Great Western Star Project

Diamond Drilling

Winter 1989-1990

Nelson Mining Division

British Columbia

NTS 82 F 6/W

Latitude 49 deg 27 min N

Longitude 117 deg 22 min W

for

Pacific Sentinel Gold Corp.
1020 - 800 West Pender Street
Vancouver, B.C.
V6C 2V6
(owner and operator)

by

P. A. Ronning, P.Eng.
New Caledonian Geological Consulting
912-510 West Hastings Street
Vancouver, B.C.
(consultant)

April 1990

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4472

Tables

List of Figures

1 Summary and Conclusions

Between November 1, 1989 and March 15, 1990 Pacific Sentinel Gold Corp. completed 5,880 meters of NQ or NQ2 diamond drilling on the Great Western Star property, at a cost of $ 579,528.77. Numerous veins containing gold, copper and other base metal mineralization were encountered, but the present exploration target is a bulk-mineable copper-gold system. The most significant mineralized intersections were drilled at the Alma N, Eureka Portal and Toughnut areas, as listed below.:

Alma N

DDH GWS-89-01

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
29.05	47.95	4.06	.118	3.8	.11	.027
51.13	62.00	.87	.025	1.7	.05	.008

Eureka Portal

DDH GWS-89-05

38.00	48.00	2.45	.071	2.1	.06	.242
52.32	84.00	.82	.024	2.5	.07	.283

Toughnut

DDH GWS-90-18

106.00	132.00	1.49	.044	1.2	.03	.018

All the mineralized zones lie along a probable northwestward extension of the Silver King Shear. The shear zone is about a kilometer wide, expressed as a ubiquitous penetrative foliation in volcanic rocks. The intrusive rocks take up strain less homogeneously and shear fabric is more localized within them.

At the Alma N, Eureka and Star areas mineralization is localized in carbonate veins and veinlets and disseminated in broader areas of intense potassium feldspar alteration, with disseminated pyrite and chalcopyrite. It is believed that the northwest-trending shear zone was one control on mineralization. To the extent, however, that mineralized intercepts can be correlated between drill holes, the mineralized zones appear to have a northerly trend, probably following post-shear brittle fractures.

The Silver King Shear is also believed to have been important at the Toughnut. As the most significant mineralization has so far been intercepted only in one hole, the trend of the mineralized zone is not known. It is probably somewhere between north and northwest. There again the mineralization is associated with intense potassium feldspar alteration.

Six diamond drill holes, amounting to about 1,200 meters, are recommended to test for further extensions of these mineralized zones. Without doing a detailed budget, it is estimated that based on prior costs this work should cost in the order of $100,000. Further drilling would be contingent on the success of this phase.

2 Introduction

2.1 Location and Access

The Great Western Star project covers about 30 square kilometers 4 km. to 8 km. southwest of Nelson in the Nelson Mining Division. It straddles the ridges and valleys between Giveout, Sandy and Eagle Creeks at latitude 49 deg 27 min N, longitude 117 deg 22 min W, on NTS sheet 82F/6W.

The Giveout Creek logging road, which leaves the Nelson-Salmo highway approximately 4 km south of Nelson, gives access to most of the property. An alternative route, via a rough forestry road, starts at the Kenville Mine, about 8 km west of Nelson.

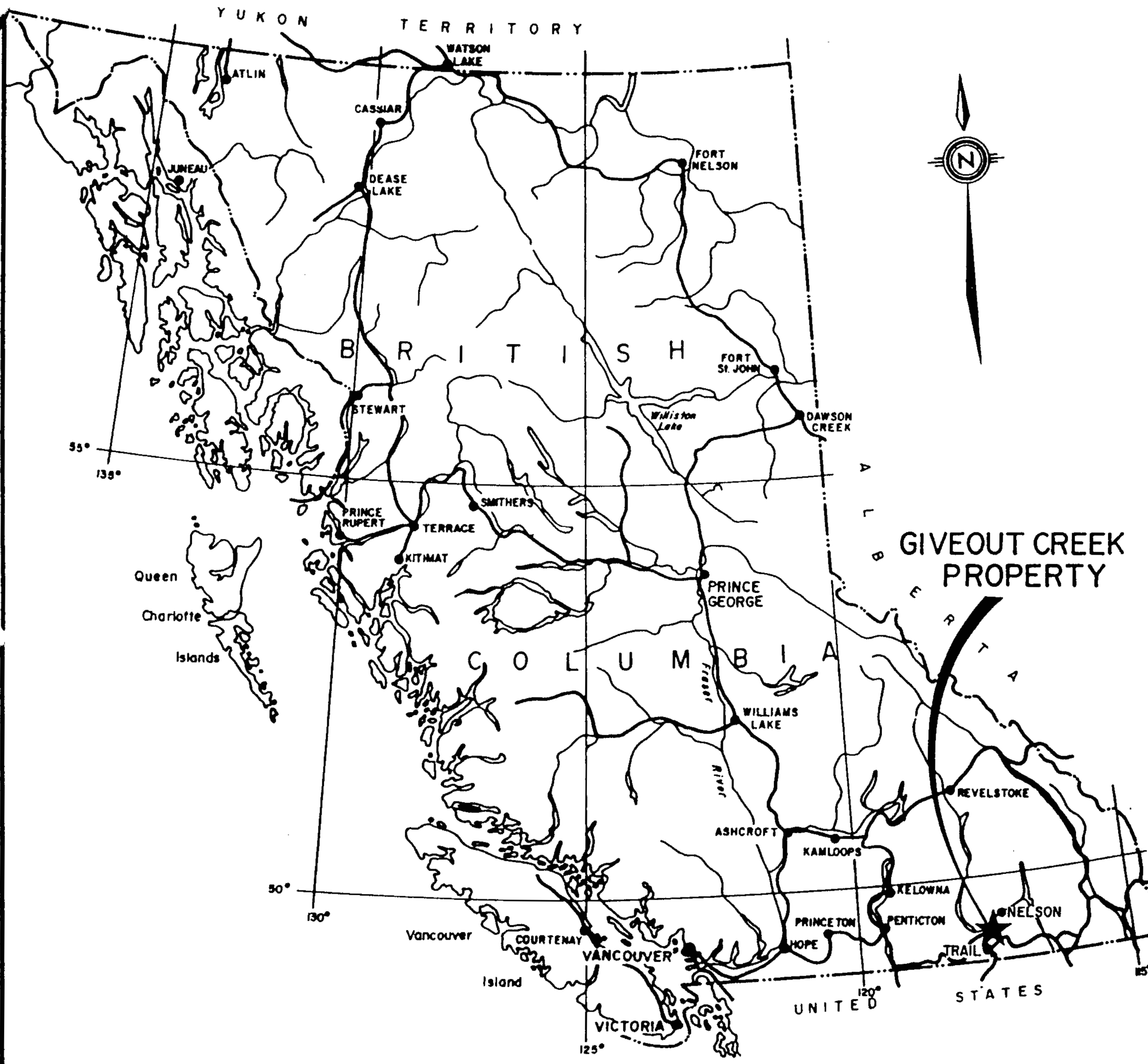
2.2 Topography and Vegetation

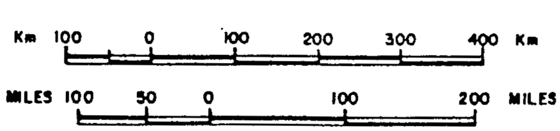
The area is moderately rugged, with elevations ranging from 600 to 2,000 meters. The central and western portions of the area are on a plateau, hidden from Nelson by Morning Mountain. Upper slopes are covered by glacial clays and sands, which reach a thickness of 12 meters.

Mature, second growth larch, douglas fir, hemlock, western red and white cedar cover much of the property. Loggers are active in the area, and parts are now clear cut.

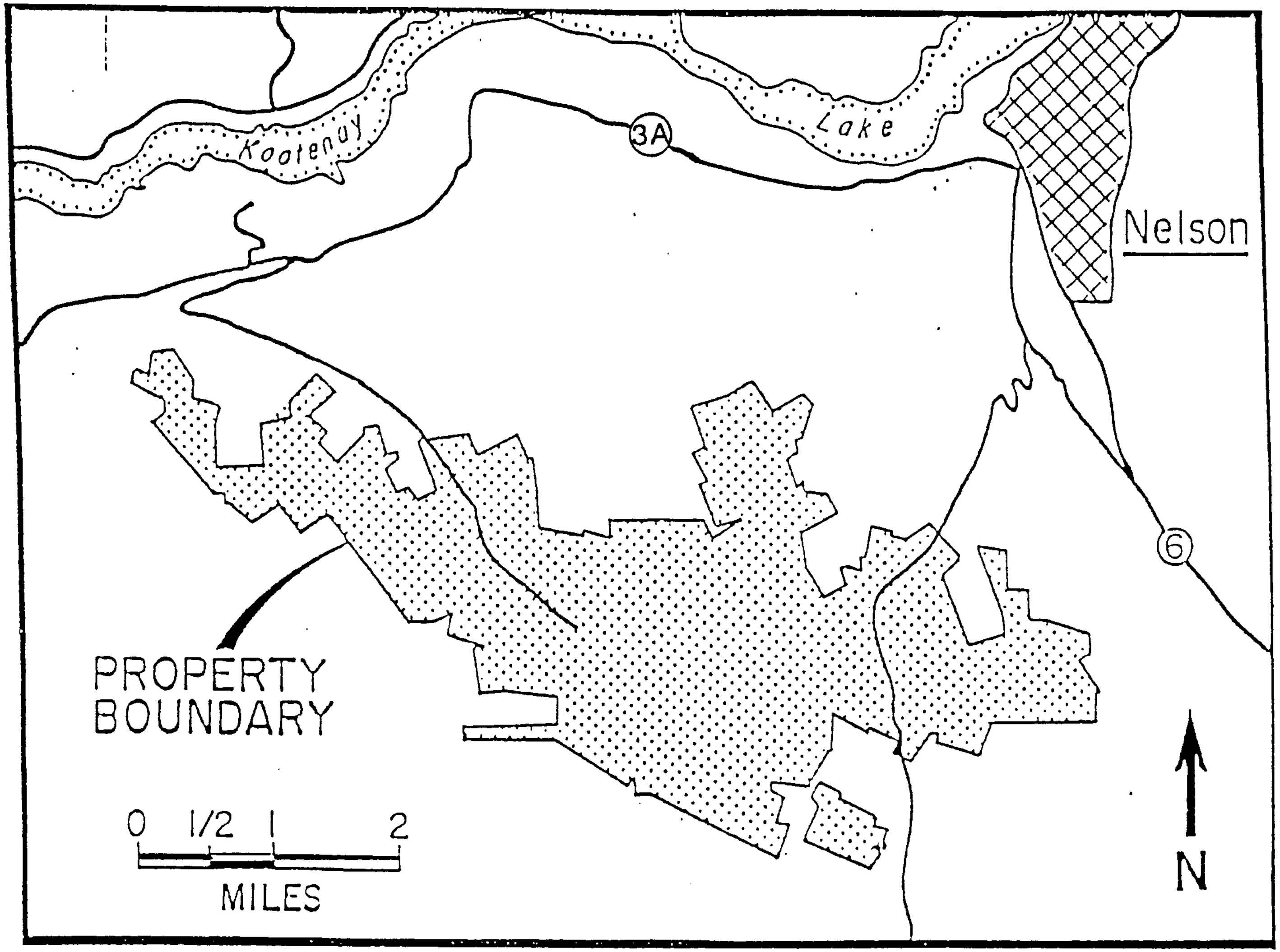
2.3 Property Status

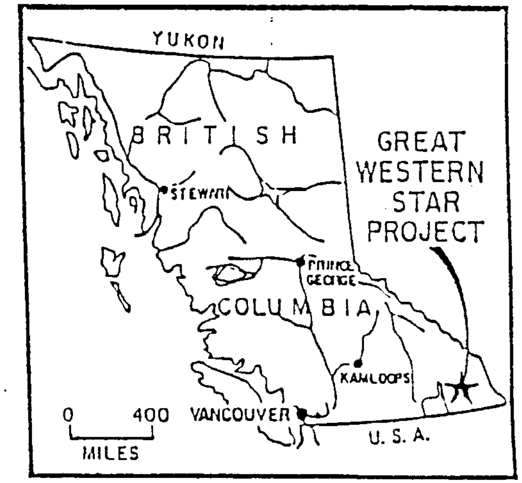
The property consists of 117 claim units, or about 30 square kilometers, being a mixture of modified grid claims, 2 post claims, crown grants and reverted crown grants. The claims are listed in Appendix A.





PACIFIC SENTINEL GOLD CORP.		
GIVEOUT CREEK PROPERTY PROPERTY LOCATION NELSON MINING DIVISION SOUTHEASTERN BRITISH COLUMBIA		
Date: Aug. 1989 Drawn: C.F.S.	N.T.S. 82F/6W	FIGURE. 1.





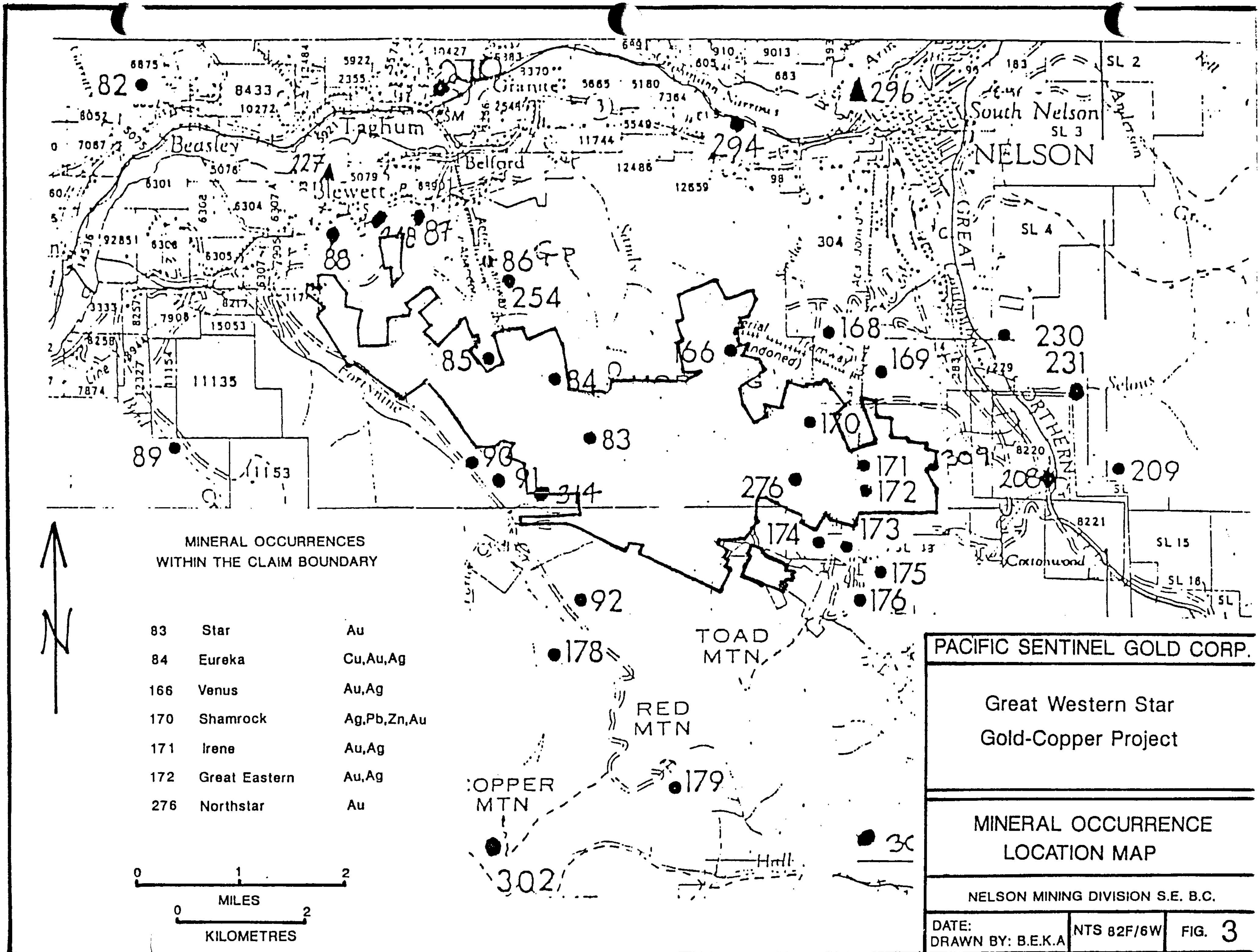
PACIFIC SENTINEL GOLD CORP

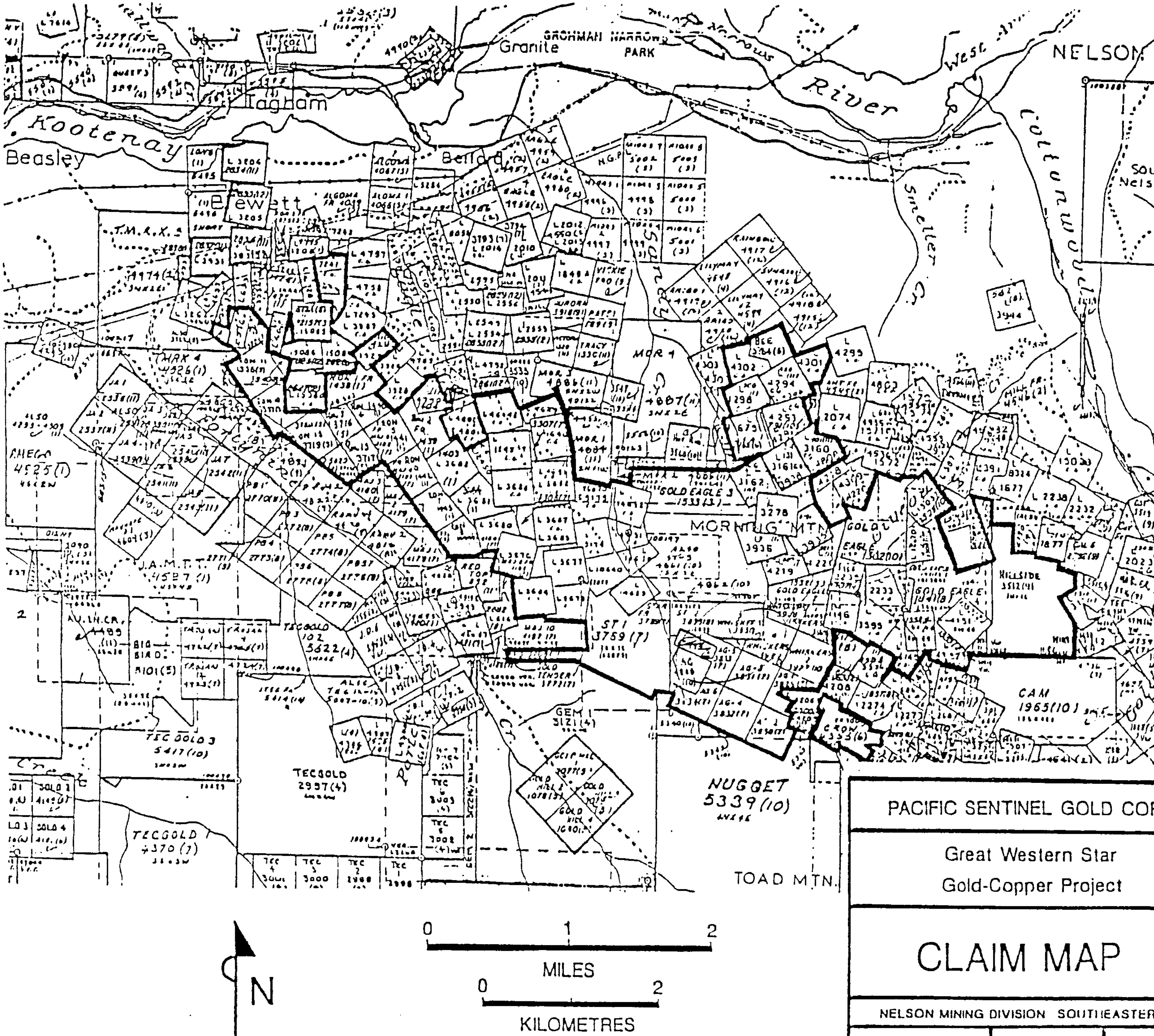
Great Western Star
Gold-Copper Project

Location Map

NELSON MINING DIVISION , S.E. B.C.

Date: Drawn by: B Augsten	NTS [illegible]F/6W	FIG. 2


PACIFIC SENTINEL GOLD CORP.
Great Western Star
Gold-Copper Project
MINERAL OCCURRENCE
LOCATION MAP
NELSON MINING DIVISION S.E. B.C.
DATE:
DRAWN BY: B.E.K.A
NTS 82F/6W
FIG. 3
MINERAL OCCURRENCES
WITHIN THE CLAIM BOUNDARY
83 Star Au
84 Eureka Cu,Au,Ag
166 Venus Au,Ag
170 Shamrock Ag,Pb,Zn,Au
171 Irene Au,Ag
172 Great Eastern Au,Ag
276 Northstar Au
0 1 2
MILES
0 2
KILOMETRES
N
NELSON
South Nelson
Taghum
Beasley
Blewett
Belford
Granite
TOAD MTN
RED MTN
COPPER MTN
Cottonwood
GREAT NORTHERN



PACIFIC SENTINEL GOLD CORP.

Great Western Star
Gold-Copper Project

CLAIM MAP

NELSON MINING DIVISION SOUTHEASTERN B.C.

DATE: June, 1989 DRAWN BY: S.M.H.	NTS: 82F/6W	FIGURE: 4

2.4 Exploration History

The project is in the Nelson Mining Camp, which has been active since before the turn of the century. Deposits in the camp include gold-bearing quartz veins, silver-copper-lead lodes and veins, disseminated shear-hosted gold replacements and porphyry copper-gold deposits. A number of prospects and small producers are located on the Great Western Star property (Fig. 3). These are discussed in Section 4.1.3.

The recent phase of exploration in the areas covered by this report began in 1984. U.S. Borax explored the Eagle-Sandy Creek area, including the old Eureka, Star and Alma N prospects, under the terms of an option agreement with Reymont Gold mines Ltd. U.S. Borax conducted soil geochemical surveys, I.P. surveys, reverse circulation drilling and diamond drilling.

On the Toughnut portion of the Great Western Star property, Lectus Developments Ltd. conducted soil geochemical and IP surveys in 1988.

Figures 7 - 11 summarize the recent work on the property prior to its acquisition by Pacific Sentinel.

In June of 1989, Pacific Sentinel Gold. Corp. completed an option agreement with Reymont Gold Mines and Lectus Developments which allows PSG to earn a 70% interest in the Great Western Star Property.

From July to September, 1989, Pacific Sentinel did a preliminary exploration program which included geological mapping, line cutting, soil geochemical surveying, IP surveying, trenching and rock geochemistry. That work is described in Dawson et al (1989).

2.5 Present Work

This report describes a diamond drilling program conducted by Pacific Sentinel, which took place between November 1, 1989 and March 15, 1990. Holes were drilled in the area between Sandy and Eagle Creeks, where the old Alma N, Star and Eagle deposits are located, and on the Toughnut property.

Table 1 lists the drilling completed. All holes are NQ2 diameter except for 21 through 26, which are NQ.

Great Western Star

Drill Holes

Hole No.	Grid Location Northing	Easting	Orientation Az.	Dip	Date Started	Date Completed	Meters
1	0+58	0+37	270	-45	11-Nov-89	13-Nov-89	169.5
2	0+58	0+67	270	-55	13-Nov-89	16-Nov-89	185.0
3	1+60	1+30	270	-45	16-Nov-89	18-Nov-89	184.4
4	5+49	4+29 W	90	-60	18-Nov-89	22-Nov-89	188.1
5	10+52	7+05 W	97	-46	22-Nov-89	25-Nov-89	203.0
6	11+12	7+97 W	90	-45	25-Nov-89	27-Nov-89	184.7
7	9+00	6+20 W	90	-45	27-Nov-89	30-Nov-89	206.0
8	8+00	5+97 W	90	-45	01-Dec-89	03-Dec-89	215.2
9	7+00	5+50 W	90	-45	03-Dec-89	07-Dec-89	273.1
10	11+00	4+55 W	90	-45	08-Dec-89	13-Dec-89	212.1
11	4+00	6+00 W	268	-45	14-Dec-89	16-Dec-89	184.1
12	9+85	4+50 W	90	-45	16-Dec-89	18-Dec-89	198.7
13	18+00	23+80 W	270	-45	07-Jan-90	09-Jan-90	184.7
14	16+00	25+80 W	90	-45	10-Jan-90	12-Jan-90	195.7
15	0+10	0+16	30	-45	14-Jan-90	16-Jan-90	217.0
16	0+19	0+65 W	30	-45	17-Jan-90	19-Jan-90	245.7
17	0+12 S	2+19 W	210	-45	20-Jan-90	24-Jan-90	300.5
18	1+48	0+76 W	30	-45	25-Jan-90	11-Feb-90	227.4
19	0+50	1+00	30	-45	12-Feb-90	22-Feb-90	233.5
20	0+30 S	5+40	30	-45	22-Feb-90	27-Feb-90	306.6
21	10+52	7+75 W	90	-45	06-Feb-90	10-Feb-90	217.3
22	6+47	4+43 W	90	-45	10-Feb-90	14-Feb-90	297.5
23	7+00	4+25 W	87	-45	15-Feb-90	19-Feb-90	249.0
24	0+55	0+50 W	86	-45	19-Feb-90	23-Feb-90	194.5
25	1+50	1+00 W	90	-45	23-Feb-90	26-Feb-90	256.9
26	1+80	1+05 W	90	-45	26-Feb-90	02-Mar-90	349.9
					Total Meters		5,880.2

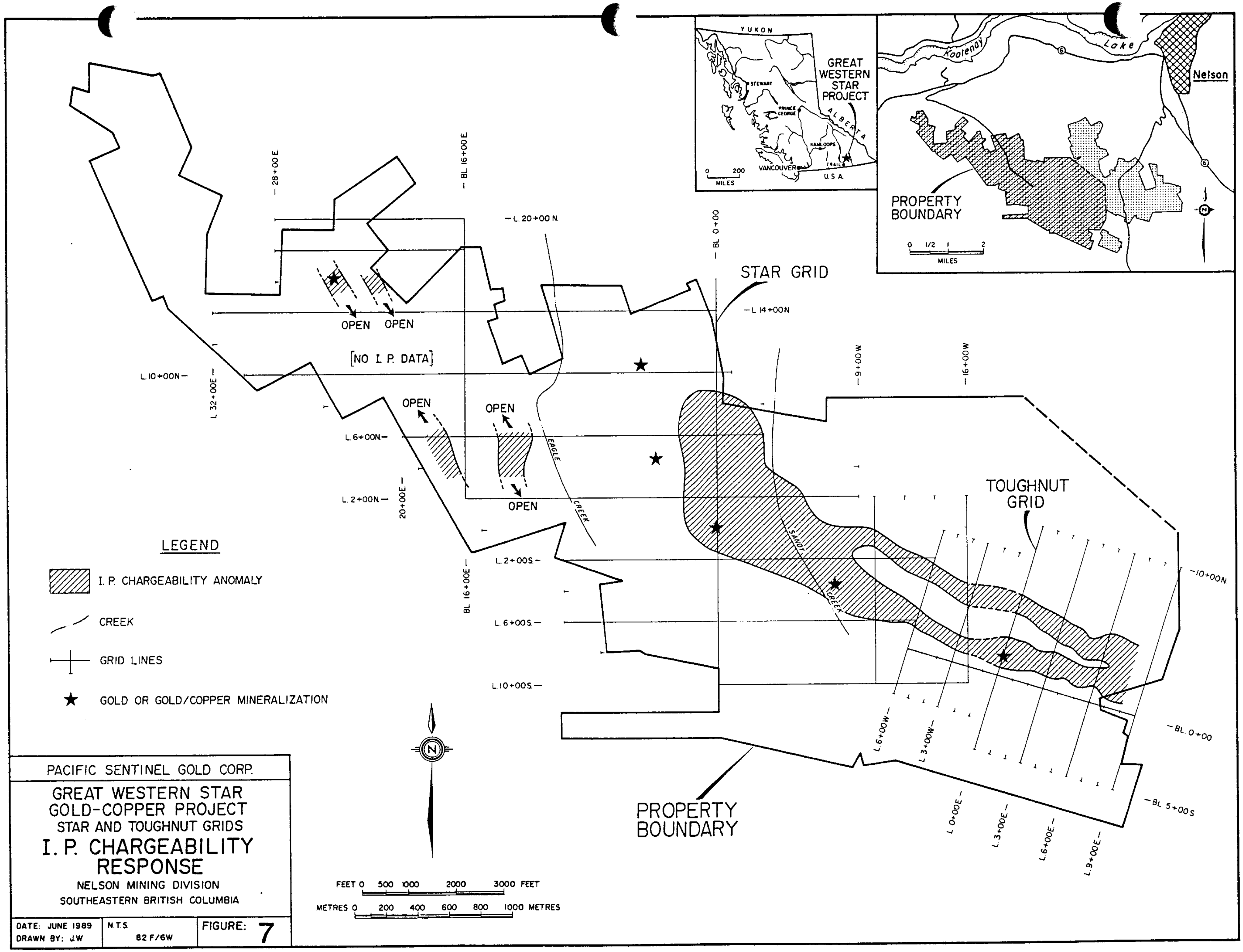
Table 1: Drill Holes Completed, Nov. 89 - March 90

Almost all of the core recovered was sampled, using a conventional Longyear core splitting device to split the core in half.

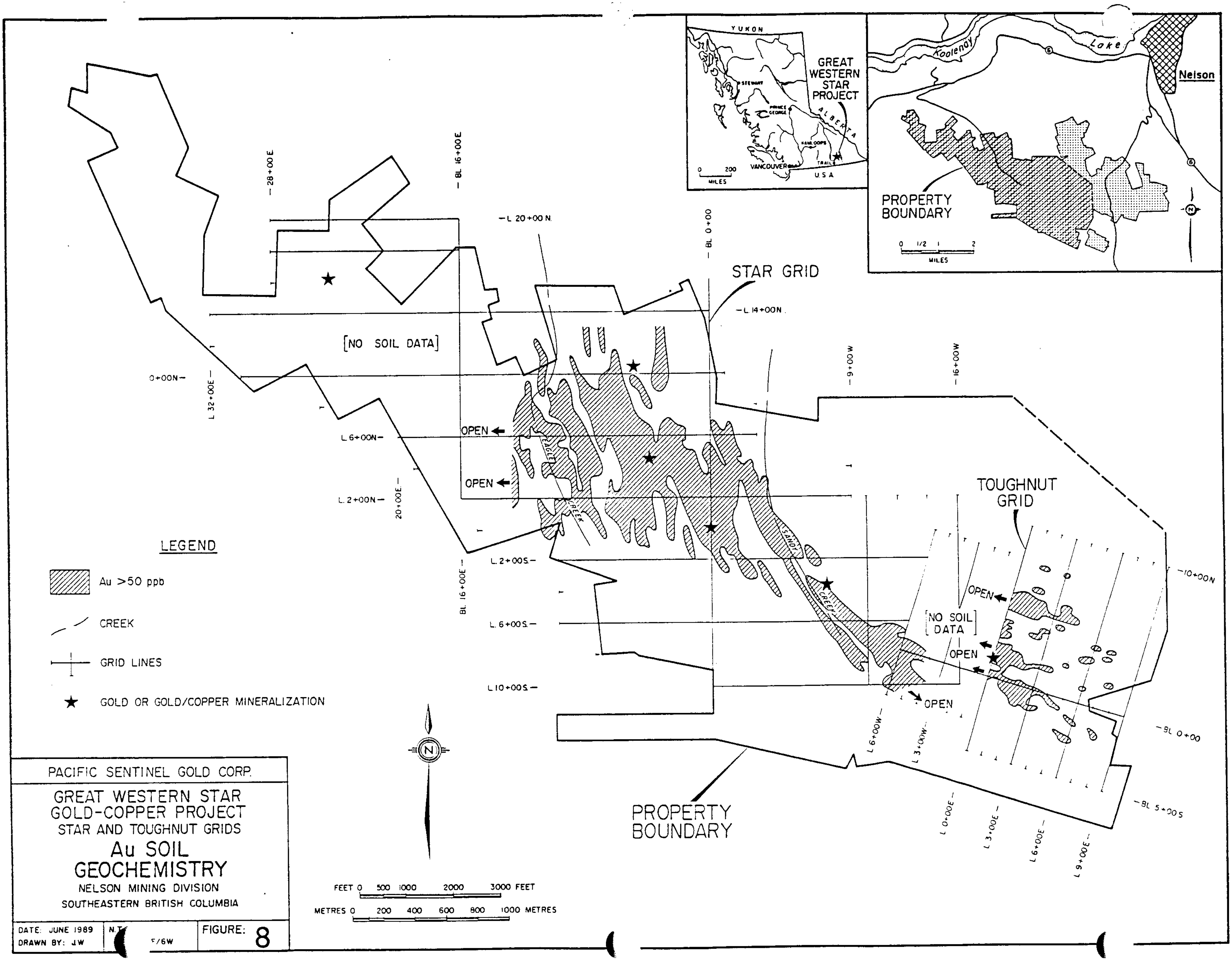
The following analyses were done on drill core:

gold fire assays	3,031
gold screen fire assays	12
copper assays	3,031
lead assays	808
zinc assays	808
31 element ICP	1,408

At the time of writing, the core is stored in racks on property adjoining the home of Eric Denny, in Nelson.



YUKON
STEWART
PRINCE GEORGE
KAMLOOPS
VANCOUVER
TRAIL
U.S.A.
ALBERTA
GREAT WESTERN STAR PROJECT
0 200 MILES
Kootenay
Lake
Nelson
PROPERTY BOUNDARY
0 1/2 1 2 MILES
STAR GRID
TOUGHNUT GRID
OPEN
[NO I. P. DATA]
EAGLE CREEK
SANDY CREEK
28+00 E.
BL 16+00 E
L. 20+00 N.
BL 0+00
L. 14+00 N
L. 10+00N
L. 32+00 E
L. 6+00N
L. 2+00N
20+00 E.
L. 2+00 S.
L. 6+00 S.
L. 10+00 S.
9+00 W
16+00 W
10+00 N
BL. 0+00
BL 5+00 S
L. 6+00 W
L. 3+00 W
L. 0+00 E
L. 3+00 E
L. 6+00 E
L. 9+00 E
PROPERTY BOUNDARY
LEGEND
I. P. CHARGEABILITY ANOMALY
CREEK
GRID LINES
GOLD OR GOLD/COPPER MINERALIZATION
FEET 0 500 1000 2000 3000 FEET
METRES 0 200 400 600 800 1000 METRES
PACIFIC SENTINEL GOLD CORP.
GREAT WESTERN STAR GOLD-COPPER PROJECT
STAR AND TOUGHNUT GRIDS
I. P. CHARGEABILITY RESPONSE
NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA
DATE: JUNE 1989
DRAWN BY: J.W
N.T.S. 82 F/6W
FIGURE: 7



YUKON
GREAT WESTERN STAR PROJECT
ALBERTA
STEWART
PRINCE GEORGE
KAMLOOPS
VANCOUVER
TRAIL
U.S.A.
0 200 MILES
Kootenay Lake
Nelson
PROPERTY BOUNDARY
0 1/2 1 2 MILES
STAR GRID
TOUGHNUT GRID
[NO SOIL DATA]
[NO SOIL DATA]
OPEN
EAGLE CREEK
SANDY CREEK
L 20+00 N.
L 14+00N
0+00N
L 6+00N
L 2+00N
L 2+00S
L 6+00S
L 10+00S
28+00 E
BL 16+00 E
BL 0+00
L 32+00E
20+00E
BL 16+00E
9+00W
16+00W
10+00N
BL 0+00
BL 5+00S
L 6+00W
L 3+00W
L 0+00E
L 3+00E
L 6+00E
L 9+00E
PROPERTY BOUNDARY
LEGEND
Au >50 ppb
CREEK
GRID LINES
GOLD OR GOLD/COPPER MINERALIZATION
FEET 0 500 1000 2000 3000 FEET
METRES 0 200 400 600 800 1000 METRES
PACIFIC SENTINEL GOLD CORP.
GREAT WESTERN STAR GOLD-COPPER PROJECT
STAR AND TOUGHNUT GRIDS
Au SOIL GEOCHEMISTRY
NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA
DATE: JUNE 1989
DRAWN BY: J.W
N.T.
F/6W
FIGURE: 8

Middle Jurassic

Nelson Intrusions

Lower or Middle Jurassic (?)

diorite

Lower Jurassic

Rossland Group

Silver King Intrusions

Hall Formation

Elise Formation

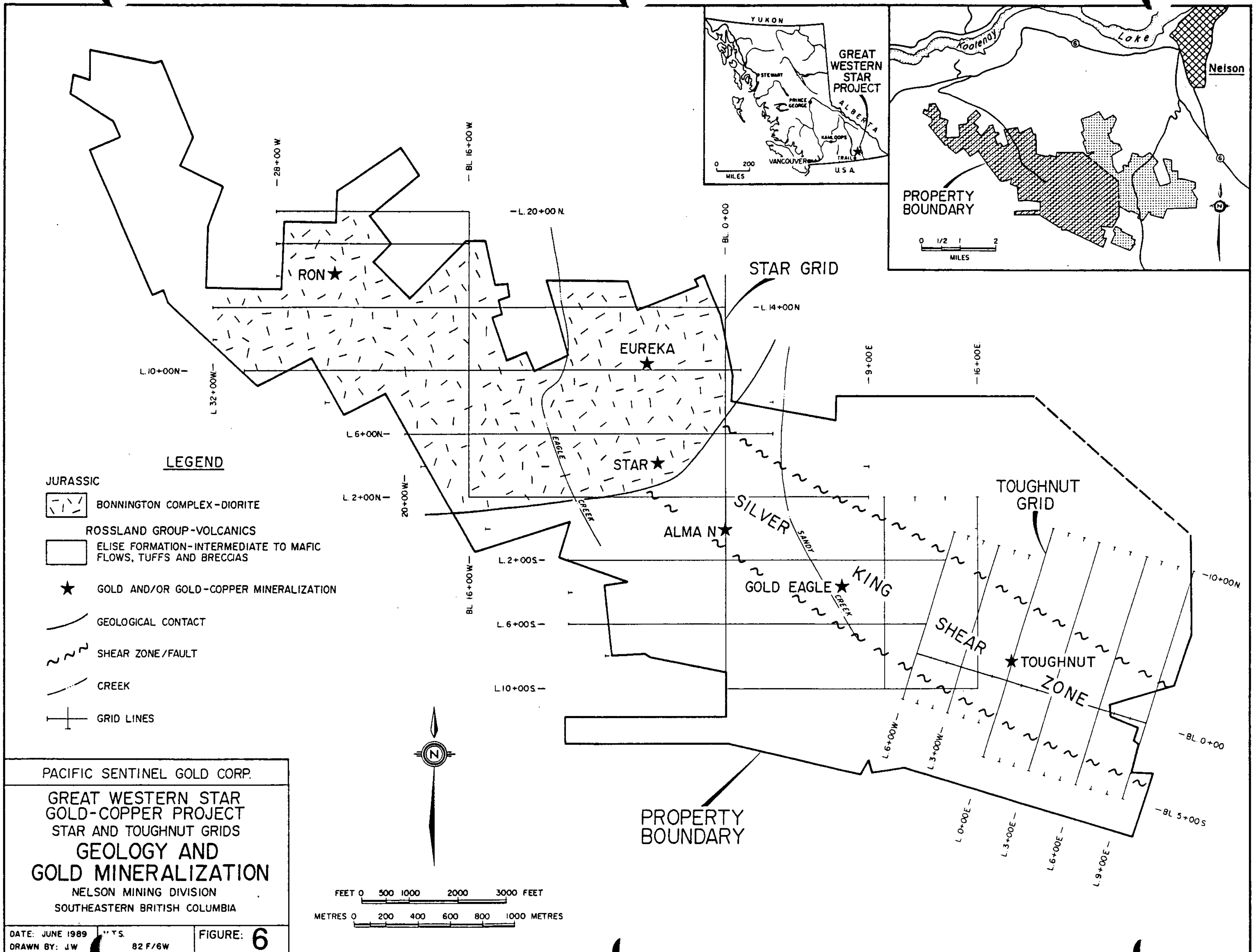
upper Elise	intermediate to mafic lapilli, crystal and fine tuff
lower Elise	mafic flow breccia, flows, mafic pyroclastic breccia, crystal tuff

Archibald Formation

Ymir group

Paleozoic metasedimentary rocks

Table 2: Lithologic Units (after Hoy & Andrew, 1989)


YUKON
STEWART
PRINCE GEORGE
GREAT WESTERN STAR PROJECT
ALBERTA
KAMLOOPS
VANCOUVER
TRAIL
U.S.A.
0 200 MILES
Kootenay
Lake
Nelson
PROPERTY BOUNDARY
0 1/2 1 2 MILES
RON
EUREKA
STAR
STAR GRID
ALMA N
GOLD EAGLE
SILVER KING SHEAR ZONE
TOUGHNUT GRID
TOUGHNUT
EAGLE CREEK
SANDY CREEK
PROPERTY BOUNDARY
L. 20+00 N.
L. 14+00N
L. 10+00N
L. 6+00N
L. 2+00N
L. 2+00S.
L. 6+00S.
L. 10+00S.
28+00 W
BL 16+00 W
BL 0+00
L 32+00W
20+00W
BL 16+00W
9+00E
16+00E
10+00N.
BL. 0+00
BL 5+00S
L. 6+00W
L. 3+00W
L. 0+00E
L. 3+00E
L. 6+00E
L. 9+00E
LEGEND
JURASSIC
BONNINGTON COMPLEX-DIORITE
ROSSLAND GROUP-VOLCANICS
ELISE FORMATION-INTERMEDIATE TO MAFIC FLOWS, TUFFS AND BRECCIAS
GOLD AND/OR GOLD-COPPER MINERALIZATION
GEOLOGICAL CONTACT
SHEAR ZONE/FAULT
CREEK
GRID LINES
FEET 0 500 1000 2000 3000 FEET
METRES 0 200 400 600 800 1000 METRES
PACIFIC SENTINEL GOLD CORP.
GREAT WESTERN STAR GOLD-COPPER PROJECT
STAR AND TOUGHNUT GRIDS
GEOLOGY AND GOLD MINERALIZATION
NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA
DATE: JUNE 1989
DRAWN BY: J.W
N.T.S. 82 F/6W
FIGURE: 6

The total expenditure for drilling, geological supervision, assaying and follow-up report writing was $ 579,528.07. See Appendix D.

2.6 Target

Most previous work in this area has concentrated on relatively high grade vein, skarn or massive sulphide deposits. The present work is directed toward the possibility of discovering a bulk mineable copper-gold deposit with similarities to a porphyry system. Volcanogenic massive sulphide are a secondary target. Drilling intersected significant intersections of disseminated gold and copper-gold mineralization (Section 4.2.1), although insufficient drilling has been done to establish a mineral inventory.

3 Regional Geological Setting

Figures 5 and 6 illustrate the regional geology.

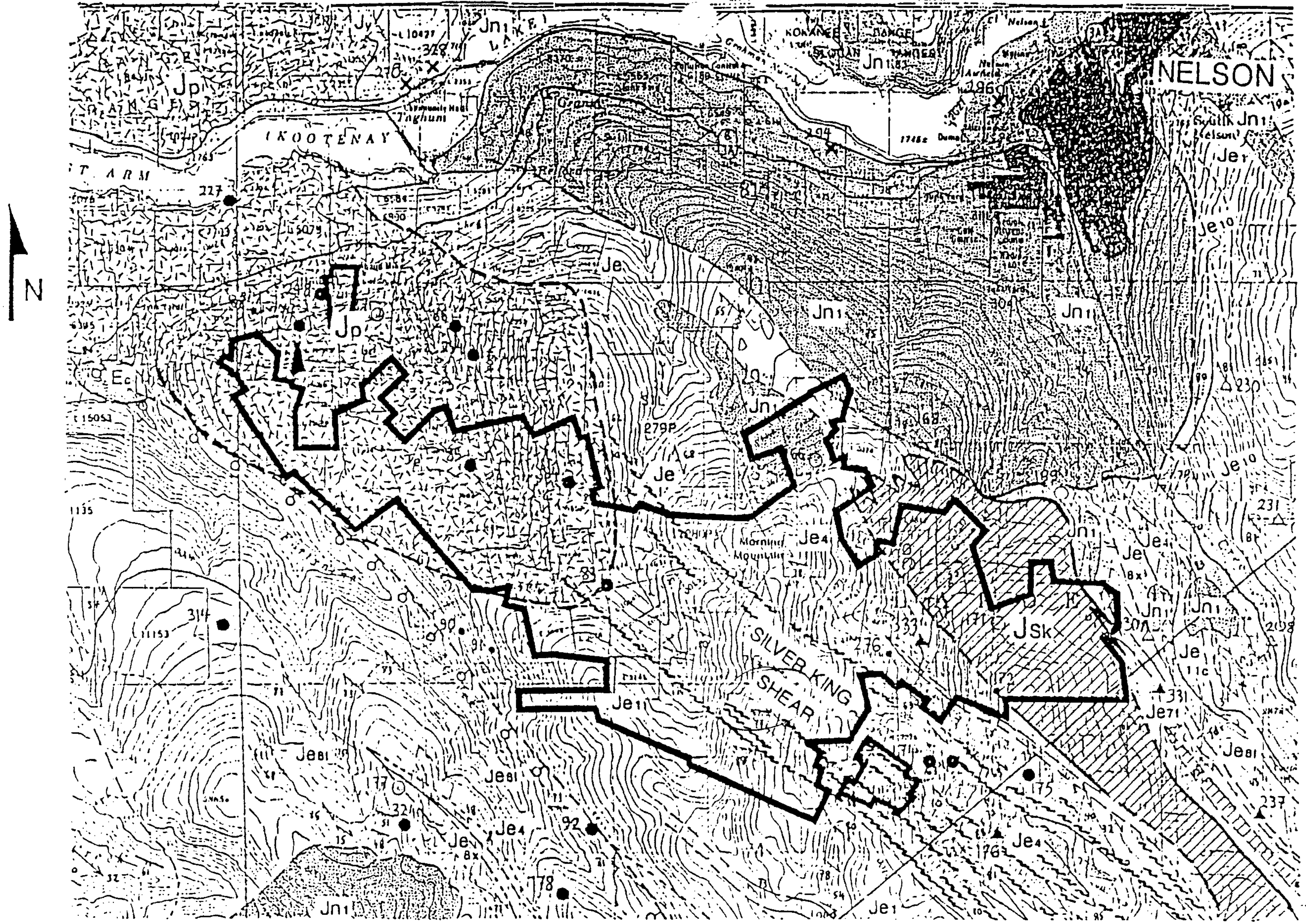
3.1 Lithological Units

The most recent regional geological work in the district is that of Hoy and Andrew (1988, 1989), concentrating on the Rossland Group. Table 2 lists the major lithologic units in the project area as described by them. Of these, the only ones intersected in drill holes were the Jurassic (?) diorite, and the Elise Formation.

Hoy and Andrews (1989) describe the Elise volcanics as having a very high potassium content, lying in the alkaline field on alkali-silica diagrams. They were probably deposited in an island arc setting.

3.2 Structural Setting

On a regional scale, the most prominent structural feature of the area is the informally named Silver King Shear. About a kilometer wide, the zone of shearing forms the core of a major syncline within the Rossland Group southeast of the project area (Hoy and Andrews, 1989). Work by exploration geologists indicates that the shear zone probably extends northwest from Giveout Creek through the area between Eagle and Sandy Creeks. Shear fabric is clear in rocks of the Rossland Group, but more cryptic within intrusive rocks.



LEGEND

EOCENE

Ec CORYELL INTRUSIONS (syenite, quartz monzonite)

JURASSIC

Jn1 NELSON INTRUSIONS (granodiorite, quartz monzonite)

Jp PSEUDIORITE, PYROXENITE

Jsk SILVER KING INTRUSIONS (plagioclase porphyry)

Je1, Je4, Je7f, Je8l, Je8x, Je10, Je11c ROSSLAND GROUP VOLCANICS, Elise Fm. (mafic to intermed. flow, epiclastic & pyroclastic units)

YMIR GROUP METASEDIMENTS (argillite, siltstone, grit)

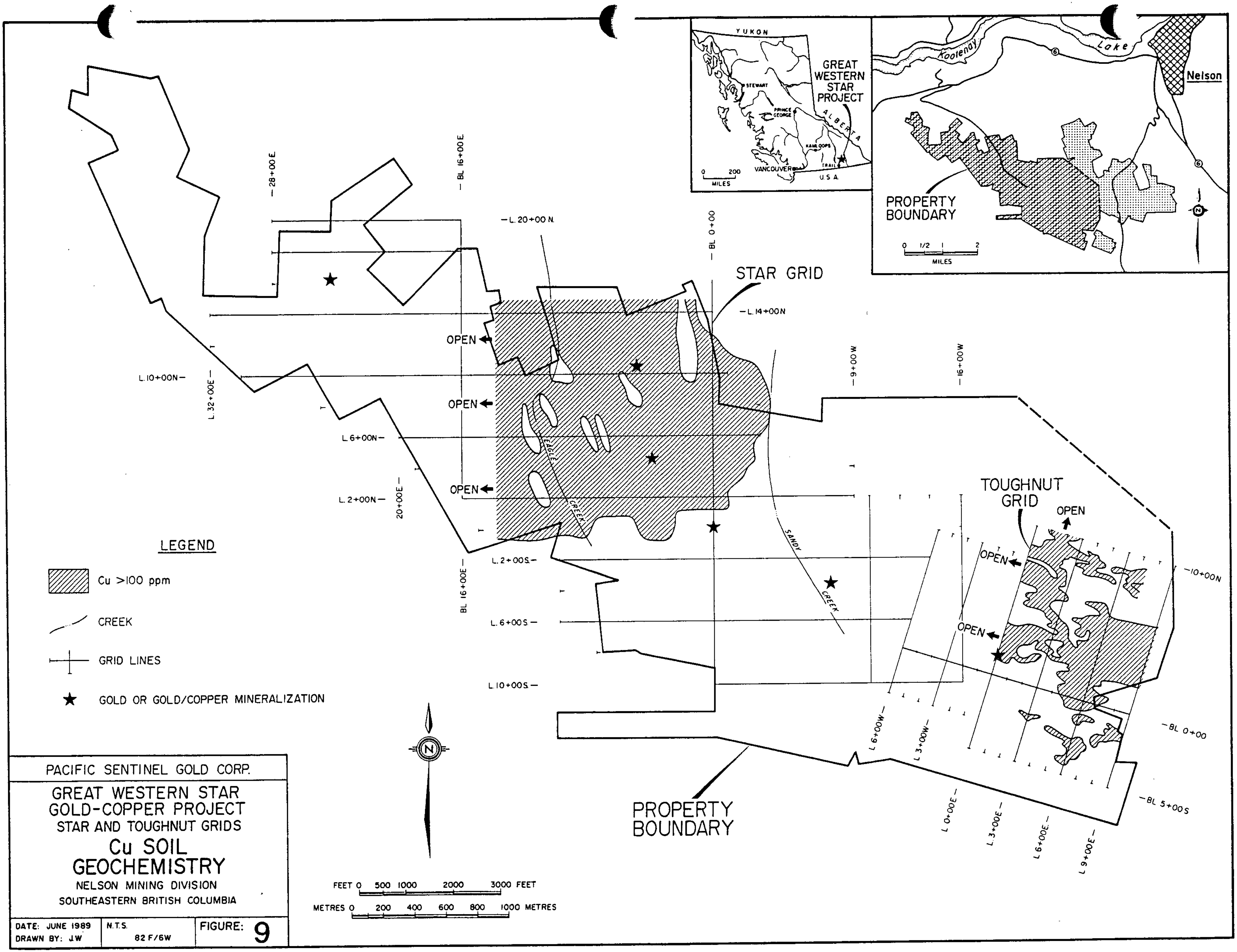
SHEAR ZONE

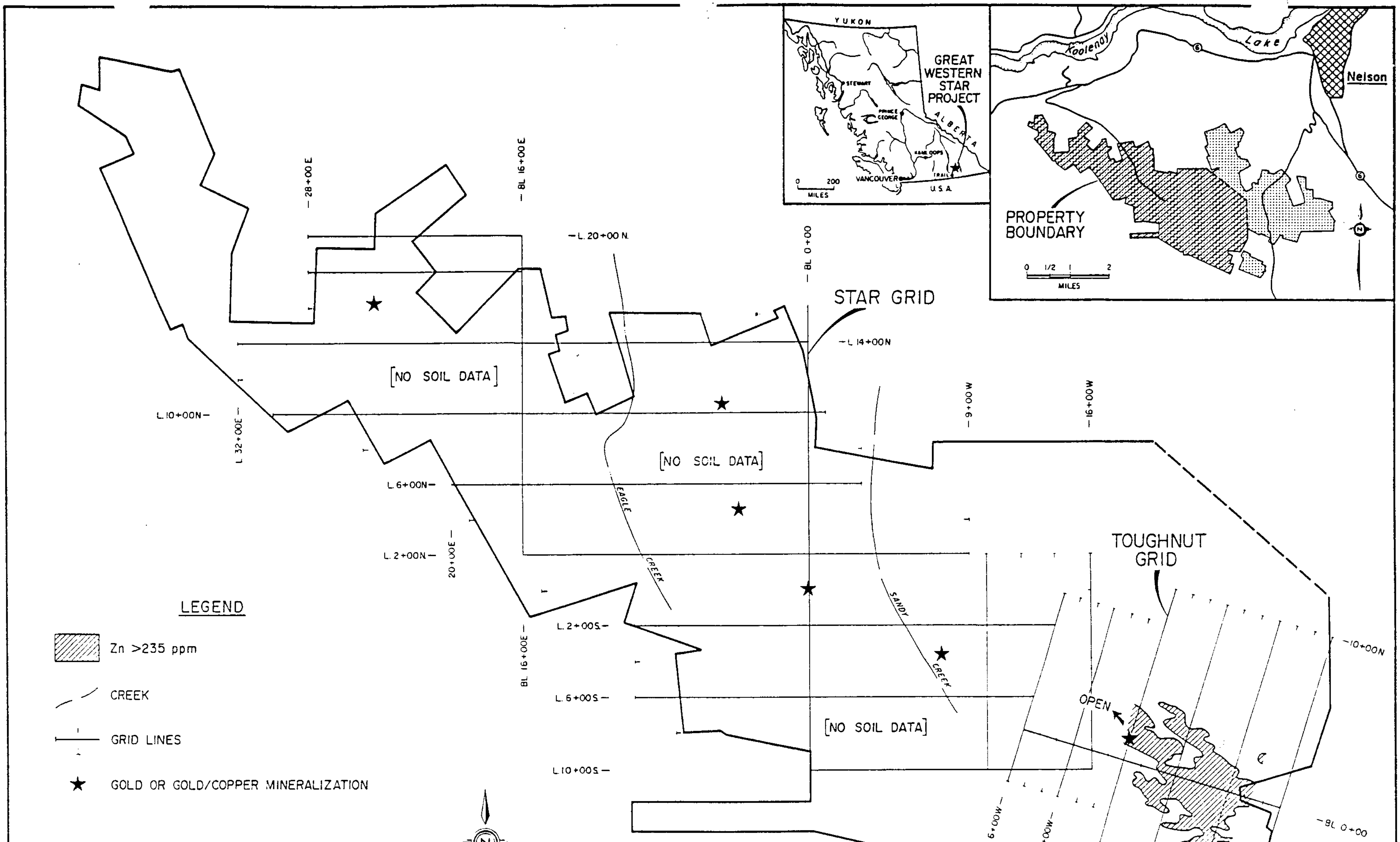
GEOLOGIC CONTACT

● Au +/- Cu MINERALIZATION

PACIFIC SENTINEL GOLD CORP.		
Great Western Star Gold-Copper Project		
Geology and Claim Boundary (Geology after T.Hoy, 1988)		
NELSON MINING DIVISION Southeastern British Columbia		
DATE: June, 1989 DRAWN BY: S.M.H.	NTS: 82F/6W	FIGURE: 5

0 km 1


YUKON
STEWART
PRINCE GEORGE
ALBERTA
KAMLOOPS
VANCOUVER
TRAIL
U.S.A.
0 200
MILES
GREAT WESTERN STAR PROJECT
Kootenay
Lake
Nelson
PROPERTY BOUNDARY
0 1/2 1 2
MILES
STAR GRID
TOUGHNUT GRID
OPEN
L. 20+00 N.
L. 14+00 N
L. 10+00N
L. 6+00N
L. 2+00N
L. 2+00S.
L. 6+00S.
L. 10+00S.
28+00 E
BL 16+00 E
L. 32+00 E
20+00 E
BL 0+00
9+00 W
16+00 W
EAGLE CREEK
SANDY CREEK
10+00 N
BL 0+00
BL 5+00 S
L 6+00 W
L 3+00 W
L 0+00 E
L 3+00 E
L 6+00 E
L 9+00 E
PROPERTY BOUNDARY
LEGEND
Cu >100 ppm
CREEK
GRID LINES
GOLD OR GOLD/COPPER MINERALIZATION
FEET 0 500 1000 2000 3000 FEET
METRES 0 200 400 600 800 1000 METRES
PACIFIC SENTINEL GOLD CORP.
GREAT WESTERN STAR GOLD-COPPER PROJECT
STAR AND TOUGHNUT GRIDS
Cu SOIL GEOCHEMISTRY
NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA
DATE: JUNE 1989
DRAWN BY: J.W
N.T.S. 82 F/6W
FIGURE: 9



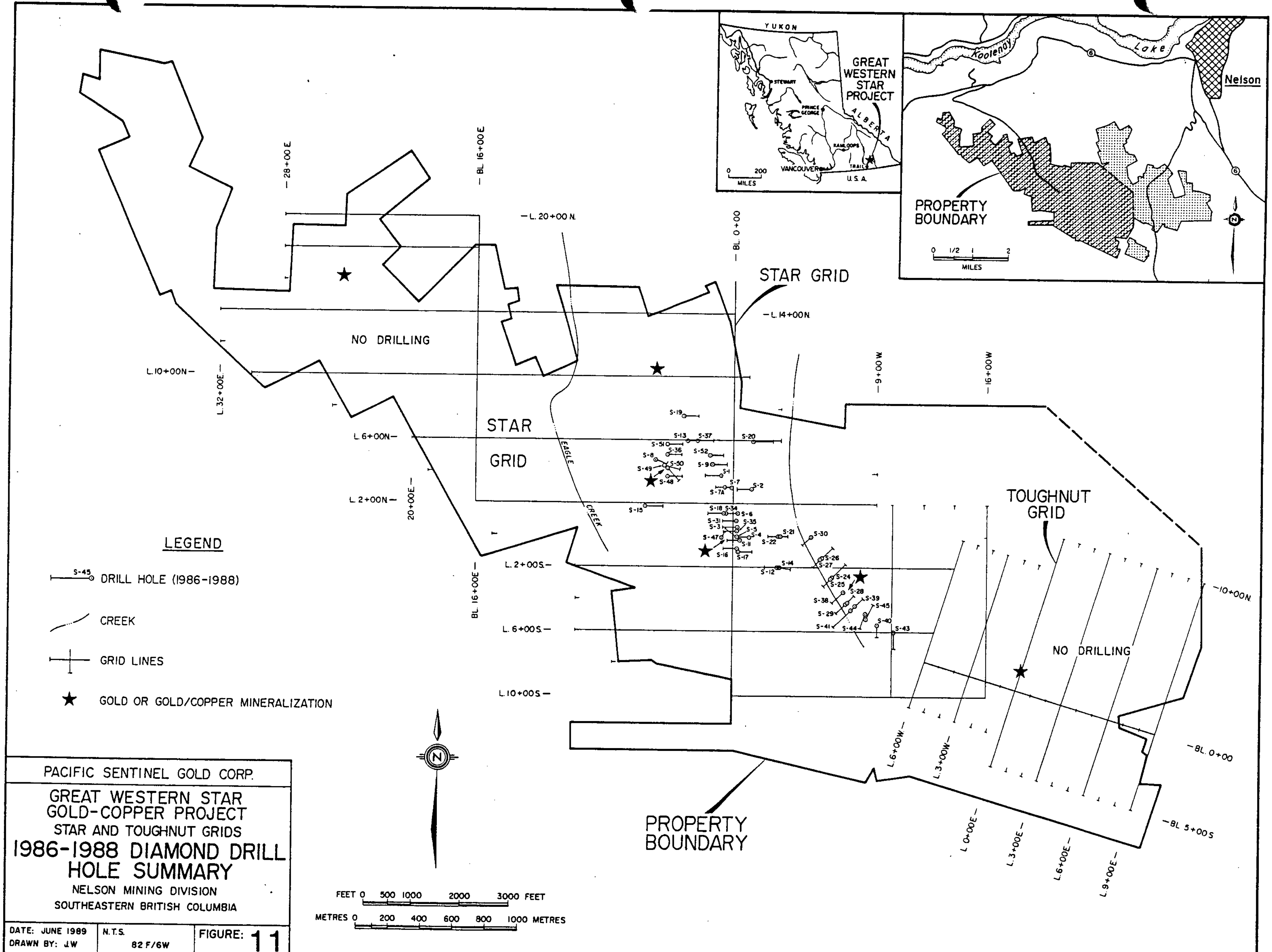
PACIFIC SENTINEL GOLD CORP.

GREAT WESTERN STAR GOLD-COPPER PROJECT
STAR AND TOUGHNUT GRIDS

Zn SOIL GEOCHEMISTRY

NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA

DATE: JUNE 1989
DRAWN BY: JW
F/6W
FIGURE: 10



PACIFIC SENTINEL GOLD CORP.

GREAT WESTERN STAR GOLD-COPPER PROJECT
STAR AND TOUGHNUT GRIDS
1986-1988 DIAMOND DRILL HOLE SUMMARY
NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA

DATE: JUNE 1989
DRAWN BY: J.W
N.T.S. 82 F/6W
FIGURE: 11

4 Alma N - Eureka - Star Area

This area comprises one of the two main geological settings for potential bulk tonnage mineralization on the Great Western Star Project. For ease of reference, it is sometimes referred to herein as the "AES" area.

4.1 Geological Setting

4.1.1 Lithologies

Diorite and Monzodiorite

The AES area is underlain almost entirely by the so-called diorite of probable lower or middle Jurassic age. In fact, this unit consists of at least two rock types:

Diorite the less abundant of the two rock types is diorite comprised of hornblende, biotite, plagioclase and minor k-feldspar, with magnetite in the 0 - 2 % range. Mafic silicate minerals usually make up 25% to 40% of the rock.

Monzodiorite most of the intrusive rock is given the field term monzodiorite. Harris (1990), based on petrographic examination, has termed them syenites.

In this rock mafic silicates, mostly biotite, typically make up 25% or less of the rock. Potassium bearing feldspar dominates over plagioclase and usually comprises 40% or more of the rock. All the samples examined by Harris (1990) contained more than 55 % kspar. Magnetite is universally present in the 2% to 4% range, except where pervasive alteration has completely destroyed the original constituent minerals.

The relationship between the diorite and the monzodiorite is not well understood, but where the contact is seen in drill core it is sharp. The diorite encountered in drill holes probably forms dike-like bodies within the monzodiorite.

Diorite is rarely mineralized. All of the significant mineralization encountered in the AES area is within monzodiorite.

Rossland Group

In the AES area the Rossland Group was encountered only in drill holes near the Alma N prospect. In all cases the volcanics were seen only near the contact with the intrusion. They are strongly sheared, broken up and altered, so that their original composition is unknown. Probably they were andesitic flows and tuffs. Where seen in drill core at the Alma N area, the intrusive-volcanic contact is a fault, although it is believed that the Rossland Group was intruded by the monzodiorite and diorite.

Although the volcanics are much more sulphidic than the diorite or monzodiorite, with 2% to 4% pyrite being typical, they don't contain significant gold or base metal values in the AES area. Magnetite, an important constituent of the intrusive rocks, is rare in the volcanics.

<u>Lamprophyres</u>

Calcite-rich biotite lamprophyres intrude all other rock types. They tend to occur in clusters or swarms of dikes each of which is a few decimeters thick. Monzodiorite is frequently mineralized near the lamprophyres, but they themselves are never mineralized.

4.1.2 Structural Setting

The AES area lies along the northwestward extension of the Silver King Shear Zone.

Some later brittle fracturing has been superimposed on the earlier shear zone, as suggested by the presence of veins.
The sparsity of outcrops in the AES area and lack of lithologic marker units constrains the structural interpretation.

4.1.3 Previously Known Mineral Deposits

The three most significant of the previously known mineral deposits in the AES area are the Alma N, Eureka and Star.

<u>Alma N</u>

This is a prospect on which two shafts were sunk by early prospectors. The reports available don't describe controls on mineralization, but apparently a small shipment from the property, thought to have been sorted ore, contained 3.7 ounces of gold and 7 ounces of silver per ton. One report described a mineralized zone about 40 feet wide.

<u>Star</u>

The Star was probably discovered in about 1897. A small lot of ore was shipped to Trail in 1904 and carried 0.63 oz. Au/ton, with 2.2 oz Ag/ton and 1.2% copper. In 1912 a stope 70 feet by 14 feet by 18 feet was mined. The ore reportedly had a value of $5.40 per ton.

The deposit was described in early reports as a mineralized shear zone striking 10 degrees east and dipping nearly vertical. An irregular quartz vein follows the shear, and mineralization occurs in both the vein and the wall rock.

Eureka

The Eureka deposit is reported to have produced 9,900 tons of ore containing 616 ounces of gold, 36,162 ounces of silver, 350,911 lbs of copper and 1,571 lbs of lead (Dasler, 1988). Early reports describe two fissure veins, one trending 308 deg. and dipping steeply east and the other trending 17 deg., also with a steep easterly dip. The veins are intimately associated with "bands of crystalline limestone" (early reports), and some writers have described the deposit as a replacement in limestone. The limestone would presumably have occurred as large xenoliths within the intrusive.

4.2 Results of Drilling

4.2.1 Assay Results

Composited assay data are listed below. Individual assays appear in Appendix B. The results are discussed in sections 4.2.4 through 4.2.5 and 6.2.2.

The following composites have been calculated using these parameters:

cut-off:	0.5 g Au/tonne
minimum composite length:	10 m
maximum inclusion below cut off:	2 m

Weighting is by length only, without considering specific gravities. S.G. is consistent in the range 2.7 - 2.8. All lengths are drill intercepts, not converted to true widths. High values have not been cut.

Star-Eureka-Alma N Areas

DDH GWS-89-01

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
29.05	47.95	4.06	.118	3.8	.11	.027
51.13	62.00	.87	.025	1.7	.05	.008

DDH GWS-89-02

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
89.00	102.00	1.65	.048	2.3	.07	.028

DDH GWS-89-04

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
60.21	78.00	1.52	.044	2.0	.06	.188
110.00	126.00	.53	.016	2.5	.07	.126
145.20	156.08	.47	.014	2.1	.06	.271

DDH GWS-89-05

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
38.00	48.00	2.45	.071	2.1	.06	.242
52.32	84.00	.82	.024	2.5	.07	.283

DDH GWS-89-07

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
154.08	167.00	1.13	.033	3.0	.09	.216

DDH GWS-89-09

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
180.00	194.00	1.19	.035	3.0	.09	.104

DDH GWS-90-22

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
200.00	210.00	2.59	.076	5.0	.15	.338

DDH GWS-90-24

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
40.00	64.00	1.23	.036	1.2	.04	.016

DDH GWS-90-25

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
112.00	124.00	1.38	.040	6.8	.20	.040

Toughnut Area

DDH GWS-90-18

From (m)	To (m)	Au, gpt	Au, opt	Ag, gpt	Ag, opt	Cu %
106.00	132.00	1.49	.044	1.2	.03	.018

4.2.2 Alteration

Almost all of the monzodiorite shows some alteration, which ranges in degree from hairline calcite veinlets that are present throughout to intense, pervasive potassium feldspar alteration. The alteration minerals are listed below in approximate paragenetic sequence. After potassium feldspar, the paragenesis is unclear.

Biotite

Almost all the mafic silicate component of the monzodiorite is biotite. I believe that at least some of the biotite is an alteration of hornblende. Harris (1990) suggested that the biotite is a late magmatic modification of some earlier mafic mineral.

The biotite itself is variably corroded by carbonate minerals, sericite and potassium feldspar. Locally, biotite has been retrograded to chlorite.

Carbonate

The most strongly altered rocks within the monzodiorite are bleached, with all of the mafic silicate constituents destroyed. This bleaching takes two forms, carbonate and potassium feldspar. The carbonate altered rock is finely crystalline and pale coloured. It can be scratched with a knife and it reacts with 10% HCl only after being powdered. Oxidized zones within the carbonate have an orange-red colour indicating that the carbonate is iron-bearing.

Bleached zones tend to be zoned between carbonate and potassium feldspar, although either one may be absent. Where both are present, the potassium feldspar zone forms a core to the carbonate zone.

Potassium Feldspar

Potassium feldspar is an important constituent of the monzodiorite, typically comprising 40% of it. Kspar is also an important alteration mineral, and I am still unsure as to how much of the kspar in the monzodiorite, if any, is primary. It is clear that potassium feldspar, as an alteration mineral, forms part of the gangue in all the significant gold mineralized zones. Its association with gold is more consistent than that of any other gangue mineral.

Calcite

Calcite is probably as important as potassium feldspar as an alteration mineral. It is found throughout the lithologic package as millimetric veinlets and more rarely as larger veins. Formation of the calcite veins and veinlets postdates all other alteration events, and the veins are not significantly deformed.

Calcite is the most common gangue mineral of chalcopyrite, and the two occurrences of visible gold noted were in calcite veinlets. Calcite is present in all significant gold-bearing intervals, but since it is present virtually everywhere its significance with respect to gold is not clear.

Chlorite

Part of the mineralized interval from 17 meters to 47 meters in GWS-89-01 is intensely chloritized, and chlorite is present in some other mineralized intervals. Chlorite appears to be locally important to gold mineralization, but is not nearly as ubiquitous as potassium feldspar and calcite.

Quartz

Quartz is present in some mineralized calcite veins. It occurs as fragments within calcite, suggesting that it predated the calcite, perhaps forming veins that were later brecciated by the calcite-depositing fluid. It is more common to find quartz in mineralized than unmineralized veins, but even in quartz-bearing veins it is the calcite that contains visible sulphide minerals.

In six specimens of syenite examined by Harris (1990) he noted quartz in only three, as trace, 1 % and 3% of the rock.

Hematite

Hematite occurs in both specular and earthy forms. Specular hematite forms veins and veinlets. Although it is sometimes associated with mineralization, it is equally as common in unmineralized zones.

Earthy red hematite coats many fractures and sometimes colours calcite, kspar or quartz.

Although it frequently occurs in or near mineralized veins, that appears to be coincidental, as it is just as common away from mineralization.

Magnetite Magnetite is a significant constituent of the monzodiorite, where it occurs as tiny specks within mafic minerals, forming 1 to 3 percent of the rock.

In rocks altered by kspar, magnetite is one of the last primary minerals to be destroyed by the alteration. In the most intensely altered zones, however, it does disappear.

Magnetite veins have been noted in several drill holes, but like hematite, magnetite's relationship to mineralization seems to be coincidental.

Tourmaline Needles of tourmaline occur in a few calcite or quartz veinlets, at several locations. Harris (1990) noticed tourmaline in one of six specimens, as an accessory mineral associated with biotite.

4.2.3 Structure

As noted in section 4.1.2, the AES area lies along the northwestward extension of the Silver King Shear Zone. In drill core, a local, weak alignment of mafic silicates is the only remaining evidence for shearing of the monzodiorite. This fabric is seen most often near the margins of the most intense alteration zones. If a stronger fabric was ever present it is now masked by the alteration.

Superimposed on the obscure shearing in the intrusive rock is a north trending structural grain. This is most obvious in a ground magnetic survey done for U.S. Borax in 1984. Magnetic contours have a strong north-south orientation that doesn't appear to be an artifact of the grid orientation or contouring bias.

Other evidence for a north-trending set of structures is:

- At the Alma N a fault contact between the intrusion and the volcanics trends north-south.
- At the Star area, where veins can be traced between drill holes they trend within a few degrees of northerly.
- The zone of disseminated gold-copper mineralization that is strong in DDH GWS-89-05 and shows up weakly in 89-06 and 90-21 strikes northerly.

4.2.4 Alma N Area

Pacific Sentinel Gold drilled six holes in the Alma N area:

GWS-89-01
GWS-89-02
GWS-89-03
GWS-90-24
GWS-90-25
GWS-90-26

These holes are shown in sectional views on Figures 14 to 17.

The target at Alma N is the mineralized zone described in old reports on the prospect. Mineralization here occurs entirely within monzodiorite, immediately adjacent to the contact with Rossland Volcanics. The mineralized rock is intensely altered by potassium feldspar, with all of the mafic silicates destroyed. Pyrite is the only significant sulphide present, in amounts of 1% to 2%.

A near vertical to westerly dipping north-south fault forms the contact between monzodiorite and Rossland Volcanics, with monzodiorite to the west and volcanics to the east.

It is apparent in GWS-90-25 and 90-26 (Fig. 16) that monzodiorite lies underneath the Rossland volcanics at a depth of 100 meters or more. One interpretation, illustrated on Figures 14 and 16, is that the north-south trending fault is a reverse fault, with the east side down-dropped. In the down-dropped block, the Rossland Volcanics structurally overlie monzodiorite, perhaps roofing the intrusion.

The most encouraging drill holes at Alma N were 01 and 24, on Section 0+50 N. GWS-89-01 contained the single best gold intersection of the drill program, with 4.06 g Au/tonne over 18.9 meters. This intersection is influenced by some high individual samples, including one of 44.4 g Au/tonne over 28 cm. The intersection in GWS-90-24, containing 1.23 g Au/tonne over 24 meters, is probably more representative of the mineralization.

The best mineralization on Section 0+50 N lies within about 50 meters of surface, but the zone persists to at least 90 meters below surface, where GWS-89-02 contained 1.65 g Au/tonne over 13 meters.

100 meters to the north, on section 1+50 N, DDH GWS-90-25 intersected the same mineralized zone, but the intersection is narrower and weaker, with 1.38 g Au/tonne over 12 meters.

In GWS-90-26, 30 meters north of 90-25, the mineralized zone is not evident.

If the structural interpretation illustrated in Figures 14 and 16 is correct, it is probable that the fault has truncated the mineralization. Part of the auriferous zone probably exists at some unknown depth, greater than 150 meters, in the down-dropped eastern block, underneath the Rossland Volcanics.

Comparing Figures 15 and 17, it is apparent that GWS-90-25 intersected the mineralization about 50 meters deeper than 89-01 and 90-24, at a depth similar to that of the intersection in 89-02. Recent drilling on Section 1+50 N did not test for shallow mineralization as encountered in GWS-89-01 and 90-24. An earlier reverse circulation drill hole by U.S. Borax, S-6, probably tested the zone where shallow mineralization might occur, with negative results.

Although drill holes GWS-90-25 and -26 are disappointing in terms of grades, 25 at least illustrates that the mineralized zone may continue northward from the area drilled to date. One further test of this area is merited. A section should be tested about 50 meters further north from the current drilling, at about 2+25 north. To adequately test for a northward extension of the mineralization, 3 holes should be drilled on this section, to a depth of about 200 meters each. They should be collared at 2+00 W, 1+00 W and 0+00 E, drilled at -45 degrees to the east. Three holes are needed because of the grade variations apparent with depth on section 50N (Fig. 15).

The gold grades intersected in GWS-89-01 and -90-24 might be good enough to support a bulk mining operation, but the dimensions, although good, are probably not enough. For the next three proposed holes to be considered successful, better widths and more continuity to depth are required.

4.2.5 Eureka Portal Area

The Eureka Portal Area is named for the portal where GWS-89-06 was collared. Three holes were drilled in the area, GWS-89-05 and 06 and GWS-90-21 (Figs. 28, 29 and 30). The target is a gold mineralized zone encountered on surface, in a trench immediately upslope (east) from the collar of GWS-89-05. The trench contains a 24 meter interval in which average grades of 587 ppb Au and 745 ppm copper were obtained (Dawson et al, 1989).

Grab samples collected at the Eureka Portal contained pyrite, chalcopyrite, and bornite in quartz-carbonate vein material. Testing this was part of the purpose of GWS-89-06, but the hole did not intersect similar mineralization.

All three holes collared in monzodiorite and intersected a diorite body at depth. The diorite is at least 90 meters thick. Since all the holes bottomed in diorite, the true shape of the diorite body is not known, but evidence from other holes suggests that such diorite bodies are dike-like. In this area the monzodiorite-diorite contact strikes 135 degrees and dips 70 degrees to the southwest. This calculation is based on three drill hole intercepts.

The Portal area was initially tested by two holes, GWS-89-05 and GWS-89-06. 89-05 was a very successful hole, intersecting 10 meters containing 2.45 g Au/tonne (0.071 oz Au/ton) and 31.68 meters containing 0.82 g Au/tonne (0.024 oz Au/ton). Together these two intervals comprise a longer one of 46 meters grading 1.13 g Au/tonne (0.033 oz Au/ton), calculated by including the grades obtained in the interval from 48 m to 52.32 m. Unlike those at the Alma N, this section also contains significant copper in the 0.24 % to 0.28% range.

Like that at the Alma N, the mineralized zone in GWS-89-05 is characterized by intense potassium feldspar alteration. The rock is not as completely bleached in 89-05 as it is at Alma N; some biotite remains. Mineralization consists of disseminated pyrite and chalcopyrite.

In Figure 30, it is evident that both GWS-89-06 and GWS-90-21 intersected the mineralized zone, with weak enrichment in copper and gold. Assuming that the mineralized zone has a roughly tabular form, it is possible to calculate that the zone strikes about 186 degrees and dips about 43 degrees to the west.

Referring to Figure 28, the mineralized zone is likely cut off along strike to the north by the cross-cutting diorite dike, which is unmineralized. It weakens with depth but it is open along strike to the south. Given the westerly slope, the surface trace of the tabular zone would trend somewhere between 185 and 195 degrees to the south. To test this hypothesis, one drill hole is warranted, collared about 50 meters south of GWS-89-05 and drilled to a depth of 200 meters at -45 degrees to the east.

4.2.6 Star to Eureka Area

For the purpose of this report, Star to Eureka describes a north-south trending zone from approximately 500 N to 1,200 N, between 450 W and 300 W. It was tested initially by drill holes GWS-89-04, 10 & 12 and by the lower part of GWS-89-09. Following moderate success with GWS-89-04 and 09, two further holes, GWS-90-22 & 23, completed the test. Figures 20 to 23 illustrate the drilling.

The target in this area is the mineralization encountered in the old Star and Eureka workings. There is some suggestion in old reports that disseminated mineralization in the Eureka extended in to the intrusive wall rocks, creating some hope for a bulk mineable deposit.

Although it is not possible at present to correlate structures or mineralization found in drill holes with the actual Eureka or Star structures, veins that are probably similar to the originals were encountered in GWS-89-09 (185.84 m to 189.59 m) and GWS-89-10 (108.10 m to 111.60 m). Both are calcite veins containing broken, brecciated fragments of quartz. Chlorite occurs as stringers within the calcite.

The calcite is banded grey-white, parallel to the vein walls. It may be this banded calcite that engendered the earlier interpretation that the Eureka mineralization is in limestone.

The monzodiorite in the vein walls shows a strong shear fabric over ten or more meters. To the extent that it can be determined in drill core, the banding in the calcite and the shear fabric in the monzodiorite are parallel.

The calcite-quartz veins contain pyrite and chalcopyrite, to a few percent locally.

In both GWS-89-09 and GWS-89-10 the veins occur within broader mineralized zones. In 89-09, 1.19 g Au/tonne (.035 oz Au/ton) and 0.104% Cu occur averaged over 14 meters. The intersection in 89-10 has low gold values but contains 0.223% Cu over 42.7 meters from 68.9 m to 111.6 m.

GWS-89-04 contains a mineralized interval of 1.52 g Au/tonne (0.044 oz Au/ton) and 0.188 % Cu over 17.79 meters. When projected on to the same east-west section (Fig. 23) this interval is vertically above the interval surrounding the vein in GWS-89-09. The interval in -04 differs from that in -09 in having several calcite veinlets without a single large vein as in -09. Despite the difference, I suspect that the two mineralized intervals are on the same structure, and that the vein in -09 anastomoses into a series of smaller ones at higher elevation and to the south in -04.

GWS-89-04, GWS-89-09 and GWS-89-10 are spread over some 550 meters from north to south. The veins in -09 and -10 are so strikingly similar that it is tempting to correlate them. The interval in GWS-89-04 would fit neatly into the pattern, leading to a model of a north-trending structure with a steep dip (Fig. 23).

The intent of drilling GWS-89-12 was to test the same structure as GWS-89-10. The large vein noted in -10 was not encountered in -12. Interestingly though, the copper enrichment associated with the vein in -10 is also present, more sporadically, in -12 (Fig. 27). The copper enrichment is associated with a series of small zones of kspar and/or carbonate enrichment, each a few centimeters wide.

The vein system that may be correlatable in GWS-89-04, -09 and -10 doesn't appear in any obvious way in GWS-90-22 and -23 (Figs. 20 and 21). There is a slight copper enrichment in -22 and gold enrichment in -23 which, projected onto section with -04 line up vertically above the mineralized interval in -04. In -22 the enrichment corresponds with unusual chlorite alteration and intervals of a few centimeters of intense kspar alteration. Holes -22 and -23 provide weak corroborative evidence for a variably mineralized structure with the following characteristics:

- strike is roughly N-S, with a vertical or steep westerly dip
- strike length may be 550 meters or more
- at depth a discrete calcite-quartz vein is present, with a width of 3 meters or more (GWS-89-09, -10)
- The vein diffuses upwards, over about 100 meters, to a set of calcite veinlets (GWS-89-04)
- Higher and to the north, the veinlets diffuse into a weak chlorite and/or carbonate and/or kspar alteration zone with some copper and gold enrichments (GWS-89-12, -90-22 and -90-23).

Both GWS-89-04 and GWS-89-09 bottomed in low level copper mineralization. The last 78 meters of GWS-89-04 contain 0.126 % Cu and the last 49 meters of GWS-89-09 contain 0.142 % Cu. These grades are not of themselves economically interesting, but holes GWS-90-22 and GWS-90-23 were drilled to see whether this low level enrichment improves to the east.

The copper enrichment persists sporadically through most of GWS-90-22 and GWS-90-23 (Fig. 21), but doesn't reach economic grades. A 10 meter interval in -22, from 200 m to 210 m, does contain 2.59 g Au/tonne (0.076 oz Au/ton) and 0.338% Cu. The interval is characterized by local sections of intense kspar alteration and a somewhat higher than average frequency of calcite veinlets.

In terms of targets for further work, the vein or veins encountered in GWS-89-04, -09 and -10, even with their mineralized wall rock, probably don't provide adequate size potential for a bulk mineable deposit. Drill hole intercepts of the vein system are widely spaced, and potential may exist for smaller, higher grade targets somewhere along the structure. Exploring for such targets would require closely spaced drilling that is beyond the scope of the present, bulk tonnage exploration program.

4.2.7 Drill Holes GWS-89-07 and GWS-89-08

When Pacific Sentinel commenced drilling on the Star and Eureka targets, it wasn't clear whether the Star structure extends northward or northwestward from the vicinity of the Star Shaft and hole GWS-89-04 (Fig. 12). Holes GWS-89-07, -08 and -09 were planned to test for a northwestward extension of the structure.

Mineralization encountered in GWS-89-09 has already been discussed in Section 4.2.6. GWS-89-07 and -08 were comparatively disappointing. There is one mineralized interval in GWS-89-07, containing 1.13 g Au/tonne (0.033 oz Au/ton) and 0.216% copper over 12.92 meters, from 154.08 meters to 167 meters. The mineralization is accompanied by strong potassium feldspar enrichment.

A narrower intersection in GWS-89-08, containing 1.08 g Au/tonne (0.031 oz Au/ton) over 8 meters, from 132 m to 140 m, may be a copper-depleted expression of the same zone. It contains similarly strong potassium feldspar alteration.

5 Ron Area

The Ron area is covered by the northwestward extension of the exploration grid from the AES area. It is underlain by monzodiorite and diorite similar to those in the AES area.

During 1989 Pacific Sentinel completed a soil geochemical survey, an IP survey and two trenches in the Ron area.

DDH GWS-90-13 (Figs. 31 and 33) was drilled underneath a trench which contained a 38 m long mineralized interval grading 0.42% copper and 292 ppb Au. Mineralization consists of disseminated chalcopyrite associated with fracture controlled magnetite and carbonatization (Dawson et al, 1989).

GWS-90-13 intersected a typical sequence of monzodiorite and more mafic rock logged as diorite, cut by mafic or lamprophyric dikes (Fig. 31) It did not intersect any mineralization like that on surface (Fig. 33). It did contain local above background copper and gold values, in the range 0.06 to 0.106 % copper over 2 to 2.3 meters, with gold values as high as 0.23 g Au/tonne. The above background values tend to be associated with potassium feldspar veinlets and are usually in the vicinity of lamprophyre dikes.

DDH GWS-90-14 tested a north-south trending zone of high chargeability and high resistivity, possibly indicative of disseminated sulphide mineralization. Like GWS-90-13, it intersected diorite and monzodiorite with numerous lamprophyre dikes (Fig. 32). It did not intersect significant disseminated mineralization. There is some copper-gold mineralization present, associated with veins. The best interval in hole GWS-90-14 contained 0.38 g Au/tonne (0.011 oz Au/ton), 13.5 g Ag/tonne (0.39 oz Ag/ton) and 1.371 % Cu over 4.34 meters. This mineralization is associated with a quartz vein, but the actual vein is only 26 cm. wide at the end of the interval. Most of the section is highly oxidized diorite containing some vuggy quartz, with malachite, chalcocite and chalcopyrite. There may be some secondary copper enrichment.

The background pyrite concentrations in drill holes GWS-90-13 and -14 are low, less than 1 %, and sporadic. The IP anomaly tested by -14 is not adequately explained by the sulphide concentrations seen so far.

No further drilling is recommended on the Ron target area.

6 Toughnut Area

The Toughnut Area is about 2 km. to 3 km. southeast of the AES area.

6.1 Geological Setting

6.1.1 Lithologies

The Toughnut area is underlain by Rossland Volcanics, which in this area consist of augite porphyritic mafic flows, intermediate tuffs and a quartz feldspar porphyry (Dawson et al, 1989). Harris (1990) described some specimens as trachytes. All of these units are schistose, lying within the Silver King Shear Zone.

Lamprophyre dikes are common and are unfoliated.

6.1.2 Structural Setting

As noted above, the Toughnut property is on the Silver King Shear, and all rock types except the lamprophyres show the effects of shearing. The penetrative foliation strikes about 120 deg and dips 75 deg south (Dawson et al, 1989).

Later brittle deformation has affected the area, as evidenced by the presence of quartz and/or calcite veins, but the geometry of the later deformation is not known.

6.1.3 Mineralization

Forster (1989) reported that mineralization on the Toughnut property consists of poorly exposed Au-Cu-Zn +- Pb mineralization in the Silver King Shear, characterized by the presence of sphalerite, pyrite and chalcopyrite. The sulphide minerals form the matrix of a brecciated andesitic volcanic flow. An Au, Cu, Zn soil geochemical anomaly, with a coincident I.P. chargeability anomaly extends along the grid for about 800 meters (Figs. 7 to 10).

6.2 Results of Drilling

Figures 34 to 41 illustrate the results of drilling on the Toughnut. Note, in 34 - 37, that grid north is actually 030 deg.

All holes were targeted on geochemical and/or geophysical anomalies.

6.2.1 Alteration

Taking in to account the different protolith, alteration on the Toughnut property is remarkably similar to that at the AES area. Chlorite, rather than biotite is the commonest mafic silicate, but as at AES, carbonate and intense potassium feldspar alteration characterize the most significant mineralized zone.

Harris (1990) described rocks from Toughnut, containing up to 82% potassium feldspar, as trachytes, based on textural evidence in thin section. It remains debatable how much of the potassium feldspar is primary and how much, if any is an alteration. I believe that potassium feldspar alteration is important on the Toughnut property.

Alteration as it relates to specific mineralized intercepts is discussed below in section 6.2.2.

6.2.2 Mineralization

Localized zones of gold mineralization occur in holes GWS-90-15,16 and 19, but the most significant zone, and the only one with potential for bulk mining, is in GWS-90-18. There, 1.49 g Au/tonne (0.044 oz Au/ton) occur averaged over 26 meters.

The mineralized zone is within an interval of intense potassium feldspar flooding. The brittle potassium feldspar rock is locally brecciated and cemented by carbonate minerals. One to two percent disseminated pyrite is common within the potassium enriched zone, associated with both kspar and carbonate.

The lower parts of holes GWS-90-15 and GWS-90-19 penetrated part of the potassium enriched zone (Figs. 36 and 40). However they did not penetrate as far in to it as GWS-90-18 and did not encounter the gold.

ICP data indicate that the kspar enriched zone also has a low level enrichment of arsenic, in the range 25 to 50 ppm (Figs. 37 and 41). Holes GWS-90-15,16 and 19 partly penetrated the arsenic-enriched zone, but did not drill far enough to fully test it.

Gold mineralization, the presence of pyrite, the potassium enrichment and the arsenic enrichment terminate abruptly at 130.66 m in GWS-90-18 (Figs. 35-37, 39-41). The potassium enrichment picks up again lower in the hole, but the gold and arsenic do not.

One significant quartz-carbonate vein was encountered at Toughnut, in DDH GWS-90-15, from 142.9 m to 146.4 m. It contains pyrite, chalcopyrite, dark sphalerite and minor galena, grading:

Width	3.5 meters
Au	0.59 g Au/tonne or 0.017 oz Au/ton
Cu	0.130 %
Pb	0.032 %
Zn	1.538 %

This vein was originally logged as a siliceous exhalite. It was not intercepted in holes to either side of GWS-90-15, so its importance is negligible.

Two further holes should be drilled to test for possible strike extensions of the gold mineralization encountered in GWS-90-18. One should be collared at about 0 E, 1+00 N and the other at about 1+50 W, 1+00 N. Both should be drilled at -45 degrees to grid north (actually 030 degrees), to depths of about 200 meters.

7 Bibliography

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Statement of Qualifications

I, Peter Arthur Ronning, of 1450 Davidson Road, Langdale, B.C., hereby certify that:

1. I am a consulting geological engineer, doing business under the registered name New Caledonian Geological Consulting. My business address is 912 - 510 West Hastings Street, Vancouver, B.C., V6B 1L8.

2. I am a member in good standing of the Association of Professional Engineers of the Province of British Columbia.

3. I am a graduate of the University of British Columbia in geological engineering, with the degree of B.A.Sc. granted in 1973.

4. I hold the degree of M.Sc. (applied) in geology from Queen's University in Kingston, Ontario, granted in 1983.

5. I have worked as a geologist and latterly as a geological engineer in the field of mineral exploration since 1973.

6. I am the author of the report entitled "Great Western Star Project, Diamond Drilling, Winter 1989-1990" and dated April 1990.

7. I carried out or supervised the work described in this report.

8. I hold no beneficial interest in Pacific Sentinel Gold Corp., the Great Western Star property or any other entity whose value could reasonably be expected to be affected by the conclusions expressed in this report.

P. Ronning

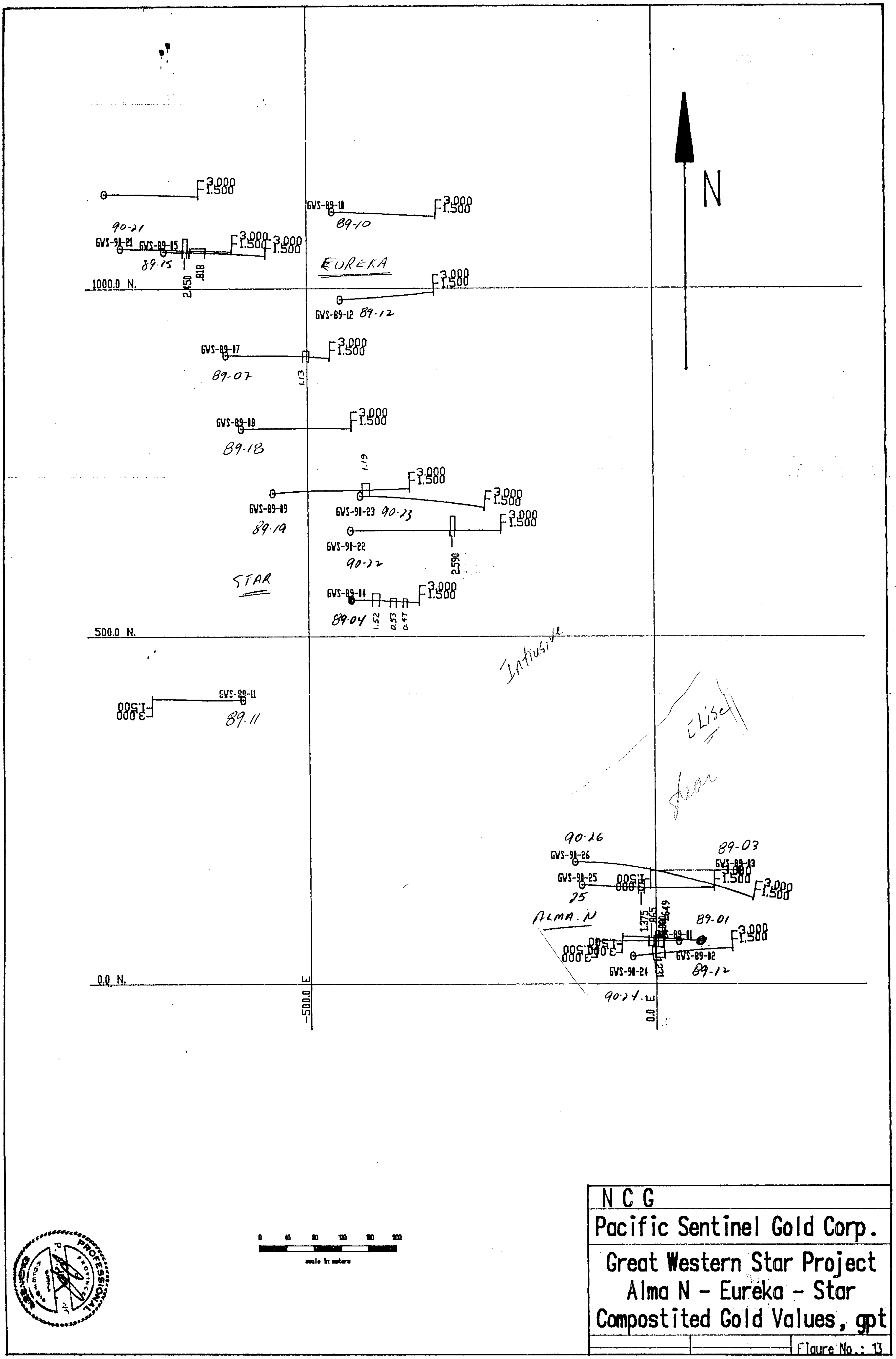
Peter A. Ronning, P.Eng.

About the Drawings

In order to reduce clutter on the drawings which follow, rock names have been abbreviated with 5 letter codes as follow:

Rock Type	Code
andesite	andst
andesitic breccia	a-brx
breccia	brx
carbonate schist	cshst
chloritic schist	mshst
diorite	dior
exhalite	exhlt
fault	fault rock
feldspar-carbonate schist	fp-cb
feldspar porphyry	fporph
felsic flow	fflow
felsic tuff	ftuff
felsic volcanic	fvolc
intermediate flow	iflow
intermediate tuff	ituff
intermediate volcanic	ivolc
k-feldspar breccia	kbrx
k-feldspar-carbonate schist	kcbsh
k-feldspar rich rock	krx
k-feldspar rich schist	kshst
k-feldspar rich tuff	ktuff
lamprophyre	lamp
latite	ltite
lapilli tuff	ltuff
leucocratic schist	lshst
mafic tuff	mtuff
monzodiorite	MD
monzonite	mz
overburden	ovb
porph	porphyry
quartz-carbonate rock	qt-cb
quartz porphyry	qp
shear	shear
syenite	sy
trachyte	trach
volcanic breccia	vbrx
volcanic mudstone	vmud

On those figures in which histograms are used, high values are clipped to the maximum value on the histogram.

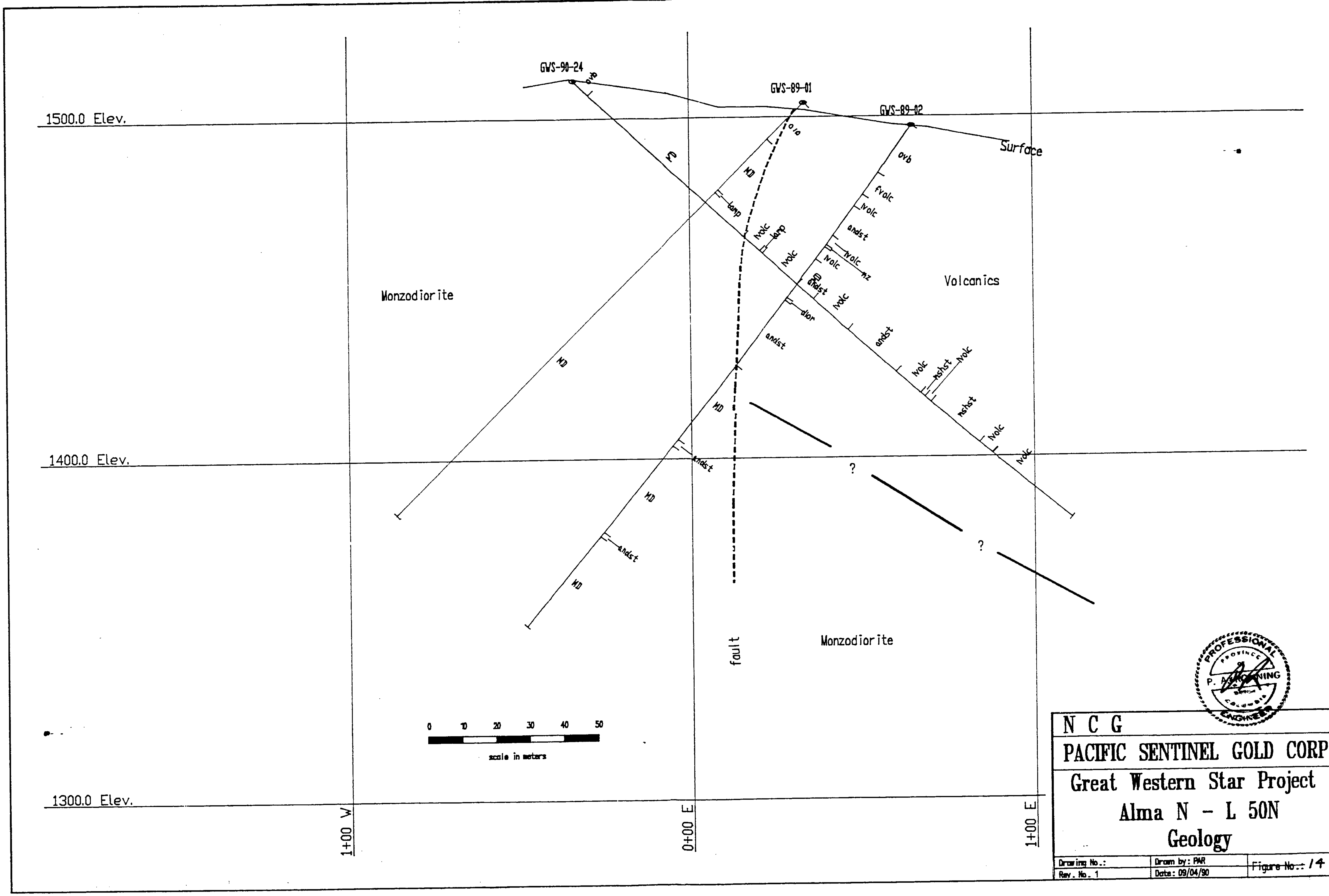


NCG

Pacific Sentinel Gold Corp.

Great Western Star Project
Alma N - Eureka - Star
Compostited Gold Values, gpt

Figure No.: 13



N C G

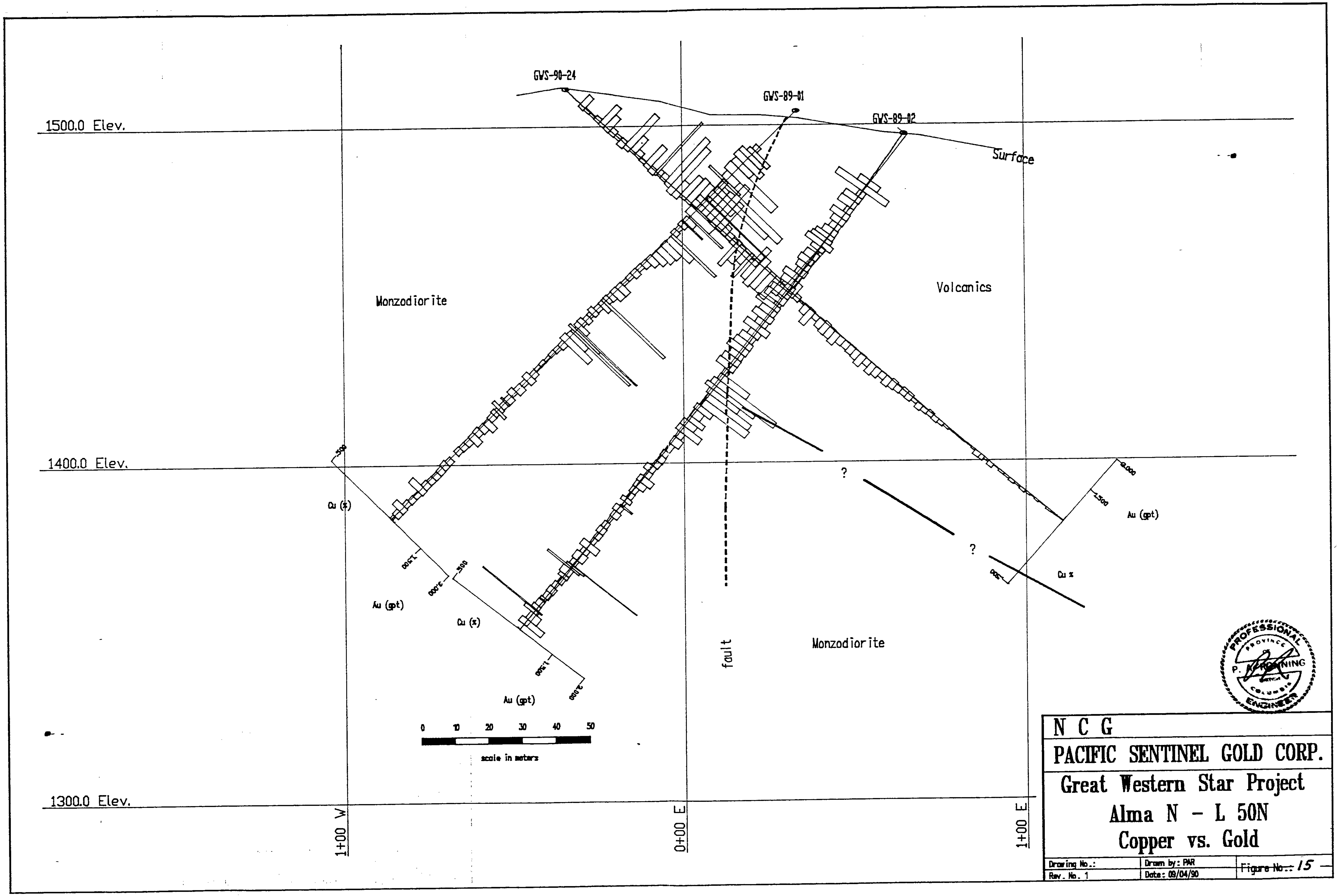
PACIFIC SENTINEL GOLD CORP.

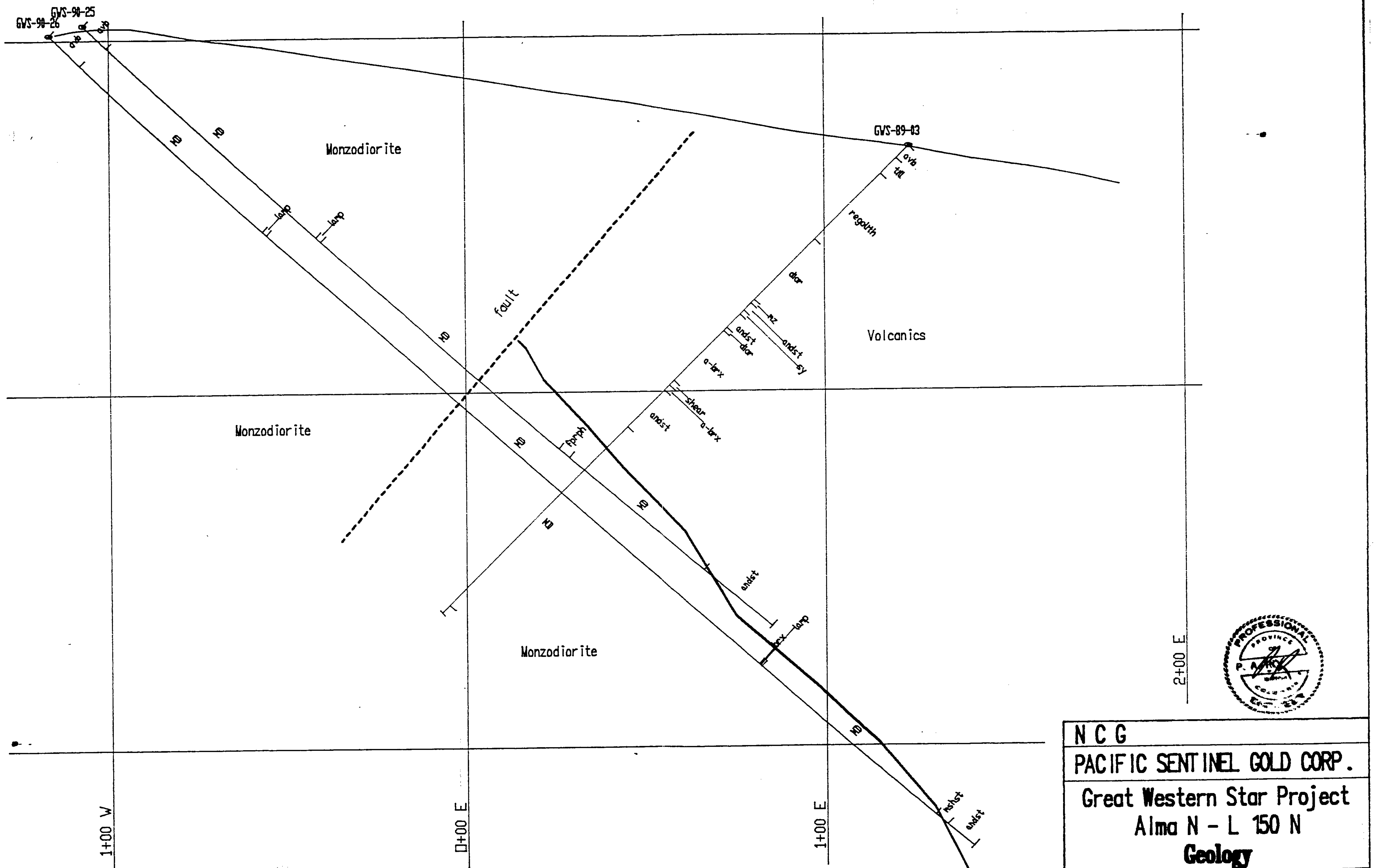
Great Western Star Project

Alma N - L 50N

Geology

Drawing No.:	Drawn by: PAR	Figure No.: 14
Rev. No. 1	Date: 09/04/90	


GWS-90-24
GWS-89-01
GWS-89-02
Surface
1500.0 Elev.
1400.0 Elev.
1300.0 Elev.
Monzodiorite
Volcanics
Monzodiorite
fault
?
?
Cu (%)
Au (gpt)
Cu (%)
Au (gpt)
Au (gpt)
Cu %
0 10 20 30 40 50
scale in meters
1+00 W
0+00 E
1+00 E
N C G
PACIFIC SENTINEL GOLD CORP.
Great Western Star Project
Alma N - L 50N
Copper vs. Gold
Drawing No.:
Rev. No. 1
Drawn by: PAR
Date: 09/04/90
Figure No.: 15
PROFESSIONAL
ENGINEER



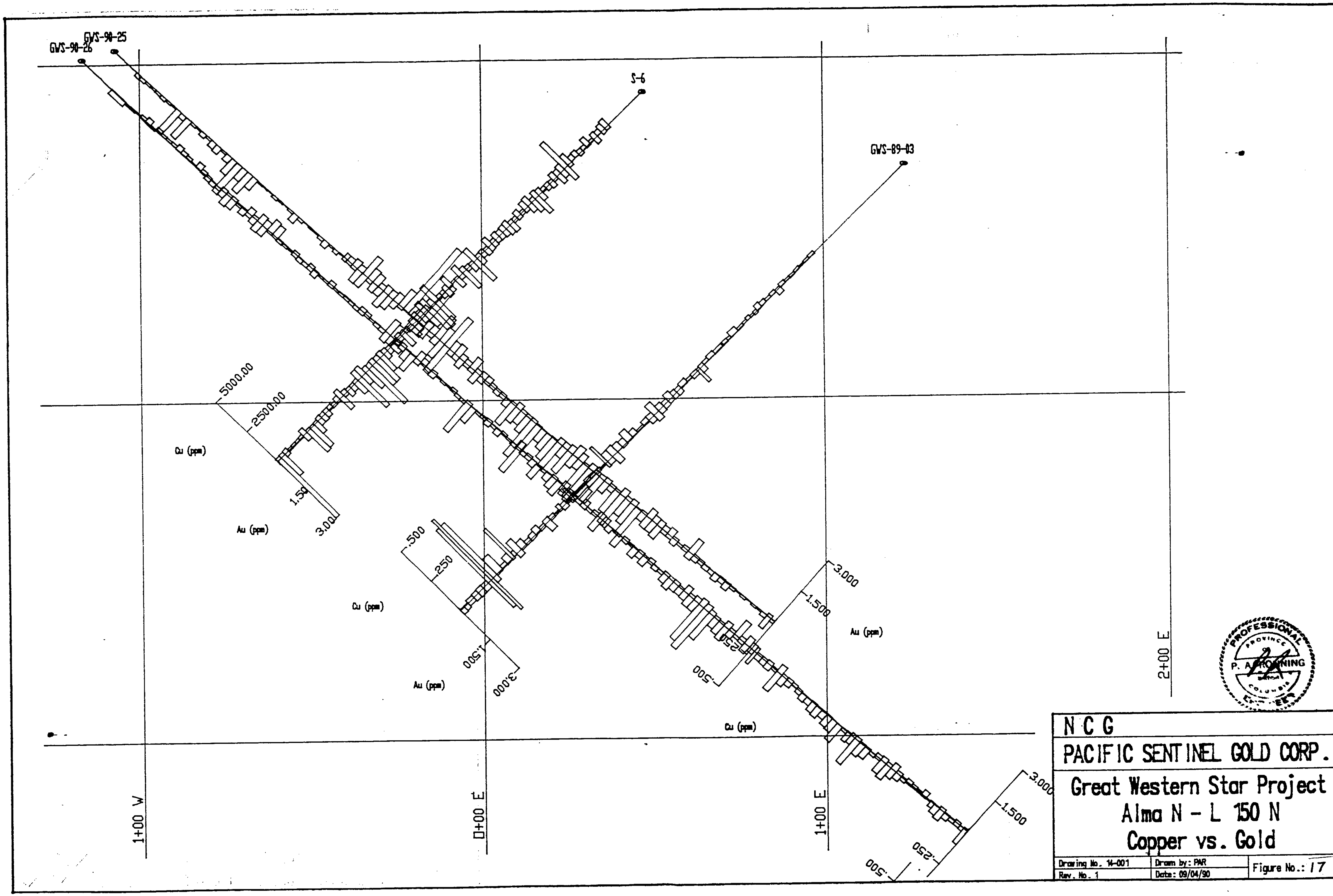
NCG

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Alma N - L 150 N

Geology

Drawing No. 14-001	Drawn by: PAR	Figure No.: 16
Rev. No. 1	Date: 09/04/90	

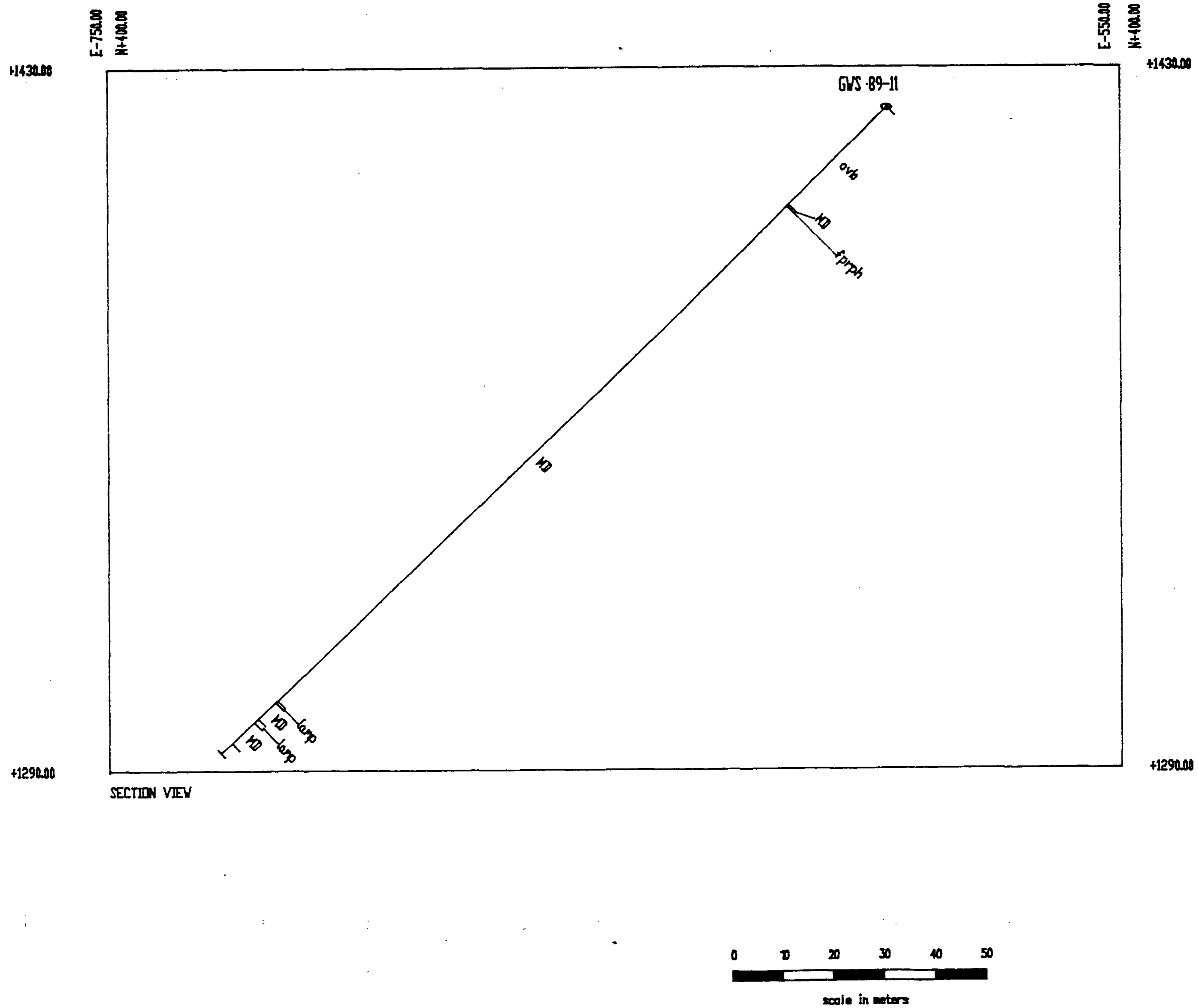


NCG

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Alma N - L 150 N
Copper vs. Gold

Drawing No. 14-001	Drawn by: PAR	Figure No.: 17
Rev. No. 1	Date: 09/04/90	

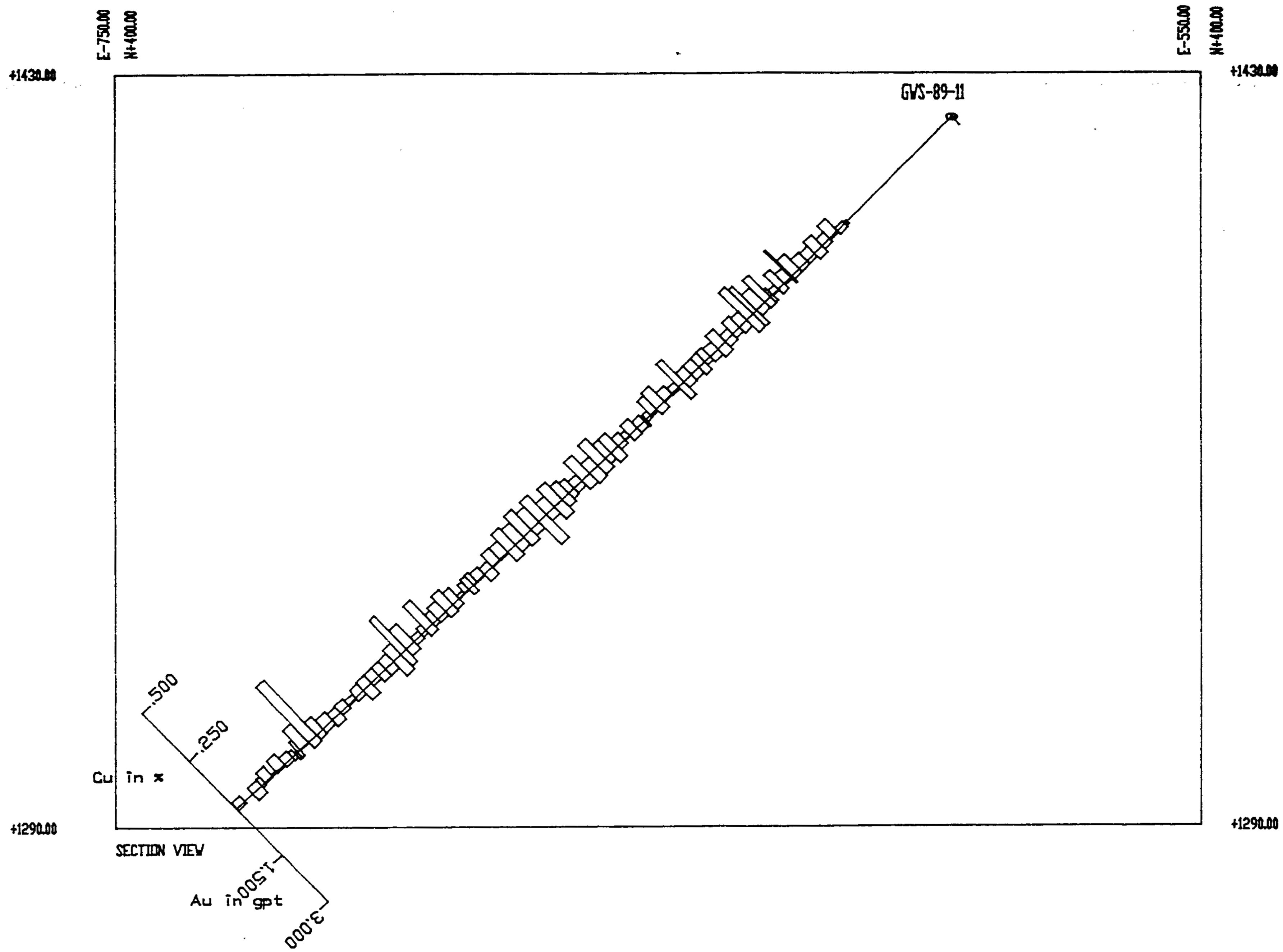


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
DDH GWS-89-11
Geology

Drawing No.:	Drawn by: PAR	Figure No.: 18
Rev. No. 1	Date: 09/04/90	



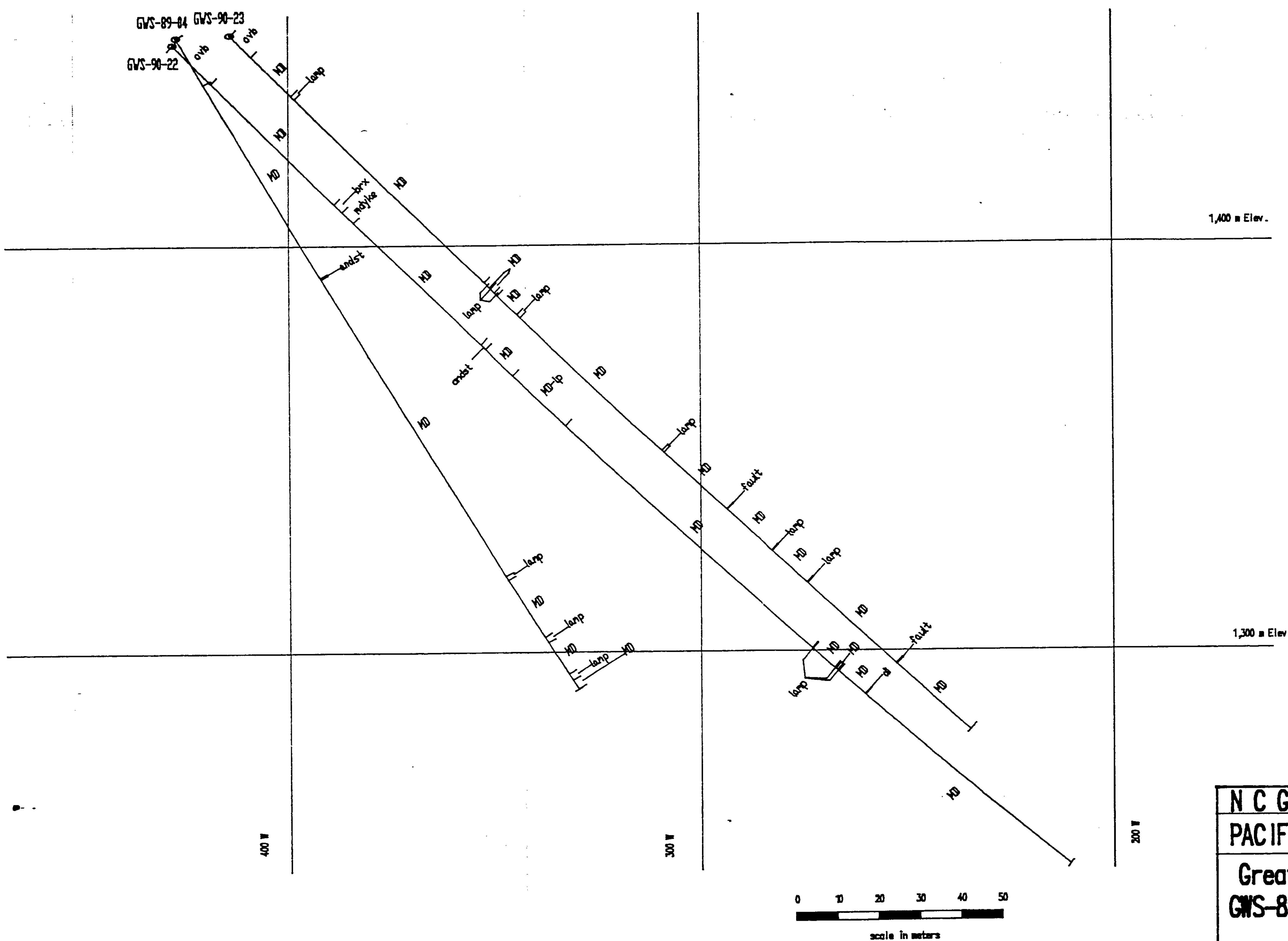
0 10 20 30 40 50
scale in meters

N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
DDH GWS-89-11
Copper (%) vs. Gold (gpt)

Drawing No.:	Drawn by: PAR	Figure No.: 19
Rev. No. 1	Date: 09/04/90	

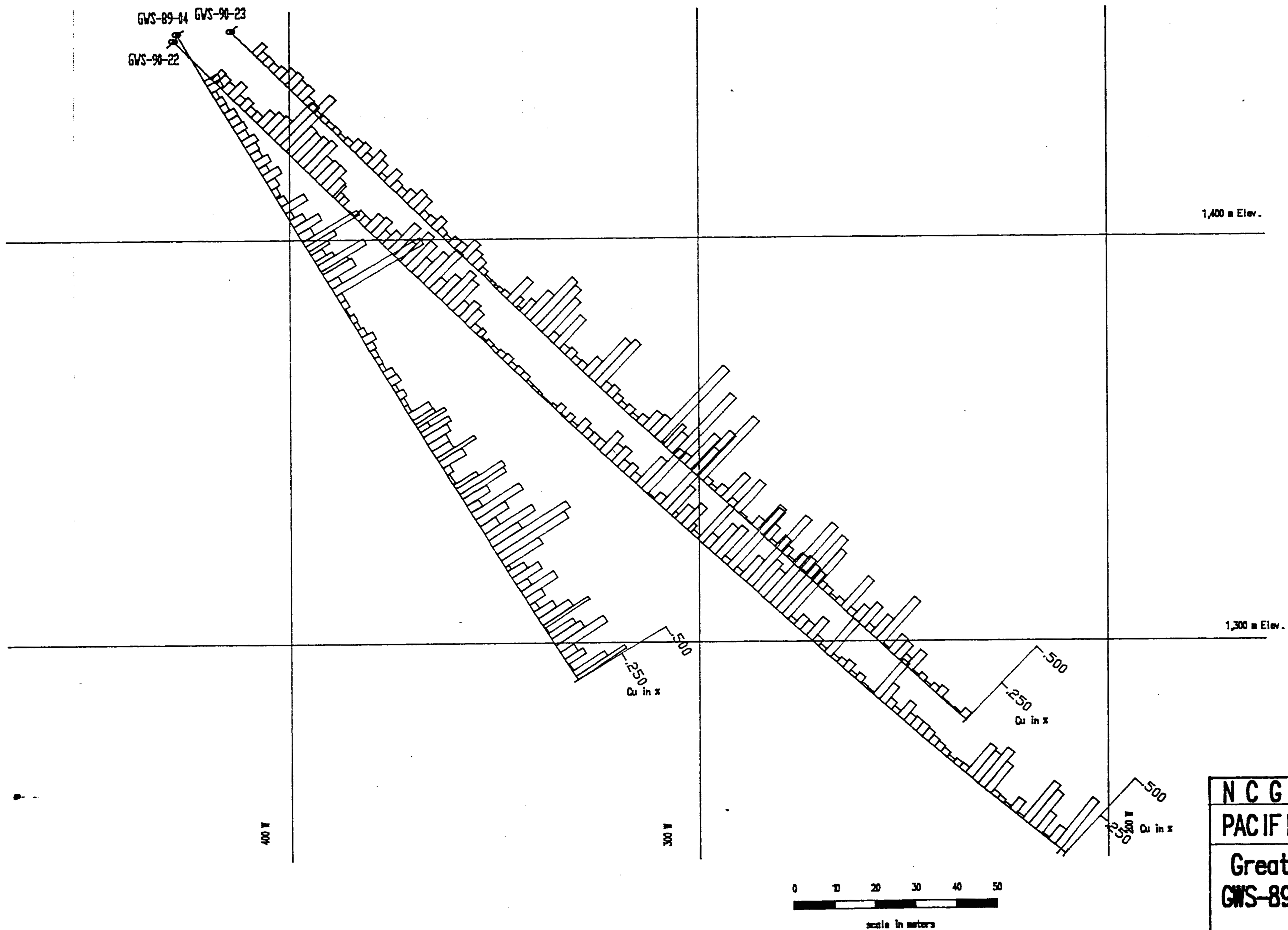


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
GWS-89-04,90-22,23 - Section
Geology

Drawing No.:	Drawn by: PAR	Figure No.: 20
Rev. No. 1	Date: 09/04/90	



NCG

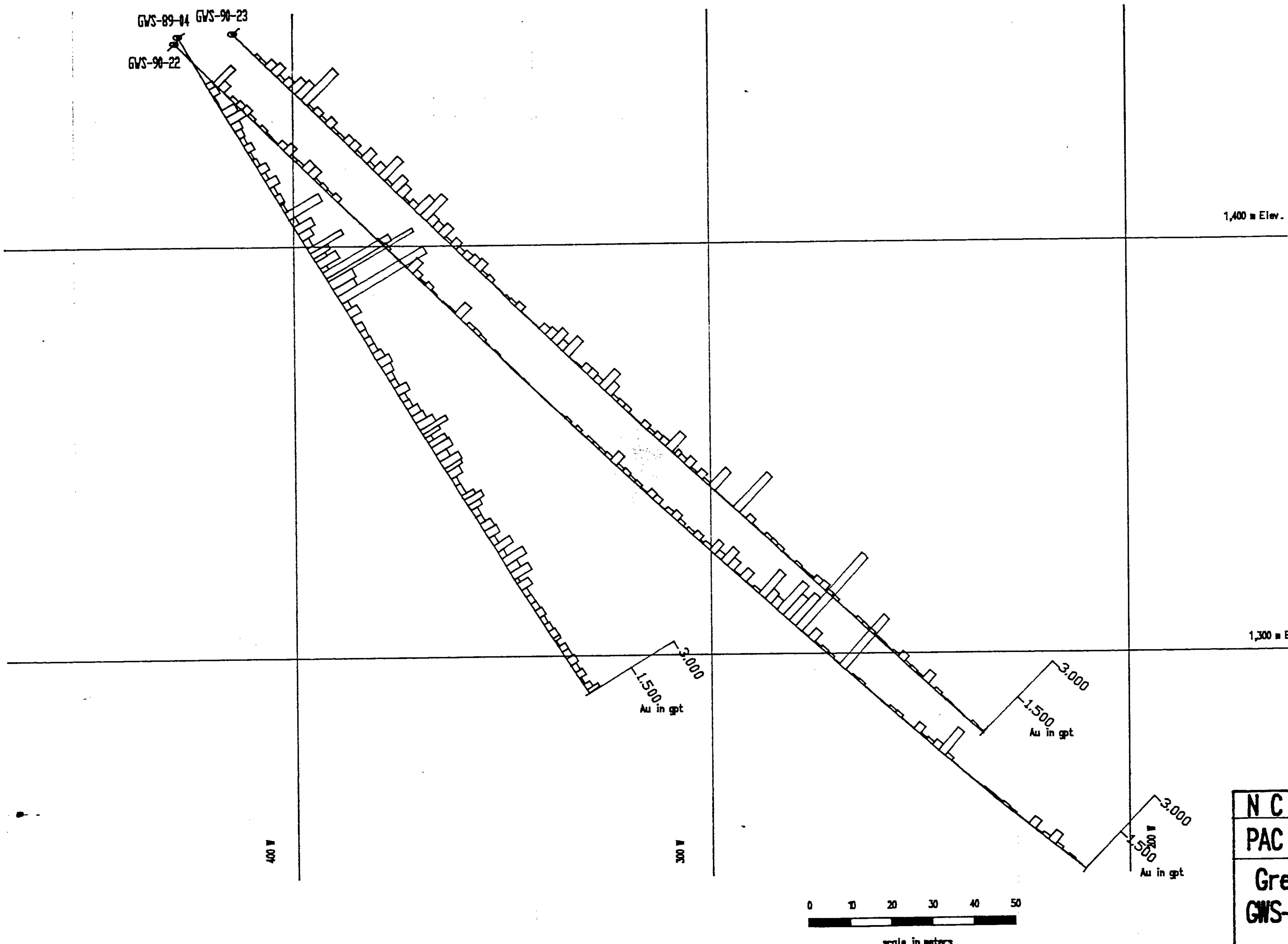
PACIFIC SENTINEL GOLD CORP.

Great Western Star Project

GWS-89-04,90-22,23 - Section

Copper in %

Drawing No.:	Drawn by: PAR	Figure No.: 21
Rev. No. 1	Date: 09/04/90	



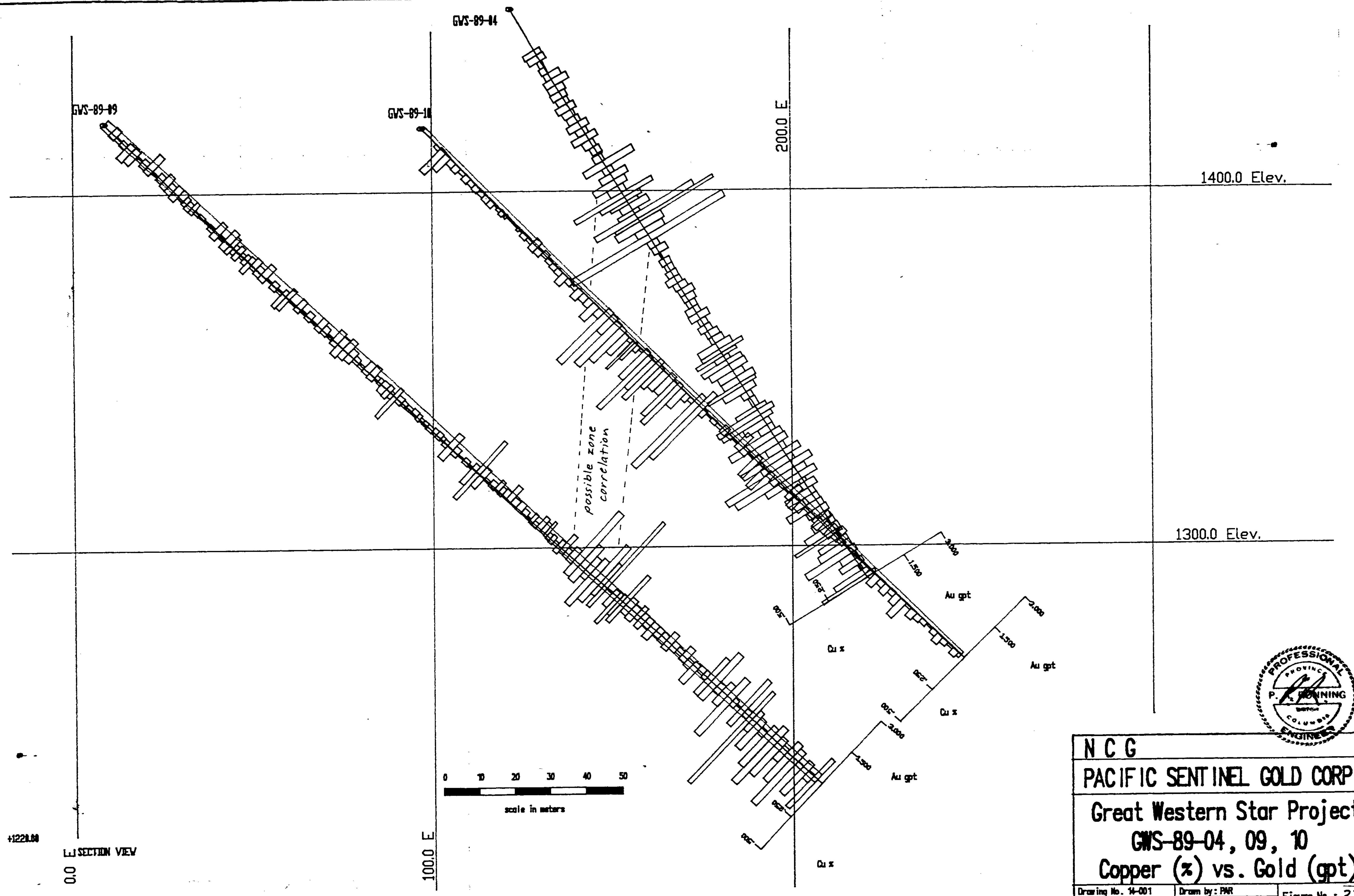
N C G

PACIFIC SENTINEL GOLD CORP.

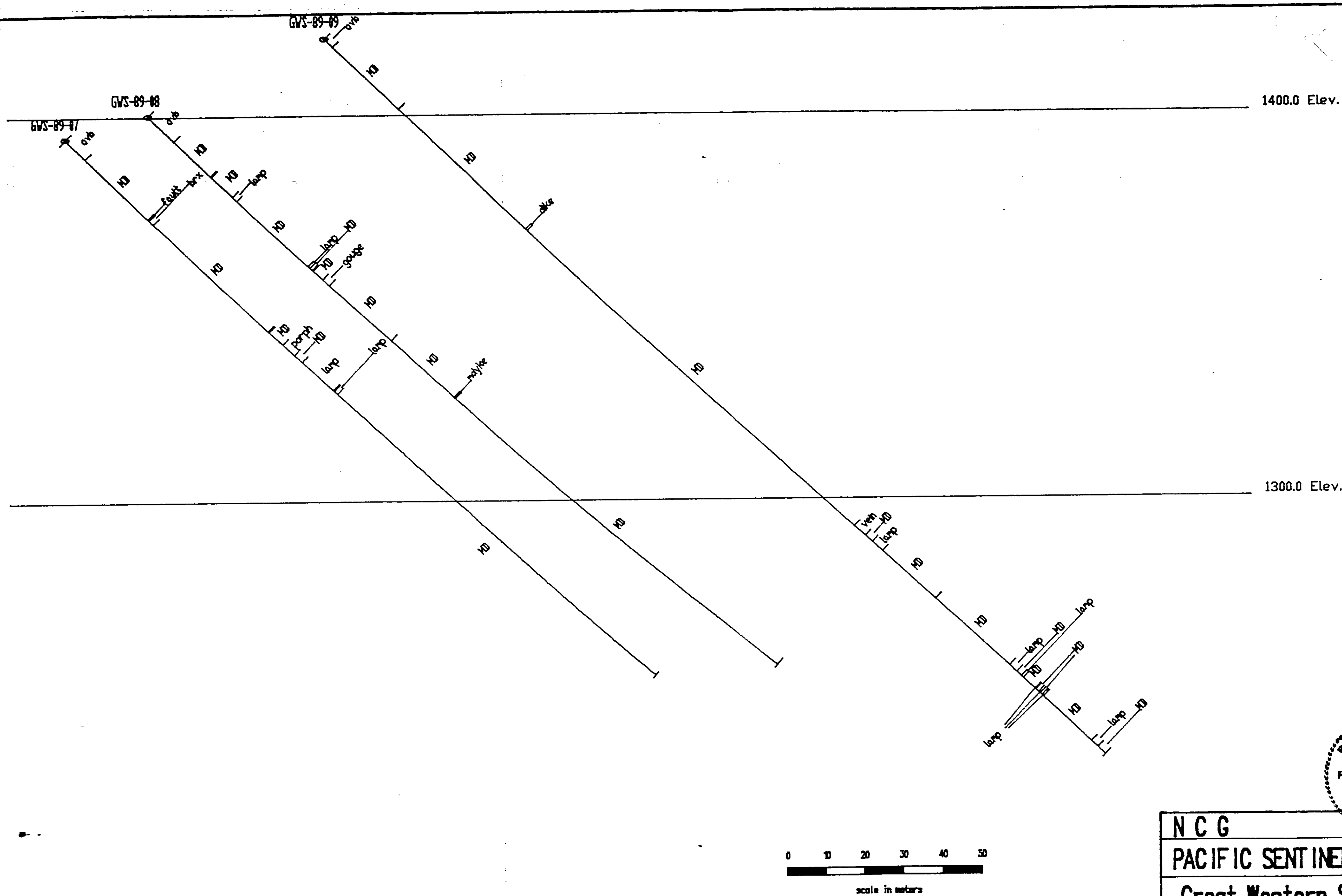
Great Western Star Project
GWS-89-04,90-22,23 - Section
Gold (gpt)

Drawing No.:	Drawn by: PAR	Figure No.: 22
Rev. No. 1	Date: 09/04/90	

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
P. A. RONNING



N C G		
PACIFIC SENTINEL GOLD CORP.		
Great Western Star Project GWS-89-04, 09, 10 Copper (%) vs. Gold (gpt)		
Drawing No. 14-001 Rev. No. 1	Drawn by: PAR Date: 09/04/90	Figure No.: 23



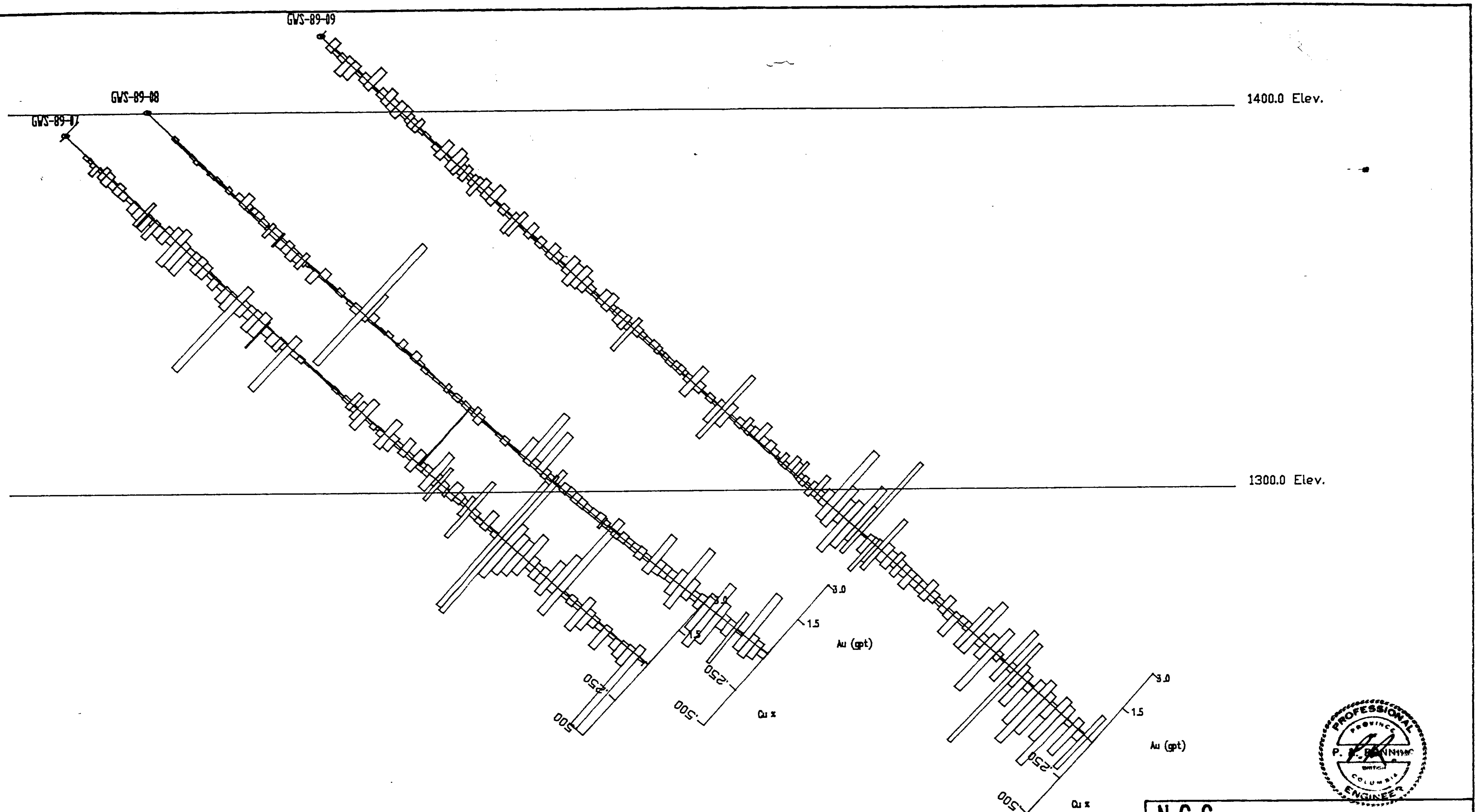
N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Star Area - Holes 7,8 & 9
Geology

Drawing No.:	Drawn by: PAR	Figure No.: 24
Rev. No. 1	Date: 09/04/90	

PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA, P. DOWNING

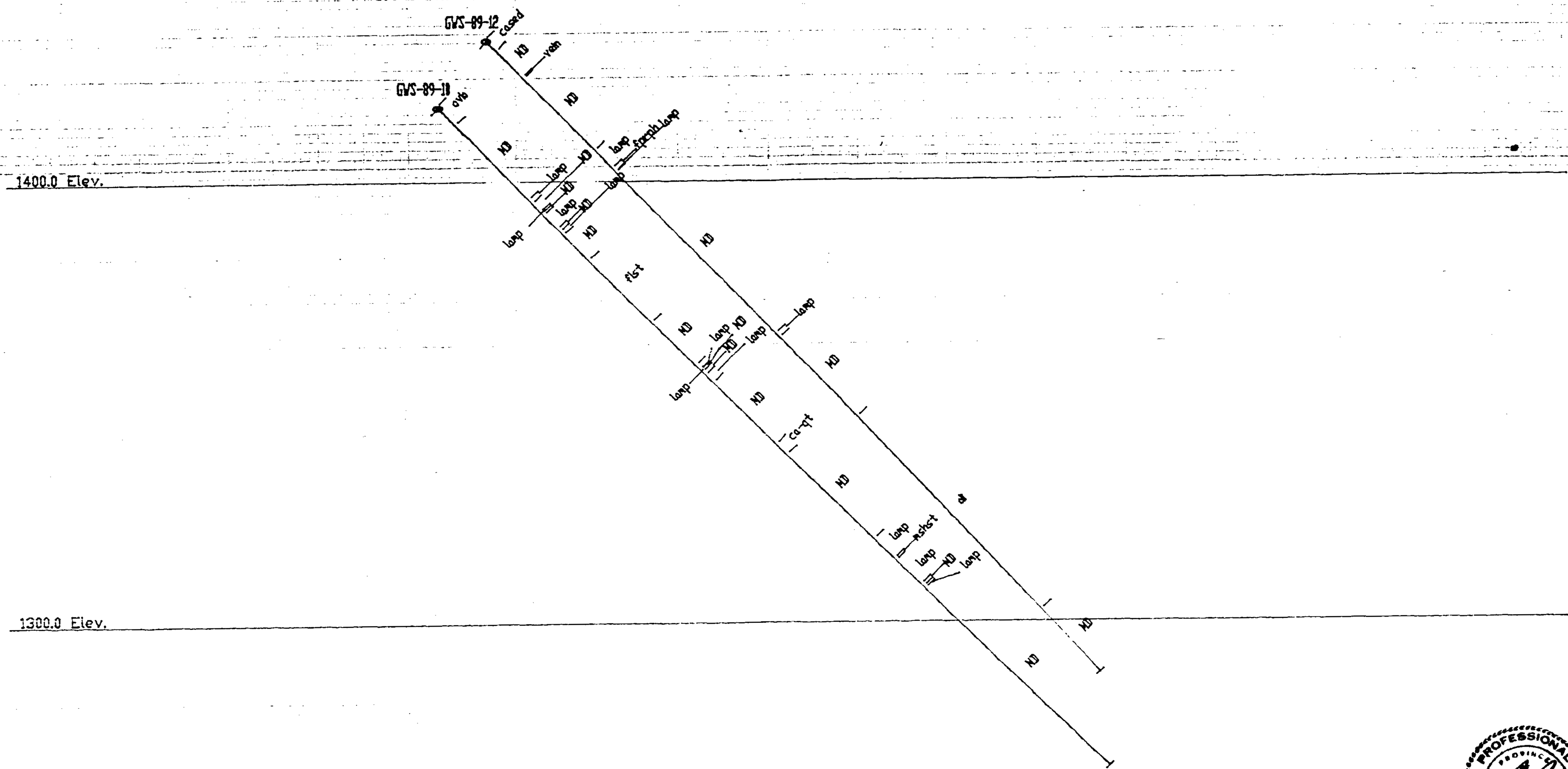


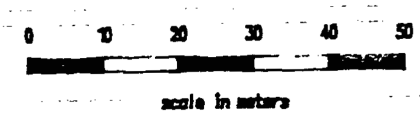
N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Star Area - Holes 7,8 & 9
Copper (%) vs. Gold (gpt)

Drawing No.:	Drawn by: PAR	Figure No.: 25
Rev. No. 1	Date: 09/04/90	





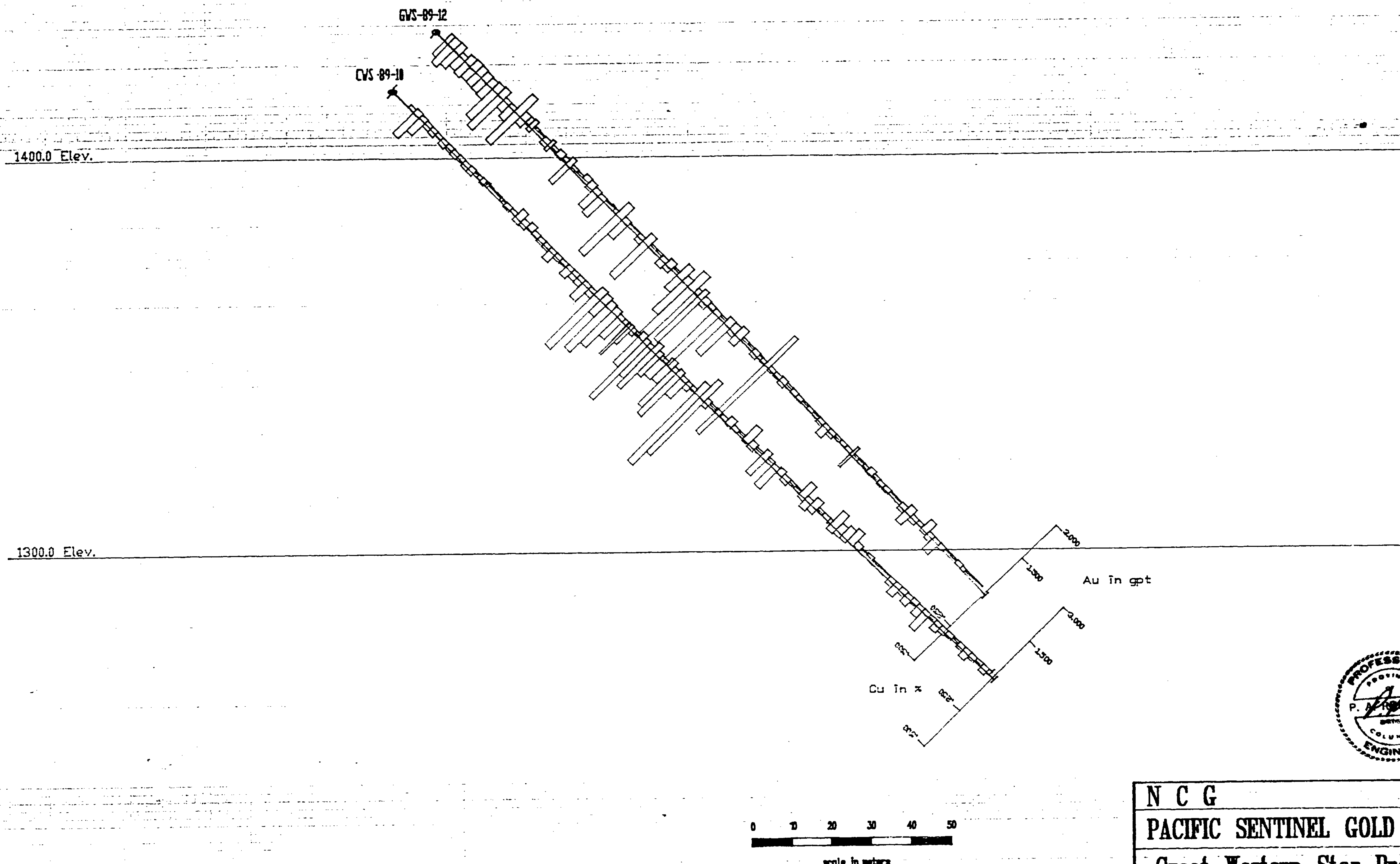
PROFESSIONAL ENGINEER
P. RONNING

N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Eureka Area, GWS-89-10 & 12
Geology

Drawing No. 14-005	Drawn by: PAR	Figure No.: 26
Rev. No. 1	Date: 09/04/90	

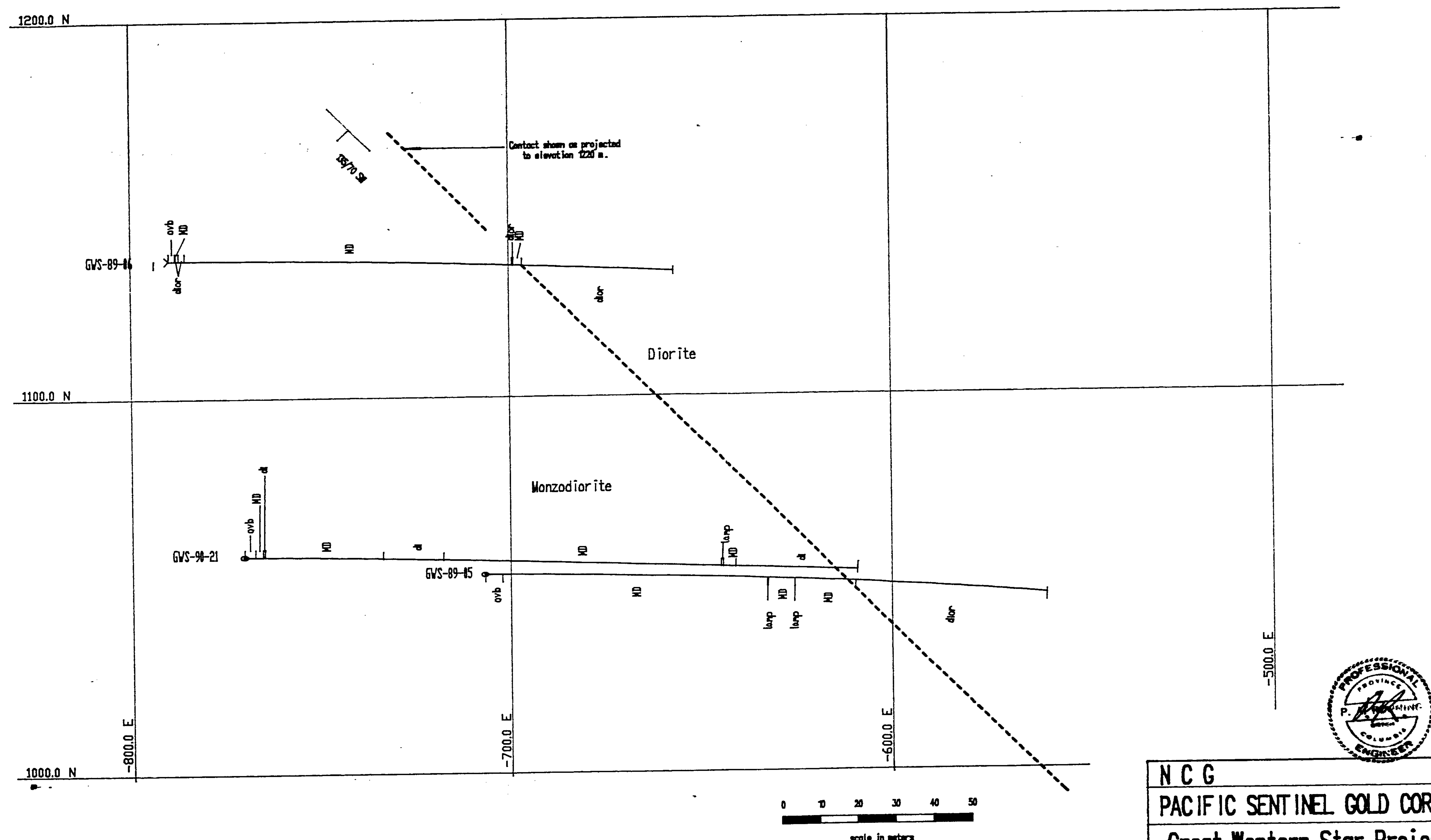


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Eureka Area, GWS-89-10 & 12
Copper vs. Gold

Drawing No. 14-005	Drawn by: PAR	Figure No.: 27
Rev. No. 1	Date: 09/04/90	

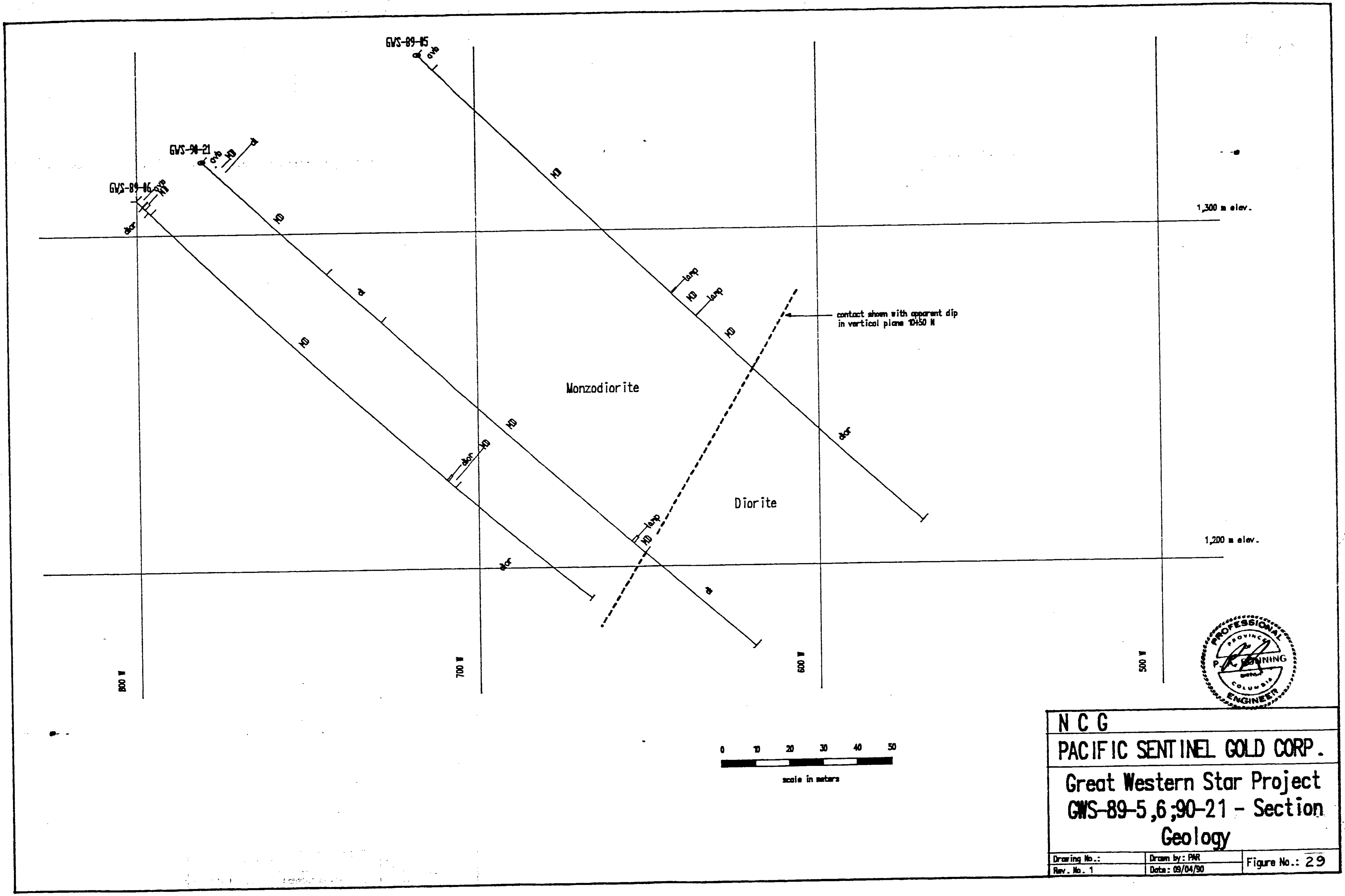


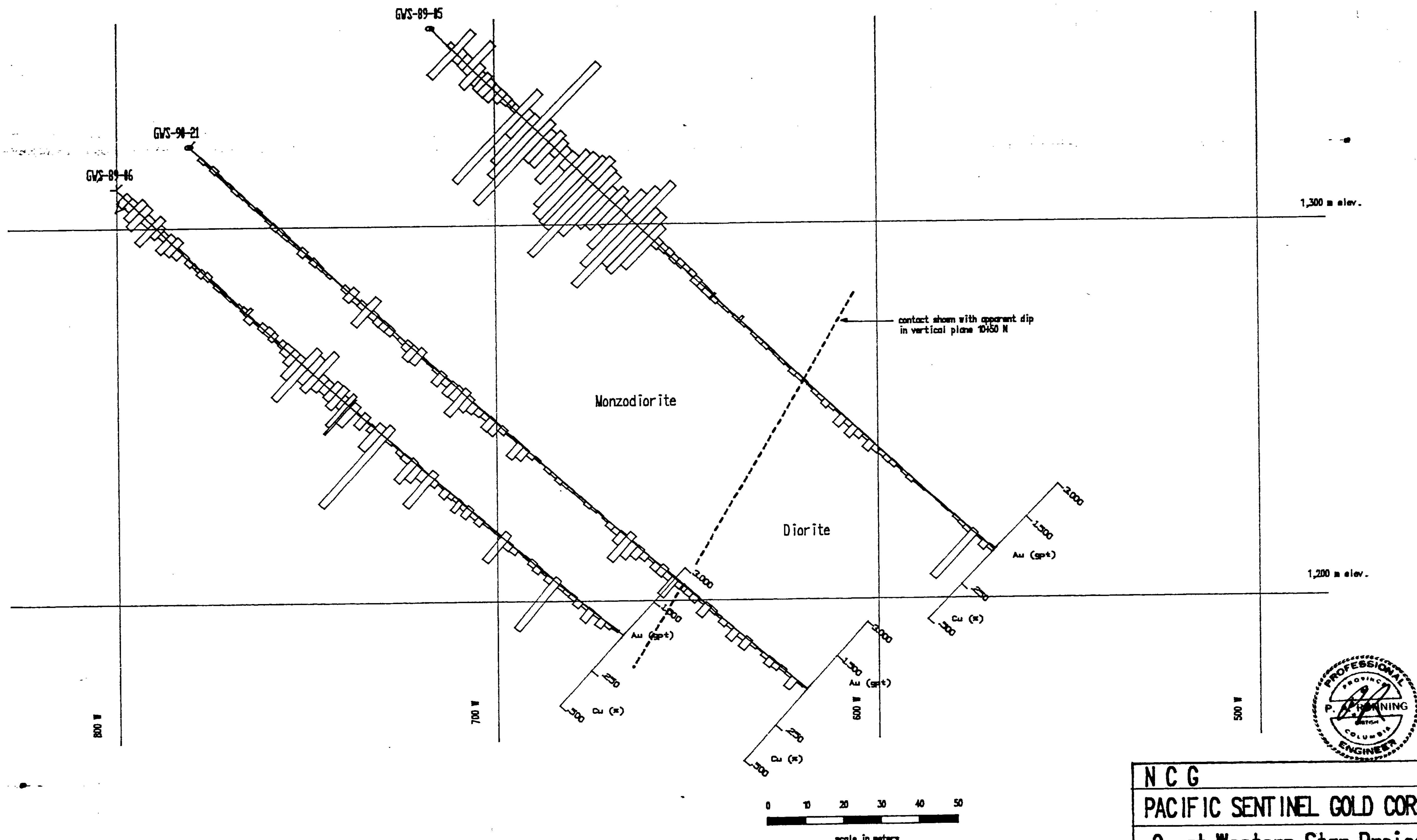
N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Eureka Portal Area - Plan
Geology

Drawing No.:	Drawn by: PAR	Figure No.: 28
Rev. No. 1	Date: 09/04/90	


GWS-89-05
GWS-90-21
GWS-89-06
ovb
MD
di
dior
lamp
1,300 m elev.
1,200 m elev.
contact shown with apparent dip in vertical plane 10+50 N
Monzodiorite
Diorite
800 W
700 W
600 W
500 W
0 10 20 30 40 50
scale in meters
PROFESSIONAL ENGINEER
NCG
PACIFIC SENTINEL GOLD CORP.
Great Western Star Project
GWS-89-5,6;90-21 - Section
Geology
Drawing No.:
Rev. No. 1
Drawn by: PAR
Date: 09/04/90
Figure No.: 29

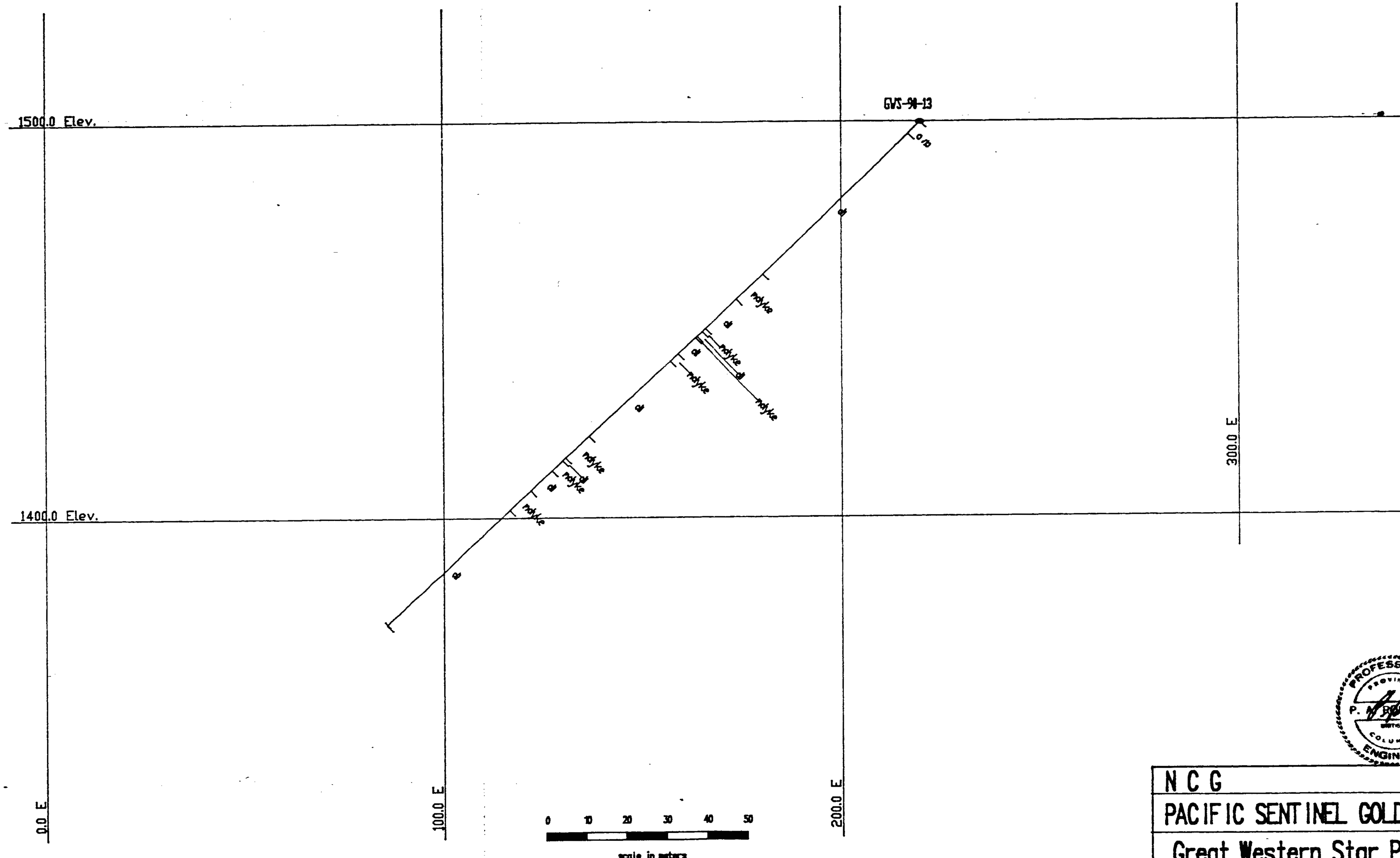


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
GWS-89-5,6;90-21 - Section
Copper (%) vs. Gold (gpt)

Drawing No.:	Drawn by: PAR	Figure No.: 30
Rev. No. 1	Date: 09/04/90	

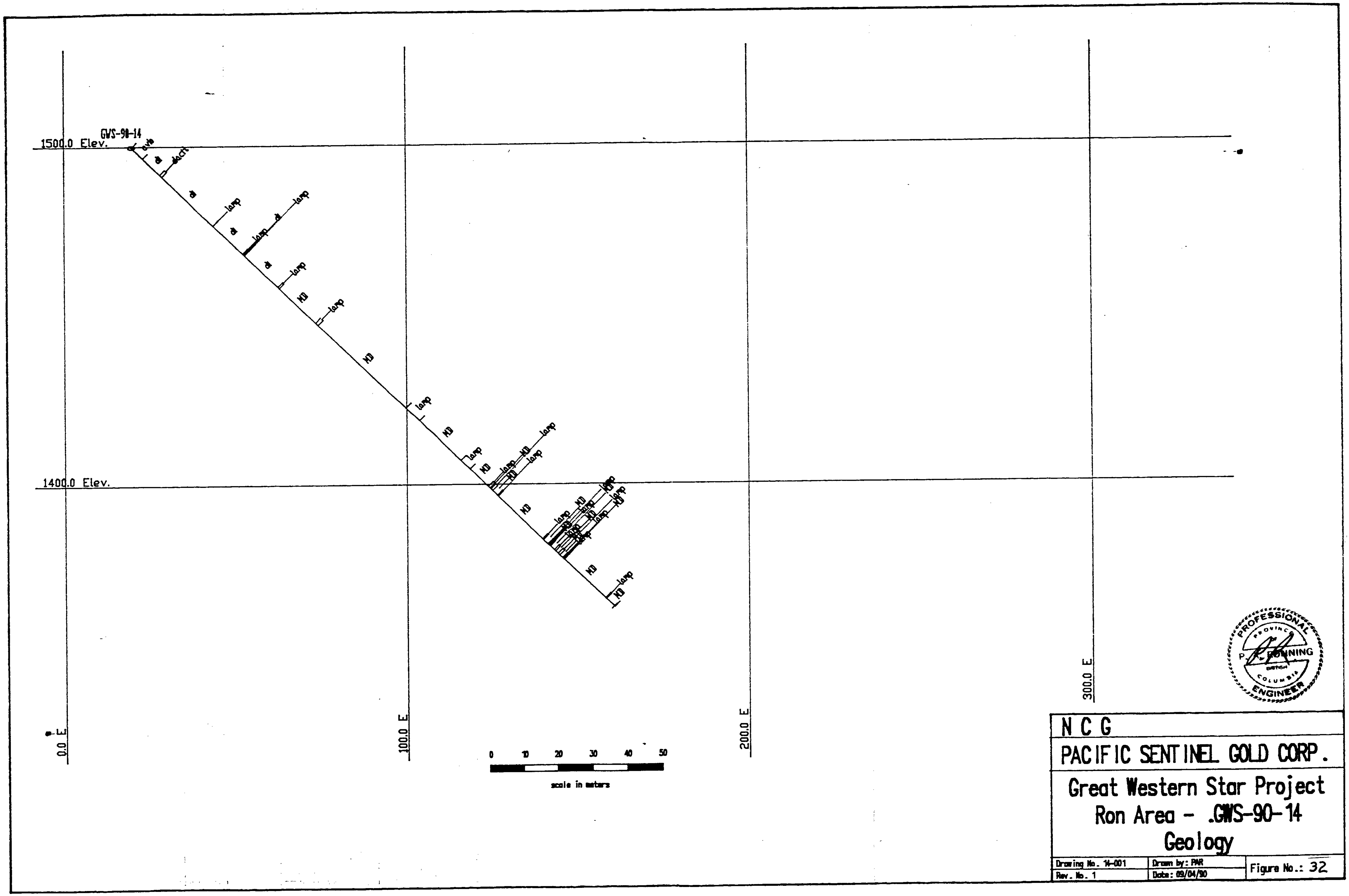


N C G

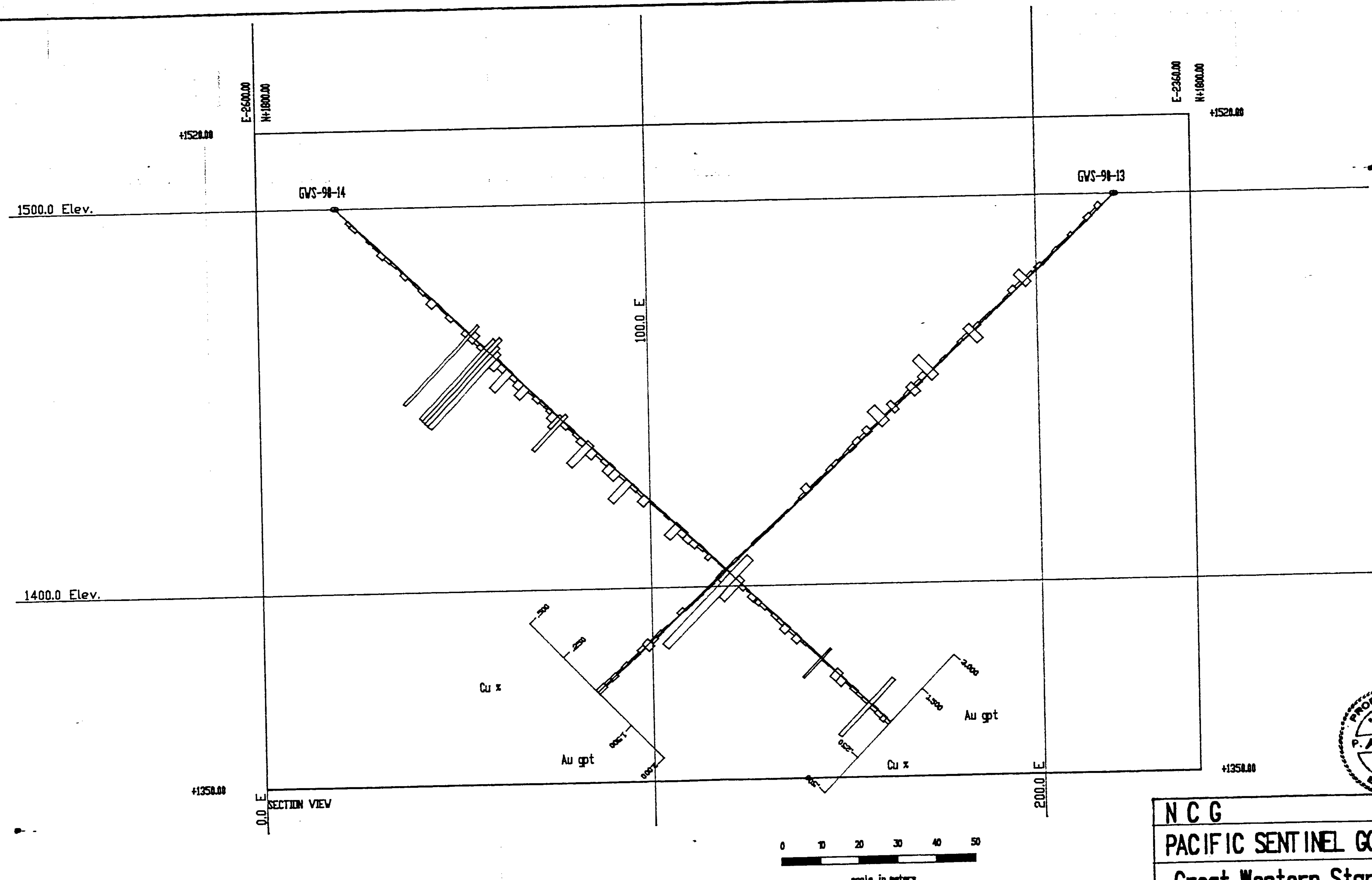
PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Ron Area - GWS-90-13
Geology

Drawing No. 14-001	Drawn by: PAR	Figure No.: 31
Rev. No. 1	Date: 09/04/90	



GWS-90-14
1500.0 Elev.
1400.0 Elev.
0.0 E
100.0 E
200.0 E
300.0 E
0 10 20 30 40 50
scale in meters
NCG
PACIFIC SENTINEL GOLD CORP.
Great Western Star Project
Ron Area - .GWS-90-14
Geology
Drawing No. 14-001
Rev. No. 1
Drawn by: PAR
Date: 09/04/90
Figure No.: 32

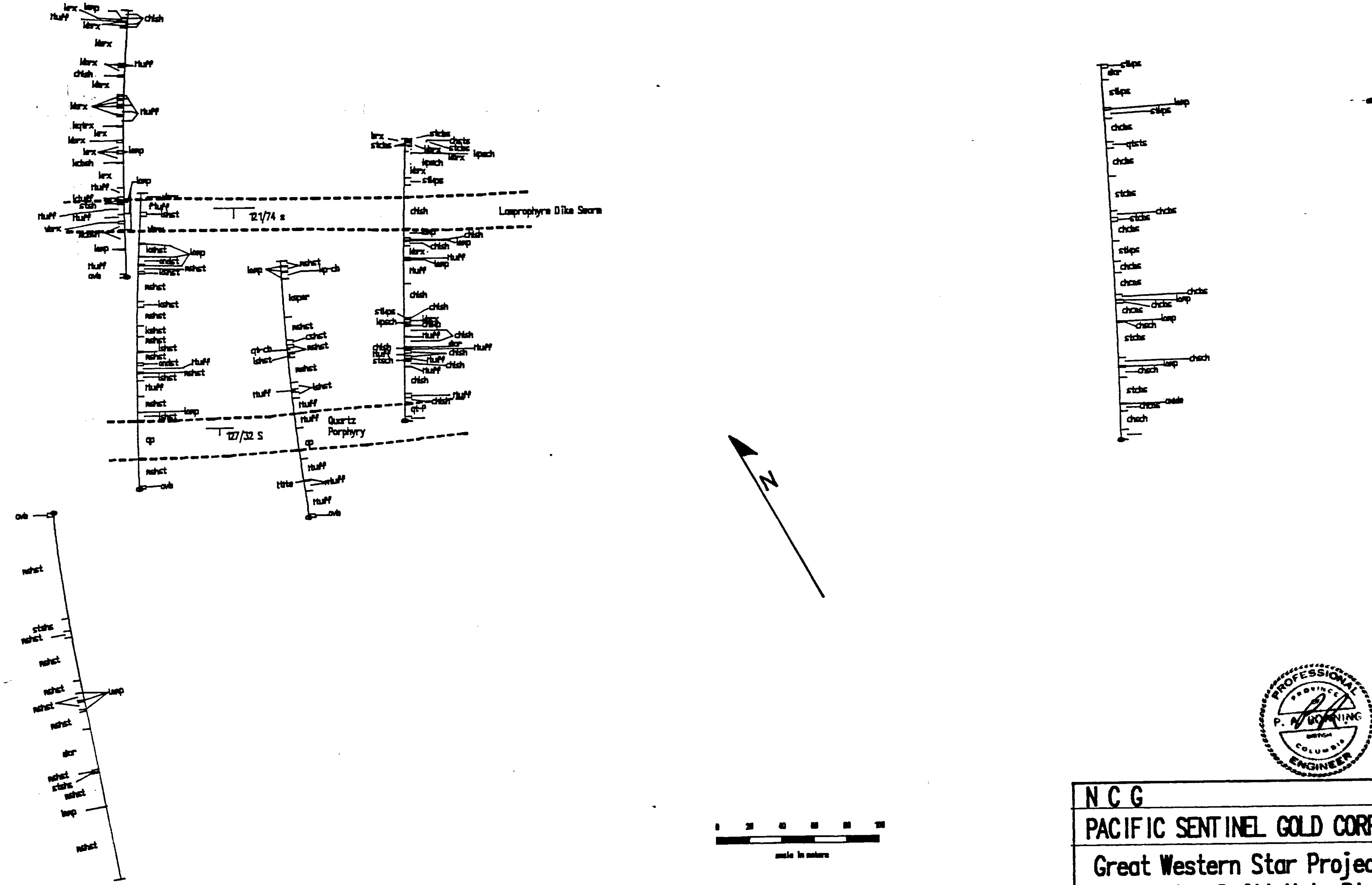


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Ron: GWS-90-13 & 14
Copper (%) vs. Gold (gpt)

Drawing No. 14-001	Drawn by: PAR	Figure No.: 33
Rev. No. 1	Date: 09/04/90	

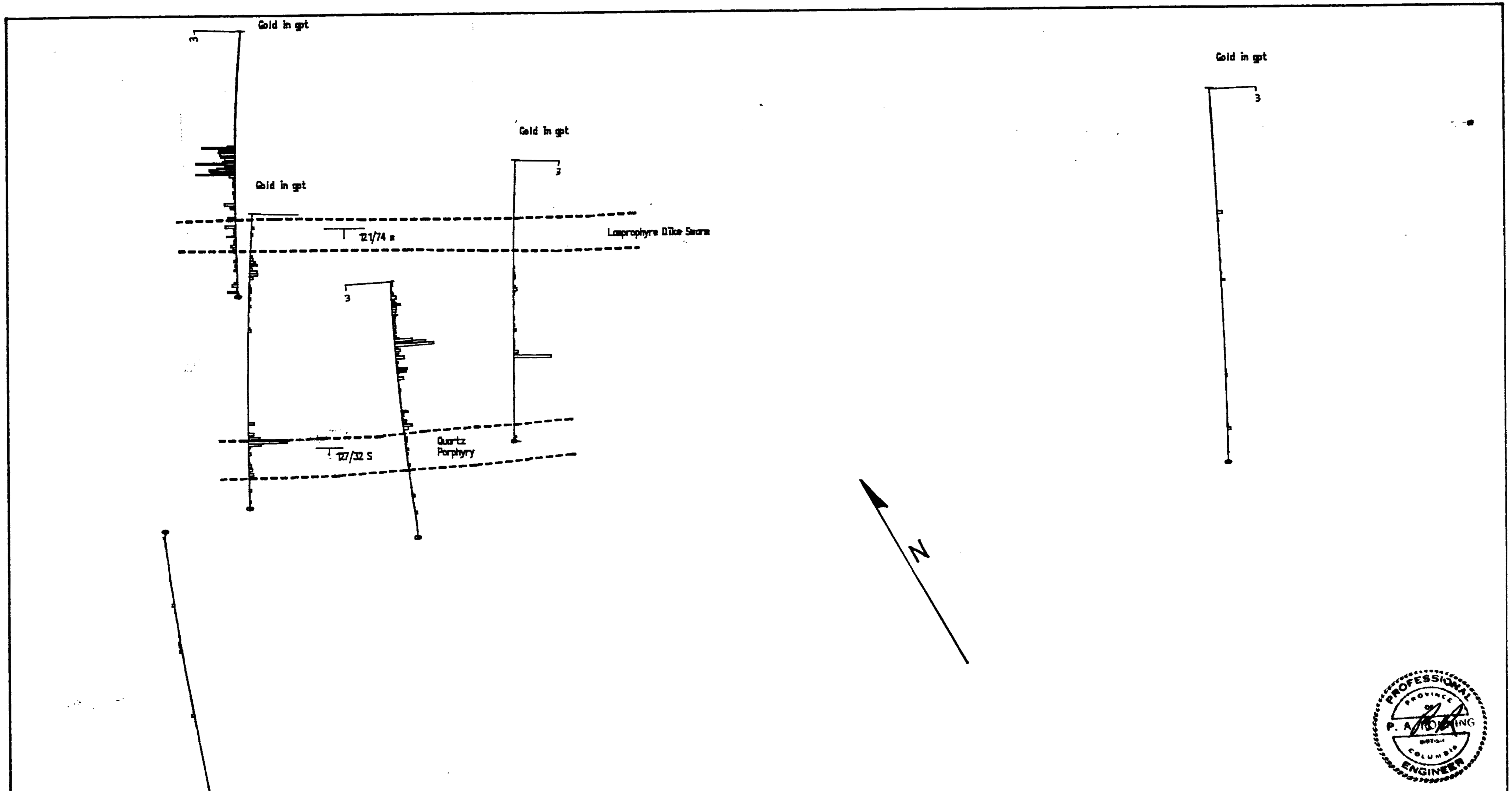


NCG

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Toughnut - Drill Hole Plan
Geology

Drawing No.:	Drawn by: PAR	Figure No.: 34
Rev. No. 1	Date: 08/04/90	

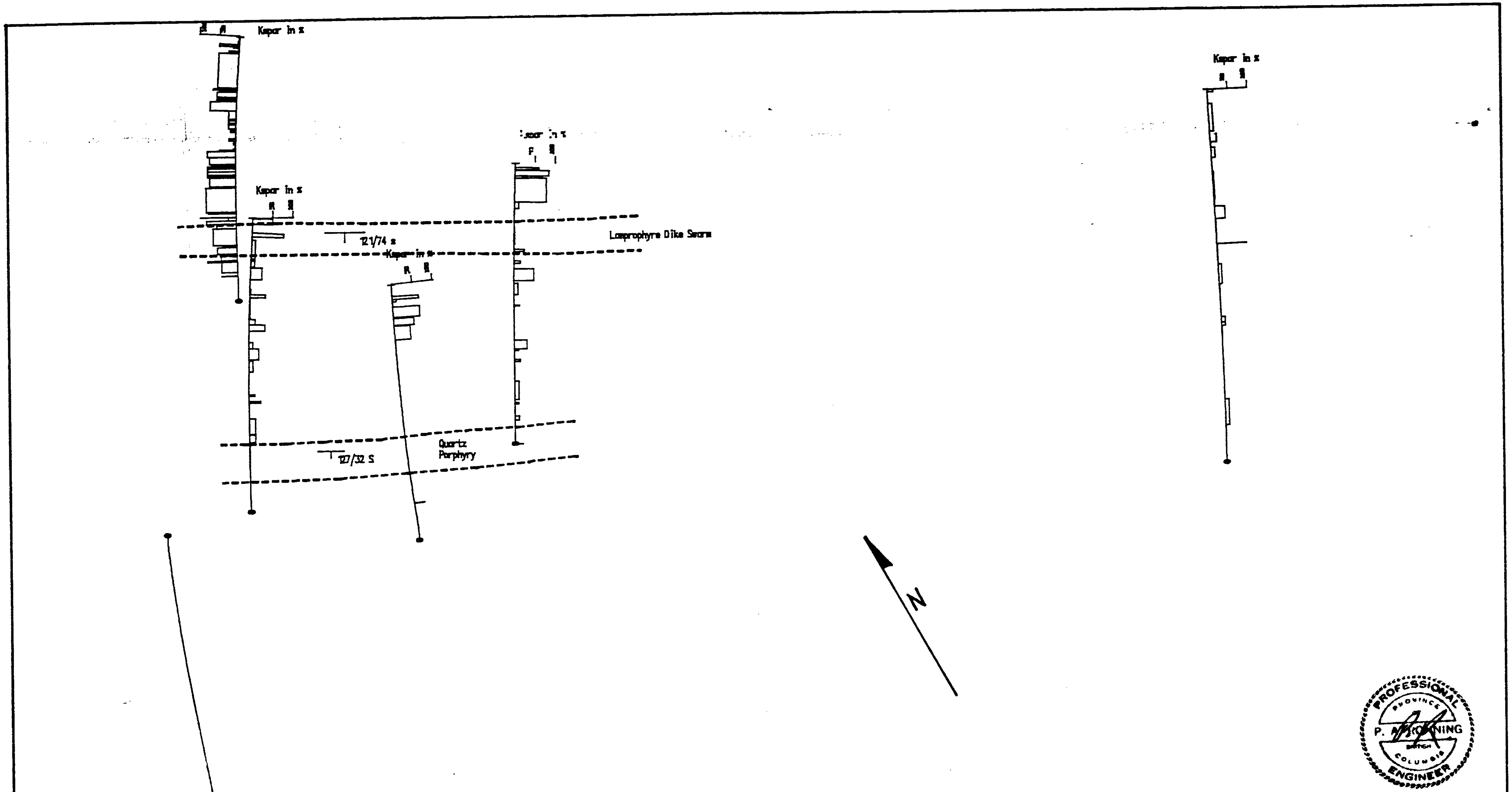


NCG

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Toughnut - Drill Hole Plan
Gold (gpt)

Drawing No.:	Drawn by: PAR	Figure No.: 35
Rev. No. 1	Date: 08/04/90	

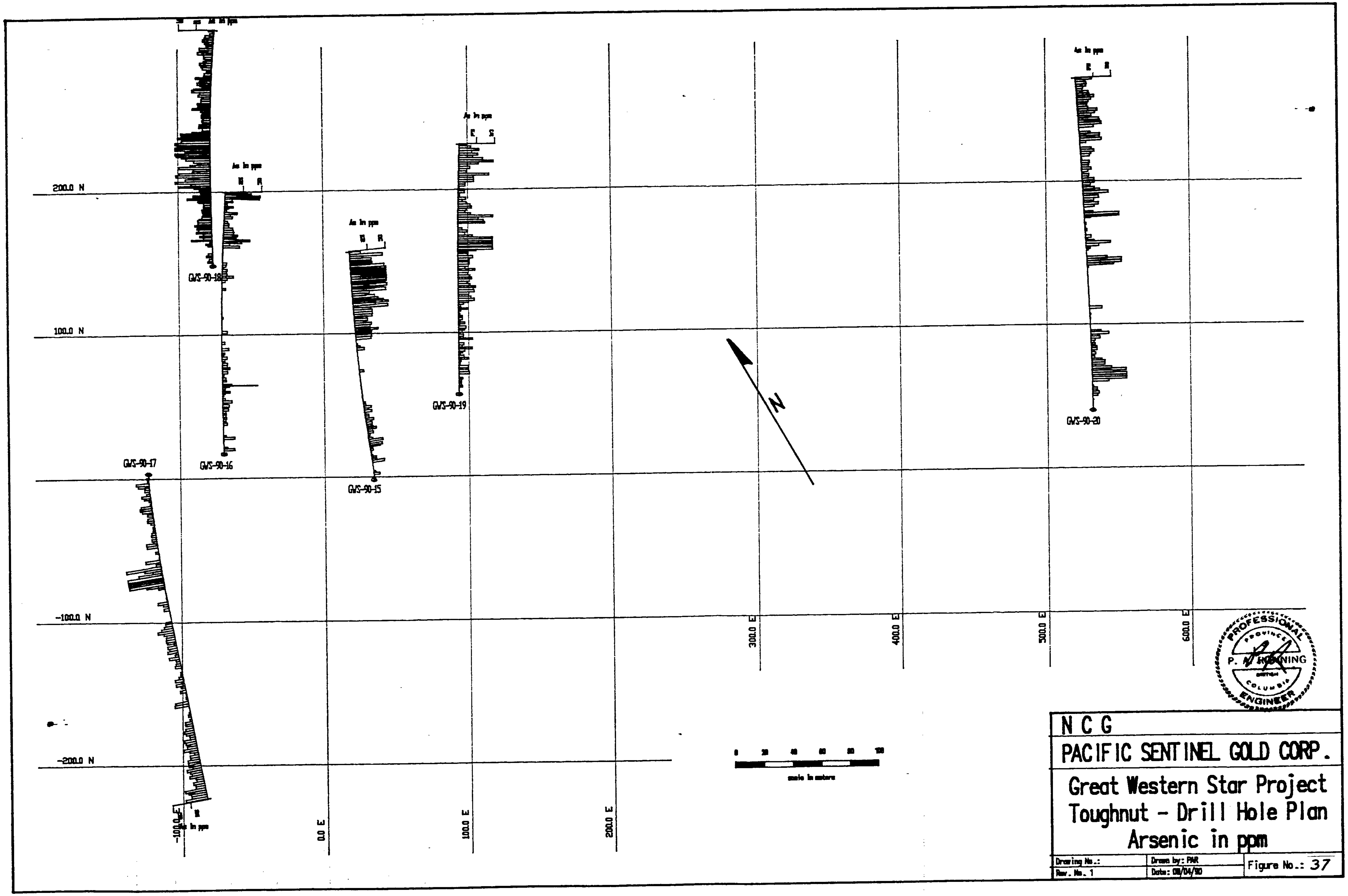


NCG

PACIFIC SENTINEL GOLD CORP.

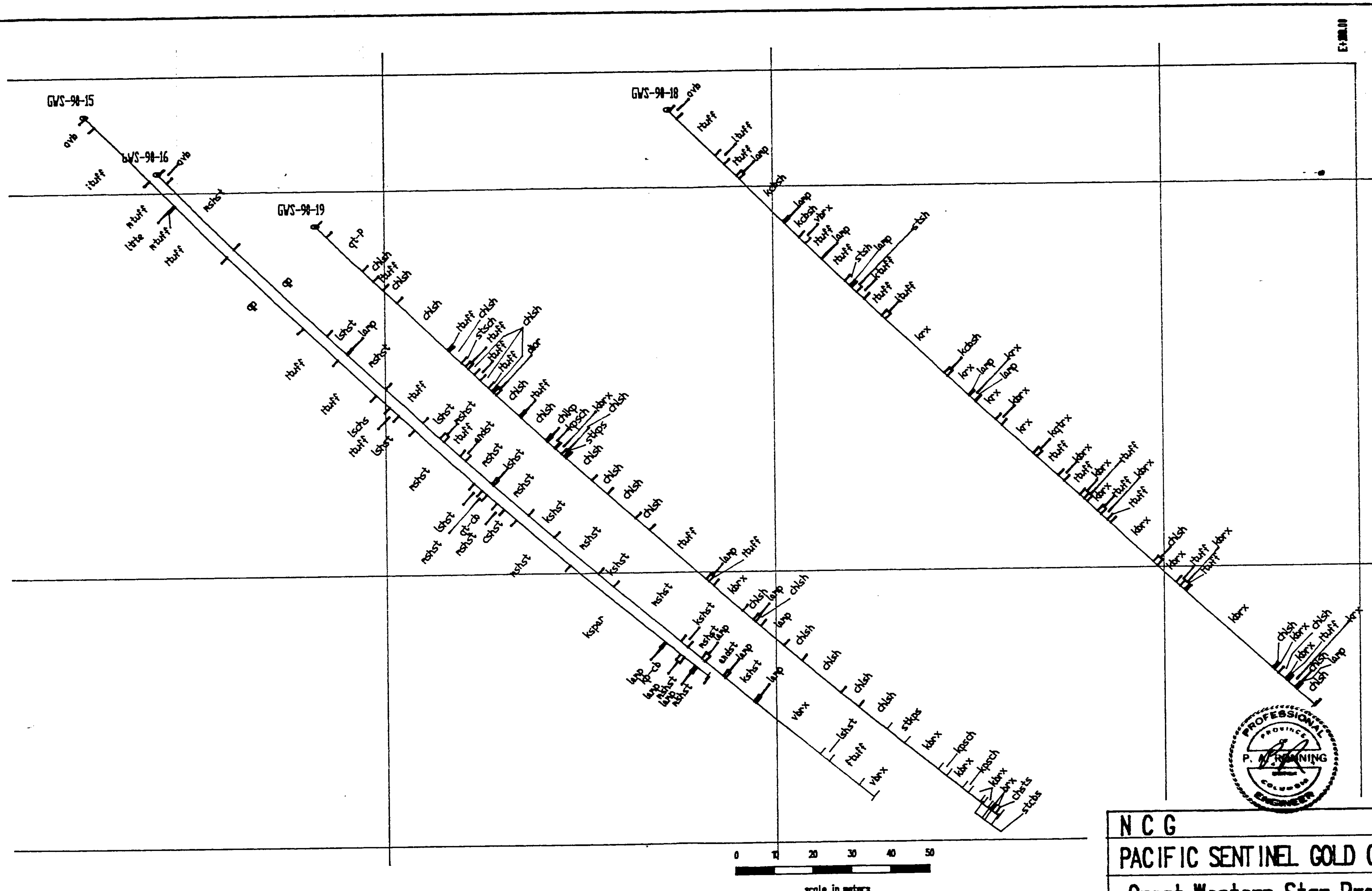
Great Western Star Project
Toughnut - Drill Hole Plan
K Feldspar (%)

Drawing No.:	Drawn by: PAR	Figure No.: 36
Rev. No. 1	Date: 08/04/90	



NCG
PACIFIC SENTINEL GOLD CORP.
Great Western Star Project Toughnut - Drill Hole Plan Arsenic in ppm

Drawing No.: Rev. No. 1	Drawn by: PAR Date: 08/04/90	Figure No.: 37

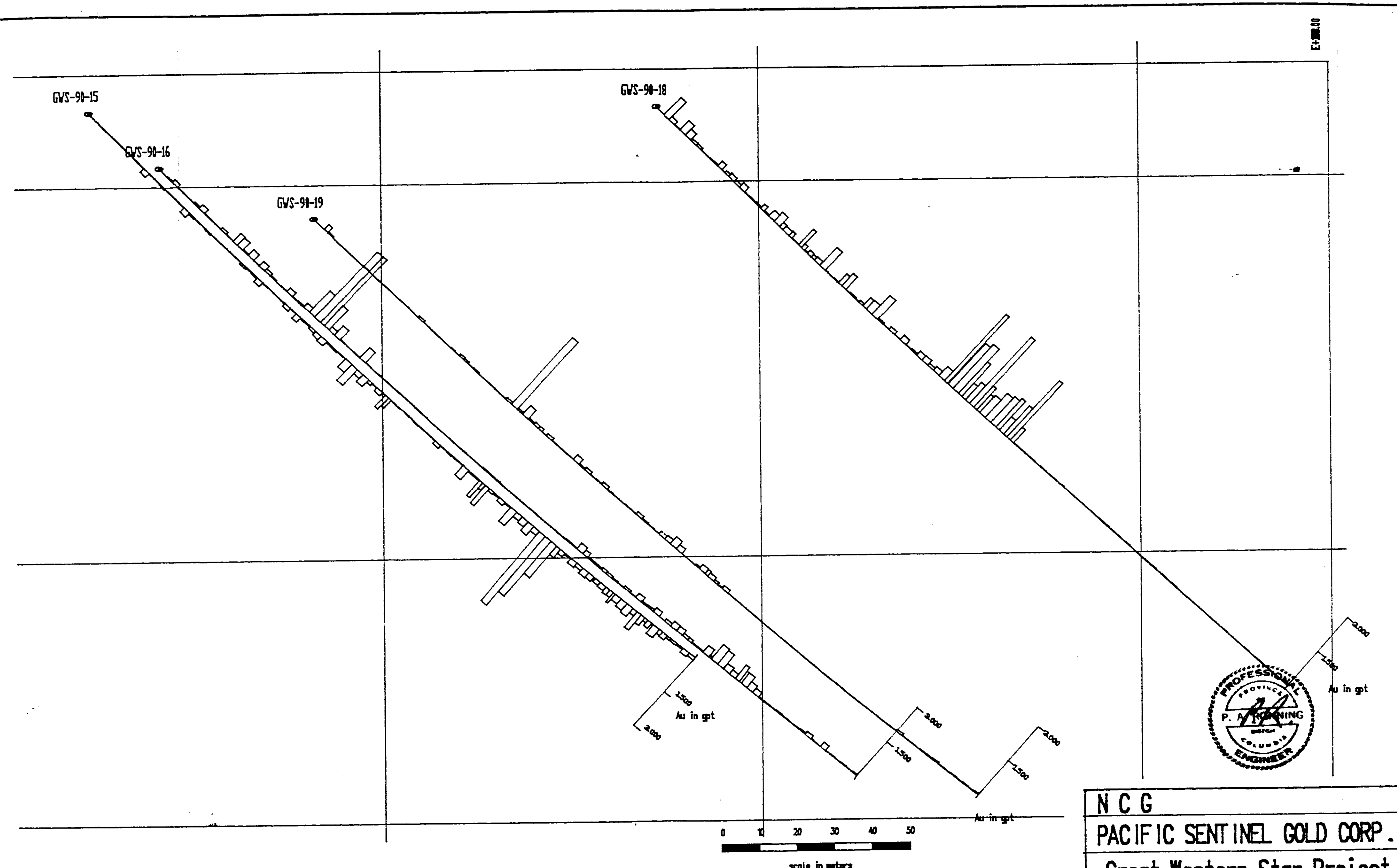


NCG

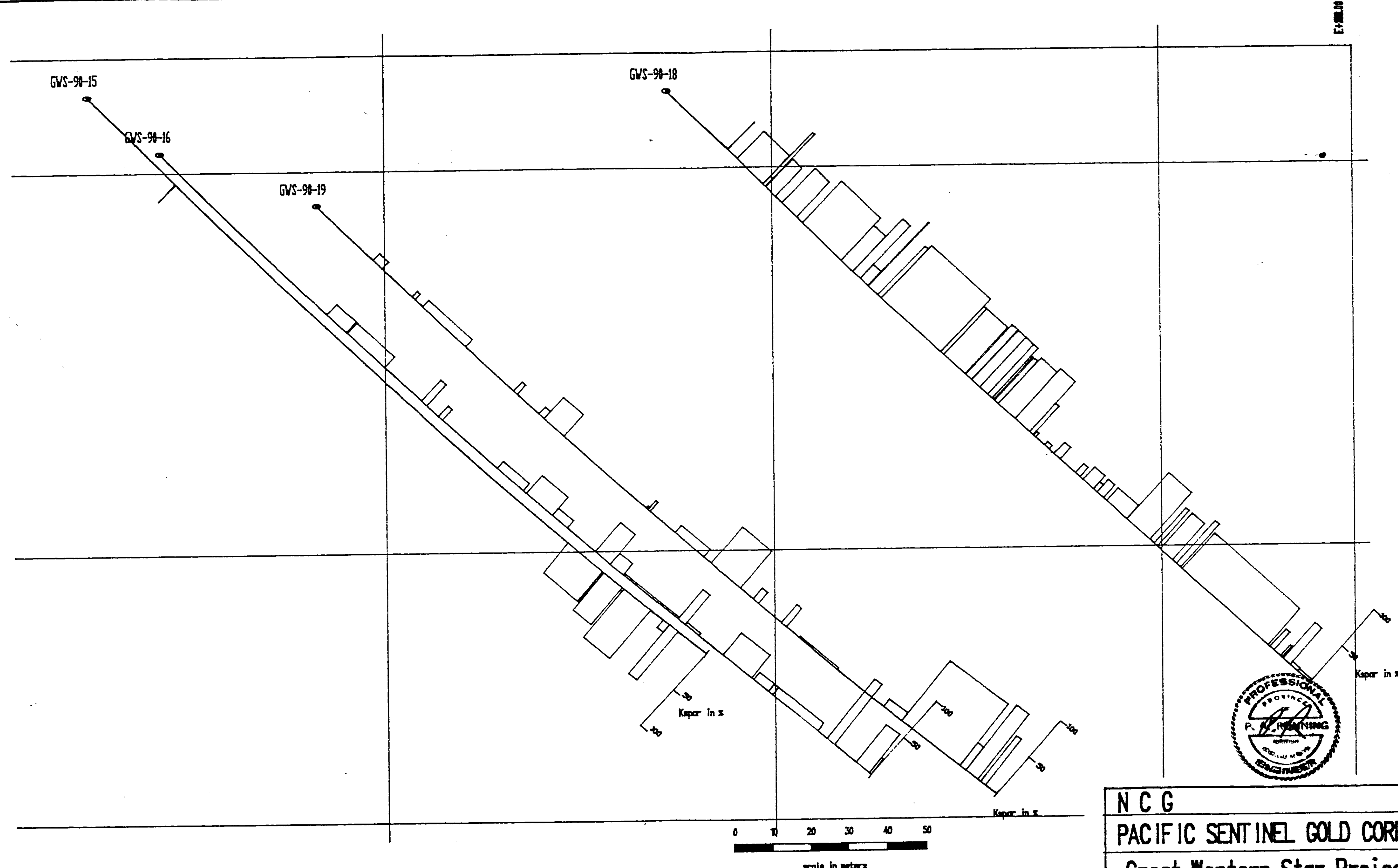
PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Toughnut - GWS-90-15, 16, 18, 19
Sectional View - Geology

Drawing No.:	Drawn by: PAR	Figure No.: 38
Rev. No. 1	Date: 09/04/90	



N C G		
PACIFIC SENTINEL GOLD CORP.		
Great Western Star Project Toughnut - GWS-90-15, 16, 18, 19 Gold		
Drawing No.: Rev. No. 1	Drawn by: PAR Date: 09/04/90	Figure No.: 39

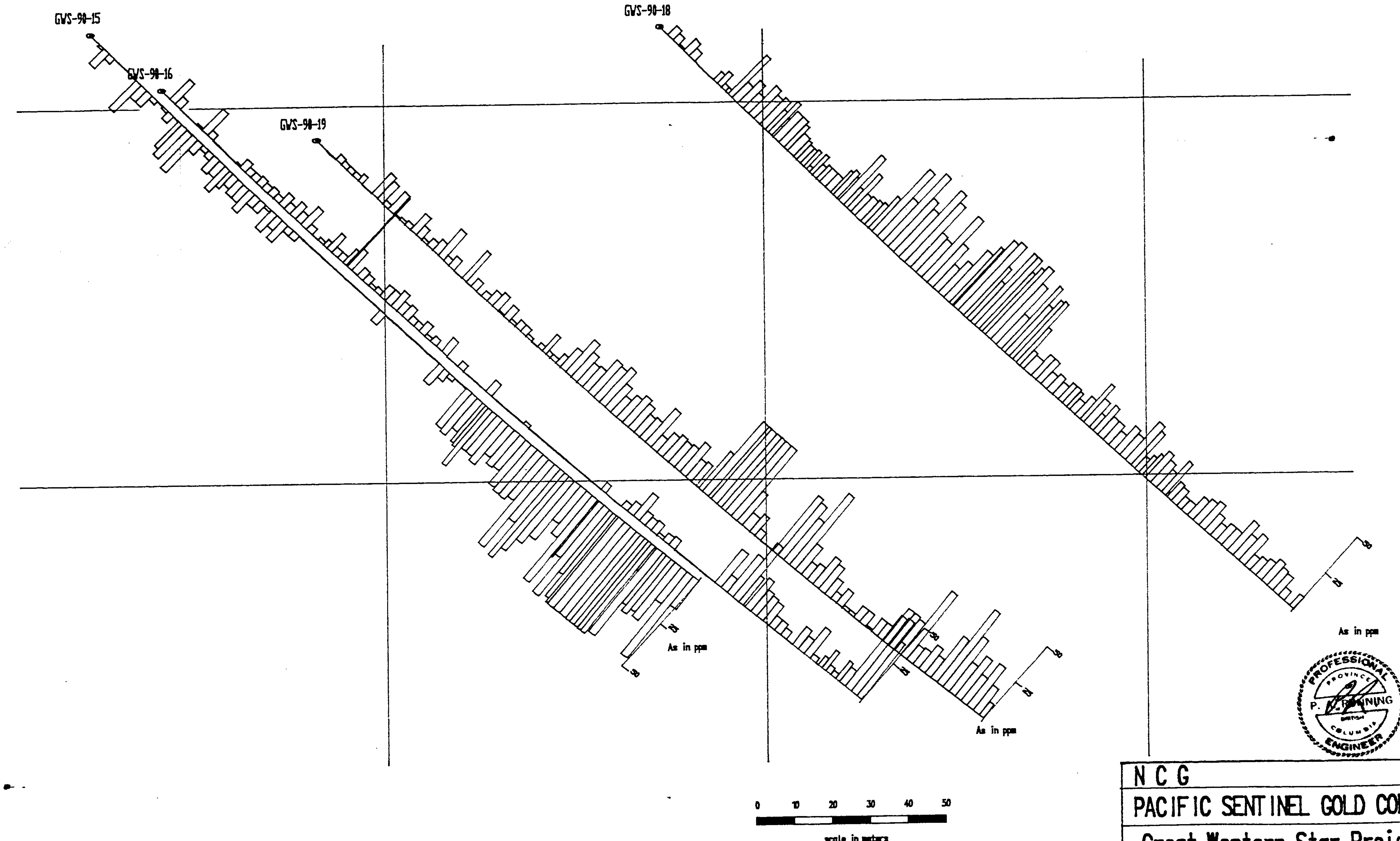


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Toughnut - GWS-90-15, 16, 18, 19
K Feldspar

Drawing No.:	Drawn by: PAR	Figure No.: 40
Rev. No. 1	Date: 09/04/90	

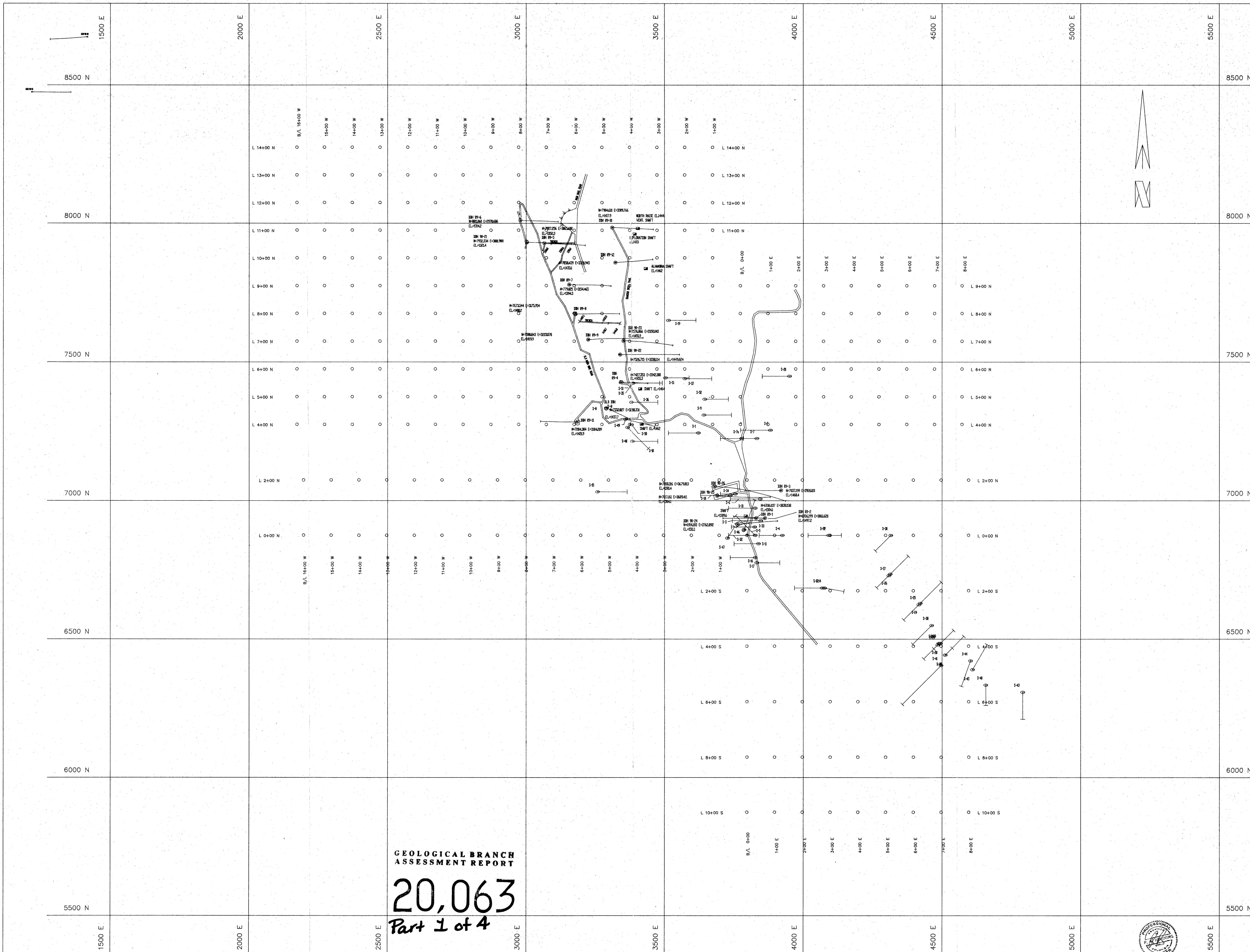


N C G

PACIFIC SENTINEL GOLD CORP.

Great Western Star Project
Toughnut - GWS-90-15, 16, 18, 19
Sectional View - Arsenic

Drawing No.:	Drawn by: PAR	Figure No.: 41
Rev. No. 1	Date: 09/04/90	



NOTES ON DRILL HOLES

- GWS holes are surveyed except GWS-90-13 & 14
- S series holes are not surveyed. Locations may be slightly inaccurate due to translation between grids.

SCALE	:	1 : 5000
GRID SPACING	:	500 m
MAP	:	1N 1E

PACIFIC SENTINEL GOLD CORP.

GREAT WESTERN STAR PROPERTY

NELSON , B.C.

LEVEL : SURFACE PLAN

NOTE:
- BEARINGS ARE GRID DERIVED FROM GRID BASE LINE.
- ELEVATIONS ARE DERVIED FROM DDH S-49.
- CO-ORDINATES ARE U.T.M.
- DISTANCE AND ELEVATIONS ARE IN METERS.

DRAWN BY : J.T.

DATE APRIL 18, 1990

20,063