Freddie Mac Guide Update: Seismic Reports

April 23 and April 24, 2013

(For access to the recorded webinar, click here)
Introductions

- Executive Sponsor:
  - Ed Hussey, Senior Vice President, Multifamily Credit Risk Management

- Today’s Presenters:
  - Mark Field, Underwriter, Targeted Affordable Housing
  - Richard Meyer, Director, Multifamily Real Estate Services
  - Hal Potter, Underwriting Manager, Western Region
Agenda

- Overview of Guide Change
- Terminology
- Level 0 Report Scope
- Level 1 Report Scope
- Risk Factors
- Form 1117 and 1105
- Consultant Qualifications
- Process
- Implementation of Requirements
- Questions and Answers
Overview

- Why is Freddie Mac making changes to its Seismic Report requirements?
  - To strengthen our focus on real property-related risk
  - To address property risk factors not adequately considered by the current “Level 0” reports
  - To provide clear definitions to better define the types of reports we receive
  - To meet current business practice

- What’s Not Changing?
  - Freddie Mac’s earthquake insurance requirements
For properties located in Seismic Zones 3 and 4, we will now require “Level 1” seismic reports, unless certain risk factors are not present. In that case, a “Level 0” seismic report will still be acceptable.
Terminology

- Seismic Risk Assessment (SRA) replaces Site Specific Seismic Report (SSSR)
- Probable Maximum Loss (PML) – ambiguous term used to characterize building damageability in earthquakes
- Scenario Expected Loss (SEL) – the mean level loss resulting from the damage experienced due to a 475-year return period earthquake
- Scenario Upper Loss (SUL) - the 90% non-exceedance level loss resulting from the damage experienced due to a 475-year return period earthquake
Current Freddie Mac Practice

United States Seismic Zones Map

Seismic Zones (Ground Acceleration)

- Zone 0 = 0.0g
- Zone 1 = 0.075g
- Zone 2A = 0.15g
- Zone 2B = 0.20g
- Zone 3 = 0.30g
- Zone 4 = 0.40g

Source: 1997 Edition UBC
“Level 0” Seismic Report

SINGLE PROPERTY EARTHQUAKE RISK ASSESSMENT REPORT

for

FEDERAL HOME LOAN MORTGAGE CORPORATION

by

RISK MANAGEMENT SOLUTIONS, INC.

December 18, 2012

Earthquake Risk Assessment

Location Information

| Property Name: | Building Value (Replacement Cost): $227,780,000 |
| City: | Equity: $14,067,500 |
| County: | Occupancy: Multifamily |
| State: OR | Construction Class: Wood Frame |
| Postal Code: 97050 | Number of Stories: 3 |
| Latitude: 46.512065 | Number of Buildings: 3 |
| Longitude: -122.434799 | Soil Type: Rock to Soft Rock |
| Year Built: 1935 | Landslide Susceptibility: Very Low |
| Year of Retrofit: N/A | Liquefaction Susceptibility: Low |

Secondary Earthquake Modifiers

| Construction Quality: Good | URM Chimney/Partition: No |
| Vertical Irregularity: Yes | Support Maintenance: No Signs |
| Plan Irregularity: irregular | Anchoring (Tilt-Up Only): Unknown |
| Soft Story: No | Frame Bolted: Bolted |
| Cripple Walls: No Cripple Walls | Structural Upgrade: No |
| Short Column: No | Engineered Foundation: Yea |
| Cladding: No Cladding | URM Retrofit: No |
| Equipment EQ Bracing: Somewhat Brooded | Base Isolation: No |
| Ornamentation: Little or None | Pounding: No |

Exceeding Probability (EP) Analysis Results

<table>
<thead>
<tr>
<th>Return Period</th>
<th>Probability</th>
<th>Ground Up Loss</th>
<th>Damage Ratio 1</th>
<th>Gross Loss 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000 years</td>
<td>0.01%</td>
<td>$5,536,383</td>
<td>24.3%</td>
<td>$0</td>
</tr>
<tr>
<td>1,000 years</td>
<td>0.19%</td>
<td>$1,618,385</td>
<td>7.1%</td>
<td>$0</td>
</tr>
<tr>
<td>475 years</td>
<td>0.21%</td>
<td>$685,863</td>
<td>3.0%</td>
<td>$0</td>
</tr>
<tr>
<td>250 years</td>
<td>0.40%</td>
<td>$212,116</td>
<td>0.9%</td>
<td>$0</td>
</tr>
<tr>
<td>100 years</td>
<td>1.00%</td>
<td>$1,209</td>
<td>0.0%</td>
<td>$0</td>
</tr>
<tr>
<td>50 years</td>
<td>2.00%</td>
<td>$0</td>
<td>0.0%</td>
<td>$0</td>
</tr>
</tbody>
</table>

1 The Damage Ratio is calculated as the Ground Up Loss divided by the Building Value.
2 Gross Loss is defined as the loss after deductibles are applied. Equity is modeled as a deductible for the analysis.
“Level 1” Seismic Report Scope

- Must meet the ASTM standard E2026-07 and the Guide
- Consultant must review available property information including construction documents, soils reports, etc., made available by the Seller/Servicer
- Consultant must inspect the property and incorporate findings into its analysis
- Consultant must provide peer-reviewable opinion of the Scenario Expected Loss (SEL) and Scenario Upper Loss (SUL), based on the 475-year return period seismic ground motion
- Consultant must include a general description of anticipated damage, including expected life safety and building stability performance
V. STABILITY AND DAMAGEABILITY

Site Stability

It was determined that the subject site is not located within an Earthquake Fault Zone as defined in the Alquist-Priolo Earthquake Zone Act. The ST-RISK software program indicates that the controlling fault is the Hollywood, which is located approximately 0.994 mile from the subject site.

The ST-RISK software program indicates that the potential for liquefaction is very low, and the potential for landsliding is very low at the subject site.

Building Damageability

Based upon the damageability characteristics of the building and on the expected ground motion at the subject site based on the results of the ST-RISK statistical software program and the Scenario Loss values indicated by the damageability curves, the Scenario Upper Loss (SUL) and Scenario Expected Loss (SEL) values for the building are as shown below:

<table>
<thead>
<tr>
<th>Probability of Exceedence</th>
<th>MMI</th>
<th>PML/SUL</th>
<th>SEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% in 50 years (475-year return period)</td>
<td>VIII-IX</td>
<td>7%</td>
<td>4%</td>
</tr>
</tbody>
</table>

With a 475-year SUL value of 7%, which is in the low-level of risk range of 0% to 10%, we would not expect a significant structural damage, only light, easily repairable architectural damage, in the event of the worst-case earthquake scenario.
Risk Factors

- For Seismic Zone 4 properties only:
  1) Building is located within 50 feet of a known fault rupture
  2) Building is located within an Alquist-Priolo Zone

- For Seismic Zone 3 and 4 properties only:
  1) Building has >= 8 floors above-grade
  2) Building has sustained prior structural earthquake damage
  3) Building is wood construction built prior to 1950
  4) Building is Unreinforced Masonry that was retrofit prior to 1995
Risk Factors

- For Seismic Zone 3 and 4 properties only:
  5) Building has a “soft story”
Risk Factors ... continued

- For Seismic Zone 3 and 4 properties only:

  6) Building is in direct contact with an adjacent building

Risk Factor not present

Risk Factor present
Risk Factors ... continued

- For Seismic Zone 3 and 4 properties only:

  7) Building is reinforced concrete, reinforced CMU, or light-frame construction above a concrete podium and constructed prior to 1994
Risk Factors ... continued

- For Seismic Zone 3 and 4 properties only:
  
  8) Building is wood construction with “tuck-under” parking that was retrofit prior to 2000
The property is located in Seismic Zone 3 or 4, as defined in the 1997 Uniform Building Code, and the undersigned is making the certifications on page 2:

☐ Yes  ☐ No  ☐ Not Applicable – Property is not located in Seismic Zone 3 or 4  ☐ Unknown at this time
The property is located in either Seismic Zone 3 or 4, and the following statements are true:

(a) No building is eight or more stories above grade;
(b) No building has a soft story, as defined by the International Building Code, at any floor level;
(c) The Property has not sustained prior structural earthquake damage;
(d) No building has direct contact to an adjacent building that is not part of a continuous structure;
(e) If the property's structural system is comprised of reinforced concrete, reinforced concrete masonry units, or a concrete podium with light-frame construction above, it was not constructed prior to 1994;
(f) If the property's structural system is comprised of wood framing, it was not constructed prior to 1950;
(g) If the property's structural system is comprised of wood framing and if it has ground level parking beneath dwelling units ("tuck-under parking"), it was retrofitted in 2000 or after;
(h) No building is an unreinforced masonry building that either has not been retrofitted or was retrofitted prior to 1995.

The property is located in Seismic Zone 4 and no building is located within 50 feet of a known fault rupture or (if located in California) within an Alquist-Priolo Special Study Zone.
Form 1105: Input by PCA Consultant

Seismic Checklist
For properties located in Seismic Zones 3 or 4 as defined in the 1997 Uniform Building Code, indicate if any of the following area applicable by placing an "x" in the appropriate box.

- There are buildings consisting of eight or more stories above grade
- There is a soft story, as defined by the International Building Code, at any floor level
- The Property has sustained prior structural earthquake damage
- Buildings have direct contact to an adjacent building that is not part of a continuous structure
- For construction prior to 1994, the Property's structural system is comprised of reinforced concrete, reinforced concrete masonry units or a concrete podium with light-frame construction above
- The property was constructed prior to 1950 and its structural system is comprised of wood framing
- The property has a wood framed structural system with tuck-under parking and it has not been retrofitted since 2000
- There are unreinforced masonry buildings that have either not been retrofitted or were retrofitted prior to 1995
- For Seismic Zone 4 ONLY: There are buildings located within 50 feet of a known fault or, if located in California, within an Alquist-Priolo Special Study Zone
Consultant Qualifications

- Consulting Company Qualifications
- Inspecting Consultant Qualifications
  - Engineering/architecture degree
  - Without Professional Engineer (P.E.) license - 5 years due diligence experience/3 year seismic assessment
  - With P.E. license - 3 years due diligence experience/1 year seismic assessment
- Writing/Reviewing Consultant Qualifications
  - Engineering/architecture degree
  - Professional Engineer - licensed in a seismic state
  - 5 years seismic assessment experience
Seller/Servicer Responsibilities

- Have seismic risk factors evaluated via Form 1117 and Form 1105
- Retain and direct qualified consultants
- Provide required information, if available, to consultant
- Disclose risk factors to Freddie Mac
- Require earthquake insurance as appropriate
Process – Standard Delivery

- **Form 1117**
  - Risk Factors not present
    - **Level 0**
      - SRA
      - PML ≤ 20%
      - EQ Insurance Not Required
    - PML > 20%
      - EQ Insurance Required
- Risk Factors present or unknown
  - **Level 1**
    - SRA
    - PML ≤ 20%
    - EQ Insurance Not Required
  - PML > 20%
    - EQ Insurance Required
Process – Early Rate Lock

- **Level 0 SRA**
  - Risk Factors not present
  - EQ Insurance Not Required
  - PML <= 20%

- **Level 1 SRA**
  - Risk Factors present or unknown
  - EQ Insurance Required
  - PML > 20%

- **Form 1105**
  - Risk Factors unknown
  - Full UW

- **Form 1117**
  - Risk Factors unknown
  - EQ Insurance Required
  - PML > 20%

Seismic Guide Update
Implementation

- Guide changes are effective 4/30/13
- New requirements go into effect for all reports ordered on or after 6/1/13
- Sellers must use the new Form 1105 and 1117 starting 6/1/13