

## Chapter 16

# Seismic Risk Assessment Requirements

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### 16.1 General requirements (09/25/15)

This chapter sets forth the requirements, duties and responsibilities of the Seller/Serviceicer and the seismic risk consultant in evaluating seismic risk at the Property for Mortgages purchased under the Multifamily Small Balance Loan (SBL) Purchase Product. For the purposes of this chapter, the seismic risk consultant will be referred to as the “Consultant”, and “Elevated Seismic Hazard Region” is as defined in Section 16.2(a).

A Level 1 SRA is required for a Property that is located in an Elevated Seismic Hazard Region, as defined in Section 16.2(a), and that exhibits any of the risk factors identified in Section 16.2(b).

If the Property is not located in an Elevated Seismic Hazard Region, an SRA is not required. If the Property is located in an Elevated Seismic Hazard Region, and the Borrower certifies that the seismic risk factors in Section 16.2(b) are not present at the Property, an SRA is not required.

References in this Chapter to ASTM Standard E-2026-07 and ASTM Standard E2557-07 shall include any successor ASTM Standard.

### 16.2 Determining whether a Level 1 SRA is required

#### a. Use of the Elevated Seismic Hazard Region Map (09/25/15)

The Elevated Seismic Hazard Regions are highlighted on the Elevated Seismic Hazard Region Map. After examining the map, if the Seller/Serviceicer conclusively determines that the Property is not located in an Elevated Seismic Hazard Region, no seismic risk documentation is required.

If the Seller/Serviceicer determines that the Property is located in an Elevated Seismic Hazard Region highlighted on the map, or if the Seller/Serviceicer is not sure whether the Property is located in an Elevated Seismic Hazard Region highlighted on the map, the Seller/Serviceicer must make its determination as to whether the Property is located in an Elevated Seismic Hazard Region following the procedure set forth in Section 16.2(b).

#### b. Determining whether a Property is located in an Elevated Seismic Hazard Region (12/16/15)

An “Elevated Seismic Hazard Region” is defined as a geographic location with a horizontal Peak Ground Acceleration (PGA) equal to or greater than 0.15g. For Properties located in the continental United States, the PGA must be calculated using the United States Geological Survey (USGS) website below:

<http://geohazards.usgs.gov/deaggint/2008/>

For any Property located in Hawaii, Alaska (limited to within 100 miles of the city of Anchorage or the Gulf of Alaska), or one of the U.S. territories, the Seller/Service must assume that the PGA is greater than 0.15g, and an SRA is required. For areas of Alaska outside the delineated area, the Seller/Service can assume a PGA of less than 0.15g, and therefore an SRA is not required.

For areas that require a PGA calculation, the Seller/Service must enter or select the input values on the USGS website as outlined below.

<b>Data Element</b>	<b>Input</b>
<b>Site Name</b>	Property name
<b>Address</b>	Address, City, State and Zip Code (after entering address, select the <i>Show Map</i> option above the <i>Compute</i> button at the bottom left to confirm the validity of the address)
<b>Exceedance Probability</b>	10% in 50 years
<b>Spectral Period</b>	0.0 seconds (Peak Ground Acceleration)
<b>V<sub>s30</sub> (m/s)*</b>	270.0 for properties located in: CA, NV, OR, WA  760.0 for all other locations
<b>Run GMPE Deaggs?</b>	No
<b>Additional Output</b>	None

\* The site soil classification [V<sub>s30</sub> (m/s)] must be adjusted as indicated in the table above, unless an alternate soil classification value is justified by documented analysis.

After the website calculates the PGA, the Seller/Service must select the PDF output option to capture and save the PGA output file.

If the PGA is less than 0.15g, an SRA is not required, and the Seller/Service must inform the Borrower that the Property is not located in an Elevated Seismic Hazard Region for the purposes of Form 1117, Borrower Certification of Property Condition.

If the PGA is equal to or greater than 0.15g, then the Property is located in an Elevated Seismic Hazard Region and the Seller/Service must instruct the Borrower to evaluate the Property for the risk factors specified in Section 16.2(b). If none of the risk factors listed above are present at the Property, no SRA is required.

If the PGA is equal to or greater than 0.15g, and any one of the risk factors listed in Section 16.5(c) is present at the Property, or if the Borrower cannot conclusively

determine that none of the risk factors are present at the Property, a Level 1 SRA is required. The Seller/Servicer must

- Obtain an SRA meeting the requirements of this Chapter 16
- Upload the PDF obtained as output from the USGS website into DMS and submit the Level 1 SRA and the PDF to Freddie Mac in the applicable underwriting package as the required seismic risk documentation
- Instruct the Borrower to indicate on the Form 1117 that at least one of the seismic risk factors is present at the Property

**c. Risk Factors for Properties located in an Elevated Seismic Hazard Region (09/25/15)**

If the Property is located in an Elevated Seismic Hazard Region, as part of the preliminary property inspection described in Section 8.15(a), the Borrower must evaluate the Property for the following seismic risk factors:

- Any property with a Certificate of Occupancy issued prior to 1980 with residential units above ground floor commercial, retail or tuck-under parking
- Any wood framed building built prior to 1950
- Any unreinforced masonry construction, regardless of retrofit

**16.3 Specific Seller/Servicer duties and responsibilities (08/04/15)**

For Mortgages purchased under the Multifamily Small Balance Loan (SBL) Purchase Product, the Seller/Servicer's responsibilities are to

- Retain and direct the Consultant when a Level 1 SRA is required

The Seller/Servicer must review and verify the Consultant's credentials, licensing, certifications, memberships and affiliations. For new Consultants, the Seller must check at least three references from lenders who have retained or employed the Consultant to sufficiently evaluate the Consultant's capabilities and performance. The Seller must maintain a separate consultant file for Freddie Mac's use that includes the Seller's ongoing evaluations of each Consultant's performance, as well as the Consultant's current resume, required references and current certificate(s) of liability insurance in accordance with the requirements of Section 15A.17(d).

The Borrower must not retain or direct the Consultant, but the Borrower may be responsible for paying the costs of all SRA services.

- Provide information identified in Section 16.6 to the Consultant
- Obtain a Level 1 SRA for the Property, when required, and review the SRA to
  - Ensure that it complies with Freddie Mac's requirements
  - Verify that conclusive recommendations are provided for all identified issues
- Disclose to Freddie Mac any seismic risks identified in the SRA as well as any insurance required by Section 16.13

## **16.4 Reserved**

### **16.5 Level 1 SRA requirements (06/03/15)**

The Level 1 SRA must be performed as defined by the ASTM Standard E2026-07, the ASTM Standard 2557-07, and the Guide. The Consultant who prepares the Level 1 SRA must meet the qualifications and requirements stated in Section 16.11. The Consultant must review pertinent information and records in accordance with Section 16.6. Each Level 1 SRA must include information disclosed by an inspection of the Property's structural components. This inspection and the report documentation must meet the requirements of Sections 16.7 through 16.9.

The Level 1 SRA must:

- Clearly state any limiting conditions and the intended purpose of the report
- Identify deviations from the Guide requirements and the ASTM Standard E2026-07 and ASTM Standard E2557-07
- Be dated within six months prior to the date on which the full underwriting package is delivered to Freddie Mac

Freddie Mac may require that the Level 1 SRA be updated if it is dated more than six months prior to the issuance date for the Letter of Commitment or adjustment letter for an early rate-lock application.

The Seller/Servicer must direct the Consultant to include the following language in the Level 1 SRA:

- “This report is for the use and benefit of, and may be relied upon by
- (a) the Seller/Servicer, Freddie Mac and any successors and assigns (“Lender”);
  - (b) independent auditors, accountants, attorneys and other professionals acting on behalf of Lender;
  - (c) governmental agencies having regulatory authority over Lender;
  - (d) designated persons pursuant to an order or legal process of any court or governmental agency;
  - (e) prospective purchasers of the Mortgage; and
  - (f) with respect to any debt (or portion thereof) and/or securities secured, directly or indirectly, by the Property which is the subject of this report, the following parties and their respective successors and assigns:
    - any placement agent or broker/dealer and any of their respective affiliates, agents and advisors;
    - any initial purchaser or subsequent holder of such debt and/or securities;
    - any Servicer or other agent acting on behalf of the holders of such debt and/or securities;
    - any indenture trustee;
    - any rating agency; and
    - any institutional provider from time to time of any liquidity facility or credit support for such financings.

In addition, this report, or a reference to this report, may be included or quoted in any offering circular, information circular, offering memorandum, registration statement, private placement memorandum, prospectus or sales brochure (in either electronic or hard copy format) in connection with a securitization or transaction involving such debt (or portion thereof) and/or securities.”

#### **16.6 Data collection and records inquiry for the Level 1 SRA (10/01/14)**

The Consultant must review all available information that would reveal the characteristics and current condition of the site and structural systems at the Property, including any seismic damage assessments. The Consultant should review such documents for informational purposes only and is not required to comment on their procedures, protocol, conclusions, or recommendations unless in conflict with the Consultant’s findings. The Consultant should only utilize such information in formulating recommendations or conclusions if such documents appear reasonably accurate. The Seller/Service must ensure that all such information is provided to the Consultant before the Consultant inspects the Property.

The Level 1 SRA must identify the information the Consultant reviewed and the contacts that were consulted.

At a minimum the following must be reviewed (as applicable) and incorporated into the SRA report:

- **As-Built Construction Documents** – Review of as-built documentation may be limited to structural information such as the type of framing material, strength of concrete or steel, type of column-to-beam connections, composition of shear walls, quantity of reinforcing bars, symmetry of building configuration, transference of loads to the substructure, nature of the substructure, and nature of the soils.
- **Documents for Planned Construction** - Review of documentation for planned construction at the Property, such as seismic retrofit or renovation work, that will likely affect the performance and damageability of the Property during a seismic event.
- **Soils Reports** – Review of available geotechnical information and comment on the soil type, geotechnical features and the potential for soil liquefaction, ground fault rupture, and landslides.
- **Building Information** – Identification of the building type and any federal, State or local law, ordinance or code under which it was designed.
- **Active Earthquake Faults** – Identification of any active faults in the region that may affect the Property, and report on their maximum credible magnitude potential.
- **Secondary Earthquake Hazards** – Identification of secondary, site-specific hazards such as soil liquefaction, earthquake-induced landslides, and tsunamis or seiches.

#### **16.7 Inspection requirements for the Level 1 SRA (10/01/14)**

The Consultant must perform a complete inspection of the exterior and interior of the Property’s components and systems that are visible and accessible. This is generally a non-intrusive survey, but the Consultant must make a reasonable attempt at discovery. This inspection must document the building characteristics, any substantive

inconsistencies between the field conditions and as-built documents, and any deficiencies in the structural systems. The Consultant must also document the sufficiency of non-structural bracing for secondary building systems, such as mechanical equipment and ceilings. The Consultant must provide photographic documentation that characterizes the Property's overall construction and configuration and that identifies specific vulnerabilities or signs of physical distress.

#### **16.8 Seismic loss estimation requirements for the Level 1 SRA (06/30/15)**

Based on the records submitted, site observations, and empirical data available through peer-reviewable data systems, the Consultant must render an opinion, in conformance with the ASTM Standard E2026-7 and ASTM Standard E2557-07, of both the Scenario Expected Loss (SEL) and Scenario Upper Loss (SUL) as a percentage of the current building replacement cost. The SEL and SUL must be determined using the 10 percent probability of exceedance in 50 years (a.k.a. 475-year return period earthquake). In the case of the SEL, this scenario is sometimes referred to as the "SEL for the design basis earthquake", or the "SEL<sub>DBE</sub>". The Consultant must include, as applicable, a general description of the anticipated damage to the structure and its expected life safety and building stability performance as a result of these scenario losses. The Consultant's method for calculating seismic loss estimates must be peer-reviewable, with all input, engineering assumptions and output documented in the report for third-party review.

For Properties where multiple building construction types are present (for example: buildings with tuck-under parking vs. buildings without tuck-under parking; garden-style buildings vs. high-rise buildings; linear buildings vs. L-shaped buildings), the Consultant must provide the SEL for each building construction type. The Consultant must also provide the aggregate SEL for the entire Property, but this will not be used in determining the need for earthquake insurance or a seismic retrofit.

For additional information on evaluating the PML to determine the need for earthquake insurance or a seismic retrofit, see Section 16.13.

#### **16.9 Report content for the Level 1 SRA (06/30/15)**

The Consultant must include the findings from the Consultant's records review, site observations, and interpretation of data in a written report containing the following elements:

- **Cover Page** – must include the Property's name and address, report date, the client's name, address, and phone number, and the Consultant's name, address and phone number.
- **Certification Memo** – must include the Property's name and location, report date, reliance language, confirmation that the report meets ASTM Standard E2026-07, ASTM Standard E2557-07, and the Guide, identification of the field and office personnel responsible for the report, and the signature of the reviewer.
- **Executive Summary** – must contain salient information about the buildings at the Property, such as their location, use, size, age, construction type, and design style. It must also summarize the findings of the analysis, including the general condition of the Property, and must highlight any specific areas of concern, provide the SEL and

SUL as a percentage damage ratio, and provide peak ground acceleration motions and the approximate Modified Mercalli scale intensity at the site. Finally, the Executive Summary must provide recommendations for further action or investigation as appropriate. If the Property is not expected to meet life safety and building stability performance standards as a result of the scenario losses considered, then the Consultant must include conceptual retrofit techniques that would achieve these performance levels.

- **Purpose & Scope** – must state the purpose of the engagement, including an outline of the scope of work, the methods used to conduct the survey, a statement describing any limitations or exceptions to the scope of work, and reasons for any deletions or additions to the scope of work.
- **Survey Approach** – must provide a short description of the methodology used to conduct the survey and arrive at the conclusions. Include the specific method used to arrive at the SEL and SUL, the sources of the empirical data and proprietary systems, the level of documentation reviewed, the procedures used during the site observations, and the methods used to determine the building stability.
- **Site Characteristics** – must list and discuss the following:
  - Property location
  - Site and vicinity characteristics
  - Current use of the Property
  - Soil data source (e.g., geotechnical report, regional online data)
  - Soil type (engineering classification)
  - Liquefaction potential (classified Very Low, Low, Moderate, High, Very High)
  - Landslide potential (classified Very Low, Low, Moderate, High, Very High)
  - Ground fault rupture potential
  - Site map with aerial imagery, where available
- **Building Characterization** – must list and discuss the following:
  - Construction classification (e.g., wood-framed, concrete, steel, masonry)
  - Number of stories
  - Year designed
  - Year constructed
  - Year renovated/upgraded
  - Structural irregularities
  - Geometric irregularities
  - Mass irregularities
  - Structural system redundancy
  - Overall construction quality
- **Site Observations** – must list and discuss property specific issues observed during the inspection. This must include a detailed appendix, as described below
- **Seismic Characteristics of Area** – must list and discuss the following:
  - Most potentially damaging faults in the area of the Property (within a 50-mile radius)
  - Maximum theoretical magnitude of an earthquake at that fault
  - Approximate distance from the most potentially damaging fault
  - Anticipated 475-year ground motion at the Property



- **Site Seismicity and Scenario Loss** – must state the Consultant’s opinion in accordance with ASTM Standard E2026-07 and ASTM Standard E2557-07 of the SEL and the SUL as a percentage of the current building replacement cost as a result of this analysis.
- **Appendices** – must include the following, at a minimum:
  - Resume of Qualifications - Site assessor and report author’s qualifications
  - Photographs - Photos specific to the seismic assessment that document the Property’s structural systems and identify seismic vulnerabilities and disrepair that relate to the calculation of the seismic loss estimates
  - Site Plan - must clearly label the Property, each building, and the location of specific seismic vulnerabilities as identified in the report

**16.10 Acceptability of the Level 1 SRA (10/01/14)**

The Level 1 SRA must be acceptable to Freddie Mac. Upon Freddie Mac's review of the completed SRA, Freddie Mac may impose additional requirements.

**16.11 Level 1 SRA Consultant qualifications and requirements (06/30/15)**

Consultants who conduct the on-site inspections and complete the Level 1 SRA reports must meet the qualifications and requirements specified in this section.

Because Freddie Mac does not approve Consultants, the Seller/Servicer must not consider any representation that a Consultant is approved or qualified by Freddie Mac to perform Level 1 SRAs. The Seller/Servicer is responsible for selecting the Consultant and is solely accountable for the Consultant's performance. The Seller/Servicer must ensure that the Consultant is qualified to perform the required work.

**a. References and experience (05/28/15)**

The consulting company providing Level 1 SRA reports must meet the following minimum qualifications:

- A staff of qualified professionals, with the responsible engineer or architect having a minimum of five years of experience in building science and physical due diligence
- The ability to rapidly assess sites in all elevated seismic hazard regions of the United States
- A significant track record completing seismic reports for commercial real estate investors
- Experience working within the commercial mortgage securitization markets and rating agencies
- A well-developed production infrastructure and a well-developed, documented quality control system

The Consultants responsible for conducting the on-site inspection must have the following minimum qualifications:

- A degree in engineering and/or architecture from an accredited institution



- If the Consultant holds a professional engineering (PE) or architectural license, a minimum of three years of experience in physical due diligence and one year of experience in assessing properties for seismic risk
- If the Consultant does not hold a PE or architectural license, a minimum of five years of experience in physical due diligence and three years of experience in assessing properties for seismic risk

A Consultant responsible for writing and reviewing Level 1 SRA reports must, at a minimum:

- Have a degree in engineering and/or architecture from an accredited institution
- Be a registered professional engineer (civil or structural designation) or a licensed architect with a minimum of five years of experience in building evaluations and authoring seismic reports
- Be in good standing with the state of issuance of the Consultant's engineering or architectural license
- Have an engineering or architectural license issued by a state where the seismic hazard is significant to the design and rehabilitation of buildings. Acceptable registration States include California, Washington, Oregon, Nevada, New York, Tennessee, Hawaii, and Alaska

See Section 16.3 for specific Seller/Service duties and responsibilities for retaining and directing a Consultant when a Level 1 SRA is required.

**b. Conflicts of interest/provision of related services (10/01/14)**

The Consultant may not be affiliated with the Borrower, the Seller/Service, a buyer or seller of the Property, or engaged in any business that might present a conflict of interest.

**c. Insurance (08/04/15)**

The Seller/Service must obtain from each Consultant an original certificate(s) of liability insurance that indicates that the Consultant is covered by insurance meeting the requirements of Section 15A.17(d). The Seller/Service must retain the original certificate(s) of liability insurance in its files.

**d. Unacceptable Consultants (10/01/14)**

The Seller/Service must send written notification immediately to the *Applicable Freddie Mac Multifamily Regional Office* or to the *Multifamily TAH Underwriter*, as applicable, if the Seller/Service, for cause, discontinues the use of a Consultant who has completed Level 1 SRAs within the past 12 months for Mortgages purchased or credit enhanced by Freddie Mac.

In addition, Freddie Mac reserves the right to refuse to accept Level 1 SRAs completed by any Consultant. Freddie Mac will maintain, on FreddieMac.com, the Multifamily Restricted Vendor List. If a Consultant appears on the Multifamily Restricted Vendor List, the Seller/Service may not use that Consultant to complete a Level 1 SRA for a Property until notified otherwise by Freddie Mac. The decision to

place a third-party vendor on the Multifamily Restricted Vendor List is solely within Freddie Mac's discretion.

The Multifamily Restricted Vendor List is made available to Seller/Service providers for the sole purpose of ensuring that unacceptable Consultants do not prepare reports for Freddie Mac and will constitute "Confidential Information" as defined in Section 2.8.

#### **16.12 Warranties and representations (10/01/14)**

The Seller/Service provider is deemed to make the representations and warranties regarding the Consultant and Level 1 SRA set forth in Section 5.3.

#### **16.13 Evaluation of the SRA results (06/30/15)**

For the purposes of this document, the term Probable Maximum Loss (PML) will be defined as the SEL corresponding to the mean level loss resulting from the damage experienced due to a 475-year return period earthquake (the  $SEL_{DBE}$ ).

Results from a Level 1 SRA must be evaluated as follows:

- **If the PML is less than or equal to 20 percent for each building construction type on the Property** - Freddie Mac requires no earthquake insurance.
- **If the PML is greater than 20 percent but less than or equal to 40 percent for any building construction type on the Property** - Freddie Mac requires, at a minimum, earthquake insurance in accordance with Section 31.9 for the affected building(s).
- **If the PML is greater than 40 percent for any building construction type on the Property** – the affected building(s) must have a seismic retrofit or the Mortgage is ineligible for sale to Freddie Mac.
- **If a Level 1 SRA indicates that a Property is not expected to meet life safety and building stability performance standards as a result of the scenario losses considered** - the Property must undergo a seismic retrofit to meet these performance levels before Freddie Mac will consider the Mortgage for purchase.

See Section 16.8 for detailed information on determining the SEL to document in the SRA.