District of North Vancouver
Att: Jozsef Dioszeghy
Director of Engineering

January 12, 2006

To whom it may concern

Re: Opinion on Situation in Area Affected by 2005 mudslide

I am a resident of the area that was affected by the 2005 mudslide and I would like to express some of my concerns especially in light of fresh evacuation notices issued because of the current continuous rains without a good explanation of perceived risks.

Just to introduce myself, I am a Principal of consulting company that provides geotechnical/mining and environmental consulting services. I am the Head of Geology and Mining Department and I have over 20 years of international experience in the field of geotechnics, geology and mining including slope stability analyses and landslide investigation. However I have to stress that this letter is written in my private capacity as North Vancouver resident.

Below are some of the main points that I would like to address in the letter:

- Requested Information from District
- Comments on BGC report (available on the web)
- My professional opinion about the risk

Information from the district

1.) During one of the meetings, shortly after the 2005 slide, the need for information and collaboration with the district was expressed. I mentioned that one of the first things we need is to know as to what strategy district adopts to mitigate the risk of reoccurrence of mudslides in this area.

I have not seen that strategy to date and I would appreciate to know where I (we) can obtain it.

2.) What is important that we will have ability to review it and comment and/or obtain professional opinion to comment on it before public (our) money is spent on investigation and analysis that may or may not be justified and that could take valuable time.

So far the web site created does not provide any insight for public to understand what level or risks the residents are exposed to for various triggers (precipitation and seismic loading). Also the risk should be put into proper perspective of public safety.

I would also like to know if the district has independent professionals in review capacity to comment on the conclusion of geotechnical studies and analyses. We (residents) should be informed about the results of the reviews and we should have opportunity to comment.

3.) So far the only "professional" report on the web is BGC report for runout analyses and my views and comments are expressed in the following paragraph.

4.) I will much appreciate if I could be given an opportunity to review the supporting documents and the accompanying risk analyses for justification to buy out properties on Berkley Avenue, Chapman Way and Treetop Lane since taxpayers (our) money is being spent on this exercise.

Comments on the BGC report

It came to my knowledge that the document "Runout Analyses for Hypothetical Slide at 2191/2205 Berkley Avenue" (BGC Engineering Inc., August 29, 2005, Project No. 0405-001) available on the government web site was one of the key documents for buy out properties decision.

The following are some of my comments with regards to the report mentioned above:

- The main issue is that the report does not address the risk related to the occupancy of house on 2430 Chapman Way; it only states the "likelihood of properties being impacted by slide debris". In case of 2430 Chapman Way property, the "hypothetical landslide" that would initiate from the crest of escarpment near the boundary between 2191 and 2205 Berkley Avenue would impact on the access driveway only and cannot have any impact on the house itself.

- In the report (Chapter Interpretation), it is stated that there is very high likelihood of impact (95% chance) for the properties situated in zone steeper than 25°. However in the following paragraph, the 2430 Chapman Way property is listed in a group that would have only "moderate likelihood of being impacted by slide debris". This later statement contradicts the first statement because the part of the property is located well within the 25° zone.

- The report does not characterize the failure mechanism of the "hypothetical slide" in comparison to the failure mechanism that caused 2005 slide. It is not clear from the report why the numerical model should be calibrated to the 2005 slide – is the failure mechanism of the hypothetical slide expected to be the same? What is the supporting evidence (drill holes and laboratory results) for such analysis. In fact it is not clear if the development of the numerical model is justified if materials and geometry of the slope for both slides are similar.

- It is not possible to judge how sensitive the results of runout analyses are to various parameters (friction angles, moisture content, volume of material etc). The numerical models are gross simplification of the nature and even if appropriate they are only as good as input parameters. The reader should have an idea what degree of confidence one should have in such numerical model analyses. I have to mention that I am familiar with the limitations of this particular numerical code that have been used and I was involved in the project where such code was used for landslide analyses.

- The key issue, what is the probability of the slide occurrence for various triggers and what range of volumes of materials being mobilized is not covered in the report at all.

- I am assuming that property listed as "2318 Chapman Way" (Chapter Interpretation) should read 2318 Treetop Lane.

In conclusion it is not clear what risk analyses justify buy off the property 2157 Berkley Avenue, and not 2430 Chapman Way, located below. If the runout analyses documented in the report mentioned above are correct, it is quite clear that much smaller volume landslide (smaller than $500m^3$ could put the occupants of 2430 Chapman Way residence at risk if the slide would occur above the property.

My Comments - Opinions

The opinion expressed below is based on my experiences and observations and I do not have access to any geological/geotechnical data that could obviously alter this opinion.

In my view the slopes of the escarpement in this area that are located in the natural materials (till) have minimal risk of failure. This opinion is based on the fact that there is no evidence of major landslides in this area. Slope geometry and hundreds of years old tree stumps located on the slope supports the opinion that even major earthquake some 300 years ago probably did not trigger any significant slides here.

The problems are with unconsolidated and/or poorly consolidated materials that were deposited on the slopes by property development. Even those deposited materials pose minimal risks of sliding if hydraulic parameters (k) is such to prevent build up of the pore pressure and no other loading (seismic) is present.

In my view, the context of 2005 slide was unique in the way that the materials were deposited over the existing spring or natural surface drainage. It is my impression that creek that runs behind Chapman Way properties is continuation of that drainage. If that is the case then risk of failure for that area was probably much higher than risk of failure of man-deposited materials on the slopes. From that point of view to extrapolate the conditions leading to 2005 slide to other areas may not be justified. Also the context of 2005 slide could impact on the velocity and destructive nature of that slide and my sense would be that unless similar conditions exists the, dynamics of other hypothetical slides could be different.

The key issue is what are the probabilities and triggers for mudslides in various locations of this ridge. It is my opinion that a concerted effort should be invested to answer this question before resources are spent on studies such as runout analyses.

In conclusions I believe that the risk of property damage or injuries should be better explained to public and also put in the context of other issues such as earthquake or likelihood of being hit by the car or shot. One fatality is one to many, especially if it could have been prevented but in the context of the risks that we are exposed to in everyday life, one mudslide fatality in 100 years of Vancouver existence is not high in comparison to other preventable tragedies.

To issue blanket evacuation notice in the case of heavy rains without explaining the risk to various residencies, triggering media frenzy is not what I am expecting from representatives of this community.

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