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November 16, 2009

Mr. Peter J. Eglick
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Suite 3130
1000 Second Avenue
Seattle, WA 98104

Geotechnical Review Letter
Tree Removal
Bear Reserve C and L
Shoreline, Washington
RMI File No. 2702E

Dear Mr. Eglick:

Bear Reserve is located between NW 180th Street and Ridgefield Road. Dr. Rick Leary, Innis Arden's Reserves' Chairman, requested in mid-October, 2008, that we review the locations of the "significant" trees proposed for removal and state if there were any geotechnical concerns. Innis Arden proposes removing 5 "significant" trees in Reserve C and 6 "significant" trees in Reserve L. The City of Shoreline classifies a tree as "significant" if it is equal to or greater than 8" at breast height (for a conifer) or equal to or greater than 12" (for a deciduous tree).

Dr. Leary sent us a quote from the Shoreline Municipal Code as follows:

20.80.030 Exemptions.

F. Activities occurring in areas which may be considered small steep slopes (areas of 40 percent slope or greater with a vertical elevation change of up to, but not greater than 20 feet), such as berms, retaining walls, excavations and small natural slopes, and activities on steep slopes created through prior legal grading activity may be exempted based upon City review of a soils report prepared by a qualified geologist or geotechnical engineer which demonstrates that no adverse impact will result from the exemption;

Advance outwash deposits at this location were mapped by James C. Yount et al of the U.S Geological Survey in 1993 in Geological Map of Surficial Deposits in the Seattle 30' by 60' Quadrangle, Washington. These are deposits laid down by streams flowing from the Vashon Glacier as it advanced. They were subsequently over-ridden by the glacier and are very dense. Non-geologists and septic designers frequently use "sandy loam" to refer to these deposits.

We met onsite on October 23rd, 2008 to see the trees and to measure the slopes on which they grew to determine if there were potential problems in removing them. The slope in the vicinity of each tree being considered for removal was measured with a digital level. Our Geotechnical Review Letter of November 3, 2008 states that the slopes mentioned above ranged from 15 to 36 degrees locally (less than the angle of repose of these dense advance outwash sands and gravels) and the heights of the slopes were quite small, generally less than 5 feet. The report also stated that no problems were anticipated with removal of the trees and recommendations were made on how it should be done.

We understand that a planner at the City of Shoreline, Paul Cohen, rejected Innis Arden's claim of exemption on January 26, 2009. In a subsequent e-mail to Dr. Leary on January 27 Mr. Cohen explained that the City had used its Arc/GIS topography and critical areas maps "to determine that the steep slopes that the trees to be cut are on easily exceed 20 vertical feet in height elevation".

The City's rejection was surprising because it relied on methods of measurement known to be both imprecise and fallible. Municipal critical area maps are typically not based on actual on-site data, but rather on gross observation and remote methods. Data collected by LIDAR is used by Arc/GIS software to develop topography. LIDAR (Light Detection And Ranging) is an active sensor, similar to radar that transmits laser pulses to a target and records the time it takes for the pulse to return to the sensor receiver. This technology is currently being used for topographic mapping by mounting a LIDAR sensor, integrated with Global Positioning System (GPS) and inertial measurement unit (IMU) technology, to the bottom of aircraft and measuring the pulse return rate to determine surface elevations. However, it has well-known limitations, which are described by NOAA Coastal Services Center at http://www.csc.noaa.gov/crs/rs_apps/sensors/lidar.htm:

What are the limitations of LIDAR data?

LIDAR has difficulty mapping earth surfaces with dense vegetation. Pulse returns can scatter and reflect within vegetation causing variation in elevations, thus limiting the penetration and return from "true" earth surfaces.

Accuracies are limited by the inherent errors from the onboard GPS, and the inertial measurement unit (IMU). The GPS records the plane's positional x, y, z coordinates, while the IMU corrects errors in coordinate measurements caused by pitch and roll from the aircraft.

Most LIDAR lasers use near-infrared (NIR) radiation. Certain materials and surfaces, such as water, asphalt, tar, clouds, and fog absorb NIR wavelengths causing null or poor returns.

LIDAR can produce very large data file sizes.

The use of remote sensing can be a valuable tool for preliminary determination of critical areas. However, as stated above by NOAA, vegetation can severely limit the accuracy of the data. This method is no substitute for on-site observations and calculations which were the basis for RMI's November, 2008 Geotechnical Review Letter.

When Dr. Leary informed us of the City of Shoreline's response we recommended that Innis Arden hire a surveyor to derive the contours in the Reserves in the vicinity of the trees in question. From these contours the angles and heights of the slopes can be calculated much more accurately than from remote sensing. When this contour survey was supplied to us we calculated the angles and slope heights and wrote another Geotechnical Review Letter dated May 21, 2009 confirming that all the trees Innis Arden wishes to remove fall within the specifications in the City Code exemption. We understand that, even after receiving our additional review, the City nevertheless continues to deny the Innis Arden Club's request that the application of the exemption be recognized. In doing so, the City does not address the surveyor contour data and our follow-up letter and calculations.

SUMMARY

Three methods have been used to determine slope angles and heights:

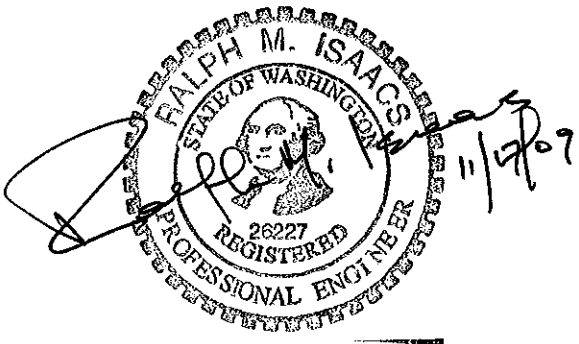
1. The City of Shoreline used an Arc/ GIS system which uses data from LIDAR and which can be quite inaccurate: it is only a remote sensing system and is known to be subject to error due to vegetation including tree coverage.
2. RMI ASSOCIATES LLC initially and directly measured on-site the slope angles and heights next to the trees.
3. Innis Arden then hired an independent professional surveying firm to develop contours of the area around the trees. RMI used these data to calculate again the slope angles and heights.

Both of the methods used by RMI demonstrate that all the trees Innis Arden wishes to remove fall within the exemption to the City's code. The City's reliance on its remote-based ArcGIS system in preference to actual on-site data and calculations produced by two different methods which have produced consistent results, is not scientifically supportable.

We appreciate the opportunity to be of service to you. If there are any questions concerning this letter or if we can provide additional services, please call.

Sincerely,

RMI ASSOCIATES LLC



Ralph M. Isaacs, Ph. D., PE
Principal