007	0.10	0.3	0.03	2.6	0.1	<0.05	4	0.8	<0.2
1768375	Soil	54	0.94	138	0.068	<1	1.30	0.009	0.13	0.2	0.01	3.8	0.1	<0.05	4	1.0	<0.2
1768376	Soil	49	0.85	141	0.066	<1	1.18	0.009	0.10	0.2	<0.01	3.8	<0.1	<0.05	4	0.6	<0.2
1768377	Soil	62	1.02	143	0.056	<1	1.56	0.009	0.13	0.6	0.01	3.8	<0.1	<0.05	5	0.8	<0.2
1768378	Soil	51	0.81	101	0.056	<1	1.15	0.007	0.12	0.3	<0.01	3.2	<0.1	<0.05	4	<0.5	<0.2
1768379	Soil	118	1.36	356	0.035	3	3.15	0.011	0.26	0.2	0.14	11.6	0.3	<0.05	9	<0.5	<0.2
1768380	Soil	123	1.49	185	0.076	<1	1.92	0.014	0.17	0.2	0.03	7.8	0.1	<0.05	6	<0.5	<0.2
1768381	Soil	52	0.67	98	0.074	1	1.09	0.011	0.11	0.1	0.02	3.2	<0.1	<0.05	5	<0.5	<0.2
1768382	Soil	63	0.89	95	0.064	2	1.65	0.009	0.12	0.2	0.03	3.8	0.3	<0.05	5	<0.5	<0.2
1768383	Soil	139	1.78	309	0.066	3	2.82	0.020	0.17	0.2	0.06	11.5	0.2	<0.05	10	1.3	0.2
1768384	Soil	44	1.09	109	0.070	<1	1.98	0.011	0.14	0.2	0.01	3.7	0.1	<0.05	6	0.5	<0.2
1768385	Soil	51	0.86	195	0.037	<1	1.45	0.013	0.11	0.2	0.05	4.3	0.1	<0.05	5	0.7	<0.2
1768386	Soil	46	0.85	179	0.042	1	1.57	0.010	0.10	0.1	0.02	3.0	<0.1	<0.05	5	<0.5	<0.2
1768387	Soil	198	1.83	108	0.108	<1	1.67	0.010	0.13	0.2	<0.01	3.9	<0.1	<0.05	5	<0.5	<0.2
1768388	Soil	67	0.90	113	0.061	<1	1.35	0.008	0.12	0.2	<0.01	3.7	<0.1	<0.05	5	<0.5	<0.2
1768389	Soil	36	0.68	138	0.028	2	1.74	0.010	0.10	0.2	0.03	2.7	0.1	<0.05	5	<0.5	<0.2
1768390	Soil	46	0.63	144	0.059	2	1.40	0.007	0.10	0.3	0.02	4.7	<0.1	<0.05	5	<0.5	<0.2

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	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768391	Soil	0.8	31.8	9.8	52	<0.1	32.4	12.9	575	2.45	8.6	2.5	5.0	18	0.2	0.6	0.2	41	0.30	0.082	21
1768392	Soil	1.4	39.5	12.7	71	<0.1	47.6	15.3	462	2.96	22.5	13.7	4.1	16	0.1	0.7	0.2	58	0.28	0.045	16
1768393	Soil	0.8	32.2	9.6	52	<0.1	34.7	12.2	456	2.33	7.2	8.2	3.5	17	<0.1	0.5	0.2	43	0.33	0.082	14
1768394	Soil	1.0	35.1	10.5	50	0.1	39.7	12.3	410	2.87	6.7	0.9	3.2	15	0.2	0.3	0.2	65	0.22	0.072	15
1768395	Soil	1.2	32.0	10.7	50	<0.1	38.0	12.8	482	2.68	20.4	4.4	1.9	18	<0.1	0.8	0.2	54	0.37	0.067	11
1768396	Soil	1.1	41.8	9.3	57	<0.1	36.6	12.7	368	3.34	15.1	1.4	2.2	14	0.3	0.6	0.2	62	0.17	0.060	12
1768397	Soil	1.4	36.3	10.1	46	0.1	27.8	8.9	430	2.41	20.0	<0.5	0.6	16	<0.1	0.4	0.2	58	0.27	0.058	15
1768398	Soil	1.3	40.9	7.2	52	<0.1	41.5	9.7	294	2.28	22.9	3.4	3.8	23	0.1	0.6	0.1	49	0.54	0.120	14
1768399	Soil	1.5	23.5	10.6	61	<0.1	23.1	9.1	385	2.39	12.8	0.9	1.1	18	0.1	0.5	0.2	52	0.30	0.056	9
1768400	Soil	1.0	47.2	7.3	70	<0.1	61.4	16.8	438	2.45	21.2	<0.5	0.9	24	0.2	0.3	<0.1	51	0.56	0.108	11
1768401	Soil	1.4	33.8	10.3	50	<0.1	46.7	12.5	471	2.54	19.7	0.6	0.5	19	0.1	0.6	0.1	56	0.35	0.100	14
1768402	Soil	0.8	96.9	5.4	102	<0.1	19.6	15.1	1005	4.50	10.7	<0.5	2.4	26	<0.1	0.3	<0.1	68	0.52	0.115	8
1768403	Soil	0.8	28.5	6.8	45	<0.1	34.9	10.0	354	2.12	16.3	1.5	1.3	16	0.1	0.5	0.1	42	0.32	0.099	13
1768404	Soil	0.9	17.1	7.4	47	<0.1	30.2	9.2	357	1.99	8.7	0.9	1.7	19	<0.1	0.3	0.1	45	0.36	0.107	12
1768405	Soil	0.8	26.9	7.8	50	<0.1	33.5	12.5	386	2.23	10.2	3.0	4.5	17	0.3	0.5	0.1	43	0.32	0.102	14
1768406	Soil	0.9	19.0	8.2	51	<0.1	28.0	8.8	313	1.90	7.8	0.5	2.8	11	0.3	0.5	0.1	49	0.21	0.064	10
1768407	Soil	1.0	21.7	9.3	49	<0.1	27.2	9.0	304	2.20	8.7	1.5	1.9	18	0.2	0.4	0.2	48	0.35	0.075	13
1768408	Soil	0.9	38.8	8.7	56	<0.1	55.4	14.2	531	2.60	12.4	1.1	5.4	21	<0.1	0.7	0.1	52	0.46	0.118	18
1768409	Soil	0.9	44.7	8.1	55	<0.1	73.7	16.9	588	2.88	11.0	2.8	6.3	21	0.2	0.7	0.2	57	0.48	0.118	23
1768410	Soil	1.0	35.5	10.4	76	<0.1	44.6	14.8	528	3.18	14.7	2.8	2.7	14	0.3	0.6	0.2	55	0.24	0.077	14
1768411	Soil	2.0	37.5	11.6	70	0.1	45.6	15.0	562	3.08	28.3	4.0	2.8	17	0.3	0.8	0.3	61	0.31	0.073	16
1768412	Soil	2.7	33.7	13.2	80	<0.1	42.8	12.8	515	2.81	43.5	2.3	1.3	16	0.3	0.9	0.2	59	0.25	0.103	14
1768413	Soil	1.1	11.3	10.9	44	<0.1	13.9	19.3	1202	1.89	5.1	3.7	2.1	6	0.1	0.4	0.2	39	0.07	0.040	9
1768414	Soil	1.0	36.4	11.4	64	<0.1	46.3	12.2	436	3.19	12.6	4.9	2.7	11	0.1	0.7	0.2	70	0.18	0.050	11
1768415	Soil	0.9	54.4	13.1	66	0.2	52.6	12.0	880	3.05	9.1	8.6	0.6	13	0.2	0.5	0.3	70	0.19	0.098	15
1768416	Soil	0.7	17.9	8.7	61	<0.1	49.2	18.2	572	3.84	8.0	2.5	3.7	14	0.1	0.4	0.2	77	0.41	0.164	11
1768417	Soil	1.1	15.7	9.8	35	<0.1	20.8	7.1	267	2.26	6.2	2.3	3.0	10	0.2	0.5	0.2	57	0.13	0.045	11
1768418	Soil	0.6	86.2	10.9	78	0.2	42.4	7.8	350	2.37	24.1	8.6	0.9	11	0.2	6.4	0.2	43	0.28	0.104	14
1768419	Soil	0.9	24.6	8.5	51	<0.1	75.9	14.8	394	2.33	5.9	3.8	4.3	13	0.3	0.4	0.2	50	0.27	0.076	15
1768420	Soil	1.1	25.3	9.5	61	<0.1	68.0	16.9	475	2.69	5.3	1.0	4.6	15	0.3	0.4	0.2	58	0.31	0.082	14

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	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768391	Soil	40	0.70	145	0.057	<1	1.06	0.007	0.11	0.2	0.02	3.2	<0.1	<0.05	4	<0.5	<0.2
1768392	Soil	60	0.97	149	0.077	1	1.65	0.008	0.16	0.2	0.02	4.1	0.1	<0.05	5	1.0	<0.2
1768393	Soil	48	0.78	96	0.059	<1	1.12	0.007	0.11	0.2	0.01	3.0	0.1	<0.05	4	<0.5	<0.2
1768394	Soil	64	0.86	134	0.088	<1	1.58	0.008	0.11	0.2	<0.01	4.2	0.1	<0.05	6	<0.5	<0.2
1768395	Soil	60	0.76	113	0.058	<1	1.31	0.008	0.10	0.2	0.01	3.1	<0.1	<0.05	5	<0.5	<0.2
1768396	Soil	67	0.88	80	0.058	<1	1.58	0.007	0.08	0.2	0.02	3.5	0.1	<0.05	5	<0.5	<0.2
1768397	Soil	52	0.65	150	0.048	<1	1.28	0.008	0.08	0.2	0.01	2.4	0.1	<0.05	6	0.5	<0.2
1768398	Soil	56	0.82	99	0.071	<1	1.19	0.009	0.11	0.2	<0.01	3.1	<0.1	<0.05	4	<0.5	<0.2
1768399	Soil	45	0.65	101	0.054	1	1.04	0.010	0.12	0.2	0.01	2.4	<0.1	<0.05	5	<0.5	<0.2
1768400	Soil	82	1.02	116	0.045	<1	1.49	0.013	0.10	0.1	<0.01	2.8	<0.1	<0.05	5	0.7	<0.2
1768401	Soil	69	0.89	185	0.022	1	1.50	0.009	0.07	<0.1	0.01	2.0	0.1	<0.05	5	<0.5	<0.2
1768402	Soil	22	1.69	286	0.161	<1	2.40	0.006	0.42	0.1	<0.01	4.1	0.2	<0.05	8	0.5	<0.2
1768403	Soil	48	0.68	97	0.046	<1	1.15	0.009	0.08	0.2	0.01	2.4	0.1	<0.05	4	<0.5	<0.2
1768404	Soil	47	0.76	111	0.052	<1	1.18	0.008	0.09	0.2	<0.01	2.4	<0.1	<0.05	4	0.5	<0.2
1768405	Soil	47	0.74	85	0.066	<1	1.23	0.007	0.10	0.2	<0.01	2.9	<0.1	<0.05	4	0.6	<0.2
1768406	Soil	38	0.58	71	0.071	<1	1.00	0.012	0.11	0.3	0.02	2.2	<0.1	<0.05	4	1.0	<0.2
1768407	Soil	39	0.63	108	0.056	<1	1.29	0.009	0.09	0.2	0.02	2.4	0.2	<0.05	4	<0.5	<0.2
1768408	Soil	66	1.02	185	0.080	<1	1.33	0.009	0.15	0.2	0.02	4.6	0.1	<0.05	4	<0.5	<0.2
1768409	Soil	86	1.21	215	0.097	2	1.45	0.010	0.16	0.3	<0.01	5.6	0.1	<0.05	5	<0.5	<0.2
1768410	Soil	71	0.90	119	0.071	2	1.58	0.008	0.13	0.2	0.01	3.4	0.1	<0.05	5	0.8	<0.2
1768411	Soil	55	0.81	228	0.074	2	1.42	0.009	0.12	0.2	0.01	3.6	0.2	<0.05	5	<0.5	<0.2
1768412	Soil	54	0.82	221	0.049	2	1.29	0.009	0.12	0.2	<0.01	2.5	0.1	<0.05	5	0.7	<0.2
1768413	Soil	24	0.43	71	0.053	<1	0.82	0.007	0.08	0.2	<0.01	1.8	<0.1	<0.05	5	<0.5	<0.2
1768414	Soil	60	0.97	105	0.083	2	1.78	0.008	0.10	0.2	0.01	4.0	0.1	<0.05	6	0.6	<0.2
1768415	Soil	58	0.73	233	0.036	2	1.80	0.010	0.11	0.2	0.03	3.4	0.2	<0.05	7	<0.5	<0.2
1768416	Soil	56	1.30	153	0.133	<1	2.11	0.008	0.33	0.3	0.02	4.4	0.1	<0.05	7	<0.5	<0.2
1768417	Soil	32	0.42	63	0.087	1	1.23	0.007	0.07	0.3	0.02	2.3	<0.1	<0.05	6	<0.5	<0.2
1768418	Soil	37	0.44	90	0.033	<1	0.91	0.012	0.05	0.2	0.08	2.6	<0.1	<0.05	3	<0.5	<0.2
1768419	Soil	57	0.86	112	0.080	2	1.38	0.008	0.11	0.2	0.02	3.0	0.1	<0.05	4	0.6	<0.2
1768420	Soil	73	1.13	109	0.098	1	1.64	0.010	0.15	0.2	0.01	3.8	0.2	<0.05	5	<0.5	<0.2

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Project: LIV
Report Date: September 05, 2014

CERTIFICATE OF ANALYSIS WHI14000091.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768421	Soil	1.2	27.0	8.7	55	<0.1	57.9	11.0	280	2.22	4.6	2.1	4.1	14	<0.1	0.4	0.2	52	0.34	0.106	19
1768422	Soil	1.0	35.7	8.3	61	<0.1	48.2	11.2	366	2.00	7.4	1.5	3.9	13	0.3	0.7	0.2	47	0.27	0.096	17
1768423	Soil	0.9	28.8	7.8	65	<0.1	54.9	16.5	569	3.05	6.8	1.7	4.9	14	0.3	0.4	0.2	62	0.28	0.087	13
1768424	Soil	0.5	545.7	5.7	55	<0.1	36.2	14.9	638	2.64	5.0	3.5	3.5	16	0.1	0.4	<0.1	54	0.36	0.110	13
1768425	Soil	1.0	20.1	10.0	54	<0.1	34.5	10.5	339	2.56	7.0	4.3	3.7	14	<0.1	0.6	0.2	57	0.20	0.063	13
1768426	Soil	0.7	34.0	8.3	54	<0.1	57.8	16.5	495	2.63	8.9	2.0	4.7	18	0.2	0.8	0.1	52	0.34	0.093	14
1768427	Soil	0.6	22.3	5.5	40	<0.1	27.6	9.7	289	1.85	3.7	1.6	2.5	14	0.2	0.3	<0.1	38	0.27	0.097	12
1768428	Soil	1.9	21.8	5.7	64	<0.1	6.6	13.9	365	3.69	1.8	6.8	5.3	14	<0.1	0.4	<0.1	78	0.33	0.060	19
1768429	Soil	1.2	34.4	9.9	78	<0.1	41.1	15.8	473	3.13	25.3	1.8	4.2	18	0.2	1.7	0.1	56	0.42	0.113	17
1768430	Soil	0.8	48.9	8.1	66	<0.1	43.6	16.2	480	2.84	33.2	1.4	3.4	13	0.3	4.3	0.1	55	0.20	0.063	16
1768431	Soil	1.2	31.2	9.4	55	<0.1	46.7	13.3	416	2.59	13.6	5.9	3.3	16	0.2	0.7	0.2	54	0.28	0.085	19
1768432	Soil	0.9	34.7	8.7	57	<0.1	52.4	16.9	479	2.95	23.8	3.6	4.1	18	0.2	1.2	0.1	48	0.31	0.107	16
1768433	Soil	1.0	35.6	9.2	55	<0.1	52.8	15.4	435	2.71	18.7	5.0	3.4	14	0.2	1.3	0.1	50	0.24	0.072	15
1768434	Soil	1.0	57.8	13.2	86	0.2	55.0	20.8	733	3.83	37.2	4.9	5.2	20	0.2	2.8	0.2	67	0.40	0.113	23
1768435	Soil	1.1	32.0	9.9	62	<0.1	42.3	13.8	407	2.45	23.5	2.9	3.6	14	0.2	0.9	0.2	53	0.27	0.081	16
1768436	Soil	1.3	30.4	9.4	60	<0.1	41.7	12.6	522	2.66	44.0	2.2	3.6	19	0.2	1.5	0.1	48	0.33	0.112	16
1768437	Soil	1.9	56.1	5.9	140	<0.1	63.8	25.6	951	4.58	32.8	2.5	12.3	47	0.3	0.8	0.1	76	1.36	0.620	37
1768438	Soil	1.4	40.6	11.0	69	0.1	45.8	14.9	425	3.01	20.9	1.5	4.4	19	0.1	0.9	0.2	57	0.29	0.100	19
1768439	Soil	0.9	24.9	9.7	56	<0.1	46.2	17.3	451	2.97	20.0	2.5	3.6	15	0.1	1.3	0.1	61	0.25	0.097	13
1768440	Soil	0.9	28.9	8.9	55	<0.1	45.1	15.8	421	2.62	19.8	2.7	3.8	14	0.3	1.2	0.1	45	0.25	0.088	14
1768441	Soil	0.9	37.1	8.1	58	<0.1	49.0	16.1	561	2.91	31.2	2.7	4.2	17	0.2	2.5	0.1	49	0.28	0.090	15
1768442	Soil	1.0	12.8	8.2	34	<0.1	15.5	6.2	215	1.83	9.3	0.7	1.9	11	0.1	0.8	0.2	51	0.14	0.045	9
1768443	Soil	1.1	51.7	9.3	72	<0.1	54.2	17.1	550	3.56	34.0	2.6	5.0	20	<0.1	2.0	0.1	60	0.33	0.101	20
1768444	Soil	1.0	44.2	10.0	76	<0.1	46.9	17.0	593	3.44	31.6	4.9	3.1	16	0.1	1.9	0.2	65	0.27	0.093	14
1768445	Soil	1.0	28.1	9.8	57	<0.1	40.1	16.1	537	2.59	17.7	5.1	2.6	16	0.1	1.3	0.2	54	0.29	0.084	14
1768446	Soil	1.1	65.7	10.9	86	0.5	71.1	25.0	1451	3.59	18.9	11.2	3.7	20	0.4	1.4	0.2	72	0.46	0.104	18
1768447	Soil	0.9	40.5	7.7	65	0.1	64.6	14.0	504	2.73	13.6	4.3	5.0	17	0.2	1.2	0.2	53	0.33	0.096	17
1768448	Soil	0.7	31.7	8.7	60	<0.1	59.2	14.0	340	2.33	10.8	8.0	6.8	18	0.2	0.8	0.2	42	0.39	0.107	22
1768449	Soil	0.6	41.4	7.6	56	<0.1	35.1	12.6	576	2.32	12.9	4.3	2.6	15	<0.1	0.7	0.2	49	0.28	0.087	12
1768450	Soil	0.6	22.3	6.8	41	<0.1	20.2	6.8	353	1.56	8.7	5.1	2.5	12	<0.1	0.5	0.2	40	0.19	0.044	12

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		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768421	Soil		58	0.88	101	0.073	3	1.47	0.009	0.09	0.2	<0.01	2.9	0.1	<0.05	4	<0.5	<0.2
1768422	Soil		43	0.66	132	0.058	1	1.22	0.007	0.12	0.3	0.01	2.9	0.2	<0.05	3	0.9	<0.2
1768423	Soil		50	1.15	138	0.090	1	1.73	0.007	0.22	0.2	0.02	5.9	0.1	<0.05	5	<0.5	<0.2
1768424	Soil		34	1.10	150	0.110	<1	1.57	0.008	0.24	0.1	<0.01	4.1	0.1	<0.05	4	<0.5	<0.2
1768425	Soil		43	0.73	84	0.080	<1	1.50	0.008	0.09	0.3	0.01	3.2	0.1	<0.05	5	0.8	<0.2
1768426	Soil		59	1.02	117	0.080	<1	1.44	0.009	0.13	0.1	<0.01	4.1	0.1	<0.05	4	<0.5	<0.2
1768427	Soil		32	0.63	71	0.051	<1	1.02	0.009	0.07	0.1	0.01	2.7	<0.1	<0.05	3	<0.5	<0.2
1768428	Soil		7	0.79	117	0.052	<1	1.29	0.005	0.33	<0.1	0.01	8.4	0.1	<0.05	4	0.8	<0.2
1768429	Soil		47	0.90	180	0.076	<1	1.36	0.009	0.15	<0.1	0.01	4.3	0.1	<0.05	4	<0.5	<0.2
1768430	Soil		51	0.95	126	0.073	<1	1.39	0.008	0.17	<0.1	0.02	3.8	0.1	<0.05	4	0.8	<0.2
1768431	Soil		53	0.80	147	0.069	<1	1.34	0.009	0.12	0.2	0.02	3.4	0.1	<0.05	4	<0.5	<0.2
1768432	Soil		60	0.93	110	0.063	1	1.32	0.009	0.10	<0.1	<0.01	3.5	<0.1	<0.05	4	0.6	<0.2
1768433	Soil		56	0.87	102	0.064	1	1.43	0.009	0.11	0.1	0.02	3.5	<0.1	<0.05	4	0.6	<0.2
1768434	Soil		67	1.32	306	0.063	1	1.78	0.009	0.25	0.1	0.06	7.5	0.1	<0.05	5	<0.5	<0.2
1768435	Soil		52	0.76	215	0.066	<1	1.30	0.007	0.11	0.2	0.01	3.7	0.1	<0.05	4	<0.5	<0.2
1768436	Soil		58	0.79	179	0.057	<1	1.11	0.008	0.11	<0.1	0.02	3.6	0.1	<0.05	4	<0.5	<0.2
1768437	Soil		65	1.67	466	0.129	<1	2.19	0.010	0.68	<0.1	0.01	6.7	0.4	<0.05	10	0.8	<0.2
1768438	Soil		55	0.84	187	0.077	<1	1.44	0.008	0.17	0.1	0.01	4.0	0.1	<0.05	4	<0.5	<0.2
1768439	Soil		49	0.84	132	0.078	<1	1.34	0.008	0.19	0.2	<0.01	3.9	0.1	<0.05	4	0.6	<0.2
1768440	Soil		49	0.81	94	0.060	1	1.23	0.015	0.14	0.2	0.01	3.4	<0.1	<0.05	3	<0.5	<0.2
1768441	Soil		53	0.94	136	0.063	2	1.39	0.008	0.13	0.1	0.01	4.4	0.1	<0.05	4	<0.5	<0.2
1768442	Soil		26	0.37	88	0.076	<1	0.82	0.007	0.07	0.2	0.02	2.4	<0.1	<0.05	5	<0.5	<0.2
1768443	Soil		57	1.12	218	0.075	<1	1.54	0.010	0.18	<0.1	0.01	5.3	0.1	<0.05	4	<0.5	<0.2
1768444	Soil		55	0.89	169	0.069	<1	1.54	0.008	0.16	0.1	0.03	5.0	0.1	<0.05	5	0.9	<0.2
1768445	Soil		51	0.93	118	0.074	1	1.42	0.010	0.13	0.2	0.01	3.8	0.1	<0.05	5	1.0	<0.2
1768446	Soil		61	1.40	264	0.065	<1	1.90	0.012	0.26	0.1	0.05	7.4	0.2	0.06	6	0.5	<0.2
1768447	Soil		52	1.08	159	0.078	1	1.43	0.009	0.18	0.2	0.03	5.2	0.1	<0.05	5	<0.5	<0.2
1768448	Soil		45	0.92	130	0.089	<1	1.26	0.012	0.14	0.4	0.02	3.7	0.1	<0.05	4	<0.5	<0.2
1768449	Soil		34	0.84	106	0.066	1	1.29	0.011	0.15	0.3	0.03	3.1	<0.1	<0.05	4	<0.5	<0.2
1768450	Soil		24	0.56	111	0.068	<1	0.96	0.008	0.09	0.4	0.02	2.3	<0.1	<0.05	4	<0.5	<0.2

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768451	Soil	1.6	60.3	30.5	79	<0.1	55.5	22.1	654	3.67	882.9	6.3	6.7	22	0.4	5.6	0.2	59	0.37	0.109	24
1768452	Soil	1.3	49.9	18.4	72	<0.1	55.1	18.8	565	3.17	68.7	2.1	4.1	25	0.2	1.4	0.1	60	0.56	0.155	16
1768453	Soil	1.8	43.1	9.0	68	<0.1	52.6	18.4	707	2.94	79.0	1.3	3.5	20	0.2	2.0	0.1	62	0.36	0.084	15
1768454	Soil	1.1	50.9	7.8	70	<0.1	77.7	16.1	553	3.14	64.0	5.5	4.5	24	0.2	2.2	0.1	67	0.47	0.126	17
1768455	Soil	1.5	48.2	9.1	55	<0.1	49.7	19.6	578	3.03	44.6	2.0	3.7	23	<0.1	1.3	0.1	56	0.41	0.116	21
1768456	Soil	0.9	55.2	10.1	64	0.1	67.5	18.1	604	3.08	17.9	2.5	4.4	24	0.4	0.8	0.1	65	0.58	0.100	18
1768457	Soil	0.9	47.1	8.8	61	<0.1	47.5	13.2	324	2.56	22.0	2.7	4.3	23	0.2	0.8	0.2	61	0.46	0.111	15
1768458	Soil	1.3	61.6	16.9	102	0.6	120.5	28.8	881	5.58	36.0	34.6	5.8	33	0.4	0.7	<0.1	151	0.86	0.142	24
1768459	Soil	152.4	100.8	118.6	133	2.0	168.4	31.0	1005	7.44	687.8	157.9	5.9	38	1.1	35.0	0.3	64	0.74	0.256	29
1768460	Soil	15.3	103.3	1318.9	134	23.8	98.4	24.3	2392	5.51	126.9	668.7	2.1	29	3.4	20.6	0.5	79	0.50	0.132	30
1768461	Soil	0.9	33.6	7.1	62	<0.1	51.6	18.2	642	2.52	31.9	7.5	5.2	21	0.2	0.9	<0.1	44	0.36	0.086	18
1768462	Soil	19.9	97.6	8.3	108	0.3	28.2	6.0	227	4.86	55.4	4.5	7.8	56	0.4	3.0	0.2	117	0.11	0.154	39
1768463	Soil	4.6	117.2	15.4	105	0.6	65.0	17.7	393	4.18	83.5	10.7	3.8	22	0.4	2.1	0.2	84	0.37	0.122	32
1768464	Soil	0.7	9.0	3.5	25	<0.1	12.9	8.5	630	1.26	14.0	0.9	0.9	18	<0.1	0.4	<0.1	33	0.33	0.082	6
1768465	Soil	1.5	63.7	11.3	90	0.2	78.7	19.1	504	3.53	43.2	9.3	5.6	28	0.2	1.7	0.1	73	0.53	0.134	20
1768466	Soil	1.3	39.8	8.1	72	<0.1	56.8	14.7	381	2.91	25.8	2.1	5.0	24	0.1	1.1	0.1	61	0.50	0.115	17
1768467	Soil	1.2	42.4	9.1	70	<0.1	49.7	17.6	518	3.20	28.8	5.2	3.9	26	0.2	1.1	<0.1	60	0.43	0.126	13
1768468	Soil	1.9	69.6	9.1	76	<0.1	50.1	17.8	842	3.80	36.0	1.9	5.0	28	0.1	1.4	0.2	62	0.27	0.107	23
1768469	Soil	1.0	36.7	8.1	62	<0.1	116.2	21.7	706	2.98	21.3	3.2	3.8	19	0.2	0.8	0.1	50	0.34	0.099	15
1768470	Soil	1.0	32.3	9.0	67	<0.1	42.3	14.7	474	2.58	22.1	3.2	5.0	19	0.2	1.0	0.1	46	0.34	0.099	15
1768471	Soil	1.1	41.8	9.0	81	<0.1	59.9	21.1	559	3.58	35.9	2.2	4.4	22	0.3	1.4	0.1	55	0.38	0.130	14
1768472	Soil	1.1	35.0	8.8	64	<0.1	57.3	17.6	543	2.77	22.2	2.5	3.8	19	0.2	1.0	<0.1	48	0.41	0.143	12
1768473	Soil	0.9	34.1	8.1	56	<0.1	42.4	14.5	511	2.71	21.2	2.1	5.6	18	0.1	1.0	0.1	53	0.31	0.090	17
1768474	Soil	1.0	45.5	10.6	71	<0.1	39.9	21.6	648	3.64	26.2	2.5	3.0	25	0.1	0.9	0.1	106	0.46	0.147	12
1768475	Soil	1.1	45.2	9.3	64	<0.1	65.5	17.9	529	2.93	27.7	3.7	4.8	20	0.2	1.1	0.1	54	0.36	0.113	14
1768476	Soil	0.9	35.9	8.2	55	<0.1	41.9	12.8	474	2.23	10.4	1.8	5.2	24	0.2	0.6	0.1	47	0.42	0.116	17
1768477	Soil	0.9	26.8	7.9	65	<0.1	30.8	13.4	454	2.79	10.1	2.6	4.1	16	0.2	0.6	0.2	58	0.30	0.089	14
1768478	Soil	0.8	28.1	6.8	58	<0.1	40.5	12.9	388	2.40	13.0	1.5	4.0	17	<0.1	0.7	0.1	52	0.33	0.101	13
1768479	Soil	0.9	30.9	6.5	45	<0.1	37.8	12.6	377	2.05	16.8	3.6	4.1	18	0.1	0.7	<0.1	40	0.32	0.104	13
1768480	Soil	0.7	30.6	7.0	55	<0.1	41.5	11.5	357	2.19	15.4	1.2	4.5	17	0.2	0.8	0.1	45	0.32	0.098	14

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Project: LIV
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		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768451	Soil		61	0.94	152	0.046	<1	1.43	0.010	0.08	0.2	0.01	5.5	0.1	<0.05	5	1.2	<0.2
1768452	Soil		58	1.03	152	0.071	<1	1.54	0.013	0.13	0.2	0.02	4.1	<0.1	<0.05	5	0.9	<0.2
1768453	Soil		70	0.97	112	0.065	2	1.42	0.012	0.10	0.2	<0.01	4.5	<0.1	<0.05	5	<0.5	<0.2
1768454	Soil		97	1.33	127	0.069	2	1.84	0.013	0.16	0.2	<0.01	5.5	<0.1	<0.05	6	<0.5	<0.2
1768455	Soil		59	0.96	143	0.056	<1	1.47	0.012	0.10	0.2	<0.01	4.5	<0.1	<0.05	5	0.7	<0.2
1768456	Soil		79	1.02	231	0.070	<1	1.70	0.013	0.14	0.2	0.02	5.4	<0.1	<0.05	6	0.9	<0.2
1768457	Soil		65	1.05	142	0.063	<1	1.49	0.012	0.12	0.2	0.02	4.4	<0.1	<0.05	6	<0.5	<0.2
1768458	Soil		189	3.23	485	0.205	1	2.97	0.011	0.79	<0.1	0.02	11.2	0.5	<0.05	12	<0.5	0.4
1768459	Soil		70	0.38	223	0.005	1	1.20	0.005	0.11	0.2	0.04	10.3	0.5	<0.05	4	2.4	2.2
1768460	Soil		63	0.60	1171	0.018	2	1.24	0.007	0.14	0.1	0.07	7.8	0.2	0.07	5	2.6	14.7
1768461	Soil		49	0.78	173	0.078	<1	1.17	0.009	0.11	0.2	0.01	3.5	<0.1	<0.05	4	<0.5	<0.2
1768462	Soil		53	0.68	550	0.017	<1	1.61	0.018	0.23	<0.1	0.02	4.7	0.2	0.45	6	6.5	<0.2
1768463	Soil		84	1.11	270	0.046	2	2.22	0.015	0.14	0.2	0.11	11.1	0.1	<0.05	7	1.8	<0.2
1768464	Soil		8	0.28	84	0.058	<1	0.57	0.026	0.04	0.1	<0.01	1.3	<0.1	<0.05	3	<0.5	<0.2
1768465	Soil		93	1.31	265	0.090	<1	1.83	0.013	0.20	0.2	0.02	6.4	<0.1	<0.05	6	0.7	<0.2
1768466	Soil		66	1.08	154	0.075	<1	1.51	0.012	0.12	0.1	0.02	4.6	<0.1	<0.05	5	<0.5	<0.2
1768467	Soil		59	0.92	168	0.066	1	1.52	0.015	0.16	0.1	0.02	4.2	<0.1	<0.05	5	0.5	<0.2
1768468	Soil		44	1.27	294	0.085	<1	1.89	0.010	0.25	0.2	<0.01	4.3	0.1	<0.05	7	1.3	<0.2
1768469	Soil		165	0.98	171	0.062	<1	1.28	0.010	0.12	0.3	<0.01	4.1	0.1	<0.05	4	0.6	<0.2
1768470	Soil		34	0.79	113	0.067	<1	1.33	0.011	0.12	0.2	<0.01	3.7	<0.1	<0.05	4	<0.5	<0.2
1768471	Soil		55	0.85	139	0.068	<1	1.35	0.010	0.20	0.2	0.01	4.6	0.1	<0.05	4	0.7	<0.2
1768472	Soil		57	0.87	104	0.068	<1	1.28	0.010	0.14	0.2	<0.01	3.2	<0.1	<0.05	4	<0.5	<0.2
1768473	Soil		48	0.82	113	0.064	<1	1.64	0.011	0.09	0.2	0.01	4.0	<0.1	<0.05	5	<0.5	<0.2
1768474	Soil		47	1.28	113	0.090	1	1.62	0.013	0.14	0.2	0.02	5.5	<0.1	<0.05	5	<0.5	<0.2
1768475	Soil		66	0.96	111	0.072	<1	1.53	0.011	0.13	0.3	0.01	4.1	<0.1	<0.05	5	<0.5	<0.2
1768476	Soil		47	0.77	86	0.082	<1	1.17	0.011	0.12	0.2	0.01	3.5	<0.1	<0.05	4	<0.5	<0.2
1768477	Soil		37	0.84	93	0.079	<1	1.76	0.010	0.13	0.3	0.02	3.5	<0.1	<0.05	5	<0.5	<0.2
1768478	Soil		39	0.83	85	0.069	<1	1.40	0.010	0.11	0.2	<0.01	3.9	<0.1	<0.05	4	<0.5	<0.2
1768479	Soil		39	0.61	80	0.058	<1	0.91	0.009	0.09	0.2	<0.01	2.9	<0.1	<0.05	3	<0.5	<0.2
1768480	Soil		41	0.66	100	0.065	<1	1.04	0.009	0.10	0.3	0.01	3.2	<0.1	<0.05	4	<0.5	<0.2

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	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768481	Soil	0.9	35.5	6.9	59	<0.1	39.7	12.3	348	2.35	34.9	0.8	3.1	15	0.1	0.7	0.1	45	0.29	0.095	12
1768482	Soil	0.9	30.4	8.4	59	<0.1	56.9	15.2	575	2.47	14.6	6.1	4.2	16	0.1	0.7	0.2	47	0.32	0.096	14
1768483	Soil	1.2	29.0	8.8	65	0.1	36.0	12.1	419	2.40	13.2	1.2	3.1	14	0.1	0.5	0.2	50	0.26	0.093	14
1768484	Soil	1.2	30.3	8.6	62	0.1	39.9	10.5	351	1.86	16.2	4.1	6.2	15	0.4	0.6	0.2	38	0.35	0.122	16
1768485	Soil	0.8	29.7	9.9	55	<0.1	33.5	7.9	171	1.94	8.8	22.2	3.2	12	0.1	0.5	0.2	49	0.22	0.079	15
1768486	Soil	0.8	46.0	7.1	66	<0.1	53.8	15.6	468	2.81	33.2	<0.5	5.7	21	0.2	1.5	0.1	50	0.37	0.128	20
1768487	Soil	0.9	32.4	8.1	55	<0.1	50.6	13.5	417	2.15	17.6	3.1	5.6	15	0.3	0.7	0.2	40	0.29	0.105	16
1768488	Soil	0.9	31.2	6.3	54	<0.1	40.0	12.7	365	2.21	16.8	1.7	4.4	16	0.2	0.7	0.2	43	0.33	0.099	13
1768489	Soil	1.0	48.4	7.8	65	<0.1	48.4	15.6	344	2.61	17.7	7.8	5.7	18	0.2	1.0	0.1	49	0.33	0.105	17
1768490	Soil	1.1	38.9	8.8	61	0.1	40.4	17.4	524	2.51	29.1	2.7	4.2	19	<0.1	2.0	0.2	47	0.37	0.136	17
1768491	Soil	1.1	52.2	8.5	65	<0.1	44.3	13.1	514	2.41	22.1	0.7	6.1	19	0.4	1.5	0.1	44	0.41	0.135	18
1768492	Soil	1.2	45.2	9.6	65	0.1	44.2	15.4	395	2.93	31.5	4.3	3.9	17	0.3	1.5	0.2	59	0.29	0.101	17
1768493	Soil	1.2	70.6	10.0	81	0.2	65.9	17.5	659	3.77	75.6	1.9	3.2	20	0.2	3.4	0.1	65	0.37	0.112	23
1768494	Soil	1.2	52.1	9.7	75	0.1	62.3	17.7	684	2.93	26.7	1.2	6.5	21	0.3	1.3	0.1	48	0.42	0.133	21
1768495	Soil	1.0	43.2	10.3	72	0.1	46.4	16.8	636	3.25	39.6	3.7	4.2	19	0.2	1.4	0.1	55	0.36	0.121	16
1768496	Soil	1.1	58.6	10.4	80	0.2	54.2	34.4	1724	3.55	34.3	5.3	5.3	18	0.2	1.4	0.1	62	0.35	0.099	23
1768497	Soil	1.4	37.2	9.3	66	0.1	45.2	16.4	486	3.25	31.0	1.6	4.8	19	<0.1	1.2	0.1	54	0.34	0.117	19
1768498	Soil	1.0	46.7	9.3	76	0.1	61.7	15.2	492	3.09	22.3	<0.5	6.2	19	0.1	0.9	0.2	60	0.37	0.116	21
1768499	Soil	0.9	42.9	9.2	69	<0.1	60.4	21.4	446	3.84	26.7	<0.5	3.8	21	0.1	0.8	0.1	64	0.42	0.122	14
1768500	Soil	1.2	40.8	9.7	83	0.1	56.7	15.0	326	3.42	18.7	<0.5	4.8	23	0.3	0.9	0.2	66	0.47	0.085	16
1768501	Soil	3.6	60.2	34.0	122	0.4	90.7	25.8	1995	4.38	44.6	8.2	7.3	103	1.1	2.5	0.2	85	2.81	0.279	31
1768502	Soil	4.4	91.1	7.0	144	0.2	39.9	9.2	241	4.87	76.0	<0.5	5.1	56	0.3	2.6	0.1	103	0.53	0.193	30
1768503	Soil	0.8	25.1	3.6	34	<0.1	10.8	3.9	91	1.34	15.1	1.1	0.2	12	0.1	0.5	<0.1	42	0.14	0.065	7
1768504	Soil	1.2	44.5	14.4	63	<0.1	48.0	19.7	741	3.43	15.2	0.7	3.7	27	0.3	0.7	0.1	62	1.62	0.155	15
1768505	Soil	1.9	48.1	8.9	64	0.2	38.9	22.1	907	3.04	52.4	<0.5	0.6	17	0.2	1.4	0.2	69	0.27	0.099	12
1768506	Soil	9.5	179.2	9.3	71	0.1	234.6	36.5	521	5.23	63.2	<0.5	6.6	28	<0.1	5.1	0.1	89	0.37	0.104	28
1768507	Soil	1.7	94.6	7.1	82	0.2	114.4	30.3	786	5.21	31.2	1.5	3.5	30	0.1	0.7	0.1	136	0.59	0.124	20
1768508	Soil	1.0	37.3	7.8	47	0.1	37.5	15.3	460	3.99	86.0	0.8	2.5	15	0.1	1.0	0.1	58	0.31	0.100	14
1768509	Soil	0.9	41.8	7.7	52	<0.1	45.0	14.1	396	2.89	56.9	<0.5	2.8	18	<0.1	1.3	0.1	54	0.35	0.116	14
1768510	Soil	1.1	28.1	9.5	55	<0.1	33.0	10.3	337	2.77	14.3	<0.5	2.4	15	0.1	0.6	0.2	58	0.26	0.067	15

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		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768481	Soil		46	0.75	115	0.056	2	1.22	0.009	0.09	0.1	0.02	3.2	<0.1	<0.05	4	<0.5	<0.2
1768482	Soil		46	0.77	129	0.068	2	1.25	0.010	0.12	0.2	0.01	3.5	0.1	<0.05	4	0.5	<0.2
1768483	Soil		36	0.67	142	0.057	1	1.16	0.008	0.11	0.4	0.02	2.6	0.1	<0.05	4	<0.5	<0.2
1768484	Soil		31	0.61	86	0.052	<1	0.86	0.009	0.10	0.4	0.01	2.6	0.1	<0.05	3	0.5	<0.2
1768485	Soil		40	0.62	137	0.063	<1	1.32	0.008	0.09	0.2	0.03	3.2	0.1	<0.05	5	<0.5	<0.2
1768486	Soil		51	0.94	155	0.064	<1	1.18	0.011	0.15	0.1	0.02	4.2	<0.1	<0.05	4	0.9	<0.2
1768487	Soil		36	0.63	89	0.054	<1	1.10	0.008	0.10	0.5	<0.01	2.6	0.1	<0.05	3	0.7	<0.2
1768488	Soil		30	0.69	97	0.061	<1	0.99	0.008	0.12	0.3	<0.01	2.7	<0.1	<0.05	3	1.0	<0.2
1768489	Soil		49	0.82	197	0.072	<1	1.23	0.008	0.12	0.1	0.03	4.5	0.1	<0.05	4	<0.5	<0.2
1768490	Soil		45	0.77	122	0.058	<1	1.09	0.008	0.11	0.2	0.02	3.5	<0.1	<0.05	4	<0.5	<0.2
1768491	Soil		40	0.73	152	0.056	1	0.97	0.009	0.10	0.2	0.02	3.8	0.1	<0.05	3	<0.5	<0.2
1768492	Soil		54	0.87	203	0.045	<1	1.52	0.009	0.10	0.1	0.02	5.0	0.1	<0.05	5	0.8	<0.2
1768493	Soil		67	0.99	395	0.042	<1	1.79	0.008	0.11	<0.1	0.05	6.1	0.2	<0.05	6	0.8	<0.2
1768494	Soil		54	0.85	186	0.066	<1	1.19	0.011	0.15	<0.1	0.01	4.6	0.1	<0.05	4	0.8	<0.2
1768495	Soil		50	0.84	145	0.058	<1	1.30	0.009	0.11	0.1	0.03	4.4	0.1	<0.05	5	<0.5	<0.2
1768496	Soil		47	0.83	224	0.062	2	1.58	0.012	0.13	0.1	0.05	7.8	0.2	<0.05	5	1.0	<0.2
1768497	Soil		50	0.82	172	0.052	2	1.41	0.009	0.10	0.1	0.02	4.3	0.1	<0.05	5	0.6	<0.2
1768498	Soil		53	0.91	150	0.072	<1	1.57	0.011	0.11	0.2	0.02	4.3	0.1	<0.05	5	0.6	<0.2
1768499	Soil		73	1.01	171	0.085	<1	1.70	0.012	0.18	0.2	0.03	3.6	0.1	<0.05	5	<0.5	<0.2
1768500	Soil		59	0.96	170	0.074	<1	1.69	0.010	0.17	0.2	0.03	4.7	0.2	<0.05	6	0.8	<0.2
1768501	Soil		65	1.20	266	0.051	2	1.83	0.009	0.17	0.2	0.04	8.1	0.2	0.05	6	1.4	<0.2
1768502	Soil		108	1.02	484	0.106	1	2.18	0.013	0.21	<0.1	0.02	6.4	0.2	0.14	6	1.4	<0.2
1768503	Soil		8	0.20	128	0.043	<1	0.56	0.019	0.03	<0.1	0.01	0.9	<0.1	<0.05	3	<0.5	<0.2
1768504	Soil		64	1.22	182	0.097	<1	1.92	0.015	0.28	0.2	0.02	4.9	0.1	<0.05	6	<0.5	<0.2
1768505	Soil		54	0.64	127	0.049	<1	1.34	0.013	0.12	0.2	0.04	2.7	0.1	<0.05	5	<0.5	<0.2
1768506	Soil		294	2.04	88	0.059	1	2.35	0.012	0.13	<0.1	0.03	8.6	0.1	<0.05	8	1.3	<0.2
1768507	Soil		177	2.13	311	0.139	<1	2.63	0.016	0.58	0.1	0.02	10.3	0.3	<0.05	10	<0.5	<0.2
1768508	Soil		49	0.76	140	0.045	2	1.38	0.011	0.08	0.2	0.04	4.0	<0.1	<0.05	4	0.8	<0.2
1768509	Soil		66	0.90	96	0.049	2	1.46	0.012	0.07	0.2	0.02	3.4	<0.1	<0.05	5	0.7	<0.2
1768510	Soil		46	0.72	126	0.064	1	1.57	0.011	0.08	0.2	0.02	3.4	0.1	<0.05	6	<0.5	<0.2

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768511	Soil	0.9	30.6	8.5	55	<0.1	30.7	15.7	497	2.92	12.5	1.1	2.1	17	0.1	0.5	<0.1	61	0.28	0.064	11
1768512	Soil	0.8	35.2	8.6	54	<0.1	37.3	14.5	460	2.40	14.8	0.5	4.5	17	0.2	0.6	0.1	46	0.32	0.101	15
1768513	Soil	2.0	38.3	9.5	78	0.2	33.2	18.1	328	2.25	12.3	2.4	4.1	22	0.2	0.6	<0.1	52	0.42	0.106	17
1768514	Soil	1.6	41.5	7.6	50	<0.1	46.1	12.0	306	2.15	31.8	<0.5	4.6	20	0.1	0.9	0.1	49	0.40	0.110	17
1768515	Soil	1.6	90.5	7.6	118	0.1	106.9	37.9	1372	5.56	97.0	6.9	4.8	45	0.2	1.9	<0.1	151	0.85	0.194	27
1768516	Soil	0.9	65.4	7.2	61	<0.1	83.3	24.8	503	3.16	25.2	0.6	4.2	22	0.1	0.7	0.1	70	0.47	0.131	15
1768517	Soil	0.8	33.4	10.6	41	0.1	24.3	12.6	414	2.15	5.3	3.7	2.0	11	0.1	0.4	0.3	39	0.17	0.050	9
1768518	Soil	0.6	47.0	7.4	58	0.1	27.7	16.8	627	2.57	14.8	1.1	3.6	18	0.2	1.1	<0.1	53	0.44	0.091	11
1768519	Soil	0.8	47.4	10.2	59	0.1	38.1	18.5	638	2.91	19.8	1.9	4.0	16	0.3	1.1	0.1	58	0.30	0.076	12
1768520	Soil	1.4	60.0	11.2	92	0.2	49.9	17.9	476	3.08	54.6	2.7	4.6	21	0.2	2.7	0.1	63	0.49	0.115	15
1768521	Soil	10.3	154.2	6.0	155	0.1	61.4	11.5	275	6.18	62.4	5.8	0.4	34	0.3	1.4	<0.1	66	0.22	0.222	20
1768522	Soil	5.4	142.7	17.3	110	0.3	112.0	29.0	765	4.52	119.1	3.1	5.1	34	0.4	2.8	0.2	82	0.54	0.167	22
1768523	Soil	2.9	47.3	4.3	49	<0.1	38.0	9.7	290	1.99	15.7	<0.5	0.5	14	<0.1	0.4	<0.1	53	0.25	0.093	7
1768524	Soil	3.9	95.6	15.0	78	0.2	67.9	24.4	603	3.88	84.1	2.5	4.2	33	0.3	2.4	0.1	67	0.50	0.159	24
1768525	Soil	1.9	66.5	9.7	60	0.1	48.1	19.2	544	2.90	49.4	3.0	4.7	23	0.2	1.5	<0.1	58	0.45	0.122	18
1768526	Soil	1.4	52.7	8.5	81	<0.1	30.7	15.3	657	3.53	29.1	0.8	2.2	26	0.2	1.0	0.1	71	0.50	0.087	11
1768527	Soil	2.6	60.3	11.5	75	0.1	43.1	17.4	521	2.85	49.0	1.4	2.2	20	0.2	1.4	0.1	66	0.36	0.098	17
1768528	Soil	0.6	32.0	14.9	88	0.1	44.3	14.3	693	2.97	30.6	4.3	7.8	14	<0.1	1.0	0.2	31	0.23	0.058	20
1768529	Soil	0.9	24.3	10.2	47	<0.1	27.3	14.5	611	3.04	13.8	1.8	3.9	15	0.1	0.6	0.2	41	0.30	0.074	14
1768530	Soil	0.8	31.4	11.8	59	<0.1	49.1	13.2	445	3.08	22.1	4.2	5.7	18	0.1	1.3	0.1	53	0.27	0.056	14
1768531	Soil	0.7	25.7	14.9	45	<0.1	36.6	16.0	935	2.75	19.2	14.6	9.4	18	0.1	1.3	0.2	46	0.30	0.085	18
1768532	Soil	1.0	36.2	8.9	49	<0.1	33.8	17.4	544	2.47	10.0	0.9	4.4	17	0.2	0.9	0.1	46	0.30	0.083	12
1768533	Soil	1.0	11.8	9.9	32	<0.1	13.1	5.2	212	1.99	6.0	<0.5	0.5	10	<0.1	0.5	0.2	56	0.16	0.042	9
1768534	Soil	0.6	29.3	8.2	48	<0.1	31.3	10.2	460	2.29	12.5	18.1	3.1	17	<0.1	0.8	0.2	41	0.34	0.078	18
1768535	Soil	0.8	24.6	8.9	53	<0.1	25.8	9.2	450	2.47	10.0	3.1	2.6	15	0.1	0.4	0.2	53	0.29	0.046	14
1768536	Soil	0.8	27.3	9.9	53	0.1	43.6	14.2	386	2.82	18.4	22.3	4.9	14	0.3	0.9	0.2	51	0.24	0.068	13
1768537	Soil	0.6	41.4	12.0	57	<0.1	34.3	12.6	415	2.79	14.4	4.5	5.2	13	0.1	0.6	0.1	42	0.20	0.064	12
1768538	Soil	0.5	42.9	12.0	60	<0.1	50.6	13.4	760	2.75	15.5	3.9	5.1	15	0.2	0.8	0.1	36	0.28	0.097	15
1768539	Soil	0.8	24.1	9.8	46	0.1	31.2	8.9	307	2.04	12.7	86.3	2.8	14	0.1	0.5	0.2	43	0.24	0.060	13
1768540	Soil	0.7	28.8	7.5	45	<0.1	44.0	10.8	345	2.11	11.1	6.7	5.7	17	<0.1	0.5	0.1	40	0.32	0.076	17

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Project: LIV
Report Date: September 05, 2014

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		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768511	Soil		48	0.92	188	0.061	<1	1.41	0.010	0.11	0.1	0.01	3.5	<0.1	<0.05	4	0.5	<0.2
1768512	Soil		48	0.76	100	0.059	<1	1.21	0.010	0.09	0.3	0.01	3.6	<0.1	<0.05	4	0.5	<0.2
1768513	Soil		56	0.80	157	0.040	2	1.26	0.011	0.09	0.2	0.04	5.0	<0.1	<0.05	4	1.8	<0.2
1768514	Soil		62	0.85	105	0.055	<1	1.15	0.010	0.11	0.2	0.02	3.7	<0.1	<0.05	3	0.6	<0.2
1768515	Soil		172	2.12	557	0.122	2	3.04	0.019	0.59	<0.1	0.02	9.7	0.3	<0.05	10	0.7	<0.2
1768516	Soil		97	1.38	200	0.093	1	1.61	0.013	0.22	0.1	<0.01	4.1	0.2	<0.05	6	<0.5	<0.2
1768517	Soil		47	0.64	52	0.045	1	1.01	0.007	0.11	0.2	0.02	2.8	<0.1	<0.05	3	<0.5	<0.2
1768518	Soil		42	0.90	113	0.047	1	1.23	0.011	0.09	0.2	0.02	5.8	<0.1	<0.05	4	<0.5	<0.2
1768519	Soil		50	0.88	140	0.054	3	1.42	0.010	0.11	0.2	0.03	5.8	0.1	<0.05	4	<0.5	<0.2
1768520	Soil		56	0.91	129	0.050	<1	1.22	0.010	0.14	0.2	0.04	7.5	0.1	<0.05	4	0.9	<0.2
1768521	Soil		23	0.77	267	0.039	1	2.13	0.007	0.05	<0.1	0.02	2.0	<0.1	<0.05	8	2.3	<0.2
1768522	Soil		124	1.31	260	0.059	<1	1.91	0.014	0.18	0.1	0.05	8.9	0.1	<0.05	6	1.5	<0.2
1768523	Soil		43	0.60	58	0.055	2	1.09	0.024	0.05	<0.1	0.01	2.0	0.1	<0.05	4	<0.5	<0.2
1768524	Soil		79	1.02	180	0.071	1	1.61	0.013	0.14	0.1	0.02	4.6	0.1	<0.05	5	1.1	<0.2
1768525	Soil		54	0.91	123	0.059	<1	1.28	0.013	0.11	0.1	0.01	4.5	0.1	<0.05	4	0.6	<0.2
1768526	Soil		43	1.16	162	0.060	2	1.74	0.010	0.15	0.1	0.02	4.2	<0.1	<0.05	5	0.8	<0.2
1768527	Soil		64	0.90	175	0.035	2	1.67	0.011	0.08	0.1	0.06	5.5	0.1	<0.05	5	0.6	<0.2
1768528	Soil		22	0.51	137	0.025	2	1.34	0.007	0.07	0.3	0.03	3.2	<0.1	<0.05	3	1.1	<0.2
1768529	Soil		31	0.52	143	0.042	1	1.35	0.011	0.08	0.4	0.02	2.8	<0.1	<0.05	4	<0.5	<0.2
1768530	Soil		45	0.88	115	0.068	<1	1.60	0.010	0.11	0.3	0.01	3.8	<0.1	<0.05	5	0.6	<0.2
1768531	Soil		36	0.73	160	0.069	2	1.35	0.009	0.10	0.5	0.03	3.3	0.1	<0.05	4	0.5	<0.2
1768532	Soil		43	0.74	101	0.048	2	1.24	0.010	0.08	0.2	<0.01	4.1	<0.1	<0.05	4	<0.5	<0.2
1768533	Soil		27	0.34	84	0.049	<1	1.14	0.009	0.06	0.2	0.04	1.6	<0.1	<0.05	6	<0.5	<0.2
1768534	Soil		33	0.64	131	0.044	1	1.29	0.009	0.08	0.3	0.02	3.5	<0.1	<0.05	4	<0.5	<0.2
1768535	Soil		35	0.74	156	0.062	<1	1.45	0.010	0.10	0.2	0.02	3.2	<0.1	<0.05	5	0.6	<0.2
1768536	Soil		40	0.77	108	0.063	2	1.63	0.009	0.11	0.3	0.02	3.5	0.2	<0.05	5	<0.5	<0.2
1768537	Soil		30	0.76	98	0.050	1	1.45	0.006	0.17	0.2	0.02	3.1	0.1	<0.05	4	0.6	<0.2
1768538	Soil		34	0.69	104	0.040	<1	1.23	0.006	0.13	0.2	0.01	3.3	<0.1	<0.05	3	0.5	<0.2
1768539	Soil		33	0.63	109	0.054	<1	1.15	0.010	0.09	0.2	0.01	2.6	<0.1	<0.05	4	<0.5	<0.2
1768540	Soil		34	0.74	107	0.068	1	1.12	0.009	0.08	0.2	<0.01	3.1	<0.1	<0.05	4	0.7	<0.2

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Project: LIV
Report Date: September 05, 2014

CERTIFICATE OF ANALYSIS WHI14000091.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768541	Soil	0.6	27.2	9.5	46	<0.1	36.9	12.4	385	2.33	12.0	7.0	5.9	13	<0.1	0.6	0.2	40	0.21	0.052	16
1768542	Soil	0.9	36.9	7.6	51	<0.1	82.5	15.2	390	2.48	17.6	1.5	4.0	17	0.2	0.6	0.1	48	0.30	0.079	12
1768543	Soil	0.7	28.7	7.0	45	<0.1	46.6	11.1	331	2.08	9.9	<0.5	4.3	15	0.1	0.4	<0.1	43	0.27	0.066	11
1768544	Soil	1.0	21.2	7.8	48	0.1	41.5	12.1	286	2.23	8.4	1.4	4.2	15	0.1	0.4	0.1	45	0.23	0.062	11
1768545	Soil	0.9	37.1	7.5	47	<0.1	50.3	14.6	457	2.26	13.3	0.6	5.1	20	0.2	0.6	<0.1	42	0.37	0.097	15
1768546	Soil	1.3	59.3	9.7	89	0.1	90.7	22.4	771	3.94	42.0	5.0	4.6	26	0.5	1.5	<0.1	75	0.70	0.120	16
1768547	Soil	0.6	27.7	6.8	46	<0.1	44.0	8.6	266	2.11	9.6	2.6	4.4	18	0.1	0.4	0.1	44	0.37	0.091	17
1768548	Soil	0.8	33.8	6.6	49	<0.1	56.5	15.4	467	2.44	18.6	<0.5	4.5	19	0.1	0.7	<0.1	44	0.40	0.104	14
1768549	Soil	1.0	20.1	7.3	49	0.1	29.6	8.8	405	2.14	8.5	1.9	1.9	15	<0.1	0.3	0.1	46	0.28	0.083	13
1768550	Soil	1.7	35.2	8.6	64	<0.1	57.4	14.0	237	1.46	13.1	1.8	6.1	19	0.2	0.8	0.1	37	0.42	0.098	17
1768551	Soil	1.6	28.1	32.8	42	0.2	42.1	10.9	286	2.29	14.0	1.5	0.6	13	0.1	0.7	0.5	66	0.21	0.058	9
1768552	Soil	1.5	46.9	8.4	57	<0.1	49.6	19.7	496	3.08	16.8	2.1	3.5	18	0.2	0.9	0.1	63	0.31	0.073	12
1768553	Soil	7.9	79.9	10.1	47	0.2	17.5	4.2	197	2.96	60.9	2.1	4.1	35	0.1	2.5	0.1	55	0.27	0.090	26
1768554	Soil	3.7	95.0	7.0	58	<0.1	151.6	27.0	485	3.17	79.0	1.8	2.8	23	0.2	1.7	0.1	65	0.40	0.128	18
1768555	Soil	1.2	34.4	10.2	57	0.1	44.8	16.1	490	2.75	20.0	2.5	3.3	16	0.3	0.7	0.2	63	0.27	0.070	14
1768556	Soil	2.0	73.9	10.6	77	0.2	62.0	16.2	367	3.28	58.5	3.5	4.3	19	0.1	2.2	0.2	72	0.41	0.117	22
1768557	Soil	1.4	43.9	10.2	65	<0.1	45.6	16.1	751	2.91	34.0	3.0	3.0	26	0.1	1.5	0.1	66	0.55	0.095	13
1768558	Soil	1.8	43.7	11.3	62	<0.1	38.0	15.3	486	2.87	26.1	2.8	2.0	17	0.1	1.1	0.2	63	0.30	0.069	13
1768559	Soil	1.7	57.5	10.9	62	<0.1	46.1	16.4	454	2.74	34.3	4.3	4.4	21	0.1	1.3	0.1	60	0.44	0.115	17
1768560	Soil	1.3	32.1	7.6	55	<0.1	29.2	10.7	310	2.19	15.4	2.3	2.0	16	<0.1	0.8	<0.1	51	0.30	0.082	12
1768561	Soil	2.9	46.1	11.9	99	0.3	43.3	11.9	388	2.66	26.1	5.2	1.5	25	0.3	1.1	0.2	60	0.57	0.136	18
1768562	Soil	3.2	59.6	22.0	101	0.3	56.1	14.0	261	2.27	19.1	6.4	3.8	30	0.5	1.7	0.1	68	0.56	0.114	20
1768563	Soil	4.5	47.7	33.0	107	0.7	59.0	18.3	591	3.72	61.0	87.1	4.6	29	0.5	2.6	0.2	70	0.35	0.139	16
1768564	Soil	0.8	27.6	7.9	47	<0.1	30.4	12.0	347	2.23	14.2	2.0	2.4	16	0.2	0.6	0.1	49	0.30	0.089	11
1768565	Soil	0.8	29.6	12.7	55	<0.1	42.0	14.8	503	2.61	13.0	1.6	5.2	22	<0.1	0.6	0.1	53	0.41	0.084	14
1768566	Soil	0.6	19.5	6.1	42	0.2	25.8	6.9	309	1.35	6.4	2.2	0.6	16	<0.1	0.3	0.1	38	0.28	0.098	11
1768567	Soil	0.9	32.6	8.1	55	0.3	36.4	10.4	348	2.14	13.9	4.3	1.7	19	0.1	0.6	0.1	53	0.37	0.128	13
1768568	Soil	0.4	9.8	4.0	17	<0.1	10.3	3.9	123	0.84	3.2	0.8	0.4	9	<0.1	0.2	<0.1	26	0.12	0.032	5
1768569	Soil	0.9	23.8	7.4	40	<0.1	37.0	10.8	305	2.00	11.0	1.6	3.4	16	<0.1	0.5	0.1	46	0.34	0.089	13
1768570	Soil	1.0	15.6	9.1	42	<0.1	18.7	6.6	232	2.30	9.9	1.4	1.5	9	0.2	0.5	0.2	66	0.12	0.038	10

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	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768541	Soil	36	0.66	115	0.057	1	1.52	0.008	0.10	0.3	0.02	3.4	<0.1	<0.05	4	<0.5	<0.2
1768542	Soil	50	0.81	107	0.073	<1	1.28	0.012	0.11	0.2	0.01	3.1	<0.1	<0.05	4	<0.5	<0.2
1768543	Soil	45	0.76	84	0.065	1	1.18	0.009	0.09	0.2	0.01	3.0	0.1	<0.05	4	0.7	<0.2
1768544	Soil	40	0.67	94	0.069	1	1.32	0.012	0.10	0.3	0.01	2.8	<0.1	<0.05	4	0.8	<0.2
1768545	Soil	51	0.81	143	0.064	<1	0.93	0.010	0.10	<0.1	<0.01	3.6	<0.1	<0.05	3	0.8	<0.2
1768546	Soil	98	1.54	330	0.089	<1	1.83	0.015	0.27	<0.1	0.02	6.3	0.1	<0.05	6	0.8	<0.2
1768547	Soil	41	0.77	133	0.064	1	1.14	0.011	0.09	0.2	0.01	3.4	<0.1	<0.05	4	0.7	<0.2
1768548	Soil	61	0.94	100	0.066	<1	1.12	0.011	0.07	0.2	<0.01	3.2	<0.1	<0.05	4	1.1	<0.2
1768549	Soil	36	0.69	101	0.055	<1	1.34	0.008	0.09	0.2	0.03	2.7	<0.1	<0.05	5	0.6	<0.2
1768550	Soil	44	0.73	118	0.060	1	0.94	0.011	0.16	0.2	0.02	3.7	<0.1	<0.05	3	1.6	<0.2
1768551	Soil	63	0.55	90	0.058	1	1.17	0.008	0.06	0.2	0.03	2.2	<0.1	<0.05	6	0.7	<0.2
1768552	Soil	64	0.99	138	0.079	1	1.51	0.010	0.12	0.2	0.02	4.4	<0.1	<0.05	5	0.9	<0.2
1768553	Soil	31	0.53	158	0.008	<1	0.96	0.011	0.09	<0.1	0.02	3.2	0.1	0.19	3	2.7	<0.2
1768554	Soil	141	1.33	94	0.057	<1	1.63	0.011	0.13	0.1	<0.01	3.2	0.1	<0.05	5	0.6	<0.2
1768555	Soil	56	0.80	128	0.056	2	1.61	0.010	0.09	0.3	0.02	4.0	0.1	<0.05	5	0.5	<0.2
1768556	Soil	89	1.11	130	0.042	1	1.71	0.008	0.10	0.2	0.04	6.0	0.2	<0.05	5	<0.5	<0.2
1768557	Soil	74	0.98	121	0.044	1	1.44	0.009	0.10	0.2	0.02	4.1	0.1	<0.05	5	<0.5	<0.2
1768558	Soil	60	0.77	146	0.040	1	1.31	0.008	0.08	0.2	<0.01	3.4	<0.1	<0.05	5	<0.5	<0.2
1768559	Soil	65	0.89	128	0.057	<1	1.30	0.009	0.11	0.2	0.01	4.3	<0.1	<0.05	4	<0.5	<0.2
1768560	Soil	57	0.78	123	0.034	1	1.21	0.008	0.07	0.2	0.01	3.6	<0.1	<0.05	4	<0.5	<0.2
1768561	Soil	63	0.85	333	0.026	2	1.50	0.011	0.09	0.1	0.04	4.2	<0.1	<0.05	4	0.7	<0.2
1768562	Soil	73	0.86	494	0.050	1	1.36	0.012	0.12	0.1	0.04	5.1	0.1	<0.05	5	1.1	<0.2
1768563	Soil	56	0.79	257	0.066	<1	1.61	0.007	0.20	0.1	0.02	4.1	0.1	<0.05	5	1.0	0.4
1768564	Soil	48	0.67	85	0.050	1	1.13	0.008	0.08	0.2	0.01	2.9	<0.1	<0.05	4	<0.5	<0.2
1768565	Soil	61	0.98	118	0.070	<1	1.29	0.010	0.09	0.1	<0.01	3.5	<0.1	<0.05	4	<0.5	<0.2
1768566	Soil	36	0.48	219	0.022	<1	1.16	0.017	0.06	0.1	0.04	1.9	<0.1	<0.05	4	<0.5	<0.2
1768567	Soil	55	0.80	170	0.032	<1	1.38	0.010	0.09	0.1	0.03	3.4	<0.1	<0.05	4	<0.5	<0.2
1768568	Soil	14	0.21	70	0.036	<1	0.53	0.020	0.04	<0.1	<0.01	0.9	<0.1	<0.05	2	<0.5	<0.2
1768569	Soil	52	0.69	92	0.052	<1	1.12	0.007	0.06	0.2	<0.01	2.7	<0.1	<0.05	3	<0.5	<0.2
1768570	Soil	41	0.43	52	0.075	1	1.10	0.007	0.08	0.2	0.02	2.3	<0.1	<0.05	6	<0.5	<0.2

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Project: LIV
Report Date: September 05, 2014

CERTIFICATE OF ANALYSIS WHI14000091.1

		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
		Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
		MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768571	Soil		1.2	35.9	9.6	57	<0.1	48.4	11.9	405	2.43	17.2	2.6	3.9	17	0.1	0.8	0.1	50	0.35	0.074	17
1768572	Soil		1.1	27.2	7.9	59	<0.1	44.1	13.7	412	2.30	13.1	2.9	5.2	18	0.2	0.7	0.1	50	0.38	0.108	16
1768573	Soil		1.0	25.0	7.8	61	<0.1	37.3	11.1	338	2.25	19.2	3.2	3.7	16	0.1	0.7	0.1	49	0.30	0.094	18
1768574	Soil		0.9	27.7	8.2	48	<0.1	38.7	11.1	320	2.09	13.9	2.8	3.7	16	0.2	0.6	0.1	43	0.31	0.090	15
1768575	Soil		0.9	25.2	7.4	46	<0.1	35.7	9.9	298	1.97	11.3	2.5	4.4	17	0.1	0.5	0.1	44	0.33	0.087	16
1768576	Soil		0.5	29.7	11.1	43	<0.1	32.8	12.0	416	2.57	16.4	7.9	5.6	15	<0.1	0.6	0.2	36	0.27	0.077	26
1768577	Soil		0.5	35.1	11.4	46	<0.1	35.7	14.0	621	2.45	19.4	14.0	9.0	17	0.1	1.4	0.2	33	0.36	0.084	25
1768578	Soil		0.7	31.5	18.4	45	<0.1	32.8	13.2	646	2.59	18.3	6.2	5.5	13	0.1	0.9	0.2	33	0.26	0.077	22
1768579	Soil		0.8	34.7	12.6	54	0.1	38.3	14.4	1069	2.81	19.9	6.8	3.9	19	0.1	0.9	0.2	50	0.38	0.081	24
1768580	Soil		0.9	23.6	9.3	41	0.1	35.6	9.3	253	2.30	12.7	75.1	2.9	14	0.1	0.6	0.2	53	0.22	0.041	14
1768581	Soil		0.7	26.2	9.9	47	<0.1	42.4	11.7	380	2.25	11.4	7.8	3.8	15	<0.1	0.5	0.2	52	0.25	0.059	15
1768582	Soil		1.3	16.8	8.3	36	<0.1	25.5	7.1	182	2.04	9.6	2.3	2.8	13	0.1	0.4	0.2	58	0.17	0.028	12
1768583	Soil		1.0	28.9	9.4	57	<0.1	46.4	12.9	303	2.47	11.9	2.4	4.6	13	0.4	0.6	0.2	56	0.25	0.071	12
1768584	Soil		0.9	35.3	8.9	57	<0.1	48.1	13.6	417	2.22	8.8	1.4	6.2	18	0.3	0.5	0.1	52	0.40	0.111	19
1768585	Soil		0.9	20.0	8.6	44	<0.1	35.7	11.0	318	2.39	13.4	1.4	2.9	11	0.2	0.5	0.2	56	0.17	0.063	9
1768586	Soil		1.5	28.4	11.1	53	<0.1	29.6	10.4	400	3.64	15.2	1.3	3.4	12	0.2	0.9	0.2	67	0.14	0.049	12
1768587	Soil		0.7	22.8	7.0	38	<0.1	31.4	10.1	253	1.96	10.5	1.5	1.7	15	0.1	0.5	0.1	43	0.29	0.079	11
1768588	Soil		1.0	22.8	7.9	42	0.2	37.3	12.2	246	2.37	13.5	2.5	3.8	13	0.2	0.5	0.2	54	0.23	0.058	11
1768589	Soil		1.3	51.7	11.4	73	0.1	83.2	18.0	586	2.73	22.6	4.1	5.6	23	0.3	1.1	0.2	52	0.69	0.103	16
1768590	Soil		1.3	27.1	9.9	67	0.2	51.9	12.8	281	2.61	17.9	2.0	4.5	15	0.3	0.9	0.2	58	0.28	0.046	13
1768591	Soil		1.0	24.3	8.5	50	<0.1	49.4	12.3	297	2.32	8.9	1.4	3.9	15	0.1	0.6	0.2	53	0.26	0.061	13
1768592	Soil		0.9	31.9	6.4	45	<0.1	54.9	12.7	351	2.26	8.2	3.4	5.6	22	0.1	0.5	0.1	46	0.43	0.110	16
1768593	Soil		1.0	29.8	10.6	49	<0.1	48.6	13.9	396	2.27	12.5	2.9	4.5	18	<0.1	0.8	0.2	51	0.31	0.080	13
1768594	Soil		1.0	33.9	10.5	50	0.3	40.9	9.0	266	2.41	10.9	1.0	0.4	16	0.2	0.5	0.2	57	0.22	0.065	16
1768595	Soil		1.3	34.9	8.7	52	<0.1	50.0	14.9	492	2.31	13.1	6.0	5.1	23	0.2	0.9	0.1	48	0.44	0.118	19
1768596	Soil		1.1	14.8	9.0	33	<0.1	23.2	7.5	241	1.98	10.0	<0.5	1.8	16	0.2	0.5	0.2	62	0.23	0.038	9
1768597	Soil		0.3	6.9	2.7	14	<0.1	6.7	3.7	165	0.86	1.1	0.8	<0.1	9	<0.1	0.1	<0.1	24	0.11	0.049	3
1768598	Soil		0.7	31.6	5.0	42	<0.1	36.5	11.1	381	2.08	4.6	1.9	4.3	18	<0.1	0.4	<0.1	42	0.35	0.089	13
1768599	Soil		0.8	24.1	9.6	55	<0.1	30.9	12.0	421	2.50	9.4	1.8	4.3	16	0.2	0.6	0.2	54	0.30	0.059	12
1768600	Soil		0.8	24.9	8.4	77	<0.1	30.4	12.7	669	2.77	8.6	0.9	1.4	19	0.1	0.6	0.2	63	0.33	0.078	23

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Project: LIV
Report Date: September 05, 2014

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768571	Soil	49	0.75	183	0.051	1	1.33	0.009	0.10	0.2	0.01	3.6	<0.1	<0.05	4	<0.5	<0.2
1768572	Soil	48	0.78	110	0.070	<1	1.24	0.008	0.11	0.2	<0.01	3.1	0.1	<0.05	4	<0.5	<0.2
1768573	Soil	45	0.75	139	0.052	<1	1.24	0.008	0.09	0.2	0.01	3.1	<0.1	<0.05	4	<0.5	<0.2
1768574	Soil	42	0.65	105	0.048	<1	1.10	0.007	0.09	0.2	0.01	2.7	<0.1	<0.05	3	<0.5	<0.2
1768575	Soil	41	0.66	156	0.053	<1	1.05	0.008	0.08	0.2	<0.01	3.0	<0.1	<0.05	3	<0.5	<0.2
1768576	Soil	33	0.56	91	0.025	<1	1.18	0.005	0.06	0.2	<0.01	2.6	<0.1	<0.05	3	<0.5	<0.2
1768577	Soil	29	0.58	130	0.031	<1	0.95	0.007	0.07	0.2	0.02	3.7	<0.1	<0.05	3	<0.5	<0.2
1768578	Soil	27	0.45	111	0.025	<1	1.05	0.007	0.06	0.3	0.01	2.7	<0.1	<0.05	3	<0.5	<0.2
1768579	Soil	40	0.66	169	0.040	1	1.55	0.008	0.08	0.2	0.03	4.2	<0.1	<0.05	4	<0.5	<0.2
1768580	Soil	41	0.60	130	0.054	<1	1.36	0.008	0.07	0.2	0.01	2.9	0.1	<0.05	5	<0.5	<0.2
1768581	Soil	41	0.68	127	0.065	<1	1.30	0.008	0.10	0.2	0.02	3.1	0.1	<0.05	4	<0.5	<0.2
1768582	Soil	40	0.47	120	0.097	<1	0.93	0.007	0.07	0.2	<0.01	2.4	<0.1	<0.05	5	<0.5	<0.2
1768583	Soil	50	0.70	112	0.073	<1	1.46	0.008	0.10	0.3	<0.01	3.1	<0.1	<0.05	4	<0.5	<0.2
1768584	Soil	53	0.84	129	0.068	<1	1.09	0.008	0.12	0.2	<0.01	3.5	0.1	<0.05	3	<0.5	<0.2
1768585	Soil	48	0.59	95	0.066	<1	0.99	0.008	0.09	0.2	<0.01	2.5	<0.1	<0.05	4	<0.5	<0.2
1768586	Soil	40	0.50	93	0.065	<1	1.33	0.008	0.07	0.2	0.01	3.5	<0.1	<0.05	5	<0.5	<0.2
1768587	Soil	42	0.61	81	0.049	<1	1.04	0.007	0.06	0.2	0.01	2.2	<0.1	<0.05	3	<0.5	<0.2
1768588	Soil	46	0.61	84	0.068	<1	1.09	0.007	0.11	0.3	0.01	2.6	<0.1	<0.05	4	<0.5	<0.2
1768589	Soil	77	1.27	220	0.072	3	1.33	0.012	0.18	0.2	0.03	4.4	<0.1	<0.05	4	0.6	<0.2
1768590	Soil	53	0.75	113	0.084	1	1.32	0.008	0.11	0.3	0.02	3.3	<0.1	<0.05	4	<0.5	<0.2
1768591	Soil	47	0.73	102	0.078	2	1.44	0.009	0.08	0.2	0.02	2.8	<0.1	<0.05	4	<0.5	<0.2
1768592	Soil	50	0.74	126	0.078	2	1.07	0.010	0.12	0.2	0.01	3.2	<0.1	<0.05	3	<0.5	<0.2
1768593	Soil	47	0.68	107	0.083	2	1.24	0.009	0.10	0.3	0.03	3.0	<0.1	<0.05	4	<0.5	<0.2
1768594	Soil	50	0.63	168	0.030	2	1.59	0.009	0.09	0.1	0.04	1.7	0.1	<0.05	5	<0.5	<0.2
1768595	Soil	56	0.87	138	0.076	1	1.18	0.011	0.11	0.2	0.01	3.8	<0.1	<0.05	3	1.1	<0.2
1768596	Soil	43	0.52	111	0.093	2	0.96	0.010	0.07	0.2	0.03	2.1	<0.1	<0.05	6	<0.5	<0.2
1768597	Soil	11	0.21	42	0.019	2	0.45	0.021	0.04	<0.1	<0.01	0.4	<0.1	<0.05	2	<0.5	<0.2
1768598	Soil	29	0.57	108	0.057	2	0.96	0.008	0.12	0.2	0.01	3.1	<0.1	<0.05	2	<0.5	<0.2
1768599	Soil	31	0.63	96	0.071	1	1.18	0.007	0.14	0.2	0.01	3.2	<0.1	<0.05	5	<0.5	<0.2
1768600	Soil	43	0.76	169	0.045	2	1.46	0.011	0.12	0.2	0.04	4.6	0.1	<0.05	5	<0.5	<0.2

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768601	Soil	1.0	16.5	8.4	50	<0.1	18.8	8.4	270	2.04	5.4	2.0	1.7	19	0.2	0.4	0.2	54	0.33	0.061	14
1768602	Soil	0.8	29.7	11.1	88	<0.1	25.6	10.7	429	2.33	9.4	1.2	1.3	25	<0.1	0.5	0.2	52	0.46	0.074	18
1768603	Soil	0.7	39.4	9.7	54	<0.1	44.7	15.5	374	2.66	7.6	7.5	3.7	17	0.2	0.3	0.1	60	0.31	0.064	13
1768604	Soil	0.9	26.2	8.8	52	<0.1	38.6	14.4	452	2.55	4.5	8.3	6.1	21	0.2	0.5	0.2	50	0.30	0.070	16
1768605	Soil	1.0	12.0	13.3	26	<0.1	15.8	4.9	168	1.53	10.2	0.7	3.5	13	<0.1	0.4	0.2	48	0.13	0.023	14
1768606	Soil	1.1	22.5	14.3	57	<0.1	37.3	11.3	453	3.06	5.1	2.9	5.0	17	0.2	0.5	0.2	61	0.19	0.066	16
1768607	Soil	0.8	18.9	7.1	47	<0.1	37.7	13.4	393	2.31	3.8	1.0	4.6	20	0.1	0.3	0.2	55	0.33	0.089	15
1768608	Soil	1.2	14.9	6.6	43	<0.1	21.0	8.3	286	2.30	3.9	1.8	3.2	15	<0.1	0.4	0.2	65	0.25	0.053	11
1768609	Soil	1.3	15.5	9.1	41	0.1	24.0	8.1	223	2.39	4.2	2.0	3.7	14	0.2	0.5	0.2	67	0.22	0.050	11
1768610	Soil	0.9	16.3	6.0	49	<0.1	16.6	8.6	423	2.40	3.5	0.7	2.2	16	<0.1	0.3	0.2	64	0.26	0.052	16
1768611	Soil	0.9	19.6	6.4	44	<0.1	35.2	11.1	279	2.06	3.2	0.8	4.0	15	0.2	0.3	0.1	47	0.27	0.072	12
1768612	Soil	1.3	19.9	7.6	45	<0.1	21.4	9.8	298	2.85	4.7	8.7	3.3	14	0.1	0.4	0.2	68	0.19	0.052	10
1768613	Soil	0.7	43.2	14.1	88	<0.1	35.2	15.2	489	2.86	4.9	5.5	4.8	39	0.1	0.3	0.2	49	0.66	0.072	34
1768614	Soil	0.8	34.4	10.9	55	0.1	34.9	14.0	577	2.71	4.6	5.0	3.3	26	<0.1	0.3	0.2	59	0.39	0.087	25
1768615	Soil	1.0	30.4	17.8	60	<0.1	43.7	15.1	459	2.69	5.7	5.4	6.2	24	0.2	0.4	0.2	64	0.29	0.058	19
1768616	Soil	0.8	11.5	9.4	29	0.2	7.6	4.5	229	1.29	2.6	<0.5	0.4	15	<0.1	0.2	0.2	41	0.18	0.047	11
1768617	Soil	1.1	16.0	7.3	42	<0.1	14.9	5.7	170	1.51	3.9	1.3	3.4	11	<0.1	0.3	0.1	33	0.19	0.064	11
1768618	Soil	0.8	23.6	10.0	52	<0.1	27.0	11.0	396	2.28	4.9	1.5	5.2	16	0.1	0.4	0.2	43	0.26	0.079	15
1768619	Soil	0.7	17.3	7.1	47	<0.1	15.1	7.2	387	1.85	2.9	1.3	2.1	15	<0.1	0.3	0.1	41	0.29	0.069	13
1768620	Soil	0.7	14.3	8.8	44	<0.1	10.6	6.1	268	1.84	1.8	<0.5	1.2	10	0.1	0.2	0.2	50	0.13	0.034	9

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Project: LIV
Report Date: September 05, 2014

CERTIFICATE OF ANALYSIS WHI14000091.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768601	Soil	30	0.60	118	0.057	2	1.34	0.011	0.09	0.2	0.01	2.5	0.1	<0.05	5	<0.5	<0.2
1768602	Soil	41	0.64	129	0.038	2	1.42	0.014	0.08	0.2	0.02	3.3	<0.1	<0.05	4	1.0	<0.2
1768603	Soil	51	0.83	82	0.081	2	1.42	0.007	0.08	0.3	0.02	3.7	0.1	<0.05	4	0.6	<0.2
1768604	Soil	43	0.71	104	0.062	2	1.45	0.008	0.11	0.2	0.01	3.4	<0.1	<0.05	4	<0.5	<0.2
1768605	Soil	24	0.26	125	0.068	2	0.97	0.006	0.06	0.2	0.02	2.2	0.1	<0.05	6	0.8	<0.2
1768606	Soil	43	0.67	97	0.055	<1	1.58	0.007	0.11	0.2	0.02	3.5	0.1	<0.05	5	0.9	<0.2
1768607	Soil	42	0.68	124	0.073	1	1.28	0.008	0.10	0.3	0.02	2.8	0.1	<0.05	4	1.0	<0.2
1768608	Soil	30	0.61	91	0.081	1	1.28	0.009	0.10	0.3	0.02	3.0	0.1	<0.05	5	<0.5	<0.2
1768609	Soil	35	0.52	91	0.101	1	1.19	0.007	0.09	0.3	0.03	2.7	<0.1	<0.05	5	<0.5	<0.2
1768610	Soil	32	0.82	124	0.076	2	1.49	0.013	0.14	0.2	<0.01	3.4	0.1	<0.05	5	<0.5	<0.2
1768611	Soil	35	0.61	106	0.064	1	1.15	0.008	0.09	0.2	0.02	3.0	<0.1	<0.05	3	<0.5	<0.2
1768612	Soil	36	0.66	54	0.084	1	1.33	0.008	0.10	0.3	0.02	3.5	<0.1	<0.05	4	<0.5	<0.2
1768613	Soil	47	0.89	138	0.061	2	1.71	0.015	0.12	0.2	0.01	3.7	0.1	<0.05	5	<0.5	<0.2
1768614	Soil	51	0.88	144	0.040	1	1.70	0.010	0.08	0.3	0.03	4.6	0.1	<0.05	5	<0.5	<0.2
1768615	Soil	37	0.76	106	0.071	2	1.52	0.011	0.13	0.3	0.01	3.7	0.1	<0.05	4	<0.5	<0.2
1768616	Soil	22	0.25	157	0.045	1	0.84	0.009	0.07	0.1	0.02	1.4	<0.1	<0.05	5	<0.5	<0.2
1768617	Soil	21	0.39	60	0.050	<1	0.79	0.005	0.07	0.2	<0.01	2.5	<0.1	<0.05	3	<0.5	<0.2
1768618	Soil	32	0.66	134	0.075	1	1.36	0.007	0.13	0.3	0.01	3.5	0.1	<0.05	4	<0.5	<0.2
1768619	Soil	21	0.54	147	0.056	2	1.13	0.018	0.09	0.1	0.03	3.2	<0.1	<0.05	4	<0.5	<0.2
1768620	Soil	20	0.52	86	0.079	1	1.11	0.011	0.09	0.2	0.02	2.6	<0.1	<0.05	5	<0.5	<0.2

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QUALITY CONTROL REPORT WHI14000091.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
Pulp Duplicates																					
1768310	Soil	1.2	32.7	9.9	67	0.1	39.0	13.7	445	2.76	19.2	1.3	3.4	15	0.2	0.9	0.2	56	0.28	0.084	16
REP 1768310	QC	1.1	33.4	10.8	66	0.1	38.9	13.7	431	2.72	18.9	2.8	3.5	16	0.3	0.9	0.2	57	0.28	0.081	16
1768345	Soil	1.3	48.1	11.5	77	0.2	46.6	18.7	676	3.09	12.6	3.4	5.2	20	0.3	0.7	0.2	63	0.45	0.064	14
REP 1768345	QC	1.1	48.2	11.2	79	0.1	48.0	19.2	673	3.18	11.1	12.1	5.1	20	0.4	0.7	0.2	62	0.42	0.066	15
1768381	Soil	1.4	34.0	7.9	55	<0.1	39.7	10.7	384	2.60	27.0	0.8	2.0	24	0.3	0.9	0.2	55	0.35	0.100	12
REP 1768381	QC	1.5	32.4	7.8	53	<0.1	36.8	11.4	364	2.54	27.5	1.7	1.8	23	0.2	0.9	0.2	55	0.34	0.093	12
1768417	Soil	1.1	15.7	9.8	35	<0.1	20.8	7.1	267	2.26	6.2	2.3	3.0	10	0.2	0.5	0.2	57	0.13	0.045	11
REP 1768417	QC	1.0	17.7	10.8	38	<0.1	21.5	7.4	281	2.34	6.4	2.9	3.2	10	0.1	0.5	0.2	57	0.14	0.049	11
1768453	Soil	1.8	43.1	9.0	68	<0.1	52.6	18.4	707	2.94	79.0	1.3	3.5	20	0.2	2.0	0.1	62	0.36	0.084	15
REP 1768453	QC	1.7	43.1	9.0	68	<0.1	52.8	18.5	705	2.93	80.4	1.9	3.5	19	0.1	2.0	0.1	60	0.37	0.087	14
1768489	Soil	1.0	48.4	7.8	65	<0.1	48.4	15.6	344	2.61	17.7	7.8	5.7	18	0.2	1.0	0.1	49	0.33	0.105	17
REP 1768489	QC	1.0	51.0	8.1	69	<0.1	52.2	15.6	354	2.64	17.5	0.7	5.7	18	0.2	1.1	0.1	50	0.34	0.107	19
1768525	Soil	1.9	66.5	9.7	60	0.1	48.1	19.2	544	2.90	49.4	3.0	4.7	23	0.2	1.5	<0.1	58	0.45	0.122	18
REP 1768525	QC	1.8	65.2	9.7	61	0.1	48.8	19.5	573	3.03	49.4	1.9	4.8	23	0.3	1.6	0.1	58	0.47	0.124	18
1768561	Soil	2.9	46.1	11.9	99	0.3	43.3	11.9	388	2.66	26.1	5.2	1.5	25	0.3	1.1	0.2	60	0.57	0.136	18
REP 1768561	QC	2.8	45.7	12.0	99	0.4	44.3	11.9	387	2.70	25.8	89.6	1.5	25	0.3	1.1	0.2	60	0.55	0.131	18
1768597	Soil	0.3	6.9	2.7	14	<0.1	6.7	3.7	165	0.86	1.1	0.8	<0.1	9	<0.1	0.1	<0.1	24	0.11	0.049	3
REP 1768597	QC	0.4	6.4	2.8	16	0.1	7.1	3.8	165	0.85	1.1	0.5	<0.1	9	<0.1	0.1	<0.1	24	0.12	0.046	3
Reference Materials																					
STD DS10	Standard	15.5	156.5	153.4	380	1.9	78.3	13.0	921	2.85	45.6	95.6	7.8	69	2.5	8.6	9.9	45	1.00	0.076	18
STD DS10	Standard	15.1	156.0	152.3	358	1.8	76.8	13.2	842	2.68	42.2	88.8	8.1	61	2.4	8.4	11.0	49	1.02	0.068	18
STD DS10	Standard	15.3	154.4	147.6	358	1.7	73.4	12.9	878	2.66	43.0	66.4	7.4	65	2.4	7.7	9.2	48	1.03	0.065	17
STD DS10	Standard	15.2	153.3	153.5	362	1.8	75.9	11.8	875	2.76	44.0	71.8	7.5	66	2.4	9.0	11.1	46	1.05	0.073	19
STD DS10	Standard	14.6	148.6	151.8	350	1.9	73.7	12.5	896	2.80	42.5	68.8	7.5	61	2.2	7.8	9.1	45	0.97	0.066	17
STD DS10	Standard	15.0	148.3	149.9	351	1.9	74.7	12.4	884	2.65	43.9	68.5	7.2	65	3.0	8.6	10.8	45	1.02	0.071	18
STD DS10	Standard	14.8	152.7	161.6	366	1.9	74.3	13.4	911	2.81	45.6	76.5	7.5	64	3.0	9.3	11.1	47	1.04	0.075	19
STD DS10	Standard	16.3	162.6	163.6	371	1.9	80.8	14.7	892	2.85	44.3	101.3	8.7	66	2.5	8.7	11.3	52	1.09	0.070	19
STD DS10	Standard	15.9	162.2	157.7	378	1.9	81.6	13.7	876	2.75	47.0	126.5	8.2	69	2.3	10.4	11.1	48	1.04	0.075	20

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QUALITY CONTROL REPORT WHI14000091.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
Pulp Duplicates																	
1768310	Soil	45	0.72	165	0.065	1	1.19	0.007	0.14	0.2	0.02	3.3	0.1	<0.05	4	<0.5	<0.2
REP 1768310	QC	46	0.72	166	0.067	2	1.19	0.007	0.14	0.2	0.03	3.5	0.1	<0.05	4	<0.5	<0.2
1768345	Soil	63	0.96	195	0.070	2	1.63	0.012	0.19	0.3	0.02	5.2	0.1	<0.05	5	<0.5	<0.2
REP 1768345	QC	66	0.94	201	0.065	1	1.59	0.011	0.19	0.3	0.03	5.4	0.1	<0.05	5	<0.5	<0.2
1768381	Soil	52	0.67	98	0.074	1	1.09	0.011	0.11	0.1	0.02	3.2	<0.1	<0.05	5	<0.5	<0.2
REP 1768381	QC	53	0.71	97	0.074	2	1.14	0.010	0.12	0.2	0.02	3.1	<0.1	<0.05	5	<0.5	<0.2
1768417	Soil	32	0.42	63	0.087	1	1.23	0.007	0.07	0.3	0.02	2.3	<0.1	<0.05	6	<0.5	<0.2
REP 1768417	QC	34	0.47	68	0.085	2	1.30	0.007	0.07	0.3	0.02	2.2	<0.1	<0.05	6	<0.5	<0.2
1768453	Soil	70	0.97	112	0.065	2	1.42	0.012	0.10	0.2	<0.01	4.5	<0.1	<0.05	5	<0.5	<0.2
REP 1768453	QC	70	1.00	112	0.067	<1	1.46	0.012	0.10	0.2	<0.01	4.3	<0.1	<0.05	5	1.0	<0.2
1768489	Soil	49	0.82	197	0.072	<1	1.23	0.008	0.12	0.1	0.03	4.5	0.1	<0.05	4	<0.5	<0.2
REP 1768489	QC	49	0.84	205	0.072	1	1.28	0.008	0.12	0.2	0.02	4.2	0.1	<0.05	4	<0.5	<0.2
1768525	Soil	54	0.91	123	0.059	<1	1.28	0.013	0.11	0.1	0.01	4.5	0.1	<0.05	4	0.6	<0.2
REP 1768525	QC	60	0.89	126	0.062	<1	1.28	0.013	0.11	0.1	0.02	4.9	<0.1	<0.05	4	0.9	<0.2
1768561	Soil	63	0.85	333	0.026	2	1.50	0.011	0.09	0.1	0.04	4.2	<0.1	<0.05	4	0.7	<0.2
REP 1768561	QC	62	0.83	324	0.027	2	1.41	0.010	0.09	0.3	0.04	4.0	0.1	<0.05	5	0.9	<0.2
1768597	Soil	11	0.21	42	0.019	2	0.45	0.021	0.04	<0.1	<0.01	0.4	<0.1	<0.05	2	<0.5	<0.2
REP 1768597	QC	11	0.21	42	0.020	1	0.43	0.022	0.04	<0.1	0.02	0.4	<0.1	<0.05	2	0.7	<0.2
Reference Materials																	
STD DS10	Standard	54	0.81	358	0.085	7	1.08	0.070	0.34	3.3	0.31	3.0	5.3	0.31	5	2.3	4.7
STD DS10	Standard	57	0.74	322	0.076	7	1.02	0.061	0.31	3.3	0.32	3.0	5.0	0.24	4	2.2	5.1
STD DS10	Standard	53	0.72	339	0.082	7	0.95	0.064	0.31	3.2	0.27	3.0	4.9	0.24	4	2.6	5.2
STD DS10	Standard	54	0.77	382	0.082	5	1.06	0.063	0.35	3.2	0.29	3.0	4.9	0.22	4	2.3	4.3
STD DS10	Standard	55	0.74	342	0.079	8	1.01	0.067	0.32	3.0	0.29	2.7	4.9	0.24	4	2.7	4.8
STD DS10	Standard	55	0.75	372	0.080	5	1.05	0.061	0.32	3.4	0.32	2.8	5.0	0.18	4	2.1	5.5
STD DS10	Standard	60	0.77	377	0.082	9	1.06	0.063	0.32	3.4	0.30	2.7	5.4	0.19	5	1.7	5.6
STD DS10	Standard	61	0.79	361	0.081	7	1.11	0.067	0.33	3.3	0.30	3.1	5.3	0.28	4	2.2	4.8
STD DS10	Standard	58	0.79	375	0.084	8	1.08	0.061	0.33	3.5	0.31	2.9	5.4	0.26	5	2.4	4.7

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		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
		AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
		0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
STD OXC109	Standard	1.5	36.4	11.1	43	<0.1	72.4	19.2	405	2.89	0.6	216.0	1.4	146	<0.1	<0.1	<0.1	50	0.72	0.097	12
STD OXC109	Standard	1.7	41.4	12.6	44	<0.1	78.8	21.8	443	3.15	0.9	193.0	1.8	141	<0.1	<0.1	<0.1	60	0.73	0.102	13
STD OXC109	Standard	1.6	38.2	11.3	45	<0.1	75.1	21.0	416	2.87	1.1	199.8	1.5	135	<0.1	<0.1	<0.1	52	0.73	0.102	12
STD OXC109	Standard	1.5	37.0	11.8	41	<0.1	74.6	19.5	421	2.95	<0.5	212.3	1.5	138	<0.1	<0.1	<0.1	51	0.71	0.106	13
STD OXC109	Standard	1.5	35.1	11.2	39	<0.1	68.5	19.6	411	2.96	1.0	198.1	1.5	133	<0.1	<0.1	<0.1	50	0.68	0.101	12
STD OXC109	Standard	1.4	33.7	11.5	42	<0.1	69.9	17.7	408	2.83	0.8	188.2	1.4	136	<0.1	<0.1	<0.1	49	0.68	0.104	13
STD OXC109	Standard	1.7	37.6	11.5	42	<0.1	77.7	21.1	389	3.05	1.3	199.8	1.5	145	<0.1	<0.1	<0.1	49	0.72	0.108	13
STD OXC109	Standard	1.6	37.7	12.1	43	<0.1	80.0	21.7	416	3.04	0.8	203.5	1.8	143	<0.1	<0.1	<0.1	57	0.75	0.100	13
STD OXC109	Standard	1.6	34.8	11.7	41	<0.1	77.4	19.7	391	2.86	<0.5	202.5	1.6	144	<0.1	<0.1	<0.1	53	0.77	0.107	13
STD DS10 Expected		14.69	154.61	150.55	370	2.02	74.6	12.9	875	2.7188	43.7	91.9	7.5	67.1	2.49	8.23	11.65	43	1.0625	0.073	17.5
STD OXC109 Expected												201									
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	3	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	0.02	0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	5	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1

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Client: **Goldspike Exploration Inc.**
4 King Street West, Suite 1500
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Project: LIV
Report Date: September 05, 2014

QUALITY CONTROL REPORT WHI14000091.1

		AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
STD OXC109	Standard	50	1.43	56	0.388	2	1.53	0.653	0.39	0.2	<0.01	1.1	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard	67	1.54	56	0.427	2	1.61	0.661	0.41	0.2	<0.01	1.4	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard	57	1.43	56	0.391	<1	1.60	0.690	0.39	0.2	<0.01	1.1	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard	59	1.49	57	0.403	2	1.54	0.657	0.46	0.2	<0.01	1.2	<0.1	<0.05	6	0.6	<0.2
STD OXC109	Standard	57	1.33	56	0.370	3	1.45	0.615	0.39	0.2	<0.01	1.0	<0.1	<0.05	5	<0.5	<0.2
STD OXC109	Standard	58	1.41	54	0.371	<1	1.51	0.638	0.37	0.2	<0.01	1.1	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard	59	1.47	57	0.396	<1	1.52	0.700	0.41	0.2	<0.01	1.2	<0.1	<0.05	5	<0.5	<0.2
STD OXC109	Standard	66	1.50	56	0.402	2	1.60	0.634	0.41	0.2	<0.01	1.3	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard	60	1.49	56	0.402	2	1.54	0.667	0.39	0.2	<0.01	1.0	<0.1	<0.05	5	<0.5	<0.2
STD DS10 Expected		54.6	0.775	359	0.0817		1.0259	0.067	0.338	3.32	0.3	2.8	5.1	0.29	4.3	2.3	5.01
STD OXC109 Expected																	
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2

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Submitted By: Bruce Durham
Receiving Lab: Canada-Whitehorse
Received: August 07, 2014
Report Date: September 10, 2014
Page: 1 of 6

CERTIFICATE OF ANALYSIS WHI14000092.1

CLIENT JOB INFORMATION

Project: LIV
Shipment ID: LIV_SOILS_2014
P.O. Number
Number of Samples: 138

SAMPLE DISPOSAL

DISP-PLP Dispose of Pulp After 90 days
DISP-RJT-SOIL Immediate Disposal of Soil Reject

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
Dry at 60C	138	Dry at 60C			WHI
SS80	138	Dry at 60C sieve 100g to -80 mesh			WHI
AQ201	138	1:1:1 Aqua Regia digestion ICP-MS analysis	15	Completed	VAN
DISP2	138	Heat treatment of Soils and Sediments			VAN

ADDITIONAL COMMENTS

Invoice To: Goldspike Exploration Inc.
4 King Street West, Suite 1500
Toronto ON M5H 1B6
CANADA

CC: Daniel Ferraro

BRITISH COLUMBIA CERTIFIED ASSAYER
MARCUS LAU
Geochemical Laboratory Manager

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

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Client: **Goldspike Exploration Inc.**
4 King Street West, Suite 1500
Toronto ON M5H 1B6 CANADA

Project: LIV
Report Date: September 10, 2014

CERTIFICATE OF ANALYSIS WHI14000092.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768621	Soil	0.5	26.4	80.5	63	<0.1	21.3	12.8	499	3.00	3.1	1.8	2.8	16	0.2	0.2	0.3	71	0.26	0.073	11
1768622	Soil	0.5	10.4	6.7	128	<0.1	14.1	18.7	722	4.51	2.4	1.2	4.0	16	0.2	0.2	0.1	86	0.26	0.091	13
1768623	Soil	1.2	13.7	9.3	56	<0.1	20.8	9.4	361	2.52	8.0	1.6	4.6	15	0.3	0.5	0.3	54	0.22	0.069	14
1768624	Soil	0.6	20.5	7.5	58	<0.1	17.3	11.1	390	2.65	3.5	1.5	5.1	14	0.1	0.2	0.2	53	0.20	0.059	14
1768625	Soil	0.7	10.9	6.7	33	<0.1	10.1	3.6	169	1.28	2.7	1.6	1.9	11	0.2	0.2	0.2	37	0.12	0.104	10
1768626	Soil	0.9	16.5	8.3	48	0.1	23.4	8.2	293	2.14	4.1	32.9	2.0	15	0.1	0.3	0.3	49	0.27	0.096	19
1768627	Soil	1.0	27.2	8.1	59	<0.1	25.9	10.9	315	2.59	3.5	1.5	4.8	12	0.2	0.3	0.2	52	0.17	0.041	13
1768628	Soil	1.0	23.6	8.5	60	<0.1	26.7	10.6	351	2.37	4.5	6.0	3.3	16	0.2	0.4	0.2	55	0.25	0.080	13
1768629	Soil	0.7	23.1	6.3	49	<0.1	12.5	9.4	373	2.35	3.8	2.1	1.7	18	<0.1	0.2	0.1	58	0.29	0.065	11
1768630	Soil	0.7	29.1	14.9	52	0.2	28.2	12.1	434	2.60	3.6	1.3	1.4	17	<0.1	0.3	0.2	60	0.30	0.089	13
1768631	Soil	0.6	28.9	8.6	59	<0.1	41.7	12.5	422	2.27	3.5	4.5	5.7	17	0.2	0.4	0.1	39	0.25	0.068	18
1768632	Soil	0.7	24.1	11.4	51	<0.1	28.8	11.7	413	2.43	4.4	1.6	4.4	17	0.1	0.4	0.2	45	0.27	0.086	16
1768633	Soil	0.6	29.8	9.6	57	<0.1	34.8	12.3	435	2.29	3.5	1.5	6.5	17	0.2	0.4	0.2	39	0.25	0.076	22
1768634	Soil	0.7	39.7	9.3	56	<0.1	38.9	15.9	477	2.57	3.8	<0.5	5.7	18	0.2	0.4	0.2	40	0.24	0.066	19
1768635	Soil	0.9	29.0	10.4	46	0.1	25.3	11.2	334	2.24	3.9	1.6	2.0	17	0.1	0.5	0.2	40	0.22	0.075	15
1768636	Soil	0.8	25.0	9.6	49	0.2	27.4	11.9	361	2.22	3.5	1.3	3.6	18	0.2	0.6	0.2	37	0.28	0.081	17
1768637	Soil	1.1	28.4	9.8	64	<0.1	33.2	10.9	347	2.24	4.5	1.8	4.4	21	0.3	0.5	0.2	48	0.36	0.105	21
1768638	Soil	2.7	55.2	12.3	53	<0.1	33.3	12.2	414	2.33	10.2	1.4	5.6	28	0.2	0.4	0.2	45	0.39	0.160	31
1768639	Soil	1.0	24.3	9.9	59	0.2	30.1	11.4	346	2.77	5.7	0.9	4.9	15	0.3	0.4	0.2	61	0.21	0.060	15
1768640	Soil	1.3	22.2	9.7	57	<0.1	20.2	10.5	363	2.69	5.6	<0.5	2.7	17	0.2	0.3	0.3	71	0.26	0.048	11
1768641	Soil	0.8	27.5	8.9	54	0.1	32.2	12.4	376	2.33	3.5	1.2	4.3	15	0.2	0.4	0.2	45	0.22	0.067	19
1768642	Soil	0.9	25.4	9.1	51	<0.1	30.5	10.7	370	2.20	4.0	1.1	3.7	17	0.2	0.5	0.2	41	0.31	0.099	18
1768643	Soil	1.4	29.7	9.5	80	0.1	45.1	12.6	414	2.51	7.5	1.5	4.8	19	0.4	0.7	0.2	54	0.37	0.082	16
1768644	Soil	1.0	26.0	6.8	69	<0.1	27.8	12.6	517	2.69	4.7	1.3	5.1	19	0.4	0.4	0.1	51	0.34	0.087	19
1768645	Soil	1.5	26.7	8.2	55	<0.1	28.8	9.3	395	1.82	5.1	1.0	5.2	17	0.4	0.6	0.1	34	0.30	0.102	15
1768646	Soil	1.3	24.8	9.0	57	<0.1	19.4	9.7	421	2.55	4.6	1.0	2.5	16	0.1	0.7	0.2	47	0.23	0.062	13
1768647	Soil	0.9	23.6	8.4	54	<0.1	16.2	10.2	353	2.38	3.6	2.4	4.6	17	0.1	0.7	0.1	46	0.24	0.040	14
1768648	Soil	0.8	79.7	6.9	58	0.1	80.4	27.9	509	3.37	11.3	1.7	4.1	22	0.1	0.4	0.2	69	0.60	0.068	17
1768649	Soil	0.6	59.0	8.0	75	<0.1	43.0	21.0	804	4.00	10.8	1.7	5.3	20	<0.1	0.5	0.1	95	0.38	0.098	15
1768650	Soil	1.0	26.1	9.0	55	<0.1	32.2	14.4	565	2.87	5.9	3.4	4.0	17	0.2	0.6	0.1	63	0.25	0.076	14

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Report Date: September 10, 2014

CERTIFICATE OF ANALYSIS WHI14000092.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768621	Soil	31	1.49	178	0.137	2	1.86	0.008	0.35	0.2	0.02	5.9	0.2	<0.05	6	<0.5	<0.2
1768622	Soil	20	1.35	347	0.151	1	2.27	0.009	0.76	<0.1	0.01	8.9	0.2	<0.05	6	<0.5	<0.2
1768623	Soil	37	0.58	98	0.088	2	1.72	0.010	0.08	0.5	0.02	3.3	0.1	<0.05	5	<0.5	<0.2
1768624	Soil	29	0.85	135	0.102	2	1.71	0.009	0.17	0.2	<0.01	4.2	0.1	<0.05	6	<0.5	<0.2
1768625	Soil	18	0.32	92	0.068	1	0.78	0.009	0.05	0.4	<0.01	1.9	0.1	<0.05	5	<0.5	<0.2
1768626	Soil	37	0.60	143	0.073	1	1.46	0.007	0.08	0.3	0.02	3.1	0.1	<0.05	5	<0.5	<0.2
1768627	Soil	32	0.78	131	0.095	2	1.52	0.006	0.15	0.2	0.02	4.0	0.1	<0.05	4	<0.5	<0.2
1768628	Soil	34	0.63	131	0.086	2	1.43	0.009	0.12	0.3	0.01	3.0	0.1	<0.05	5	<0.5	<0.2
1768629	Soil	24	0.89	189	0.095	1	1.73	0.009	0.24	0.2	0.03	2.4	0.1	<0.05	5	<0.5	<0.2
1768630	Soil	40	0.97	153	0.082	1	1.59	0.013	0.17	0.2	0.02	3.0	0.1	<0.05	5	<0.5	<0.2
1768631	Soil	42	0.91	109	0.091	1	1.45	0.010	0.21	0.2	0.01	3.2	0.1	<0.05	4	<0.5	<0.2
1768632	Soil	49	0.74	96	0.083	1	1.34	0.007	0.14	0.3	0.02	3.1	0.1	<0.05	5	<0.5	<0.2
1768633	Soil	40	0.81	133	0.086	1	1.40	0.009	0.14	0.2	<0.01	3.3	0.1	<0.05	4	<0.5	<0.2
1768634	Soil	42	0.80	102	0.080	1	1.37	0.008	0.17	0.2	0.01	3.5	0.1	<0.05	4	<0.5	<0.2
1768635	Soil	35	0.56	93	0.064	2	1.12	0.007	0.12	0.2	0.03	2.5	0.1	<0.05	4	<0.5	<0.2
1768636	Soil	37	0.68	90	0.065	1	1.18	0.008	0.13	0.2	0.01	2.8	0.1	<0.05	4	<0.5	<0.2
1768637	Soil	38	0.71	160	0.086	1	1.30	0.011	0.15	0.4	<0.01	3.5	0.1	<0.05	4	<0.5	<0.2
1768638	Soil	39	0.66	149	0.078	1	1.18	0.008	0.16	0.3	<0.01	2.8	0.1	<0.05	3	0.6	<0.2
1768639	Soil	41	0.77	97	0.116	2	1.71	0.009	0.18	0.4	0.03	3.2	0.1	<0.05	6	<0.5	<0.2
1768640	Soil	31	0.79	145	0.136	1	1.53	0.009	0.15	0.2	0.02	3.0	0.1	<0.05	8	<0.5	<0.2
1768641	Soil	36	0.74	134	0.094	<1	1.44	0.009	0.17	0.3	0.02	2.8	0.1	<0.05	4	<0.5	<0.2
1768642	Soil	34	0.67	96	0.073	1	1.24	0.010	0.13	0.3	0.02	2.9	0.1	<0.05	4	<0.5	<0.2
1768643	Soil	39	0.75	182	0.076	2	1.55	0.011	0.12	0.3	0.02	3.7	0.1	<0.05	4	<0.5	<0.2
1768644	Soil	24	1.02	228	0.110	1	1.57	0.009	0.30	0.2	0.03	3.0	0.1	<0.05	4	<0.5	<0.2
1768645	Soil	26	0.46	98	0.060	1	0.83	0.007	0.08	0.3	0.02	2.6	<0.1	<0.05	2	<0.5	<0.2
1768646	Soil	28	0.54	169	0.047	1	1.14	0.007	0.11	0.2	0.02	3.3	0.1	<0.05	4	<0.5	<0.2
1768647	Soil	23	0.61	138	0.037	1	1.16	0.007	0.12	0.1	<0.01	4.4	<0.1	<0.05	4	<0.5	<0.2
1768648	Soil	101	2.16	136	0.090	2	2.09	0.008	0.12	0.2	0.02	5.8	0.1	<0.05	6	<0.5	<0.2
1768649	Soil	83	1.87	229	0.086	1	2.39	0.007	0.27	0.1	<0.01	7.5	0.1	<0.05	7	<0.5	<0.2
1768650	Soil	55	1.02	128	0.095	2	1.55	0.008	0.22	0.2	0.01	5.6	0.1	<0.05	5	<0.5	<0.2

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Project: LIV
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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768651	Soil	0.7	20.0	5.6	53	<0.1	29.4	10.1	273	2.43	3.4	0.7	2.7	21	0.2	0.2	0.1	52	0.39	0.075	10
1768652	Soil	0.6	15.9	7.6	35	<0.1	20.7	6.6	176	1.58	3.7	2.3	0.6	17	<0.1	0.2	0.2	41	0.29	0.069	13
1768653	Soil	0.9	31.9	6.2	52	<0.1	44.1	11.3	410	2.47	6.4	2.7	5.5	22	0.2	0.6	0.1	48	0.44	0.116	18
1768654	Soil	1.2	24.3	9.9	56	0.2	35.8	15.6	462	2.88	9.4	1.7	4.4	21	0.3	0.6	0.2	54	0.28	0.074	15
1768655	Soil	0.8	24.3	5.2	44	<0.1	37.8	12.1	361	2.15	3.8	1.8	3.8	21	0.2	0.4	<0.1	46	0.42	0.114	11
1768656	Soil	0.4	75.6	30.4	157	0.2	40.1	23.0	576	3.29	10.9	3.3	3.6	23	0.4	0.3	0.1	94	0.59	0.057	17
1768657	Soil	0.9	16.3	7.1	48	<0.1	17.5	9.3	763	1.83	7.1	15.5	0.4	11	0.2	0.6	0.2	44	0.13	0.058	10
1768658	Soil	0.9	42.2	9.5	59	0.1	36.0	13.4	475	2.90	6.3	3.5	4.6	24	0.2	0.7	0.2	49	0.40	0.080	19
1768659	Soil	0.7	37.6	15.9	75	<0.1	68.3	18.5	733	3.16	5.9	19.0	7.4	16	0.2	0.5	0.2	44	0.18	0.050	31
1768660	Soil	0.9	30.1	7.7	51	<0.1	51.8	13.9	423	2.05	3.9	1.1	4.9	18	0.4	0.4	0.1	38	0.34	0.114	13
1768661	Soil	0.8	28.7	10.1	58	<0.1	18.1	11.6	1028	2.40	3.7	1.6	2.1	31	<0.1	0.3	0.2	53	0.48	0.064	26
1768662	Soil	0.9	37.0	8.8	67	0.1	51.3	11.2	413	2.29	4.5	1.2	2.0	23	0.2	0.4	0.2	50	0.30	0.055	23
1768663	Soil	1.1	16.2	8.7	45	<0.1	20.1	8.4	239	2.87	4.9	<0.5	3.7	12	0.2	0.5	0.2	84	0.16	0.037	10
1768664	Soil	0.8	23.2	6.7	59	<0.1	37.3	14.2	525	2.61	4.0	3.2	3.4	16	0.3	0.4	0.1	56	0.31	0.117	11
1768665	Soil	0.9	13.7	9.2	52	<0.1	11.6	5.3	169	1.90	4.2	1.8	2.9	16	0.2	0.4	0.2	60	0.24	0.020	13
1768666	Soil	0.5	35.6	11.2	70	0.1	34.7	12.3	497	2.44	5.3	5.6	5.7	33	0.2	0.3	0.2	38	0.69	0.093	43
1768667	Soil	1.0	28.8	18.2	61	0.1	32.7	11.6	553	2.67	5.1	2.9	4.1	32	0.1	0.4	0.2	38	0.67	0.088	27
1768668	Soil	0.6	27.5	7.4	69	<0.1	14.1	20.1	1489	5.57	28.4	<0.5	11.6	18	0.1	2.7	<0.1	37	1.18	0.029	26
1768669	Soil	4.2	34.1	7.2	60	<0.1	12.8	10.9	580	3.27	3.6	2.2	2.6	14	<0.1	0.4	0.1	69	0.29	0.053	11
1768670	Soil	1.0	31.6	10.1	69	<0.1	29.3	13.6	461	2.95	17.8	<0.5	5.6	14	0.2	0.7	0.2	46	0.23	0.061	13
1768671	Soil	1.7	34.7	8.0	52	<0.1	45.1	15.0	532	2.71	8.2	<0.5	4.8	21	0.1	1.8	0.2	49	0.38	0.105	16
1768672	Soil	1.1	22.3	8.9	53	0.1	27.5	10.7	315	2.52	7.2	0.9	6.1	18	0.1	0.5	0.2	51	0.32	0.053	16
1768673	Soil	0.8	25.1	8.7	56	<0.1	24.8	11.6	372	2.50	4.7	<0.5	5.1	14	0.2	0.3	0.2	53	0.27	0.072	13
1768674	Soil	1.0	23.8	7.4	60	<0.1	17.9	11.9	562	2.88	4.3	2.9	3.0	18	0.1	0.3	0.2	70	0.37	0.069	11
1768675	Soil	1.1	23.0	10.1	60	<0.1	35.5	11.2	234	2.39	6.9	<0.5	6.6	14	0.4	0.5	0.3	47	0.25	0.093	13
1768676	Soil	1.0	18.8	7.6	45	<0.1	20.1	7.3	193	2.23	4.9	0.9	2.4	14	0.1	0.3	0.2	52	0.29	0.109	10
1768677	Soil	0.7	25.6	7.0	46	<0.1	27.9	11.8	402	2.13	3.2	0.7	4.7	17	0.2	0.3	0.1	45	0.36	0.121	14
1768678	Soil	0.7	32.8	7.9	67	<0.1	35.7	20.4	614	3.45	4.5	<0.5	3.2	20	0.2	0.3	0.1	77	0.32	0.087	11
1768679	Soil	0.8	24.1	10.6	68	<0.1	28.9	15.3	522	2.77	9.1	14.1	3.4	21	0.1	0.6	0.2	55	0.45	0.106	12
1768680	Soil	0.9	32.5	14.5	76	<0.1	36.7	13.5	533	2.69	12.7	7.5	4.0	19	0.2	0.5	0.2	55	0.32	0.070	16

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		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768651	Soil		45	0.74	106	0.090	2	1.20	0.011	0.11	0.2	<0.01	2.7	<0.1	<0.05	4	<0.5	<0.2
1768652	Soil		34	0.51	109	0.056	1	1.17	0.010	0.07	0.2	0.02	1.9	0.1	<0.05	5	<0.5	<0.2
1768653	Soil		39	0.73	143	0.087	1	0.98	0.011	0.15	0.2	<0.01	3.7	<0.1	<0.05	3	0.5	<0.2
1768654	Soil		41	0.65	152	0.081	2	1.59	0.010	0.17	0.2	0.03	4.2	0.1	<0.05	4	<0.5	<0.2
1768655	Soil		36	0.69	94	0.081	1	1.01	0.012	0.13	0.2	<0.01	3.0	<0.1	<0.05	3	<0.5	<0.2
1768656	Soil		118	1.73	120	0.111	2	1.95	0.014	0.22	0.2	0.04	9.5	0.1	<0.05	7	<0.5	<0.2
1768657	Soil		27	0.40	59	0.045	2	0.93	0.008	0.08	0.2	0.02	1.4	<0.1	<0.05	5	<0.5	<0.2
1768658	Soil		40	0.76	185	0.038	3	1.50	0.009	0.11	0.3	0.03	4.3	0.1	<0.05	5	0.6	<0.2
1768659	Soil		64	0.94	205	0.041	2	1.59	0.007	0.11	0.2	0.01	4.4	0.1	<0.05	5	<0.5	<0.2
1768660	Soil		38	0.56	101	0.061	2	0.95	0.012	0.09	0.3	<0.01	2.5	<0.1	<0.05	3	<0.5	<0.2
1768661	Soil		30	0.64	182	0.058	2	1.28	0.009	0.10	0.2	0.01	2.7	<0.1	<0.05	6	<0.5	<0.2
1768662	Soil		37	0.72	351	0.070	2	1.48	0.024	0.14	0.2	0.03	4.0	0.2	<0.05	5	<0.5	<0.2
1768663	Soil		33	0.68	112	0.122	1	1.25	0.008	0.09	0.3	0.02	3.0	0.1	<0.05	6	<0.5	<0.2
1768664	Soil		34	0.75	130	0.070	2	1.37	0.008	0.17	0.3	0.01	3.1	<0.1	<0.05	4	<0.5	<0.2
1768665	Soil		25	0.35	142	0.116	1	0.84	0.008	0.08	0.2	<0.01	1.9	<0.1	<0.05	6	<0.5	<0.2
1768666	Soil		31	0.66	105	0.057	2	1.18	0.013	0.11	0.2	0.02	3.1	0.1	<0.05	4	<0.5	<0.2
1768667	Soil		34	0.65	155	0.029	2	1.30	0.008	0.09	0.2	0.01	3.1	<0.1	<0.05	4	<0.5	<0.2
1768668	Soil		8	0.14	316	<0.001	4	0.75	0.006	0.14	<0.1	0.02	19.5	0.1	<0.05	1	<0.5	<0.2
1768669	Soil		19	0.95	153	0.042	2	1.53	0.005	0.11	<0.1	0.01	5.6	<0.1	<0.05	5	<0.5	<0.2
1768670	Soil		34	0.91	159	0.083	2	1.86	0.007	0.15	0.3	0.01	4.1	0.2	<0.05	5	<0.5	<0.2
1768671	Soil		34	0.70	112	0.064	1	1.14	0.010	0.13	0.3	0.02	3.5	<0.1	<0.05	3	<0.5	<0.2
1768672	Soil		36	0.64	244	0.082	2	1.75	0.012	0.09	0.3	0.02	3.8	0.1	<0.05	5	<0.5	<0.2
1768673	Soil		32	0.72	114	0.093	<1	1.46	0.007	0.11	0.3	0.02	3.5	0.1	<0.05	5	<0.5	<0.2
1768674	Soil		28	0.84	134	0.092	2	1.56	0.009	0.19	0.3	0.02	4.2	0.1	<0.05	6	<0.5	<0.2
1768675	Soil		38	0.59	97	0.082	1	1.89	0.012	0.10	0.6	0.02	3.5	0.1	<0.05	4	0.5	<0.2
1768676	Soil		32	0.49	52	0.073	1	0.86	0.007	0.06	0.5	0.01	2.3	<0.1	<0.05	4	<0.5	<0.2
1768677	Soil		33	0.60	106	0.078	2	1.02	0.008	0.11	0.2	0.01	3.0	<0.1	<0.05	3	<0.5	<0.2
1768678	Soil		48	1.17	166	0.114	1	2.38	0.009	0.17	0.2	0.01	3.5	0.1	<0.05	5	<0.5	<0.2
1768679	Soil		35	0.84	136	0.098	<1	1.30	0.009	0.17	0.2	0.01	3.5	0.1	<0.05	5	<0.5	<0.2
1768680	Soil		39	0.73	129	0.079	1	1.47	0.008	0.15	0.2	0.02	3.5	0.1	<0.05	5	<0.5	<0.2

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	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768681	Soil	1.0	38.6	8.8	66	<0.1	37.9	14.4	533	2.53	11.1	2.1	6.6	24	0.2	0.6	0.1	51	0.34	0.093	26
1768682	Soil	1.7	46.3	10.5	127	0.2	56.7	15.6	528	2.91	9.4	2.5	6.8	28	0.7	0.9	0.2	53	0.44	0.100	20
1768683	Soil	1.7	36.1	10.4	83	<0.1	41.2	18.1	602	2.80	9.2	1.4	5.9	21	0.4	0.8	0.2	65	0.37	0.124	20
1768684	Soil	0.8	39.4	7.4	65	<0.1	35.5	15.1	577	2.96	12.8	<0.5	5.2	18	0.2	0.6	0.1	56	0.31	0.074	18
1768685	Soil	1.1	32.7	10.0	64	<0.1	41.1	15.9	497	2.82	11.4	<0.5	5.3	17	0.1	0.7	0.1	48	0.24	0.068	19
1768686	Soil	0.5	50.9	12.0	106	<0.1	40.0	17.9	828	3.85	8.1	<0.5	8.6	15	0.1	0.5	0.3	64	0.24	0.062	36
1768687	Soil	1.0	38.0	9.6	60	<0.1	42.0	16.1	564	2.68	13.1	1.7	6.2	25	0.2	0.7	0.2	48	0.46	0.121	20
1768688	Soil	0.9	31.0	10.3	56	<0.1	32.5	12.8	451	2.62	13.1	0.7	4.1	21	0.1	0.6	0.2	50	0.31	0.071	19
1768689	Soil	0.8	28.6	10.6	50	<0.1	33.2	11.1	367	2.47	17.6	1.5	2.5	18	0.1	0.8	0.2	47	0.24	0.068	18
1768690	Soil	0.8	41.1	12.2	62	<0.1	41.8	14.4	528	2.49	23.3	3.5	7.7	21	0.2	1.0	0.2	38	0.27	0.052	28
1768691	Soil	1.0	24.8	11.2	58	<0.1	37.5	12.1	449	2.31	15.4	<0.5	4.2	17	0.1	0.8	0.2	45	0.28	0.078	16
1768692	Soil	0.8	32.1	14.7	67	<0.1	35.0	13.6	417	3.10	40.5	1.1	4.2	16	0.1	0.8	0.2	40	0.19	0.045	18
1768693	Soil	0.8	38.1	13.7	63	<0.1	38.8	14.6	593	2.78	21.3	2.7	8.6	16	0.1	0.9	0.2	42	0.20	0.039	30
1768694	Soil	1.1	27.8	10.6	50	<0.1	31.0	10.6	367	2.54	10.3	8.0	5.6	15	0.2	0.6	0.2	53	0.20	0.043	20
1768695	Soil	0.9	49.2	4.9	54	<0.1	41.6	25.0	902	2.80	3.3	5.8	1.5	9	0.4	0.3	<0.1	78	0.36	0.052	7
1768696	Soil	0.5	29.3	6.0	47	<0.1	30.8	14.8	550	2.64	5.2	5.1	4.1	17	<0.1	0.5	<0.1	57	0.33	0.090	13
1768697	Soil	0.7	27.2	7.7	48	<0.1	24.9	13.3	456	2.42	4.6	3.9	2.5	15	0.1	0.5	0.1	55	0.28	0.078	11
1768698	Soil	0.7	36.9	9.8	47	0.1	25.4	12.2	462	2.35	6.3	4.2	3.4	18	0.2	0.5	0.1	49	0.30	0.080	12
1768699	Soil	1.1	33.6	8.9	42	<0.1	25.7	12.8	510	2.27	6.5	3.2	3.7	18	0.2	0.5	0.1	47	0.33	0.086	14
1768700	Soil	1.1	33.8	10.6	56	0.1	26.9	17.0	622	2.80	8.5	5.7	2.2	14	0.2	0.7	0.2	59	0.22	0.067	11
1768701	Soil	0.9	29.3	11.6	54	<0.1	31.4	12.7	533	2.34	6.2	5.5	5.0	17	0.2	0.6	0.1	49	0.35	0.107	14
1768702	Soil	0.9	38.6	9.7	49	<0.1	27.6	14.2	508	2.62	6.4	5.2	2.4	15	<0.1	0.8	0.2	61	0.20	0.032	11
1768703	Soil	1.4	41.5	10.8	65	0.1	34.1	14.5	754	2.96	13.8	5.7	1.8	17	0.2	0.9	0.2	68	0.34	0.071	17
1768704	Soil	1.1	68.5	9.2	71	0.1	67.2	26.0	1025	4.67	65.8	3.1	5.0	22	0.5	1.7	0.1	70	0.42	0.124	31
1768705	Soil	2.4	63.9	9.3	75	0.2	40.0	10.8	301	2.61	49.3	4.8	0.6	17	0.1	1.4	0.2	61	0.25	0.111	16
1768706	Soil	3.0	91.3	9.6	52	0.2	26.2	10.8	302	3.44	37.6	6.8	1.3	13	0.1	1.5	0.2	71	0.12	0.063	10
1768707	Soil	1.2	28.7	9.0	51	<0.1	24.1	13.7	515	2.77	4.5	2.7	4.9	14	<0.1	0.4	0.2	48	0.16	0.043	15
1768708	Soil	0.7	25.0	10.2	48	<0.1	25.9	13.2	497	2.59	7.7	6.3	5.0	13	<0.1	0.5	0.2	44	0.15	0.040	16
1768709	Soil	0.9	32.3	10.8	51	<0.1	27.4	14.8	666	2.72	13.6	2.5	6.1	16	<0.1	1.0	0.2	43	0.21	0.051	20
1768710	Soil	0.7	17.4	7.0	46	<0.1	18.9	7.4	272	1.93	8.2	5.4	2.0	14	0.2	0.4	0.1	41	0.24	0.080	14

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Project: LIV
Report Date: September 10, 2014

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	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768681	Soil	38	0.83	165	0.075	1	1.29	0.011	0.17	0.2	0.02	3.9	0.1	<0.05	4	<0.5	<0.2
1768682	Soil	43	0.95	218	0.094	4	1.50	0.013	0.20	0.2	0.05	4.9	0.2	<0.05	4	<0.5	<0.2
1768683	Soil	36	0.84	158	0.100	1	1.53	0.010	0.15	0.2	0.02	4.6	0.1	<0.05	4	<0.5	<0.2
1768684	Soil	43	1.01	135	0.077	1	1.59	0.009	0.18	0.1	<0.01	4.2	0.1	<0.05	5	<0.5	<0.2
1768685	Soil	43	0.79	70	0.063	1	1.44	0.008	0.13	0.1	0.01	3.8	<0.1	<0.05	4	<0.5	<0.2
1768686	Soil	46	1.44	108	0.065	<1	2.21	0.007	0.24	<0.1	<0.01	7.8	0.2	<0.05	7	<0.5	<0.2
1768687	Soil	46	0.77	116	0.072	1	1.15	0.010	0.17	0.3	0.02	3.6	0.1	<0.05	4	<0.5	<0.2
1768688	Soil	40	0.80	138	0.069	2	1.41	0.008	0.14	0.2	0.02	4.1	0.1	<0.05	5	<0.5	<0.2
1768689	Soil	42	0.70	104	0.057	1	1.36	0.008	0.10	0.2	0.02	3.0	0.1	<0.05	4	<0.5	<0.2
1768690	Soil	41	0.70	125	0.063	1	1.06	0.008	0.14	0.2	0.02	4.1	<0.1	<0.05	3	<0.5	<0.2
1768691	Soil	36	0.60	104	0.060	1	1.20	0.008	0.13	0.2	0.02	2.9	0.1	<0.05	4	<0.5	<0.2
1768692	Soil	36	0.74	63	0.054	1	1.47	0.007	0.15	0.2	0.01	3.2	0.1	<0.05	4	<0.5	<0.2
1768693	Soil	39	0.82	131	0.062	<1	1.38	0.006	0.10	0.1	0.03	3.2	0.1	<0.05	4	<0.5	<0.2
1768694	Soil	38	0.61	105	0.092	1	1.14	0.007	0.11	0.3	<0.01	2.9	0.1	<0.05	5	0.8	<0.2
1768695	Soil	151	1.56	106	0.076	<1	1.52	0.009	0.29	<0.1	0.02	6.8	0.1	<0.05	4	<0.5	<0.2
1768696	Soil	45	1.01	130	0.055	2	1.47	0.010	0.12	0.2	<0.01	3.8	<0.1	<0.05	4	<0.5	<0.2
1768697	Soil	42	0.74	92	0.056	1	1.22	0.008	0.14	0.2	0.02	3.3	0.1	<0.05	4	<0.5	<0.2
1768698	Soil	36	0.78	101	0.053	<1	1.13	0.008	0.11	0.2	0.03	3.7	<0.1	<0.05	4	<0.5	<0.2
1768699	Soil	36	0.71	125	0.050	<1	1.03	0.007	0.10	0.2	<0.01	3.7	<0.1	<0.05	3	<0.5	<0.2
1768700	Soil	43	0.85	87	0.049	<1	1.45	0.008	0.11	0.1	0.01	4.5	<0.1	<0.05	4	<0.5	0.2
1768701	Soil	37	0.74	99	0.057	<1	1.15	0.008	0.12	0.3	0.01	4.0	<0.1	<0.05	3	<0.5	<0.2
1768702	Soil	46	0.85	79	0.055	<1	1.37	0.008	0.08	<0.1	0.02	4.4	<0.1	<0.05	4	<0.5	<0.2
1768703	Soil	58	0.79	185	0.043	<1	1.57	0.009	0.10	0.2	0.03	5.6	0.1	<0.05	5	<0.5	<0.2
1768704	Soil	79	1.07	688	0.027	1	1.73	0.007	0.15	0.1	0.02	11.0	0.1	<0.05	5	<0.5	<0.2
1768705	Soil	52	0.66	147	0.030	<1	1.53	0.015	0.07	0.2	0.09	3.2	0.2	<0.05	5	<0.5	<0.2
1768706	Soil	51	0.58	69	0.067	<1	1.51	0.007	0.06	0.2	0.05	3.2	0.1	<0.05	6	0.7	<0.2
1768707	Soil	34	0.69	97	0.037	1	1.37	0.006	0.09	0.2	<0.01	3.5	0.1	<0.05	4	1.1	<0.2
1768708	Soil	31	0.63	105	0.040	<1	1.55	0.006	0.10	0.2	<0.01	3.1	0.1	<0.05	4	<0.5	<0.2
1768709	Soil	33	0.69	149	0.040	<1	1.25	0.005	0.10	0.1	<0.01	3.7	0.1	<0.05	3	<0.5	<0.2
1768710	Soil	30	0.60	74	0.039	<1	1.19	0.006	0.07	0.2	0.02	2.7	<0.1	<0.05	3	<0.5	<0.2

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	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768711	Soil	0.8	28.4	9.9	47	<0.1	33.6	15.3	558	2.72	13.8	6.6	4.8	14	0.3	0.6	0.2	43	0.20	0.050	16
1768712	Soil	1.1	33.6	10.5	48	<0.1	35.3	15.1	518	2.55	10.3	6.6	5.0	14	0.3	0.8	0.1	40	0.19	0.038	17
1768713	Soil	0.7	20.2	9.8	47	<0.1	30.1	9.1	378	2.63	8.9	2.9	3.3	15	0.1	0.5	0.2	64	0.24	0.043	14
1768714	Soil	0.8	32.5	10.6	51	<0.1	34.6	14.1	522	2.39	14.0	2.3	5.7	18	0.1	0.7	0.2	36	0.31	0.087	17
1768715	Soil	1.2	33.3	11.6	54	0.2	65.2	16.3	537	2.45	23.5	3.3	5.2	17	0.3	0.8	0.2	41	0.25	0.074	17
1768716	Soil	1.3	34.1	11.3	53	<0.1	42.1	15.5	636	2.69	17.0	4.8	6.0	18	0.2	0.8	0.2	41	0.29	0.079	17
1768717	Soil	1.4	28.3	10.0	45	0.2	28.0	6.7	273	2.19	6.7	7.1	3.2	14	0.2	0.3	0.2	57	0.24	0.035	19
1768718	Soil	1.3	24.3	8.7	54	<0.1	33.1	11.1	439	1.96	7.1	1.8	5.4	17	0.4	0.4	0.2	41	0.34	0.110	17
1768719	Soil	0.8	28.0	15.9	54	<0.1	37.7	13.3	431	2.44	8.4	5.7	4.7	15	0.4	0.5	0.2	48	0.23	0.071	16
1768720	Soil	1.6	15.4	8.7	63	<0.1	26.3	12.3	441	2.62	5.3	0.5	4.2	11	0.5	0.4	0.2	56	0.22	0.094	12
1768721	Soil	1.7	23.3	10.5	81	0.2	45.9	13.1	495	2.51	7.8	4.9	5.2	15	0.3	0.8	0.2	99	0.32	0.110	17
1768722	Soil	0.8	21.9	8.0	54	<0.1	39.5	12.3	440	2.35	4.9	3.1	3.8	14	0.4	0.4	0.2	52	0.31	0.092	11
1768723	Soil	1.6	20.1	10.0	64	<0.1	48.9	11.5	352	2.74	5.7	4.7	4.1	13	0.2	0.4	0.2	57	0.23	0.066	11
1768724	Soil	1.1	9.4	8.3	31	<0.1	14.3	4.1	134	1.84	5.5	4.1	2.2	12	<0.1	0.3	0.2	49	0.21	0.039	11
1768725	Soil	0.6	19.6	5.6	42	<0.1	44.6	12.8	482	2.05	3.6	1.6	4.6	14	<0.1	0.2	0.1	33	0.30	0.080	13
1768726	Soil	0.9	21.3	8.0	48	<0.1	31.5	10.0	319	2.48	4.7	1.7	3.9	14	<0.1	0.3	0.1	54	0.26	0.070	12
1768727	Soil	0.4	21.7	7.0	54	<0.1	24.0	10.1	335	2.11	4.5	1.6	4.5	14	<0.1	0.2	0.2	39	0.26	0.080	13
1768728	Soil	0.6	24.6	5.7	42	<0.1	21.9	11.6	349	2.10	3.1	4.9	3.6	15	0.2	0.2	<0.1	34	0.31	0.079	10
1768729	Soil	1.0	21.8	8.1	48	<0.1	30.9	11.4	402	2.30	6.6	1.3	4.7	17	0.2	0.3	0.1	41	0.23	0.079	12
1768730	Soil	0.5	17.8	7.7	46	<0.1	27.7	10.6	319	2.31	4.1	<0.5	4.3	16	<0.1	0.4	0.2	45	0.23	0.065	11
1768731	Soil	1.5	15.8	8.0	39	<0.1	17.4	8.3	225	2.18	3.2	2.4	3.0	14	0.1	0.3	0.2	48	0.16	0.026	10
1768732	Soil	1.0	17.7	8.4	58	<0.1	21.1	11.8	414	2.63	6.4	3.8	3.3	13	0.4	0.4	0.2	55	0.17	0.044	10
1768733	Soil	0.4	26.2	6.0	42	<0.1	20.1	9.6	385	1.93	2.4	1.1	4.1	17	<0.1	0.5	<0.1	38	0.29	0.064	18
1768734	Soil	<0.1	27.6	1.4	100	<0.1	11.0	9.5	883	3.12	<0.5	1.6	3.8	17	0.1	0.1	<0.1	67	0.32	0.047	12
1768735	Soil	1.1	11.2	7.8	33	0.2	17.1	5.3	206	1.86	4.8	2.6	3.3	14	0.1	0.2	0.2	51	0.20	0.031	12
1768736	Soil	1.7	33.6	14.5	103	<0.1	36.0	12.3	542	2.55	8.2	1.3	3.7	15	0.5	0.5	0.2	57	0.33	0.093	15
1768737	Soil	1.1	29.2	8.9	66	0.2	48.1	11.0	478	2.31	7.7	1.6	6.0	18	0.2	0.7	0.2	43	0.31	0.083	25
1768738	Soil	1.3	30.4	7.6	70	0.1	60.8	13.9	459	2.40	2.8	2.1	5.5	16	0.3	0.4	0.2	51	0.35	0.080	18
1768739	Soil	2.2	21.2	7.4	54	<0.1	29.3	13.5	380	2.62	3.0	1.1	4.0	14	<0.1	0.2	0.2	61	0.31	0.088	10
1768740	Soil	2.0	22.7	9.4	65	<0.1	34.9	12.1	555	2.96	4.7	1.6	5.0	15	0.2	0.5	0.1	47	0.29	0.095	14

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	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768711	Soil	45	0.74	116	0.050	<1	1.26	0.006	0.10	0.2	<0.01	3.7	<0.1	<0.05	3	<0.5	<0.2
1768712	Soil	43	0.70	92	0.054	<1	1.18	0.006	0.09	0.2	0.03	2.8	0.1	<0.05	3	0.7	<0.2
1768713	Soil	44	0.64	130	0.080	<1	1.41	0.008	0.10	0.3	0.01	3.5	<0.1	<0.05	5	<0.5	<0.2
1768714	Soil	36	0.65	94	0.055	3	1.04	0.007	0.13	0.1	0.02	3.0	0.1	<0.05	3	<0.5	<0.2
1768715	Soil	58	0.73	135	0.055	<1	1.11	0.007	0.10	0.2	0.02	3.5	0.1	<0.05	3	<0.5	<0.2
1768716	Soil	51	0.69	116	0.050	2	1.16	0.007	0.13	0.1	0.02	3.2	0.1	<0.05	3	<0.5	0.2
1768717	Soil	39	0.50	177	0.071	<1	1.58	0.009	0.10	0.3	0.05	3.4	0.1	<0.05	6	<0.5	<0.2
1768718	Soil	33	0.59	85	0.062	<1	0.96	0.007	0.11	0.3	0.02	2.8	0.1	<0.05	3	<0.5	<0.2
1768719	Soil	45	0.72	96	0.069	<1	1.33	0.007	0.16	0.3	0.03	3.3	0.1	<0.05	3	<0.5	<0.2
1768720	Soil	48	0.73	74	0.071	<1	1.56	0.007	0.14	0.3	0.02	4.1	<0.1	<0.05	4	<0.5	<0.2
1768721	Soil	44	0.82	168	0.075	2	1.76	0.008	0.10	0.3	0.03	3.8	0.1	<0.05	4	<0.5	<0.2
1768722	Soil	34	0.64	113	0.076	<1	1.37	0.008	0.11	0.2	0.02	3.3	<0.1	<0.05	4	<0.5	<0.2
1768723	Soil	39	0.68	110	0.080	<1	1.50	0.007	0.13	0.2	0.02	3.7	0.1	<0.05	5	<0.5	<0.2
1768724	Soil	28	0.38	73	0.067	2	1.21	0.007	0.05	0.3	<0.01	2.5	0.1	<0.05	4	<0.5	<0.2
1768725	Soil	51	0.71	95	0.044	2	1.07	0.005	0.08	0.1	<0.01	2.6	<0.1	<0.05	3	<0.5	<0.2
1768726	Soil	41	0.68	100	0.074	<1	1.48	0.007	0.10	0.2	<0.01	3.4	<0.1	<0.05	4	<0.5	<0.2
1768727	Soil	28	0.63	120	0.063	<1	1.22	0.006	0.09	0.1	0.02	2.8	<0.1	<0.05	3	<0.5	<0.2
1768728	Soil	23	0.64	120	0.062	1	1.22	0.006	0.13	0.2	0.03	2.5	<0.1	<0.05	3	<0.5	<0.2
1768729	Soil	31	0.66	147	0.068	<1	1.33	0.010	0.15	0.2	0.03	2.9	0.1	<0.05	4	<0.5	<0.2
1768730	Soil	32	0.61	198	0.075	<1	1.39	0.009	0.12	0.2	0.03	3.1	0.1	<0.05	4	1.2	<0.2
1768731	Soil	26	0.51	145	0.082	<1	1.09	0.008	0.13	0.3	0.02	3.2	<0.1	<0.05	5	<0.5	<0.2
1768732	Soil	36	0.58	104	0.095	<1	1.21	0.007	0.12	0.2	0.03	3.4	<0.1	<0.05	5	0.9	<0.2
1768733	Soil	26	0.62	118	0.064	<1	1.03	0.008	0.08	0.2	0.01	3.2	<0.1	<0.05	3	0.6	<0.2
1768734	Soil	15	1.64	269	0.123	<1	1.96	0.005	0.52	<0.1	<0.01	5.0	0.1	<0.05	5	0.9	<0.2
1768735	Soil	28	0.35	142	0.077	<1	1.31	0.008	0.08	0.4	0.01	3.1	<0.1	<0.05	5	1.1	<0.2
1768736	Soil	36	0.68	133	0.065	<1	1.26	0.008	0.08	0.5	0.01	3.5	<0.1	<0.05	4	1.7	<0.2
1768737	Soil	36	0.60	220	0.053	<1	1.18	0.009	0.07	0.2	0.05	4.1	0.1	<0.05	3	0.7	0.3
1768738	Soil	43	0.99	184	0.079	<1	1.43	0.009	0.11	0.5	0.01	3.6	0.1	<0.05	4	<0.5	<0.2
1768739	Soil	38	0.65	106	0.075	<1	1.11	0.007	0.13	0.3	<0.01	2.8	0.1	<0.05	4	<0.5	0.3
1768740	Soil	37	0.64	118	0.061	<1	1.37	0.007	0.11	0.3	0.02	3.7	0.1	<0.05	4	<0.5	<0.2

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Bureau Veritas Commodities Canada Ltd.
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PHONE (604) 253-3158

Client: **Goldspike Exploration Inc.**
4 King Street West, Suite 1500
Toronto ON M5H 1B6 CANADA

Project: LIV
Report Date: September 10, 2014

CERTIFICATE OF ANALYSIS WHI14000092.1

		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
		Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
		MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
1768741	Soil		1.3	22.1	9.9	72	<0.1	33.2	12.6	527	1.99	5.0	<0.5	4.7	16	0.2	0.5	0.2	36	0.33	0.112	16
1768742	Soil		0.5	19.6	5.0	41	<0.1	25.9	9.5	402	1.81	2.6	<0.5	4.7	18	0.1	0.3	0.1	31	0.33	0.106	18
1768743	Soil		0.4	98.8	9.0	118	<0.1	58.5	28.2	2086	5.57	1.2	4.9	11.8	16	0.2	0.2	0.3	54	0.28	0.097	44
1768744	Soil		1.6	47.8	4.4	97	<0.1	89.9	25.8	728	4.67	3.0	<0.5	4.2	24	0.2	0.3	<0.1	54	0.59	0.176	20
1768745	Soil		1.5	26.4	6.5	50	<0.1	39.9	11.5	354	2.17	4.2	5.4	5.4	17	0.1	0.3	0.1	43	0.37	0.091	13
1768746	Soil		1.0	25.8	8.8	54	<0.1	43.1	14.3	374	2.40	5.3	<0.5	4.7	13	0.3	0.5	0.2	48	0.29	0.050	10
1768747	Soil		0.7	15.1	7.4	46	<0.1	15.0	9.3	492	2.48	6.0	<0.5	2.3	14	0.3	0.2	0.2	53	0.20	0.050	9
1768748	Soil		0.4	18.8	6.6	37	<0.1	19.9	9.2	375	2.00	3.2	<0.5	4.3	19	<0.1	0.2	<0.1	29	0.34	0.076	16
1768749	Soil		0.8	14.9	5.5	42	<0.1	16.8	9.5	288	2.20	4.4	<0.5	2.9	16	<0.1	0.3	<0.1	41	0.23	0.046	9
1768750	Soil		0.3	20.1	5.3	34	<0.1	21.5	8.7	369	1.80	5.4	0.9	3.7	18	0.2	0.3	<0.1	30	0.32	0.084	14
1768751	Soil		1.0	18.8	6.4	36	<0.1	25.9	11.1	306	1.99	4.3	2.1	3.9	15	<0.1	0.3	<0.1	34	0.28	0.070	11
1768752	Soil		0.7	20.8	5.4	39	<0.1	23.1	12.2	503	2.45	2.8	<0.5	3.8	16	0.3	0.4	<0.1	41	0.32	0.074	11
1768753	Soil		0.5	18.5	4.3	35	<0.1	24.3	10.1	355	1.94	2.7	<0.5	3.8	17	<0.1	0.2	<0.1	33	0.34	0.077	10
1768754	Soil		0.9	14.0	8.6	37	<0.1	26.1	8.3	191	2.41	5.5	<0.5	3.3	12	0.3	0.3	0.1	49	0.21	0.051	10
1768755	Soil		1.3	11.6	9.2	45	<0.1	23.6	8.8	256	3.06	8.6	0.6	4.1	16	0.2	0.6	0.2	62	0.22	0.036	11
1768756	Soil		0.7	17.1	5.5	47	<0.1	21.7	11.3	588	2.65	3.4	<0.5	4.0	16	<0.1	0.5	<0.1	43	0.39	0.076	14
1768757	Soil		0.8	10.9	8.4	34	<0.1	16.6	7.1	232	2.20	7.2	<0.5	3.9	13	0.2	0.3	0.1	57	0.18	0.025	11
1768758	Soil		0.7	18.0	5.2	37	<0.1	26.8	12.9	357	2.26	3.5	<0.5	3.6	17	0.2	0.3	<0.1	42	0.35	0.079	9

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Project: LIV
Report Date: September 10, 2014

CERTIFICATE OF ANALYSIS WHI14000092.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768741	Soil	33	0.53	96	0.056	<1	0.97	0.007	0.08	0.2	0.02	3.0	<0.1	<0.05	3	<0.5	<0.2
1768742	Soil	33	0.54	105	0.051	<1	0.81	0.009	0.07	0.1	0.01	2.4	<0.1	<0.05	3	<0.5	<0.2
1768743	Soil	43	0.64	235	0.021	<1	1.16	0.006	0.25	<0.1	0.05	11.7	0.1	<0.05	4	1.8	<0.2
1768744	Soil	58	0.75	191	0.097	<1	1.52	0.008	0.52	0.1	0.02	4.8	0.1	<0.05	5	1.2	<0.2
1768745	Soil	37	0.68	165	0.089	<1	1.24	0.011	0.13	0.4	<0.01	3.6	0.1	<0.05	4	0.8	<0.2
1768746	Soil	41	0.70	134	0.102	1	1.57	0.011	0.11	0.2	0.03	3.2	0.1	<0.05	5	0.9	<0.2
1768747	Soil	26	0.62	97	0.081	<1	1.20	0.007	0.16	0.2	0.03	3.2	0.1	<0.05	4	0.9	<0.2
1768748	Soil	25	0.58	130	0.049	<1	1.01	0.008	0.09	0.1	0.01	2.8	<0.1	<0.05	3	<0.5	<0.2
1768749	Soil	25	0.70	112	0.081	<1	1.37	0.007	0.13	0.2	<0.01	2.5	<0.1	<0.05	3	<0.5	<0.2
1768750	Soil	23	0.49	94	0.055	<1	0.85	0.008	0.07	0.2	0.01	2.4	<0.1	<0.05	2	0.5	<0.2
1768751	Soil	27	0.49	87	0.058	<1	1.07	0.008	0.11	0.2	0.04	2.8	<0.1	<0.05	3	0.5	<0.2
1768752	Soil	27	0.74	115	0.062	<1	1.18	0.009	0.16	0.1	0.03	3.4	<0.1	<0.05	4	0.6	0.2
1768753	Soil	26	0.58	91	0.066	<1	1.00	0.008	0.09	0.1	0.02	2.9	<0.1	<0.05	3	<0.5	<0.2
1768754	Soil	31	0.47	84	0.083	<1	1.20	0.008	0.08	0.2	0.04	2.8	<0.1	<0.05	4	0.6	<0.2
1768755	Soil	37	0.61	133	0.087	<1	1.54	0.009	0.12	0.3	0.02	3.8	<0.1	<0.05	6	<0.5	<0.2
1768756	Soil	24	0.65	165	0.063	<1	1.06	0.009	0.14	0.1	0.02	4.3	<0.1	<0.05	3	0.6	<0.2
1768757	Soil	30	0.46	113	0.094	<1	1.35	0.008	0.08	0.3	0.02	2.7	<0.1	<0.05	5	<0.5	<0.2
1768758	Soil	27	0.69	119	0.073	<1	1.25	0.010	0.15	0.2	0.03	2.8	<0.1	<0.05	3	<0.5	<0.2

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Project: LIV
Report Date: September 10, 2014

QUALITY CONTROL REPORT WHI14000092.1

	Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
Pulp Duplicates																					
1768638	Soil	2.7	55.2	12.3	53	<0.1	33.3	12.2	414	2.33	10.2	1.4	5.6	28	0.2	0.4	0.2	45	0.39	0.160	31
REP 1768638	QC	2.8	56.4	11.8	54	<0.1	33.9	12.9	432	2.37	10.2	0.7	5.7	28	0.2	0.4	0.2	45	0.39	0.159	32
1768674	Soil	1.0	23.8	7.4	60	<0.1	17.9	11.9	562	2.88	4.3	2.9	3.0	18	0.1	0.3	0.2	70	0.37	0.069	11
REP 1768674	QC	0.9	22.6	7.4	59	<0.1	16.8	11.2	548	2.73	4.2	1.0	3.1	18	0.1	0.3	0.2	67	0.36	0.070	11
1768710	Soil	0.7	17.4	7.0	46	<0.1	18.9	7.4	272	1.93	8.2	5.4	2.0	14	0.2	0.4	0.1	41	0.24	0.080	14
REP 1768710	QC	0.6	16.6	7.4	42	<0.1	20.7	7.1	259	1.90	8.0	1.7	2.0	14	<0.1	0.4	0.1	39	0.22	0.073	14
1768733	Soil	0.4	26.2	6.0	42	<0.1	20.1	9.6	385	1.93	2.4	1.1	4.1	17	<0.1	0.5	<0.1	38	0.29	0.064	18
REP 1768733	QC	0.9	25.3	6.0	41	<0.1	22.7	9.5	374	1.88	3.3	2.1	4.2	16	0.1	0.3	0.1	36	0.23	0.067	17
Reference Materials																					
STD DS10	Standard	15.5	158.3	144.1	366	2.0	73.1	12.5	841	2.66	46.2	71.2	6.9	69	2.5	9.3	12.1	45	1.02	0.075	20
STD DS10	Standard	16.3	153.9	161.9	375	1.8	74.2	13.1	927	2.90	45.0	101.3	7.9	71	2.9	9.0	12.4	48	1.17	0.073	19
STD DS10	Standard	15.8	156.7	154.9	365	1.9	78.8	12.4	895	2.74	43.3	81.5	7.3	69	2.5	9.0	11.6	46	1.02	0.070	19
STD DS10	Standard	15.7	160.7	158.3	375	1.9	79.4	13.5	905	2.81	49.7	83.0	8.1	72	2.9	9.4	12.4	48	1.07	0.084	20
STD OXC109	Standard	1.6	37.3	11.3	43	<0.1	72.3	19.8	405	2.89	0.6	188.3	1.3	147	<0.1	<0.1	<0.1	51	0.72	0.109	13
STD OXC109	Standard	1.3	36.0	11.5	44	<0.1	74.4	19.6	426	2.90	0.6	179.3	1.3	149	<0.1	<0.1	<0.1	50	0.70	0.102	12
STD OXC109	Standard	1.4	37.8	11.1	44	<0.1	78.7	21.6	446	2.99	0.9	200.8	1.5	150	<0.1	<0.1	<0.1	54	0.75	0.106	13
STD OXC109	Standard	1.6	37.4	12.0	41	<0.1	74.6	20.3	423	2.93	0.6	205.4	1.6	146	<0.1	<0.1	<0.1	50	0.73	0.117	14
STD DS10 Expected		14.69	154.61	150.55	370	2.02	74.6	12.9	875	2.7188	43.7	91.9	7.5	67.1	2.49	8.23	11.65	43	1.0625	0.073	17.5
STD OXC109 Expected												201									
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	1.0	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1

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Project: LIV
Report Date: September 10, 2014

QUALITY CONTROL REPORT WHI14000092.1

		Method	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201	AQ201
		Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
Pulp Duplicates																		
1768638	Soil		39	0.66	149	0.078	1	1.18	0.008	0.16	0.3	<0.01	2.8	0.1	<0.05	3	0.6	<0.2
REP 1768638	QC		40	0.68	150	0.079	2	1.16	0.008	0.16	0.3	0.01	3.0	0.1	<0.05	4	0.6	<0.2
1768674	Soil		28	0.84	134	0.092	2	1.56	0.009	0.19	0.3	0.02	4.2	0.1	<0.05	6	<0.5	<0.2
REP 1768674	QC		27	0.80	130	0.094	2	1.57	0.009	0.18	0.4	0.01	4.2	0.1	<0.05	5	<0.5	<0.2
1768710	Soil		30	0.60	74	0.039	<1	1.19	0.006	0.07	0.2	0.02	2.7	<0.1	<0.05	3	<0.5	<0.2
REP 1768710	QC		31	0.59	68	0.038	<1	1.17	0.006	0.07	0.1	0.02	2.7	<0.1	<0.05	3	<0.5	<0.2
1768733	Soil		26	0.62	118	0.064	<1	1.03	0.008	0.08	0.2	0.01	3.2	<0.1	<0.05	3	0.6	<0.2
REP 1768733	QC		27	0.63	111	0.059	<1	1.09	0.009	0.08	0.1	0.04	3.2	<0.1	<0.05	3	<0.5	<0.2
Reference Materials																		
STD DS10	Standard		55	0.76	383	0.085	6	1.04	0.068	0.32	3.3	0.31	3.2	5.2	0.32	4	2.5	5.1
STD DS10	Standard		59	0.81	358	0.086	6	1.12	0.071	0.35	3.1	0.31	3.3	5.2	0.29	4	1.0	4.7
STD DS10	Standard		57	0.80	373	0.082	9	1.06	0.059	0.33	3.2	0.27	3.0	4.9	0.35	5	<0.5	4.6
STD DS10	Standard		57	0.82	387	0.096	7	1.14	0.071	0.35	3.4	0.31	3.3	5.4	0.29	5	2.2	4.8
STD OXC109	Standard		60	1.50	62	0.381	1	1.58	0.697	0.40	0.2	<0.01	1.2	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard		61	1.43	57	0.407	<1	1.49	0.699	0.40	0.2	<0.01	1.4	<0.1	0.05	5	0.9	<0.2
STD OXC109	Standard		63	1.46	57	0.409	<1	1.60	0.678	0.40	0.2	0.01	1.0	<0.1	<0.05	6	<0.5	<0.2
STD OXC109	Standard		62	1.49	62	0.408	1	1.61	0.699	0.42	0.2	<0.01	1.1	<0.1	<0.05	5	<0.5	<0.2
STD DS10 Expected			54.6	0.775	359	0.0817		1.0259	0.067	0.338	3.32	0.3	2.8	5.1	0.29	4.3	2.3	5.01
STD OXC109 Expected																		
BLK	Blank		<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank		<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	0.9	<0.2
BLK	Blank		<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank		<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2

Appendix IV: Rock Sample Assay Certificates

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Client: **Goldspike Exploration Inc.**
4 King Street West, Suite 1500
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Submitted By: Bruce Durham
Receiving Lab: Canada-Whitehorse
Received: August 07, 2014
Report Date: August 22, 2014
Page: 1 of 3

CERTIFICATE OF ANALYSIS WHI14000090.1

CLIENT JOB INFORMATION

Project: LIV
Shipment ID: LIV_ROCKS_2014
P.O. Number
Number of Samples: 55

SAMPLE DISPOSAL

DISP-PLP Dispose of Pulp After 90 days
DISP-RJT Dispose of Reject After 90 days

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
PRP70-250	55	Crush, split and pulverize 250 g rock to 200 mesh			WHI
FA330-Au	55	Fire assay fusion Au by ICP-ES	30	Completed	VAN
AQ200	55	1:1:1 Aqua Regia digestion ICP-MS analysis	0.5	Completed	VAN

ADDITIONAL COMMENTS

Invoice To: Goldspike Exploration Inc.
4 King Street West, Suite 1500
Toronto ON M5H 1B6
CANADA

CC: Daniel Ferraro

BRITISH COLUMBIA CERTIFIED ASSAYER
MARCUS LAU
Geochemical Laboratory Manager

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

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Report Date: August 22, 2014

CERTIFICATE OF ANALYSIS WHI14000090.1

	Method	WGHT	FA330	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
	Analyte	Wgt	Au	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	2	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01
1768001	Rock	1.85	<2	4.0	138.8	2.8	79	0.2	42.8	17.4	326	5.65	6.1	<0.5	4.2	52	0.3	0.3	0.1	136	0.48
1768002	Rock	0.88	<2	0.2	2.9	0.7	11	<0.1	2.4	2.8	132	0.80	3.5	<0.5	0.5	6	<0.1	<0.1	<0.1	15	0.13
1768003	Rock	0.60	<2	0.3	20.0	1.7	16	<0.1	21.5	8.2	81	0.62	15.7	<0.5	<0.1	4	<0.1	0.3	<0.1	7	0.16
1768004	Rock	1.10	<2	0.2	1.7	1.2	10	<0.1	1.8	0.5	31	0.44	31.4	<0.5	<0.1	2	<0.1	1.0	<0.1	2	<0.01
1768005	Rock	0.99	7	0.2	5.4	2.4	16	<0.1	10.2	3.2	355	0.77	3.7	3.6	1.9	6	0.2	0.2	<0.1	12	0.10
1768006	Rock	0.94	29	90.0	37.8	133.2	7	1.9	13.5	2.1	28	1.35	3.3	25.3	0.7	27	0.2	0.4	0.1	11	0.03
1768007	Rock	1.04	3	26.3	17.9	12.1	33	0.5	7.6	0.5	40	1.62	14.1	1.9	4.6	21	0.3	0.4	<0.1	154	0.03
1768008	Rock	1.73	1750	58.0	320.2	1598.7	35	69.0	6.0	0.8	80	1.26	127.9	1598.4	0.7	31	1.5	46.0	0.3	9	0.02
1768009	Rock	2.05	588	34.2	99.2	333.0	61	29.0	12.6	0.8	41	1.61	159.4	561.1	1.2	41	0.6	9.8	0.1	15	0.03
1768010	Rock	2.49	641	70.7	135.7	702.3	68	28.7	13.5	0.8	44	1.75	158.2	543.5	0.9	43	0.5	7.5	0.2	14	0.03
1768011	Rock	1.01	6	15.7	21.4	20.9	136	0.8	17.1	1.9	108	1.99	52.0	2.8	4.4	42	0.1	2.6	0.2	48	0.09
1768012	Rock	0.79	<2	0.3	13.8	6.5	8	<0.1	6.2	2.9	1290	0.37	1.1	1.4	1.2	112	<0.1	<0.1	<0.1	4	25.91
1768013	Rock	1.26	4707	42.1	171.8	2633.4	11	>100	5.3	0.6	35	0.48	3.3	6514.6	0.1	14	0.5	61.9	0.7	<2	0.09
1768014	Rock	0.37	6	0.9	3.8	14.6	5	0.3	2.8	1.2	51	0.33	1.9	2.9	0.4	35	<0.1	0.4	<0.1	2	0.69
1768015	Rock	1.21	8	0.3	3.4	11.8	29	0.4	15.5	9.4	271	1.09	1.5	6.5	1.1	14	<0.1	0.3	<0.1	27	0.81
1768016	Rock	2.32	7	17.0	135.6	5.1	28	0.2	46.3	13.5	328	1.49	73.3	2.8	3.5	8	0.1	1.0	1.0	54	0.01
1768017	Rock	3.24	<2	0.1	32.7	6.0	22	0.1	30.7	22.0	366	1.41	1.1	4.7	1.0	69	<0.1	0.1	<0.1	40	2.32
1768018	Rock	0.79	<2	0.2	22.9	1.2	6	<0.1	18.8	26.5	135	1.18	1.0	3.0	0.5	9	<0.1	<0.1	<0.1	13	0.52
1768019	Rock	1.13	<2	0.1	2.8	4.7	30	<0.1	8.3	3.4	327	0.97	0.6	2.6	7.7	73	0.2	0.1	<0.1	12	1.45
1768020	Rock	0.55	15	0.4	29.1	7.5	4	0.5	7.9	5.1	85	1.11	0.5	13.0	1.3	4	<0.1	<0.1	<0.1	5	0.11
1768021	Rock	1.17	643	0.5	3524.5	12.1	4	6.8	3.1	13.6	40	3.33	37.3	618.2	0.4	9	<0.1	0.6	1.5	8	0.06
1768022	Rock	1.34	6	<0.1	64.7	7.8	22	0.1	23.3	10.1	1140	0.72	2.8	2.1	0.7	235	0.2	<0.1	<0.1	3	13.30
1768023	Rock	0.92	<2	0.4	19.2	0.8	6	<0.1	1.4	2.4	130	0.48	0.5	<0.5	0.2	3	<0.1	<0.1	<0.1	6	0.13
1768024	Rock	1.12	<2	0.2	2.6	2.3	38	<0.1	2.3	3.6	648	1.97	0.8	3.3	6.3	8	<0.1	0.2	<0.1	9	0.46
1768025	Rock	1.55	4	0.8	323.2	9.4	68	0.8	38.5	59.4	542	5.72	3.0	6.4	3.8	83	0.2	0.3	0.2	26	0.99
1768026	Rock	0.83	<2	1.0	12.6	4.0	49	<0.1	8.2	42.5	565	3.07	1.2	2.4	4.0	36	0.1	<0.1	<0.1	36	1.59
1768027	Rock	0.70	<2	<0.1	2.9	0.4	17	<0.1	1960.2	93.3	557	4.72	2.7	2.1	<0.1	<1	<0.1	<0.1	<0.1	20	0.01
1768028	Rock	1.13	<2	0.1	2.9	1.8	30	<0.1	7.3	4.5	428	1.36	<0.5	0.9	2.1	17	<0.1	<0.1	<0.1	35	0.68
1768029	Rock	1.80	9	0.8	224.4	2.1	4	3.5	9.0	57.6	30	3.12	5.5	8.3	0.7	2	0.2	<0.1	0.2	15	<0.01
1768030	Rock	0.72	<2	<0.1	2.3	1.1	29	<0.1	4.4	6.1	907	1.05	1.6	<0.5	<0.1	36	0.2	0.2	<0.1	7	3.16

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Project: LIV
Report Date: August 22, 2014

CERTIFICATE OF ANALYSIS WHI14000090.1

		Method	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
		Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	0.001	1	1	0.01	1	0.001	20	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768001	Rock		0.172	12	119	1.47	228	0.303	<20	2.11	0.040	0.79	0.2	<0.01	11.0	0.3	0.99	10	2.1	<0.2
1768002	Rock		0.012	<1	7	0.25	26	0.043	<20	0.35	0.026	0.03	<0.1	<0.01	0.9	<0.1	<0.05	<1	<0.5	<0.2
1768003	Rock		0.011	<1	17	0.13	27	0.021	<20	0.15	0.016	0.03	<0.1	<0.01	0.7	<0.1	<0.05	<1	<0.5	<0.2
1768004	Rock		0.002	<1	7	<0.01	16	<0.001	<20	0.04	0.001	0.04	<0.1	0.03	0.4	<0.1	<0.05	<1	<0.5	<0.2
1768005	Rock		0.022	8	12	0.09	145	0.010	<20	0.23	0.021	0.10	<0.1	<0.01	1.5	<0.1	<0.05	<1	<0.5	0.2
1768006	Rock		0.043	3	16	0.03	240	0.005	<20	0.10	0.017	0.03	<0.1	<0.01	0.5	<0.1	0.89	<1	2.7	0.9
1768007	Rock		0.045	12	29	0.10	1315	0.035	<20	0.29	0.017	0.25	0.3	0.04	2.3	<0.1	0.32	3	7.4	0.3
1768008	Rock		0.062	3	9	0.01	1062	0.001	<20	0.09	0.003	0.04	0.1	0.23	0.8	<0.1	0.18	<1	12.2	37.0
1768009	Rock		0.068	5	8	0.01	479	<0.001	<20	0.14	0.002	0.06	0.2	0.46	1.2	<0.1	0.10	<1	3.6	16.5
1768010	Rock		0.061	4	8	0.01	434	<0.001	<20	0.13	0.002	0.05	0.1	0.11	1.1	0.1	0.10	<1	4.8	15.9
1768011	Rock		0.122	19	14	0.03	1557	0.003	<20	0.31	0.004	0.14	0.3	0.04	2.1	<0.1	0.12	1	10.1	0.3
1768012	Rock		0.082	3	5	0.35	21	0.023	<20	0.16	0.004	0.03	0.1	<0.01	0.9	<0.1	<0.05	<1	<0.5	<0.2
1768013	Rock		0.024	1	7	<0.01	809	<0.001	<20	0.02	0.003	0.01	<0.1	0.28	0.2	<0.1	0.09	<1	14.4	44.0
1768014	Rock		0.018	1	4	0.02	15	0.005	25	0.07	0.005	0.04	<0.1	<0.01	0.2	<0.1	<0.05	<1	<0.5	<0.2
1768015	Rock		0.034	1	59	0.70	49	0.067	27	0.62	0.030	0.23	<0.1	<0.01	2.7	<0.1	<0.05	2	<0.5	<0.2
1768016	Rock		0.010	13	23	0.63	330	0.004	24	0.82	0.012	0.19	0.2	<0.01	2.8	0.1	0.42	3	1.7	0.3
1768017	Rock		0.202	4	100	0.87	62	0.101	<20	0.84	0.051	0.08	0.3	<0.01	4.9	<0.1	0.13	3	<0.5	<0.2
1768018	Rock		0.019	1	54	0.29	48	0.044	<20	0.15	0.033	0.02	<0.1	<0.01	2.0	<0.1	0.24	<1	<0.5	<0.2
1768019	Rock		0.008	17	15	0.26	292	0.011	<20	0.39	0.044	0.03	<0.1	<0.01	2.2	<0.1	<0.05	2	<0.5	<0.2
1768020	Rock		0.005	2	7	0.05	18	0.020	<20	0.11	0.034	0.02	<0.1	<0.01	0.6	<0.1	0.18	<1	<0.5	<0.2
1768021	Rock		0.009	1	12	0.03	54	0.020	<20	0.10	0.018	0.02	<0.1	0.09	0.6	<0.1	2.59	<1	2.2	0.8
1768022	Rock		0.058	2	5	0.10	13	0.012	26	0.13	0.011	<0.01	0.1	<0.01	0.7	<0.1	0.28	<1	<0.5	<0.2
1768023	Rock		0.003	<1	6	0.09	12	0.005	26	0.13	0.013	0.03	<0.1	<0.01	0.5	<0.1	<0.05	<1	<0.5	<0.2
1768024	Rock		0.062	18	4	0.74	358	0.011	<20	0.90	0.033	0.21	0.3	<0.01	3.1	<0.1	<0.05	3	<0.5	<0.2
1768025	Rock		0.073	6	15	0.91	158	0.121	<20	1.35	0.031	0.08	0.3	0.01	1.3	<0.1	2.10	5	1.4	0.3
1768026	Rock		0.039	7	10	0.81	197	0.020	<20	0.85	0.078	0.17	0.1	<0.01	8.0	<0.1	0.97	4	0.7	0.2
1768027	Rock		0.004	<1	995	11.14	2	0.006	27	0.21	<0.001	<0.01	0.1	<0.01	4.8	<0.1	0.09	<1	<0.5	<0.2
1768028	Rock		0.066	6	17	0.68	26	0.005	<20	0.63	0.042	0.03	<0.1	<0.01	4.0	<0.1	<0.05	3	<0.5	<0.2
1768029	Rock		0.005	<1	10	0.04	13	0.001	<20	0.05	0.021	<0.01	1.7	<0.01	0.2	<0.1	<0.05	<1	2.1	1.3
1768030	Rock		0.527	2	4	0.79	63	0.003	<20	0.15	0.024	0.01	0.5	<0.01	0.5	<0.1	<0.05	<1	<0.5	<0.2

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Method		WGHT	FA330	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
Analyte		Wgt	Au	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca
Unit		kg	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
MDL		0.01	2	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01
1768051	Rock	0.54	<2	0.2	69.8	16.6	63	<0.1	25.4	13.1	583	1.53	15.0	<0.5	6.3	105	0.3	1.3	<0.1	22	2.12
1768052	Rock	1.17	<2	0.5	8.1	2.0	72	<0.1	15.9	19.3	435	2.90	1.3	<0.5	1.3	21	0.2	0.1	<0.1	145	0.96
1768053	Rock	1.54	<2	<0.1	19.1	2.2	48	<0.1	33.3	22.0	185	3.18	1.6	0.9	5.0	36	0.2	0.1	<0.1	78	0.73
1768054	Rock	1.63	<2	3.9	64.9	17.7	65	0.2	11.8	2.0	165	3.29	16.4	1.6	2.3	113	0.3	3.6	0.5	62	0.74
1768055	Rock	1.04	34	0.4	5.2	4.4	20	0.1	14.6	8.6	557	1.85	56.1	34.1	4.4	18	0.2	4.0	0.2	12	0.07
1768056	Rock	0.49	3	15.7	15.3	1529.9	7	3.1	1.7	0.7	54	0.56	6.6	1.1	0.4	64	0.2	0.9	4.4	2	0.02
1768057	Rock	0.54	3	12.0	15.1	103.0	11	0.3	2.3	0.4	44	1.03	12.2	2.5	0.6	114	<0.1	0.5	0.3	4	0.02
1768058	Rock	1.55	231	37.2	75.5	>10000	3	57.7	1.6	0.3	41	0.78	4.3	224.9	0.2	23	5.6	2.9	72.5	4	<0.01
1768059	Rock	1.95	81	86.5	48.5	3570.8	6	11.5	2.7	0.5	57	1.17	5.0	72.2	0.4	22	0.8	2.6	15.5	7	<0.01
1768060	Rock	0.84	144	72.1	136.5	1847.9	8	14.0	2.7	0.5	72	0.94	6.1	138.1	0.7	19	0.2	8.7	3.5	11	<0.01
1768061	Rock	1.40	72	13.1	17.5	492.7	7	5.1	2.3	0.5	46	0.95	6.4	61.0	0.4	21	<0.1	0.6	0.5	10	<0.01
1768062	Rock	1.03	11	59.8	29.6	135.2	11	0.6	15.4	1.8	25	1.71	3.8	7.8	3.5	69	0.3	0.3	0.1	68	<0.01
1768063	Rock	2.01	19	8.1	136.5	18.3	29	0.4	53.8	25.9	284	4.83	22.6	19.8	3.7	37	<0.1	0.7	0.3	55	0.69
1768064	Rock	0.61	<2	0.4	134.6	11.2	27	0.2	19.3	17.7	641	1.35	0.8	1.5	3.9	189	0.1	0.2	0.1	14	2.68
1768065	Rock	1.53	<2	80.7	213.8	6.2	212	0.3	103.0	40.1	305	4.79	<0.5	1.6	9.9	32	0.4	<0.1	0.1	98	0.72
1768066	Rock	1.74	2	1.4	157.2	8.2	78	0.2	48.9	12.9	353	3.96	<0.5	2.0	1.5	130	0.5	0.1	0.2	33	1.45
1768067	Rock	2.78	249	50.8	104.1	>10000	3	82.4	1.3	0.3	29	0.79	4.7	239.5	0.3	14	5.2	8.5	109.5	3	<0.01
1768068	Rock	2.15	<2	0.2	61.0	66.7	92	0.2	45.4	21.5	602	2.21	0.5	0.5	0.3	648	<0.1	0.2	0.2	33	0.57
1768069	Rock	1.85	24	1.1	189.0	35.6	40	0.4	26.5	27.2	1075	3.35	21.6	29.4	6.7	134	0.2	0.4	0.3	8	4.67
1768070	Rock	1.56	558	0.6	1342.5	6997.3	8	20.4	2.9	1.6	270	0.72	<0.5	352.3	0.3	30	3.2	<0.1	30.4	4	0.73
1768071	Rock	0.71	4	0.2	41.0	37.2	21	0.1	25.4	10.7	84	1.49	21.5	2.3	7.7	410	<0.1	0.1	0.5	28	4.05
1768072	Rock	0.51	<2	0.2	15.6	10.0	43	<0.1	23.2	10.3	354	2.27	1.5	<0.5	11.4	15	<0.1	<0.1	0.1	11	0.26
1768073	Rock	0.72	<2	<0.1	6.6	5.9	65	<0.1	5.6	14.0	879	3.66	<0.5	<0.5	4.9	19	<0.1	0.2	<0.1	84	0.28
1768074	Rock	1.26	<2	<0.1	73.6	6.5	45	<0.1	9.1	13.3	717	3.07	1.3	0.9	0.7	86	<0.1	1.9	0.2	77	2.45
1768075	Rock	1.18	<2	0.2	57.1	3.6	10	0.2	46.1	13.8	91	1.88	254.9	<0.5	0.1	2	<0.1	3.1	<0.1	15	0.18

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	Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	0.001	1	1	0.01	1	0.001	20	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
1768051	Rock	0.081	17	22	0.47	104	0.115	<20	1.07	0.027	0.08	0.3	<0.01	2.6	<0.1	<0.05	4	<0.5	<0.2
1768052	Rock	0.030	2	25	1.54	133	0.361	<20	1.70	0.099	0.18	0.1	<0.01	5.5	<0.1	0.17	5	<0.5	<0.2
1768053	Rock	0.153	20	60	0.48	228	0.272	<20	0.50	0.113	0.12	0.1	<0.01	3.1	<0.1	1.30	3	1.3	<0.2
1768054	Rock	0.186	21	35	0.79	192	0.124	<20	1.63	0.006	0.14	<0.1	0.03	3.5	<0.1	0.08	7	6.2	<0.2
1768055	Rock	0.027	9	4	0.04	3491	0.002	<20	0.26	0.060	0.07	<0.1	0.01	4.4	<0.1	0.08	1	<0.5	0.3
1768056	Rock	0.020	2	6	<0.01	2980	0.001	<20	0.06	0.002	0.02	<0.1	<0.01	0.3	<0.1	0.19	<1	14.5	<0.2
1768057	Rock	0.024	6	6	<0.01	2377	<0.001	<20	0.06	0.002	0.03	<0.1	<0.01	0.4	<0.1	0.19	<1	3.6	<0.2
1768058	Rock	0.028	1	8	<0.01	822	<0.001	<20	0.03	0.004	0.02	<0.1	0.79	0.2	0.2	0.67	<1	>100	12.6
1768059	Rock	0.043	3	9	<0.01	813	<0.001	<20	0.05	0.004	0.05	<0.1	0.25	0.4	<0.1	0.35	<1	26.5	3.8
1768060	Rock	0.039	4	11	0.14	284	0.001	<20	0.19	0.010	0.03	<0.1	0.24	0.5	<0.1	0.17	<1	11.7	8.0
1768061	Rock	0.037	4	9	<0.01	538	0.001	<20	0.05	0.005	0.03	<0.1	0.03	0.4	<0.1	0.14	<1	3.5	2.0
1768062	Rock	0.057	10	32	0.03	345	0.048	<20	0.12	0.060	0.14	0.1	0.02	3.4	<0.1	0.88	2	13.2	0.6
1768063	Rock	0.156	21	72	0.68	262	0.247	<20	0.77	0.094	0.08	0.5	0.03	3.2	<0.1	2.37	5	1.8	<0.2
1768064	Rock	0.060	12	15	0.33	102	0.116	<20	0.71	0.047	0.01	0.2	0.01	1.8	<0.1	0.38	3	<0.5	<0.2
1768065	Rock	0.193	27	75	1.56	90	0.173	<20	1.84	0.056	0.57	0.1	0.01	4.2	0.4	1.82	6	3.7	0.2
1768066	Rock	0.046	4	17	0.32	54	0.147	<20	1.06	0.039	0.04	0.1	<0.01	1.9	<0.1	0.67	4	2.4	0.2
1768067	Rock	0.029	1	7	<0.01	653	<0.001	<20	0.02	0.005	<0.01	<0.1	0.98	0.2	0.2	0.87	<1	>100	14.0
1768068	Rock	0.013	4	12	1.13	2472	0.019	<20	1.12	0.011	0.02	<0.1	<0.01	4.3	<0.1	0.13	3	<0.5	<0.2
1768069	Rock	0.046	26	10	0.22	385	0.067	<20	0.74	0.004	0.04	3.7	0.02	1.3	<0.1	1.65	2	1.2	<0.2
1768070	Rock	0.010	3	7	0.07	784	0.003	<20	0.10	0.006	<0.01	<0.1	0.05	0.6	<0.1	0.27	<1	28.7	4.5
1768071	Rock	0.040	9	32	0.37	103	0.087	<20	6.43	0.384	0.14	0.3	<0.01	2.9	<0.1	0.20	14	<0.5	<0.2
1768072	Rock	0.045	13	13	0.55	123	0.027	<20	1.25	0.016	0.36	<0.1	<0.01	2.5	<0.1	<0.05	3	<0.5	<0.2
1768073	Rock	0.037	15	10	1.85	292	0.058	<20	2.08	0.043	0.52	<0.1	<0.01	7.3	<0.1	<0.05	7	<0.5	<0.2
1768074	Rock	0.143	5	10	1.11	1265	0.075	<20	1.20	0.116	0.34	<0.1	0.04	6.3	<0.1	0.20	4	<0.5	<0.2
1768075	Rock	0.009	<1	706	1.24	48	0.018	<20	0.69	0.005	<0.01	<0.1	0.04	1.1	<0.1	0.31	1	1.4	<0.2

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Project: LIV
Report Date: August 22, 2014

QUALITY CONTROL REPORT WHI14000090.1

		Method	WGHT	FA330	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
		Analyte	Wgt	Au	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca
		Unit	kg	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
		MDL	0.01	2	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01
Pulp Duplicates																						
1768010	Rock		2.49	641	70.7	135.7	702.3	68	28.7	13.5	0.8	44	1.75	158.2	543.5	0.9	43	0.5	7.5	0.2	14	0.03
REP 1768010	QC			707																		
REP 1768011	QC				16.6	22.4	20.9	141	0.9	18.7	1.8	110	2.02	53.8	1.5	4.2	43	0.2	2.5	0.2	49	0.10
1768064	Rock		0.61	<2	0.4	134.6	11.2	27	0.2	19.3	17.7	641	1.35	0.8	1.5	3.9	189	0.1	0.2	0.1	14	2.68
REP 1768064	QC			<2																		
1768066	Rock		1.74	2	1.4	157.2	8.2	78	0.2	48.9	12.9	353	3.96	<0.5	2.0	1.5	130	0.5	0.1	0.2	33	1.45
REP 1768066	QC				1.5	154.8	8.1	77	0.2	47.1	12.3	352	3.89	<0.5	1.6	1.5	133	0.4	0.1	0.2	33	1.44
Core Reject Duplicates																						
1768011	Rock		1.01	6	15.7	21.4	20.9	136	0.8	17.1	1.9	108	1.99	52.0	2.8	4.4	42	0.1	2.6	0.2	48	0.09
DUP 1768011	QC			4	16.1	21.2	20.1	132	0.8	18.5	1.8	103	1.94	52.4	4.3	4.2	43	0.2	2.5	0.2	49	0.10
1768069	Rock		1.85	24	1.1	189.0	35.6	40	0.4	26.5	27.2	1075	3.35	21.6	29.4	6.7	134	0.2	0.4	0.3	8	4.67
DUP 1768069	QC			22	1.6	199.4	33.5	42	0.4	27.1	28.0	1101	3.41	20.2	24.6	6.9	128	0.2	0.4	0.3	8	4.63
Reference Materials																						
STD DS10	Standard				13.1	154.6	154.3	375	1.9	74.0	12.8	873	2.74	43.7	59.2	7.0	61	2.7	8.2	12.3	42	1.05
STD DS10	Standard				15.5	153.0	152.3	366	1.8	77.9	13.2	890	2.78	42.6	47.0	7.5	63	2.8	8.5	12.0	43	1.07
STD OREAS45EA	Standard				1.5	698.6	14.7	32	0.3	399.5	53.9	400	24.96	11.1	50.8	10.0	4	<0.1	0.3	0.3	314	0.04
STD OREAS45EA	Standard				1.5	693.4	14.5	30	0.3	372.8	47.9	404	20.43	9.6	66.2	10.0	3	<0.1	0.3	0.2	285	0.04
STD OXD108	Standard			419																		
STD OXD108	Standard			418																		
STD OXI121	Standard			1802																		
STD OXI121	Standard			1789																		
STD OXD108 Expected				414																		
STD OXI121 Expected				1834																		
STD DS10 Expected					14.69	154.61	150.55	370	2.02	74.6	12.9	875	2.7188	43.7	91.9	7.5	67.1	2.49	8.23	11.65	43	1.0625
STD OREAS45EA Expected					1.39	709	14.3	28.9	0.26	381	52	400	23.51	9.1	53	10.7	3.5	0.02	0.2	0.26	303	0.036
BLK	Blank			<2																		
BLK	Blank			<2																		
BLK	Blank			<2																		

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Project: LIV
Report Date: August 22, 2014

QUALITY CONTROL REPORT WHI14000090.1

		Method	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
		Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
		MDL	0.001	1	1	0.01	1	0.001	20	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
Pulp Duplicates																				
1768010	Rock		0.061	4	8	0.01	434	<0.001	<20	0.13	0.002	0.05	0.1	0.11	1.1	0.1	0.10	<1	4.8	15.9
REP 1768010	QC																			
REP 1768011	QC		0.123	19	14	0.03	1514	0.003	<20	0.28	0.004	0.14	0.2	0.03	2.2	<0.1	0.12	1	9.6	0.3
1768064	Rock		0.060	12	15	0.33	102	0.116	<20	0.71	0.047	0.01	0.2	0.01	1.8	<0.1	0.38	3	<0.5	<0.2
REP 1768064	QC																			
1768066	Rock		0.046	4	17	0.32	54	0.147	<20	1.06	0.039	0.04	0.1	<0.01	1.9	<0.1	0.67	4	2.4	0.2
REP 1768066	QC		0.044	4	17	0.32	52	0.149	<20	1.05	0.038	0.04	0.1	<0.01	2.0	<0.1	0.67	4	2.1	0.2
Core Reject Duplicates																				
1768011	Rock		0.122	19	14	0.03	1557	0.003	<20	0.31	0.004	0.14	0.3	0.04	2.1	<0.1	0.12	1	10.1	0.3
DUP 1768011	QC		0.122	19	14	0.03	1440	0.003	<20	0.28	0.004	0.14	0.3	0.04	2.1	<0.1	0.12	1	10.2	0.2
1768069	Rock		0.046	26	10	0.22	385	0.067	<20	0.74	0.004	0.04	3.7	0.02	1.3	<0.1	1.65	2	1.2	<0.2
DUP 1768069	QC		0.048	28	10	0.24	431	0.064	<20	0.73	0.003	0.04	3.5	0.01	1.2	<0.1	1.68	2	1.6	<0.2
Reference Materials																				
STD DS10	Standard		0.074	16	56	0.76	420	0.072	<20	1.01	0.066	0.33	3.3	0.28	2.9	5.3	0.29	5	2.3	4.9
STD DS10	Standard		0.076	18	56	0.77	412	0.078	35	1.00	0.067	0.33	3.5	0.29	2.9	5.5	0.28	4	2.2	5.3
STD OREAS45EA	Standard		0.030	7	925	0.09	141	0.091	<20	3.26	0.025	0.06	<0.1	0.01	78.5	<0.1	<0.05	13	1.5	<0.2
STD OREAS45EA	Standard		0.028	7	826	0.09	140	0.089	<20	3.09	0.020	0.05	<0.1	<0.01	69.9	<0.1	<0.05	11	1.1	<0.2
STD OXD108	Standard																			
STD OXD108	Standard																			
STD OXI121	Standard																			
STD OXI121	Standard																			
STD OXD108 Expected																				
STD OXI121 Expected																				
STD DS10 Expected			0.073	17.5	54.6	0.775	359	0.0817		1.0259	0.067	0.338	3.32	0.3	2.8	5.1	0.29	4.3	2.3	5.01
STD OREAS45EA Expected			0.029	6.57	849	0.095	148	0.0875		3.13	0.02	0.053			78	0.072	0.036	11.7	0.6	0.07
BLK	Blank																			
BLK	Blank																			
BLK	Blank																			

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Project: LIV
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QUALITY CONTROL REPORT WHI14000090.1

		WGHT Wgt kg 0.01	FA330 Au ppb 2	AQ200 Mo ppm 0.1	AQ200 Cu ppm 0.1	AQ200 Pb ppm 0.1	AQ200 Zn ppm 1	AQ200 Ag ppm 0.1	AQ200 Ni ppm 0.1	AQ200 Co ppm 0.1	AQ200 Mn ppm 1	AQ200 Fe % 0.01	AQ200 As ppm 0.5	AQ200 Au ppb 0.5	AQ200 Th ppm 0.1	AQ200 Sr ppm 1	AQ200 Cd ppm 0.1	AQ200 Sb ppm 0.1	AQ200 Bi ppm 0.1	AQ200 V ppm 2	AQ200 Ca % 0.01
BLK	Blank		<2																		
BLK	Blank			<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01
BLK	Blank			<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01
Prep Wash																					
G1-WHI	Prep Blank		<2	0.1	3.3	3.7	45	<0.1	2.7	3.8	566	1.88	2.8	<0.5	5.5	56	<0.1	<0.1	<0.1	36	0.46
G1-WHI	Prep Blank		<2	<0.1	3.6	3.6	45	<0.1	2.8	3.8	564	1.92	2.3	<0.5	5.2	58	<0.1	<0.1	<0.1	36	0.48

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QUALITY CONTROL REPORT WHI14000090.1

		AQ200 P % 0.001	AQ200 La ppm 1	AQ200 Cr ppm 1	AQ200 Mg % 0.01	AQ200 Ba ppm 1	AQ200 Ti % 0.001	AQ200 B ppm 20	AQ200 Al % 0.01	AQ200 Na % 0.001	AQ200 K % 0.01	AQ200 W ppm 0.1	AQ200 Hg ppm 0.01	AQ200 Sc ppm 0.1	AQ200 Tl ppm 0.1	AQ200 S % 0.05	AQ200 Ga ppm 1	AQ200 Se ppm 0.5	AQ200 Te ppm 0.2
BLK	Blank																		
BLK	Blank	<0.001	<1	<1	<0.01	<1	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<0.001	<1	<1	<0.01	<1	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
Prep Wash																			
G1-WHI	Prep Blank	0.072	13	6	0.47	169	0.121	<20	0.89	0.092	0.47	0.1	<0.01	2.3	0.4	<0.05	5	<0.5	<0.2
G1-WHI	Prep Blank	0.072	12	6	0.48	168	0.119	<20	0.96	0.103	0.48	<0.1	<0.01	2.2	0.3	<0.05	5	<0.5	<0.2

Appendix V: Aurora Geophysics IP and Magnetometer Report

See back folder for Aurora maps and figures:

- Grid Location Map
- Stacked Section – Apparent Chargeability
- Stacked Section – Calculated Apparent Resistivity
- Ground Magnetics – Main Showing – Shaded Grid
- Ground Magnetics – North Showing – Shaded Grid

AURORA GEOSCIENCES

NORTHERN GEOLOGICAL & GEOPHYSICAL CONSULTANTS

YELLOWKNIFE - WHITEHORSE - JUNEAU

34A Laberge rd. Whitehorse, YT, Y1A 5Y9 (p) 867.668.7672

MEMORANDUM

To: Bruce Durham **Date:** August 25, 2014

From: Louis Rosenthal
Dave Hildes

Re: 2014LivingstoneDC/IP& Magnetics Field Report

This memorandum describes an induced polarization / DC resistivity (2D DCIP) survey and a total field magnetic (MAG) survey completed for Goldspike Exploration Inc. on the Livingstone property between August 9th and August 19th, 2014. The purpose of the survey was to measure the resistivity and chargeability across a gold showing on the property, as well as measure the total magnetic field on two separate grids.

Three Aurora Geosciences Ltd. personnel and a geological consultant (Dan Ferraro) left Whitehorse in a Cessna Grand Caravan on August 9th 2014 and landed half an hour later at the Livingstone air strip. They were met by a Raven R44 helicopter operated by Capital Helicopters which slung the equipment up to the existing camp near the grid. The grids were accessed by foot and with a Yamaha Big Bear ATV, provided by Druid Exploration. Safety and operational training occurred on the evening of the 9th, and the survey started on the 10th lasting a total of 6 days. Following this 2 personnel were flown out in a Cessna 172 and the remaining crew members surveyed approximately 22 km of ground magnetics over the next three days before packing up camp and flying back to Whitehorse on the 19th. There were no significant damages to equipment, no safety incidents, and all sites were cleaned of litter after the survey. A few stainless steel electrodes were lost during the course of the survey. Weather was highly variable, with strong winds, variable cloud cover and at least some rain every day. Daily logs, personnel tracking sheet and a production summary are included with this report.

The source of signal for the DCIP survey was a single GDD TxII3.6 kW steady-voltage IP transmitter which allows up to 2400V and 3600 watts of power. The transmitter array consisted of a stationary and roving current injection site to transmit current to the ground. The transmitter was powered by a 5 kW Honda Gasoline generator. Total fuel consumption was approximately 100 L. The primary voltage and chargeability was collected by an Iris Elrec-Pro 10-channel receiver which was plugged into a 500 m array with stainless steel electrodes every 50m. At the end of a line the array was “rolled-off” by progressively reducing the number of dipoles until the operator decided that the data was past the anomaly. The job specification for the survey asked for only 6 dipoles (n=6) and the operator did not spend extra time to capture the n=7-10 data, though for the majority of the survey this data was available and of high quality and was recorded.

The grid consisted of five 2 km roughly E-W oriented lines separated by 200m (see location map). It took 6 days to complete the 2D DCIP survey of the grid. The three northern lines were shifted 200 m east from the original plan, to better close off the anomaly at this end. Signal levels were generally excellent, although the highly conductive ground noticed near station 1000E required multiple measurements to ensure repeatability. An additional source of noise was ground movement caused by the vegetation blowing in the wind.

Stacked sections of the apparent chargeability, calculated apparent resistivity and chargeability error are included with this report. Data is consistent across all lines and the strike of the geology is approximately perpendicular to

the survey direction. The west end of all lines is a resistive, low chargeability zone. To the east there is a wide moderately resistive and chargeable zone which spans stations 800E to 1200E. At the core of this zone is a very low resistivity and high chargeability anomaly measured on most lines between 1000E and 1050E. Further east is a shallow high resistivity zone, followed by another low resistivity, high chargeability anomaly centered on 1650E to 1700E.

The ground magnetic data took parts of three days to acquire. The grid was designed by Dan Ferraro to overlap and supplement existing ground magnetic grids in the main showing area and in the north showing as well. Weather was particularly bad during the magnetic survey, and most of the grids were in thick brush, which hampered progress. The survey lines were oriented E-W and spaced 100 m apart. The base station was located near camp and levelling grids were created for each grid and surveyed daily. All magnetometers were synched to GPS time daily and each data point had a time stamp. The sensors were mounted on 2.5m poles and readings were taken approximately every 10 m. Survey lines were situated using a handheld GPS which recorded a track log that was used to georeference the final data.

a. Crew and Equipment

The following personnel conducted the survey:

Louis Rosenthal	Crew Chief	August 9-19th, 2014
Dan Ferraro	Consulting Geologist	August 9-19th, 2014
Matthew Ford	Geophysical technician	August 9-16th, 2014
Laurence Gagnon	Geophysical technician	August 9-16th, 2014

The crew was equipped with the following instruments and equipment:

IP receiver	1 - Iris Elrec Pro 10 channel IP receiver s/n: 165
IP transmitter	1 - GDD TxII 3.6 kW s/n:266
Generator	1 - Honda Ex5000 5kW generator
IP Equipment	1 - Repair tools and spare IP parts
	24 - 50m 10 pin receiver array cables
	30 - Stainless steel electrodes
	5 km - 18 gauge wire
	2 - Georeels
	3- spools
Magnetometers	3 - GEM GSM-19 Magnetometers
Other	1 - laptop with Geosoft IP package
	5 - Garmin handheld non-differential GPS
	5 - Icom handheld radios
	1 - Icom Base Radio

b. Survey Location

The Livingstone Property is located approximately 80 km north of Whitehorse and is accessed by fixed wing aircraft and helicopter.

c. Survey Specifications

GPS Gridding

Geographic datum & projection:	NAD83 Zone 8 UTM coordinates
Grid location:	The grid locations were provided by Dan Ferraro.
Station location:	Stations were situated using handheld Garmin GPS's
Grid Registration	GPS locations for each station were determined by examining the track logs of the operators.

2D DCIP

Array:	Pole-dipole
Dipole Spacing:	50 m
Dipoles range:	N=1-10
Transmitter settings:	Time domain, 50% duty cycle, reversing polarity, 0.125 Hz.
Receiver Settings:	Semi-logarithmically spaced time gates
Stacks:	15 stacks per reading
Repeats	If the initial reading had an S.D greater than 5 mV/V or if the reading was suspected for any reason, the reading was repeated until the operator determined the data was acceptable or unattainable.
Distant Electrode:	The distant electrode was placed in a creek approximately 600 m from the start of the grid.

MAG

Station spacing:	10 m
Base station magnetometer:	Installed on the grid and cycled at 3 s throughout the survey
Corrections:	Temporal geomagnetic variations were removed by linear interpolation of drift determined by the base station magnetometer.

d. Data Processing

2D DCIP

Data were downloaded from the receiver and imported into Geosoft's Oasis Montaj IP package. GPS databases are created from the track log and waypoints in the GPS dump files. Geosoft's "georeference IP database" function was used to assign coordinates to each electrode of each reading. Every reading was inspected and irregular readings which did not repeat were rejected using the Oasis Montaj's IP quality control tool.

The apparent resistivity was recalculated using a four electrode equation assuming a homogeneous earth using georeferenced coordinates. The apparent resistivity and total chargeability were averaged using a weighted mean based on the number of stacks and the standard deviation of the chargeability. The plotting stations for the pseudosections were georeferenced using a cross-database channel lookup and the topography was assigned to these stations by sampling the digital elevation model. Table 1 lists the name and description of the channels in the final databases.

Table 1: List and description of the channels in the 2D DCIP databases

Channel Name	Description
X	Georeferenced Plot point -Easting
Y	Georeferenced Plot point -Northing
Z	Georeferenced Plot point - Elevation
__X	Local Coordinate Plot point - Station
__Y	Local Coordinate Plot point - Line
__Z	Local Coordinate Plot point - Depth
Stn	Stn, defined by geosoft as the midpoint between RX1 and TX1
stn_utme	Easting of Stn
stn_utmn	Northing of Stn
Topo	Elevation of Stn
T1X	Local Coordinate of T1X (roving current electrode)
T1X_	UTM Easting Nad 83 Zone 8 coordinate of T1X
T1Y_	UTM Northing Nad 83 Zone 8 coordinate of T1X
T1Z_	Elevation of T1X
t2_Z	Elevation of T2X
T2X	Dummy value local coordinate of infinite electrode
T2X_	UTM Easting Nad 83 Zone 8 coordinate of T2X
T2y_	UTM Northing Nad 83 Zone 8 coordinate of T2X
R1X	Local Coordinate of potential electrode 1
R1X_	UTM Easting Nad 83 Zone 8 coordinate of R1X
R1Y_	UTM Northing Nad 83 Zone 8 coordinate of R1X
R1Z_	Elevation of R1X
R2X	Local Coordinate of potential electrode 2
R2X_	UTM Easting Nad 83 Zone 8 coordinate of R2X
R2Y_	UTM Northing Nad 83 Zone 8 coordinate of R2X
R2Z_	Elevation of R2X
Date	Date of data acquisition
DayTime	Time of data acquisition
Type	Geosoft indicator of array type
Time	Length of the reading window
Stack	Number of transmitter cycles measured during the course of the reading
RsCheck	Contact resistance of potential electrodes (kOhm)
IP_Index	Necessary channel for Geosoft Database
IP_Mask[0]	Geosoft mask value in the 40-80 ms offtime window (mV/V)
IP_Mask[1]	Geosoft mask value in the 80-120 ms offtime window (mV/V)
IP_Mask[2]	Geosoft mask value in the 120-160 ms offtime window (mV/V)
IP_Mask[3]	Geosoft mask value in the 160-200 ms offtime window (mV/V)
IP_Mask[4]	Geosoft mask value in the 200-240 ms offtime window (mV/V)
IP_Mask[5]	Geosoft mask value in the 240-280 ms offtime window (mV/V)
IP_Mask[6]	Geosoft mask value in the 280-360 ms offtime window (mV/V)

IP_Mask[7]	Geosoft mask value in the 360-440 ms offtime window (mV/V)
IP_Mask[8]	Geosoft mask value in the 440-520 ms offtime window (mV/V)
IP_Mask[9]	Geosoft mask value in the 520-600 ms offtime window (mV/V)
IP_Mask[10]	Geosoft mask value in the 600-680 ms offtime window (mV/V)
IP_Mask[11]	Geosoft mask value in the 680-760 ms offtime window (mV/V)
IP_Mask[12]	Geosoft mask value in the 760-840 ms offtime window (mV/V)
IP_Mask[13]	Geosoft mask value in the 840-1000 ms offtime window (mV/V)
IP_Mask[14]	Geosoft mask value in the 1000-1160 ms offtime window (mV/V)
IP_Mask[15]	Geosoft mask value in the 1160-1320 ms offtime window (mV/V)
IP_Mask[16]	Geosoft mask value in the 1320-1480 ms offtime window (mV/V)
IP_Mask[17]	Geosoft mask value in the 1480-1640 ms offtime window (mV/V)
IP_Mask[18]	Geosoft mask value in the 1640-1800 ms offtime window (mV/V)
IP_Mask[19]	Geosoft mask value in the 1800-1960 ms offtime window (mV/V)
Sp	Spontaneous potential (mV/V)
ResCalc	Apparent resistivity calculated by Geosoft (without correction for proximal infinite) (Ohm*m)
ResMeas	Apparent resistivity calculated by the receiver (local coordinate) (Ohm*m)
Vp	Primary voltage measured 1260 into the ontime window (mV)
VP_Final	Primary voltage normalized by the current then averaged between repeated readings weighted according to their standard deviation. (mV/mA)
QC_RES	Quality control for the resistivity channel
Recalc_res	Resistivity calculated using four electrode equation.
Res_Final	Final Calculated Resistivity averaged between repeated readings weighted according to their standard deviation. (ohm.m)
I	Transmitter current (A)
Chg	Average chargeability calculated by the receiver
IP[0]	Normalized Voltage measurement in the 40-80 ms offtime window (mV/V)
IP[1]	Normalized Voltage measurement in the 80-120 ms offtime window (mV/V)
IP[2]	Normalized Voltage measurement in the 120-160 ms offtime window (mV/V)
IP[3]	Normalized Voltage measurement in the 160-200 ms offtime window (mV/V)
IP[4]	Normalized Voltage measurement in the 200-240 ms offtime window (mV/V)
IP[5]	Normalized Voltage measurement in the 240-280 ms offtime window (mV/V)
IP[6]	Normalized Voltage measurement in the 280-360 ms offtime window (mV/V)
IP[7]	Normalized Voltage measurement in the 360-440 ms offtime window (mV/V)
IP[8]	Normalized Voltage measurement in the 440-520 ms offtime window (mV/V)
IP[9]	Normalized Voltage measurement in the 520-600 ms offtime window (mV/V)
IP[10]	Normalized Voltage measurement in the 600-680 ms offtime window (mV/V)
IP[11]	Normalized Voltage measurement in the 680-760 ms offtime window (mV/V)
IP[12]	Normalized Voltage measurement in the 760-840 ms offtime window (mV/V)
IP[13]	Normalized Voltage measurement in the 840-1000 ms offtime window (mV/V)
IP[14]	Normalized Voltage measurement in the 1000-1160 ms offtime window (mV/V)
IP[15]	Normalized Voltage measurement in the 1160-1320 ms offtime window (mV/V)
IP[16]	Normalized Voltage measurement in the 1320-1480 ms offtime window (mV/V)
IP[17]	Normalized Voltage measurement in the 1480-1640 ms offtime window (mV/V)

IP[18]	Normalized Voltage measurement in the 1640-1800 ms offtime window (mV/V)
IP[19]	Normalized Voltage measurement in the 1800-1960 ms offtime window (mV/V)
IP_Avg	Average Chargeability calculated by the receiver
IP_Avg_Final	Final Apparent chargeability averaged between repeated readings weighted according to their standard deviation. (mV/V)
IP_err_FInal	Final Chargeability error averaged between repeated readings weighted according to their standard deviation. (mV/V)
MF	Calculated Metal Factor
N	The dipole number in the array
Q	Standard deviation of the average chargeability during the reading (mV/V)
QC	Quality control for IP_Avg Channel

MAGNETICS

The MAG data were downloaded and corrected for diurnal variations using GEM systems software which was also used to append the GPS positioning data collected during the survey. The corrected and georeferenced data were then imported into Geosoft software. The software was used to grid the line data and produce an image of the total magnetic field measured over the survey areas. Table 12 lists the name and description of the channels in the final databases.

Table 2: List and description of the channels in the MAG databases

Channel Name	Description
Line	line coordinate for data point
Station	station coordinate for data point
UTME_nad83_z8	Easting UTM coordinate for data point, as NAD83 zone 8
UTMN_nad83_z8	Easting UTM coordinate for data point, as NAD83 zone 8
RawMag	Uncorrected magnetic reading
Corr_mag	Diurnal corrected magnetic reading
Signal	Sensor quality
Time	Time of reading

e. Products

The following files are included in the digital version of this report:

File / Folder name	Description of contents
\Daily Log\	Daily log, Production summary and Personnel Tracking Sheet in PDF format
\Databases\	Final Databases in Geosoft .gdb and ASCII format
\Figures\	Stacked 2D DCIP pseudo-sections and magnetic grid plan maps in PDF format
\Raw\	Raw IP receiver, magnetometer and GPS receiver dump files

Respectfully submitted,

Aurora Geosciences Ltd.

Louis Rosenthal, B Sc.

Appendix VI: Precision Geophysics Airborne Geophysical Report

Precision GeoSurveys

AIRBORNE GEOPHYSICAL SURVEY REPORT

Livingstone Survey Block
Prepared for Goldspike Exploration Inc.

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1.0 Introduction

This report outlines the geophysical survey operations and data processing procedures taken during the high resolution airborne magnetic and radiometric survey flown at the Livingstone survey block for Goldspike Exploration Inc. The survey area is located east of Livingstone Creek, Yukon (Figure 1). The geophysical survey was flown on September 08, 2014 and September 09, 2014.

Figure 1: Livingstone survey block location map.

1.1 Survey Area

Livingstone survey block is located east of Livingstone Creek approximately 84 km north east of Whitehorse, YT. It covers an irregular area of 8.6 km by 4.0 km (Figure 2). A total of 284 line kilometers of magnetic and radiometric data were collected; this total includes tie lines and survey lines.

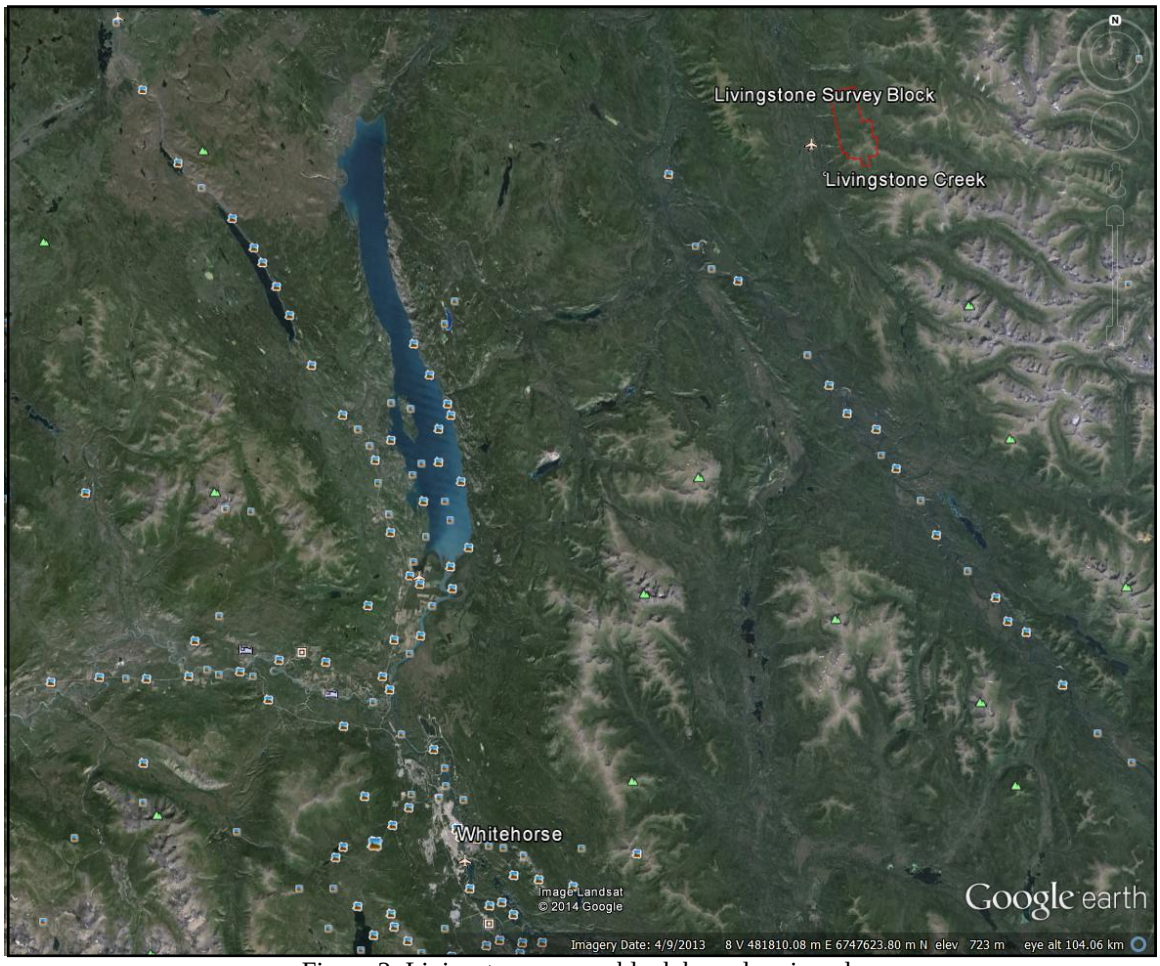


Figure 2: Livingstone survey block boundary in red.

The survey block was flown at 100 meter spacing at a 077°/257° heading; the tie lines were flown at 1000 meter spacing at a heading of 167°/347° (Figures 3 and 4).

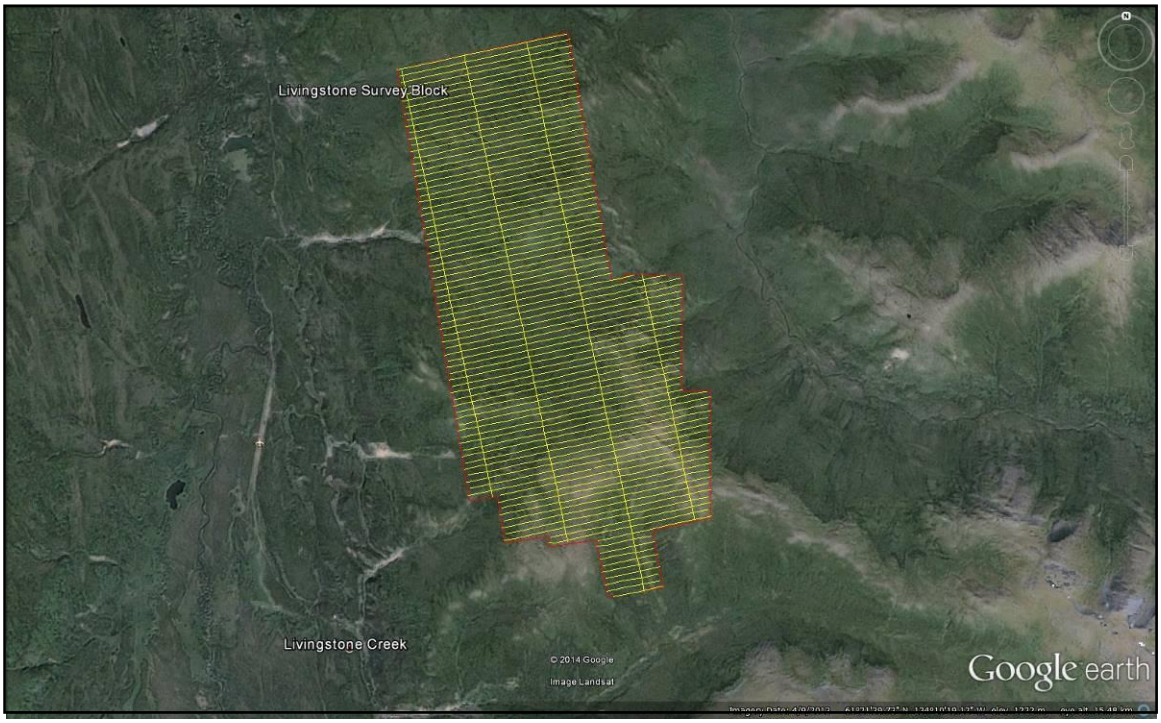


Figure 3: Plan View – Livingstone survey block with actual survey and tie lines outlined in yellow, and the block boundary in red.

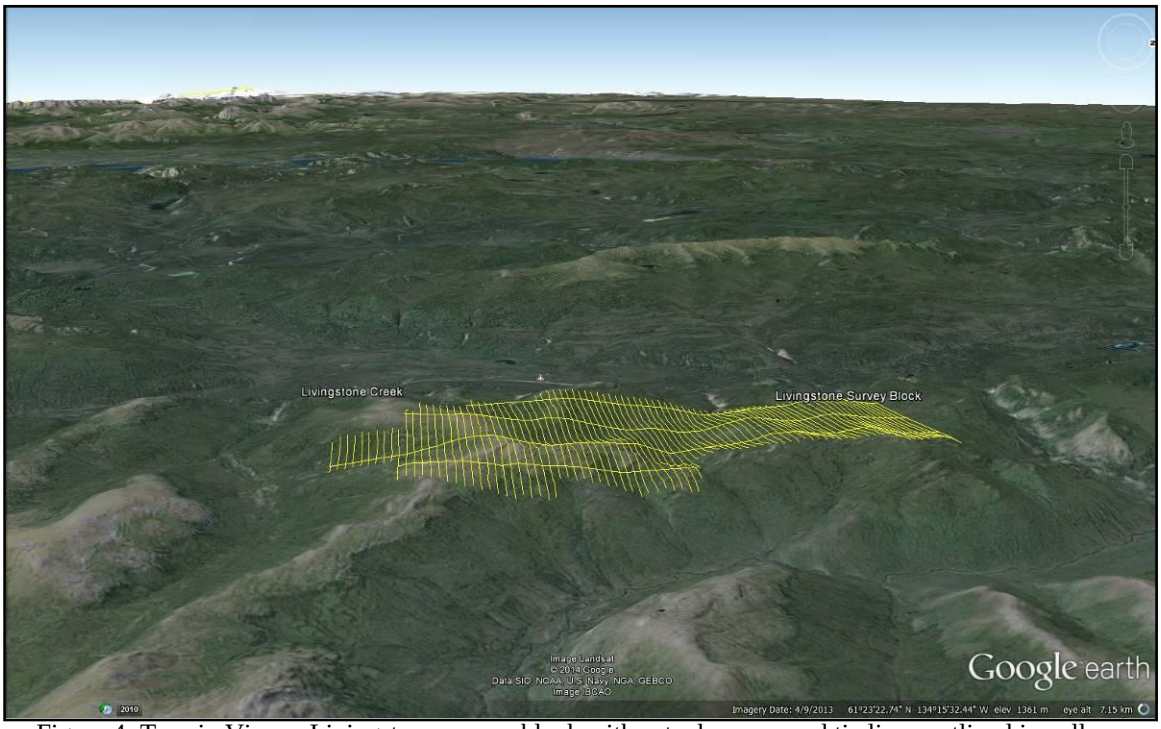


Figure 4: Terrain View – Livingstone survey block with actual survey and tie lines outlined in yellow.

1.2 Survey Specifications

The geodetic system used for this survey is WGS 84 and the area is contained in zone 8N. A total of 284 line km was flown (Figure 5). The survey data acquisition specifications and coordinates for the survey are specified as follows (Tables 1 and 2).

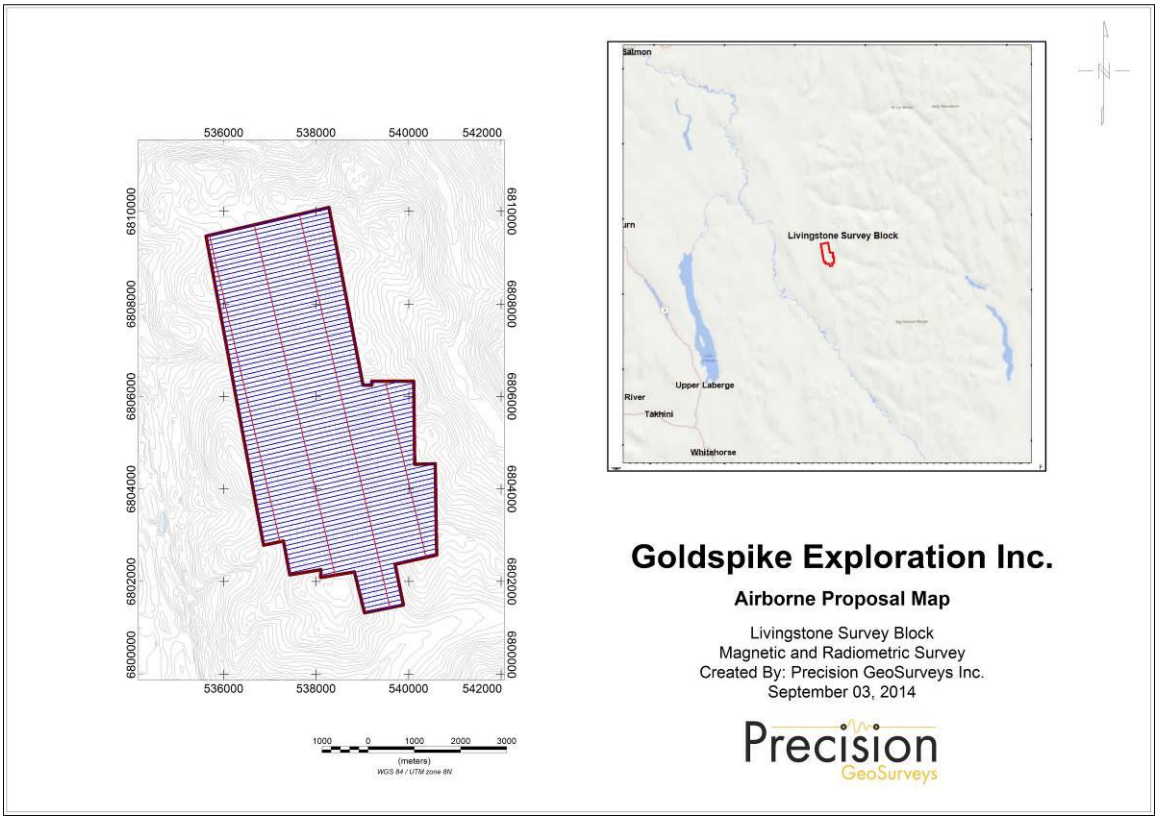


Figure 5: Survey map of Livingstone survey area showing outlines of proposed survey and tie lines.

Survey Block	Area (km^2)	Planned Line Spacing (m)	Planned Survey Line (km)	Planned Tie Line (km)	Survey Line Orientation	Nominal Survey Height (m)	Actual Survey Height (m)	Total Planned Line (km)	Total Actual Flown (km)
Livingstone	25.5	100	257	27	077°/257°	40	42.22	284	284
Total								284	284

Table 1: Livingstone survey area flight line specifications.

Longitude	Latitude	Easting	Northing	N/S	E/W
134.33270882	61.41741950	535616	6809465	N	W
134.28280438	61.42274993	538273	6810087	N	W
134.26976366	61.38817012	539012	6806243	N	W
134.26618882	61.38815089	539203	6806243	N	W
134.26617030	61.38894083	539203	6806331	N	W
134.24919413	61.38884822	540110	6806331	N	W
134.24924412	61.37271537	540128	6804534	N	W
134.24086073	61.37277657	540576	6804546	N	W
134.24083881	61.36055761	540593	6803185	N	W
134.24074708	61.35508060	540605	6802575	N	W
134.25763591	61.35335136	539704	6802372	N	W
134.25445836	61.34544244	539884	6801493	N	W
134.27024993	61.34401985	539041	6801325	N	W
134.27410350	61.35196791	538825	6802208	N	W
134.28781305	61.35094512	538093	6802086	N	W
134.28766641	61.35246160	538099	6802255	N	W
134.30030794	61.35153071	537424	6802144	N	W
134.30266666	61.35812355	537290	6802877	N	W
134.31072545	61.35732970	536860	6802784	N	W

Table 2: Livingstone survey block polygon coordinates using WGS 84 in zone 8N.

2.0 Geophysical Data

Geophysical data are collected in a variety of ways and are used to aid in determination of geology, mineral deposits, oil and gas deposits, geotechnical investigations, contaminated land sites and UXO detection.

For the purposes of this survey, airborne magnetic and radiometric data were collected to serve in the exploration for potential gold deposits.

2.1 Magnetic Data

Magnetic surveying is probably the most common airborne survey type to be conducted for both mineral and hydrocarbon exploration. The type of survey specifications, instrumentation, and interpretation procedures depend on the objectives of the survey. Typically magnetic surveys are performed for:

1. Geological Mapping - to aid in mapping lithology, structure and alteration.
2. Depth to Basement mapping - for exploration in sedimentary basins or mineralization associated with the basement surface.

2.2 Radiometric Data

Radiometric surveys detect and map natural radioactive emanations, called gamma rays, from rocks and soils. All detectable gamma radiation from earth materials come from the natural decay products of three primary elements; uranium (U), thorium (Th), and potassium (K). The purpose of radiometric surveys is to determine either the absolute or relative amounts of U, Th, and K in surface rocks and soils which are then useful in mapping lithology, alteration, and structure.

3.0 Survey Operations

Precision GeoSurveys flew the survey out of Livingstone Creek. The experience of the pilot helped to ensure that the data quality objectives were met and that the safety of the flight crew was never compromised given the potential risks involved in airborne geophysical surveying. Field processing and quality control checks were done daily.

3.1 Operations Base and Crew

The base of operation for this survey was at Livingstone airstrip, YT. It is located 3.8 km west of the survey block (Figure 6).

Figure 6: Map showing Livingstone airstrip; base of operation.

The Precision geophysical crew consisted of three members:

Don Plattel– Pilot
Christina Larocque - Operator
Jenny Poon – Geophysicist and data processor

The survey was flown on August 08, 2014 and August 09, 2014. The survey did not encounter any delays.

3.2 Base Station Specifications

Two base station magnetometers were set up before the survey to ensure that diurnal magnetic activity was recorded during the survey flights. In this case, two GEM GSM 19T base stations (Figure 7), GEM 2 (Serial # 2105650) and GEM 4 (Serial # 2065370), were located in the bushes east of the Livingstone airstrip (see Table 3 and Figure 8).

Station name	Easting/ Northing	Longitude/ Latitude	Datum/ Projection
GEM 2 (Serial # 2105650)	0533636E, 6803748N	134° 22' 15.02" W 61° 21' 58.61" N	WGS 84, Zone 8N
GEM 4 (Serial # 2065370)	0533636E, 6803746N	134° 22' 15.02 " W 61° 21' 58.54" N	WGS 84, Zone 8N

Table 3: Base station specifications.

Base station readings were reviewed at regular intervals to ensure that no data were collected during periods with high diurnal activity (greater than 5 nT per minute). The magnetic base stations were installed at a magnetically noise-free area, away from metallic items such as ferrous objects, vehicles, or power lines that could affect the survey data.

Figure 7: GEM 2 (left) and GEM 4 (right) magnetic base station locations highlighted in red circles.

Figure 8: GEM 2 and GEM 4 magnetic base station locations on the east side of the Livingstone airstrip.

The diurnal magnetic variations recorded by the stationary base stations were removed from the magnetic data recorded in flight to ensure that the anomalies seen were real and not due to solar activity.

3.3 Field Processing and Quality Control

On a flight-by-flight basis, the survey data were transferred from the helicopter's data acquisition system onto a USB flash drive and copied onto a field data processing laptop. The raw data files were in PEI binary data format and were converted into Geosoft GDB database format. Using Geosoft Oasis Montaj 8.2, the quality of the data was inspected to see if it met the contract specifications (Table 4). Navigational accuracy (left/right or up/down) for all survey and tie lines were within contract specifications (Figure 9), and no re-flights were required due to navigational error. All suspect anomalies, especially those found on a single flight line, were re-flown. Re-flight lines were a minimum of 2000 m long, so that survey line re-flights crossed at least two tie lines, and tie line re-flights crossed at least 5 survey lines. All data were confirmed and verified by a geophysicist before the survey helicopter and crew demobilized on August 09, 2014.

Specification	Parameter	Details
Line Spacing	Position	Flight line deviation from flight path by more than 15 m left/ right for 1 km or more.
Height		Flight line deviation from height by more than 15 up/down with a nominal flight height of 40 m above ground for 1 km or more.
GPS		Any flight lines where 3 or less GPS satellites received for distances of greater than 1 km, provided signal loss is not due to topography.
Diurnal Variations	Magnetics	Non-linear magnetic diurnal variations exceed 10nT from a linear chord of length one (1) minute.
Normalized 4th Difference		Magnetic data exceeding 0.2 nT peak to peak for distances greater than 1 km or more (provided noise is not due to geological or cultural features).
Test Line Data	Radiometrics	If signal from the four spectrometer windows (K, Th, U, and TC) over the test line vary by more than 12%, the flights shall be re-flown or suspended.

Table 4: Contract re-flight specifications.

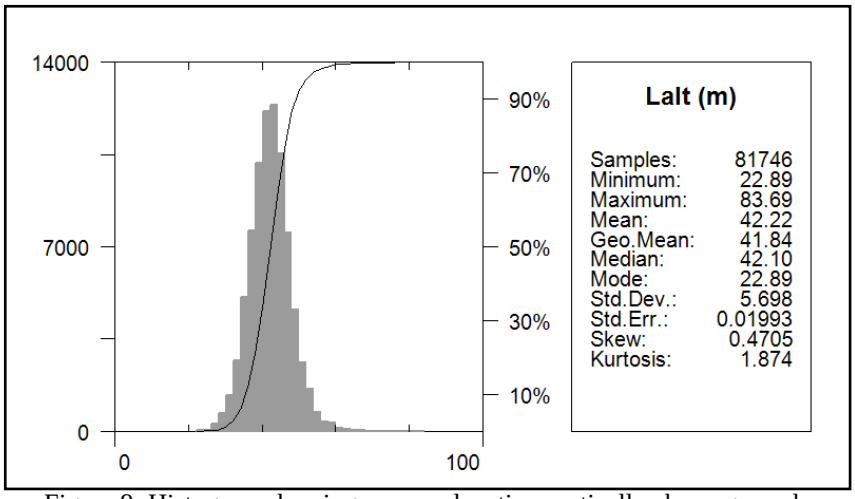


Figure 9: Histogram showing survey elevation vertically above ground.

4.0 Aircraft and Equipment

All geophysical and subsidiary equipment are carefully installed on Precision GeoSurveys aircraft. For this survey, a magnetometer, a spectrometer, a data acquisition system, laser altimeter, magnetic compensation system, a pilot guidance unit (PGU), and magnetic base stations were required to carry out the survey and collect quality, high resolution data. The survey magnetometer was carried in an approved "stinger" configuration to enhance flight safety and improve data quality in this mountainous terrain.

4.1 Aircraft

Precision GeoSurveys flew the Livingstone survey block using a Eurocopter AS350 helicopter (Figure 10), registration C-GOHK. The survey lines were flown at a nominal line spacing of one hundred (100) meters and the tie lines were flown at one thousand (1000) meters spacing for both the magnetometer and spectrometer.

Figure 10: Eurocopter AS350 helicopter equipped with mag stinger for magnetic data acquisition, and internal spectrometer crystals for radiometric data acquisition.

4.2 Equipment

4.2.1 AGIS

The Airborne Geophysical Information System, AGIS, (Figure 11), is the main computer used in data recording, data synchronizing, displaying real-time QC data for the geophysical operator, and the generation of navigation information for the pilot and operator display system. Information such as magnetic field, total count, counts of various radioelements (K, U, Th, etc.), temperature, cosmic radiation, barometric pressure, atmospheric humidity and survey altitude can all be monitored on the AGIS monitor for immediate QC.

Figure 11: AGIS operator display installed in the Eurocopter AS350.

The AGIS was manufactured by Pico Envirotec; therefore the system uses standardized Pico software and external sensors are connected to the system via RS-232 serial communication cables. The AGIS data format is easily converted into Geosoft or ASCII file formats by a supplied conversion program called PEIView. Additional Pico software allows for post or real time magnetic compensation and survey quality control procedures.

4.2.2 Magnetometer

The airborne magnetic sensor used by Precision GeoSurveys is a Scintrex cesium vapor CS-3 magnetometer. The system was housed in a front mounted "stinger" (Figure 12). The CS-3 is a high sensitivity/low noise magnetometer with automatic hemisphere switching and a wide voltage range, the static noise rating for the unit is +/- 0.01 nT. On the AGIS monitor the operator can view the raw magnetic response, the magnetic fourth difference, compensated and uncompensated data, aircraft position, and the survey altitude for immediate QC of the magnetic data. The magnetic data are recorded at 10 Hz. A magnetic compensator is also used to remove noise created by the movement of the helicopter as it pitches, rolls and yaws within the Earth's geomagnetic field.

Figure 12: View of the mag stinger.

4.2.3 Spectrometer

The IRIS, or Integrated Radiometric Information System, is a fully integrated, gamma radiation detection system containing 12.6 litres of NaI (T1) synthetic downward looking crystals and 4.2 litres of NaI (T1) synthetic upward looking crystals (Figure 13) with 256 channel output at 1 Hz sampling rate. The downward-looking crystals are designed to measure gamma rays from below the aircraft and are equipped with upward-shielding high density RayShield® gamma-attenuating blankets to minimize cosmic and solar gamma noise. The upward looking crystal measures solar gamma radiation from above the survey helicopter and a 6 mm thick lead plate is used for downward-shielding. Real time data acquisition, navigation and communication tasks are integrated into a single unit that is installed in the rear cabin of the aircraft as indicated below.

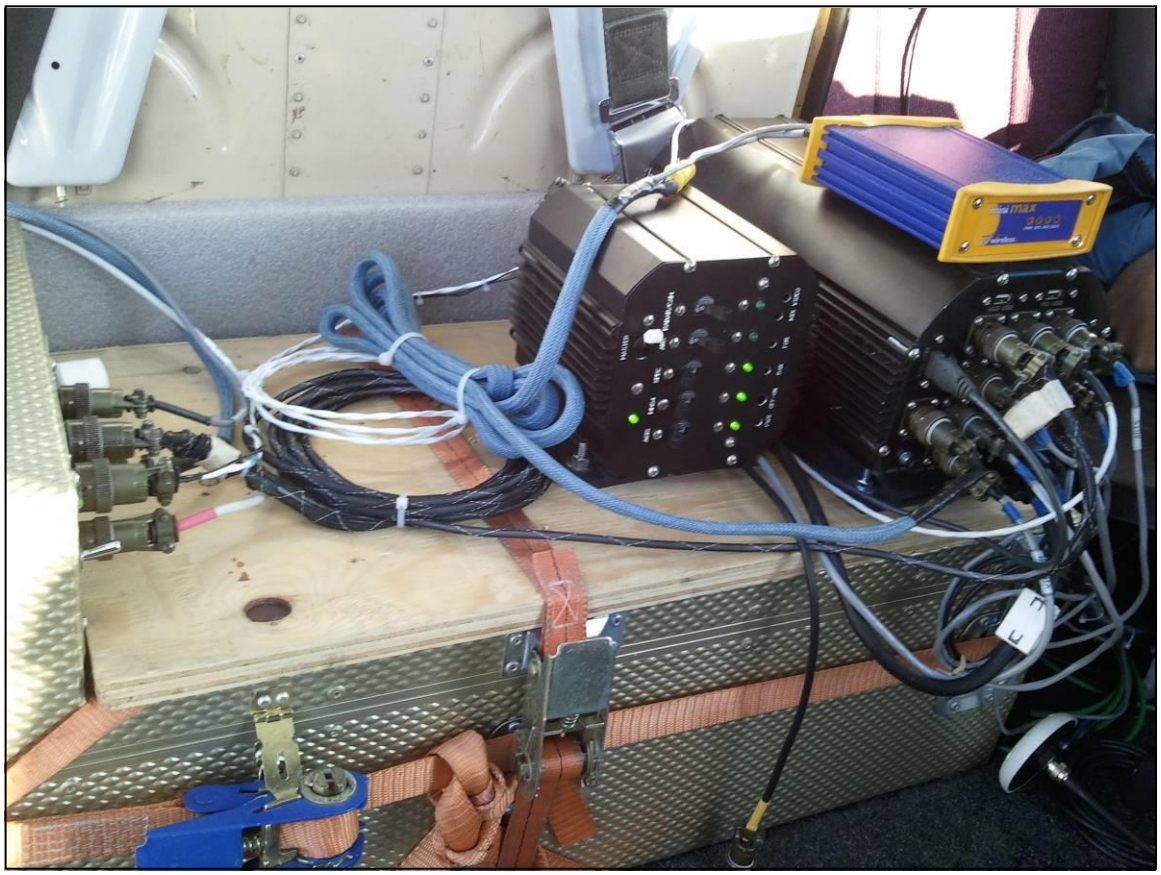


Figure 13: IRIS strapped in the back seat of the Eurocopter AS350.

4.2.4 Base Station

For monitoring and recording of the Earth's diurnal magnetic field variation, Precision GeoSurveys operates two GEM GSM-19T magnetometer base stations continuously throughout the airborne data acquisition operation. The base stations were positioned north of the airstrip, hidden within the trees and in a region with low magnetic gradient, to give accurate magnetic field readings. The base stations were located in an area away from electric transmission power lines and moving ferrous objects, such as aircraft and motor vehicles that could affect the survey data integrity.

The GEM GSM-19T magnetometer with integrated GPS (Figure 14) or time synchronization uses proton precession technology sampling at a rate of 0.5 Hz. The GSM-19T has an accuracy of +/- 0.2 nT at 1 Hz. Base station data are recorded on the internal solid-state memory, and downloaded onto a field laptop computer using a serial cable and GEMLink 5.0 software. Profile plots of the base station readings are generated and updated at the end of each survey day.

Figure 14: GEM GSM-19T proton precession magnetometer.

4.2.5 Laser Altimeter

The pilot is provided with terrain guidance and clearance information from an Opti-Logic RS800 laser altimeter (Figure 15). This is attached at the aft end of the magnetometer boom. The RS800 sensor is a time-of-flight sensor that measures distance by a rapidly-modulated and collimated laser beam that creates a dot on the target surface. The maximum range of the laser altimeter is 700 m off of natural surfaces with an accuracy of +/- 1 meter on 1 x 1 m^2 diffuse target with 50% (+/- 20%) reflectivity. Within the sensor unit, reflected signal light is collected by the lens and focused onto a photodiode. Through serial communications and digital outputs, the ground clearance data are transmitted to an RS-232 compatible port and recorded and displayed by the AGIS and PGU at 10 Hz.

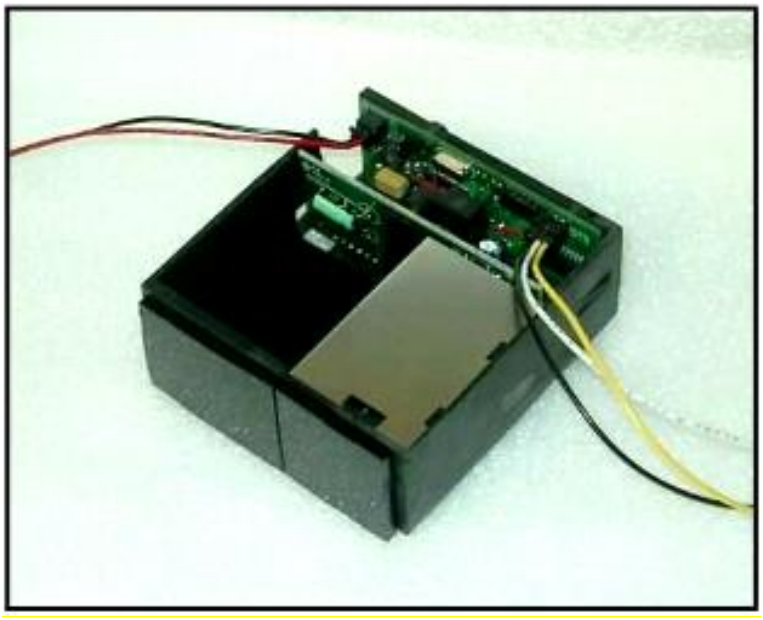


Figure 15: Opti-Logic RS800 laser altimeter.

4.2.6 Pilot Guidance Unit

The PGU (Pilot Guidance Unit) is a graphical display type unit that provides continuous steering and elevation information to the pilot (Figure 16). It is mounted remotely from the data system on top of the helicopter's instrument panel. The PGU assists the pilot in keeping the helicopter on the flight path and at the desired ground clearance.

Figure 16: Pilot Guidance Unit.

The LCD monitor measures 7 inches, with a full VGA 800 x 600 pixel display. The CPU for the PGU is housed in the PC-104 console and uses Windows XP Embedded operating system control, with input from the GPS antenna, laser altimeter, and AGIS.

4.2.7 GPS Navigation System

A Hemisphere GPS Mini Max navigation system integrated with the pilot display (PGU) and AGIS provided navigational information and control. The Hemisphere GPS Mini Max is composed of a receiver with an MGL-3 antenna (Figure 17). It has a position accuracy to within 1 meter and supports SBAS (WAAS, EGNS, and others), Beacon, and Satloc's patented e-Dif.

Figure 17: Hemisphere GPS – Mini Max

A differential correction signal (DGPS –Differential GPS) is applied to the GPS signal received through the MGL-3 antenna and can be applied up to 5 times per second (5 Hz). Therefore, the high- performance Mini Max differential correction provides positional accuracy on the order of 1 meter or less.

5.0 Data Acquisition Equipment Checks and Calibration

Airborne equipment tests were conducted at the start of the survey. There are three tests conducted for the airborne magnetometer: compensation flight, lag test, and heading error test. Gamma ray spectrometer checks and calibrations are also conducted prior to the start of the survey. The three tests conducted were the calibration pad test, cosmic flight test, and the Breckenridge test range.

5.1 Magnetometer Checks

5.1.1 Compensation Flight Test

During aeromagnetic surveying a small but significant amount of noise is introduced to the magnetic data by the aircraft itself, as the magnetometer is within the helicopter's magnetic field. Movement of the aircraft (roll, pitch and yaw) and the permanent magnetization of certain aircraft parts (engine and other ferric objects) contribute to this noise. To remove noise generated by the aircraft a process called magnetic compensation is implemented. The magnetic compensation process starts with a test flight at the beginning of the survey where the aircraft flies in the four orthogonal headings required for the survey (077°/257° and 167°/347° in the case of this survey) at a sufficient altitude (typically > 1,500 m AGL) where the Earth's magnetic field becomes nearly uniform at the scale of the compensation flight. In each heading direction, three specified roll, pitch, and yaw maneuvers are performed by the pilot at constant elevation so that any magnetic variation recorded by the airborne magnetometer can be attributed to the aircraft movement. The variations recorded by these maneuvers provide the data that are required to calculate the necessary parameters for compensating the magnetic data and removing the aircraft noise.

Pre-Compensation					Post-Compensation				
Heading	**Roll**	**Pitch**	**Yaw**	**Total**	**Heading**	**Roll**	**Pitch**	**Yaw**	**Total**
074	7.8256	4.1684	2.7834	14.7774	074	0.0863	0.1215	0.1371	0.3449
169	10.1898	3.1929	2.8137	16.1964	169	0.1080	0.1313	0.0827	0.3220
256	5.0334	3.0205	2.6299	10.6838	256	0.0938	0.1074	0.0881	0.2893
344	7.4897	2.2170	1.7633	11.4700	344	0.1934	0.1258	0.1118	0.4310
Total	30.5385	12.5988	9.9903		**Total**	0.4815	0.4860	0.4197	
FOM = 53.1276 nT					**FOM = 1.3872 nT**				

Table 5: Figure of Merit maneuver test results.

5.1.2 Lag Test

A lag test was performed to determine the relationship between the time the digital reading was recorded by the instrument magnetic sensor and the time for the position fix that the fiducial of the reading was obtained by the GPS system.

The test was flown in the four orthogonal headings over an identifiable magnetic anomaly (ie. Truck, Trailer, etc.) at survey speed and height. A lag of 10 fiducials (1.0 seconds) was determined from the lag test.

5.1.3 Heading Error Test

To determine the magnetic heading effect a cloverleaf pattern flight test was conducted. The cloverleaf test was flown in the same orthogonal headings as the survey and tie lines ($077^{\circ}/257^{\circ}$ and $167^{\circ}/347^{\circ}$) at >1000 m AGL in an area with low magnetic gradient. For all four directions the survey helicopter must pass over the same mid-point all four times at the same elevation (Table 6 and Figure 18).

Line Number	Fiducials	Heading	Mag (nT)	Average (nT)
L077	1108.1	ENE – 077°	57167.3738	
L167	772.4	SSE – 167°	57177.8480	
L257	1151.2	WSS - 257°	57183.4290	
L347	905.1	NNW - 347°	57156.9218	
				57171.3932

Table 6: Heading error test data format flown on September 09, 2014.

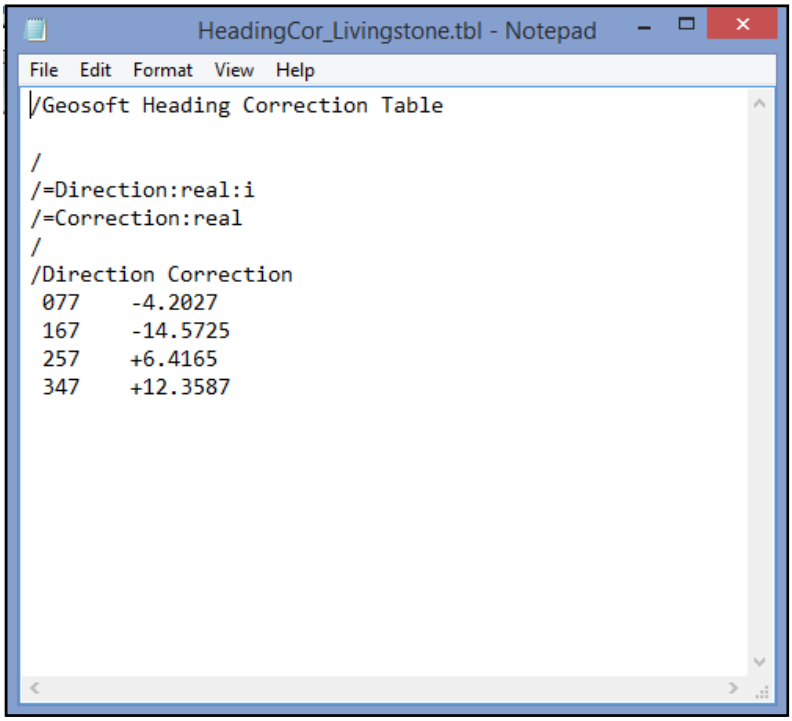


Figure 18: Heading data results in .tbl format in Geosoft table.

5.2 Gamma-ray Spectrometer Checks and Calibrations

Pre-survey calibrations and testing of the GRS-10 airborne gamma-ray spectrometry system were carried out prior to the start of the survey. The calibration of the spectrometer system involved three tests which enabled the conversion of airborne data to ground concentration of natural radioactive elements. These tests were the calibration pad test, cosmic flight test, and the Breckenridge test range. The measurements were made in accordance with IAEA technical report series No. 323, "Airborne Gamma Ray Spectrometer Surveying", and AGSO Record 1995/60, "A Guide to the Technical Specification for Airborne Gamma-Ray Surveys".

5.2.1 Calibration Pad Test

The calibration pad test was conducted by Pico Envirotec at the GSC (Geological Survey of Canada) testing facility in Ottawa, Ontario over the approved GSC calibration pad. It is a slab of concrete containing known concentrations of the radioelements (K, Th, and U) and is ideally used to simulate a geological source of radiation. The measurements collected from the calibration pad test are used to determine the Compton scattering and Grasty Backscatter (spectral overlap between element windows) coefficients.

5.2.2 Cosmic Flight Test

While the background source of gamma radiation from the aircraft itself is essentially constant, the amount of signal detected from ground sources varies with ground clearance. As the height of the aircraft increases, the distance between the ground and the spectrometer crystals increase, and the proportion of cosmic radiation in each spectral window increases exponentially due to radiation of cosmic origin. The cosmic flight test is conducted to determine the aircraft's background attenuation coefficients for the detector crystal packs and the cosmic coefficients. The pilot is required to fly over the same location repeatedly in opposite directions starting from 1,500 m to 3,000 m at 500 m intervals for approximately 2 minutes each to collect gamma data used to determine the amount of non-terrestrial gamma signal.

5.2.3 Breckenridge Test Range

The Breckenridge test range is very similar to the cosmic flight test but is conducted at lower elevations (from ground level). The pilot is required to fly over the same location at the following elevations in meters above ground; 30, 50, 100, 150, 200, 250, and 300. As the distance of the aircraft increases away from the radioactive ground source, the source signature exponentially degrades. As a result, this test is used to determine the altitude attenuation coefficients and the radio-element sensitivity of the airborne spectrometer system.

6.0 Data Processing

After all the data were collected from a survey flight several procedures were undertaken to ensure that the data met a high standard of quality. All data were processed using Pico Envirotec software and Geosoft Oasis Montaj 8.2 geophysical processing software along with proprietary processing algorithms.

6.1 Magnetic Processing

The data obtained from the compensation flight test was applied to the raw magnetic data before any further processing and editing. The computer program called PEIComp was used to create a model from the compensation flight test for each survey to remove the noise induced by aircraft movement; this model was applied to each survey flight so the data can be further processed.

Over water or fog, the laser altimeter is unable to record a valid reading and a zero is recorded; therefore all data points recorded at zero were replaced with a nominal height of 40 m. Filtering was then applied to the laser altimeter data to remove vegetation clutter and to show the actual ground clearance. To remove vegetation clutter a Rolling Statistic filter was applied to the laser altimeter data and a low pass filter was used to smooth out the laser altimeter profile to eliminate isolated noise. As a result, filtering the data will yield a more uniform surface in close conformance with the actual terrain. A digital

terrain model channel was calculated by subtracting the filtered laser altimeter data from the filtered GPS altimeter data defined by the WGS 84 ellipsoidal height.

The processing of the magnetic data first involved the correction for diurnal variations. Out of the two base stations that were set up, GEM 4 was chosen and used for diurnal corrections. The base station data were edited, plotted and merged into a Geosoft (.gdb) database on a daily basis. The airborne magnetic data were corrected for diurnal variations by subtracting the observed magnetic base station deviations. Following the diurnal correction, a lag correction was applied. A lag correction of 1.0 seconds was applied to the total magnetic field data to compensate for the combination of lag in the recording system and the magnetometer sensor flying 5.70 m ahead of the GPS antenna. Lastly, a heading correction was applied to the data. As a result, after all corrections have been applied the initial Total Magnetic Intensity (TMI) data was generated.

The initial Total Magnetic Intensity (TMI) data from the survey and tie lines were used to level the entire survey dataset. Two forms of leveling were applied to the corrected data: conventional leveling and micro-leveling. There were two components to conventional leveling; the first involved statistical leveling of magnetic data to correct miss ties (intersection errors) followed by specific patterns or trends. For the second component, tie lines were brought to a common regional base value using the mean value of the cross-level error. To obtain the best possible leveled data, individual corrections were edited at selected intersections. Lastly, micro-leveling was applied to the corrected conventional leveled data. This will remove any residual noise related to flight line direction, and any low amplitude component of flight line noise, that still remained in the data after tie line leveling.

6.1.1 IGRF Removal and Calculation of the First Vertical Derivative

The International Geomagnetic Reference Field (IGRF) model is the empirical representation of the Earth's magnetic field (main core field without external sources) collected and disseminated from satellites and from observatories around the world. The IGRF is generally revised and updated every five years by a group of modelers associated with the International Association of Geomagnetism and Aeronomy (IAGA). In this case, the IGRF values were calculated from model year 2010 and the actual survey dates were obtained from the "Date" channel.

With the removal of the IGRF from the observed Total Magnetic Intensity (TMI) a Residual Magnetic Intensity (RMI) was generated. This created a more valid model of individual near surface anomalies and the data will not be referenced to a time which can be easily incorporated into databases of magnetic data acquired in the past or in the future.

The first vertical derivative was computed from the Total Magnetic Intensity (TMI) data. Long wavelengths and vertical rate of change were suppressed in the magnetic field. Therefore, the edges of magnetic anomalies were highlighted and spatial resolution was increased.

6.2 Radiometric Processing

Radiometric surveys map the concentration of radioelements at or near the earth's surface; typically up to 1.5 meters below surface. Thus, the first step which is vital before processing of the airborne radiometric data was to calibrate the spectrometer system. Once calibration of the system was complete, the radiometric data were processed by windowing the full spectrum to create channels for U, K, Th and total count. A 5-point Hanning filter was applied to the Cosmic window before going any further with processing the radiometric data.

Aircraft background and cosmic stripping corrections were applied to all three elements, and total count using the following formula:

$$C_{ac} = C_{lt} - (a_c + b_c * \mathrm{Cos}_f)$$

where: C_{ac} is the background and cosmic corrected channel
C_{lt} is the live time corrected channel
a_c is the aircraft background for this channel
b_c is the cosmic stripping coefficient for this channel
Cos_f is the filtered cosmic channel

The radon backgrounds were first removed followed by Compton stripping. Spectral overlap corrections were applied on to potassium, uranium, and thorium as part of the Compton stripping process. This was done by using the stripping ratios that have been calculated for the spectrometer by prior calibration; this breaks the corrected elemental values down into the apparent radioelement concentrations. Lastly, attenuation corrections were applied to the data which involves nominal survey altitude corrections, in this case 42.22 metres is applied to total count, potassium, uranium, and thorium data.

With all corrections applied to the radiometric data, the final step was to convert the corrected potassium, uranium, and thorium to apparent radioelement concentrations using the following formula:

$$eE = C_{cor} / s$$

where: eE is the element concentration K(%) and equivalent element concentration of U(ppm) & Th(ppm)
s is the experimentally determined sensitivity
C_{cor} is the fully corrected channel

Finally, the natural air exposure rate was determined by using the following formula:

$$E = [(13.08 * K + 5.43 * eU + 2.69 * eTh)/8.69]$$

where: E is the absorption dose rate in µR/h
K is the concentration of potassium (%)
eU is the equivalent concentration of uranium (ppm)
eTh is the equivalent concentration of thorium (ppm)

To calculate for radiometric ratios the guidelines of the IAEA were followed. Due to statistical uncertainties in the individual radioelement measurements, some care was taken in the calculation of the ratio in order to obtain statistically significant values. Following IAEA guidelines, the method of determining ratios of the eU/eTh, eU/K and eTh/K was as follows:

1. Any data points where the potassium concentration was less than 0.25% were neglected.
2. The element with the lowest corrected count rate was determined.
3. The element concentrations of adjacent points on either side of each data point were summed until they exceeded a pre-determined threshold value. This threshold was set to be equivalent to 100 counts of the element with the lowest count rate. Additional minimum thresholds of 1.6% for potassium, 20 ppm for thorium, and 30 ppm for uranium were set up to ensure meaningful ratios.
4. The ratios were calculated using the accumulated sums.

With this method, the errors associated with the calculated ratios were minimized and comparable for all data points.

7.0 Deliverables

All digital data are presented on a compact disc (CD) and USB memory stick with the logistic report. The survey data are presented as digital databases, maps, and a report.

7.1 Digital Data

The file format will be provided in two (2) formats, the first will be a .GDB file for use in Geosoft Oasis Montaj, the second format will be a .XYZ file, this is text file. A complete file provided in each format will contain magnetic and radiometric data separately. Full description of the digital data and contents are included in the report (Appendix B).

The digital data are represented into grids. The following grids are prepared for the Livingstone survey block at 25 m cell size listed below:

- Digital terrain model (DTM)
- Total magnetic intensity (TMI)
- Residual magnetic intensity (RMI) – removal of IGRF from TMI
- Calculated vertical gradient (CVG) - first vertical derivative of TMI
- Potassium (%K) - radiometric data in percentage
- Thorium (eTh) - radiometric data in concentrations
- Uranium (eU) - radiometric data in concentrations
- Total count (TCcor) – radiometric data in equivalent dose rate
- Total count (TCexp) – radiometric data in exposure rate
- Thorium over Potassium ratio (eTh/%K) – radiometric ratios
- Uranium over Potassium ratio (eU/%K) – radiometric ratios
- Uranium over Thorium ratio (eU/eTh) – radiometric ratios

7.2 KMZ Grids

The digital data represented into grids were exported into kmz files which can be displayed using Google Earth. The grids can be draped onto topography and rendered to give a 3D view.

7.3 Maps

Digital maps were created for the Livingstone survey block. The following map products were prepared:

Survey Overview Maps (colour images with elevation contour lines):

- Actual flight lines
- Digital terrain model

Magnetic Maps (colour images with elevation contour lines):

- Total magnetic intensity
- Total magnetic intensity with plotted flight lines
- Residual magnetic intensity
- Calculated vertical gradient of the total magnetic intensity

Radiometric Maps (colour images with elevation contour lines):

- Potassium – percentage
- Thorium – equivalent concentration
- Uranium – equivalent concentration

- Total Count – equivalent dose rate
- Total Count – exposure rate
- Thorium over Potassium ratio
- Uranium over Potassium ratio
- Uranium over Thorium ratio
- Ternary – an element ratio map of K, Th, and U

All maps were prepared in WGS 84 and UTM zone 8N.

7.4 Report

The logistics report provides information on the acquisition procedures, magnetic processing, radiometric processing, and presentation of the Livingstone survey block data. A pdf copy of the report is included along with the digital data and maps that are provided on the CD and USB stick.

Appendix A

Equipment Specifications

- GEM GSM-19T Proton Precession Magnetometer (Base Station)
- Hemisphere GPS – Mini Max
- Opti-Logic RS800 Laser Altimeter
- Scintrex CS-3 Survey Magnetometer
- Bartington Mag-03 three-axis fluxgate magnetic field sensor
- Pico Envirotec GRS-10 Gamma Spectrometer
- Pico Envirotec AGIS data recorder system (for Navigation, Gamma spectrometer, VLF-EM and Magnetometer Data Acquisition)

GEM GSM-19T Proton Precession Magnetometer (Base Station)

Configuration Options	15
Cycle Time	999 to 0.5 sec
Environmental	-40 to +60 ° Celsius
Gradient Tolerance	7,000 nT/m
Magnetic Readings	299,593
Operating Range	10, 000 to 120,000 nT
Power	12 V @ 0.62 A
Sensitivity	0.1 nT @ 1 sec
Weight (Console/ Sensor)	3.2 Kg
Integrated GPS	Yes

Hemisphere GPS – Mini Max

GPS Sensor Specifications	Receiver Type	LI, C/A code, with carrier phase smoothing
	Channels	I2-channel, parallel tracking (10-channel when tracking SBAS)
	WAAS Tracking	2-channel, parallel tracking
	Update Rate	1 Hz default, 5 Hz max
	Horizontal Accuracy	< 1 m 95% confidence (DGPS) < 5 m 95% confidence (autonomous, no SA)
	Cold Start	1 min typical
	Antenna Input Impedance	50 Ω
Beacon Sensor Specifications	Channels	2-channel, parallel tracking
	Frequency Range	283.5 to 325 kHz
	Channel Spacing	500 Hz
	MSK Bit Rates	50, 100, and 200 bps
	Operating Modes	Manual, automatic, semi-automatic
	Cold Start Time	< 1 minute typical
	Reacquisition Time	< 2 seconds typical
	Demodulation	Minimum shift keying (MSK)
	Sensitivity	2.5µV for 6dB SNR @ 200 bps
	Dynamic Range	100dB
	Frequency Offset	±8 Hz (~ 27 ppm)
	Adjacent Channel Rejection	61 dB ± 1dB @ fo ± 400 Hz
Communications	Serial ports	2 full duplex
	Interface Level	RS-232C
	Baud Rates	4800, 9600, 19200
	Correction Input/ Output Protocol	RTCM SC-104
	Raw Measurement Data	Proprietary binary (RINEX utility available)
	Timing Output	1 PPS (HCMOS, active high, rising edge sync, 10kΩ, 10pF load)
Environmental	Operating Temperature	-32^{0}C to +74ºC
	Storage Temperature	-40^{0}C to +85ºC
	Humidity	95% non-condensing
	EMC	FCC Part I 5, Subpart B, Class B CISPR 22
Power	Input Voltage Range	9 to 32 VDC
	Reverse Polarity Protection	Yes
	Power Consumption	3W
	Current Consumption	<250 mA @ 12 VDC
	Antenna Short Circuit Protection	Yes

Opti-Logic RS800 Laser Altimeter

Accuracy	+/- 1 yard
Com. Protocol	RS232-8,N,1
Baud Rate	19200
Raw Data Rate	~200 Hz
Calibrated Data Rate	~10 Hz
Laser	Class I (eye-safe) 905nm +/- 10nm
Power	7-to-9 Vdc
Typical Range	400 yards
Laser Wavelength	905 nm +/- 10 nm
Laser Divergence	Vertical axis -- 3.5 mrad half- angle divergence Horizontal axis -- 1 mrad half- angle divergence (Approximate beam footprint at 100 m is 5 cm x 5 cm)
Data Rate	~200 Hz raw counts for un-calibrated operation ~10 Hz for calibrated operation (averaging algorithm seeks 8 good readings)
Dimensions	32 x 78 x 84 mm (lens face cross section is 32 x 78 mm)
Casing	RS100/RS400/RS800 units are supplied as OEM modules consisting of an open chassis containing optics and circuit boards. Custom housings can be designed and built on request.

Scintrex CS-3 Survey Magnetometer

Operating Principal	Self-oscillation split-beam Cesium Vapor (non-radioactive Cs-133)
Operating Rage	15,000 to 105,000 nT
Gradient Tolerance	40,000 nT/metre
Operating Zones	10° to 85° and 95° to 170°
Hemisphere Switching	a) Automatic b) Electronic control actuated by the control voltage levels (TTL/CMOS) c) Manual
Sensitivity	0.0006 nT √Hz rms.
Noise Envelope	Typically 0.002 nT P-P, 0.1 to 1 Hz bandwidth
Heading Error	+/- 0.25 nT (inside the optical axis to the field direction angle range 15° to 75° and 105° to 165°)
Absolute Accuracy	<2.5 nT throughout range
Output	a) continuous signal at the Larmor frequency which is proportional to the magnetic field (proportionality constant 3.49857 Hz/nT) sine wave signal amplitude modulated on the power supply voltage b) square wave signal at the I/O connector, TTL/CMOS compatible
Information Bandwidth	Only limited by the magnetometer processor used
Sensor Head	Diameter: 63 mm (2.5”) Length: 160 mm (6.3”) Weight: 1.15 kg (2.6 lb)
Sensor Electronics	Diameter: 63 mm (2.5”) Length: 350 mm (13.8”) Weight: 1.5 kg (3.3 lb)
Cable, Sensor to Sensor Electronics	3m (9’ 8”), lengths up to 5m (16’ 4”) available
Operating Temperature	-40°C to +50°C
Humidity	Up to 100%, splash proof
Supply Power	24 to 35 Volts DC
Supply Current	Approx. 1.5A at start up, decreasing to 0.5A at 20°C
Power Up Time	Less than 15 minutes at -30°C

Bartington Mag-03 three-axis fluxgate magnetic field sensor

Number of Axes	3
Bandwidth	0 to 3kHz at 50µT peak
Internal Noise: **Basic version** **Standard version** **Low Noise version**	 >10 to 20pTrms/√Hz at 1Hz 6 to ≤10pTrms/√Hz at 1Hz <6pTrms/√Hz at 1Hz
Scaling error (DC)	<±0.5%
Orthogonality error	<0.1°
Alignment error (Z axis to reference face)	<0.1°
Linearity error	<0.0015%
Frequency response	0 to 1kHz maximally flat, ±5% maximum at 1kHz
Input voltage	±12V to ±17V
Supply current	+30mA, -10mA (+1.4mA per 100µT for each axis)
Power supply rejection ratio	5µV/V (-106dB)
Analog output	±10V (±12V supply) swings to within 0.5V of supply voltage
Output impedance	10 Ω
Operating temperature range	-40°C to +70°C
Environmental protection	IP51
Dimensions (W x H x L)	32 x 32 x 152mm
Weight	160g
Enclosure material	Reinforced epoxy
Connector	ITT Cannon DEM-9P-NMB
Mating connector	ITT Cannon DEM-9S-NMB
Mounting	2 x M5 fixing holes

Pico Envirotec GRS-10 Gamma Spectrometer

Crystal volume	12.6 litres of NaI (T1) synthetic downward looking crystals and 4.2 litres of NaI (T1) synthetic upward looking crystals
Resolution	256/512 channels
Tuning	Automatic using peak determination algorithm
Detector	Digital Peak
Calibration	Fully automated detector
Real Time	Linearization and gain stabilization
Communication	RS232
Detectors	Expandable to 10 detectors and digital peak
Count Rate	Up to 60,000 cps per detector
Count Capacity per channel	65545
Energy detection range:	36 KeV to 3 MeV
Cosmic channel	Above 3 MeV
Upward Shielding	RayShield® non-radioactive shielding on downward looking crystals
Downward Shielding	6 mm thick lead plate is used for downward-shielding
Spectra	Collected spectra of 256/512 channels, internal spectrum resolution 1024
Software	Calibration: High voltage adjustment, linearity correction coefficients calculation, and communication test support Real Time Data Collection: Automatic Gain real time control on natural isotopes, and PC based test and calibration software suite
Sensor	Each box containing two (2) gamma detection NaI(Tl) crystals – each 4.2 liters. (256 cu in.) (approx. 100 x 100 x 650 mm) Total volume of approx 8.4 litres or 512 cu in with detector electronics
Spectra Stabilization	Real time automatic corrections on radio nuclei: Th, Ur, K. No implanted sources.

Pico Envirotec AGIS data recorder system
(for Navigation, Gamma spectrometer, VLF-EM and Magnetometer Data Acquisition)

Functions	Airborne Geophysical Information System (AGIS) with integrated Global Positioning System Receiver (GPS) and all necessary navigation guidance software. Inputs for geophysical sensors - portable gamma ray spectrometer GRS-10, MMS4 Magnetometer, Totem 2A EM, A/D converter, temperature probe, humidity probe, barometric pressure probe, and laser altimeter. Output for the 2 line Pilot Indicator
Display	Touch screen with display of 800 x 600 pixels; customized keypad and operator keyboard. Multi-screen options for real-time viewing of all data inputs, fiducial points, flight line tracking, and GPS channels by operator.
GPS Navigation	Garmin 12-channel, WAAS-enabled
Data Sampling	Sensor dependent
Data Synchronization	Synchronized to GPS position
Data File	PEI Binary data format
Storage	80 GB
Supplied Software	PEIView: Allows fast data Quality Control (QC) Data Format: Geosoft GBN and ASCII output PEIConv: For survey preparation and survey plot after data acquisition
Software	Calibration: High voltage adjustment, linearity correction coefficients calculation, and communication test support Real Time Data Collection: Automatic Gain real time control on natural isotopes and PC based test and calibration software suite
Power Requirements	24 to 32 VDC
Temperature	Operating:-10 to +55 deg C; storage:-20 to +70 deg C

Appendix B

Digital File Descriptions

- Magnetic database description
- Radiometric database description
- Grids
- Maps

Magnetic Database:

Abbreviations used in the GDB files listed below:

Channel	Units	Description
X_WGS84	m	UTM Easting – WGS 84 Zone 8 North
Y_WGS84	m	UTM Northing – WGS 84 Zone 8 North
Lon_deg	deg	Longitude
Lat_deg	deg	Latitude
Date	yyyy/mm/dd	Dates of the survey flight(s)
FLT		Flight Line numbers
STL		Number of satellite(s)
LineNo		Line numbers
GPSfix		GPS fix
GPStime	Hours:min:secs	GPS time (UTC)
Geos_m	m	Geoidal separation
GHead_deg	deg	Heading of the helicopter
XTE_m	M	Flight line cross distance
Galt	m	GPS height – WGS 84 Zone 8 North
Lalt	m	Laser Altimeter readings
DTM	m	Digital Terrain Model
basemag	nT	Base station diurnal data
IGRF		International Geomagnetic Reference Field 2010
Declin	Decimal deg	Calculated declination of magnetic field
Inclin	Decimal deg	Calculated inclination of magnetic field
TMI	nT	Total Magnetic Intensity
RMI	nT	Residual Magnetic Intensity

Radiometric Database:

Abbreviations used in the GDB files listed below:

Channel	Units	Description
X_WGS84	m	UTM Easting – WGS 84 Zone 8 North
Y_WGS84	m	UTM Northing – WGS 84 Zone 8 North
Lon_deg	deg	Longitude
Lat_deg	deg	Latitude
Date	yyyy/mm/dd	Dates of the survey flight(s)
FLT		Flight numbers
STL		Number of satellite(s)
LineNo		Line numbers
GPStime	Hours:min:secs	GPS time (UTC)
Geos_m	m	Geoidal separation
GPSFix		GPS fix
GHead_deg	deg	Heading of the helicopter
XTE_m	m	Flight line cross distance
Galt	m	GPS height – WGS 84 Zone 8 North
Lalt	m	Laser Altimeter readings
DTM	m	Digital Terrain Model
BaroSTP_Kp	KiloPascal	Barometric Altitude (Press and Temp Corrected)
Temp_degC	Degrees C	Air Temperature
Press_kP	KiloPascal	Atmospheric Pressure
COSFILT	counts/sec	Spectrometer - Filtered Cosmic
UPUFILT	counts/sec	Spectrometer – Filtered Upward Uranium
Kcor	%	Equivalent Concentration - Potassium
THcor	ppm	Equivalent Concentration - Thorium
Ucor	ppm	Equivalent Concentration - Uranium
TCcor	µR	Equivalent Dose Rate
TCexp	µR/hour	Exposure Rate - SUM(%k, eU, eTh) * determined factors
THKratio		Spectrometer – eTh/%K ratio
UKratio		Spectrometer – eU/%K ratio
UTHratio		Spectrometer – eU/eTh ratio

Grids: Livingstone survey block, WGS 84 Datum, Zone 8N

FILE NAME	DESCRIPTION
Livingstone_DTM_25m.grd	Livingstone survey block digital terrain model gridded at 25 m cell size
Livingstone_TMI_25m.grd	Livingstone survey block total magnetic intensity gridded at 25 m cell size
Livingstone_RMI_25m.grd	Livingstone survey block residual magnetic intensity gridded at 25 m cell size
Livingstone_CVG_25m.grd	Livingstone survey block calculated vertical gradient of TMI gridded at 25 m cell size
Livingstone_Kcor_25m.grd	Livingstone survey block potassium (Kcor) percentage gridded at 25 m cell size
Livingstone_Thcor_25m.grd	Livingstone survey block Thorium (Thcor) equivalent concentration gridded at 25 m cell size
Livingstone_Ucor_25m.grd	Livingstone survey block Uranium (Ucor) equivalent concentration gridded at 25 m cell size
Livingstone_TCcor_25m.grd	Livingstone survey block Total Count (TCcor) equivalent dose rate gridded at 25 m cell size
Livingstone_TCexp_25m.grd	Livingstone survey block Total Count (TCexp) exposure rate gridded at 25 m cell size
Livingstone_ThKratio_25m.grd	Livingstone survey block thorium over potassium ratio (eTh/%K) gridded at 25 m cell size
Livingstone_UKratio_25m.grd	Livingstone survey block uranium over potassium ratio (eU/%K) gridded at 25 m cell size
Livingstone_UTHratio_25m.grd	Livingstone survey block uranium over thorium ratio (eU/eTh) gridded at 25 m cell size

Maps: Livingstone survey block, WGS 84 Datum, Zone 8N (jpegs and pdfs)

FILE NAME	DESCRIPTION
Livingstone_ActualFlightLines_25m	Livingstone Survey block plotted actual flown flight lines
Livingstone_DTM_25m	Livingstone Survey block digital terrain model gridded at 25 m cell size
Livingstone_TMI_25m	Livingstone Survey block total magnetic intensity gridded at 25 m cell size
Livingstone_TMI_with_FlightLines_25m	Livingstone Survey block total magnetic intensity with plotted actual flight lines gridded at 25 m cell size
Livingstone_RMI_25m	Livingstone Survey block residual magnetic intensity gridded at 25 m cell size
Livingstone_CVG_25m	Livingstone Survey block calculated vertical gradient of TMI gridded at 25 m cell size
Livingstone_%Kcor_25m	Livingstone Survey block potassium (Kcor) percentage gridded at 25 m cell size
Livingstone_Thcor_25m	Livingstone Survey block Thorium (Thcor) equivalent concentration gridded at 25 m cell size
Livingstone_Ucor_25m	Livingstone Survey block Uranium (Ucor) equivalent concentration gridded at 25 m cell size
Livingstone_TCcor_25m	Livingstone Survey block Total Count (TCcor) equivalent dose rate gridded at 25 m cell size
Livingstone_TCexp_25m	Livingstone Survey block Total Count (TCexp) exposure rate gridded at 25 m cell size
Livingstone_eTh%K_Ratio_25m	Livingstone Survey block thorium over potassium ratio (eTh/%K) gridded at 25 m cell size
Livingstone_eU%K_Ratio_25m	Livingstone Survey block uranium over potassium ratio (eU/%K) gridded at 25 m cell size
Livingstone_eUeTH_Ratio_25m	Livingstone Survey block uranium over thorium ratio (eU/eTh) gridded at 25 m cell size
Livingstone_TernaryMap_25m	Livingstone Survey block displaying ratios of all three elements (%K, eTh, eU)

Appendix C

Livingstone Survey Block Maps

Survey Overview Maps (colour image with elevation contour lines):

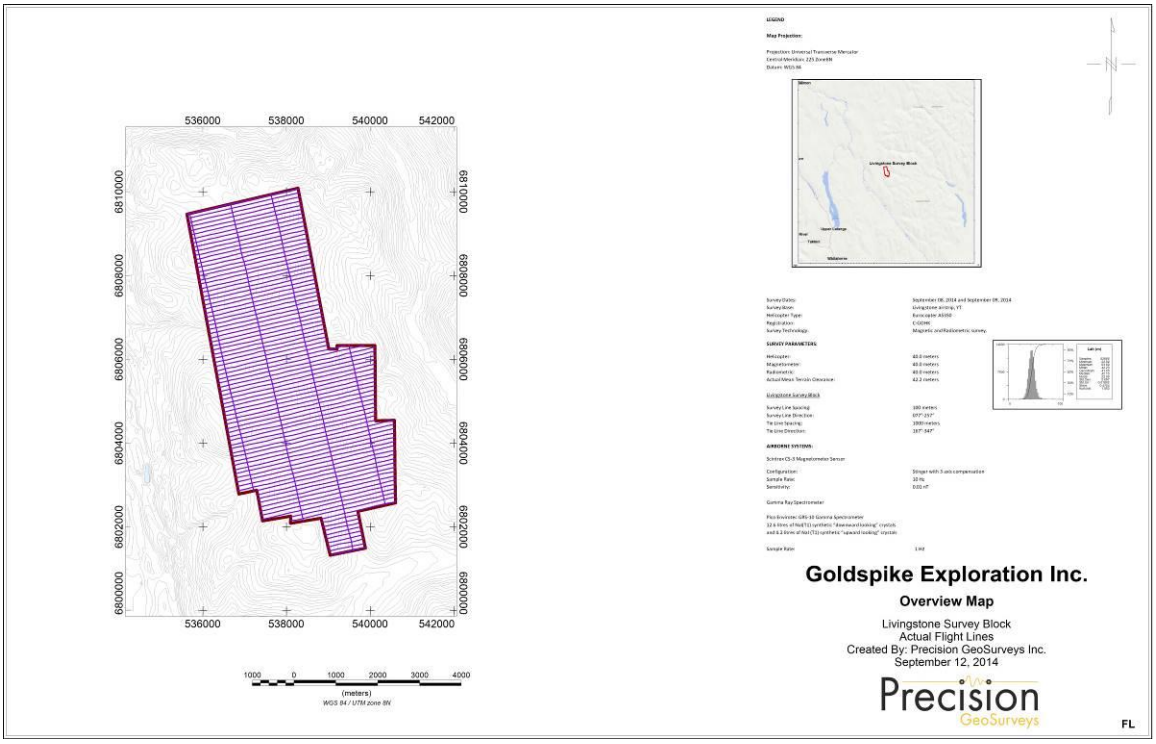
- Flight Lines (FL)
- Digital Terrain Model (DTM)

Magnetic Maps (colour image with elevation contour lines):

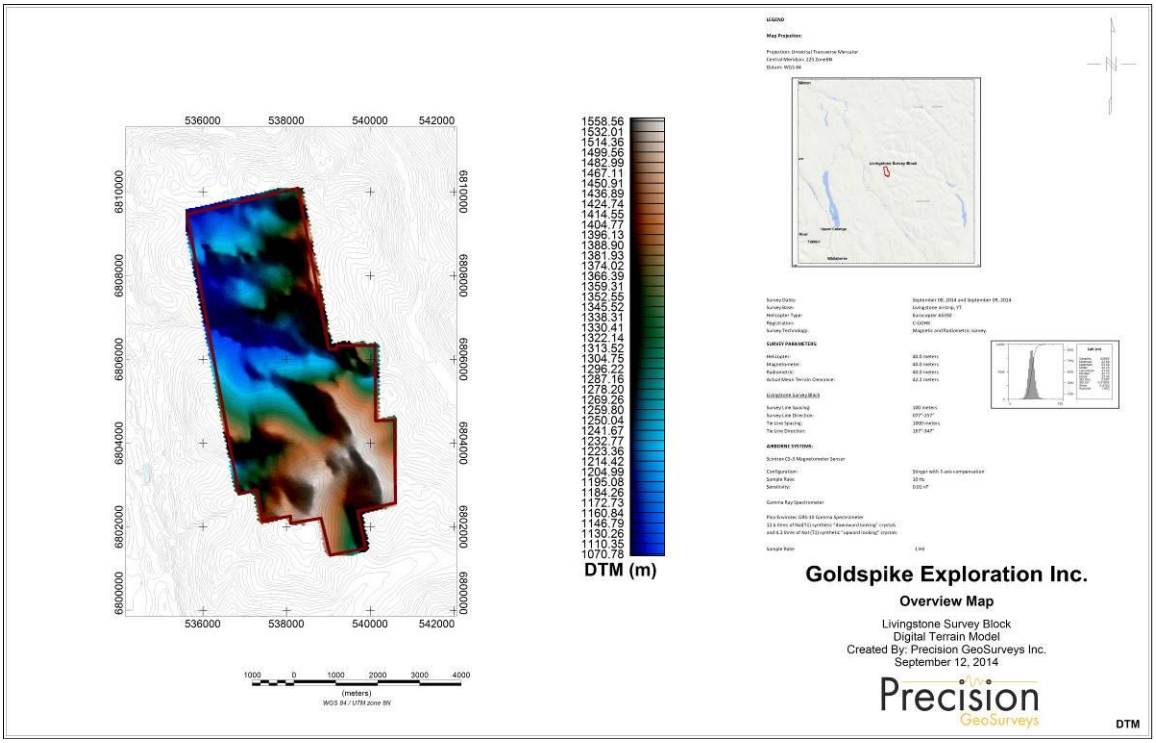
- Total Magnetic Intensity (TMI)
- Total Magnetic Intensity (TMI_wFL) with flight lines
- Residual Magnetic Intensity (RMI)
- Calculated Vertical Gradient (CVG) of TMI

Radiometric Maps (colour image with elevation contour lines):

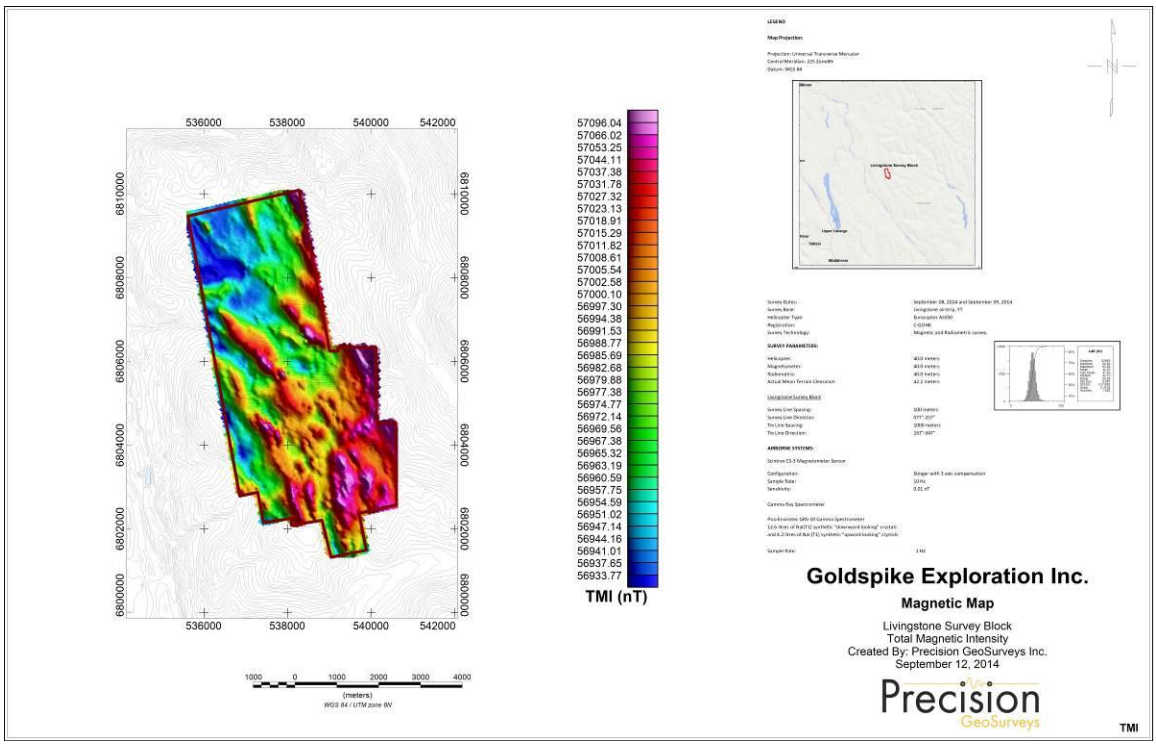
- Potassium – Equivalent Concentration (%K)
- Thorium – Equivalent Concentration (eTh)
- Uranium – Equivalent Concentration (eU)
- Total Count –Equivalent Dose Rate (TCcor)
- Total Count – Exposure Rate (TCexp)
- Thorium over Potassium Ratio - Spectrometer - eTh/%K ratio
- Uranium over Potassium Ratio - Spectrometer - eU/%K ratio
- Uranium over Thorium Ratio - Spectrometer - eU/eTh ratio
- Ternary (TM)



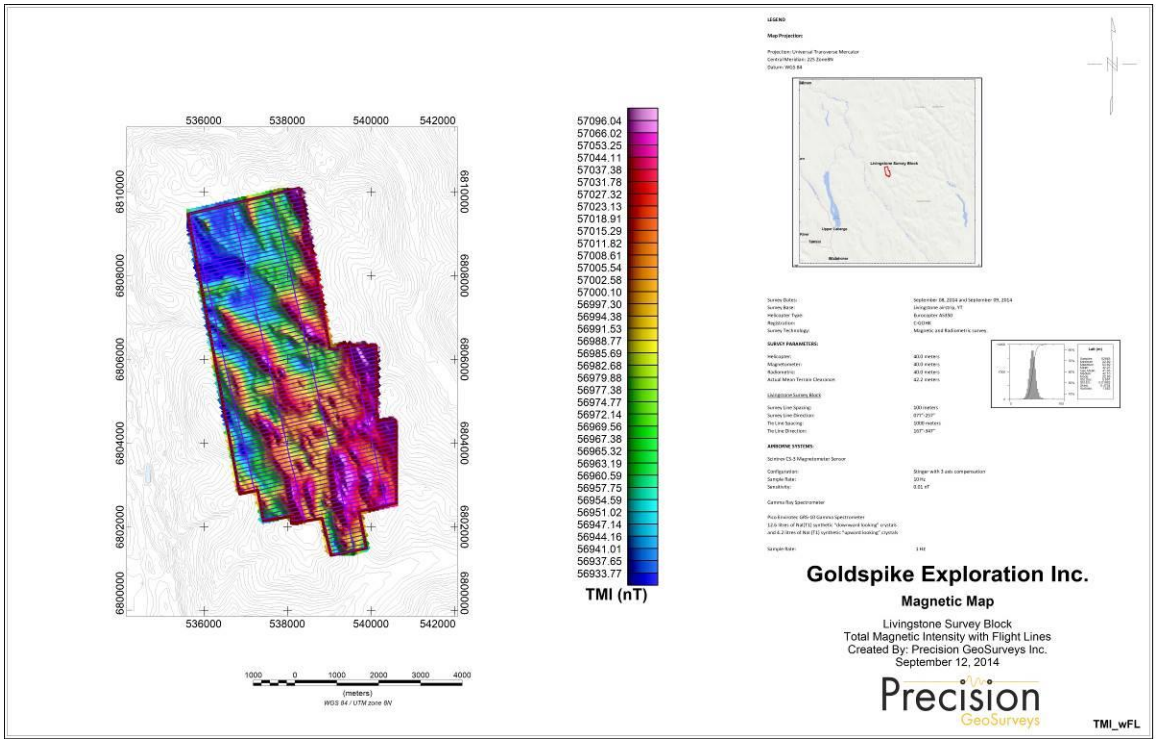
Map 1: Livingstone survey block actual flight lines.



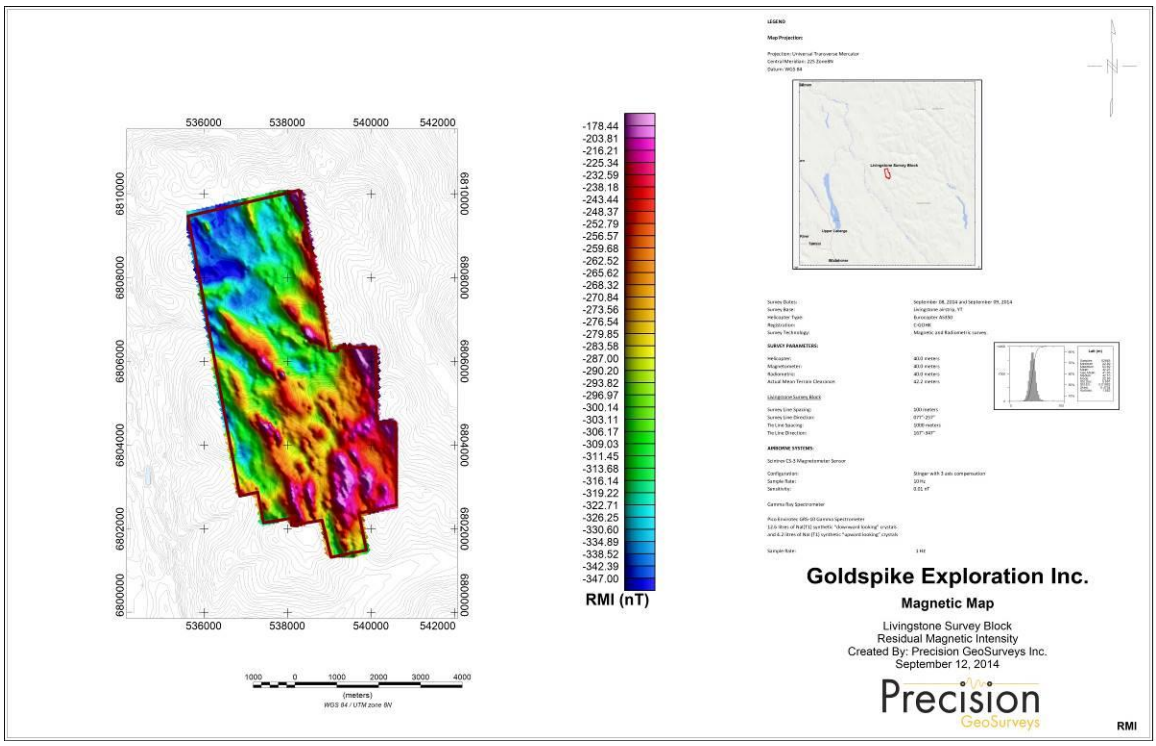
Map 2: Livingstone survey block digital terrain model.



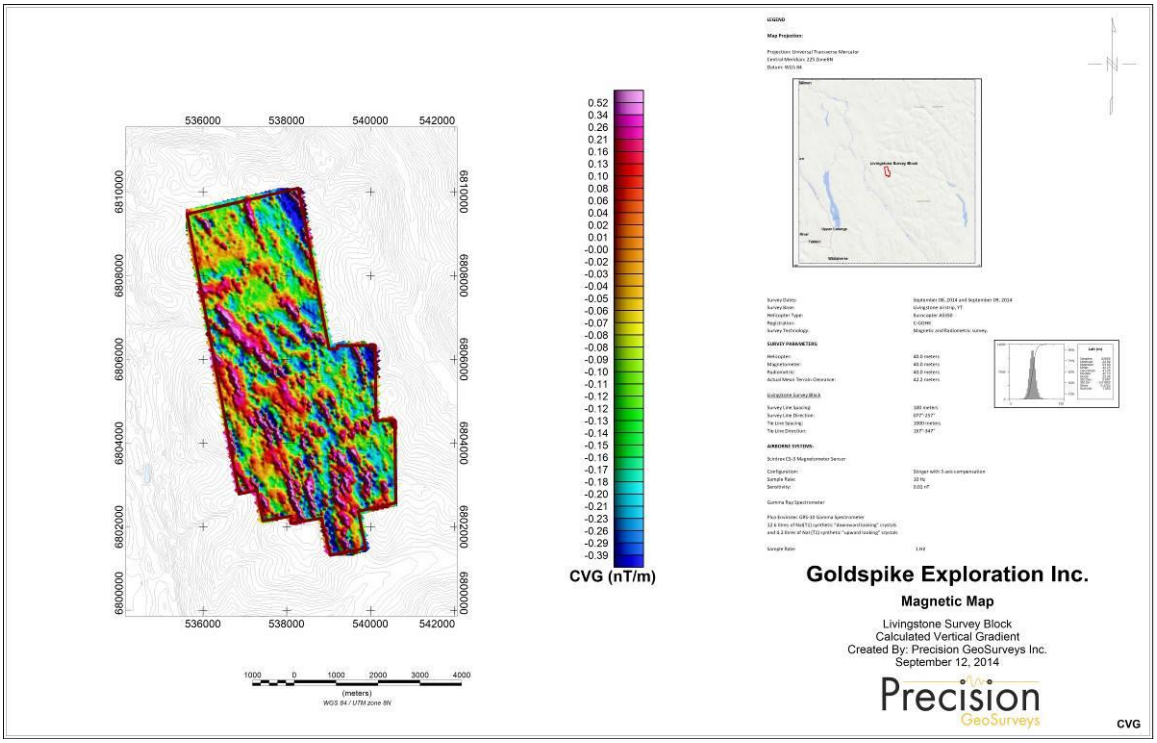
Map 3: Livingstone survey block total magnetic intensity.



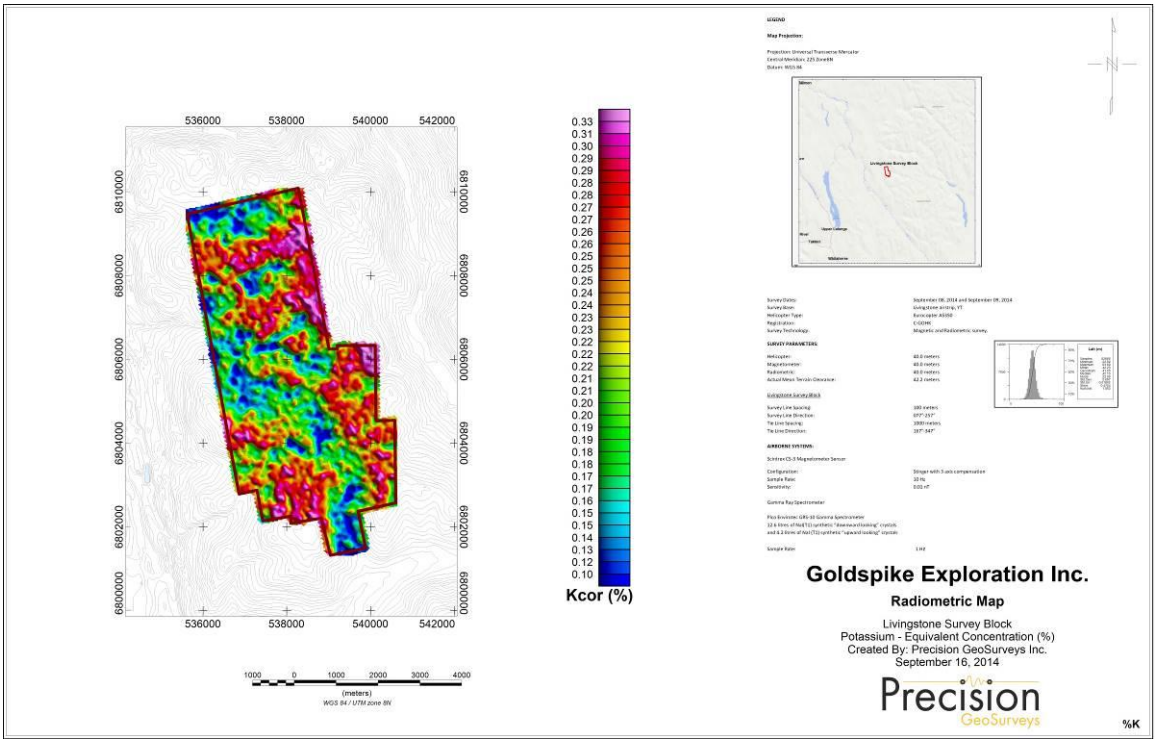
Map 4: Livingstone survey block total magnetic intensity with plotted actual flight lines.



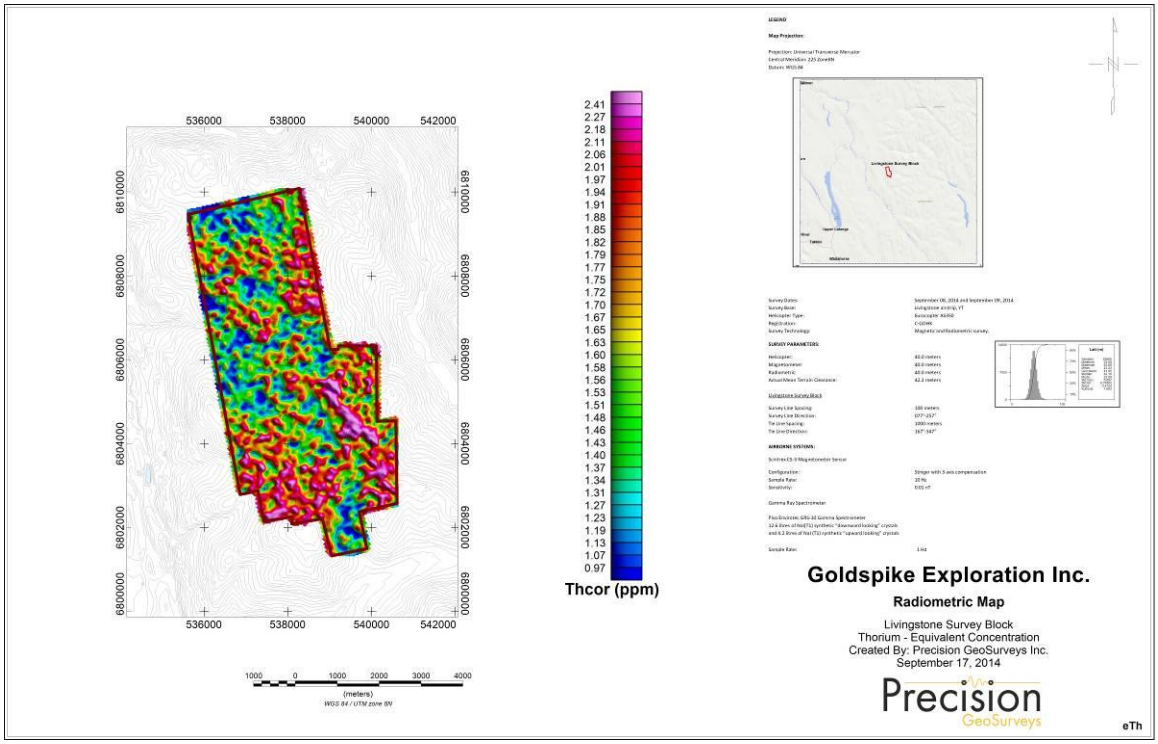
Map 5: Livingstone survey block residual magnetic intensity.



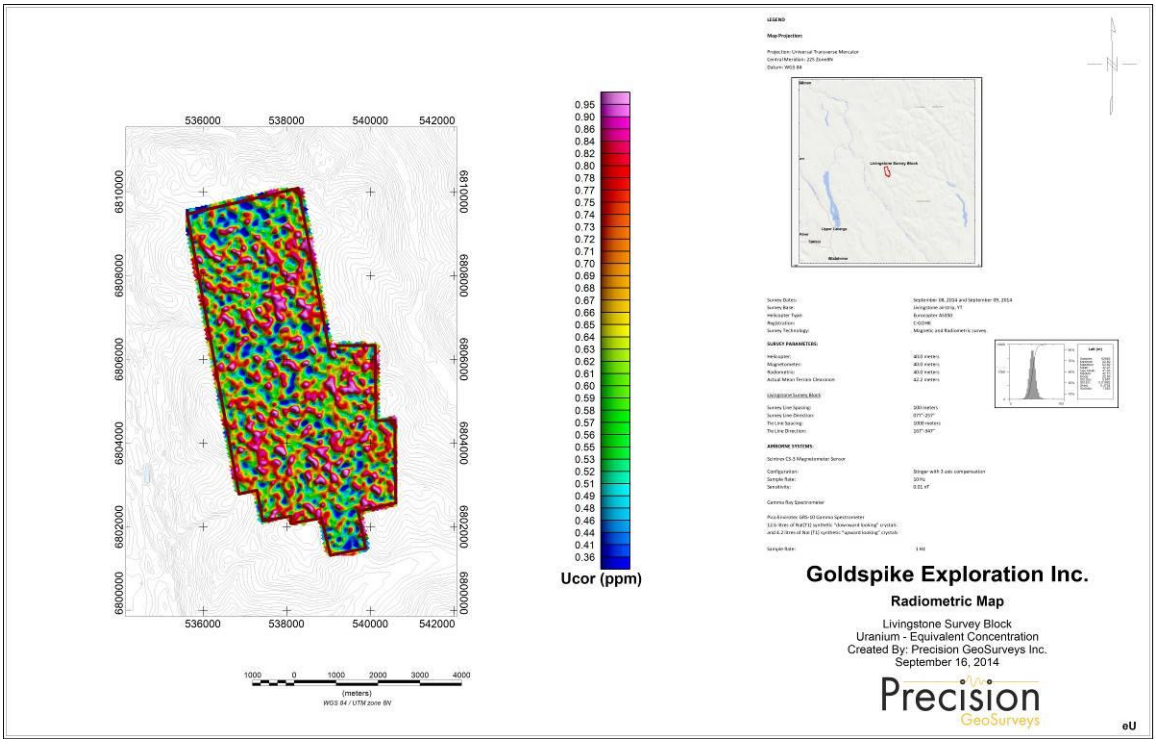
Map 6: Livingstone survey block calculated vertical gradient of the total magnetic intensity.



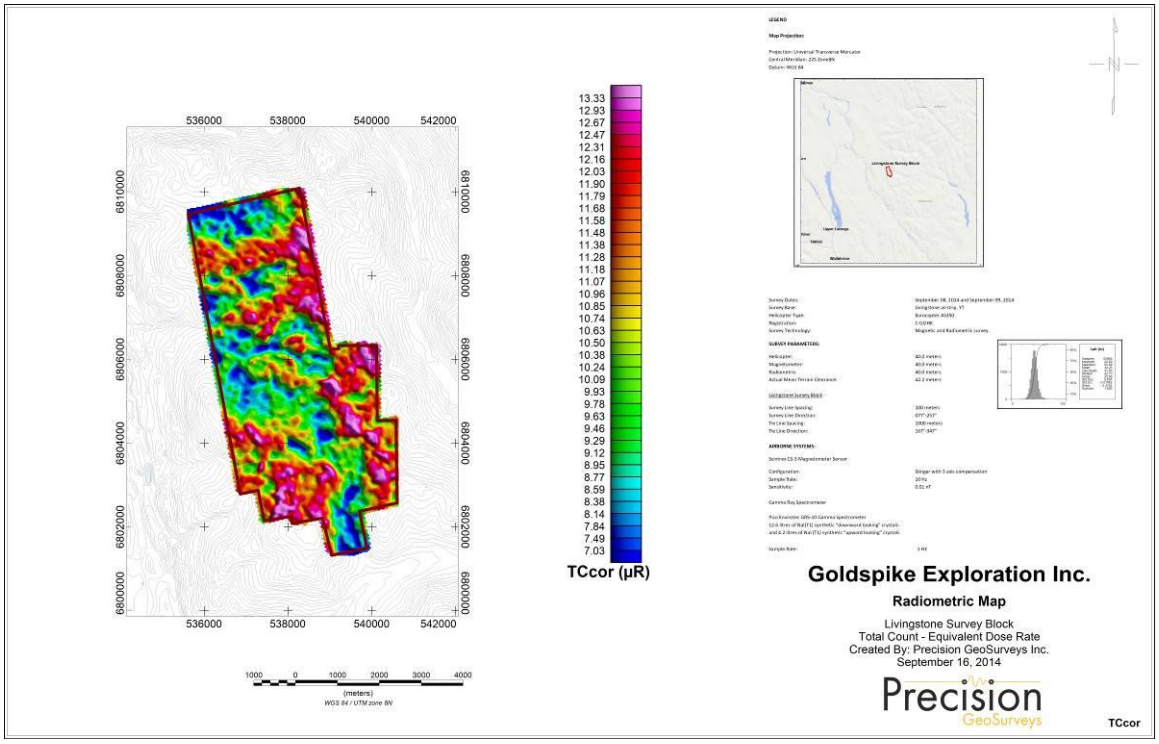
Map 7: Livingstone survey block potassium – (percentage) equivalent concentration.



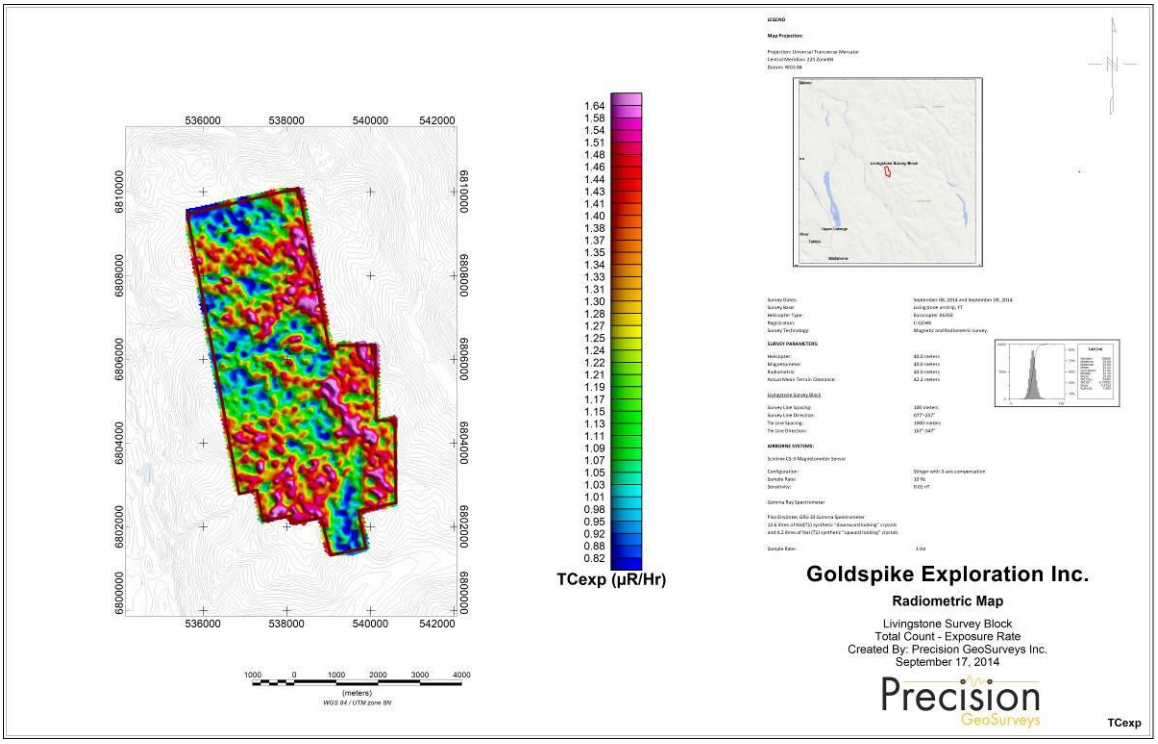
Map 8: Livingstone survey block thorium – equivalent concentration.



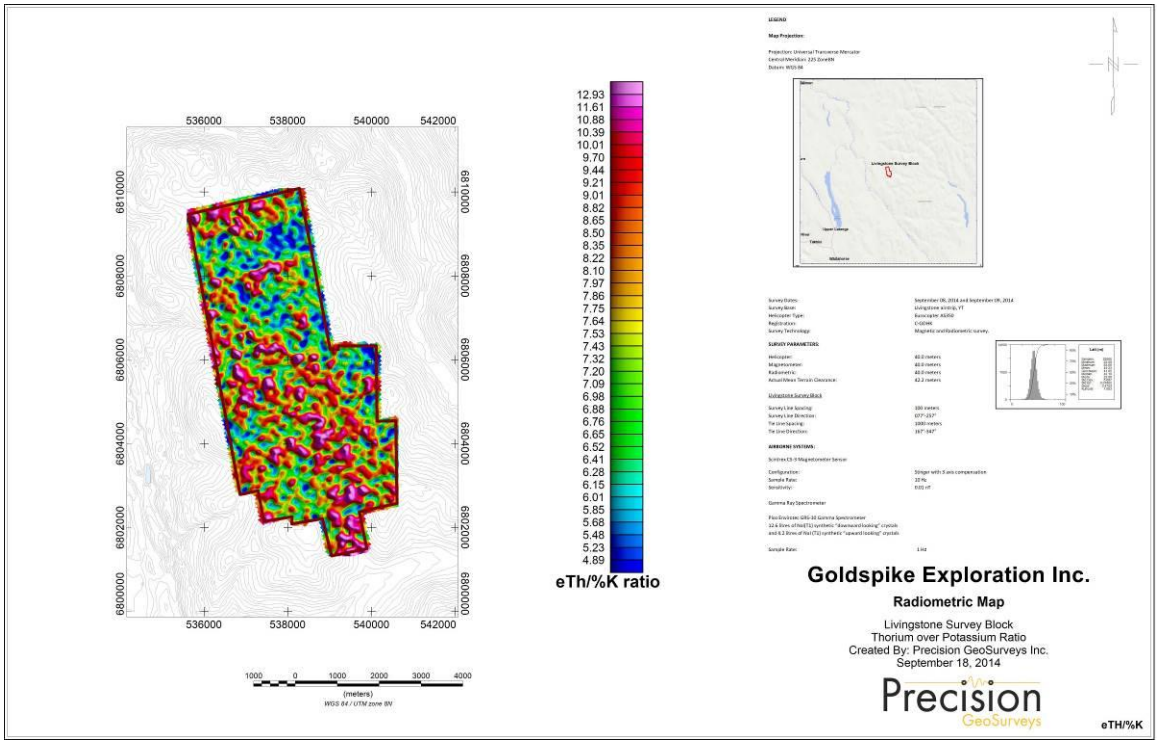
Map 9: Livingstone survey block uranium – equivalent concentration.



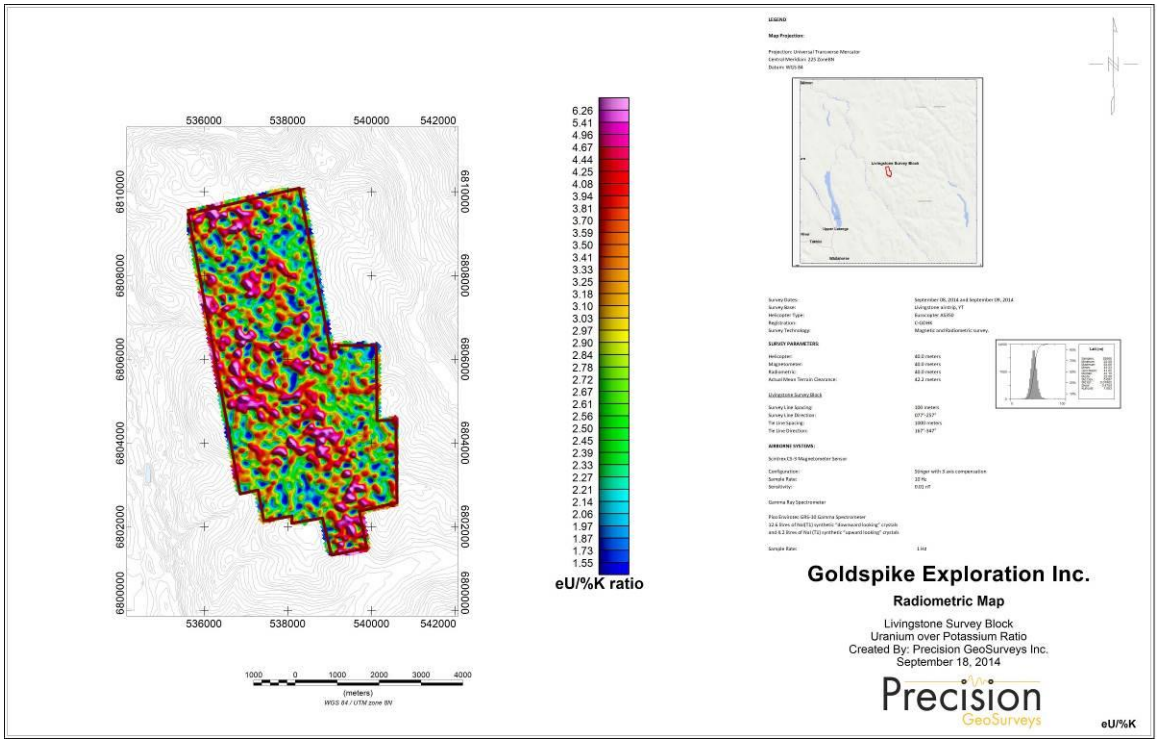
Map 10: Livingstone survey block total count – equivalent dose rate.



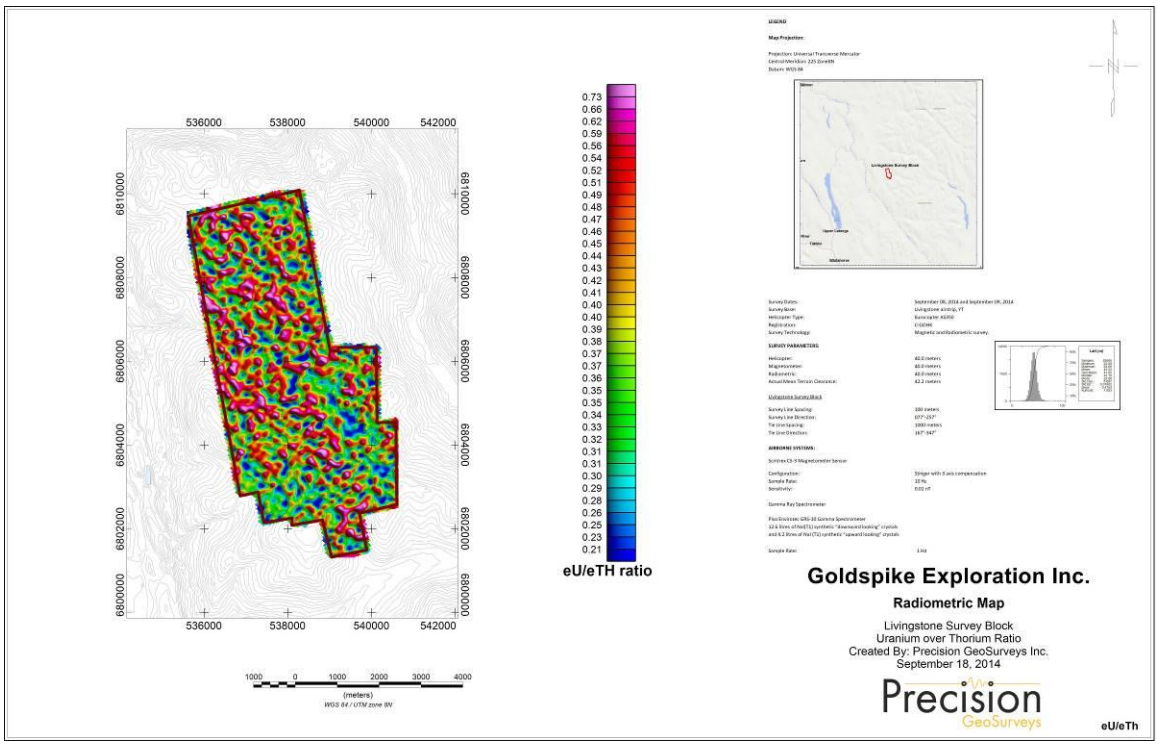
Map 11: Livingstone survey block total count –exposure rate.



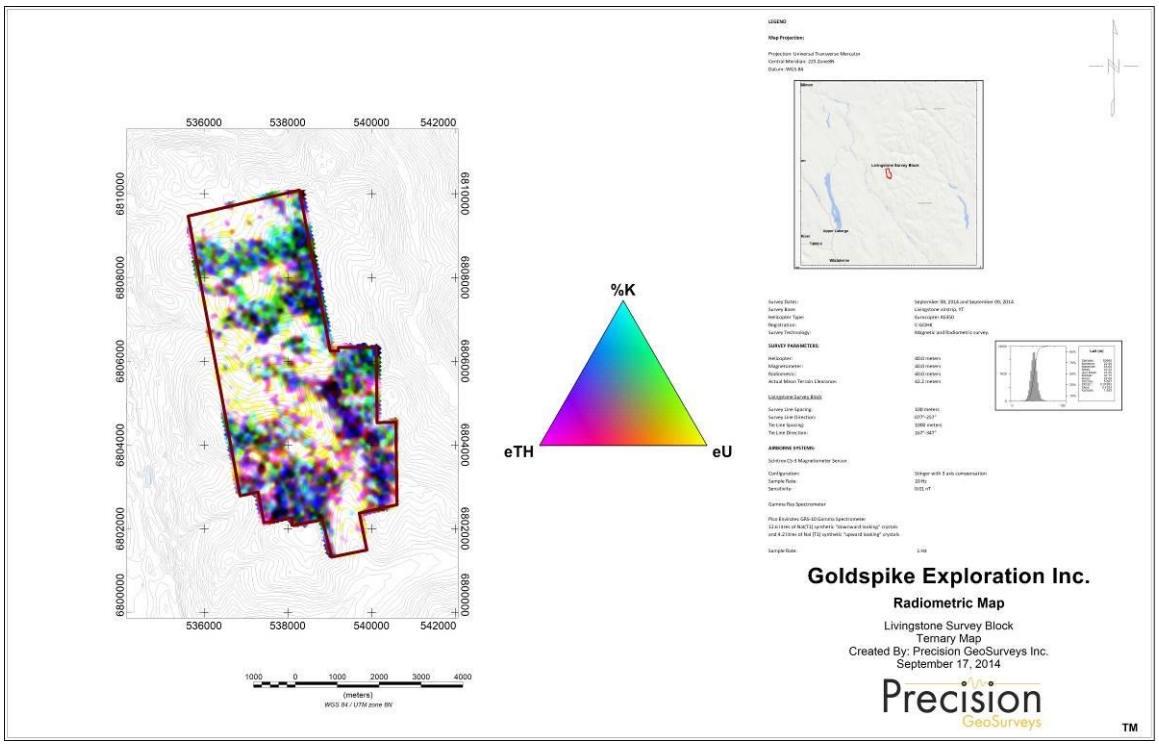
Map 12: Livingstone survey block thorium over potassium ratio.



Map 14: Livingstone survey block uranium over potassium ratio.



Map 15: Livingstone survey block uranium over thorium ratio.



Map 16: Livingstone survey block ternary map.

Appendix VII: YMEP Final Submission Form

YMEP FINAL SUBMISSION FORM

		Date submitted: Jan 31, 2014	
submit by January 31st to:	YMIP- EMR/ YTG		
	Street address: 102-300 Main Street	YMEP@gov.yk .ca	
(winter placer projects may	Mailing address: Box 2703, K-102	phone: 867-456-3828	
submit at pre-approved date)	Whitehorse, Yt, Y1A 2C6	fax: 867-667-3198	

CONTACT INFO		***PROJECT INFO***	
Name:	Dan Ferraro (Goldspike Exploration Inc.)	YMEP no:	14-093
Address:	4 King St. West, Suite 1500	Project name:	Livingstone
	Toronto, ON M5H 1B6	Project type:	Hard rock
email	danferraro@hotmail.com	Project module:	Target evaluation
Phone:	807-708-7445, 416-504-8821		

Is the final report enclosed? ☑ yes ☐ no

☑ hard copy
☑ pdf copy
☐ digital spreadsheet of station location data

Comment:

PROJECT SUMMARY

Total project expenditures: $119,744

Number of new claims since March 31st: 0

Has an option resulted since March 31? ☐ yes ☑ no ☐ in negotiation

Number of calendar field days: 28

Number of person-days of employment: 70 paid _____ days of unpaid work

Total no. of samples: 55 rocks silts 458 soils _____ other

Total length/volume of trenching/ shafting:

Total number of line-km of geophysics 9.4 km IP, 24.3 km ground mag, 284 km airborne

Total meters drilled _____ diamond drill _____ RC drill _____ auger/percussion drill

Other products (provide details):

This is not an expense claim form.To request reimbursement of expenses, please submit a separate detailed expense claim form.

FINANCIAL SUMMARY

Total daily field allowance	7000	Total contractor costs	61693
Total field air transportation costs (helicopter/plane)	9406	Total excavating/ heavy equipment costs	0
Total truck/ mileage costs	554	Total assay/analyses costs	15744
Total wages paid	17200	Total reclamation costs	0
Total light equipment rental costs	4480	Total report writing cost	2800
Other (please specify)	Hotels - 867	Total staking costs	0
Other (please specify)			

(see reverse)

Your feedback on any aspect of the program:

Program went well. Soil sampling seems to have some success in this area despite glaciation. Geophysical surveys successful, especially IP. Great to have a property visit from YGS. Potential for further work on the property. Hope to apply for more YMEPs in the future.

The Department of Energy, Mines and Resources may verify all statements related to and made on this form, in any previously submitted reports, interim claims and in the Summary or Technical Report which accompanies it.

I certify that;

1. I am the person, or the representative of the company or partnership, named in the Application for Funding and in the Contribution Agreement under the Yukon Mining Incentives Program.

2. I am a person who is nineteen years of age or older, and I have complied with all the requirements of the said program.

3. I hereby apply for the final payment of a contribution under the Yukon Mineral Exploration Program (YMEP) and declare the information contained within the Summary or Technical Report and this form to be true and accurate.

Date Jan 25th, 2014

Signature of Applicant 

Name (print) Dan Ferraro

(see reverse)

Livingstone Property

Fig 4: Sample Location Map
2014 Program

Goldspike Exploration Inc.

Cottoneva Creek area,
Whitehorse Mining District

Legend

- Rock samples
- Soil samples
- Livingstone Property

1:12,000

0 187.5 375 750 1,125 1,500
Meters

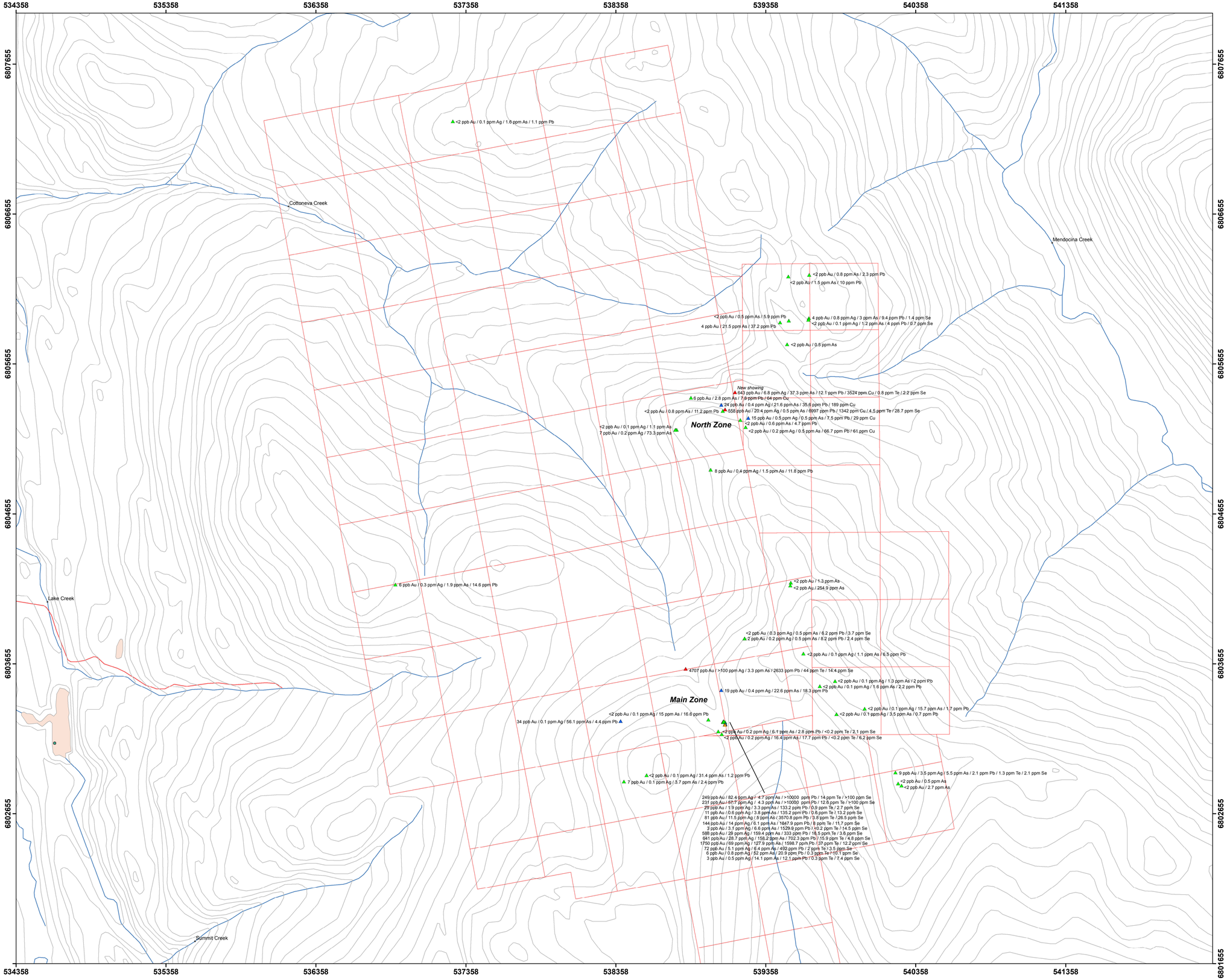
Date: January, 2015
Mapsheets: 105E08
Datum: UTM NAD83 Zone 8

Livingstone Property

Fig 5: Rock Sample Results
2014 Program

Goldspike Exploration Inc.

Cottoneva Creek area,
Whitehorse Mining District



Legend

Rock samples

Au (ppb)

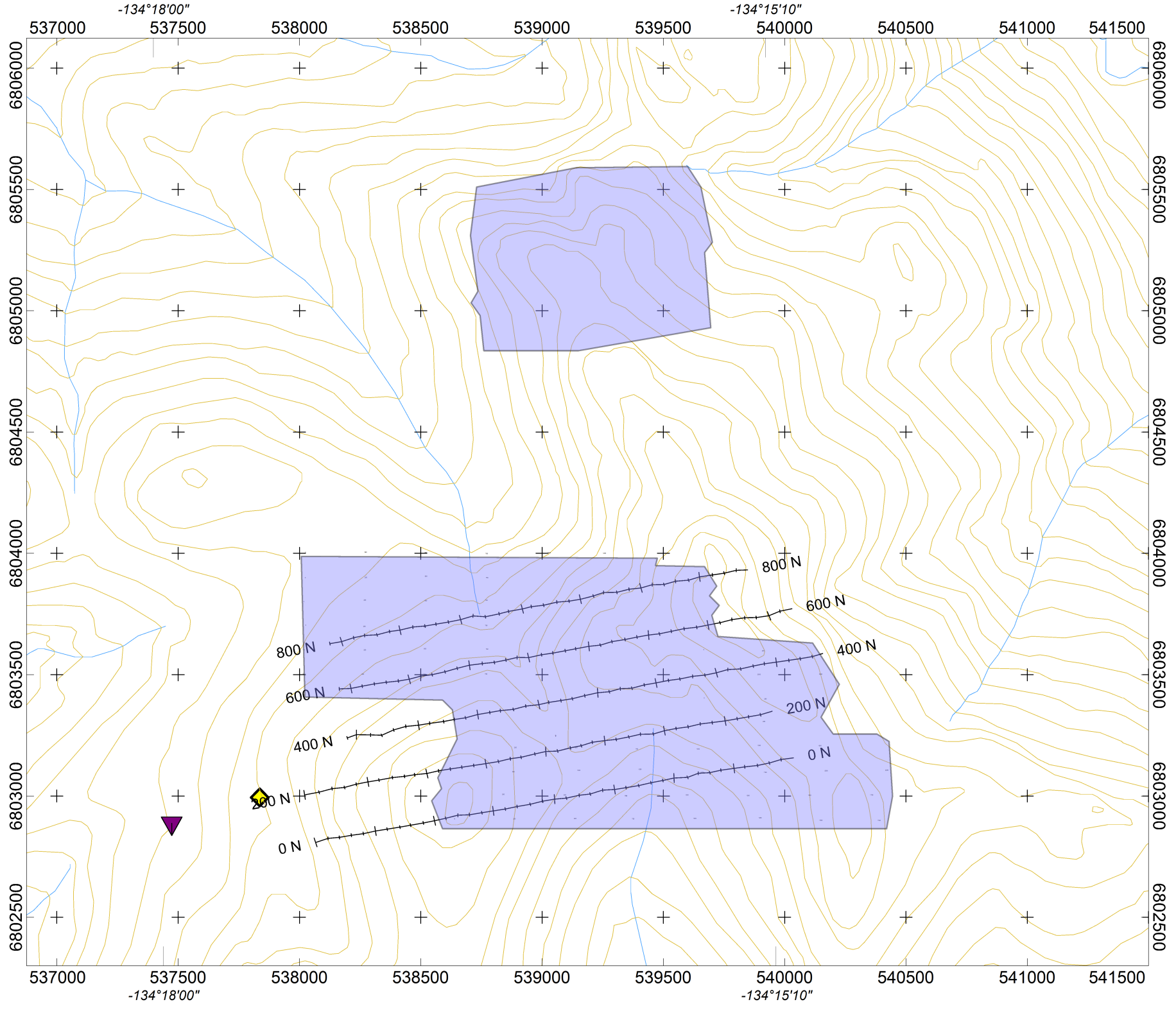
- <2 - 10.0
- 10.1 - 50.0
- 50.1 - 100.0
- 100.1 - 500.0
- 500.1 - 4707
- Livingstone Property

Note: Gold values derived from fire assay analyses; all other elements from ICP

1:12,000

0 187.5 375 750 1,125 1,500 Meters

Date: January, 2015
Mapsheets: 105E08
Datum: UTM NAD83 Zone 8



Ground magnetics coverage

DC/IP survey line

Camp

Stationary Electrode location

Scale 1:20000

250 0 250 500 750 1000

(meters)

NAD83 / UTM zone 8N

GOLDSPIKE EXPLORATIONS INC.

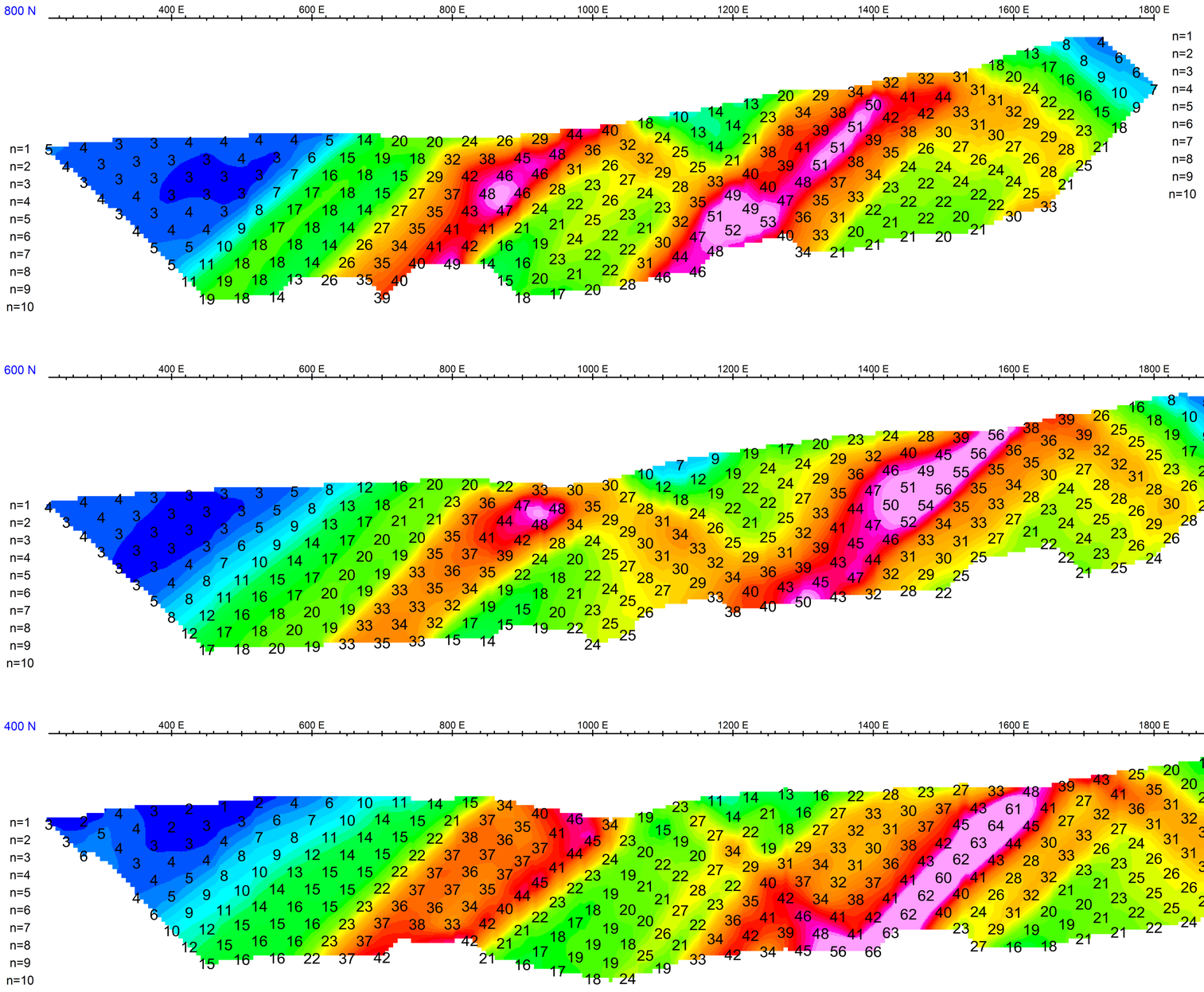
2014 GEOPHYSICAL SURVEYS
Livingstone Claims - Survey Location Map

Mining District: Whitehorse
Date: August 21, 2014

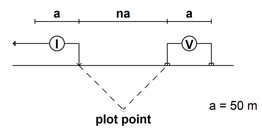
NTS: 105E08
Job: GSE-14546-YT

AURORA GEOSCIENCES LTD.

2014 Livingstone 2D DC/IP Survey
STACKED SECTION



Pole-Dipole Array



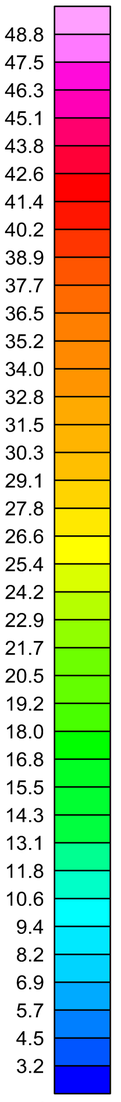
Stationary electrode at 537473E 6802887N
Survey Moved towards the east.

Receivers: Iris ElrecPro

Transmitter: GDD Tx-II 3.6kW

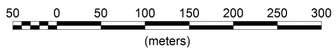
Data File: Livingstone_DCIP_Final.gdb

Dates Surveyed : August 10-15, 2014



Apparent Chargeability
mV/V

Scale 1:5000



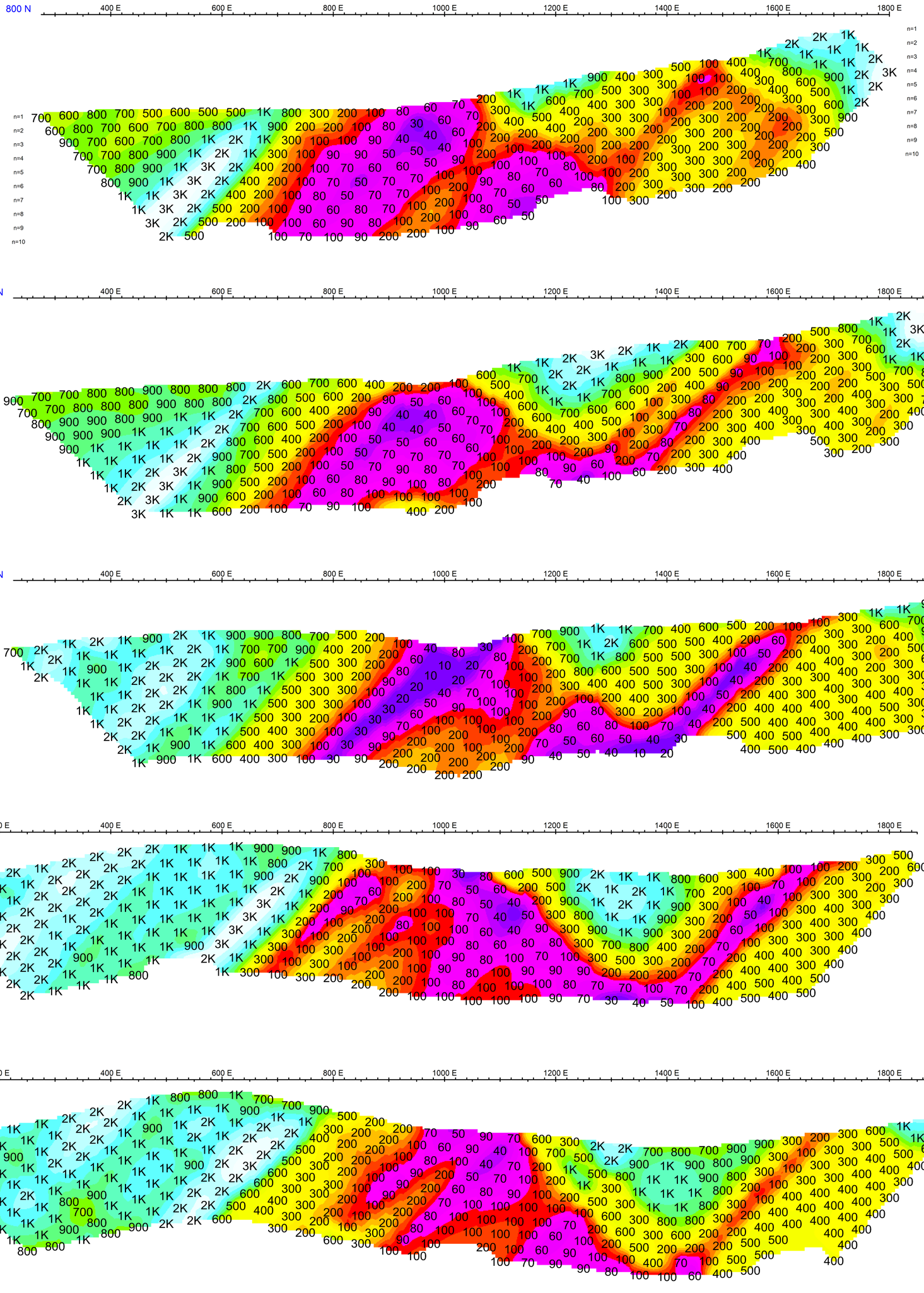
GOLDSPIKE EXPLORATIONS INC.

2014 2D DC/IP SURVEY
Stacked Section Plots
Observed Apparent Chargeability

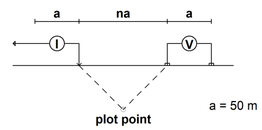
Date: August 16, 2013 Job#: GSE-14566-YT

AURORA GEOSCIENCES LTD.

2014 Livingstone 2D DC/IP Survey
STACKED SECTION



Pole-Dipole Array



Stationary electrode at 537473E 6802887N
Survey moved towards the east.

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Transmitter: GDD Tx-II 3.6kW

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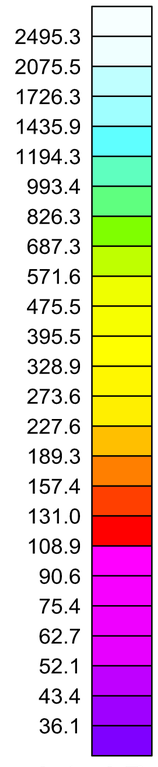
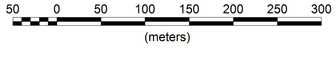


Obs Calculated Resistivity
ohm.m

Scale 1:5000

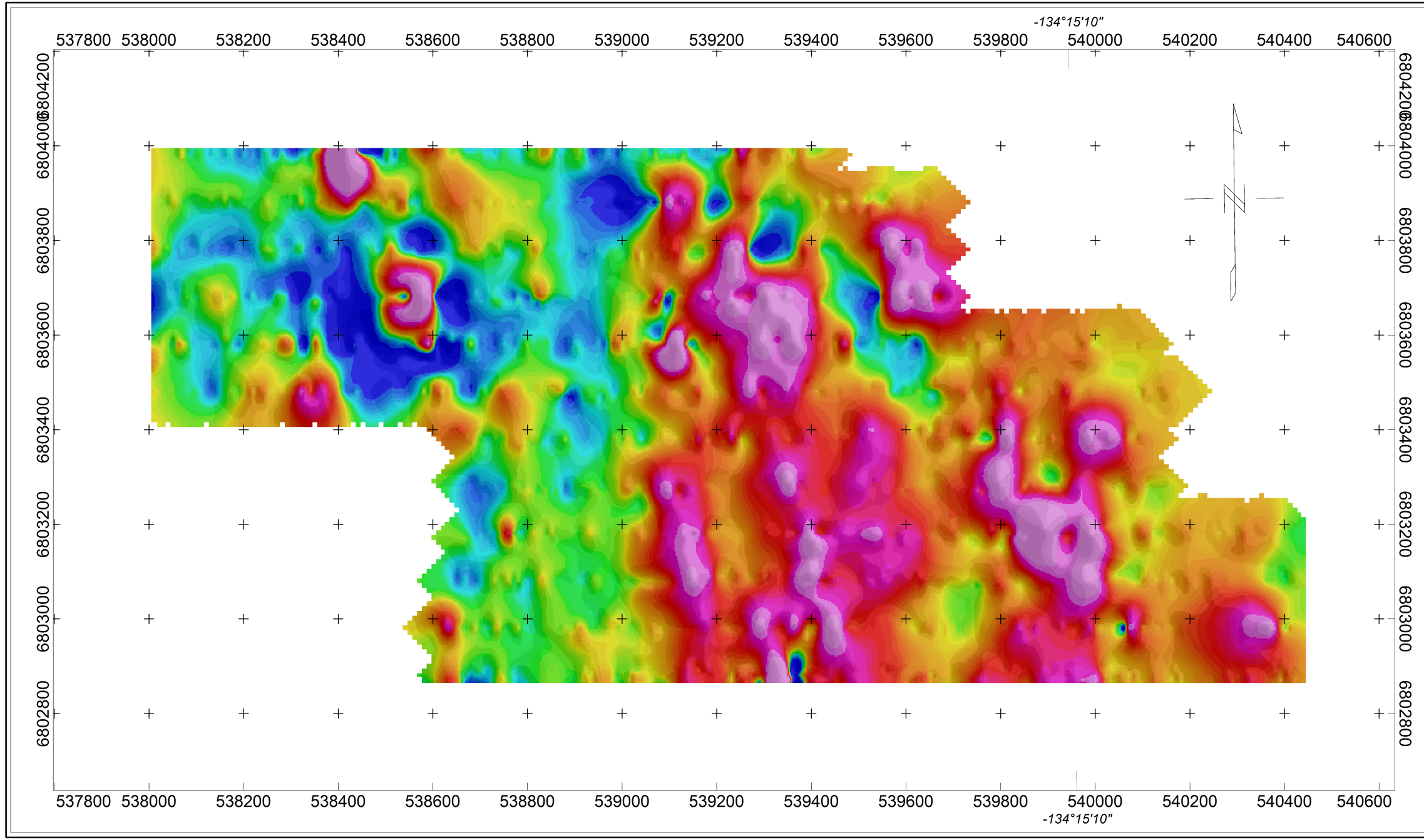


GOLDSPIKE EXPLORATIONS INC.

2014 2D DC/IP SURVEY
Stacked Section Plots
Observed Apparent Resistivity

Date: August 16, 2013 Job#: GSE-14566-YT

AURORA GEOSCIENCES LTD.



Total Field
nT

57290
57257
57238
57224
57210
57197
57187
57180
57173
57168
57163
57157
57152
57147
57142
57137
57131
57123
57105

Scale 1:10000

100 0 100 200 300 400 500 600 700

(meters)

NAD83 / UTM zone 8N

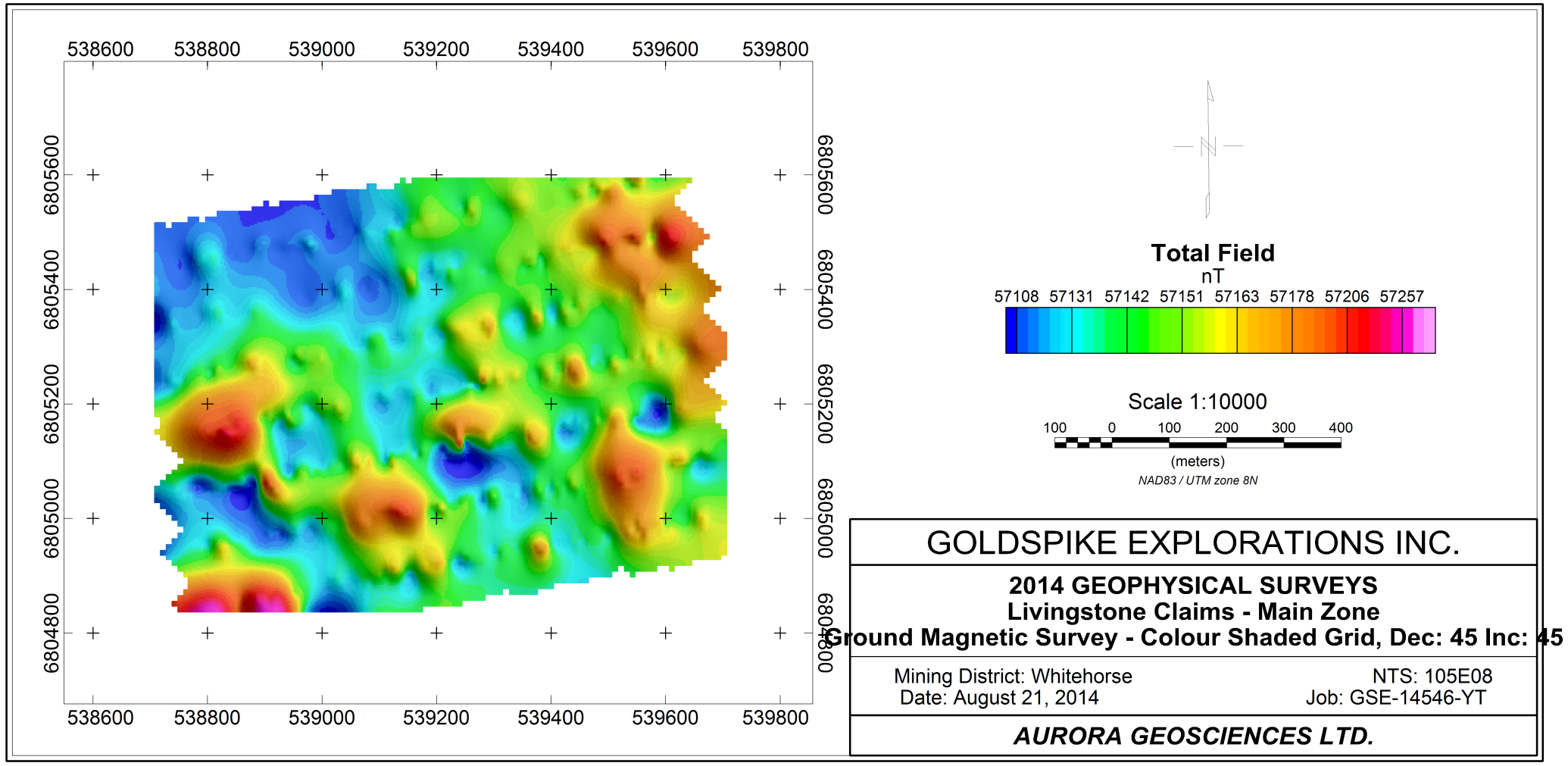
GOLDSPIKE EXPLORATIONS INC.

2014 GEOPHYSICAL SURVEYS
Livingstone Claims - Main Zone
Ground Magnetic Survey - Shaded Grid, Inc: 45, Dec: 45

Mining District: Whitehorse
Date: August 21, 2014

NTS: 105E08
Job: GSE-14546-YT

AURORA GEOSCIENCES LTD.



GOLDSPIKE EXPLORATIONS INC.

2014 GEOPHYSICAL SURVEYS
Livingstone Claims - Main Zone
Ground Magnetic Survey - Colour Shaded Grid, Dec: 45 Inc: 45

Mining District: Whitehorse
Date: August 21, 2014

NTS: 105E08
Job: GSE-14546-YT

AURORA GEOSCIENCES LTD.