WOOD FRAME
SOFT-STORY BUILDING
RETROFIT PROGRAM

City of Los Angeles
Department of Building and Safety

LA DBS
DEPARTMENT OF BUILDING AND SAFETY
WOOD FRAME SOFT STORY BUILDINGS

- Wood frame buildings with the following criteria:
  - Built before 1980
  - Consists of 2 or more stories
  - Residential with 4 or more units and/or commercial
GARAGE DOORS/STEEL GATES
CONSIDERED AS OPENINGS
COMMERCIAL STORE FRONT
WHY RETROFIT?

Without proper strengthening, the soft-story floor becomes weak and may suffer structural damage or complete failure during and/or after an earthquake.
SOLUTION!
ELIMINATE SOFT, WEAK, OR OPEN WALL LINE

Concrete walls or masonry walls are prohibited.
STEP 1

COMPILE A LIST OF WOOD FRAME BUILDINGS BUILT BEFORE 1980

Obtain information from:

- Housing Department
- Tax Assessors
- Building Records
STEP 2

USE GOOGLE MAPS TO PERFORM ONLINE SURVEY

<table>
<thead>
<tr>
<th>ADDRESS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZIP CODE</td>
<td>91601</td>
</tr>
<tr>
<td>YEAR BUILT</td>
<td>1963</td>
</tr>
<tr>
<td>UNIT COUNT</td>
<td>8</td>
</tr>
<tr>
<td>STORY COUNT</td>
<td>2</td>
</tr>
<tr>
<td>OPENING SIZE RATIO OF FIRST FLOOR VS FLOORS ABOVE (%)</td>
<td></td>
</tr>
<tr>
<td>FRONT</td>
<td>100</td>
</tr>
<tr>
<td>BACK</td>
<td>90</td>
</tr>
<tr>
<td>LEFT</td>
<td>30</td>
</tr>
<tr>
<td>RIGHT</td>
<td>40</td>
</tr>
<tr>
<td>CANTILEVERED</td>
<td>Yes</td>
</tr>
<tr>
<td>COMMENTS/DESCRIPTION</td>
<td>Tuck Under Parking</td>
</tr>
<tr>
<td>POSSIBLE SOFT STORY</td>
<td>Yes</td>
</tr>
</tbody>
</table>

30,000 surveyed
6,000 classified as “No”
24,000 classified as “Possible”
24,000 buildings classified as “Possible soft-story” were evaluated and surveyed.
# SURVEY POSSIBLE
**SOFT-STORY BUILDINGS**

<table>
<thead>
<tr>
<th>Building Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Construction:</td>
<td>Wood Frame</td>
</tr>
<tr>
<td>Building of Interest:</td>
<td></td>
</tr>
<tr>
<td>AKA Address:</td>
<td></td>
</tr>
<tr>
<td>Year Built:</td>
<td>1926</td>
</tr>
<tr>
<td>Neighborhood:</td>
<td></td>
</tr>
<tr>
<td>No. of Building on Property:</td>
<td></td>
</tr>
<tr>
<td>No. of Res Units Greater Than 4:</td>
<td>YES</td>
</tr>
<tr>
<td>No. of Stories:</td>
<td>3</td>
</tr>
<tr>
<td>Primary Occupancy:</td>
<td>Dwelling</td>
</tr>
<tr>
<td>First Floor Use:</td>
<td>Living Space, Parking</td>
</tr>
</tbody>
</table>

### Soft Story Determination
Opening Size Ratio of First Floor Vs Floors Above (%):

<table>
<thead>
<tr>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

- Cantilevered (< than 4 feet): YES
- Comments/Description: Staircase Balcony, Tuck Under Parking, TUP @ left-rear, cantilever 6' @ rear-left

### Sustainability Determination

- Landscaping (< than 15%): NO
- Status of Exterior Lights: Off
- Type of Light Bulbs: Incandescent, CFL

### Inspection
- Inspector's Name: D. FEILER
- Inspection Date: 11/19/2014

- Log No: 10710
- BAS Address No: 735633
- BAS Parcel No: 218632
- PIN: 144B189 1031
- Census Tract #: 1917.10
- State Assembly District No: 10
## Possible Soft Story: No

<table>
<thead>
<tr>
<th>Building Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Construction:</td>
<td>Wood Frame</td>
</tr>
<tr>
<td>AKA Address:</td>
<td></td>
</tr>
<tr>
<td>Building of Interest:</td>
<td></td>
</tr>
<tr>
<td>Year Built:</td>
<td>1954</td>
</tr>
<tr>
<td>Neighborhood:</td>
<td></td>
</tr>
<tr>
<td>No. of Building on Property:</td>
<td></td>
</tr>
<tr>
<td>No. of Res Units Greater Than 4: Yes</td>
<td></td>
</tr>
<tr>
<td>No. of Stories:</td>
<td>2</td>
</tr>
<tr>
<td>Primary Occupancy:</td>
<td>Dwelling</td>
</tr>
<tr>
<td>First Floor Use:</td>
<td>Living Space</td>
</tr>
</tbody>
</table>

### Soft Story Determination

Opening Size Ratio of First Floor Vs Floors Above (%):  
- Front: 10  
- Left: 10  
- Back: 0  
- Right: 0  

### Sustainability Determination

- Landscaping (> than 15%): Yes  
- Status of Exterior Lights: Off  
- Type of Light Bulbs: LED

### Inspection

- Inspector’s Name: C. MORENO  
- Inspection Type:  
- Inspection Date: 11/20/2014  

### Log No:
- 14583

### BAS Address No:
- 665767

### BAS Parcel No:
- 277200

### PIN:
- 136-5A203 184

### Census Tract #:
- 2085.02

### State Assembly District No:
-  

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**LA DBS**

DEPARTMENT OF BUILDING AND SAFETY
**Possible Soft Story: YES**

**Building Description**
- **Type of Construction:** Wood Frame
- **Year Built:** 1964
- **No. of Building on Property:** 2
- **No. of Res Units Greater Than 4:** YES
- **Primary Occupancy:** Dwelling
- **First Floor Use:** Living Space, Parking

**Soft Story Determination**
- **Opening Size Ratio of First Floor Vs Floors Above (%):**
  - Front: 15
  - Back: 70
  - Left: 40
  - Right: 40
- **Comments/Description:** Tuck Under Parking / TUP @ rear & right

**Sustainability Determination**
- **Landscaping (> than 15%):** NO
- **Status of Exterior Lights:** Off
- **Type of Light Bulbs:** Incandescent
- **Turf Grass (> than 15%):** N

**Inspection**
- **Inspector’s Name:** G. ZUBER
- **Inspection Date:** 11/22/2014

<table>
<thead>
<tr>
<th>Log No.</th>
<th>BAS Address No.</th>
<th>PIN</th>
<th>Census Tract #:</th>
<th>State Assembly District No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3773</td>
<td>803421</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>167410</td>
<td></td>
<td>153B209 492</td>
<td>1871.01</td>
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</tbody>
</table>
There are 13,500 currently identified as wood soft-story buildings in the City of Los Angeles.

- 78% are 2 stories or more
- 22% are 3 stories or more
- 99% are apartments/condos
ESTABLISH RETROFIT CRITERIA

Strengthen soft, weak or open wall line ONLY:

- The Design Base Shear
  - 75% of current requirement under ASCE 7
- Story Drift Limitations
  - Not to exceed 0.025 times the story height

Exception

Buildings greater than 2 stories with horizontal structural irregularities shall meet the additional requirements under ASCE 7, for the entire story with weak or open wall lines.
STEP 6

ESTABLISH ORDINANCE

MANDATORY EARTHQUAKE HAZARD REDUCTION IN EXISTING WOOD FRAME BUILDINGS WITH SOFT, WEAK OR OPEN FRONT WALLS

Ordinance No. ________, Effective ________

I. PURPOSE

The purpose of this division is to promote public welfare and safety by reducing the risk of death or injury that may result from the effects of earthquakes on existing wood-frame multi-unit buildings with soft, weak or open front walls. In the Northridge Earthquake, many multi-story wood-frame buildings with rock-under parking performed poorly and collapsed, causing the loss of human life, personal injury, and property damage. It has been determined that the structural vulnerability of this building type is typically due to soft, weak, or open front walls. This division creates minimum standards to mitigate hazards from these deficiencies. Adherence to these minimum standards will improve the performance of these buildings, but will not necessarily prevent the loss of life, injury, or all earthquake-related damage.

This division shall not require existing electrical, plumbing, mechanical, or fire-safety systems to be altered unless they constitute a hazard to life or property. Nor shall this division require compliance for any other violations under Los Angeles Municipal Code unless they constitute a hazard to life or property. Notwithstanding the scope of this division, its provisions shall not be interpreted to waive any limitations or requirements imposed by other statutes or ordinances of the State or City.

Unless expressly stated herein, this division shall not amend, repeal, or supersede provisions of the Los Angeles Municipal Code. When the requirements of this division are not identical to or are in conflict with the requirements of any other part of the Los Angeles Municipal Code, the most restrictive requirement protecting greater safety to person, property, or public welfare shall prevail.

II. SCOPE

The provisions of this division shall apply to all existing buildings of wood-frame construction, or wood-frame portions thereof, where:

1. A permit for construction of a new building was applied for before January 1, 1978, or, if no permit can be located, the structure is determined by the Department to have been built before January 1, 1980; and

2. The ground floor portion of the structure contains parking or other similar open floor space that causes soft, weak or open-front wall lines, and there exists one or more stories above.

EXCEPTION: This division shall not apply to any building containing 3 dwelling units or less if the building is used solely for residential purposes.

III. DEFINITIONS

In addition to the definitions in Division 2 of this Code, the following definitions shall apply for the purposes of this division:

CRIPPLE WALL is a wood-framed stud wall extending from the top of the foundation wall to the underside of the lowest floor framing of the building.

DWELLING UNIT shall include any individual residential unit within either an R-1 or R-2 occupancy building, including a mixed-occupancy building when part of it is either an R-1 or R-2 occupancy. A dwelling unit shall include the area of a building that is occupied as a dwelling unit, whether the building is approved or unapproved for residential use.

GROUND FLOOR is any floor within the wood-frame portion of a building whose elevation is immediately accessible from an adjacent grade by vehicles or pedestrians. The ground floor portion of the structure does not include any floor that is completely below adjacent grades.

OPEN-FRONT WALL LINE is an exterior wall line, without vertical elements of the lateral force-resisting system, which requires tributary seismic forces to be resisted by diaphragm rotation or excessive cantilevered beyond parallel lines of these walls. Diaphragms that cantilever more than 25 percent of the distance between lines of lateral force resisting elements from which the diaphragm cantilevers shall be considered excessive. Exterior cantilevers of ten feet or less in width shall not be considered excessive cantilevers.

QUALIFIED HISTORICAL BUILDING is any building designated or considered in the process of being designated as a “qualified historical building” as defined in Part 8, Title 24 of the California Code of Regulations.

RETROFIT is an improvement of the lateral force-resisting system by alteration of existing structural elements or addition of new structural elements.
STEP 7

NOTIFY BUILDING OWNERS

- Where to obtain help
- Ordinance description
- Timeline for compliance
- Webpage for guidance
ISSUE TECHNICAL RETROFIT BULLETIN FOR CONSTRUCTION PROFESSIONALS

- Structural Design
  - Prescriptive
  - Alternative Methods
- Permitting Process
  - Required submittal package
STEP 9
SEND ORDER TO COMPLY

- Compliance requirements
- Compliance timeline
- Appeal procedures
TIME LIMIT FOR RETROFIT

1 year
From the date of the Order to Comply
Submit
1. Proof of previous retrofit or,
2. Retrofit Plans and design or,
3. Plans for demolition

2 years
From the date of the Order to Comply
Obtain permit to retrofit or demolish

4 years
From the date of the Order to Comply
Complete Construction
Step 10

Make the program cost recovery to support a special plan check and inspection team

13,500 projects at $665 of average plan check and permit fees,
$9 million total revenue for the 4-year program

$2.25 million per year to support a special plan check and inspection team

Cost will be recovered.
QUESTIONS AND COMMENTS

For further information, please contact

Catherine Nuezca Gaba  
Chief of Wood Frame Soft-story Program  
(213) 482-0435 or Catherine.NuezcaGaba@lacity.org