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Hardy BBT Limited

CONSULTING ENGINEERING & PROFESSIONAL SERVICES

VG-04636

April 12, 1989

Mr. Keith Cook,
BONANZA MARBLE LTD.
2625 Soole Road,
R.R. 7,
DUNCAN, B.C.
V9L 4W4

Dear Sir:

PROPERTY FILE

Re: Proposed Marble Quarry
Northeast Corner of Bonanza Lake
North end of Vancouver Island, B.C.

1.0 INTRODUCTION

In accordance with your March 14, 1989 verbal request, Hardy BBT Limited has prepared this report for submission to the Department of Mines in support of commencing quarrying operations on your Special Use Permit 10229 located at the northeast corner of Bonanza Lake. The Terms of Reference for this report were outlined in a Hardy BBT Limited letter dated April 3, 1989.

The material covered within the report follows those items described in "Guidelines for Development of Sand and Gravel Pits and Quarries under the Mines Act", prepared by the Ministry of Energy, Mines and Petroleum Resources, and also additional materials as outlined in discussions and correspondence from MEMPR.

The information contained in this report was supplied by personnel of Bonanza Marble Ltd. Hardy BBT Limited has not made an assessment of the viability of this quarry or of the quality of the rock.

Bob Bone
- no work started yet although permits all in place.
1 Dec. 13/89

4052 GRAVELEY STREET, BURNABY, BRITISH COLUMBIA V5C 3T6 TELEPHONE (604) 294-3811 FAX (604) 294-4664

2.0 PHYSICAL ASPECTS

2.1 LOCATION

The presently identified limestone or marble deposits and proposed quarry location are on the northeast side of Bonanza Lake. The area is located almost directly south of Beaver Cove which is, in turn, located some 20 miles southeast along the coast of Vancouver Island from Port Hardy (refer to Plate 1).

Access to the area is by means of the Island Highway, which runs from Campbell River to Port Hardy. A short distance north of Woss, presently active logging roads lead into Bonanza Lake area from the highway. Access is understood to also be available from the Beaver Cove area via presently active logging roads.

2.2 TOPOGRAPHY

Topography in the area is mountainous and rugged with topography rising from the proposed quarry location on Bonanza Lake (elevation 876 ft.) to over 3,000 ft. at the top of neighbouring limestone ridges.

2.3 GEOLOGY

According to available geological maps, limestone outcrops, which form part of the Quatsino formation, occur in the proposed quarry location. The limestone has been recrystallized to produce marble. The colour of the material is variable, ranging from white to dark grey or black with various other colours, such as pale greens, blue-greys or buff present in certain beds. Geological information for the area is available from Map 1552A, published by the Geological

Survey of Canada and Muller, et al (1974). Hardy BBT Limited has not mapped in detail the outcrop proposed for initial quarrying.

The Quatsino limestone overlies rock of the Karmutsin Group which includes a variety of volcanic basalts and andesite lavas with some limestone and other sedimentary rocks, particularly in the upper part of the formation. Overlying the Quatsino formation limestone are rocks of the Bonanza group which include a series of volcanic lavas, limestones, sandstones and other sedimentary rocks.

This entire sedimentary and volcanic sequence was cut by intrusive rocks similar to the Coast Range batholith. These intrusions, which trend approximately northwest, may, in part, be responsible for metamorphism of the limestone into marble. One major intrusive occurs along the east side of Bonanza Lake immediately south of the proposed quarry location. The degree of recrystallization to marble may vary with distance from the intrusives.

2.4 CLIMATE

The proposed marble quarry location is situated in an area which has a cool, moderate coastal region climate. Rainfall occurs throughout most of the year. Typical temperatures are cool. The climate data presented below is for the Town of Port Hardy and was obtained from Environment Canada.

Mean annual temperatures for the area are a high of 11.2°C, a low of 4.6°C, for an average mean annual temperature of 7.9°C. The warmest month is August, and has an average temperature of 13.8°C. The coldest month is January, and has an average temperature of 2.4°C.

Total annual precipitation for the region is 1782.8 mm of equivalent water. The wettest months are September through March which account for 79% of the total average annual precipitation.

3.0 PLANNED OPERATIONS

The information presented within the following sections is based on discussions with Mr. Keith Cook and Mr. L. Marchesi. In addition, recommendations by Hardy BBT Limited are presented on specific aspects of the planned operations. Plate 2 shows the proposed quarry infrastructure.

3.1 PRODUCTION PLANS

It is understood that planned production may be in the order of 10 to 15 tons per day and 3,000 to 4,000 tons per annum. Actual production will depend on a number of variables such as the type and quality of product being quarried, market demand, transportation, storage and weather.

Total reserves at the proposed quarry location are not known. Neither Bonanza Marble nor Hardy BBT Limited have conducted a study of this nature.

It is understood that the initial development planned for the quarry will be to open up a workable face as follows:

1. Overall working face length of 20 m.
2. Overall quarry height of 10 to 15 m.
3. Individual benches 2 to 3 m high.

It is understood that the waste materials or rubble will be placed in the area indicated on Plate 2.

3.2 SITE FACILITIES

It is understood that very limited facilities will be placed on site due to the fact that the site will not be occupied at all times and will therefore be unsecure. It is understood that an office/lunchroom trailer which was left on site previously was stolen.

It is understood that planned facilities for the site include a tool trailer and a commercially available portable self contained washroom. Further, it is understood that workers will be living in the Town of Port McNeill and will be commuting daily to the site.

3.3 WATER REQUIREMENT AND SETTLING

It is understood that one wire saw is proposed for the site for the purpose of cutting marble blocks. This saw will have a water requirement in the order of 1 gpm. Continued operation of the saw for an 8 hour period will require in the order of 500 gallons.

Two wire saws, together with a grinding machine using tin oxide, are in operation at L. Marchesi's Marblecraft Plant in Burnaby. The saws are set up to saw a finer kerf and produce finer material than the saws which would be used in the field. The Burnaby operation uses a small tank to settle the water for recirculation to the saws. Relatively short settlement times suffice to settle calcium carbonate (marble) cuttings before the water is recirculated.

It is proposed to use a similar system at Bonanza Lake utilizing a "horse trough" or similar portable tank to settle cuttings out of water coming from the saw. The water would be directed to the tanks which would have a partition to split the tank in two.

The small amount of water required for the saw will be pumped from local sources.

3.4 STORAGE AREA

Plate 2 shows the proposed area for storage of the following items:

a) Cuttings from the wire saw settling tanks. These cuttings will be limestone (marble) cuttings typically of fine sand sizes (Bonanza Marble Quarry information). Cuttings will be stored against future sales or removal. The total volume of cuttings will be in the order of 0.5 ft^3 per cut (3/16 of an inch cut on a 6 ft by 6 ft block). One cut would require 8 hrs. Thus, at two cuts per day, the annual production would be in the order of 12 cubic yards. The material will be stockpiled with a low rock berm around the toe if sloughing or erosion is a problem.

b) Waste rock. Particularly during start up waste rock will be produced which will be stockpiled.

c) Tool trailer.

d) Block storage.

3.5 POWER

The equipment proposed for this site will be diesel powered. There will be no requirement for external power to be supplied to the site.

3.6 FUEL STORAGE FACILITIES

As the equipment proposed for the site will be diesel powered, a requirement for fuel storage facilities will exist. It is understood that diesel fuel storage will be limited to approximately 1,000 gallons. It is recommended that a containment berm be constructed around the perimeter of any proposed fuel storage tank. The containment area created by the berm should have a volume at least equivalent to the volume of the fuel storage tank which is placed within this area. The containment area should be lined with a suitable low permeability material.

3.7 EXPLOSIVES

It is understood that use of explosives is not planned on this site.

3.8 MATERIAL TRANSPORT

It is understood that marble blocks cut from the quarry will be removed from the site by flatbed trucks. Once off site, transport of the marble blocks may be by flatbed truck or by barge. On site hoisting will initially be by front end loader or similar equipment. Ultimately, a derrick type crane may be considered.

3.9 RECLAMATION

At the completion of quarry operations, the area will be left in a near natural state. At the start of operations, any reclamable topsoil will be stockpiled. At the end of operations, any available soil and crushed marble will be spread on the benches and working areas to form a seed base. The area will be mulched if required and reseeded with seed mix acceptable to MEMPR.

4.0 CLOSURE

Hardy BBT Limited is pleased to have had the opportunity to provide engineering services to you on this interesting project. If you have any questions or require any further assistance, please do not hesitate to contact us at your convenience.

Yours truly,

Hardy BBT Limited

Per:

Geoffrey G. Dyer, P.Eng.
Geotechnical Project Engineer

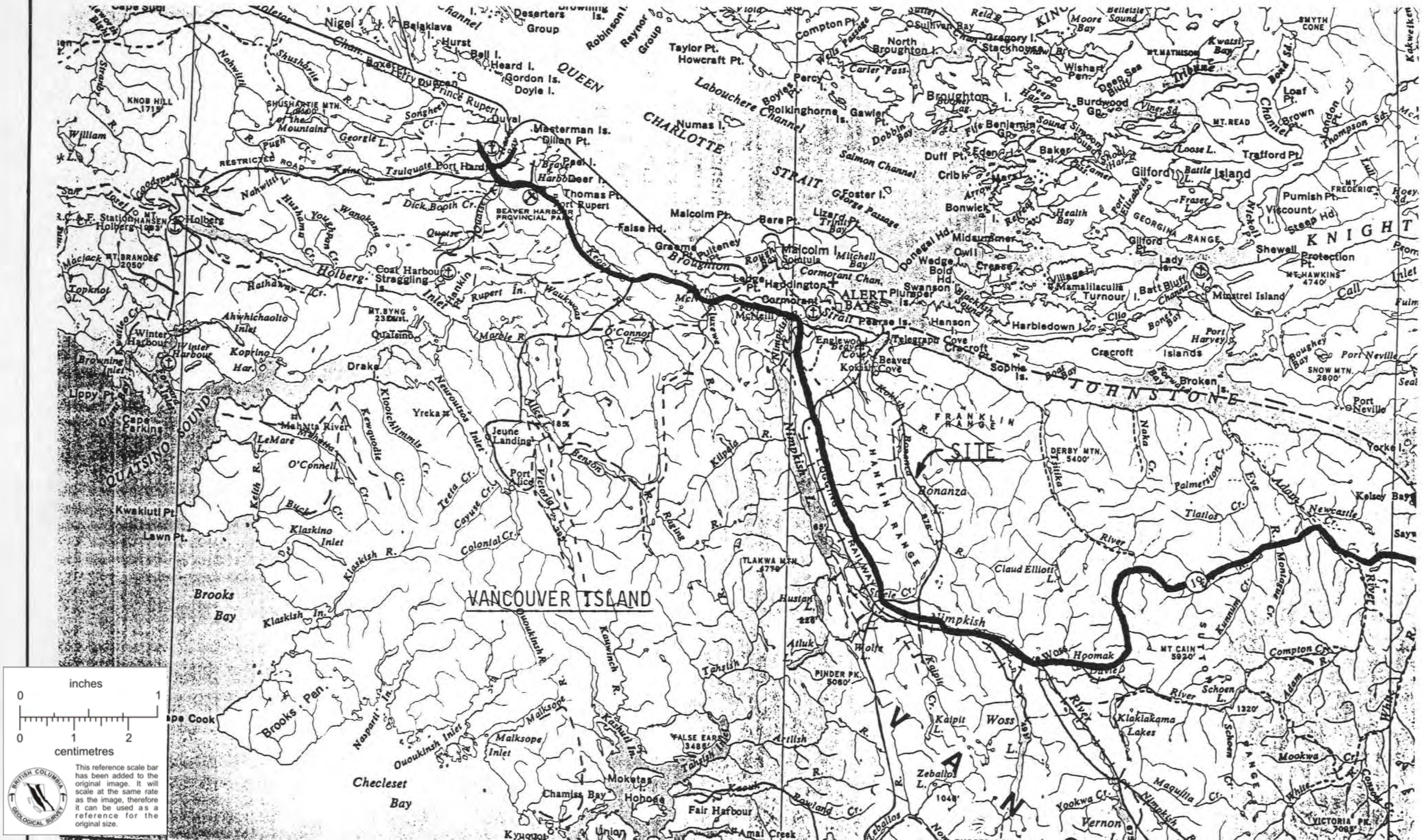
Reviewed by:

D.S. Cavers, M.Eng., P.Eng.
Senior Geological Engineer

GGD:cg

Enclosures

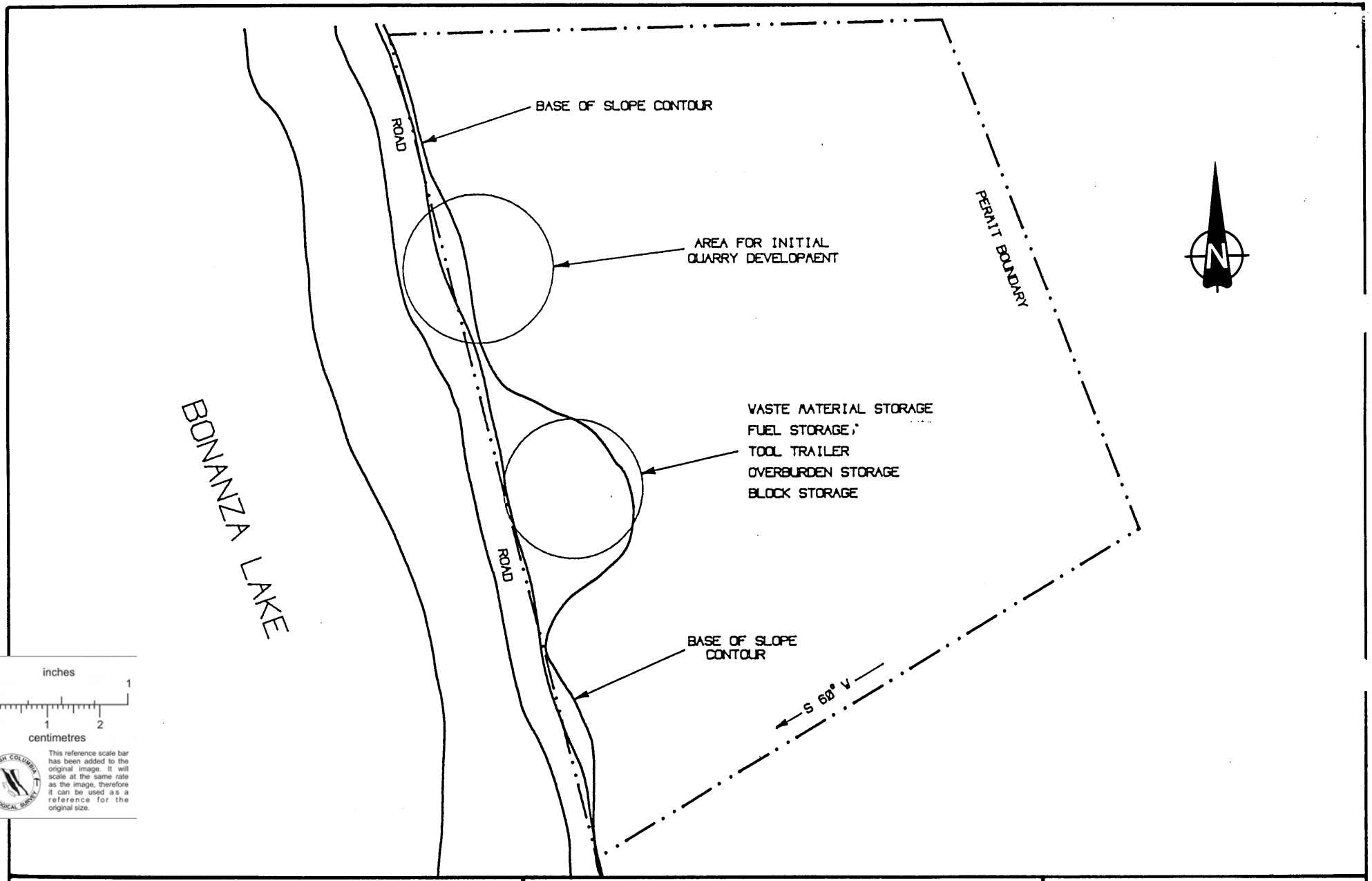
cc: Mr. Louis Marchesi
Marchesi Marblecraft Ltd.



REVISIONS	Hardy BBT Limited CONSULTING ENGINEERING & PROFESSIONAL SERVICES	LOCATION PLAN BONANZA MARBLE QUARRY
REFERENCES		

SCALE	DATE	MADE	CHKD.	JOB No.	PLATE 1

HBLT 53-87/11



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This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

Hardy BBT Limited
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

PROPOSED QUARRY INFRASTRUCTURE

BONANZA MARBLE QUARRY

Scale 1:1250
Date APRIL 7, 1989
Drawn By G.D.

PLATE 2

HBLT 12-87/05