

Part III—Building Planning and Construction

CHAPTER 3

BUILDING PLANNING

SECTION R300 SITE DRAINAGE

R300.1 Storm water drainage and retention during construction. Projects which disturb less than one acre of soil and are not part of a larger common plan of development which in total disturbs one acre or more, shall manage storm water drainage during construction in accordance with the California Green Building Standards Code, Chapter 4, Division 4.1.

R300.2 Grading and paving. Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings in accordance with the California Green Building Standards Code, Chapter 4, Division 4.1.

SECTION R301 DESIGN CRITERIA

R301.1 Application. Buildings and structures, and all parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code. The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation. Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

Existing buildings housing existing protective social care homes or facilities established prior to 1972 (see Section 3413 of the California Building Code).

R301.1.1 Alternative provisions. As an alternative to the requirements in Section R301.1 the following standards are permitted subject to the limitations of this code and the limitations therein. Where engineered design is used in conjunction with these standards, the design shall comply with the California Building Code.

1. AF&PA Wood Frame Construction Manual (WFCM).
2. AISI Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings (AISI S230).
3. ICC Standard on the Design and Construction of Log Structures (ICC 400).

R301.1.1.1 Alternative provisions for limited-density owner-built rural dwellings. The purpose of this subsection is to permit alternatives that provide minimum

protection of life, limb, health, property, safety and welfare of the general public and the owners and occupants of limited-density owner-built rural dwellings as defined in Chapter 2 of this code. For additional information see Chapter 1, Subchapter 1, Article 8, of Title 25, California Code of Regulations, commencing with Section 74.

To meet compliance with the requirements of this code, provisions of Section R301.1.1.1, Items 1 through 5 may be utilized for limited-density owner-built rural dwellings when the materials, methods of construction, or appliances are determined appropriate or suitable for their intended purpose by the local enforcing agency.

1. *A limited-density owner-built rural dwelling may be of any type of construction which will provide for a sound structural condition. Structural hazards which result in an unsound condition and which may constitute a substandard building are delineated in Section 17920.3 of the Health and Safety Code.*
2. *There shall be no requirements for room dimensions as required in Chapter 3, provided there is adequate light and ventilation and means of egress.*
3. *There shall be no specified requirement for heating capacity or for temperature maintenance. The use of solid-fuel or solar heating devices shall be deemed as complying with the requirements of Chapter 3. If nonrenewable fuel is used in these dwellings, rooms so heated shall meet current installation standards.*
4. *Pier foundations, stone masonry footings and foundations, pressure-treated lumber, poles or equivalent foundation materials or designs may be used provided that bearing is sufficient.*
5. *Owner-produced or used materials and appliances may be utilized unless found not to be of sufficient strength or durability to perform the intended function. Owner-produced or used lumber, or shakes and shingles may be utilized unless found to contain dry rot, excessive splitting or other defects obviously rendering the material unfit in strength or durability for the intended purpose.*

R301.1.2 Construction systems. The requirements of this code are based on platform and balloon-frame construction for light-frame buildings. The requirements for concrete and masonry buildings are based on a balloon

framing system. Other framing systems must have equivalent detailing to ensure force transfer, continuity and compatible deformations.

R301.1.3 Engineered design. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *California Building Code* is permitted for all buildings and structures, and parts thereof, included in the scope of this code.

R301.1.3.1 California licensed architect or engineer. *When any portion of any structure deviates from substantial compliance with conventional framing requirements for woodframe construction found in this code, the building official shall require the construction documents to be approved and stamped by a California licensed architect or engineer for that irregular or non-conforming portion of work. Notwithstanding other sections of law, the law establishing these provisions is found in Business and Professions Code Sections 5537 and 6737.1.*

R301.1.3.2 Woodframe structures. *The building official shall require construction documents to be approved and stamped by a California licensed architect or engineer for all dwellings of woodframe construction more than two stories and basement in height located in Seismic Design Category A, B, or C. Not-*

withstanding other sections of law, the law establishing these provisions is found in Business and Professions Code Sections 5537 and 6737.1.

The Building Official shall require construction documents to be approved and stamped by a California licensed architect or engineer for all dwellings of wood frame construction more than one story in height or with a basement located in Seismic Design Category D₀, D₁ or D₂.

R301.1.3.3 Structures other than woodframe. *The building official shall require floor, wall or roof-ceiling structural elements in dwellings designed of cold-formed steel, concrete, masonry or structural insulated panels prescribed by this code to be approved and stamped by a California licensed architect or engineer. Notwithstanding other sections of law, the law establishing these provisions is found in Business and Professions Code Sections 5537 and 6737.1.*

R301.1.4 Seismic design provisions for buildings constructed on or into slopes steeper than one unit vertical in three units horizontal (33.3 percent slope). The design and construction of new buildings and additions to existing buildings when constructed on or into slopes steeper than one unit vertical in three units horizontal (33.3 percent slope), shall comply with Section 1613.7 of the *Los Angeles County Building Code*.

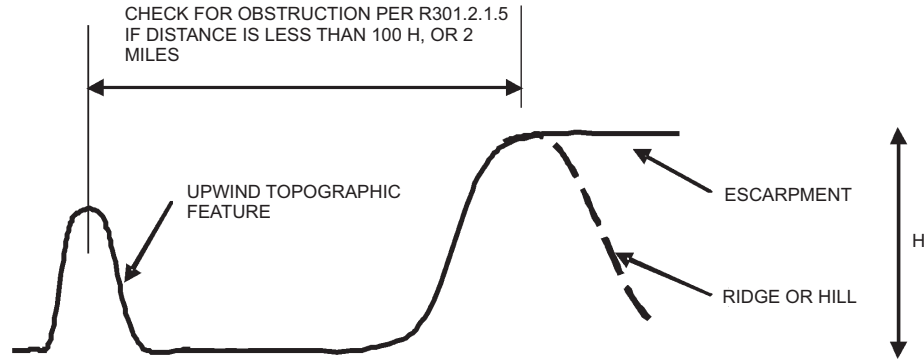
R301.2 Climatic and geographic design criteria. Buildings shall be constructed in accordance with the provisions of this code as limited by the provisions of this Section. Consult with the Building Official regarding additional criteria in Table R301.2(1).

**TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA**

GROUND SNOW LOAD	WIND DESIGN		SEISMIC DESIGN CATEGORY ^f	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP ^e	ICE BARRIER UNDERLAYMENT REQUIRED ^b	FLOOD HAZARDS ^g	AIR FREEZING INDEX ⁱ	MEAN ANNUAL TEMP ^j
	Speed ^d (mph)	Topographic effects ^k		Weathering ^a	Frost line depth ^b	Termite ^c					

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

- a. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index (i.e., “negligible,” “moderate” or “severe”) for concrete as determined from the Weathering Probability Map [Figure R301.2(3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.
- b. The frost line depth may require deeper footings than indicated in Figure R403.1(1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.
- c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.
- d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(4)A]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
- e. Temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.
- f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.
- g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction’s entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of all currently effective FIRMs and FBFMs or other flood hazard map adopted by the authority having jurisdiction, as amended.
- h. In accordance with Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall fill in this part of the table with “NO.”
- i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F)” at www.ncdc.noaa.gov/fpsf.html.
- j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F)” at www.ncdc.noaa.gov/fpsf.html.
- k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall indicate “NO” in this part of the table.



**FIGURE R301.2.1.5.1(3)
UPWIND OBSTRUCTION**

R301.2.2.1.2 Alternative determination of Seismic Design Category E. Buildings located in Seismic Design Category E in accordance with Figure R301.2(2) are permitted to be reclassified as being in Seismic Design Category D₂ provided one of the following is done:

1. A more detailed evaluation of the seismic design category is made in accordance with the provisions and maps of the *California Building Code*. Buildings located in Seismic Design Category E per Table R301.2.2.1.1, but located in Seismic Design Category D per the *California Building Code*, may be designed using the Seismic Design Category D₂ requirements of this code.
2. Buildings located in Seismic Design Category E that conform to the following additional restrictions are permitted to be constructed in accordance with the provisions for Seismic Design Category D₂ of this code:
 - 2.1. All exterior shear wall lines or braced wall panels are in one plane vertically from the foundation to the uppermost story.
 - 2.2. Floors shall not cantilever past the exterior walls.
 - 2.3. The building is within all of the requirements of Section R301.2.2.2.5 for being considered as regular.

R301.2.2.2 Seismic Design Category C. Structures assigned to Seismic Design Category C shall conform to the requirements of this section.

R301.2.2.2.1 Weights of materials. Average dead loads shall not exceed 15 pounds per square foot (720 Pa) for the combined roof and ceiling assemblies (on a horizontal projection) or 10 pounds per square foot (480 Pa) for floor assemblies, except as further limited by Section R301.2.2. Dead loads for walls above grade shall not exceed:

1. Fifteen pounds per square foot (720 Pa) for exterior light-frame wood walls.

2. Fourteen pounds per square foot (670 Pa) for exterior light-frame cold-formed steel walls.
3. Ten pounds per square foot (480 Pa) for interior light-frame wood walls.
4. Five pounds per square foot (240 Pa) for interior light-frame cold-formed steel walls.
5. Eighty pounds per square foot (3830 Pa) for 8-inch-thick (203 mm) masonry walls.
6. Eighty-five pounds per square foot (4070 Pa) for 6-inch-thick (152 mm) concrete walls.
7. Ten pounds per square foot (480 Pa) for SIP walls.

Exceptions:

1. Roof and ceiling dead loads not exceeding 25 pounds per square foot (1190 Pa) shall be permitted provided the wall bracing amounts in Chapter 6 are increased in accordance with Table R301.2.2.2.1.
2. Light-frame walls with stone or masonry veneer shall be permitted in accordance with the provisions of Sections R702.1 and R703.
3. Fireplaces and chimneys shall be permitted in accordance with Chapter 10.

**TABLE R301.2.2.2.1
WALL BRACING ADJUSTMENT
FACTORS BY ROOF COVERING DEAD LOAD^a**

WALL SUPPORTING	ROOF/CEILING DEAD LOAD	
	15 psf or less	25 psf
Roof only	1.0	1.2
Roof plus one or two stories	1.0	1.1

For SI: 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

R301.2.2.2.2 Stone and masonry veneer. Anchored stone and masonry veneer shall comply with the requirements of Sections R702.1 and R703.

R301.2.2.2.3 Masonry construction. Masonry construction shall comply with the requirements of Section R606.12.

R301.2.2.2.4 Concrete construction. Detached one- and two-family dwellings with exterior above-

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grade concrete walls shall comply with the requirements of Section R611, PCA 100 or shall be designed in accordance with ACI 318. Townhouses with above-grade exterior concrete walls shall comply with the requirements of PCA 100 or shall be designed in accordance with ACI 318.

R301.2.2.2.5 Irregular buildings. The seismic provisions of this code shall not be used for irregular structures located in Seismic Design Categories C, D₀, D₁ and D₂. Irregular portions of structures shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. When the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, design of the remainder of the building shall be permitted using the provisions of this code. A building or portion of a building shall be considered to be irregular when one or more of the following conditions occur:

1. When exterior shear wall lines or braced wall panels are not in one plane vertically from the foundation to the uppermost story in which they are required.
2. When a section of floor or roof is not laterally supported by shear walls or braced wall lines on all edges.

Exception: Portions of floors that do not support shear walls or braced wall panels above, or roofs, shall be permitted to extend no more than 6 feet (1829 mm) beyond a shear wall or braced wall line.

3. When the end of a braced wall panel occurs over an opening in the wall below and ends at a horizontal distance greater than 1 foot (305 mm) from the edge of the opening. This provision is applicable to shear walls and braced wall panels offset in plane and to braced wall panels offset out of plane as permitted by the exception to Item 1 above.
4. When an opening in a floor or roof exceeds the lesser of 12 feet (3658 mm) or 50 percent of the least floor or roof dimension.
5. When portions of a floor level are vertically offset.
6. When shear walls and braced wall lines do not occur in two perpendicular directions.
7. When stories above grade plane partially or completely braced by wood wall framing in accordance with Section R602 or steel wall framing in accordance with Section R603 include masonry or concrete construction. When this irregularity applies, the entire story shall be designed in accordance with accepted engineering practice.

Exception: Fireplaces, chimneys and masonry veneer as permitted by this code.

R301.2.2.3 Seismic Design Categories D₀, D₁ and D₂. Structures assigned to Seismic Design Categories D₀, D₁ and D₂ shall conform to the requirements for Seismic Design Category C and the additional requirements of this section.

R301.2.2.3.1 Height limitations. Wood-framed buildings shall be limited to three stories above grade plane or the limits given in Table R602.10.3(3). Cold-formed, steel-framed buildings shall be limited to less than or equal to three stories above grade plane in accordance with AISI S230. Mezzanines as defined in Section R202 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above grade plane.

R301.2.2.3.2 Stone and masonry veneer. Anchored stone and masonry veneer shall comply with the requirements of Sections R702.1 and R703.

R301.2.2.3.3 Masonry construction. Masonry construction in Seismic Design Categories D₀ and D₁ shall comply with the requirements of Section R606.12.1. Masonry construction in Seismic Design Category D₂ shall comply with the requirements of Section R606.12.4.

R301.2.2.3.4 Concrete construction. Buildings with exterior above-grade concrete walls shall comply with PCA 100 or shall be designed in accordance with ACI 318.

R301.2.2.3.5 Cold-formed steel framing in Seismic Design Categories D₀, D₁ and D₂. In Seismic Design Categories D₀, D₁ and D₂ in addition to the requirements of this code, cold-formed steel framing shall comply with the requirements of AISI S230.

R301.2.2.3.6 Masonry chimneys. Masonry chimneys shall be reinforced and anchored to the building in accordance with Sections R1003.3 and R1003.4.

R301.2.2.3.7 Anchorage of water heaters. Water heaters shall be anchored against movement and overturning in accordance with the *California Plumbing Code*.

R301.2.2.3.8 Anchorage of mechanical, electrical, or plumbing components and equipment. Mechanical, electrical, or plumbing components and equipment shall be anchored to the structure. Anchorage of the components and equipment shall be designed to resist loads in accordance with the *Los Angeles County Building Code* and ASCE 7, except where the component is positively attached to the structure and flexible connections are provided between the component and associated ductwork, piping, and conduit; and either:

1. The component weighs 400 pounds (1,780 N) or less and has a center of mass located 4 feet (1.22 m) or less above the supporting structure; or
2. The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 pounds per foot (73 N/m) or less.

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R301.2.2.4 Seismic Design Category E. Buildings in Seismic Design Category E shall be designed to resist seismic loads in accordance with the *California Building Code*, except when the seismic design category is reclassified to a lower seismic design category in accordance with Section R301.2.2.1. Components of buildings not required to be designed to resist seismic loads shall be constructed in accordance with the provisions of this code.

R301.2.3 Snow loads. Wood-framed construction, cold-formed, steel-framed construction and masonry and concrete construction, and structural insulated panel construction in regions with ground snow loads 70 pounds per square foot (3.35 kPa) or less, shall be in accordance with Chapters 5, 6 and 8. Buildings in regions with ground snow loads greater than 70 pounds per square foot (3.35 kPa) shall be designed in accordance with accepted engineering practice.

R301.2.4 Floodplain construction. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with Section R322. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R301.2.4.1 Alternative provisions. As an alternative to the requirements in Section R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) and coastal A Zones, if delineated, ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

R301.3 Story height. The wind and seismic provisions of this code shall apply to buildings with story heights not exceeding the following:

1. For wood wall framing, the laterally unsupported bearing wall stud height permitted by Table R602.3(5) plus a height of floor framing not to exceed 16 inches (406 mm).

Exception: For wood-framed wall buildings with bracing in accordance with Tables R602.10.3(1) and R602.10.3(3), the wall stud clear height used to determine the maximum permitted story height may be increased to 12 feet (3658 mm) without requiring an engineered design for the building wind and seismic force-resisting systems provided that the length of bracing required by Table R602.10.3(1) is increased by multiplying by a factor of 1.10 and the length of bracing required by Table R602.10.3(3) is increased by multiplying by a factor of 1.20. Wall studs are still subject to the requirements of this section.

2. For steel wall framing, a stud height of 10 feet (3048 mm), plus a height of floor framing not to exceed 16 inches (406 mm).
3. For masonry walls, a maximum bearing wall clear height of 12 feet (3658 mm) plus a height of floor framing not to exceed 16 inches (406 mm).

Exception: An additional 8 feet (2438 mm) is permitted for gable end walls.

4. For insulating concrete form walls, the maximum bearing wall height per story as permitted by Section R611 tables plus a height of floor framing not to exceed 16 inches (406 mm).
5. For structural insulated panel (SIP) walls, the maximum bearing wall height per story as permitted by Section R613 tables shall not exceed 10 feet (3048 mm) plus a height of floor framing not to exceed 16 inches (406 mm).

Individual walls or wall studs shall be permitted to exceed these limits as permitted by Chapter 6 provisions, provided story heights are not exceeded. Floor framing height shall be permitted to exceed these limits provided the story height does not exceed 11 feet 7 inches (3531 mm). An engineered design shall be provided for the wall or wall framing members when they exceed the limits of Chapter 6. Where the story height limits of this section are exceeded, the design of the building, or the noncompliant portions thereof, to resist wind and seismic loads shall be in accordance with the *California Building Code*.

R301.4 Dead load. The actual weights of materials and construction shall be used for determining dead load with consideration for the dead load of fixed service equipment.

R301.5 Live load. The minimum uniformly distributed live load shall be as provided in Table R301.5.

R301.6 Roof load. The roof shall be designed for the live load indicated in Table R301.6 or the snow load indicated in Table R301.2(1), whichever is greater.

**TABLE R301.6
MINIMUM ROOF LIVE LOADS IN POUNDS-FORCE
PER SQUARE FOOT OF HORIZONTAL PROJECTION**

ROOF SLOPE	TRIBUTARY LOADED AREA IN SQUARE FEET FOR ANY STRUCTURAL MEMBER		
	0 to 200	201 to 600	Over 600
Flat or rise less than 4 inches per foot (1:3)	20	16	12
Rise 4 inches per foot (1:3) to less than 12 inches per foot (1:1)	16	14	12
Rise 12 inches per foot (1:1) and greater	12	12	12

For SI: 1 square foot = 0.0929 m², 1 pound per square foot = 0.0479 kPa, 1 inch per foot = 83.3 mm/m.