

Fisheries and Oceans, Canada, Habitat Management Division (DFO-HMD) specific review
of the Whites Cove Blasting Plan submitted by Nova Stone Exporters Inc., dated November 18, 2002.

Area of concern	Specifics of DFO's concern	Need for information
seal colony	What is the potential for disruption or harm to the seal colony identified in the report at Crowells Cove?	<p>How far is the colony from the blast site? What species were present? What is the seasonal nature of the blasting? Is blasting to be concentrated in time or to occur throughout the year? What mitigation will be in place to protect the colony? What monitoring will be implemented to ensure the mitigation is effective? <i>Blasting may have to be restricted in specific months, seasons, depending on specific species present. For instance, if there were a harbour seal breeding colony, blasting may need to be restricted during May and June.</i> <i>There is evidence that seals are present to some degree year round adjacent to the site.</i></p>
ammonium nitrate-fuel oil (ANFO)	The main explosive to be used is ANFO. The [blasting guidelines] state that ANFO explosives are not to be used in or near water.	<p>What mitigation will be in place to protect against ANFO entering the water? What monitoring will be implemented to ensure the mitigation is effective? Where does surface runoff go?</p>
Timing of multiple delays	The time delay of multiple explosive charges should be greater than 25 ms (Guidelines p. 9). The blasting plan delay specifies exactly 25 ms between adjacent shot holes (blasting plan Fig. 2) but more than one line of shot holes are detonated simultaneously. This amounts to a total of 57 shots over 660 ms or an average time delay of only 11.8 ms. One pair of shots are only, in theory, 1 ms apart (367 and 368 ms delays	<p>How will this effect be avoided, or what mitigation will be in place to protect against these effects? What monitoring will be implemented to ensure the mitigation is effective?</p>

	respectively). This is sufficiently close to cause addition (approximate doubling) or "beaming" of excess acoustic pressures in particular directions. For a spherically spreading pressure wave this would approximately double the range for a given pressure effect compared to a single isolated detonation.	
35.6m setback	While the 35.6 m set back criterion (ignoring "beaming" effects above) for the approximate shot weight appears to be met for both the initial detonation site and for the projected region of the quarry. The setback distance for the 13 mm/s maximum ground velocity criterion for spawning habitat, is about 101 m (using a 45 kg charge and interpolating using a square root dependence on charge size and the data from Guidelines Table 2) and appears not to be met by the proposed initial blast site using the high water mark located 80 - 85 m distant. The intertidal and subtidal zone in this area is utilized by lobster, scallop, mussels, various species of groundfish, as well as pelagic species such as mackerel. Given the habitat features present and the level of commercial fishing success, it is expected that this area provides spawning, nursery, feeding, shelter and migration areas for the aquatic species noted.	DFO-HMD requires more detailed information to ascertain the impact of the blast(s) or redesign (such as widening of the setback) to ensure that negative impacts will not occur to the se species.
Fly rock	Will fly-rock, potentially hazardous wild life, be generated by the blasting?	How far will fly rock travel? What is the danger to marine mammals? What mitigation will be in place to protect against these effects? What monitoring will be implemented to ensure the mitigation is effective?
Sub-lethal effects of blast	One should note that the 35.6 m set back criterion	It is likely there are swim-bladdered fish in

	<p>is computed for a 100 kPa pressure pulse. Such a pulse has a high probability of lethal effects on swim bladdered fish, especially at shallow water depths. Sub-lethal effects are not considered. This is a very severe criterion, and the report has not considered this.</p> <p>As mentioned previously, the intertidal and subtidal zone in this area is utilized by lobster, scallop, mussels, various species of groundfish, as well as pelagic species such as mackerel. Given the habitat features present and the level of commercial fishing success, it is expected that this area provides spawning, nursery, feeding, shelter and migration areas for the aquatic species noted.</p>	<p>proximity to the site. What mitigation will be in place to protect against these effects? What monitoring will be implemented to ensure the mitigation is effective?</p>
<p>Effects of sound and vibration</p>	<p>No mention is made of the projected frequency of future blasting (one per day – once per week – sporadic, on demand?). Some quarry operations are both noisy and of a more or less continuous nature such as drilling shot holes. Have these aspects been assessed? They could have a bearing on the effects to nearby colonies of seabirds or marine mammals.</p>	<p>What levels of sound and vibration are anticipated in the waters adjacent to the blast site? What mitigation will be in place to protect against these effects? What monitoring will be implemented to ensure the mitigation is effective?</p>
<p>Blasting within 500m of a marine mammal</p>	<p>This criteria is contained in [blasting guidelines]</p>	<p>What mitigation will be in place to protect against this possibility? What monitoring will be implemented to ensure the mitigation is effective?</p>