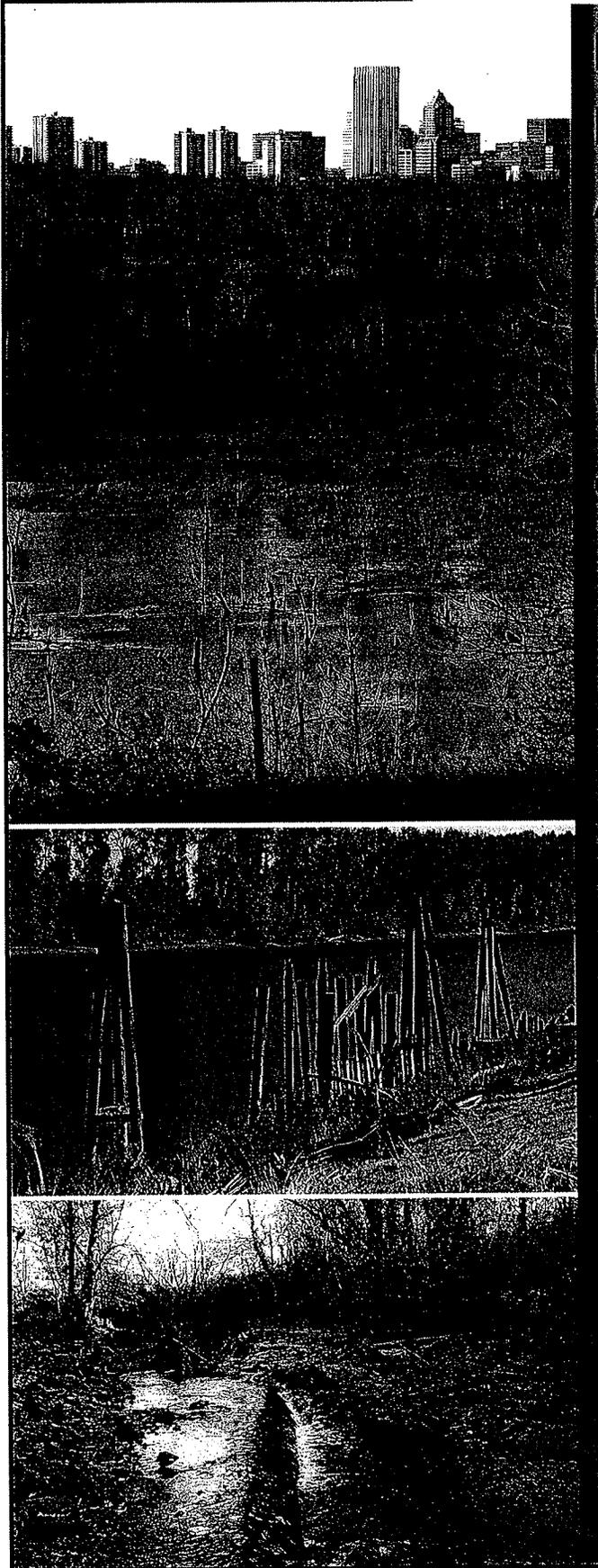


Exhibit A



# Federal Emergency Management Agency (FEMA)

## Flood Map Update Project Recommended Draft

October 27, 2010



City of Portland Bureau of  
**Planning and Sustainability**  
Sam Adams, Mayor | Susan Anderson, Director

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**Federal Emergency Management Agency (FEMA)  
Flood Map Update Project**

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The Bureau of Planning and Sustainability is committed to providing equal access to information and hearings. If you need special accommodation, please call 503-823-7700, the City's TTY at 503-823-6868, or the Oregon Relay Service at 1-800-735-2900.

For more information about the **FEMA Flood Map Update Project** please contact:

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or visit [PortlandOnline.com/bps/femaupdate](http://PortlandOnline.com/bps/femaupdate)

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## Acknowledgements

### **Portland City Council**

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Nick Fish, *Commissioner*  
Amanda Fritz, *Commissioner*  
Randy Leonard, *Commissioner*  
Dan Saltzman, *Commissioner*

### **Portland Planning and Sustainability Commission**

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Michelle Rudd—Vice Chair  
Howard Shapiro—Vice Chair  
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# I. Introduction

## Background

The Federal Emergency Management Agency (FEMA) maintains maps of areas around the country that are prone to flooding. When communities have flood-hazard regulations that apply within the areas mapped by FEMA, community members in those areas are eligible to participate in the National Flood Insurance Program (NFIP). The regulations limit the kinds of development allowed in the areas likely to flood, and specify building regulations that limit damage when there is a flood. The NFIP makes flood insurance available to homeowners, renters, and business owners at a lower rate than private insurance companies would be able to provide.

FEMA updates these maps periodically. The most recent set of updated maps will be effective on November 26, 2010. In Portland, the maps consist of 26 separate map panels. Nine of the 26 map panels are being revised; this affects areas in the North Reach of the Willamette River, Columbia River, Columbia Slough, and the drainage districts adjacent to the Columbia River. The revised flood boundaries are based on more detailed and up-to-date topographic data. Flood elevations are not changed on the revised maps.

Portlanders are eligible to participate in the NFIP. However, to maintain that eligibility, the City must adopt the FEMA-updated maps of flood-prone areas. Some references in our regulations must also be updated.

## Recommended Map Changes

These amendments adopt the maps most recently updated by FEMA, which will become effective on November 26, 2010. There has been no change to the elevation at which the map boundaries are drawn. However, more accurate topographical information has resulted in revised map boundaries that provide better information on the location of flood elevations.

## Recommended Amendments to City Codes

Some minor amendments are needed to both Title 24 (Building Regulations) and Title 33 (Planning and Zoning) to refer to the updated maps. No substantive changes to the regulations are proposed.

In Title 24, Section 24.50.040 will be changed to refer to the updated maps. In addition, several code changes are recommended to ensure full compliance with the Federal regulations:

- New definitions and changes to existing definitions;
- Revised reference to the Flood Insurance Study and Flood Insurance Rate Maps to cite the documents by their official publication names and dates;
- Clarification to the floodway encroachment standard for AE Zone flood hazard areas without a regulatory floodway;
- Clarification to requirements for the use and design of fully enclosed spaces located below the lowest floor; and
- The addition of standards for drainage paths in AH/AO Zone flood hazard areas.

In Title 33, Planning and Zoning, changes are proposed throughout the code:

- The term "flood hazard area" will be changed to "special flood hazard area" to be consistent with FEMA terminology.
- The definition of "special flood hazard area" will refer to the 100-year floodplain "as defined by FEMA as of November 26, 2010", replacing the reference to the 100-year floodplain "as currently defined by FEMA" for specificity.

- Terms such as flood hazard area, floodplain, 100-year floodplain, and the like will be changed to "special flood hazard area" to be consistent both within the Zoning Code and with FEMA terminology.

The recommended amendments to Title 24 and Title 33 do not change how development is regulated. The amendments only update the two Titles to refer to the most recent FEMA maps, and to clarify terminology in City Codes so that it is consistent within the Titles and with FEMA's terminology.

### **Planning and Sustainability Commission Recommendation**

The Planning and Sustainability Commission recommends that City Council take the following actions:

- Adopt the ordinance;
- Adopt this report;
- Amend Title 24, Building Regulations, and Title 33, Planning and Zoning, as shown in this report;
- Adopt the special flood hazard areas information on the FEMA Flood Insurance Rate Map (FIRM) as shown in this report; and
- Adopt the report and commentary as further findings and legislative intent.

## **II. Amendments to Title 24, Building Regulations**

The recommended amendments to Title 24 are in this section of the report. The amendments are on the odd-numbered pages. The facing (even-numbered) pages contain commentary about the recommended amendments.

**Chapter 24.50, Flood Hazard Areas**

**24.50.030 Flood Related Definitions**

Some definitions are added and others clarified to come into conformance with Federal regulations.

- X. For clarity, Subsection X (previously W) is split into multiple definitions, lettered X through EE. There are no substantive changes.

Language to be **added** is underlined  
 Language to be **deleted** is shown in ~~strikethrough~~

## AMEND CHAPTER 24.50, FLOOD HAZARD AREAS

### 24.50.030 Flood Related Definitions.

The definitions contained in this Section relate to flood hazard areas and considerations outlined in this Chapter.

A through D: [No change]

**E.** "Basement" means any area of the building having its floor subgrade (below ground level) on all sides.

**E. F.** "City Datum" means the reference datum for the City of Portland maps. The FIRM maps described in Section 24.50.050 are referenced to the North American Vertical Datum (NAVD) of 1988. To convert NAVD 1988 level to City datum, subtract 2.125 feet from the elevation referenced to NAVD 1988 level.

**F. G.** "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings, bridges, other structures, and mining, dredging, filling, grading, paving, excavation, fencing, landscaping, drainage facilities, ~~or~~ drilling operations, or storage of equipment or materials.

[Re-letter G through V to H through W]

**W X.** "New manufactured home park or manufactured home subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale for which the construction of facilities for servicing the lots on which the manufactured home is to be affixed (including as a minimum, the installation of utilities, either final site grading or the pouring of concrete pads and the construction of streets) is completed on or after the original date of this Chapter.

**Y.** "Start of construction" includes substantial improvement, and means 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. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets, walkways, sanitary sewers, storm sewers, and/or drainage facilities; nor does it include excavation for a basement, footings, piers, or foundation or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

**Z.** "Structure or accessory structure" means, for the purposes of this Chapter, a walled and roofed building including a gas or liquid storage tank that is principally above ground.

**AA.** "Substantial Damage" means 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.

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## Commentary

24.50.030 Flood Related Definitions (con't)

184235

Language to be **added** is underlined  
Language to be **deleted** is shown in ~~strikethrough~~

#### **24.50.030 Flood Related Definitions (con't)**

**BB.** "Substantial Improvement" means any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure, either:

1. Before the improvement or repair is started, or
2. If the structure has been damaged, and is being restored, before the damage occurred. 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.

The term does not, however, include either:

- a. Any project for improvement of a structure to comply with existing State or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or
- b. Any alteration of a structure listed on the National Register of Historic Places or the State Inventory of Historic Places.

**CC.** "Variance" means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

**DD.** "Water surface elevation" means the height of the water surface of the base flood for any point along the longitudinal course of a stream.

**EE.** "Watercourse" means a channel in which a flow of water occurs, either continuously or intermittently, and if the latter, with some degree of regularity. Watercourses may be either natural or artificial.

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## Commentary

### 24.50.040 FIA Study and Flood Hazard Maps.

These amendments change the reference to include the latest revision to the Flood Insurance Study and Flood Insurance Rate Maps, which will become effective on November 26, 2010. The Flood Insurance Rate Maps consist of 26 separate map panels. Nine of the 26 map panels are being revised which affect areas in the North Reach of the Willamette River, Columbia River, Columbia Slough, and the drainage districts adjacent to the Columbia River.

The boundaries on the maps have been revised based on the use of more detailed and up-to-date topographic data. Flood elevations have not been changed.

Language to be **added** is underlined  
Language to be **deleted** is shown in ~~strikethrough~~

**24.50.040 FIA Study and Flood Hazard Maps.**

The following study and maps in this Section are hereby adopted and declared to be a part of this Chapter.

- A.** Flood Insurance Study is the official scientific and engineering report entitled "Flood Insurance Study for City of Portland, Oregon: Multnomah, Clackamas and Washington Counties", dated November 26, 2010 prepared by the Federal Insurance Administration (FIA) under agency agreement with the Portland District Corps of Engineers. ~~The latest revised October 19, 2004,~~ edition of the report, along with accompanying FIRMs, are on file with the Bureau of Development Services.
- B.** Flood Insurance Rate Maps (FIRMs) are is the official maps entitled "The Flood Insurance Rate Maps (FIRMs) for City of Portland, Oregon: Multnomah, Clackamas and Washington Counties", dated either October 19, 2004 or November 26, 2010, whichever is more current, on which the Federal Insurance Administration has delineated the areas of flood hazards along with the 100-year (base flood) and 500-year flood boundaries, the floodway zone boundaries and the 100-year flood elevations.
- C.-E.** No Change.

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## Commentary

184235

### 24.50.060 Provisions for Flood Hazard Reduction.

These amendments revise flood protection standards necessary to conform to the minimum requirements of the National Flood Insurance Program (NFIP).

The floodway encroachment standard is revised to address flood zones where a regulatory floodway has not been identified on the Flood Insurance Rate Maps (FIRMs).

Standards are added to provide for the automatic equalization of hydrostatic flood forces on building walls of fully enclosed areas located below the lowest floor of buildings.

**RECOMMENDED CODE LANGUAGE**

Language to be **added** is underlined  
 Language to be **deleted** is shown in ~~strikethrough~~

**24.50.060 Provisions for Flood Hazard Reduction.**

In all flood hazard areas defined in Section 24.50.050, the following provisions are required:

**A through C.** [No change.]

**D. Floodway.** Encroachments into the floodway by development and structures defined in Section 24.50.020 are prohibited unless it is demonstrated by technical analysis from a registered engineer that the development will result in no increase in the base flood elevation. In areas where a regulatory floodway has not been designated, no new construction, substantial improvement or other development (including fill) shall be permitted within Zone AE, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than 1 foot at any point within the community. Technical analysis shall be reviewed and approved by the Sewage System Administrator. However, the minimum width of the floodway shall not be less than 15 feet.

**E.** [No change.]

**F. Special flood hazard areas.**

1. [No change]

2. **Residential construction.**

a. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to or above the flood protection elevation. Floodproofing of "lowest floor" space is not permitted.

b. Fully closed areas below the lowest floor that are subject to flooding are prohibited or shall be used solely for parking of vehicles, building access or limited storage and be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing 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:

(1) 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;

(2) The bottom of all openings shall be no higher than one foot above grade;

(3) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

a. Fills required to elevate the lowest floor to the flood protection level shall comply with Chapter 24.70. Fill selection and placement shall recognize the effects of inundation from floodwaters on slope stability, fill settlement, and scour. The minimum elevation at the top of the fill slope shall be at the

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## Commentary

184235

### 24.50.060 Provisions for Flood Hazard Reduction (con't)

Standards are added to provide for adequate drainage pathways around buildings in flood areas subject to shallow ponding and sheetflow (AH/AO Zones).

Language to be **added** is underlined  
Language to be **deleted** is shown in ~~strikethrough~~

184235

**24.50.060 Provisions for Flood Hazard Reduction (con't)**

base flood level. Minimum distance from any point of the building perimeter to the top of the fill slope shall be either 25 feet or twice the depth of fill at that point, whichever is the greater distance.

- b. Piling foundations required to elevate the lowest habitable floor to the flood protection level shall comply with Section 1809 and 1808 of the Structural Specialty Code. Pilings shall be spaced no more than 10 feet apart, and reinforcement shall be provided for piling more than 6 feet above the ground level.

3 through 10. [No change.]

- 11. AH/AO Zone Drainage.** Adequate drainage paths shall be provided around structures on slopes to guide floodwaters around and away from proposed structures.

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## Commentary

### III. Amendments to Title 33, Planning and Zoning

The recommended amendments to Title 33 are included in this section of the report. The amendments are on the odd-numbered pages. The facing (even-numbered) pages contain commentary about the recommended amendments.

184235

#### Chapter 33.910, Definitions

##### Flood Hazard Area

This amendment updates Zoning Code definition of "Flood Hazard Area" in three ways.

First, the term "flood hazard area" is changed to "special flood hazard area" to be consistent with FEMA terminology.

Second, this amendment changes the definition by referring to the special flood hazard area in effect on November 26, 2010. This is the date of the most recent FEMA update. The new language replaces language that refers to the area "as currently defined by FEMA." The new language is more specific. For future updates, the effective date will be changed in this definition instead of throughout the code.

Finally, the definition is amended to be consistent with FEMA's definitions of special flood hazard area and base flood. The amended Zoning Code definition directly incorporates portions of FEMA's definitions:

##### **Special Flood Hazard Area (FEMA Definition, FCR 44.I.59.1)**

The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-A30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO V1-30, VE, and V.

##### **Base Flood (FEMA Definition, FCR 44.I.59.1 )**

The flood having a one percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the "100-year flood." The base flood is the national standard used by the NFIP and all Federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base Flood Elevations (BFEs) are typically shown on Flood Insurance Rate Maps (FIRMs).

##### Floodway

No change. This definition is included here for reference only.

**AMEND CHAPTER 33.910, DEFINITIONS**

**Special Flood Hazard Area.** Land area covered by the floodwaters of the base flood, as mapped that is in the 100-year floodplain as currently defined by shown on the Federal Emergency Management Agency (FEMA) maps in effect on November 26, 2010. The base flood is the flood having a one percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the "100-year flood."

**Floodway.** The active flowing channel during a flood, as designated on the flood maps adopted under authority of Title 24 of the Portland City Code. The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

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## Commentary

### Title 33, Planning and Zoning

#### **Code provisions where "special flood hazard area" will replace other terms**

These amendments substitute the newly-defined term "special flood hazard area" where "flood hazard area," "100-year floodplain," and "100-year floodplain, as currently defined by Federal Emergency Management Agency (FEMA)" currently exist in the Code. See commentary on previous page for legislative intent.

#### **Code provisions where "potential" will be deleted from "flood hazard area"**

A project called "Code Maintenance 2004" deleted a map and terminology that referred to the "potential" flood hazard area. The references in 33.660.120, 33.662.120, 33.664.120 and 33.664.220 were inadvertently left in the Code. This amendment corrects that oversight and clarifies that the provisions apply to the special flood hazard area.

**Replace “flood hazard area” with “special flood hazard area” in the following places:**

- 33.564.310.A – Pleasant Valley Plan District
- 33.610.100.C – Land Divisions – Lots in RF through R5
- 33.610.100.C and D – Land Divisions – Lots in RF through R5 Zones
- 33.611.100.C and D – Land Divisions – Lots in R2.5 Zone
- 33.631 – Sites in Special Flood Hazard Areas (9 changes in this chapter)
- 33.634.200.D.2 – Required Recreation Area
- 33.660.110.B.3 and 120.C – Review of Land Divisions in Open Space and Residential Zones, Review Procedures and Approval Criteria
- 33.662.110.B.3 and 120.C – Review of Land Divisions in Commercial, Employment, and Industrial Zones, Review Procedures and Approval Criteria
- 33.664.120.A.3 and 220.B.1.c – Review of Land Divisions of Large Sites in Industrial Zones, Review of Preliminary Plan and Final Plat – Approval Criteria
- 33.730.060.D.1.c – Quasi-Judicial Procedures, Application Requirements

**Replace “100-year floodplain” or “100-year floodplain, as currently defined by Federal Emergency Management Agency (FEMA)” with “special flood hazard area” in the following places:**

- 33.430.240.A.1.a. – Environmental Zones
- 33.537.020 – Johnson Creek Basin Plan District (JCBPD)
- 33.537.110.A, B.1.b., and B.2.b. – JCBPD, Transfer of Development Rights
- 33.537.120.B.2 – JCBPD, Bonus Density
- 33.537.140.B – JCBPD, South Subdistrict Development Standards
- 33.537.150.B – JCBPD, Floodplain Standards
- 33.730.060.D.1.c – Quasi-Judicial Procedures, Application Requirements

**Delete “potential” in the following places:**

- 33.660.120.C – Review of Land Divisions in Open Space and Residential Zones, Preliminary Plan, Approval Criteria
- 33.662.120.C – Review of Land Divisions in Commercial, Employment, and Industrial Zones, Preliminary Plan, Approval Criteria
- 33.664.120.A.3 and 220.B.1.c – Review of Land Divisions on Large Sites in Industrial Zones, Preliminary Plan and Final Plat, Approval Criteria

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## Commentary

### Chapter 33.537, Johnson Creek Basin Plan District

#### 33.537.100 General Development Standards

The term "floodway" is already defined in the Code. This amendment removes the language that refers to the "currently defined" floodway because it is redundant with the definition. See pages 14-15 of this report for reference.

### Chapter 33.730, Quasi-Judicial Procedures

#### 33.730.060.D. Application Requirements. Required information for land divisions

See commentary on page 6.

This amendment deletes the reference to FEMA to avoid confusion, as both "floodway" and "special flood hazard area" are FEMA designations, but only floodway is currently called out as pertaining to a FEMA designation. See page 15 for definitions of Special Flood Hazard Area and Floodway.

**AMEND CHAPTER 33.537, JOHNSON CREEK BASIN PLAN DISTRICT**

**33.537.100 General Development Standards**

The standards of this section apply to the entire Johnson Creek Basin plan district.

- A.** The following are prohibited within the Johnson Creek floodway ~~as currently defined by the Federal Emergency Management Agency (FEMA)~~. Exceptions to this are fences, public bridges, outfall structures, and fire hydrants, which are allowed subject to standards set by the Bureau of Environmental Services.

1. - 3. [No change.]

**B.-E.** [No Change.]

**AMEND CHAPTER 33.730, QUASI-JUDICIAL PROCEDURES**

**33.730.060 Application Requirements**

**A.-C.** [No Change.]

**D. Required information for land divisions.** [No change.]

1. [No Change.]

a.-c. [No Change.]

d. [No change.]

(1) [No Change.]

(2) Existing conditions map. The following existing site conditions must be shown:

Surveyed information:

- Bullets 1-6 [No change.]
- Location of flood hazard areas, including elevations of the special flood hazard area 100-year floodplains, and ~~FEMA Floodway~~ boundaries. Sites that contain a water body not shown on the FEMA maps must identify the location of the flood hazard areas;

Additional information:

- [No change.]
- [No change.]

(3)-(4). [No Change.]

e.-k. [No Change.]

2.-4. [No Change.]

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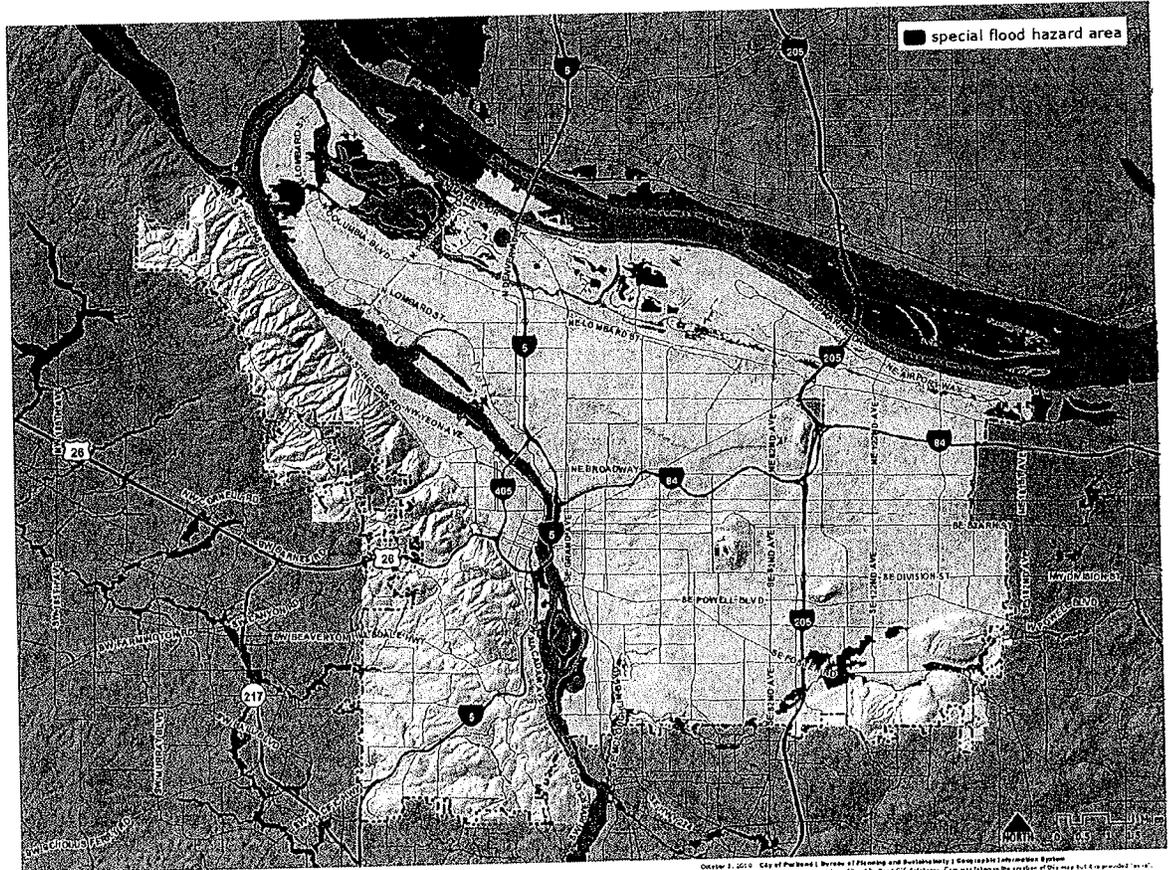
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## Commentary

### IV. Recommended Portland Special Flood Hazard Areas Map as of November 26, 2010

This map shows, at a citywide scale, the recommended special flood hazard areas map as of November 26, 2010. It is the same as the maps created by FEMA.

To see the map on a larger scale, visit [PortlandOnline.com/bps/femaupdate](http://PortlandOnline.com/bps/femaupdate). There will also be a large version of this map at public hearings, and is available for review at the Bureau of Planning and Sustainability offices.



FEMA Special Flood Hazard Area (effective 11/26/2010)

October 2, 2010. City of Portland, Bureau of Planning and Sustainability | Geographic Information System  
 This map is an informational product from City of Portland GIS Services. City maintains the accuracy of this map but does not warrant the  
 City of Portland cannot accept any responsibility for errors, omissions, or partial updates, and therefore, it is not responsible for any damage  
 the product. Please notification of any errors will be appreciated.

184235



City of Portland Bureau of  
**Planning and Sustainability**

Sam Adams, Mayor | Susan Anderson, Director