

PROGRESS REPORT - 1977-1978

TSS JOINT VENTURE

By:

J. G. Simpson, Ph.D., P.Eng.  
D. S. Jennings, Ph.D.  
CYPRUS ANVIL MINING CORPORATION  
November, 1978

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105-K-5

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### TSS JOINT VENTURE

#### SUMMARY

Since 1977, geological mapping on a scale of 1":1,000', line cutting and TURAM electromagnetic surveys have been carried out on the TSS claim block. By referenee to this work and previous airborne Mag./E.M. data, two zones of potential interest are indicated by conductors parallel to the regional structural/stratigraphic trend. Recent experience with terrain-corrected gravity data and experimental multi-spectral I.P. techniques suggest that the latter is much more positive in identifying sulphide response and does, in fact, differentiate between graphite only, graphite + sulphide, and sulphide only. Gravity techniques will indicate mass excess but, because of the lack of absolute topographic control and rapid variations in overburden thickness, anomalies in the 0.25 to 0.5 milligal range can be either suppressed or induced by the correction techniques applied. While it is unlikely that a portable production spectral I.P. unit will be available before late 1979, it is suggested as the next logical tool for further evaluation of the claim group.

#### GEOLOGY

##### 1. General

The present state of knowledge in the Anvil area allows the construction of a lithostratigraphic section as indicated in Table 1. The relative position of the formations is considered to be stratigraphically correct and is applicable in spite of the poly-deformational/poly-metamorphic condition of the assemblage. The base of the Anvil metasedimentary-metavolcanic package is represented by the Faro Formation



characterised by quartzo-feldspathic muscovite-biotite schist (unit 1C), overlain by carbonaceous, biotite-muscovite-andalusite schist (unit 1D) host to the Faro orebodies. This is overlain by a thick sequence of calc-silicate rocks (unit 3) or Mt. Mye Formation, with development of impure marbles and thin graphitic schists and phyllites as the extreme end members of a calc-silicate phyllite package. The Mt. Mye Formation is in turn overlain by the Vangorda Formation characterised by calcareous phyllites, at the base of which is a fairly continuous graphitic phyllite (unit 5A) host to the Vangorda-Grum-DY deposits. Thus, two separate stratigraphic horizons are of value as exploration parameters within the Anvil package.

The alignment of known deposits and thinning directions of graphitic host units has led to a "hinge-line" theory of syn-sedimentary exhalative sulphide deposit origin along a line of continued high heat flow, active from Faro Formation to Vangorda Formation time, in combination with reduced basin depositional conditions and intermittent, convective overturn and exhalation of metaliferous connate brines along the "hinge-line". This picture is masked by subsequent intense deformation of which three phases are the most important.

## 2. Claims

The claim group is underlain almost equally by Unit 3D Mt. Mye Formation calc-silicate rocks in the northern half and Vangorda Formation unit 5B calcareous phyllites in the southern half. The contact is not well exposed but, from outcrop data east and west of the claims, trends approximately  $120^{\circ}$ . A late plug of pyroxenite and associated hornblende-biotite-diorite cuts unit 3D rocks in the extreme northwest corner of the claim block and outcrops of metabasite flows and/or sills occur

both in the Mt. Mye (unit 3C) and Vangorda Formations (unit 5C). Structurally, the unit 3D rocks occupy an  $F_1$  saddle or area of fold plunge reversal on the projected northwesterly continuation of the main Faro anticline (a major  $F_1$  antiform and nearly coaxial  $F_4$  antiform), through which the theoretical depositional hinge-line can be projected. There is therefore potential for unit 1D graphitic-aluminous schist host rocks to occur at depth on the TSS group. It is unlikely that this would be within 1,000 feet of surface, as indicated by old boreholes in this saddle zone to the west of the TSS claim group. A second target would be graphitic units (5A?) at or near the base of unit 5B which, in this case, would be remote from the projected depositional hinge-line (Map No. 2).

#### GEOPHYSICS

On the basis of the above geological models, deep search TURAM E.M. was conducted over a 42-mile (67 km) line mile grid, at right angles to the west-northwest structural trend, and the results compared against previous airborne Mag./E.M. data. As a result, two conductors of sufficient strength and extent to be worth further investigation were noted. The airborne magnetic data is essentially featureless except for the anticipated strong positive response over the pyroxenite intrusive at the extreme northwest corner of the claim block.

Airborne E.M. shows an incomplete but distinctive linear anomaly across the central portion of the claim block slightly south of the inferred 3D/5B contact ratios of 3 to 1 in phase to quadrature suggest a graphitic or carbonaceous source. This anomaly is mirrored by a modest but persistent TURAM anomaly extending for about 4,000' and is suggestive of at least some graphitic horizons near the base of unit 5B. Although a some-

what stronger response is usually generated by a well-developed unit 5A graphitic phyllite horizon, this is an interesting anomaly.

A second linear TURAM anomaly within the 3D calc-silicate is more erratic with less favourable ratios, but again is suggestive of graphitic material. Graphitic lenses within unit 3D are not uncommon, for instance south of the Faro orebodies, but generally are impersistent. The airborne response is weak with a reversed field strength ratio to phase difference.

#### SUMMARY AND WORK PROPOSED

In the normal course of events, gravity profiles would be run over the TURAM responses on the TSS claims to check for excess mass response.

However, extensive work in the Anvil area with terrain-corrected gravity data suggests that this method is not sufficiently accurate to distinguish low order, i.e. 10 - 20 millitons buried mass, given a lack of accurate topographic control and lack of information on the overburden profile.

Recent experimental work with multi-spectral I.P. in the Anvil area indicates that this method distinguishes clearly between graphitic and sulphide response and is capable of picking up a sulphide response up to 2,000 feet below surface, as evidenced by test results on the new DY deposit. However, it is unlikely that a portable production field unit will be available before the late summer of 1979 and, even then, it would be prudent to carry out further tests on known graphite-sulphide combinations before clearing the unit for general fieldwork. The cost of this research is being carried by Cyprus Anvil and it is our belief that this will prove the most useful tool in making a further evaluation of the option claims.

A pattern of drillholes is planned on the Faro claims just east of the TSS ground in 1979, to test the major antiform/hinge-line concept, and should also be of help in establishing the best stratigraphic-structural

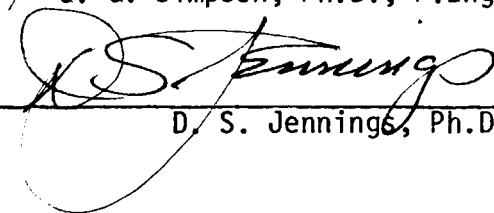
interpretation of the southwest flank of the Faro anticline. Further drill tests, including holes on the TSS claims, could be drilled in 1980 on the basis of the I.P. results or, in any event, as a confirmatory stratigraphic test before abandoning the area.

Respectfully submitted,



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J. G. Simpson, Ph.D., P.Eng.



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D. S. Jennings, Ph.D.

APPENDIX I

Claim Summary Sheet

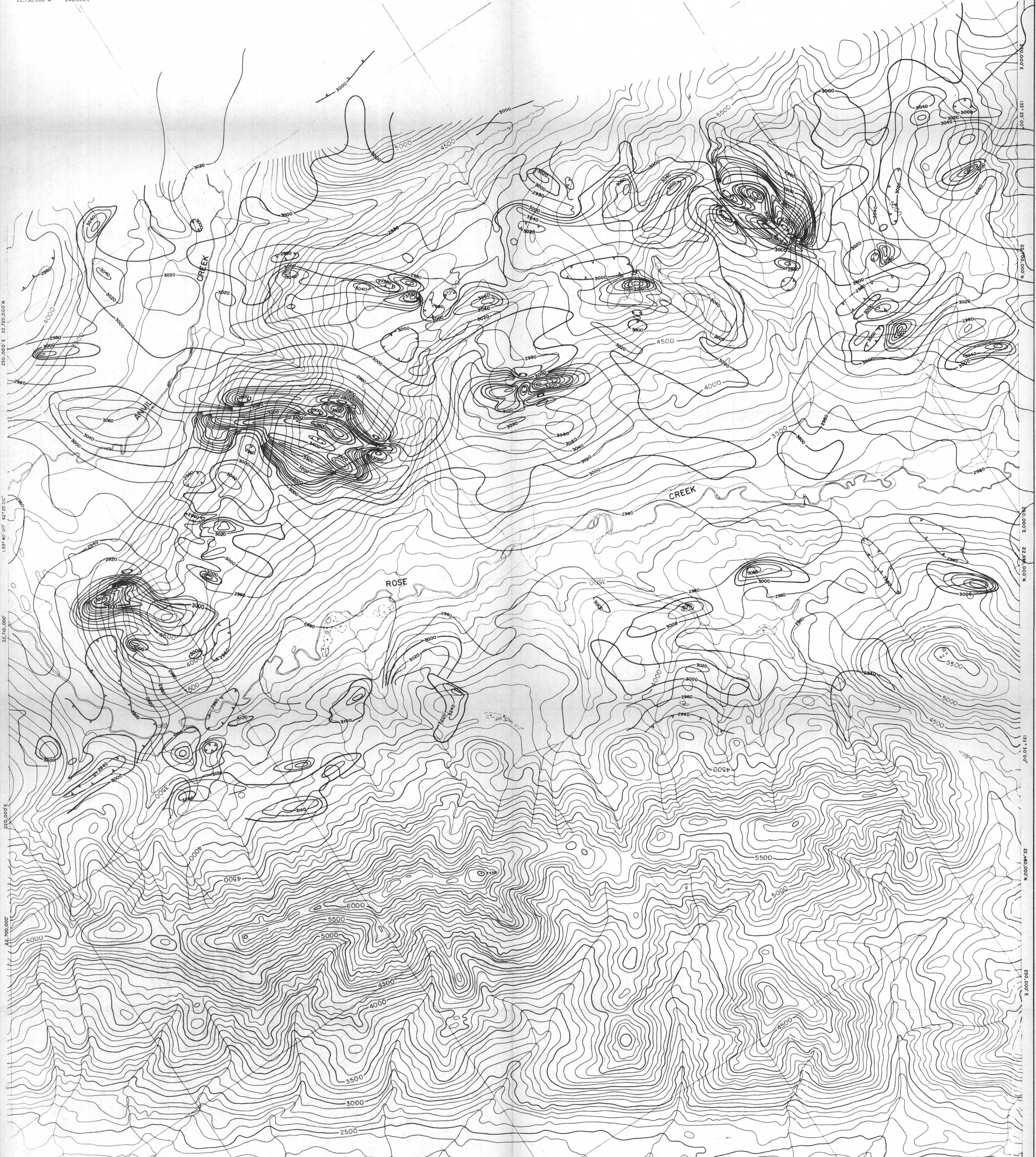
COMPANY ... CYPRUS ANVIL ... CLAIM ..... PROPERTY OWNERSHIP Cyprus Anvil 60% Teck Corp. 40% M.D. .... N.T.S. ....

Claim No.	Grant No.	No. of Claims	Staked by	Recording Date	Transfer Information		Due Date	Assessment Work and Remarks
					To	Date		
<u>OPTION AGREEMENT - TECK CORPORATION</u>								
<u>TSS CLAIMS</u> - 105-K-5 & 6 - Whitehorse Mining District								
1-39	Y79609-Y79647	39					July 18, 1980	Assessment Work Filed Date: July 9, 1976 Amount: \$21,122.75 Type: Linecutting (4 yrs. on each)





22,730,000'N 133° 35' 00" 240,000'E 250,000'E 133° 30' 00" 22,720,000'N 260,000'E 62° 25' 00" 133° 25' 00" 22,710,000'N



230,000'E 22,750,000'N  
133° 40' 00" 62° 25' 00"  
22,710,000'  
220,000'E  
22,700,000'  
22,690,000'N

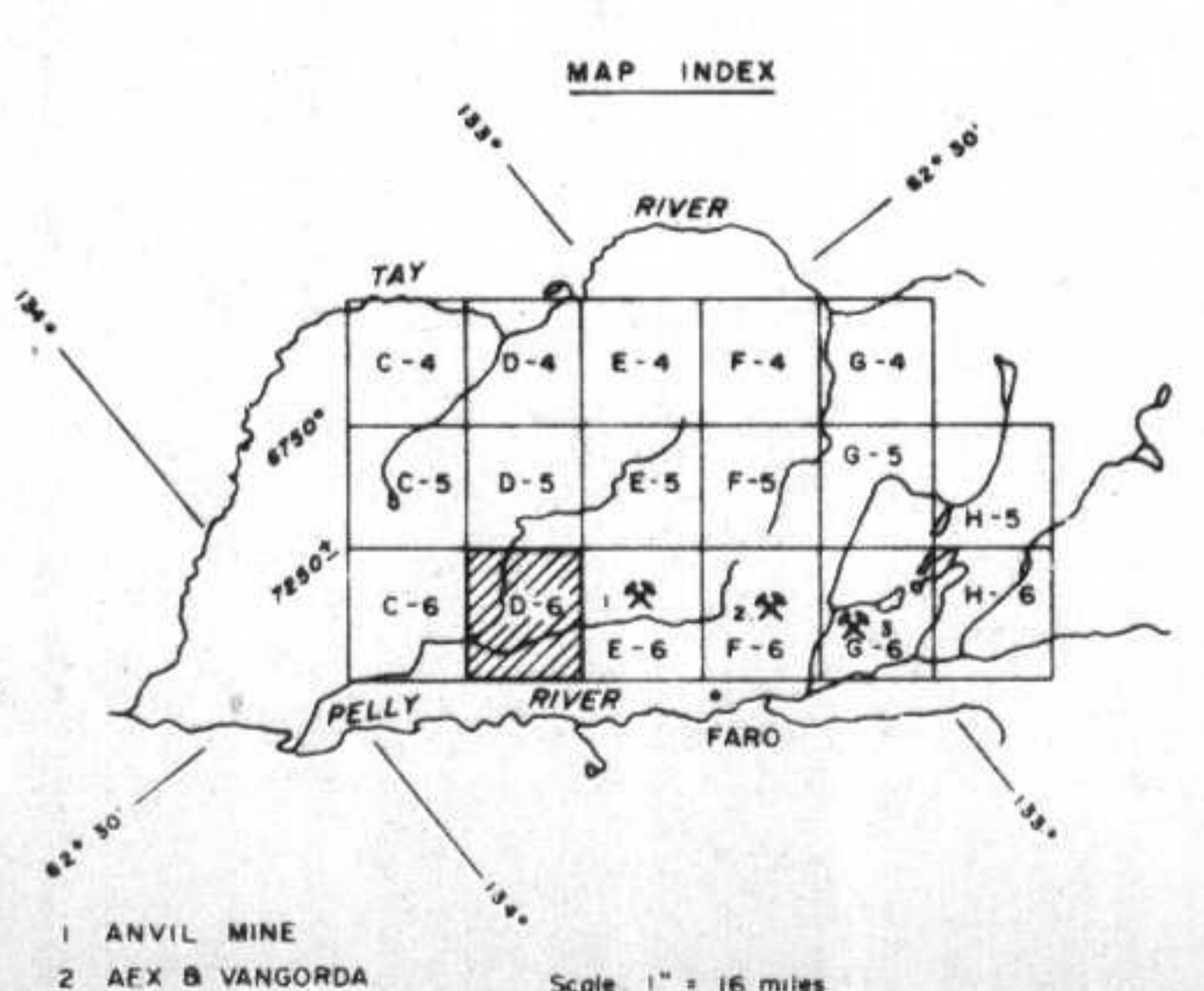
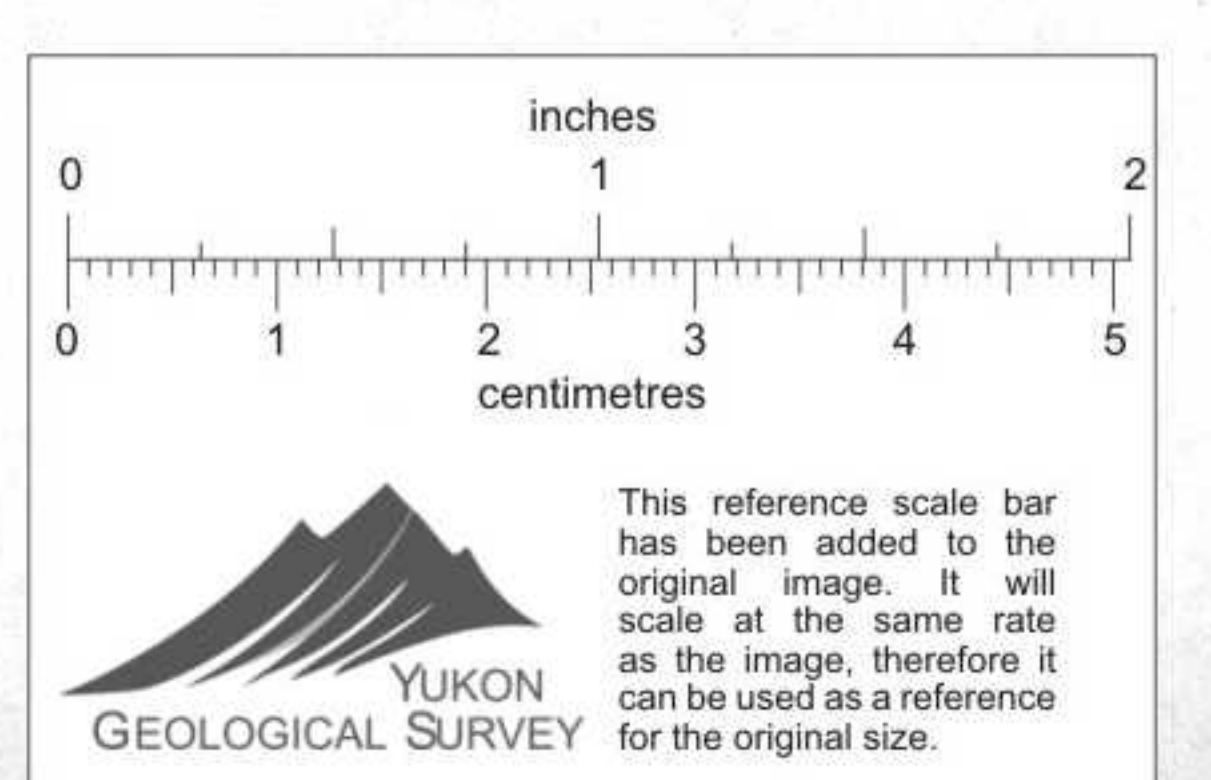
240,000'E  
133° 25' 00"  
22,700,000'N  
240,000'E  
22,690,000'N  
133° 30' 00"  
22,680,000'N  
250,000'E

22,690,000'N 220,000'E 62° 20' 00" 133° 40' 00" 230,000'E 240,000'E 133° 35' 00"

LEGEND

- 20 GAMMAS
- 1000 FEET
- NEAR FLIGHT LINE SPACING
- 450 FEET
- NEAR TERRAIN CLEARANCE
- 500 GAMMA CONTOUR
- 20 GAMMA CONTOUR
- MAGNETIC LOW

NOTE: Plans and compiled by HORTONS SURVEY CORPORATION LIMITED TORONTO CANADA 1984 at 1"=1000'  
DATA: Original 1"=1000' and other maps  
MAGNETIC DATA BY CONVERSION OF GEOMAGNETIC DATA BY S. K. BILZAK May 13, 1977.



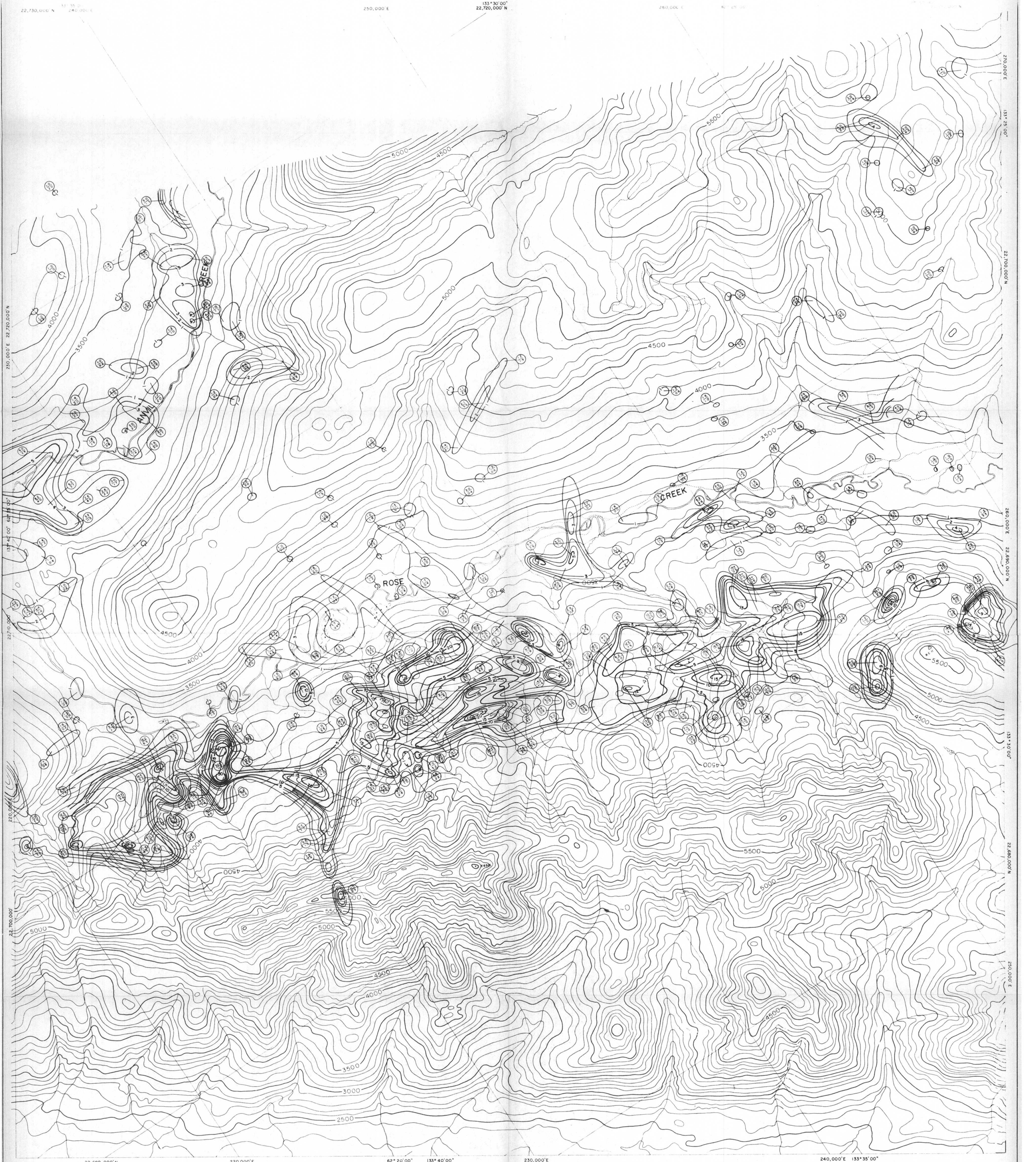
- ALL WEATHER ROADS
- SECONDARY ROADS
- TOTE TRAILS
- BRIDGES
- PRIMARY STREAMS
- SECONDARY STREAMS
- SWAMPS
- CAMP LOCATIONS
- DIAMOND D.H. SITES
- ROTARY DRILL SITES
- TRIANGULATION STATIONS
- SPOT ELEVATION IN FEET

Map No. 3

CYPRUS ANVIL MINING CORPORATION

AIRBORNE MAGNETIC SURVEY

REVISED BY: \_\_\_\_\_ N.T.S. 1054-586  
DRAWN BY: C.L.C.  
DATE: \_\_\_\_\_



22,730,000' N 240,000' E 133° 30' 00" 22,720,000' N 250,000' E 133° 25' 00" 22,710,000' N 260,000' E 133° 20' 00" 22,700,000' N 270,000' E 133° 15' 00" 22,690,000' N 280,000' E 133° 10' 00" 22,680,000' N 290,000' E 133° 05' 00" 22,670,000' N 300,000' E 133° 00' 00"

22,690,000' N 220,000' E 62° 20' 00" 133° 40' 00" 230,000' E 240,000' E 133° 35' 00"

LEGENO

MEAN FLIGHT LINE SPACING ..... 1000 FEET

MEAN TERRAIN CLEARANCE ..... 200 FEET

ELECTROMAGNETIC CONTOURS 5, 10, 15, 20 FT. 1, 2, 3, 4 CM.

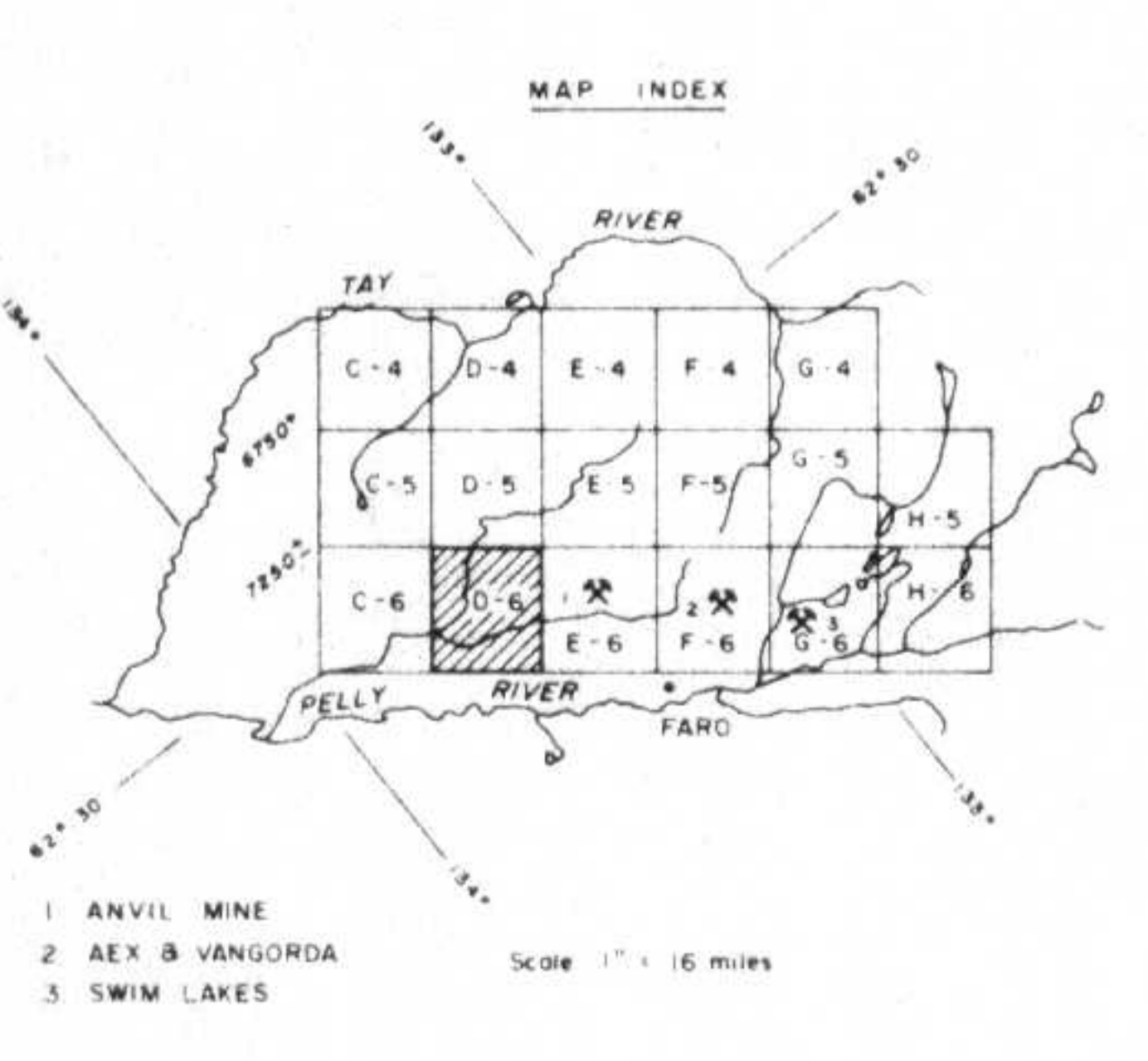
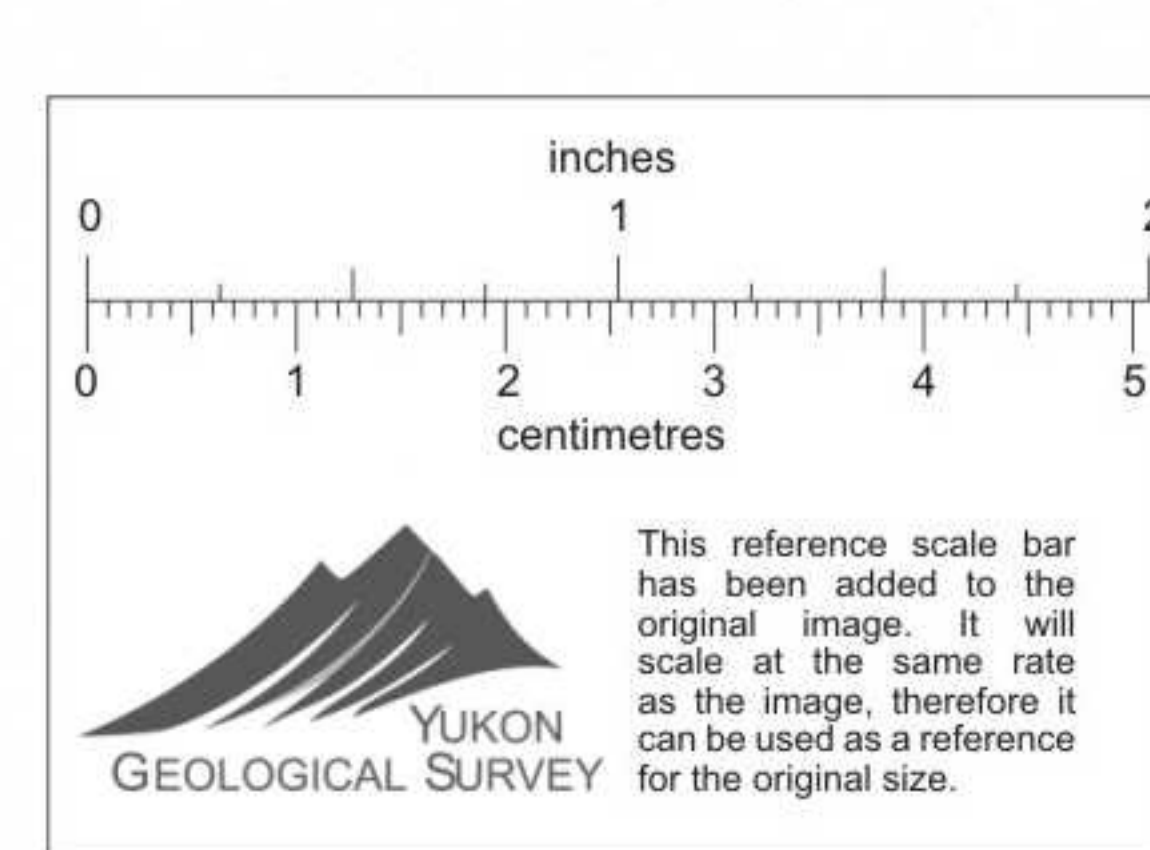
The contours represent amplitude of in phase response of the resultant field expressed in parts per million of the primary field.

The figures (1) represent secondary field phase component.

The frequency of the primary current is 4000 cycles per second.

NOTE: Flown and compiled by LOCKWOOD SURVEY CORPORATION LIMITED TORONTO CANADA 1965, at 1:1000.

DATA: Engraves 1", 1000' and plotted onto topographic map by correction of promerica data by S. H. BULLOCK May 24, 1977



- ALL WEATHER ROADS
- SECONDARY ROADS
- TOTE TRAILS
- BRIDGES
- PRIMARY STREAMS
- SECONDARY STREAMS
- SWAMPS
- CAMP LOCATIONS
- DIAMOND D.H. SITES
- RITARY DRILL SITES
- TRIANGULATION STATIONS
- SPOT ELEVATION IN FEET

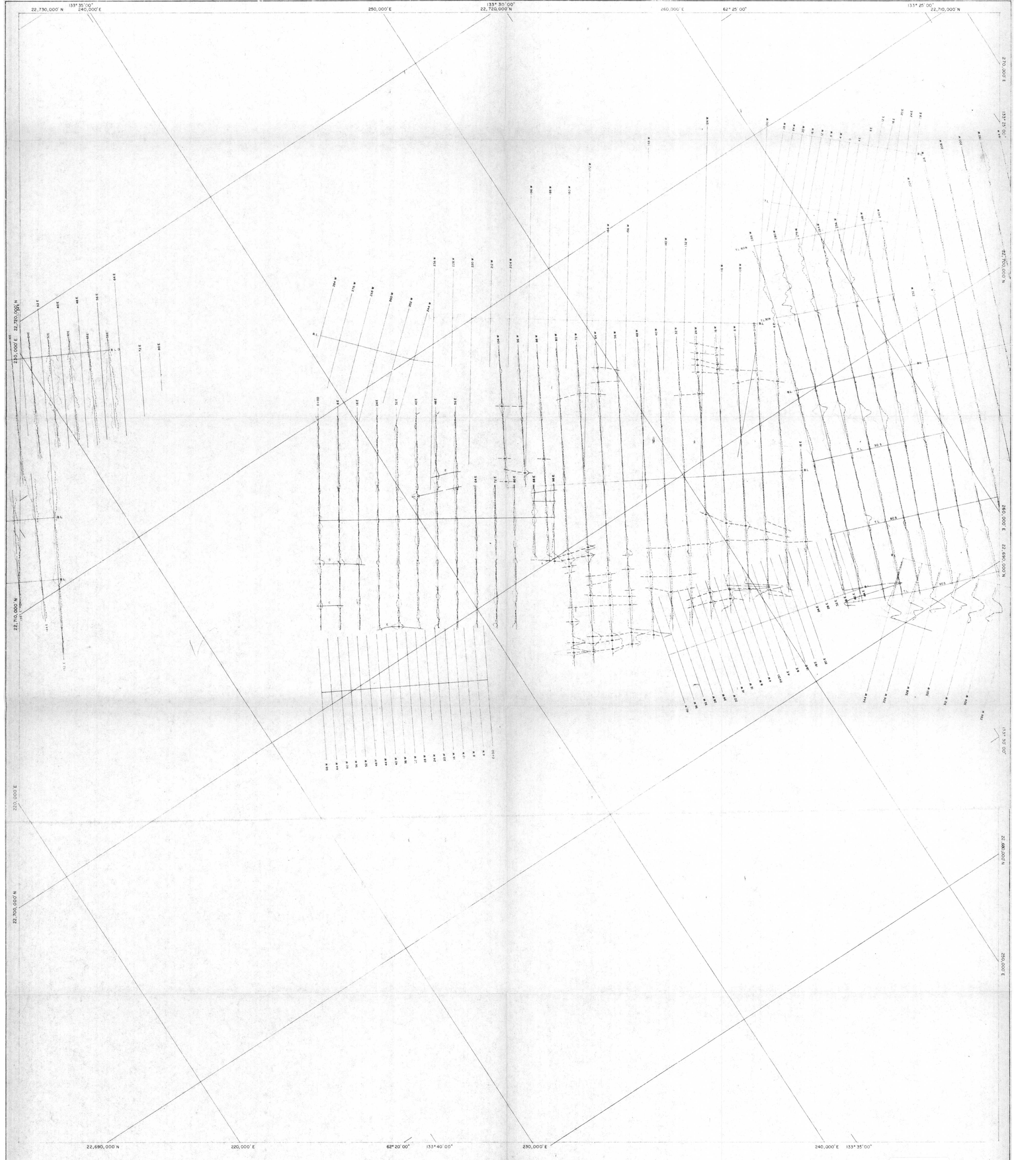
Map No. 4

CYPRUS ANVIL MINING CORPORATION

AIRBORNE E. M. SURVEY

REVISED BY: [Signature]

DATE: [Blank]



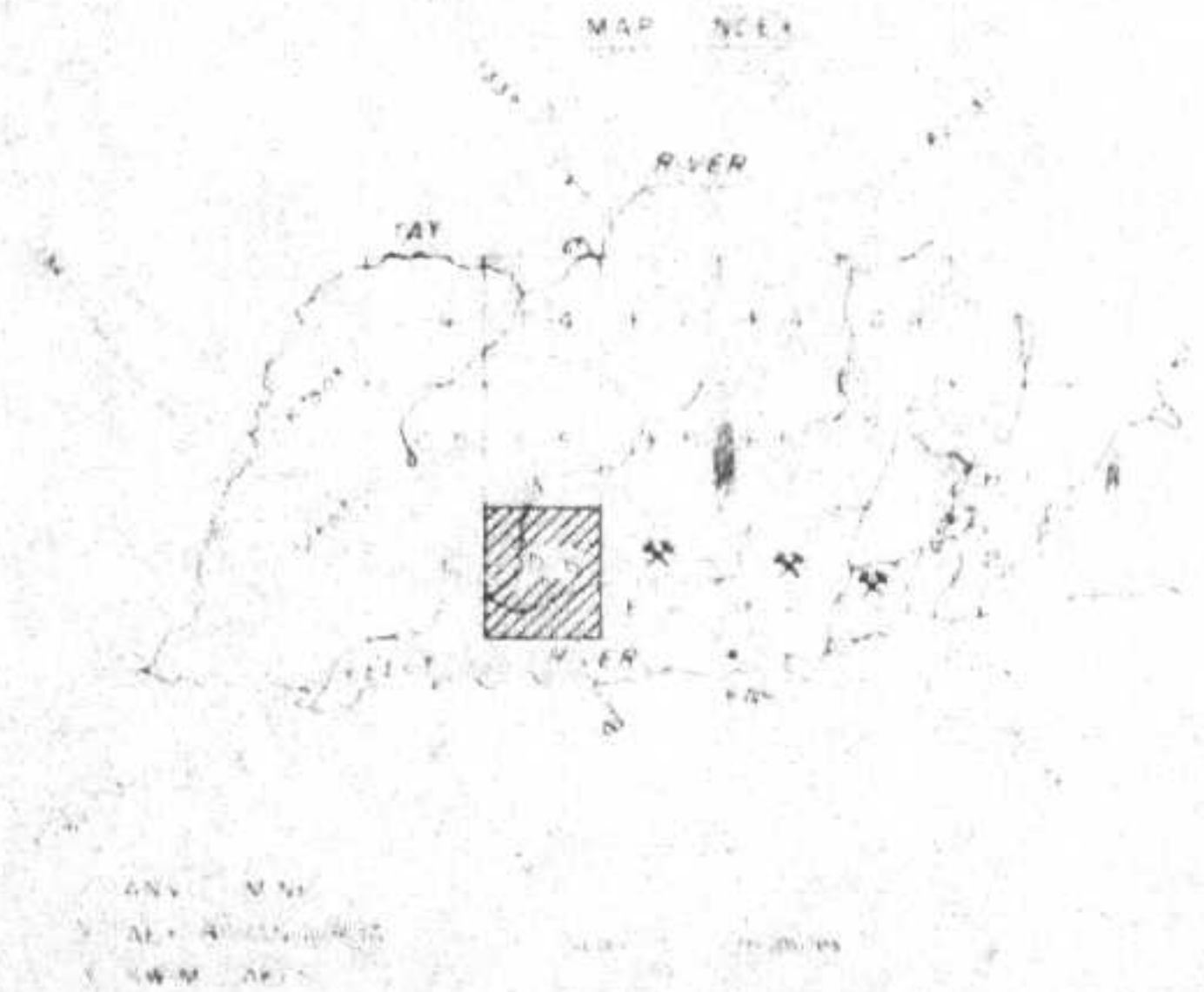
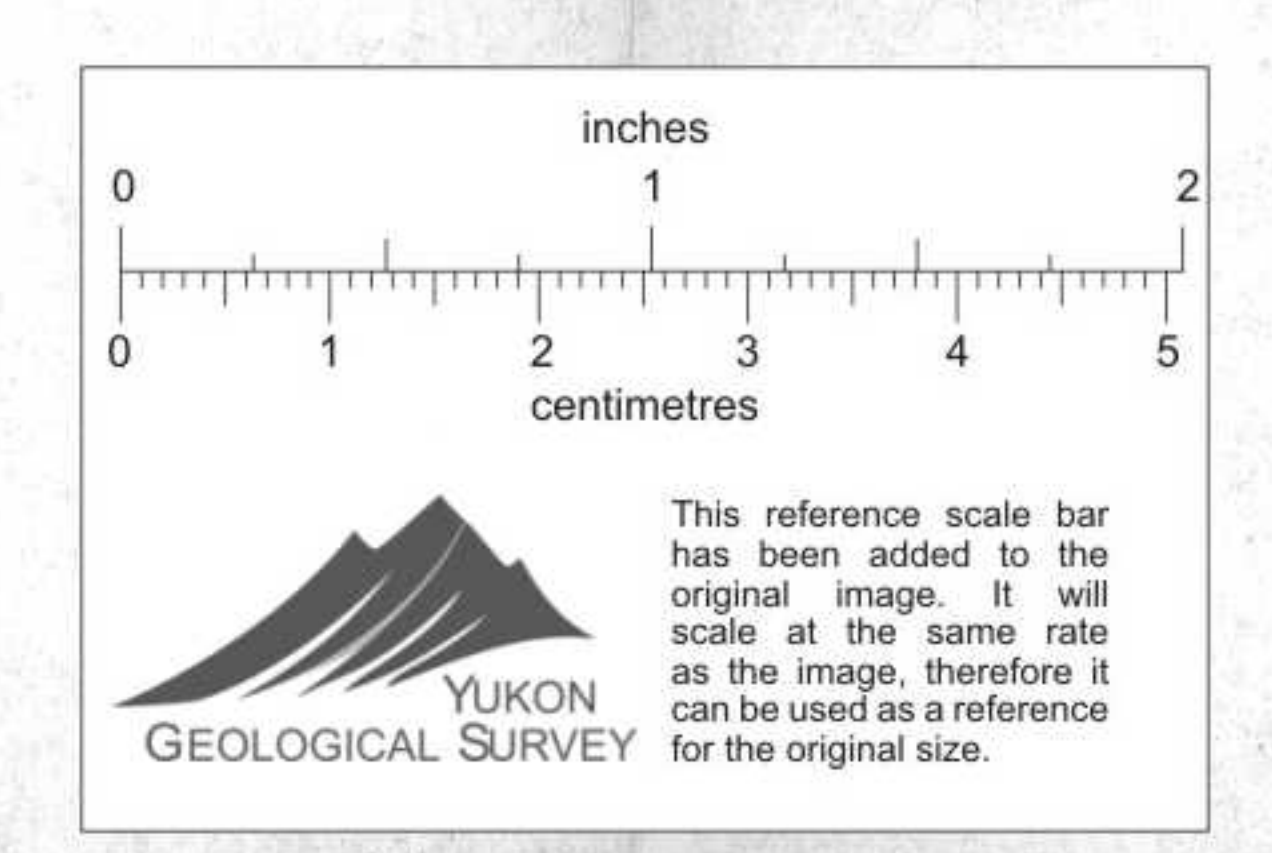
Map No. 5

CYPRUS ANVIL MINING CORPORATION

TURAM ELECTROMAGNETIC COMPILATION

REVISED BY: M.S.M. MAY 27, 1977  
 M.W.M. OCT 12, 1976

DRAWN BY: C.L.C.  
 DATE: MARCH 15, 1976  
 VALUE: P. 400 HA.



- 1. WEATHER FIELD
- 2. ROCKY HILLS
- 3. TRAILS
- 4. QUARRY
- 5. ROAD
- 6. RAILROAD
- 7. RIVER
- 8. STREAM
- 9. CANAL
- 10. DAM
- 11. TOWER
- 12. TELEPHONE
- 13. POWER LINE
- 14. FENCE
- 15. BOUNDARY
- 16. PROPERTY
- 17. ROAD
- 18. RAILROAD
- 19. RIVER
- 20. STREAM
- 21. CANAL
- 22. DAM
- 23. TOWER
- 24. TELEPHONE
- 25. POWER LINE
- 26. FENCE
- 27. BOUNDARY
- 28. PROPERTY