

# Hazard Annex

This annex gathers detailed information on natural hazard events in the County and places them into one easy to access file. The annex documents knowledge regarding each hazard threatening the County; each specific hazard annex is divided into four section headings:

- (1) Best Available Local Data
- (2) State of Oregon NHMP Mid-Columbia (Region 5) Risk Assessment
- (3) Wasco County Hazard Identification & Vulnerability Assessment (HIVA)
- (4) Oregon Technical Resource Guide (TRG)

A summary of the section headings is provided below:

## Best Available Local Data

This section collects the best available local data (i.e. County data) on hazard events and their impact. Instances are noted where local data was not readily available or insufficient.

## State of Oregon Natural Hazard Mitigation Plan: Mid-Columbia (Region 5) Risk Assessment

This section reports the hazard assessment scores from the State of Oregon's mitigation plan. Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

- High = One incident likely within a 10 to 35 year period.
- Moderate = One incident likely within a 35 to 75 year period.
- Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

- High = More than 10% affected
- Moderate = 1-10% affected
- Low = Less than 1% affected

In some cases, counties either did not rank the hazard or did not find it to be a significant concern. These cases are noted with a dash (-) in the table below.

A copy of the State NHMP can be downloaded here:

<http://www.oregonshowcase.org/index.cfm?mode=stateplan>

#### Wasco County Hazard Inventory & Vulnerability Analysis (HIVA)

This section highlights the risk assessment provided by the Wasco County HIVA. The Oregon Revised Statutes (ORS) requires each political subdivision to base its Emergency Operations Plan on a hazard analysis. The hazard analysis is also a training tool, providing introductory knowledge of the hazards posing a threat to Wasco County. To make the analysis more useful, adjective descriptors (High, Moderate, Low) are established for each hazard's probability-of-occurrence and vulnerability and a risk rating is assigned based on a subjective estimate of their combination. The risk rating is assigned on the probability of a hazard occurring over the next 50 years. The risk rating will help focus the emergency management program on the hazards of greatest risk.

A high risk rating warrants major program effort to prepare for, respond to, recover from, and mitigate against the hazard.

A moderate risk rating warrants modest program effort to prepare for, respond to, recover from, and mitigate against the hazard.

A low risk rating warrants no special effort to prepare for, respond to, recover from, or mitigate against the hazard beyond general awareness training.

#### Oregon Technical Resource Guide (TRG)

The TRG is a comprehensive resource developed to assist Oregon communities in planning and preparing for natural hazard events. The TRG includes information on:

- Comprehensive Planning
- Legal Issues of Planning
- Hazard Specific Planning, i.e.:
  - Is your community threatened by natural hazards?
  - What are the laws in Oregon for natural hazards?
  - How can your community reduce risk from natural hazards?
  - How are Oregon communities addressing natural hazards?
  - Where can your community find resources to plan for natural hazards?

A hard copy of the TRG can be found at the Wasco County Planning & Development office. The TRG is also available online at: <http://www.oregonshowcase.org/index.cfm>

**Best Available Local Data**

Drought data and its impact are not easily accessible at the local level. Stakeholder interviews revealed that the Oregon State University Extension Service has the capacity to perform detailed analysis of drought impact on the agricultural community, but had not done so at the time of this plan’s development. Additionally, the Wasco County Soil & Water Conservation District houses data on river and stream flows, and irrigation consumption.

**State Risk Assessment**

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
High	High

**HIVA Risk Assessment**

History suggests a high probability of occurrence. The entire population of the county is vulnerable to the effects of drought. Transportation and communications infrastructure would be minimally impacted, if at all. As growth places more pressure on limited local resources, future impacts may be greater, suggesting high vulnerability. A high risk rating is assigned

**Oregon Technical Resource Guide**

There is no Drought specific section in the TRG. Please refer to the University of Nebraska-Lincoln’s National Drought Mitigation Center ( NDMC) website for more information. The NDMC provides the excellent drought related coverage for:

- *Planning for drought*
- *Monitoring drought*
- *Drought risks & impacts*
- *Mitigating drought*

The website address is: <http://www.drought.unl.edu/>

## EARTHQUAKE

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### Best Available Local Data

Due to a lack of recent earthquake events in the County, the best available data is spread across Federal and State sources, the Oregon Department of Geology and Mineral Industries (DOGAMI) in particular. The following Tables are taken from the State of Oregon NHMP and the Wasco County HIVA.

More detailed DOGAMI HAZUS runs, approximating expected damage to critical infrastructure, are forthcoming.

Table H.1: Significant Earthquakes in Oregon

DATE	LOCATION	MAGNITUDE (M)	REMARKS
Approximate Years 1400 BCE* 1050 BCE 600 BCE 400 750 900	Offshore, Cascadia Subduction Zone	Probably 8-9	Based on studies of earthquake and tsunamis at Willapa Bay, Washington. These are the mid-points of the age ranges for these six events.
January, 1700	Offshore, Cascadia Subduction Zone	Approximately 9.0	Generated a tsunami that struck Oregon, Washington, and Japan; destroyed Native American villages along the coast
March, 1893	Umatilla	VI-VII (Modified Mercalli Intensity)	Damage unknown
July, 1936	Milton-Freewater	6.1	Eastern Oregon's largest event, several aftershocks, \$100, 000 dollars in damage based on 1936 dollars, chimney damage, houses shifted off foundations, school buildings damaged
January, 1951	Hermiston	V	Damage unknown
April, 1976	Deschutes Valley	4.8	Near Maupin, cracked plaster, objects thrown

Notes: \* BCE: Before the Common Era

Source: Ivan Wong and Jacqueline D.J. Bolt, November 1995, A Look Back at Oregon's Earthquake History, 1841-1994, *Oregon Geology*, pp. 125-139.

Table H.2 Estimated Loss from Cascadia Subduction Zone Event

Wasco County	8.5 Cascadia subduction zone event	500 year model
Injuries	0	6
Deaths	0	0
Displaced households	0	23
Short term shelter needs	0	17
Economic losses for buildings	\$795,000	\$25 million
<b>Operating the day after the quake:</b>		
Fire stations	99%	NA
Police stations	100%	NA
Schools	100%	NA
Bridges	99%	NA
<b>Economic losses to:</b>		
Highways	\$71,000	\$3 million
Airports	0	\$2 million
<b>Communication systems:</b>		
Economic losses	\$6,000	\$1 million
Operating the day of the quake	100%	NA
Debris generated (thousands of tons)	1	16

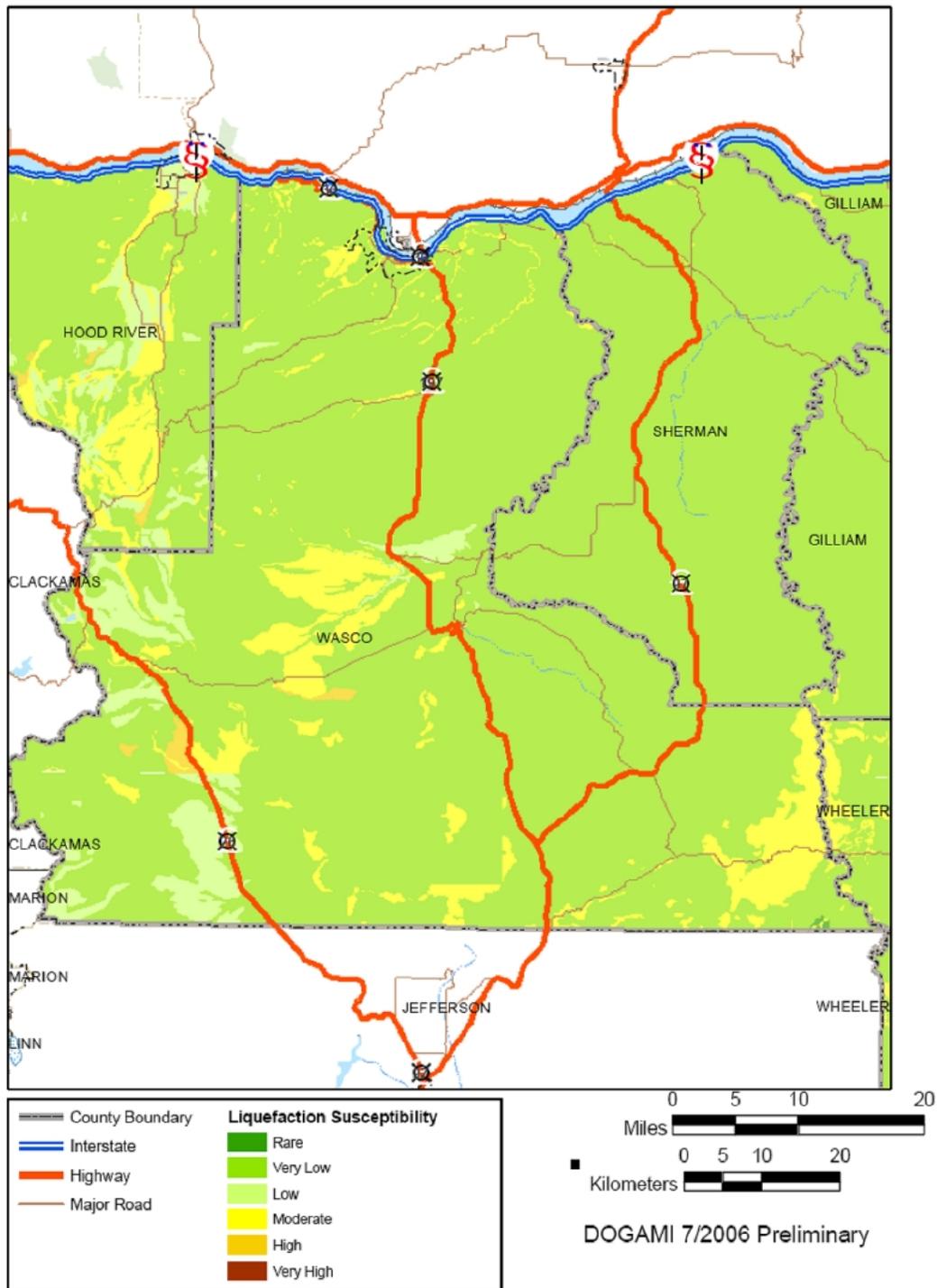
These figures have a high degree of uncertainty and should be used only for general planning purposes. Because of rounding, numbers may not add up to 100%.  
Because the 500 year model includes several earthquakes, the number of facilities operational the "day after" cannot be calculated.

8.5 Cascadia event	Percentage of buildings in damage categories				
	None	Slight	Moderate	Extensive	Complete
<b>Building type</b>					
Agriculture	98	1	1	0	0
Commercial	98	1	1	0	0
Education	Unknown				
Government	98	1	0	0	0
Industrial	98	2	0	0	0
Residential	99	1	0	0	0

500 year model	Percentage of buildings in damage categories				
	None	Slight	Moderate	Extensive	Complete
<b>Building type</b>					
Agriculture	74	13	10	3	0
Commercial	68	16	12	3	0
Education	56	10	7	2	0
Government	66	16	14	4	1
Industrial	65	16	15	5	0
Residential	80	12	6	1	0

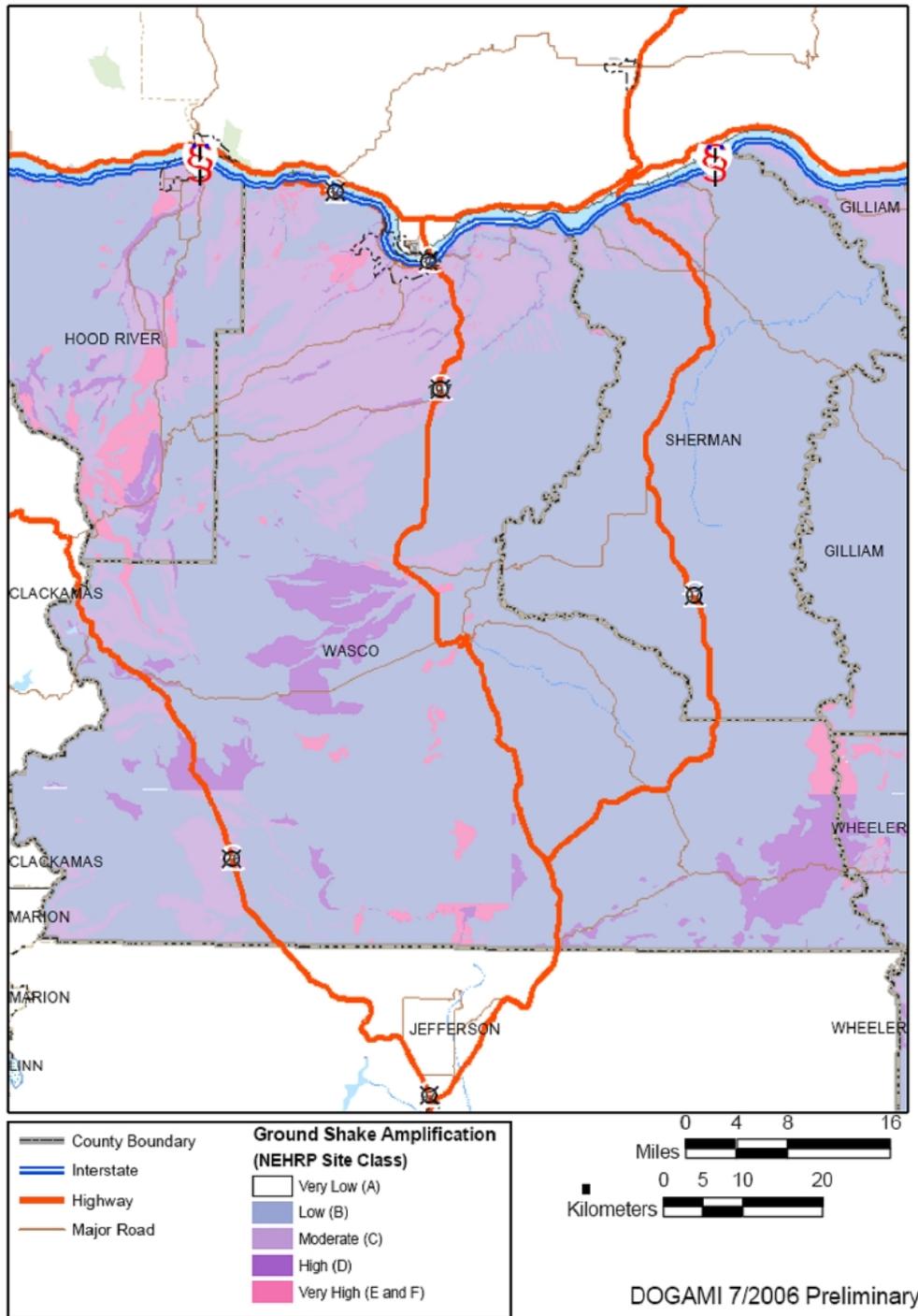
Source: Wasco County HIVA

Figure HA.1: Wasco County Liquefaction Susceptibility



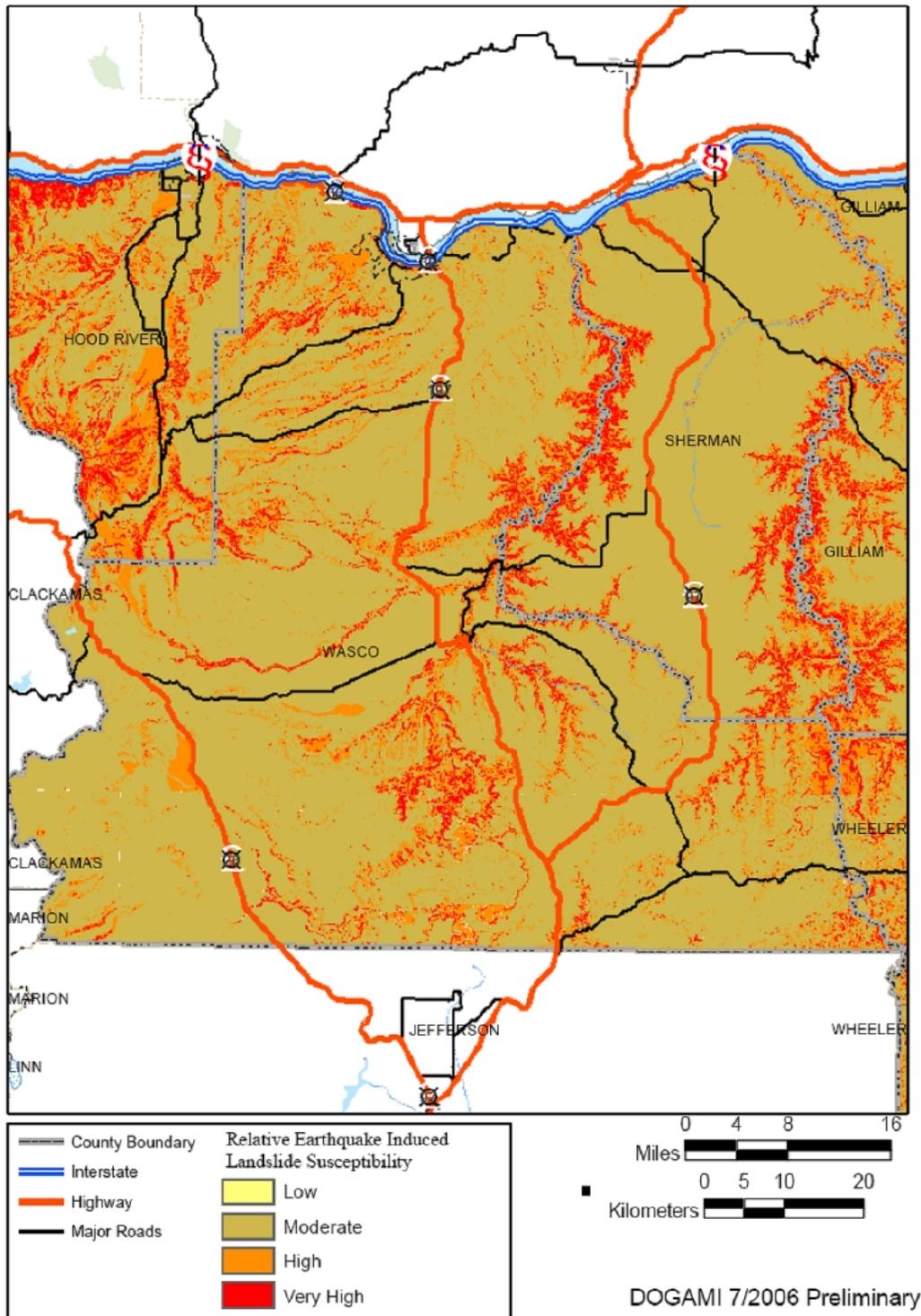
Source: DOGAMI

Figure HA.1: Wasco County Ground Shake Amplification Class



Source: DOGAMI

Figure HA.3 Relative Earthquake Induced Landslide Susceptibility



Source: DOGAMI

### State Risk Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
High	Low

### HIVA Risk Assessment

Within the limits of predictability, we must assume a moderate probability of occurrence for a damaging earthquake during the next 50 years. A large earthquake centered in Western Oregon could have a minor impact on Wasco County suggesting moderate vulnerability. Accordingly, a moderate-risk rating is assigned.

### Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Wasco County Planning & Development office. The TRG is also available online at: <http://www.oregonshowcase.org/index.cfm>

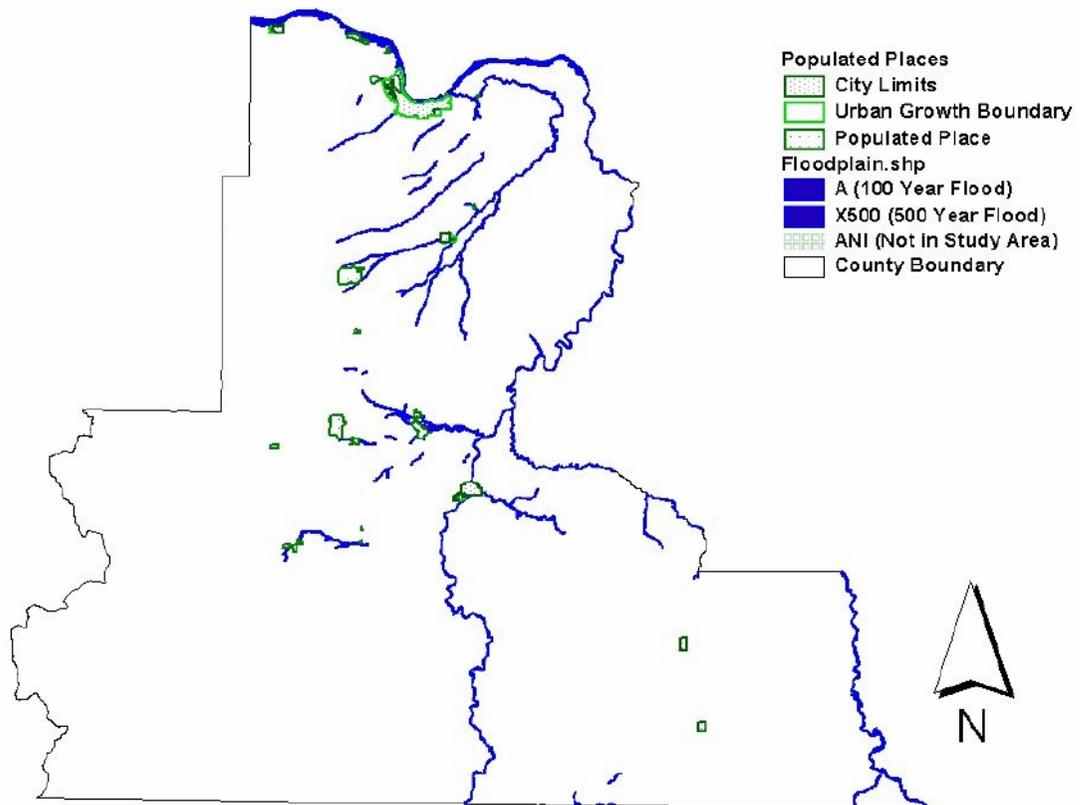
## Best Available Local Data

The section includes Wasco County flood ordinances and DOGAMI flood plain maps for populated places within the County.

## Ordinances

This section includes the Wasco County Land Use and Development Ordinance- Chapter 22. Flood Damage Prevention. The flood hazard overlay is provided in Figure HA.4 below.

Figure HA.4 Wasco County 100 & 500 Year Flood Plain



## CHAPTER 22 FLOOD DAMAGE PREVENTION

### SECTION 22.010 Statement of Purpose

It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone, and sewer lines, and streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and,
- H. To insure that those who occupy the areas of special flood hazard assume responsibility for their actions.

### SECTION 22.020 Methods of Reducing Flood Losses

In order to accomplish its purposes, this chapter includes methods and provisions for:

- A. Restricting or prohibiting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- D. Controlling filling, grading, dredging, and other development which may increase flood damage; and,
- E. Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

### SECTION 22.030 Special Definitions

Unless specifically defined below, words or phrases used in this chapter shall be interpreted so as to give them the meaning they have in common usage and to give this chapter its most reasonable application.

- A. "Area of special flood hazard" means the land in the flood plain within a community subject to a one percent or greater chance of flooding in any given year. Designation on maps always includes the letters A or V. (revised 4-87)
- B. "Base flood" means the flood having a one percent chance of being equaled or exceeded in any given year. Also referred to as the "100-year flood". Designation on maps always includes the letters A or V. (revised 4-87)
- C. "Basement" means any area of the building having its floor subgrade below ground level) on all sides.
- D. "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, paving, excavation or drilling operations located within the area of special flood hazard.
- E. "Flood" or "Flooding" means a general and temporary condition of partial or complete inundation of normally dry land areas from:
  - 1. The overflow of inland or tidal waters and/or
  - 2. The unusual and rapid accumulation or runoff of surface waters from any source.
- F. "Flood Insurance Rate Map (FIRM)" means 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.
- G. "Floodway" means 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 one foot.
- H. "Lowest Floor" means 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 ordinance found at Section 22.180 A.2.
- I. "Manufactured Home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. The term "manufactured home" does not include a "recreational vehicle."
- J. "Manufactured Home Park or Subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.
- K. "Recreational Vehicle" means a vehicle which is: (1) built on a single chassis; and (2) 400 square feet or less when measured at the largest horizontal projection; (3) designed to be self-propelled or permanently towable by a light duty truck; and (4) designed primarily not

for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

- L. "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 and/or walkways; 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.
- M. "Structure" means a walled and roofed building, including a gas or liquid storage tank, that is principally above ground. (revised 4-87)
- N. "Substantial improvement" means any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds fifty (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.

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.

The term does 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 have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or,
  - 2. any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.
- O. "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."

#### SECTION 22.040 Lands to which this Chapter Applies

This chapter shall apply to all areas of special flood hazards within the jurisdiction of Wasco County.

#### SECTION 22.050 Basis for Establishing the Areas of Special Flood Hazard

The areas of special flood hazard identified by the Federal Insurance Administration on its Flood Insurance Rate Map (FIRM), dated September 24, 1984, and any revision thereto, is adopted by

reference and declared to be a part of this Ordinance. The Flood Insurance Rate Map is on file at the Wasco County Planning and Development Office. (revised 4-87)

SECTION 22.060 Abrogation and Greater Restrictions

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

SECTION 22.070 Interpretation

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

- A. Considered as minimum requirements;
- B. Liberally construed in favor of the governing body; and,
- C. Deemed neither to limit nor repeal any other powers granted under State statutes.

SECTION 22.080 Warning and Disclaimer of Liability

The degree of flood protection required by this chapter 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 chapter does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of Wasco County, any officer or employee thereof or the Federal Insurance Administration, for any flood damages that result from reliance on this chapter or any administrative decision lawfully made thereunder.

SECTION 22.090 Establishment of Development Permit

A Development Permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 22.050. Application for a Development Permit shall be made on forms furnished by the Planning Director and may include, but not be limited to: plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities; and the location of the foregoing.

Specifically, the following information is required:

- A. General elevation to mean sea level of building site using best information available.
- B. Distance between ground elevation and level to which structure is to be flood-proofed.
- C. Certification by a registered professional engineer or architect that the flood-proofing methods for any non-residential structure meet the flood-proofing criteria in Section 22.180(B). (revised 4-87)
- D. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.
- E. Copies of all permits required from any governmental agency, together with a certification under penalties of perjury that all certificates and permits requested have been obtained.

SECTION 22.100 Designation of the Planning Director

The Planning Director is hereby appointed to administer and implement this chapter by granting or denying development permit applications in accordance with its provisions.

SECTION 22.110 Development Permit Required

A development permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 22.050. The permit shall be for all structures including manufactured homes, as set forth in the "DEFINITIONS", and for all development including fill and other activities, also as set forth in the "DEFINITIONS". (added 4-87)

SECTION 22.120 Duties and Responsibilities of the Planning Director

Duties of the Planning Director shall include, but not be limited to:

A. Permit Review

1. Review all development permits to determine that the permit requirements of this chapter have been satisfied.
2. Review all development permits to determine if the proposed development adversely affects the flood carrying capacity of the area of special flood hazard. For the purposes of this chapter, "adversely affects" means damage to adjacent properties because of rises in flood stages attributed to physical changes of the channel and the adjacent overbank areas.
  - a. If it is determined that there is no adverse effect, then the permit shall be granted consistent with the provisions of this chapter.
  - b. If it is determined that there is an adverse effect, then flood damage mitigation measures shall be made a condition of the permit.
  - c. 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. (added 4-87)

B. Use of Other Base Flood Data

When base flood elevation data has not been provided in accordance with Section 22.050, Basis for Establishing the Areas of Special Flood Hazard, the Planning Director shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a Federal, State or other source, in order to administer Section 22.180, Specific Standards and Section 22.150.

C. Information to be Obtained and Maintained

1. Where base flood elevation data is provided through the Flood Insurance Study or required as in Section 22.120 B., obtain and record all records and data on base flood elevations and flood-proofing certificates required in Section 22.090(C). (revised 4-87)
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 22.090 C. (added 4-87)
3. Maintain for public inspection all records pertaining to this chapter.

D. Alteration of Watercourses

1. Notify adjacent communities, Division of State Lands, Department of Land Conservation & Development, and the Department of Water Resources prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.
2. Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

E. Interpretation of FIRM Boundaries

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).

SECTION 22.130 General Standards

In all areas of special flood hazards the following standards are required:

A. Anchoring

1. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.
2. 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 (Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques). (revised 4-87)
3. Any alternative method of anchoring may involve a system designed to withstand a wind-force of ninety (90) miles per hour, or greater. Certification shall be provided to the Planning Director that this standard has been met.

B. Construction Materials and Methods

1. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
2. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.
3. 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 within the components during conditions of flooding. (added 4-87)

C. Utilities

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

D. Subdivision Proposals

1. All subdivision proposals shall be consistent with the need to minimize flood damage;
2. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage;
3. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage; and,
4. 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 development which contain at least fifty (50) lots or five (5) acres (whichever is less). (revised 4-87)

SECTION 22.140 Review of Building Permits

Where elevation data is not available either through the Flood Insurance Study or from another authoritative source (Section 22.120 B.), 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. (added 4-87)

SECTION 22.150 Manufactured Homes

All manufactured homes to be placed or substantially improved within Flood Insurance Rate Map Zones A1-30, AH, and AE shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated a minimum of one foot (1') ~~at or~~ above the base flood elevation and be securely anchored to an adequately designed foundation system to resist floatation, collapse and lateral movement, and shall be in accordance with the provisions of subsection 22.130.2. (added 4-87)

SECTION 22.155 Recreational Vehicles

Recreational Vehicles placed on sites with an "A" zone (Areas of 100-year flood) as identified on the Flood Insurance Rate Maps (FIRM) must: (1) be on the site for fewer than 180 consecutive days; or (2) 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; or (3) meets the requirements of Section 22.150 and the elevation and anchoring requirements for manufactured homes.

SECTION 22.160 Floodways (added 4-87)

Located within areas of special flood hazard established in Section 22.050 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- A. Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- B. If Section 22.160 A. is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Section 22.130, "Provisions for Flood Hazard Reduction".

SECTION 22.170 Encroachments

Any proposed development shall be analyzed to determine effects on the flood carrying capacity of the area of special flood hazard as set forth in Section 22.120(A)(2).

SECTION 22.180 Specific Standards

In all areas of special flood hazards where base flood elevation data has been provided as set forth in Section 22.120(B), Use of Other Base Flood Data, the following standards are required:

- A. Residential Construction (revised 4-87)
  1. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated a minimum of one foot (1') above base flood elevation.
  2. 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:
    - 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.
    - b. The bottom of all openings shall be no higher than one foot above grade.
    - c. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.
- B. 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 at or above the base flood elevation; or, together with attendant utility and sanitary facilities, shall:

  1. be flood-proofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;

2. have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and,
3. 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, specifications and plans. Such certifications shall be provided to the official as set forth in Section 22.120(C). (revised 4-87)
4. Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in Section 22.180 A.2. (added 4-87)
5. Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building constructed to the base flood level will be rated as one foot below that level). (added 4-87)

**SECTION 22.190 Variances**

- A.** Appeals shall be processed as described in Chapter 2.
- B.** In considering a variance to floodplain standards, the Planning Commission shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:
  1. The danger that materials may be sept onto other lands to the injury of others;
  2. The danger to life and property due to flooding or erosion damage;
  3. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
  4. The importance of the services provided by the proposed facility to the community;
  5. The necessity to the facility of a waterfront location, where applicable;
  6. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
  7. The compatibility of the proposed use with existing and anticipated development;
  8. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area;
  9. The safety of access to the property in times of flood for ordinary and emergency vehicles;
  10. The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and

**11.** The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.

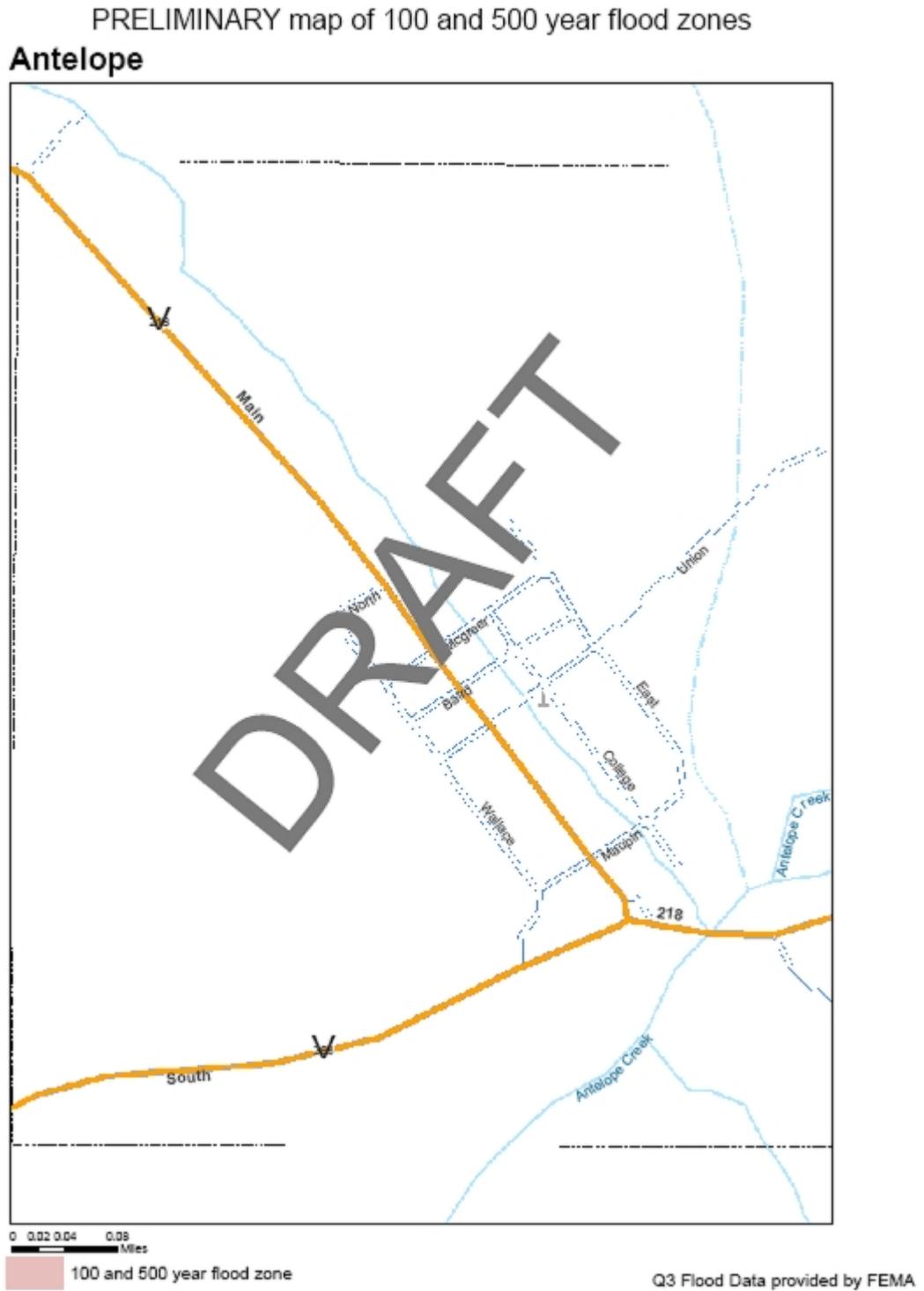
**C.** Upon consideration of the factors in B., and the purposes of this ordinance, conditions may be attached to the granting of the variance as is deemed necessary to further the purposes of this ordinance.

**D.** Records of all appeal actions shall be maintained by Wasco County and any variances shall be reported to the Federal Insurance Administration upon request.

**E.** Conditions for Variances:

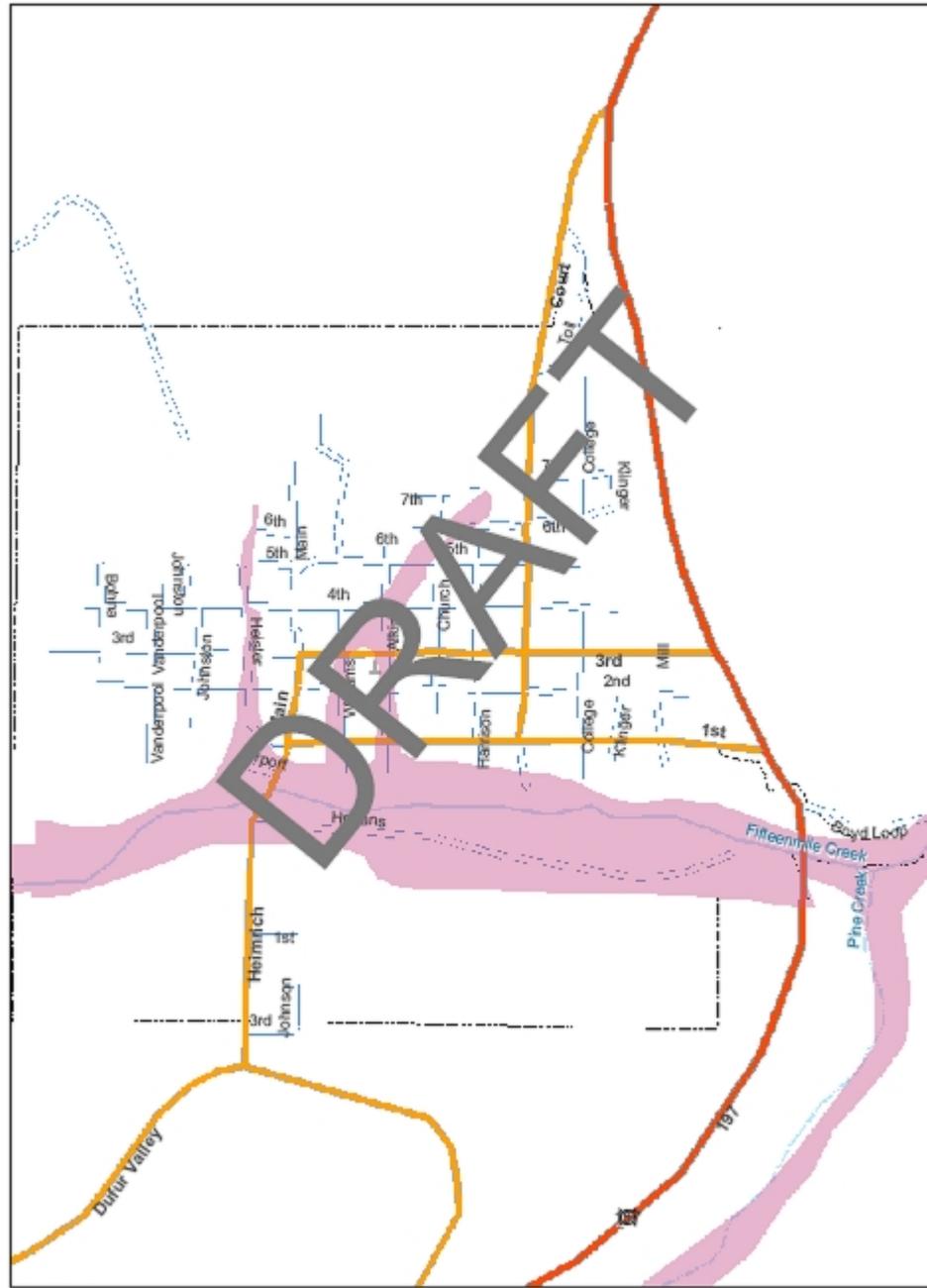
**1.** Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing items.

Figures HA.5 – 10 DOGAMI Flood Zone Maps



PRELIMINARY map of 100 and 500 year flood zones

Dufur



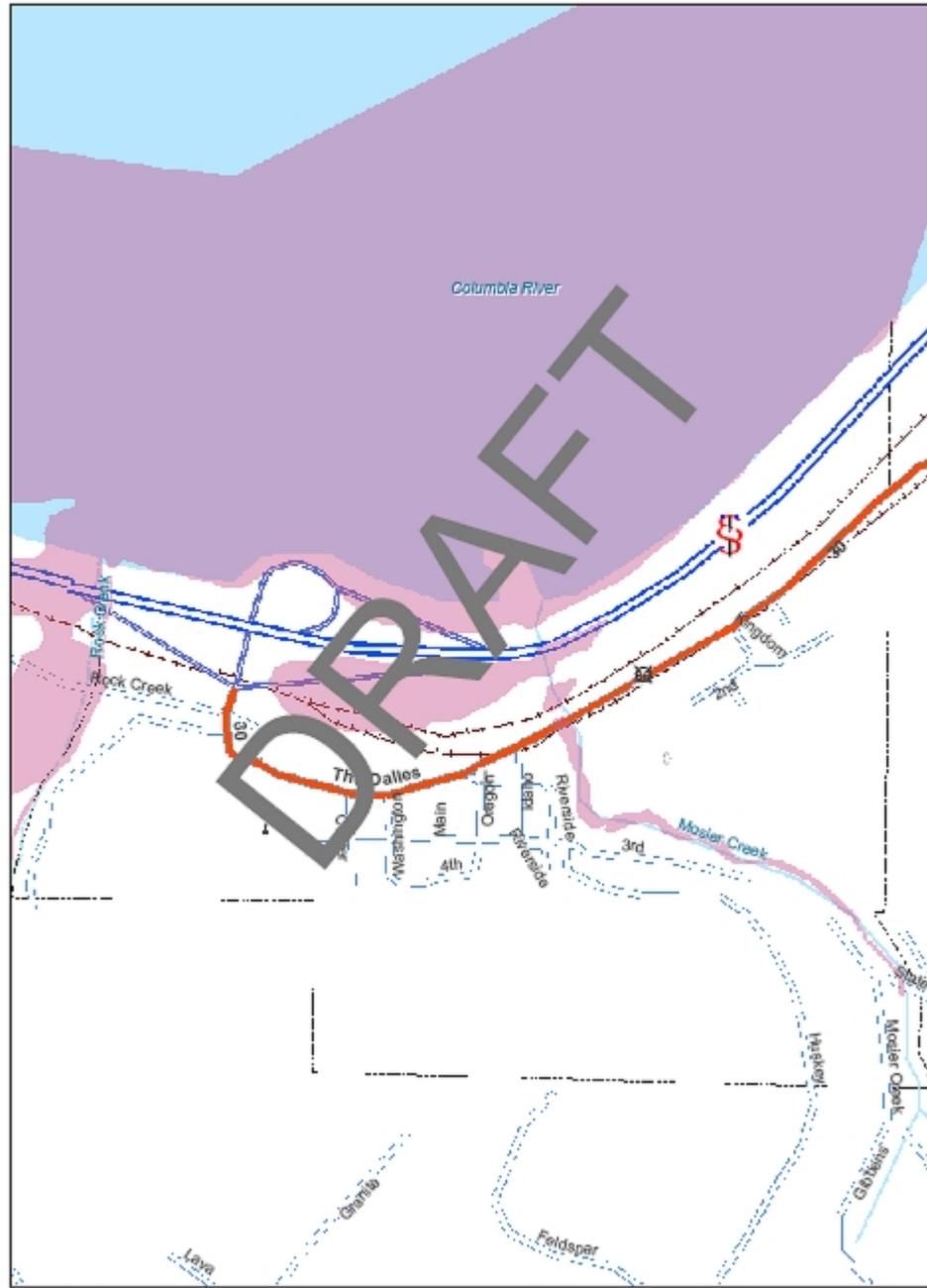
0.005 0.01 0.05 Miles  
100 and 500 year flood zone

Q3 Flood Data provided by FEMA



PRELIMINARY map of 100 and 500 year flood zones

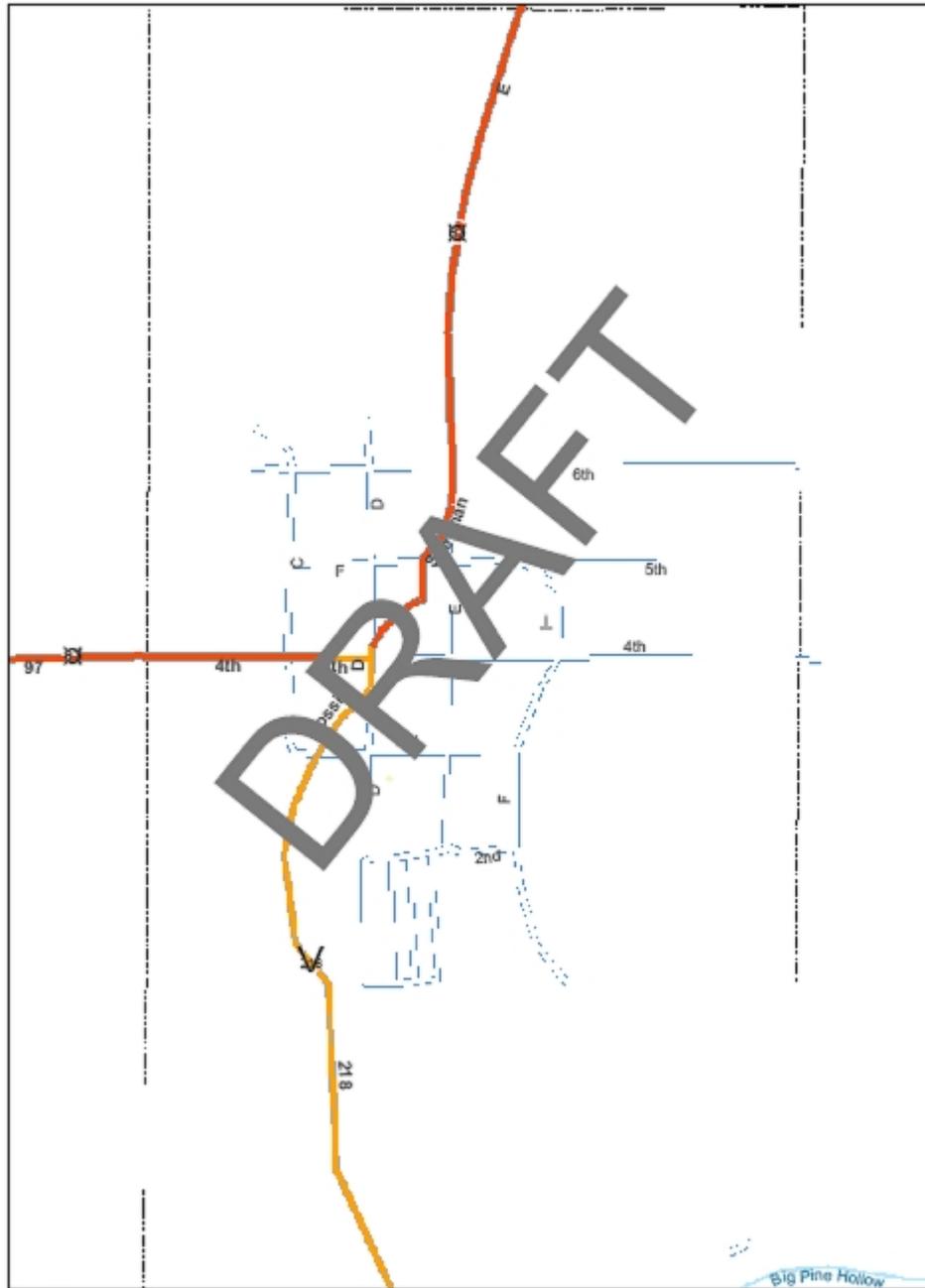
Mosier



Q3 Flood Data provided by FEMA

PRELIMINARY map of 100 and 500 year flood zones

**Shaniko**

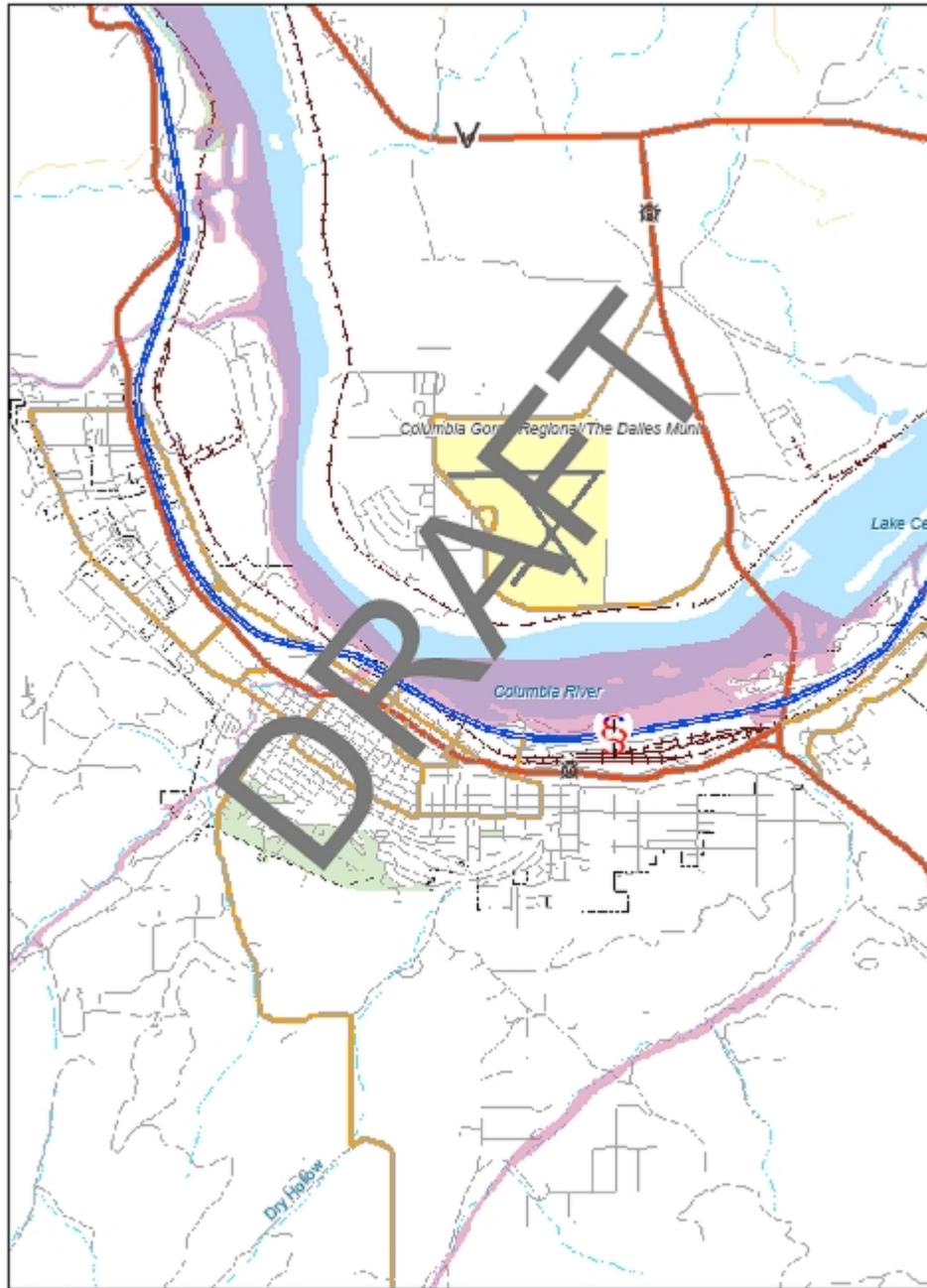


0.01503 0.05 Miles  
100 and 500 year flood zone

Q3 Flood Data provided by FEMA

PRELIMINARY map of 100 and 500 year flood zones

**The Dalles**



0.125 0.5  
Miles  
100 and 500 year flood zone

Q3 Flood Data provided by FEMA

## State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
Moderate	High

## HIVA Assessment

Historically, flooding occurs along one or more of the County's waterways every few years, suggesting a moderate probability of occurrence. Because of the relative land area and population affected, the County is exposed to moderate vulnerability. The frequency of flooding, the potential for simultaneous flooding events, plus the historical record of recurrent flooding and cumulative costs, all suggest the assignment of a moderate risk rating.

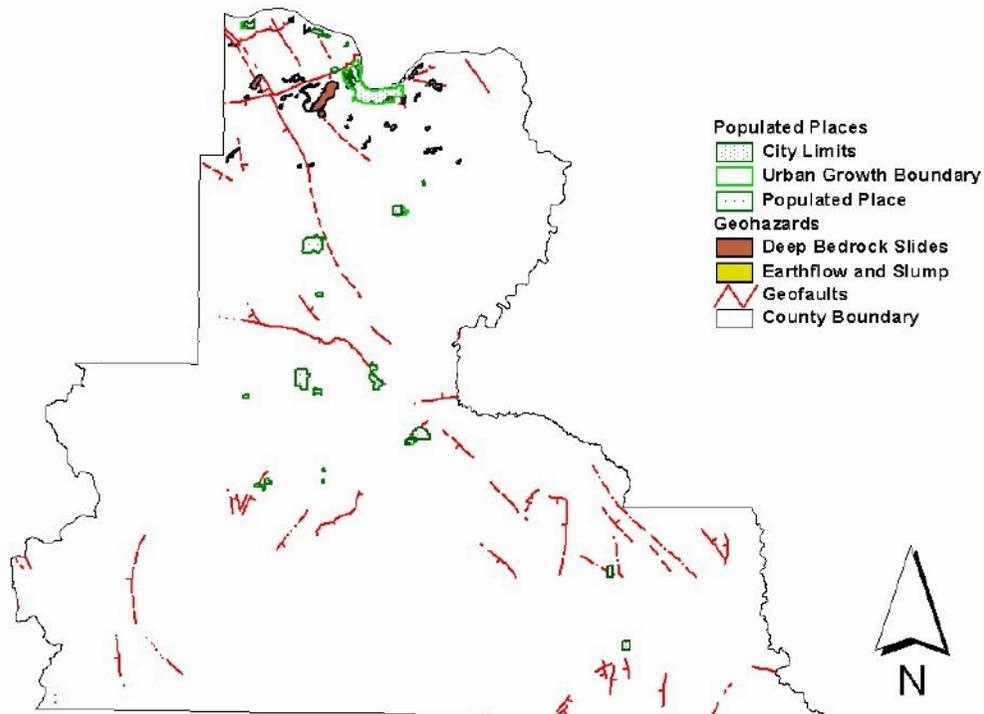
## Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Wasco County Planning & Development office. The TRG is also available online at: <http://www.oregonshowcase.org/index.cfm>

## Best Available Local Data

From the Wasco County Land Use and Development Ordinance:

Figure HA.11 Wasco County Geologic Hazard Overlay



## SECTION 3.750 DIVISION 2 - GEOLOGIC HAZARDS OVERLAY

The purpose of the Geologic Hazards Overlay District is to protect the public health, safety and welfare by assuring that development in hazardous or potential hazardous areas is appropriately planned to mitigate the threat to man's life and property.

### A. Basis for Establishing the Geologic Hazards Overlay District

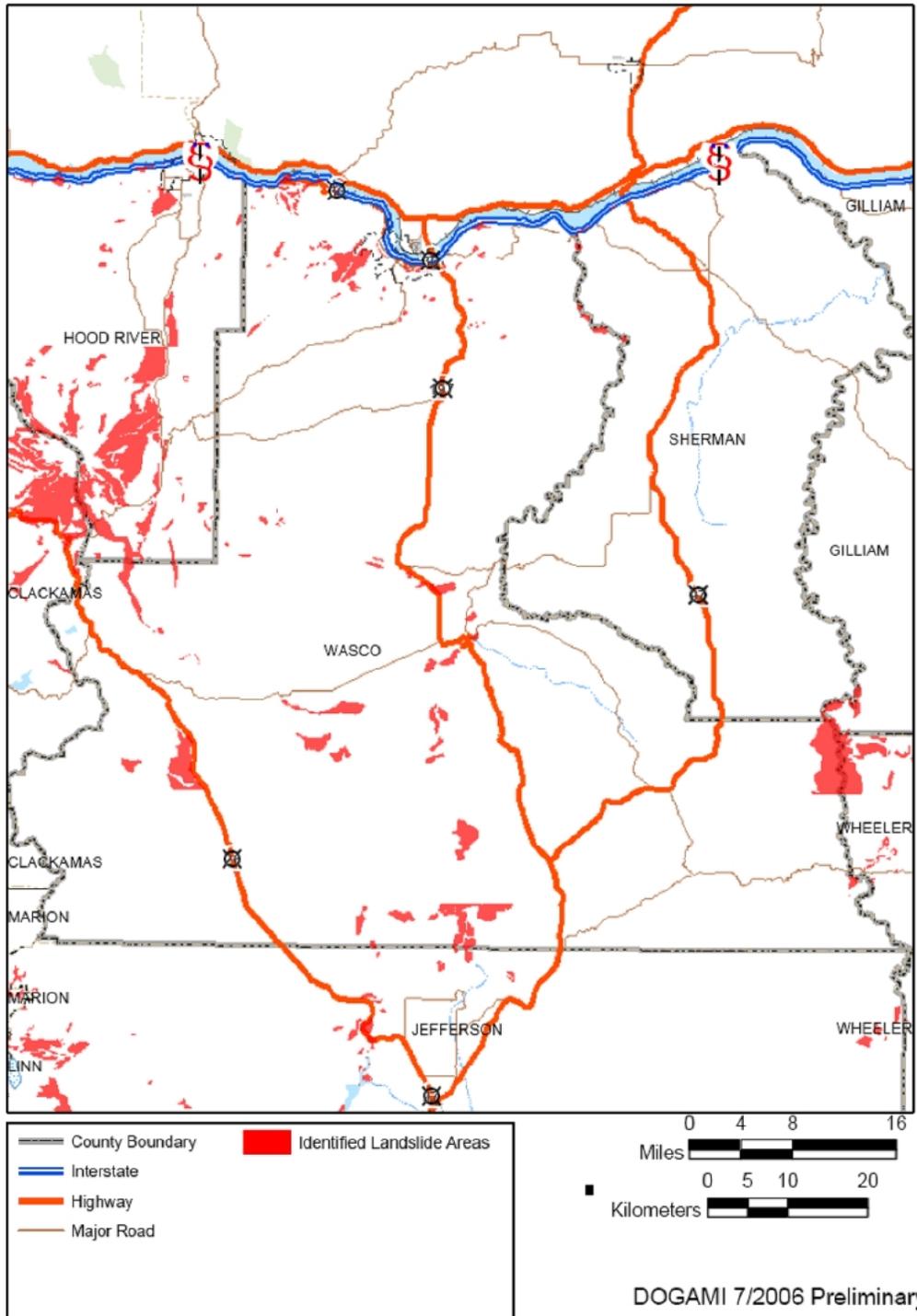
The Geologic Hazards Overlay District is intended to be applied to areas identified by the State of Oregon Department of Geology and Mineral Industries, Geologic Hazards of Parts of Northern Hood River, Wasco and Sherman Counties, Oregon, 1977. A complete explanation and maps showing the natural hazards and geologic units can be found in this document; however, this document may be superseded by a more site specific study conducted by a licensed engineer or geologist registered in the State of Oregon.

### B. Approval Standards

Prior to development, the following measures shall be utilized:

1. Any proposed developments on slopes greater than twenty-five percent (25%) shall be reviewed to ensure site suitability. Such review shall be conducted in the process for building permit approval and, unless the site has been identified as a geologic hazard area, shall rely on provisions of the Uniform Building Code for the protection of the public health, safety and welfare.
2. Any proposed development in an identified geologic hazard area shall be preceded by a written report by an engineering geologist or an engineer who certifies he is qualified to evaluate soils for suitability. For purposes of this section, development shall include any excavation or change in topography, such as home construction, associated roads, driveways, septic tank disposal fields, wells and water tanks. The written report of the engineering geologist or engineer shall certify that the development proposed may be completed without threat to public safety or welfare and shall be used in ministerially reviewing the development proposal.
3. In approval of a development permit, whether ministerial or through the Administrative Action procedures of Chapter 2 of this Ordinance, the following conditions may be imposed at the time of approval to ensure site and area stability:
  - a. Maintain vegetation and eliminate widespread destruction of vegetation.
  - b. Carefully design new roads and buildings with respect to:
    1. placement of roads and structures on the surface topography.
    2. surface drainage on and around the site.
    3. drainage from buildings and road surfaces.
    4. placement of septic tank disposal fields.
  - c. Careful construction of roads and buildings.
    1. avoid cutting toeslopes of slump blocks.
    2. careful grading around the site, especially avoiding over-steepened cut banks.
    3. re-vegetating disturbed areas as soon as possible.
  - d. Other conditions may be imposed to reasonably assure that the development is protected from damage by mass movement.

Figure HA.12 Identified Landslide Areas within Wasco County



## State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
Low	Low

## HIVA Assessment

Wasco County has a history of landslides suggesting a moderate probability of occurrence. Landslides tend to occur in isolated, sparsely developed areas threatening individual structures and remote sections of the transportation, energy and communications infrastructure suggesting low vulnerability. Because of the moderate probability of occurrence, a moderate risk rating is assigned.

## Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Wasco County Planning & Development office. The TRG is also available online at: <http://www.oregonshowcase.org/index.cfm>

**SEVERE STORM**

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**Best Available Local Data**

XXXXXXXXXXXX

**State Hazard Assessment**

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

**Windstorm**

Vulnerability	Probability
Moderate	Moderate

**Winter Storm**

Vulnerability	Probability
High	High

**HIVA Assessment**

Storm history suggests a high probability of occurrence. Historical damage and cumulative costs of destructive storms suggest high vulnerability. Accordingly, a high risk rating is assigned.

**Oregon Technical Resource Guide**

A hard copy of the TRG can be found at the Wasco County Planning & Development office. The TRG is also available online at: <http://www.oregonshowcase.org/index.cfm>

**Best Available Local Data**

Please consult the Wasco County Community Wildfire Protection Plan (CWPP) for more information (click on title below).

**Wasco County, Oregon**  
**Community Wildfire Protection Plan**



**December 21, 2005**

**Prepared by  
James H. Hulbert**

## State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
High	High

## HIVA Assessment

Historically, it appears that the instance of wildfire is increasing through the region. Additionally, the existence of open range lands and large forested areas, increasing population and recreational activities, and the uncertain impact of a changing climate combine to suggest a high probability of occurrence. The destruction of large tracts of forest land would have immediate economic impact to the community through lost jobs, reduced taxes, and increased public support while collateral economic and social effect could impact the County for years, suggesting moderate vulnerability. Accordingly, a high risk rating is assigned.

## Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Wasco County Planning & Development office. The TRG is also available online at: <http://www.oregonshowcase.org/index.cfm>

Best Available Local Data

Please consult the report [Volcanic Hazards in the Mount Hood Region, Oregon](#) for more information (click on title below).

U.S. Department of the Interior  
U.S. Geological Survey

VOLCANO HAZARDS IN THE MOUNT HOOD  
REGION, OREGON



By

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Standard Code. Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

1997

## State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
High	Moderate

## HIVA Assessment

History suggests a low probability of occurrence. Because of potential impact to the White River and Deschutes River drainages from a lahar flow, there is low vulnerability. Because Mt. Hood is relatively quiet, this hazard is assigned a low risk rating.

## Oregon Technical Resource Guide

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