

May 31,2021

Re: Big Bear Mountain Quarry in Marblemount

Casey Hanell,
State Geologist
Washington Department of Natural Resources
1111 Washington St. SE, Olympia, WA 98504,

Dear Mr. Hanell,

I am a licensed geologist and have lived in Marblemount for 35 years. As a professional geologist I have conducted and published numerous peer-reviewed papers and guidebooks on the geology of Skagit Valley. My doctoral research was on the glacial history of Skagit Valley.

As a longtime resident and someone who has detailed knowledge of the valley's geology, I feel compelled to comment on the proposed Big Bear Mountain Quarry expansion project. There are several aspects of the proposal that concern me, but the most important is safety.

The site is a glacially over-steepened valley wall, with local overhangs and overall cliff slope of 70°. One can see the polished bedrock on some of the rocks near the top of the cliffs visible from the quarry floor. The near vertical cliffs are formed in relatively weak, severely jointed bedrock known as Shuksan Greenschist (Tabor and Haugerud, 1999). The formerly horizontally-bedded rocks were severely folded and now stand on-edge, with bedding planes dipping steeply toward the valley. This configuration leads to the formation of rock towers and fins prone to failure by toppling. The accumulation of massive blocks of talus 30 ft or more diameter in an irregular pattern at the toe of the slope site supports the conclusion that toppling, rather than individual block detachment and accumulation, is the dominant process at the site. There are fissures on the top of the ridge that likely define former bedding planes, and that define formation of new towers and rock fins. The area is known to be seismically active.

This setting underscores the need for a careful geotechnical slope stability study of the site and a detailed operation plan that takes into account the potential for a large slope failure after removal of talus or by vibrations from blasting and rock crushing. Indeed, the DNR suggested a geotechnical study would be necessary back in 2011 based on a review by Geologist Rian Skov. And DNR Geologist John Bromley affirmed the need for such a study at this site in 2019, as did Skagit County in reviewing the Kiewit proposal.

Recent comments from DNR suggest that the current mining plan precludes the need for such an analysis because the scope of the project is diminished and talus only would be removed from the top-down. In my professional opinion, this approach will not avoid slope instability issues because the rock towers probably fail from above the talus, and not down the slope at or below the talus apron. As a licensed geologist, I maintain that it would be dangerous to approve a site operation plan without a geotechnical study due to the potential for toppling of large blocks during blasting, road building and rock crushing.

Another safety concern is the potential for asbestos-laden dust to be released into the neighborhood. In his 1978 Geologic Map of the Marblemount Quad, pioneering North Cascades Geologist Peter Misch described the local greenschist as 'actinolite schist'. The potential for the dust to contain asbestos must be thoroughly investigated. One or two random samples are inadequate for characterizing such an extensive area. Further, the lack of water at the site and occasionally strong canyon winds in winter and summer could spread the dust and should be considered. There are homes and a day care facility within a ¼ mile of the site. And there is a moratorium on new water wells in Skagit County; Where will the water come from and how will wastewater be disposed of?

And what about the noise? The blasting, drilling, sorting, rock handling and loading, and truck engines and jake-brakes will be heard from one side of the valley to the other, and for some distance off site up and down the valley. For those people adjacent to the site, on Rockport Cascade Road, and Highway 530 this noise will be extremely disruptive.

This is also an unusual feature on the Skagit Valley floor. I am not aware of any other sites where such a large accumulation of big talus blocks can be found. These sites are known for their diverse microclimates and vegetation. This type of talus, with large cavities with stable, cool air temperatures, is also known to be places where native people stored food and interred the remains of their ancestors.

Finally, I am aware that some federal agencies and large corporations view this proposal as potentially serving the needs for large jetty rocks along the entire west coast for an extended period of time. A proposal of such scale clearly needs careful environmental screening so that one small community does not bear the brunt of the impacts from a continental-sized project. Indeed, Skagit County determined that the 2019 Kiewit proposal for the same site required a SEPA. This proposal, even scaled down, still has safety concerns and the potential to change the community for generations to come. Surely it needs more than a reclamation permit from DNR. I agree with concerned citizens that Skagit County is the correct entity to review this proposal.

Thank you for addressing these concerns, and please keep me informed as this moves forward.

Sincerely,

A handwritten signature in cursive script, reading "Jon L. Riedel", enclosed in a light blue rectangular box.

Jon L. Riedel, Ph.D., L.G.
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c.c. Skagit County Commissioner Lisa Janicki,
c.c. Skagit County Planner Hal Hart
c.c. Representative Susan DelBene
c.c. Commissioner of Public Lands Hillary Frans