ADMINISTRATIVE MANUAL
LOS ANGELES COUNTY PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SURFICIAL SLOPE STABILITY FOR NATURAL SLOPES

This directive provides guidelines applicable for the review of structures proposed adjacent to natural slopes, swales, etc., that have a potential for shallow or surficial failures (excludes gross stability).

Guidelines contained herein exclude additional criteria and requirements that may be imposed by the Building Official or Land Development Division's Subdivision Mapping Section relative to runoff, drainage, grading, etc.

1. A coordinated investigation by a Certified Engineering Geologist and Geotechnical Engineer competent in geotechnical engineering is commonly necessary for a thorough assessment of the stability of natural slopes. Surficial materials include soils, colluvium, talus, slopewash, highly weathered (soil like) bedrock, etc.

2. The geotechnical consultant(s) must demonstrate that proposed structures will be free from landsliding, settlement, and slippage as defined in the latest version of the County of Los Angeles Building Code (CLABC) Sections 110 and 111.

3. Site specific data must be provided and considered in the assessment of potential mobilization of surficial materials (e.g., debris flows, mudflows).

4. Assessment and/or contents of consultant's geotechnical reports should include:

    - Location and description of past surficial failures in the area.

    - Evaluation of existing off-site instabilities and slope performance under similar site and geologic conditions.

    - Evaluation of significant slopes. Generally, significant slopes are steeper than 2:1 (horizontal:vertical) ratio (greater than 26 degrees), and/or when the height of the slope and geologic conditions warrant.

    - Evaluation of material thickness, density, variability, and potential irregularity of contact with underlying firm material or bedrock.

    - Change in slope gradients.

- Hydrogeologic and geologic conditions relative to stability.

- Impact of underlying bedrock or other materials of low permeability that may indicate conditions conducive to potential instability.

- Variability and concentration of surface runoff (no drainage devices). If drainage devices are determined to be necessary and considered a mitigation measure in the evaluation, devices must be shown on the plans.

- Presence of animal burrows, cracks in the soils, and fractures that may increase the infiltrate rate into the surficial materials.

- Geotechnical map that includes native drainage courses (e.g., swales, hollows), proposed drainage devices, and topographic anomalies.

- Illustration of geologic and hydrogeologic conditions and data inclusive of cross-sections.

5. A slope stability analysis that evaluates stability of natural surficial materials. The consulting engineering geologist shall supplement the stability analysis with a qualitative assessment that takes into account geologic conditions, slope history, published documents, etc. Mitigative measures should be based upon input from the consulting engineering geologist and soils engineer. Surficial slope stability requirements shall conform to the following:

    - Analysis shall use the infinite slope method with seepage parallel to the slope surface, or other critical surface if identified during the geotechnical investigation.

    - Depth of full saturation shall be 4 feet, unless geologic conditions indicate an alternate thickness is appropriate for the analysis.

    - Minimum Factor of Safety shall be 1.50.

    - Shear strength parameters and unit weight used in the analysis shall be representative of surficial materials.

6. The volume of debris calculated for mitigation design/measures should be based upon slope stability analysis and qualitative input from the geotechnical consultants.

7. If surficial slope stability analyses and/or qualitative data indicate a debris flow potential exists on the subject natural slope, slope setback reductions cannot be granted (see 2023 CLABC Section 1808.7).

8. Walls detaining or diverting debris shall be designed as impact walls. These walls shall be designed for a minimum force of 125 pounds per cubic foot (Equivalent Fluid Pressure). Force acting on the wall shall be applied to the entire height of wall potentially in contact with debris.

9. Mitigative or preventative measures which divert debris onto adjacent properties and/or require maintenance are unacceptable. Debris hazards should be completely mitigated on-site. Mitigative measures, resulting in modification of natural drainage or removal (grading) of natural slope surficial material, are subject to review and approval by the Building Official or Subdivision's Mapping Section. Incorporation of paved swales or other devices may be required by the Building Official or Subdivision's Mapping Section. Please note that debris fences are not an accepted form of mitigation unless a debris fence maintenance covenant is permitted by the Building Official.

Note: Before preparing comments regarding surficial slope stability, Geotechnical Development reviewers should have read and be familiar with, at a minimum, the following documents:

- California Geological Survey Note 33 (https://www.conservation.ca.gov/cgs/Pages/Publications/Note_33.aspx),
- United States Geological Survey Professional Paper 851 (by Russell H. Campbell, 1975) (https://pubs.usgs.gov/pp/0851/report.pdf), and
- Bulletin of the Association of Engineering Geologist, Vol. XVIII, No. 1, 1981, pp. 17-28.

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