

From: Brian Beaman <bbeaman@iciclecreekengineers.com>
Sent: Wednesday, June 13, 2012 7:18 AM
To: Debbie Beadle
Subject: Planning Commission - Best Available Science, Erosion Hazards

Debbie, could you please forward this email to the appropriate members of the Planning Commission involved in the discussions of "Best Available Science – Erosion Hazards" and Stormwater Infiltration?

I would appreciate it if my email comments and questions could be entered into the public record for this purpose.

Erosion Hazards Mapping – Erosion Hazards Mapping by the City of Sammamish, and most other jurisdictions, is based on the November 1973 US Department of Agriculture Soil Conservation Service (SCS) (now called Natural Resources Conservation Service), Soil Survey, King County Area, Washington (Soil Survey). Field work for this survey was completed by "Soil Scientists," not Licensed Engineering Geologists (LEG) or Geotechnical Engineers. The 1973 SCS Soil Survey field work was completed in 1966 through 1968, 44 to 46 years ago. The primary categories of identification, concern and discussion in the 1973 SCS Soil Survey were related to unmitigated agricultural and logging practices, not urban land development.

Primary Questions for the City of Sammamish

- 1) How accurate is the 1973 Soil Survey mapping? Are the "lines" between soil types distinct, gradational, or even representative of the actual field conditions?
- 2) Is an LEG, or possibly a Geotechnical Engineer, which are the most likely professionals that will be providing opinions and recommendations related to the 1973 SCS Soil Survey mapping, qualified to identify soil types based on Soil Scientist type background?
- 3) Should the basis for Erosion Hazards be the 1973 SCS Soil Survey, or is there a better "Best Available Science" for this purpose? If it perceived that no better Best Available Science is available for Erosion Hazards Mapping, then why not?
- 4) Should the City of Sammamish rely on the existing Erosion Hazards mapping as providing sufficient "science" (foundation of the regulation) to delineate specific areas where a true Erosion Hazard exists and to designate areas of land that are known to be so sensitive, that development should be excluded?
- 5) The City's geotechnical engineer should provide a statement to the City and community that the current mapping of Erosion Hazards (based on the 1973 SCS Soil Survey) is accurate based on current standards of engineering practice and is appropriate for the development of critical land use decisions. A statement suggesting that there is "no other available science" would be considered unacceptable. In other words, the City's geotechnical engineer should be able to state that they would fully support any land use decisions related to Erosion Hazards, some of which may exclude land use, based on the use of the 1973 SCS Soil Survey.

As most of the community is aware, Critical or Sensitive Areas (Steep Slope, Landslide, Seismic, Erosion, Coal Mine, Wetlands, Riparian Habitat) were formally recognized and mapped, along with the preparation of Development/Performance Standards beginning in the early 1990s when the Growth Management Act was adopted by many jurisdictions. It is interesting to note that Erosion Hazards have been the only Critical Area where the base mapping was never questioned, studied further, revised or updated. All the other Critical Areas have been "works-in-progress" when considering the appropriate mapping (delineation) of these areas. It is likely that the primary reason for the lack of updated mapping of Erosion Hazards was that Soils Scientist professionals are usually involved in agricultural or forestry activities, and not land development, so are not available or no longer involved. Those professionals involved

in land development in our community, such as LEGs and Geotechnical Engineers, typically do not have the background to modify the 1973 SCS Soil Survey.

The reason not questioning the dated Erosion Hazards mapping by LEGs and Geotechnical Engineers in the past was likely because that Erosion Hazards did not really present a significant issue with land development. So no one was interested in changing the maps. However, if land use policies change to the extent that Erosion Hazards become a basis for excluding land development, then some serious thought needs to be put forward as to the foundation (basis) of the current Erosion Hazards mapping, which may be grossly inaccurate, and possibly not even appropriate for land use decisions regarding property development.

Stormwater Infiltration – We are aware that infiltration is a preferred method of stormwater disposal in the City of Sammamish. The basic assumption is that stormwater infiltrated into the ground moves vertically through the soil column, eventually merging with a deep regional aquifer which drains to Lake Sammamish. The “science” behind this is simple, water goes into the ground and disappears, the enters the lake a few days later.

Unfortunately, the regional geologic conditions for the City of Sammamish area are anything but favorable for this simple infiltration model. The upland areas of the City of Sammamish are typically mantled with Glacial Till, sometimes referred to as “hardpan.” Glacial Till does not reasonably infiltrate water. Instead, vertically infiltrating water is intercepted by the Glacial Till, then ground water then moves laterally, usually reemerging as springs on hillside areas, especially the “West Bluff” that overlooks Lake Sammamish. Even when infiltrated stormwater bypasses the Glacial Till cap (there are often “windows” in the Glacial Till where the Glacial Till is absent) the vertically infiltrating stormwater will be intercepted by other deeper very low permeability soil deposits (such as the Transitional Beds or other Pre-Fraser soil deposits) with the ground water forced to move laterally to emerge as springs on slopes. Increasing this “recharge” to these spring areas may, and often does, cause significant slope instability of the West Bluff.

Primary Questions for the City of Sammamish

- 1) Does the City of Sammamish (or their geotechnical engineer) agree that low permeability layers underlie the entire City area?
- 2) Does the City of Sammamish agree that emerging ground water on slopes is a cause of landslides, and resultant erosion and sedimentation, on the West Bluff area?
- 3) Will increasing the rate of infiltration, and also the point source for infiltration, in the upland areas possibly cause landslides or aggravate the existing marginally stable conditions in the West Bluff area?
- 4) Can the infiltration paths for stormwater be confidently identified and evaluated for impacts to the stability of slopes in the West Bluff area? If not, then why would the City of Sammamish desire to encourage stormwater infiltration?

I am available any time to discuss questions or comments regarding this email.

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