

Geological Report  
Consolidated Gem Explorations Ltd (NPL)  
Highland Valley Property  
(Cleveland Mining & Smelting Ltd Option)

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT

NO. 2602 MAP

GEOLOGICAL REPORT ON THE

CONSOLIDATED GEM EXPLORATIONS LTD (NPL)

HIGHLAND VALLEY PROPERTY

(Cleveland Mining & Smelting Ltd. Option)

by

R. H. D. Philp, P. Eng.,

January 13, 1970

Vancouver, B. C.

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### MAPS (*rear*)

#1 Geological Survey - North

1" = 400 feet

#2 Geological Survey - South

1" = 400 feet

#3 *Property Map*

1" = 1000 feet

GEOLOGICAL REPORT ON THE  
CONSOLIDATED GEM EXPLORATIONS LTD (NPL)

HIGHLAND VALLEY PROPERTY  
(Cleveland Mining & Smelting Ltd. Option)

INTRODUCTION

The property described in this report consists of 121 mineral claims and fractions held under option by Consolidated Gem Explorations Ltd (NPL) from Cleveland Mining & Smelting Ltd.

Situated within the Guichon Batholith the claims have received sporadic investigation for several years, with most previous work being concentrated in selected areas of the property. Previous geological mapping of the claims has been limited, the only prior mapping available to the writer having been conducted by Utah Construction & Mining Co. over a very small portion of the claims.

This report is based on field mapping by B. Mottershead of Agilis Exploration Services Ltd which contracted to map the claim group at a reconnaissance scale of 1 inch = 400 feet. The main purpose of this work is to provide geological information which can be used in interpreting previous and possibly future geochemical and geophysical surveys, drilling, etc.,

GENERAL CONDITIONS

The property is situated in the Highland Valley Region of British Columbia 1 1/2 miles west-northwest of the Valley Copper deposit, 15 miles southeast of Ashcroft, British Columbia.

Several 4-wheel drive roads branching from the "Alwin" road, which runs south from the main Ashcroft-Highland Valley road provide access to most of the property.

Topographic relief throughout the claims area is low to moderate, the claims occupying northerly facing slopes south of the Highland Valley. The region is generally treed, mainly with Jackpine, while underbrush is light or absent. Rainfall is light; snow, although not deep, is present throughout the winter months.

Outcrop is generally abundant on all but the southeastern portion of the claim group.

## GEOLOGY

### Mapping Procedure:

Mapping was conducted at a scale of 1 inch = 400 feet using several old grids for control. In some instances it was necessary to re-establish stations by chaining along the older grid lines. Traverses were generally run along grid lines and, where outcrop was present or suspected, between lines, with outcrops being tied-in by chain and compass. Type samples collected in the field were later studied under a microscope and have been kept for future reference.

### Regional Geology:

The property lies within the Guichon Batholith and is underlain by several phases of this intrusive, with a small remnant of post-intrusive Kamloops Group volcanics in the north-central portion. Regional mapping of the batholith by K. E. Northcote for his doctoral thesis is available at a scale of 1 inch = 1 mile.

The Guichon Batholith is a north-south elongated intrusive mass, roughly 40 miles in length by an average of 16 miles wide. A complex intrusive, the batholith has been divided into several phases, varying from acid to intermediate in composition. In general more acidic rocks occupy the central portion or core of the batholith.

Copper mineralization is widespread throughout the batholithic rocks and several major deposits have received extensive investigation, with one property, that of Bethlehem Copper Corp., in production. Copper minerals consist primarily of chalcopyrite and bornite with lesser chalcocite, copper oxides and carbonates. These occur as disseminations, along fracture planes and in quartz veins and stringers, with concentrations generally accompanying zones of intense shearing and alteration.

Molybdenite is generally present in variable amounts in the known ore zones. Pyrite is also widespread throughout the intrusive.

### Local Geology:

Outcrop is abundant in all but the extreme southeastern portion of the claims. The property is entirely underlain by intrusive rocks of the Guichon Batholith with a small remnant of post-intrusive volcanics capping these in the north-central portion of the claim group.

The intrusive rocks have been separated into different phases mainly on the basis of Northcote's descriptions. However, because of the more detailed nature of this mapping additional textural and compositional variations were noted.

Contacts between the various phases are invariably gradational across about 200 feet or more. In areas where three or more phases are present, as in the western portion of the claim group, differentiation between the rock types is very difficult.

The following is a description by B. Mottershead of the typical mineralogical and textural characteristics of the various units used for field classification. These units and the names assigned to them correspond to Northcote's classification.

#### Highland Valley Phase - Guichon Variety

The Guichon granodiorite, which outcrops on the west part of the property, is grey to cream in colour with evenly distributed anhedral grains of hornblende and, typically, clusters of biotite flakes. Quartz usually comprises about 15% of the rock and the mafic minerals about 25%. Biotite is normally in excess of hornblende. The rock is medium to coarse-grained and often shows a rough foliation due to the preferred orientation of the mafic minerals, especially biotite.

#### Highland Valley Phase - Chataway Variety

The Chataway granodiorite varies from medium to very coarse-grained and is usually a creamy-green colour. Texture is typically poikilitic with evenly distributed euhedral hornblende much in excess of biotite. Small zones of hybrid granodiorite occur within the larger masses, mainly on the west part of the property. These zones are ultramafic in character with the rock occasionally varying to pure hornblende. Other than the increase in mafic content no accessory minerals seem to be associated with these zones.

Chloritic alteration is widespread throughout the Chataway phase and can be found to some extent in virtually every outcrop.

### Bethlehem Phase

Bethlehem granodiorite is light cream-grey, medium to coarse grained, and characterized by uneven distribution of mafics. Hornblende is normally euhedral and only slightly in excess of biotite. Occasionally biotite predominates. Total mafic content is about 10% and quartz about 25%. Orthoclase commonly forms large patches in optical continuity but, unfortunately, weathering seems to obscure this diagnostic feature.

### Witches Brook Phase

Witches Brook granodiorite shows more textural and compositional differences than the other phases. Where it occurs in small amounts and also where it is in contact with other phases it is fine grained, greenish-grey, with scattered hornblende phenocrysts and occasional clumps or aggregates of the fine mafic grains. In the larger body on the northwest part of the property it becomes medium grained, has a slightly ophitic texture and is predominantly cream-green due to mild chloritic alteration, with flecks of pink. This rock is easily confused with medium grained Chataway granodiorite.

Witches Brook occurs randomly throughout the Bethlehem phase and is probably related to that phase or age of intrusion.

### Bethsaida Phase

The Bethsaida granodiorite, which forms the central core of the batholith, is only thought to outcrop at two locations on the east part of the property. It is very similar to Bethlehem in mineralogy but forms distinctive outcrops, with rough weathering surfaces due to quartz standing in relief.

### Kamloops Group

Kamloops volcanics which overly the Guichen rocks in one small area in the north, consist of fine grained rhyolite or tuff.

The Bethlehem Phase is the most widespread unit on the property, occupying most of the central and eastern portions of the claim group. Small patches ascribed to the Witches Brook Phase have also been mapped throughout this area.

The next most abundant unit is the Chataway Variety of the Highland Valley phase which bounds the Bethlehem Phase in the southwestern and north central portions of the claims. In the latter area where this phase extends south almost to Jac Lake the contacts are very approximate due to scarcity

of outcrop. The Bethlehem Phase re-appears in the extreme northern part of the claims, north of the Highland Valley Phase.

The Guichon Variety of this same phase is less abundant and occupies the extreme southwestern and northwestern portions of the claims.

Rocks assigned to the Witches Brook Phase occur mainly in the northwestern portion of the claims where they form a distinct mass between the Bethlehem and Highland Valley Phases. As mentioned earlier, they have also been mapped as small patches throughout most of the region underlain by the Bethlehem Phase.

The Bethsaida Phase, which forms the core of the Guichon Batholith, was noted only in the northeast corner of the claim group. Regional mapping indicates this would form the northwestern limit of this phase.

Kamloops Group volcanics occupy a small area probably less than one claim in extent in the north-central portion of the claims.

#### Structure:

As described previously, contacts between the various phases are gradational and, at the scale mapped, are very irregular. Regionally, the units form concentric rings concave to the southeast about the Bethsaida rocks.

An indistinct foliation is common in the Guichon Variety and less common in the Chataway Variety and Witches Brook Phase. This consists of a preferential orientation of the mafic minerals and, where observed in the western portion of the claims, trends north to northeast.

Principal jointing directions are slightly east or west of north, dipping steeply east or west; northeast, generally vertical; northwest, vertical or dipping moderately to steeply northeast; east-west and steeply dipping either north or south.

No major faults were observed during mapping. However, minor faults trending from northeasterly to northwesterly appear widespread. Most of these are indicated by topography while others are indicated by micro-jointing and discontinuities in rock types.



Mineralization:

Copper mineralization in the form of bornite, chalcopyrite and malachite was observed in minor amounts at several locations, most of which have been investigated previously.

Of possible interest is an occurrence on line 60N of the main grid where small amounts of bornite occur in a chlorite-sericite alteration zone in rocks of the Chitaway Variety of the Highland Valley Phase. This was observed in two small outcrops and, apart from some trenching nearby, does not appear to have been investigated in detail.

CONCLUSIONS

Outcrop is abundant throughout most of the claims area.

Based on Northcote's classification, the property is underlain by four phases of the Guichon Batholith, with one phase divided into two units. Kamloops Group volcanics occupy a very small area in the north-central portion of the claims.

Bethlehem granodiorite is the most abundant rock type, bounded to the north and west by the Highland Valley and Witches Brook Phases. Bethesda granodiorite occurs only in the northeast corner of the claims.

Contacts are gradational, thus only approximate on the accompanying map.

No major faults are in evidence in the field although several minor faults and joint sets are indicated.

Minor copper mineralization occurs at several points and one occurrence, where overburden cover is extensive, warrants further investigation.

Respectfully submitted,

R. H. D. Philp, P. Eng.,

Agilis Exploration Services Ltd.,

January 13, 1970





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Mines and Petroleum Resources  
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- LEGEND**
- Post-intrusive Rocks
  - Kemloos Group
  - Intrusive Rocks
  - Bethsaida Phase
  - Witches Brook Phase
  - Bethlehem Phase
  - Highland Valley Phase - Chateway Variety
  - Highland Valley Phase - Guichen Variety
  - Joint Planes
  - Shear Planes
  - Foliation
  - Fault
  - Trench
  - Glacial Drift
  - Ultramafic Zone

2602  
#1

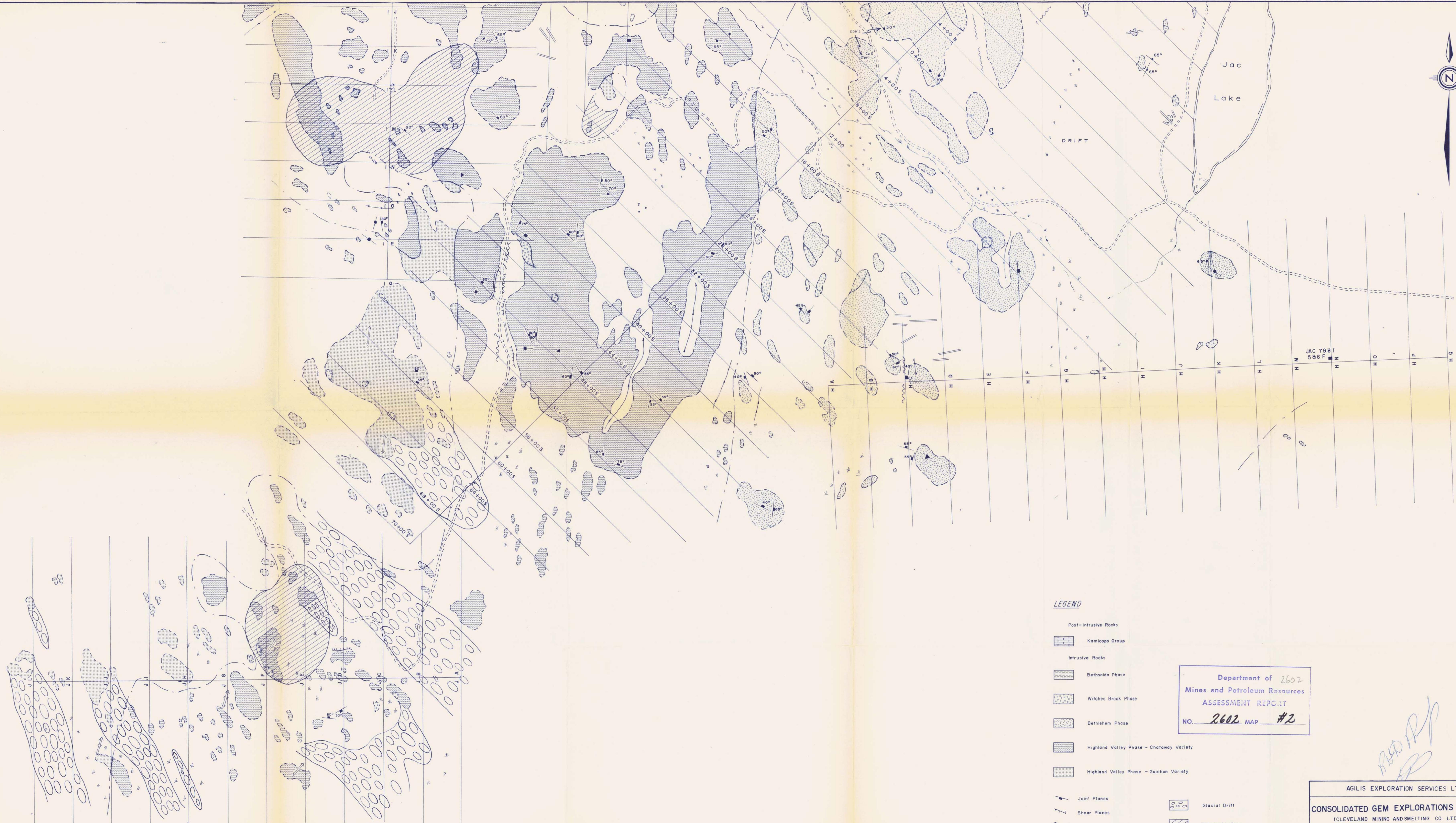
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2602

AGILIS EXPLORATION SERVICES LTD.  
**CONSOLIDATED GEM EXPLORATIONS LTD (N.P.L.)**  
 (CLEVELAND MINING AND SMELTING CO. LTD. option)  
 HIGHLAND VALLEY, B.C.  
**Geological Survey**  
 NORTH

DRAWN BY: K. K.      SCALE: 1" = 400 Feet  
 CHECKED BY: R. P.      DATE: November, 1969





**LEGEND**

- Post-Intrusive Rocks
- Kamloops Group
- Intrusive Rocks
  - Bethside Phase
  - Witches Brook Phase
  - Bethlehem Phase
  - Highland Valley Phase - Chataway Variety
  - Highland Valley Phase - Guichen Variety
- Joint Planes
- Shear Planes
- Foliation
- Fault
- Trench
- Glacial Drift
- Ultramafic Zone

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*R.P.P.*

**2602**

AGILIS EXPLORATION SERVICES LTD.

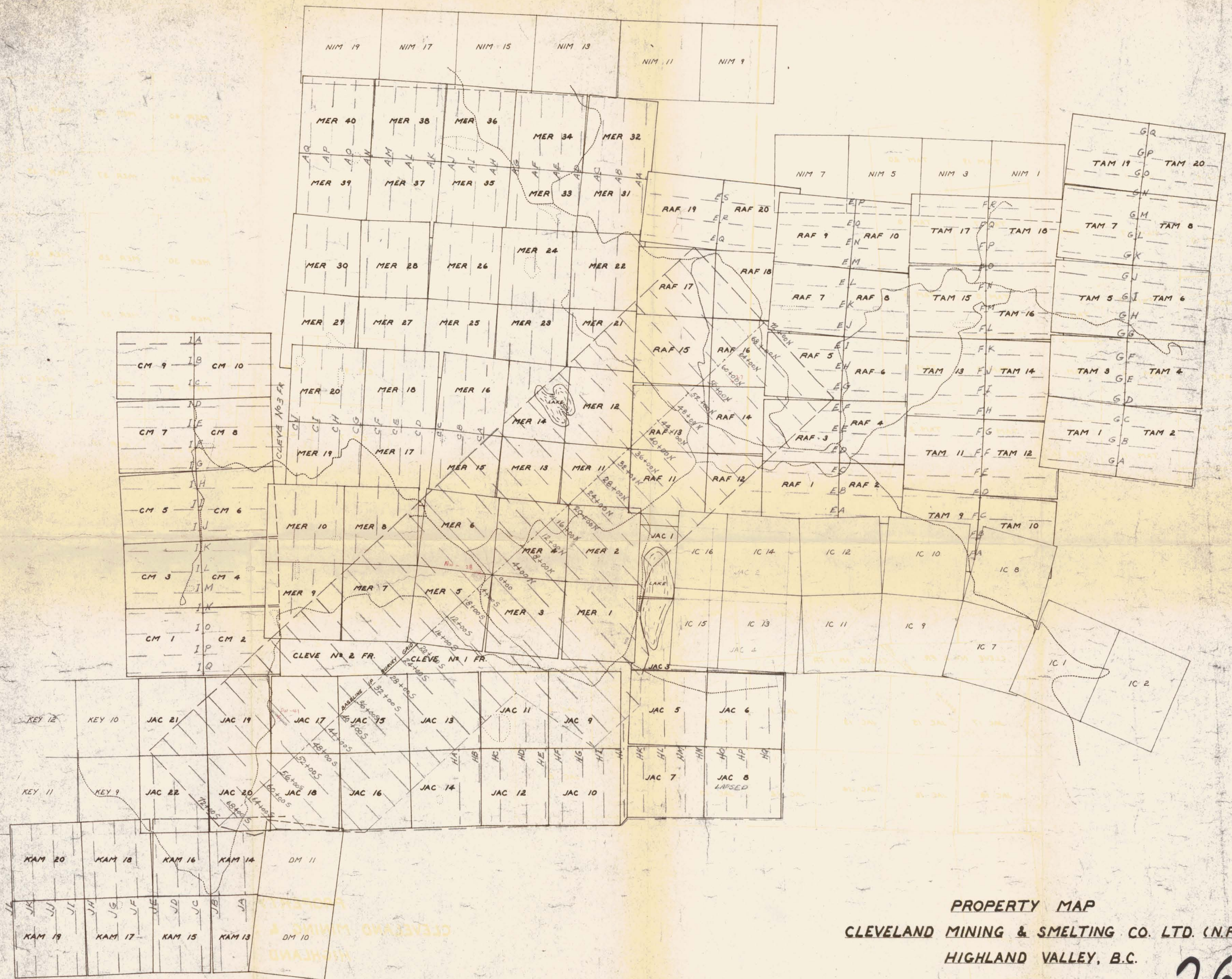
**CONSOLIDATED GEM EXPLORATIONS LTD. (N.P.L.)**  
 (CLEVELAND MINING AND SMELTING CO. LTD. option)

HIGHLAND VALLEY, B.C.

**Geological Survey**  
 SOUTH

DRAWN BY: L.M.      SCALE: 1" = 400'  
 CHECKED BY: R.P.      DATE: November, 1969.





**PROPERTY MAP**  
**CLEVELAND MINING & SMELTING CO. LTD. (N.P.L.)**  
**HIGHLAND VALLEY, B.C.**

**2602**

ROADS  
 BOUNDARIES OF IP SURVEY  
 GEOCHEMICAL ANOMALIES  
 MINERALIZED ZONES (Cu, Mo)

SCALE: 1 INCH = 1000 FEET.  
 DECEMBER 1962

Department of  
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 NO. 2602 MAP #3