MINNOVA

824144

MEMORANDUM

DATE: September 30, 1991

A TO: D. Heberlein

COPIES À COPIES TO: A. Davidson, I. Pirie, Ross Weeks

DE FROM: C.J. Clayton

SUJET SUBJECT: Fall 1991 Drill Proposal - Tam O'Shanter/Wildrose Properties - Update

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INTRODUCTION

A 19 hole, 2500 metre drill program is proposed to test a number of targets on the Tam O'Shanter and Wildrose properties. Drilling is planned to commence on the property on October 1, 1991, to test for Cu-Au porphyry, disseminated, and replacement mineralization.

SUMMARY

A large diorite porphyry system is present on the Tam O'Shanter area in the north-east corner of the Rainbow-Tam O'Shanter property. This system has been known for some time and was explored fairly extensively during the seventies and eighties as a Cu-Mo system with little or no analysis for Au. As well a number of high grade veins occur within the porphyry and these have been worked in the past. Work in 1991 began with extension of the old BP grid to the north-east and south-east to cover a portion of this system with mapping, rock sampling and soil sampling, and limited geophysical (I.P.) work. As mapping and sampling proceeded both rock and soil analyses returned strongly encouraging Au and Cu results, not only from the veins but from the diorite itself. These results as well as reconnaissance work prompted the extension of the grid further to the east to the property claim boundary. As mapping continued a roughly concentric, mineralization and alteration pattern became evident. When placed in a more regional context, further patterns typical of porphyry systems emerged. The geometric relationship of the Motherlode, Greyhound, and Buckhorn skarn deposits to the Tam porphyry system is such that these form a roughly arcuate trend, occurring as proximal deposits to the Tam

system. To the south-east, alteration and mineralization, and I.P. anomalies trend onto the Wildrose property. Still further south is the Wildrose vein system, consisting of a number of auriferous massive pyrite, arsenopyrite, magnetite, and chalcopyrite veins. These are considered distal deposits related to the Tam porphyry system, and occur topographically and stratigraphically higher than the porphyry.

The acquisition of the Wildrose property postponed drilling on the Tam O'Shanter property to allow grid line extensions, grid mapping and rock and soil sampling, and I.P. geophysics and magnetometery to be completed over the new area and over areas on Tam not covered by the original survey.

The Tam porphyry system consists of diorite porphyry of various phases mapped over an area approximately 1.4 km lengthwise in a north-south orientation by 1.0 km in width east to west. The system is bordered to the west by a curvilinear north-south trending fault placing Tertiary as well as Permian sediments against the Jurassic porphyry system. The fault is extensional and related to Toroda graben formation, and varies in dip from vertical to 30° to the west. A related east-west structure forms the southern border of the Tam diorite. This fault dips roughly 20° to the south, with bedded cherty volcaniclastics and minor andesite, conglomerate and sandstone, and coarse hornblende diorite bodies in the hanging wall.

The diorite itself was subdivided into a leucodioritic phase (quartz rich, leucocratic), a dioritic phase, and a chlorite-magnetite alteration phase. D.R.H. has proposed the chlorite-magnetite phase may be a retrograde alteration of biotite alteration substituting for a central potassic zone of alteration which is not prevalent in the system. This hypothesis works well, as the system seems to be zoned concentrically around the chlorite magnetite zone with diorite proximal to the zone and extending outward into leucodiorite. Another possibility for the lack of an

extensive potassic alteration zone with K-feldspar is this may be a dissected system, oriented on its side as a result of rotational block faulting during Tertiary graben formation. The chlorite-magnetite zone would then become an annular alteration zone around the central portion of the system.

Alteration away from this central zones grades through an intermediate argillic zone which includes some sericite, chlorite and calcite, as well as localised zones of hematized magnetite, specular hematite veins, and gypsum. An annular zone of pyritic and siliceous alteration of diorite may indicate a weak zone of phyllic alteration grading into a more intensely altered outer zone of massive silicification occurring at both the northern and southern extent of the diorite. Within the silicification fracturing and stockwork quartz veining, localized hydrothermal breccias, and localized chalcedonic quartz are observed. These areas may present prospective areas for exploration.

Proposed Drilling:

The 1991 drill program on the Tam O'Shanter property is directed at testing mineralization related to the Tam porphyry system. Drill targets on the property have been defined by geology, anomalous rock and soil geochemistry, I.P. geophysics, and magnetometery. A total of 23 holes are planned. The attached schematic cross section and metallogenic model shows in a generalized way the two areas of planned drilling. Topographic sections showing chargeability, anomalous soil geochemistry, magnetometery, and drill hole locations and orientations are attached.

AREA 1

Area 1 encompasses holes P-1 through P-8. Holes P-1 through P-2 will test andesitic volcanics to the north of the Tam diorite for disseminated and replacement mineralization within the volcanics. Holes P-3 through P-6 will test porphyry mineralization within diorite underlying andesitic volcanics and siliceous cappings. Holes P-7 and P-8 will test diorite for porphyry mineralization

directly in areas of high chargeabilities (to +30mV/V) increasing with depth. Surface samples taken in the area of both diorite and silica altered andesite have returned anomalous values of up to 7103 ppm Cu and 3780 ppb Au.

AREA 2

Area 2 encompasses holes P-9 through P-23. Holes P-9 through P-11 will test diorite and chlorite-magnetite alteration near what appears to be the central portion of the porphyry system. Anomalous rocks nearby returned values of 2646 ppm Cu and 328 ppb Au from diorite, and 12962 ppm Cu and 762 ppb Au from a shear within diorite. Holes P-12 through P-14 will test porphyry mineralization underneath areas of siliceous cappings near cross cutting structures. Surface samples in the area have returned results of 4131 ppm Cu and 165 ppb Au, and 1449 ppm Cu and 180 ppb Au. Hole P-15 will test the contact between diorite and Permian sediments located in the southern portion of the property. Cross cutting structures and hydrothermal breccias are located in this area. Hole P-16 will directly test underneath a siliceous capping showing a strong chargeability (+25 mV/V) at depth accompanied by a mag high and anomalous Cu soil geochemistry. Hydrothermal breccias are seen in the area. Holes P-17 and P-18 will test an area of strong stockwork silicification accompanied by a +30 mV/V chargeability anomaly at depth, strong mag high, and broad anomalous Cu-Au soil geochemistry. The chargeability anomaly may indicate the porphyry system underlying the cap. Hole P-19 will test andesitic volcanics for possible stockwork and disseminated mineralization near cross cutting structures, stockwork silicification, and chargeabilities greater than 30 mV/V. Holes P-20 and P-21 will test for sediment hosted disseminated and replacement mineralization in areas accompanied by chargeabilities greater than +30 mV/V, anomalous soil and rock geochemistry, and weak to moderate mag highs. Holes P-22 and P-23 will test diorite where it intrudes Permian sediments. The areas show high chargeabilities (+30 mV/V), anomalous Cu-Au soil geochemistry, and weak to moderate mag highs.

TABLE 1

RAINBOW-TAM O'SHANTER/WILDROSE PROPERTIES, 1991

PROPOSED DRILL HOLE LOCATIONS

HOLE	LOCATION	COLLAR			DEPTH	TARGET
		AZ	DIP	ELEV		
P-1	2800N 825E	270	-45	1020 metres	130 metres	TEST ANDESITIC VOLCANICS TO NORTH OF DIORITE; Cu/Au SOIL, CHARGEABILITY, MAG AND ROCK SAMPLE ANOMALIES.
P-2	2800N 975E	110	-60	975 metres	120 metres	
P-3	2600N 1012E	110	-45	1015 metres	160 metres	TEST ANDESITIC VOLCANICS, DIORITE; CHARGEABILITY, MAG,SOIL, AND SURFACE ROCK SAMPLE ANOMALIES IN AREA.
P-4	2600N 1275E	270	-60	965 metres	120 metres	
P-5	2400N 925E	090	-60	1065 metres	120 metres	TEST SILCIFICATION, DIORITE, AND ANDESITIC VOLCANICS; CHARGEABILITY, MAG, SOIL, AND SURFACE ROCK SAMPLE ANOMALIES.
P-6	2400N 1200E	090	-65	1010 metres	100 metres	
P-7	2200N 1300E	090	-45	- metres	150 metres	
P-8	2000N 1050E	090	-60	1050 metres	120 metres	TEST DIORITE IN AREA OF HIGH CHARGEABILITY, MAG, SOIL AND ROCK ANOMALIES.
P-9	1400N 1025E	090	-45	1100 metres	150 metres	TEST CHLORITE-MAGNETITE ALTERATION ZONE
P-10	1200N 820E	115	-45	1070 metres	150 metres	TEST CHL-MAG ALTERATION, ANDESITIC VOLCANICS, AND SILICIFICATION WITH CO-INCIDENT CHARGEABILITY, MAG, SOIL, AND ROCK SAMPLE ANOMALIES.
P-11	1200N 1150E	090	-50	1050 metres	130 metres	
P-12	1000N 960E	090	-70	1230 metres	100 metres	
P-13	1000N 1125E	270	-45	- metres	100 metres	

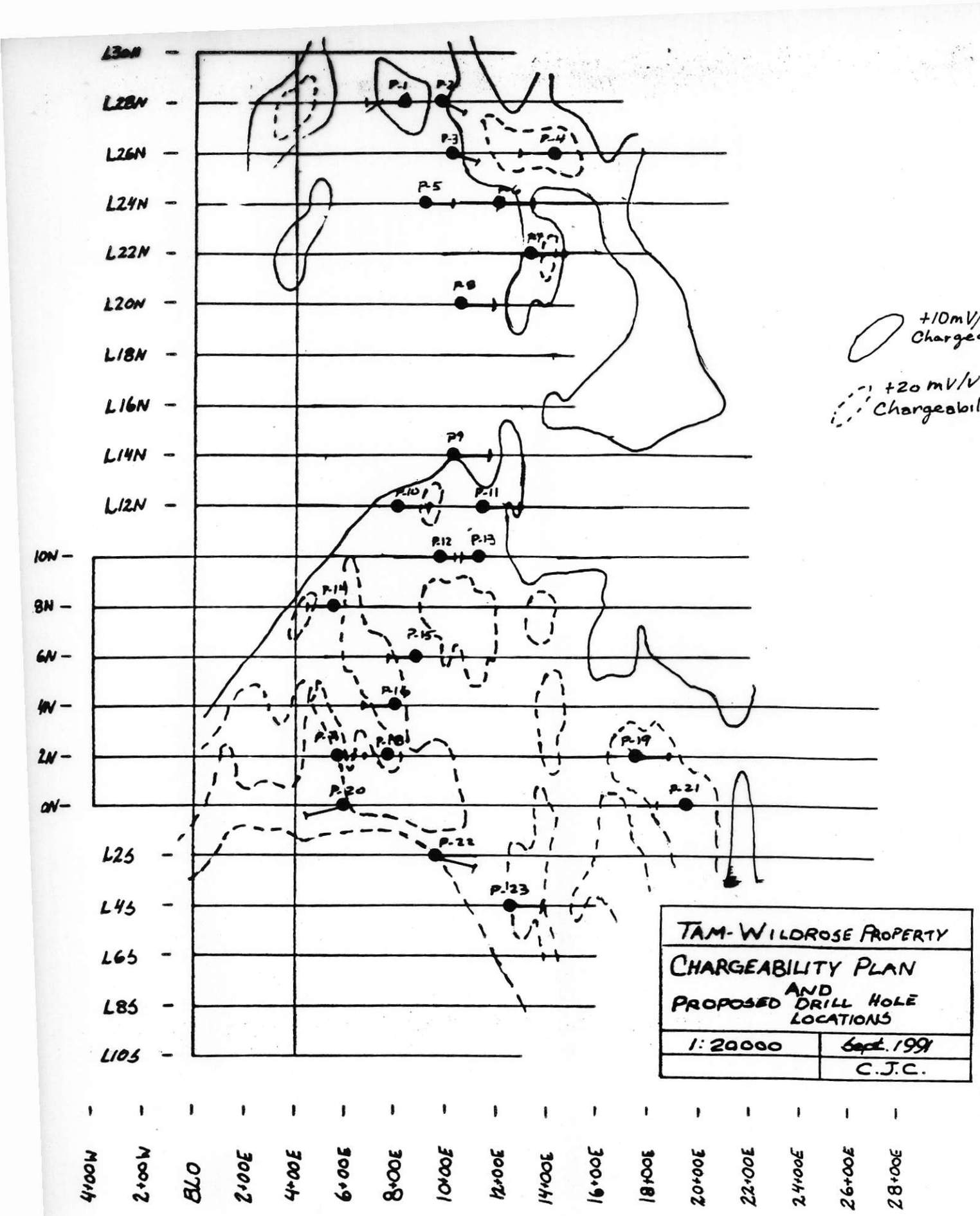
TABLE 1 (CONTINUED)

RAINBOW-TAM O'SHANTER/WILDROSE PROPERTIES, 1991

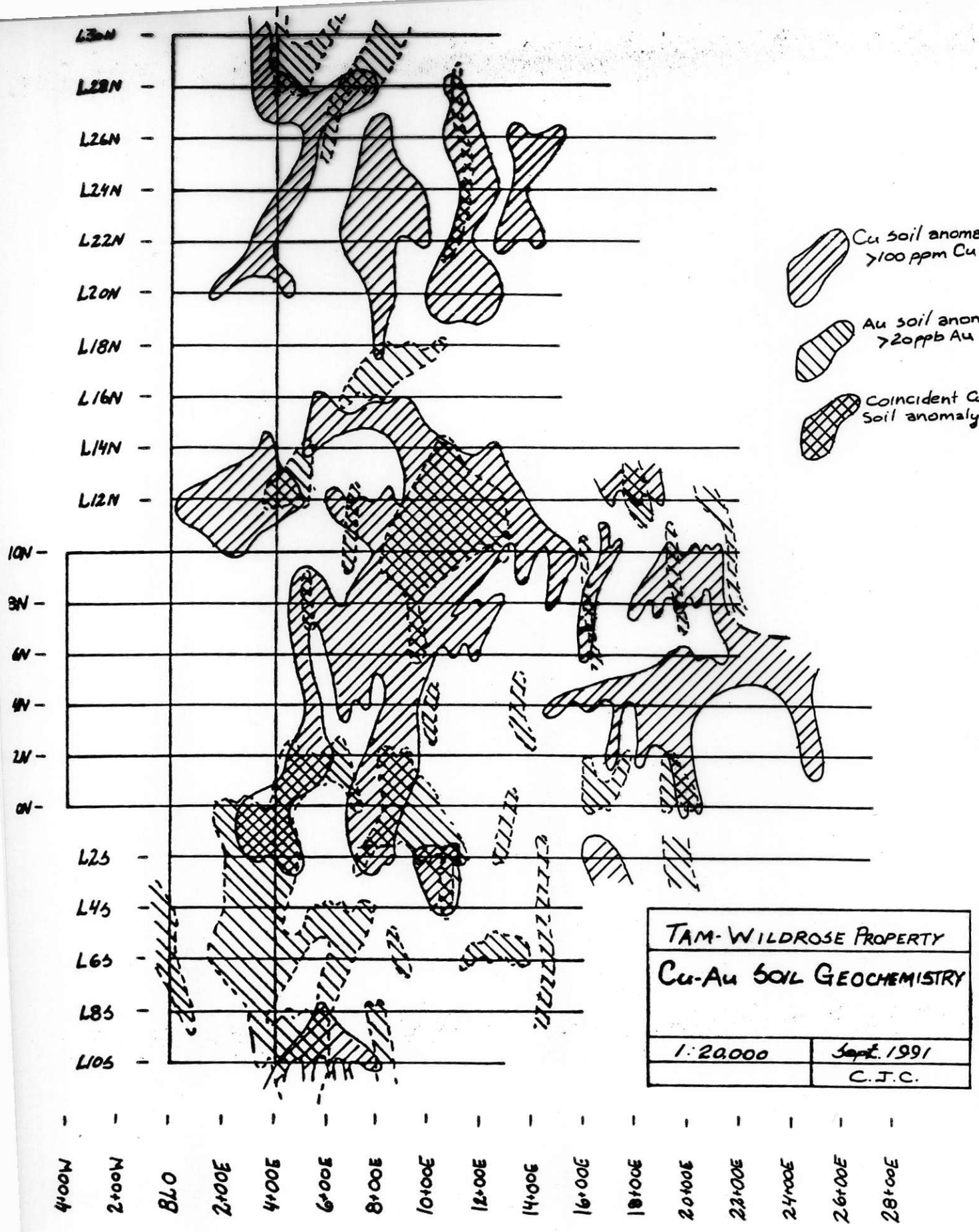
PROPOSED DRILL HOLE LOCATIONS

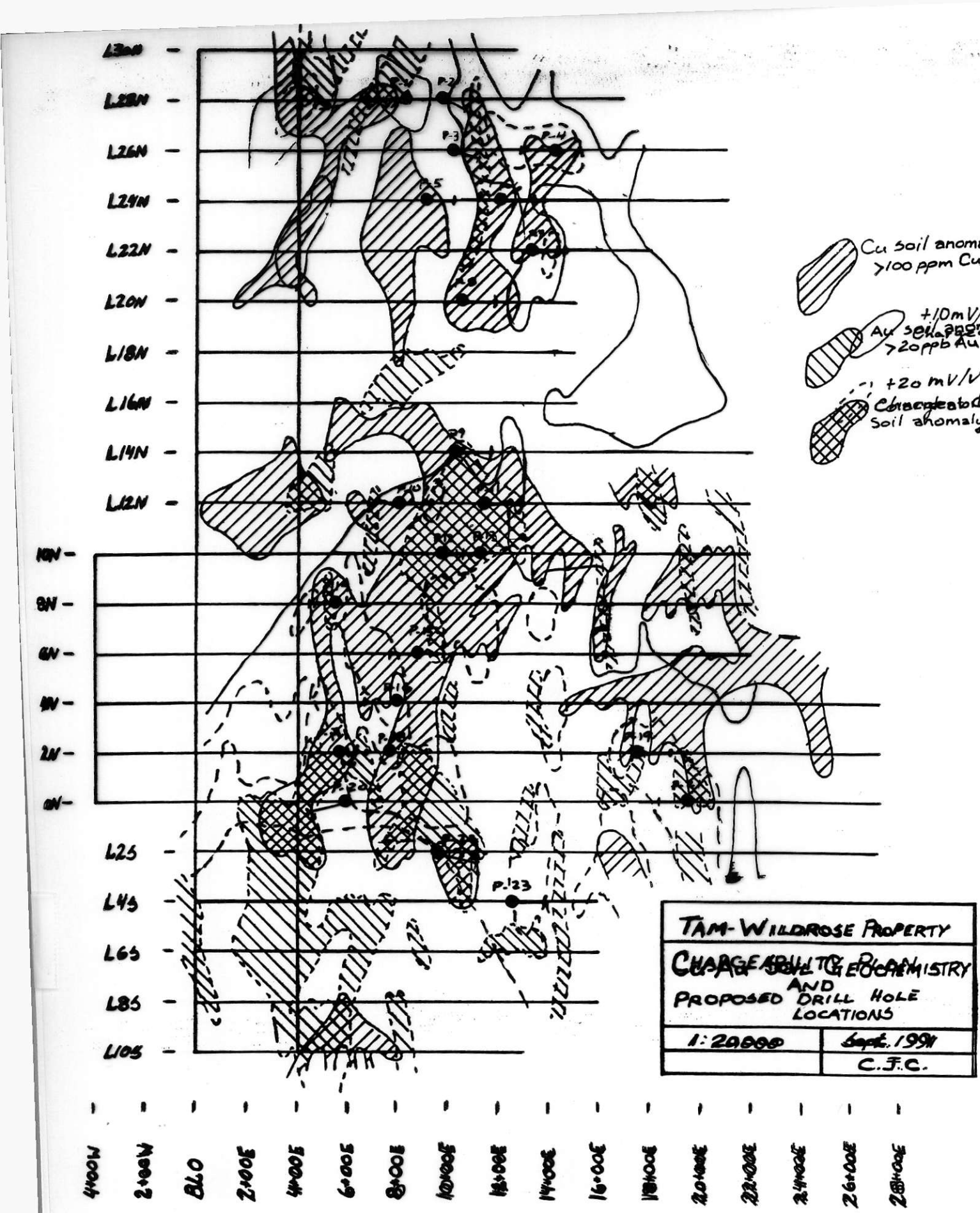
HOLE	LOCATION	COLLAR			DEPTH	TARGET
		AZ	DIP	ELEV		
P-14 *C	800N 550E	270	-45	- metres	150 metres	TEST DIORITE, AND SILCIFICATION NEAR SOUTHERN CONTACT WITH PERMIAN BEDDED CHERTS AND ANDESITES; H'THERMAL BX, CHARGEABILITY, MAG, SOIL AND ROCK ANOMALIES.
P-15	600N 875E	270	-45	1340 metres	200 metres	
P-16	400N 800E	270	-45	1370 metres	110 metres	
P-17	200N 575E	090	-70	- metres	110 metres	TEST MAG ANOMALY AND CHARGEABILITY ANOMALY AT DEPTH BELOW SILICEOUS CAP; ANOMALOUS SOIL AND ROCK GEOCHEMISTRY.
P-18	200N 775E	270	-45	1360 metres	150 metres	
P-19	200N 1750E	070	-55	1100 metres	130 metres	TEST PERMIAN SEDIMENTS AND ANDESITIC VOLCANICS FOR STKWRK AND/OR SEDIMENT HOSTED DISSEMINATED MINERALIZATION ASSOCIATED WITH HIGH CHARGEABILITIES, WEAK MAG AND WEAK TO STRONG SOIL GEOCHEM AND ANOMALOUS ROCK GEOCHEM.
P-20 *C	000N 600E	245	-45	- metres	120 metres	
P-21 *C	000N 1950E	270	-45	- metres	130 metres	
P-22 *C	200S 950E	120	-55	- metres	130 metres	TEST DIORITE INTRUDING PERMIAN SEDIMENTS WITH CHARGEABILITY AND MAG HIGHS, AND WEAK TO STRONG Au SOIL GEOCHEMISTRY.
P-23	400S 1255E	090	-50	1240 metres	150 metres	

*C - CANCELLED HOLE



TAM-WILDROSE PROPERTY	
CHARGEABILITY PLAN AND PROPOSED DRILL HOLE LOCATIONS	
1:20000	~~Sept.~~ 1991
	C.J.C.

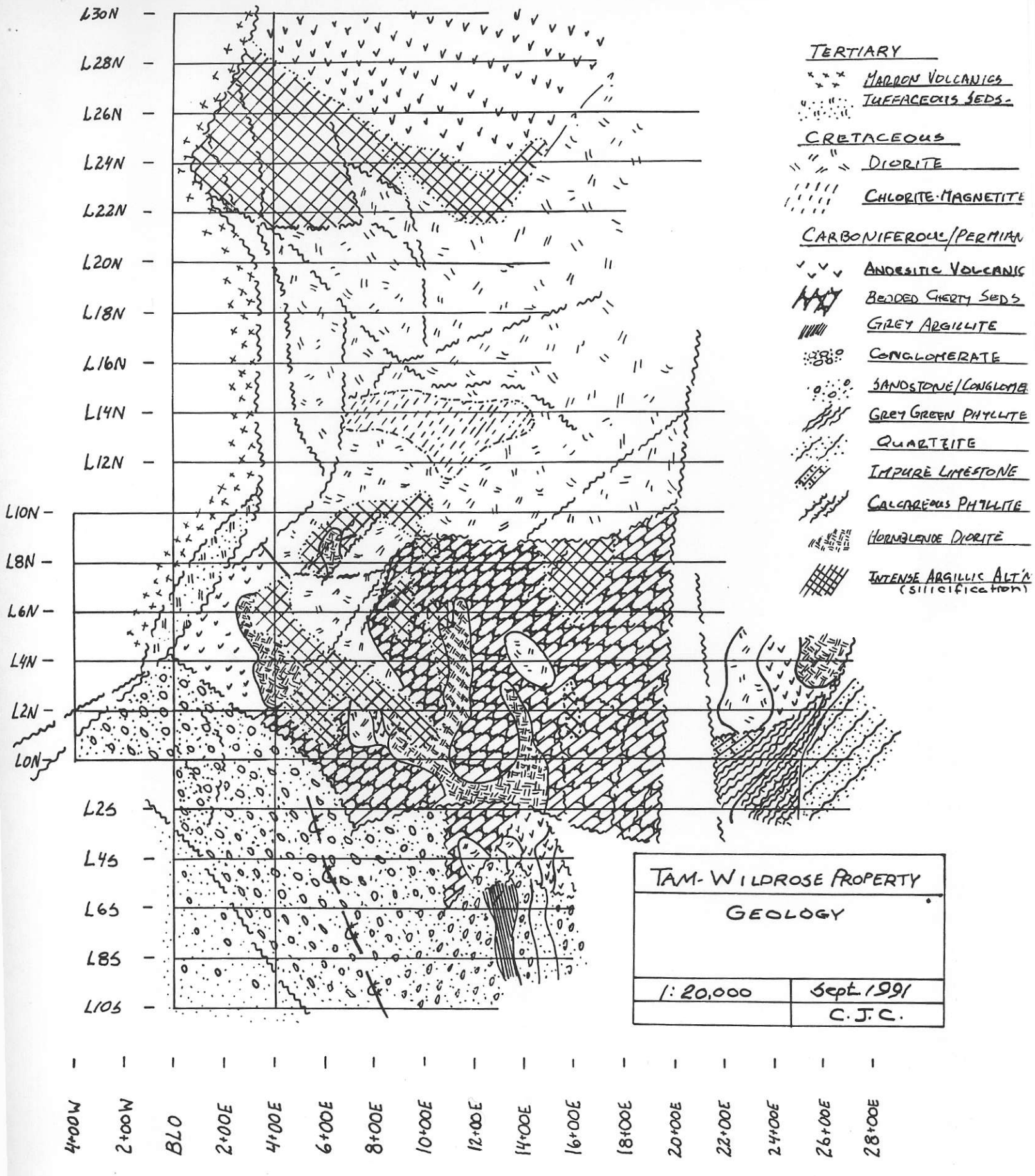

L30N
L28N
L26N
L24N
L22N
L20N
L18N
L16N
L14N
L12N
10N
8N
6N
4N
2N
0N
L2S
L4S
L6S
L8S
L10S
4+00W
2+00W
BLO
2+00E
4+00E
6+00E
8+00E
10+00E
12+00E
14+00E
16+00E
18+00E
20+00E
22+00E
24+00E
26+00E
28+00E
Cu soil anomaly >100 ppm Cu
Au soil anomaly >20ppb Au
Coincident Cu-Au Soil anomaly
TAM-WILDROSE PROPERTY
Cu-Au SOIL GEOCHEMISTRY
1:20,000
Sept. 1991
C.J.C.



TAM-WILDROSE PROPERTY

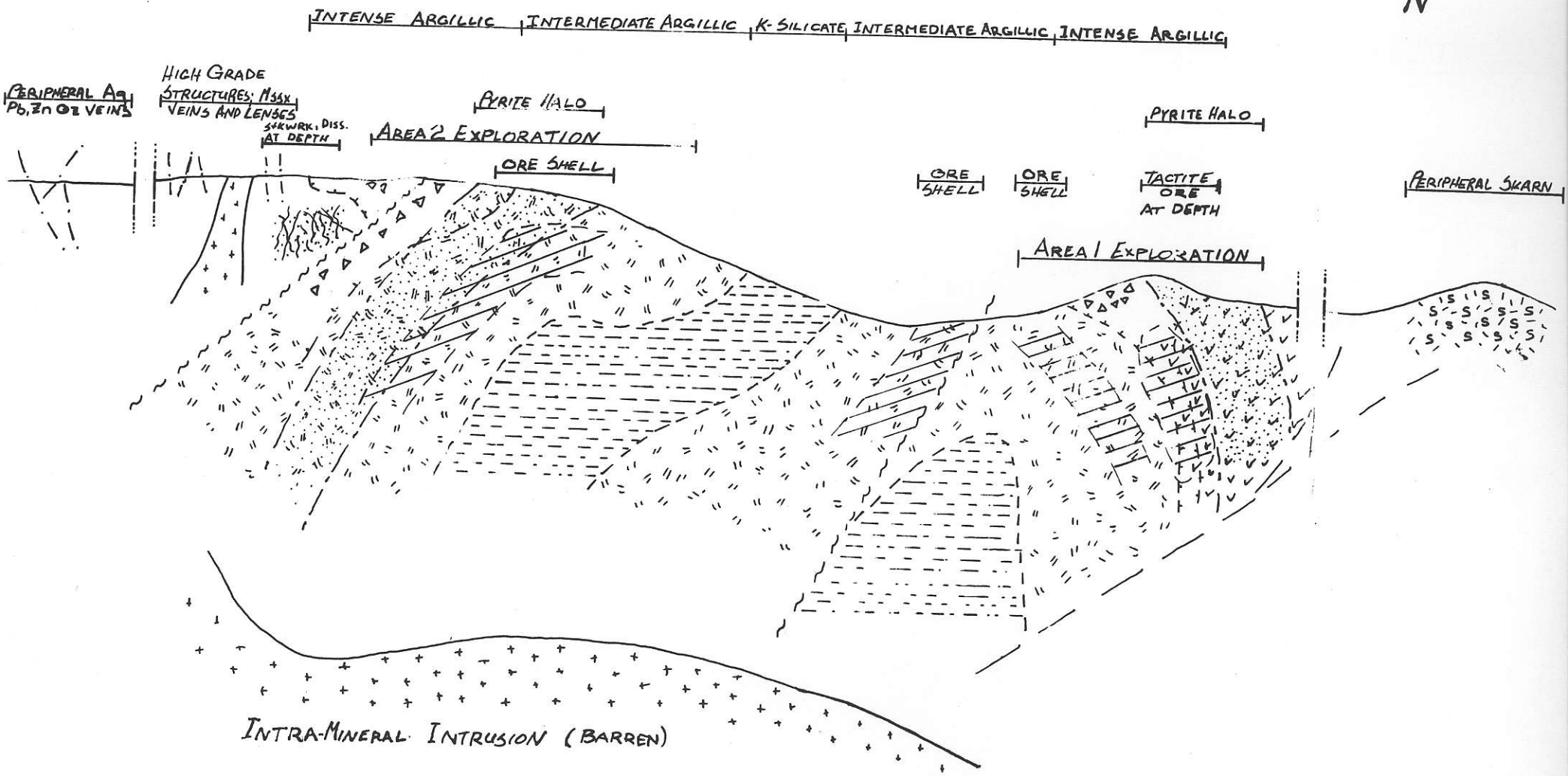
CHARGEABILITY PLAN
Cu-Au SOIL GEOCHEMISTRY
AND
PROPOSED DRILL HOLE LOCATIONS

1:20000	Sept. 1991
	C.J.C.


L30N
L28N
L26N
L24N
L22N
L20N
L18N
L16N
L14N
L12N
L10N
L8N
L6N
L4N
L2N
L0N
L2S
L4S
L6S
L8S
L10S
4+00W
2+00W
BL0
2+00E
4+00E
6+00E
8+00E
10+00E
12+00E
14+00E
16+00E
18+00E
20+00E
22+00E
24+00E
26+00E
28+00E
TERTIARY
MAROON VOLCANICS
TUFFACEOUS SEDS.
CRETACEOUS
DIORITE
CHLORITE-MAGNETITE
CARBONIFEROUS/PERMIAN
ANDESITIC VOLCANIC
BEDDED CHERTY SEDS
GREY ARGILLITE
CONGLOMERATE
SANDSTONE/CONGLOMERATE
GREY GREEN PHYLLITE
QUARTZITE
IMPURE LIMESTONE
CALCAREOUS PHYLLITE
HORNBLENDE DIORITE
INTENSE ARGILLIC ALT'N (SILICIFICATION)
TAM-WILDROSE PROPERTY
GEOLOGY
1:20,000
Sept. 1991
C.J.C.

5

N



CENTRAL K-SILICATE ZONE
CHLORITE-MAGNETITE ALTERATION

INTENSE SILICA FLOODING AND REPLACEMENT; HYDROTHERMAL BRECCIATION

PYRITIC HALO

DIORITE · QUARTZ DIORITE PORPHYRY
INTERMEDIATE ARGILLIC ALTERATION
INCLUDES SPECULARITE + CHLORITE VEINS, GYPSUM, HEMATITED FM.

POTENTIAL ORE ZONES.

TAM-WILDROSE PROPERTY	
SCHEMATIC SECTION METALLOGENIC MODEL FACING WEST	
NOT TO SCALE	Sept. 1991
	C.J.C.

L 26+00N

W

Mag High

Cu-Au Soil anomaly

P-1
825E

+15mV/V

+10 mV/V

+10mV/V

+20

+15mV/V

+8mV/V

-45°
130m

Mag High

Cu-Au
soil
anomaly

P-2
975E

+10mV/V

+15mV/V

+10mV/V

Mssx veins

+8mV/V

-60°
120m

E

L26+00N

W

Mag High

Low

Mag High

P-3
1012E

Cu-Au soil anomaly

Mssx veins

Cu-Au
soil
anomaly

P-4
1275E

+20 mV/V

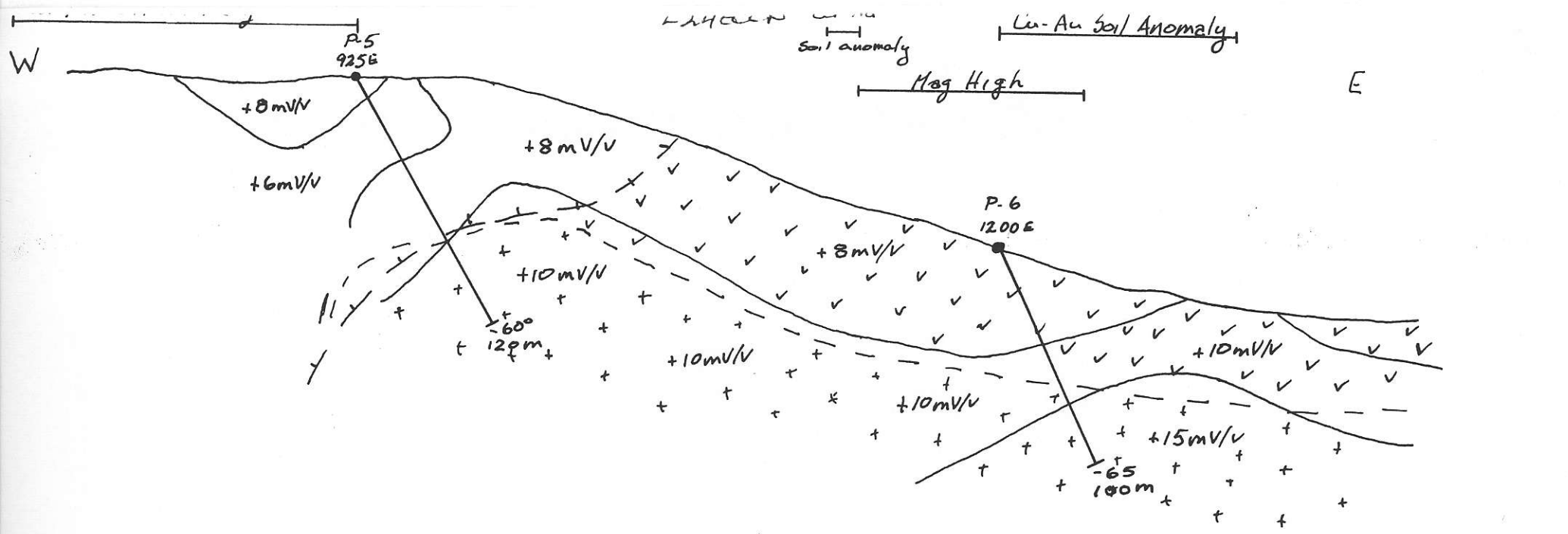
+10mV/V

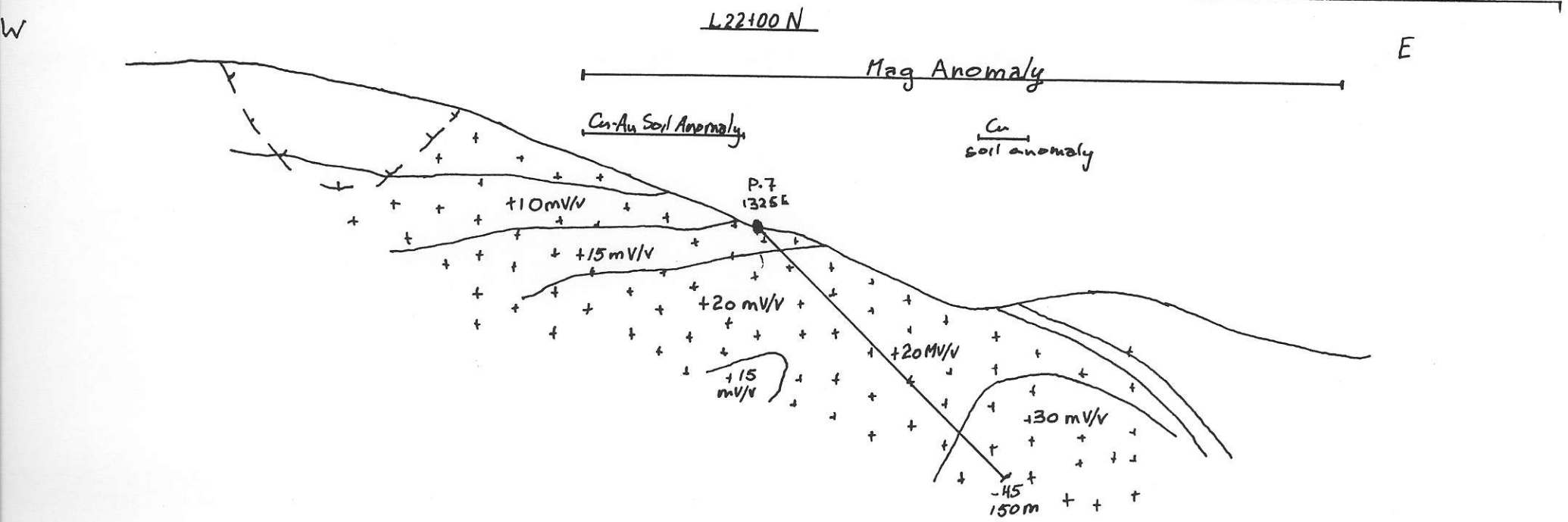
+15mV/V

-45°
160m

-45
140m

E


W
E
P.5
925E
+8mV/V
+6mV/V
+8mV/V
+10mV/V
-60°
125m
+10mV/V
+10mV/V
P.6
1200E
+8mV/V
+10mV/V
+15mV/V
-65
100m
Cu-Au Soil Anomaly
Soil anomaly
Mag High

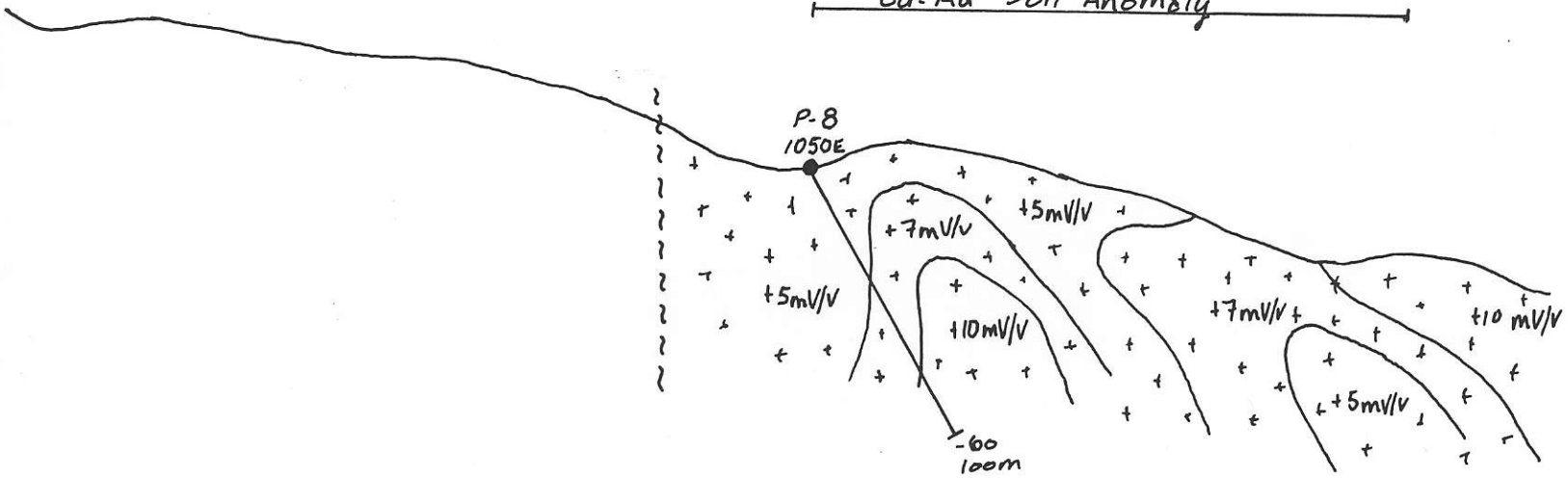

W
E
L22100N
Mag Anomaly
Cu-Au Soil Anomaly
Cu
Soil anomaly
P.7
1325E
+10mV/V
+15mV/V
+20mV/V
+15
mV/V
+20MV/V
+30mV/V
-45
150m

W

E

Mag High

Cu-Au Soil Anomaly



W

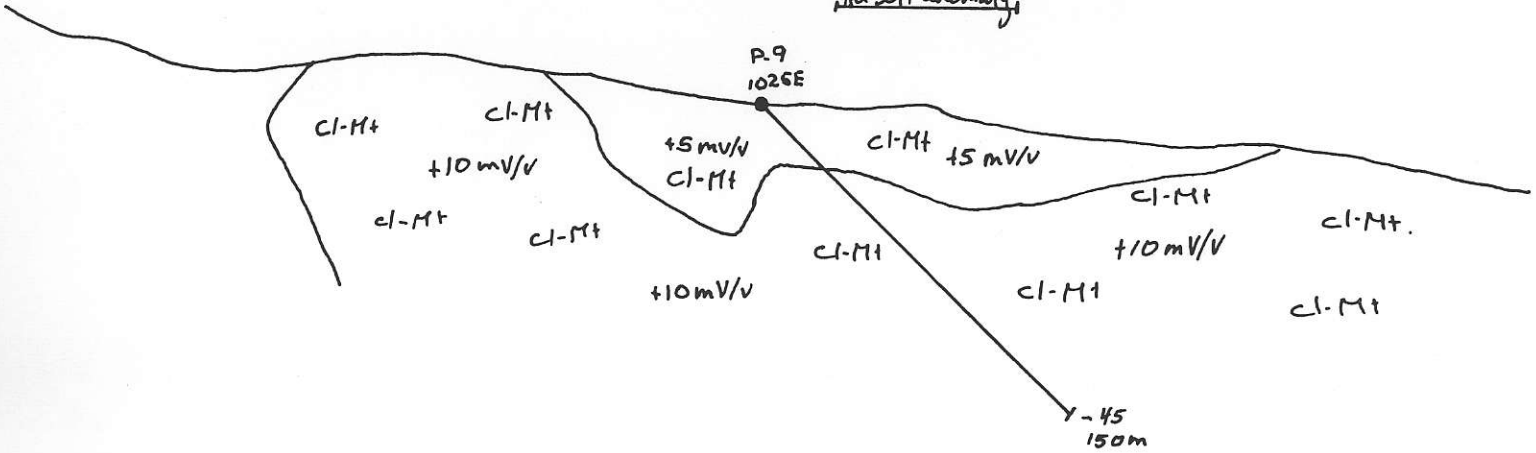
E

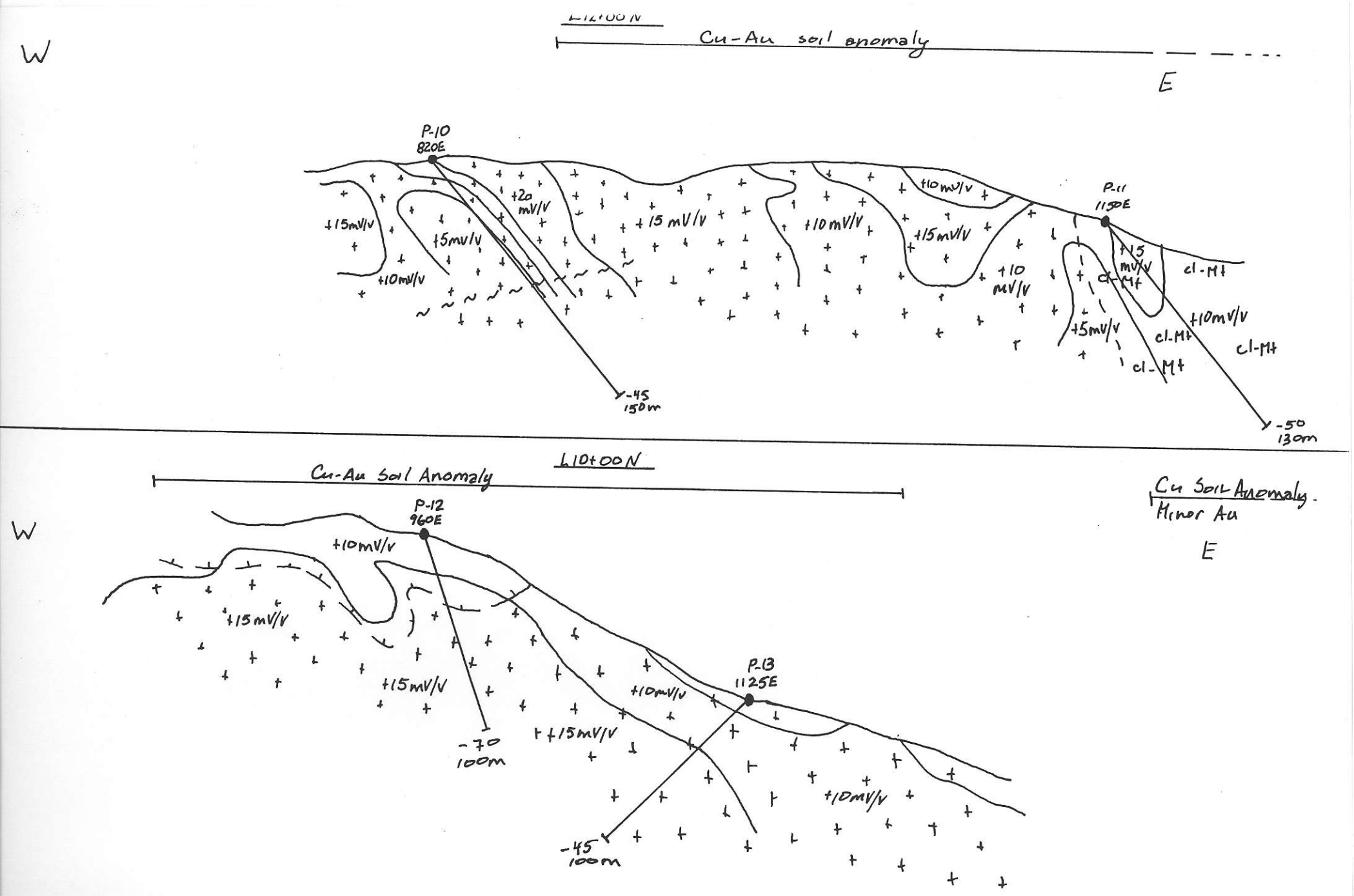
L 14+00N

Cu soil anomaly

Mag High.

Au soil anomaly




L12+00N
Cu-Au soil anomaly
W
E
P-10
820E
+15mV/V
+10mV/V
+15mV/V
+20 mV/V
+15 mV/V
+10mV/V
+10mV/V
+15mV/V
P-11
1150E
+15 mV/V
+10 mV/V
+5mV/V
cl-Mt
cl-Mt
+10mV/V
cl-Mt
cl-Mt
-45
150m
-50
130m
L10+00N
Cu-Au Soil Anomaly
W
E
P-12
960E
+10mV/V
+15mV/V
+15mV/V
-70
100m
+15mV/V
P-13
1125E
+10mV/V
+10mV/V
-45
100m
Cu Soil Anomaly.
Minor Au

W

Cu soil anomaly

E

Au soil anomaly

P-14
550E

+10mV/V
+15 mV/V
+10mV/V
+15mV/V
-45
150m
+15mV/V
+20mV/V
+20 mV/V
+10 mV/V
+15 mV/V
+15mV/V
+20mV/V

4+00N

W

Mag High

Mag Low

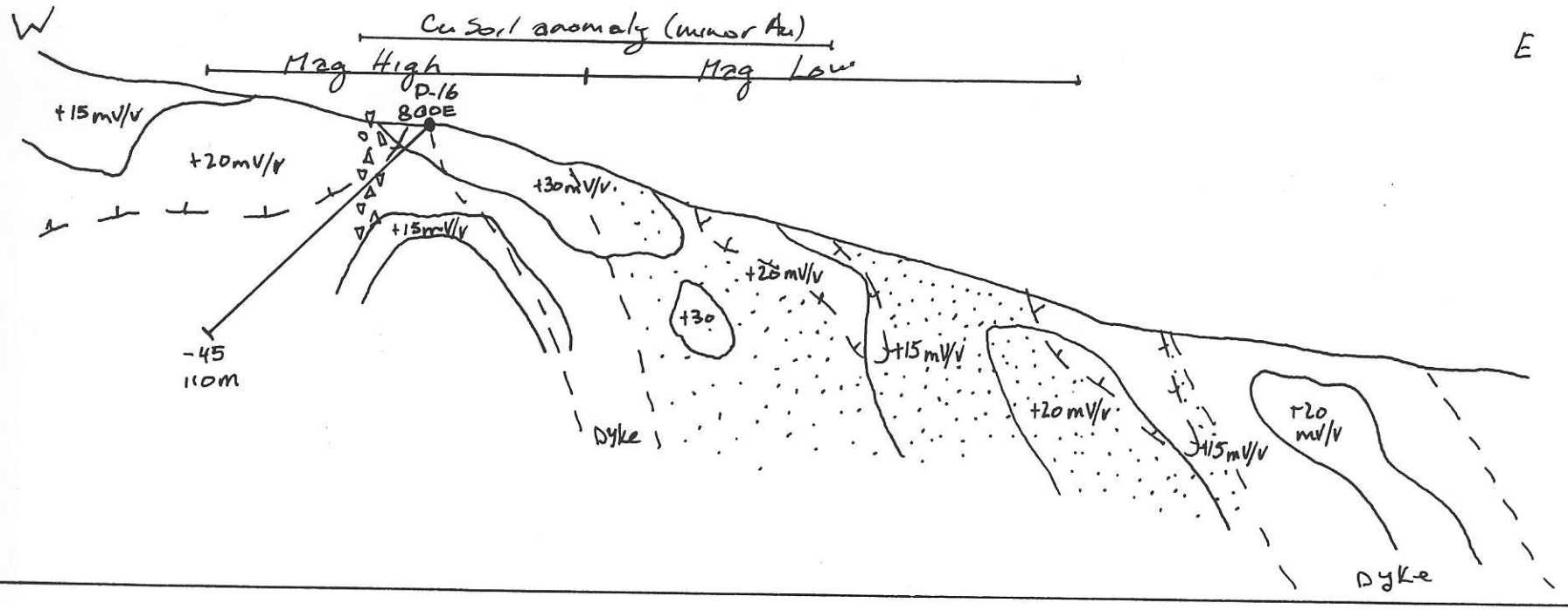
E

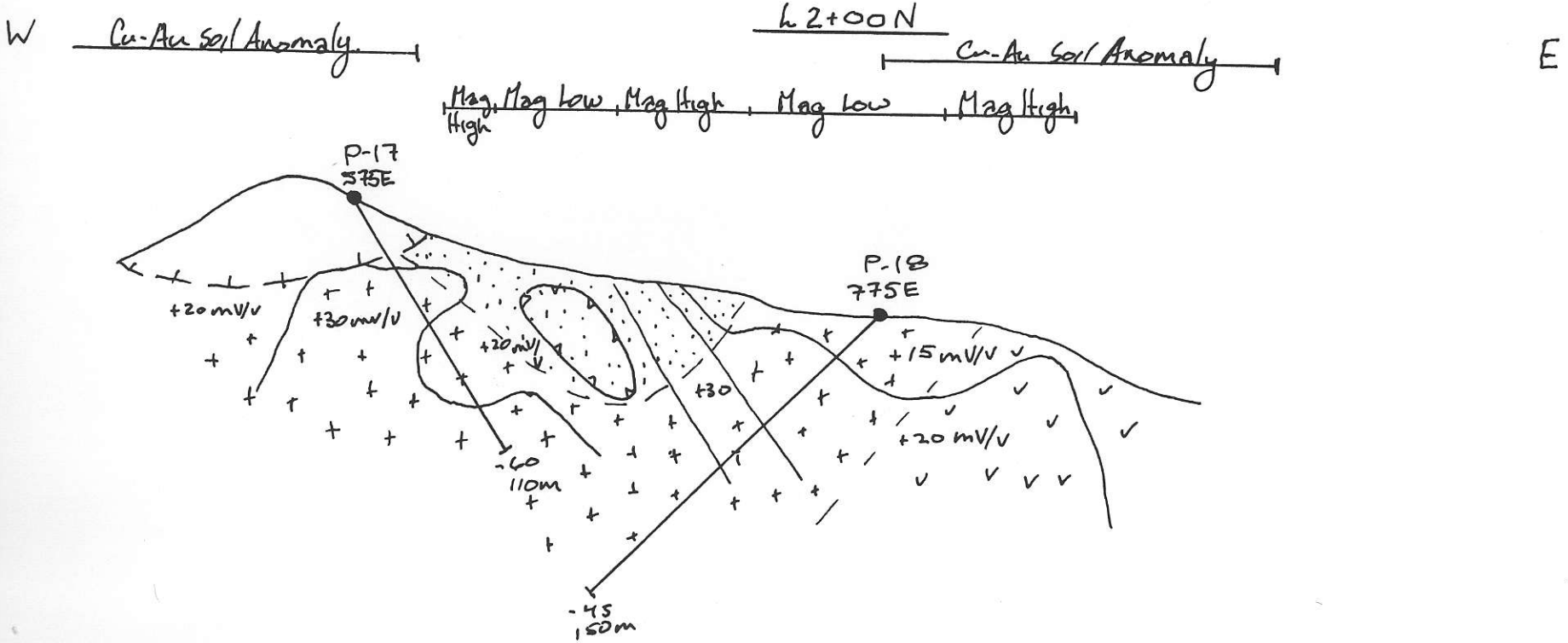
Cu-Soil Geochemistry (Local Au anomalies)

Hydrothermal Breccia.

P-15
875E

+5 mV/V
+20mV/V
+5mV/V
+20mV/V
+10mV/V
+20mV/V
+15 mV/V
+20 mV/V
-45
200m

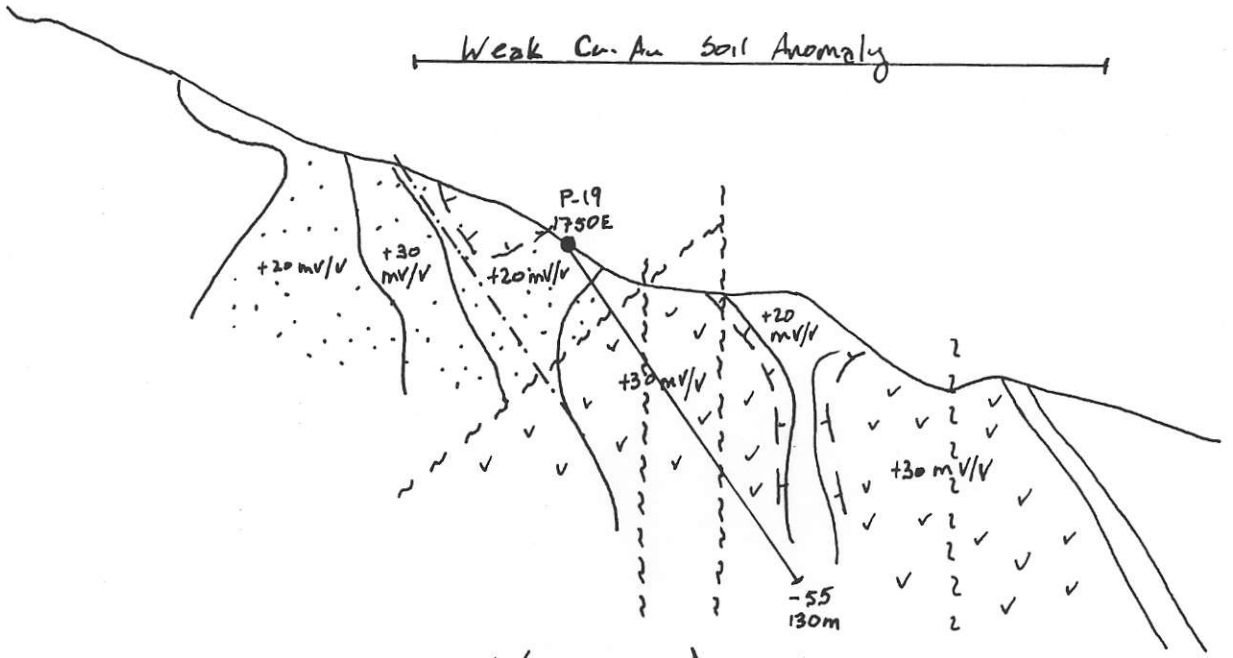

W
Cu Soil anomaly (minor Au)
Mag High
Mag Low
E
P-16
800E
+15mV/V
+20mV/V
+30mV/V
+15mV/V
+20mV/V
+30
+15mV/V
+20 mV/V
+15mV/V
+20 mV/V
-45
110m
Dyke
Dyke


W
Cu-Au Soil Anomaly.
L 2+00N
Cu-Au Soil Anomaly
E
Mag High
Mag Low
Mag High
Mag Low
Mag High
P-17
575E
P-18
775E
+20mV/V
+30mV/V
+20mV/V
+30
+15mV/V
+20 mV/V
-60
110m
-45
150m

W

E

Weak Cu. Au Soil Anomaly



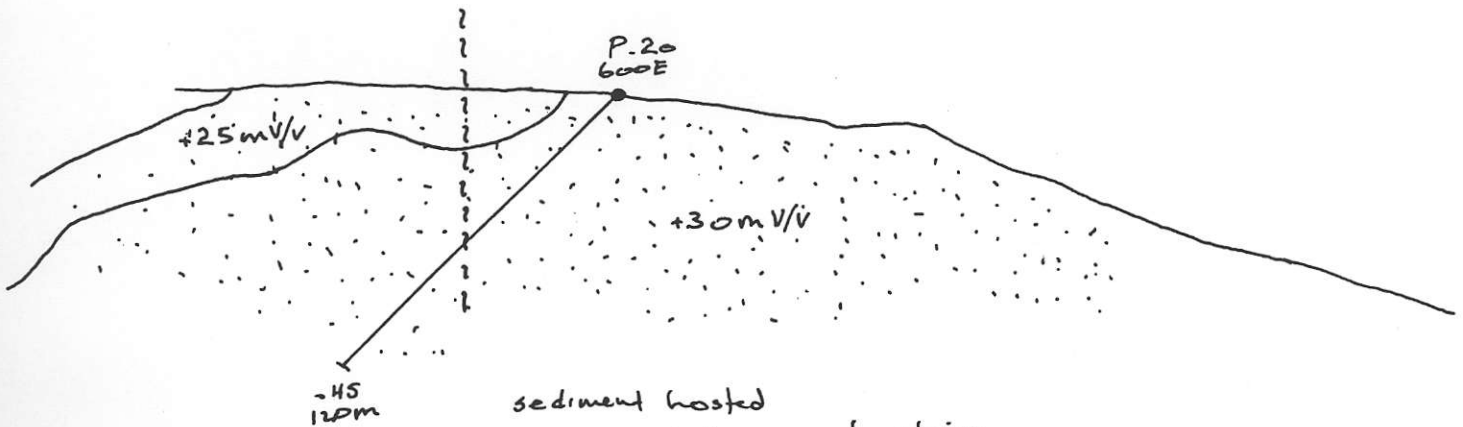
stockwork/replacement mineralization

LOTOON

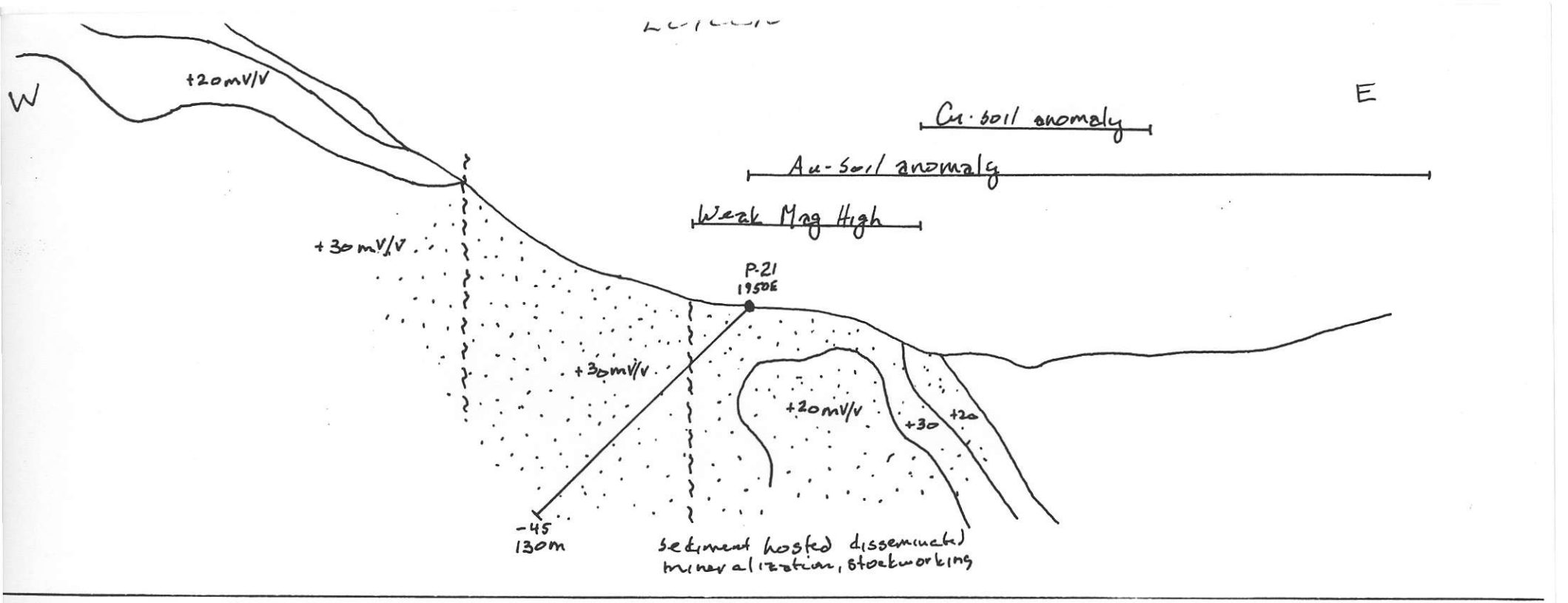
W

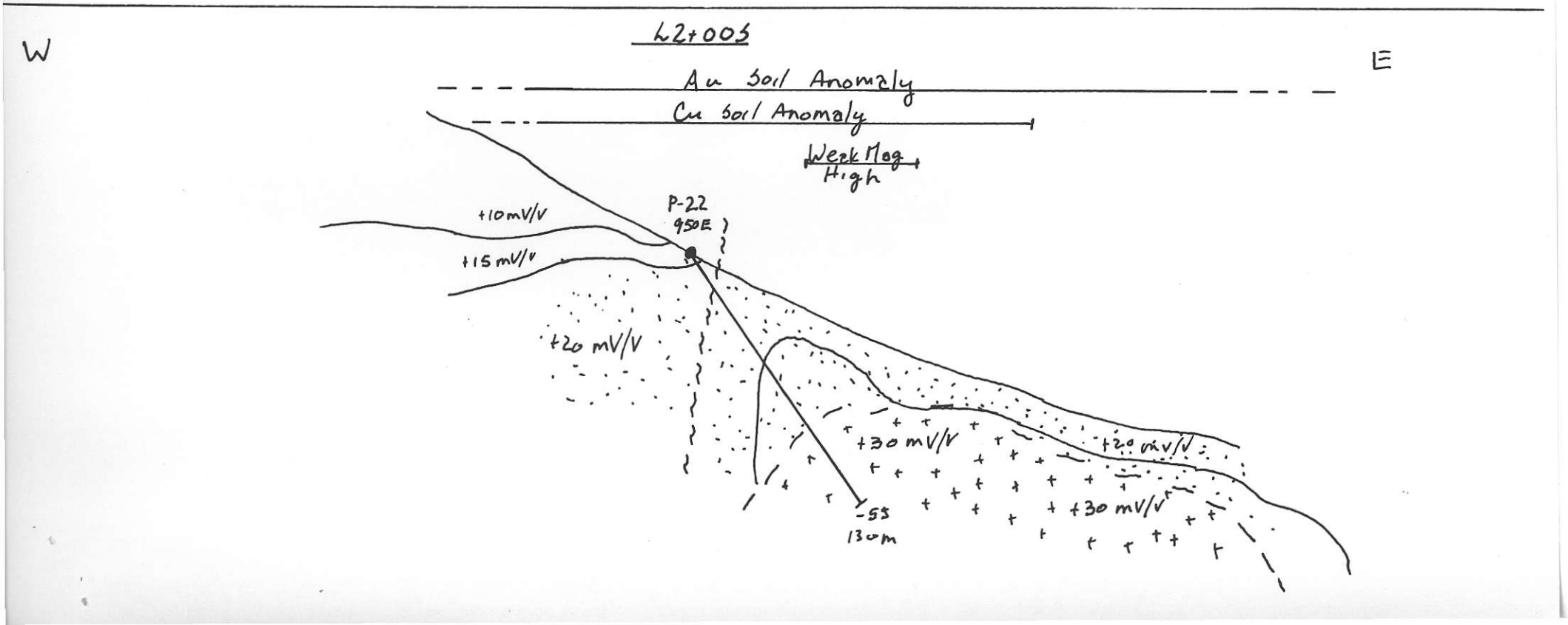
E

Weak Cu. Au Soil Anomaly (Local Highs)



sediment hosted disseminated mineralization.

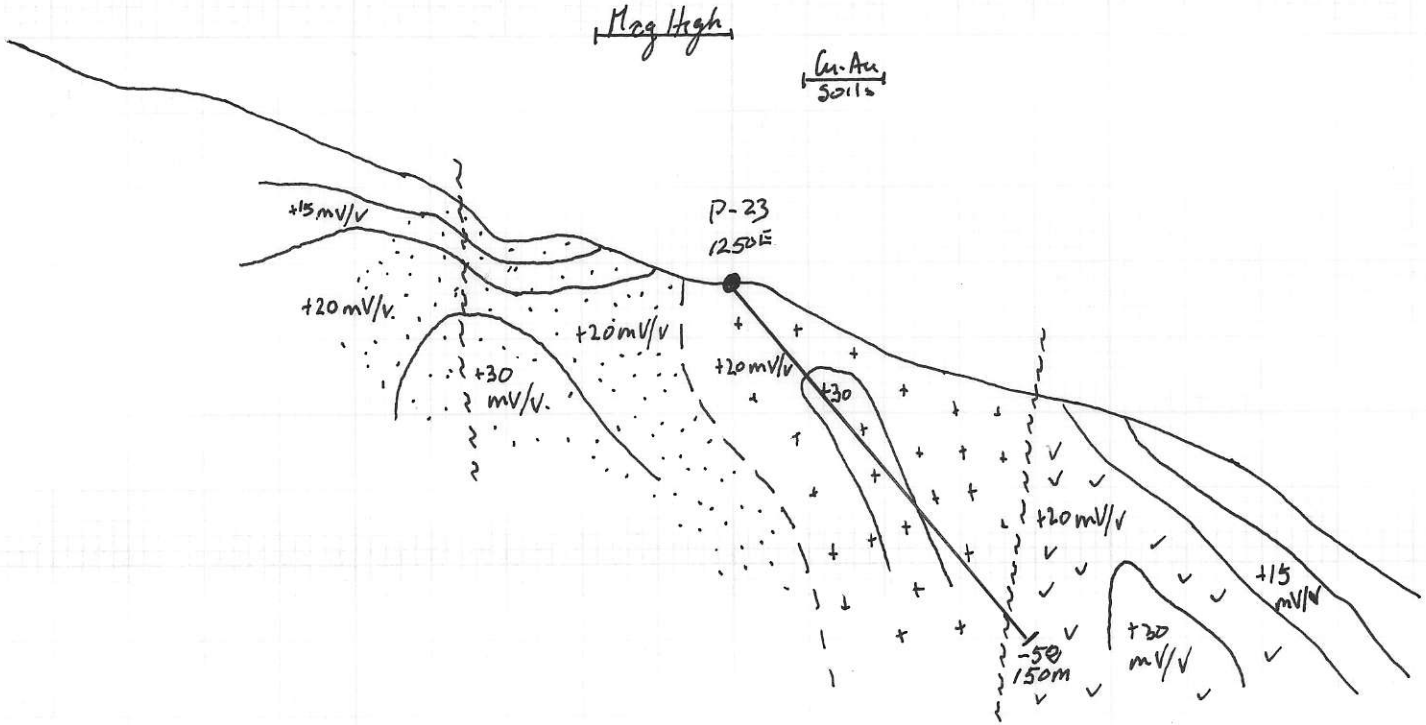

W
E
+20mV/V
Cu soil anomaly
Au-soil anomaly
Weak Mag High
+30 mV/V
P-21
1950E
+30mV/V
+20mV/V
+30
+20
-45
130m
sediment hosted disseminated
mineralization, stockworking


W
L2+00S
E
Au Soil Anomaly
Cu Soil Anomaly
Weak Mag
High
+10mV/V
+15mV/V
P-22
950E
+20 mV/V
+30 mV/V
+20 mV/V
+30 mV/V
-55
130m

L4+00S

W

E


Mag High
Cu. Au Soils
+15 mV/V
+20 mV/V.
+20 mV/V
+30 mV/V.
P-23
1250E
+20 mV/V
+30
+20 mV/V
+15 mV/V
+30 mV/V
-50
150m