RESIDENTIAL BUILDING/STRUCTURE DESIGN CRITERIA

OVERVIEW

The following design criteria apply only to residential buildings/structures that fall within the scope of the prescriptive design provisions of the Oregon Residential Specialty Code (ORSC), which are typically limited one- or two-family dwellings (and their accessory structures) of conventional wood framing, no more than three stories in height. The ORSC does not apply to multi-family residential buildings. See the City of Gresham Commercial Building/Structure Design Criteria document for multi-family residential buildings and for one- or two-family dwellings that fall outside the scope of the ORSC.

Individual elements of a residential structure that is otherwise within the scope of the ORSC may fall outside the scope of the ORSC prescriptive design provisions. Such elements shall be designed in accordance with the applicable provisions of the Oregon Structural Specialty Code (OSSC) and the City of Gresham Commercial Building/Structure Design Criteria document. These elements are typically those for which the ORSC does not provide design tables and/or which it specifies shall be “designed in accordance with accepted engineering practice”. Typical examples include wood roof trusses or a ridge beam for a gabled roof with a “vaulted” or “cathedral” ceiling (i.e. without ceiling joists or rafter ties conforming to ORSC Section R802.3.1 and Figure R802.5.1). Structural design calculations for such elements, by a Professional Engineer licensed in the State of Oregon, are required to be submitted for permit.

CURRENT BUILDING CODES

- 2017 Oregon Residential Specialty Code (ORSC), based on 2015 International Residential Code (IRC)
- 2017 Oregon Electrical Specialty Code (OESC), based on 2017 NFPA 70, National Electrical Code

SNOW LOADS

Design snow loads for residential buildings/structures shall be determined in accordance with Chapter 3 of the ORSC. The following is a clarification (not a modification) of the provisions of Chapter 3 of the ORSC.

For a site at an elevation of 500 ft or less, the ground snow load shall be 36 psf per ORSC Table R301.2(1). As indicated in Table R301.2(1), the ground snow load of 36 psf corresponds to a roof snow load of 25 psf. However, note that ground snow load is typically used in ORSC tables for framing design, including those for roof framing. Where tables are limited to ground snow loads of 30 psf and 50 psf, 50 psf may be used conservatively, or linear interpolation may be used for 36 psf.

For a site at an elevation above 500 ft, snow loads shall be determined in accordance with the City of Gresham Commercial Building/Structure Design Criteria document. The ground and roof snow loads used for design shall be the larger of the values determined based on that document, and 36 psf (ground) and 25 psf (roof).

The residential design ground snow load of 36 psf per the ORSC may significantly exceed mapped ground snow loads for Oregon available online. However, a lower ground snow load may not be used for prescriptive residential design per the ORSC, because the ground snow load of 36 psf corresponds to the required minimum roof snow load of 25 psf, and if the ORSC design tables are used with a lower value of ground snow load, the results will be incorrect.

SEISMIC DESIGN

Seismic design criteria for residential buildings/structures shall be in determined in accordance with Chapter 3 of the ORSC. Per ORSC Figure 301.2(2), all residential buildings/structures located in the City of Gresham or areas where it has jurisdiction shall be assigned Seismic Design Category D, if soil conditions at the site are representative of Site Class D. (Site Class D shall be assumed unless geotechnical data indicates otherwise.)

WIND DESIGN

Wind design criteria for residential buildings/structures shall be determined in accordance with Chapter 3 of the ORSC, as modified by this document, including attached Figures 1 and 2. For residential buildings/structures located in the City of Gresham or areas where it has jurisdiction, the ultimate design wind speed, $V_{ult}$, shall be as shown in attached Figure 1, and the exposure category shall be as shown in attached Figure 2.

(Effective 2017)
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NOTE:
In areas of Multnomah County under the jurisdiction of the City of Gresham without a value shown on this map, the ultimate design wind speed shall be 120 mph, except where the site has full exposure to Columbia River Gorge winds (i.e. exposure category D), where it shall be 135 mph. See Figure 2 of this document for determination of exposure category.
NOTE:

1. The exposure category shown on this map shall be used unless justified otherwise by a rational analysis of the prevailing ground surface roughness determined from natural topography, vegetation, and surrounding construction for each wind direction, per ORSC R301.2.1.3. Analysis shall be submitted to the City of Gresham for review and approval prior to submittal for permit (strongly recommended to be submitted prior to the start of any structural design work).

2. Unless justified otherwise per Note #1, in areas of Multnomah County under the jurisdiction of the City of Gresham without an exposure category shown on this map, exposure category C shall be used, except in areas of full exposure to Columbia River Gorge winds (typically adjacent to I-84 and/or U.S. Route 30) where exposure category D shall be used.