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SUMMARY REPORT
on the
PL #29 PROPERTY
KEITHLEY CREEK B.C.

by
M.K. Lorimer, P.Eng.

SUMMARY

PL 29 is a placer lease owned by Cascadia Mines and Resources Limited and located at the confluence of Keithley and Snowshoe Creeks in the Cariboo District. It is easily reached by travelling 18 miles northerly from Likely.

The lease covers two high gravel benches on either side of Keithley Creek. To date, exploration has been confined to the bench on the north side of the creek.

Exploration consisting of surface sampling, bulk sampling, drilling and seismic surveying has been carried out each year since 1978. As a result of this work it has been established that the north bench contains over four million cubic yards of gold-bearing gravels, much of it of commercial grade.

Of particular interest is the finding by seismic surveying of a major buried channel that appears to be a former course of Snowshoe Creek.

It is recommended that the property be put into production at a rate of at least 1000 cubic yards a shift and at an estimated cost of \$248,000.

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SUMMARY REPORT
on the
PL 29 PROPERTY
Keithley Creek, B.C.

INTRODUCTION:

The following report summarizes the information obtained to date concerning the placer gold deposits on Placer Lease 29 and makes recommendations for the development and putting into production of the property. It is based on the writer's close association with the property since 1979 and is essentially an up-dating of several engineering and progress reports written over the last four years. A glossary of placer mining terms is appended.

LOCATION:

Placer Lease 29 is located at the confluence of Keithley and Snowshoe Creeks about midway between Likely and Barkerville in the Cariboo District. Map 1.

The area is most conveniently reached by travelling north-erly from Likely over an all-weather gravelled road for about 18 miles. Old logging roads and trails give easy access to the claim and to much of the surrounding country.

The geographic location is $N52^{\circ}50'$, $W121^{\circ}25'$, the National Topographic System map area is 93A/14W and the Mining Division is Cariboo. The average elevation is about 3300 feet above sea level.

CLAIM:

PL 29 is a full-sized placer claim. Its initial post is near the junction of Snowshoe and Keithley Creeks and the location line runs southeasterly for about 1000 metres along the north bank of Keithley

Creek. The claim extends 250 metres to right and left of the location line, thus covering the creek and the benches on either side.

The owner of the claim is Cascadia Mines and Resources Ltd. of Vancouver. The expiry date is 15 October, 1984.

PL 29 is underlain by the J1 Mineral Claim, also owned by Cascadia Mines and Resources Ltd.

TOPOGRAPHY:

The ground varies from steep near the creek to comparatively flat along the northern boundary. Rock outcrops are scarce except near the western end.

Except for 13 acres recently logged, the claim is forested. Many of the trees are of commercial size and grade and have to be logged before the ground is disturbed.

Water is plentiful. Keithley Creek is a Yellow Colour Coded Stream.

GEOLOGY:

Geologic mapping has shown that the region is underlain by Cambrian metasedimentary rocks including schist, quartzite, argillite and limestone. They have been intensely folded, faulted and intruded by quartz veins, many of which are the sources of the placer gold of the region.

In pre-glacial times these ancient rocks were disintegrated and the fragments transported, mainly by stream action, to form vast placer deposits in wide valleys. During the glacial periods further disintegration occurred and the old stream beds were filled. Post-glacial streams cut new and often deeper channels through the debris. This action resulted in further concentration of gold and other heavy minerals to produce rich stream-bed deposits while leaving vast, but leaner deposits in benches on the flanks.

This situation prevails on PL 29 where Keithley Creek flows between 100-foot-high gravel benches. The gravel deposits are largely till, evidence of their glacial origin, but recent road-building has shown them to be composed in part of well-stratified, obviously stream-sorted, material lying as much as 100 feet above the present creek bed.

In size the gravels range from clay particles to large boulders. Jagged fragments of quartz, indicating a local origin, and carrying pyrite and/or gold have been noted. Pyrite, usually combined with gold, is an important constituent of the "black sands" after concentration. In discussing this area the Geological Survey of Canada Annual Report for 1887-8 states that benches 100 feet above the creek paid for open work and some drifting.

The predominant bedrock is a micaceous schist with local occurrences of limy schist, limestone, greenstone and quartz. A recent seismic survey found areas of high velocity that have been interpreted as volcanic and intrusive rocks.

The same survey revealed a major buried channel that seems to connect the present courses of Snowshoe and Keithley Creeks and was probable a pre-glacial course of the former. Other channels and/or fault zones were also identified.

In summary, it may be concluded that in pre-glacial times the course of Snowshoe Creek was east of its present location and may have occupied more than one channel over a long period of time. Subsequently, through glacial action, the area was covered with debris containing gold from the disintegration of quartz veins in the surrounding hills. The streams that developed as the ice melted cut new channels across the glacial deposits, producing the stratification visible today. The final result of the various stages of glaciation and changing stream courses was a large deposit of gold-bearing gravel containing local concentrations of enriched material.

HISTORY:

The early history of the property is not well documented but it is known that the Keithley Creek deposits were discovered about 1860. They continued as important producers of placer gold for the next few decades and as minor and intermittent producers up to the present time. Activity was largely in response to economic conditions - high unemployment or rises in the price of gold.

PL 29 was staked in 1975. A recommended exploration programme was initiated in 1978 and completed in 1979. It included the completion of an access road, the purchase and setting up of a five-man trailer, the excavation and sampling of several test pits, and the operation of a small washing plant for the bulk sampling of excavated material. The results were encouraging.

The following year was mainly devoted to the drilling and testing of selected areas of the bench north of the creek. An old track along the creek was improved and two new roads built to provide access for a truck-mounted Becker drill. Thirty-six holes, totalling 1065 feet, were drilled from locations along these roads. Later in the year a seismic refraction survey was made over most of the northern bench.

In 1981, preparations were made for production. About 13 acres of ground designated for initial mining operations were logged and cleared in the spring. A new camp with complete facilities for at least eight persons was established. In September, a washing plant comprising a trommel and sluice box was moved in. Mining commenced the same month at the toe of the slope using a Gradall, a front-end loader and a bulldozer for material handling. Satisfactory gold values were recovered from the start, most of it in the form of flakes and nuggets. Although the best recoveries were made near bedrock, gold was found throughout the excavated material, a depth of about 20 feet.

SAMPLING:

Samples taken by the writer and other examining engineers conformed to the usual placer gold pattern in that they were widely divergent in value. The assays depended on both the source of the samples and on the chance inclusion or exclusion of a fragment of gold in the charge placed in the assay furnace. The values ranged from \$0.02 to \$102.43 per cubic yard of gravel. These results could not be used for evaluation purposes but they did show that gold was widely distributed throughout the bench, often in commercial quantities.

The first systematic sampling took place when the Becker drill recovered 273 samples, most of them from 4-foot runs. Spot examinations, including panning, were made of the recovered gravels during the drilling. All the samples were bagged and shipped to Vancouver for concentration and testing. As a result of work done by the writer, by Bacon, Donaldson and Associates Ltd., by Jiffy Ore Dressers and by Bondar-Clegg and Company Ltd., it has been established that 12 holes along the base of the bench, averaging 24 feet in depth, over a distance of 530 feet showed a weighted average value for the full depth of the gravels of 820.1 milligrams of gold or \$12.91 Canadian per cubic yard. (Gold at \$420 US/ounce.) The values from the holes drilled from the upper road are expected to be higher since more free gold was seen during drilling.

SEISMIC SURVEY:

The seismic survey previously mentioned was carried out for the purposes of measuring gravel depths, finding buried channels and determining the nature of the bedrock. It was confined to the northern bench and covered the upper three-quarters of the deposit.

Eleven lines, 165 metres long, at intervals of approximately 90 metres, were run in a northerly direction. On one line near the centre of the surveyed area, bedrock was not reached because of the limited length of the line. This fact means a gravel depth exceeding 50 metres and indicates a major buried channel that appears to be a former course of Snowshoe Creek. A minor channel was detected near the eastern end of the survey and a feature running between the two channels has been tentatively interpreted as a possible canyon-type channel and/or a fault zone. Bedrock velocities were compatible with those of volcanics and intrusives, and would therefore include the schists common in the area.

A calculation of gravel volume based mainly on this survey gives a total of over 4,100,000 cubic yards. Fig. 2.

DISCUSSION:

The history of this property and the work done in the last three years show that it contains a large deposit of gravel with widely distributed gold values. It is unlikely that the distribution is homogeneous; rather, there will be zones of varying richness due to the concentrating forces that have acted on the gravels. Such zones can be expected in or near buried channels, on bedrock generally, and associated with clay or hardpan bands that have served as bedrock. To date several such channels and horizons have been identified on surface, and by drilling and seismic surveying. For the present, they should be regarded as initial target areas, particularly the major channel believed to be a former course of Snowshoe Creek.

Further testing of the gravels by drilling or bulk sampling would be expensive and would produce no revenue. It is felt that there is enough favourable information on hand to warrant putting the property into production with a portable plant that could be moved from one favourable zone to another.

The operation should be planned to treat at least 1000 cubic yards daily. The required equipment will include excavating and loading machines, a washing plant, a tailings disposal system, pumps and a power plant. Since the natural drainage is towards the creek

it will be necessary to impound pit waters in settling ponds before discharge into the creek. To further reduce environmental impact, a closed-circuit method of handling the washing water should be used.

Because of the clay content it will be necessary to provide a plant capable of disintegrating clay lumps and thoroughly washing boulders. A trommel with high-pressure water jets is recommended for this purpose. It should form part of a skid-equipped unit comprising, in addition to the trommel, a distributor with gates, a set of sluice boxes and a belt stacker. A grizzly-equipped bin with an inclined belt reaching to the head end of the trommel should also be incorporated to ensure an even flow of material to the plant. A sand screw to thicken the sluice tailings might be useful but would be bulky. All plant machinery should be electrically driven from a central power plant. Belts, unless fully enclosed, should be avoided in favour of gear reducers and shaft drives. At least two pumps would be needed.

For clearing overburden, digging, carrying gravel to the plant, handling tailings, cleaning bedrock, etc., the minimum equipment requirements would be a bulldozer, a loader and a backhoe. Highly desirable would be a welder to facilitate plant changes and to deal with the inevitable breakdowns.

The minimum crew per shift would be a foreman, three equipment operators and two men on the washing plant.

The operation should start at the toe of the slope below the main buried channel and work upwards so that the material is moving downwards to final disposal. Initially there will be a problem in disposing of the tailings, but once a pit has been established and elevation gained, they can be deposited in worked-over areas. Similarly, pit water that may have to be pumped at first will eventually be channelled to flow naturally to the settling ponds.

There should be two products recovered. One will consist of nuggets and flakes that can be sold for jewellery at a probable premium of about 20 percent. To qualify as jewellery gold the pieces should exceed Tyler mesh 6 (approximately 1/8 inch) in size, but much depends on the shape and general appearance. They can be picked out of the sluices and require no further treatment. The second product will be the finer gold particles collected in the "black sands" in the sluices along with pyrite, magnetite and other high specific gravity minerals. After removal from the sluices the black sands should be further concentrated to eliminate most of the valueless constituents. The resulting concentrate can then be shipped out for refining or treated on the site. There are several methods of on-site treatment that will produce a product of varying degrees of refinement. One

would involve grinding and amalgamating (with mercury) in a clean-up barrel, retorting the amalgam and selling the resulting button. Other methods include direct smelting and cyanidation. As much on-site treatment as possible is recommended.

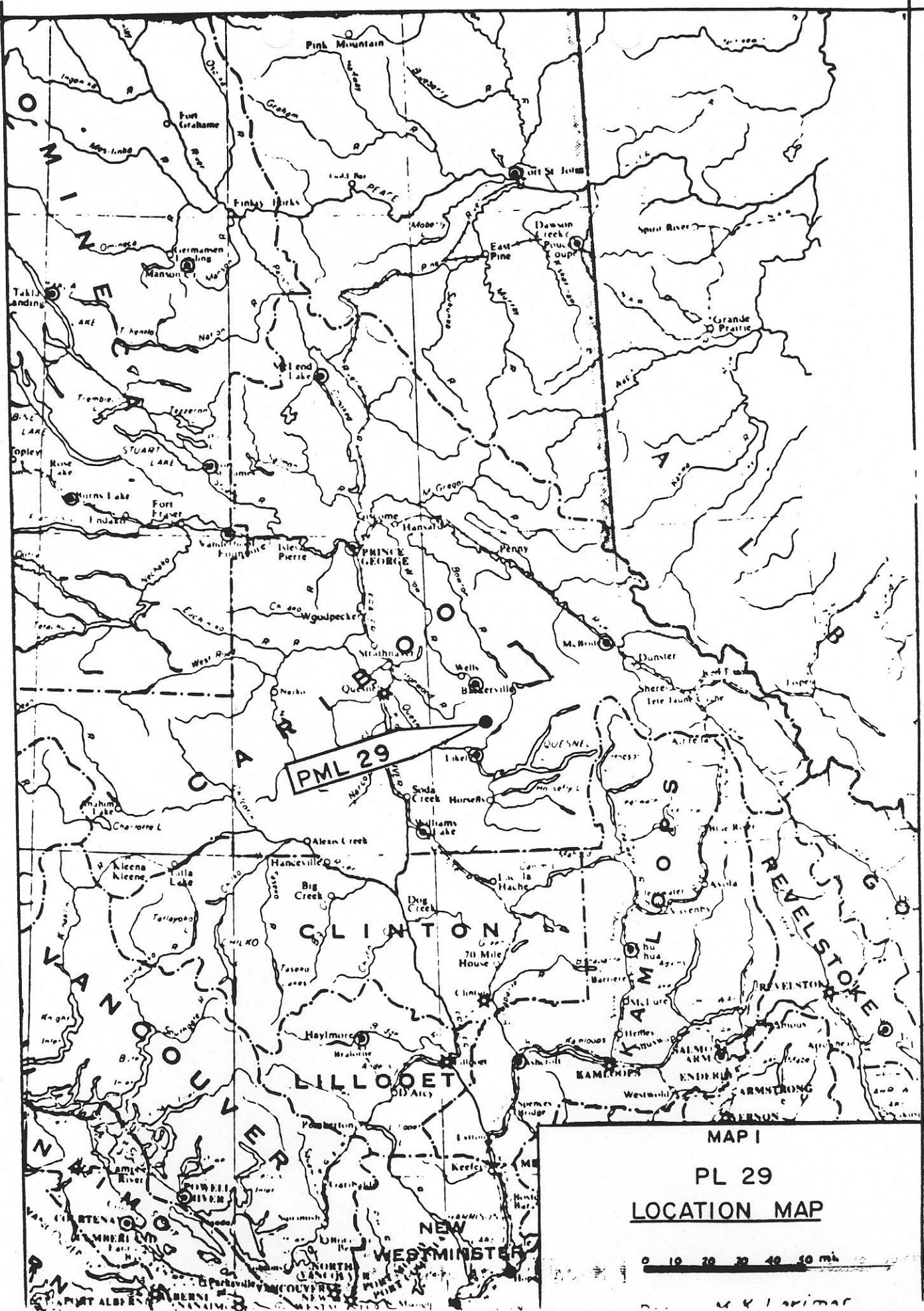
The holder of a placer lease is only entitled to the minerals that can be obtained without disturbing the underlying bedrock. In order to legally recover gold that has penetrated into breaks in the bedrock and cannot be recovered except by blasting or ripping, the holder must obtain rights by staking a mineral claim if the ground is open, or by agreement with the owner of an existing claim. In the present case it is recommended that the proposed Casca PML 29 Limited Partnership obtain the rights from Cascadia Mines and Resources Limited to all free gold within the bedrock.

Finally, security must be tight since gold nuggets tempt the most virtuous. Sluices must be covered with locked screens and clean-up operations must be closely supervised.

RECOMMENDATIONS:

In accordance with the foregoing presentation of data and discussion, it is recommended that PL 29 be put into production as follows:

1. Plan on using the plant and equipment reported to be available under the terms of a Joint Venture Agreement with 88865 Canada Ltd. Corporation.
2. Continue the removal of top-soil and debris from the designated mining areas and the preparation of settling ponds.
3. Move the plant in.
4. Start mining.
5. Carry out detailed mapping and seismic surveying to assist in the day-to-day planning of operations.
6. Have a perimeter survey made to determine the exact boundaries of the lease.



PML 29

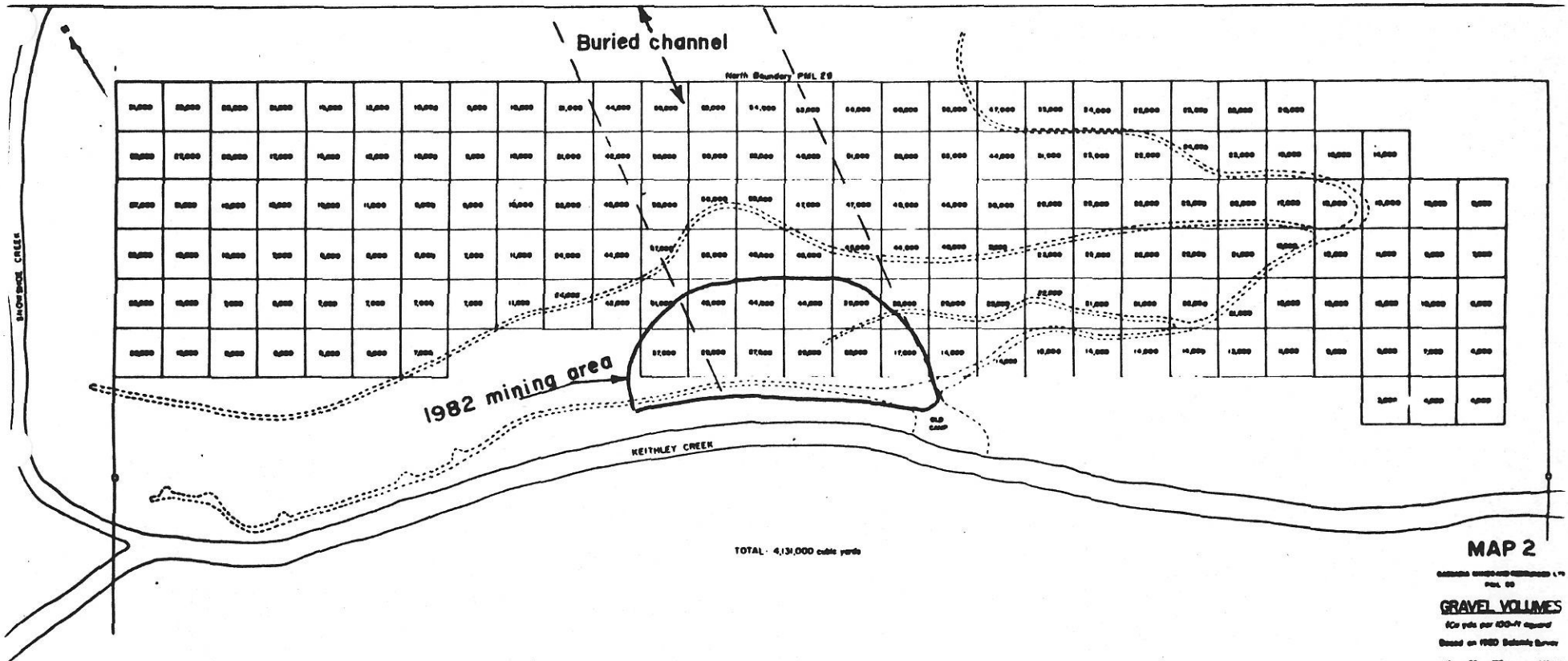
MAP I
PL 29
LOCATION MAP



MAP I

PL 29

LOCATION MAP



MAP 2
COLUMBIAN UNIVERSITY LIBRARY
P.O. BOX 100
GRAVEL VOLUMES
1 Cu yds per 100-ft square
Based on 1983 Database Survey

Drawn: M & L
Date: 8/8

CERTIFICATE OF QUALIFICATIONS

I, MALCOLM KEITH LORIMER, of the City of Vancouver, B.C.
Mining Engineer, hereby certify:

1. THAT I am a practising Mining Engineer and reside at 3082 West 27th Avenue, Vancouver, B.C.
2. THAT I am a graduate of the University of British Columbia and hold a Bachelor of Applied Science degree in Mining Engineering granted in 1950.
3. THAT I have been practising my profession for over 29 years.
4. THAT I am a member of the Association of Professional Engineers of the Province of British Columbia.
5. THAT the following is a true record of my employment and experience:

1950-52	General engineering, Consolidated Mining and Smelting Co. of Canada Limited, Kimberley, B.C.
1952-56	Chief Engineer, Pioneer Gold Mines of B.C. Ltd., Pioneer Mines, B.C.
1956-57	Chief Engineer, Buchans Mining Co. Ltd., Buchans, Nfld.
1957-59	Chief Engineer and Mine Superintendent, Cowichan Copper Company Ltd., Lake Cowichan, B.C.
1959-65	General exploration work for various companies, mostly in southern British Columbia.
1965-75	Associate, H.L. Hill and Associates Ltd., later L.J. Manning and Associates Ltd., Consulting Mining and Geological Engineers, Vancouver, B.C.
1975	To present time - Independent Mining Consultant.
6. THAT I have no direct or indirect interest in the properties or securities of Cascadia Mines and Resources Ltd. nor do I expect to acquire any.

DATED at Vancouver, British Columbia, this 21st day of July, 1983.

Malcolm Keith Lorimer

GLOSSARY
(Placer Terms)

- BECKER DRILL** - a drill with hollow stem up which gravels and cuttings are blown by compressed air.
- BEDROCK** - the solid rock underlying a gravel deposit.
- BENCH** - gravel deposits standing 50 to several hundred feet above the present stream.
- BLACK SANDS** - heavy grains of various minerals, usually black because of high magnetite (iron oxide) content. Collects in bottoms of sluice boxes. Gold collects in these sands also.
- FLAKES** - flat, thin pieces of gold.
- FREE GOLD** - gold uncombined with other substances.
- GLACIAL DEPOSITS** - materials put in place by glaciers.
- GRAVEL** - a comprehensive term applied to the water-worn material making up a placer deposit. Sizes range from minute clay particles to boulders. May contain gold and other heavy minerals.
- NUGGETS** - water-worn pieces of gold larger than, say, 1/20 ounce or one gram.
- PANNING** - washing gravel in a miner's pan to recover gold and/or other heavy minerals.
- PLACER** - a place where gold occurs in stream- or glacier-deposited gravels.
- RETORTING** - heating an amalgam of gold and mercury to drive off the mercury.
- SEISMIC SURVEY** - a survey in which the sound waves from an explosion are used to determine such things as gravel depths and rock types.
- SLUICE BOX** - a trough with roughened bottom through which a stream of water and gravels passes. Heavy minerals such as gold are trapped on the bottom.
- STACKER** - a belt to carry washed gravels for disposal.
- WASHING PLANT** - a plant for recovering gold through the action of water and gravel.