DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 6898
JBER, AK 99506-0898

January 22, 2016

Mr. Dick Somerville, P.E.
PND Engineers
9360 Glacier Hwy Suite 100
Juneau, AK 99801

Dear Mr. Somerville:

This letter is in response to your December 21, 2015 letter requesting a Section 408 permit for the Portage Cove Harbor Expansion Project in Haines, Alaska. We are unable to approve your application as submitted; please provide the additional data listed below so that we may complete our review.

1. Potential wave transmission through the gap between the wave barrier and crest of the existing breakwater will cause larger waves inside the harbor than designed for. On Sheet 5.04 in the 95% design review submittal, there should not be a gap between the wave barrier and the crest of the existing breakwater.
2. There is concern that the armor size on the existing breakwater is not large enough to withstand the reflected wave force from a wave barrier installed through the head of the rubble-mound breakwater and that the armor rock would be pulled off of the breakwater. There is conflicting information on the size of armor rock and the design of the existing breakwater (Ref. 1.1 & 1.2). Based on photos and the design drawings, the armor rock on the existing breakwater appear to be in the 600 lb range. A field site visit should be performed by the project designers to determine the size of the existing armor rock on the head of the breakwater.
3. A flume study is recommended to determine the exact rock size necessary to ensure stability of the existing breakwater once the wave barrier is installed through the breakwater. If no flume study is done, at a minimum the armor rock size should be increased to 2500 lbs if 80% of the armor rock at the end of the existing breakwater is less than 1000 lbs and increased to 3500 lbs if 80% of the armor rock is larger than 1000 lbs on the existing breakwater. The replaced section of breakwater should have two layers of armor rock backed by two "B" layers in the W_{10} range.
4. Please submit cross section drawings for review that show the redesigned two layers of armor rock at 2500 lbs or 3500 lbs (based on site investigation), two layers of "B" rock, and core that will fit within the current breakwater neatlines. It must also detail the transition from the existing armor rock configuration to the new armor stone size, starting at a minimum of 25 feet from the wave barrier on the Portage Cove side of the breakwater.
5. The project designers should evaluate potentially adverse impacts the wave barrier wall construction could have on stability of the breakwater in view of the sensitive foundation soil conditions present. The design should include the following details and analyses.

5.1 Provide a detailed construction sequence for the planned wave barrier wall connection to the existing breakwater, involving excavation within the breakwater, installation of piles and barrier wall elements, and reconstruction of the breakwater nose.

5.2 Provide a construction monitoring plan that would track and document continued stability of the breakwater and achievement of the required breakwater elevations and grades.

5.3 Perform a slope stability analysis to evaluate post-construction stability of the breakwater, considering pile driving and reconstruction of the breakwater nose. Post construction condition of the breakwater should be at least a factor of safety of 1.3 against slope failure as determined in accordance with Corps of Engineers criteria.

5.4 This office assumes that reconstruction of the breakwater will retain the existing elevation and cross-section configuration, placing no additional load on the underlying very soft clay foundation. If that is not the case, the slope stability analysis should reflect the expected increased loading from breakwater reconstruction and any localized weakening of the underlying clay stratum.

Although not part of the scope of this review, the Alaska District is hopeful that a wave analysis has been performed to assess the potential adverse impacts of reflected and diffracted waves from the wave barrier on the Port Chilkoot Dock.

If you have any questions, please contact me at (907) 753-5685 or by email at Julie.l.anderson@usace.army.mil.

Sincerely,

ANDERSON.JULIE.LYNN.1061087296

Digitally signed by ANDERSON.JULIE.LYNN.1061087296
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Julie L. Anderson, P.E.
Operations Branch Chief
Engineering and Construction Operations Division

CC:
Haines Harbormaster (Shawn Bell)
Haines Borough Manager (Brad Ryan)
Alaska District Juneau Regulatory Branch (Randy Vigil)