



COMMUNITY DEVELOPMENT DEPARTMENT POLICY & PROCEDURE

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Revision Date: June 29, 2022

TITLE: The City Policy for Site-Specific Seismic Fault Investigation

PURPOSE:

The purpose of this policy is to ensure that non-exempt developments initiate a site-specific fault-rupture investigation according to the California Building Code in effect and following procedures of the California Geological Survey (CGS). The major purpose of the site-specific seismic fault investigation is to identify and to prohibit construction of structures intended for human occupancy across the traces of active faults, and thereby to mitigate the hazard of surface and near-surface fault rupture.

Prior to issuance of building permits, current City regulations and practice require that applicants for proposed developments conduct an appropriate site-specific fault-investigation, the ultimate intent of which is to ensure public health, safety and welfare. The City of Beverly Hills is known to be in a seismically active area, and as of this date is impacted by three specific, State-defined earthquake fault zones (EFZ) related to the Santa Monica, the Hollywood and the Newport-Inglewood/West Pico systems. The minimal required investigation procedures in these zones are spelled out in the most recent CGS Special Publication 42 (2018). Additionally, as a matter of public safety and policy, the City, as the lead agency, follows the authority given to the City Building Official by the 2016 California Building Code, including recommendations and guidelines established by the CGS and spelled out in regulations implementing the Alquist-Priolo (AP) Act, the pertinent provisions are outlined as follows:

1. The 2019 California Building Code, Chapter 18 Soils and Foundations, Section 1803 Geotechnical Investigations, subsection 1803.5.11 Seismic Design Categories C

through F, states “For structures assigned to Seismic Design Category C, D, E, or F, a geotechnical investigation shall be conducted, and shall include an evaluation of all of the following potential geologic and seismic hazards:

- i. Slope instability.
 - ii. Liquefaction.
 - iii. Total and differential settlement.
 - iv. Surface displacement due to faulting or seismically induced lateral spreading or lateral flow.
2. The Alquist-Priolo (AP) Act was enacted in 1972 following the February 1971 Sylmar earthquake. The main intent of the AP is to prevent construction of habitable structures across an “active fault,” presently defined by the State (CGS, 2018) as “a fault that has had surface or near-surface displacement within Holocene time (about the last 11,700 years), hence constituting a potential hazard to structures that might be located across it.” [14 Cal. Code Regs. Section 3601(a)].
3. The State Geologist (CGS) is mandated to establish earthquake fault zones (EFZ) across known or reasonably inferred active faults. A project affected by the AP (PRC Section 2621.6) generally includes any structure for human occupancy with the exception of the following:
 - 3.1. One- and two-family dwellings, and their accessory structures, that are of wood or steel framed construction as covered under the State of California Residential Code with the following provisions defined under Section 2621.6 of Chapter 7.5 of the CPRC:
 - A) Residential buildings three stories or higher are not exempt. The number of stories in a building is equal to the number of distinct floor levels, including any basement levels, provided that any levels that differ from each other by less than two feet shall be considered as one distinct level; AND
 - B) Buildings that are accessory to a residential occupancy, including accessory dwelling units (ADU); AND
 - C) Residential buildings shall not be part of a development of four or more dwellings; AND
 - D) Multi-family buildings as covered under the State of California Building Code are not exempt.
 - 3.2. Any new commercial structure with an occupancy rate of less than 2,000 person-hours per year.
 - 3.3. Additions and/or alterations to existing residential and non-residential buildings where the total value of the work is less than 50 percent of the replacement value of the existing building and the added floor area is less than 50 percent of the floor area of the existing building. However, if the existing building foundation has been specifically designed for any type of earthquake-induced ground failure, then the addition shall comply with the same or the most current requirements whichever is more restrictive.

- 3.4. Detached structures of Group U occupancy, including private garages, carports, retaining walls, fences, cell phone towers, etc.
 - 3.5. Pools, spas and decks.
 - 3.6. Conversion of an existing apartment building into a condominium.
4. The City may impose investigation requirements more restrictive than those imposed by State regulations. Additionally, the City may require that applicants for any development, whether in or out of an AP zone, conduct appropriate, site-specific fault investigations that employ current professional standards-of-practice; and that these reports be subject to peer review by a technically qualified geologist retained by the agency.

Each site-specific fault investigation inherently produces new information about the possible presence, trend and relative activity of faults whether newly identified or previously known. Accordingly, the City, to ensure public health and safety, may require that all potential new development, whether in or outside of an existing CGS-mandated EFZ, be subject to a fault investigation, the scope and extent of which may vary from site to site. Though not in a current CGS EFZ, those areas of the City on projection from the existing Santa Monica, Hollywood and Newport-Inglewood are of particular concern. So likewise, is the broad zone between the Santa Monica and the Hollywood faults where regional tectonic slip is likely taken up by heretofore unrecognized step-over or so-called “tear” faults. And given that the “nexus” of the three current EFZ’s lies within the City, adherence to public health, safety and welfare inherently requires that City mandate appropriate fault investigations throughout its jurisdiction. Additional technical information is given in the City (2021) “Guidelines for Evaluating Potential Surface Fault Rupture” and should therefore be reviewed and followed by the geological consultants for the developer/permit applicant.

PROCESSES AND PROCEDURES:

The developer is responsible to conduct the required fault-activity investigations. The documentation (usually draft and final reports) is then submitted to the City for review and potential approval. Since the City does not have professional geologist on staff, all fault investigation reports are critiqued by a State licensed, technically qualified peer reviewer who specializes in fault assessments. This reviewer is retained by the City to assess the scope and technical documentation provided by the applicant’s Consultants-of-Record, including their professional opinions and conclusions, as to the possible presence and relative impact of active faults within and adjacent to the proposed development. The peer reviewer also determines whether or not the particular site-specific investigation meets the current geologic standard-of-practice for evaluating potential surface-fault rupture.

When all fault issues have been adequately addressed, the City's reviewer briefly summarizes the investigation scope and conclusions, and whether or not these conform to current building codes and geologic standards-of-practice. Ultimately, if warranted, the Reviewer then provides the City with a formal "Recommendation for Acceptance." Under current practice, and as common in other lead agencies, the local Building Official relies on the peer review to make an informed decision about acceptance. In the interest of public health and safety and as provided in the 2019 California Building Code (see above), other geologic and geotechnical concerns may also have to be addressed; e.g., potential ground deformation owing to seismically induced liquefaction. The appropriate investigations for these seismic and other pertinent geological issues are then reviewed by the City's in-house staff or by a contracted specialist as needed. As authorized by the A-P Act, the City imposes and collects fees for: (1) Technical Reviewer professional services; (2) Administration (currently 15 percent) based on Reviewer services deposit; (3) in-house engineering evaluations; and (4) permits for drilling, excavation, grading, after-hours, street uses, or other activities impacting City rights-of-way. When all code-mandated investigations have been completed and accepted, and when all required fees have been received, the City Building Official may then issue a Seismic Investigations and associated permits.

ATTACHMENTS / REFERENCES:

California Geological Survey, 2018, Earthquake fault zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: Special Publication 42, Revised 2018, 93 p.

Guidelines for Evaluating Potential Surface-Fault Rupture Within the City of Beverly Hills, California October 20, 2021



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GUIDELINES FOR EVALUATING POTENTIAL SURFACE-FAULT RUPTURE WITHIN THE CITY OF BEVERLY HILLS, CALIFORNIA

(Revised June 29, 2022)

As the decision-making (Lead) agency, the City of Beverly Hills has the duty to protect the health, safety, and welfare of the public by minimizing the potential adverse effects of surface-fault rupture. Accordingly, the City requires that the owners/developers (applicant) for proposed development of habitable structures (refer to Policy No: DSP-003) complete an appropriate “standard-of-practice” geological investigation to ensure that active faults do not underlie the site or, if present, are appropriately mitigated by avoidance (structural setbacks). All sites are different, and hence a wide variety of geological investigation techniques may be appropriate for a specific location. The following Guidelines and general information recognize this reality, and enumerate general procedures to assist the permit applicant and the consultants-of-record to conduct adequate and yet reasonable investigations consistent with maintenance of public health and safety.

1. An “active fault” is currently defined by the California Geological Survey (CGS) as one having surface or near-surface ground rupture within the last ~11,700 years, regardless of recurrence interval or amount of displacement per event (CGS, 2018a). Further, CGS investigation criteria now state that “faults within a formally designated Earthquake Fault Zone (EFZ) are presumed to be active until determined otherwise” (CGS, 2018a, p. 27). The City follows these definitions and investigation criteria, but recognizes that in certain situations, on a site-specific basis, well documented engineering mitigation may be appropriate.

2. Fault-rupture investigations must meet current geologic standards-of-practice. Such practice changes over time. It is therefore the duty of the geologic consultants to keep abreast of and to employ the latest investigation techniques. Many such techniques are provided in CGS Note 49 “Guidelines for Evaluating the Hazard of Surface Fault Rupture;” a document that is periodically revised and readily available via the CGS website. **Important:** Both the Applicant and the Consultants-of-Record are strongly urged to obtain, review, understand and comply with the recommended fault-investigation procedures now spelled out in the latest revision of CGS Publication 42 (CGS, 2018a).

At present, the CGS has designated three distinct fault zones (EFZs) as either demonstrably or potentially affecting the City of Beverly Hills. As shown on relevant CGS documents, these are the Santa Monica, the Hollywood, and the Newport-Inglewood/West Pico fault zones (CGS, 2018b). However, new zones have been and will likely be identified that impinge upon the City (see, for example, CGS website, “Earthquake Zones of Required Investigation.”) Indeed, projection of the three current EFZs converge towards the center of the City. Also, previous, and on-going City-wide and regional investigations show that fault slip within these zones is primarily horizontal, but that only vertical slip can be reasonably detected in trenches or in apparent offset along CPT and continuous-core transects. Further, from a regional tectonic standpoint, it is reasonable to assume that yet un-documented faults transfer slip between the currently identified EFZs, whether through steps, “tear” or other fault kinematics. *IMPORTANT:* Therefore, in the interest of public health and safety, the City thus requires that appropriate levels of fault investigations be carried out throughout its jurisdiction whether within or outside of an existing EFZ.

3. Well documented trenches of sufficient length and depth are currently regarded as the most useful indicator of potential fault presence and relative activity. Trenching is the “standard” and is a general requirement in Beverly Hills and in adjacent jurisdictions. Presumably, trench locations will be placed reasonably perpendicular to existing EFZ’s, but also will consider other faults projected into the City (CGS, 2018b). Such subsurface exploration, as needed for a specific site, may also require emplacement, collection and interpretation of continuous cores, advancement and interpretation of cone penetrometer tests (CPT), and – if appropriate – geophysical surveys and bucket-auger borings. Trench depth and number of cores or applicability of other exploratory techniques will vary from site to site, and thus no specific procedures are specified other than the requirement to carry out standard-of-practice investigations, which invariably change with time and place. Geological consultants for the permit applicant (owner/developer) should be aware of and employ appropriate investigation techniques, many of which are spelled out in CGS Note 49 and revised Special Publication 42 (2018a), both of which are available on the CGS website.

The City recognizes that trenching may be spatially constrained in highly urbanized areas and that, for safety, only closely spaced CPTs and continuous cores might be appropriate for the initial investigation. In some cases, to emulate a trench, the consultants may opt to emplace overlapping bucket-auger borings. Though expensive and logistically challenging, such borings have exposed vertical and near-vertical faults that were “missed” in CPT and continuous-core transects. Accordingly, based on the permit applicant’s request and technical justification, a consultant’s “preliminary report” can be submitted for potential “*Recommendation for Conditional Acceptance.*” Formal “*Recommendation for Acceptance,*” in lieu of traditional site trenching and documentation, will then await lot clearance followed by on-site trench(es) or detailed geological documentation of foundation cuts. Should this procedure be requested, the applicant’s geological consultants should discuss the potential option with the City reviewer.

4. Sediment dating by radiocarbon assay is preferred. Dating by optical stimulated luminescence or other numeric methods are useful, but usually require collection and analysis by highly trained specialists and may be subject to differences of interpretation. In general, specialists in numeric, relative, or other fault and sediment-dating techniques are expected to substantiate their investigation methods and conclusions in one or more Appendix reports as needed. Should the designated City Reviewer find that a specific dating technique requires knowledge beyond his/her expertise, the Reviewer, with the City's concurrence, can request that a well-recognized specialist appraise and advise as needed.

5. For trench exposures, continuous cores and other site-specific geologic data, applicants' consultants should request field observations by the City reviewer for identifying possible technical issues early in the investigation. The City, as Lead Agency, will make the final judgment as to whether the Consultant's report(s) comply with current standard-of-practice, fault investigations.

6. In accordance with City regulations, the designated reviewer will commence communications with the applicant and consultant upon City receipt of review fees and formal authorization by a designated Building Official.

It is strongly recommended that the applicant's geological consultants meet with the City reviewer to discuss the proposed investigation plan. Consultant communication with the reviewer is encouraged throughout the investigation, primarily to avoid or reduce any problems that may arise.

7. The applicant(s), through the geological consultant, will submit a draft and ultimately a formal "final" report to the designated reviewer that describes the investigation procedures and technical conclusions. The reviewer will then comment on the report and likely meet with the consultant(s) to discuss any issues to be resolved. The reviewer will recommend "acceptance" when the report complies with the City's requirements. As requested, the reviewer will also respond to the consultants' technical questions during the entire review process.

9. These Guidelines apply only to investigation of potential surface-fault rupture. Requirements to investigate, identify and mitigate other possible geological or geotechnical hazards, such as high seismic accelerations, liquefaction and related ground deformation, or landslides and mudflows, are currently subsumed within the latest California Building Codes and thus subject to review by City officials or by a designated external peer reviewer. These Guidelines may be subject to change based on acquisition of new data and on local experience. Accordingly, the applicant and consultants should periodically communicate with the City and/or reviewer as appropriate.

10. Trenching and any other excavation shall be done in a safe manner. The following is required by the City:

- a) Consulting firms conducting trench exploration are required to have their annual CalOSHA permit current. Proof of the annual permit and notification to CalOSHA of the specific project shall be on site at all times.
- b) Underground Service Alert must be notified at least 2 days prior to excavation. Consideration should also be given for the use of a private utility locator utilizing electromagnetic utility locating techniques and/or ground penetrating radar to map out the location of known or suspected utilities.
- c) Permits from the Department of Public Works are required for trenches, bucket-auger borings, continuous cores or other invasive excavations in the public right-of-way.
- d) CalOSHA regulations regarding trench safety shall be followed, with appropriate shoring and/or benching, ladders and/or exit ramps, etc.
- e) Trenches left overnight shall be secured by locked fencing. In some cases, it may be appropriate to cover the trenches with steel plates or chain link fencing for an added precaution. (See [BH-113](#) for “Steel Plate For Open Trench Detail”)
- f) The Department’s reviewing geologist shall be invited to observe the trench or other excavations after they are secured; shored or benched; cleaned; and a string line or grid reference system is in place. A completed field log is preferred but not necessary.
- g) For major projects, invitation to CGS geologists and other paleoseismic experts to view trenches may be appropriate and should be discussed with the City reviewer.
- h) A grading permit is required for trench excavation as well as backfilling the trench with primary or secondary certified fill. Otherwise, backfill will be considered uncertified.
- i) Spoil piles should be protected from erosion during the rainy season and not encroach neighboring property.
- j) Trenches should not remove lateral support from adjoining property, buildings on or off the site, or public right-of-way.
- k) Below is the link to City of Beverly Hills Public Right-of-Way use and Hauling regulations, approved heavy haul routes, and required permits. <http://www.beverlyhills.org/business/constructionlanduse/publicrightofwayhauling/>

11. Procedures to design, emplace and interpret CPT, geophysical, continuous-core, bucket-hole auger and other subsurface explorations methods are well described in CGS

reports and technical notes, on their websites and in pertinent literature readily available to California-licensed, Professional Geologists (PG) who are technically qualified to assess fault presence and relative activity.

12. Potential building-setback widths from State-defined active or age-undetermined faults will likely vary dependent on the quantity and quality of data obtained. In brief, more site-specific data may potentially reduce uncertainty and hence setback width. In no case shall a habitable structure be placed beyond the limit of investigation.

13. The geological investigations and related report(s) are to be performed and signed by a Professional Geologist (PG) licensed in the State of California.

PERTINENT REFERENCES

California Geological Survey, 2002, Guidelines for evaluating the hazard of surface fault rupture: Technical Note 49, 4 p.,

California Geological Survey, 2018a, Earthquake Fault Zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: Special Report 42, 82 p.

California Geological Survey, 2018b [B. Olson, lead author], The Hollywood, Santa Monica and Newport-Inglewood faults in the Beverly Hills and Topanga 7.5' quadrangles, Los Angeles, County, California: California Geological Survey Fault Evaluation Report (FER) 259, 74 p.