2011 GEOCHEMICAL REPORT

ON THE

MAMQUAM 5 CLAIM

IN THE PACIFIC RANGES OF THE COAST MOUNTAINS, 92 G/10

NEW WESTMINSTER MINING DIVISION

122 DEGREES 55 MINUTES 25 SECONDS WEST

49 DEGREES 37 MINUTES 54 SECONDS NORTH

CLAIM: MAMQUAM 5, TENURE NUMBER: 558954

OWNER/OPERATOR: KEN MACKENZIE, FMC# 116450

AUTHOR: KEN MACKENZIE

SQUAMISH, B.C. JULY, 2012

EVENT NUMBER: 5308501

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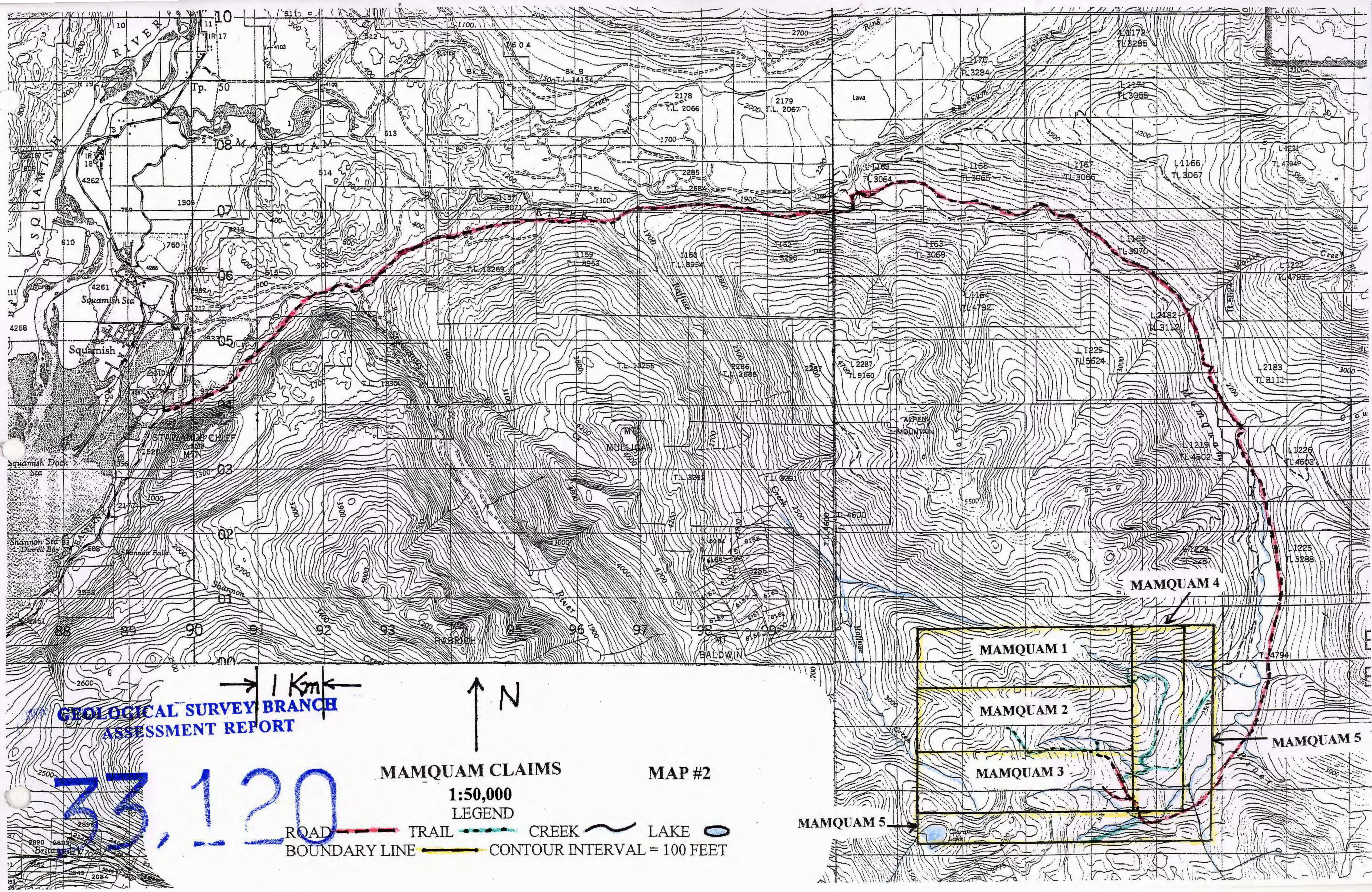
MAMQUAM CLAIMS

1:600,000

MAP #1

0 10 20 30 40 5

Km



MAMQUAM CLAIMS
1:50,000
MAP #2
LEGEND
ROAD
TRAIL
CREEK
LAKE
BOUNDARY LINE
CONTOUR INTERVAL = 100 FEET
N
1 Km
MAMQUAM 1
MAMQUAM 2
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MAMQUAM 4
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MAMQUAM 5
GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT
33,120
Squamish
Squamish Sta
Squamish Dock Sta
Shannon Sta
Darrell Bay
Shannon Falls
STAWAMUS CHIEF MTN
MT MULLIGAN
ALPEN MOUNTAIN
MT BALDWIN
SQUAMISH
MAMQUAM
RIVER

N

MAMQUAM CLAIMS

1:20,000 MAP # 3

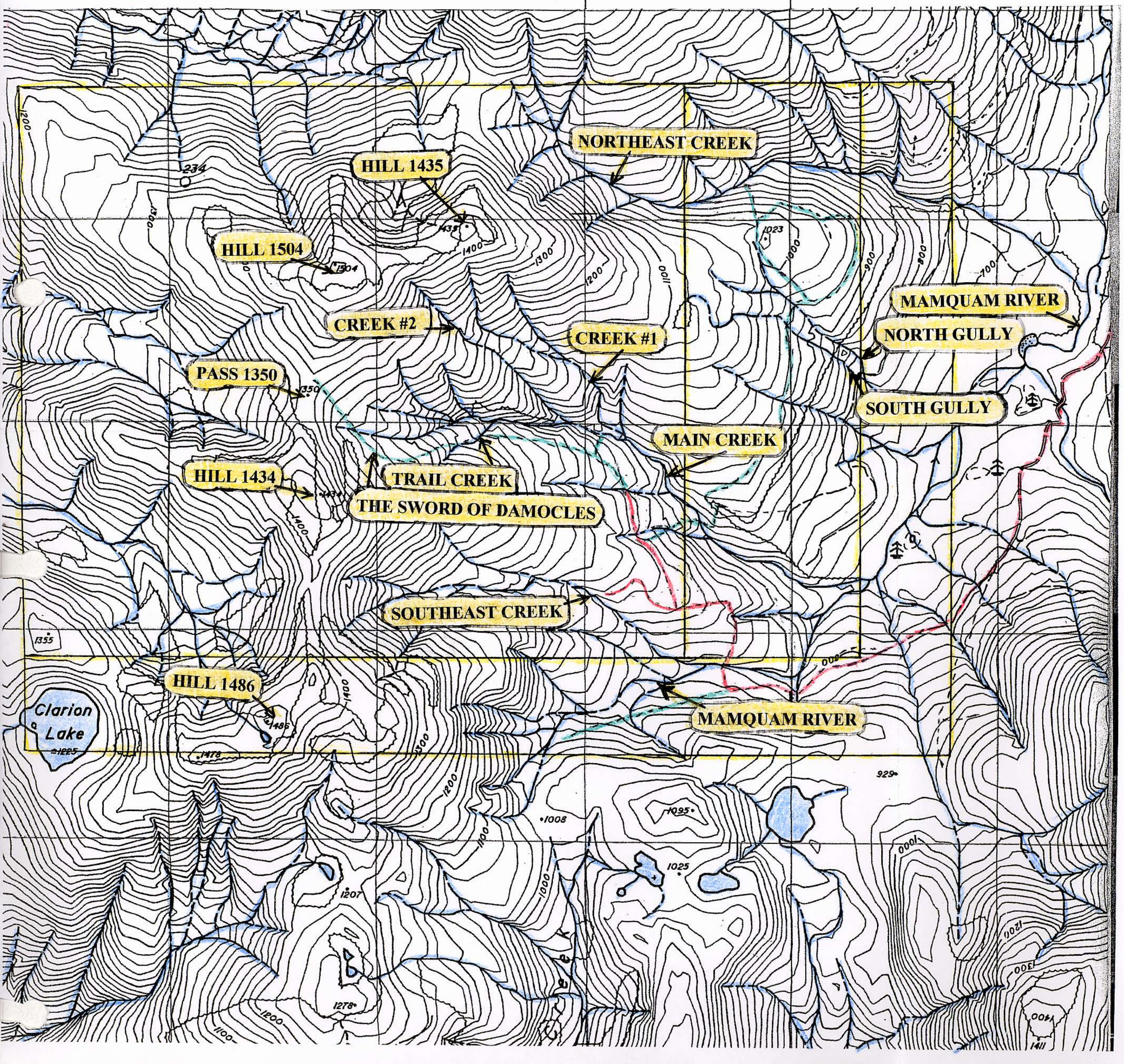
PLACE NAMES, ROADS AND TRAILS

LEGEND

ROAD — TRAIL — CREEK OR RIVER — LAKE

BOUNDARY LINE — CONTOUR INTERVAL = 20 METERS

1 Km



HISTORY OF THE MAMQUAM 5 CLAIM

A detailed history of the Mamquam claims was documented in my 2005 prospecting report. Please refer to that report for a more complete summary. This report on the history of the Mamquam 5 claim will be shorter and will provide only a brief description of the property and the subsequent findings.

This property was discovered in 1979 using a field dithizone test and stream sediment analyses performed in commercial laboratories. The highest geochemical values found at that time surrounded hill 1504. The rocks were similar to those found at the nearby Britannia Mine and consisted of andesites, rhyolites, volcaniclastics and occasional cherts emplaced above quartz diorite intrusive rocks. At first it was felt that this area was a roof pendant, but subsequent prospecting has shown that the Gambier Group rocks are probably continuous with those found in Britannia Beach, and are much more extensive than previously thought.

The original model was a volcanogenic massive sulphide type of deposit. This interpretation is still considered valid and in 2005 other types of mineralized rock were found that indicated the presence of a feeder zone, which supports the volcanogenic massive sulphide model.

In addition, chalcopyrite disseminated in quartz diorite intrusive rocks has been discovered on the Mamquam 1-4 claims and high grade chalcopyrite was found close to the eastern boundary of Mamquam 4 claim.

Based on these findings and preliminary prospecting outside the boundaries of the Mamquam 1-4 claims, a decision to stake the Mamquam 5 claim was made on May 20, 2007. Since that time, three prospecting reports and a geochemical report have been submitted. Please refer to these reports for further information.

MAMQUAM 5 CLAIM INTRODUCTION

The Mamquam 5 claim is located in the Pacific Ranges of the Coast Mountains near the headwaters of the Mamquam River. See Map #1 (the index map) for the location.

The property can be accessed by road from Squamish. Drive south from Squamish on highway 99 to the Mamquam Forest Service road, which is reached just beyond a bridge over the Stawamus River near the base of the Stawamus Chief (a well-known rock climbing area). Turn left (east) off the highway and follow the main road, which is marked in miles and in kilometres. Logging trucks or construction vehicles may be present on this road so drive carefully with your lights on and use a radio. The correct frequency is posted.

At approximately 2.5 miles the road crosses the Stawamus River, and continues on past a run of the river electrical generating plant (mile 6 to 8). At mile 9 the road crosses a bridge over the Mamquam River and stays on the north and east side of the river until the headwaters are reached.
In 2011 there was no logging activity beyond the 9 mile bridge but in 2012 there has been considerable logging that extends close to mile 13. The heavy trucks and machinery damaged the road in many places and it appears that the company involved does not intend to fix it.

At mile 15 the road narrows and becomes steep for a short section. If there is evidence of logging trucks on the road I stop there and make more calls than usual on the radio to ensure there are no loaded logging trucks coming down the hill while I'm proceeding up. There is also a fork in the road at mile 15. The main road goes uphill to the left. The other road continues straight ahead but is decommissioned and cross-ditched.

At mile 18 there is a similar junction but this time you should continue straight ahead on the decommissioned, cross-ditched road that soon crosses a branch of the Mamquam River near its headwaters. The road is easily drivable with a four-wheel drive vehicle with sufficient clearance.

The southeast corner of the claim can be accessed from a road that climbs uphill from the main road at about UTM 10: 505995 E, 5498310 N.

The main road enters the eastern portion of the Mamquam 5 claim at UTM 10: 0505768 E, 5497976 N near a small stream.
Approximately one and a quarter kilometres from this point there is another junction at UTM 10: 0504660 E, 5497720 N. The main road continues to the right (west) and then crosses a branch of the Mamquam flowing from the southwest. Another branch of the road continues southwest, but it is blocked by a large boulder and is not driveable. This road has become a trail that I use to gain access to the southern portion of the Mamquam 5 claim.

It's also possible to gain access to the Mamquam 5 claim by following the main road which crosses the Mamquam, and then continue uphill until the road splits.

One road continues straight ahead and the other goes right (north). Both roads terminate on the property between 900 and 1000 metres of elevation.
Take the right fork and head north, roughly contouring around the mountain until a washout is reached.
These roads are shown on Map #2 (1:50,000 index map), which shows the property in relationship to the Mamquam River, Raffuse Creek, Clarion Lake, the Stawamus River and the town of Squamish.

There are three trails that begin from this north branch of the road. The first one is found at a low point in the road where a small creek flows through a culvert under the road. This trail descends from the road south of the creek then crosses the creek to travel north along the edge of the logging slash until the forest is entered. The trail then continues downhill beside the small stream until the main creek is reached. The main creek can be easily crossed at this site and the trail ascends the other bank passing over a recently fallen cedar tree which is gradually settling into the hillside. The trail then follows a small gully next to a glacial till slope failure. Once the logging slash is reached, the trail continues along the edge of the forest until an old logging road is encountered. This road can be followed uphill (west) and then north contouring around the mountain. Near the end of the road above the northeast creek, the trail enters the logging slash to the west and ascends through a thick growth of blueberries and small trees until the forest is reached again. From this site the trail proceeds north and west a short distance then descends the steep bank into the northeast creek.

In 2011 I cut an alternate trail that begins about 50 metres north of the north gully creek and heads uphill until the north gully creek is reached near its source. The route follows the creek and contours around hill 1023 until the previous trail to the northeast creek is reached.

The old logging road on the other side of the main creek can also be followed downhill (east and then north) until it reaches the lower gossan that contains the north and south gullies.

The other two trails can be accessed by parking before the washout and hiking to the end of the road where there is a turnaround. The first trail leaves the turnaround towards the north and descends steeply into the main creek.
The second trail leaves the turnaround towards the west and heads uphill through the logging slash until the forest is reached, where it continues parallel to the main creek until trail creek is reached. The route then continues in trail creek, or parallel to trail creek until sub-alpine glades are encountered. At this point the trail changes direction to the northwest until pass 1350 is reached.

There are numerous deer, black bears and the occasional cougar in the area. The animals use the roads and trails regularly so caution is advised. In addition, elk have been re-introduced to the Indian River watershed and they have now expanded into the Mamquam River area. Bull elk can be very aggressive in the fall rutting season.
There is one very big bear that lives in the high country near pass 1350. I haven't seen the bear or its tracks, but its droppings are much larger than those of most black bears. Grizzly bears have been sighted to the south and to the east of this property so extra caution is advised. I no longer go through this pass alone, particularly since two of us found the carcass of a small black bear in the area.

However, other than grizzly bears, the most dangerous animals encountered in this area are other humans.

Many people drive the roads quickly and recklessly. Although I'm very careful, I've still had near misses with people on all-terrain vehicles, motorcycles or other vehicles which were travelling at high speeds on the potholed, gravel roads.

Hunters are another special problem. Many hunters are knowledgeable and safety conscious but there are others who seem to shoot indiscriminately in all directions and these people are a major danger. I've even heard of hunters who shoot at a noise in the bush without seeing what they're firing at. Apparently this is called a sound shot.

In addition to the normal wild black bears that I encounter, conservation officers occasionally release problem bears that have been habituated to humans into this area. For some strange reason the Conservation Officer Services thinks this is a safe place to release dangerous bears. These bears are not afraid of humans and view them as a source of food. Habituated bears are no longer accustomed to foraging in the woods and become very hunger and extremely aggressive. These problem bears are apparently marked with a yellow ear tag, which isn't going to be very helpful if you are confronted by one in the bush. I've never seen any warnings posted that a problem bear has been released on one of the back roads, and I consider this lack of warning a serious failing by the Conservation Officer Services.

To date, only habituated black bears have been released into the Mamquam River area. However, my greatest fear is that one day the Conservation Officer Services will release a habituated grizzly bear into the Indian River or the Mamquam River area without public consultation or warnings.

There was one problem black bear released without any warning at mile 20 in 2010, and at about the same time a lone hiker, who was never seen again, left mile 20 to make a multi-day solo traverse across the divide into the Pitt River to Coquitlam. There are many reasons why a hiker can go missing in this area, but being attacked by a habituated black bear with a yellow ear tag is certainly one of those possibilities.

The Conservation Officer Services released another habituated black bear into this area in 2011 and apparently they have permission to relocate another bear to the Mamquam in 2012. I consider this an extremely irresponsible and dangerous practice, considering that many people use the Mamquam for recreation, hunting, fishing, prospecting, electrical power generation and logging.

The tenure number for the Mamquam 5 claim is 558954.

Most of the property is covered with soil or glacial till so rock outcrops are scarce. As a result, prospecting has mainly been done by following the stream sediment geochemistry, and examining creek beds. Outcrops on or near old logging roads have also been prospected. For geochemical exploration, soil and bedrock samples are obtained on a 100 metre by 100 metre grid. In addition I am also performing a seep, spring and waterfall survey on all parts of the property.

There are two main rock types found on the property, Gambier Group metamorphosed volcanics that contain rhyolites, andesites, cherts, tuffs and volcaniclastics and intrusive rocks such as quartz diorite and granodiorite. The two areas of metamorphosed volcanic rocks identified in the early 1980's have been found to be more extensive than previously thought. In addition, there are numerous rhyolite and some porphyry dykes in the area. These are the same rocks that are associated with the Britannia Mine so the model originally used was a volcanogenic massive sulphide type of mineralization. This model still applies, particularly now that a number of silicified mineralized rocks (float) have been found in the glacial till, which probably derive from a feeder zone. However, as more evidence of disseminated chalcopyrite and mineralized quartz veins are found, other models may also apply.

To date no massive sulphide, feeder zone or area of disseminated chalcopyrite of commercial value has been identified on the Mamquam property.

Map #3 is a 1:20,000 map that shows the roads, trails and place names used on all the Mamquam claims.

SUMMARY OF WORK PERFORMED ON THE MAMQUAM 5 CLAIM IN 2011 AND 2012

All the prospecting and road clearing trips into the Mamquam property in 2011 were day trips. In addition, there were four road clearing trips performed in 2012 before the May 20th anniversary date.

Although the end of the road as shown on Map # 2 is over 40 kilometres from Squamish, this is close enough to allow daily access, but each one-way trip takes about two hours. The road is severely potholed and is narrowing in many places as trees grow on the shoulders and lean into the driving space. Each year work is required so that access to the claims can be maintained.

Road and trail access work is apportioned to the various Mamquam claims according to the number of units in each claim. In 2011 road and trail work was performed on May 20, 25 and 31, June 7, 9, 15, 17, 23, 24, 27 and 30, July 4, 18, and 19, August 3 and 5 and on October 27. In 2012 road work was done on May 3, 10, 16 and May 17 before the May 20, 2012 anniversary date. The Mamquam 5 claim was apportioned 22.86% of the total number of days worked.

On July 6, 2011, Kristian Larson and I cleared road until we reached the creek with a beautiful waterfall just above the road. There is a narrow strip of mature trees left around the creek that leads down to its junction with the Mamquam River. We followed the west bank of the creek by travelling in the mature trees or the logging slash where it was not too thick until we reached the Mamquam. We then took a sediment sample from the small creek well above its junction and prospected the rocks that were in and around the creek. No mineralized rocks were found.

<u>M 211</u> 0505417 E 5498202 N

This sediment sample was taken from the creek that has a waterfall above the road, near its junction with the Mamquam River.

Significant results for M 211:

Au	0.006	ppm
Al	2.25	%
As	5	ppm
Ba	90	ppm

Ca	0.58	%
Co	19	ppm
Cr	20	ppm
Cu	53	ppm
Fe	4.16	%
Mg	1.46	%
Mn	768	ppm
P	750	ppm
Sr	37	ppm
Zn	106	ppm

<u>M 212</u> 0505400 E 5498200 N

This soil sample was taken from the west side of the same creek. It was a medium brown coloured "C" level soil with some organic material mixed in, obtained from a hole about 50 centimetres deep.

Significant results for M 212:

Au	0.005	ppm
Al	2.17	%
Cr	13	ppm
Mg	0.52	%
Mo	3	ppm
Sr	20	ppm

Kristian and I then waded and jumped across the Mamquam River so we could sample the river as well as the main creek.

<u>M 213</u> 0505327 E 5498190 N

This sediment sample was taken from the west bank of the Mamquam River above its junction with the main creek. No mineralized rock float was found in the stream.

Significant results for M 213:

Au	0.01	ppm
Al	2.08	%
As	8	ppm
Ba	90	ppm
Ca	0.54	%
Cd	0.5	ppm
Co	23	ppm

Cr	26	ppm
Cu	89	ppm
Fe	4.43	%
Mg	1.49	%
Mn	1225	ppm
Mo	2	ppm
P	980	ppm
Pb	24	ppm
Sr	30	ppm
Zn	179	ppm

M 214 0505326 E 5498209 N

This sediment sample was obtained from behind a large rock on the south side of the main creek near its junction with the Mamquam River. There were a considerable number of iron and manganese stained rocks (float) that included quartz diorites, andesites, volcaniclastics, quartz vein pebbles and rhyolites. A few of these rocks contained malachite stains and chalcopyrite.

Significant results for M 214:

Au	0.366	ppm
Ag	0.6	ppm
Al	1.64	%
As	10	ppm
Ba	90	ppm
Ca	0.38	%
Cd	1.4	ppm
Co	29	ppm
Cr	12	ppm
Cu	278	ppm
Fe	7.03	%
Mg	1.14	%
Mn	1295	ppm
Mo	6	ppm
P	930	ppm
Pb	21	ppm
S	2.89	%
Sr	28	ppm
Zn	311	ppm

The gold level obtained at this site is the third highest and the sulphur level is the highest found in a sediment sample to date on the Mamquam claims.

M 215 0505326 E 5498209 N

At the same site, a piece of iron-stained rhyolite rock float was found that contained malachite stains in the fractures.

Significant results for M 215:

Au	0.005	ppm
Ag	0.4	ppm
As	6	ppm
Ba	280	ppm
Cu	996	ppm

M 235 0504751 E 5497762 N

This sediment sample was taken from a small stream flowing into the Mamquam River. This site was close to the edge of the cliffs that lead down into the river.

Significant results for M 235:

Au	0.005	ppm
As	6	ppm
Ba	140	ppm
Ca	0.6	%
Cd	2.1	ppm
Co	50	ppm
Cr	11	ppm
Mg	0.67	%
Mn	9760	ppm
Mo	9	ppm
Pb	47	ppm
Sr	36	ppm
Zn	101	ppm

I continued eastward along the edge of the bluffs until I encountered another small stream.

M 236 0504839 E 5497754 N

This sediment sample was obtained from the next small stream that flows into the Mamquam River, just before it descends over the cliff edge.

Significant results for M 236:

Au	0.006	ppm
Al	1.67	%
As	6	ppm
Ba	70	ppm
Ca	0.57	%
Co	13	ppm
Cr	13	ppm
Cu	51	ppm
Mg	0.75	%
Mn	1175	ppm
Mo	4	ppm
P	730	ppm
Pb	22	ppm
Sr	33	ppm
Zn	91	ppm

N

MAMQUAM 5 CLAIM

1:20,000

MAP # 4

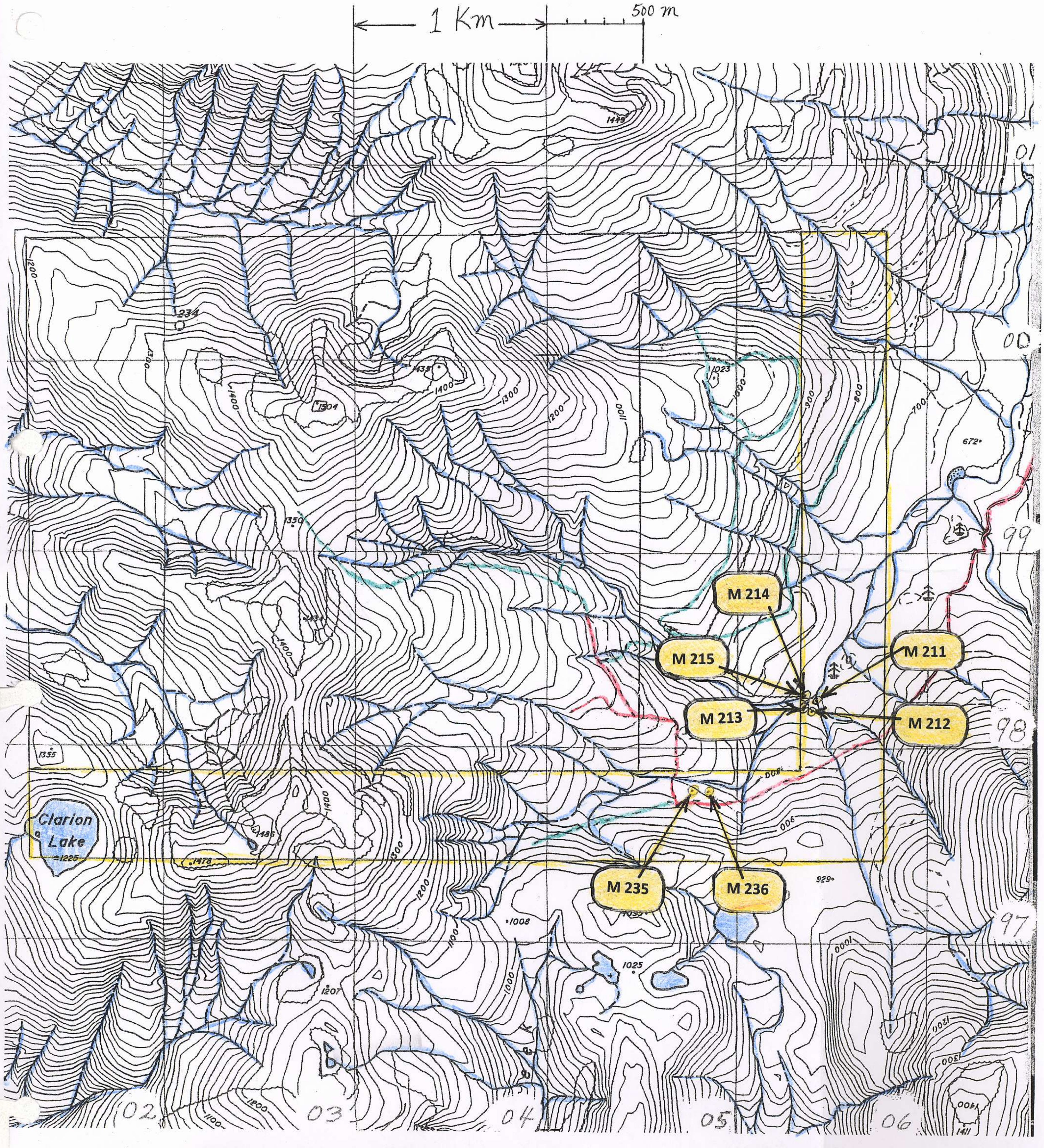
2011 GEOCHEMICAL SURVEY SAMPLE SITE LOCATIONS

LEGEND:

CREEK LAKE ROAD TRAIL DATUM: NAD 83

CONTOUR INTERVAL = 20 METRES CLAIM BOUNDARY 2011 SAMPLE SITE

M 235



GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT

33,120

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MAMQUAM 5 CLAIM

1:20,000

MAP # 5

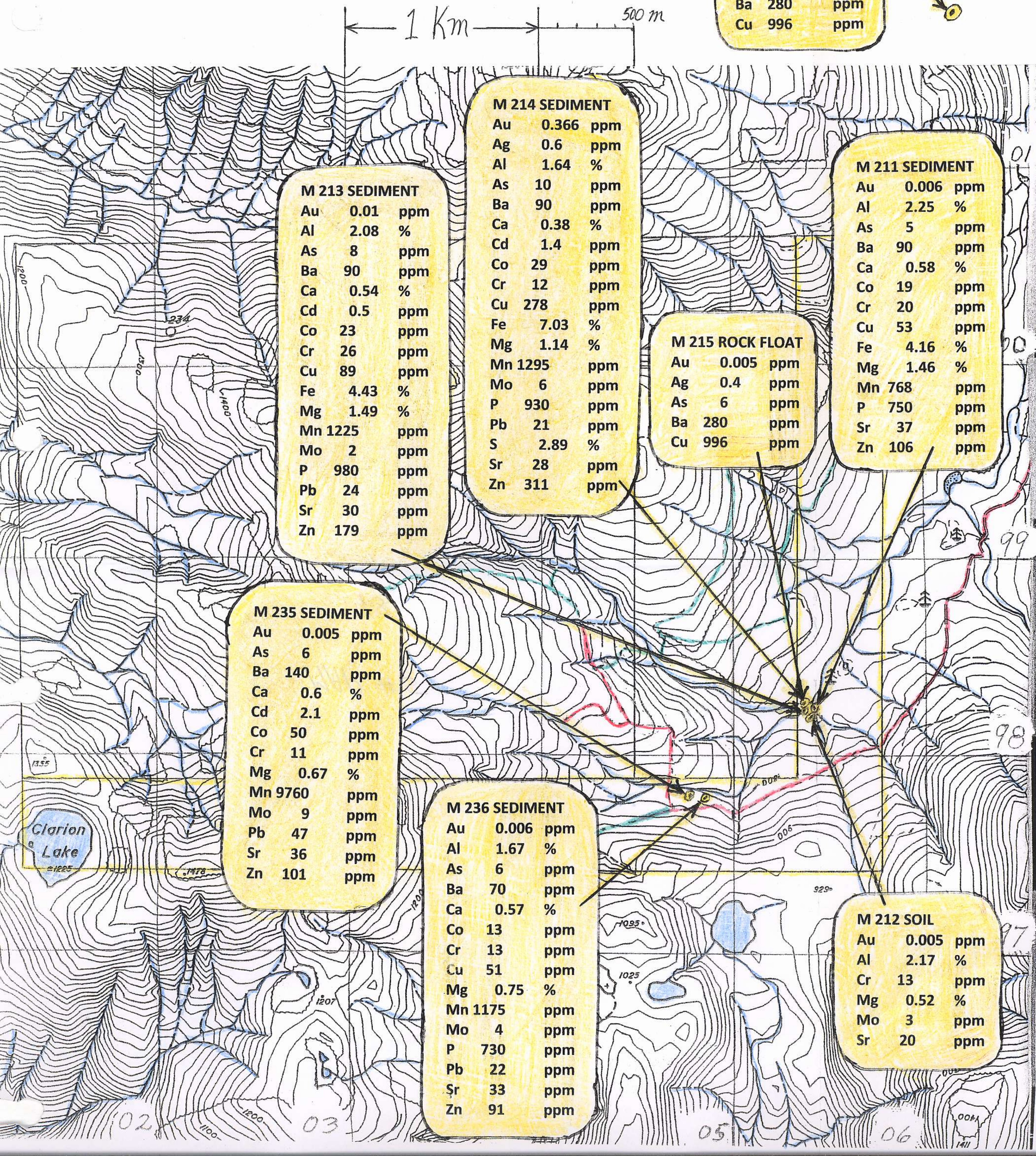
2011 GEOCHEMICAL SURVEY SIGNIFICANT RESULTS

LEGEND:

CREEK   LAKE   ROAD   TRAIL   DATUM: NAD 83

CONTOUR INTERVAL = 20 METRES   CLAIM BOUNDARY   2011 SAMPLE SITE

M 215 ROCK FLOAT
Au 0.005 ppm
Ag 0.4 ppm
As 6 ppm
Ba 280 ppm
Cu 996 ppm



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MAMQUAM 5 CLAIM

1:10,000

MAP # 6

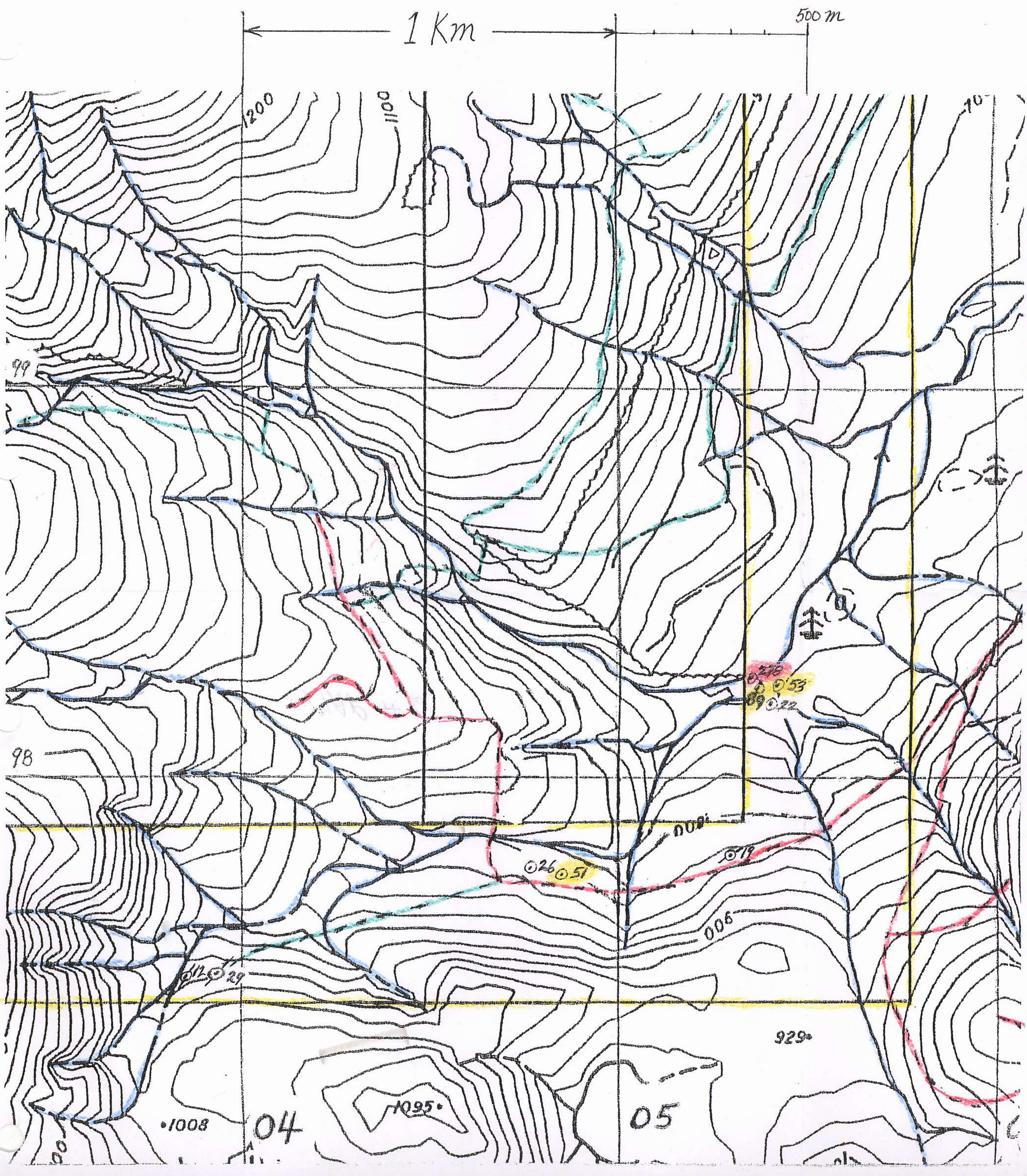
2011 GEOCHEMICAL SURVEY-COPPER

LEGEND:

CREEK — TRAIL — ROAD — 2010 SAMPLE SITES ⊘12

DATUM NAD 83 — CONTOUR INTERVAL = 20 METRES — 2011 SAMPLE SITES ⊙ 53

Cu 50-99 ppm — Cu 100-199 ppm — Cu > 199 ppm



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MAMQUAM 5 CLAIM

1:10,000

2011 GEOCHEMICAL SURVEY-LEAD

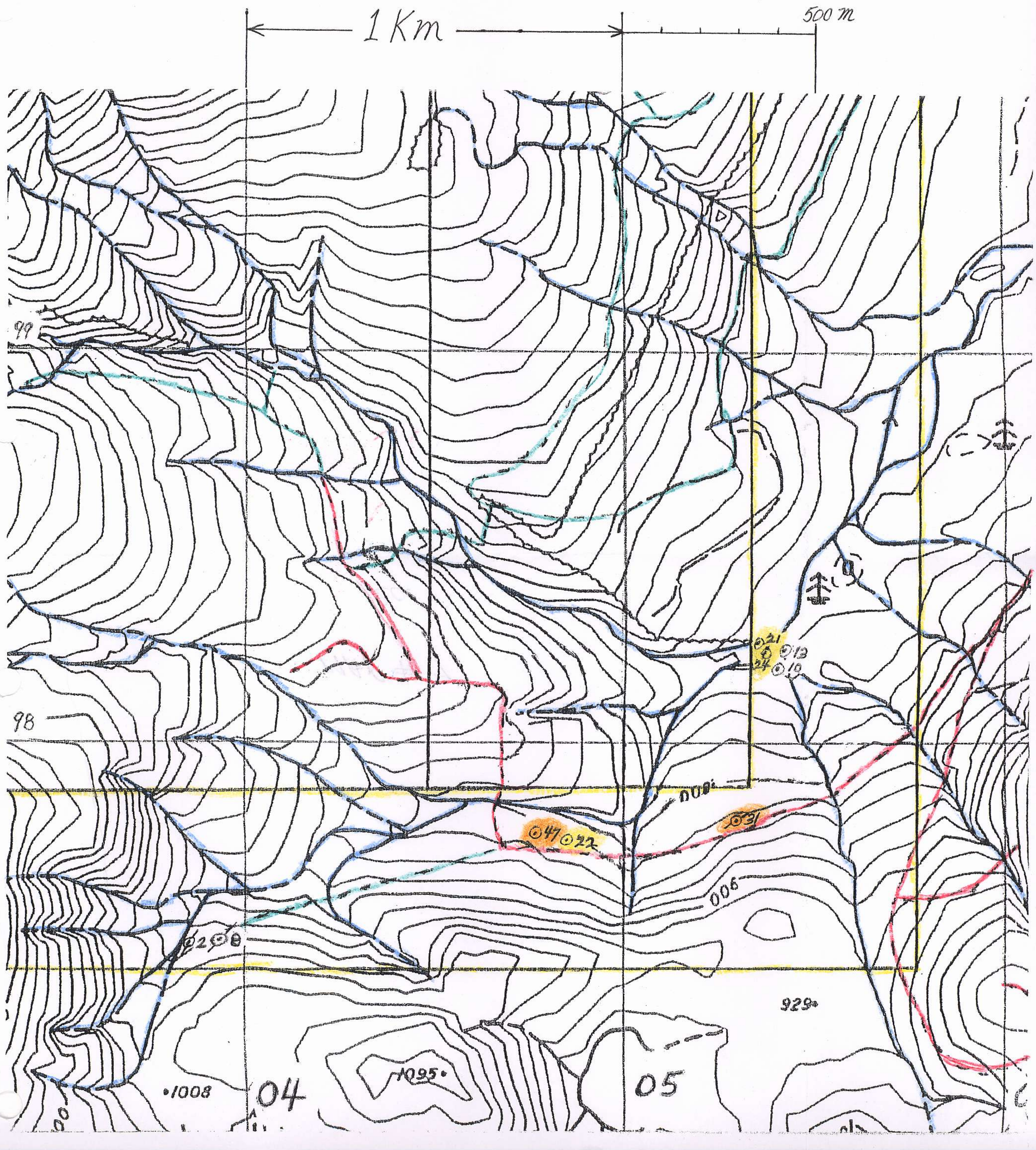
MAP # 7

LEGEND:

CREEK TRAIL ROAD 2010 SAMPLE SITES ⌀31

DATUM NAD 83 CONTOUR INTERVAL = 20 METRES 2011 SAMPLE SITES ⊙22

Pb 15-29 ppm Pb 30-59 ppm Pb > 59 ppm



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MAMQUAM 5 CLAIM

1:10,000

MAP # 8

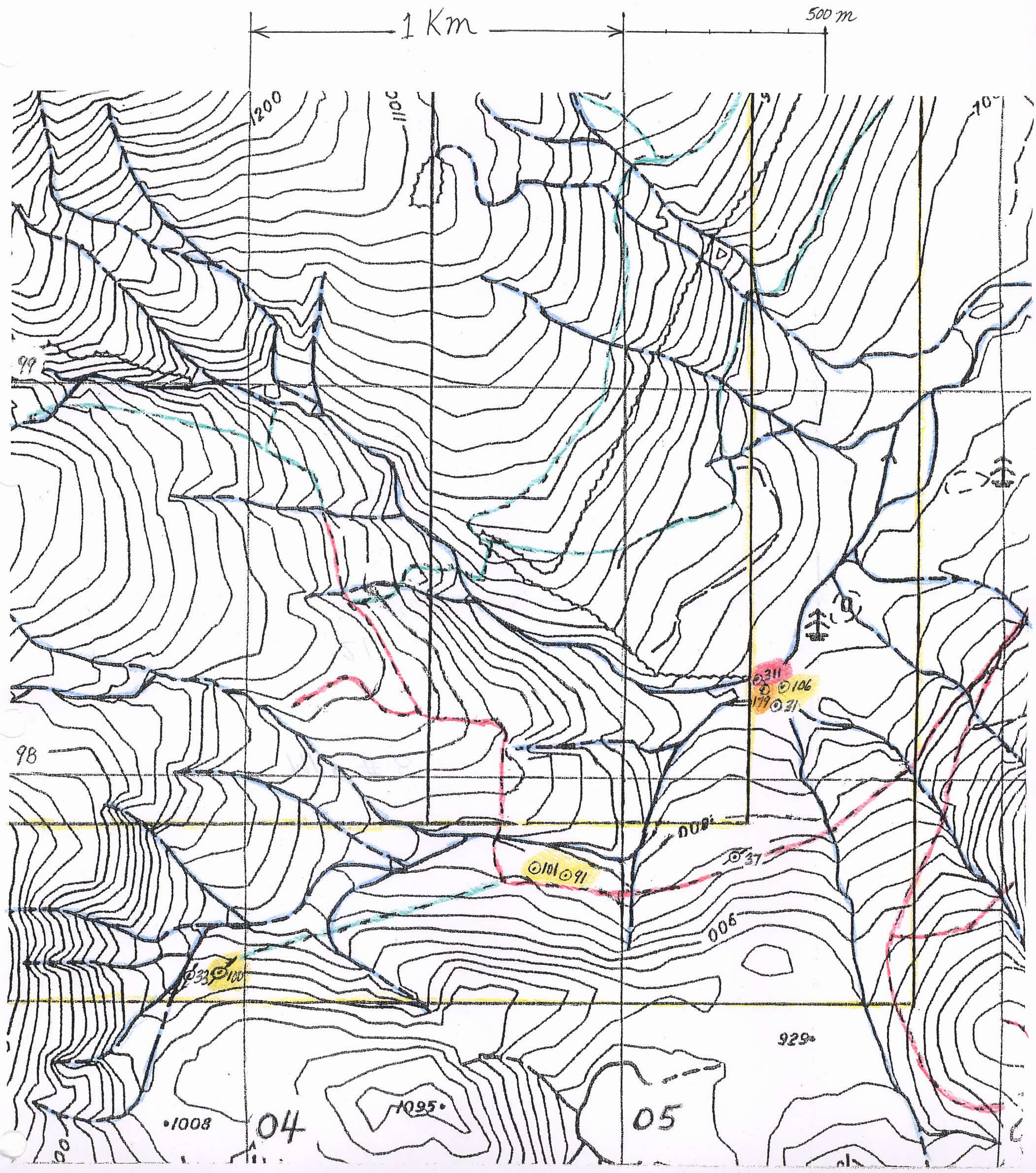
2011 GEOCHEMICAL SURVEY-ZINC

LEGEND:

CREEK — TRAIL — ROAD — 2010 SAMPLE SITES ⊘100

DATUM NAD 83 — CONTOUR INTERVAL = 20 METRES — 2011 SAMPLE SITES ⊙106

Zn 75-149 ppm — Zn 150-299 ppm — Zn > 299 ppm



N

MAMQUAM 5 CLAIM

1:10,000

MAP # 9

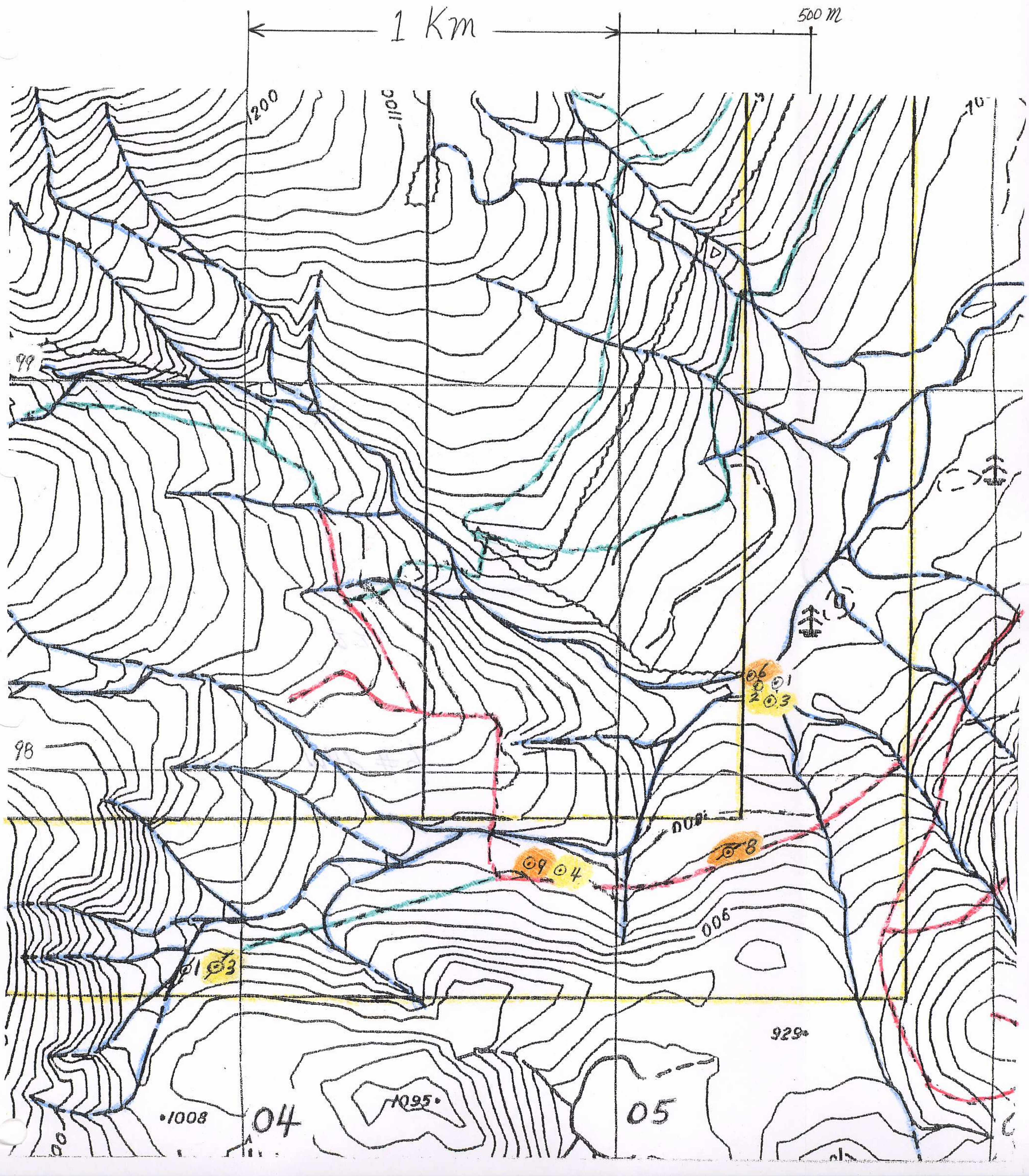
2011 GEOCHEMICAL SURVEY-MOLYBDENUM

LEGEND:

CREEK — TRAIL — ROAD — 2010 SAMPLE SITES ⊘3

DATUM NAD 83 — CONTOUR INTERVAL = 20 METRES — 2011 SAMPLE SITES ⊙6

Mo 2-4 ppm — Mo 5-9 ppm — Mo > 9 ppm



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MAMQUAM 5 CLAIM

1:10,000

2011 GEOCHEMICAL SURVEY-GOLD

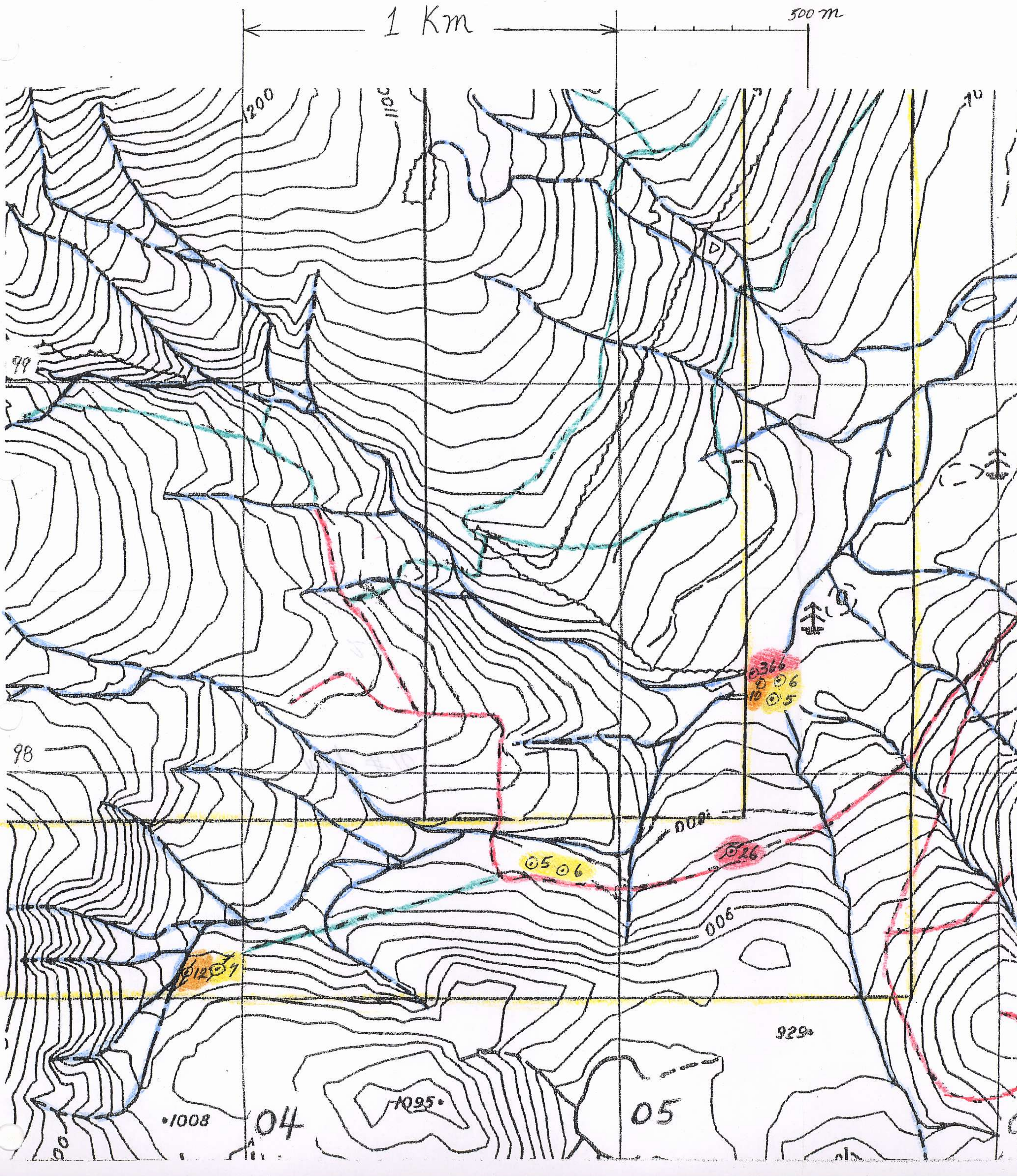
MAP # 10

LEGEND:

CREEK — TRAIL — ROAD — 2010 SAMPLE SITES ⊘6

DATUM NAD 83 — CONTOUR INTERVAL = 20 METRES — 2011 SAMPLE SITES ⊙10

Au 5-9 ppb — Au 10-19 ppb — Au > 19 ppb



MAMQUAM 5 2011 GEOCHEMICAL SURVEY
TECHNICAL DATA AND INTERPRETATION

This report covers a total of 7 geochemical samples, which includes 5 sediment samples, 1soil sample and 1 rock float sample.
The location of each sample was obtained using a Garmin GPSmap 60Cx GPS, with the datum setting at NAD 83.
The object of this survey was to follow up on anomalies found in previous years, and to continue soil and bedrock survey lines, which could be expanded in future surveys.

Each soil sample was obtained using the pick end of a steel rock hammer and a light steel garden trowel. The rock hammer was used to loosen soil and to dig around rocks so they could be removed from the hole. The trowel was used to remove loose soil from the hole and to obtain the sample once the correct level was reached. The holes were excavated widely to prevent upper soil layers from rolling into the hole and contaminating the lower soil layers. My general goal was to sample "C" level soils, but this was not possible at all sites. In areas that have a lot of roots in the soil I also use a pair of pruning shears and occasionally a small hand saw. If I encounter large roots, I try to dig around and under them or I move to another spot.

The sample number, location, description, depth and soil horizon were carefully recorded at each site and the soil obtained was placed in a labelled plastic zip-lock bag, which was sealed. The sealed plastic bag was then placed into a labelled paper bag that was used to protect the plastic bag and the sample from perforation and contamination. Each sample was then carefully placed into a pack and padded with extra clothing to prevent inadvertent damage. This system worked very well and all samples remained intact from the field to the laboratory.

Bedrock samples were examined, broken with a rock hammer and the fresh surfaces examined with a hand lens. A description was written in the field notes along with the GPS location. Representative samples of the rocks were bagged and transported as described for the soil samples. Rocks with sharp edges were given additional care and padding.

Once I had returned to Squamish, parts of each of the rock samples were removed from their labelled bags and examined again with a hand lens and a stereoscopic microscope. Only one sample was opened at a time, and the table and microscope stage were cleaned after each sample was examined in order to minimize contamination. Once the examination was completed, the pieces of sample were replaced in their bags, sealed and removed from the area before a new sample was reviewed.

Sediment samples were collected using the light steel trowel and a plastic container with a removable lid. The lid has about forty 5 millimetre holes drilled in it. The holes are spaced about 1.25 centimetres apart so the plastic is not weakened. The trowel, the plastic container and the lid are washed before and after collecting each sample so that contamination between samples is minimized. For this survey I was attempting to collect heavy minerals or metals so the preferred sites were gravel bars with rocks 2.54 centimetres or larger found at the base of waterfalls, in other pools or on the sides of creeks.
The trowel was used to dig through the rocks in order to collect the finer material between. The sand, silt and gravel were placed on the lid of the closed container and shaken or scraped with the trowel to filter the fine material into the container. The coarse material is discarded back into the creek. Many trowel loads are required to obtain a sample large enough for analysis. Once the container is about three-quarters full, the cleaned trowel is used to scoop most of the material into a labelled zip-lock plastic bag. The rest of the material still in the container is carefully washed into the bag until the last of the fine black material has been collected. The last material out of the container is the heaviest and therefore the most important. If this portion of the sample is lost, the entire procedure needs to be repeated so a complete sample can be obtained.

Once the sample is in the zip-lock bag, the bag is gently agitated so the heavier material will sink to the bottom. This also causes excess water to rise to the surface where it can be carefully poured out of the bag, while retaining all the heavy minerals or metals. Any black material that floats out with the water at this stage is likely to be quite light and usually organic in nature so the loss is not significant. The zip-lock bag is then sealed, placed in a second larger plastic bag and sealed again with a twist tie (zip-lock bags leak water). Both plastic bags are then placed in a labelled paper bag and the sample is packed upright, near the bottom of the pack in case of water leakage.

Sediment and soil samples should be protected from the sharp edges of tools or rock samples to avoid perforation, which can result in loss or contamination.

All samples were analysed by ALS Ltd. In North Vancouver, BC, and their reports can be found in appendix B. The company has also provided written material on the preparation of the soil, sediment and rock samples as well as their protocols for analyses. This material has been included in appendix C, along with a Quality Assurance Overview that covers quality assurance, quality control, external accreditation and certification, and external proficiency tests.

Microsoft office is the suite of software programs used to produce this report, which includes a database program "Access", a spreadsheet program "Excel", and a word processing program "Word". All geochemical analysis results for each sample site are entered into a database. Sample types (rock, soil, sediment, rock float, etc.), collection dates and locations are also recorded. The database can be queried in many ways to produce relevant comparisons.

Map # 4 shows the site locations for all samples collected in this geochemical survey.

Map # 5 documents the sample sites and significant results reported in the survey.

The most significant sample found in this survey was M 214, a sediment sample obtained from a gravel bar on the south bank of the main creek close to its junction with the Mamquam River. M 214 showed anomalous levels of many elements including copper, lead, zinc, molybdenum and gold. We could tell from the many pieces of mineralized rock float in the creek that this site was going to be of great interest. Follow-up on the Mamquam 4 claim later in the year confirmed our assessment.
Sample M 213 was collected from the west bank of the Mamquam River well above the junction with the main creek. No mineralized float was seen at this site, but the geochemistry results were also significant and require follow-up.

Maps # 6 to # 10 show contours for copper, lead zinc molybdenum and gold from the 2010 and 2011 geochemical surveys. The main areas of interest continue to be the main creek, the Mamquam River and the section of road that extends from the creek at 0505540 E to the last bridge over the Mamquam River. This area includes sample M 67 which is a sulphide vein that contains anomalous values of gold, arsenic, cobalt, iron and tungsten, and was described in my 2007 Mamquam 5 prospecting report.

In summary, this geochemical survey has shown that the anomalous results found by previous prospecting and geochemical surveys cover larger areas than previously thought, and that extensions of the 2011 geochemical survey lines are indicated. Sediment samples of the small creeks and seeps that drain these areas should continue to be collected in future geochemical surveys.

MAMQUAM 5 GEOCHEMICAL REPORT
ITEMIZED COST STATEMENT FOR 2011

	SCHEDULE	
FOOD COSTS /PERSON/DAY		$15.00
VEHICLE TO MAMQUAM		$90.00
VEHICLE TO VANCOUVER		$50.00
PROSPECTORS/DAY		$500.00
	ROAD AND TRAIL CLEARING (PRORATED)	
PROSPECTORS	5.49 DAYS @ $500	$2745.00
VEHICLE	4.80 TRIPS @ $90	$432.00
FOOD	5.49 DAYS @ $15	$82.35
	PROSPECTING EXPENSES	
PROSPECTORS	3 DAYS @ $500	$1500.00
VEHICLE	2 TRIPS @ $90	$180.00
FOOD	2 DAYS @ $15	$30.00
	OTHER EXPENSES	
ANALYSES	5 SAMPLES @ $34.80	$174.00
	2 SAMPLES @ $33.44	$66.88
FILING FEES	15-MAY-2012	$267.82
	SAMPLES TO ALS-NORTH VANCOUVER	
2 TRIPS PRORATED FOR THE NUMBER OF SAMPLES		
PROSPECTOR	0.182 DAYS @ $500	$91.00
VEHICLE	0.182 TRIPS @ $50	$9.10
	REPORT PREPARATION	
GEOCHEMICAL REPORTS	3.8125 DAYS @ $500	$1906.25
TOTAL		**$7,484.40**

APPENDIX A

AUTHOR'S QUALIFICATIONS

K.R. MacKenzie, B.Sc., M.D.

Dr. MacKenzie is a retired physician who graduated from the University of British Columbia in 1963 with a B.Sc. in Chemistry and Mathematics. Geology 105 was taken as part of his undergraduate studies. He spent three summers working for the Geological Survey of Canada under Dr. J.O. Wheeler.
After graduating from U.B.C. in 1968 with a medical degree, Dr. MacKenzie continued to prospect as a hobby and after retiring from Medicine in 1998, the prospecting hobby evolved into a business venture.

Recent reading by the author includes:

THE ROCKS AND MINERALS OF THE WORLD by C. Sorrell and G. Sandstrom

EXPLORATION AND MINING GEOLOGY by William C. Peters

ORE DEPOSITS by C.F. Park and R.A. MacDiarmid

A FIELD GUIDE TO ROCKS AND MINERALS by Pough

THE GEOCHEMISTRY OF GOLD AND ITS DEPOSITS by R.W. Boyle

CASE HISTORIES OF MINERAL DISCOVERIES, VOLUME 3, PORPHYRY COPPER, MOLYBDENUM AND GOLD DEPOSITS, VOLCANOGENIC DEPOSITS (MASSIVE SULPHIDES), AND DEPOSITS IN LAYERED ROCK by V.F. Hollister, Editor

PORPHYRY COPPER AND MOLYBDENUM DEPOSITS; WEST-CENTRAL B.C. by N.C. Carter

GEOLOGY OF THE PORPHYRY COPPER DEPOSITS OF THE WESTERN HEMISPHERE by Victor F. Hollister

ATLAS OF ALTERATION by A.J.B. Thompson and J.F.H. Thompson, Editors

ORE MINERAL ATLAS by Dan Marshall, C.D. Anglin and Hamid Mumin

PORPHYRY DEPOSITS OF THE CANADIAN CORDILLERA by A. Sutherland Brown, Editor

THE GEOLOGY OF ORE DEPOSITS by John M. Guilbert and Charles F. Park, Jr.

GEOCHEMISTRY OF HYDROTHERMAL ORE DEPOSITS by H.L. Barnes

GEOCHEMISTRY by Arthur H. Brownlow

FIELD GEOPHYSICS by John Milsom

XXIV INTERNATIONAL GEOLOGICAL CONGRESS; COPPER AND MOLYBDENUM DEPOSITS OF THE WESTERN CORDILLERA by C.S. Ney and A. Sutherland Brown

PRINCIPLES OF GEOCHEMICAL PROSPECTING by H.E. Hawkes

GEOCHEMICAL EXPLORATION by R.W. Boyle and J.I. Mcgerrigle

THE ELEMENTS by John Elmsley

GREAT MINING CAMPS OF CANADA 5. BRITANNIA MINES, BRITISH COLUMBIA
Geoscience Canada, September 2011, Volume 38 Number 3.
By W.G. Smitheringale

APPENDIX B

ANALYSIS RESULTS FOR ALL SAMPLES

COLLECTED ON THE MAMQUAM 5 CLAIM

DURING 2011

ALS Minerals

ALS Canada Ltd.
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North Vancouver BC V7H 0A7
Phone: 604 984 0221 Fax: 604 984 0218 www.alsglobal.com

MACKENZIE, KEN
PO BOX 641
GARIBALDI HIGHLANDS BC V0N 1T0

Finalized Date SEP-2011
This c. reported on
23-SEP-2011
Account: MACKEN

CERTIFICATE VA11162670

Project: X,M
P.O. No.:
This report is for 16 Sediment samples submitted to our lab in Vancouver, BC, Canada on 15-AUG-2011.
The following have access to data associated with this certificate:

KEN MACKENZIE

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
SCR-41	Screen to -180um and save both

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
Au-AA23	Au 30g FA-AA finish	AAS
ME-ICP41	35 Element Aqua Regia ICP-AES	ICP-AES

32

To: MACKENZIE, KEN
PO BOX 641
GARIBALDI HIGHLANDS BC V0N 1T0

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

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

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North Vancouver BC V7H 0A7
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PO BOX 641
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Finalized Date: SEP-2011
Account: MACKEN

Project: X,M

CERTIFICATE OF ANALYSIS VA11162670

Sample Description / Method / Analyte / Units / LOR	WEI-21 Recvd Wt. kg 0.02	Au-AA23 Au ppm 0.005	ME-ICP41 Ag ppm 0.2	ME-ICP41 Al % 0.01	ME-ICP41 As ppm 2	ME-ICP41 B ppm 10	ME-ICP41 Ba ppm 10	ME-ICP41 Be ppm 0.5	ME-ICP41 Bi ppm 2	ME-ICP41 Ca % 0.01	ME-ICP41 Cd ppm 0.5	ME-ICP41 Co ppm 1	ME-ICP41 Cr ppm 1	ME-ICP41 Cu ppm 1	ME-ICP41 Fe % 0.01
[redacted]															
M-211	0.62	0.006	<0.2	2.25	5	<10	90	<0.5	<2	0.56	<0.5	19	20	53	4.16
M-212	0.70	<0.005	<0.2	2.17	3	<10	20	<0.5	<2	0.15	<0.5	7	13	22	1.53
M-213	0.70	0.010	0.2	2.08	8	<10	90	<0.5	<2	0.54	0.5	23	26	89	4.43
M-214	0.66	0.366	0.6	1.64	10	<10	90	<0.5	<2	0.38	1.4	29	12	278	7.03

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Finalized Date: SEP-2011
Account: MACKEN

Project: X,M

CERTIFICATE OF ANALYSIS VA11162670

Sample Description	Method Analyte Units LOR	ME-ICP41 Ga ppm 10	ME-ICP41 Hg ppm 1	ME-ICP41 K % 0.01	ME-ICP41 La ppm 10	ME-ICP41 Mg % 0.01	ME-ICP41 Mn ppm 5	ME-ICP41 Mo ppm 1	ME-ICP41 Na % 0.01	ME-ICP41 Ni ppm 1	ME-ICP41 P ppm 10	ME-ICP41 Pb ppm 2	ME-ICP41 S % 0.01	ME-ICP41 Sb ppm 2	ME-ICP41 Sc ppm 1	ME-ICP41 Sr ppm 1
[redacted]																
M-211		10	<1	0.24	10	1.46	768	1	0.03	11	750	13	0.04	<2	4	37
M-212		10	<1	0.04	<10	0.62	208	3	0.01	6	260	10	0.04	<2	3	20
M-213		10	<1	0.11	10	1.49	1225	2	0.02	19	980	24	0.17	<2	4	30
M-214		<10	<1	0.06	10	1.14	1295	6	0.03	16	930	21	2.89	<2	4	28

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Finalized Date: SEP-2011
Account: MACKEN

Project: X,M

CERTIFICATE OF ANALYSIS VA11162670

Sample Description	Method Analyte Units LOR	ME-ICP41 Th ppm 20	ME-ICP41 Ti % 0.01	ME-ICP41 Tl ppm 10	ME-ICP41 U ppm 10	ME-ICP41 V ppm 1	ME-ICP41 W ppm 10	ME-ICP41 Zn ppm 2
[redacted]								
M-211		<20	0.22	<10	<10	114	<10	106
M-212		<20	0.16	<10	<10	51	<10	31
M-213		<20	0.08	<10	<10	87	<10	179
M-214		<20	0.03	<10	<10	53	<10	311

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GARIBALDI HIGHLANDS BC V0N 1T0

Finalized Date: SEP-2011
This c... reported on
23-SEP-2011
Account: MACKEN

CERTIFICATE VA11167748

Project: X,M
P.O. No.:
This report is for 2 Rock samples submitted to our lab in Vancouver, BC, Canada on 15-AUG-2011.
The following have access to data associated with this certificate:

KEN MACKENZIE		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
CRU-31	Fine crushing - 70% <2mm
SPL-21	Split sample - riffle splitter
PUL-31	Pulverize split to 85% <75 um

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-ICP41	35 Element Aqua Regia ICP-AES	ICP-AES
Au-AA23	Au 30g FA-AA finish	AAS

36.

To: MACKENZIE, KEN
PO BOX 641
GARIBALDI HIGHLANDS BC V0N 1T0

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Signature:
Colin Ramshaw, Vancouver Laboratory Manager

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Finalized Date. -SEP-2011
Account: MACKEN

Project: X,M

CERTIFICATE OF ANALYSIS VA11167748

Sample Description	Method Analyte Units LOR	WEI-21 Recvd Wt. kg 0.02	Au-AA23 Au ppm 0.005	ME-ICP41 Ag ppm 0.2	ME-ICP41 Al % 0.01	ME-ICP41 As ppm 2	ME-ICP41 B ppm 10	ME-ICP41 Ba ppm 10	ME-ICP41 Be ppm 0.5	ME-ICP41 Bi ppm 2	ME-ICP41 Ca % 0.01	ME-ICP41 Cd ppm 0.5	ME-ICP41 Co ppm 1	ME-ICP41 Cr ppm 1	ME-ICP41 Cu ppm 1	ME-ICP41 Fe % 0.01
[redacted]																
M-215		0.80	<0.005	0.4	0.31	6	<10	280	<0.5	<2	0.21	<0.5	5	4	996	0.78

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Finalized Date. SEP-2011
Account: MACKEN

Project: X,M

CERTIFICATE OF ANALYSIS VA11167748

Sample Description	Method / Analyte / Units / LOR	ME-ICP41 Ga ppm 10	ME-ICP41 Hg ppm 1	ME-ICP41 K % 0.01	ME-ICP41 La ppm 10	ME-ICP41 Mg % 0.01	ME-ICP41 Mn ppm 5	ME-ICP41 Mo ppm 1	ME-ICP41 Na % 0.01	ME-ICP41 Ni ppm 1	ME-ICP41 P ppm 10	ME-ICP41 Pb ppm 2	ME-ICP41 S % 0.01	ME-ICP41 Sb ppm 2	ME-ICP41 Sc ppm 1	ME-ICP41 Sr ppm 1
[redacted]																
M-215		<10	<1	0.21	10	0.08	168	1	0.04	1	120	<2	0.37	<2	<1	15

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Finalized Date: SEP-2011
Account: MACKEN

Project: X,M

CERTIFICATE OF ANALYSIS VA11167748

Sample Description	Method / Analyte / Units / LOR	ME-ICP41 Th ppm 20	ME-ICP41 Ti % 0.01	ME-ICP41 Tl ppm 10	ME-ICP41 U ppm 10	ME-ICP41 V ppm 1	ME-ICP41 W ppm 10	ME-ICP41 Zn ppm 2
[redacted]								
M-215		<20	<0.01	<10	<10	1	<10	13

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To: MACKENZIE, KEN
PO BOX 641
GARIBALDI HIGHLANDS BC V0N 1T0

Finalized Date: 8- DEC- 2011
This copy reported on 13- DEC- 2011
Account: MACKEN

CERTIFICATE VA11241761

Project: D.L.X,M
P.O. No.:
This report is for 22 Sediment samples submitted to our lab in Vancouver, BC, Canada on 16- NOV- 2011.
The following have access to data associated with this certificate:

KEN MACKENZIE

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI- 21	Received Sample Weight
LOG- 22	Sample login - Rcd w/o BarCode
SCR- 41	Screen to - 180um and save both

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
Au- AA23	Au 30g FA- AA finish	AAS
ME- ICP41	35 Element Aqua Regia ICP- AES	ICP- AES

40.

To: MACKENZIE, KEN
PO BOX 641
GARIBALDI HIGHLANDS BC V0N 1T0

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

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

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Phone: 604 984 0221 Fax: 604 984 0218 www.alsglobal.com

To: MACKENZIE, KEN
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GARIBALDI HIGHLANDS BC V0N 1T0

Finalized Date: 8- DEC- 2011
Account: MACKEN

Project: D.L.X,M

CERTIFICATE OF ANALYSIS VA11241761

Sample Description	Method	WEI- 21	Au- AA23	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41	ME- ICP41
	Analyte	Recvd Wt.	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe
	Units	kg	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%
	LOR	0.02	0.005	0.2	0.01	2	10	10	0.5	2	0.01	0.5	1	1	1	0.01
M- 235		1.10	0.005	<0.2	1.37	6	<10	140	<0.5	<2	0.60	2.1	50	11	26	2.26
M- 236		0.62	0.006	0.2	1.67	6	<10	70	<0.5	<2	0.57	<0.5	13	13	51	2.43

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GARIBALDI HIGHLANDS BC V0N 1T0

Finalized Date: 8- DEC- 2011
Account: MACKEN

Project: D.L.X,M

CERTIFICATE OF ANALYSIS VA11241761

Sample Description	Method / Analyte / Units / LOR	ME- ICP41 Ga ppm 10	ME- ICP41 Hg ppm 1	ME- ICP41 K % 0.01	ME- ICP41 La ppm 10	ME- ICP41 Mg % 0.01	ME- ICP41 Mn ppm 5	ME- ICP41 Mo ppm 1	ME- ICP41 Na % 0.01	ME- ICP41 Ni ppm 1	ME- ICP41 P ppm 10	ME- ICP41 Pb ppm 2	ME- ICP41 S % 0.01	ME- ICP41 Sb ppm 2	ME- ICP41 Sc ppm 1	ME- ICP41 Sr ppm 1
M- 235		<10	<1	0.07	<10	0.87	9760	9	0.01	11	560	47	0.07	<2	1	36
M- 236		<10	<1	0.07	<10	0.76	1176	4	0.01	8	730	22	0.05	<2	2	33

42.

APPENDIX C

SAMPLE PREPARATION, GEOCHEMICAL ANALYSIS, QUALITY ASSURANCE, QUALITY CONTROL, EXTERNAL ACCREDITATION AND CERTIFICATION, AND EXTERNAL PROFICIENCY TESTS

ALS Chemex

Sample Preparation Package – PREP-41
Standard Preparation: Dry sample and dry-sieve to –180 micron

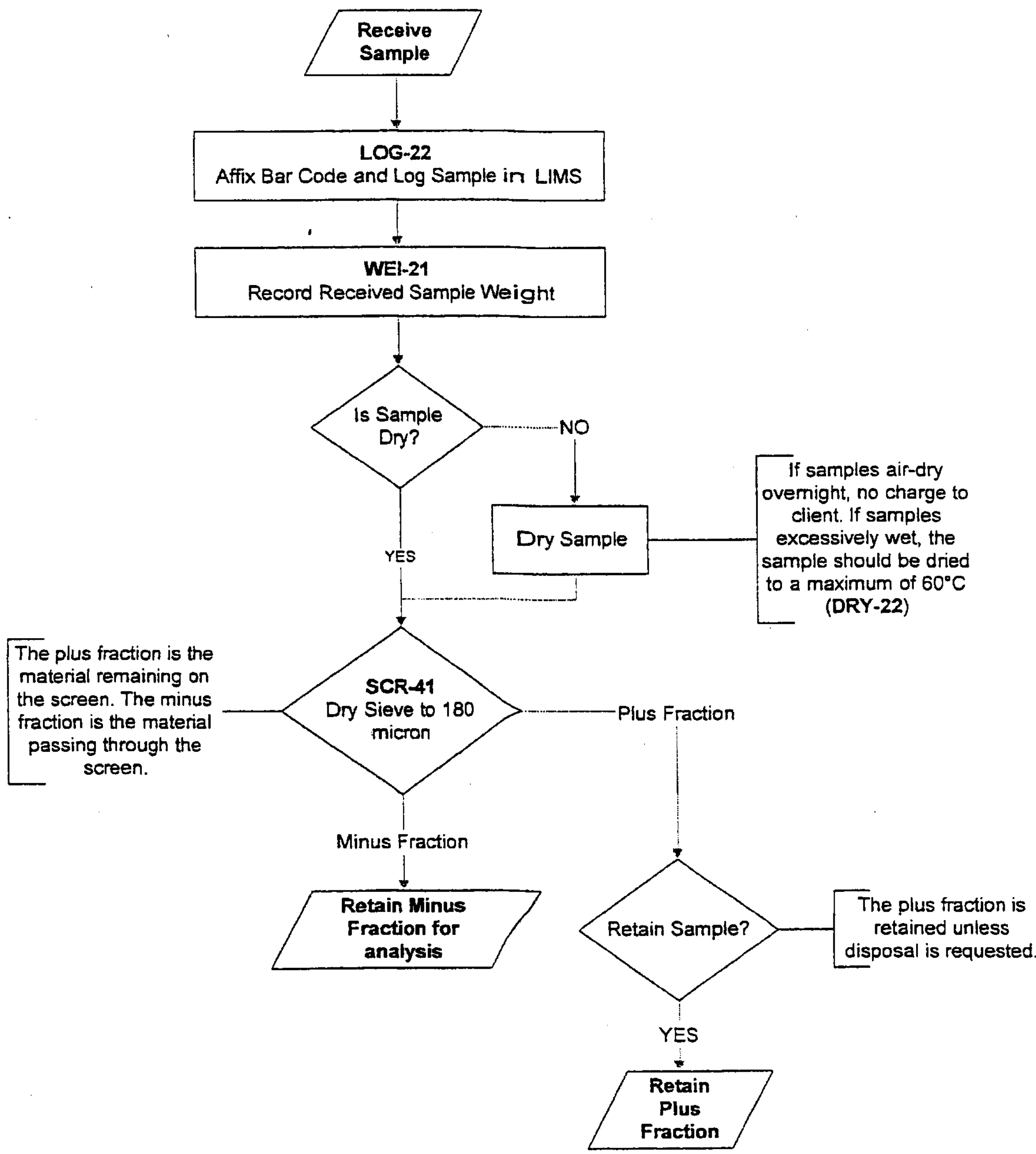
Sample preparation is the most critical step in the entire laboratory operation. The purpose of preparation is to produce a homogeneous analytical sub-sample that is fully representative of the material submitted to the laboratory.

An entire sample is dried and then dry-sieved using a 180 micron (Tyler 80 mesh) screen. The plus fraction is retained unless disposal is requested. This method is appropriate for soil or sediment samples up to 1 kg in weight.

Method Code	Description
LOG-22	Sample is logged in tracking system and a bar code label is attached.
SCR-41	Sample is dry-sieved to — 180 micron and both the plus and minus fractions are retained.

ALS Chemex

Sample Preparation Flowchart Package –PREP-41



ALS Chemex

Geochemical Procedure - ME-ICP41
Trace Level Methods Using Conventional ICP-AES Analysis

Sample Decomposition:	Nitric Aqua Regia Digestion (GEO-AR01)
Analytical Method:	Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP - AES)

A prepared sample is digested with aqua regia for in a graphite heating block. After cooling, the resulting solution is diluted to 12.5 mL with deionized water, mixed and analyzed by inductively coupled plasma-atomic emission spectrometry. The analytical results are corrected for inter-element spectral interferences.

NOTE: In the majority of geological matrices, data reported from an aqua regia leach should be considered as representing only the leachable portion of the particular analyte.

Element	Symbol	Units	Lower Limit	Upper Limit	Default Overlimit Method
Silver	Ag	ppm	0.2	100	Ag-OG46
Aluminum	Al	%	0.01	25	
Arsenic	As	ppm	2	10000	
Boron	B	ppm	10	10000	
Barium	Ba	ppm	10	10000	
Beryllium	Be	ppm	0.5	1000	
Bismuth	Bi	ppm	2	10000	
Calcium	Ca	%	0.01	25	
Cadmium	Cd	ppm	0.5	1000	
Cobalt	Co	ppm	1	10000	
Chromium	Cr	ppm	1	10000	
Copper	Cu	ppm	1	10000	Cu-OG46
Iron	Fe	%	0.01	50	

ALS Chemex

Element	Symbol	Units	Lower Limit	Upper Limit	Default Overlimit Method
Gallium	Ga	ppm	10	10000	
Mercury	Hg	ppm	1	10000	
Potassium	K	%	0.01	10	
Lanthanum	La	ppm	10	10000	
Magnesium	Mg	%	0.01	25	
Manganese	Mn	ppm	5	50000	
Molybdenum	Mo	ppm	1	10000	
Sodium	Na	%	0.01	10	
Nickel	Ni	ppm	1	10000	
Phosphorus	P	ppm	10	10000	
Lead	Pb	ppm	2	10000	Pb-OG46
Sulfur	S	%	0.01	10	
Antimony	Sb	ppm	2	10000	
Scandium	Sc	ppm	1	10000	
Strontium	Sr	ppm	1	10000	
Thorium	Th	ppm	20	10000	
Titanium	Ti	%	0.01	10	
Thallium	Tl	ppm	10	10000	
Uranium	U	ppm	10	10000	
Vanadium	V	ppm	1	10000	
Tungsten	W	ppm	10	10000	
Zinc	Zn	ppm	2	10000	Zn-OG46

ALS Chemex

Fire Assay Procedure – Au-AA23 & Au-AA24
Fire Assay Fusion, AAS Finish

Sample Decomposition: Fire Assay Fusion (FA-FUS01 & FA-FUS02)

Analytical Method: Atomic Absorption Spectroscopy (AAS)

A prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica and other reagents as required, inquarted with 6 mg of gold-free silver and then cupelled to yield a precious metal bead.

The bead is digested in 0.5 mL dilute nitric acid in the microwave oven, 0.5 mL concentrated hydrochloric acid is then added and the bead is further digested in the microwave at a lower power setting. The digested solution is cooled, diluted to a total volume of 4 mL with de-mineralized water, and analyzed by atomic absorption spectroscopy against matrix-matched standards.

Method Code	Element	Symbol	Units	Sample Weight (g)	Lower Limit	Upper Limit	Default Overlimit Method
Au-AA23	Gold	Au	ppm	30	0.005	10.0	Au-GRA21
Au-AA24	Gold	Au	ppm	50	0.005	10.0	Au-GRA22

ALS Chemex

QUALITY ASSURANCE OVERVIEW

Laboratory Accreditation and Certification

ISO 17025

ALS Chemex's North Vancouver laboratory has received ISO 17025 accreditation from the Standards Council of Canada under CAN-P-4E (ISO/IEC 17025:2005), the General Requirements for the Competence of Testing and Calibration Laboratories, and the PALCAN Handbook (CAN-P-1570).

Standards Council of Canada Accredited Laboratory Scope of Accreditation 579
Conseil canadien des normes Laboratoire accrédité Portée d'accréditation 579 TM

The scope of the accreditation includes the following methods:

- Au-AA: Determination of Au by Lead Collection Fire Assay and AAS
- Au/Ag-GRA: Determination of Au and Ag by Lead Collection Fire Assay and Gravimetric Finish
- PGM-ICP: Determination of Au, Pt and Pd by Lead Collection Fire Assay and ICP-AES
- ME-ICP41: Multi-Element (Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, Hg, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sb, Sc, Sr, Ti, Tl, U, V, W, Zn) Determination by Aqua Regia Digestion and ICP-AES
- ME-ICP61: Multi-Element (Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, S, Sb, Sc, Se, Si, Sn, Sr, Ta, Te, Ti, Tl, U, V W, Y, Zn and Zr) Determination by 4-Acid Digestion and ICP-AES
- ICP81: Al, Co, CU, Fe, Mg, Mn, Ni, Pb, S and Zn by Sodium Peroxide Fusion and ICP-AES
- OG46: Ag, Cu, Pb, and Zn – Determination of Ores and High Grade Material Using ICP-AES Following an Aqua Regia Digestion
- OG62: Ag, Cu, Pb and Zn – Determination of Ores and High Grade Material Using ICP-AES Following a Four-Acid Digestion
- AA45: Ag, Cu, Pb and Zn – Determination of Base Meals Using AAS Following an Aqua Regia Digestion
- AA46: Ag, Cu, Pb, Zn and Mo – Determination of Ores and High Grade materials Using AAS Following an Aqua Regia Digestion
- AA61: Ag, Co, Cu, Ni, Pb and Zn – Determination of Base Metals Using AAS Following a Four-Acid Digestion
- AA62: Ag, Co, CU, Mo, Ni, Pb and Zn – Determination of Ores and High Grade Materials Using AAS Following a Four-Acid Digestion

Our Reno, Nevada and Val d'Or, Quebec labs are actively pursuing ISO 17025 accreditation for Au by Fire Assay methods.

ISO 9001

ALS Chemex laboratories in North America are registered to ISO 9001:2000 for the "provision of assay and geochemical analytical services" by QMI-SAI Global Quality Registrars.

The ISO 9001:2000 registration provides evidence of a quality management system covering all aspects of our organization. ISO 17025 accreditation provides specific assessment of our laboratory's analytical capabilities. In our opinion, the combination of the two ISO standards provides our clients complete assurance regarding the quality of every aspect of ALS Chemex operations.

Aside from laboratory accreditation, ALS Chemex has been a leader in participating in, and sponsoring, the assayer certification program in British Columbia. Many of our analysts have completed this demanding program that includes extensive theoretical and practical examinations. Upon successful completion of these examinations, they are awarded the title of Registered Assayer.

Quality Assurance Program

The quality assurance program is an integral part of all day-to-day activities at ALS Chemex and involves all levels of staff. Responsibilities are formally assigned for all aspects of the quality assurance program.

Sample Preparation Quality Specifications

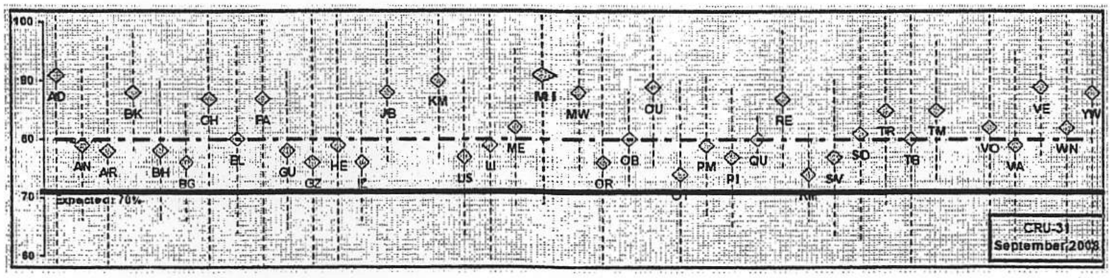
Standard specifications for sample preparation are clearly defined and monitored. The specifications for our most common methods are as follows:

- Crushing (CRU-31)
  > 70% of the crushed sample passes through a 2 mm screen
- Ringing (PUL-31)
  > 85% of the ring pulverized sample passes through a 75 micron screen (Tyler 200 mesh)
- Samples Received as Pulps
  >80% of the sample passes through a 75 micron screen (Tyler 200 mesh)

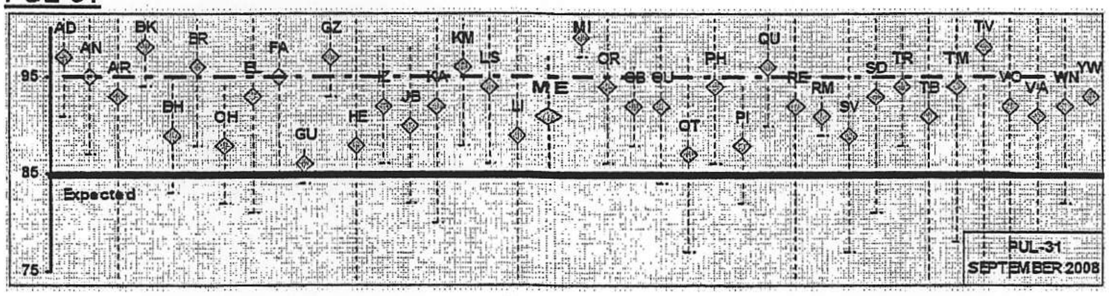
These characteristics are measured and results reported to verify the quality of sample preparation. Our standard operating procedures require that samples at every preparation station are tested regularly throughout each shift. Measurement of sample preparation quality allows the identification of equipment, operators and processes that are not operating within specifications.

QC results from all global sample preparation laboratories are captured by the LIM System and the QA Department compiles a monthly review report for senior management on the performance of each laboratory from this data.

CRU-31



PUL-31



Other Sample Preparation Specifications

Sample preparation is a vital part of any analysis protocol. Many projects require sample preparation to other specifications, for instance >90% of the crushed sample to pass through a 2 mm screen. These procedures can easily be accommodated and the Prep QC monitoring system is essential in ensuring the required specifications are routinely met.

Analytical Quality Control – Reference Materials, Blanks & Duplicates

The LIMS inserts quality control samples (reference materials, blanks and duplicates) on each analytical run, based on the rack sizes associated with the method. The rack size is the number of sample including QC samples included in a batch. The blank is inserted at the beginning, standards are inserted at random intervals, and duplicates are analysed at the end of the batch. Quality control samples are inserted based on the following rack sizes specific to the method:

Rack Size	Methods	Quality Control Sample Allocation
20	Specialty methods including specific gravity, bulk density, and acid insolubility	2 standards, 1 duplicate, 1 blank
28	Specialty fire assay, assay-grade, umpire and concentrate methods	1 standard, 1 duplicate, 1 blank
39	XRF methods	2 standards, 1 duplicate, 1 blank
40	Regular AAS, ICP-AES and ICP-MS methods	2 standards, 1 duplicate, 1 blank
84	Regular fire assay methods	2 standards, 3 duplicates, 1 blank

Laboratory staff analyse quality control samples at least at the frequency specified above. If necessary, they may include additional quality control samples above the minimum specifications.

All data gathered for quality control samples – blanks, duplicates and reference materials – are automatically captured, sorted and retained in the QC Database.

Quality Control Limits and Evaluation

Quality Control Limits for reference materials and duplicate analyses are established according to the precision and accuracy requirements of the particular method. Data outside control limits are identified and investigated and require corrective actions to be taken. Quality control data is scrutinised at a number of levels. Each analyst is responsible for ensuring the data submitted is within control specifications. In addition, there are a number of other checks.

Certificate Approval

If any data for reference materials, duplicates, or blanks falls beyond the control limits established, it is automatically flagged red by the computer system for serious failures, and yellow for borderline results. The Department Manager(s) conducting the final review of the Certificate is thus made aware that a problem may exist with the data set.

Precision Specifications and Definitions

Most geochemical procedures are specified to have a precision of ± 10%, and assay procedures ± 5%. The precision of Au analyses is dominated by the sampling precision.

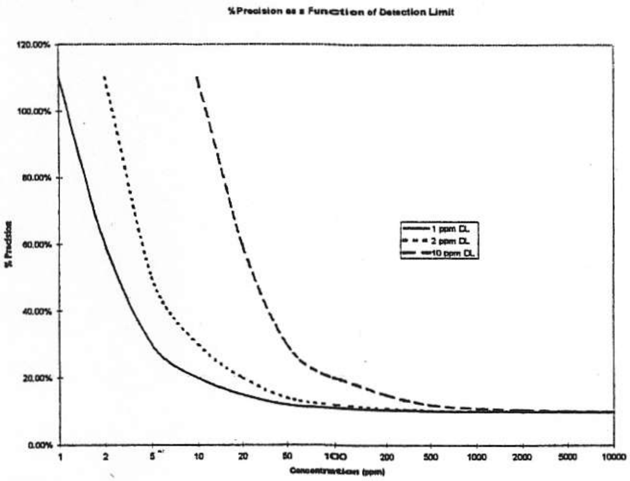
Precision can be expressed as a function of concentration:

$$P_c = \left(\frac{DetectionLimit}{c} + P\right) \times 100\%$$

where P_c - the precision at concentration c
c - concentration of the element
P - the "Precision Factor" of the element. This is the precision of the method at very high concentrations, i.e. 0.05 for 5%.

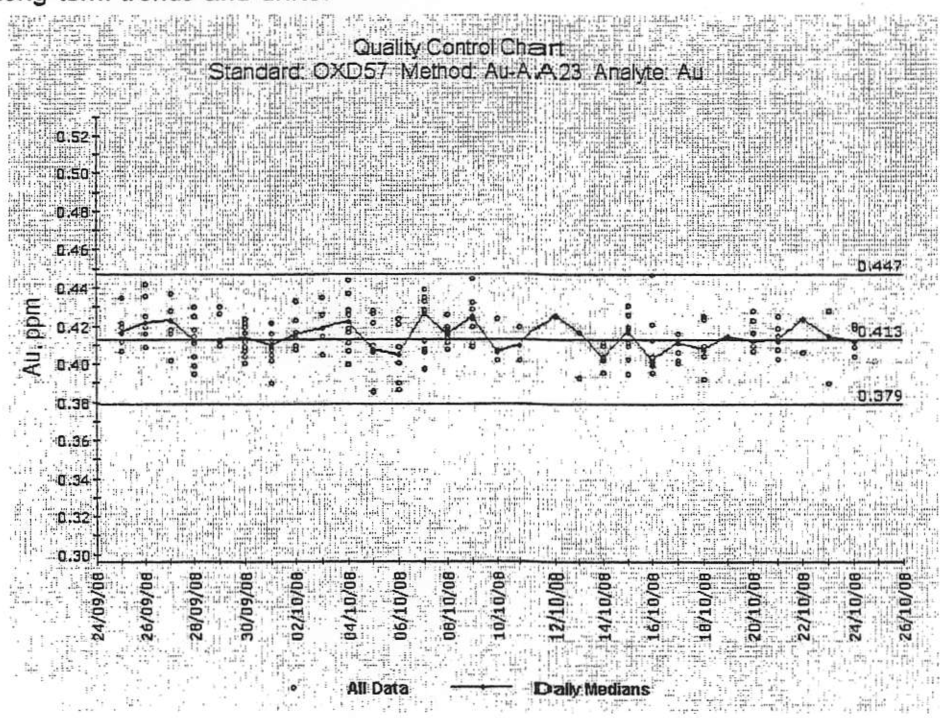
(M. Thompson, 1988. Variation of precision with concentration in an analytical system. Analyst, 113: 1579-1587.)

As an example, precision as a function of concentration (10% precision) is plotted for three different detection limits. The impact of detection limit on precision of results for low-level determinations can be dramatic.



Evaluation of Trends

Control charts for frequently used method codes are generated and evaluated by laboratory staff on a regular basis. The control charts are evaluated to ensure internal specifications for precision and accuracy are met. The data is also reviewed for any long-term trends and drifts.



External Proficiency Tests

Proficiency testing provides an independent assessment of laboratory performance by an outside agency. Test materials are regularly distributed to the participants and results are processed by a central agency. The results are usually converted to a Z-Score to rate the laboratory's result against the consensus value from all participating labs.

All ALS Chemex analytical facilities in North America participate in proficiency tests for the analytical procedures routinely done at each laboratory. ALS Chemex has participated for many years in proficiency tests organized by organizations such as Canadian Certified Reference Materials Projects, and Geostats as well as a number of independent studies organized by consultants for specific clients. We have participated also participated in several certification studies for new certified reference materials by CANMET and Rocklabs.

Feedback from these studies is invaluable in ensuring our continuing accuracy and validation of methods.

Quality Assurance Meetings

A review of quality assurance issues is held regularly at Technical and Quality Assurance Meetings. The meetings cover such topics as:

- Results of internal round robin exchanges, external proficiency tests and performance evaluation samples
- Monitoring of control charts for reference materials
- Review of quality system failures
- Incidents raised by clients
- Results of internal quality audits
- Other quality assurance issues

The Quality Assurance Department and senior laboratory management participate in these meetings.