KLOHN LEONOFF
CONSULTING ENGINEERS

Our File: PB 3942 0101

April 8, 1988

White Marble Mountain Corporation
220 - 7525 King George Highway
Surrey, British Columbia
V3W 5A8

Mr. J.D. Stewart

Summary of Field Work and Preliminary
Evaluation - Bonanza Lake Marble Property

Dear Sir:

This letter summarizes the results of field work recently carried out at the Leo D'or marble claim on the east shore of Bonanza Lake and provides a preliminary technical evaluation of the suitability of the site for development of a potential marble quarry. As agreed, we have made no assessment of the economic viability of the property with respect to development costs or market value of the product. The field work, undertaken during the week of March 21, 1988 to March 25, 1988, constitutes the first phase of a technical evaluation for the quarry, as outlined in our proposal dated January 8, 1988.

1. LOCATION

The Leo D'or marble claim is located approximately 30 km southeast of Port McNeill on northern Vancouver Island. The property is located at the northeast end of Bonanza Lake on a tree covered slope which rises from the lake shore, up to the east at an average slope of 1.7H:1V (30°). The claim covers an area of approximately 225 hectares (555 acres). Access to the claim from the Island Highway is via a public road to Beaver Cove followed by a Crown Forest Industries' private logging road to the site. The general location and the claim boundary is shown on Drawing B-1001.

2. FIELD WORK

The field work consisted of detailed geologic mapping and sampling. Traverse lines were run approximately east from the edge of the existing Crown Forest logging road using compass and topofil chains. The traverse lines were spaced approximately 50 m apart as measured along the Crown Forest road. Mapping stations were located along each traverse line at outcrops. Rock chip samples were taken at all stations and taken back to our Richmond laboratory for detailed colour evaluation and further laboratory testing. A descriptive note was made between stations when significant change in rock colour or rock type were noticed.

A base map was prepared using the eastern edge of the Crown Forest road as a base line. The road alignment and road width were surveyed using a Brunton compass and topofil chain line. A B.C. Hydro power line which runs approximately parallel to, and between 80 m to 110 m east of the road, was located on the base map by triangulation.

The road alignment, power line and station locations are shown on Drawing D-1002. Field descriptions of the rock observed at each station are included on Drawing D-1002.

Initially, the geologic mapping was intended to cover the entire claim area shown on Drawing B-1001. However, snow prevented exploration of the higher eastern parts of the property. Following discussions with Mr. Jim Stewart at the site, the areal extent of the field mapping was reduced to the area shown on Drawing D-1002.

3. GENERAL GEOLOGY

The claim area is underlain for the most part by either Upper Triassic age limestones of the Quatsino Formation or Jurassic age granodiorites of the Island Intrusions. Discontinuous dykes or sills of basalt of unknown age were frequently observed intruding the limestone.

The limestones have been metamorphosed by the intrusions of the granodiorite and recrystallized to a marble.

3.1 COLOUR AND GRAIN SIZE VARIATIONS

The marble varies in colour from a very light grey to a dark grey or almost black. In some areas the colour varies gradationally and appear to be mottled grey and white whereas at other sites, distinct bands of colour varying from several centimetres to several metres in width were observed. The bands vary in colour from very light grey to black. The contacts between colour bands vary from very sharp to gradational. The orientations of the colour bands vary from horizontal to near vertical.

The grain size of the marble varies from fine to coarse grained. The majority of the marble (approximately 75%) is medium grained. The very dark grey marble was predominantly fine grained, while most of the coarse grained texture observed was contained in the very light grey marble.

3.2 WEATHERING

All of the geological mapping, with the exception of the interior mapping of two caves, was done on surface exposures of marble. No drilling was undertaken at this time. Consequently, most of the rocks observed were weathered to some degree.

Most of the rock samples observed had a light brown to very light orange stain superimposed on their base colours. The staining is caused by oxidation of the iron impurities in the marble. The degree of weathering and the resulting colour varies with the percentage of iron present. Brown staining along micro cracks and around grain boundaries was observed in some of the highly weathered, near-surface rocks. Some samples showed no signs of iron staining at all.

Most of the iron impurities are present as discrete iron particles shaped like rods 0.5 mm in diameter and 3 to 4 mm long, or sand size particles up to 1 mm in diameter. The particles, which oxidize to a rusty brown, were observed at several locations in all colours of marble. A visual estimation of the percentage of iron was made in the field and from a review of the chip samples taken back to our Richmond laboratory. The percentage of iron is estimated to vary from 0% to 4%.

The massive marble for the most part is hard and resists weathering. However, some blocks of coarse grained very light grey marble and several bands of the very fine grained dark grey marble were observed to be friable and less competent than the majority of the rock.

A strong sulphur odor can be detected in some of the rocks when they are broken open by hammer blows. The sulphur smell was only observed occasionally.

3.3 KARST

The marble rocks observed at Bonanza Lake are predominantly calcium carbonate and as such are susceptible to the formation of karst which forms as a result of circulating groundwater dissolving the calcium carbonate material. The karst usually forms along pre-existing geologic discontinuities which concentrate and control the flow of groundwater. Descriptions of the karst features observed within the claim area are given below.

Crevice karst is present throughout the claim area. The crevices, which follow joints or faults, may be up to 1 to 3 m wide and 3 to 15 m deep. Generally the crevices extend laterally for up to 15 m.

Caves were observed at two locations along the existing Crown Forest road. The caves were explored for a distance of 8 m and 25 m respectively and the cave outlines are shown on Drawing D-1002. Both caves could not be explored to their source due to narrowing of the passages but are assumed to end either at sinkholes or crevices. The larger of the two caves explored ends very close to the location of a wide deep crevice mapped on the surface. Both caves were dry at the time of exploration.

Springs were observed at several spots within the mapped area. One major spring flowed from rubble at an estimated rate of 20 to 30 gpm. The location is shown on Drawing D-1002. Other springs, which were little more than trickles, appeared to be flowing along and exiting from joints in otherwise massive blocks.

3.4 STRUCTURES

Bedding in the marble has a regional dip of approximately 20°. The strike varies considerably. Locally, the beds are folded into tight synclines or anticlines, the limbs of which dip locally as steeply as 40° to 60°. The fold axes vary in plunge from 0° up to 65°.

A major fault has been mapped by Muller et al. (1974) running north-south through Bonanza Lake. Minor faults, probably sympathetic to the Bonanza Lake Fault, were observed running east-west at several outcrops along the road. Movements on the small faults, quantified by offsets in the marble banding, vary from 3 to greater than 1 m. The faults are generally steeply dipping to both the north and south.

Faulting and folding were observed frequently in the northern third of the mapped area and were infrequently observed in the south.

Joints in the area are generally steeply dipping. The strike of joints varies from parallel and perpendicular to the slope (parallel and perpendicular to the main fault in Bonanza Lake) to 30° to 60° from slope directions. Joint spacing varies from several centimeters to as much as 10 m. Closely spaced joints form blocky outcrops while widely spaced joints form massive outcrops. Massive or blocky outcrops occur randomly within the mapped area.

3.5 INTRUSIVES

The major intrusive which is believed responsible for the marblization of the Quatsino limestone was observed at approximately marker 22 km, south of the Leo D'or claim area. The rock exposed on the road is a medium grained, medium to light grey granodiorite.

Dykes of basalt rock were observed throughout the mapped area. The dykes vary in thickness from 30 cm to several metres. The majority observed are approximately 60 cm thick. The dykes vary from vertical to almost flat lying. All are discontinuous and could not be traced far more than 10 to 15 m.

4. LABORATORY TESTING

Chip samples of marble have been submitted to Geotex Consultants for thin section analysis and X-ray diffraction. The results have not yet been reported.

A single sample of marble was dissolved in concentrated hydrochloric acid in the Klohn Leonoff laboratory. Approximately 97% to 98% of the sample by weight was completely dissolved within several minutes. The residue was dried and examined under a hand lens. The remaining residue (2% to 3% by weight) consisted of an unidentified white mineral and iron

particles. The iron was estimated visually to be one half of the residue by volume. Additional testing is underway to provide a range of iron content and identify the nature of the residue.

5. PRELIMINARY CONCLUSIONS

Prior to the start of field work, Klohn Leonoff was requested by Mr. J. Stewart to identify, if possible, areas of consistent colour within the mapped area.

A single preferred site approximately 160 m long x 100 m wide (approximately 4 acres) has been identified for further evaluation. The outline of the area is shown on Drawing D-1002. The site consists of very light grey to white marble, with varying amounts of iron staining. Very little colour banding was observed within this area. The majority of the rock is massive although some areas are blocky and dissected by joints. The area is close to the road and is considered accessible. Crevice karst and springs were observed within this preferred site. However, there does not appear to be any site within the claim which does not contain karst.

The overall slope of the ground within the identified area is 30°, although individual faces as steep as 45° are present.

A volume of marble available within the area of consistent colour has been estimated, assuming that the rock at depth is similar to that observed on the surface, and that the average ground surface slope over the site is 30°. We have further assumed that rock waste due to close joint spacing or karst will be 50% and that quarry slopes will extend up at approximately 60° from the outline of the preferred site as shown on section A on Drawing B-1003. We estimate that a rock volume of 240,000 m^3 is potentially available for quarrying. Assuming a unit weight of 2752 kg/m^3 (172 psf) the total tonnage available for quarrying is

660,000 tonnes. Volume will vary depending upon the design guarry slopes eventually determined.

Development of a marble quarry at the Leo D'or claim area is considered to be technically feasible. Blocks of marble will be removed by either very light explosive or wedging by expanding cement and should not therefore interfere with the operation of the existing B.C. Hydro power line. However, support of the transmission towers on the perimeter of the quarry will require closer examination at a later stage.

Groundwater at the site is expected to be concentrated in karst channels at a variety of depths. The actual flows cannot be easily determined prior to development but are not expected to cause insurmountable problems.

Access to the preferred site shown on Drawing B-1001 will be relatively convenient. We understand that a written road use agreement has been granted by Crown Forest Industries for use of its private logging road.

6. FUTURE WORK

Additional field work in the form of drilling is recommended to assess the variation in colour and the variation in iron content of the subsurface marble.

Samples recovered should be subjected to ASTM tests for strength and abrasion resistance. In addition, accelerated weathering tests should be conducted on fresh samples, particularly samples with iron particles, to determine the reaction and acceptability of weathering with respect to the product.

We recommend that the White Mountain Marble Corporation approach B.C. Hydro to determine what limitations, if any, would be imposed by Hydro for future quarry developments in the vicinity of the existing power line.

Yours very truly,
KLOHN LEONOFF LTD.

for Scott E. Broughton
Project Engineer

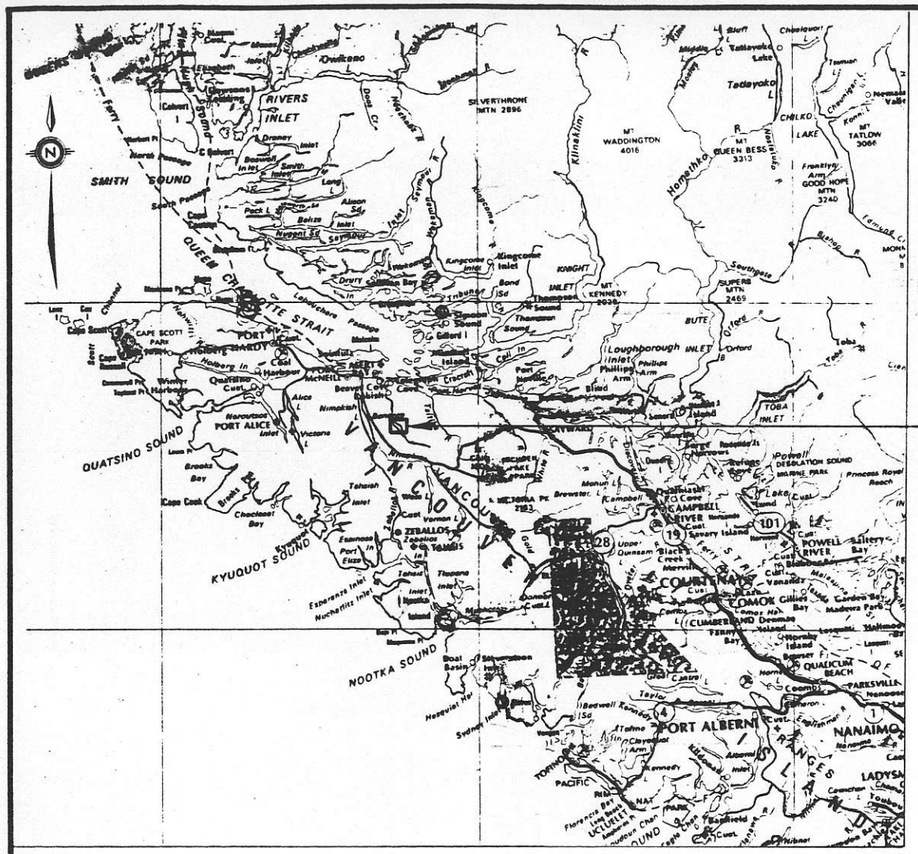
Iain G. Bruce, P.Eng.
Project Manager

Encl.
Drawing B-1001 - General Locations
D-1002 - Geologic Map
B-1003 - Schematic Section A

IGB/ld

REFERENCES

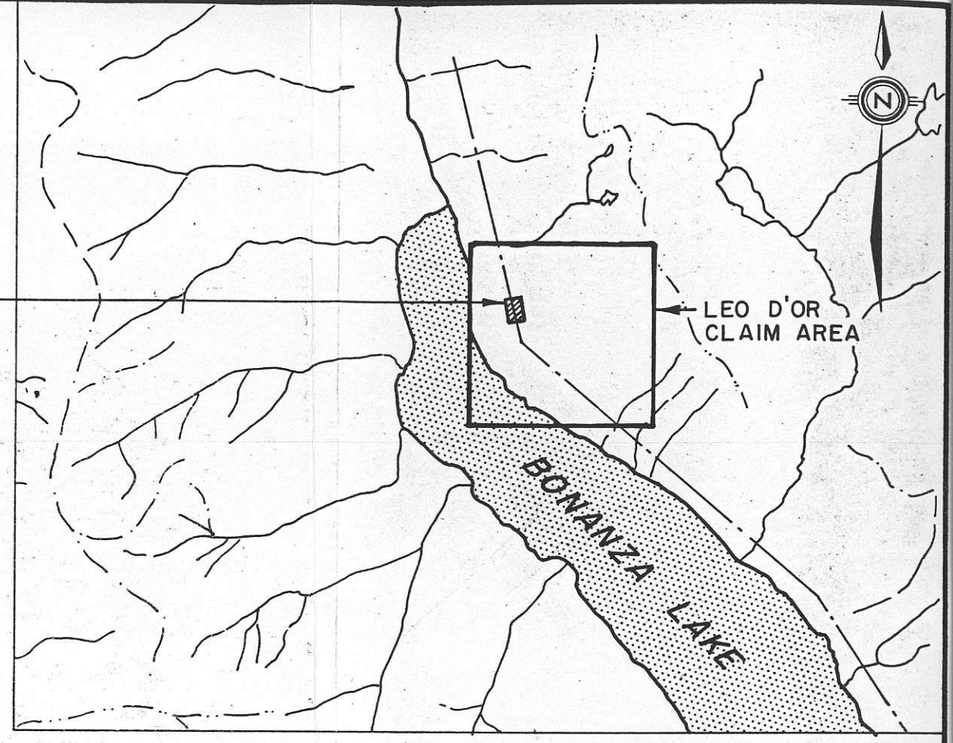
Muller J.E., Northcote, K.E. and Carlisle, D. 1974. Geology and Mineral Deposits of Alert Bay - Cape Scott Map area, Vancouver Island, British Columbia. Geological Survey of Canada, paper 74-8, 77 pp.



CLAIM AREA LOCATION PLAN

Scale 20 0 20 40 60 80 Kilometres

FOR ENLARGEMENT OF THIS AREA SEE DRAWING D-1002



AREA OF EXPLORATION (MARCH 88)

Scale 1 0 1 2 Kilometres

TO BE READ WITH KLOHN LEONOFF REPORT DATED APR. 8, 1988

SCALE AS SHOWN

KLOHN LEONOFF LTD.
CONSULTING ENGINEERS

CLIENT: WHITE MOUNTAIN MARBLE CORPORATION

PROJECT: BONANZA LAKE MARBLE

TITLE: GENERAL LOCATIONS

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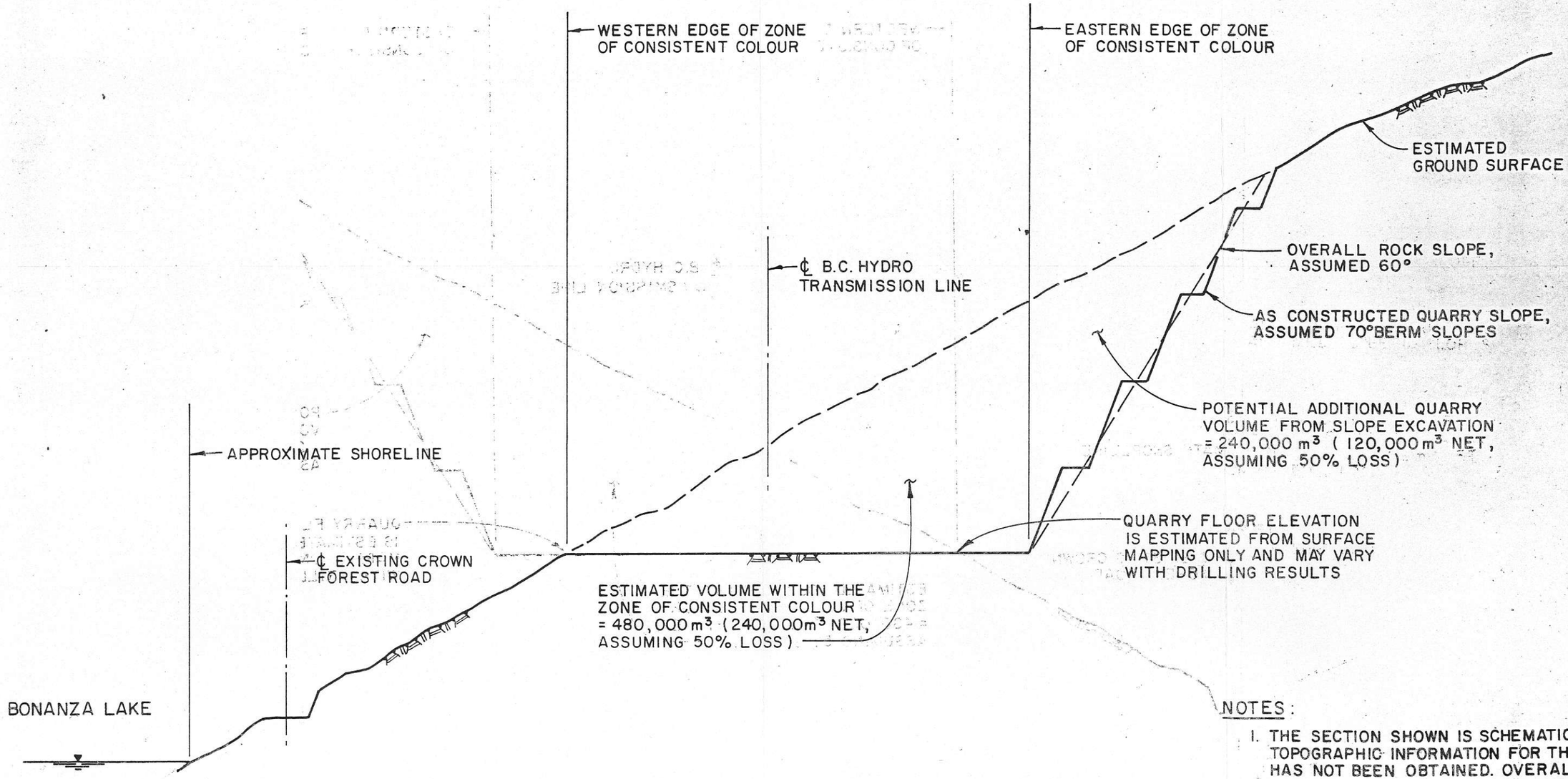
Apr 8/1988	PB3942-01	B-1001	

APPROVED

NCI-802-KL



NOTES:

1. THE SECTION SHOWN IS SCHEMATIC ONLY. TOPOGRAPHIC INFORMATION FOR THE SITE HAS NOT BEEN OBTAINED. OVERALL SLOPE HAS BEEN ESTIMATED BY CLINOMETER.

A/SO

SECTION A/02

TO BE READ WITH KLOHN LEONOFF REPORT DATED APR. 8, 1988

SCALE 1:1000

KLOHN LEONOFF LTD.
CONSULTING ENGINEERS

CLIENT: WHITE MOUNTAIN MARBLE CORPORATION

PROJECT: BONANZA LAKE MARBLE

TITLE: SECTION A

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