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2 March 2001

U.S. Army Corps of Engineers
Regulatory Branch
P.O. Box 3755
Seattle, WA 98124
ATTN: Jonathan Freedman, Project Manager

Washington State Department of Ecology
Shorelands and Environmental Assistance Program
3190 - 160th Ave. SE
Bellevue, WA 98008
ATTN: Ann Kenny, Environmental Specialist

Subject: Correction to Comment #7 of our 16 February, 2001, letter regarding the Third Runway Project

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GeoSyntec Consultants (GeoSyntec) recently submitted a technical review letter dated 16 February, 2001, to you on behalf of the Airport Communities Coalition regarding the Third Runway project at Seattle Tacoma International Airport. The letter contained an error in the caption for comment #7, which read as follows:

> **Comment 7: The methodology used in performing pseudo-static (seismic) stability analysis is incorrect and may seriously underestimate the ability of the wall to withstand seismic loads.**

The word "underestimate" is incorrect. The correct word is "overestimate." Our concern is that the Hart Crowser methodology, wherein the yield acceleration was calculated only for the failure surface with the lowest static factor of safety rather than systematically searching for the failure surface with the lowest yield acceleration, may seriously overestimate the seismic resistance of the wall. The corrected comment is attached to this letter.

Exhibit 462
Date 2/19/02
Witness Kavazanjian
...ne Mills, Court Reporter

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MAR 9 2001
USACE
REGULATORY BRANCH

We apologize for any confusion this correction may have caused.

Sincerely,

Patrick C. Lucia, Ph.D.,P.E.,G.E.
Principal

Edward Kavazanjian, Jr., Ph.D.,P.E.,G.E.
Principal

Enclosures: Revised Comment #7

cc: Peter Eglick, Helsell Fetterman LLP
Kimberly Lockard, Airport Communities Coalition

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Comment 7: The methodology used in performing pseudo-static (seismic) stability analysis is incorrect and may seriously overestimate the ability of the wall to withstand seismic loads.

According to Hart Crowser, "We typically apply the seismic coefficient to the most critical failure surface identified in the steady-state condition." No justification is given for using this methodology, and it is in fact incorrect as the critical static (steady-state) and seismic failure surfaces are frequently very different. Under pseudo-static conditions, a horizontal acceleration is applied to the entire failure mass, which acts as a destabilizing force. The computed critical failure surfaces for the seismic case tend to be longer, extending further back into the slope in order to collect more driving mass. The critical surface for the seismic case will also frequently extend along a weak material interface, such as the existing peat layer, or through the liquefied sand deposit.

A proper pseudo-static slope stability analysis should be performed to search for the critical failure surface independently of the static analysis. Additionally, "sliding block" failure surfaces that propagate along the weak seams should be examined, rather than just circular surfaces that cut across them. The Slope/W program that Hart Crowser is using is well suited to explore these alternate failure surfaces, and to search carefully for an independent critical pseudo-static failure surface. This analysis will likely result in a reduced factor of safety and may lead to requirements for additional ground improvement.

Figure 1 shows a conceptual sketch of a representative failure surface under pseudo-static conditions, extending through the weak peat layer far back into the fill (and potentially beyond the limits of the modeled cross-section). As currently analyzed and designed only the weak soils directly below the wall are being improved. If the critical seismic failure surface extends along the weak peat layer or liquefied zone farther back into the embankment than the static surface, the areas for ground improvement will also need to extend further back in order to remove the threat of these weak soils under a strong earthquake.

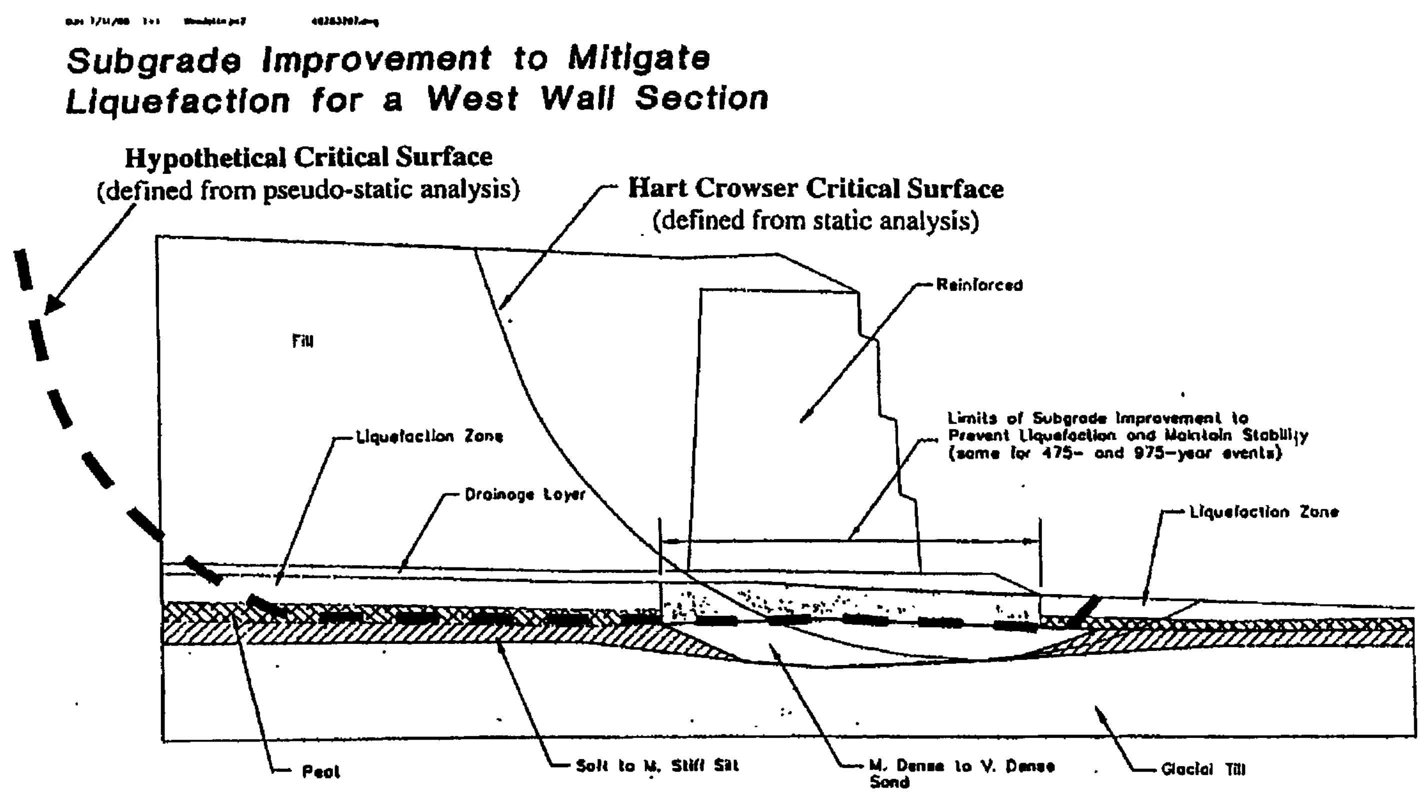

Figure 1: Hypothetical Seismic Stability Failure Surface