Geotechnical Investigation, Reports, and Inspection Requirements for Structures in Hazard Zones 4 and 5

The Municipality of Anchorage recognizes that certain residential properties have an inherent risk of ground failure due to strong seismic ground shaking. As discussed in the June 1989 report by Shannon & Wilson for the Turnagain N.E. landslide re-evaluation, ground failure can result in localized differential settlements, partial loss of foundation support, uneven lateral movements across the structure or lot, increased lateral pressures against buried structural elements, and/or slope failures of the ground above, under or downhill from the site.

For construction on properties in Hazard Zones 4 and 5, the Municipality requires that the structure be designed or the soil conditions improved so that the building will not collapse. Hazard zones 4 and 5 boundaries are shown on maps at Building Safety.

To achieve this level of safety, a geotechnical investigation must be performed to evaluate the magnitude of the possible ground displacements and loadings. The investigation shall include subsurface exploration, sampling and laboratory testing sufficient to define the soil and ground water conditions and discontinuities. Borings will be required to explore for liquifiable sand layers and soft, sensitive clays and, if conditions are not uniform between the borings, test pits may be needed to define the lateral changes between borings. The number of borings and test pits should be adequate to define the subsurface conditions in three dimensions within the building footprint, i.e., at least three borings in a triangular pattern are expected. Additional subsurface exploration might be needed up and downslope from the building location to evaluate wall pressures and slope stability. The depth of the borings should be adequate to explore any soils that might influence the footings; in general borings on the order of 20 to 25 feet deep are anticipated for residences of two stories or less.

The geotechnical investigation shall be performed under the direction of a civil engineer registered to practice in the State of Alaska and experienced to practice in the specialty of geotechnical engineering. The engineer shall perform analysis and make judgments as required to estimate the magnitude of possible ground movements and soil loadings on the structure, shall make recommendations for subsurface improvements which could mitigate or reduce the movements and loadings, and shall prepare and sign a written report with field and laboratory data and conclusions and recommendations.

The structure shall be designed by a civil engineer registered to practice in the State of Alaska and experienced to practice in the specialty of structural engineering. The structural engineer shall show by calculations that the building is capable of withstanding, without collapse, the displacements and loadings in its foundation and subgrade wall system as recommended by the geotechnical report.

The site improvement work as recommended by the geotechnical engineer and all foundation excavations shall be performed under the inspection and testing of the same geotechnical engineer who, upon the completion of the work, will submit a letter report to Building Safety stating that the work was performed in accordance with his recommendations. The structural engineer shall also perform special inspections during the construction of the building and likewise submit a statement to Building Safety stating that the construction was in compliance with his design.

Ron Thompson, Building Official
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