



Natural Resources Board  
District #4 Environmental Commission  
111 West Street  
Essex Jct., Vermont 05452

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April 1, 2011

Paul O'Leary  
O'Leary-Burke Civil Associates, PLC  
1 Corporate Drive Suite #1  
Essex Jct., VT 05452

RE: Jurisdictional Opinion #4-226 / LUP #4C1232  
Hydraulic Jack Hammering at Fay Drive, South Burlington

Dear Paul:

This jurisdictional opinion is written pursuant to your written request of March 23, 2011 regarding the applicability of Act 250 jurisdiction over the proposed use of a hydraulic jack hammer at the Fay Drive project. I have based my analysis on your Jurisdiction Opinion request submittal, my site visit and the project file for the Fay Drive project. For the reasons set forth below, I have determined that in specific circumstances Act 250 jurisdiction does not apply and in those situations a permit amendment is not required.

**Facts**

1. The District Commission issued LUP #4C1232 on August 6, 2010 for the construction of thirty residential units in four new three-story buildings, the retention of one existing residence, the construction of 600-lf of a new road and the construct of three carport structures. All residences would be connected to municipal sewer and water services. In the application a gravity sewer line as shown on Sheet 1 (Exhibit #33 of LUP #4C1232) that follows the northern property line and connects to an existing service line from Derby Circle.
2. On November 18, 2010, I made a site visit to the property to investigate the permit requirements for removing rock that was found at the site. At that visit, I witnessed a rock outcrop located approximately 30-feet from the southwest corner of the Carlson residence. Only one other rock was identified at that site visit. This rock was an isolated boulder, not ledge, located south of the Meyer's residence, approximately 800-feet away.
3. In Schedule B of the application for LUP #4C1232, the Applicants claimed that the noise during construction will be limited to standard construction equipment. The proposed water line and gas



lines are on the same side of Hinesburg Road as the proposed development. The connection to the municipal sewer services is located in the northwest corner of the subject property and is existing.

4. According to published data from the Vermont Agency of Transportation, 73% of Chittenden County includes paved roads. According to the City of South Burlington more than 95% of their roads are paved. Most utility lines tend to run along public roads. New developments in this area commonly need to cross a paved road to connect to existing utility services. New access roads for new developments need to cut existing pavement shoulders to connect to existing roads. These cuts use loud equipment but for a short time duration.
5. A Project Review Sheet was issued on November 22, 2010 stating that a permit amendment was needed for removal of the outcrop located near the Carlson residence by use of blasting. The noise and vibrations from blasting are significantly louder than that from standard construction equipment. No permit amendment was needed for removal of the large boulder by blasting as it was not expected to be felt by the area residences and its duration was extremely short.
6. Sound loudness or amplitude is measured on a logarithmic scale in units called decibels, represented by the symbol "dB" (dBA is used if the measuring device used the A scale). An increase in noise of 3 dB is barely noticeable to an average person; sound must increase about 5 dB before the increase becomes noticeable. Sound frequency or tone is measured in cycles per second or Hertz and is represented by the symbol "Hz." Sound pressure is inversely proportional to the distance from the source of that sound. Sound level decreases by about 6 dB for every doubling of distance. *Hannaford Brothers Co. and Southland Enterprises, Inc.*, Land Use Permit Amendment #4C0238-5-EB Findings of Fact, Conclusions of Law, and Order (Altered) at 9 (Vt. Env. Bd. November 27, 2002).
7.  $L_{\max}$  and  $L_{\min}$  are the maximum and minimum sound levels measured during a designated period of time. Since sound level meters typically record sound levels in one-second intervals, the  $L_{\max}$  represented the loudest second of sound during any designated period, and the  $L_{\min}$  represented the quietest second of sound during any designated period. The  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$  are the 10th, 50th, and 90th percentile sound levels. The  $L_{10}$  represents the sound level exceeded 10 percent of the time, the  $L_{50}$  is the median level, and the  $L_{90}$  is the level exceeded 90 percent of the time. Since the  $L_{90}$  represents the quieter portion of a measurement period, it is often considered the "background" level. *Hannaford Brothers Co. and Southland Enterprises, Inc.*, Land Use Permit Amendment #4C0238-5-EB Findings of Fact, Conclusions of Law, and Order (Altered) at 9 (Vt. Env. Bd. November 27, 2002).
8. A hand-held jack hammer at 1 meter emits sound levels of approximately 130 dB. Heavy machinery is also expected to emit sound levels of approximately 120 dB. A hydraulic jack hammer or a pneumatic chisel operates at the same level. Portable air compressors operate at a slightly lower level of 90-100 dB. Traffic on a busy roadway located 30m away (approx. 100-feet) has sound levels of 60-80 dB, which is also typical for the output of a stereo within a room. A truck passing at 60 mph 50-feet away has sound levels at approximately 85 dBA. Typical residential neighborhoods have sound levels in the 45-60 dB range. However, riding lawn mowers and snow machines have sound levels over 90dBA. Jack hammering and heavy machinery are intermittent noise levels like lawn mowers and snow machines as opposed to

traffic on a busy roadway which is continuous for a period of time. *Noise Pollution Clearing House website*

9. To account for changes over time, a weighted average sound level called the “equivalent continuous” sound level ( $L_{eq}$ ) is often used.  $L_{eq}$  averages sound pressure rather than decibels, and results in weighting the levels of loud and infrequent noises more heavily than quieter and more frequent noises. A train passing by for one minute out of an hour could produce sound levels around 90 dBA while passing by, but the equivalent continuous sound level for the entire hour ( $L_{eq(1)}$ ) would be 72 dBA. The  $L_{eq(8)}$  ( $L_{eq}$  over an eight-hour period) for a large office is 65 dB, while that for a residence with a TV or stereo on is 50-70 dB. The 8-hour exposure level, which protects virtually the entire population from greater than 5 dB hearing loss is 73 dB. Before this value of 73 dB for 8-hour exposures can be applied to the environmental situation, certain correction or conversion factors must be considered. These correction factors are: (a) Intermittency: allows the exposure level to be 5 dB higher. This correction factor is required because most environmental noise is intermittent (not at a steady level, but below 65 dBA more than 10% of any one-hour period) and intermittent noise has been shown less damaging than continuous noise of the same  $L_{eq}$ . This correction should normally be applied except in situations that do not meet this criterion for intermittency; (b) Correction to yearly dose (250 to 365 days): requires reduction of the exposure level by 1.6 dB. All data used as the basis comes from occupational exposures which are only 250 days per year, whereas, one must consider all 365 days in a year and (c) Correction to twenty-four hour day: the identified level of 73 dB is based on 8-hour daily exposures. Conversion to a 24-hour period using the equal-energy rule requires reduction of this level by 5 dB. This means that continuous sounds of a 24-hour duration must be 5 dB less intense than higher level sounds of only 8 hours duration, with the remaining 16 hours considered quiet. Using the above corrections and conversions implies that the average 8-hour daily dose (based on a yearly average and assuming intermittent noise) should be no greater than 76.4 dB. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, EPA/ONAC 550/9-74-004, March, 1974 from the *Noise Pollution Clearing House website*
10. A hearing was held on January 24, 2011 for the proposed use of blasting to remove the ledge near the Carlson residence. In that application, it was stated that air blast overpressure from blasting will not exceed 133 peak dB. Ground vibration peak particle velocity shall not exceed 0.5 inches per second with a vibration < 30 Hz; 1.0 inches per second with a vibration of 31-40 Hz and 2.0 inches per second with a vibration >40 Hz. Exhibit #8 of LUP #4C1232-1 application. Peak particle velocity is the number of inches per second the ground around the point of interest will shift.



## Issues

*Does the proposed use of a hydraulic jack hammer mounted to an excavator to remove the ledge encountered near the southwest corner of the Carlson home require a permit amendment as a Material Change pursuant to Act 250 Rule 2(C)(6)?*

## Analysis

Act 250 Rule 3(C)(6) defines a material change as any change to a permitted development or subdivision which has a significant impact on any finding, conclusion, term or condition of the project's permit or which may result in an impact with respect to any of the criteria specified in 10 V.S.A. Section 6086(a)(1) through (a)(10).

The Environmental Board has adopted a two-prong test when applying Rule 34(A): (a) whether alteration (physical change or change in use) has or will take place; and (b) whether alteration has a significant impact on any finding, conclusion, term or condition of the project's permit, and the alteration may affect one or more of the values Act 250 protects. *McDonald's Corporation*, #1R0477-5-EB, Memorandum of Decision at 9-10 (Vt. Env. Bd. May 3, 2000); *Hiddenwood Subdivision*, Declaratory Ruling #378, Findings of Fact, Conclusions of Law and Order at 9-10 (Vt. Env. Bd. Jan. 12, 2000).

Most of the previous decisions regarding noise impacts dealt with noise generated during operation of a project. For example in *Barre Granite Quarries* the Board found that the adverse aesthetic effects from noise from the quarry would not be undue if such noise were to be restricted by a permit condition such that noise levels would "not exceed 70 dBA  $L_{max}$  at the Project boundary and 55 dBA  $L_{max}$  outside any residence or area of frequent human use." *Barre Granite Quarries*, Land Use Permit #7C1079 (Revised)-EB, Condition 10 (Vt. Env. Bd. Dec. 8, 2000). In *Bickford*, the Board held that, "Interference with activity and annoyance will occur if outdoor noise levels exceed 55 dB." *Charles and Barbara Bickford*, Land Use Permit #75W1186-EB at 33 (Vt. Env. Bd. May 22, 1995).

The Environmental Board did establish guidance on noise output from permitted projects using the EPA  $L_{dn}$  standards (day-night equivalence), 55 dB(A)  $L_{max}$  for daytime operations and 45 dB(A)  $L_{max}$  for nighttime operations. *Hannaford Brothers Co. and Southland Enterprises, Inc.*, Land Use Permit Amendment #4C0238-5-EB Findings of Fact, Conclusions of Law, and Order (Altered) at 25 (Vt. Env. Bd. November 27, 2002). Again these are for project operation noise levels not construction noise levels. The difference being the intermittency of the construction noise.

In Chittenden County and especially the City of South Burlington, it is not uncommon for construction activities to use pavement cutting machines. In addition, given the closeness of the residences, one often hears power lawnmowers or even chain saws. The residences at the adjacent subdivision are within 500-feet of the Interstate travel lanes. Intermittent noise events in an urban or semi-urban setting that reach levels of 100 dB are not rare. However, the current proposal is for ledge removal and that may reach significant sound levels for several hours each day. The use of jack hammers or pavement cutting machines are standard construction equipment in this context area. However, the use of the hydraulic jack hammer, in this situation, may take several days and thus if used continuously over an 8-hour period would be a public health concern and a Material Change to the permitted project. In order to maintain

conditions that do not endanger health,  $L_{eq}$  levels should not exceed 76 dB. Maintenance of sound levels below this level would not be a Material Change to the permitted project.

### Conclusions

The Permittee may use a hydraulic jack hammer to remove the ledge and not need a permit amendment provided that the  $L_{eq}$  level does not exceed 76 dB. The contractor is required to have a qualified noise expert monitor the sound levels at the northern property boundary (in several places including, at least, the property boundary with the residences of Sharon & Doug Carlson, Mona & Paul Martin and Jill & Les Myers) and to report to the District Coordinator by 2 PM of the subsequent day that the level has not been exceeded. Failure to provide the report or exceed a  $L_{eq}$  of 76 dB will result in the need for a permit amendment.

This is a jurisdictional opinion issued pursuant to 10 V.S.A. § 6007(c) and Act 250 Rule 3(B). Reconsideration requests are governed by Act 250 Rule 3(B) and should be directed to the district coordinator at the above address. Any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of issuance, pursuant to 10 V.S.A. Chapter 220. The appellant must attach to the Notice of Appeal the entry fee of \$225.00, payable to the State of Vermont. The appellant must also serve a copy of the Notice of Appeal on the Natural Resources Board, National Life Records Ctr. Bldg., Drawer 20, Montpelier, VT, 05620-3201, and on other parties in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings.

For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at [www.vermontjudiciary.org](http://www.vermontjudiciary.org). For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at [www.vermontjudiciary.org](http://www.vermontjudiciary.org). The address for the Environmental Court is: Environmental Court, 2418 Airport Rd., Suite 1, Barre, VT 05641-8701. (Tel. # 802-828-1660)

If you have any questions regarding this jurisdictional determination, please call me at (802) 879-5658.

Sincerely,

/s/Peter E. Keibel  
Peter E. Keibel  
District #4 Coordinator

cc: Lou Borie, Executive Director, NRB  
John Hasen General Counsel, NRB  
all parties to LUP application #4C1232-1

