

**CRESO: COLUMBIA RIVER ESTUARY SHORELAND OVERLAY DISTRICT**

14.500. **PURPOSE AND AREAS INCLUDED.**

This overlay district establishes additional requirements for shoreland areas adjacent to the Columbia River Estuary to assure that estuary shorelands are managed in a way that is compatible with adjacent estuarine aquatic areas. This district includes the following shoreland areas:

1. Areas within 50 feet of the estuary shoreline;
2. Adjacent area of geologic instability where the instability is related to or will impact the estuary;
3. Riparian vegetation;
4. Area of significant shoreland and wetland biological habitats where habitat quality is derived from or associated with the estuary;
5. Areas in the S-1, S-2, S-2A, S-3 or S-4 Zones.
6. Area of exceptional aesthetic or scenic quality, where the quality is primarily derived from or associated with the estuary;

*(Section 14.500 renumbered by Ord 14-09, 10-16-14)*

14.505. **PERMITTED AND CONDITIONAL USES.**

1. Use and activity listed in the underlying zone, subject to the procedure specified in the underlying zone.
2. Accessory use and activity associated with development in adjacent Columbia River Estuary aquatic areas, subject to the procedure specified in the Aquatic Zone.

*(Section 14.505 renumbered by Ord 14-09, 10-16-14)*

14.510. **DEVELOPMENT STANDARDS AND PROCEDURAL REQUIREMENTS.**

1. All uses will satisfy applicable Columbia River Estuary Shoreland and Aquatic Area Use and Activity Standards in Article 4. Where a proposal involves several uses, the Standards applicable to each use shall be satisfied.

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2. Proposals involving a development that is only partially within this Overlay District shall be reviewed so that only the uses and activities actually within the Shorelands Boundary are subject to the requirements of this Overlay District.
3. The Shorelands Boundary describes the landward limit of this Overlay District. The Shorelands Boundary is described in the Subarea Plans, Section CP.155 through CP.180 of the Comprehensive Plan.
4. There shall be a 15' landscaped buffer area maintained between outdoor storage areas, parking areas, and/or driving surfaces and the top of bank along the shoreline. Except as otherwise noted, parked vehicle bumpers may overhang a maximum of 2.5' beyond a bumper guard into the landscaped area.  
*(Section 14.510.4 added by Ord 19-05, 6-17-2019)*

*(Section 14.500 renumbered by Ord 14-09, 10-16-14)*

**FHO: FLOOD HAZARD OVERLAY ZONE**

14.520. **PURPOSE AND OBJECTIVES.**

- A. It is the purpose of this Flood Hazard Overlay Zone to regulate the use of those areas subject to periodic flooding, to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions. In advancing these principles and the general purposes of the City of Astoria Comprehensive Plan and Development Code, the specific objectives of this zone are:
1. To combine with the present zoning requirements certain restrictions made necessary for the known flood hazard areas to promote the general health, welfare and safety of the City.
  2. To prevent the establishment of certain structures and land uses in areas unsuitable for human habitation because of the danger of flooding, unsanitary conditions or other hazards.
  3. To minimize the need for rescue and relief efforts associated with flooding.
  4. To help maintain a stable tax base by providing for sound use and development in flood-prone areas and to minimize prolonged business interruptions.
  5. To minimize damage to public facilities and utilities located in flood hazard areas.
  6. To ensure that potential home and business buyers are notified that property is in a flood area.
  7. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

*(Section 14.520 renumbered by Ord 14-09, 10-16-14)*

14.525. **DEFINITIONS.**

Unless specifically defined below, words or phrases used in this Code shall be interpreted so as to give them the meaning they have in common usage, and to give this Code its most reasonable application. In addition, any words or phrases found in this section are applicable to only this section of the Code, unless otherwise stated.

*(Section 14.500 renumbered by Ord 14-09, 10-16-14; Section 2.805 amended by Ordinance 09-03, 8/3/09)*

AREA OF SHALLOW FLOODING: A designated AO or AH zone on the Flood Insurance Rate Map (FIRM). The base flood depth range is from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

AREA OF SPECIAL FLOOD HAZARD: The land in the flood plain subject to a one percent (1%) or greater chance of flooding in any given year. Designation on maps always include the letter A or V.

BASE FLOOD: A flood having a one percent (1%) chance of being equaled or exceeded in any given year (also referred to as a 100-year flood).

*(Amended by Ordinance 09-03, 8/3/09)*

BASE FLOOD ELEVATION (BFE): The height of the base flood, usually in feet, in relation to the current FEMA Flood Insurance Rate Maps, or depth of the base flood, usually in feet, above the ground surface.

*(Added by Ordinance 09-03, 8/3/09)*

BASEMENT: Basement means any area of the building having its floor subgrade below ground level on all sides.

*(Added by Ordinance 09-03, 8/3/09)*

BELOW-GRADE CRAWLSPACE: An enclosed area below the base flood elevation in which the interior grade is not more than two feet below the lowest adjacent exterior grade and the height, measured from the interior grade of the crawlspace to the top of the crawlspace foundation, does not exceed 4 feet at any point.

*(Added by Ordinance 09-03, 8/3/09)*

CRITICAL FACILITY: A facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals police, fire and emergency response installations, installations which produce, use or store hazardous materials or hazardous waste. Critical facilities exclude water, sanitary sewer, and storm water infrastructure, as well as assisted-living facilities.

*(Added by Ordinance 09-03, 8/3/09)*

DEVELOPMENT: Any man-made change to improved or unimproved real property, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

*(Amended by Ordinance 09-03, 8/3/09)*

**ELEVATED STRUCTURE:** A non-basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, posts, piers, pilings, or columns.

*(Added by Ordinance 09-03, 8/3/09)*

**FLOOD OR FLOODING:** A general and temporary condition of partial or complete inundation of normally dry land areas from:

- a. The overflow of inland or tidal waters; and/or
- b. The unusual and rapid accumulation of runoff of surface waters from any source.

**FLOOD INSURANCE RATE MAP (FIRM):** The official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

**FLOOD INSURANCE STUDY:** The official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Boundary-Floodway Map, and the water surface elevation of the base flood.

**LOWEST FLOOR:** The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this Code in Section 14.545(A).

**MEAN SEA LEVEL (MSL):** The National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

*(Amended by Ordinance 09-03, 8/3/09)*

**NEW CONSTRUCTION:** Structures for which the "start of construction" commenced on or after January 21, 1988.

**START OF CONSTRUCTION:** The date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building. Permanent construction does not include:

*(Amended by Ordinance 09-03, 8/3/09)*

- a. Land preparation, such as clearing, grading and filling;
- b. Installation of streets and/or walkways;
- c. Excavation for basement, footings, piers, or foundation or the erection of temporary forms;
- d. Installation on the property of an accessory building, such as a garage or shed not occupied as a dwelling unit or not part of the main structure.

**STRUCTURE:** A walled, floored, and/or roofed building including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

*(Amended by Ordinance 09-03, 8/3/09)*

**SUBSTANTIAL DAMAGE:** Is damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred as indicated on the records of the Clatsop County Assessor.

*(Added by Ordinance 09-03, 8/3/09)*

**SUBSTANTIAL IMPROVEMENT:** Any repair, reconstruction, or improvement of an existing structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:

- a. Before the improvement or repair is started; or
- b. If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.
- c. The terms do not, however, include either:
  - 1) Any project for improvement of a structure to correct existing violations of State or local health, sanitary, or safety code specifications which

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have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

*(Section c.1 amended by Ordinance 09-03, 8/3/09)*

- 2) Any alteration of a structure listed on the National Register of Historic Places, Local Landmark, or on a State Inventory of Historic Places.

*(Section 14.525.c.2 amended by Ordinance 09-03, 8/3/09)*

*(Section 14.525 renumbered by Ord 14-09, 10-16-14)*

14.530. GENERAL PROVISIONS.

A. Lands To Which This Code Applies.

This Code shall apply to all areas of special flood hazards (Flood Hazard Overlay Zone) in combination with present zoning requirements within the jurisdiction of the City of Astoria.

B. Basis For Establishing The Areas of Special Flood Hazard.

The areas of special flood hazard identified by the Federal Insurance Administration through a scientific and engineering report entitled "The Flood Insurance Study for Clatsop County, Oregon and Incorporated Areas", dated September 17, 2010, with accompanying Flood Insurance Rate Maps and Flood Boundary Maps and any revision thereto, is hereby adopted by reference and declared to be a part of this Code. The Flood Insurance Study is on file at the City of Astoria City Hall, Community Development Department, 1095 Duane Street, Astoria.

*(Section 14.530.B formerly 2.810.B amended by Ordinance 09-03, 8/3/09; amended by Ordinance 10-09, 9-7-10)*

C. Compliance.

No structure or land shall hereafter be located, extended, converted or altered without full compliance with the terms of this Code and other applicable regulations.

Compliance with the terms of this Code and other applicable regulations, and adherence to the submitted plans, as approved, is required. Any departure from the conditions of approval and approved plans, or any work not in compliance with the Code constitutes a violation of this Code. See Section 1.010 of the Astoria City Code concerning penalties.

*(Section 14.530.C formerly 2.810.C amended by Ordinance 09-03, 8/3/09)*

D. Warning and Disclaimer of Liability.

The degree of flood protection required by this Code is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This Code does not imply land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. The Code shall not create liability on the part of the City of Astoria, or any officer or employee thereof, for any flood damages that result from reliance on this Code or any administrative decision lawfully made thereunder.

E. Abrogation and Greater Restrictions.

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, state building code, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

*(Section 14.530.E formerly 2.810.E added by Ordinance 09-03, 8/3/09)*

F. Interpretation.

In the interpretation and application of this ordinance, all provisions shall be:

1. Considered as minimum requirements;
2. Liberally construed in favor of the governing body; and,
3. Deemed neither to limit nor repeal any other powers granted under State statutes and rules including the state building code.

*(Section 14.530.F formerly 2.180.F added by Ordinance 09-03, 8/3/09)*

G. Flood Insurance Rates.

Some construction techniques, including but not limited to below-grade crawl space, may affect flood insurance rates. The applicant and/or property owner are advised to obtain additional information on this subject from an insurance company, the Oregon Department of Land Conservation and Development or the Federal Emergency Management Administration.

*(Section 14.530.G formerly 2.810.G added by Ordinance 09-03, 8/3/09)*

*(Section 14.530 renumbered by Ord 14-09, 10-16-14)*

14.535.     ADMINISTRATION.

A.     Establishment of Development Permit.

A development permit shall be obtained before construction or development begins within any area defined as an Area of Special Flood Hazard (see definition). The permit shall be for all structures including manufactured homes, set forth in the "definitions" and for all developments including fill and other activities, also as set forth in the "Definitions". Application for a development permit shall be made to the Community Development Director on forms furnished by the City, and shall specifically include the following information:

1.     Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures.
2.     Elevation in relation to mean sea level to which any structure has been floodproofed.
3.     Certification by a registered professional engineer or architect that the floodproofing method for any non-residential structure meets the floodproofing criteria in Section 14.545(A.2).
4.     Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

B.     Duties and Responsibilities.

The duties of the Community Development Director shall include, but not be limited to:

1.     Review of all development permits to determine that the permit requirements of this Code have been satisfied.
2.     Review all development permits to determine that all necessary permits have been obtained from those Federal, State or local governmental agencies from which prior approval is required.
3.     Review all development permits in the area of special flood hazard to determine if the proposed development adversely affects the flood carrying capacity of the area.

C. Use of Other Base Flood Data.

When base flood elevation data has not been provided in accordance with Section 14.530(B), Basis for Establishing the Area of Special Flood Hazard, the Community Development Director shall:

1. Obtain, review and reasonably utilize any base flood elevation data available from a Federal, State or other source, in order to administer Section 14.545(A.1), Specific Standards, Residential Construction, and Section 14.545(A.2), Specific Standards, Non-residential Construction.
2. Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act amendments of 1972, 33 U.S.C. 1334.

*(Section 14.535.C.2 formerly 2.815.C.2 added by Ordinance 09-03, 8/3/09)*

D. Information to Be Obtained and Maintained By Community Development Director.

Where base flood elevation data is provided through the Flood Insurance Study or required as in Section 14.535(C), the Community Development Director shall:

1. Verify and record actual elevation (in relation to Mean Sea Level) of the lowest floor (including basement) of all new or substantially improved structures and whether or not the structure contains a basement.
2. For all new or substantially improved floodproofed structures:
  - a. verify and record the actual elevation (in relation to Mean Sea Level); and
  - b. maintain the floodproofing certifications required in Section 14.535(A.3).
3. Maintain for public inspection all records pertaining to the provision of this ordinance.

*(Section 14.535.D.3 formerly 2.815.D.3 added by Ordinance 09-03, 8/3/09)*

E. Alteration of Watercourses.

The Community Development Director shall:

1. Notify adjacent communities, the Oregon Department of Land Conservation and Development, Department of State Lands, the Oregon Water Resources Department, and other appropriate State and Federal agencies, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.

*(Section 14.535.E.1 formerly 2.815.E.1 amended by Ordinance 09-03, 8/3/09)*

2. Require that maintenance is provided within the altered or relocated portion of said watercourse, so that the flood carrying capacity is not diminished.

F. Interpretation of FIRM Boundaries.

The Community Development Director shall make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretations as provided in Section 14.535(H).

G. Variance Procedures.

1. A variance shall be reviewed by the Community Development Director in accordance with Article 12.

*(Section 14.535.G.1 formerly 2.815.G.1 amended by Ordinance 09-03, 8/3/09)*

2. *(Section 14.535.G.2 formerly 2.815.G.2 deleted by Ordinance 09-03, 8/3/09).*

H. *(Section 14.535.H formerly 2.185.H deleted by Ordinance 09-03, 8/3/09).*

*(Section 14.535 renumbered by Ord 14-09, 10-16-14)*

14.540. GENERAL PROVISIONS FOR FLOOD HAZARD REDUCTION.

A. General Standards.

In the Flood Hazard Overlay Zone (FHO) the following provisions are required:

1. Anchoring.

- a. All new construction and substantial improvement shall be anchored to prevent flotation, collapse or lateral movement of the structure.
- b. All manufactured homes must likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Refer to FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques).

2. Construction Materials and Methods.

- a. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- b. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage.
- c. Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating with the components during conditions of flooding.

3. Utilities.

- a. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
- b. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters; and
- c. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

4. Subdivision Proposals.

- a. All subdivision proposals shall be consistent with the need to minimize flood damage.
- b. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.

- c. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage.
- d. Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).

5. Review of Building Permits.

Where elevation data is not available either through the Flood Insurance Study or from another administrative source (Section 14.535(C), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

*(Section 14.540 renumbered by Ord 14-09, 10-16-14)*

14.545. SPECIFIC PROVISIONS FOR FLOOD HAZARD REDUCTION.

A. Specific Standards.

In all areas of special flood hazards (FHO) where base flood elevation data has been provided as set forth in Section 14.530(B), Basis for Establishing the Areas of Special Flood Hazard, or Section 14.535(C), Use of Other Base Flood Data, the following provisions are required:

1. Residential Construction.

New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to a minimum of one foot above the base flood elevation. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

*(Section 14.545.A.1 formerly 2.825.A.1 amended by Ordinance 09-03, 8/3/09)*

- a. A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

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- b. The bottom of all openings shall be no higher than one foot above grade.
- c. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

*(Section 14.545.A.1.c formerly 2.825.A.1.c added by Ordinance 09-03, 8/3/09)*

- d. For below-grade crawlspace. See Section 14.545(A.5).

*(Section 14.545.A.1.d formerly 2.825.A.1.d added by Ordinance 09-03, 8/3/09)*

2. Non-Residential Construction.

New construction and substantial improvement of any commercial, industrial, or other non-residential structure shall either have the lowest floor, including basement, elevated to one foot above the base flood elevation, or, together with attendant utility and sanitary facilities, shall:

- a. Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;
- b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;
- c. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this Subsection based on their development and/or review of the structural design, specification and plans. Such certifications shall be provided to the official as set forth in Section 14.535(D.2.b);
- d. Non-residential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in Section 14.535(A);
- e. Applicants floodproofing non-residential buildings shall be notified that flood insurance premium will be based on rates that are one foot below the flood proofed level (e.g., a building constructed to the base flood level will be rated as one foot below that level).
- f. For below-grade crawlspace. See Section 14.545(A.5).

*(Section 14.545.A.2.f formerly 2.825.A.2.f added by Ordinance 09-03, 8/3/09)*

3. Manufactured Homes.

All manufactured homes, both within or outside of manufactured dwellings parks, to be placed or substantially improved within Zones A1-30, AH and AE shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to one foot above the base flood elevation and securely anchored to an adequately anchored foundation system in accordance with the provisions of Section 14.540(A.1.b).

*(Section 14.545.A.3 formerly 2.825.A.3 amended by Ordinance 09-03, 8/3/09)*

4. Recreational Vehicles.

Recreational vehicles are prohibited from being located within Zones A1-30, AH and AE, or are being stored and are unoccupied in compliance with all other City codes and ordinances.

In addition to other City codes and ordinances, the recreational vehicle shall:

- a. Be located on the site for fewer than 180 consecutive days; and
- b. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

*(Section 14.545.A.4 formerly 2.825.A.4. added by Ordinance 09-03, 8/3/09)*

5. Below-Grade Crawlspace.

Below-grade crawlspaces are allowed subject to the following standards as found in FEMA Technical Bulletin 11-01, Crawlspace Construction for Buildings Located in Special Flood Hazard Areas (See Figure 1 below):

- a. The building must be designed and adequately anchored to resist flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy. Hydrostatic loads and the effects of buoyancy can usually be addressed through the required openings stated in Section 14.545(A.5.b) below. Because of hydrodynamic loads,

crawlspace construction is not allowed in areas with flood velocities greater than five (5) feet per second unless the design is reviewed by a qualified design professional, such as a registered architect or professional engineer. Other types of foundations are recommended for these areas.

- b. The crawlspace is an enclosed area below the base flood elevation (BFE) and, as such, must have openings that equalize hydrostatic pressures by allowing the automatic entry and exit of floodwaters. The bottom of each flood vent opening can be no more than one (1) foot above the lowest adjacent exterior grade.
- c. Portions of the building below the BFE must be constructed with materials resistant to flood damage. This includes not only the foundation walls of the crawlspace used to elevate the building, but also any joists, insulation, or other materials that extend below the BFE. The recommended construction practice is to elevate the bottom of joists and all insulation above BFE.
- d. Any building utility systems within the crawlspace must be elevated above BFE or designed so that floodwaters cannot enter or accumulate within the system components during flood conditions. Ductwork, in particular, must either be placed above the BFE or sealed from floodwaters.
- e. The interior grade of a crawlspace below the BFE must not be more than two (2) feet below the lowest adjacent exterior grade.
- f. The height of the below-grade crawlspace, measured from the interior grade of the crawlspace to the top of the crawlspace foundation wall must not exceed four (4) feet at any point. The height limitation is the maximum allowable unsupported wall height according to the engineering analyses and building code requirements for flood hazard areas.
- g. There must be an adequate drainage system that removes floodwaters from the interior area of the crawlspace. The enclosed area should be drained within a reasonable time after a flood event. The type of drainage system will vary because of the site gradient and other drainage characteristics, such as soil types. Possible options include natural drainage through porous, well-drained soils and drainage systems such as perforated pipes, drainage tiles or gravel or crushed stone drainage by gravity or mechanical means.

- h. The velocity of floodwaters at the site should not exceed five (5) feet per second for any crawlspace. For velocities in excess of five (5) feet per second, other foundation types should be used.

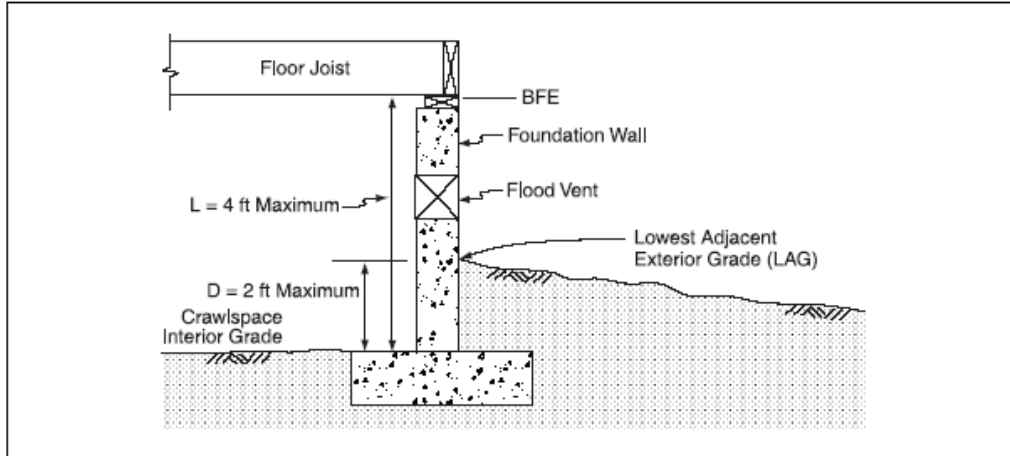


Figure 1. Requirements regarding below-grade crawlspace construction.

NOTE: In addition, the Oregon State Building Code requires residential structures to elevate 1 ft. above BFE.”

*(Section 14.545.A.5 formerly 2.825.A.5. added by Ordinance 09-03, 8/3/09)*

*(Section 14.545 renumbered by Ord 14-09, 10-16-14)*