

December 5, 2013

Soils/ Geologic Report

Record search for Geologic Data on Project Site:

Figure 4.2-2, Epicenters and Faults Map, of the Final EIR for the Nevada County General Plan shows a pre-Quaternary fault (older than 2 million years) beginning approximately one mile north of the PD, just south of the border between Yuba and Sierra counties, and trending southeast into Placer County. The Nevada County Master Environmental Inventory (December 1991) characterizes pre-Quaternary faults as “relatively inactive,” concluding that “the history of past earthquake activity does not indicate that Nevada County is a particularly hazardous area.”

In Special Publication 42, Fault-Rupture Hazard Zones in California (1997), the California Geologic Survey mapped earthquake faults within the state that it characterized as “sufficiently active and well-defined as to constitute a potential hazard to structures from surface faulting or fault creep.” Faults that had not been active for more than 11,000 years were considered inactive and were not shown on the fault maps. Although Nevada County was included in the study, the State Geologist found no evidence of active faulting there (D. Stickney, Information Geologist, California Geological Survey, phone conversation, August 28, 2006). Figure 4H from Special Publication 42, Index to Official Maps of Earthquake Fault Zones, is the California Geologic Survey’s map of earthquake fault zones in the Nevada County region (Attached here in Appendix 10). No active faults are shown in the County. Therefore, neither the existing nor the potential PD development will be on or near a known historical fault.

Apex Engineering reviewed Geologic Hazards for the Ananda School Use Permit in 2008. This report noted inactive Pre-Quaternary Faults in the vicinity of the project that could be considered as “dead” faults. The closest active fault is the Cleveland Hill Fault near Oroville, thirty miles west. The report concluded that no significant geological or seismic hazards were identified. The Apex report is attached here in Appendix 10.

Lincoln and Long Engineering included an evaluation of Seismic and Geological Hazards on the site in their Sewage Evaluation Report (Appendix 4). Their analysis concluded that “as long as development follows normal procedures for building and grading permits no additional inventories, testing, mitigation, or monitoring seems warranted. The relevant section of the Sewage Evaluation Report is attached here in Appendix 10.

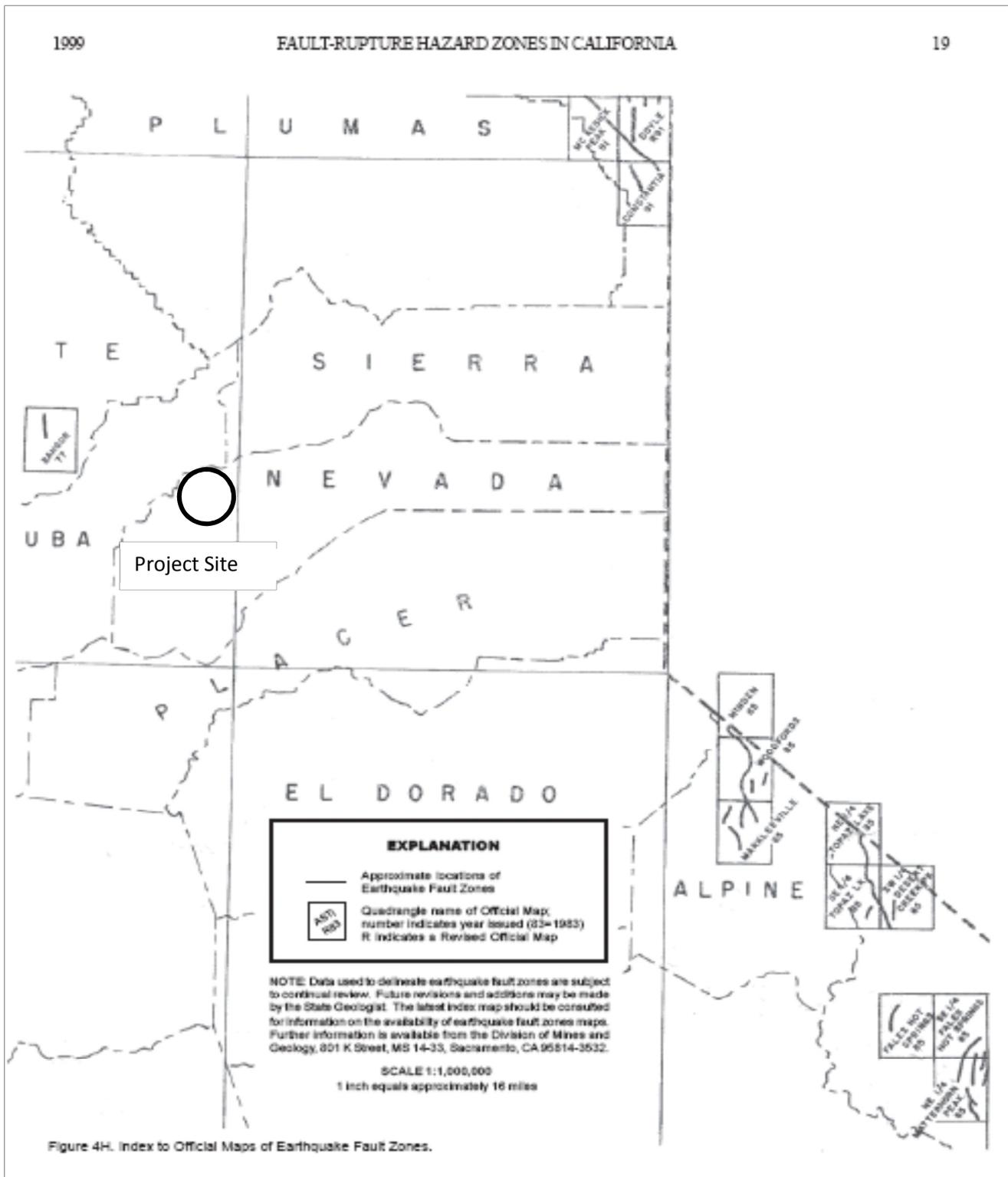


Figure 4H from Special Publication 42, Fault-Rupture Hazard Zones in California

APEX ENGINEERING
P.O. BOX 1074
Oregon House, CA 95962
272-1250 or 692-9048

January 28, 2008

Ananda Village
14618 Tyler-Foote Road
Nevada City, CA 95959
ATTN: Peter Goering

RE: Geological Hazards Report for Ananda School, APN 61-170-17 and 24

Dear Peter:

This report addresses geological and seismic hazards that may exist in the vicinity of the Ananda School. A field investigation and record search was conducted in accordance with the requirements of the Nevada County General Plan, Policy 10.13.

The school buildings, both existing and proposed, are single-story wood-framed structures with standard concrete perimeter foundations. The structures, and planned structures, are not constructed on soil fill. The School has been onsite for at least twenty-five years. The school campus and its roadway are sited on a rounded ridge top as is illustrated on the attached exhibit. At an elevation of 2,600 feet, the site supports growth of Black Oaks and Ponderosa Pines. Rainfall average is approximately 55 inches per year. The onsite slopes range from nearly level to twenty percent. Rock outcrops onsite and upgrade of the School are rare and are of small size.

Some evidence of minor erosion is present southwest and downgrade of the School campus. However, the erosion is apparently quite old because there are large trees and brush growing in the concaved area. The Milton Ditch, an abandoned historic canal, is adjacent downhill of the eroded area. It is possible that the eroded area was excavated for the ditch embankment fill. The eroded area now appears to be stable due to the vegetation. No development is proposed in-or-near the eroded area.

Other than the erosion described above, there were no signs of existing erosion problems or geologic hazards such as landslides, mudslides, ground failures, subsidence, liquefaction or seiches. There are embanked ponds that flank the ridge downgrade of the School site. Asbestos and radon is not expected to be present in the granitic soils. No evidence of underground hard rock mining was observed in-or-around the School campus. There are hydraulic mines about one mile east of the School, but the mines are not located downgrade so potential soil instability of the mine cliffs should not be a project-related issue.

The onsite soils are listed as Hoda sandy loam by the Soil Survey of the Nevada County Area, USDA, Soil Conservation Service, 1970. These soils are derived from in-place weathering of granodiorite. The Survey indicates that runoff is medium to rapid on this soil; it has moderate shrink-swell potential and that the erosion hazard is high. .

A recent soils testing program was conducted by this office to determine the feasibility of constructing other septic tank-leach field systems onsite to allow for school expansion, or other uses. The soil is

Appendix 10

described as a well-drained clay loam to a depth of ten feet. No clay lenses or bedrock was encountered in eight test pits dug throughout the site. The soil appears to be stable although soil creep could occur as with any soil. The large onsite trees do not exhibit signs of a “pistol butt”, or bent trunk bases, which indicates soil movement.

A literature search for the presence of earthquake faults in the project area was conducted by this office. The site is located outside of the Alquist-Priolo Earthquake Fault Zone Map Area as defined by the State Division of Mines and Geology Special Report 42 of 1997. Said map illustrates active faults that have ruptured in the last 11,000 years. The Act is not applicable to this project because there is no known active faults at-or-near the School campus.

The attached Fault Exhibit illustrates that the School site is bounded by two north trending Pre-Quaternary faults, which lie about one mile east and five miles west respectively. Such faults are reported to have not caused displacement for over two million years. However, such faults should not necessarily be considered “dead”. The western half of Nevada County, in which the School is located, is in the low intensity zone for earthquake severity. However, earth movement can be felt in the western Nevada County area from earthquakes that are a considerable distance from the local area. The closest active fault to the School is reported to be the Cleveland Hill Fault near Oroville, which is about thirty miles west.

In conclusion, no significant geological or seismic hazards were identified in the course of this report. No mitigation measures are proposed other than those common to any land development project. The buildings will be constructed in conformance Uniform Building Code and the Nevada County Land Use and Development Code. This report is subject to review and comment by the Nevada County Planning Department and the Public.

Thank you for the opportunity to serve your community.

Sincerely,

Jim Shultz

Attach:
School Exhibit
Fault Map

Geotechnical Evaluation

Excerpted from Sewage Evaluation Report by Lincoln and Long Civil Engineering, Appendix 4

Seismic and Geological

Erosion hazard of the Nevada County Master Environmental Inventory indicates that Ananda Village PD is within moderated to high erosion hazard areas. Soil surveys of the Village prepared by the US Soil Conservation Service show much of the existing and proposed development at Ananda Village to be on Musick sand loam 15-50% (MrE), which the USCS considers to be highly erodible. The soils map is a broad-brush representation, and areas classified as MrE (15-50%) at the Village include slopes that are less than 15%. To preserve the integrity of the soil and the natural topography of Ananda Village, new development will be sited as much as possible on grades less than 15%. However, the Ananda Master Plan update does propose some residential development in both existing and new clusters and a new non-residential building at the Rajarshi Park PD zone on slopes between 15 and not to exceed 20% slopes.

The Ananda Comprehensive Master Plan does not propose any buildings for slopes over 20% and all the buildings proposed for soils with a high erosion potential will be on slopes less than 20%. Based on observation of the development at Ananda Village that has been carried out in the last 40 years on soils classified as MrE, extensive soil testing in preparation for the Ananda Village Comprehensive Master Plan Sewage Evaluation Report, and decades of experience with projects on similar soils throughout Nevada County, it is the undersigned engineers opinion that a formal management plan for building on soils with high erosion potential would not be necessary for the proposed Comprehensive Master Plan Update. As long as development follows

normal procedures required for building and grading permits no additional inventories, testing, mitigation, or monitoring seems warranted.

If, in the future, a proposed single family residence or group of single family residences are proposed to be built and state or county rules and requirements dictate a management plan or a more intensive evaluation be completed before construction then said reports or further testing or evaluations can be completed at that time.

Very truly yours,

David L. Lincoln
CE 27126

