

DAS CFO Facility Planning Guidelines for Development with Natural Hazards

www.oregon.gov/DAS/CFO/FPU

SPECIFIC FLOOD AND EARTHQUAKE HAZARDS



Floods

- Coastal flooding and riverine flooding
- Tsunami (local and distant sources)
- Future climate with sea level rise
(2015 Presidential Executive Order 13690)



Earthquakes

- Ground shaking
- Soil amplification
- Liquefaction
- Earthquake-triggered (co-seismic) landslides

GUIDING PRINCIPLES (advances toward higher resilience)

- Follow existing regulations (building codes, federal and Oregon Laws)
- Use best practices supporting public safety and prudent use of state funds
- Use a long-term view to protect citizens and state investments
- Provide best practice examples for others, including the private sector
- Integrate resilience, where possible, by avoiding high risk areas or to embracing higher performance standards than may be required by building codes. This will lessen damage and speed recovery after disasters, and improve continuity of governing/operations. For new office buildings, building code risk category IV may be voluntarily selected to lessen damage and quicken recovery time.

Note: We build for resilience using science, data and community wisdom to protect against and adapt to risks, thereby making people, communities and systems better prepared to withstand catastrophic events—both natural and human-caused—and able to bounce back more quickly and emerge stronger from these shocks and stresses.

TWO STEP PRELIMINARY HAZARD EVALUATION PROCESS

1. Determine exposure to flood and earthquake hazards using available information (see resources provided below). Collect site specific information if available and warranted.
2. Address hazards by avoidance or through appropriate analyses, design and construction methods to address risk (see Guiding Principles and Planning and Development).
 - If flood or earthquake hazards exist that are concerning, perform building and site specific analysis, such as 100 year flood depth analyses, seismic rapid visual screening or engineering analyses (e.g., FEMA 154, ASCE 31/41).
 - State expertise on floods and earthquakes is available through the Interagency Hazard Mitigation Team: <http://www.oregon.gov/OMD/OEM/IHMT/Pages/IHMT.aspx>

FLOOD HAZARD EVALUATION

A. Coastal and Riverine Flood

A1. Determine if building is in the FEMA Special Flood Hazard Area (SFHA) 1% annual chance area (100 yr flood).

<http://fema.maps.arcgis.com/home/>

Select "Flood" box (second of 4 boxes)

<http://fema.maps.arcgis.com/home/group.html?id=34d18d8f320d4a4b8e63d59a4d4d69f0>

Select FEMA's National Flood Hazard Map (Official)

<http://fema.maps.arcgis.com/home/item.html?id=cbe088e7c8704464aa0fc34eb99e7f30>

A2. Determine if building is in the FEMA SFHA 0.2 % annual chance area (500 yr flood). Use same links as above.

B. Tsunami (local and distant)

B1. Determine whether building is in a state or local government regulatory tsunami inundation zone (ORS 455.446 and 455.447; and local land use programs). State of Oregon Tsunami Regulatory Maps: <http://www.oregongeology.org/tsuclearinghouse/pubs-regmaps.htm>

B2. Determine whether building is in the XXL zone of the most recent DOGAMI Tsunami Inundation Maps (TIM). Tsunami Inundation Maps: <http://www.oregongeology.org/pubs/tim/p-TIM-overview.htm>

C. Coastal Flood with Projected Sea Level Rise (SLR)

Determine whether building is in the area with estimated SLR. Sources include:

C1. Coastal flooding and SLR (large areas are missing data such as Oregon's central and south coasts) <http://coast.noaa.gov/slr/>

C2. Sea level rise projections for the nation: <http://sealevel.climatecentral.org/ssrf/oregon>

Note: All new development in the Special Flood Hazard Area requires a local floodplain development permit. Development should be consistent with 2015 Presidential Executive Order. Link to EO info <https://www.whitehouse.gov/the-press-office/2015/01/30/executive-order-establishing-federal-flood-risk-management-standard-and->

Rationale for Flood Risk Management

Oregon has extensive flood prone areas. A significant number of state-owned buildings have been built in the FEMA-defined 100 year floodplain lacking sufficient flood protection. Protection, such as elevated foundations and flood walls, may be a cost effective way to manage the risk for existing buildings. Benefit cost analyses are a useful tool to support decision making (avoiding or designing to specific performance levels).

EARTHQUAKE HAZARD EVALUATION

A. Determine Expected Earthquake Shaking Category

DOGAMI HAZVU: <http://www.oregongeology.org/hazvu/>

Categories include: Violent, Severe, Very Strong, Strong, Moderate, and Light

B. Determine Earthquake Liquefaction Hazard Category

DOGAMI HAZVU: <http://www.oregongeology.org/hazvu/>

Categories include: High, Moderate, Low, and None

C. Determine if in Existing Landslide Hazard Zone

DOGAMI SLIDO: <http://www.oregongeology.org/slido/index.html>

Select both Historic Landslide Data Inventory and Mapped Landslide Data Inventory to determine if in existing landslide hazard zone. These zones are prone to reactivate (move) during earthquake shaking.

Rationale for Earthquake Risk Management

Earthquakes, although infrequent, are a natural process that will severely impact all of Oregon in its future. Earthquakes can shake all of western Oregon for minutes and cause severe damage to thousands of buildings. Due to improvements in state building codes, buildings built after 1995 have been designed to provide for life safety during earthquakes. Many buildings constructed before 1995 are seismically deficient, may incur extensive damage, and may be out of service for prolonged periods. Starting in 2015, benefit cost analyses have been conducted by DAS CFO to support long range planning for all major pre-1995 state-owned buildings. Well seismically-designed, constructed and maintained buildings will keep occupants safe and can allow for continued use or quick recovery after major earthquakes.

PLANNING AND DEVELOPMENT

Options for Existing Buildings: Retrofit or Replace

Options for New Buildings: Avoid building in hazard zone, Lower occupancy risk, Design to mitigate risk, Design for high-performance in hazard zone