LOG NO: FEB 05 RD.
ACTION:

FILE NO:

PROSPECTOR'S REPORT
ON THE
SILVERBELLS CLAIM

1. Located on Horne Lake 75 km. N.W. of Nanaimo, B.C.
2. Nanaimo Mining Division
3. NTS Map 092F/07E
4. UTM Grid Reference
   10 546571 375 277
5. Latitude: 49° 20'N
   Longitude: 124° 43'W
6. Work done during 1990-1991
7. Owner Operator: A.B.L. Whittles

By

A.B.L. Whittles, Prospector

November, 1991

GEOLOGICAL BRANCH
ASSESSMENT REPORT

22,096

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PART 1: INTRODUCTION

PART 1: INTRODUCTION

1.1 ASSESSMENT REPORT SUMMARY

The Silverbells Claim has been prospected on Regional, Property and Target Scales.

Numerous outcrops of epithermal metallic mineralization have been found on the west side of the claim, particularly around the old Silver Bell Adit, and in the creek along the south boundary of the claim. A study of the metallic mineralization, alteration, rock types and structural controls suggests that a "bonanza" type gold and silver deposit could underlie the claim area.

In addition, mineralized rock float indicates the potential for a VMS deposit on the property.

Geochemical assay results provide strong support for the exploration model proposed for this property.

1.2 PROPERTY LOCATION, ACCESS AND DESCRIPTION

The Silverbells Claim consists of 12 units located 75 km. NW of Nanaimo, B.C. (see Figure 1). One proceeds from Departure Bay, Nanaimo, Ferry Terminal, to the community of Dunsmuir (61 km.), turns left (south) on Kenmuire Road and proceeds toward Horne Lake. The pavement terminates after 2.4 km., and a gravel road continues until one reaches the Horne Lake Campsite on the Qualicum River Delta (13.7 km.). The claim can be reached by boat on the east shore of Horne Lake (see Figure 2).

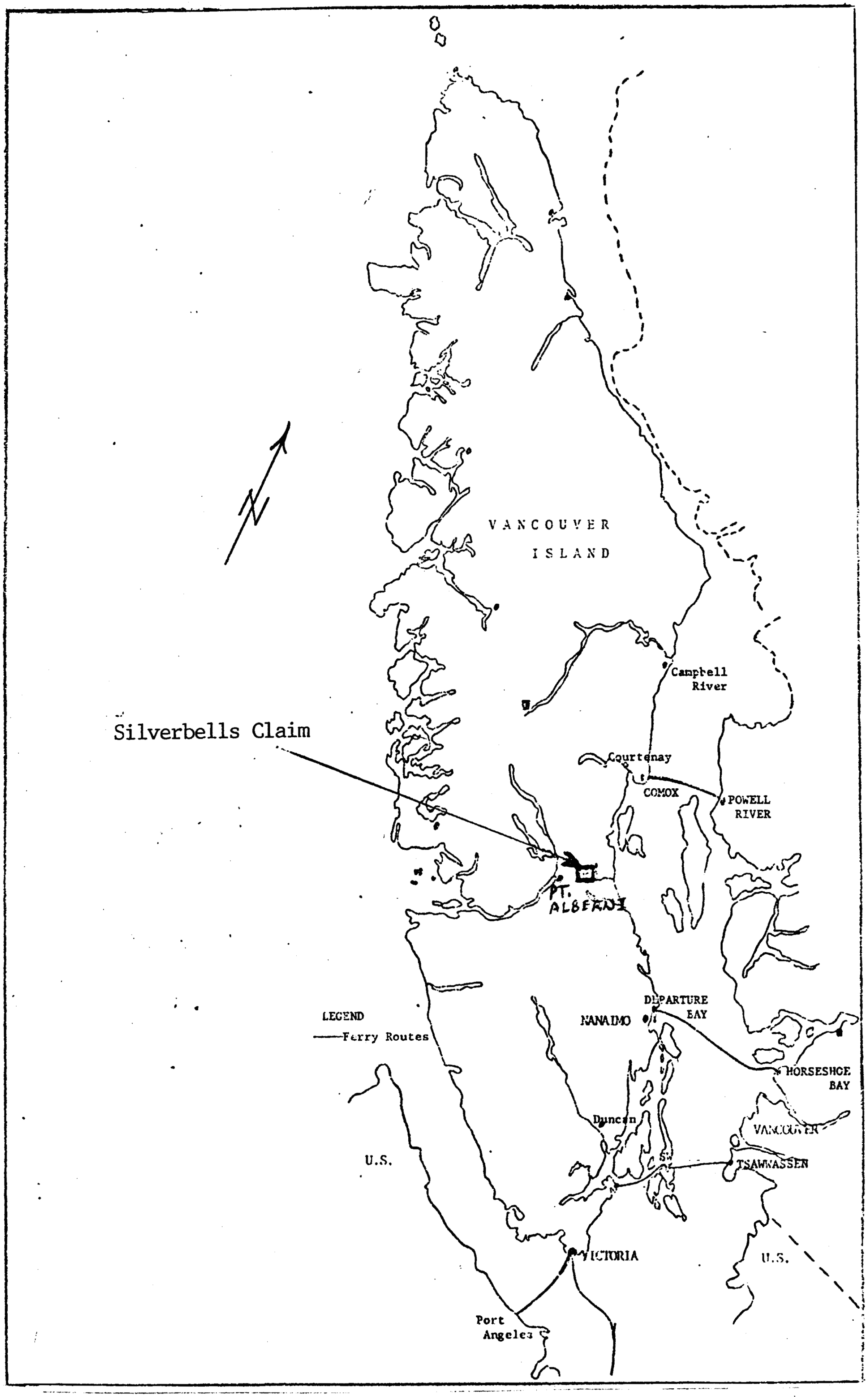

Figure 1. Silverbells Claim Location on Vancouver Island

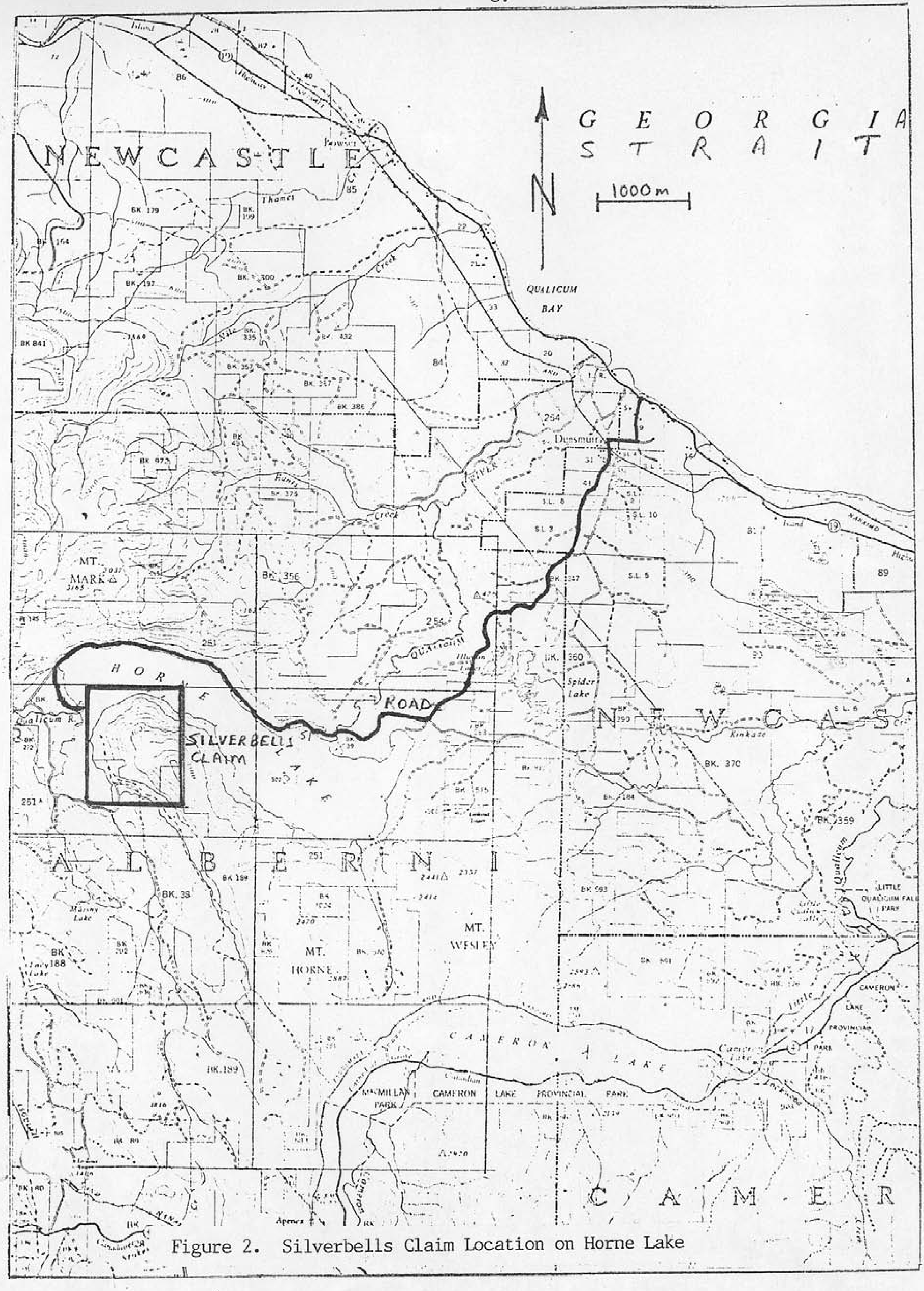

Figure 2. Silverbells Claim Location on Horne Lake

The topography of the claim varies from flat low lying land near the shore of the lake, to rocky hills, with cliffs, in the central part of the claim.

Tree cover is fairly open, and access is not usually difficult, except in areas of thick salal, and blow downs.

One major creek cuts across the southern edge of the claim.

1.3 OWNERSHIP

Claim Name	Record Number	Units	Type	Recorded Owner	New Expiry Date
Silverbells	3909	12	Metric Grid	A.B.L. Whittles Nanaimo, B.C.	July 6, 1993

These units are oriented 4 claims N/S, by 3 claims E/W (see Figure 2).

PART 2: SUMMARY OF PREVIOUS WORK

PART 2: SUMMARY OF PREVIOUS WORK

2.1 GEOLOGY

The geology in this area has been examined by a number of authors, most notably Muller and Carson (1969a and 1969b), Muller (1977a and 1977b), Muller (1980), Muller (1981), Sutherland-Brown (1986), Getsinger (1987), Massey and Friday (1989), and Massey et al (1991).

The general geology will be discussed in Part 3.

2.2 MINERAL DEPOSITS

The general mineral potential of this area has been examined by a variety of authors Gunnex (1966), Muller and Carson (1969a and 1969b), Muller (1981), and Massey and Friday (1988).

The only mineralization on the Silverbells Claim property known until recently is a system of stibnite/quartz veins in the NW corner of the claim. These veins were discovered several decades ago. In 1939 (MMAR, 1939) a 25 M. adit was driven exploring these veins (see Figure 5).

Minfile Report 092F 243 states that small amounts of copper, lead, zinc, arsenic, gold and silver were found in assays. Main vein minerals were stibnite and quartz with small amounts of arsenopyrite. The vein was found in Sicker Volcanics.

Various prospectors and companies have held parts of the Silverbells Claim since the adit was driven, including the present owner's father in the 1960's, but no detailed further information was reported until recently.

Fletcher (1983) produced a soil geochemistry report of 276 samples (using 32 element ICP, and some fire assay/AA.) These suggest the following anomalous levels for this area.

Element	Anomalous	Possibly Anomalous
Gold	> 16 ppb	9-16 ppb
Silver	>0.4 ppm	0.3-0.4 ppm
Mercury	>240 ppb	110-240 ppb
Antimony	> 30 ppm	4-30 ppm
Arsenic	> 55 ppm	20-55 ppm
Zinc	>120 ppm	80-120 ppm

Cope and Hawkins (1987) completed further geochemical and geological work. Anomalous value of Cu, As, Au and Ag were found, and possibly anomalous Zn, Mn, Cr, and Ba.

Walker (1988) provided further stream and rock sample values which showed anomalous As, Cu, Sb, Ag, Hg, Cr, and Zn in several locations.

The present writer will discuss the finding of additional mineralization later in Section 4.2. Four assays and 2 ICP sample values are also provided in the present report (Section 4.3).

PART 3: GENERAL GEOLOGY

PART 3: GENERAL GEOLOGY

3.1 ROCK TYPES

Since the Silverbells Claim covers eugeosynclinal sequences of Paleozoic Sicker Group, later intruded by other rocks, one can expect:

(1) Volcanic Rocks: tuffs, pillow lavas, agglomerates and breccias. The pillow lavas should be examined closely for mineralization between the pillows.

(2) Sedimentary Rocks: mudrocks (siltstones and claystones), jaspers, cherts, limestones and conglomerates. The first three rock types could be associated with VMS deposits in this area. Limestones (and perhaps limey tuffs) could host skarn deposits. On one property, Nanaimo Group conglomerate overlies a stratiform auriferous hematitic cap developed on a skarn (Massey & Friday, 1989; p. 73. Villalta Property).

(3) Igneous Intrusive Rocks: granodiorites may be related to skarns (where they intrude limestones or limey volcanics), and may be the source of epithermal quartz-arsenic-antimony-zinc-lead veins; gold-bearing pyrite-chalcopyrite-quartz-carbonate (calcite and ankerite) veins; and, copper-molybdenite quartz veins and stockworks.

Figure 3 shows the general distribution of rock types, and structures (from Massey et al, 1991).

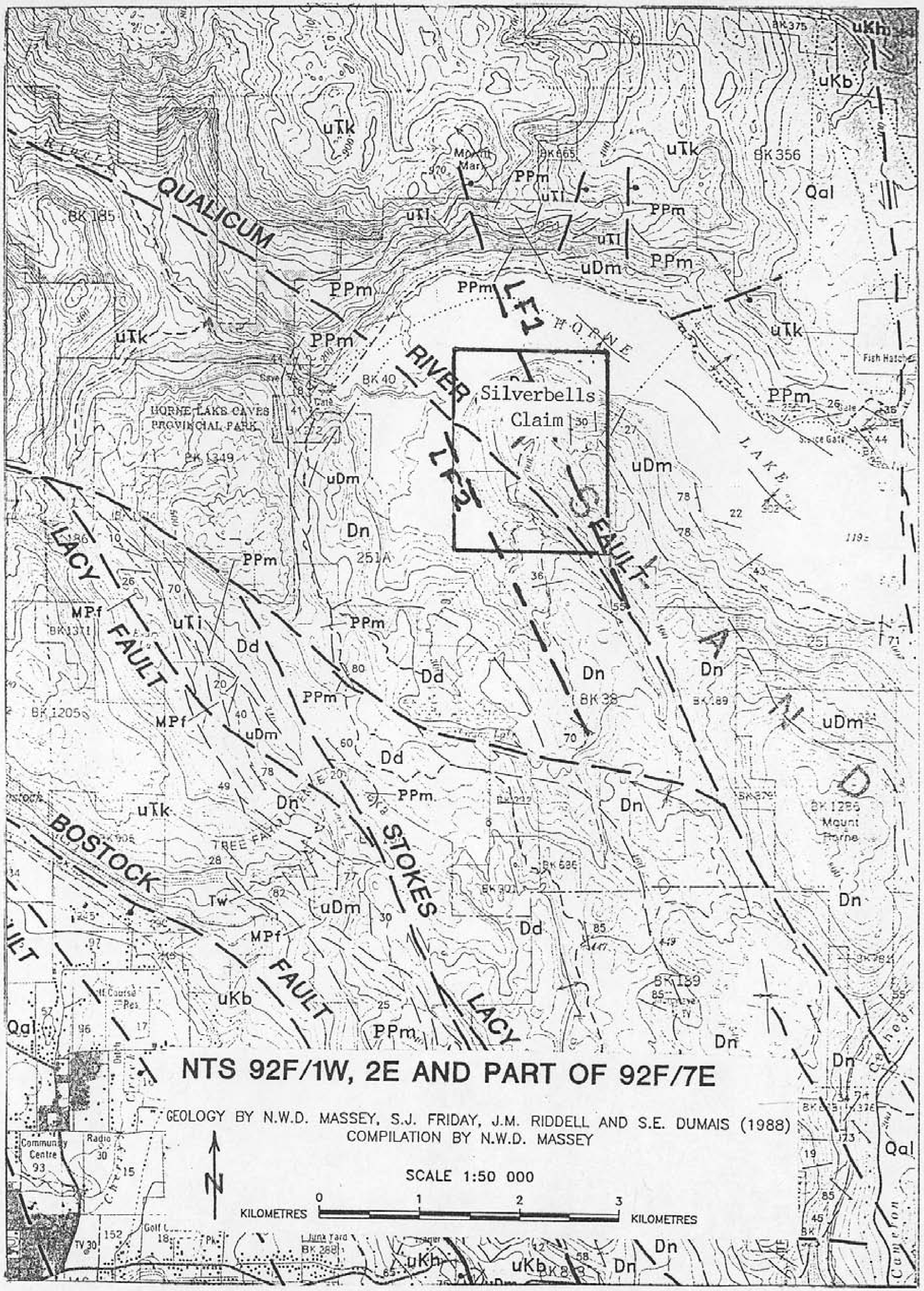

Figure 3. General Geology Map of the Horne Lake Area

VOLCANIC AND SEDIMENTARY ROCKS

QUATERNARY

Qal	Unconsolidated glacial till and poorly sorted alluvium

UPPER CRETACEOUS

NANAIMO GROUP

uKh	HASLAM FORMATION: argillite, siltstone, shale and minor sandstone
uKb	BENSON FORMATION: boulder and pebble conglomerate, sandstone and minor siltstone

LOWER JURASSIC

BONANZA GROUP

JB	Feldspar basalt, andesite, dacite, tuff, sandy tuff, crystal tuff, lapilli tuff and breccia, with minor argillite and sandstone

UPPER TRIASSIC

VANCOUVER GROUP

uTs	QUATSINO AND PARSON BAY FORMATIONS (UNDIFFERENTIATED): massive micrite, flaggy limestone, argillite, siltstone
uTk	KARMUTSEN FORMATION: pillowed and massive basaltic flows, hyaloclastite and hyaloclastite breccia

MISSISSIPPIAN TO LOWER PERMAIN

BUTTLE LAKE GROUP

LOWER PERMIAN

lPs	ST. MARY'S LAKE FORMATION: volcanic sandstone and pebble conglomerate, graded sandstone and argillite, cherty argillite, chert and minor jasper

UPPER PENNSYLVANIAN TO LOWER PERMIAN

PPm	MOUNT MARK FORMATION: massive crinoidal limestone, bedded limestone, marble, chert, cherty argillite and siltstone

MISSISSIPPIAN TO PENNSYLVANIAN

MPf	FOURTH LAKE FORMATION: ribbon chert, argillite, crinoidal limestone, intercalated thinly bedded sandstone, siltstone and argillite, epiclastic sandstone, conglomerate

MIDDLE(?) TO UPPER DEVONIAN

SICKER GROUP

uDm	MCLAUGHLIN RIDGE FORMATION: thickly bedded tuffite and lithic tuffite, feldspar–crysta tuff, heterolithic lapilli tuff and breccia, rhyolite, dacite, laminated tuff, and chert
Dn	NITINAT FORMATION: pyroxene–feldspar phyric agglomerate, breccia and lapilli tuff, massive and pillowed flows, massive tuffite and lithic tuffite, laminated tuff, and chert
Dd	DUCK LAKE FORMATION: pillowed and massive basaltic flows, monolithic basalt breccia and pillow breccias, chert, jasper and cherty tuff, felsic tuffs and lapilli tuff, massive dacite and rhyolite

SYMBOLS

Geological contact (defined, approximate, assumed, transitional)..	——— — — ········ —·—
Limit of drift covered area..	· · · ·
Bedrock outcrops within drift covered area..	× ⬭
Bedding (horizontal, inclined, overturned)..	+ ⊥ ⊥

3.2 STRUCTURAL GEOLOGY

Structurally the main features include a syncline (running NW/SE along Horne Lake - See Figure 3). This feature is clearly visible in the east side of Mt. Mark, on the north side of Horne Lake.

The existence of faulting is not as clear cut as the map suggests. A preliminary look at the air photos (Section 4.1) suggests the "Qualicum River Fault" is not connected as seen on Figure 3; instead there seems to be two major faults (LF1, LF2) with many minor fractures in between. This is an interesting area in which to prospect, since it is known to contain several mineralized fractures (e.g. the Silver Bell Adit veins).

3.3 MINERALIZATION

Over the years (from at least 1862) exploration has revealed numerous mineral occurrances. Some production of Au, Ag, Cu, Pb, and marble has occurred from several nearby mines (Massey and Friday, 1989).

Several types of deposits should be looked for when prospecting in this area.

3.3.1 Volcanogenic Massive Sulfides (VMS)

Several major deposits of this type have been found in the Sicker Group rocks: Westmin Mine, Buttle Lake, the Lara and Mt. Sicker deposits near Chemainus River.

VMS deposits, with related cherts, jaspers, manganiferous cherts, and exhalitive oxides, may be found in the immediate vicinity of the Silverbells Claim, particularly in the sedimentary rocks near the top of the Duck Lake Formation.

3.3.2 Gold-bearing Pyrite, Chalcopyrite, Quartz-Carbonate Veins

These veins are found along shear zones, and consist of rusty orange weathered quartz carbonate. Tertiary thrust faults appear to be particularly favorable locations. The quartz veins are up to 1 meter wide, surrounded by carbonate alteration up to several meters wide.

Mineralization includes pyrite, pyrrhotite, chalcopyrite, arsenopyrite, sphalerite (minor), and galena (minor). The carbonates are ankerite and calcite.

Dark green fuchsite is occassionally present. All occurs in the quartz veins and alteration haloes.

3.3.3 Cu - Mo Quartz Veins and Stockworks

These are found in granodiorite stocks and adjacent country rock.

3.3.4 Other Base Metal Veins

Various chalcopyrite, pyrite, sphalerite, arsenopyrite, quartz veins have been discovered in the areas, one just to the north of the Silverbells Claim (the PD showing, see Massey and Friday (1989).

3.3.5 Skarns

Cu - Mo and Cu - Fe skarns occur in some locations where intrusive (granodiorite) bodies have encountered limey rocks.

3.3.6 Epigenetic Quartz/Antimony Veins

These veins are reported to have realgar, antimony, pyrite in Tertiary Sills and Haslam Formation argillites. Massey and Friday (1989) consider that these may be related to group 3.3.2 mineralization.

3.3.7 The Silver Bell Adit Mineralization

Massey and Friday (1989) place this mineralization in type 3.3.2 deposits, but this seems questionable.

As noted later, (Sections 4.2 and 4.3) this mineralization is very epithermal in texture, is mostly comprised of stibnite (Sb_2S) and quartz with minor visible pyrite. Arsenic seems very minor and ranges to a maximum 0.1%.

It would appear that the Silver Bell Adit vein fits into the 3.3.6 deposits such as the Coal and Grizzly showings. There is a difference, however, in that these last two showings are in Tertiary Sills and Haslam argillites, where as the Silver Bell veins are in Sicker volcanics.

The difference in intruded rock types may account for the different minerals found at the various locations, even though the mode of mineralization could be the same.

PART 4: CURRENT WORK AND RESULTS

PART 4: CURRENT WORK AND RESULTS

4.1 PRELIMINARY AIR PHOTO EXAMINATION

The air photos were examined not to geologically map the area, but to guide the prospecting activities; consequently there were three objectives.

1. To identify highly fractured and sheared zones where the prospecting should be concentrated.
2. To identify specific linear features (including creeks) along which to prospect.
3. To determine the location of roads, and suitable traverse lines along which to prospect.

High altitude photos BC 87046-040 to 043, were used to observe the larger features, particularly fractures and shear zones covering large areas.

The low altitude photos BC 7079-157 to 161 and BC 84025-778 to 782, were used to identify linear features, creeks, roads and accessible traverse lines along which to prospect.

The photos were examined using a pocket stereoscope, and also a mirror stereoscope. The features were drawn onto Figure 4. (note that this is based on an older topographical map, so the contour lines are in feet).

As well, the present writer climbed the talus slope of Mt. Mark, on the opposite (NW) side of Horne Lake and took stereo photos (simply two slides of the same area from two different

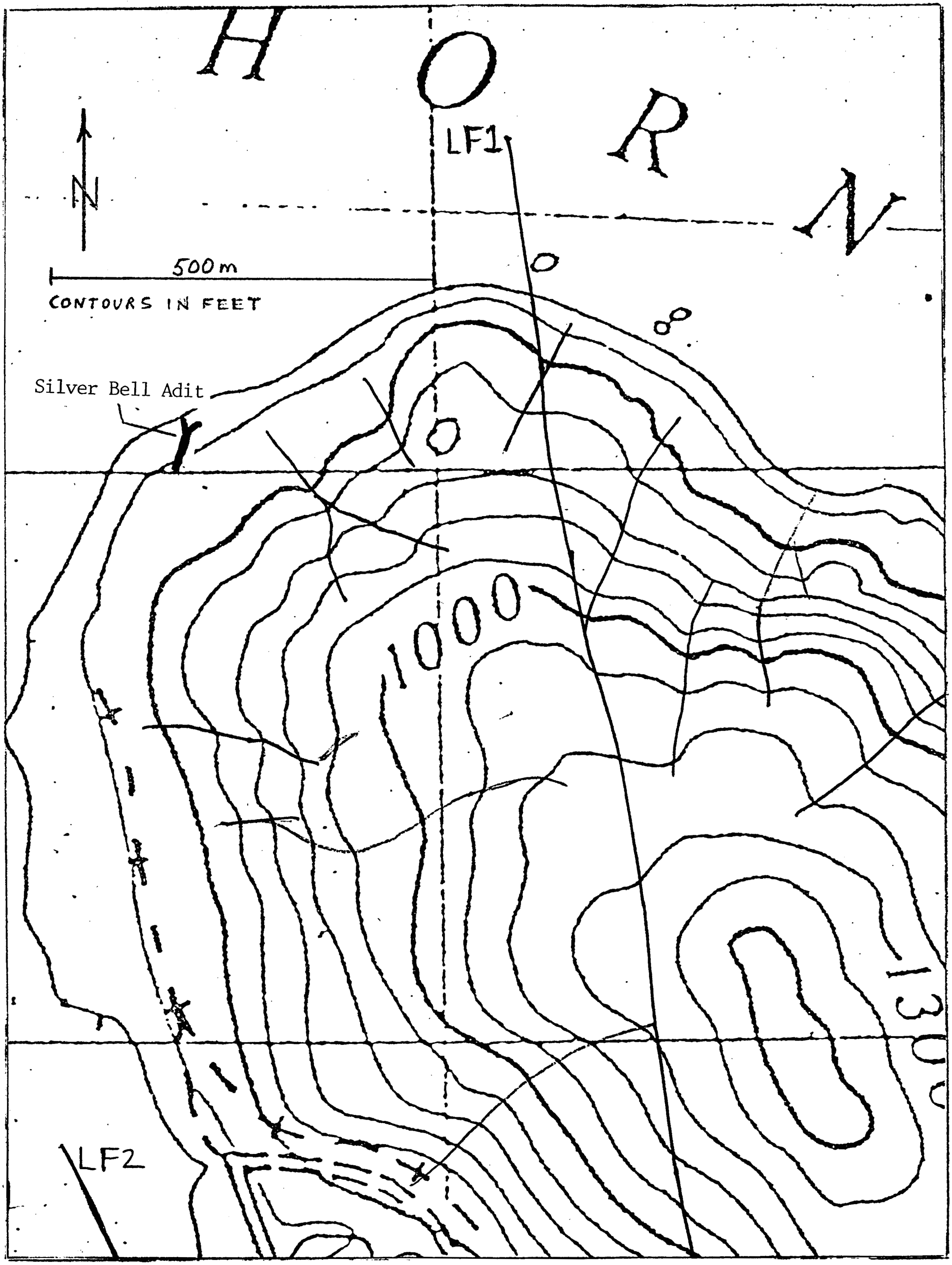

Figure 4: Air Photo Linear Features

locations on the talus slope) of the east side of the Silverbells Claim. This was done to enhance the observations of the lineaments.

4.2 PROSPECTING TECHNIQUES AND RESULTS

It is interesting to note, that although this property has been known about, and examined, since the 1930's, no prospecting report has ever been filed.

4.2.1 General Propecting Procedures

Prospecting is a distinctive process different from geological mapping, geochemistry, or geophysics. One cannot, for example, prospect and geologically map at the same time.

Geological mapping requires an examination of exposed rock outcrops. These are usually at higher elevations and are thus likely to be hard, resistant to erosion, and unmineralized.

Prospecting, on the other hand, initially concentrates on finding unusual float, while examining drainage beds, and low lying lineaments, which are more likely to contain (weathered) mineralization. The search is primarily for indications of this mineralization - gossans and gossan float, alteration mineralization and float, as well as float containing ore minerals; although rock types favorable to hosting mineral deposits, are also watched for, provided these are sufficiently distinct from the country rock on the property.

The detailed prospecting procedure used is given in Section 7.5.

There are several scales of prospecting that must be considered (APS, 1990-1, and Dr. Tom Richards, personal communications).

SCALE	AREA COVERED	OBJECTIVE
Regional	10's to 1000's sq. km.	Define areas of interest
Property	0.25 to 10's sq. km.	Define target areas
Target	10's to 1000's sq. m.	Define targets

The present property was approached using this three level procedure.

4.2.2 Regional Scale Procedure and Summary of Results

(1) Literature Research Conclusions

(Please refer to Part 2: Summary of Previous Work for a more detailed discussion and references.)

The general region in which to prospect and stake was considered prior to staking in 1988-89. Regionally, the Sicker Group rocks have provided a favorable zone for finding economic mineralization, including the world class Westmin Mine at Buttle Lake.

There are numerous other showings as well.

Also access is good, the topography is not excessively difficult, and rock exposures are common.

Geochemical studies that were available at that time indicated the most favorable zone was on the Horne Lake peninsula. These studies indicated high values for epithermal mineralization; Sb, As, Zn, Au, Ag.

As well, one strongly mineralized zone (the Silver Bell

Adit vein) was known.

(2) Fieldwork

(a) General

Several days were spent generally looking through the area to evaluate the extent of the Sicker Group rocks particularly with respect to access. Access should not be too easy or most of the showings would be discovered already (or built upon!).

Examination of float was the main prospecting activity.

(b) Mineralized Outcrops

The old Silver Bell Adit was found and re-examined. It appears promising as an indicator of potential epithermal or other type of base metal deposit.

(c) Float

Drift, active stream beds near the mouth of the lake, and crossing roads, and talus slopes were examined on a regional basis.

Float found along the SE shore of Horne Lake included jasper, chert, and one piece of heavily mineralized float. All these appeared to suggest a VMS deposit potential in the Horne Lake area.

. . . .

12 units were subsequently staked (the Silverbells Claim, Figure 2).

4.2.3 Property Scale Procedure and Summary of Results

Most of the work discussed in this report was carried out at this scale, with the objective of defining some target areas.

(1) Literature Research Conclusions

The assessment reports noted in Section 2.2 indicated several anomalous zones in the area staked; however, few details as to the probable causes, and no prospecting or detailed mapping information, were given (except for the old Silver Bell Adit site).

(2) Fieldwork

(a) General Procedure

Several traverses were made using either a "hip chain", or an electronic distance (walking) meter, or pacing. Direction was controlled by topographical map (see Figure 5).

Traverse A:	Along the beach of Horne Lake, in the NW corner of the Silverbells Claim.
Traverse B:	In the area to the west of the Silver Bell Adit, particularly along an air photo lineament (and dry creek bed).
Traverse C:	Southern boundary creek.
Traverse D:	Road system in south central part of Silverbells Claim. Altimeter and topographical map used for location control.

What follows in this section is a general outline of what was observed in the vicinity of these traverse lines. Refer to Section 7.6: Detailed Prospecting Traverse Results, for an in-depth discussion of the findings along each traverse line.

(b) Beach Drift/Outcrops (Traverse A)

The east side beach of Horne Lake was prospected first, looking for float, and examining rock outcrops. Narrow arsenopyrite/quartz and also stibnite/quartz veinlets were found to the south-west of the old adit. These veinlets have not been reported before, nor do they appear to have been worked in any way; however, it is probable that the observation of these veinlets in the past led to the discovery of the larger vein which was explored by the Silver Bell Adit.

Pieces of jasper and a possible piece of VMS float were also found.

Glacial striations were also noted at several rock outcrops; the direction of these indicate that the float was derived from the rocks to the south.

(c) Outcrops/Float in the Vicinity of the Silver Bell Adit (Traverse B)

The discovery of the veinlets on the beach shifted the fieldwork into the bush to the north and west of the old adit.

One previously unreported zone of heavy alteration (clay alteration in a highly bleached rock, with disseminated pyrite) was found to the west of the adit, and another zone of strongly magnetic rock - still farther west - was also discovered by the deflection of a compass line. Subsequent digging exposed a highly altered shear zone containing magnetite.

Extensive calcite alteration (as veinlets, stockworks, and pervasive mineralization) was found a few hundred meters to the south east.

A seasonal (dry) drainage stream bed was examined along an east/west linear feature first identified on the air photos. Abundant red and brown jasper float was found (one piece 1m. x 0.5m. x 0.5m.) again the indication of a possible VMS environment to the south.

The stibnite vein system, the Silver Bell Adit, and trenching were also examined.

(d) Southern Creek Bed (Traverse C)

A strongly flowing creek is located along the southern boundary of the claim (See Figure 5). This was prospected for float, outcrops and also panned (gravel banks and moss mat). The moss mat pan samples returned the most black sand and other heavy minerals.

Rock outcrops in the creek bed and walls were found in one location to show extensive alteration (calcite and ankerite). Quartz/arsenopyrite/stibnite veinlets occurred in another location.

(e) Reconnaissance Survey on the North East Side of the Silverbells Claim (Traverse D)

A rapid survey was made along the old logging road system. One interesting quartz/chalcopyrite vein was noted.

4.2.4 Target Scale Considerations

As a result of the Property Scale prospecting, several targets have been identified. These will be discussed in Part 5.

The low lying land from the Silver Bell Adit to the southern boundary creek should be examined on a Property Scale for additional targets.

The area discussed in 4.2.3 (e) should also be examined more carefully to see if additional targets can be recommended for more detailed examination.

4.3 GEOCHEMICAL/ASSAY RESULTS

4.3.1 Assays

(1) Two fire/AA assays were recently obtained (See Section 7.9). Sample HS91W-D1 was a sample of stibnite/quartz vein material from the Silver Bell Adit dump. Gold content was negligible (1 ppb). Sample HS91W-B4 was from a narrow quartz vein (with visible pyrite) in a tuff. Gold content was 2 ppb.

(2) The present writer would also like to report on two assays that, while they date from the 1960's, have not been reported before. These assays are of the vein material from the

Silver Bell Adit, and were obtained by the present writer's father, Arthur Whittles. Copies of the original letters are included in Section 7.9.

(a) National Lead Company, Texas Mining and Smelting Division, P.O. Box 559, Larado, Texas.

Antimony : 56%
Sulfur : 22%
Arsenic : 0.07%
Lead : 0.04%
Selenium : 0.001%

(b) Colorado Assay Co., 2244 Broad Way, P.O. Box 298, Denver 1, Colorado.

Antimony : large
Silica : large
Arsenic : 0.1%
Lead : trace
Zinc : trace
Calcium : 0.1%
Gold : 0.005oz/T
Silver : 0.2oz/T

The percentage for other elements can be seen in Section 7.9.

4.3.2 ICP Results

(1) Sample HS91W-B4 (see 4.3.1 (1)) was also the subject of a 31 element ICP (see Section 7.9).

The ICP results gave:

Antimony : 41009 ppm (4%)
Arsenic : 648 ppm (0.06%)
Lead : 14 ppm (0.001%)
Zinc : 167 ppm (0.02%)
Copper : 13 ppm (0.001%)
Iron : 8480 ppm (1%)
Calcium : 1270 ppm (0.1%)

The antimony content is of course large, but considerably less than that reported in 4.3.1 (2) (a). This is due mainly to the selection of a sample with much less stibnite compared to quartz (too large of ICP peaks will tend to swamp the peaks of adjacent elements).

The higher calcium (0.1%), aluminum (0.1%), sodium (0.001%), and potassium (0.07%) contents probably represent a small amount of feldspar mineralization.

(2) Sample HS91W-B4 showed:

Antimony : 52 ppm (0.005%)
Arsenic : 358 ppm (0.04%)
Lead : 10 ppm (0.001%)
Zinc : 40 ppm (0.004%)
Copper : 38 ppm (0.004%)
Iron : 34310 ppm (3.4%)
Calcium : 31390 ppm (3%)

A larger percentage of fedspar mineralization is indicated from the Al (0.4%), Ca (3%), K (0.2%) and Na (0.003%).

The much higher calcium content also suggests several percent calcite mineralization is present in the vein.

The visible pyrite in this sample is responsible for the iron peak, but stibnite and arsenopyrite mineralization would seem minor (although the garlic smell of arsenopyrite was present when the vein was struck).

The attitude of the vein from which this sample was taken (350/42R) was different from the Silver Bell Adit vein (015/70R) and may represent a different episode of mineralization.

4.3.3 Comments

The old (1960's) assay results seem quite comparable to the ICP results and should be accepted as accurate.

Both assay and ICP results show that the main ore mineral is stibnite, and the main gangue is quartz. The calcite, pyrite, and aresenopyrite contents are minor in the veins that contain sulfide mineralization, although there are numerous unmineralized calcite veins, and pyrite is common as disseminated mineralization in the country rocks (particularly the tuffs).

Three to four different episodes of mineralization are suggested from these results (see Part 5).

The low gold and silver content seems to indicate we are high up in an epithermal system (see Part 5).

4.4 SAMPLE PREPARATION, EXAMINATION AND DESCRIPTION

4.4.1 General Procedures

Summaries of detailed visual, physical property, and field observations are provided in Section 7.8 for a number of the key samples collected furing prospecting.

All samples were examined closely with a hand lens, hardness testors, etc., and a zoom microscope using 6 to 60 magnification. Several samples were slabbed on a diamond saw so that the structure could more easily be examined at the higher powers.

Section 7.10 outlines the simplied classification of textures and rock names used.

The collected samples that were examined in detail were divided into three groups, depending upon the importance to the prospecting process.

12.9.1 Samples with metallic mineralization.

12.9.2 Highly altered rock samples.

12.9.3 Unmineralized, unaltered to weakly altered, rock samples.

4.4.2 Samples With Metallic Mineralization

(1) Sample HS91W-B1+1/2

This sample appears to be from a VMS (Volcanogenic Massive Sulfide) deposit of unknown size.

The sample was found as (glacial) float near the Silver Bell Adit, and was probably derived from the south or south west (as indicated by glacial striations).

The sample contains mostly pyrite and has not yet been assayed so the economic implications are not clear; however, the potential for VMS deposits in the claim area clearly exists.

(2) Sample HS91W-B1-X+26 H-W

This sample was obtained from a rock outcrop on the beach just SW of the Silver Bell Adit.

This shows (see also Section 7.6.1 (3)) that the epithermal system around the Silver Bell Adit is quite extensive, extending at least a couple of hundred meters to the south.

Sample HS91W-40S-20E (Section 4.4.3 (4)) also indicates some form of mineralization to the north of the Silver Bell Adit.

(3) Sample HS91W-C-100B

This sample was obtained as float, 100 m. upstream from the mouth of the creek along the south boundary of the Silverbells Claim.

An assay of this sample has not yet been obtained; however, the mineralization present is unusual in color, and does not appear to be pyrite or chalcopyrite.

(4) Sample HS91W- 5

This sample was found as float approximately 200 m. north of the Silver Bell Adit along Traverse Line B.

The presence of quartz, sulfides and fuchsite in a breccia suggest the possibility of another type of mineral deposit: "gold-bearing pyrite, chalcopyrite, quartz-carbonate veins" (Section 3.3.2). Although little rusty orange weathered carbonate (ankerite) was observed some green fuchsite was present. No assay is yet available.

4.4.3 Highly Altered Rock Samples

There were several samples in this category (see Section 7.8.2).

(1) Sample HS91W-C-100A

Location: 100 m. from southern creek mouth.

This appeared to represent a sample (although not mineralized by sulfides) of the quartz-carbonate stockwork/ veining discussed in 4.4.2 (4) preceeding and Section 3.3.2.

Although it was found as float, it appears to be related to the samples HS91W-C-315 or HS91W-C-370-390.

(2) Samples HS91W-C-315 and HS91W-C-370-390

Locations: 315 and 370 to 390 m. from southern creek mouth.

These samples appear to highly altered tuffs, flooded with calcite (mainly). Ankerite is also present as a pervasive rusty orange powder. Quartz may be present, but it would represent only a minor component.

The first sample showed a very unusual discontinuous black layer, 1-2 mm. wide, showing conchoidal fracture, brittle, hardness <4. This resembled obsidian but was much softer. On close inspection with a binocular microscope it appears in places to occupy wandering tubular structures reminiscent of worm burrows. This is probably an organic bitumen.

(3) Sample HS91W- 11

Location: Traverse B.

This sample showed both brecciated and agglomerate textures. Calcite is so common that it may not be a volcanic breccia/agglomerate, but a green colored limestone.

(4) Sample HS91W-40S-20E

This sample/area may provide important alteration zone information if properly excavated, examined and assayed.

Although the present small exposure suggests a sill-like form (it could be a dacite sill), it contains finely disseminated pyrite, clay, and calcite. Its texture appears more tuffaceous than grandular/crystalline.

4.4.4 Unmineralized, Unaltered to Weakly Altered Rock Samples

These samples provide a cross section of rock types found in the claim area. See Section 7.8.3 for the details.

(1) Sedimentary Rocks

Conglomerates (possibly Nanaimo Group), as well as Sicker Group limestones (tuffaceous), dolostones, chert/jasper/argillites are present in this area.

(2) Igneous Extrusive Rocks

Agglomerates, tuffs (often limey, and pyritic), amygdaloidal andesites, and massive andesites are very common on the claim. Some rhyolite may be present.

The agglomerate is particularly interesting. It has pillow like clasts, mostly rounded, often quite vesicular, and often with what appears to be a chill margin (fine grained rind around the outside, as if it formed in water). The spaces in-between are filled with a white calcite. One piece of fuchsite appeared to be present. This rock type was found as float (HS91W-A) along the southern boundary creek, and in place about 320 m. upstream from the creek mouth. Note that the very open nature of this rock could provide a site for mineralization.

(3) Igneous Intrusive Rocks

Glomeroporphyritic andesite (a feldspar porphyry or "flowerstone"), brecciate feldspar porphyry, and a pyroxene/feldspar porphyry were found as float.

The pyroxene/feldspar porphyry (HS91W-P) was very striking with large (up to 2 cm.) square, fresh, well cleaved pyroxene crystals) intermixed with smaller, somewhat brecciated, light colored, feldspar crystals, in a light green aphanitic ground mass. Overall this rock appears quite fresh (unaltered) and does not appear to be from the Sicker Group. It is probably considerably younger. If found in sufficient quantity it would make a fine facing stone in buildings; to date only well rounded float has been found, and the samples may have had a complex glacial history.

Diorite float is common as float, and was found at one location in situ (Figure 5).

PART 5: INTERPRETATION

PART 5: INTERPRETATION

5.1 GEOLOGICAL STRUCTURE AND FAVORABLE ROCK TYPES

The most noticeable geological structural feature is the syncline that appears to lay under the north arm of Horne Lake (Figure 3). A preliminary cross section of the map across the north arm, Silverbells Claim, and the south arm of Horne Lake suggest an anticline on the Silverbells Claim, and another syncline in the south arm.

If this proves to be the case, older Duck Lake Formation rocks may be near or on the surface on the Claim. This is also supported by what appear to be Duck Lake rocks exposed along the south boundary creek.

Duck Lake Formation rocks appear to have a greater VMS potential than the overlying Nitnat Formation rocks.

The carbonate altered tuffs along the south boundary creek also indicate potentially mineralized zones.

Various limey vocanic rocks and limestones may be worth exploring further (See Sections 4.4.3 and 4.4.4) as potential skarn deposit sites, particularly near the diorite outcrop on the southern boundary.

5.2 MINERAL POTENTIAL

5.2.1 Epithermal Gold Deposits: General Considerations

At the present time this represents the best potential for economic mineralization on the Silverbells Claim. The most obvious target area is the old Silver Bell Adit.

To describe and explore a mineral deposit, one needs an appropriate "exploration model"; that is, a model of mineralization, structure, rock types, genesis, etc. which relates the observed facts, and suggests future exploration steps. One of the best books on ore deposit models is that of Roberts and Sheahan (1988). A more detailed discussion is that of Guilbert and Park (1986).

Both books provide generalized diagrams (p. 34 and 197 respectively) that provide an epithermal ore deposit exploration model. In addition, the first book (p. 38) describes the "British Columbia Epithermal Model". Both diagrams are provided in the Section 7.11 since these features must, in part, guide our interpretation of what is observed on the Silverbells Claim, and the recommendations for further work.

The diagrams in the aforementioned books provide useful structural and mineralogical models; however, these are composite models, and not every deposit will show all features. Another model that allows for this is given in Table 1 (Guilbert and Park, 1986, p. 219). (See Section 7.11)

A summary of the features of epithermal deposits is given in Roberts and Sheahan (1988). These are summarized as follows.

(1) Rock Types

These are commonly volcanic flows, and subaerial pyroclastic rocks, with numerous small intrusions.

(2) Structural Controls

The deposits form in extensional tectonic settings, with well developed tensional fracture systems, and normal faults.

(3) Ore Depths

The deposits form from the surface down to a maximum depth of 1000 m. The average vertical range of the ore zone is 350 m., rarely exceeding 600 m.

(4) Ore Host

Veins are the most common hosts, but can include breccia zones and stockworks.

(5) Ore Textures

The ore is deposited mainly in open spaces and the resulting textures are banded, vuggy, drusy, colloform and cockscomb.

The ore minerals are usually fine grained.

The gangue minerals are usually coarse grained, and pseudomorphs of quartz after calcite are common.

(6) Ore Minerals/Elements

Au and Ag are the main economic minerals.

Galena (Pb), sphalerite (Zn), chalcopyrite (Cu), cinnabar (Hg), stibnite (Sb), tetrahedrite (Cu), and arsenopyrite (As) are important in some deposits.

(7) Gangue Minerals

The main gangue mineral is silica (as quartz, amethyst, opal, chalcedony and cristobalite).

Calcite is abundant at several levels in the epithermal system.

Lesser amounts of fluorite, barite and pyrite may be present.

More rarely chlorite, hematite, dolomite, rhodenite, and rhodochrosite are present.

(8) Alteration

Hydrothermal alteration is pronounced primarily as silicification; but is often quite complex. An idealized pattern of hydrothermal alteration zoning is outlined in Table 2 (Section 7.11).

5.2.2 Epithermal Gold Deposits: The Silver Bell Adit Vein System

The Silver Bell Adit vein system seems to be best described as an epithermal vein system.

A general consideration of the mineralogy (Sections 7.6.1 and 7.6.2) and the geochemical/assay results (Section 4.3) suggests stibnite (Sb, S) and quartz are the main components, followed by calcite, all in veins. Pyrite runs to a few percent. Small, but anomalous amounts of As, Pb, Zn, Cu, Hg, Ba, as well as the precious metals Au and Ag, were found.

The results of the prospecting so far completed suggests this system may well be at step 3 of Table 1 (Section 7.11). This suggests a "bonanza type" gold and silver deposit (step 4) could underlie this area.

If the findings are considered in detail according to the divisions of Section 5.2.1, one would note the following.

(1) Rock Types

Abundant volcanic flows and pyroclastic rocks (tuffs) are found in the area. At least one small diorite intrusion is indicated.

(2) Structural Controls

The whole area between LF1 and LF2 on Figure 3 appears on the basis of the air photos, and an examination around the Silver Bell Adit, to indicate a highly fractured, extensional environment, from the lake shore down to the creek at the southern boundary of the Silverbells Claim.

(3) Ore Depths

The main ore zone, if it exists, could be a few 100 meters, at most, below the Silver Bell Adit vein system, and probably not more than 500 m.

(4) Ore Host

The quartz stibnite deposits are as veins with some brecciated texture in places.

(5) Ore Textures

The mineral textures near the Adit, are typically epithermal: vuggy, drusy and some cockscomb (see photos Section 7.7).

The gangue minerals are generally coarse grained, which is also (untypically) true of the main metallic mineral: stibnite.

(6) Ore Minerals/Elements

As noted earlier Au, Ag, Sb, As, Hg, Zn and Cu are present in anomalous amounts, and represent a typical epithermal suite.

(7) Gangue Minerals

Silica is common (mostly as quartz) as is calcite. Pyrite is present and possibly barite (Ba is listed as anomalous in one assessment report. Fluorite, chlorite, hematite, dolomite, rhodenite and rhodochrosite do not appear to be present.

(8) Alteration

A propylitic zone is clearly indicated to the west of the adit (Sample HS91W- 11, see Sections 7.8.2 and 4.4.3 (3)). Calcite is so common in this area that the rock, although it looks volcanic reacts to HCl as if it were a limestone. It represents an intense propylization.

Sample HS91W-40S-20E (Sections 7.8.2 and 4.4.3 (4)) may represent a phyllic to intermediate argillic zone, although it seems very localized. In general, the rock between the propylitic zone and the veins does not seem to be as highly altered, although it has never been examined closely with alteration in mind. This clearly needs to be done.

Samples HS91W-C-100A, -C-315, -C-370-390 (Section 4.4.3) also fit a description of propylitic alteration.

(10) Summary of the Epithermal Characteristics of the Silver Bell Adit

As a working exploration model, the area between LF1 and LF2 on Figure 3 can be assumed to mark the upper levels of a gold bearing epithermal system. Sample HS91W- 11 is located to the east of LF1 and will be assumed to mark the outer boundary of the system's alteration zones. Note that similar propylitic alteration seems common along Traverse Line D, the eastern side of the Claim, particularly at lower elevations (near the creek; see Section 7.6.4).

5.2.3 VMS Deposits

Although a VMS deposit potential clearly exists on the property (as indicated by the VMS mineral sample - Section 4.4.2 and numerous pieces of jasper and magnetite) no target can be suggested at this time.

VMS deposits are known to exist to the south of the Silverbells Claim (Massey and Friday, 1989, p. 72) and may be the source of the VMS mineralization discovered to date.

5.2.4 Other Mineral Deposits

Samples HS91W-C-100A; -315; 370-390 (Section 4.4.3) could be interpreted as possible quartz-carbonate gold vein system; however, it would also fit into the category of propylitic alteration mineralization, of perhaps a more felsic rock layer (thus accounting for the lack of chlorite). This conclusion agrees with that expressed by Massey and Friday (1989, p. 73).

Cu-Mo deposits and skarns have not been indicated by the prospecting results to date.

PART 6: RECOMMENDATIONS

PART 6: RECOMMENDATIONS

6.1 PROPERTY SCALE RECOMMENDATIONS

Some property scale work remains to be done, and should probably be completed before proceeding with any detailed work.

6.1.1 Air Photo Interpretation

A more detailed air photo/geological interpretation on regional (high altitude) and property (low altitude) scales are recommended as the next step. The main objective would be to look for fault and fold structures that indicate potential mineralized zones.

6.1.2 Mid-Section LF Fracture Zone Recommendations

This zone lies between LF1 and LF2 of Figure 3, and between the Silver Bell Adit and the south boundary of the Silverbells Claim.

The procedures of Sections 4.2.3 (2)(a) and 7.5 should be followed. The objective is to define new targets between the known targets at either end.

The previous geochemical assessment report results should be carefully considered when doing this work (Section 2.2). A re-analysis of these results might be considered.

6.1.3 High Eastern Zone Recommendations

This zone runs along the high land on the eastern side of the Claim.

This zone is of low priority and could wait until after the recommendations of 6.2 and 6.3 are completed.

Most of the zone is suggestive of propylitic alteration. Only one mineralized vein (with abundant chalcopyrite) is known to exist in this area.

6.2 TARGET SCALE RECOMMENDATIONS

Several targets have been located during the current work.

6.2.1 Silver Bell Adit Zone Recommendations

(1) Detailed Geological Mapping

This should be carried out:

(a) around the Adit and trench;

(b) east of the Adit, in particular around the altered sill (HS91W-40S-20E), and the magnetic shear zone further to the south east;

(c) the stibnite/arsenopyrite/quartz/calcite veinlets to the south west of the Adit, in from the beach; and,

(d) along the beach to the north east of the Adit.

(2) Geophysical Mapping

The following surveys should be made on a grid around the Adit:

(a) S.P.;

(b) Magnetometer; and,

(c) VLF-EM.

6.2.2 Southern Boundary Creek Zone Recommendations

(1) Prospect on a Target Level

Prospect in the immediate area of:

(a) the arsenopyrite/stibnite/quartz veinlets at the "lower falls" (C-350), and the nearby agglomerates; and,

(b) downstream at C-315 where the altered quartz/carbonate zone cuts across the creek. Look for quartz veins that could be up to 1 m. wide.

(2) Panned Samples

Examine and identify the minerals in the panned samples (Section 7.6.3 (3)).

(3) Geological Mapping

The area around the diorite outcrop at the south edge of the Claim, and between the diorite and the rusty quartz/carbonate zone 315 m. from the creek mouth should be mapped on a reconnaisance basis to see if these are related (e.g. did the intrusion cause the hydrothermal alteration?).

6.3 GEOCHEMICAL/ASSAY RECOMMENDATIONS

The following samples should be subject to a 31 element ICP test and fire assay for gold.

HS91W-A

HS91W-B1+1/2

HS91W-B1-X+26

HS91W-C-100B

HS91W- 5

HS91W-40S-20E

6.4 OTHER RECOMMENDATIONS

(1) Outcrops of the pyroxene - feldspar porphyry (HS91W-P) should be watched for. In sufficient quantities this rock could make a suitable facing stone.

(2) "Dallasite" - a volcanic pillow basalt breccia should be collected as a Vancouver Island gemstone material (See Danner, 1976).

(3) The garnet species rhodolite should be watched for in panned samples to see if a source, and larger samples, can be discovered.

PART 7: SUPPORTING INFORMATION

7.1 REFERENCES

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Sutherland-Brown (1986). "Sicker Group in the Northwest Cowichan Uplift", GSC Open File Map 862 by A. Sutherland-Brown.

Walker (1988). "Cathedral Project - 1988: Assessment Report on Reconnaissance Survey on Cave 1 Group", B.C. Assessment Report 17,730, by J.E. Walker.

7.2 COST STATEMENT/DIARY

7.2 COST STATEMENT/DIARY

(1) Regional Scale Work

(a) Collected regional samples, on and around Silverbells Claim (July 8, 1990)

(b) Collected reference material re: rock types, geology, assessment reports (July 12, 1990)

(c) Studied geology and mineralogy expected on the claim area (July 14, 1990)

(d) Studied collected samples and prepared some ID Summary Sheets (May 16, 1990)

4 days @ $150.00 $ 600.00

(2) Property Scale Work

(a) Preliminary air photo and topographical study to roughly locate linear features, creeks and roads for prospecting; preliminary map preparation for fieldwork (June 1, 1991)

(b) Prospected Traverse A (June 4, 1991)

(c) Prospected linear features Traverse B (June 6 and 7, 1991)

(d) Prospected creek, Traverse C (June 11 and 15, 1991)

(e) Prospected roads, Traverse D (June 19, 1991)

6 days @ $150.00 $1050.00

(3) Target Scale Work

(a) Examine rocks/mineralization in detail around old Silver Bell Adit (part of Traverse B) (June 22 and 23, 1991)

2 days @ $150.00 $ 300.00

(4) Report Preparation

(a) Study of all reference material, report writing (July 22, 25, 26, 1991)

(b) Preparation of Maps and diagrams (July 3, 1991)

4 days claimed @ $150.00	$ 600.00

(Note that many more days of report preparation were undertaken, but after the assessment deadline of July 6, and therefore not claimed)

(5) Other Costs

(a)	Boat launches (8 @ $3.00)	24.00
(b)	Meals	50.00
(c)	Maps/assessment reports/photos	68.93
(d)	Binocular stereoviewer rental	25.00
(e)	ICP/Assay costs	36.00
(f)	Travel: 10 field days @ 150 km. @ 0.30 (in lieu of board and room or camp costs	450.00
(g)	Typing (preliminary)	50.00
(h)	Duplicating	25.00
(i)	Recording fees	120.00
(j)	Photos	25.00
		$ 873.93

Total costs incurred July 8, 1990 - July 3, 1991: $3423.93

NOTE: only 2 years' assessment ($100 X 12 units X 2 years) = $2400.00 was claimed. (See attached "Statement of Work")

7.3 RESUMÉ OF PROSPECTING EXPERIENCE

7.3 RESUMÉ OF PROSPECTING EXPERIENCE OF A.B.L. WHITTLES

(1) Two summers of experience as a field hand in the geophysical section of Imperial Oil Ltd. in Alberta.

(2) Surveying experience, Buttle Lake Power Project.

(3) Taken (and taught) beginner's level prospecting courses.

(4) A 1990 graduate of the Malaspina College/B.C. Geological Survey Advanced Prospector School, Mesachi Lake, B.C.

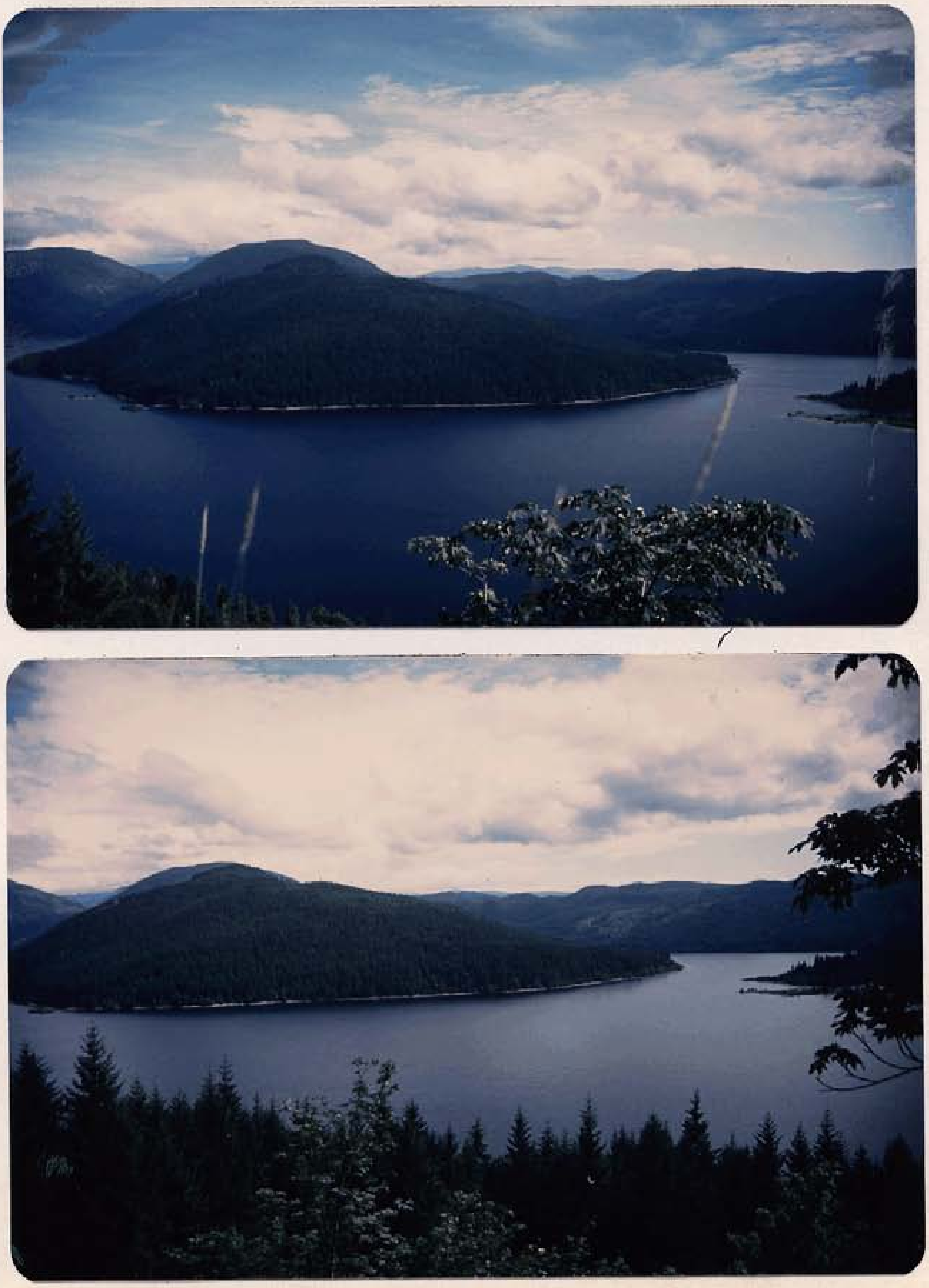
(5) Part-time prospecting experience since 1964 on Vancouver Island, southern B.C., the Yukon, Nevada and Idaho.

(6) Author of numerous B.C. mineral and placer claim assessment reports.

7.4 PHOTOS OF SILVERBELLS CLAIM

MT. MARK NORTH

SHORE HORNE LAKE



STEREO PAIR

SILVERBELLS CLAI

FROM MT. MARK

7.5 PROSPECTING FIELD TECHNIQUES

7.5 PROSPECTING FIELD TECHNIQUES

(1) General Observation

Prospecting is a distinctive process different from geological mapping, geochemistry, or geophysics. One cannot, for example, prospect and geologically map at the same time.

Geological mapping requires an examination of exposed rock outcrops. These are usually at higher elevations and are thus likely to be hard, resistant to erosion, and unmineralized.

Prospecting, on the other hand, initially concentrates on finding unusual float, while examining drainage beds, and low lying lineaments, which are more likely to contain (weathered) mineralization. The search is primarily for indications of this mineralization - gossans and gossan float, alteration mineralization and float, as well as float containing ore minerals; although rock types favorable to hosting mineral deposits, are also watched for, provided these are sufficiently distinct from the country rock on the property.

(2) Mapping Rock Types

A limited amount of geological mapping may be considered for the Target Scale of prospecting, but, in general, one should not spend too much time trying to create or relate to an existing geologic map on the Regional or Property Scale, for three reasons:

(a) Most geological maps are large scale generalizations (by necessity) and one can waste much time trying to match, in detail, the ground observations with the map.

(b) Many geological maps are incorrect (because of the necessary generalization) to the extent that an area which does not appear to have good mineral-potential rock types on the map, may indeed, have them on the ground.

(c) The prospector is initially looking for mineral showings, not just favorable rock types, and it is difficult, if not impossible, to do both prospecting and geological mapping together. The prospecting should come first, then later mapping if it helps to expand one's knowledge of the mineralization, at the Target Scale.

Consequently one should simply note the various rock types as float, and as outcrops, but concentrate mainly on finding indications of mineralization, in the initial stages.

(3) Prospecting: Where to Look

Use a topographical map keyed to a notebook "Location and Physical Features Map" and:

(a) Start at lower elevations.

(b) Work up main creeks first.

(c) Work up side gullies (secondary drainage).

(d) Work along any linear features.

(e) Work along ridges, looking for gossans (use binoculars).

Generally outcrops and ridges, being resistant, will not have good mineral showings.

(f) Follow your nose; don't use fixed traverse directions.

(4) Prospecting: How to Look

The primary rule of prospecting (Dr. Tom Richards, personal communication) is "the faster you go the less you see". Consequently, one should move slowly and carefully.

Look for anything out of the ordinary; what you are looking for (mainly mineralization - primary, or secondary/alteration) represents a small fraction of what is found on the Earth's crust, consequently, the indications are often subtle.

Success in prospecting, not unlike pure scientific research, requires a mind alert to subtle clues that should be followed up to see if they are significant.

Patience and persistance are also necessary since most of the subtle clues will not prove to be significant!

(5) Prospecting: What to Look For

(a) Mineralized Float

Look for rusty or otherwise mineralized float, and note:

(i) Mineralization/Alteration:

(a) Type.

(b) Amount in sample (%)

(ii) Amount (of float; record as):

(a) Number of pieces/or:

(b) A = abundant/or:

(c) Percentage.

- (iii) Shape:
  - (a) Angular (A).
  - (b) Subangular (SA).
  - (c) Rounded (R).
- (b) Rock Types
  - (i) Carry $0.50-sized chip samples for comparison.
  - (ii) Break rocks of all kind, not just rusty ones.
  - (iii) Record:
    - (a) Percentage of whole.
    - (b) Shape - A,SA, R.
- (c) Surficial/Glacial Geology

  Record on prepared notebook sheets.
- (d) Fines
  - (i) Take moss-mat samples for ICP.
  - (ii) Pan gravels, and moss-mats, for heavy mineral samples.
  - (iii) Take silt samples (if reconnaissance: creek and tributary mouths; if staked: every 50, 100 or 200 m.).
  - (iv) Take soil samples across showings.

(6) Follow up

- (a) Once interesting float is found, search until the source is located. Ribbon the location.
- (b) Look for structural controls.
- (c) Work outward from discovery site.

(d) If there are only insignificant indications, sample, note, and move on. Generally, assays must indicate economic grades, and the potential structures should be large enough to host a mine. The distribution of widespread alteration may help here.

(e) If the showing has merit, stake it, then move into:

  (i) detailed prospecting (on a target scale);
  (ii) geological mapping;
  (iii) geochemical sampling; and,
  (iv) geophysical mapping.

(ii), (iii), (iv) can initially be done on random lines; then later on detailed grids.

7.6 DETAILED PROSPECTING TRAVERSE RESULTS: SILVERBELLS CLAIM

7.6 DETAILED PROSPECTING TRAVERSE RESULTS: SILVERBELLS CLAIM

The location of the traverses are shown on Figure 5.

7.6.1 Traverse A: Horne Lake Beach

This was the easiest traverse to make, and so was undertaken first. It was sighted along the beach and both float and outcrops were found and examined.

(1) Traverse A Rock Types

(a) The bedrock encountered seems to be mainly adesitic tuffs, commonly with disseminated pyrite, and/or calcite. This calcite is present as veins and perhaps a pervasive alteration or syngenetic limestone. These tuffs are probably part of the Nitnat formation.

(b) Some lenses/layers of a dark brown limestone may also be present (it is not clear whether these are limestones, limey tuffs, or altered tuffs).

(c) A number of pieces of crinoidal limestone were found as float (probably Mt. Mark Formation).

(d) Dallasite float was fairly common along this traverse.

(e) One piece of light orange-brown breccia float was found (see also Traverse C). This could be a carbonate-altered (ankerite?) tuff.

(2) Traverse A Structure

(a) Glacial striations were found at several locations. These varied in direction from 30°-50°. This puts the source of much of the float to the south-west (toward Marshy Lake).

(b) Unmineralized rock joints measured 034/35R (major); 200-265/85-90 R (major) and 285-335/55-90 R (minor). These do not appear to be related to the quartz, epidote, or sulfide mineralized fractures (see (3) following), but some limonite staining was observed.

(3) Traverse A Mineralization

(a) Vuggy (epithermal) quartz veins are common in situ and as float. These veins strike 160-180°, and dip 50-90° right (e.g. attitude: 160-180/50-90 R).

(b) Epidote, often with quartz, and occasionally minor calcite and sulfides, was found in veins in several locations. The attitude of these differed from (a): 315-350/40-65 R, and 270/90.

These veins were often very vuggy, 1-3 cm. wide and had well developed quartz crystals (2 mm. by 1 cm. long).

The hanging wall of one vein showed horizontal slickensides. In one vein, the vugs were very rusty, the vein showed good selvage, and a garlic smell (arsenopyrite?) was present when the vein was struck with a hammer (although no visible arsenopyrite was observed).

(c) One narrow calcite vein (0.5-1 mm. wide, 180/68 R) was observed, vuggy to massive, with minor quartz and no observed sulfides.

(d) Two vuggy quartz veins, one with abundant stibnite (the other with lesser amounts) were observed. These seem to range from 1-2 cm. in width, with attitudes of 340-360/60-65 R. The mineralization was very similar to that in the Silver Bell Adit vein, but the dip had the opposite sense.

(e) One very intriguing sample was found as float - possibly an example of a VMS deposit. This was about 40% sulfides (mostly pyrite?) which were aphanitic, and distributed as 1 to 2 cm. irregular masses, possibly brecciated. These were in a dark chert.

7.6.2 Traverse B: Linear Air Photo Feature/Silver Bell Adit Vein Area

This traverse explored inland from the stibnite/arsenopyrite/quartz veins found in traverse A.

(1) Traverse B Rock Types

(a) The country rock along this traverse appears to be mostly Nitnat (?) Formation tuffs, often with disseminated pyrite.

(b) Some sedimentary cherts/argilites layers were present but seem limited in extent, and interlayered with tuffs. A thin layer of limestone was also observed (360/80 R).

(c) Andesite in the SE part of this traverse is flooded with calcite (pervasive alteration (?), veins, and stockworks). This rock reacts to HCl to the extent that it appears to be a limestone.

(d) Some rhyolite may be present, although this may be an altered andesite.

(e) A magnetite bearing schist was observed in the central part of Traverse B. Calcite veining was also present.

(f) A very bleached (almost white) rock was found not far to the east (40 m.) of the Silver Bell Adit. This contained clay alteration, and disseminated pyrite, and so the surface is rusted to a depth of approximately 5 mm.

(g) Abundant brown and red jasper was found as float. This is usually fractured, and veined with quartz. One unusually large red piece was 1 m. x 0.5 m. x 0.5 m. in size.

(h) Some dallasite (a volcanic pillow breccia cemented later by quartz) was found as float. This is known to occur in the Karmutsen volcanic rocks across Horne Lake to the west, on Mt. Mark's talus slopes.

(i) Some amydaloidal basalt was found as float. These pieces were well rounded, and small in size.

(j) Diorite float is quite abundant, but is usually fairly small in size, and well rounded.

(k) One piece of possible limestone was found as float. This had a dark grey, almost black, appearance, and did not seem to resemble the Mt. Mark Formation limestones across the lake.

(2) Traverse B Mineralization

(a) The main mineralization in this area has been explored by the old Silver Bell Adit and trenching to the south. The vein consists of economic grade stibnite with quartz and minor arsenopyrite, but over non-economic widths and lengths (See Section 4.3 for assay results). Very little gold is present. Attitude is 195/70 R.

(b) Quartz float, with some sulfides was observed in a number of locations. One piece had some green micaeous fuchsite which is often associated with gold mineralization. The quartz is often very vuggy.

Quartz veins are also observed in pieces of jasper, but these are unmineralized.

(c) Calcite veinlets were observed as both float and in the country rock. No sulfides were visible.

(d) Pyrite is common in the (Nitnat Formation?) tuffs. Disseminated pyrite was also common in the bleached rock outcrop 40 m. E of the Adit.

(e) Magnetite was present as float and in situ in the central part of the traverse. There is sufficient magnetite present to cause the deflection of a compass, as was discovered when grid lines were laid out over the Adit.

Subsequent digging exposed an outcrop of schist containing the magnetite.

7.6.3 Traverse C: South Boundry Creek

This was a detailed survey mostly along the creek shown on Figure 5, and was conducted by examining any unusual float, bed rock, gravel banks, and moss mats in the creek.

(1) Traverse C Rock Types

- (a) 80% of the float consisted of various types of volcanic greenstone.
- (b) Some brown-orange float (limonite? ankerite? altered tuff?) was fairly abundant.
- (c) Diorite was common as float, and some was found in situ, although its nature was not clear (e.g. a later intrusive or a more slowly cooled portion of volcanic flows?).
- (d) Red jasper was abundant as float, and was also found in the creek bedrock 350 m. from the creek mouth (at "the falls").
- (e) Some dark grey/black chert was found as float (similar in appearance to the possible VMS sample - see Section 7.6.1 (3) (e)). It did not appear mineralized and was not abundant.
- (f) Amydaloidal basalt was fairly abundant as float.
- (g) A brown tuffaceous rock, often with fairly abundant finely disseminated pyrite, was abundant as float.
- (h) One small boulder of conglomerate/sandstone was found as float.

(i) An unusual agglomerate (?), or pillow lava (?) with 5-10 cm. clasts was found as float and also in situ in the creek. This is an interesting rock type from a prospecting point of view because it has a very open structure, suitable for mineralizing solutions. Quartz and calcite were found in some samples but no sulfide mineralization was observed.

Attitude was found to be 220/80 R but this was difficult to ascertain and may represent creek erosion rather than structure.

(2) Traverse C Mineralization

(a) Disseminated pyrite is common in some of the volcanic float, and in parts of the tuffaceous bedrock.

(b) Minor chalcopyrite was observed in tuffaceous float.

(c) In the "falls" region (350 m. from the creek mouth) a 2 cm. quartz vein contained some stibnite and arsenopyrite, and had an attitude 010°/90° (similar to the Silver Bell Adit). Other quartz veins had similar attitudes.

(3) Traverse C Panned Samples

Five samples were obtained by panning. These have not been examined in detail, but some preliminary points may be made.

(a) Type of Location

(i) One sample was panned from a gravel bank 110 m. from the creek mouth, using gravel under boulders in the bank.

(ii) One sample was obtained from a gravel bank, from a bed lying on a clay layer, 160 m. from the creek mouth.

(iii) One sample was obtained from gravels resting on bedrock in a cut bank, 390 m. from the creek mouth.

(iv) Two moss mat samples were panned (160 and 550 m. from the creek mouth). Note that the moss mat provides a <u>much</u> more effective method of obtaining a heavy mineral sample than any of the other locations tested (by a factor to 10 to 20 times).

(b) <u>Observations</u>

(i) No gold was observed.

(ii) No sulfides were observed.

(iii) Only a few mineral grains in the heavy portion of the pan were fluorescent under U.V. light.

(iv) Two small grains (< 0.8 mm. diameter) were found and consist of what is apparently gem quality garnet (location (3) (a) (i) foregoing).

These show the characteristic rounded garnet form, and one had a typical, 4 sided, diamond shaped, dodecahedral face (at 30 power, using a binocular microscope).

These crystals were a transparent, light rose-pink color and were tentatively identified as rhodolite (an intermediate mix of almandine and pyrope). However, subsequent examination of the transmitted light with a spectroscope indicates the crystals are most probably almandine.

The crystals do not fluoresce under U.V.

7.6.4 Traverse D: High Ground, South East and East Central Zone of the Silverbells Claim

(1) This was a rapid, mainly road side reconnaissance survey that followed a road along the creek to the claim boundary, then along the south and east boundaries until a road was crossed, then along the road to the summit, then back down the road to the creek mouth (Figure 5).

(2) Quartz and calcite veinlets are common in massive to tuffaceous volcanic rocks. These were not examined in detail but appear to be barren of sulfides except for one location. In the 1960's the present writer was shown a quartz vein with chalcopyrite, located near the summit. This is approximately located on Figure 5. No effort was made during the reconnaissance survey to relocate this mineralization; however, this will be done in the near future.

7.7 PHOTOS OF SELECTED SAMPLES

TRENCH

SOUTH OF

SILVER BELL ADIT

10 cm. WIDE

STIBNITE/

QUARTZ

VEIN IN TRENCH

PIT/SILL? AT 40 m. S, 30 m. E

OF SILVER BELL ADIT

BLEACHED? FELSIC TUFF

SAMPLE HS91W-40W-20E

EPITHERMAL QUARTZ/STIBNITE TEXTURE

SILVER BELL ADIT

VUGGY QUARTZ VEIN MATERIAL FROM STATION B1

TRAVERSE A

QUARTZ CARBONATE STOCKWORKS

SAMPLE HS91W-C-100A

FINE GRAINED, INTERMEDIATE TUFF

SAMPLE HS91W-C-100B

DUCK LAKE (?) AGGLOMERATE

DUCK LAKE (?) AGGLOMERATE

SAMPLE HS91W-A

KARMUTSEN PILLOW BASALTS

DALLASITE (VOLCANIĆ BRECCIA)

BETWEEN PILLOWS

DALLASITE

GEMSTONE

MATERIAL

✓

PYROXENE/FELDSPAR PORPHYRY

SAMPLE HS91W-P

AMYGDALOIDAL ANDESITE

SAMPLE HS91W-A12

7.8 VISUAL EXAMINATIONS AND FIELD NOTES SUMMARY ON MINERAL AND ROCK SAMPLES FROM THE SILVERBELLS CLAIM

7.8.1 SAMPLES WITH METALLIC MINERALIZATION

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS, HORNE LAKE PAGE: ____

SAMPLE REFERENCE NUMBER: HS 91W - B1+1/2 DATE: 1990

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: A.B.L WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR [✓ SUBROUNDED] ROUNDED

TEXTURE: ____

COLOUR (WEATHERED): GREEN/LIGHT BROWN COLOUR (FRESH): BLACK/BRASSY

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC [✓ VOLCANIC FLOW] PYROCLASTIC ____

ROCK CLASS: FELSIC INTERMEDIATE [✓ MAFIC] ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ? %

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: ____ % ____ %

GRAIN SIZE: ____ mm ____ mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ____

PERCENTAGE: ____ % ____ % ____ %

GRAIN SIZE: ____ mm ____ mm ____ mm

QUARTZ PRESENT?: YES [✓ NO] OTHER MINERALS: PYRITE ____

PERCENTAGE: ____ % PERCENTAGE: [✓ 40] % ____ %

GRAIN SIZE: ____ mm GRAIN SIZE: ____ mm ____ mm

ALTERATION MINERALS: ____ ____ ____ ____

ALTERATION HABIT: ____ ____ ____ ____

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ____ ____ ____ ____

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK STRONG [✓ VERY STRONG]

ROCK HARDNESS (MOHS): ~7

OTHER FEATURES: PYRITE(?) SPREAD OUT AS IRREGULAR MASSES, PERHAPS AS A FLOW BRECCIA, IN A SILICOUS SEDIMENT.

PROBABLE FORMATION DUCK LAKE ? AGE: D

APPROXIMATE FIELD NAME: VMS IN CHERT

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS PAGE: ____

SAMPLE REFERENCE NUMBER: HS91W – B1 – X+26 DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: APHANITIC / BRECCIATED

COLOUR (WEATHERED): RUSTY GREEN COLOUR (FRESH): LIGHT → DARK GREEN

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW PYROCLASTIC ____

ROCK CLASS: FELSIC INTERMEDIATE MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ____ %

		K-FD	PLAGIOCLASE	
FELDSPARS:	TYPES:	K-FD	PLAGIOCLASE	
	PERCENTAGE:	____ %	____ %	
	GRAIN SIZE:	____ mm	____ mm	
FERROMAGNESIANS:	TYPES:	AMPHIBOLES	PYROXENES	____
	PERCENTAGE:	____ %	____ %	____ %
	GRAIN SIZE:	____ mm	____ mm	____ mm

QUARTZ PRESENT?: [✓ YES] NO CALCITE OTHER MINERALS: STIBNITE / PYRITE / CHALCOPYR

PERCENTAGE: MINOR % PERCENTAGE: MINOR % 1 %

GRAIN SIZE: APHANITIC mm GRAIN SIZE: 3 mm 0.5 mm

ALTERATION MINERALS: ____ ____ ____ ____

ALTERATION HABIT: EPITHERMAL TEXTURE ____ ____ ____

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ____ ____ ____ ____

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): <3 TO 5

OTHER FEATURES: NOTE: STIBNITE CRYSTAL; ALSO CHALCOPYRITE

PROBABLE FORMATION NITNAT ? AGE: D

APPROXIMATE FIELD NAME: MINERALIZED, HIGHLY ALTERED, BRECCIATED ANDESITE

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS PAGE: 1

SAMPLE REFERENCE NUMBER: HS91W-C-100B DATE: 1991

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: [✓ ANGULAR] SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: APHANITIC

COLOUR (WEATHERED): LIGHT ORANGE BROWN COLOUR (FRESH): ______

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S)] MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW [✓ PYROCLASTIC] ______

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ______%

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: ______% ______%

GRAIN SIZE: ______mm ______mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ______

PERCENTAGE: ______% ______% ______%

GRAIN SIZE: ______mm ______mm ______mm

QUARTZ PRESENT?: [✓ YES] NO OTHER MINERALS: ______ ______

PERCENTAGE: 10 % PERCENTAGE: ______% ______%

GRAIN SIZE: 1 mm QUARTZ EYES? GRAIN SIZE: ______mm ______mm

ALTERATION MINERALS: CLAY CALCITE ______ ______

ALTERATION HABIT: P P ______ ______

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ______ ______ ______ ______

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 4

OTHER FEATURES: THIN PLATES OF GOLDEN MINERAL, POSSIBLY ELECTRUM?!

PROBABLE FORMATION NITNAT AGE: D

APPROXIMATE FIELD NAME: INTERMEDIATE TUFF (FINE GRAINED)

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS PAGE: ______

SAMPLE REFERENCE NUMBER: HS91W-A5 DATE: 1991

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR [✓ SUBROUNDED] ROUNDED

TEXTURE: BRECCIATED

COLOUR (WEATHERED): RUSTY - GREEN COLOUR (FRESH): LIGHT GREEN TO RED

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW PYROCLASTIC ?

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ______%

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: ______% ______%

GRAIN SIZE: ______mm ______mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ______

PERCENTAGE: ______% ______% ______%

GRAIN SIZE: ______mm ______mm ______mm

QUARTZ PRESENT?: [✓ YES] NO OTHER MINERALS: SULFIDES FUCSITE

PERCENTAGE: LARGE % PERCENTAGE: MINOR % MINOR %

GRAIN SIZE: ______mm GRAIN SIZE: ______mm ______mm

ALTERATION MINERALS: QUARTZ ______ ______ ''

ALTERATION HABIT: P ______ ______ D

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ______ ______ ______ ______

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 3-5

OTHER FEATURES: VERY BRECCIATED TEXTURE, WITH BLACK CHERT, JASPER (RED) AND ANDESITE CLASTS. FLOODED WITH QUARTZ (VEIN BRECCIA?)

PROBABLE FORMATION ? AGE: D?

APPROXIMATE FIELD NAME: CHERT BRECCIA

7.8.2 HIGHLY ALTERED ROCK SAMPLES

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE PAGE:

SAMPLE REFERENCE NUMBER: HS91W-C-100A DATE: 1990

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: [✓ ANGULAR] SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE:

COLOUR (WEATHERED): COLOUR (FRESH):

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S) MEDIUM] COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW PYROCLASTIC [✓ UNCERTAIN]

ROCK CLASS: [✓ FELSIC] INTERMEDIATE MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: %

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: % %

GRAIN SIZE: mm mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES

PERCENTAGE: % % %

GRAIN SIZE: mm mm mm

QUARTZ PRESENT?: [✓ YES] NO OTHER MINERALS: CALCITE

PERCENTAGE: 5 %? PERCENTAGE: % %

GRAIN SIZE: mm GRAIN SIZE: mm mm

ALTERATION MINERALS: QUARTZ CALCITE

ALTERATION HABIT: V P, V.

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE:

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE [✓ WEAK] STRONG VERY STRONG

ROCK HARDNESS (MOHS): 4

OTHER FEATURES: BOXWORK / STOCKWORK OF QUARTZ / CALCITE? VEINS, LIMONITE STAIN WHERE WEATHERED

PROBABLE FORMATION NITNAT ? AGE: D

APPROXIMATE FIELD NAME: QUARTZ CARBONATE STOCKWORKS

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE B.C. PAGE: ____

SAMPLE REFERENCE NUMBER: H591W -C-315 DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: FINE GRAINED

COLOUR (WEATHERED): LIGHT BR TO OR-BR COLOUR (FRESH): LIGHT GREEN

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S)] MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW [✓ PYROCLASTIC] ____

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ____%

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: ____% ____%

GRAIN SIZE: ____mm ____mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ____

PERCENTAGE: ____% ____% ____%

GRAIN SIZE: ____mm ____mm ____mm

QUARTZ PRESENT?: YES [✓ NO] OTHER MINERALS: ANKERITE CALCITE

PERCENTAGE: ____% PERCENTAGE: 1-5 % ✓ %

GRAIN SIZE: ____mm GRAIN SIZE: POWDERY mm ____mm

ALTERATION MINERALS: ANKERITE $CaFe(CO_3)_2$ (EFF. IN HCL) CALCITE CLAY

ALTERATION HABIT: D ____ P, V P

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ____ ____ ____ ____

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE [✓ WEAK] STRONG VERY STRONG

ROCK HARDNESS (MOHS): <3

OTHER FEATURES: APPEARS TO BE A BLEACHED / ALTERED TUFF

NOTE: DISCONTINUOUS BLACK LAYER, 1-2 mm WIDE, SHOWING CONCOIDAL FRACTURE, BRITTLE, HARDNESS <4? ORGANIC? OBSIDIAN? (UNLIKELY)

PROBABLE FORMATION NITNAT FORMATION AGE: D

APPROXIMATE FIELD NAME: ALTERED (INTERMEDIATE TO RHYOLITIC) TUFF

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS PAGE: ______

SAMPLE REFERENCE NUMBER: HS91W-C-370-390 DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: ______

COLOUR (WEATHERED): LIGHT BROWN COLOUR (FRESH): WHITE → PINK

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] ~~FINE(S)~~ [✓ MEDIUM] COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW [✓ PYROCLASTIC] ______

ROCK CLASS: FELSIC INTERMEDIATE MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ______%

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: ______% ______%

GRAIN SIZE: ______mm ______mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ______

PERCENTAGE: ______% ______% ______%

GRAIN SIZE: ______mm ______mm ______mm

QUARTZ PRESENT?: YES NO OTHER MINERALS: CALCITE ↔ DOLOMITE

PERCENTAGE: ______% PERCENTAGE: MAJOR % ______%

GRAIN SIZE: ______mm GRAIN SIZE: A → 2 mm ______mm

ALTERATION MINERALS: ______ ______ " ______

ALTERATION HABIT: ______ ______ P, V ______

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ______ ______ ______ ______

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 4 → 5

OTHER FEATURES: BASIC ROCK APPEAR TUFFACES, BUT HIGHLY ALTERED (CALCITE)

PROBABLE FORMATION NITNAT? AGE: D

APPROXIMATE FIELD NAME: HIGHLY ALTERED TUFFS

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS **PAGE:** ____

SAMPLE REFERENCE NUMBER: HS91N—Δ11 **DATE:** 1991

SAMPLE MODE: IN SITU [✓ FLOAT] **SAMPLER:** B. WHITTLES

(IF FLOAT): SPHERICITY: [✓ ANGULAR] SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: APHANITIC TO GRANULAR

COLOUR (WEATHERED): BROWN TO DARK GREEN **COLOUR (FRESH):** GREEN TO WHITE

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW [✓ PYROCLASTIC] ____

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: 50-90 %

FELDSPARS: TYPES:	K-FD	PLAGIOCLASE	
PERCENTAGE:	____ %	____ %	
GRAIN SIZE:	____ mm	____ mm	
FERROMAGNESIANS: TYPES:	AMPHIBOLES	PYROXENES	____
PERCENTAGE:	____ %	____ %	____ %
GRAIN SIZE:	____ mm	____ mm	____ mm

QUARTZ PRESENT?:	YES [✓ NO]	OTHER MINERALS:	CHLORITE	CALCITE
PERCENTAGE:	____ %	PERCENTAGE:	? %	LARGE %
GRAIN SIZE:	____ mm	GRAIN SIZE:	____ mm	____ mm

ALTERATION MINERALS:	____	____	✓	✓
ALTERATION HABIT:	____	____	P	P

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ____ ____ ____ ____

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE [✓ WEAK] STRONG VERY STRONG

ROCK HARDNESS (MOHS): < 3

OTHER FEATURES: SOME BRECCIATED / AGGLOMERATE SURFACE TEXTURE

PROBABLE FORMATION NITNAT **AGE:** D

APPROXIMATE FIELD NAME: CALCITE FLOODED AGGLOMERATE (VOLCANIC OR SEDIMENTARY (LIMESTONE ?))

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE PAGE: 12.9-2

SAMPLE REFERENCE NUMBER: HS91W-40S-20E DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: APHANITIC

COLOUR (WEATHERED): ______ COLOUR (FRESH): ______

OVERALL GRAIN SIZE: GLASSY APHANITIC FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC VOLCANIC FLOW PYROCLASTIC ______

ROCK CLASS: FELSIC INTERMEDIATE MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ______ %

FELDSPARS:	TYPES:	K-FD	PLAGIOCLASE	
	PERCENTAGE:	%	%	
	GRAIN SIZE:	mm	mm	
FERROMAGNESIANS:	TYPES:	AMPHIBOLES	PYROXENES	
	PERCENTAGE:	%	%	%
	GRAIN SIZE:	mm	mm	mm

QUARTZ PRESENT?:	YES NO	OTHER MINERALS:	PYRITE	CALCITE
PERCENTAGE:	%	PERCENTAGE:	<1 %	MINOR %
GRAIN SIZE:	mm	GRAIN SIZE:	<0.1 mm	mm

ALTERATION MINERALS:	PYRITE	CLAY	CALCITE	
ALTERATION HABIT:	D	P	P	

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: PY

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): ______

OTHER FEATURES: APPEAR AS A SILL LIKE LAYER. SLIGHT HCl EFFERVESCENCE. DISTINCTIVE BROWN RUSTY LAYER 2-5m INTO ROCK. ASSOCIATED WITH NITNAT ROCK FORMATIONS

PROBABLE FORMATION DUCK LAKE ?? NITNAT ?? AGE: D

APPROXIMATE FIELD NAME: BLEACHED (?) FELSIC TUFF DACITE ?

7.8.3 UNMINERALIZED, UNALTERED TO WEAKLY ALTERED ROCK SAMPLES

Name: B. WHITLES
Date: 1991
Field Project : SILVERBELLS

SEDIM RY ROCK
IDENTIFICATION WORKSHEET

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SAMPLE NUMBER	TEXTURE	HCl REACTION GRAINS? MATRIX? POWDER?	FIRST APPROXIMATION (Rock Type)	GRAIN SIZE	GRAIN SHAPE	GRAIN COMPOSITION	MATRIX PERCENT	HARDNESS	SECOND APPROXIMATION (Rock Name)	SEDIMENTARY STRUCTURES, ETC.
HS91W -C-25A FLOAT	CLASTIC	NO	NON-CALCAREOUS DETRITAL	SAND SIZE TO 2cm	ROUNDED		CHERT -BLACK -GREY -BROWN -RED (JASPER) WHITE QUARTZ		CONGLOMERATE POSSIBLY NANAIMO GROUP HASLAM FORMATION? FOURTH LAKE " ?	SOME IMBRICATION
HS91W -△11 FLOAT	APHANITIC	YES-ALL	LIMESTONE	APHANITIC TO 1cm	?	CALCITE WHITE TO GREEN	CALCITE DARK	< 3	LIMESTONE OR PERVASIVELY FLOODED (WITH CALCITE) VOLCANIC	
HS91W -C-195A IN SITU	GRANULAR FINE GRAINED	YES-ALL	LIMESTONE	<1 mm	CRYSTALLINE	CALCITE BROWN	←	≳ 3	TUFFACEOUS LIMESTONE	
HS91W -△16 IN SITU	APHANITIC	YES NO	DOLOSTONE CHERT + ARGILLITE	APHANITIC	—	DOLOMITE SILICA/CLAY	←	~3 4→5+	DOLOSTONE LAYER CHERT/ARGILLITE LAYERS	

NOTE: VERY HEAVY HEMATITE AND LIMONITE STAINS ON SOME FRACTURE SURFACES

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS PAGE: 1 of 1

SAMPLE REFERENCE NUMBER: HS91W-A DATE: 1990

SAMPLE MODE: [✓ IN SITU] [✓ FLOAT] SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: [✓ ANGULAR] SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE:

COLOUR (WEATHERED): GREEN TO DARK RED COLOUR (FRESH): AS PER WEATHERED

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC [✓ VOLCANIC FLOW] PYROCLASTIC

ROCK CLASS: FELSIC INTERMEDIATE [✓ MAFIC] ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: 7 %

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: % %

GRAIN SIZE: mm mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES

PERCENTAGE: % % %

GRAIN SIZE: mm mm mm

QUARTZ PRESENT?: YES NO OTHER MINERALS: CALCITE FUCSITE

PERCENTAGE: % PERCENTAGE: 5-10 % V. MINOR %

GRAIN SIZE: mm GRAIN SIZE: mm mm

ALTERATION MINERALS: CHLORITE HEMATITE

ALTERATION HABIT: P P

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: G

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE [✓ WEAK] STRONG VERY STRONG

ROCK HARDNESS (MOHS): 3-4

OTHER FEATURES: ROUNDED, PILLOW-LIKE, TO SUB-ANGULAR CLASTS, VERY VESSICULAR (GAS BUBBLES); SPACES BETWEEN CLASTS FILLED WITH CALCITE. CLASTS APPEAR TO SHOW A RIND

PROBABLE FORMATION DUCK-LAKE AGE: D

APPROXIMATE FIELD NAME: AGGLOMERATE

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE PAGE: 12.1-7

SAMPLE REFERENCE NUMBER: HS91W - B1 - X+5 DATE: 1990

[illegible]

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B.WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: GRANULAR

COLOUR (WEATHERED): LIGHT BROWN COLOUR (FRESH): MED. GREEN

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S)] MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC [✓ VOLCANIC FLOW] [✓ PYROCLASTIC] ______

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ______ %

FELDSPARS:	TYPES:	K-FD	PLAGIOCLASE
	PERCENTAGE:	____ %	____ %
	GRAIN SIZE:	____ mm	____ mm

FERROMAGNESIANS:	TYPES:	AMPHIBOLES	PYROXENES	______
	PERCENTAGE:	____ %	____ %	____ %
	GRAIN SIZE:	____ mm	____ mm	____ mm

QUARTZ PRESENT?:	YES NO	OTHER MINERALS:	CALCITE	SULFIDES
PERCENTAGE:	____ %	PERCENTAGE:	? %	MINOR %
GRAIN SIZE:	____ mm	GRAIN SIZE:	____ mm	____ mm

ALTERATION MINERALS:			"	
ALTERATION HABIT:			V, D	

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ______ ______ ______ ______

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): <3

OTHER FEATURES: VERY STRONG HCl REACTION ON SOME FACES, WEAK ON OTHERS.

PROBABLE FORMATION NITNAT AGE: D

APPROXIMATE FIELD NAME: LIMY TUFF

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS PAGE:

SAMPLE REFERENCE NUMBER: HS91W-C-195B DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: APHANITIC / AMYGDALOIDAL

COLOUR (WEATHERED): RUSTY GREEN COLOUR (FRESH): DARK GREEN

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC [✓ VOLCANIC FLOW] PYROCLASTIC

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: %

FELDSPARS: TYPES:	K-FD	PLAGIOCLASE
PERCENTAGE:	%	%
GRAIN SIZE:	mm	mm

FERROMAGNESIANS: TYPES:	AMPHIBOLES	PYROXENES	
PERCENTAGE:	%	%	%
GRAIN SIZE:	mm	mm	mm

QUARTZ PRESENT?: YES [✓ NO] OTHER MINERALS: CALCITE

PERCENTAGE: % PERCENTAGE: 10-20 % %

GRAIN SIZE: mm GRAIN SIZE: 1 mm mm

ALTERATION MINERALS:			✓	
ALTERATION HABIT:			D, V	

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE:

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 4

OTHER FEATURES: CALCITE FILLS VESICLES IN ANDESITE, SOME ARE BLACK ON SURFACE?

PROBABLE FORMATION NITNAT AGE: D

APPROXIMATE FIELD NAME: AMYGDALOIDAL ANDESITE.

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE PAGE: 129-7

SAMPLE REFERENCE NUMBER: HS91W-F DATE: 1990

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: ABL WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR [✓ SUBROUNDED] ROUNDED

TEXTURE: PORPHYRITIC

COLOUR (WEATHERED): MED. GRAY COLOUR (FRESH):

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S)] MEDIUM COARSE(P) [✓ V. COARS]

ROCK TYPE: [✓ PLUTONIC VOLCANIC FLOW] PYROCLASTIC

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: 40 %

		K-FD	PLAGIOCLASE	
FELDSPARS:	TYPES:			
	PERCENTAGE:	%	60 %	
	GRAIN SIZE:	mm	1-10 mm	
FERROMAGNESIANS:	TYPES:	AMPHIBOLES	PYROXENES	
	PERCENTAGE:	? %	? %	%
	GRAIN SIZE:	mm	mm	mm

QUARTZ PRESENT?: YES NO OTHER MINERALS:

PERCENTAGE: ? % PERCENTAGE: % %

GRAIN SIZE: mm GRAIN SIZE: mm mm

ALTERATION MINERALS:

ALTERATION HABIT:

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE:

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 4

OTHER FEATURES: FELDSPARS ARRANGED, IN PLACES, IN A DAISY-LIKE PATTERN (RADIATING OUT FROM A COMMON CENTER.)

PROBABLE FORMATION KARMUTSEN AGE: TR

APPROXIMATE FIELD NAME: GLOMEROPORPHYRITIC ANDESITE

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS, HORNE LAKE PAGE: 1

SAMPLE REFERENCE NUMBER: HS91W - P DATE: 1990

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: A.B.L. WHITTLES

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED [✓ ROUNDED]

TEXTURE: PORPHYRITIC

COLOUR (WEATHERED): WHITE/GREEN/BLACK COLOUR (FRESH): AS PER WEATHERED

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) [✓ V. COARSE]

ROCK TYPE: [✓ PLUTONIC] VOLCANIC FLOW PYROCLASTIC

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: 70 %

FELDSPARS: TYPES: K-FD PLAGIOCLASE PERTHITIC STRUCTURE

PERCENTAGE: ? 30 % %

GRAIN SIZE: 1-10 mm mm

FERROMAGNESIANS: TYPES: AMPHIBOLES [✓ PYROXENES] 30-40%

PERCENTAGE: % % %

GRAIN SIZE: mm mm mm

QUARTZ PRESENT?: YES [✓ NO] OTHER MINERALS:

PERCENTAGE: % PERCENTAGE: % %

GRAIN SIZE: mm GRAIN SIZE: mm mm

ALTERATION MINERALS: NONE

ALTERATION HABIT: NONE

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: NONE

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 6 - 7

OTHER FEATURES: PYROXENE CRYSTALS 2mm — 2cm; FELDSPAR APPEAR BRECCIATED IN PLACES. LIGHT GREEN APHANITIC GROUND MASS (~30% OF TOTAL), SOME PYROXENES INSIDE FELDSPARS

PROBABLE FORMATION UNKNOWN AGE: J?

APPROXIMATE FIELD NAME: PYROXENE /FELDSPAR PORPHYRY

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS, HORNE LAKE PAGE: 12.7-6

SAMPLE REFERENCE NUMBER: HS91W- Δ1 DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES.

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: APHANITIC

COLOUR (WEATHERED): LIGHT ORANGE-BROWN COLOUR (FRESH): LIGHT GREEN

OVERALL GRAIN SIZE: GLASSY [✓ APHANITIC] FINE(S) MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC [✓ VOLCANIC FLOW] PYROCLASTIC ____

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ____%

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: ____% ____%

GRAIN SIZE: ____mm ____mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ____

PERCENTAGE: ____% ____% ____%

GRAIN SIZE: ____mm ____mm ____mm

QUARTZ PRESENT?: YES NO OTHER MINERALS: CALCITE ____

PERCENTAGE: ____% PERCENTAGE: MINOR % ____%

GRAIN SIZE: ____mm GRAIN SIZE: ____mm ____mm

ALTERATION MINERALS: ____ ____ " ____

ALTERATION HABIT: ____ ____ V→P ____

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ____ ____ ____ ____

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): 4

OTHER FEATURES: ____

PROBABLE FORMATION NITNAT AGE: D.

APPROXIMATE FIELD NAME: ANDESITE

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE PAGE: 12 [illegible]

SAMPLE REFERENCE NUMBER: HS91W – Δ11+ DATE: 1991

SAMPLE MODE: IN SITU [✓ FLOAT] SAMPLER: B. WHITTLES

(IF FLOAT): SPHERICITY: [✓ ANGULAR] SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: PORPHYRITIC

COLOUR (WEATHERED): BROWN / GREEN COLOUR (FRESH): GREEN (FLECTED WITH WHITE)

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S)] MEDIUM COARSE(P) [✓ V. COARS]

ROCK TYPE: [✓ PLUTONIC VOLCANIC FLOW] PYROCLASTIC ______

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: ______%

FELDSPARS: TYPES: K-FD [✓ PLAGIOCLASE]

PERCENTAGE: ______% 25 %

GRAIN SIZE: ______mm 5 mm (MAX)

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES ______

PERCENTAGE: ______% ______% ______%

GRAIN SIZE: ______mm ______mm ______mm

QUARTZ PRESENT?: YES [✓ NO] OTHER MINERALS: ______ ______

PERCENTAGE: ______% PERCENTAGE: ______% ______%

GRAIN SIZE: ______mm GRAIN SIZE: ______mm ______mm

ALTERATION MINERALS: UNALTERED ______ ______ ______

ALTERATION HABIT: ______ ______ ______ ______

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE: ______ ______ ______ ______

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): > 5

OTHER FEATURES: FELDSPAR CRYSTALS ARE WHITE IN LIGHT GREEN GROUND MASS. SOME OF FELDSPAR FRAGMENTS APPEAR BROKEN & ROUNDED.

PROBABLE FORMATION NITNAT AGE: D

APPROXIMATE FIELD NAME: PORPHYRY (BRECCIATED?)

✓

IGNEOUS ROCK SAMPLE SUMMARY SHEET

PROJECT: SILVERBELLS HORNE LAKE PAGE:

SAMPLE REFERENCE NUMBER: HS91W-△12 DATE: 1991

SAMPLE MODE: [✓ IN SITU] FLOAT SAMPLER: B. WHITTLES.

(IF FLOAT): SPHERICITY: ANGULAR SUB-ANGULAR SUBROUNDED ROUNDED

TEXTURE: AMYGDALOIDAL

COLOUR (WEATHERED): DARK BROWN COLOUR (FRESH): MED. GREEN

OVERALL GRAIN SIZE: GLASSY APHANITIC [✓ FINE(S)] MEDIUM COARSE(P) V. COARS

ROCK TYPE: PLUTONIC [✓ VOLCANIC FLOW] PYROCLASTIC

ROCK CLASS: FELSIC [✓ INTERMEDIATE] MAFIC ULTRA-MAFIC

TOTAL PERCENTAGE DARK MINERALS: %

FELDSPARS: TYPES: K-FD PLAGIOCLASE

PERCENTAGE: % %

GRAIN SIZE: mm mm

FERROMAGNESIANS: TYPES: AMPHIBOLES PYROXENES

PERCENTAGE: % % %

GRAIN SIZE: mm mm mm

QUARTZ PRESENT?: YES [✓ NO] OTHER MINERALS: CALCITE

PERCENTAGE: % PERCENTAGE: 30-40 % %

GRAIN SIZE: mm GRAIN SIZE: mm mm

ALTERATION MINERALS: CALCITE

ALTERATION HABIT: P, ALSO FILLS AMYGDULES

[DISSEMINATED(D) ENVELOPE (HALO) (E) PERVASIVE (P) VEIN (V) SELVEGE (S)]

ALTERATION TYPE:

[ZEOLITIC (Z) PROPOLYTIC (G) ARGILLIC (AB) PHYLLIC (PB) PYRITIC (PY) POTASSIC (K)]

ROCK STRENGTH: LOOSE FRIABLE WEAK [✓ STRONG] VERY STRONG

ROCK HARDNESS (MOHS): ~3 TO 4

OTHER FEATURES: VUGS (GAS BUBBLES) ON SURFACE ARE PROBABLE WEATHERED. FRESH ROCK HAS ALL BUBBLES FILLED WITH CALCITE. AT 30X MAGNIFICATION APPEARS TUFFACEOUS

PROBABLE FORMATION NITNAT AGE: △

APPROXIMATE FIELD NAME: AMYGDALOIDAL ANDESITE (LAVA TO TUFF)

7.9 GEOCHEMICAL/ASSAY RESULTS

COMP: GEONICS CONSULTING SERVICES
PROJ: HORNE LAKE
ATTN: DR. A. WHITTLES

MIN-EN LABS — ICP REPORT

705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

FILE NO: 1V-0635-RJ1
DATE: 91/07/08
* ROCK * (ACT:F31)

SAMPLE NUMBER	AG PPM	AL PPM	AS PPM	B PPM	BA PPM	BE PPM	BI PPM	CA PPM	CD PPM	CO PPM	CU PPM	FE PPM	K PPM	LI PPM	MG PPM	MN PPM	MO PPM	NA PPM	NI PPM	P PPM	PB PPM	SB PPM	SR PPM	TH PPM	U PPM	V PPM	ZN PPM	GA PPM	SN PPM	W PPM	CR PPM	AU-FIRE PPB
HS91W-B4	.1	3890	358	5	53	.4	1	31390	.1	13	38	34310	1980	6	13080	1043	1	30	38	430	10	52	5	1	1	65.9	40	1	1	5	108	2
HS91W-D1	.1	1380	648	1	34	.1	1	1270	.1	5	13	8480	740	1	690	136	3	10	16	30	14	41009	1	1	1	12.9	167	1	1	10	248	1

From

TEXAS MINING & SMELTING DIVISION
of national lead co.

MAKERS OF ANTIMONY & ANTIMONY OXIDE.
P.O.BOX 559
LAREDO TEXAS

The sample which you refered to in your letter of Aug 6 has been asseyed and is of good antimony sulfide ore.We should like very much to have ore of that kind.It ran 56.6% antimony,22% sulfur,.07% arsenic,.04% lead,& .001% selenium.

Antimony ores are paid for on the basis of the antimony content,the higher the grade,the higher the value of each pound of antimony contained. Ores of 50% would be worth $148 a ton & 60% $190 a ton at this time,placed Laredo Texas.

We should like to know the shipping point.

From

THE COLORADO ASSEYING CO.
2244 BROADWAY
P.O. BOX 298
DENVER I COLORADO.

This sample consists of the metallic gray steel stibnite (antimony sulphide)& the hard white quartz(silica).

A small amount of white feldspar(sodium,potassium,lithium, aluminum silicate)is present.

This ore is of interest,or value,for its antimony content only.

Metals present.

Silica large
Antimony large
Iron 1.-2.%
Aluminum 1.-3.%
Calcium .1%
Magnesium .05%
Sodium .3%
potassium .2-.5%
Lithium .01-.03%
Manganese .01%

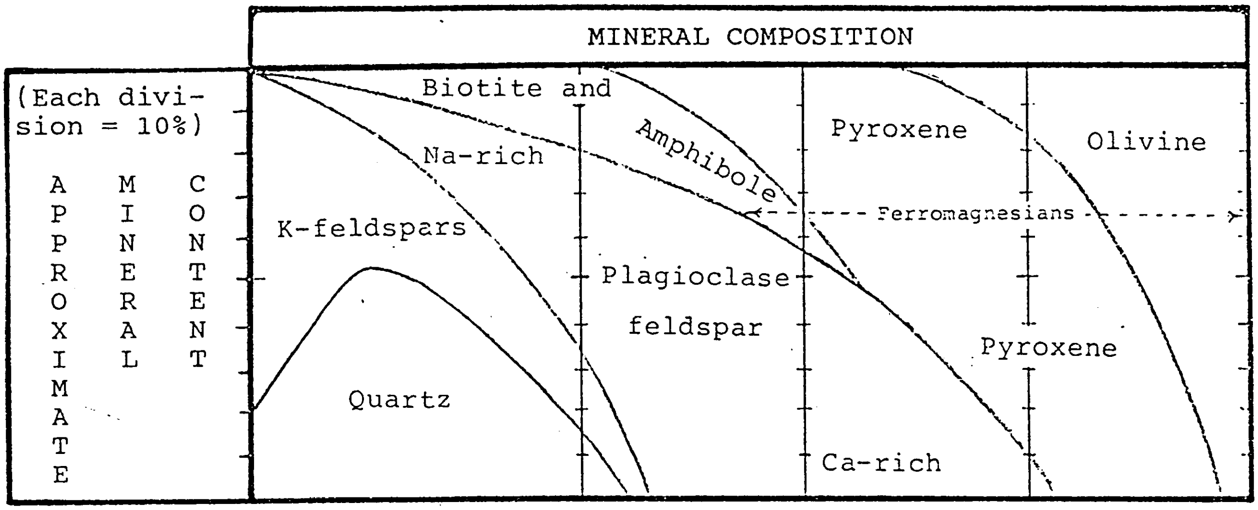
Barium .01-.05%
Copper trace
Lead trace
Arsenic .1%
Zinc trace
Uranium nil
Gold .005 oz per ton .18¢
Silver .2 oz per ton .18¢

7.10 SIMPLIFIED IGNEOUS CLASSIFICATION SCHEME USED IN THIS REPORT

FIGURE 6.

CLASSIFICATION OF IGNEOUS ROCKS

FERROMAGNESIAN CONTENT — (increasing) ——>			
Light Coloured		Dark Coloured	
ROCK TYPE			
Sialic	Intermediate	Simatic	
Felsic	Intermediate	Mafic	Ultramafic



		ROCK NAMES			
TEXTURES	Porphyritic	Porphyry			
	Pegmatitic	Pegmatite			
	Granular	Granite	Diorite	Gabbro	Ultramafic
	Aphanitic	Rhyolite	Andesite	Basalt	
	Glassy	Obsidian/Pumice			
	Pyroclastic	Tuff/Agglomerate/Breccia			

FIGURE 7

TEXTURAL NAMES FOR ROCKS

ROCK TYPE	SIZES OF GRAINS OR FRAGMENTS		
	Grains TOO SMALL to be seen	MIXED SIZES	Nearly EQUAL SIZED Grains Grains VISIBLE to unaided eye
IGNEOUS	GLASSY APHANITIC (Crystalline)	PORPHYRITIC (Crystalline, with mineral phenocrysts) PYROCLASTIC (angular) (rounded) BRECCIATED larger angular rock fragments in a finer grained matrix	PHANERITIC (Crystalline) GRANULAR - Coarse (pea sized) - Medium - Fine (sugar sized) PEGMATITIC Size > 1 cm
SEDIMENTARY	APHANITIC Crystalline (Micro-crystalline) Clastic - mud sized fragments - fossils - weathered rock)	CLASTIC (angular) BRECCIATED larger angular rock fragments in a finer grained matrix (rounded) a mixture of mud/sand/gravel sizes	NON-CLASTIC (Crystalline or chemical) - Coarse (pea sized or greater) - Medium - Fine (sugar sized) CLASTIC - Gravel sized - Sand sized (Sorted, Unsorted) (Mature, Immature) (Mechanical Chemical)
METAMORPHIC	APHANITIC (Clastic to crystalline) FOLIATED SLATY PHYLLIC UNFOLIATED	PORPHYROBLASTIC (Clastic to crystalline) FOLIATED UNFOLIATED SCHISTOSE CATACLASTIC (Brecciated)	GRANOBLASTIC (Crystalline in appearance but with sutured boundaries) FOLIATED (Multimineralic) SCHISTOSE GNEISSIC UNFOLIATED (Monomineralic/multimineralic) - Coarse (pea sized or greater) - Medium - Fine (sugar sized)

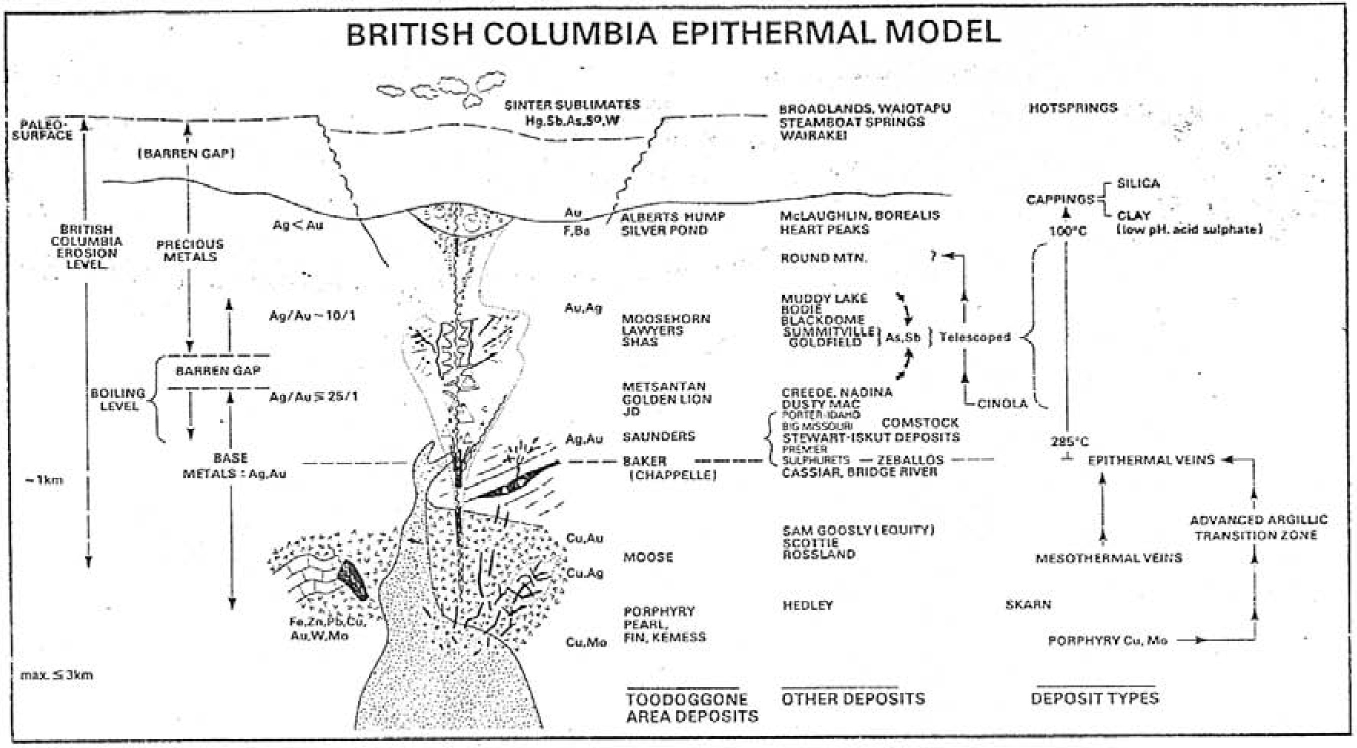
FIGURE 8.

LIST OF ROCK NAMES

	SIZES OF GRAINS OR FRAGMENTS		
ROCK TYPE	Grains TOO SMALL to be seen	MIXED SIZES	Nearly EQUAL SIZED Grains Grains VISIBLE to unaided eye
IGNEOUS	(Glassy) OBSIDIAN PUMICE (Aphanitic) RHYOLITE ANDESITE BASALT TUFF	(Pyroclastic) (angular) BRECCIA - Intrusive - Extrusive (rounded) AGGLOMERATE TUFF (Porphyritic) PROPHYRITIC: RHYOLITE ANDESITE BASALT (or else): FELDSPAR (etc.) PORPHYRY	(Granular to Pegmatitic) GRANITE DIORITE GABBRO ULTRAMAFIC (Most pegmatites are granitic)
SEDIMENTARY	(Aphanitic) (crystalline) LIMESTONE DOLOSTONE MARL TRAVERTINE TUFA CHERT (hard) (clastic) LIMESTONE MUDROCKS: - SILTSTONES - CLAYSTONES - Mudstones - Shale - Argillite CHERT (hard)	(Clastic) (angular). (Brecciated) BRECCIA (rounded) CONGLOMERATE GREYWACKE TILLITE	(Non-clastic) ROCK SALT GYPSUM POTASH (Clastic) SANDSTONE - ARKOSE - CALCARENITE LIMESTONE
METAMORPHIC	(Aphanitic) (Foliated) SLATE PHYLLITE GREENSTONE (Unfoliated) QUARTZITE	(Porphyroblastic) (Foliated) SCHIST (e.g., garnet-mica schist) (Unfoliated) HORNFELS SKARN	(Granoblastic) (Foliated) SCHIST (e.g., mica schist) GNEISS (Unfoliated) MARBLE QUARTZITE SKARN HORNFELS

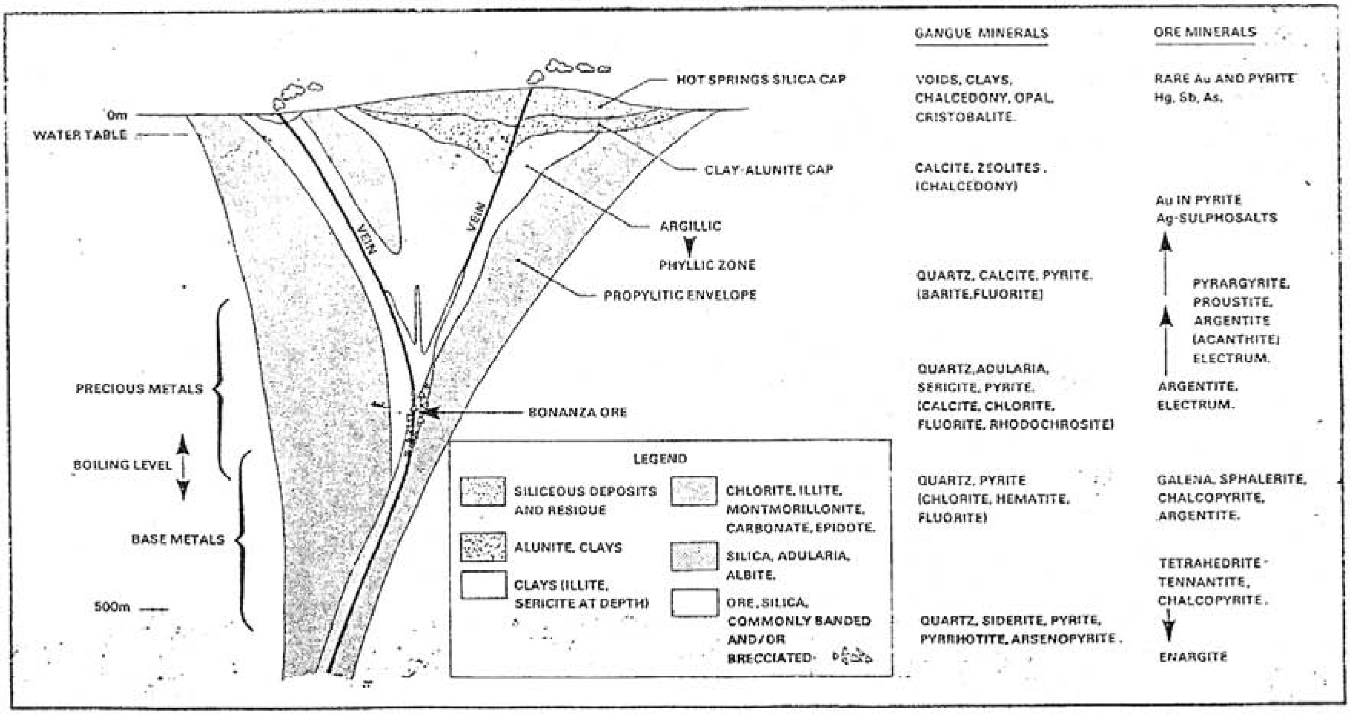
7.11 GOLD BEARING EPITHERMAL MINERAL SYSTEMS

FIGURE 9.



British Columbia epithermal model. The model is based on studies of epithermal deposits in the Toodoggone area by T.G. Schroeter and A. Panteleyev, and comparisons with deposits elsewhere. The model infers a continuum from porphyry copper and skarn through transitional deposits, to epithermal veins, and hot spring discharge deposits.

FIGURE 10. IDEALIZED SECTION OF A BONANZA EPITHERMAL DEPOSIT



Idealized section of a bonanza epithermal deposit. (After Buchanan, 1981). Real systems are commonly more complex because this single-stage model is overprinted by several stages of mineralization related to migration of fluid boiling or degassing levels.

FIGURE 11. EPITHERMAL DEPOSITS AND DEPTH

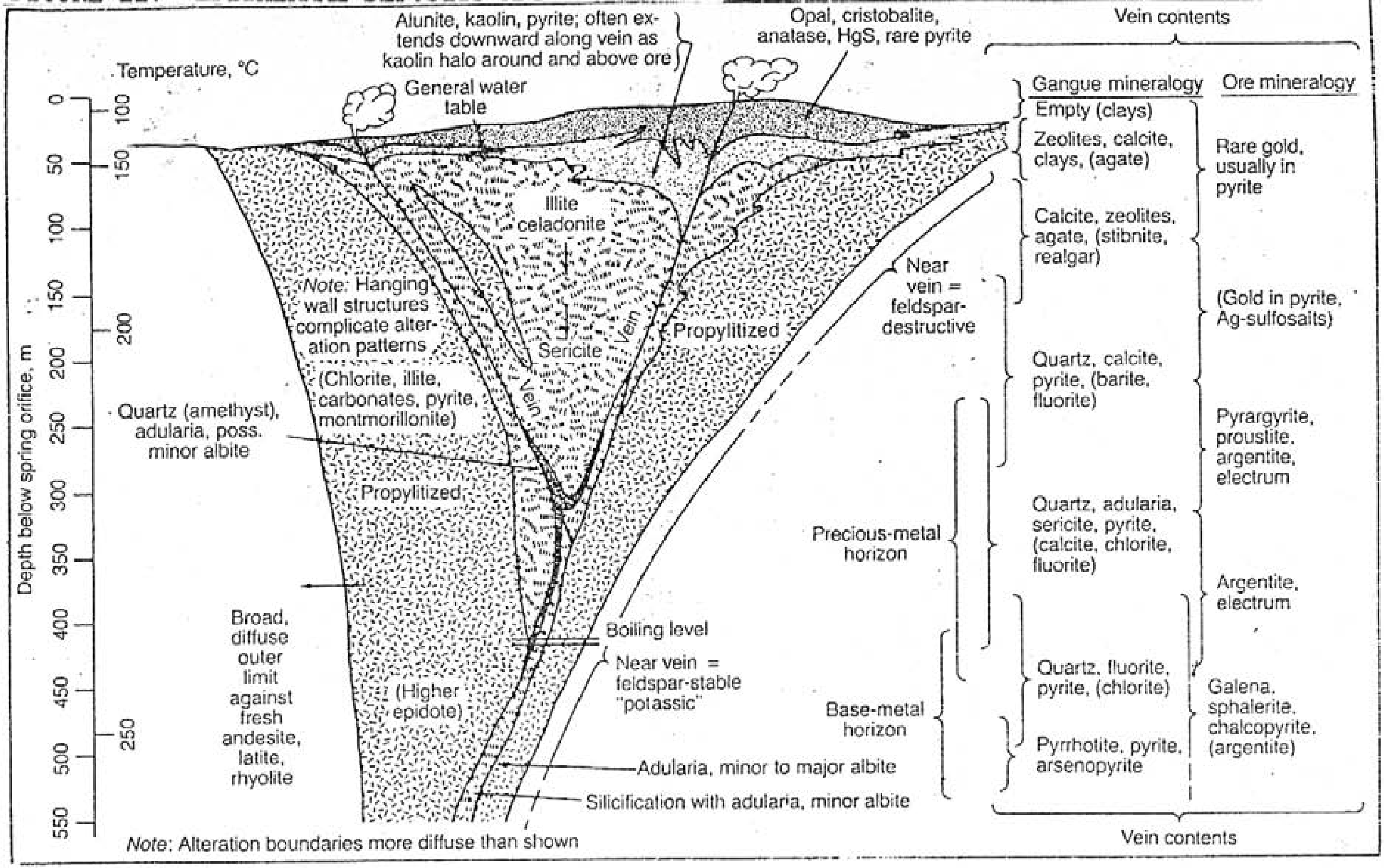


TABLE . -1. Mineralogy of an Idealized Composite Vein from Surface to Depth

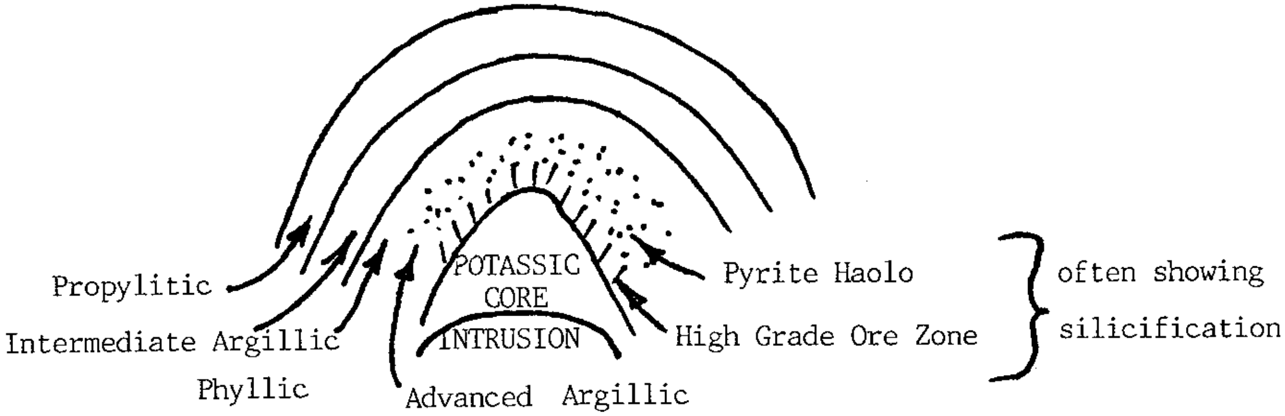
1. *Barren:* Chalcedony, quartz, barite, fluorite, carbonates. Some veins carry small amounts of mercury, antimony, or arsenic minerals. 'Fringe' mineralization.
2. *Mercury:* Cinnabar, commonly with chalcedony, quartz, barite, fluorite, or carbonates.
3. *Antimony:* Stibnite, commonly with quartz, locally passing downward into galena, with lead-antimony sulfosalts. Some carry gold-silver.
4. *Gold-silver:* Bonanza gold and gold-silver deposits. Acanthite with arsenic and antimony minerals common. Abundant quartz, chalcedony, amethyst. Tellurides and selenides in places. Relatively small amounts of galena, adularia, alunite with calcite, rhodochrosite, and other carbonates. Epithermal textures; silicification. Some potassic, some sericitic, some propylitic alteration.
5. *Barren interval:* Most nearly consistent barren zone; represents bottom of many Teritiary precious-metal veins. Quartz, carbonates, and small amounts of pyrite, chalcopyrite, sphalerite, and galena.
6. *Silver-manganese:* Quartz gangue with calcite-dolomite-siderite; acanthite-rhodochrosite; silver-arsenic-antimony sulfosalts; minor rhodonite. Low pyrite. Sericitic-argillic-propylitic alteration.
7. *Lead:* Quartz gangue, minor carbonates. Galena generally with silver; sphalerite usually present, increasing with depth; some chalcopyrite, rhodochrosite-rhodonite. Low pyrite.
8. *Zinc:* Quartz, with, in some deposits, Ca-Fe-Mn carbonate gangue. Sphalerite, with galena, chalcopyrite, tennantite-tetrahedrite. Chalcopyrite-pyrite increase downward. *Lithocap:* Some systems at level 6, 7, or 8 are quartz-enargite-tennanite, minor chalcopyrite. Advanced argillic alteration, quartz-pyrophyllite-topaz-alunite-kaolinite. Low pyrite.
9. *Copper:* Tennantite-tetrahedrite-chalcopyrite, commonly argentiferous. Quartz-pyrite gangue. Sericitic-argillic-propylitic alteration.
10. *Copper:* Chalcopyrite, quartz gangue, most with pyrite, some with pyrrhotite. Tennantite-bornite-chalcocite-enargite-downward, commonly with quartz-sericite-pyrite alteration. Generally carry precious metals, especially silver. Huebnerite common. Trace tin.
11. *Molybdenum-tungsten:* Quartz-huebnerite or scheelite-pyrite veins with trace molybdenite-chalcopyrite, or quartz-molybdenite as white quartz-smoky molybdenite veinlets. Some with cassiterite. No alteration or potassic.
12. *Barren or low grade:* Quartz, K-feldspar, biotite, chalcopyrite, molybdenite, trace pyrite, carbonates, anhydrite. Potassic alteration.

Revised "Emmons' reconstructed vein," an idealized composite vein system from the surface (1) to deep-seated conditions (12). No one vein is known to contain all of these associations, but most of them show several intervals in the order given. A typical wall rock would be a related I-type quartz monzonite. Emmons' original reconstruction combined what we now know to be I-type and S-type metallogenic assemblages.

Source: Extensively revised from Emmons (1936).

Table 2: Hydrothermal Alteration Zoning

Alteration may form around ore mineralization in the following idealized pattern:



(1) Potassic Zone

- (a) Secondary, salmon pink, K-feldspar (veinlets, pervasive, envelopes).
- (b) Secondary, brown, phlogopite.
- (c) Magnetite and/or hematite.
- (d) Rocks are usually resistant to erosion unless highly fractured.

(2) Advanced Argillic Zone

- (a) Highly kaolinitized (Note chalky taste and feel; the rock does NOT have a chalky look, however, but rather a fine platy sheen.
- (b) Seritization is intense.
- (c) Pyrite is abundant.
- (d) Silicification is common with the quartz as a fine grit.
- (e) The alteration zone may be large (> 1 km^2).

  (f) The original rock textures may be destroyed.
  (g) The resulting rocks are generally weaker and recessive with erosion, although the rock is harder than those of the intermediate argillic zone.

(3) *Sericitic or Phyllic Zone*
  (a) *Sericite* is abundant and derived from the mafic minerals and feldspars. Commonly a pale *green*.
  (b) *Quartz* is always present.
  (c) *Pyrite* is common if mafic minerals were originally present.
  (d) Less than 5% clays, mafic minerals, or feldspars normally; however, sometimes only the plagioclases are altered, and not the K-feldspars.
  (e) Rock is *very bleached*.
  (f) Original rock texture is destroyed.

(4) *Intermediate Argillic Zone*
  (a) *Clays* are common (tacky to the tongue, clay smell, white to green. May contain calcite and thus effervesce with HCl).
  (b) *Sericite* is expected.
  (c) Secondary *quartz* is possible but not abundant (although primary quartz may be).
  (d) *Pyrite* is not abundant.
  (e) *Chlorite* may be present.
  (f) Rock is bleached.
  (g) Original rock textures may be destroyed.

(h) The original rock types most likely will be rhyolites to andesites (mafic rocks are propylitically altered).

(i) The resulting rocks are of average resistance.

(5) Propylitic Zone

(a) Chlorite colors the rock green.

(b) Carbonates (calcite, ankerite, dolomite) is abundant, pervasively and/or as veins. If pervasive the zone is considered intensely propylitic.

(c) Quartz and epidote may be present.

(d) Zeolites may be present if low grade alteration.

(e) Common in basic to intermediate rocks.

(f) Very widespread (over many km^2) and thus may be confused with regional low grade (greenstone) metamorphism.

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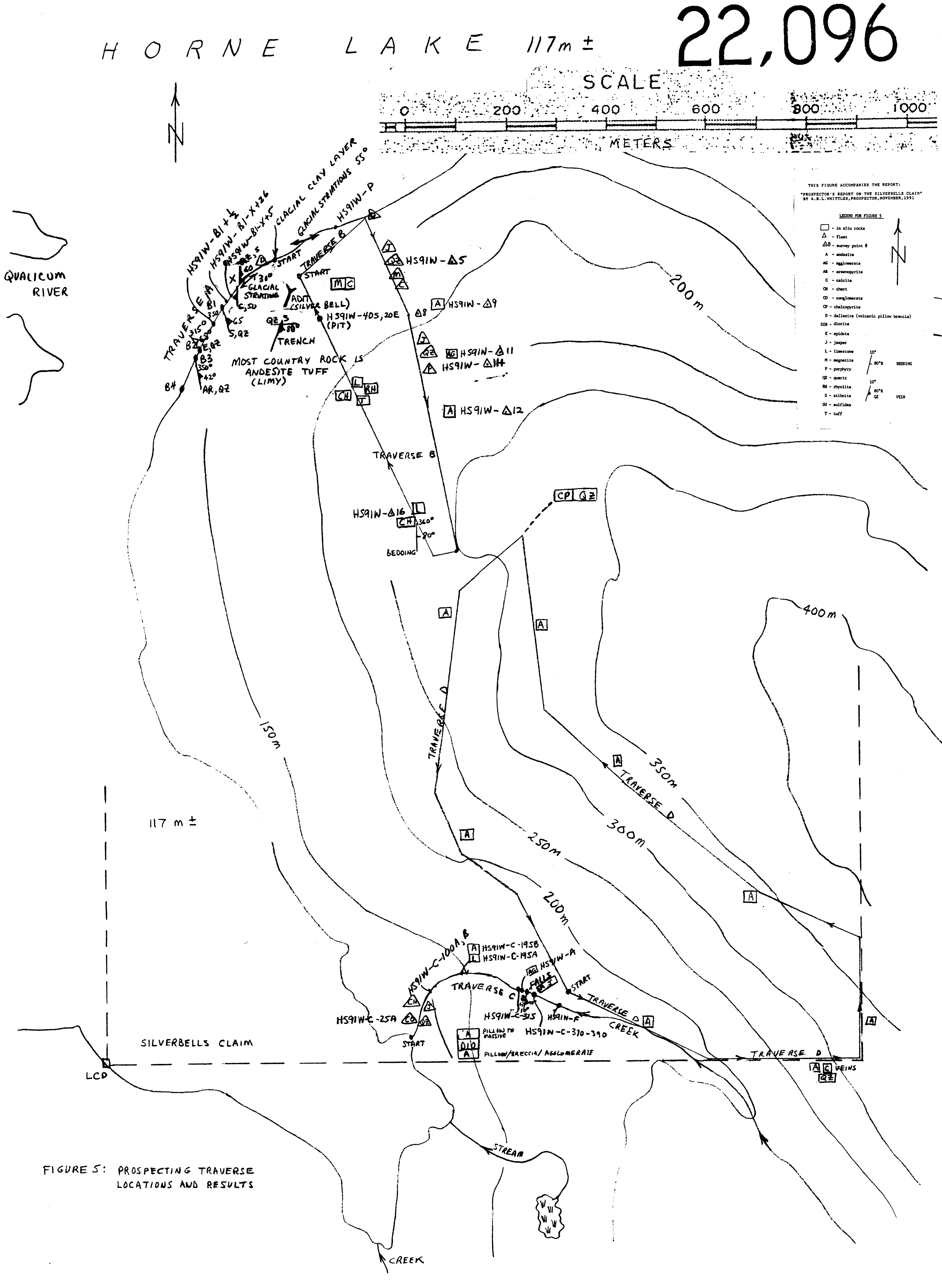

THIS FIGURE ACCOMPANIES THE REPORT:

"PROSPECTOR'S REPORT ON THE SILVERBELLS CLAIM"
BY A.B.L.WHITTLES,PROSPECTOR,NOVEMBER,1991

LEGEND FOR FIGURE 5

□ - in situ rocks
△ - float
△8 - survey point 8
A - andesite
AG - agglomerate
AR - arsenopyrite
C - calcite
CH - chert
CO - conglomerate
CP - chalcopyrite
D - dallesite (volcanic pillow breccia)
DIO - diorite
E - epidote
J - jasper
L - limestone
M - magnetite
P - porphyry
QZ - quartz
RH - rhyolite
S - stibnite
SU - sulfides
T - tuff

10° 80°R BEDDING

10° 80°R QZ VEIN

FIGURE 5: PROSPECTING TRAVERSE LOCATIONS AND RESULTS