

EXPLORATION COSTS

An exploration budget in the order of \$330,000 is required to explore and develop a dimension stone property to quarry status.

Initially, the property must be mapped with several polished samples made. Once a favourable location has been identified, excavator trenching and further polished sampling is required. Diamond drilling is then required to evaluate the stone to a depth of 50-100 feet. The cost to this stage is estimated at \$75,000 to \$80,000.

The bulk of the exploration cost is in establishing a "quarry bench" to remove 10-25 - six cubic metre blocks. These blocks are then sold to fabricating plants to ensure the stone can be successfully processed into its desired end products. An added bonus is the revenue generated from the sale of the blocks. The cost of this stage is estimated at \$150,000 to \$250,000, exclusive of the block revenue.

Capital Equipment Costs

Capital costs to place the quarry into production are in the order of Cdn.\$350,000 to Cdn.\$450,000. Several of the equipment suppliers have lease purchase plans available to help minimize the capital outlay at start-up. Alternatively, the quarrying can be completed on a contract basis eliminating the capital requirements altogether. The downside is the increase in quarrying cost, potentially affecting the annual revenues.

Projected Revenues

Based on the quarrying equipment cost analyses provided by suppliers, a marble or granite quarrying operation will provide the following annual cash flows based on preliminary operating proformas at annual production rate of 5,400 cubic metres.

Annual Quarry Operations			
Gross Revenues	\$2,160,000		
Operating Costs		\$1,056,126	
Pre-Tax Income			\$1,103,874
To summarize:	Year-1	Year-2	Year-3
Exploration Costs	(\$280,000)		
Capital Costs	(\$400,000)		
Annual Operating Costs		(\$1,056,126)	(\$1,056,126)
Annual Revenues	54,000*	\$2,160,000	\$2,160,000
Annual Pre-Tax Income	(\$626,000)	\$1,103,874	\$1,103,874
Running Pre-Tax Income		\$477,874	\$1,581,748

* +15 blocks cut during exploration - 15b * 6cu.m/b * \$600/cu.m = \$54,000

THE COMPANY

Mammoth Geological Ltd., a private geological consulting firm, is owned by Mr. R. Tim Henneberry, a registered Professional Geoscientist in the Province of British Columbia. He has been involved in the mining industry since 1978, with extensive background in production and has been a consultant since 1986. Mr. Henneberry is the president of Panorama Natural Stone.

Lou D. Straith is Project Engineer. He is a mining technologist, involved in the mining industry since 1971. Mr. Straith's experience in several producing mines in the north has resulted in a strong background in operating and production costs.

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**MAMMOTH
GEOLOGICAL LTD.**

PROPERTY FILE

PROPERTY PORTFOLIO

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WHY DIMENSION STONE?

General Background

Dimension stone is a commodity experiencing a continually expanding market over the last ten years. The industry is essentially in its infancy in western Canada, in comparison to producing countries.

The industry has seen rapid expansion in Quebec and Ontario during the last 10 years, as government has begun to support it. As an example, annual granite sales in Quebec have gone from \$10 million to \$100 million in that space of time.

The Geological Survey Branch of the British Columbia Government has followed the lead and completed a series of studies during the late-1980's aimed at building the dimension stone industry in British Columbia. The British Columbia Trade Development Corporation is lending its support by promoting the industry via trade missions and by supplying background information and product samples to prospective clients throughout the Pacific Rim as a result of inquiries. These inquiries verify a demand exists for British Columbia stone.

The principals of Mammoth Geological Ltd. have been involved in dimension stone since September 1991. A year of extensive background research resulted in the formation of Panorama Natural Stone Ltd., a private corporation currently exploring and developing British Columbia dimension stone properties, in September of 1992.

This research was initiated as a result of the aforementioned British Columbia government's on-going dimension stone studies. Our research included: identifying marble and granite properties, compiling quarrying and fabricating plant equipment quotes and cost analyses, and completing a preliminary analysis of North American consumption and demand.

After supplying Panorama Natural Stone Ltd. with sufficient properties to complete its business plan, additional properties identified and staked as a result of the research remained. Mammoth Geological Ltd. plans to option these properties to interested parties, utilizing its expertise to help develop them, further building and promoting British Columbia dimension stone.

Dimension Stone Industry

Dimension stone refers to a natural rock which can be quarried and shaped to meet specific requirements for use in the construction, building and monument industries. Common dimension stone includes granite (technically any intrusive rock), serpentine (referred to as verde antique marble) and limestone and marble (generally referred to as marble).

The granites and marbles must occur in large outcroppings, with relatively few joints and fractures. During quarrying, master blocks 15m by 5m by 7m (50 ft by 16 ft by 24 ft) are cut from the outcropping and sliced in stages to the final quarry block size of 1.8m by 2.4m by 2.4m (6 ft by 8 ft by 8 ft).

The final quarry blocks are then transformed into tiles and slab for final sale to wholesalers, distributors and developers. These processes generally involve several stages of sawing and polishing, generally reducing the block to the dimensions of the tiles and slabs.

Rough stone is basically the raw blocks taken from the quarry site. These final quarry blocks are sold to fabricating plants. Currently prices are in the order of US\$350 to US\$900 per cubic metre for marble and granite FOB the quarry site. Costs are in the order of Cdn.\$200 per cubic metre.

Dressed stone is a finished product, sold either in face finished slab or tile form. Face finished slab is made by slicing the raw block into 20mm to 30mm slices and polishing one side. Current prices range from US \$5.00 to US \$12.00 p.s.f.) FOB plant. Costs are in the order of Cdn.\$2.30 p.s.f. Marble tile is commonly 300mm by 300mm or 600mm by 600mm by 10mm thick. The tiles are made by cutting the raw block first into strips and then cutting the strips into tiles. Current prices range from US\$3.50 to US \$9.00 p.s.f.) FOB the plant site. Costs are in the order of Cdn. \$2.30 p.s.f.

Marketing

As with most industrial minerals, marketing is an integral part of the exploration program. On-going marketing research shows British Columbian stone will be looked upon favorably in the world market place. The Panorama Natural Stone Ltd. marbles and granites have been exhibited at the last three North American Trade Shows for stone with very favourable results. The British Columbia Trade Development Corporation repeatedly gets inquiries for British Columbia stone from Pacific Rim countries, substantiating the demand for British Columbia marbles and granites.

DIMENSION STONE TARGETS

As with most industrial minerals, dimension stone has a low value per unit weight. As a result, transportation costs are critical. Dimension stone deposits need to be on or near major transportation routes. Exploration targets were pursued based heavily on the transportation criteria.

Northern Vancouver Island was known to contain significant volumes of carbonate rocks, a good target area for marble. This area also fit the transportation criteria, as large sections of the carbonate rocks were on or proximal to tidewater.

The Quatsino Formation limestones, the main focus of the marble exploration, range in color from white to black with various intermediate colors. The Quatsino Limestone outcrops in three relatively narrow discontinuous bands of varying lengths on the north end of Vancouver Island. The East Band, centred north of Bonanza Lake, is about 23 kilometres long. The Centre Band, east of Nimpkish Lake, is 35 kilometres long. The West Band extends in excess of 140 kilometres. The width of the bands averages 1-2 kilometres.

Quarrying is presently underway at the Leo D'or property in the East Band. Quarrying was undertaken at the turn of the century at Hisnet Inlet in the West Band.

International Marble and Stone Company is presently mining white limestone for industrial filler from a property in the West Band.

A number of granitic plutons also outcrop throughout northern Vancouver Island. The most important is the Vernon Batholith, a large rather homogeneous body of medium- to coarse-grained plutonic rocks ranging from quartz diorite to leuco-quartz monzonite. The Vernon Batholith outcrops in a 16 kilometre wide north-south belt, centred on the Klaklakama Lakes, east of Woss.

No quarrying has been undertaken in the granitic rocks of northern Vancouver Island.

MARBLE PROPERTIES

Six targets were identified, distributed through the three marble bands. The colors obtained include: grey-white, black, white, dove grey and brown. Two of the properties may have potential as a source of industrial filler limestone.

Anutz	4 units	dove grey	Iron	2 units	dove grey
Cove	3 units	white, brown	Nimp	2 units	black
Dump	2 units	white	Tash	4 units	browns

The Anutz property lies near the south end of the Centre Band. This property was acquired for a fine-grained dove grey marble. A known world comparison for this stone has not yet been found.

The Cove property lies at the north end of the East Band. Two marbles have been located: a fine-grained white marble and a fine-grained grey brown marble that can be cut by white carbonate veinlets and stringers. This second stone is similar to an Italian stone - *Grigio Carnico*.

The Dump property also lies near the south end of the Centre Band. A sugary white marble has been sampled. The polished appearance of this stone is similar to an Italian stone - *Cararra Bianco*.

The Iron property also lies near the south end of the Centre Band. This property was acquired for a fine-grained dove grey marble, similar to the Anutz property.

The Nimp property lies within the Centre Band. Preliminary mapping located a dense, grey-black marble cut by white carbonate veins and stringers. The polished appearance of this marble is similar to the Spanish stone - *Negro Marquina*.

The Tash property lies near the centre of the West Band. Preliminary mapping and sampling identified two major varieties of marble: a light brown to tan stone similar to an Italian - *Grigio Billiemi* or a Mexican - *Degussa Grey*, and a darker brown stone similar to an Italian - *Grigio Carnico*.

GRANITE PROPERTIES

Two targets were identified within the Vernon Batholith. The colors obtained include: grey-pink and grey-white. A further location may be a source of easily obtainable ashlar.

Klak	4 units	grey-pink	MK3	2 units	grey-white
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The Klak property lies near the central core of the Vernon Batholith. A medium-grained grey-pink granodiorite has been located. Polished, this stone is somewhat similar to an Italian - *Rosa Gamma*.

The MK3 property lies close to the eastern contact of the Vernon Batholith. A medium-grained grey-white granodiorite has been located. Polished, this stone is somewhat similar to an Italian - *Grigio Malaga*.

