



May 15, 2007

PN 97082-1364

Mr. Joel Rojas  
**CITY OF RANCHO PALOS VERDES**  
30940 Hawthorne Boulevard  
Rancho Palos Verdes, CA 90275-5391

Subject: Geologic and Geotechnical Opinion Regarding Development within the Landslide Moratorium Area, Rancho Palos Verdes, California

Dear Mr. Rojas:

At your request and authorization, our firm has been tasked with providing this geologic and geotechnical opinion paper regarding development within the city's current landslide moratorium area. This paper intends to address the following general questions:

- 1) From a geologic and geotechnical engineering perspective, should the City continue to prohibit new construction on vacant lots within the landslide moratorium area?
- 2) From a geologic and geotechnical engineering perspective, is it detrimental to the landslide moratorium area to continue to allow existing residents to add minor square footage and improvements to their existing homes, such as the 600 square feet maximum allowance that currently exists?
- 3) Should such rules be the same in the blue area as they are for the red area?

We have been asked to approach the above questions from a geologic and geotechnical engineering perspective based on our knowledge of the geology of the moratorium areas, an assessment of the current and potential movement within the area, and past and present city policies within the landslide moratorium areas.

First of all, we would like to make our basic position regarding development or building within any area of landslide hazard very clear. From a purely geologic perspective, it is our opinion that development within areas of landslide hazards is unwise at any time unless the landslide instability can be mitigated to a level consistent with at least the minimum code and standards of practice as exercised within the professional geologic and geotechnical community. It should be understood that by developing in an area of landslides or potential landsliding there are inherent risks to life safety

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and property that vary depending on the type and scale of building and/or development, and location and geologic environment involved. When discussing the topic of risk here in we are referring to the potential of increasing geologic instability and the potential for creating or increasing unsafe conditions with respect to property and/or the health and safety of the populace. People who choose to live within known landslide areas are exposing themselves to a higher degree of risk than those who live elsewhere.

The inherent risks involved with development in a landslide area increase with the scale of the proposed improvement. In general, a minor addition with little or no grading or landform modification poses a lower risk compared to a large development with major grading and associated landform modification. A minor addition that introduces no additional irrigation or water use poses less risk than a subdivision comprised of numerous new homes that would likely introduce additional water into the groundwater system.

The above discussion is simplistic and does not cover all potential hazards or risks to development in a landslide area, however it has been utilized as a basis for our continued discussion directed to the Rancho Palos Verdes Landslide moratorium area.

*Question #1: From a geologic and geotechnical engineering perspective, should we continue to prohibit new construction on vacant lots within the landslide moratorium area?*

The obvious answer to this question is that people who live within an active or potentially active landslide area are subject to a higher degree of risk than people who live outside of such areas. By allowing new development to occur within an area with known higher risk to life safety and property, more people would be potentially exposed to that risk.

Beyond this simple evaluation is to consider the varying risks associated with different development actions. In order to explore this further, it should be understood that all areas within the landslide moratorium area are subject to some degree of risk. Some areas are associated with active landslide movement and are subject to an even higher degree of risk. Still other areas have experienced little or no perceived movement. However, even with little to no perceived movement, these areas are still considered to be below the accepted geotechnical industry standard of practice and the building code level of stability.

First of all we would like to address the issues of grading to create building pads. As set forth by Municipal Code section 17.76.040, a minor grading permit is to be issued for grading in excess of 20 cubic yards but less than 50 cubic yards in any two year period, on a slope of less than 35 percent or which results in an excavation or fill of more than three feet but less than 5 feet. From a risk assessment standpoint, it is our professional opinion that any grading above the 20 cubic yard threshold could raise the risk above an unacceptable level. On the other hand, limited grading could be considered acceptable if it does not create drainage issues such as blocking or redirecting drainage

to areas of potential increased subsurface percolation and is limited to fills up to 3 feet in height and less than 20 cubic yards of earth movement.

The addition of subsurface water within the landslide moratorium area could have a detrimental affect on its stability. The risk therefore increases substantially if the project is served by on-site sewage disposal or has no access to storm drain runoff collection.

Any new project, development or single family home that requires only limited grading (as defined above) and could collect and dispose of storm water or sewer effluents from the project site to outside the landslide area would theoretically have no impact on the stability of the landslide; however, the baseline risk associated with any new project would be the same as other properties within the landslide. As stated above, these new developments would serve to expose more people to at least the baseline level of risk associated with living in a landslide area.

Based on the above, it is our professional opinion that new development not be allowed within any of the moratorium area.

*Question #2: From a geologic and geotechnical engineering perspective, is it detrimental to the landslide to continue to allow existing residents to add minor square footage and improvements to their existing homes, such as the 600 square feet maximum allowance that currently exists?*

From a geologic and geotechnical perspective, the issues of grading, sewage disposal and storm water runoff collection discussed above are still the main factors under consideration in addressing this question. The actual weight of a structure is generally very small compared to the weight of the entire landslide mass. In addition, it could be argued that some minor grading can actually enhance the drainage of the site. Therefore, from one perspective, a minimal addition to an existing residence (i.e. 600 square feet or less) or limited grading (20 Cubic yards or less) would not add to the instability of the landslide moratorium areas, and may have the beneficial effect of improving drainage and reducing permeable area for runoff to enter into the landslide. It is also our professional opinion that minor additions that involve only limited grading (less than 20 cubic yards) and do not increase the potential for infiltration of water into the subsurface are acceptable from a geologic and geotechnical perspective. The potential infiltration of water may be prevented with storm water disposal and sanitary sewer or demonstration that the project will not increase the potential for infiltration of water into the subsurface.

Swimming pools, spas, and other water features could create the potential for adding water into the subsurface, potentially decreasing the stability of the landslide area. Therefore, projects that would potentially destabilize the moratorium areas such as swimming pools, spas, and other water features should not be allowed.

The issue of the size of an addition is generally a policy issue. Whether the allowed addition is 200 square feet or 1,000 square feet will not make a substantial difference from a geologic perspective. It should be understood that the larger the addition the more the issues of grading and runoff come into play. In addition, at a certain point, additional square footage would serve to expose more people to landslide risk.

Partially to conform to current code standards, we would recommend that the levels for additions currently allowed by the moratorium ordinance be established at a cumulative maximum of 1,200 square feet for all additions including habitable and non-habitable space. The cumulative totals may include first story, second story and garage additions. The square footage of all additions including the garage addition may be interchanged provided the cumulative total does not exceed a cumulative total of 1,200 square feet. It is further recommended that the geology and soils engineering report requirements set forth in the current code also continue.

*Question #3: Should such rules be the same in the blue area as they are for the red area?*

Currently the code differentiates a portion of the Klondike Canyon landslide as the “blue” area and has treated it differently from other areas of the moratorium. From a purely geologic perspective, landslides in a state of movement are by definition at or below a factor of safety of 1.0. This is below the commonly accepted standard of a 1.5 factor of safety. Construction or development within a landslide area has varying risks depending on the area chosen and the local topographic conditions. Generally, landslides can have areas that are more coherent with less fissures and cracks and other areas where cracks and fissures are more abundant. These more coherent areas have less risk associated with them than the more broken up areas. In addition, areas of landslides that have more local topographic relief are also generally at higher risk. Generally the entire area of the Portuguese Bend landslide has a much higher risk associated with it than does the developed areas of the Abalone Cove or Klondike Canyon landslide areas. This does not imply that there is no risk associated with living on or developing within the Abalone Cove or Klondike Canyon landslides. Both have shown movement and therefore, would be considered below the minimum standard of practice or code requirements for development.

Based on our review of prior studies and displacement data over time, a case may be made to propose a direct relationship between movement of the Portuguese Bend Landslide and Klondike Canyon Landslide area. It is our professional opinion that if the Portuguese Bend Landslide experiences a significant level of movement, either over time or in a catastrophic episode, support for the western flank of the Klondike Canyon landslide could be lost and the Klondike Canyon landslide could be subject to potentially catastrophic movement.

For the above reasons, it is our professional opinion that both the “red” and “blue” areas should be treated the same from a code standpoint.

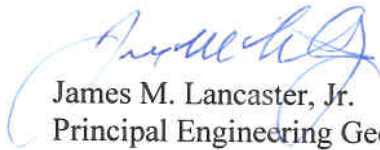
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We appreciate this opportunity to be of continued service to the City of Rancho Palos Verdes. Please call if you have any questions regarding the content of this letter.

Sincerely,

**ZEISER KLING CONSULTANTS, INC.**



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