

CHAPTER 18  
OREGON AMENDMENTS  
SOILS AND FOUNDATIONS  
2007 OSSC

Amend Section 1802.1 as Follows:

**1802.1 General.** Foundation and soils investigations shall be conducted in conformance with Sections 1802.2 through 1802.6. Where required by the building official, the classification and investigation of the soil shall be made by a registered design professional. **Building sites for new structures and facilities defined by ORS 455.447 as essential facilities, hazardous facilities, major structures [ parking structures are classified as major structures when they are over three stories and 30,000 square feet of aggregate floor area] and special occupancy structures shall be evaluated on the site-specific basis for vulnerability to seismic geologic hazards. This evaluation shall be done by an especially qualified engineer or engineering geologist registered by the state to practice as such. Such evaluation and report may require the services of persons especially qualified in fields of engineering seismology, earthquake geology or geo-technical engineering.**

Add new Section 1802.1.1 as Follows:

**1802.1.1 Tsunami inundation zone. Some new “essential facilities” and some new “special occupancy structures” as defined in ORS 455.447 shall not be constructed in tsunami inundation zones established by the Department of Geology and Mineral Industries (DOGAMI), unless specifically exempted by ORS 455.446 or given an exception by the DOGAMI governing board. See OAR Chapter 632, Division 5 adopted by DOGAMI for specific provisions.**

**Some other new “essential facilities,” other “special occupancy structures” and all new “hazardous facilities” and “major structures” defined in ORS 455.447 that are constructed in a tsunami inundation zone are mandated to seek advice from DOGAMI, but are not necessarily prohibited from tsunami inundation zones. See OAR Chapter 632, Division 5 adopted by DOGAMI for specific provisions. See Table 1802.1 for a summary of statute requirements.**

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ORS 455.446 is not part of this code but is reproduced here for the reader's convenience:

455.446 Construction of certain facilities and structures in tsunami inundation zone prohibited; establishment of zone; rules; exceptions.

(1)

(a) New essential facilities described in ORS 455.447(1)(a)(A), (B) and (G) and new special occupancy structures described in ORS 455.447(1)(e)(B), (C) and (E) shall not be constructed in tsunami inundation zone established under paragraph (c) of this subsection. The provisions of this paragraph apply to buildings with a capacity greater than 50 individuals for every public, private or parochial school through secondary level and child care centers.

(b) The State Department of Geology and Mineral Industries shall establish the parameters of the area of expected tsunami inundation based on scientific evidence that may include geologic field data and tsunami modeling.

(c) The governing board of the State Department of Geology and Mineral Industries, by rule, shall determine the tsunami inundation zone based on the parameters established by the department. The board shall adopt the zone as determined by the department under paragraph (9b) of this subsection except as modified by the board under paragraph (d) of this subsection.

(d) The board may grant exceptions to restrictions in the tsunami inundation zone established under paragraph (c) of this subsection after public hearing and a determination by the board that the applicant has demonstrated that the safety of building occupants will be ensured to the maximum reasonable extent:

(A) By addressing the relative risks within the zone.

(B) By balancing competing interests and other considerations.

(C) By considering mitigative construction strategies.

(D) By considering mitigative terrain modifications.

(e) The provisions of paragraph (a) of this subsection do not apply:

(A) To fire or police stations where there is a need for strategic location; and

(B) To public schools if there is a need for the school to be within the boundaries of a school district and this can not otherwise be accomplished.

(f) All materials supporting an application for an exception to the tsunami inundation zone are public records under ORS 192.005 to 192.170 and shall be retained in the library of the department for periods of time determined by its governing board.

(g) The applicant for an exception to the tsunami inundation zone established under paragraph (c) of this subsection shall pay any costs for department review of the application and the costs, if any, of the approval process.

(2) The definitions in ORS 455.447 apply to this section.

(3) The provisions of this section do not apply to water-dependent and water-related facilities, including but not limited to docks, wharves, piers and marinas.

(4) Decisions made under this section are not land use decisions under ORS 197.015(10).

Definitions from ORS 455.447(1) are not part of this code but are reproduced here for the reader's convenience.

455.447 Regulation of certain structures vulnerable to earthquakes.

(1) As used in this section, unless the context requires otherwise:

(a) "Essential facility" means:

(A) Hospitals and other medical facilities having surgery and emergency treatment areas;

(B) Fire and police stations;

(C) Tanks or other structures containing, housing or supporting water or fire-suppression materials or equipment required for the protection of essential or hazardous facilities or special occupancy structures;

(D) Emergency vehicle shelters and garages;

(E) Structures and equipment in emergency-preparedness centers;

(F) Standby power generating equipment for essential facilities; and

(G) Structures and equipment in government communication centers and other facilities required for emergency response.

(b) "Hazardous facility" means structures housing, supporting or containing sufficient quantities of toxic or explosive substances to be of danger to the safety of the public if released.

(c) "Major structure" means a building over six stories in height with an aggregate area of 60,000 square feet or more, every building over 10 stories in height and parking structures as determined by Department of Consumer and Business Services rule.

(d) "Seismic hazard" means a geologic condition that is a potential danger to life and property which includes but is not limited to earthquake, landslide, liquefaction, tsunami inundation, fault displacement and subsidence.

(e) "Special occupancy structure" means:

(A) Covered structures whose primary occupancy is public assembly with a capacity greater than 300 persons;

(B) Buildings with a capacity greater than 250 individuals for every public, private or parochial school through secondary level or day care centers;

(C) Buildings for colleges or adult education schools with a capacity greater than 500 persons;

(D) Medical facilities with 50 or more residents, incapacitated patients not included in subparagraphs (A) to (C) of this paragraph;

(E) Jails and detention facilities; and

(F) All structures and occupancies with a capacity greater than 5,000 persons.

**Protection of Public from Landslide Hazards**

**ORS 195.260(1) and (2) are not part of this code but are reproduced here for the reader's convenience:**

**195.260 Duties of local governments, state agencies and landowners in landslide hazard areas.**

**(1) In order to reduce the risk of serious bodily injury or death resulting from rapidly moving landslides, a local government:**

**(a) Shall exercise all available authority to protect the public during emergencies, consistent with ORS 401.015.**

**(b) May require a geo-technical report and, if a report is required, shall provide for a coordinated review of the geo-technical report by the State Department of Geology and Mineral Industries or the State Forestry Department, as appropriate, before issuing a building permit for a site in a further review area.**

**(c) Except those structures exempt from building codes under ORS 455.310 and 455.315, shall regulate through mitigation measures and site development standards the siting of dwellings and other structures designed for human occupancy, including those being restored under ORS 215.130(6), in further review areas where there is evidence of substantial risk for rapidly moving landslides. All final decisions under this paragraph and paragraph (b) of this subsection are the responsibility of the local government with jurisdiction over the site. A local government may not delegate such final decisions to any state agency.**

**(d) May deny a request to issue a building permit if a geo-technical report discloses that the entire parcel is subject to a rapidly moving landslide or that the subject lot or parcel does not contain sufficient buildable area that is not subject to a rapidly moving landslide.**

**(e) Shall maintain a record, available to the public, of properties for which a geotechnical report has been prepared within the jurisdiction of the local government.**

**(2) A landowner allowed a building permit under subsection (1)(c) of this section shall sign a statement that shall:**

**(a) Be recorded with the county clerk of the county in which the property is located, in which the landowner acknowledges that the landowner may not in the future bring any action against an adjacent landowner about the effects or rapidly moving landslides on or adjacent to the landowner's property; and**

**(b) Record in the deed records for the county where the lot or parcel is located a non-revocable deed restriction that the land-owner signs and acknowledges, that contains a legal description complying with ORS 93.600 and that prohibits any present or future owner of the property from bringing any action against an adjacent landowner about the effects of rapidly moving landslides on or adjacent to the property.**

**Note: Additional information relating to limitations on local authority to adopt land use regulations relating to "rapidly moving landslides" can be found in ORS 195.263 through 195.275.**

**Add Table 1802.1 as Follows:**

**TABLE 1802.1 – REQUIREMENTS FOR CONSTRUCTION IN TSUNAMI ZONE**

<b><u>BUILDING CATEGORY PER ORS 455.447</u></b>	<b><u>NEW CONSTRUCTION PROHIBITED IN TSUNAMI INUNDATION ZONE UNLESS GRANTED AN EXCEPTION THROUGH PROCESS ADMINISTERED BY DOGAMI<sup>1</sup></u></b>	<b><u>NEW CONSTRUCTION PROHIBITED IN TSUNAMI INUNDATION ZONE, UNLESS STRATEGIC LOCATION CONFLICT EXISTS OR GRANTED AN EXCEPTION THROUGH PROCESS ADMINISTERED BY DOGAMI<sup>1</sup></u></b>	<b><u>PRIOR TO NEW CONSTRUCTION IN TSUNAMI INUNDATION ZONE, MUST REQUEST ADVICE FROM DOGAMI</u></b>	<b><u>MAY BE CONSTRUCTED IN TSUNAMI INUNDATION ZONE WITHOUT ADVICE FROM DOGAMI</u></b>
<b><u>ORS 455.447 SECTION REFERENCE IS IN [BRACKETS]</u></b>				
[1(a)] Essential Facilities				
[1(a)(A)] Hospitals and other medical facilities with surgery	X			
[1(a)(b)] Fire and police stations		X		
[1(a)(C)] Tanks and similar structures				X
[1(a)(D)] Emergency vehicle shelters				X
[1(a)(E)] Structures and equipment in emergency preparedness centers			X	
[1(a)(F)] Standby power generating equipment				X
[1(a)(G)] Structures and equipment in government communication centers and other emergency response facilities	X			
[1(b)] Hazardous facilities			X	
[1(c)] Major Structures			X	
[1(e)] Special Occupancies				
[1(e)(A)] Covered Structures with assembly greater than 300 persons			X	
[1(e)(B)] (Part) Buildings with capacity greater than 50 <sup>2</sup> for non public schools through secondary level or child care centers	X			
[1(e)(B)] (Part) Buildings with capacity greater than 50 <sup>2</sup> for public schools through secondary level		X		
[1(e)(C)] Buildings for colleges or adult education with capacity greater than 500	X			
[1(e)(D)] Medical facilities with 50 or more resident, incapacitated patients			X	
[1(e)(E)] Jails and detention facilities	X			
[1(e)(F)] Structures and occupancies with a capacity greater than 5,000			X	

1 These facilities and structures may be granted an exception by DOGAMI Governing Board to allow new construction in the tsunami inundation zone. If the exception is granted, then advice must be sought from DOGAMI. See OAR 632-05.

2 ORS 455.446 specifies an occupancy load of 50 for this category.

**NOTE: Reference Table 1802.1 is not a part of this code but is provided here for the reader's convenience. This table summarizes the requirements of ORS 455.446 and 455.447.**

**Amend Section 1802.2 as Follows:**

**1802.2 Where required.** The owner or applicant shall submit a foundation and soils investigation to the building official where required in Sections 1802.2.1 through 1802.2.7.

**Exception:** The building official need not require a foundation or soils investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1802.2.1 through ~~1802.2.6~~ **1802.2.7**.

**Amend Section 1802.2.7 as Follows:**

**1802.2.7 Seismic Design Category D, E or F.** Where the structure is determined to be in Seismic Design Category D, E or F, in accordance with Section 1613, the soils investigation requirements for Seismic Design Category C, given in Section 1802.2.6, shall be met, in addition to the following. The investigation shall include:

1. A determination of lateral pressures on basement and retaining walls due to earthquake motions. **Seismic lateral pressures shall be developed based on one half (0.5) of the peak horizontal acceleration.**
2. An assessment of potential consequences of any liquefaction and soil strength loss, including estimation of differential settlement, lateral movement or reduction in foundation soil-bearing capacity, and shall address mitigation measures. Such measures shall be given consideration in the design of the structure and can include but are not limited to ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements or any combination of these measures. The potential for liquefaction and soil strength loss shall be evaluated for site peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration shall be determined from a site-specific study taking into account soil amplification effects, as specified in Chapter 21 of ASCE 7.

**Exception:** A site-specific study need not be performed, provided that peak ground acceleration equal to  $SDS/2.5$  is used, where  $SDS$  is determined in accordance with Section 21.2.1 of ASCE 7.

**Add New Section 1802.4.2 as Follows:**

**1802.4.2 Seismic site hazard investigation. Sites for structures and facilities defined by ORS 455.447 as essential facilities, hazardous facilities, major structures and special occupancy structures shall be evaluated on a site-specific basis for vulnerability to seismic-induced geologic hazards as required in Section 1802.6.1. The degree of detail of investigation shall be compatible with the type of development and geologic complexity, and the structural system required by other parts of this code.**

Add New Section 1802.4.2.1 as Follows:

**1802.4.2.1 Design earthquake. Building sites required to be investigated as provided in Section 1802.4.2 shall, at a minimum, address earthquakes from:**

- 1. A shallow crustal earthquake on real or assumed faults near the site subject to evaluation. The minimum design earthquake shall in no case be considered less than a Moment Magnitude 6.0 or the design earthquake ground motion acceleration determined in accordance with Section 1613.**
- 2. A deep earthquake with a Moment Magnitude greater than 7 on the seismogenic part of the subducting plate of the Cascadia Subduction Zone.**
- 3. An earthquake on the seismogenic part of the interface between the Juan de Fuca Plate and the North American Plate on the Cascadia Subduction Zone with a minimum magnitude of 8.5**

Add New Section 1802.7 as Follows:

**1802.7 Seismic site hazard report. The seismic site hazard report shall include, but not be limited to, the following:**

- 1. A plot showing the location of test boring or sample excavations;**
- 2. Descriptions and classification of the materials encountered;**
- 3. Elevation of the water table, either measured or estimated;**
- 4. A geologic profile of the site extending to bedrock, either measured or estimated;**
- 5. An explanation of the regional geologic, tectonic and seismic setting;**
- 6. A literature review of the regional seismic or earthquake history (i.e. potential seismic source, maximum credible earthquakes, recurrence intervals, etc.);**
- 7. Selection criteria for seismic sources and recommendations for a design earthquake;**
- 8. Selection criteria and recommended ground response, including local amplification effects;**
- 9. An evaluation of the site-specific seismic hazards, including earthquake-induced landslide, liquefaction, settlement including subsidence, fault rupture, sciche, tsunami inundation, and other seismic hazard at the site including the effects of local geology and topography;**
- 10. Recommendations for foundation type and design criteria, including expected total and differential settlement, bearing capacity, provisions to mitigate the effects of expansive soils, and the effects of adjacent load; and**
- 11. Other criteria as required for structures not defined by ORS 455.447.**

**In addition, other reports and calculations may be required to be provided by seismologists, geophysicists or professional engineers to evaluate the seismic hazards in order to comply with Section 1802. Such additional investigation may include a study of aerial photographs, review of local groundwater data, exploratory borings, penetrometer results, geophysical surveys, trenching across faults or suspicious zones, and laboratory soil and rock testing.**

Add New Section 1802.8 as Follows:

**1802.8 Seismic site hazard report review. Provision shall be made by the agency with jurisdiction for qualified review of the seismic site hazard report for conformance with Section 1802. Persons qualified to do such review shall have qualifications deemed equivalent to the person who prepared the report. This review may be by the jurisdiction's staff, a consultant firm or a committee established by the jurisdiction. With the approval of the building official, the owner may provide a peer review.**

**1802.8.1 Report review criteria. Where the review is provided by a party other than the jurisdiction's staff, review shall consist of a written summary of the reviewer's assessment of the overall adequacy of the site report and a listing of additional questions or factors that need to be addressed.**

Add New Section 1802.9 as Follows:

**1802.9 Seismic site hazard report submittal. Two copies of the seismic site hazard report shall be submitted. One copy shall be submitted to the building permit issuing agency and retained on file with its permit record. One copy shall be submitted by the applicant to the Department of Geology and Mineral Industries (DOGAMI).**

Add New Section 1803.7 as Follows:

**1803.7 Under-floor drainage. When required by the building official, the ground under any building or portion thereof shall be sloped to a low point and drainage facilities shall be installed to provide positive drainage from the area under the building. The drainage facilities shall be in accordance with the Plumbing Code. If the premises abut a curbed street, or a storm sewer is available, and if the grade is favorable, a gravity drainage system from under the building shall extend to the gutter, storm sewer or other approved means. Crawl space drains may be connected to a footing drain.**

Add New Section 1805.4.2.7 as Follows:

**1805.4.2.7 Grounding of foundation re-bars. When concrete reinforcing bars are installed in concrete footings, a grounding electrode system, for each building or structure provided with electrical service, shall be installed according to the *Electrical Specialty Code*.**

Amend Section 1806.1 as Follows:

**1806.1 General.** Retaining walls shall be designed to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning **of 1.5 for static soil loading and 1.1 for seismic soil loading.**

**Amend Section 1808.2.8.5 as Follows:**

**1808.2.8.5 Uplift capacity.** Where required by the design, the uplift capacity of a single pier or pile shall be determined by an approved method of analysis based on a minimum factor of safety of three or by load tests conducted in accordance with ASTM D 3689. The maximum allowable uplift load shall not exceed the ultimate load capacity as determined in Section 1808.2.8.3 divided by a factor of safety of two. For pile groups subjected to uplift, the allowable working uplift load for the group shall be the lesser of:

1. The proposed individual pile uplift working load times the number of piles in the group.
2. Two-thirds of the effective weight of the pile group and the soil contained within a block defined by the perimeter of the group and the length of the pile **or any other analysis method approved by the Building Official.**