REPORT ON GEOLOGICAL MAPPING

ENGINEER 1, 2, 3, & 4 CLAIMS

LILLOOET MINING DIVISION

NTS MAP SHEET 92J/11E

50°35'30"N 123°01'15"W

OWNERS: R. Jordan 50%, P. Jordan 50%

OPERATOR: P. Jordan

CONSULTANT: J.M. Riddell, P.Geo.

AUTHORS: J.M. Riddell, P.Geo. and P. Jordan, P.Geo.

DATE SUBMITTED: November 23, 1993

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1.0 SUMMARY

The Engineer claims (four 2-post claims) were staked in September 1988, immediately south of Railroad Pass, in the Lillooet Mining Division about 35 km northwest of the village of Pemberton.

Pyrite mineralization occurs in volcanic flows and tuffs and in quartz-feldspar porphyry dikes of the Upper Triassic Cadwallader Group. The mineralized rocks outcrop in road cuts and in a northwesterly trending gorge at the upper end of Railroad Creek.

In 1993, geological mapping was conducted on the claims, in order to map those areas not covered by previous assessment work. Mineralization was found to be controlled by structure, and is concentrated in a fault zone and associated quartz-feldspar porphyry dikes which follow the creek gorge.

2.0 INTRODUCTION

This report covers assessment work done on the Engineer claims during the period August 21 to 27 by J.M. Riddell, working as consultant for the operator, P. Jordan. Sections 3, 4, and 5 of this report are written by J.M. Riddell, and sections 1 and 2 are written by P. Jordan.

2.1 Location, Access, and Physiography

The Engineer claims are located on the south side of Railroad Pass, at an elevation of about 1400 m, adjacent to the Hurley River Forest Road. They are centred on the gorge at the upper end of Railroad Creek.

Access to the claims is via the summer-use Hurley River Forest Road which connects Pemberton and Goldbridge. The road runs through the east part of the claim group. Figure 1 shows the location and access.

Topography on the claims ranges from flat and swampy in the wet meadows below the Railroad Creek gorge, to steep and rugged and occasionally inaccessible on the Engineer 3 and 4 claims to the northwest. Elevations range from 1340 to 1650 metres. The claims are covered for the most part by a dense growth of sub-alpine spruce and fir trees, and rhododendron, alder, and huckleberry shrubs. Outcrop is well exposed at higher elevations and in the creek gorge. However, outcrop is poor or nonexistent in the swampy alluvial deposits east of the mouth of the gorge, and in the gently sloping, drift-covered area south of the gorge.

2.2 Property Description and History

The Engineer 1 to 4 claims are located in the Lillooet Mining Division on map sheet 92J/11E. They were staked and are owned by P. Jordan and R. Jordan. Recording data is listed below:

Claim Name	Units	Rec. No.	Original Rec. No.	Date Staked
Engineer 1	1	228985	4095(9)	6 Sept. 1988
Engineer 2	1	228986	4096(9)	6 Sept. 1988
Engineer 3	1	228987	4097(9)	6 Sept. 1988
Engineer 4	1	228988	4098(9)	6 Sept. 1988

The area covered by the claims was previously held by portions of the Don 1 (Noranda) and Hag 1 (Canadian Nickel) claims, which had been forfeited at the time the Engineer claims were staked.

Assessment work in 1989 included soil sampling along 2 lines on the boundary of Engineer 1 and 3, and mapping of outcrop along the Hurley River road cut and in the lower part of the creek gorge. The results of this work are given in an assessment report dated Oct. 25, 1989 (Jordan 1989). Anomalous copper and zinc values were found in samples taken in and immediately northeast of the gorge.

2.3 1993 Mapping

Field work was carried out in a period of about 1 1/2 days, on August 21 and 25, 1993. The objectives of the mapping work were: to map areas not covered in the 1989 assessment work; to investigate structural and lithological controls on mineralization; and to describe the geology in the context of nearby, previously mapped, areas. Results of the mapping are shown in Figure 2, which includes only those areas newly mapped in 1993. The geological map from the 1989 assessment report is also included as Appendix 1. Field work in 1993 was done on all four claims of the Engineer group.

3.0 GEOLOGY

3.1 Regional Setting

This section is adapted from the writer's unpublished thesis (Riddell, 1992).

The Engineer claims are underlain primarily by volcanic flows and tuffs of the Upper Triassic Cadwallader Group. The Triassic rocks form a large pendant within the intrusive bodies of the Cretaceous Coast Plutonic Complex.

Lithology

In the Pemberton area the Cadwallader Group forms four distinct mappable lithofacies:

- mafic volcanic rocks (mv)

- unbedded tuffs

- rhyolitic flows and tuffs (r)

- bedded tuffs and sedimentary rocks (bts)

The mafic volcanic rocks, the unbedded tuffs, and the rhyolitic flows and tuffs are represented on the Engineer claim.

The mafic volcanic lithofacies is characterized by massive, dark green basaltic andesite and lesser basalt flows, with common feldspar porphyritic phases and abundant epidote clots and veinlets. Breccias with clasts 3 cm and smaller are common within the flow units, and the clast material is generally more mafic in composition than the matrix. Limestone pods 2 to 30 metres across are present in this lithofacies; they are especially abundant in the Tenquille Lake area. The mafic volcanic lithofacies hosts a number of mineral occurrences in the Pemberton area. Most are iron and copper skarns associated with the limestone pods; for example Copper Mound and Crown Mine near Tenquille Lake, the Margery east of Mount Currie, and the Lill property on the cliffs at the northwest end of Lillooet Lake (Riddell, 1991; Cairnes, 1925). Mineralization in quartz veins cutting massive andesite flows near Tenquille Mountain has been reported (Assessment Report 22247).

The unbedded tuff lithofacies consists of thick deposits of unbedded felsic lithic, lapilli and feldspar-crystal tuffs and ash tuffs. They weather pale green to white and are poorly sorted. Clasts are subangular and are normally 3 to 4 cm or smaller, but locally clasts as large as 6 to 7 cm are present. The most abundant clast types are feldspar crystals and crystal fragments, dacitic and andesitic volcanic lithic fragments. Basalt fragments occur at some locations. The unbedded tuffs are the most abundant of the rock types in the Tenquille/Lillooet Lake pendant. Tuffs commonly contain intercalations of andesitic to basaltic flows which are often indistinguishable from the mafic volcanic lithofacies at the outcrop scale. The unbedded tuffs do not host any known significant mineral occurrences, except in the Grouty Peak/Grizzly Pass area where they are accompanied by rocks of the rhyolitic lithofacies.

Rhyolitic flows and tuffs are widely exposed east of the Engineer claims, from Grouty Peak directly east of Railroad Pass, to Grizzly Pass north of Tenquille Creek. These rocks form a sub-facies within coeval unbedded tuffs. Rocks of this lithofacies are identified by the presence of conspicuous quartz grains that average 4 to 5 mm in diameter. Clusters of quartz crystals up to 1 or 2 centimetres are locally abundant. These rocks have been the focus of exploration for massive sulphide deposits in recent years (Riddell, 1991; Riddell, Helm, & and Pautler, 1991).

Structure

The north-northwest striking structural grain in the Pemberton area was formed in Late Jurassic to Late Cretaceous and early Tertiary time in response to northeast-directed compression in the southern Coast Belt (Journeay, 1989).

The Engineer claims lie about 3 kilometres northeast of the trace of the north-northwest striking Owl Creek fault, which juxtaposes Triassic Cadwallader Group rocks against Cretaceous strata of the Gambier Group to the southwest (Riddell, 1991). Cadwallader Group rocks northeast of the Owl Creek fault are moderately to intensely deformed along the north-northwest strike direction. Zones of intense penetrative shearing occur at 3 to 4 kilometres spacings (Riddell et al, 1991). In places these zones show evidence that they formed prior to the mid Mesozoic compressional events and then were later reactivated and probably rotated into their current north-northwest striking position. One of these zones lies in the Railroad Creek on the Engineer claims and continues to the southeast across Railroad Pass, and is exposed at 6500' on a knob about 2.5 kilometres northwest of Goat Peak.

3.2 Property Geology

Lithology and Structure

Distribution of the above described rock types on the Engineer claims is illustrated on Figure 2. The Engineer claim is cut in two by a northwest-striking steeply-dipping fault zone characterized by intense shearing. Railroad Creek follows the trace of the fault zone down to 4400' elevation, where it turns abruptly to the south and flows away from the fault zone.

Northeast of the shear zone massive andesite intruded by feldspar porphyry dikes crop out up to an elevation of 4680'. The orientation of the feldspar porphyry dikes is unknown. They are small, and are dioritic in composition, though some outcrops contain small quartz grains in some places. Above 4700', the steep ridge that strikes northwest off the claim is composed of resistant unbedded tuffs with basaltic andesite interflows. The abundance of flow material increases with elevation.

In, and adjacent to the creek shear zone, northwest-striking coarse feldspar quartz porphyritic dikes intrude unbedded tuffs. Both rock types are intensely sheared in the creek canyon. They contain very coarse quartz grains which tend to occur in clusters up to 2 centimetres across. Feldspars are less than 1 centimetre across, and are ivory coloured on the fresh surface. The matrix is very light grey and silicic. Clearly these dikes are related to the rhyolitic facies and probably represent feeders to rhyolite flows higher in the section east of Railroad Pass. They are distinct from the feldspar porphyry dikes that intrude the andesites northeast of the fault zone. Previous mapping (Jordan, 1989) shows that the dike exposed at the top of the claim continues to the southwest down the creek at least to the 4500' elevation level.

The southwest half of the claim is not well exposed except in the cliffs along the southwest edge of the claim where it is intruded by a large granodiorite to quartz monzonite body of probable Cretaceous age (inferred from Woodsworth, 1977). The pluton intrudes primarily massive andesite with minor occurrences of unbedded tuffs and a bit of feldspar quartz porphyry in the southern corner of the claim. The andesite in the southernmost part of the claim is feldspar porphyritic.

Mineralization and Alteration

Mineralization on the Engineer claim is clearly controlled by structure. Pyrite and rusty alteration are most abundant in the shear zone in the creek, and they decrease with distance away from it. In the southwestern section, the occurrence of sulphides drops abruptly; pyrite is absent from almost all outcrops that I observed there. In contrast, northeast of the fault all outcrops observed, contain at least a few percent disseminated pyrite and some have up to 5-10% pyrite in disseminations and small clots. Rusty coatings are apparent on all fracture surfaces. Lithology does not appear to control the concentration of pyrite.

The abundant epidote veinlets and clots in the andesite and basaltic andesite flows occurs everywhere in the mafic volcanic lithofacies in the Pemberton/Tenquille area, and does not correlate with mineralization in my experience.

4.0 RECOMMENDATIONS

Clearly the fault zone in Railroad Creek is the most prospective area for mineralization on the Engineer claim and should be the locus of further work. The feldspar quartz porphyry exposed there is genetically related to the gossanous rhyolitic rocks that make up the spectacular rusty bluffs on the east side of Railroad Pass.

There may be potential for skarn mineralization on the southwest side of the claim, where the mafic volcanic lithofacies is intruded by a large pluton, if limestone pods occur in the intruded rocks. However this area is poorly exposed.

5.0 REFERENCES

B.C. Ministry of Energy, Mines and Petroleum Resources Assessment Report 22247.

Cairnes, C.E. (1925): Pemberton Area, Lillooet District, British Columbia; in Summary Report 1924, Part A, Geological Survey of Canada, pages 76-99.

Jordan, R. (1989): Engineer Claims, Report on Preliminary Geological Mapping and Geochemical Sampling. Assessment report dated October 25, 1989.

Journeay, J.M. (1990): Structural and Tectonic Framework of the Southern Coast Belt: a Progress Report; in Current Research, Part E, Geological Survey of Canada, Paper 90-1E, pages 197-204.

Riddell, J.M. (1991): Stratigraphy of Mesozoic rocks east of Pemberton, B.C. and the setting of mineral showings (92J/2, 7, 10), B.C. Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1990, Paper 1991-1, pages 57-64.

Riddell, J.M., Helm, S.M., and Pautler, J.M. (1991): Geology of the Tenquille Lake, Owl Creek, and Lillooet Lake Area, 92J/1, 2, 7, 10, B.C. Ministry of Energy, Mines and Petroleum Resources Open File map 1991-12, 5 sheets, 1:100,000 scale compilation.

Riddell, J.M. (1992): Stratigraphy and Structure in Mesozoic rocks east of Pemberton, southeastern British Columbia; unpublished MS thesis, University of Montana, Missoula, MT, 142 pages.

Woodsworth, G.J. (1977): Pemberton (92J) Map Area, British Columbia; Geological Survey of Canada, Open File 482.

6.0 STATEMENT OF EXPENDITURES

Professional services 2 days @ 300.00 per day	600.00
Truck rental, fuel	77.75
Lodging, 1 night	41.35
Meals, 1 day	30.00
Total	$ 749.10

7.0 STATEMENT OF QUALIFICATIONS

(on following page)

Statement of Qualifications J. M. Riddell

I, Janet Marian Riddell of Vancouver, B.C. do hereby certify that:

1. I hold a Bachelor of Science degree in Geology from the University of British Columbia (1984) and a Master of Science degree in Geology from the University of Montana (1992).

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

3. My primary form of employment since 1984 has been as a regional geological mapper and a mineral exploration geologist.

4. This report is based on mapping that I conducted on the Engineer claims in August 1993, and on my previous experience with the stratigraphy in the Pemberton area.

J. M. Riddell, P.Geo

September 16, 1993

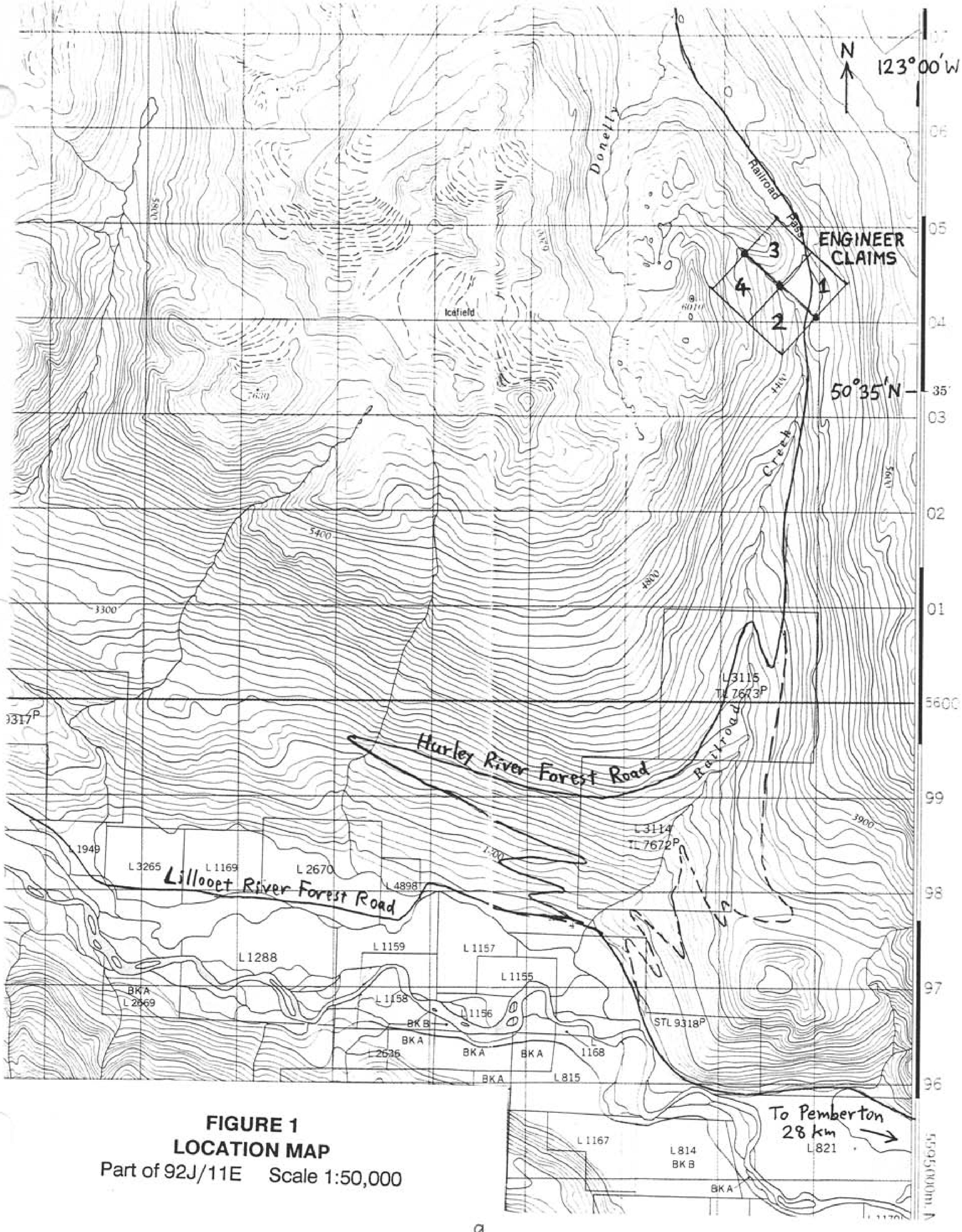
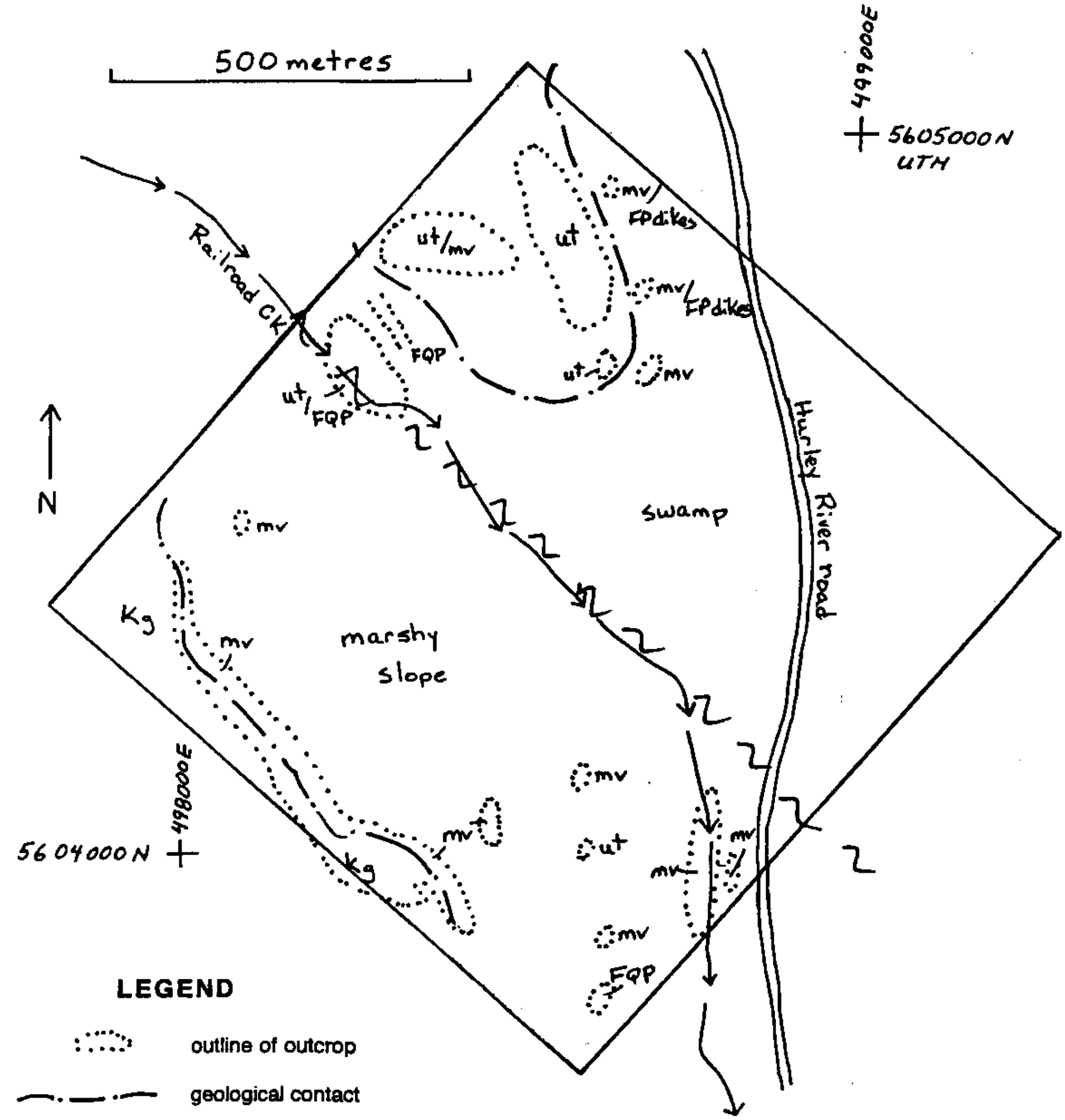


FIGURE 1
LOCATION MAP
Part of 92J/11E Scale 1:50,000



LEGEND

	outline of outcrop
	geological contact
	creek
ut	unbedded tuffs (as described in text)
mv	mafic volcanic rocks (as described in text)
FQP	feldspar quartz porphyry
FP	feldspar porphyry
Kg	granodiorite to quartz monzonite, probably Cretaceous
	Railroad Creek shear zone

FIGURE 2 **GEOLOGICAL MAP ENGINEER CLAIMS**

NTS Map Sheet 92J/11E
Scale 1:10,000 approx.

APPENDIX 1.
GEOLOGICAL MAP FROM
1989 ASSESSMENT REPORT