GENERAL REQUIREMENTS FOR NEW CONSTRUCTION AND ADDITIONS

All plans must include the legible name of the architect, engineer, designer or other person preparing the plans. The drawings must be clear, complete, and must show in detail how the proposed work will comply with the codes.

All plans must be to a common scale. All plan views must be drawn to a minimum scale of 1/4" = 1'. Plans on graph paper are not acceptable due to the difficulty of distinguishing graph lines from drawing and dimension lines, especially on photocopies.

Completeness and clarity of the plans is essential to avoid delays in the issuance of your permit. Your plans would be considered complete if you could give them to a total stranger and he or she could understand how the building will be constructed and what the finished project will look like.

ENGINEERED DESIGNS

All construction which falls outside the category of “Conventional Light-Frame Construction” as described in Section 2320 of the California Building Code must be designed by an architect or engineer with a California license. This includes, but is not limited to, truss systems, retaining walls over forty-eight inches high, foundations with pilings or caissons, roofs on posts such as carports and patio covers which are freestanding or which extend more than 6' beyond the building to which they are attached, and wall bracing systems which are not described in Section 2320. Buildings with more than two stories also require engineering. Structural calculations for such designs must be submitted in two copies with the designer’s stamp, signature, and license number. All design elements required by the calculations must appear on the plans as well as in calculations. The building or field inspector should not need to refer to the calculations to see how the structure is to be built.

TITLE 24 ENERGY COMPLIANCE DOCUMENTATION

“Energy calcs” are required for projects creating heated or cooled space. This documentation shows how the project will comply with California Energy Commission regulations for energy conservation. For most projects, this documentation is best prepared by an experienced professional.

INFORMATION REQUIRED ON PLANS

For purposes of accuracy, clarity and efficiency in the plan review, construction and inspection processes, the following minimum plans standards are adopted as policy by the Mariposa County Building Department. Use this as a checklist when preparing your plans. Some items may not apply to your project but if you address all those which do, unnecessary delays in the plan review process can be avoided. If you have any questions about any of the items on this list we will be glad to discuss them with you. Please keep in mind that at this time the 2016 California Codes are in effect. Brace wall calculations are required (see attached handout) or an engineer or architect stamp. All of Mariposa County is in a Cal Fire W.U.I. area; please see the attached W.U.I. handout for details and requirements. The California 2016 Energy Code has gotten much more complicated this year. It will be necessary to produce detailed drawing on the plans for some of the more complex requirements.
Site Plans must be provided for new buildings and for any work which alters the footprint of an existing building. Site plans must be drawn to a common engineers scale and must show:

- Property lines
- Lot dimensions
- Front, rear, and side setback distances to buildings
- Septic tank, leach field and replacement area
- Topographic features such as streams and drainage areas
- All existing and proposed structures on the property including covered patios, porches, and roof overhangs longer than 3'
- The proposed building's exterior dimensions
- All public and private easements
- Underground gas, electric and water lines
- Proposed and existing gas and electric meter locations
- North arrow showing the compass orientations
- The name of the adjacent road(s) and the road centerline(s)
- Driveway location
Floor Plans are required for all new construction. They should be drawn to 1/4" = 1' scale and must include:

- A separate plan for each floor level
- Descriptions and dimensions of all rooms
- Locations and descriptions of all Braced Wall Panels
- Locations and sizes of doors and windows
- Description of window types (and doors if glazed)
- Locations and sizes of skylights (indicated if openable)
- Changes of ceiling height
- Location and size of attic access opening(s)
- Required landing at exterior doors
- Plumbing fixtures and appliances
- Location and description of room heaters
- Location of heating and cooling appliances
- Method of providing combustion air for fuel-burning appliances in confined spaces
- Locations of electrical service panel, sub-panels, receptacles, lights, switches, fans and smoke detectors (may need to be shown on a separate electrical plan if the floor plan is too crowded to maintain clarity)
- Location and size of posts supporting roof or ceiling beams
- Locations of section views
- For additions, adjacent existing rooms must be included
- For alterations to existing rooms, the plans must clearly show what is existing and what is new
Foundation Plans are required for all new construction. They should be drawn to 1/4" = 1' scale and must include:
- All continuous footing with length of each segment
- Cross-section detail(s) with markers showing where they apply – may be on a separate sheet
- Foundations for interior bearing walls
- Locations of all pier footings (centers dimensioned in both directions)
- Size and depth of all pier footings
- Location and description of the embedded portion of all hold-downs
- Post anchor specifications for exterior posts

For slab floors the following is also required:
- Footings or thickened slab under interior Braced Wall Panels with note on how sills will be attached

Floor Framing Plans for the first story are normally included on the foundation plan. If the building has more than one wood-framed floor level, a separate floor framing plan must be provided for each level unless no floor is above the other at any point, such as a split level. The Following must be included:
- Size and center to center spacing of girders
- Size and center to center spacing of joists
- Dimensions showing spans of girders and joists
- Size and span of any floor beams
- Under-floor posts at all point load footings
- Additional joists or blocking under interior Braced Wall Panels
- Location and size of under-floor access opening
- Calculations detailing how the under-floor ventilation requirement will be met (see worksheet on page 8)
**Roof Framing Plans** are required for all “stick-framed” roofs. They are also required for “stick-framed” portions of truss roofs, such as overlay (or “California”) framing, porch roofs, etc. Ceiling framing may be included on the roof framing plan or the floor plan if adequate clarity can be maintained. Complex structures may need separate roof and ceiling framing plans. These must include:

- Roof pitch
- Header sizes for all openings in bearing walls (may be on floor plan instead)
- Location, size, grade and span of each roof or ceiling beam (or on floor plan)
- Sizes, center to center spacing and spans of rafters
- Sizes, center to center spacing and spans of ceiling joists
- Locations and sizes of purlins
- Location of each purlin support, showing where it is supported by a beam or bearing wall
- Calculations detailing how the attic ventilation requirement will be met (see worksheet on page 8)

For truss roofs the following must be submitted if applicable:

- Truss layout
- Engineering for each truss
- Gable stud bracing detail
- Web bracing specifications
- Bottom chord bracing specifications
- Hat truss attachment specifications
- Truss-to-truss hanger specifications
- Overlay framing specifications
- Calculations detailing how the attic ventilation requirement will be met (see worksheet on page 8)
Section Views are helpful for clarifying framing in complex buildings. Even in simple structures such as garages a "typical" section view can be very helpful. More complex buildings may require several section views. The location of each section view must be marked on the floor plan. Section views should specify all materials not called out on one of the plan views such as sub-flooring, roof sheathing, wall framing, insulation, etc. as well as vertical dimensions not shown on other drawings.

Details should be numbered and the number of each one marked at appropriate location(s) on the plan views.
Elevation views are required for each side of all new construction. They are usually drawn to 1/4" = 1’ scale, but may be drawn to 1/8" = 1’ scale if clarity is maintained. They should show:

- Approximate grade including actual slopes at the site
- Type of siding and roofing
- Windows, doors and skylights
- Porches and decks
- Roof overhangs
- Chimney extensions

Drawings of the following type have little or no value to a plan checker. Submittals which consist primarily of such drawings will probably not be acceptable for review.
## ATTIC / UNDERFLOOR VENTILATION WORKSHEET

- **Attic**
- **Underfloor**

<table>
<thead>
<tr>
<th>Floor area in sq. ft.*</th>
<th>Sq. ft. of NET ventilation area required</th>
<th>Gross area of vents required in sq. ft.</th>
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<tbody>
<tr>
<td>______________________</td>
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\[
\text{Width in inches} \times \text{Height in inches} = \text{Area in sq. in. each} = 144 = \text{Area in sq. ft. each} = \text{How many} = \text{Area in sq. ft. provided} = \\
\]

Total vent area provided - must equal or exceed gross area required

---

**Attic**

- **Underfloor**

<table>
<thead>
<tr>
<th>Floor area in sq. ft.*</th>
<th>Sq. ft. of NET ventilation area required</th>
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**Attic**

- **Underfloor**

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<tr>
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\text{Width in inches} \times \text{Height in inches} = \text{Area in sq. in. each} = 144 = \text{Area in sq. ft. each} = \text{How many} = \text{Area in sq. ft. provided} = \\
\]

Total vent area provided - must equal or exceed gross area required

---

* Separate attic or underfloor areas must be calculated separately, e.g. house and garage attics with firewall between
Brace Wall Design Requirements

Designers:

A Brace Wall design page is required for all substantial building plan submissions and new Single Family Residential construction as per the California Residential Code section R106.1.1. If your plans are stamped and signed by a California licensed Engineer or Architect you may disregard this memo. Your building plans submission will be returned to you without one of the above.

The following and attached information is a guideline for your Brace Wall Design submission. It is subject to change and is not intended to be all inclusive. It is highly recommended that you become very familiar with the provisions of the current California Residential Code chapter 6 – wall construction. It is also highly recommended that you purchase and study “A guide to the 2015 IRC Wood Wall Bracing Provisions”. This book is available from the International Code Counsel’s online book store. The Brace Wall work form on the last page of the attachment (or something similar on the plans) will be required for plan review. Parts of the following may reference the International Residential Code for examples and additional explanations. The current edition of the California Residential Code is what is required for design and is used in plan review.

1. It is the Designer’s responsibility to establish the Seismic and Wind parameters (Building plan check just verifies the presented information) for the Brace Wall calculations. This includes the wind exposure category per the California Residential Code, section R301.2.1.4.

2. It is the Designer’s responsibility to provide the Geo Tech soils report and design the footing to that report. A soils report waiver may be granted under a “one case at a time” special circumstances as determined by the Building Official. If a Geo Tech report is waived it is still the designer’s responsibility to accurately indicate the class of soil material and its load-bearing pressure designation and to address any soil problems (expansive clays, layers of organic material, other soil problems, etc.) that may be associated with the building site. This information shall be indicated on the foundation plan.

3. Follow the guidelines in the attached handout. Provide Brace Wall lines on your plans similar to page #212 of the 2013 California Residential Code and page #78 of the guide to the 2015 IRC Wood Wall Bracing Provisions workbook. Submit the attached and completed worksheet (or something similar) with your completed plans and application.

4. Due to the structural complexity of multiple story houses and large single story Single Family Residential structures, these projects will be sent out for independent plan review if they are not stamped and signed by a California licensed Engineer or Architect.

Thank you for your cooperation in this required State of California building code plan review process.
When plans are submitted using the 2013 California Residential Code (CRC), and no engineering is provided, the following minimum requirements must appear on the submitted construction documents: From **CRC Section R106.1.1** Information on construction documents: all braced wall lines shall be identified on the construction documents and all pertinent information including, but not limited to, bracing methods, location and length of braced wall panels, foundation requirements of braced wall panels at top and bottom shall be provided. Parts of the following may reference the International Residential Code for examples and additional explanations. The current edition of the California Residential Code is what is required for design and is used in plan review.

Wall bracing provisions should meet the requirements of the California Residential Code (CRC), primarily Section R602.10. If the wall bracing provisions cannot be satisfied, then an engineered design shall be provided. Portions of the building that do not meet the items below must be designed by a California licensed architect or civil or structural engineer using accepted engineering practice. Wall bracing provisions may be applied to a new structure, remodel, or addition. For the ease of application, the following flowchart guides designers through the process of applying the wall bracing provisions:

1. Establish Design Criteria/Assumptions – The following are assumed for the design. If your project doesn’t meet the following items, see the referenced code sections for more information.
   a. Seismic Design Category (SDC) – D2 (Table R602.10.3(3))
   b. Wind Speed – 85 mph, Exposure B (Table R602.10.3(1), R301.2.1.4.3)
      i. Tree protected rural homes typically qualify as Exposure B. Homes in Mariposa County built on mountain tops, canyon sides and other high wind areas need to be classified in accordance with section R301.2.1.4 and Table R602.10.3(2).
   c. Braced Wall Panel (BWP) Material (Table R602.10.4)
      i. Wood Structural Panels (WSP) – 3/8” thick plywood or Oriented Strand Board (OSB) attached to framing with 8d common nails at 6” o.c. at the edges and 12” o.c. field nailing.
      ii. Continuous CS-WSP – Continuous Sheathed Wood Structural Panels requires the entire story be sheathed with WSPs, full height walls as well as above and below openings. Thickness and attachment same as WSP.
      iii. Gypsum Board (GB) – ½” gyp board nailed or screwed to framing at 7” on center. Fastener size per Table R702.3.5.
      iv. Portland Cement Plaster (PCP) – Stucco, framing spaced <= 16” o.c. and PCP is attached to all framing members at 6” o.c.
   d. Irregularities (R301.2.2.2.5) – If the home doesn’t meet the following irregularities, see the code section for design guidance
      i. Vertical irregularity – Limited to 4 times the nominal depth of the floor joists provided the following conditions are met
         1. Floor joists are nominal 2x10 or larger
2. The ratio of the backspan to cantilever is >= 2:1
3. Floor joists at the ends of BWPs are doubled
4. A continuous rim joist is connected to the ends of cantilevered joists.
5. Gravity loads are limited to uniform wall and roof loads and any headers in the wall must have a span <= 8’.

   ii. Floor or roof overhang – Limited to 6’
   iii. BWPs occurring over an opening in the wall below – Limited to 1’ without special detailing, may overlap an opening more than 1’ provided the following are met:
      1. The opening length is <= 8’
      2. The opening has a header of the following sizes:
         a. If the opening <= 4’, the header is one 2x12 or two 2x10s
         b. If the opening <= 6’, the header is two 2x12s or three 2x10s
         c. If the opening <= 8’, the header is three 2x12s or four 2x10s
   3. The entire length of the BWP does not occur over the opening

   iv. Roof or floor opening – limited to the lesser of 12’ or 50% of the least floor or roof dimension

   v. Roof vertical offset – Ok provided the framing is supported by continuous foundations at the perimeter of the building or the floor framing is lapped or tied together per Section R502.6.1

   vi. When BWLs do not occur in 2 perpendicular directions engineering is required

   vii. When masonry or concrete construction is used engineering is required. Exceptions: fireplaces, chimneys, and masonry veneer

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2. **Define Braced Wall Lines (BWLS) (R602.10.1)**
   a. BWLs are straight lines in each direction of the building that contain Braced Wall Panels (BWPs).
      BWLs are commonly all exterior walls and interior walls where required.
   b. Designer should identify BWLs on plan with grid lines
   c. For SDC D2, BWLs are required every 25’ (R602.10.1.3), exception: 35’ with increased amount of BWPs or 1 room exception, see aforementioned code section for more information
   d. BWPs may be offset 4’ in either direction from BWL (R602.10.1.2)

3. **Define Braced Wall Panels (BWPs) (R602.10.2.2, R602.10.2.3)**
   a. Must occur at corner for methods GB or PCP
   b. Must occur within 10’ of corners for WSP or CS-WSP provided:
      i. 1800 pound hold down is installed on end of BWP closest to the corner for WSP
      ii. 800 pound hold down is installed on end of BWP closest to the corner for CS-WSP
      iii. Or 24” WSP provided at corner in both directions for either WSP or CS-WSP
c. Spaced <= 20' edge to edge

d. Meet BWP min. lengths based on: wall height, special detailing
   i. WSP & PCP = 4' for 8-10' tall wall
   ii. GB = 4' for 8-10' tall walls, Double Sided GB’s contributing length = actual length (for example, 4' double sided GB = 4’ bracing), Single Sided GB’s contributing length = ½ actual length (for example, 4’ single sided GB = 2” bracing)
   iii. CS-WSP min length based on wall height and opening ht (Table R602.10.5) = 24-48” for 8-10’ tall wall
   iv. WSPs with hold downs qualify for shorter lengths, see code for details

- Figure 2 (Courtesy APA)

  e. Identify locations, lengths, types on plan view (create key if using different materials)

4. Define the required length of bracing per BWL in Wind and Seismic tables
   a. Check wind and seismic table, greater length controls
   b. Wind table excerpt for Wind Speed 85 mph

<table>
<thead>
<tr>
<th>Basic Wind Speed (mph)</th>
<th>Story Location</th>
<th>Braced Wall Line Spacing (feet)</th>
<th>Minimum Total Length (feet) of Braced Wall Panels Required Along Each Braced Wall Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Method GB</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>40</td>
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<td>11.5</td>
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<td>50</td>
<td></td>
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</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td>16.5</td>
</tr>
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<td>≤85</td>
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</tr>
<tr>
<td>10</td>
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<td></td>
<td>11.5</td>
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<tr>
<td>20</td>
<td></td>
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<td>16.5</td>
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<td></td>
<td></td>
<td>21.5</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td>31.5</td>
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</table>
c. Seismic table excerpt for SDC D2

<table>
<thead>
<tr>
<th>Seismic Design Category (SDC)</th>
<th>Minimum Total Length (feet) of Braced Wall Panels Required Along Each Braced Wall Line</th>
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<tbody>
<tr>
<td></td>
<td>Braced Wall Line Length (feet)</td>
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<tr>
<td>------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>SDC D₂</td>
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<td></td>
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<tr>
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<tr>
<td></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>

5. Add up BWPs per BWL in step 3 and compare to Step 4
   a. If Step 3 > Step 4, done
   b. If Step 3 < Step 4, add additional BWPs

6. Example 4.3 Reprinted from the “Guide to the 2012 IRC Wood Wall Bracing Provisions” with permission from ICC and APA.

Example 4.3: Two-story house in SDC D2
The basic wind speed is 85 mph with Exposure Category B. The roof has an eave-to-ridge height of 8 feet. Intermittent Method WSP (wood structural panel) will be used as the bracing material on the exterior braced wall lines. Intermittent Method GB (gypsum board) will be used on the interior braced wall lines. All braced walls have a height of 10 feet.

Example 4.3 highlights:
* The amount of bracing required based on the greater amount required by the ≤ 85 mph wind speed category and SDC D2.
* For a single-family dwelling located in SDC D0, D1 and D2, braced wall panels on the second floor cannot be placed over an opening on the first floor except in certain cases (IRC Section R301.2.2.2.5, Item 3, Exceptions).
* In SDC D0, D1 and D2, braced wall panels are not permitted to be located away from the ends of braced wall lines except in certain cases and only with Method WSP (IRC Section R602.10.2.2.1, Exceptions).
* For structures in SDC D0, D1 and D2, braced wall line spacing is limited to 25 feet (IRC Section R602.10.1.3 and Table R602.10.1.3).

Figures 4.3a and 4.3b show the house and braced wall segments for each story. Tables 4.3a and 4.3b summarize the amount of bracing required and the amount of bracing provided for each braced wall line on each story, based on wind and seismic requirements respectively.
FIGURE 4.3a
First-story plan with intermittent Methods WSP (wood structural panel) and GB (gypsum board) braced wall panels

FIGURE 4.3b
Second-story plan with intermittent Methods WSP (wood structural panel) and GB (gypsum board) braced wall panels
### Wind Calculations

<table>
<thead>
<tr>
<th>IRC Tobie R602.10.3(2)</th>
<th>Numbered Wall lines</th>
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<td>Exposure Category</td>
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<td>Roof Eave-to-Ridge Height</td>
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<td>Wall Height</td>
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<td>Number of Braced Wall Lines</td>
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<th>Required Bracing (ft)</th>
<th>Wind Factor Total</th>
<th>Total Required Bracing length (ft)</th>
<th>Bracing length Provided (ft)</th>
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### Seismic Calculations

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<tr>
<td>Story Height</td>
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<td>Roof/Ceiling Dead Load</td>
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<tr>
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</tr>
<tr>
<td>Cripple Wall</td>
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<td>Seismic Factor Total</td>
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<th>Bracing Method</th>
<th>Braced Wall line length (ft)</th>
<th>Required Bracing Factor</th>
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<th>Total Required Bracing length (ft)</th>
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### TABLE 4.3b

Calculations for the second of two stories to determine the required bracing length based on wind speed and Seismic Design Category

#### WIND CALCULATIONS

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<th>Numbered Wall Lines</th>
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<td>Roof Eave-to-Ridge Height</td>
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#### SEISMIC CALCULATIONS

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<tr>
<td>Roof/Ceiling Dead Load</td>
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<td>Stone/Masonry in SOC C-O</td>
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<tr>
<td>CrippleWall</td>
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<th>Required Bracing (ft)</th>
<th>Braced Wall Line Spacing Factor</th>
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PRESCRIPTIVE WALL BRACING WORKSHEET

See Residential Wall Bracing Guide for step-by-step instructions on how to use this worksheet

WIND ADJUSTMENT FACTORS

Table R602.10.1.2(1) assumes wind exposure category B, 30 ft mean roof height, 10 ft eave to ridge height, 10 ft wall height, and 2 braced wall lines sharing load in a given plan direction on a given story level. For any other conditions, apply the appropriate adjustment factors.

EXPOSURE FACTOR - select adjustment factor based on exposure and story height:
(Exposure B is typical. Exposure C only occurs where exposed to open terrain such as shorelines)

Exposure B - 1 story = 1.0  - 2 story = 1.0  - 3 story = 1.0
Exposure C - 1 story = 1.2  - 2 story = 1.3  - 3 story = 1.4

EAVE HEIGHT FACTOR - select support condition & height to determine adjustment factor:

<table>
<thead>
<tr>
<th>Support Condition</th>
<th>Roof Eave To Ridge Height</th>
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<tbody>
<tr>
<td>1 Story or Top Story of 2 or 3 Story</td>
<td>≤ 5 ft</td>
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<tr>
<td>1.0</td>
<td>0.7</td>
</tr>
<tr>
<td>1.0</td>
<td>0.85</td>
</tr>
<tr>
<td>1.0</td>
<td>0.90</td>
</tr>
</tbody>
</table>

WALL HEIGHT FACTOR - select adjustment factor based on ceiling height:
- 8 Ft Ceiling = 0.90  - 9 Ft Ceiling = 0.95  - 10 Ft Ceiling = 1.0
- 11 Ft Ceiling = 1.05  - 12 Ft Ceiling = 1.10

NO. OF BRACED WALL LINES FACTOR - select adjustment factor based on number of braced wall lines:
- 2 Wall Lines: 1.0  - 3 Wall Lines: 1.30  - 4 Wall Lines: 1.45  - 5 Wall Lines: 1.60

TOTAL GENERAL WIND ADJUSTMENT FACTORS
Multiply all of the above adjustment factors for each story:

SPECIFIC WIND ADJUSTMENT FACTORS - Specific to certain types of bracing methods or building conditions:

GYPSUM WALL BOARD FACTOR - Apply 1.4 adjustment factor if all the following conditions occur:
- Bracing method is either DWB, WSP, FSB, PBS, PCP or HPS and
- Gypsum board is not applied to inside face of braced wall panels.

@ Braced Wall Lines @ Story

GYPSUM WALL BOARD BRACING METHOD - Apply 0.7 adjustment factor if all of the following conditions are met:
- Bracing method is GB and
- Gypsum board is attached with 4" spacing at panel edges, including top and bottom plates and
- Blocking is provided at all horizontal joints.

@ Braced Wall Lines @ Story

ONE SIDED GYPSUM WALL BOARD FACTOR - Apply 2.0 adjustment factor if all of the following conditions are met:
- Bracing method is GB and
- Gypsum board is only attached to one side.

@ Braced Wall Lines @ Story

HOLD DOWN FACTOR - Apply 0.8 adjustment factor if all of the following conditions are met:
- Bracing method is DWB, WSP, SFB, PBS, PCP and HPS methods and
- Limited to 1 story buildings or top story of 2 or 3 story buildings and
- 800# hold down installed at each end of braced wall panels along the braced wall line.

@ Braced Wall Lines @ Story

CRIPPLE WALL BRACING - Apply 1.15 adjustment factor if cripple walls occur
Wall panel spacing shall be decreased to 18 ft. See additional requirements in Section 602.10.9.1

@ Braced Wall Lines

All information in this document is subject to change.
SEISMIC ADJUSTMENT FACTORS

STORY HEIGHT FACTOR - Select the adjustment factor based on story height

\[
\begin{align*}
\leq 10 \text{ ft} & = 1.0 \\
\leq 11 \text{ ft} & = 1.1 \\
\leq 12 \text{ ft} & = 1.2
\end{align*}
\]

All Wall Lines

BRACED WALL LINE SPACING FACTOR - Select the adjustment factor if braced wall line spacing is greater than 25 ft. The spacing can only exceed 25 ft to accommodate 1 single room not exceeding 900 SF. When a braced wall line has a parallel braced wall line on both sides, the larger adjustment factor shall be used. See additional requirements in Section 602.10.1.5

\[
\begin{align*}
\leq 25 \text{ ft} & = 1.0 \\
\leq 30 \text{ ft} & = 1.2 \\
\leq 35 \text{ ft} & = 1.4
\end{align*}
\]

@ Braced Wall Lines
@ Story

@ Braced Wall Lines
@ Story

GYPSUM WALL BOARD FACTOR - Apply 1.5 adjustment factor if all the following conditions occur:
- Bracing method is either DWB, WSP, FSB, PBS, PCR or HPS and
- Gypsum board is not applied to inside face of braced wall panels.

@ Braced Wall Lines
@ Story

WALL DEAD LOAD FACTOR - Apply 0.85 adjustment factor if wall dead load is less than or equal to 8 psf. (This applies only to interior walls with gypsum board on each side.)

@ Braced Wall Lines
@ Story

ROOF/CEILING DEAD LOAD FACTOR FOR WALL SUPPORTING - Select adjustment factor based on the roof/ceiling dead load and wall support condition. (Typical composition or metal roof covering will have a roof dead load ≤ 15 psf if no ceiling finish is installed. The addition of a finished ceiling will increase the dead load to > 15 psf).

<table>
<thead>
<tr>
<th>Wall Supporting</th>
<th>Roof/Ceiling Dead Load</th>
<th>Adj. Factor</th>
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<tbody>
<tr>
<td>Roof Only</td>
<td>≤ 15 psf</td>
<td>1.0</td>
</tr>
<tr>
<td>Roof Only</td>
<td>&gt;15 psf ≤ 25 psf</td>
<td>1.1</td>
</tr>
<tr>
<td>Roof plus Occupied Attic</td>
<td>&gt; 15 psf &lt; 25 psf</td>
<td>1.2</td>
</tr>
</tbody>
</table>

@ Braced Wall Lines
@ Story

CRIPPLE WALL BRACING - Apply 1.15 adjustment factor if cripple walls occur.
Wall panel spacing shall be decreased to 18 ft. See additional requirements in Section 602.10.9.1

@ Braced Wall Lines
@ Story

WALLS WITH STONE OR MASONRY VENEER
See Section 602.12 and 703.7. Braced wall length shall not be less than required by Table 602.12(2)
### TABLE EXAMPLE

#### WIND CALCULATIONS

<table>
<thead>
<tr>
<th>IRC Table R602.10.3(2) Wind Adjustment Factors (TABLE 3.4)</th>
<th>Numbered Wall Lines</th>
<th>Lettered Wall Lines</th>
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<td>Exposure Category</td>
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<tr>
<td>Roof Eave-to-Ridge Height</td>
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<td>0.94</td>
</tr>
<tr>
<td>Wall Height</td>
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<tr>
<td>Number of Braced Wall Lines</td>
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<tr>
<td>Wind Factor Total</td>
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<th>Required Bracing (ft)</th>
<th>Wind Factor Total</th>
<th>Total Required Bracing Length (ft)</th>
<th>Bracing Length Provided (ft)</th>
<th>Status</th>
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#### SEISMIC CALCULATIONS

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<th>Adjustments</th>
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<td>Story Height</td>
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<tr>
<td>Wall Dead Load</td>
<td>1.00</td>
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<tr>
<td>Roof/Ceiling Dead Load</td>
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<td>Stone/Masonry in SDC C-D2</td>
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<tr>
<td>Cripple Wall</td>
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<th>Required Bracing (ft)</th>
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<td>13.75</td>
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</table>

Please follow this example when you calculate the required length of bracing on your plans.
CALCULATIONS FOR LENGTH OF BRACED WALL PANELS

Multiply all adjustment factors and the required wall bracing lengths to determine the total adjusted wall bracing length for each wall line for wind and for seismic. The bracing length provided shall be equal to or greater than the higher of the two. Provide a separate calculation for each story.

WIND CALCULATION  Refer to Table R602.10.1.2 (1)

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<th>Bracing Method</th>
<th>Braced Wall Line Spacing</th>
<th>Required Bracing Length</th>
<th>General Wind Adjustment Factor</th>
<th>Specific Wind Adjustment Factor(s) *</th>
<th>Total Adjusted Bracing Length (Required Bracing Length X All Adjustment Factors)</th>
<th>Bracing Length Provided</th>
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* A braced wall line may have more than one specific wind adjustment factor.

SEISMIC CALCULATION  Refer to Table R602.10.1.2 (2)

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<th>Bracing Method</th>
<th>Braced Wall Line Length</th>
<th>Required Bracing Length</th>
<th>Seismic Adjustment Factor(s) *</th>
<th>Total Adjusted Bracing Length (Required Bracing Length X All Adjustment Factors)</th>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

* A braced wall line may have more than one seismic adjustment factor. Show all adjustment factors.

All information in this document is subject to change.
Residential “Wildland Urban Interface” (W.U.I.) new construction requirements and clarification for Mariposa County per the 2016 California Residential Code.

CRC section R337 “materials and construction methods for exterior wildfire exposure” is attached.

Roofs: Class A roof covering is allowed. For Class B and less, please verify in California State Fire Marshal product listing http://osfm.fire.ca.gov for approved systems. Ridge venting that is a part of the class A roof covering is allowed. Metal valley flashing (26ga) needs one layer of # 72 ASTM cap sheet installed underneath. Roof gutters (metal or plastic) need debris covering (wire or plastic mesh, etc.)

Attic Vents: “shall be protected by corrosion-resistant, noncombustible wire mesh with 1/8 - inch openings (max) or its equivalent”. Eave and cornice vents may not be used unless they resist the intrusion of flame and burning embers (the SFM listed vents) into the attic area of the structure. Gable end vents shall be protected by corrosion resistant, non-combustible wire mesh with 1/8 inch openings max, or its equivalent.

Under Floor Vents: “shall be protected by corrosion-resistant, noncombustible wire mesh with 1/8 - inch openings max, or its equivalent”.

Eaves: Standard exposed rafter tail framing with solid 2x bird blocking for the eaves are allowed. Eave and cornice vents may not be used unless they “resist the intrusion of flame and burning embers (the SFM listed vents) into the attic area of the structure”. If you enclose the rafter tails (a soffit) you must use noncombustible materials and if you vent it you must use vents that resist the intrusion of flame and burning embers (the SFM listed vents).

Exterior walls: “Exterior walls shall be approved noncombustible or ignition-resistant material” “HardiePlank”, APA 303 T1-11, SFM 12-7A-1, etc. Note: It is the permit holder’s responsibility to present the building inspector with written evidence that the siding of choice meets California State Fire Marshal requirements http://osfm.fire.ca.gov at the time of siding inspection. Non-listed siding material will not be allowed. Non-rated window, door and corner trim is allowed.

Exterior windows: All exterior windows shall be insulating-glass units with at least one tempered pane in all window sections.

Exterior doors: All exterior doors shall be at least a 20 minute fire-resistance rating or equivalent (solid wood 1 3/8” thick). Raised panel solid wood doors with a tapered tongue less than 1 ¼” thick are approved (SFM standard 12-7A-1) Noncombustible vehicle access doors are allowed.

Decking Surfaces: Decking, surfaces, stair treads, risers, and landings of decks, porches, and balconies where any portion of such surface is within 10 feet of the primary structure shall be approved ignition resistant or noncombustible materials. Standard and pressure treated 2x and greater deck framing material is allowed (SFM interpretation 09-024 “CBC Ch 7A has no requirements that apply to deck support structures (joists, framing, posts, etc.).”

Under-floor Appendages: The underside of kickouts and appendages (not decks) shall maintain the ignition-resistant integrity of the exterior walls.

Accessory Structures: Miscellaneous and accessory structures are per R337.10 (attached). Be aware that if you convert a non-habitable structure built after January 2008 to a habitable structure, all of the above will apply.

The above requirements are not all-inclusive. It is the permit holder’s responsibly to know all of the regulations.

Revised per 2016 California Residential Code.
b. A large family day-care home shall not be subject to the provisions of Division 13 (commencing with Section 21000) of the Public Resources Code.

c. Use of a single-family dwelling for the purposes of a large family day-care home shall not constitute a change of occupancy for purposes of Part 1.5 (commencing with Section 17910) of Division 13 (State Housing Law), or for purposes of local building and fire codes.

d. Large family day-care homes shall be considered as single-family residences for the purposes of the State Uniform Building Standards Code and local building and fire codes, except with respect to any additional standards specifically designed to promote the fire and life safety of the children in these homes adopted by the State Fire Marshal pursuant to this subdivision.

R336.3 Smoke alarms. Large family day-care homes shall be equipped with State Fire Marshal approved and listed single station residential type smoke alarms. The number and placement of smoke alarms shall be determined by the enforcement authority.

R336.4 Fire extinguishers. Large and small family day-care homes shall be equipped with a portable fire extinguisher having a minimum 2A10BC rating.

R336.5 Fire alarm devices. Every large family day-care home shall be provided with at least one manual device at a location approved by the authority having jurisdiction. Such device shall actuate a fire alarm signal, which shall be audible throughout the facility at a minimum level of 15 db above ambient noise level. These devices need not be interconnected to any other fire alarm device, have a control panel or be electrically supervised or provided with emergency power. Such device or devices shall be attached to the structure and may be of any type acceptable to the enforcing agent, providing that such devices are distinct in tone and are audible throughout the structure.

R336.6 Compliance. Every large family day-care home shall comply with the provisions for Group R-3 occupancies and, if appropriate, Section R336.1. For the purposes of Section R336.1, the first story shall be designated as the floor used for residential occupancy nearest to the street level which provides primary access to the building.

Enforcement of the provisions shall be in accordance with the Health and Safety Code Sections 13145 and 13146. No city, county, city and county, or district shall adopt or enforce any building ordinance or local rule or regulation relating to the subject of fire and life safety in large-family day-care homes which is inconsistent with those standards adopted by the State Fire Marshal, except to the extent the building ordinance or local rule or regulation applies to single-family residences in which day care is not provided.

R336.7 Special hazards. Every unenclosed gas-fired water heater or furnace which is within the area used for child care in a large family day-care home shall be protected in such a way as to prevent children from making contact with those appliances.

Exception: This does not apply to kitchen stoves or ovens.

R336.8 Exiting. Every story or basement of a large family day-care home shall be provided with two exits which are remotely located from each other. Every required exit shall be of a size to permit the installation of a door not less than 32 inches (813 mm) in clear width and not less than 6 feet 8 inches (2032 mm) in height. A manually operated horizontal sliding door may be used as one of the two required exits.

Where basements are used for day-care purposes, one of the two required exits shall provide access directly to the exterior without entering the first story. The second exit from the basement may either pass through the story above or exit directly to the exterior.

Rooms used for day-care purposes shall not be located above the first story.

Exception: Buildings equipped with an automatic sprinkler system throughout and which have at least one of the required exits providing access directly to the exterior. NFPA 13R may be used in large family day-care homes. The sprinkler omissions of NFPA 13R shall not apply unless approved by the enforcing agency.

Exit doors, including manually operated horizontal sliding doors, shall be operable from the inside without use of a key or any special knowledge or effort.

SECTION R337
MATERIALS AND CONSTRUCTION METHODS FOR EXTERIOR WILDFIRE EXPOSURE

SECTION R337.1
SCOPE, PURPOSE AND APPLICATION

R337.1.1 Scope. This chapter applies to building materials, systems and or assemblies used in the exterior design and construction of new buildings located within a Wildland-Urban Interface Fire Area as defined in Section R337.2A.

R337.1.2 Purpose. The purpose of this chapter is to establish minimum standards for the protection of life and property by increasing the ability of a building located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland-Urban Interface Fire Area to resist the intrusion of flame or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses.

R337.1.3 Application. New buildings located in any Fire Hazard Severity Zone or any Wildland-Urban Interface Fire Area designated by the enforcing agency constructed
after the application date shall comply with the provisions of this chapter.

Exceptions:

1. Buildings of an accessory character classified as a Group U occupancy and not exceeding 120 square feet in floor area, when located at least 30 feet from an applicable building.

2. Buildings of an accessory character classified as Group U occupancy of any size located at least 50 feet from an applicable building.

3. Buildings classified as a Group U Agricultural Building, as defined in Section 202 of this code (see also Appendix C – Group U Agricultural Buildings), when located at least 50 feet from an applicable building.

4. Additions to and remodels of buildings originally constructed prior to the applicable application date.

R337.1.3.1 Application date and where required. New buildings for which an application for a building permit is submitted on or after July 1, 2008 located in any Fire Hazard Severity Zone or Wildland Interface Fire Area shall comply with all sections of this chapter, including all of the following areas:

1. All unincorporated lands designated by the State Board of Forestry and Fire Protection as State Responsibility Area (SRA) including:
   1.1. Moderate Fire Hazard Severity Zones
   1.2. High Fire Hazard Severity Zones
   1.3. Very-High Fire Hazard Severity Zones

2. Land designated as Very-High Fire Hazard Severity Zone by cities and other local agencies.

3. Land designated as Wildland Interface Fire Area by cities and other local agencies.

Exceptions:

1. New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas, for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all sections of this chapter.

2. New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland Interface Fire Area designated by cities and other local agencies for which an application for a building permit is submitted on or after December 1, 2005 but prior to July 1, 2008, shall only comply with the following sections of this chapter:
   2.1. Section R337.5 – Roofing
   2.2. Section R337.6 – Vents

R337.1.4 Inspection and certification. Building permit applications and final completion approvals for buildings within the scope and application of this chapter shall comply with the following:

1. Building permit issuance. The local building official shall, prior to construction, provide the owner or applicant a certification that the building as proposed to be built complies with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this chapter. Issuance of a building permit by the local building official for the proposed building shall be considered as complying with this section.

2. Building permit final. The local building official shall, upon completion of construction, provide the owner or applicant with a copy of the final inspection report that demonstrates the building was constructed in compliance with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this chapter. Issuance of a certificate of occupancy by the local building official for the proposed building shall be considered as complying with this section.

R337.1.5 Vegetation management compliance. Prior to building permit final approval, the property shall be in compliance with the vegetation management requirements prescribed in California Fire Code Section 4906, including California Public Resources Code 4291 or California Government Code Section 51182. Acceptable methods of compliance inspection and documentation shall be determined by the enforcing agency and may include any of the following:

1. Local, state, or federal fire authority or designee authorized to enforce vegetation management requirements.

2. Enforcing agency.

3. Third party inspection and certification authorized to enforce vegetation management requirements.

4. Property owner certification authorized by the enforcing agency.

SECTION R337.2
DEFINITIONS

For the purposes of this chapter, certain terms are defined below:

CDF DIRECTOR means the Director of the California Department of Forestry and Fire Protection.

EXTERIOR COVERING. The exposed siding or cladding material applied to the exterior side of an exterior wall, roof eave soffit, floor projection or exposed underfloor framing.
FIRE PROTECTION PLAN is a document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure. The fire protection plan shall be in accordance with this chapter and the California Fire Code, Chapter 49. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted. Only locally adopted ordinances that have been filed with the California Building Standards Commission or the Department of Housing and Community Development in accordance with Section 1.1.8 shall apply.

FIRE HAZARD SEVERITY ZONES are geographical areas designated pursuant to California Public Resources Codes Sections 4201 through 4204 and classified as Very-High, High, or Moderate in State Responsibility Areas or as Local Agency Very-High Fire Hazard Severity Zones designated pursuant to California Government Code Sections 51175 through 51189. See California Fire Code Article 86.

The California Code of Regulations, Title 14, Section 1280 entitles the maps of these geographical areas as "Maps of the Fire Hazard Severity Zones in the State Responsibility Area of California."

HEAVY TIMBER. A type of construction classification specified in Section R602. For use in this chapter, heavy timber shall be sawn lumber or glue laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Heavy timber walls or floors shall be sawn or glue-laminated planks splined, tongue-and-groove, or set close together and well spiked.

IGNITION-RESISTANT MATERIAL. A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames, as prescribed in Section R337.3 and SFM Standard 12-7A-5, Ignition-Resistant Material.

LOCAL AGENCY VERY-HIGH FIRE HAZARD SEVERITY ZONE means an area designated by a local agency upon the recommendation of the CDF Director pursuant to Government Code Sections 51177(c), 51178, and 5118 that is not a state responsibility area and where a local agency, city, county, city and county, or district is responsible for fire protection.

LOG WALL CONSTRUCTION. A type of construction in which exterior walls are constructed of solid wood members and where the smallest horizontal dimension of each solid wood member is at least 6 inches (152 mm).

RAFTER TAIL. The portion of roof rafter framing in a sloping roof assembly that projects beyond and overhangs an exterior wall.

ROOF EAVE. The lower portion of a sloping roof assembly that projects beyond and overhangs an exterior wall at the lower end of the rafter tails. Roof eaves may be either "open" or "enclosed." Open roof eaves have exposed rafter tails and an unenclosed space on the underside of the roof deck.

Enclosed roof eaves have a boxed-in roof eave soffit with a horizontal underside or sloping rafter tails with an exterior covering applied to the underside of the rafter tails.

ROOF EAVE SOFFIT. An enclosed boxed-in soffit under a roof eave with exterior covering material applied to the soffit framing creating a horizontal surface on the exposed underside.

STATE RESPONSIBILITY AREA means lands that are classified by the Board of Forestry pursuant to Public Resources Code Section 4125 where the financial responsibility of preventing and suppressing forest fires is primarily the responsibility of the state.

WILDFIRE is any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property or resources as defined in Public Resources Code Sections 4103 and 4104.

WILDFIRE EXPOSURE is one or a combination of radiant heat, convective heat, direct flame contact and burning embers being projected by vegetation fire to a structure and its immediate environment.

WILDLAND-URBAN INTERFACE FIRE AREA is a geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires.

SECTION R337.3
STANDARDS OF QUALITY

R337.3.1 General. Building material, systems, assemblies and methods of construction used in this chapter shall be in accordance with Section R337.3.

R337.3.2 Qualification by testing. Material and material assemblies tested in accordance with the requirements of Section R337.3 shall be accepted for use when the results and conditions of those tests are met. Product evaluation testing of material and material assemblies shall be approved or listed by the State Fire Marshal, or identified in a current report issued by an approved agency.

R337.3.3 Approved agency. Product evaluation testing shall be performed by an approved agency as defined in Section 1702 of the California Building Code. The scope of accreditation for the approved agency shall include building product compliance with code.

R337.3.4 Labeling. Material and material assemblies tested in accordance with the requirements of Section R337.3 shall bear an identification label showing the fire test results. That identification label shall be issued by a testing and/or inspecting agency approved by the State Fire Marshal.

1. Identification mark of the approved testing and/or inspecting agency.
2. Contact and identification information of the manufacturer.
3. Model number or identification of the product or material.

4. Pre-test weathering specified in this chapter.

5. Compliance standard as described under Section R337.3.7.

R337.3.5 Weathering and surface treatment protection.

R337.3.5.1 General. Material and material assemblies tested in accordance with the requirements of Section R337.3 shall maintain their fire test performance under conditions of use when installed in accordance with the manufacturers instructions.

R337.3.5.2 Weathering. Fire-retardant-treated wood and fire-retardant-treated wood shingles and shakes shall meet the fire test performance requirements of this chapter after being subjected to the weathering conditions contained in the following standards, as applicable to the materials and the conditions of use.

R337.3.5.2.1 Fire-retardant-treated wood. Fire-retardant-treated wood shall be tested in accordance with ASTM D2898, “Standard Practice for Accelerated Weathering of Fire- Retardant Treated Wood for Fire Testing (Method A)” and the requirements of Section 2303.2 of the California Building Code.

R337.3.5.2.2 Fire-retardant-treated wood shingles and shakes. Fire-retardant-treated wood shingles and shakes shall be approved and listed by the State Fire Marshal in accordance with Section 208(c), Title 19 California Code of Regulations.

R337.3.5.3 Surface treatment protection. The use of paints, coatings, stains, or other surface treatments are not an approved method of protection as required in this section.

R337.3.6 Alternates for materials, design, tests and methods of construction. The enforcing agency is permitted to modify the provisions of this chapter for site-specific conditions in accordance with Section 111.2.4. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted in accordance with the California Fire Code, Chapter 49.

R337.3.7 Standards of quality. The State Fire Marshal standards for exterior wildfire exposure protection listed below and as referenced in this chapter are located in the California Referenced Standards Code, Part 12 and Chapter 35 of this code.

SFM Standard 12-7A-1, Exterior Wall Siding and Sheathing. A fire resistance test standard consisting of a 150 kW intensity direct flame exposure for a 10 minutes duration.

SFM Standard 12-7A-2, Exterior Windows. A fire resistance test standard consisting of a 150 kW intensity direct flame exposure for a 8 minutes duration.

SFM Standard 12-7A-3, Horizontal Projection Underside. A fire resistance test standard consisting of a 300 kW intensity direct flame exposure for a 10 minute duration.

SFM Standard 12-7A-4, Decking. A two-part test consisting of a heat release rate (Part A) deck assembly combustion test with an under deck exposure of 80 kW intensity direct flame for a 3 minute duration, and a (Part B) sustained deck assembly combustion test consisting of a deck upper surface burning ember exposure with a 12 mph wind for 40 minutes using a 2.2 lb (1 kg) burning “Class A” size 12” x 12” x 2.25” (300 mm x 300 mm x 57 mm) roof test brand.

SFM Standard 12-7A-4A, Decking Alternate Method. A heat release rate deck assembly combustion test with an under deck exposure of 80 kW intensity direct flame for a 3 minute duration.

SFM Standard 12-7A-5, Ignition-Resistant Material. A generic building material surface burning flame spread test standard consisting of an extended 30 minute ASTM E84 or UL 723 test method as is used for Fire-Retardant-Treated wood.

SECTION R337.4

IGNITION RESISTANT CONSTRUCTION

R337.4.1 General. The materials prescribed herein for ignition resistance shall conform to the requirements of this chapter.

R337.4.2 Ignition-resistant material. Ignition-resistant material shall be determined in accordance with the test procedures set forth in SFM Standard 12-7A-5 “Ignition-Resistant Material” or in accordance with this section.

R337.4.3 Alternative methods for determining ignition-resistant material. Any one of the following shall be accepted as meeting the definition of ignition-resistant material:

1. Noncombustible material. Material that complies with the definition for noncombustible materials in Section 202.

2. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use that complies with the requirements of Section 2303.2 of the California Building Code.

3. Fire-retardant-treated wood shingles and shakes. Fire-retardant-treated wood shingles and shakes, as defined in Section 1503.6 of the California Building Code and listed by State Fire Marshall for use as “Class B” roof covering, shall be accepted as an Ignition-resistant wall covering material when installed over solid sheathing.

SECTION R337.5

ROOFING

R337.5.1 General. Roofs shall comply with the requirements of Sections R337 and R902. Roofs shall have a roof-
ing assembly installed in accordance with its listing and the manufacturer's installation instructions.

**R337.5.2 Roof coverings.** Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be firestopped with approved materials or have one layer of minimum 72-pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909 installed over the combustible decking.

**R337.5.3 Roof valleys.** Where valley flashing is installed, the flashing shall be not less than 0.019-inch (0.48 mm) No. 26 gage galvanized sheet corrosion-resistant metal installed over not less than one layer of minimum 72-pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909, at least 36-inch-wide (914 mm) running the full length of the valley.

**R337.5.4 Roof gutters.** Roof gutters shall be provided with the means to prevent the accumulation of leaves and debris in the gutter.

### SECTION R337.6 VENTS

**R337.6.1 General.** Where provided, ventilation openings for enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation shall be in accordance with Section 1203 of the California Building Code and Sections R337.6.1 through R337.6.3 of this section to resist building ignition from the intrusion of burning embers and flame through the ventilation opening.

**R337.6.2 Requirements.** Ventilation openings for enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation openings shall be fully covered with metal wire mesh, vents, other materials, or other devices that meet one of the following requirements:

1. Listed vents complying with ASTM E2886 with the following test results:
   1.1. The Ember Intrusion Test shall have no flaming ignition of the cotton material.
   1.2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

2. Vents complying with all of the following:
   2.1. The dimensions of the openings therein shall be a minimum of 1/16 inch (1.6 mm) and shall not exceed 1/8 inch (3.2 mm).
   2.2. The materials used shall be noncombustible.

   **Exception:** Vents located under the roof covering, along the ridge of roofs, with the exposed surface of the vent covered by noncombustible wire mesh, may be of combustible materials.

2.3. The materials used shall be corrosion resistant.

**R337.6.3 Ventilation openings on the underside of eaves and cornices.** Vents shall not be installed on the underside of eaves and cornices.

**Exceptions:**

1. Listed vents complying with ASTM E2886 with the following test results:
   1.1. The Ember Intrusion Test shall have no flaming ignition of the cotton material.
   1.2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

2. The enforcing agency may accept or approve special eave and cornice vents that resist the intrusion of flame and burning embers.

3. Vents complying with the requirements of Section R337.6.2 may be installed on the underside of eaves and cornices in accordance with either one of the following conditions:
   3.1. The attic space being ventilated is fully protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 of the California Building Code or,
   3.2. The exterior wall covering and exposed underside of the eave are of noncombustible material, or ignition-resistant materials as determined in accordance with SFM Standard 12-7A-5 Ignition-Resistant Material and the vent is located more than 12 feet from the ground or walking surface of a deck, porch, patio, or similar surface.

### SECTION R337.7 EXTERIOR COVERING

**R337.7.1 Scope.** The provisions of this section shall govern the materials and construction methods used to resist building ignition and safeguard against the intrusion of flames resulting from small ember and short-term direct flame contact exposure.

**R337.7.2 General.** The following exterior covering materials and/or assemblies shall comply with this section:

1. Exterior wall covering material.
2. Exterior wall assembly.
3. Exterior exposed underside of roof eave overhangs.
4. Exterior exposed underside of roof eave soffits.
5. Exposed underside of exterior porch ceilings.
7. Exterior underfloor areas.

Exceptions:

1. Exterior wall architectural trim, embellishments, fascias and gutters.
2. Roof or wall top cornice projections and similar assemblies.
3. Roof assembly projections over gable end walls.
4. Solid wood rafter tails and solid wood blocking installed between rafters having minimum dimension 2 inch (50.8 mm) nominal.
5. Deck walking surfaces shall comply with Section R337.9 only.

R337.7.3 Exterior walls. The exterior wall covering or wall assembly shall comply with one of the following requirements:

1. Noncombustible material.
2. Ignition-resistant material.
3. Heavy timber exterior wall assembly.
4. Log wall construction assembly.
5. Wall assemblies that meet the performance criteria in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in SFM Standard 12-7A-1.

Exception: Any of the following shall be deemed to meet the assembly performance criteria and intent of this section:

1. One layer of 1/4-inch Type X gypsum sheathing applied behind the exterior covering or cladding on the exterior side of the framing.
2. The exterior portion of a 1-hour fire resistive exterior wall assembly designed for exterior fire exposure including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.

R337.7.3.1 Extent of exterior wall covering. Exterior wall coverings shall extend from the top of the foundation to the roof, and terminate at 2 inch (50.8 mm) nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.

R337.7.4 Open roof eaves. The exposed roof deck on the underside of unenclosed roof eaves shall consist of one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 1/4-inch Type X gypsum sheathing applied behind an exterior covering on the underside of the roof deck.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the roof deck designed for exterior fire exposure including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.

Exceptions: The following materials do not require protection:

1. Solid wood rafter tails on the exposed underside of open roof eaves having a minimum nominal dimension of 2 inch (50.8 mm).
2. Solid wood blocking installed between rafter tails on the exposed underside of open roof eaves having a minimum nominal dimension of 2 inch (50.8 mm).
3. Gable end overhangs and roof assembly projections beyond an exterior wall other than at the lower end of the rafter tails.
4. Fascia and other architectural trim boards.

R337.7.5 Enclosed roof eaves and roof eave soffits. The exposed underside of enclosed roof eaves having either a boxed-in roof eave soffit with a horizontal underside, or sloping rafter tails with an exterior covering applied to the underside of the rafter tails, shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 1/4-inch Type X gypsum sheathing applied behind an exterior covering on the underside of the rafter tails or soffit.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the rafter tails or soffit including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. Boxed-in roof eave soffit assemblies with a horizontal underside that meet the performance criteria in accordance with the test procedures set forth in either of the following:
   5.1. SFM Standard 12-7A-3; or
   5.2. ASTM E2957

Exceptions: The following materials do not require protection:

1. Gable end overhangs and roof assembly projections beyond an exterior wall other than at the lower end of the rafter tails.
2. Fascia and other architectural trim boards.

R337.7.6 Exterior porch ceilings. The exposed underside of exterior porch ceilings shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 1/4-inch Type X gypsum sheathing applied behind the exterior covering on the underside of the ceiling.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the ceiling.
assembly including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.

5. Porch ceiling assemblies with a horizontal underside that meet the performance criteria in accordance with the test procedures set forth in either of the following:
   5.1. SFM Standard 12-7A-3; or
   5.2. ASTM E2957

Exception: Architectural trim boards.

R337.7.7 Floor projections. The exposed underside of a cantilevered floor projection where a floor assembly extends over an exterior wall shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 7/16-inch Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor projection including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. The underside of a floor projection assembly that meet the performance criteria in accordance with the test procedures set forth in either of the following:
   5.1. SFM Standard 12-7A-3; or
   5.2. ASTM E2957

Exception: Architectural trim boards.

R337.7.8 Underfloor protection. The underfloor area of elevated or overhanging buildings shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall consist of one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 7/16-inch Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. The underside of a floor assembly that meets the performance criteria in accordance with the test procedures set forth in either of the following:
   5.1. SFM Standard 12-7A-3; or
   5.2. ASTM E2957

Exception: Heavy-timber structural columns and beams do not require protection.

R337.7.9 Underside of appendages. When required by the enforcing agency the underside of overhanging appendages shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall consist of one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 7/16-inch Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. The underside of a floor assembly that meets the performance criteria in accordance with the test procedures set forth in either of the following:
   5.1. SFM Standard 12-7A-3; or
   5.2. ASTM E2957

Exception: Heavy-timber structural columns and beams do not require protection.

SECTION R337.8
EXTERIOR WINDOWS AND DOORS

R337.8.1 General.

R337.8.2 Exterior glazing. The following exterior glazing materials and/or assemblies shall comply with this section:

1. Exterior windows.
2. Exterior glazed doors.
3. Glazed openings within exterior doors.
4. Glazed openings within exterior garage doors.
5. Exterior structural glass veneer.

R337.8.2.1 Exterior windows and exterior glazed door assembly requirements. Exterior windows and exterior glazed door assemblies shall comply with one of the following requirements:

1. Be constructed of multipane glazing with a minimum of one tempered pane meeting the requirements of Section R308 Safety Glazing, or
2. Be constructed of glass block units, or
3. Have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 257, or
4. Be tested to meet the performance requirements of SFM Standard 12-7A-2.

R337.8.2.2 Structural glass veneer. The wall assembly behind structural glass veneer shall comply with Section R337.7.3.
R337.8.3 Exterior doors. Exterior doors shall comply with one of the following:

1. The exterior surface or cladding shall be of noncombustible or Ignition-resistant material, or
2. Shall be constructed of solid core wood that comply with the following requirements:
   2.1. Stiles and rails shall not be less than 1 1/8 inches thick
   2.2. Raised panels shall not be less than 1 1/4 inches thick, except for the exterior perimeter of the raised panel that may taper to a tongue not less than 1/8 inch thick.
3. Shall have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 252.
4. Shall be tested to meet the performance requirements of SFM Standard 12-7A-1.

R337.8.3.1 Exterior door glazing. Glazing in exterior doors shall comply with Section R337.8.2.1.

SECTION R337.9 DECKING

R337.9.1 General. The walking surface material of decks, porches, balconies and stairs shall comply with the requirements of this section.

R337.9.2 Where required. The walking surface material of decks, porches, balconies and stairs shall comply with the requirements of this section when any portion of such surface is within 10 feet (3048 mm) of the building.

R337.9.3 Decking surfaces. The walking surface material of decks, porches, balconies and stairs shall be constructed with one of the following materials:

1. Ignition-resistant material that complies with the performance requirements of both SFM Standard 12-7A-4 and SFM Standard 12-7A-5.
2. Exterior fire retardant treated wood.
3. Noncombustible material.
4. Any material that complies with the performance requirements of SFM Standard 12-7A-4A when attached exterior wall covering is also either noncombustible or ignition-resistant material.

Exception: Wall material may be of any material that otherwise complies with this chapter when the decking surface material complies with the performance requirements ASTM E84 with a Class B flame spread rating.

SECTION R337.10 ACCESSORY STRUCTURES

R337.10.1 General. Accessory and miscellaneous structures, other than buildings covered by Section R337.1.3, which pose a significant exterior exposure hazard to applicable buildings during wildfires shall be constructed to conform to the ignition resistance requirements of this section.

R337.10.2 Applicability. The provisions of this section shall apply to trellises, arbors, patio covers, carports, gazebos, and similar structures of an accessory or miscellaneous character.

Exceptions:

1. Decks shall comply with the requirements of Section R337.9.
2. Awnings and canopies shall comply with the requirements of Section 3105 of the California Building Code.

R337.10.3 Where required. Accessory structures shall comply with the requirements of this section.

R337.10.3.1. Attached accessory structures shall comply with the requirements of this section.

R337.10.3.2. When required by the enforcing agency, detached accessory structures within 50 feet of an applicable building shall comply with the requirements of this section.

R337.10.4 Requirements. When required by the enforcing agency accessory structures shall be constructed of noncombustible or ignition-resistant materials.

SECTION R338 ELECTRIC VEHICLE

R338.1 Electric vehicle. An automotive-type vehicle for highway use, such as passenger automobiles, buses, trucks, vans and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array or other source of electric current. For the purpose of this chapter, electric motorcycles and similar type vehicles and off-road self-propelled electric vehicles such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats and the like, are not included.

R338.2 Charging. In any building or interior area used for charging electric vehicles, electrical equipment shall be installed in accordance with the California Electrical Code.

R338.3 Ventilation. Mechanical exhaust ventilation, when required by the California Electrical Code shall be provided at a rate as required by Article 625 or as required by Section 1203 of the California Building Code whichever is greater. The ventilation system shall include both the supply and exhaust equipment and shall be permanently installed and located to intake supply air from the outdoors, and vent the exhaust directly to the outdoors without conducting the exhaust air through other spaces within the building.

Exception: Positive pressure ventilation systems shall only be allowed in buildings or areas that have been designed and approved for that application.