

November 14, 2003

RECEIVED

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Mr. Ed MacLeod
MacLeod Reckord
231 Summit Avenue East
Seattle, WA 98102

MacLeod Reckord

RE: DESIGN STATEMENT REGARDING BRANSON PARK STAIRWAY

Dear Mr. MacLeod:

This letter presents a philosophical statement regarding the stability of the Branson Park hillside with respect to the design of a steel stairway that is being designed by MLA Engineering of Seattle, Washington. The statement that follows is based on Shannon & Wilson's geotechnical report for the Branson Park project dated March 2003 and discussions at a design team meeting held at the Burien Public Works Department on October 24, 2003. This statement is meant to accompany a "basis of design" statement by MLA Engineering.

Although the steep slope on the Branson Park site is not perceptibly moving at this time, the subject slope is marginally stable and has many indicators that it has been unstable in the distant and recent past. This instability is both deep and shallow. The presence of sand over clay and groundwater seepage at the contact between the two formations, reported indicators of historic movement at the top of the bluff, and the arcuate nature of the slope indicate the presence of past and the likelihood of future deep-seated landsliding. Shallow movement is evident in the presence of chutes that indicate the periodic occurrence of debris flows. Creep, the imperceptible movement of soil in the upper few to several feet, is very active on this slope. All of these types of mass movement will continue in the future with or without the implementation of the proposed park stairway. It is the intent of the Parks Department to allow such mass wasting processes to continue, so the sediment can be naturally delivered to the shoreline.

Due to the non-invasive nature of the proposal, that is, a stairway on the steep hillside, there will be no project-induced change in the stability conditions on this hillside. The stairway corridor was selected in order to minimize effects on the hillside, and because it appeared to have fewer indicators of instability than the hillside segments to the north

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and south of it. However, movement of this hillside is inevitable. Movement may be in small increments of inches or in large increments of many feet. It may be induced by a buildup of the groundwater table due to winter-long precipitation and/or intense storm activity. Seismic shaking could engender movement by itself or in tandem with a high groundwater level. All of these will have a deleterious effect on the stairway, either by incremental strain (soil creep and small landslides) or by sudden, large displacements.

If you have any questions or comments, please contact me at 206-695-6891.

Sincerely,

SHANNON & WILSON, INC.



William T. Laprade, L.E.G.
Vice President

WTL/wtl

c: Michael Leonard, MLA Engineering

MLA

Engineering, pllc

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MEMO

TO: Ed MacLeod, MacLeod-Reckord
FROM: Michael Leonard, P.E. *MLR*
PROJECT: Branson Trail
SUBJECT: Structural Design Criteria
DATE: November 14, 2003

MESSAGE:

After our meeting with the City of Burien, it became apparent that presenting the design criteria and describing its limits on performance should be made and approved prior to developing the construction documents. The criteria that we propose using for the structural design is as follows:

Structural Criteria:

The stair superstructure (stringers, treads and railing) will be designed to resist its self weight and live load. The stringers will span between pile-supported reinforced concrete footings/pilecaps.

The elevated stairway will be designed to resist seismic loads consistent with UBC equation 34-1, for lateral forces on a non-building, rigid structure. Because the pilecaps are partially imbedded into the hillside, lateral loads imparted on them due to seismic activity will be neglected.

Piles and pilecaps will be designed to resist vertical loads, including the weight of the stairs and concrete pilecap. The pilecap will not be restrained to resist soil creep or forces due to landslides, as this would offer little safety benefit to the structure's occupants. It would also require soil stabilization, which is inconsistent with the project objectives and budget.

Design Code: 1997 UBC

Live Load: 100 psf

Seismic Load: $V = 0.7 * C_s * I * W$

Where $C_s = .38$ and $I = 1.0$

Relative lateral movement of pilecap relative to adjacent pilecap
= 12 inches in the downhill direction, 3 inches in the transverse direction

END OF MEMO