

# The City of Rainier’s Annex to the Natural Hazards Mitigation Plan for the Thurston Region

## Table of Contents

Title Pages and Table of Contents.....	1
Adopting Resolution .....	3
Community Profile .....	5
City of Rainier’s Plan Development Process.....	7
City of Rainier Risk Assessment.....	9
City of Rainier Mitigation Initiatives.....	29
City of Rainier Implementation of the National Flood Insurance Program .....	33

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RESOLUTION NO. 492

A RESOLUTION adopting the “Natural Hazards Mitigation Plan for the Thurston Region” and “The City of Rainier’s Annex to the Natural Hazards Mitigation Plan for the Thurston Region.”

WHEREAS, the City of Rainier, its residents and property are vulnerable to natural disasters; and

WHEREAS, the City of Rainier City Council realizes the importance of reducing or eliminating vulnerabilities from natural hazard events for the overall good and welfare of the community; and

WHEREAS, the City of Rainier has been an active participant in the Thurston Region Hazards Mitigation Planning Workgroup, which has established a comprehensive, coordinated planning process to eliminate or decrease these vulnerabilities; and

WHEREAS, the City of Rainier staff have identified, justified, and prioritized three initiatives intended to mitigate the vulnerabilities within the City of Rainier; and

WHEREAS, public input prior to drafting the update to the “Natural Hazards Mitigation Plan for the Thurston Region” was sought during three open house meetings including Olympia, Tenino, and Rochester on June 25, 26, and 30, 2008, respectively; and

WHEREAS, these proposed initiatives have been incorporated into the “City of Rainier’s Annex to the Natural Hazards Mitigation Plan” as part of the second edition of the “Natural Hazards Mitigation Plan for the Thurston Region” that has been prepared and issued for consideration and implementation by the jurisdictions and organizations of Thurston County;

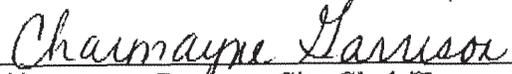
NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Rainier, Washington, as follows:

1. City of Rainier hereby approves and adopts the “Natural Hazards Mitigation Plan for the Thurston Region” and “The City of Rainier’s Annex to the Natural Hazards Mitigation Plan for the Thurston Region” as its natural hazards mitigation plan and comprehensive flood hazard management plan.
2. City of Rainier staff are requested and instructed to pursue available funding opportunities for implementation of the mitigation initiatives designated by the City.
3. The City of Rainier will, upon receipt of such funding or other necessary resources, seek to implement the proposals contained in its section of mitigation initiatives, and
4. The City of Rainier will continue to participate in the updating and expansion of the “Natural Hazards Mitigation Plan for the Thurston Region” in the years ahead, and
5. The City of Rainier will further seek to encourage the businesses, industries, and community groups operating within Thurston County to also participate in the updating and expansion of the “Natural Hazards Mitigation Plan for the Thurston Region” in the years ahead.

APPROVED by the City Council of Rainier this 8<sup>th</sup> day of June, 2010.

  
\_\_\_\_\_  
Randy Schleiss, Mayor

Attest:

  
\_\_\_\_\_  
Charmayne Garrison, City Clerk/Treasurer

# Community Profile City of Rainier

City info: (360) 446-2265

www.ci.rainier.wa.us



Demographics

Population, 1990	991
Population, 2000	1,492
Population, 2008	1,740
Av. Ann. Pop. Growth, 1990-2000	4.2%
Av. Ann. Pop. Growth, 2000-2008	1.9%
Households, 2000	530
Average Household Size, 2000	2.82

**Age Structure, 2000:**

19 and under	493	33%
20 - 64	871	58%
65 and over	128	9%
Median Age	34	--

**Race and Ethnic Categories, 2000:**

White	1,381	92.6%
Black/African American	8	0.5%
American Indian & Alaska Native	27	1.8%
Asian	11	0.7%
Native Hawaiian & Other Pacific Islander	4	0.0%
Other Race	16	1.1%
Two or More Races	49	3.3%
Hispanic*	58	3.9%

Named for its view of Mt. Rainier, Rainier is situated amidst the 'ten al quelth' prairies which is the Indian word meaning "the best yet." The area was first settled by Albert and Maria Gehrke who homesteaded there in 1890. Six years later, Albert and his two brothers, Theodore and Paul, built the community's first school and church, which today is a state historic landmark. A post office followed in 1890 when residents grew tired of mail being delivered by "toss off and catch" since the trains did not stop in Rainier.

Lumbering brought prosperity to the town and its first lumber company, the Bob White Lumber Company, opened in 1906. Other lumber companies followed, including companies such as Deschutes, Gruber and Docherty and Fir Tree. A series of fires in the Rainier area in the late 1920s and early 1930s destroyed several of these mill operations (in addition to many of its town buildings) and town residents sought work at Weyerhaeuser Lumber at Vail.

Housing

**Housing Units, 2000:**

Single-Family	416
Multifamily	29
Manufactured Homes	110

**Census Median House Value, 2000** \$52,300

Employment and Income

**Median Household Income:**

1989 (Census 1990 in 1999 \$'s)	\$31,290
1999 (Census 2000)	\$42,955

**Taxable Retail Sales, 2007** \$11,366,217

**Households by Income Category, 1999:**

Less than \$14,999	66	13%
\$15,000 to \$24,999	38	8%
\$25,000 to \$49,999	197	39%
\$50,000 to \$74,999	141	28%
\$75,000 or more	64	13%

**Total Jobs, 2003:**

Manufacturing	<10
Retail	90
Finance/Services	140
Federal, State, & Local Gov't	200
Tribal Gov't & Enterprises	<10
Other	40

Development Activity

**Total New Permitted Residential Units, 2007:**

Single-Family	23
Multifamily	0
Manufactured Homes	0
<b>Total</b>	<b>23</b>

**Subdivision Activity, 2007:**

	<b># Appl.</b>	<b># Lots</b>
Short Plat	0	0
Long Plat	1	22

Explanation: \*Person of Hispanic Origin can be of any race.  
Source: TRPC, Profile 2008 (www.trpc.org).

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## City of Rainier's Plan Development Process

### Hazard Mitigation Plan Partners

The following individuals served as the City of Rainier's hazard mitigation plan development team:

Department/Title	Representative(s)
Assistant Planner, Plan Lead	Andrew Deffobis
Associate Planner, TRPC	Paul Brewster
Councilmember/Mayor Pro-Tem	Randy Schleiss
Director of Public Works	Ron Gibson

### Hazard Mitigation Plan Development

The following activities supported the development of the City of Rainier's hazard mitigation planning process:

Date	Location	Activity	Subject
April 2008-September 2009	Various	Natural Hazards Mitigation Plan Workgroup	City of Rainier staff and Mayor Schleiss participate in region's update to the Natural Hazards Mitigation Plan for the Thurston Region
August 24, 2009	Town Hall	Meeting with Randy Schleiss and Ron Gibson	Reviewing draft Hazard Assessment and Mitigation Initiatives; brainstorming
December 18, 2009	TRPC	TRPC staff reviews draft annex	City's draft annex reviewed for consistency with "Natural Hazards Mitigation Plan for the Thurston Region."
February 25, 2010	TRPC	Annex Review by FEMA	FEMA returns plan review results to TRPC
April 13, 2010	Rainier City Hall	Rainier City Council Meeting	Staff presented draft annex
June 8, 2010	Rainier City Hall	Rainier City Council Meeting	Plan adoption

On December 18, 2009, a draft annex was submitted to Thurston Regional Planning Council (TRPC) for review. In January 2010, TRPC submitted the city's annex to the Washington State Emergency Management Division and the Federal Emergency Management Agency (FEMA) for preliminary review. On February 25, 2010 FEMA submitted the results of its review to TRPC. FEMA concluded that the City of Rainier's annex met all federal hazard mitigation planning requirements except for one; the city's mitigation strategy did not address continued compliance with the National Flood Insurance Program (NFIP) as required in Section 201.6(c)(3)(ii).

On April 13, 2009, TRPC staff presented the draft annex and the findings of FEMA's review to the Rainier City Council. During the meeting, the City Council reviewed the draft plan update. One

new flood hazard initiative, FH2, was developed by city staff during the final stages of the planning process to fulfill the NFIP planning requirement. FEMA reviewed the draft annex on April 14, 2010 and sent email confirmation that the city's annex complies with Section 201.6(c)(3)(ii).

## **Mitigation Initiative Prioritization Process**

During a meeting of a City Councilmember/Mayor Pro-Tem and Director of Public Works, The City of Rainier reviewed the two mitigation initiatives that were first drafted in 2003. Information about the initiatives was updated, and the priority of the initiatives was examined. It was decided that the former prioritization was still appropriate. The new flood hazard mitigation initiatives was added after the City Council's initial review of the draft plan. This initiative was ranked the third priority as the risk of flooding in Rainier is low.

# City of Rainier Risk Assessment

## Introduction

The risk assessment provides information about the hazards that threaten Rainier. This information provides the factual basis to identify and support a strategy that can effectively mitigate the effects of the hazards that threaten this jurisdiction's safety and challenge its ability to perform essential functions.

The content and structure of this plan's risk assessment was developed using the Federal Emergency Management Agency's (FEMA) 2008 "Local Multi-Hazard Mitigation Planning Guidance." Table 1 shows the Disaster Mitigation Act (DMA) Risk Assessment Planning Requirements that must be met in order for this plan to receive a "satisfactory" score. Each of these planning requirements is met through the information contained in both the regional risk assessment and in this local annex.

**Table 1: Disaster Mitigation Act Risk Assessment Planning Requirements**

DMA Section	Requirement
§201.6(c)(2)(i):	[The risk assessment <b>shall</b> include a] description of the type ... of all natural hazards that can affect the jurisdiction ...
§201.6(c)(2)(i):	[The risk assessment <b>shall</b> include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan <b>shall</b> include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii):	[The risk assessment <b>shall</b> include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description <b>shall</b> include an overall summary of each hazard and its impact on the community.
§201.6(c)(2)(ii):	[The risk assessment in all] plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.
§201.6(c)(2)(ii)(A):	The plan <b>should</b> describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas ...
§201.6(c)(2)(ii)(B):	[The plan <b>should</b> describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate ...
§201.6(c)(2)(ii)(C):	[The plan <b>should</b> describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii):	For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

In general the Federal DMA planning requirements with the words "**shall**" and "**must**" indicate that the item is mandatory and must be included in the plan, otherwise it will not be approved by FEMA. Regulations with the word "**should**" indicate that the item is strongly recommended to be included in the plan, but its absence will not cause FEMA to disapprove the plan.

## Hazard Analysis Definitions

The adjective descriptors (High, Moderate, and Low) for each hazard's probability of occurrence, vulnerability, and risk rating are consistent with the terms used in the regional assessment.

The following terms are used in this plan to analyze and summarize the risk of the hazards that threaten this jurisdiction:

### Risk Rating:

An adjective description (High, Moderate, or Low) of the overall threat posed by a hazard is assessed for the next 25 years. Risk is the subjective estimate of the combination of any given hazard's probability of occurrence and vulnerability.

- High: There is strong potential for a disaster of major proportions during the next 25 years; or History suggests the occurrence of multiple disasters of moderate proportions during the next 25 years.
- Moderate: There is medium potential for a disaster of less than major proportions during the next 25 years.
- Low: There is little potential for a disaster during the next 25 years.

### Probability of Occurrence:

An adjective description (High, Medium, or Low) of the probability of a hazard impacting the jurisdiction within the next 25 years.

- High: There is great likelihood that a hazardous event will occur within the next 25 years.
- Moderate: There is medium likelihood that a hazardous event will occur within the next 25 years.
- Low: There is little likelihood that a hazardous event will occur within the next 25 years.

### Vulnerability:

Vulnerability can be expressed as combination of the severity of a natural hazard's effect and its consequential impacts to the community. An adjective description (High, Medium, or Low) of the potential impact a hazard could have on the community. It considers the population, property, commerce, infrastructure and services at risk relative to the entire jurisdiction.

- High: The total population, property, commerce, infrastructure and services of the community are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worse case scenario, there could be a disaster of major to catastrophic proportions.

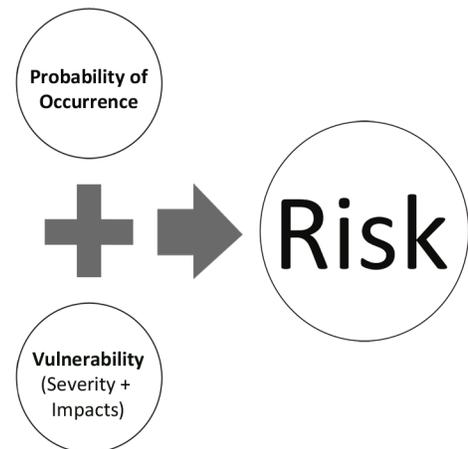


Figure 1: Risk is a subjective estimate of the combination of a hazard's probability of occurrence and a community's vulnerability.

- **Moderate:** The total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence; or The total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence, but not all to the same degree; or An important segment of population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard. In a worse case scenario there could be a disaster of moderate to major, though not catastrophic, proportions.
- **Low:** A limited area or segment of population, property, commerce, infrastructure, or service is exposed to the effects of a hazard. In a worse case scenario, there could be a disaster of minor to moderate proportions.

## Summary Risk Assessment

Based on the regional risk assessment and the local risk assessment in the subsequent section, the following hazards pose the greatest threat to the City of Rainier:

Hazard	Probability of Occurrence	Vulnerability	Risk
Earthquake	High	Moderate	High
Storm	High	High	High
Flood	Moderate	Low	Low
Landslide	Moderate	Low	Moderate
Wildland Fire	High	Low	Moderate
Volcanic Event	Low	Moderate	Low

## Local Risk Assessment

A comprehensive risk assessment of the major natural hazards that threaten the City of Rainier was developed for this plan through the regional risk assessment process described in Chapter 4.0. The regional risk assessment and its hazard profiles serve as the foundation for this jurisdiction's risk assessment. A list of all of the potential natural hazards that could impact this jurisdiction is located in Chapter 4. Chapter 4 includes six natural hazard profiles for earthquake, storm, flood, landslide, wildland fire, and volcanic events. Each profile defines the hazard and describes its effects, severity, impacts, probability of occurrence, and historical occurrences. The regional profiles describe this jurisdiction's local vulnerabilities in terms of the portion of the jurisdictions land base or service area, population, employment, dwelling units, jurisdiction-owned assets, and critical facilities that are within each hazard zone.

This section of the plan provides additional details or explains differences where this jurisdiction's risks for each hazard vary from the risks facing the entire planning area. Maps of the hazards that affect the City of Rainier are scaled to local boundaries and are included in this section.

## Earthquake

### Severity

A profile of earthquakes is provided in Section 4.1 of the Regional Risk Assessment. The greatest effects of earthquakes experienced by Rainier are ground shaking and ground failures. Rainier is less susceptible to liquefaction than communities in northern Thurston County. Nearly all of the incorporated area of the city sits on soils rated to have “very low” vulnerability to liquefaction (see the City of Rainier Liquefaction Hazards map). According to the Washington State Department of Natural Resources, Rainier is situated upon Class C soils, which amplify the shaking effects of earthquake events.

### Impacts

Section 4.1 of the Regional Risk Assessment explains in detail the impacts of earthquake events. The impacts of earthquakes that are faced by Rainier include surface faulting, landslides, subsidence and uplifting associated with ground failures. These impacts may cause structures to be damaged or collapse, and falling debris may cause injury and/or death to humans and animals. Transportation and utilities infrastructure may become damaged or disrupting, complicating the actions of emergency response personnel in the aftermath of an earthquake.

None of the land incorporated into the city of Rainier is considered to lie within an earthquake hazard area. None of Rainier’s population currently resides within earthquake hazard areas, and no buildings of any type are found in hazard areas. However, the housing stock of Rainier includes many older buildings which may be vulnerable to damage from earthquake events. In addition, the City of Rainier has fewer emergency resources at its disposal with which to respond to earthquakes, compared to larger communities in Thurston County.

### Probability of Occurrence

Past trends of earthquake activity are described in Section 4.1 of the Regional Risk Assessment. Historically, a destructive event occurs every 26 years in the Thurston region.

### Historical Occurrences and Impacts Specific to this Jurisdiction

February 28, 2001, Federal Disaster 1361: Nisqually Earthquake

Structural supports of a city reservoir sustained minor damage. Some building foundations suffered cracks, and a carport collapsed.

## Summary Assessment

Historical data suggests that a destructive event occurs roughly every 26 years. Thus, there is high probability of a damaging earthquake occurring in the future. Rainier is not as vulnerable to earthquakes as other communities in Thurston County, as none of its residents or infrastructure are found within earthquake hazard areas. Therefore, Rainier has been assigned a moderate vulnerability rating. The risk of impacts from earthquakes remains high due to Rainier's older stock of housing, few emergency response resources and the possibility of isolation if an earthquake event damages transportation infrastructure.

### Summary Risk Assessment for Earthquake in Rainier

Probability of Occurrence	Vulnerability	Risk
High	Moderate	High

## Storm

### Severity

A profile of storms is provided in Section 4.2 of the Regional Risk Assessment. The severity of storms experienced by Rainier is similar to that experienced by the rest of Thurston County.

### Impacts

Wind is the biggest storm hazard faced by Rainier. The city may also be impacted by heavy rains, freezing rain, snow, tornadoes, hail and lightning. One storm event may consist of one or more of the above. For instance, hail and lightning are often associated with tornadoes, and heavy wind may accompany a rain or snowstorm.

Wind, snow and ice may cause power outages in Rainier, which depending on their severity, may take days to restore. Storm events may also cause trees to topple, which can damage property and cause the death or injury of people or animals. Snow and ice may make roads impassable, and create difficulty in emergency response. Rain or snowmelt may cause localized flooding.

The city was much more vulnerable to power outages in the past, but the frequency of these events has declined since 2005 with the installation of a new electrical substation and subsequent rerouting of power lines that serve the city. Thurston County also assists the city with sanding and plowing during snowstorm events.

### Probability of Occurrence

Same as described in Section 4.2 of the Regional Risk Assessment.

### Historical Occurrences and Impacts Specific to this Jurisdiction

December 2008, Federal Disaster 1825: Severe Winter Storm

This snowstorm required a lot of sanding and plowing, though roads were navigable. There was one accident reported, though it was attributed to inattentive driving. No injuries were reported.

December 1996 & February 1997, Federal Disaster 1159: Ice, Wind, Snow, Landslide, Flooding

Some minor wind damage was sustained during this event.

January 1993, Federal Disaster 981: Inauguration Day Storm

Several trees were blown down during this windstorm, causing power outages and transportation hazards. Food spoiled due to lack of refrigeration. Live power lines were lying in the streets in some locations. The Tipsoo Loop area, which contains 217 homes, was without power for two weeks. Five or six cars were damaged, and three or four trees fell onto houses and caused damage. Emergency shelters were activated; City Hall, Rainier High School and Rainier Chapel housed a total of five citizens.

## Summary Assessment

Severe storms have a high probability of occurrence throughout the Thurston Region. Past experience demonstrates that Rainier is highly vulnerable to the impacts of storms. Based on these considerations, a high risk rating has been assigned.

### Summary Risk Assessment for Storm in Rainier

Probability of Occurrence	Vulnerability	Risk
High	High	High

## Flood

### Severity

Same as described in Section 4.3 of the Regional Risk Assessment. Severity of flooding events is influenced by the amount and type of precipitation, pre-existing conditions of the ground (saturated from previous rain, covered with snow, or frozen) and human modification of the landscape (development and logging practices). Flood zones are shown on the City of Rainier Flood Hazards map.

### Impacts

Rainier is not impacted by riverine or tidal flooding. There are some areas in the northern part of the city that may be threatened by high groundwater flooding, and certain areas may be vulnerable to urban flooding. Some intersections along Binghampton Street (SR 507) used to become impassible during flood events, but Rainier Public Works has retrofitted some of these with new drains to help control flooding.

A listing of Rainier's population, structures and assets that are at risk of flooding is found in Table 2(a-e) below.

**Table 2a. Description of land area at risk of flooding in Rainier.**

	Total Acres	100 Year SFHA		500 Year SFHA		High Groundwater		All Flood Zones	
		In Hazard Area	% In Hazard Area	In Hazard Area	% In Hazard Area	In Hazard Area	% In Hazard Area	In Hazard Area	% In Hazard Area
City	1,105	3	0%	0	0%	72	6%	74	7%
UGA <sup>1</sup>	319	4	1%	0	0%	16	5%	19	6%
<b>Total</b>	<b>1,424</b>	<b>7</b>	<b>0%</b>	<b>0</b>	<b>0%</b>	<b>87</b>	<b>6%</b>	<b>94</b>	<b>7%</b>

**Table 2b. Description of population at risk of flooding in Rainier.**

	2006 Population Estimate			2030 Population Forecast		
	Total	In Hazard Area	% in Hazard Area	Total	In Hazard Area	% in Hazard Area
City	1,675	80	5%	2,540	85	3%
UGA	115	10	9%	355	10	3%
<b>Total</b>	<b>1,790</b>	<b>90</b>	<b>5%</b>	<b>2,895</b>	<b>95</b>	<b>3%</b>

Table 2c. Description of dwelling units at risk of flooding in Rainier.

	2006 Dwelling Estimate			2030 Dwelling Forecast		
	Total	In Hazard Area	% in Hazard Area	Total	In Hazard Area	% in Hazard Area
City	610	30	5%	1,045	35	3%
UGA	45	5	11%	155	5	3%
<b>Total</b>	<b>655</b>	<b>35</b>	<b>5%</b>	<b>1,200</b>	<b>40</b>	<b>3%</b>

Table 2d. Description of employment (by number of jobs) at risk of flooding in Rainier.

	2006 Employment Estimate			2030 Employment Forecast		
	Total	In Hazard Area	% in Hazard Area	Total	In Hazard Area	% in Hazard Area
City	375	5	1%	1,065	5	0%
UGA	10	0	0%	20	0	0%
<b>Total</b>	<b>385</b>	<b>5</b>	<b>1%</b>	<b>1,085</b>	<b>5</b>	<b>0%</b>

Table 2e. Description of financial assets at risk of flooding in Rainier.

	Residential			Commercial/Industrial			Government/Institutional		
	Total (mil. \$)	In Hazard Area	% in Hazard Area	Total (mil. \$)	In Hazard Area	% in Hazard Area	Total (mil. \$)	In Hazard Area	% in Hazard Area
City	70	3	4%	6	0	0%	28	0	0%
UGA	7	1	9%	0	0	0%	0	0	0%
<b>Total</b>	<b>77</b>	<b>3</b>	<b>4%</b>	<b>6</b>	<b>0</b>	<b>0%</b>	<b>28</b>	<b>0</b>	<b>0%</b>

Source: Thurston Regional Planning Council Population Forecast, 2007; Thurston County Assessor's Office; Local Jurisdictions.

Explanations: Numbers may not add due to rounding.

<sup>1</sup>UGA - Urban Growth Area. Unincorporated area designated to be annexed into city limits over 20 years time to accommodate urban growth.

## Probability of Occurrence

Same as described in Section 4.3 of the Regional Risk Assessment.

## Historical Occurrences and Impacts Specific to this Jurisdiction

February 1996, Federal Disaster 1100

Freezing conditions associated with this flood resulted in icy roads in the vicinity of Rainier. At the request of the Thurston County Roads Department, Rainier emergency personnel sanded roads outside city limits.

January 1990, Federal Disaster 852

Flooding occurred in the Tipsoo Loop area (Mountainview Estates), with approximately three or four residences needing assistance with pumping floodwater. Rainier emergency personnel used gasoline-powered pumps to remove floodwater from roadways. Flooding occurred in residents' basements and garages, but no above-ground living spaces were flooded. Wind knocked down trees and caused power outages, after which Rainier residents were unable to operate electrical floodwater pumps. Some theft was reported during the time the power was out.

## Summary Assessment

Flooding events in Rainier do not occur as often as other natural hazards due to the city's elevation and location relative to bodies of water that regularly flood. Flooding events in Rainier are limited to those of urban and high groundwater nature. Therefore, a moderate probability rating has been assigned. Overall, the city exhibits low vulnerability to flooding. Flooding events have historically been sporadic in nature with isolated impacts. According to the Federal Emergency Management Agency, there is only one flood policy held in Rainier. No claims have ever been filed for flood damages. A low risk rating has been assigned for flood hazards.

### Summary Risk Assessment for Flood in Rainier

Probability of Occurrence	Vulnerability	Risk
Moderate	Low	Low

## Landslide

### Severity

Same as described in Section 4.4 of the Regional Risk Assessment.

### Impacts

Same as described in Section 4.4 of the Regional Risk Assessment. Travel by Rainier residents and emergency response personnel could be impacted by landslides. Illustrated on the City of Rainier Steep Slopes map, slopes of greater than 40% are found along Minnesota St., which leads out of Rainier. Travel to neighboring jurisdictions could be impacted by steep slopes along SR 507 (between Rainier and both Tenino and Yelm), and Rainier Rd., which connects the City of Rainier to the City of Lacey.

See Table 3(a-e) for information on population, structures and assets that are at risk of landslides in Rainier.

**Table 3a. Description of land area at risk of landslides in Rainier.**

	Total Acres	Landslide Hazard Area	
		In Hazard Area	% In Hazard Area
City	1,105	9	1%
UGA <sup>1</sup>	319	4	1%
<b>Total</b>	<b>1,424</b>	<b>13</b>	<b>1%</b>

**Table 3b. Description of population at risk of landslides in Rainier.**

	2006 Population Estimate			2030 Population Forecast		
	Total	In Hazard Area	% in Hazard Area	Total	In Hazard Area	% in Hazard Area
City	1,675	50	3%	2,540	456	18%
UGA	115	5	4%	355	84	24%
<b>Total</b>	<b>1,790</b>	<b>55</b>	<b>3%</b>	<b>2,895</b>	<b>540</b>	<b>19%</b>

**Table 3c. Description of dwelling units at risk of landslides in Rainier.**

	2006 Dwelling Estimate			2030 Dwelling Estimate		
	Total	In Hazard Area	% in Hazard Area	Total	In Hazard Area	% in Hazard Area
City	610	20	3%	1045	190	18%
UGA	45	0	0%	155	35	23%
<b>Total</b>	<b>655</b>	<b>20</b>	<b>3%</b>	<b>1200</b>	<b>225</b>	<b>19%</b>

**Table 3d. Description of employment (by number of jobs) at risk of landslides in Rainier.**

	2006 Employment Estimate			2030 Employment Forecast		
	Total	In Hazard Area	% in Hazard Area	Total	In Hazard Area	% in Hazard Area
City	375	15	4%	1065	45	4%
UGA	10	0	0%	20	0	0%
<b>Total</b>	<b>385</b>	<b>15</b>	<b>4%</b>	<b>1085</b>	<b>45</b>	<b>4%</b>

**Table 3e. Description of financial assets at risk of landslides in Rainier.**

	Residential			Commercial/Industrial			Government/Institutional		
	Total (mil. \$)	In Hazard Area	% in Hazard Area	Total (mil. \$)	In Hazard Area	% in Hazard Area	Total (mil. \$)	In Hazard Area	% in Hazard Area
City	70	2	3%	6	0	0%	28	1	4%
UGA	7	0	4%	0	0	0%	0	0	0%
<b>Total</b>	<b>77</b>	<b>3</b>	<b>3%</b>	<b>6</b>	<b>0</b>	<b>0%</b>	<b>28</b>	<b>1</b>	<b>4%</b>

Source: Thurston Regional Planning Council Population Forecast, 2007.

Explanations: Numbers may not add due to rounding.

<sup>1</sup>UGA - Urban Growth Area. Unincorporated area designated to be annexed into city limits over 20 years time to accommodate urban growth.

## Probability of Occurrence

Same as described in the Regional Risk Assessment.

## Historical Occurrences and Impacts Specific to this Jurisdiction

There are some steep slopes (greater than 40%) along the southern, eastern and western edges of the city, and in Rainier's urban growth area (UGA).

## Summary Assessment

Historically, landslides have not occurred very frequently in Rainier, so a moderate probability of occurrence has been assigned. The city itself is not very vulnerable to the impacts of landslide events, resulting in a low vulnerability rating. However, due to the possibility of travel routes outside the city being impacted by landslides, a moderate risk rating has been assigned.

### Summary Risk Assessment for Landslide in Rainier

Probability of Occurrence	Vulnerability	Risk
Moderate	Low	Moderate

## Wildland Fire

### Severity

Same as described in Section 4.5 of the Regional Risk Assessment.

### Impacts

There are no official High Risk Fire Areas within or surrounding Rainier. This does not mean that wooded or other lesser developed areas could not catch fire and pose a threat to the city. Wooded areas exist on the southeast side of the city, and also east and north of City Limits.

Rainier is served by Fire District 4, which operates a fire station in the city. Their proximity and training in wildfire fighting helps to mitigate the threat posed by wildfires.

### Probability of Occurrence

There is a high probability of small fires (less than two acres in size) occurring in Rainier. There is a low probability of larger fires occurring.

### Historical Occurrences and Impacts Specific to this Jurisdiction

Between 1972 and 2007, there were approximately fifteen fires within Rainier city limits and its urban growth area. All were smaller than two acres in size. In 2008, a fire burned for a week in nearby Fort Lewis' Area 21. Smoke impacted Rainier, reducing visibility to 100 feet and affecting air quality. Extended exposure to outside air caused difficulty breathing, and complaints were received by the city from residents, some with respiratory problems.

### Summary Assessment

Rainier itself does not contain any fire hazard areas. This does not mean that wooded areas within the city could not catch fire and pose a threat to the city. The city has a fire station with well-trained staff, and is not very vulnerable to wildland fire events. Because there are wooded areas within and adjacent to the city, a moderate risk rating has been assigned.

#### Summary Risk Assessment for Wildland Fire in Rainier

Probability of Occurrence	Vulnerability	Risk
High	Low	Moderate

## Volcanic Hazards

### Severity

Same as described in Section 4.6 of the Regional Risk Assessment.

### Impacts

Rainier could be impacted by ash fall from a volcanic eruption. Ash accumulation presents difficult driving conditions, including reduced visibility. This could result in injury or death as a result of traffic accidents. Inhalation of ash particles could pose a threat to people with respiratory illnesses, though avoiding exposure would mitigate this threat. Ash can cause damage to agricultural crops as well as outdoor ventilation, heating and air conditioning systems. Significant rooftop accumulation could lead to structural failures. Wet ash can cause slippery roads, increased threat of structural failures, and power outages.

### Probability of Occurrence

For ash fall, same as described in Section 4.6 of the Regional Risk Assessment. A volcanic lahar is not likely to impact Rainier.

### Historical Occurrences and Impacts Specific to this Jurisdiction

May 1980, Federal Disaster 623: Mt. St. Helens Eruption

Rainier was blanketed by approximately a half inch of ash. It was dispersed by wind over the next few days.

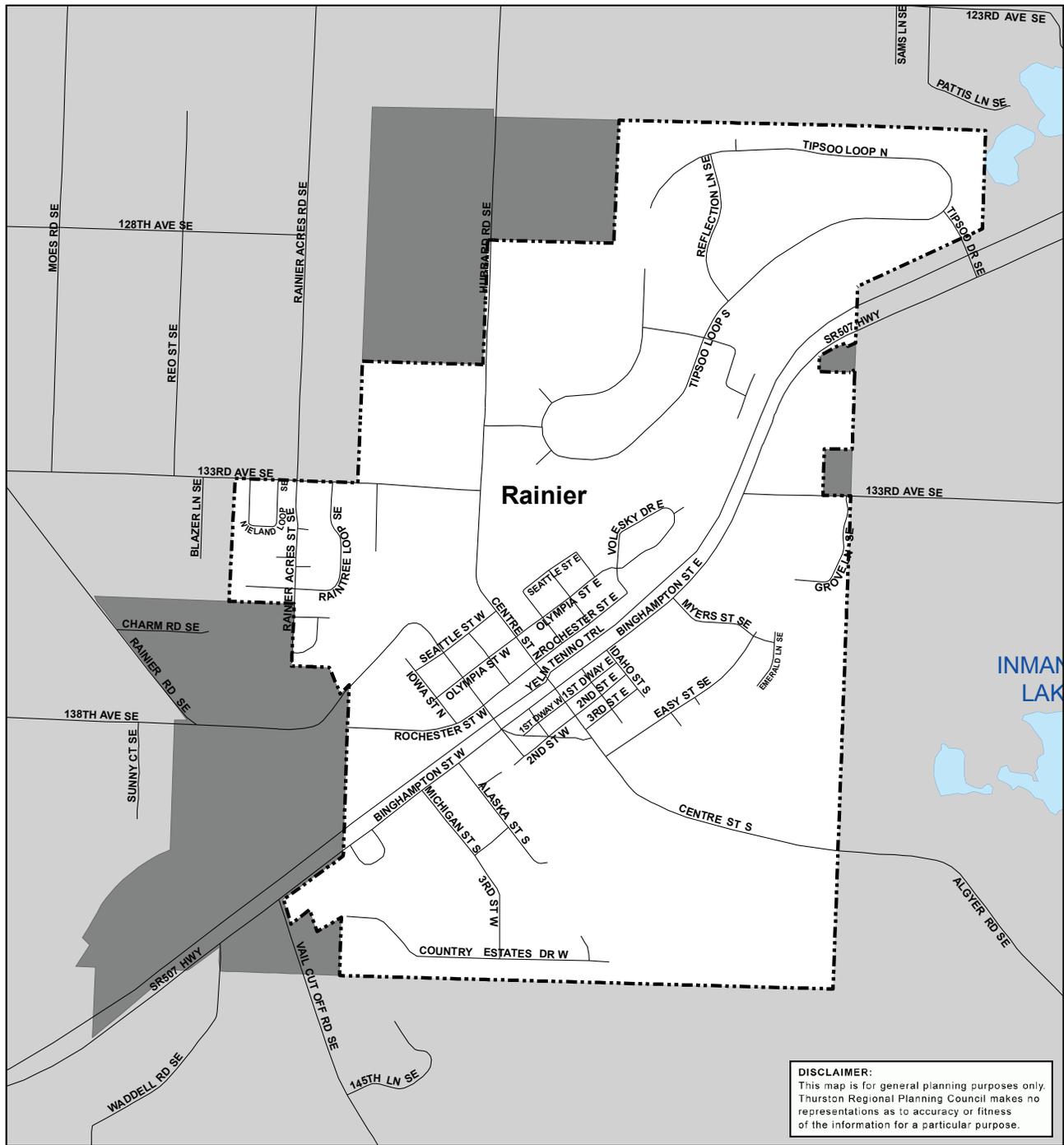
### Summary Assessment

Volcanic events have a low probability of occurrence. Historical events demonstrate a moderate vulnerability to the threats of volcanic events, though a major eruption could impact the city depending on the specific conditions of the event. Impacts would likely be limited to ash fall. A low risk rating has been assigned.

#### Summary Risk Assessment for Volcanic Events in Rainier

Probability of Occurrence	Vulnerability	Risk
Low	Moderate	Low

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**TRPC**  
Thurston Regional Planning Council

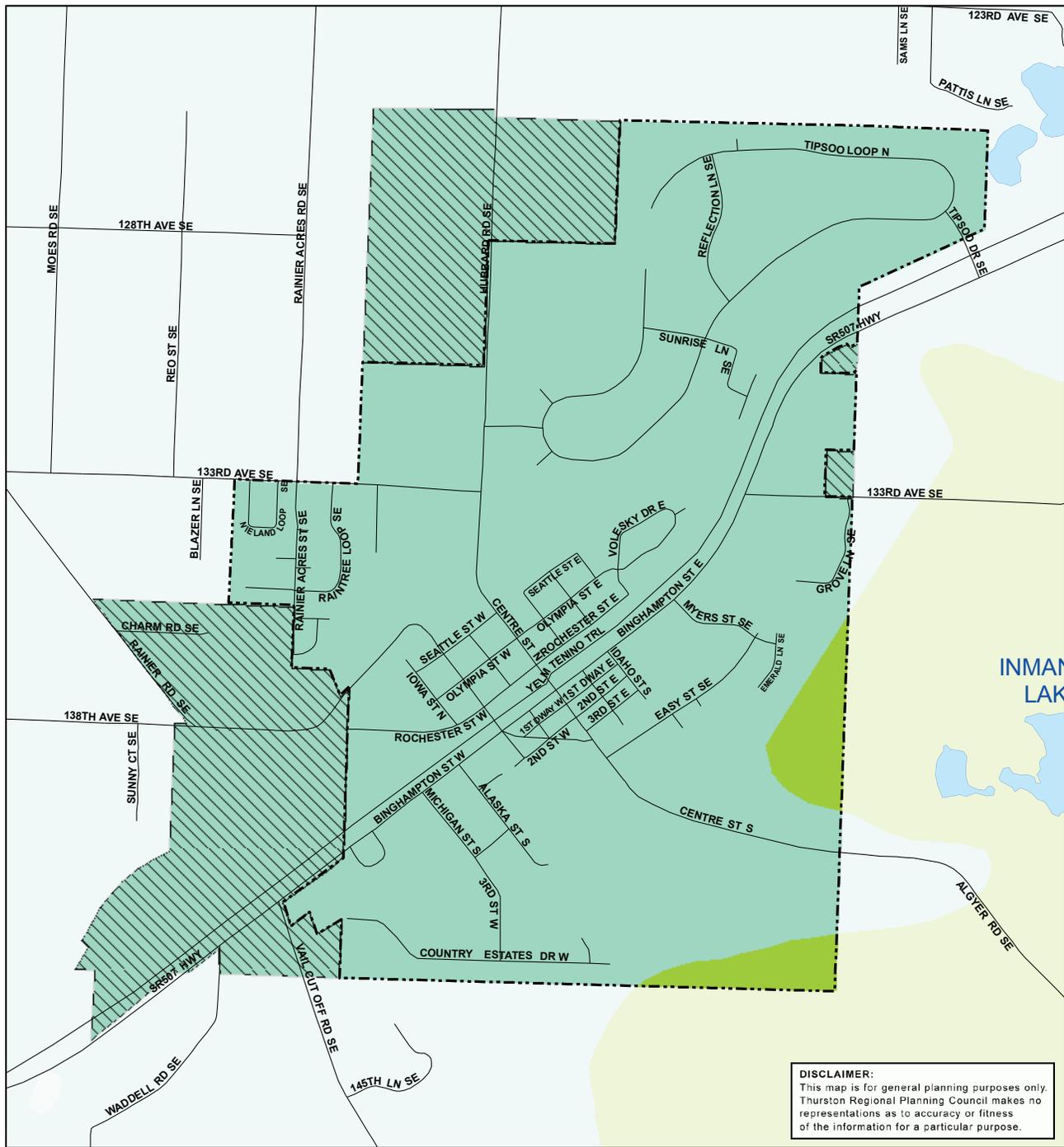
## City of Rainier

Thurston County, WA

- City of Rainier
- City Limits
- Urban Growth Boundary

0.25   0.125   0   0.25 Miles

Printing Date: April 24, 2009  
 File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\Vicinity\Maps\Rainier



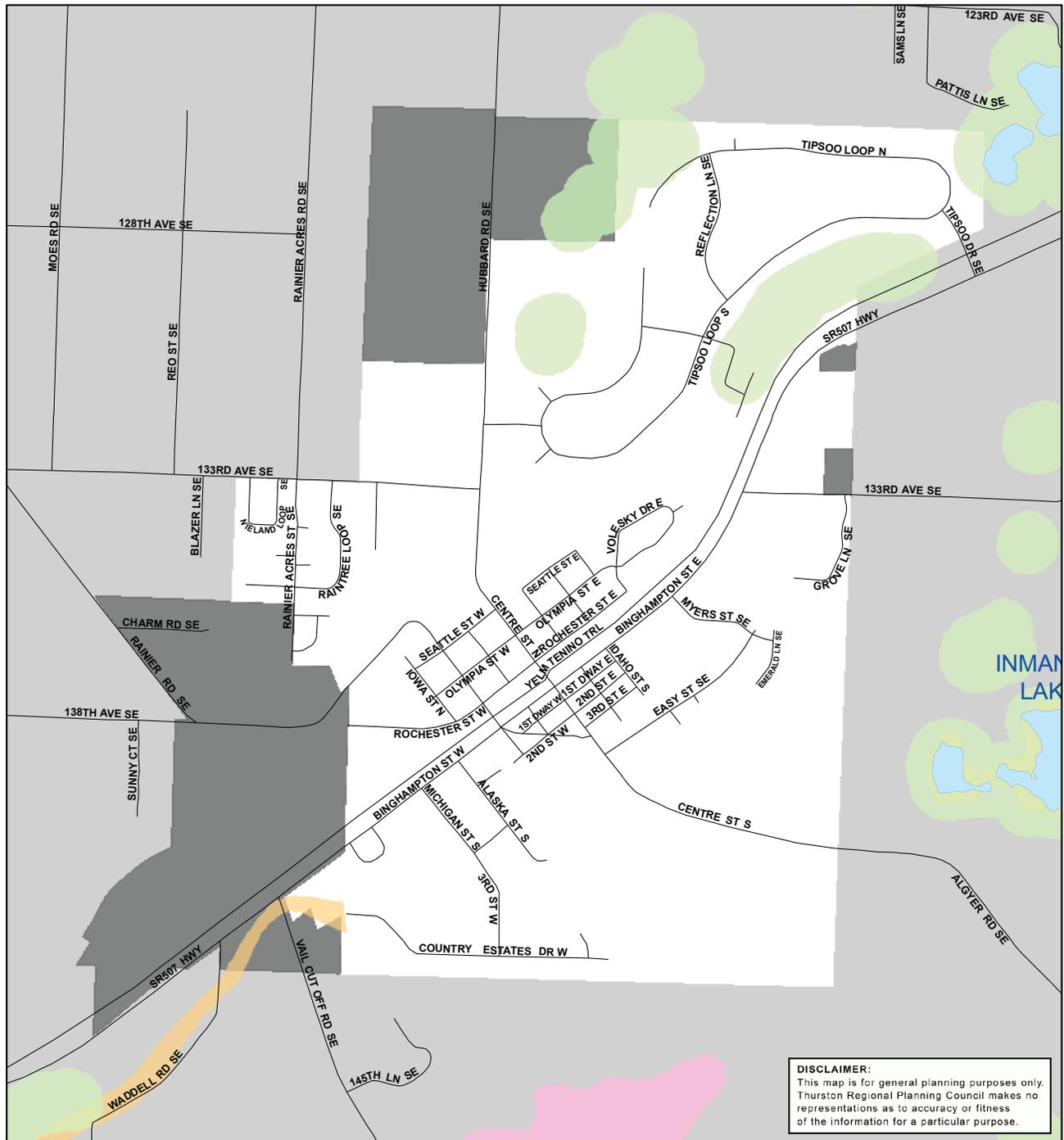
**DISCLAIMER:**  
 This map is for general planning purposes only. Thurston Regional Planning Council makes no representations as to accuracy or fitness of the information for a particular purpose.

## City of Rainier Liquefaction Hazards

City Limits	high	low	bedrock
Urban Growth Boundary	moderate to high	very low to low	peat
	low to moderate	very low	water

0.25 0.125 0 0.25 Miles

Printing Date: March 11, 2009  
 File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\liq\_rainier\_8x11.mxd



**DISCLAIMER:**  
 This map is for general planning purposes only. Thurston Regional Planning Council makes no representations as to accuracy or fitness of the information for a particular purpose.

## City of Rainier Flood Hazards

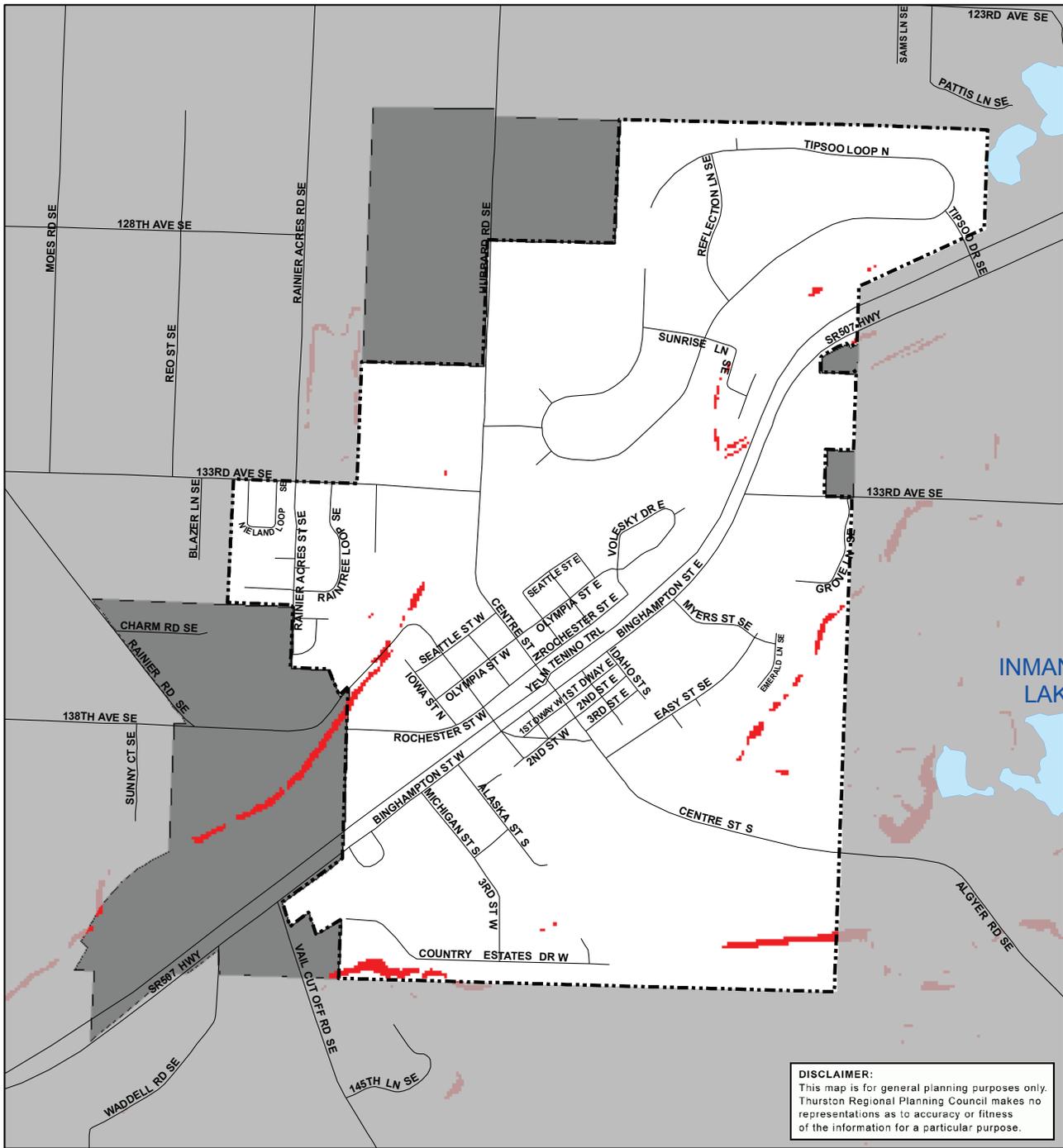


- High Groundwater Flooding
- 100 Year Floodplain
- 500 Year Floodplain
- City Limits
- Urban Growth Boundary



Printing Date: February 18, 2009  
 File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\ flood\_rainier\_8x11.mxd





**City of Rainier  
Steep Slopes**

Printing Date: March 19, 2009  
File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\Steep\_Maps\steep\_rainier\_8x11.mxd

- Slopes Over 40%
- City Limits
- Urban Growth Boundary

Thurston Regional Planning Council

0.25 0.125 0 0.25 Miles

## City of Rainier Mitigation Initiatives

### Current Adopted Mitigation Initiatives

Current Mitigation Initiatives consist of actions that have not yet begun or require additional work. They consist of existing initiatives that were carried over from the first edition of this plan and modified from their original form to reflect present needs.

Priority	I.D. Number	Category	Action	Status
1 of 3	R-SH 1	Critical Facilities Replacement/Retrofit	Install City-owned natural gas generator at City Hall.	Modified
2 of 3	R-FH 1	Hazard Damage Reduction	Stormwater management engineering and design for City streets.	Modified
3 of 3	R-FH 02	Public Information	Flood Hazard Education and Community Outreach	New

Hazard Category Codes are as follows: EH=Earthquake Hazard; FH=Flood Hazard; LH=Landslide Hazard; MH=Multi Hazard; SH=Storm Hazard; WH=Wildland Fire Hazard; and VH=Volcanic Hazard.

**Priority: 1 of 3****Status: Existing****Hazard Addressed: Multi Hazard****Category: Critical Facilities Replacement / Retrofit****R-SH 1: Install City-owned natural gas generator at City Hall**

**Rationale:** It is important that municipal operations are not significantly disrupted during power outages. City Hall can also provide shelter if other shelters are overflowing. This initiative would provide for the installation of a City-owned natural gas generator at City Hall. This funding would provide for the electrical panels, plumbing, slab, and enclosure for the generator.

**Relates to Plan Goal(s) and Objectives: 3B, 3C****Implementer:** City of Rainier, Public Works**Estimated Cost:** \$7,500**Time Period:** 2010-2014**Funding Source:** Grant funding**Source and Date:** Natural Hazard Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** R-SH-1**Reference Page:** Addendum 2-8

**Initiative and Implementation Status:** This initiative has not yet been implemented due to the unavailability of funds. This initiative is still a priority.

**Priority: 2 of 3****Status: Existing****Hazard Addressed: Flood Hazard**  
**Category: Hazard Damage Reduction****R-FH 1: Stormwater management engineering and design for City streets**

**Rationale:** During periods of heavy rains, surface run-off from City streets carries pollutants into the aquifer, which Rainier relies upon for its drinking water. Some areas flood as a result of inadequate stormwater drainage from streets. This initiative consists of an engineering study to design a stormwater drainage system for City streets.

**Relates to Plan Goal(s) and Objectives:** Goal 6, Objective A

**Implementer:** City of Rainier Public Works

**Estimated Cost:** \$40,000

**Time Period:** 2010-2014

**Funding Source:** Grant funding (Transportation Improvement Board; Surface Transportation Program)

**Source and Date:** City of Rainier Comprehensive Plan, Capital Facilities Chapter, November 9, 2004

**Adopted Plan Number:** This initiative was included in the original Natural Hazard Mitigation Plan, but was not numbered.

**Reference Page:** Addendum 2-9

**Initiative and Implementation Status:** Portions of storm drain along Minnesota Street were upgraded in 2009. Stormwater requirements exist in the planning phase for developments, and are incorporated into the City's development regulations. Stormwater upgrades are to be continued as funding becomes available.

**Priority: 3 of 3**

**Status: New**

**Hazard Addressed: Flood Hazard**  
**Category: Public Information**

**R-FH 02: Flood Hazard Education and Community Outreach**

**Rationale:** Some portions of neighborhoods within Rainier city limits are vulnerable to flooding due to high groundwater when seasonal precipitation exceeds normal high levels. In order to prepare residents for potential flood hazards, the City will notify and educate flood prone property owners about the risks of flooding, steps that can be taken to prevent losses, and inform property owners about the National Flood Insurance Program and enrollment procedures.

**Relates to Plan Goal(s) and Objectives:** 1E, 8A,B

**Implementer:** City of Rainier Public Works and Utilities

**Estimated Cost:** \$500 per year

**Time Period:** Ongoing

**Funding Source:** General Fund

**Source and Date:** New Initiative for 2010

**Adopted Plan Number:** N/A

**Reference Page:** N/A

**Initiative and Implementation Status:** This initiative will begin in Fall 2010. City staff, planning commission, and council members will review the effectiveness of the program and adjust as necessary each year.

# City of Rainier Implementation of the National Flood Insurance Program

## Introduction

All Local Mitigation Plans approved by FEMA after October 1, 2008 **must** describe each jurisdiction’s participation in the NFIP and **must** identify, analyze and prioritize actions related to continued compliance with the NFIP. Basic compliance NFIP actions could include, but are not limited to:

- Adoption and enforcement of floodplain management requirements, including regulating all and substantially improved construction in Special Flood Hazard Areas (SFHAs);
- Floodplain identification and mapping, including any local requests for map updates, if needed; or
- Description of community assistance and monitoring activities.

**Requirement §201.6(c)(3)(ii):** [The mitigation strategy] must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

## National Flood Insurance Program Participation

### Summary of National Flood Insurance Program Premiums, Policies, and Claims

Community	Total Premium	Number of Policies			Total Coverage	Total Claims Since 1978	Total Paid Since 1978	Repetitive Losses	Severe Losses
		V Zone	A Zone	Total					
Bucoda	\$55,051	0	64	74	\$10,033,700	42	\$249,262	0	0
Lacey	\$4,652	0	0	14	\$3,871,000	3	\$8,088	0	0
Olympia	\$90,555	0	31	82	\$25,265,400	16	\$347,006	0	0
Rainier	\$326	0	0	1	\$280,000	0	\$0	0	0
Tenino	\$1,327	0	0	4	\$633,700	7	\$105,233	0	0
Tumwater	\$2,707	0	0	6	\$1,482,000	2	\$12,515	0	0
Yelm	\$17,617	0	11	28	\$7,313,400	2	\$7,603	0	0
Thurston County	\$316,352	3	281	663	\$141,785,400	215	\$3,389,280	10	0
<b>County Total :</b>	<b>\$488,587</b>	<b>3</b>	<b>387</b>	<b>872</b>	<b>\$190,664,600</b>	<b>287</b>	<b>\$4,118,987</b>	<b>10</b>	<b>0</b>

**Source:** FEMA NFIP Insurance Report, Washington, May 5, 2009.

The City of Rainier has participated in the NFIP since 1999. There is one policy within the city with total coverage of \$280,000. No claims have ever been filed. There were no outstanding concerns or issues from the City’s last community assistance visit.

The City of Rainier will continue to participate in the NFIP.

## Flood Plans, Ordinances, and Regulations

Rainier has development standards in place for both flood hazard areas and wetlands. The following conditions must be met in order for a building permit to be issued (taken from the Rainier Municipal Code):

### 18.124.030 Flood hazard area review procedures.

2. The department will complete a review of the city's critical areas wetland map and other source documents for any proposed regulated activity to determine whether the project area for a proposed single-family dwelling unit or site for all other proposed regulated activities is located within a potential wetland. Identification of a potential wetland may also occur as a result of field investigations conducted by department staff.
3. When department maps, sources, or field investigations indicate that a potential wetland is located within the project area for a proposed single-family dwelling or within the site for all other proposed regulated activities, the department shall require a site evaluation (field investigation) to determine whether or not a regulated wetland is present and, if so, the relative location in relation to the proposed project area or site. The findings of the site evaluation shall be documented as outlined in subsections (B) and (C) of this section.

#### B. Flood Boundary Verification Survey.

1. A flood boundary verification survey that delineates the horizontal and vertical limits of the base flood elevation shall be submitted to the department when the department's maps or sources indicate that the proposed project area for a regulated activity is located within a potential flood hazard area.
  - a. Where a base flood elevation has not been determined, a flood study shall be required pursuant to subsection (C) of this section.
  - b. A base flood elevation that has been established through a detailed flood study accepted by the department may be used in lieu of conducting a flood study.
  - c. The base flood elevation for a natural watercourse shall be established at the five-foot topographic elevation line above the ordinary high water mark.
2. The requirement to submit a flood boundary verification survey may be waived at the department's discretion, when the department can determine, using contour elevations, base flood data, orthophotos, and parcel data, that the extent of the regulated activity is clearly above the base flood elevation.
3. The flood boundary verification survey shall be prepared, signed, and dated by a registered land surveyor or professional engineer.
4. The department shall review the flood boundary verification survey to determine if the proposed development is located within a flood hazard area.

5. If the proposed development lies within the flood hazard area, the limits of the floodway, as well as the base flood elevation shall be shown on the flood boundary verification survey.

#### C. Flood Study.

1. A flood study shall be conducted when the department's maps or sources indicate that the proposed project area for a regulated activity is, or may be located within, a potential flood hazard area where base flood elevation data is not available through the flood insurance study or other authoritative sources, or when an established base flood elevation is contested. A full engineering analysis to determine the base flood elevation shall be required by the department. Base flood elevations shall be determined using the detailed methods established in Section 18.124.050, Appendix A. The department may approve alternative methods.
2. The flood study shall be prepared, signed, and dated by a professional engineer.
3. Once the department has reviewed and approved the flood study, the applicant shall be required to provide a flood boundary verification survey, utilizing the newly established base flood elevation, as outlined in this subsection (B) of this section.

#### D. Deep and/or Fast Flowing Water Analysis.

1. When the department determines that a proposed project area for a regulated activity is located within a flood hazard area, a deep and/or fast flowing water analysis based on Figure 18.124-9 and Section 18.124.050, Appendix A, shall be required to determine the floodway limits.

#### E. Zero-Rise Analysis.

1. When the department determines that a proposed project area for a regulated activity is located within a flood hazard area, a zero-rise analysis shall be required to determine that no increase in base flood elevation, displacement of flood volume, or flow conveyance reduction will occur as a result of the development.

### **18.124.040 Flood hazard area standards.**

#### C. Flood Fringe Areas.

6. Structures. Single-family, two-family, multifamily, mobile/manufactured homes, commercial, industrial, etc., except for critical facilities as set forth in subsection (C)(5) of this section, shall be allowed subject to the following standards:
  - a. New construction, additions affixed to the side of an existing structure, and substantial improvement of any structure with a crawlspace shall have the lowest floor elevated a minimum of two feet above base flood elevation (see Figure 18.124-12).
  - b. New construction, additions affixed to the side of an existing structure, and substantial improvement of any structure elevated by piers or pilings shall have the bottom of the lowest horizontal structural member elevated a minimum of two feet above the base

flood elevation and must be designed by a professional structural engineer. Electrical, heating, ventilation, plumbing, air-conditioning equipment, and other service facilities and associated ductwork shall be elevated a minimum of two feet above base flood elevation; however, the department may approve a lesser minimum distance above base flood elevation; provided, that the systems are designed to prevent floodwater from entering or accumulating within the components (see Figure 18.124-13). Areas below the lowest horizontal structural member shall not be enclosed and shall remain free of obstructions.

## Wetlands

### 18.108.030 Wetland review procedures.

#### A. General Requirements.

1. The city's critical areas wetland map provides an indication of where potential wetlands are located within the city. The actual presence or location of a potential wetland that has not been mapped, but may be present on or adjacent to a site, shall be determined using the procedures and criteria established in this chapter.
2. The department will complete a review of the city's critical areas wetland map and other source documents for any proposed regulated activity to determine whether the project area for a proposed single-family dwelling unit or site for all other proposed regulated activities is located within a potential wetland. Identification of a potential wetland may also occur as a result of field investigations conducted by department staff.
3. When department maps, sources, or field investigations indicate that a potential wetland is located within the project area for a proposed single-family dwelling or within the site for all other proposed regulated activities, the department shall require a site evaluation (field investigation) to determine whether or not a regulated wetland is present and, if so, the relative location in relation to the proposed project area or site. The findings of the site evaluation shall be documented as outlined in subsections (B) and (C) of this section.
4. If department staff completes the site evaluation and determines that no regulated wetlands are present, then wetland review will be considered complete.
5. All site evaluations shall include a proposed categorization of the wetland in accordance with the guidelines set forth in Section 18.108.020(D) and a calculation of the standard wetland buffer as set forth in Section 18.108.060.

#### Specific Ordinances and Plans

Ordinance 319 – Interlocal agreement with Thurston County emergency management

Ordinance 548 – Planning and Zoning, Development Regulations (includes Critical Area Ordinance)



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000  
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

December 17, 2009

Mr. Andrew Deffobis, Assistant Planner  
Thurston Regional Planning Council  
2424 Heritage Court SW, Suite A  
Olympia, WA 98502

RE: National Flood Insurance Program (NFIP) Status

Dear Mr. Deffobis:

This letter certifies that the Town of Rainier is a participating member in good standing in the National Flood Insurance Program (NFIP) with an approved flood damage prevention ordinance found in RMC 18.124.

The Town of Rainier joined the NFIP on March 29, 1999. The NFIP identification number is 530260. There are no unresolved issues from the last community assistance visit.

If you need further documentation, please call me at (360) 407-7253 and I will be glad to provide you with any other information you may need.

Sincerely,

*Kevin Farrell*

Kevin B. Farrell  
Floodplain Management Specialist - SWRO  
Shorelands and Environmental Assistance Program

Cc. Dan Sokol, Ecology

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