

Creating Resilient  
Communities

# Earthquake Soft-Story (ESS)

Funds To Strengthen Your Home



**CEA**

**CEA is a  
not-for-profit residential  
earthquake insurer.**

# CEA: Publicly Managed • Privately Financed

A not-for-profit provider of residential earthquake insurance

## GOVERNING BOARD:

Governor  
Insurance Commissioner  
State Treasurer

## Non-Voting:

Assembly Speaker and Senate Rules Chair

## PRIVATELY FINANCED:

1,106,000 Policyholders

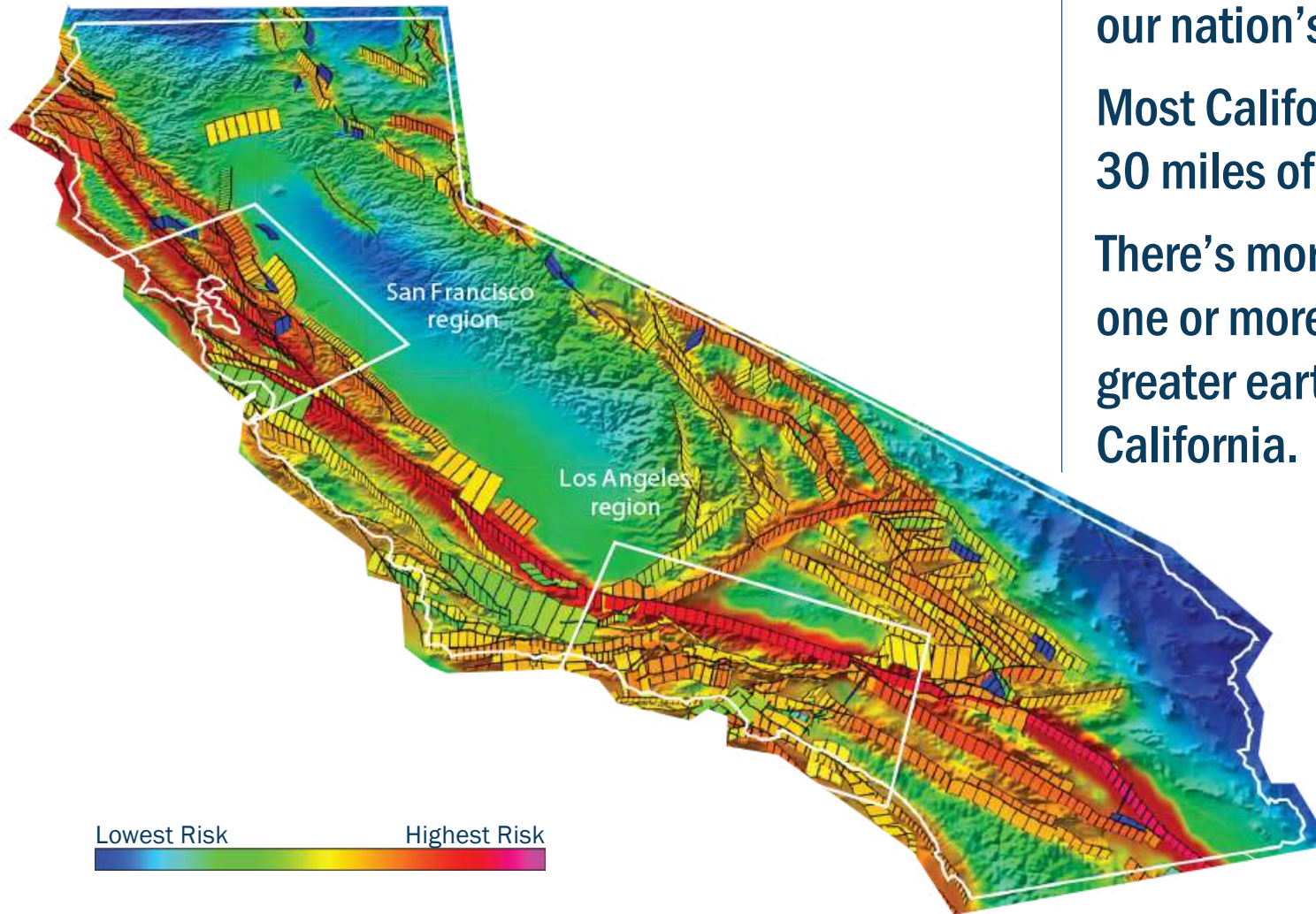
## MISSION:

Educate  
Mitigate  
Insure

# CRMP

ESS Program benefits are made possible by funding from the California Residential Mitigation Program (CRMP).

CRMP is a joint powers agreement established under California Government Code Section 6500, et seq., whose members are the California Earthquake Authority (CEA), a public instrumentality of the State of California, and the California Governor's Office of Emergency Services, an agency of the State of California.



California is home to two-thirds of our nation's earthquake risk.

Most Californians live within 30 miles of an active fault.

There's more than a 99% chance of one or more magnitude 6.7 or greater earthquakes striking California.



## Soft-Story or Living-Space-Over-Garage Seismic Vulnerability

The Soft-Story was Created with the Introduction of the Automobile and the Garage



# Soft-Story or Living-Space-Over-Garage Seismic Vulnerability

Examples of Damage Can be Found From Every Earthquake



1971 San Fernando EQ



1989 Loma Prieta EQ



1994 Northridge EQ



2014 Napa EQ

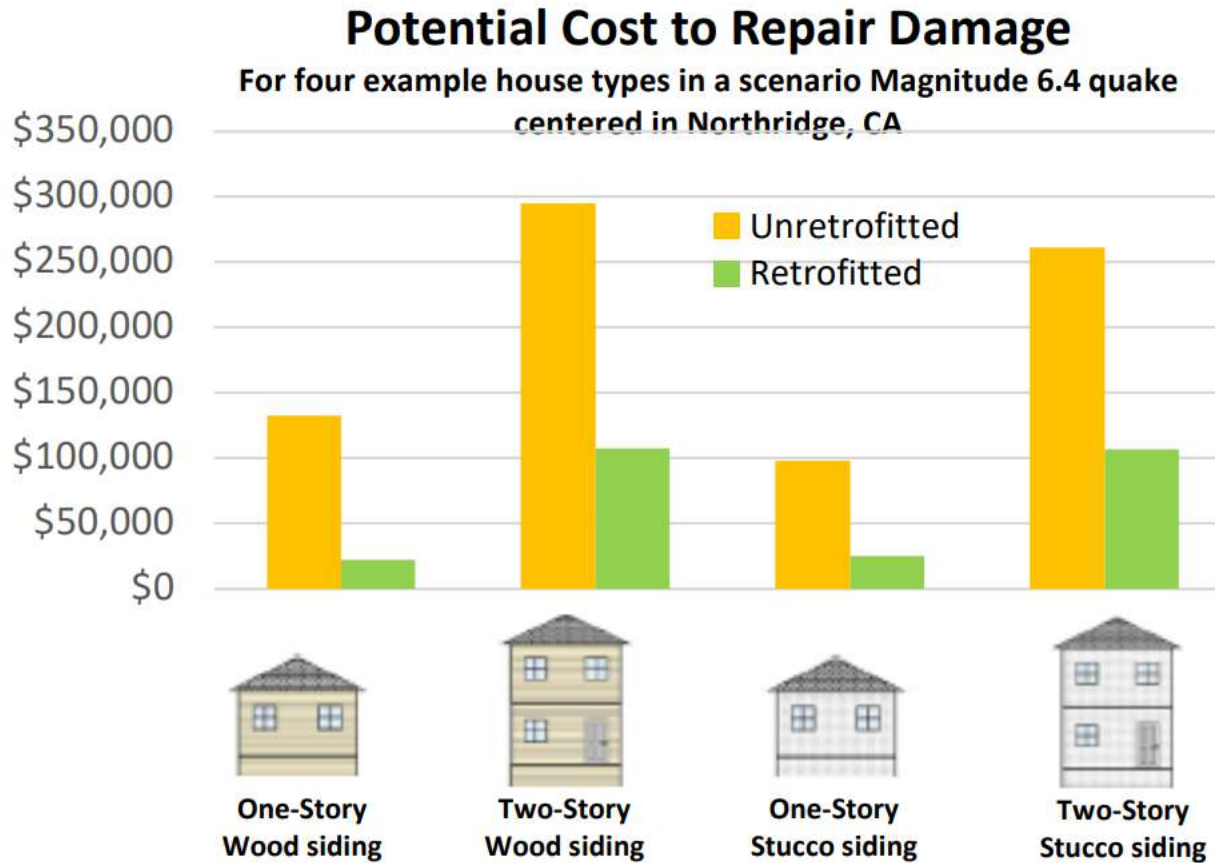
# RETROFIT

Retrofitting is the modification of an existing structure to make it more resistant to earthquake damage.



# Retrofitting Reduces Cost to Repair Damage

Pacific Earthquake Engineering Research Center (PEER) Study on Reduction of Damage for Retrofitted Houses



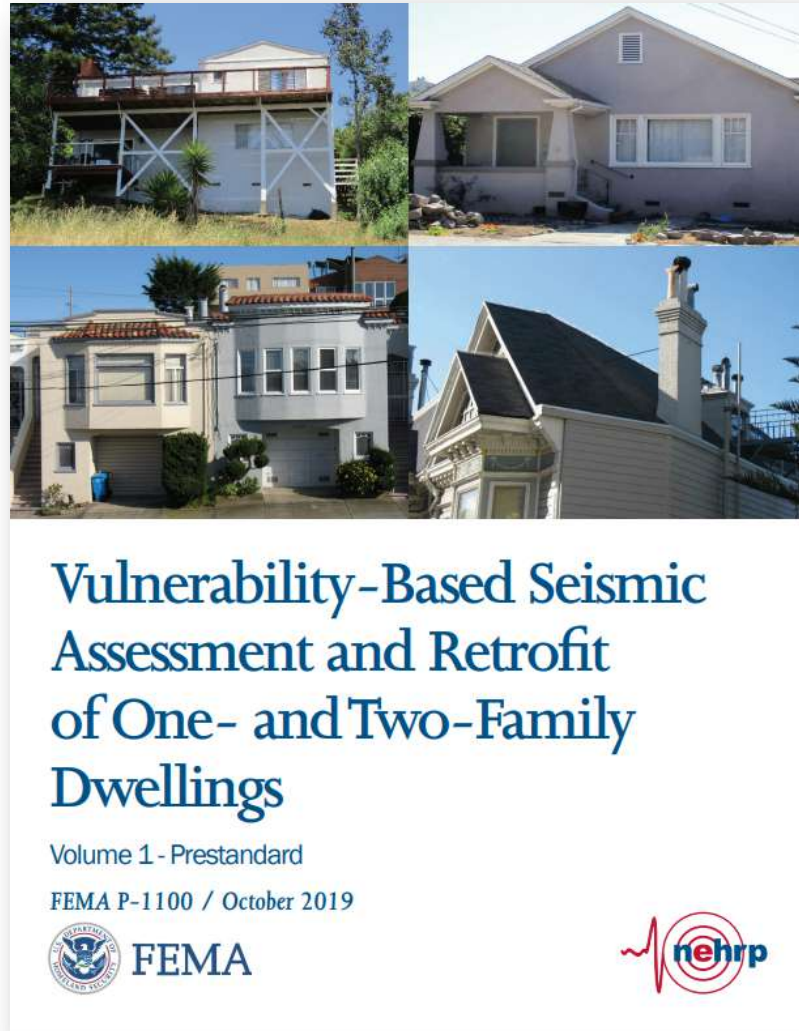
Assumes \$200/sf replacement cost

Approved foundation plates may also be used.

## **FEMA P-1100**

The ESS program provides incentive grants for retrofits that are in conformance with FEMA P-1100 Volumes 1 and 2B.

# FEMA P-1100 ESS Retrofit Standard- Volume 1



Accepted Plan Set  
for ESS  
Crawlspace-  
Volume 2A



Vulnerability-Based Seismic  
Assessment and Retrofit  
of One- and Two-Family  
Dwellings

Volume 2A - Plan Set for Crawlspace Dwellings

FEMA P-1100-2A / October 2019



# Accepted Plan Set for ESS- Volume 2B



## Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

Volume 2B - Plan Set for Living-Space-Over-Garage Dwellings

FEMA P-1100-2B / October 2019





# FEMA P-1100 Eligibility

Eligibility for Use Table To Be filled out for Every ESS Project

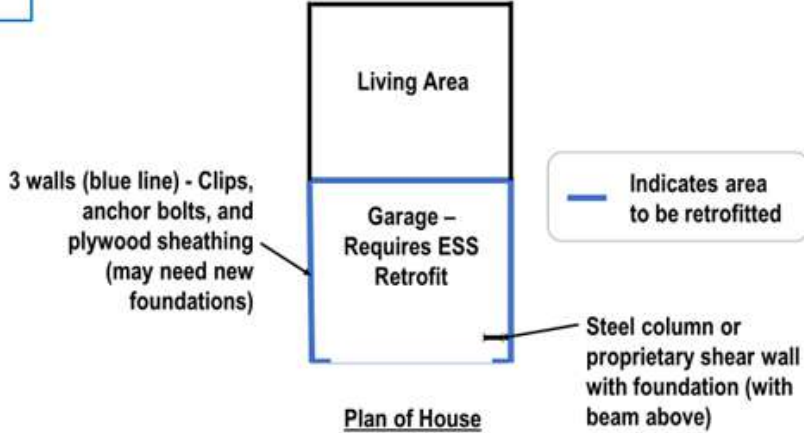
<b>TABLE 1: ELIGIBILITY FOR USE</b>		
To determine if a home qualifies, answer the following:	Compliant	Non-Compliant
1. The dwelling is a one or two-family detached structure or the dwelling is a unit in a townhouse and assessment and retrofit will occur for each attached townhouse.		
2. The dwelling is a wood light-frame dwelling and has a maximum of one story above the garage story.		
3. The dwelling is a living-space-over-garage dwelling as defined in Chapter 2 FEMA P-1100 prestandard.		
4. The dwelling perimeter (not including porches or other appurtenances) is supported on continuous concrete foundations, concrete stem walls or thickened slab edge footings.		
5. The lower (garage) level floor is constructed of a conventionally reinforced concrete slab on grade (or at least the portion of the floor that bounds the garage).		
6. Weight of roofing material shall not exceed 12 psf (measure on slope).		
7. Weight of exterior wall finish shall not exceed 10 psf, except that veneer wainscots supported on concrete or masonry foundations are permitted to extend up to four feet above the top of foundation.		
8. Weight of interior wall finish shall not exceed 8 psf, except that masonry fireplace surrounds of not more than 4 inches thick and up to 100 square feet are permitted to exceed this weight.		
9. Weight of upper floor finish shall not exceed 5 psf, except that heavier floor finishes of up to 10 psf are acceptable where limited to 25% of the total floor area of each level.		
10. Floors in each story are at the same level and not split level, excluding slab on grade portions.		
11. The home floor area, calculated as "B" times "L", as defined in figures 3, 4 or 5 shall not exceed 2,000 square feet.		
12. No part of the foundations is constructed of unreinforced masonry or stone.		
13. Clear floor to ceiling heights at any occupied level does not exceed 9'-0".		
<p>If you answered "Compliant" to each of these questions, proceed to Sheet S3.                      If you answered "Non-compliant" to any of these questions, the home is not eligible to apply this Plan Set, unless a Registered Design Professional has addressed non-compliant issues in accordance with P-1100 Prestandard, Section 5.5. See Differing Conditions section on this sheet.</p>		

# FEMA P-1100 Eligibility

There are Four Types of Houses that are Eligible for ESS

Type  
1

## House-Over-Garage - Has Ground Floor Living Area

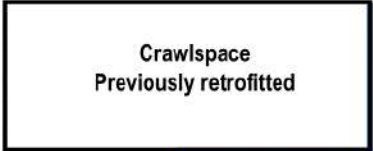


# FEMA P-1100 Eligibility

There are Four Types of Houses that are Eligible for ESS

Type  
2

## Room-Over-Garage - Crawlspace area under a portion of the house



3 walls (blue line) - Clips, anchor bolts, and plywood sheathing (may need new foundations)



Steel column or proprietary shear wall with foundation (with beam above)

— Indicates area to be retrofitted

Plan of House

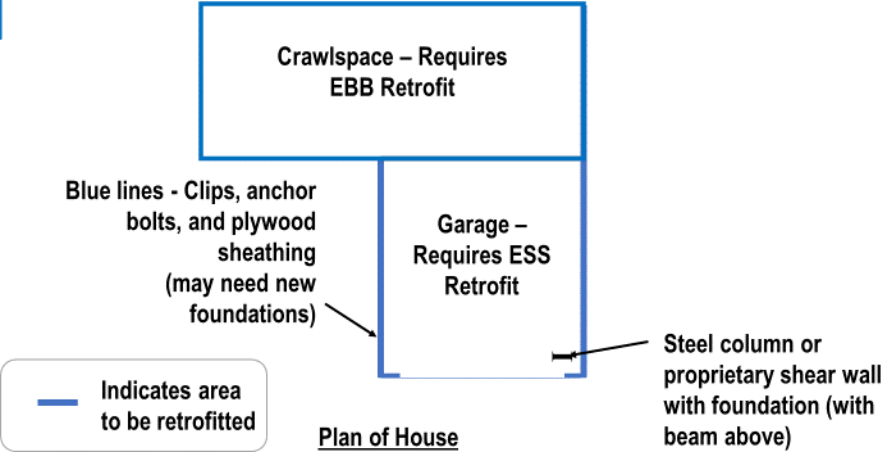


# FEMA P-1100 Eligibility

There are Four Types of Houses that are Eligible for ESS

Type  
3

### Room-Over-Garage – Crawlspace area under a portion of the house

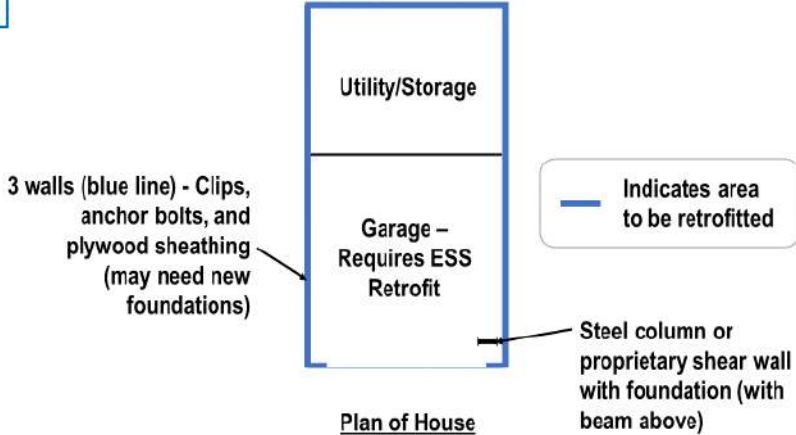


# FEMA P-1100 Eligibility

There are Four Types of Houses that are Eligible for ESS

Type  
4

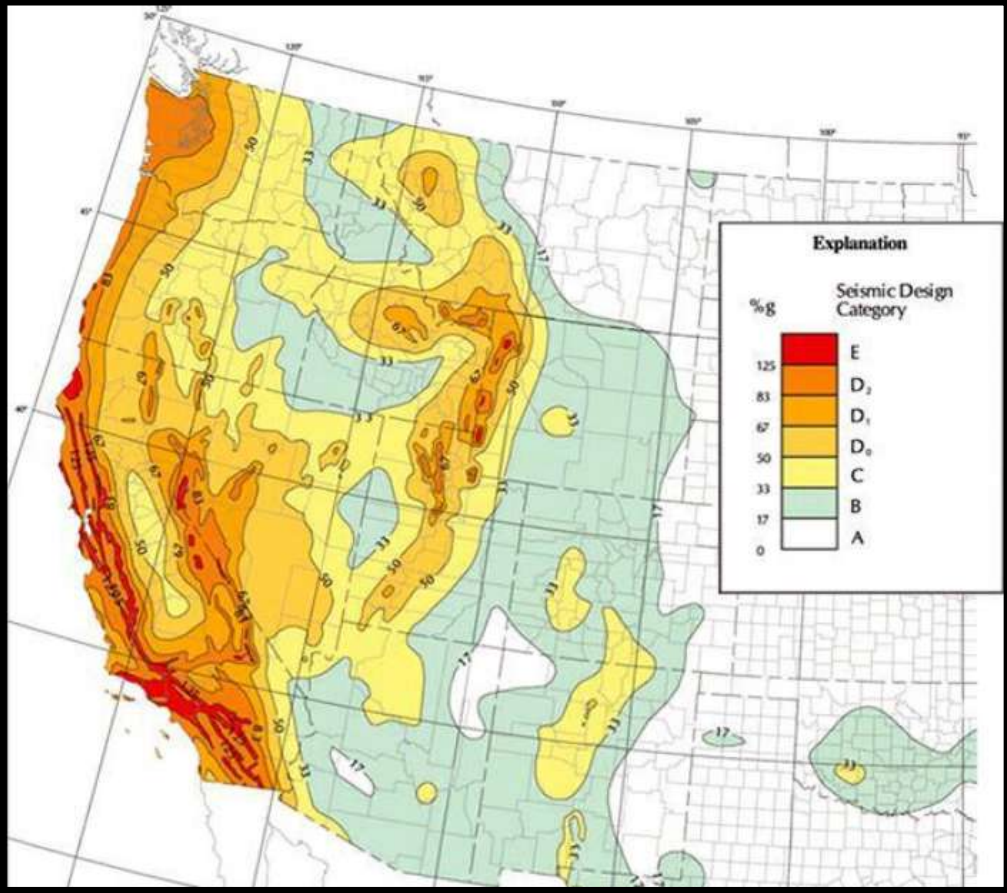
## House-Over-Garage – No Ground Floor Living Area





# Seismic Design Category -SDC

Each Location Corresponds to a Seismic Design Category



Source: FEMA

# Seismic Design Category -SDC

ESS is Currently in SDC E and D2 Areas

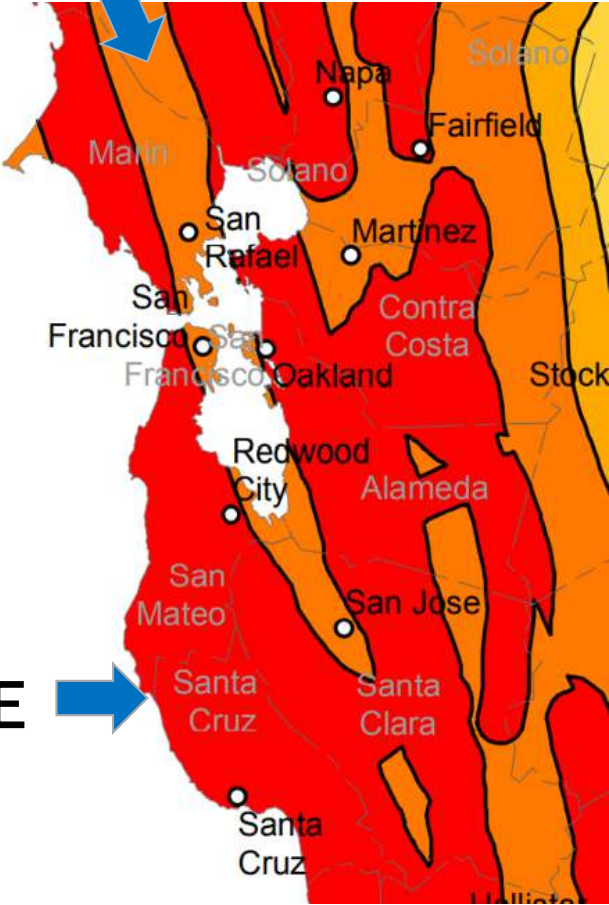
## Seismic Design Category

Marin, Solano, Contra Costa, Alameda, San Mateo, Santa Cruz, Santa Clara Counties – E and D2

Explanation	
%g	Seismic Design Category
> 125	E
83-125	D <sub>2</sub>
67-83	D <sub>1</sub>
50-67	D <sub>0</sub>
33-50	C
17-33	B
0-17	A

SDC D2

SDC E



## FEMA P-1100 – SDS Value for Use with Seismic Retrofit Tables

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Tables Provide Requirements for Plywood, Anchors, Clips, and Front Wall Retrofit Elements

Once you know the Seismic Design Category (SDC) of the house, determine the Design Spectral Response at Short Periods (SDS) value:

SDC	SDS
D2	1.2
E	1.5

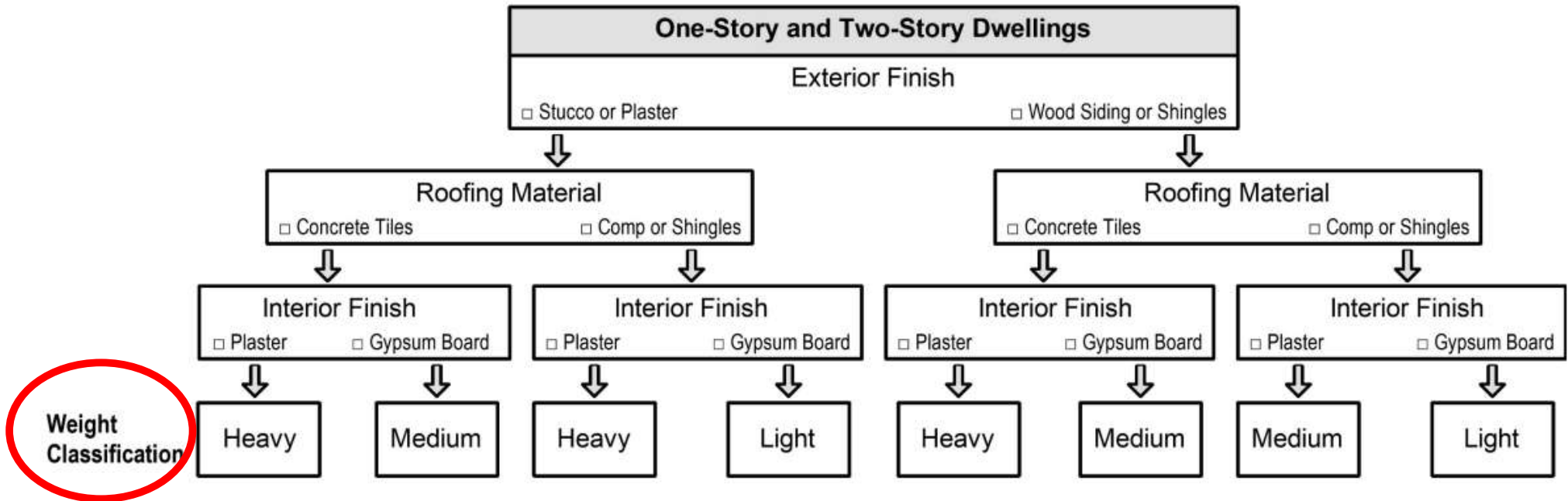
**SDS will be  
1.2 or 1.5**

### Notes:

1. Where your location is on, or close to, the border of two SDC's, it is prudent to choose the higher value.
2. For SDC D2, a lower SDS value of 1.0 can be used if the site class is determined to be A, B, or C

# FEMA P-1100 - Weight Classification for Use with Retrofit Tables

Tables Provide Requirements for Plywood, Anchors, Clips, and Front Wall Retrofit Elements



# FEMA P-1100 – Floor Area for Use with Retrofit Tables

Tables Provide Requirements for Plywood, Anchors, Clips, and Front Wall Retrofit Elements



$$\text{Area} = B \times L$$

*Figure 3*  
Example of dwelling configuration  
without Ground Floor Residential Unit



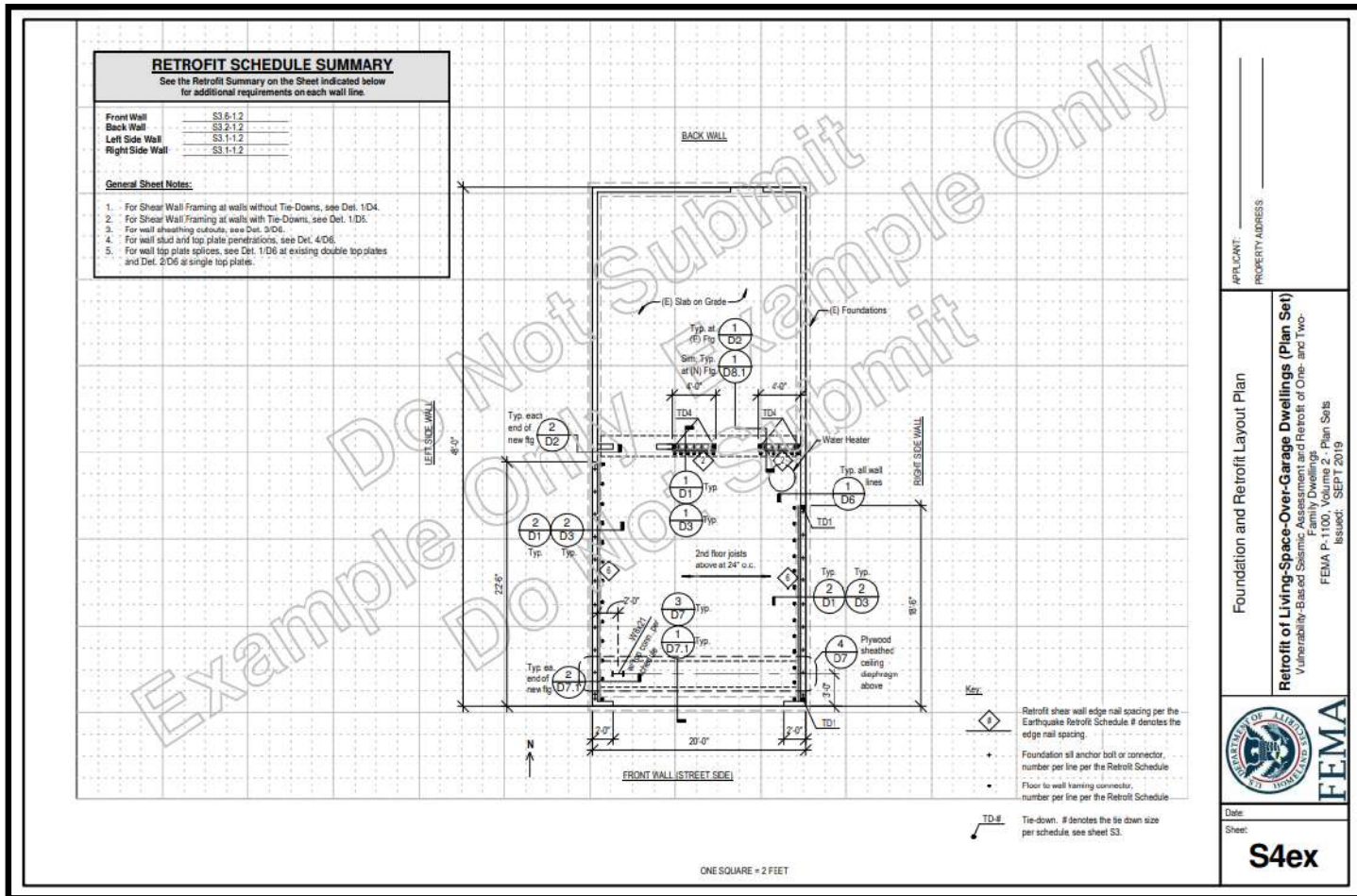
# FEMA P-1100 – SDS Value Determines the Amount of Retrofit Required

Tables Provide Requirements for Plywood, Anchors, Clips, and Front Wall Retrofit Elements

EARTHQUAKE RETROFIT SCHEDULE (SDS = 1.2) for Single Section of Wall																								
① WEIGHT CLASSIFICATION	② Floor Area in Square Feet	③ Mark row that applies <input type="checkbox"/>	④ MINIMUM REQUIRED LENGTH OF A SINGLE SECTION OF WALL OF WOOD STRUCTURAL PANEL SHEATHING (at each wall line)										⑤ FOUNDATION SILL ANCHORAGE  Min. No. of Foundation Connectors or Anchors at Each Wall Panel					⑥ FLOOR FRAMING TO WALL CONNECTION  Min. No. of Connectors at Each Wall Panel						
			No Tie-down			w/ Tie-downs in Existing or New Foundations							Type "A"		Type "B"		Type "C"	1/2"Ø Bolt	5/8"Ø Bolt	Type "D"	Type "E" or "F"	Type "G"		
			8d Nail Spacing		Wall Length	Wall Length		Tie- down	New Fdn Req'd ?	Wall Length		Tie- down	New Fdn Req'd ?	Wall Length	Tie- down	New Fdn Req'd ?	Type "A"	Type "B"	Type "C"	1/2"Ø Bolt	5/8"Ø Bolt	Type "D"	Type "E" or "F"	Type "G"
						8d at 6" O.C.		8d at 4" O.C.		8d at 2" O.C.														
Light Construction	800		6	19'-0"	15'-0"	TD1	No	10'-6"	TD2	Yes	6'-0"	TD5	Yes	4	7	9	7	5	11	10	14			
	1000		6	22'-6"	18'-6"	TD1	No	13'-0"	TD2	Yes	7'-6"	TD4	Yes	5	8	11	9	6	13	13	17			
	1200		6	25'-6"	22'-6"	TD1	No	15'-6"	TD2	Yes	9'-0"	TD4	Yes	6	10	13	10	7	16	15	20			
	1500		6	29'-6"	28'-0"	TD1	No	19'-0"	TD2	Yes	11'-6"	TD4	Yes	8	12	16	13	9	20	19	25			
	2000		4	38'-0"	37'-6"	None	No	25'-6"	TD2	Yes	15'-0"	TD4	Yes	10	16	21	17	12	26	25	33			
Medium Construction	800		6	23'-6"	19'-6"	TD1	No	13'-6"	TD2	Yes	8'-0"	TD5	Yes	5	8	11	9	6	14	13	17			
	1000		6	27'-6"	24'-0"	TD1	No	16'-6"	TD2	Yes	10'-0"	TD4	Yes	7	10	14	11	8	17	17	22			
	1200		6	31'-0"	29'-0"	TD1	No	20'-0"	TD2	Yes	12'-0"	TD4	Yes	8	12	16	13	9	21	20	26			
	1500		4	35'-6"	36'-6"	None	No	25'-0"	TD2	Yes	15'-0"	TD4	Yes	10	15	20	17	11	26	25	32			
	2000		4	43'-0"	48'-6"	None	No	33'-0"	TD2	Yes	19'-6"	TD4	Yes	13	20	27	22	15	34	33	43			
Heavy Construction	800		4	24'-6"	25'-6"	None	No	17'-6"	TD2	Yes	10'-6"	TD4	Yes	7	11	14	12	8	18	17	23			
	1000		4	28'-0"	31'-6"	None	No	21'-6"	TD2	Yes	13'-0"	TD4	Yes	9	13	18	15	10	22	21	28			
	1200		4	31'-6"	38'-0"	None	No	28'-0"	TD1	No	15'-6"	TD4	Yes	10	16	21	17	12	27	26	34			
	1500		4	34'-0"	47'-6"	None	No	32'-6"	TD1	No	19'-6"	TD4	Yes	13	20	26	22	15	33	32	42			
	2000		2	34'-6"	"NG"	None	No	43'-6"	None	No	25'-6"	TD3	Yes	17	26	35	29	20	44	42	56			

# FEMA P-1100

## Plan requirements for FEMA P-1100 ESS permit submittal



# FEMA P-1100

## Typical Details Available for FEMA P-1100 ESS permit submittal

**1 ANCHOR THROUGH FOUNDATION SILL ONLY**  
Detail applies where (E) foundation sill is the same width as the (E) wall studs

**2 ANCHOR THROUGH BLOCKING AND FOUNDATION SILL**  
Detail applies where (E) foundation sill is wider than the (E) wall studs

**3 NEW BLOCKING INSTALLATION FOR WOOD STRUCTURAL PANEL ATTACHMENT**

**4 FOUNDATION SILL CONNECTORS**

**MATERIAL KEY:**

Below is a key to common callouts in the details. Unless specified otherwise in the details, use the sizes and materials as follows:

Term	Description
Stale	
3d (3 penny) at Connections attached over plywood	(E) 131" x 2-1/2" long
3d (3 penny) at Connections attached directly to framing	(E) 131" x 1-1/2" long
10d (10 penny) at Connections attached over plywood	(E) 148" x 3" long
10d (10 penny) at Connections attached directly to framing	(E) 148" x 1-1/2" long
16d (16 penny)	(E) 162" x 3-1/2" long
20d (20 penny)	(E) 192" x 4" long
Screws	Empsen Orange-Tie 1/4" SDC, CRK, 3/8" RSS "ClimateX", USP Mitek 1/4" WTS "Solid Coat", or equivalent.
2" screw	2" long structural wood screw
4" screw	4" long structural wood screw
6" screw	6" long structural wood screw
Wood Structural Panel	1/2" Wood Structural Panel-Sheathing, Exposure 1, S-Ply.
LVL (Laminated Veneer Lumber)	Weyerhaeuser "MicroLam", Boise-Cascade "VersiLam", Georgia-Pacific "SP-Lam", LP "Solid Start", or equivalent.
Plate Washer	2" x 3" square x 0.229" thick.
Panel & Stick Flashing Tape	Fortiflash, Orange Peel-n-Seal, Tyvek, Vycor, HardieWrap, or equivalent.

**ABBREVIATIONS**

For Connector types see Sheet S3

Cr. Ceiling  
Conc. Concrete  
Dia. Diameter  
(E) Existing  
EQ. Equal  
E.N. Edge Nail  
Emb. Embedment  
(N) New  
Max. Maximum  
Min. Minimum  
Mfr. Manufacturer  
N.T.S. Not to Scale  
O.C. On Center  
PL. Plate  
S.O.G. Sub on ground  
Typ. Typical  
w/ with

APPLICANT: \_\_\_\_\_  
PROPERTY ADDRESS: \_\_\_\_\_

**Foundation Sill to Concrete Foundation Connection Details**

**Retrofit of Living-Space-Over-Garage Dwellings (Plan Set)**  
Variationally Shared Occupancy Attached to Existing Form of One and Two-Family Dwellings  
FEMA P-1100, Volume 2 - Plan Sets  
Issued: SEPT 2019

Date: \_\_\_\_\_  
Sheet: **D1**



# EarthquakeSoftStory.com

Anchor Bolts, Plywood Sheathing and Framing Clips



# FEMA P-1100

## New Steel Column or Proprietary Shear Wall at Garage Door Wall

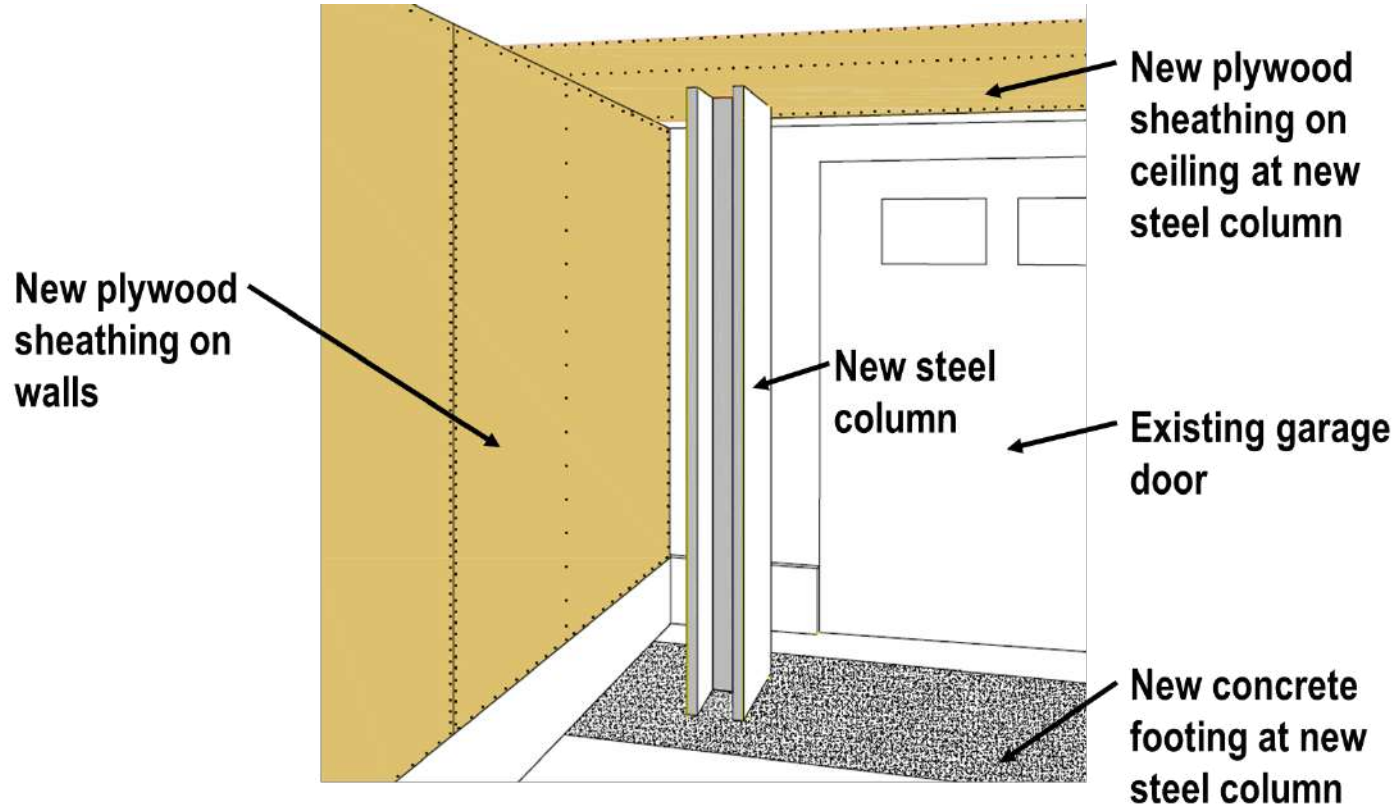


Image of Interior Front Corner of Garage





**EARTHQUAKE  
SOFT-STORY**

**Funds To Strengthen Your Home** <sup>SM</sup>

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# Earthquake Soft-Story provides grants to homeowners to strengthen pre-2000 houses against earthquake damage

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## Qualifying Homeowner:

- Owns and lives in the qualifying house

## Qualifying House:

- Located in one of 82 California ZIP Codes in 2023
- Constructed pre-2000
- Vulnerabilities of Living-Space-Over Garage Construction

## Grant Amounts:

- Type 1 and Type 2 houses – up to 75% of the cost of the retrofit, not to exceed \$10,000
- Type 3 and Type 4 houses – up to 75% of the cost of the retrofit, not to exceed \$13,000

The retrofit work requires a permit and must meet or exceed the requirements of the FEMA P-1100.



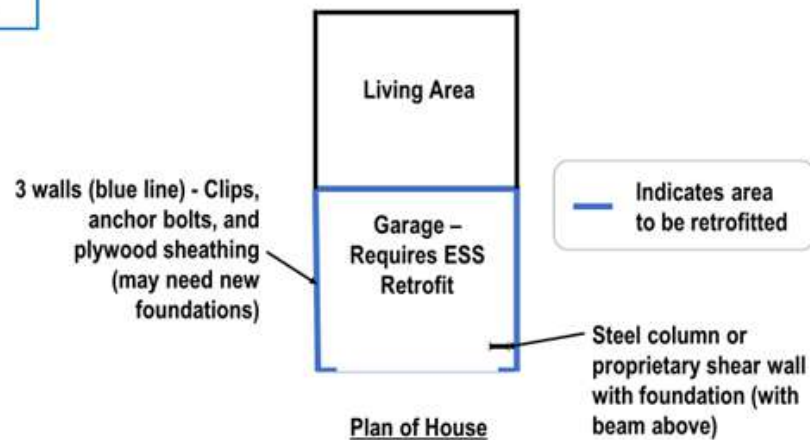
# House Types

## 1 & 2:

Have ground floor areas that do not require retrofitting, either because of living area behind the garage (Type 1) or a previous retrofit of the crawl space meeting the requirements of Chapter A3 of the 2019 CEBC, for the Type 2 house.

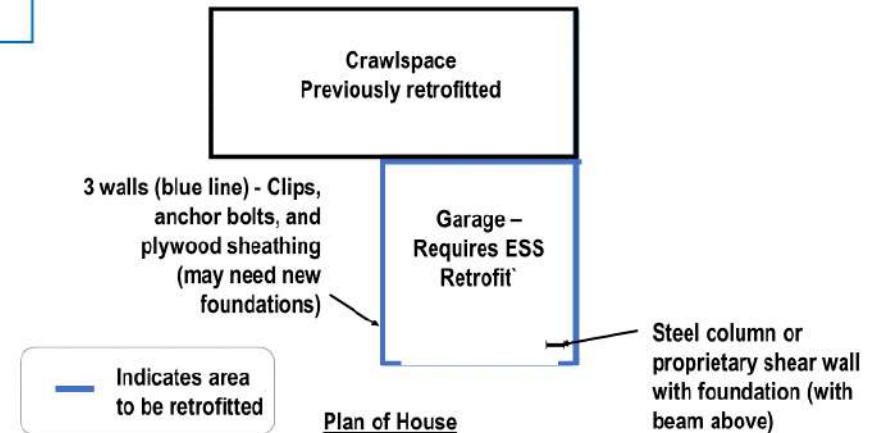
Type  
1

### House-Over-Garage - Has Ground Floor Living Area



Type  
2

### Room-Over-Garage - Crawlspace area under a portion of the house



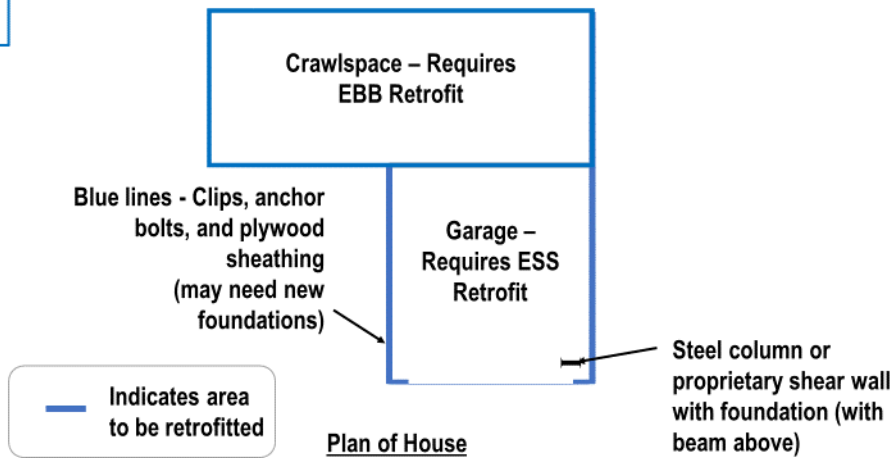
# House Types

## 3 & 4:

Require a retrofit covering the entire ground floor of the house.

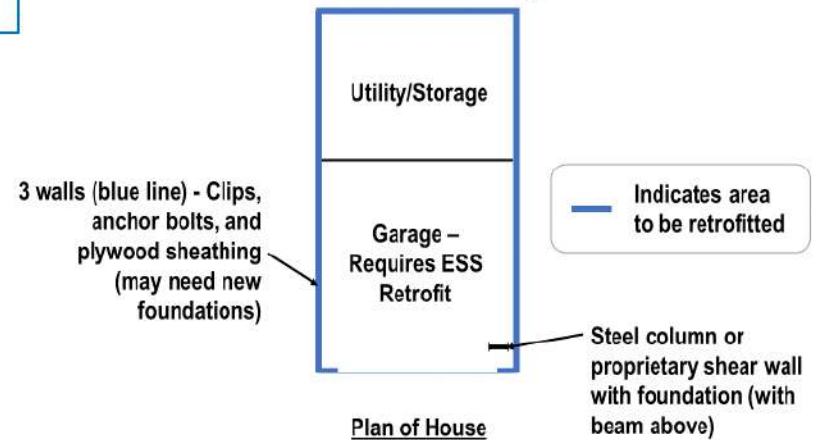
Type  
3

### Room-Over-Garage – Crawlspace area under a portion of the house



Type  
4

### House-Over-Garage – No Ground Floor Living Area



# FEMA P-1100



## Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

Volume 2B - Plan Set for Living-Space-Over-Garage Dwellings

FEMA P-1100-2B / October 2019



- The retrofit for the living space over garage (LOG) must address all vulnerabilities covered by FEMA P-1100, i.e., no partial retrofits.
- For houses that have both a continuous perimeter foundation, i.e. a crawl space, and LOG in need of retrofit, Volume 2A may be used for the crawl space, while Volume 2B may be used for the LOG.
- If Engineered plans are used, they must meet or exceed the requirements of FEMA P-1100.

# FEMA P-1100



## Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

Volume 2A - Plan Set for Crawlspace Dwellings

FEMA P-1100-2A / October 2019



- Homeowners with cripple walls in their crawl space up to 7ft. in height may use the FEMA P-1100 plan set for their retrofit, an engineer is not required.
- FEMA P-1100 is pre-engineered and does not require the use of an engineer for the retrofit of cripple walls between 4ft. and 7ft. in height.



## How We Try to Ensure Retrofit Quality and How You Can Help

- **Permits must state the retrofit is:**
  - in accordance with FEMA P-1100 or
  - is per engineered plans that meet or exceed the requirements of FEMA P-1100
- **FYI, if the retrofit is per engineered plans, we require the homeowner to provide us with a signed and stamped letter from the engineer stating the retrofit meets or exceeds the requirements of FEMA P-1100.**

## How We Try to Ensure Retrofit Quality and How You Can Help

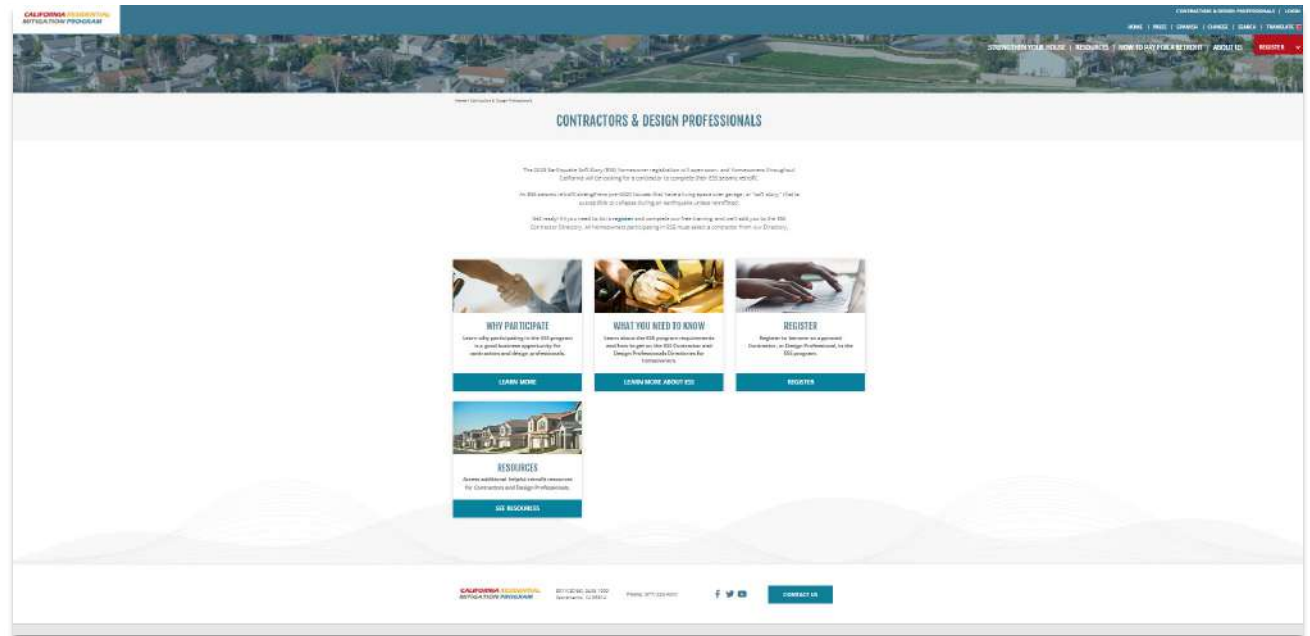
- All vulnerabilities covered by FEMA P-1100 need to be addressed, i.e., no partial retrofits.
- A “partial” retrofit is determined by the end product, not the starting point. All FEMA P-1100 vulnerabilities must be addressed.
- Contractors must be licensed and trained.

## How We Try to Ensure Retrofit Quality and How You Can Help

- **Retrofit work must be finalized by the local building department before reimbursement of the funds may occur.**
- **ESS has a third-party inspection company to perform random inspections.**

# ESS Website

Includes detailed program information, a way to search to see if your ZIP Code is included in ESS (plus a complete list of cities and ZIP Codes) and a place to sign up for updates.



# EarthquakeSoftStory.com

## Contractors Directory

### Example

ZIP Code: 90026

Within: 10 Miles

Full/Partial Company Name:

Contractor's Licensed #:

If they wish to hire a contractor, homeowners may use our Contractor Directory as a resource.

**SEARCH FOR FEMA-TRAINED CONTRACTORS**

The Contractor Directory is a list of contractors who have successfully completed the FEMA training for seismic retrofit of single family wood-frame houses. The Directory is provided as a service and is not an endorsement or approval of any contractor.

CEA Brace - Bolt program is not responsible for confirming the contractor is licensed in the State of California. To verify the contractor is licensed and in good standing, visit the Contractor State License Board website. If you have not done it already, please review the following information before deciding on a contractor: "What You Should Know Before Hiring a Contractor".

To search for a contractor, enter your Zip Code and choose between a 5 and 100 mile radius. You can also search by Company Name or Contractor License Number.

ZIP Code:


Within:

Full / Partial Company Name:


Contractor's License #:

**SEARCH RESULTS**


Sort Results

 **GENIE CONSTRUCTION (CSLB # 552551)**  
3950 Montclair St  
Los Angeles, CA 90018  
jpetillo25@gmail.com  
W: geniehomeremodel.com  
P: (323) 732-5225

**About Us:** Completed FEMA training for Seismic Retrofits of One- and Two-Family Wood-Frame Dwellings

 **Villa Construction (CSLB # 888175)**  
741 Hay Ave  
Los Angeles, CA 90022  
villaefrain1@yahoo.com  
P: (323) 236-5712

**About Us:** Completed FEMA training for Seismic Retrofits of One- and Two-Family Wood-Frame Dwellings

 **The Mop Crew Inc (CSLB # 1013556)**  
11277 Sardis Ave  
Los Angeles, CA 90064  
luc@themopcrew.com

[Homeowner Reviews](#)

# Items Currently Available at CRMPTools.com

## Step-by-Step Planner



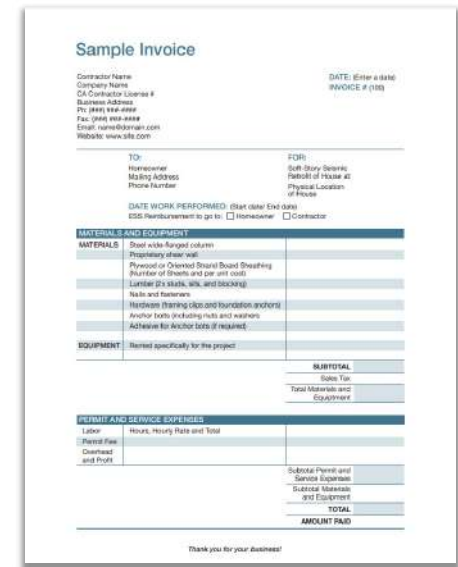
## ESS Approved Logo



## Press Release



## Sample Invoice





# One Sheet and Postcard Examples



**Apply between Oct. 18 and Nov. 29, 2022**  
(See below for details)

**EARTHQUAKE BRACE + BOLT**  
Powered by Cal OES & FEMA

**Receive up to \$3,000 toward an Earthquake Retrofit**

**Earthquake Brace + Bolt (EBB)** helps homeowners lessen the potential for damage during an earthquake. EBB offers up to \$3,000 toward a code-compliant seismic retrofit for houses that qualify.

**A Brace and Bolt Retrofit**

In an EBB retrofit, the foundation is bolted, and if there is a cripple wall, it is braced.

- Bolting:** adding anchor bolts in the crawl space to help prevent the home from sliding.
- Bracing:** adding plywood to the cripple walls to stiffen them and help prevent the home from collapsing.

**NEW ELEMENTS MAKE UP A SEISMIC RETROFIT**



**Houses that qualify, typically:**

- Are built before 1980 (but are more prevalent before 1940);
- Have a raised continuous perimeter concrete foundation;
- Sit on level ground or a low-slope; and
- May have wood-framed walls (called cripple walls) in the crawl space under the first floor.

**Supplemental Grants Available**

EBB is offering a Supplemental Grant to help income-eligible households pay up to 100 percent of the cost to seismically retrofit their homes. Income-eligible is defined as a household with an annual income at or below \$72,080.

**Register for EBB:**

Go to [EarthquakeBraceBolt.com](http://EarthquakeBraceBolt.com) between October 18 and November 29, 2022. Create an online account and answer questions for an opportunity to participate. Participants will be randomly selected.

A permit must not be issued before you have been accepted into the program, and retrofit construction work must not begin before being notified by EBB that your pre-retrofit documents have been approved.

**17K+ RETROFITS**  
SEISMIC RETROFITTING SINCE 2008  
ONE AT A TIME  
[EarthquakeBraceBolt.com](http://EarthquakeBraceBolt.com)

EBB has helped more than 17,000 homeowners seismically retrofit their older houses. EBB is working to create more resilient communities, one house at a time.

[EarthquakeBraceBolt.com](http://EarthquakeBraceBolt.com)



**REGISTRATION IS NOW OPEN!**

**See if your house qualifies for up to a \$3,000 seismic retrofit grant.**

For More Information

Para más Información

如需更多資訊

**EARTHQUAKE BRACE + BOLT**  
Powered by Cal OES & FEMA  
[EarthquakeBraceBolt.com](http://EarthquakeBraceBolt.com)

**REGISTRATION IS OPEN**  
for a limited time Oct 18 - Nov 29, 2022

EBB was created to help homeowners lessen the damage caused by earthquakes. Your house may qualify for an EBB grant if it is:

- In an EBB ZIP Code
- Built before 1980
- Owner-occupied
- On a raised foundation

EBB is also offering a Supplemental Grant to help income-eligible households pay up to 100% of the cost to seismically retrofit their homes. An "income-eligible household" is defined as a household with income at or below \$72,080. These grants are based on available funds.

Visit [www.EarthquakeBraceBolt.com](http://www.EarthquakeBraceBolt.com) to see if your house qualifies.

Homeowners will be randomly selected and notified. To qualify for the retrofit grant, homeowners must not apply for a permit until they have been accepted into the program. Retrofit work must not start until the homeowner has been approved by EBB.

For complete program rules, visit [EarthquakeBraceBolt.com/What-is-EBB/Program-Rules](http://EarthquakeBraceBolt.com/What-is-EBB/Program-Rules).

**EARTHQUAKE BRACE + BOLT**  
Powered by Cal OES & FEMA  
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A program of the California Earthquake Authority & California Governor's Office of Emergency Services

Registration  
Opening  
Soon





For more on our program visit:

[www.EarthquakeSoftStory.com](http://www.EarthquakeSoftStory.com)

[www.CaliforniaResidentialMitigationProgram.com](http://www.CaliforniaResidentialMitigationProgram.com)

[www.CRMPTools.com](http://www.CRMPTools.com)

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