

**REPORT AND RECOMMENDATIONS
ON THE
BLUE MOUNTAIN RESOURCES LIMITED
ROCK EXTRACTION AND PROCESSING DEVELOPMENT**

Kearney Lake Road, Halifax County

submitted to

MINISTER OF THE ENVIRONMENT

prepared by

ENVIRONMENTAL ASSESSMENT ADMINISTRATOR

January 14, 1992

TABLE OF CONTENTS

1.0	REVIEW PROCESS	1
1.1	Environmental Review Participants	2
2.0	PROJECT DESCRIPTION	3
2.1	Location and Area Description	3
2.2	Quarry Operations	6
3.0	DISCUSSION OF ISSUES	7
3.1	Separation Distances	7
3.2	Runoff Control	8
3.3	Aluminum	9
3.4	Dust	9
3.5	Hydrocarbon Emissions	10
3.6	Drilling and Blasting	10
3.7	Rehabilitation	11
3.8	Pockwock Water Main	12
3.9	Traffic	12
3.10	Need for the Undertaking	13
3.11	Monitoring	13
	3.11.1 Air Quality Monitoring	13
	3.11.2 Runoff Water Quality	14
4.0	CONCLUSION AND RECOMMENDATIONS	15
4.1	CONCLUSION	15
4.2	RECOMMENDATIONS	15
	Recommendation 1: Separation Distances	15
	Recommendation 2: Community Liaison Committee	15
	Recommendation 3: Dispute Arbitration and Resolution	16
	Recommendation 4: Runoff Control	17
	Recommendation 5: Dust Control	17
	Recommendation 6: Blasting	18

Recommendation 7:	Rehabilitation and Reclamation	18
Recommendation 8:	Monitoring	19
Recommendation 9:	Contingency Plans	21

LIST OF FIGURES

FIGURE 1. LOCATION MAP	5
-------------------------------------	----------

1.0 REVIEW PROCESS

Blue Mountain Resources Limited registered its proposed Rock Extraction and Processing Development as a Class I undertaking under the Environmental Assessment Act on December 27, 1989.

The Environmental Assessment Administrator on January 22, 1990 advised Blue Mountain Resources Limited of the Environment Minister's decision that an Environmental Assessment Report was required for the undertaking.

Draft guidelines, prepared in consideration of government agency comments were made available for public review and comment from February 26 until April 2, 1990. Notification of the draft guideline review period was published in the Chronicle-Herald, the Daily News, and the Royal Gazette.

Final guidelines incorporating comments from the public, municipal governments and government agencies were delivered to the proponent on April 20, 1990.

The draft Terms of Reference were received from the proponent on July 26, 1990, and approved by the Environment Minister on August 7, 1990.

The draft Environmental Assessment Report was received on June 25, 1991, and accepted by the Minister on July 6, 1991.

The final Environmental Assessment Report was received on July 19, 1991, and released to the public for review and comment from July 26 until September 13, 1991. Notification of the Environmental Assessment Report review period was published in the Chronicle-Herald, the Daily News and the Royal Gazette.

The Environment Minister referred the Report to the Environmental Control Council on July 25, 1991. Public hearings on the project were held on November 21, 22, 23, 26, 28 and 30, 1991.

1.1 Environmental Review Participants

The Environmental Assessment Administrator coordinated a technical review of the Report by government agencies. Public input to the technical review was solicited through notices placed in newspapers, advertising public availability of the Environmental Assessment Report and the opportunity to provide views and comments on the Report.

The following government agencies provided comments to the Environmental Assessment Administrator. Their participation is gratefully acknowledged.

Nova Scotia Department of the Environment:

**Water Resources Branch
Air Quality Branch
Industrial Pollution Control Branch**

**Nova Scotia Department of Municipal Affairs
Community Planning Division**

**Environment Canada:
Environmental Protection**

**Department of Fisheries and Oceans:
Habitat Management Branch**

The City of Halifax

2.0 PROJECT DESCRIPTION

Blue Mountain Resources Limited proposes to develop and operate a rock quarry, a crusher, a ready-mix concrete plant and an asphalt plant at a site on lands owned by Annapolis Basin Pulp and Power and S.R. MacKay and Sons Ltd. in the Kearney Lake area near Bedford, Halifax County.

Total recoverable reserves of high quality quartzite at the site are estimated at 10,000,000 tons. Annual production rates of aggregate are proposed to be 100,000 tons for the first year of operation, stabilizing at 1,000,000 tons per year after 4 years of operation. Asphalt production is forecast to peak at 200,000 tons per year and ready-mix concrete production is predicted to increase over time to 20,000 cubic yards per year. Production rates of all of these materials will fluctuate in response to market conditions and demand.

2.1 Location and Area Description

The entrance to the proposed quarry development is approximately 5 kilometres along Kearney Lake Road northwest of the intersection with Bicentennial Drive and is about 5 kilometres southwest of the centre of the Town of Bedford. The quarry development is about 1.8 kilometres northwest of the northern end of Kearney Lake (Figure 1.).

The site of the proposed development and the surrounding lands are forested and have been used for small scale timber harvesting operations for more than 50 years. The proposed project location is in an area of Halifax County which is zoned for mixed use and mixed resource, thus making the proposed development consistent with current land use zoning requirements of the Municipality.

A number of quarries have operated in the Kearney Lake area since the late 1960's. In the late 1970's Atlantic Sand and Gravel ceased operation of a quarry on 20 acres of land at the southeast end of Kearney Lake, and Gateway Materials continues to operate a quarry located near the intersection of Kearney Lake Road and Bicentennial Drive.

The residential area closest to the proposed site is Kingswood on the Lakes subdivision. This subdivision is currently under development adjacent to the northwest boundary of the lands upon which the proposed quarry site will be located. If development of the subdivision continues as planned, residential dwellings will be located within the 800 metre (0.5 mile) separation distance required by the Pit and Quarry Guidelines. There is also a home on the northwest shore of Kearney Lake that is 800 metres from the proposed quarry development.

Most residences in the area of the proposed development obtain domestic water from piped Municipal services. There are approximately 20 private operating wells in the area, located along the edge of Kearney Lake Road and near the intersection of that road with Hammonds Plains Road. The Pockwock water transmission main, buried below Kearney Lake Road, is a 40 inch diameter pipeline that supplies water to Halifax. The pipeline is 300 metres from the proposed development at its closest approach.

2.2 Quarry Operations

The development is proposed to occupy about 81 hectares of land approximately 2 kilometres north of Kearney Lake in Halifax County. Operations at the site are scheduled for 36 to 40 weeks per year at the maximum estimated aggregate production rate of 1,000,000 tons per year. A 7.00 a.m. to 7.00 p.m., 6 day operating week is proposed.

Drill and blast quarrying is required at the development. At peak production, 2 to 3 blasts per week are anticipated, and broken rock will be transported to on-site crushers by as many as four 20-35 ton capacity dump trucks. The crushers will produce about 200 tons per hour of suitably sized market grade aggregate which will be stored in on-site stockpiles.

In addition to the quarry operation, a ready-mix concrete plant and an asphalt plant are proposed for the site. The ready-mix concrete plant will consist of cement and aggregate loading hoppers, a batch plant, an over-head truck loading hopper and on-site cement powder storage silos. The asphalt plant will include aggregate loading, batch heating and mixing systems, and a truck loading conveyor. Liquid asphalt will be stored in on-site storage tanks.

Aggregate products will be delivered to market by 16 ton capacity tandem dump trucks. Traffic generated by the development has been estimated by the proponent to be 52 truck trips and 26 passenger trips per day in the first year of operation for 100,000 tons of aggregate produced. This traffic is estimated to increase after 4 years of quarry operation to 525 truck trips and 262 passenger vehicle trips per day at an annual aggregate production rate of 1,000,000 tons.

3.0 DISCUSSION OF ISSUES

The Blue Mountain Resources proposed quarry development has been the subject of bitter and heated community opposition since the intentions of the proponent became public knowledge more than two years ago, and before the undertaking was registered in December of 1989. Public opposition is based upon a long history of dealing with a number of quarries that have operated in the general area since the 1960's. Local residents feel that after having tolerated noise, dust, increased truck traffic, actual and perceived blast damage and other problems commonly associated with these operations, that any more new quarry operations would be totally unacceptable.

The issues presented in this Report and Recommendations arise from submissions received by the Environmental Review Branch following the technical review of the Environmental Assessment Report.

3.1 Separation Distances

The Nova Scotia Department of the Environment's Pit and Quarry Guidelines specifies that a quarry operation shall not be located within 800 metres of lands in or restricted to residential use.

Lands adjacent to the those upon which the quarry development will be sited, and closer than the specified 800 metre separation distance, are planned for residential development. The proponent and the developers of the Kingswood on the Lakes subdivision have entered into a Restrictive Covenant and Water Flow Easement which, in return for permission to discharge runoff water from the subdivision development onto the proponent's lands, provides the following covenant:

"Armoyan, on its behalf and on behalf of its successors in title with respect to the Armoyan Lands or any portion thereof irrevocably covenants and agrees that it and its successors shall not object to and shall not interfere with the development by Annapolis, its successors and assigns of the Annapolis Land for the Intended Uses."

In spite of the foregoing, it is expected that this department will receive frequent nuisance complaints related to dust, property damage and other matters from owners of homes closer than the 800 metre separation distance specified in the Pit and Quarry Guidelines. There is also a question regarding the legal right of the subdivision developers to bind future property owners in this manner.

3.2 Runoff Control

Water discharges from the proposed quarry operation will result from natural precipitation falling on the site, from water used for aggregate washing and from employee uses (domestic wastewater).

Aggregate washing will require water at a rate of about 600 gallons per minute in a two pond, closed circuit system. Washwater in the circuit will be treated and re-used in the washing process. Any overflows from the closed system will be directed towards the sedimentation pond receiving runoff from the crusher/stockpile area.

Runoff from other operational areas, including the ready-mix plant and the asphalt plant, will also be directed to sedimentation ponds.

There are a number of technical concerns related to runoff and sedimentation control which must be addressed through engineering and technical design at the permit stage.

Several reviewers indicated that the proposed pond sizes and volumes may not be sufficient to retain runoff from individual significant precipitation events when the ponds are full or nearly full. These events could include periods of intense and/or prolonged rainfall, and spring flooding when seepage is precluded by a frozen ground surface. There was also concern expressed that some data suggests peak runoff of overland water flows in the quarry site drainage basin may be delivered in short bursts, or flash flood situations.

In these situations, there may not be sufficient opportunity to drain the ponds between or during rainfall to provide the necessary storage capacity. Normal pond detention times may not be achieved and thus fine suspended sediments may not be retained.

Other comments pointed out that roadside ditches should be stabilized sufficiently to prevent erosion, and that sediments accumulated in the ponds should be analyzed before they are dredged and disposed of.

3.3 Aluminum

The Environmental Assessment Report identified aluminum as the only contaminant of concern likely to be leached out of disturbed and stockpiled soils and rock. This may result if low pH water is permitted to run over and percolate through disturbed soil and rock from the proposed development.

Blue Mountain proposes to reduce the chances of aluminum leaching by covering the topsoil and overburden stockpiles with limestone which would increase the Ph of the water, thus reducing the waters' dissolving capabilities.

One reviewer noted that a contingency plan should be prepared to address the unlikely event that leaching of aluminum does occur.

3.4 Dust

Dust will be generated from quarrying operations and from aggregate crushing operations. Concerns were expressed regarding unspecified methods proposed to limit dust generated by truck traffic, and in particular, how will dust from trucks travelling on streets be controlled.

The City of Halifax in its submission inquired as to the cumulative effect of dust on Kearney Lake over the long term.

3.5 Hydrocarbon Emissions

In the asphalt plant, air is forced across a burner flame and through a chamber where liquid asphalt and aggregate are mixed. The expected hydrocarbon and related dust emissions from the asphalt plant are proposed to be controlled by passing the air discharge from a dryer through a fabric filter, known as a bag house system.

Concerns were expressed that there is no estimate of the hydrocarbon emission concentrations before or after the bag house system, nor any estimate of hydrocarbon dispersion from the stack.

The proponent indicated in the Report and in documentation submitted subsequent to the Report review period that bag houses provide a level of control over hydrocarbon emissions sufficient to satisfy Federal and Provincial regulatory requirements.

3.6 Drilling and Blasting

Drilling blast holes for explosives will be carried out on most days, and blasts will occur at rates needed to satisfy the market demand for aggregate, probably 2 to 3 times per week. Drilling will be limited to between 7.00 a.m. and 7.00 p.m., and blasting will occur between noon and 1.00 p.m.

Ground vibration and air concussion from blasting activities was one of the most commonly heard concerns from the public. The few comments concerning blasting received during the Technical Review of the E.A. Report indicated the issue to be of only minor technical concern.

One reviewer indicated that the proponent should contact Environment Canada's Atmospheric Environment Service prior to blasting to confirm the absence of a local thermal inversion. Thermal inversions, wind shear and other atmospheric conditions provide reflective surfaces which can reflect sonic waves back to earth at unacceptable concussion levels.

Ground, or seismic vibrations may be preferentially transmitted along anticlinal and synclinal axes in the bedrock. Concerns were stated that the vibrations along these axes should receive particular attention and be closely monitored.

Another concern was that the pre-blast survey encompassing a one mile radius proposed by Blue Mountain Resources is insufficient to cover all structures that could potentially be impacted by blasting.

In general, technical reviewers felt that the Nova Scotia Pit and Quarry Guidelines in concert with the Halifax County Regulations are adequate to control and monitor all blasting activity at the proposed development.

3.7 Rehabilitation

Blue Mountain Resources Limited has proposed progressive rehabilitation for the development. As topsoil and overburden materials are stripped and removed from an area to be worked, the material will be used for site restoration and rehabilitation in previously worked areas. The rehabilitation will involve grading the overburden slopes and quarry faces, spreading soil mixed with limestone over worked areas, hydroseeding the new soil, and planting trees on the rehabilitated area after the ground vegetation from hydroseeding has been firmly established.

Some technical comments indicated that permanent overburden dumps must be stabilized with a vegetative cover sufficient to prevent erosion, and that volumes of topsoil and overburden must be sufficient to ensure successful revegetation of the site.

The proponent has indicated that it will post a \$2,000 per acre security to ensure rehabilitation of disturbed areas. Reviewers have noted that the \$2,000 figure may be inadequate to ensure acceptable site rehabilitation. Indeed, from an economic cost perspective, it would appear to be advantageous to the operator to forfeit the \$2,000 rather than spend more time to rehabilitate.

It was also suggested that there is a need for a better means of ensuring there will be rehabilitation, whether it be the use of higher security deposits reflective of what it would cost to hire an independent company to rehabilitate the site or the imposition of a provincial levy per ton of excavated material to cover eventual site rehabilitation or the possibility of tying the rehabilitation to an annual licence renewal procedure for the operation.

3.8 Pockwock Water Main

A 28 inch diameter water transmission line delivers water from Pockwock Lake to Halifax. The Pockwock water main is buried below Kearney Lake Road and parallels the northern boundary of the proposed quarry development. The separation of the water main from the northern edge of the development averages 2000 feet, and comes to within 1000 feet at one location.

Concerns were expressed about the potential for seismic vibration from blasting at the quarry damaging the water main. The Halifax Water Commission is satisfied that blast vibrations not exceeding 0.5 inches per second will not pose a threat to the pipeline.

3.9 Traffic

Blue Mountain Resources estimates the quarry development will attract and generate some 787 vehicle trips per day at the 1 million ton per year peak production rate. The impact of this increase in traffic was of considerable public concern, however very little review agency comment addressed traffic. Concern was expressed by the City of Halifax that the Report did not assess the impact on city streets resulting from the estimated 394 vehicle trips per day to Halifax from the quarry development.

This concern was addressed by the proponent after the Report was submitted. The proponent acknowledged the impact on roads near the proposed development would be negative, however it was pointed out that Kearney Lake Road and Hammonds Plains Road are designated arterial routes which bring

traffic into the metropolitan area from outlying industrial developments. Therefore, any other industrial development would also contribute to an increase in truck traffic on roads leading to and within the city, regardless of the establishment of the Blue Mountain development.

3.10 Need for the Undertaking

A concern of the City of Halifax is the lack of a provincial analysis and policy to assess the need for aggregate materials and the most appropriate locations to meet those needs. The City felt there should be a demonstrated net benefit to the metro area in having a new quarry operation established, and that potential quarry sites and the existing quarry sites should be compared on the basis of societal interests, not just market forces.

The concern outlined above is considered to be beyond the scope of the environmental assessment of the Blue Mountain Resources proposal.

3.11 Monitoring

The Environmental Assessment Report presents conceptual environmental monitoring programs for blast vibration, air quality, surface water quality and groundwater levels. The Report also discusses on-site monitoring of water quality in sedimentation ponds and release of clarified water from the ponds by Blue Mountain staff.

Several reviewers suggested that monitoring by agencies not associated with the proponent is needed for the operations that involve the sedimentation ponds and collection of oily wastes from the asphalt plant.

3.11.1 Air Quality Monitoring

It is noted in the technical review that the wind blows from the northwest,

west, and southwest directions 63 per cent of the time. The proposed air quality program does not provide for an air quality monitoring station downwind of the production pad.

3.11.2 Runoff Water Quality

It is proposed to direct surface runoff to settling ponds where stop logs will be used to manually control water levels. Quarry staff will "observe" the quality of the water to determine when it should be released. Doubts were raised as to the ability of staff to properly operate the stop logs at all times, in particular during heavy rain storms that may rapidly fill up the ponds. Quarry staffing and sedimentation pond operation procedures during holidays was also of concern, as increased runoff occurring on a holiday may not be dealt with by proper procedures.

Some concerns were expressed that a quantitative measurement or some sort of standard, is needed for uniform and consistently proper manual control of the sedimentation ponds and stop logs.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

It is concluded, based upon the information received during the technical review of the Report, that it is technically possible for the Rock Extraction and Processing Development proposed by Blue Mountain Resources Limited to be developed and operated without unacceptable impacts on the bio-physical environment. Hence, subject to careful consideration of the community and human environment issues being evaluated by the Environmental Control Council, it is recommended that the project be approved with conditions and allowed to proceed to the permit stage.

It is important to reiterate that the technical review process did not have the benefit of comments from the community and thus the determination of environmental acceptability under the Environmental Assessment Act must be reserved until the Environmental Control Council submits its report and recommendation.

4.2 RECOMMENDATIONS

Recommendation 1: Separation Distances

It is recommended that the proposed development not be permitted to operate within 800 metres of any property in or restricted to residential use (Nova Scotia Department of the Environment Pit and Quarry Guidelines), including the Kingswood on the Lakes subdivision.

Recommendation 2: Community Liaison Committee

- A. It is recommended that Blue Mountain Resources Limited immediately begin work with the community to establish a Community Liaison Committee which

will provide a forum in which community/company communications will occur throughout the life of the development.

- B. Committee membership, terms of reference and mandate should be finalized in consultation with the community and appropriately documented. A copy of the resulting documentation should be filed with the Manager, Nova Scotia Department of the Environment Central Region in support of the application of approval under the Environmental Protection Act.

It is recommended that the mandate, powers and responsibilities of the Committee include but not be limited to:

- unrestricted access to all environmental monitoring data and analysis
- unrestricted access to the development as permitted by safety, site control and insurance requirements
- participation in the development and review of all compensation plans, insurance/liability coverage
- participation in the development and review of operational procedures and site rehabilitation and reclamation plans.

Recommendation 3: Dispute Arbitration and Resolution

Blue Mountain Resources Limited should, in consultation with the Community Liaison Committee, establish a procedure which ensures rapid investigation and resolution of complaints and disputes that may arise between the company and the local area residents.

An independent third party should be employed to act as a mediator/arbitrator to ensure any disputes are handled, and seen to be handled, in an efficient and equitable manner.

A copy of the procedure and the name and affiliation of the mediator/arbitrator should be filed with the Manager, Nova Scotia Department of the Environment Central Region in support of the application for approval under the Environmental Protection Act.

Recommendation 4: Runoff Control

It is recommended that, as a minimum requirement, all site preparation and construction activities be carried out in accordance with the practices described in the Erosion and Sediment Control Handbook for Construction Sites, Nova Scotia Department of the Environment, 1988.

Recommendation 5: Dust Control

It is recommended that a dust reduction plan, including associated operating procedures, be developed following consultation with the Liaison Committee and submitted to the Nova Scotia Department of the Environment in support of the application for approval under the Environmental Protection Act. The plan should address all potential sources of dust and describe all proposed mitigation procedures and devices including, but not limited to:

- wash stations for trucks leaving the site
- visual inspections for rubble or dust lying on any surfaces of trucks leaving the site
- a requirement for dust and wind proof covers to be placed over aggregate leaving the site in open trucks
- dust control devices for rock drills

Recommendation 6: Blasting

It is recommended that Blue Mountain Resources conduct a pre-blast survey of residences and other structures which may be at risk within an area to be determined in consultation with the Liaison Committee and approved by the Nova Scotia Department of the Environment in the permit to be issued under the Environmental Protection Act.

Recommendation 7: Rehabilitation and Reclamation

- A. It is recommended that all rehabilitation and reclamation procedures use accepted methods to ensure rapid and permanent revegetation and stabilization of all disturbed sites. Reclamation plans are to be developed in consultation with the Liaison Committee and submitted to the Nova Scotia Department of the Environment in support of the application for approval under the Environmental Protection Act.
- B. It is recommended that Blue Mountain Resources Limited be required to provide security, in a form acceptable to the Department, intended to guarantee appropriate and progressive site rehabilitation. The amount of the security should be determined on the basis of estimates from independent contractors but should not be less than \$2000 per acre. The rate per acre should be revised on a periodic basis to reflect changing rehabilitation costs. Proposals to satisfy this requirement should be discussed with the Department and submitted in support of the application for approval under the Environmental Protection Act.
- C. It is recommended that the Pit and Quarry Guidelines be amended to reflect the above means for determination of the amount of the rehabilitation bond.

Recommendation 8: Monitoring

It is recommended that Blue Mountain Resources Limited submit a proposed monitoring program in support of the application for approval under the Environmental Protection Act. In addition to any other requirements of the regulatory agencies, the proposed monitoring program should include but not be limited to the following:

A. Air Quality.

- an air quality high volume sampler station be located downwind of the "production pad" along the eastern boundary of the site, between the access road and Black Duck Brook; and
- provision for monitoring hydrocarbon emissions from the asphalt plant.

B. Surface Water Quality

- establishment of a quantitative measurement or standard for determination of water quality by Blue Mountain staff when operating the sedimentation pond stop logs.

C. Sediment Disposal

- provision for analysis of material recovered from sedimentation ponds to ensure compliance with all applicable sediment and effluent quality guidelines or regulations, prior to transportation and disposal.

D. Blast Monitoring

Establishment of additional blast monitoring stations at:

- the nearest residential dwellings along the anticlinal/synclinal axes of the

Goldenville formation which either pass through or are adjacent to the proposed development, and

- the Halifax Water Commission's Pockwock Pipeline valve chamber at the intersection of Hammonds Plains and Bluewater Road

until such time as:

- the vibration (seismic and air concussion) predictions and associated effects are verified; and
- such other conditions which may be imposed under the Environmental Protection Act are satisfied.

E. Effects Monitoring

- an effects monitoring programme designed to verify predicted environmental impacts and to provide early warning of environmental change. One component of the effects monitoring programme should address the long term impact of project generated dust on Kearney Lake.

F. Access to Information

- further to any reporting requirements agreed to by the Liaison Committee or required under the Environmental Protection Act, all monitoring data and analyses should be available on request to the Municipality of the County of Halifax, the City of Halifax, the Town of Bedford, and the Uplands Park Village Commission.

Recommendation 9: Contingency Plans

It is recommended that the proponent develop and submit contingency plans in support of the application under the Environmental Protection Act. These plans should include but not be restricted to:

- A. provisions to deal with excessive levels of aluminium in liquid effluent discharges from the development;
- B. provisions to ensure adequate supplies of domestic water to owners of domestic water wells in the quarry area in the event that well water quality and/or quantity is or is alleged to be adversely affected by Development related activity. This supply of water should continue until the dispute is resolved through the dispute arbitration process; and
- C. response to runoff events that exceed the effective retention capacity of the sedimentation control system(s).