

# A PROTOTYPE 2007 SEISMIC DESIGN CATEGORY MAP FOR RESIDENTIAL CONSTRUCTION IN THE STATE OF WASHINGTON

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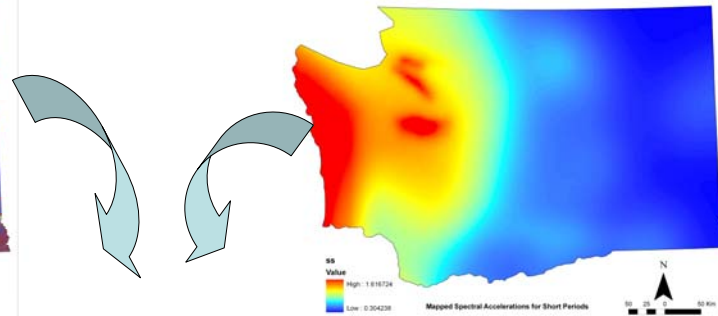
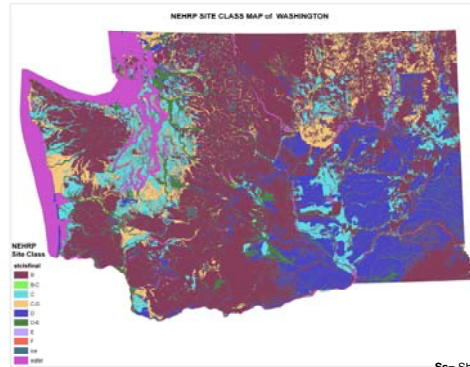
The new International Residential Code 2006 (2006 IRC) recently published by International Code Council (ICC) requires changes in seismic design category (SDC) determination given in IRC 2003. In the new determination the design category D1 ( $0.50 < SDS \leq 0.83g$ ) is subdivided into categories D0 ( $0.50 < SDS \leq 0.67$ ) and D1 ( $0.67 < SDS \leq 0.83$ ). It is anticipated that the category change in D1 will be more pronounced in western Washington where population and housing developments are larger.

In response to the new IRC 2006, our plans are also to update and make changes on 2007 Seismic Design Category Maps for Residential Construction (2007 SDCMRC) in Washington State. New prototype 2007 SDCMRC for Washington State will be generated using the same methodology as Poelstra and Palmer (2004). The new 2007 seismic design map will be official in July 2007.

After determining the  $F_a$  values from Table above, SDS values calculated using SS values (Frankel et al., 2002) and assumption of siteclass D in the State of Washington are used to calculate SDS values. Finally, the IRC 2006 new categories given below are assigned to generate a prototype 2007 Seismic Design Category Map (bottom) for residential construction in Washington.

## References

- International Code Council, 2006, International Building Code: International Code Council, Inc., 666 p.
- International Code Council, 2006, International Residential Code for one- and two-family dwellings: International Code Council, Inc., 670 p.
- Poelstra, James L.; Palmer, Stephen P., 2004, Seismic design category maps for residential construction in Washington: [accessed Feb. 6, 2007 at <http://www.dnr.wa.gov/geology/hazards/hmcp.html>]
- Frankel, A. D. Petersen, Charles S. Mueller, Kathleen M. Haller, Russell L. Wheeler, E.V. Leyendecker, Robert L. Wesson, Stephen C. Harmsen, Chris H. Cramer, David M. Perkins, and Kenneth S. Rukstales, 2002, Documentation for the 2002 Update of the National Seismic Hazard Maps: [accessed May 2, 2007 at <http://earthquake.usgs.gov/research/hazmaps/publications/of02-420/OFR02-420.pdf>]



SS= Short-period spectral accelerations mapped and distributed by the USGS Hazard Program (2003).

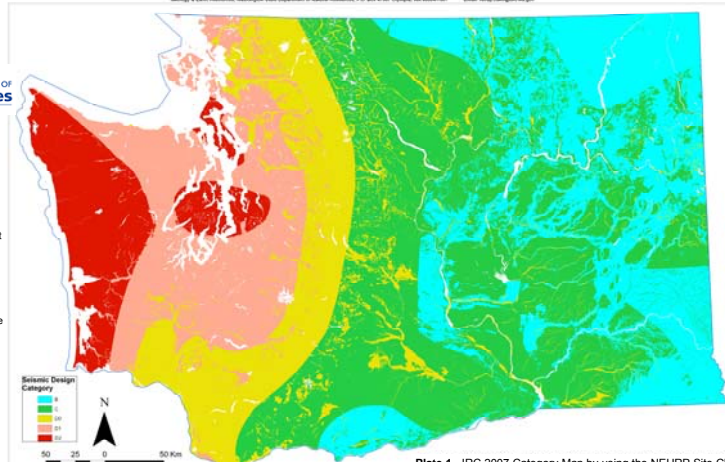
$F_a$ = Site coefficients that are determined from Table 1613.5.3(1) in the IBC 2006)

Seismic Design Category IRC (2006)	$S_{DS}$ (calculated)
A	$S_{DS} \leq 0.17g$
B	$0.17 < S_{DS} \leq 0.33g$
C	$0.33 < S_{DS} \leq 0.50g$
D <sub>0</sub>	$0.50 < S_{DS} \leq 0.67g$
D <sub>1</sub>	$0.67 < S_{DS} \leq 0.83g$
D <sub>2</sub>	$0.83 < S_{DS} \leq 1.17g$
E	$S_{DS} > 1.17$

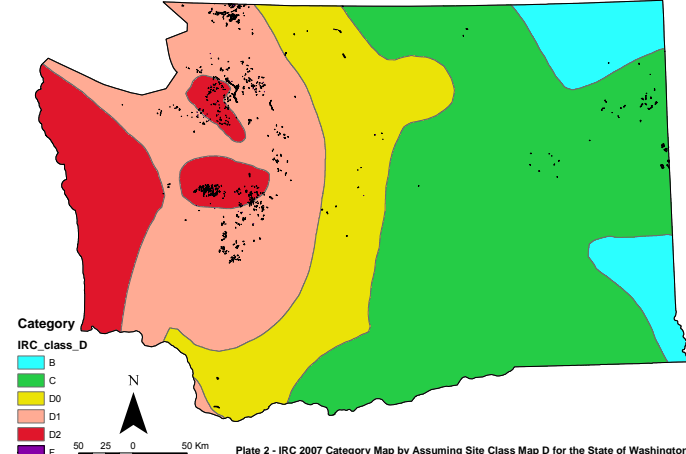
$$S_{DS} = \frac{2}{3} F_a S_s$$

SITE CLASS	Short Period Spectral Response Accelerations (S <sub>s</sub> Values) (2006 IBC)				
	S <sub>s</sub> ≤ 0.25	S <sub>s</sub> =0.5	S <sub>s</sub> =0.75	S <sub>s</sub> =1.0	S <sub>s</sub> ≥ 1.25
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	*	*	*	*	*

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## Disclaimer

The maps presented in Plates 1 and 2 are not a substitute for site-specific investigation to assess the actual ground conditions and potential for amplified ground shaking, as measured by the site class or other more quantitative analyses. These products are provided 'as is' without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular use. The Washington State Department of Natural Resources will not be liable to the user of these products for any activity involving the products with respect to the following: (a) lost profits, lost savings, or any other consequential damages; (b) the fitness of the product for a particular purpose; or (c) use of the products or results obtained from the use of the products.