

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

## Table of Contents

Title Page and Table of Contents.....	1
Adopting Resolution .....	3
Community Profile .....	5
City of Tumwater Plan Development Process .....	7
City of Tumwater Risk Assessment.....	11
City of Tumwater Mitigation Initiatives .....	39
City of Tumwater Implementation of the National Flood Insurance Program.....	63

This page left intentionally blank.

**RESOLUTION NO. R2010-001**

**A RESOLUTION** of the City Council of the City of Tumwater, Washington adopting the 2009 update to the Natural Hazards Mitigation Plan for the Thurston Region.

**WHEREAS**, the City of Tumwater is vulnerable to the human and economic costs of natural disasters; and

**WHEREAS**, the Tumwater City Council recognizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community; and

**WHEREAS**, the City of Tumwater has been an active participant in the Natural Hazards Mitigation Planning Workgroup and Task Force, which have established a comprehensive, coordinated planning process to eliminate or decrease these vulnerabilities; and

**WHEREAS**, the City of Tumwater's staff have identified, justified and prioritized a number of proposed projects and programs needed to mitigate the vulnerabilities of Tumwater to the impacts of future disasters; and

**WHEREAS**, these proposed projects and programs have been incorporated into the 2009 update edition of the "Natural Hazards Mitigation Plan for the Thurston Region" that has been prepared and issued for consideration and implementation by the communities of Thurston County;

**NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TUMWATER AS FOLLOWS:**

**Section 1.** The Tumwater City Council hereby accepts and approves of its designated portion of the 2009 update to the "Natural Hazards Mitigation Plan for the Thurston Region."

**Section 2.** The agency personnel of the City of Tumwater are requested and instructed to pursue available funding opportunities for implementation of the proposals designated therein.

**Section 3.** The City of Tumwater will, upon receipt of such funding or other necessary resources, seek to implement the proposals contained in its section of the strategy.

**Section 4.** The City of Tumwater will continue to participate in the updating and expansion of the "Natural Hazards Mitigation Plan for the Thurston Region" in the years ahead.

**Section 5.** The City of Tumwater will further seek to encourage the businesses, industries and community groups operating within and/or for the benefit of the City of Tumwater to also participate in the updating and expansion of the "Natural Hazards Mitigation Plan for the Thurston Region" in the years ahead.

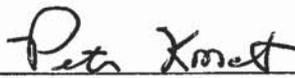
**Section 6. Ratification.** Any act consistent with the authority and prior to the effective date of this Resolution is hereby ratified and affirmed.

**Section 7. Severability.** The provisions of this Resolution are declared separate and severable. The invalidity of any clause, sentence, paragraph, subdivision, section, or portion of this Resolution or the invalidity of the application thereof to any person or circumstance, shall not affect the validity of the remainder of the Resolution, or the validity of its application to other persons or circumstances.

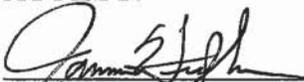
**Section 8. Effective Date.** This Resolution shall become effective immediately upon adoption and signature as provided by law.

RESOLVED this 19<sup>th</sup> day of January 2010.

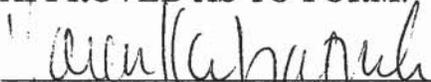
CITY OF TUMWATER

  
\_\_\_\_\_  
Pete Kmet, Mayor

ATTEST:

  
\_\_\_\_\_  
James Hendrickson, City Clerk

APPROVED AS TO FORM:

  
\_\_\_\_\_  
Karen Kirkpatrick, City Attorney

# Community Profile City of Tumwater

City info: (360) 754-5855

www.ci.tumwater.wa.us



Demographics

Population, 1990	9,976
Population, 2000	12,698
Population, 2008	13,780
Av. Ann. Pop. Growth, 1990-2000	2.4%
Av. Ann. Pop. Growth, 2000-2008	1.0%

Households, 2000	5,659
Average Household Size, 2000	2.2

**Age Structure, 2000:**

19 and under	3,334	26%
20 - 64	7,644	60%
65 and over	1,720	14%
Median Age	36	--

**Race and Ethnic Categories, 2000:**

White	11,226	88.4%
Black/African American	176	1.4%
American Indian & Alaska Native	157	1.2%
Asian	495	3.9%
Native Hawaiian & Other Pacific Islander	46	0.0%
Other Race	237	1.9%
Two or More Races	407	3.2%
Hispanic*	518	4.1%

Tumwater, originally called "New Market," was the first permanent American settlement on Puget Sound. In 1845, a party of 30 men and women, led by Michael T. Simmons and George Bush, established a settlement here when it was still British territory.

Initially, the community developed around the falls of the Deschutes River, called *SpEkwa'L*, "cascade," by the Coastal Salish. The town was later known as "Tumwater," Chinook jargon for "waterfall."

Tumwater was incorporated November 25, 1869 and reincorporated on November 12, 1875.

In 1896 Leopold Schmidt established a brewery at the falls, which became a focus of the city. In 1956, the construction of the freeway through the city razed most of the original downtown.

Now noted for its parks and museums, Tumwater has adopted the classic lines of the Old Brewhouse for buildings at its new civic center along Israel Road.

Housing

**Housing Units, 2000:**

Single-Family	2,825
Multifamily	2,657
Manufactured Homes	461

Census Median House Value, 2000	\$141,000
Average House Sale Price, 2007	\$307,272

Employment and Income

**Median Household Income:**

1989 (Census 1990 in 1999 \$'s)	\$37,406
1999 (Census 2000)	\$43,329

**Households by Income Category, 1999:**

Less than \$14,999	610	11%
\$15,000 to \$24,999	749	13%
\$25,000 to \$49,999	1,899	34%
\$50,000 to \$74,999	1,135	20%
\$75,000 or more	1,194	21%

**Taxable Retail Sales, 2007** \$457,730,665

**Total Jobs, 2003:** **15,830**

Manufacturing	1,640
Retail	2,210
Finance/Services	3,410
Federal, State, & Local Gov't	6,520
Tribal Gov't & Enterprises	<10
Other	2,070

Development Activity

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

Single-Family	135
Multifamily	220
Manufactured Homes	5
<b>Total</b>	<b>360</b>

**Subdivision Activity, 2007:**

	<b># Appl.</b>	<b># Lots</b>
Short Plat	0	0
Long Plat	6	340

Explanation: \*Person of Hispanic Origin can be of any race.

Source: TRPC, Profile 2008 ([www.trpc.org](http://www.trpc.org)).

This page left intentionally blank.

## City of Tumwater Plan Development Process

### Hazard Mitigation Plan Workgroup

The following individuals served as the City of Tumwater's hazards mitigation planning development workgroup:

Department/Title	Representative(s)
Tumwater Fire Chief and member of the Emergency Management Council for Thurston County	John Carpenter
Tumwater Planning and Facilities Director	Mike Matlock
Tumwater Long Range Planning Manager	Tim Smith
Tumwater Long Range Associate Planner	David Ginther

### Hazard Mitigation Plan Development

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

Activity and/or Name(s)	Subject(s)	Date	Location
<b>FIELD VISIT:</b> Mike Matlock-Planning and Facilities Director and David Ginther-Long Range Planning Associate Planner	Inspection of three sites that are regularly subject to flooding including the Pioneer Park sewer lift station facility (including the generator), the "M" Street sewer lift station, and the Tumwater Valley Golf Course clubhouse.	June 29, 2009	Deschutes River valley in Tumwater
<b>MEETING:</b> Mike Matlock-Planning and Facilities Director, Tim Smith-Long Range Planning Manager, and David Ginther-Long Range Planning Associate Planner	Meeting to discuss and review possible new mitigation initiatives and old mitigation initiatives and their prioritization.	June 30, 2009	Tumwater Long Range Planning Department
<b>MEETING:</b> Mike Matlock-Planning and Facilities Director, Tim Smith-Long Range Planning Manager, and David Ginther-Long Range Planning Associate Planner	Meeting to discuss and review new mitigation initiatives, old mitigation initiatives, and review the prioritization of the mitigation initiatives.	July 7, 2009	Tumwater Long Range Planning Department
<b>MEETING:</b> John Carpenter-Tumwater Fire Chief and Emergency Management Council member and David Ginther-Long Range Planning Associate Planner	Meeting to discuss and review new mitigation initiatives, old mitigation initiatives, and review the prioritization of the mitigation initiatives.	July 7, 2009	Tumwater Fire Department
John Carpenter-Tumwater Fire Chief and Emergency Management Council member	Discussed damage reports and reviewed photos of damage from the 2001 Nisqually earthquake. Discussed new mitigation initiative regarding air filters for emergency equipment, vehicles, and critical facilities.	June 3, 2009 July 6, 2009 June 10, 2009 June 11, 2009	Tumwater Fire Department

Cathy Blakeway-Tumwater Fire Department Administrative Assistant and FEMA Applicant Agent and Denny Peace-Fire Department Secretary	Obtained and reviewed disaster photos of Tumwater including the 2008 snowstorm, 2009 and 2007 floods, and the 2001 Nisqually earthquake.	June 3, 2009 June 18, 2009	Tumwater Fire Department
Jay Eaton-Tumwater Public Works Director	Discussed 1965 landslide (and subsequent slides in same area) that took out the sewer line(s) and railroad tracks across from Historical Park in Tumwater. Also discussed the earthquake resistant design of the relocated sewer lines along Deschutes Parkway.	June 12, 2009	Tumwater Public Works Department
Dan Smith-Water Resource Program Manager	Discussed Tumwater's drinking water sources in the floodplain (Palermo Wellfield). Reviewed and discussed earthquake, flooding, and landslide damages and photos. Discussed possible mitigation initiatives for Tumwater's water system infrastructure. Also discussed inter-jurisdictional flood hazard reduction efforts and the Tumwater Stream Team program.	June 2, 2009 June 3, 2009 June 9, 2009 June 23, 2009 June 24, 2009 June 25, 2009	Tumwater Public Works Department
Meeting with Dan Smith-Water Resource Program Manager and Tim Wilson-Water Resource Specialist	Reviewed and discussed eight different studies and plans that analyzed and documented the riparian buffers and habitat along streams and rivers in Tumwater.	June 22, 2009 June 23, 2009	Tumwater Public Works Department
Debbie Smith-Tumwater Water Resource Educator	Discussed Stream Team work in Tumwater and inter-jurisdictional coordination with other stream teams.	July 10, 2009	Tumwater Public Works Department
Steve Craig- Tumwater Public Works Operations Manager	Discussed the Pioneer Park sewer lift station, the number of homes it serves, its design, and the impacts if it was flooded. Also discussed storm impacts and responses and the impacts of lightning on the utility telemetry system.	July 6, 2009 June 15, 2009	Tumwater Public Works Department
Mark LaVack-Tumwater Public Works Operations Supervisor	Discussed Pioneer Park sewer lift station controls, hatches, pumps. Also, discussed the "M" Street sewer lift station, the stream behind it, and problems with debris from upstream beaver dams.	June 29, 2009	Tumwater Public Works Department
Carolyn Koivula-Front counter staff for Tumwater Public Works Operations Division	Discussion about telemetry system which controls both water and sewer systems in Tumwater.	June 18, 2009	Tumwater Public Works Department
Dave Barclift-Retired Tumwater Public Works Operations Manager	Phone discussion regarding flooding in Tumwater including the golf course clubhouse.	June 18, 2009	Tumwater Planning Department
Jeff Vrabel-Tumwater Facilities Manager	Discussed his experiences with flooding at Pioneer Park and the Tumwater Valley golf course and clubhouse. Also reviewed data on damages to City properties as a result of the 2001 Nisqually earthquake.	June 3, 2009 June 10, 2009	Tumwater Facilities Division
Sheryle Wyatt-Tumwater City Clerk	Obtained earthquake and flooding photos including ones of the retaining wall collapse at the Extended Stay America facility during the 2001 Nisqually Earthquake	June 3, 2009	Tumwater Finance Department

Chuck Denney-Tumwater Parks and Recreation Director	Discussed the January 2009 flooding event and a new mitigation initiative regarding a floodwall surrounding the newly remodeled Tumwater Valley Golf Course clubhouse.	June 9, 2009 July 6, 2009	Tumwater Parks and Recreation Department
John Darnall-Assistant Development Services Director	Discussed flood elevation certificates and the possible construction of a floodwall around the Tumwater Valley Golf Course clubhouse and its possible external effects.	July 2, 2009	Tumwater Development Services Department
Amy Callahan of Thurston Geodata Center	Discussed work the Geodata Center was doing on creating a new data set from flood elevations, flood gauge readings, and Lidar.	June 23, 2009	Thurston County Geodata Center
Craig Tosomeen-City of Olympia Water Resources Storm and Surface water	Discussed flood gauges on Deschutes River, USGS flood gauge policies, and costs. Also discussed the possibility of partnerships between Olympia, Tumwater, and the WA General Administration Dept. for a gauge.	June 29, 2009	City of Olympia
Tim Smith-Long Range Planning Manager	Discussed the results of the Shoreline Inventory and Analysis for the update to the Shoreline Management Plan.	June 23, 2009	Tumwater Long Range Planning Department
Steve Morrison of the Thurston Regional Planning Council	Discussed the costs of the Shoreline Inventory and Analysis for the update to the Shoreline Management Plan.	June 23, 2009	Thurston Regional Planning Council

## Mitigation Initiative Prioritization Process

The Tumwater Hazard Mitigation Initiative Workgroup consisted of John Carpenter-Tumwater Fire Chief and Emergency Management Council member, Mike Matlock-Planning and Facilities Director, Tim Smith-Long Range Planning Manager, and David Ginther-Long Range Planning Associate Planner. The workgroup reviewed the original mitigation initiatives and determined that two initiatives had been completed, some could be combined due to their similarities, and several could be removed due to changed conditions and new information that was not available during the writing of the first Natural Hazards Mitigation Plan (NHMP) in 2003. Two new mitigation initiatives were proposed and discussed as well.

The workgroup also assessed the prioritization (ranking) of the mitigation initiatives. The original order of the remaining mitigation initiatives was retained. Despite recent county-wide Federal disaster declarations, the Tumwater workgroup reached a consensus that the effects on Tumwater were not significant enough to re-order the remaining mitigation initiatives. The first two mitigation initiatives (EH-1 and SH-1) were left with the same #1 and #2 rankings as in the 2003 NHMP. These two initiatives are actions that could be done for relatively minimal costs that could result in a significant reduction (or prevention) of damages to critical facilities during a hazard event.

One of the new initiatives (FH-15) deals with protecting the City-owned golf course clubhouse from floodwaters. This new initiative was inserted into the ranking as #3 for the following reasons: 1) the City recently substantially invested in an extensive remodel of the clubhouse (2009); 2) the floodwaters in the January 2009 flooding event were very close to entering the doors of the

clubhouse; and 3) the site is within the 100-year floodplain where flooding occurs on a regular basis. This initiative was placed ahead of the rest of the pre-existing initiatives which are generally either more broad in nature, involve ongoing efforts, involve a hazard that is much less likely to occur, or consist of data collection/regulation related type initiatives.

The other new mitigation initiative (VH-1) deals with volcanic hazards which were not addressed in the 2003 NHMP. This initiative involves having extra air filters on hand for emergency equipment and facilities (HVAC, generators, etc.) and emergency vehicles. This will help to enhance Tumwater's ability to respond during a volcanic ash fall by allowing continued operation of emergency equipment, vehicles, and facilities (including the Emergency Operations Center). Even though the risk is relatively low for this natural hazard, being prepared for it could significantly reduce damages and help to facilitate emergency responses. This mitigation initiative was ranked as #5 due to the low risk but significant possible benefits. It was ranked above the remaining pre-existing mitigation initiatives which deal with broad subjects such as the ongoing riparian re-vegetation efforts, inter-jurisdictional coordination, or data collection/regulation. However, it was ranked below the mitigation initiative involving flood gauges on the Deschutes River due to the frequency of flooding in Tumwater and the importance of having up to date information regarding floodwater levels.

In deciding upon the ranking of the new mitigation initiatives the workgroup also took into consideration changes in Tumwater since the original NHMP was written, new information in regards to hazards in Tumwater, and the collective experience of the workgroup members in dealing with hazards.

## City of Tumwater Risk Assessment

### Introduction

The risk assessment provides information about the hazards that threaten the City of Tumwater. 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 shall include a] description of the type ... of all natural hazards that can affect the jurisdiction ...
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii):	[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall 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 should 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 should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate ...
§201.6(c)(2)(ii)(C):	[The plan should 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.
- Moderate: The total population, property, commerce, infrastructure, and services of the



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

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 worst 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 worst 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 Tumwater.

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

## Local Risk Assessment

A comprehensive risk assessment of the major natural hazards that threaten the City of Tumwater 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 Tumwater are scaled to local boundaries and are included in this section.

## Earthquake

### Severity

Same as described in Regional Risk Assessment

### Impacts

Generally the same as described in Regional Risk Assessment. As shown in the tables in the regional risk assessment (Chapter 4 of this plan), 75% of the land area and 80% of the population of Tumwater and the Tumwater Urban Growth Area (UGA) are in earthquake hazard areas.

In addition, according to the Water Resource Division of the Tumwater Public Works Department, more than one third of Tumwater's drinking water comes from the Palermo wellfield in the Deschutes River Valley which is identified as an area of high liquefaction susceptibility by data provided by the Washington State Department of Natural Resources. Damage to the Palermo wells and/or related infrastructure could cause a significant disruption in the supply of potable water for Tumwater residents and emergency responses such as fire fighting.

### Probability of Occurrence

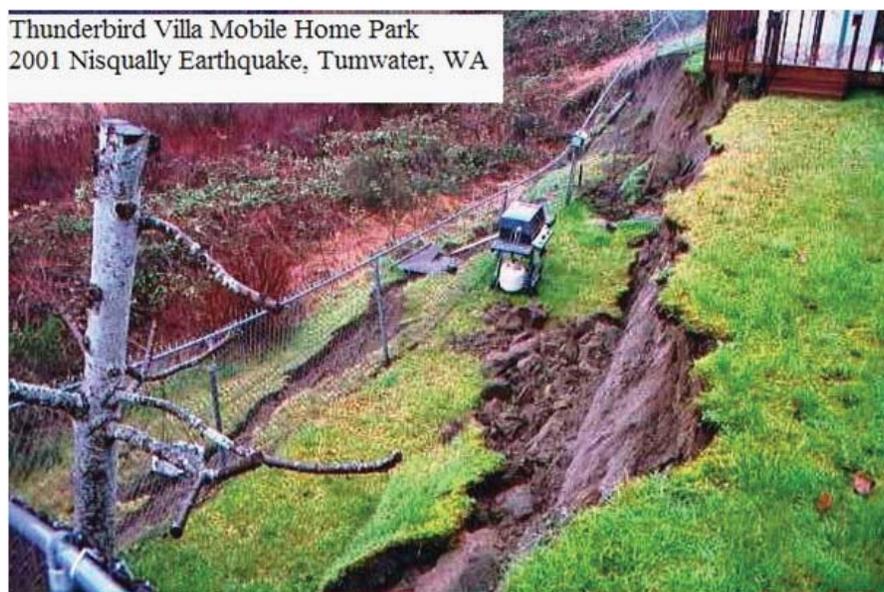
Same as described in Regional Risk Assessment

### Historical Occurrences and Impacts Specific to this Jurisdiction

Four of the seven large manufactured/mobile home parks within Tumwater are located in areas of high liquefaction hazards and/or on peat.<sup>1</sup> These include Eagles Landing, Tumwater Mobile Estates, Western Plaza (all located on Trospen Road), and Thunderbird Villa on Dennis Street. The latter three sustained damage during the 2001 Nisqually earthquake.<sup>2</sup>

Tumwater Mobile Estates experienced substantial liquefaction during the earthquake. Part of a private street within the mobile home park collapsed into a pond, taking two unoccupied cars into the water. The sidewalk also ended up in the pond. Private water lines and a natural gas line were ruptured prompting the evacuation of 50 residences in the mobile home park.<sup>2</sup> Evidence of liquefaction in the form of sand boils appeared in several areas of the park.<sup>3,4</sup>

The Western Plaza mobile home park experienced some settling due to liquefaction, although it was to a lesser degree than that seen at Tumwater Mobile Estates.<sup>2</sup> Thunderbird Villa on Dennis Street had damage as well. The Tumwater Fire Department observed at least one home in Thunderbird Villa that had the backyard settle several feet abruptly off the back of the home.<sup>2,5</sup>



The Olympics West assisted living facility, located on the south side of Trosper Road across from the Tumwater Mobile Estates mobile home park, also experienced settling and minor damage even though it is located within an area designated as low to moderate risk.<sup>1,2</sup> The current Tumwater Fire Chief happened to be inside the building at the time and witnessed the formation of a ~10” step in the middle of a formerly flat hallway.<sup>2</sup> It is of particular concern that these types of facilities and mobile/manufactured home parks, which tend to be populated by some of the more vulnerable citizens (including the elderly and disabled as well as low income), are located in areas that are highly susceptible to liquefaction.

Even buildings within areas of low to moderate liquefaction susceptibility sustained damage. The main Tumwater fire station (on Israel Road) which houses the Emergency Operations Center was structurally damaged during the quake. The apparatus bay shifted away from the main building of the fire station even though the two were structurally joined together.<sup>2</sup>

Most City buildings had at least some minor damage. Both the main fire station and station #2 on Linwood Avenue, Tumwater City Hall, the Tumwater Timberland Library, Old Town Center, the historic Crosby house, the Henderson House Museum, and portions of the Tumwater Valley Municipal golf course all were damaged in the earthquake.<sup>2,6,7</sup> There were approximately 173 reports of damage to private property in Tumwater.<sup>8</sup> The Best Western hotel located on the bluff above the Palermo wellfield had a portion of the rear parking lot settle and start to slide down the hill.<sup>2</sup> The Extended Stay America facility near the Highway 101/Crosby Boulevard interchange had a large retaining wall give way which broke a water line.<sup>2,9</sup>



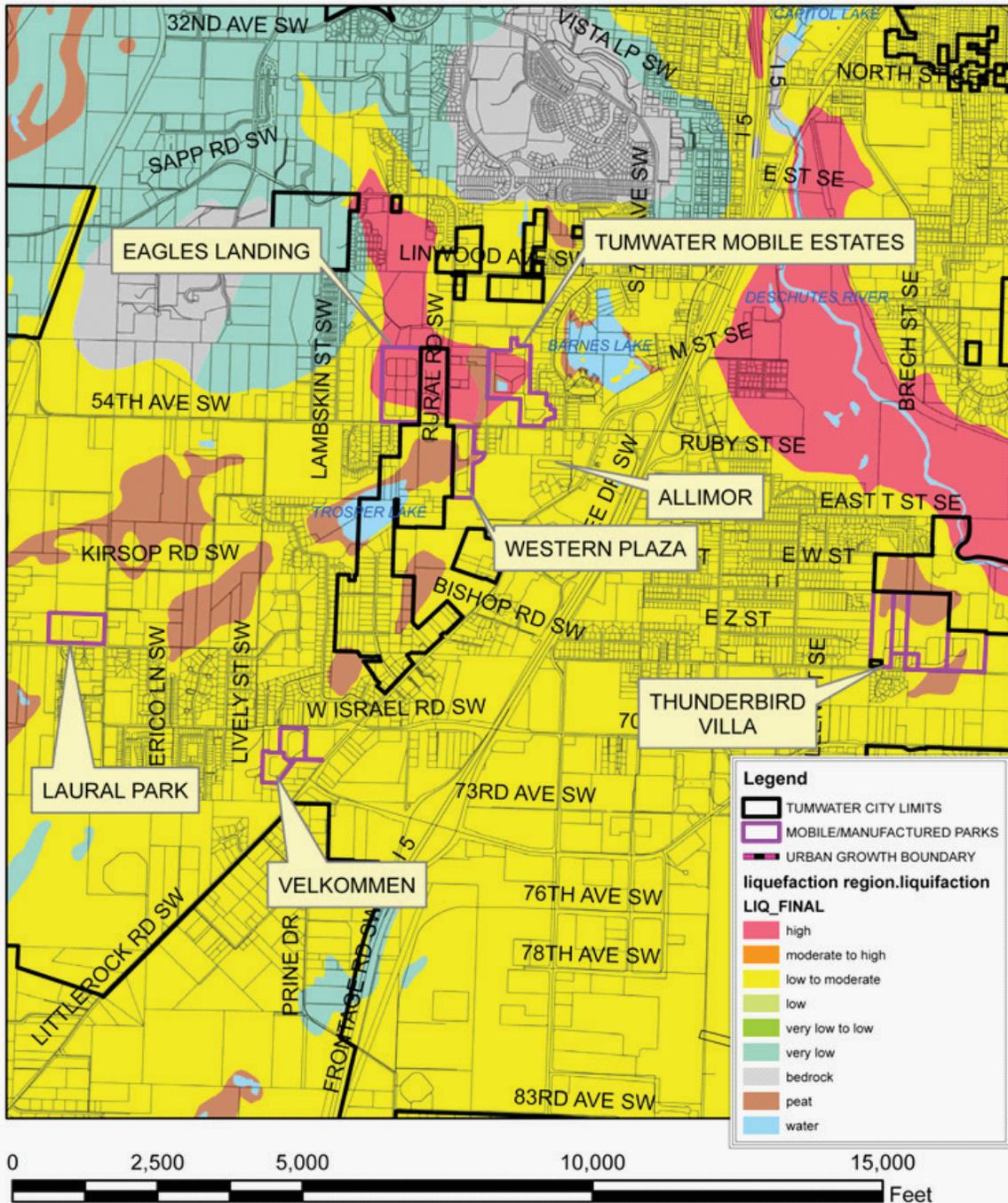
### Summary Assessment

Same as described in Regional Risk Assessment. The probability, vulnerability, and risk for earthquakes in Tumwater are all high. This is due to the amount of land in Tumwater and the UGA located within earthquake hazard areas, the large number of people present within those areas (particularly the large number of elderly/disabled living in mobile/manufactured home parks on soils highly susceptible to liquefaction), and the fact that a major City drinking water source is located within an area that is highly susceptible to liquefaction.

### Summary Risk Assessment for Earthquake in Tumwater

Probability of Occurrence	Vulnerability	Risk
High	High	High

## TUMWATER MOBILE&MANUFACTURED HOME PARKS LIQUEFACTION SOIL HAZARDS



CITY OF TUMWATER PLANNING AND FACILITIES DEPARTMENT  
 June 11, 2009 Mobile&Manufactured Home Parks Tum&UGA.MXD  
 Liquefaction data obtained from the Washington  
 State Department of Natural Resources.

**DISCLAIMER:** The City of Tumwater does not warrant, guarantee, or accept any liability for the accuracy, precision, or completeness of any information shown hereon or for any inferences made therefrom.

## Earthquake Footnotes

<sup>1</sup>Map-Tumwater Mobile&Manufactured Home Parks Liquefaction Soil Hazards

<sup>2</sup>Tumwater Fire Chief John Carpenter-phone conversation 6-3/9/10-2009

<sup>3</sup>USGS report on 2001 Nisqually Earthquake: <http://pubs.usgs.gov/of/2003/ofr-03-211/NisquallyFinal.html#sunset>

<sup>4</sup>Geo-Earthquake Engineering Reconnaissance report on 2001 Nisqually Earthquake: [http://research.eerc.berkeley.edu/projects/GEER/GEER\\_Post%20EQ%20Reports/Nisqually\\_2001/liquefaction/lateralspread/index.html#sunset](http://research.eerc.berkeley.edu/projects/GEER/GEER_Post%20EQ%20Reports/Nisqually_2001/liquefaction/lateralspread/index.html#sunset)

<sup>5</sup>Picture by Tumwater Fire Department of earthquake damage at Thunderbird Villa mobile home park

<sup>6</sup>Jeff Vrabel-Tumwater Facilities Manager-phone conversation 6-10-2009

<sup>7</sup>City of Tumwater Preliminary Damage Assessment Worksheet 3-5-01

<sup>8</sup>City-wide damage spreadsheet (Excel) sourced from Tumwater Fire Department

<sup>9</sup>Picture of retaining wall failure at Extended Stay America hotel at Crosby Boulevard/US 101 interchange.

## Storm

### Severity

Same as described in Regional Risk Assessment

### Impacts

Same as described in Regional Risk Assessment

### Probability of Occurrence

Same as described in Regional Risk Assessment

## Historical Occurrences and Impacts Specific to this Jurisdiction

Lightning has caused damage to the infrastructure in Tumwater several times over the last 15 years. The Tumwater Public Works Department uses a SCADA system (Supervisory Control and Data Acquisition) as part of the management of the water and sewer systems. SCADA automatically monitors reservoir levels, pumps, and other components of the potable water system as well as the lift stations in the sewer system in Tumwater. This system utilizes radio communication in order to function properly. When components of this system, such as radio antennas, are hit by lightning the system does not work. A new system is being developed that utilizes fiber optic lines with radio communication as a backup. This will make the system more reliable. It is being phased in and is already in use at one site. Future expansions of fiber optic lines to other parts of the system are planned.<sup>1</sup>

In 1991 a deep freeze resulted in several frozen and broken water mains. Most of the water mains that froze were on overpasses. A couple of these frozen water mains were part of construction projects so the water was not moving inside the pipes, just sitting still. Usually a minor amount of water movement will prevent water from freezing inside a pipe. Steps have since been taken to prevent water mains from freezing again.<sup>1</sup>

During the December 2008 snow storm carports at several apartment buildings in Tumwater collapsed including the Breckonridge Heights apartments, Indian Creek condos (pictured below), and Capitol Heights apartments.<sup>2</sup> The Olympics West Retirement facility on Trospen Road was evacuated due to the threat of roof collapse from heavy snow.<sup>3</sup> Other relatively minor damage occurred to the main Tumwater Fire Station when the weight of the snow tore the gutters off of the building. No injuries were reported due to the collapses.

Due to the amount of trees in Tumwater, power outages are expected during storms. The most recent significant power outage was during the December 2006 windstorm where City facilities were without power for several days. In order to help mitigate this situation a professional arborist is on contract with the City of Tumwater to evaluate trees of concern and the potential hazards they may cause.<sup>1</sup> If a tree is determined to pose a significant hazard to people or property it will be removed promptly. In addition, there are generators for most of the City facilities including, but not limited to, the Emergency Operations Center, the fire department, the public works operations building, several



critical components of the water and sewer systems, and the police station/City Hall. The generator for City Hall and the police station was installed in the spring of 2009.

### Summary Assessment

Generally the same as described in Regional Risk Assessment. Lightning has proven to occasionally be a problem for Tumwater’s water and sewer telemetry system. However, changes have already been made to part of the system to make the lightning susceptible radio communications a backup feature of the system and instead, to utilize fiber optic as the backbone for communication in the system. Future expansions to the rest of the water and sewer systems are planned. In the past there have also been some issues with freezing water mains. These issues have since been resolved for those lines that were most susceptible (located on overpasses). The power outage issue is unlikely to be completely resolved but it is being mitigated and the City is prepared to deal with it when it occurs.

Tumwater matches the regional risk assessment for storms in regards to probability of occurrence, vulnerability, and risk (all are “high”). However, in regards to lightning the City of Tumwater has slightly different assessments than the County as a whole. Even though the probability of occurrence is the same (moderate), the vulnerability and risk levels are higher. For Tumwater the latter two assessments will be placed at “moderate” (instead of “low” like in section 4.2 of the County-wide assessment). This difference in assessment is due to the amount of lightning strikes on the Tumwater water and sewer telemetry system in the past 15 years and the damage it causes when it does strike.

**Summary Risk Assessment for Storm in Tumwater**

Probability of Occurrence	Vulnerability	Risk
High	High	High

## Storm Footnotes

<sup>1</sup>Phone conversation with Steve Craig-Tumwater Public Works Operations Manager-June 15, 2009.

<sup>2</sup>Picture from Tumwater Fire Department of collapsed carport at Indian Creek Condos 220 Israel Road in Tumwater (12-25-2008) and conversation with Fire Department front counter staff.

<sup>3</sup>The Olympian newspaper article 12-28-2008 (online). “Riding arena’s roof collapses...” by Rolf Boone.

## Flood

### Severity

Same as described in Regional Risk Assessment

### Impacts

Same as described in Regional Risk Assessment

### Probability of Occurrence

Same as described in Regional Risk Assessment

### Historical Occurrences and Impacts Specific to this Jurisdiction

The most obvious and visually dramatic examples of flooding in Tumwater generally occur within the Deschutes River valley. Pioneer Park, Historical Park, the Tumwater Valley Golf Course and associated clubhouse/restaurant, the Palermo wellfield and water treatment facility, the “M” Street sewer lift station, and other water and sewer infrastructure are located within this floodprone area. Private properties within this area include the bottling plant for the former Miller brewery, a few homes in the Palermo neighborhood (off of “M” Street), The Valley athletic club, Tumwater Falls park (private park open to the public), the fish hatchery and associated fish ladder at Tumwater Falls, and the old brewhouse (across from Historical Park).

Pioneer Park located on Henderson Boulevard is inundated almost yearly. A visible current of water typically flows through the entire parking lot area.<sup>1</sup> Fortunately, the building which houses the restrooms has yet to be flooded.<sup>2</sup> The building is also used as a storage shed for mowers, tractors, and other equipment used for park maintenance.<sup>3</sup> In addition, a sewer lift station is also at the same location.<sup>4</sup> Access to the building and the sewer lift station has not been possible during floods due to the floodwaters surrounding the site and flowing over the access road.<sup>4</sup>

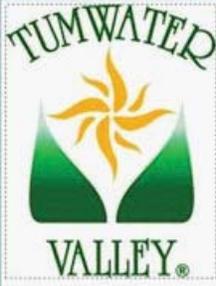


The Tumwater Valley golf course is within the 100-year floodplain and is also flooded almost yearly. Floodwaters routinely cover the golf course and get to within a couple of feet of the door of the clubhouse/restaurant (only inches below the level needed to flood the interior). Chuck Denney (Tumwater Parks and Recreation Director) produced of a one page demonstration of the water level at the Tumwater golf course clubhouse in the January 2009 flood. Two photos with yellow lines drawn on them indicate the extent of the water levels near the clubhouse and a citation of the water level at the floodgauge at Rainier on the Deschutes River (14.5’).

The Palermo neighborhood off of “M” Street has several homes within the 100-year floodplain. The area also contains the Palermo wellfield and water treatment facility and the “M” Street sewer lift station. Flood waters have not yet flooded the drinking water facility but have come close in the past few years. The sewer lift station at the end of “M” Street is often surrounded by floodwaters but has not been affected by the floodwaters yet. The hatch to the wetwell has already been replaced to limit the inflow of floodwaters into the wetwell. Also, plans to replace manway access to the drywell and increase its height are in process. This would help to avoid the flow of floodwaters into the sewer lift station.<sup>4,6</sup>

High groundwater flooding is an issue in several areas but mostly concentrated in the southwest portion of Tumwater and the UGA. In order to deal with future groundwater flooding impacts the City of Tumwater (and Thurston County) adopted the Salmon Creek Drainage Basin Plan and implementing regulations in 2005. The regulations control development within areas impacted by high groundwater flooding.





**TUMWATER**  
VALLEY®

# 1/09 FLOOD

## 14.5 FOOT WATERLINE





14.5 foot waterline data from Rainier gauge on Deschutes river.  
Produced by Tumwater Parks and Recreation Dept. (Chuck Denney).

With most storms that involve precipitation there are localized areas of flooding on streets. The Tumwater Public Works operations crew keeps a list of these areas so they can quickly identify and address this issue when it occurs. In most cases it is tree leaves and other debris blocking storm drains which causes the water to back up into the streets. In the December 2008 snow storm it became apparent that the snow and ice on Capitol Boulevard was blocking the storm drains and causing localized flooding for most of the length of Capitol Boulevard.<sup>4</sup>

In the Trosper Road/Kirsop Road vicinity localized flooding is a regular occurrence with storms. The area has little in the way of frontage improvements and has deep ditches instead of storm drains. The issue is currently be reviewed and a request for Statements for Qualifications (SFQ) has been sent out by the Tumwater Water Resources Division for a drainage study for the area (deadline for submittal was June 15, 2009). Also, it has become known that a large amount of beaver dams in the vicinity may be contributing to the localized flooding problem.<sup>7</sup>

Currently there are only six properties in Tumwater that have flood insurance and only two claims have been paid since 1978 for a total of \$12,515 (see Table 4.3.6 in this plan). None of the Tumwater owned facilities or buildings (including the recently remodeled golf course clubhouse) that are located in the floodplain have FEMA flood insurance. However, some work has already been done and more is planned to help to minimize flood damage to infrastructure such as the “M” Street sewer lift station.

### Summary Assessment

Although flooding occurs quite frequently within Tumwater, a large portion of the area that is prone to flooding is located within the Deschutes River valley. Floods in the last decade have not been large enough to cause significant damage. However, if the flooding elevations increase a minor amount there will be significant damages to sewer and water infrastructure located within the 100 year floodplain and buildings such as the golf course clubhouse.

#### Summary Risk Assessment for Flood in Tumwater

Probability of Occurrence	Vulnerability	Risk
High	Moderate	High

## Flood Footnotes

<sup>1</sup>Picture of flooding in parking lot and access road at Pioneer Park-January 8, 2009.

<sup>2</sup>Picture of flooding near restrooms at Pioneer Park-December 4, 2007.

<sup>3</sup>Phone conversation with Jeff Vrabel-Tumwater Facilities Manager-June 10, 2009.

<sup>4</sup>Phone conversation with Steve Craig-Tumwater Public Works Operations Manager-June 15, 2009.

<sup>5</sup>Illustration of flood levels at Tumwater Valley golf course clubhouse by Tumwater Parks and Recreation Director-Chuck Denney. January 8, 2009.

<sup>6</sup>Picture of sewer lift station on “M” Street (Palermo area) during January 8, 2009, flooding.

<sup>7</sup>Conversation with Tumwater Public Works Water Resource Division Staff and review of the June 15, 2009, Request for Statement of Qualifications for drainage studies in the City of Tumwater

## Landslide

### Severity

Same as described in Regional Risk Assessment

### Impacts

Same as described in Regional Risk Assessment

### Probability of Occurrence

Same as described in Regional Risk Assessment

### Historical Occurrences and Impacts Specific to this Jurisdiction

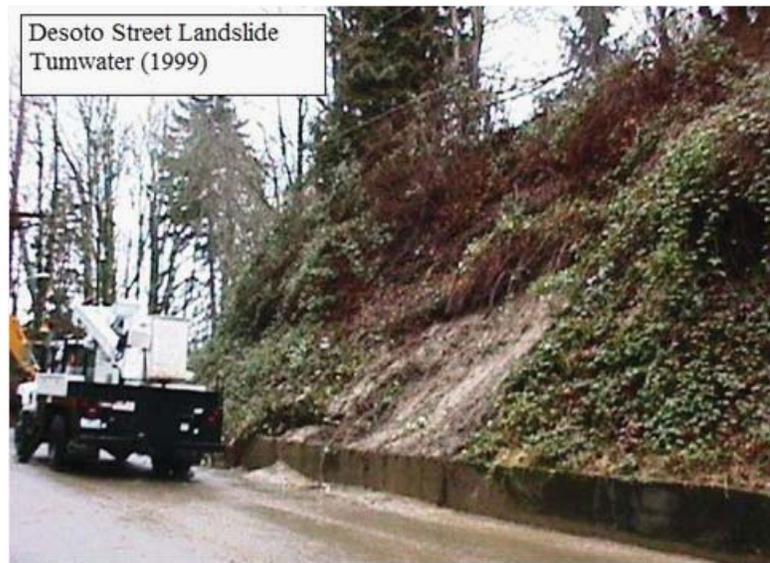
The areas within Tumwater that are most susceptible to landslides are shown on the City of Tumwater Steep Slopes map.<sup>1</sup> Most of the steep slopes are in the northern portion of the City and include the bluffs along the Deschutes River valley, portions of Tumwater Hill, areas on Bush Mountain, and some areas west of Black Lake Boulevard including Jones Quarry.

A landslide occurred on Desoto Street near the base of Tumwater Hill in 1999.<sup>2</sup> The street lies along a short steep canyon called Desoto Canyon. The landslide occurred during the prolonged and heavy rainfall episode that happened in 1999.

Four other landslides have occurred at the southeast end of the south basin of Capitol Lake. This area is across the water from Tumwater Historical Park, behind the row of historic homes on Capitol Boulevard, and near the old brewhouse.

The 1965 earthquake triggered a landslide in this area that took out the railroad tracks and the sewer line that transported Tumwater's waste water to Olympia.<sup>3</sup>

Another landslide in 1996 in the same area again took out the railroad tracks and the two main sewer lines that transported all of Tumwater's waste water to the treatment plant in Olympia.<sup>4,5</sup> The 1996 landslide was not triggered by an earthquake but occurred during a prolonged and intense period of precipitation. The waste water has since been redirected to a new pipe that is located on the other side of the valley along Deschutes Parkway.<sup>4</sup>



The third landslide in this general vicinity was observed to have occurred during the 2001 Nisqually earthquake.<sup>6</sup> This last landslide was located slightly further to the north than the two previous landslides, but still south of Interstate-5. No damage to facilities or infrastructure resulted from this landslide.

The fourth landslide occurred in December 2008, at a location closer to the old brewery building. This slide was in close proximity to a minor sewer lift station and contributed partially to its the temporary failure. This minor lift station only serves about 20 residences on and near Capitol Boulevard.<sup>7</sup>

### Summary Assessment

Although Tumwater has several areas of steep slopes, most of the landslides have been concentrated in one area across the Deschutes River from Historical Park. The vulnerability level is low (as compared to moderate for the region) due to the fact that the main critical infrastructure (sewer mains) that were damaged by the landslides in 1965 and 1996 have been moved to Deschutes Parkway and stabilized to withstand future earthquakes. The railroad remains in the same location as the previous landslides but is not a significant transportation connection for Tumwater.

#### Summary Risk Assessment for Landslide in Tumwater

Probability of Occurrence	Vulnerability	Risk
High	Low	Low

## Landslide Footnotes

<sup>1</sup>City of Tumwater Steep Slopes map

<sup>2</sup>Desoto Street landslide (1999)-Picture sourced from Tumwater Public Works Water Resource Division

<sup>3</sup>1965 landslide: WA EMD Washington State Hazard Mitigation Plan p.7 of the landslides section.

[http://www.emd.wa.gov/plans/documents/Tab\\_7.1.5\\_Landslide\\_final.pdf](http://www.emd.wa.gov/plans/documents/Tab_7.1.5_Landslide_final.pdf)

<sup>4</sup>1996 landslide: “Sewer line plan upended by quake”. Tuesday, March 20, 2001. John Dodge. The Olympian.

<sup>5</sup>1996 landslide: WA EMD Washington State Hazard Mitigation Plan. November 2007. Hazard Profile-Landslide. p.9

<http://www.emd.wa.gov/plans/documents/LandslideNov2007Tab5.6.pdf>

<sup>6</sup>2001 landslide: Landslide was noted in the 2002 Capitol Lake Adaptive Management Plan, “Also the February 2001 Nisqually earthquake caused a large landslide along the eastern shore of the South Basin across from Tumwater Historical Park,…”

<http://academic.evergreen.edu/curricular/sustainabledesign/CLAMPPlan2003-2013.pdf>

<sup>7</sup>Phone conversation with Steve Craig-Tumwater Public Works Operations Manager-June 15, 2009.

## Wildland Fire

### Severity

Same as described in Regional Risk Assessment

### Impacts

Same as described in Regional Risk Assessment

### Probability of Occurrence

Same as described in Regional Risk Assessment

### Historical Occurrences and Impacts Specific to this Jurisdiction

Tumwater has had very few wildfires compared to most other fire protection areas in Thurston County. According to Table 4.5.1, Tumwater has had 41 fires in 35 years (an average of 1.2 wildland fires per year).

As shown on the City of Tumwater Wildfire Hazard Areas map there are no wildfire hazard areas within the City limits of Tumwater. There are a couple of relatively small wildfire hazard areas on the fringes of the Tumwater Urban Growth Area (UGA). One area is near the intersection of Littlerock Road and 93rd Avenue. The other small area is in the northwest corner of the UGA in the vicinity of the Jones Quarry.

If a fire occurred within the wildland fire hazard areas in the UGA, the primary responders would be Littlerock Fire District 11 and McLane Fire District 9 (Black Lake FD5). There are no fire hydrants near these areas. These districts have tenders (pumper trucks) and are trained to fight fires such as these. The Tumwater fire department does have several hundred gallons of water on the fire engines but generally relies on the mutual aid agreements for situations where a tender is required.

### Summary Assessment

Vulnerability and risk to Tumwater are low for wildland fires due to the low number of wildland fires in Tumwater and the UGA and the small amount of land designated as wildland fire hazard areas.

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

Probability of Occurrence	Vulnerability	Risk
High	Low	Low

## Volcanic Hazards

### Severity

Same as described in Regional Risk Assessment

### Impacts

Same as described in Regional Risk Assessment

### Probability of Occurrence

Same as described in Regional Risk Assessment

### Historical Occurrences and Impacts Specific to this Jurisdiction

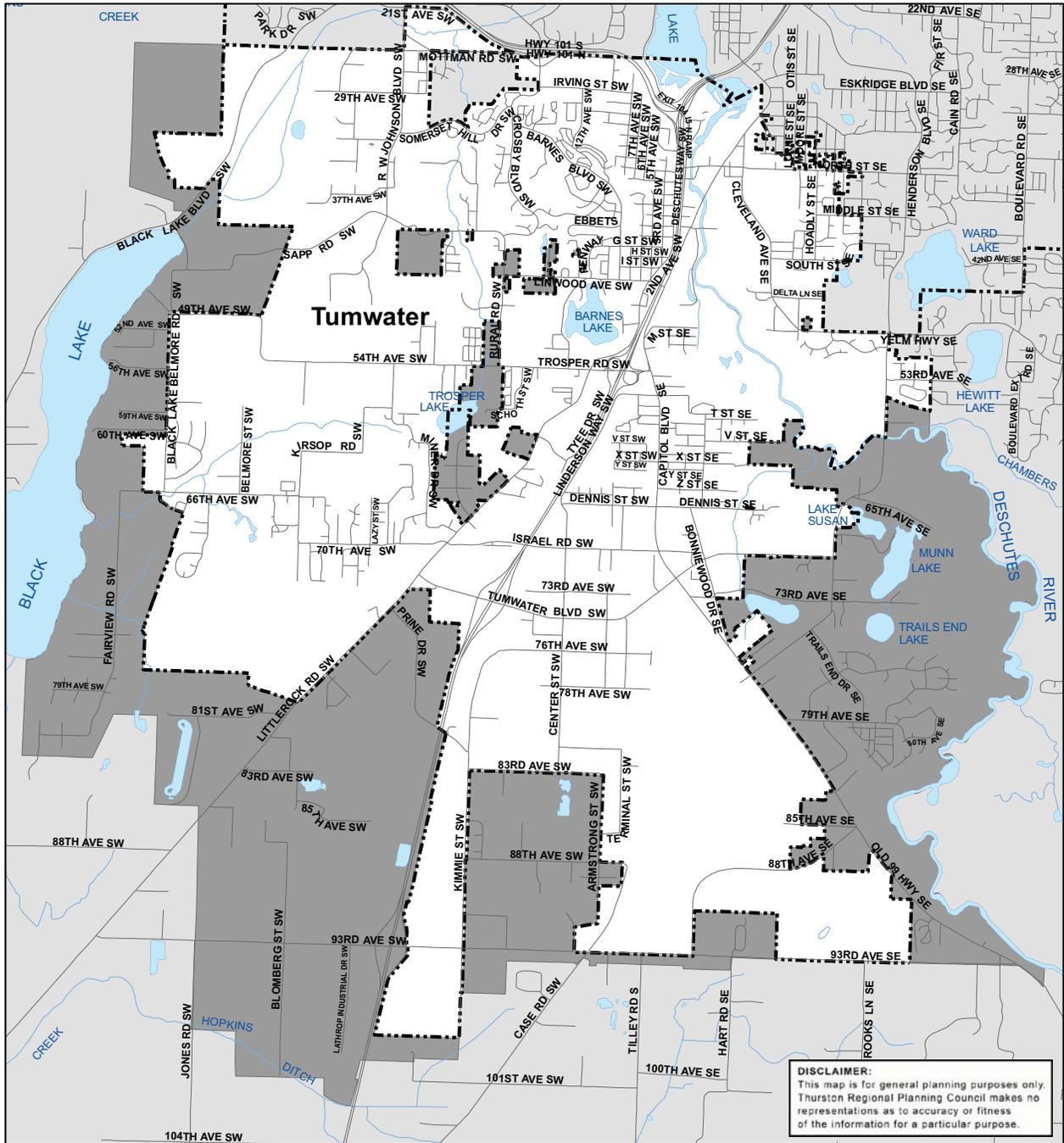
Same as described in Regional Risk Assessment

### Summary Assessment

Same as described in Regional Risk Assessment

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

Probability of Occurrence	Vulnerability	Risk
Low	Moderate	Low



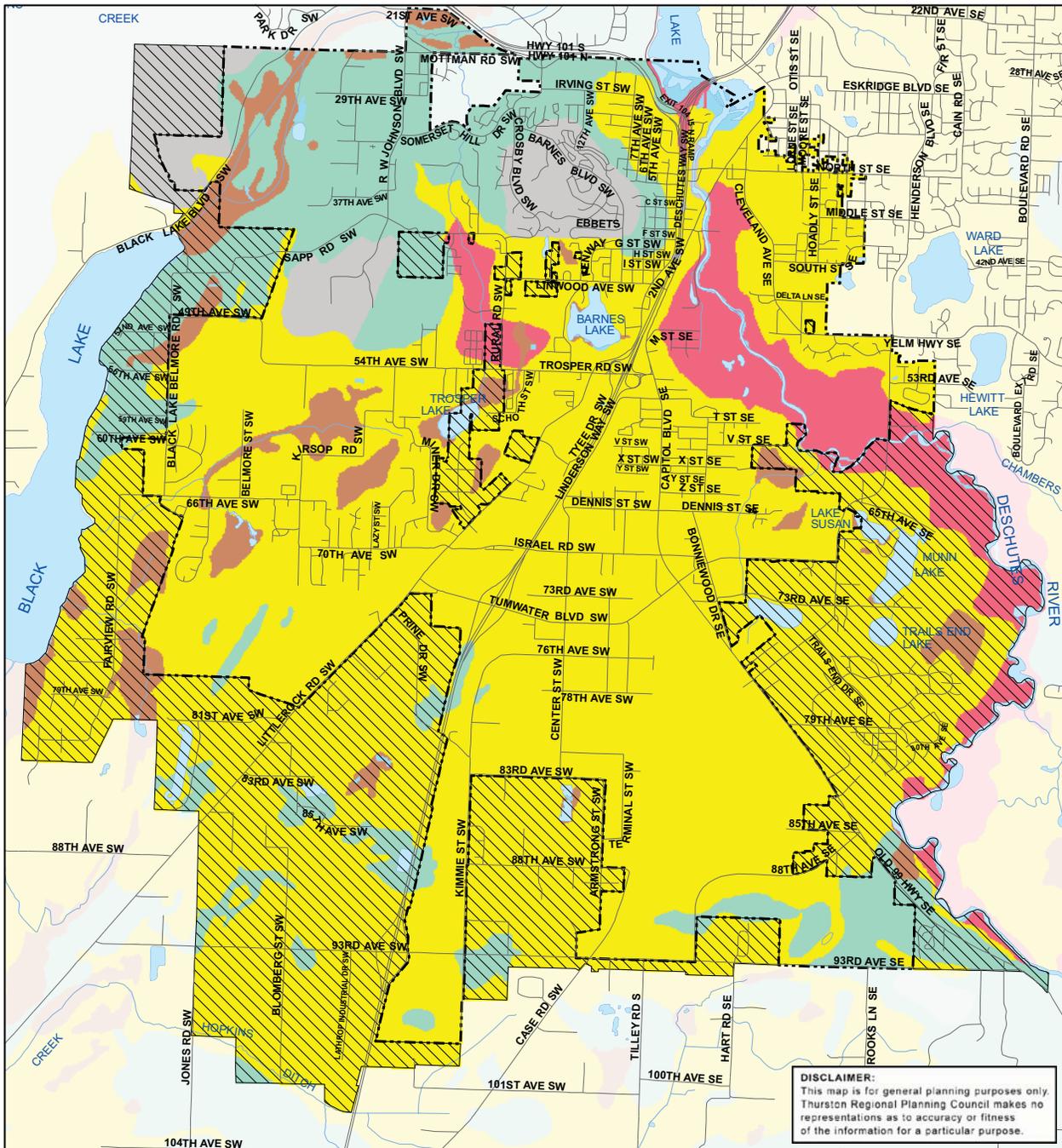
Printing Date: April 24, 2009  
 File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\VicinityMaps\Tumwater

### City of Tumwater

- City of Tumwater
- City Limits
- Urban Growth Boundary

0.5 0.25 0 0.5 Miles





**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 Tumwater Liquefaction Hazards



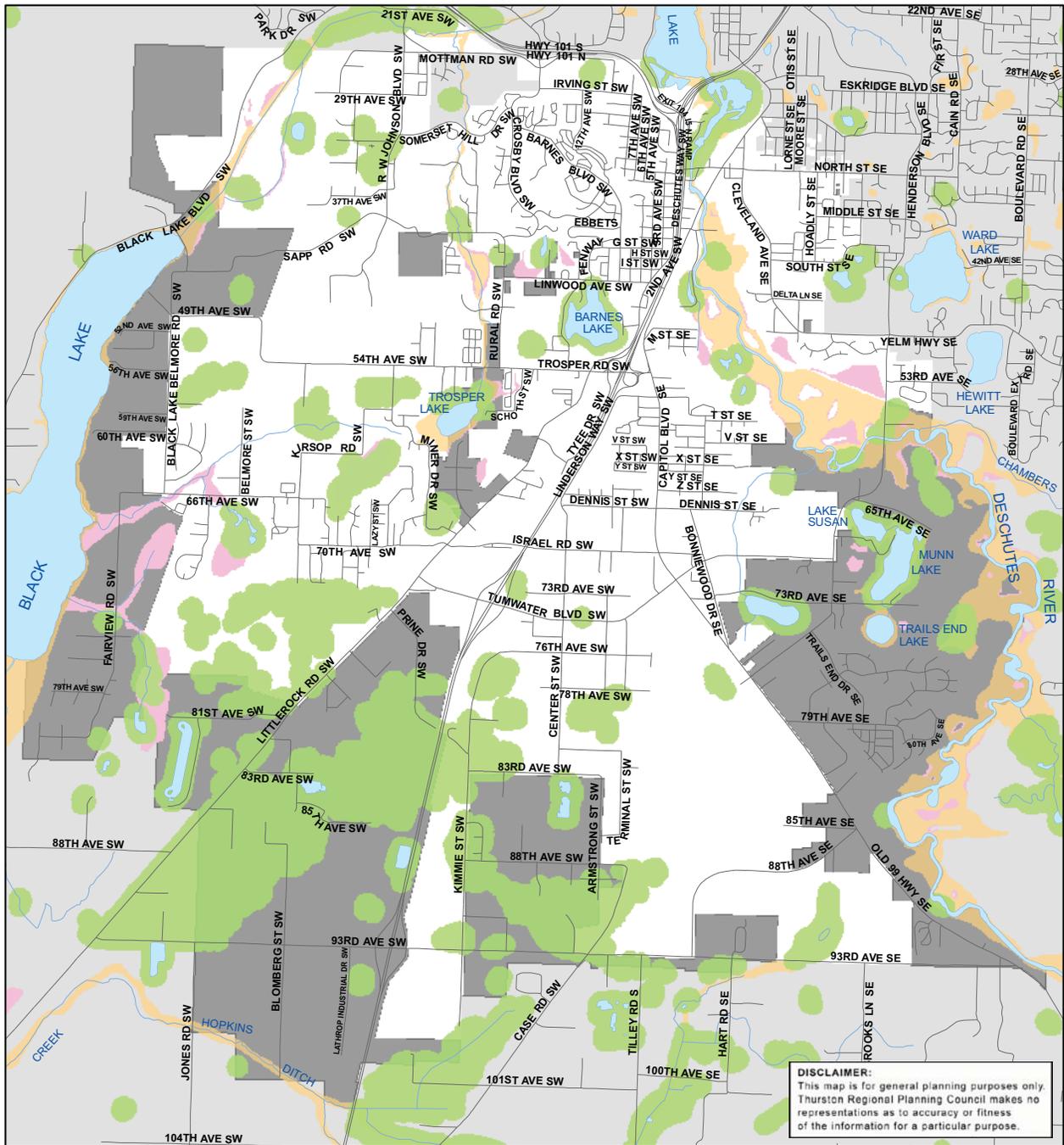
- City Limits
- Urban Growth Boundary

- high
- moderate to high
- low to moderate
- low
- very low to low
- very low
- bedrock
- peat
- water



0.5 0.25 0 0.5 Miles

Printing Date: March 12, 2009  
 File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\liq\_tumwater\_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 Tumwater Flood Hazards



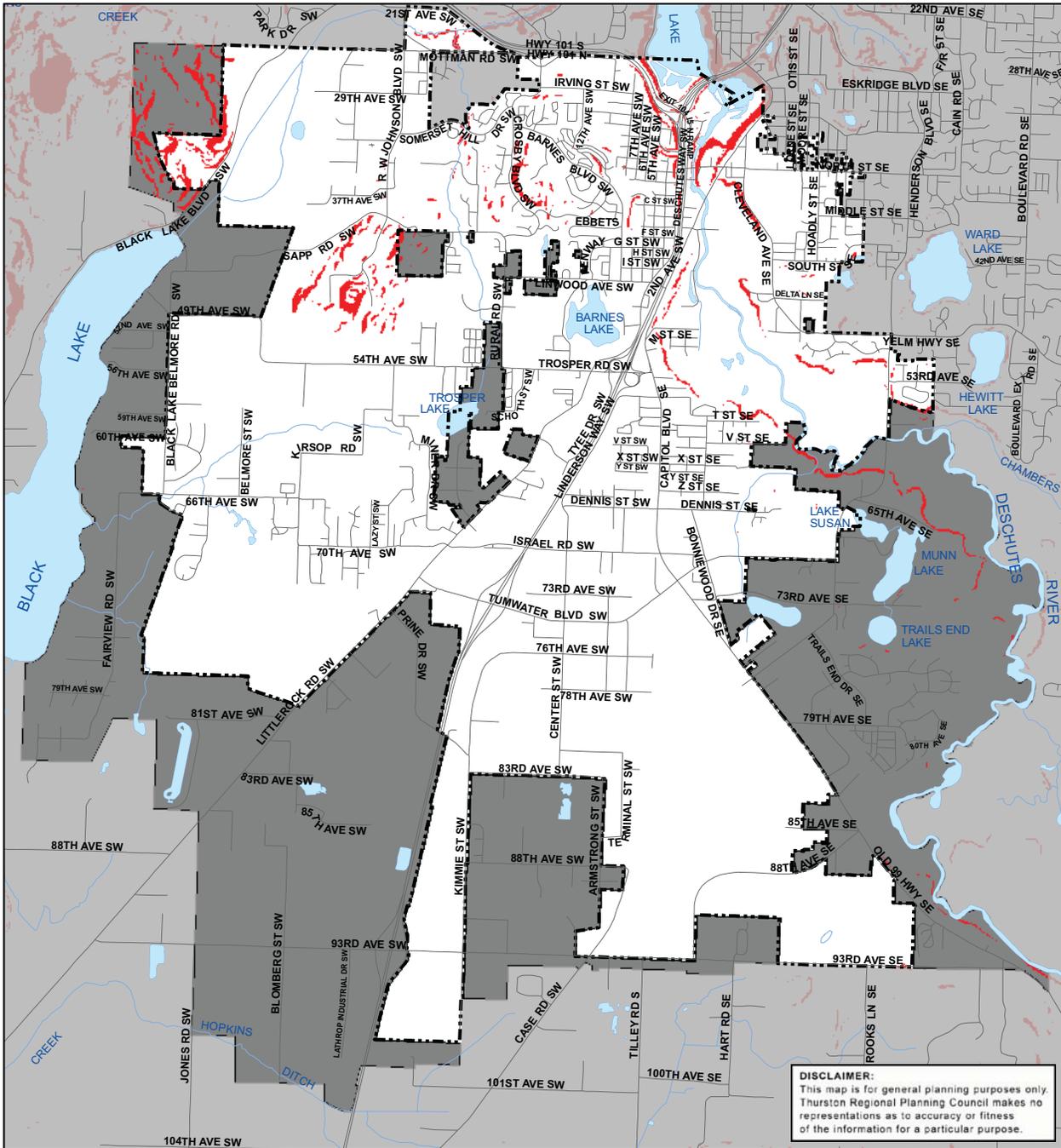
- High Groundwater Flooding
- 100 Year Floodplain
- 500 Year Floodplain
- City Limits
- Urban Growth Boundary



0.5 0.25 0 0.5 Miles



Printing Date: February 5, 2009  
 File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\ flood\_bucoda\_8x11.mxd



### City of Tumwater Steep Slopes

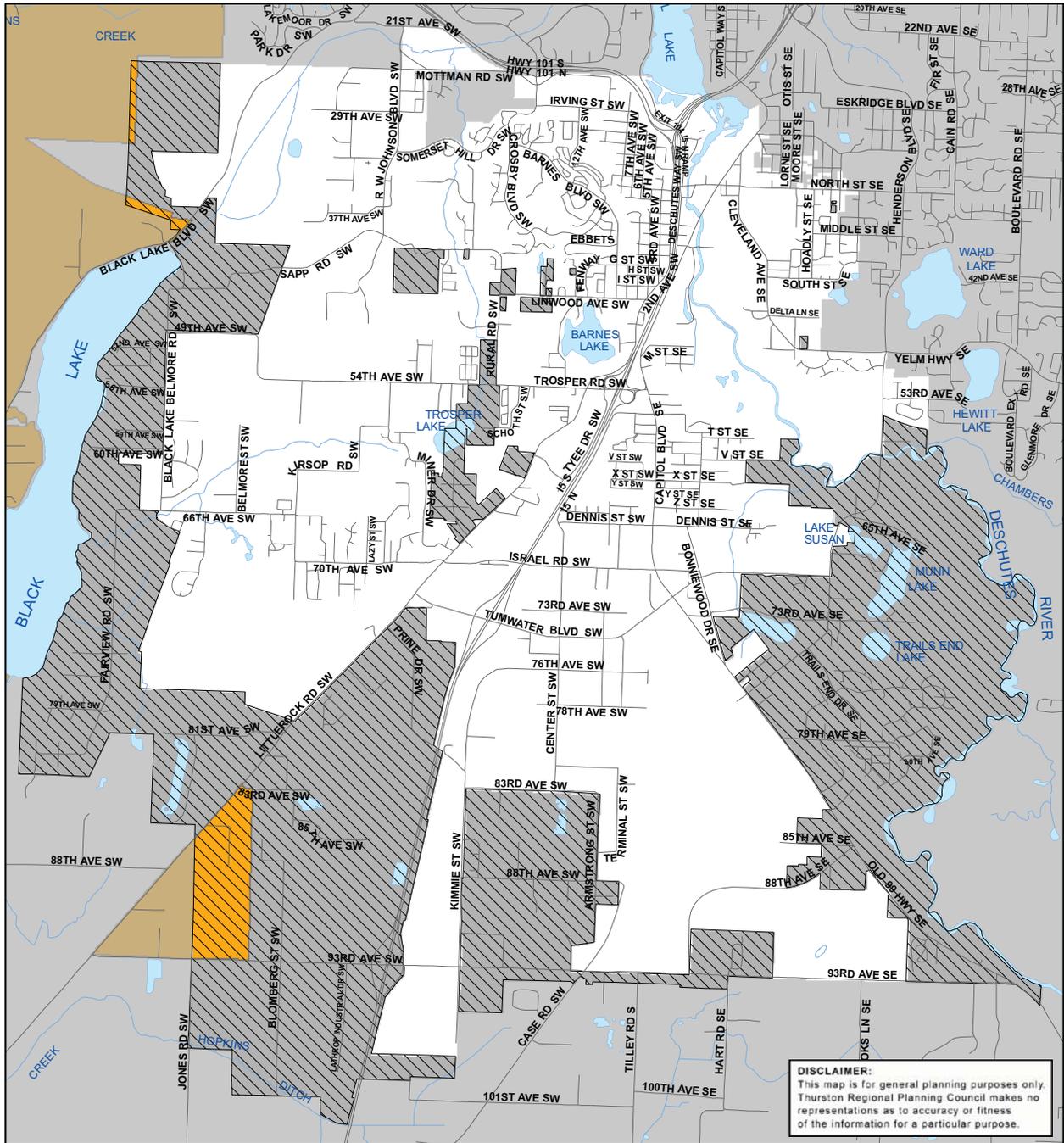
- Slopes Over 40%
- City Limits
- Urban Growth Boundary



0.5 0.25 0 0.5 Miles



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



**City of Tumwater  
Wildfire Hazard Areas**



Printing Date: March 23, 2009  
File: P:\ThurstonCounty\Hazard\_Mgt\HazardMit08\Maps\_Images\Chapter\_Maps\Wildfire\_Maps\fire\_tumwater\_8x11.mxd

- Wildfire Hazard Areas
- City Limits
- Urban Growth Boundary



Thurston Regional Planning Council

0.5 0.25 0 0.5 Miles



This page left intentionally blank.

## City of Tumwater Mitigation Initiatives

### Current Adopted Mitigation Initiatives

Current Mitigation Initiatives consist of actions that have not yet begun or require additional work. They consist of new initiatives identified by the City of Tumwater during the plan update process. They also consist of existing initiatives that were carried over in their original form from the first edition of this plan or other plans, or modified from their original form to reflect present needs.

Priority	I.D. Number	Category	Action	Status
1 of 8	TUM-EH 1	Critical Facilities Replacement/Retrofit	Conduct a voluntary non-structural earthquake readiness inspection for all critical facilities on an annual basis	Modified
2 of 8	TUM-SH 1	Critical Facilities Replacement/Retrofit	Inspect all trees within falling distance of critical facilities, related equipment such as generators, and utilities such as power and communication lines within the immediate vicinity to determine if they pose a hazard to the facility or operation of the facility during a storm	Modified
3 of 8	TUM-FH 15	Hazard Damage Reduction	Consider the construction of a short floodwall around the Tumwater Valley golf course clubhouse to stop the infiltration of floodwaters during a flood event	New
4 of 8	TUM-FH 14	Data Collection and Mapping	Install flood elevation gauges on the Deschutes River	Modified
5 of 8	TUM-VH 1	Hazard Preparedness	Keep a supply of air filters on hand for critical equipment, generators and vehicles in case of ashfall from a volcanic eruption	New
6 of 8	TUM-FH 6	Hazard Damage Reduction	Work with landowners to reforest corridors along river and stream shorelines	Modified
7 of 8	TUM-FH 3	Development Regulations	Reevaluate land uses and zoning based upon new floodplain maps	Existing
8 of 8	TUM-FH 12	Plan Coordination and Implementation	Continue to be actively involved in inter-jurisdictional flood hazard reduction efforts where Tumwater and other jurisdictions are located within the same basin	Existing

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.

## Completed or Removed Mitigation Initiatives

Initiatives that were completed in the last five years are included in this plan to provide evidence of progress made. These initiatives are no longer relevant and no longer part of the City of Tumwater's adopted mitigation strategy. These initiatives are not ranked as they are no longer relevant.

I.D. Number	Category	Action	Status
TUM-FH 4	Development Regulations	Adopt development regulations for high groundwater areas	Completed
TUM-FH 5	Data Collection and Mapping	Determine the width and conditions of buffers along river and stream shorelines	Completed
TUM-FH 1	Plan Coordination and Implementation	Apply to FEMA to be included into the Community Rating System (CRS) Program as a part of the National Flood Insurance Program	Removed
TUM-FH 2	Public Information	Mail flood insurance information to residents and property owners who live in a floodplain, and to real estate offices	Removed
TUM-FH 7	Hazard Damage Reduction	Encourage research into bioengineering and other techniques which provide streambank protection and support local demonstration projects which could provide such research	Removed
TUM-FH 8	Hazard Damage Reduction	Plant trees and other native vegetation and install large woody debris to prevent erosion and stream scour which occurs as a result of excessive runoff	Removed
TUM-FH 9	Hazard Damage Reduction	Draft a prioritized list of which floodplain residences Tumwater would acquire (buyout) if state and federal monies are available	Removed
TUM-FH 10	Hazard Damage Reduction	Draft a prioritized list of residences Tumwater would elevate above the 100-year floodplain, if state and federal monies are available	Removed
TUM-FH 11	Hazard Damage Reduction	Construct a stormwater detention and treatment facility for Tumwater's municipal stormwater that is not currently contained or treated	Removed
TUM-FH 13	Plan Coordination and Implementation	Secure funding for the stormwater related projects within Tumwater's 6-year Capital Facilities Plan	Removed
TUM-LH 1	Hazard Damage Reduction	Replant native vegetation along the rivers to stabilize banks and to prevent landslides	Removed
TUM-LH 2	Development Regulations	Reevaluate development regulations in regards to steep slopes	Removed

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 8****Status: Modified****Hazard Addressed: Earthquake Hazard****Category: Critical Facilities Replacement/Retrofit****TUM-EH 1: Conduct a voluntary non-structural earthquake readiness inspection for all critical facilities on an annual basis.**

**Rationale:** It is in the best interest of Tumwater to ensure that all critical facilities are prepared for the possibility of an earthquake. An annual inspection should be done. As new staff, new equipment, and workstation/office changes occur it is possible that the earthquake damage preventative measures (such as retaining straps for books shelves, computers, or other equipment, etc) can be lost or left unused. An annual inspection would help to keep these preventative measures in place.

**Relates to Plan Goal(s) and Objectives:** 3B, 3C, 4C, 5A**Implementer:** Tumwater Development Services Department and the Tumwater Fire Department.**Estimated Cost:** \$1,000 of in-house staff time.**Time Period:** 2010-2015**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-EH1.**Reference Page:** V-229

**Initiative and Implementation Status:** Ranked 1 of 18 in 2003. This initiative has not been implemented yet. It was changed to specify that an annual inspection should be done.

**Priority: 2 of 8****Status: Modified****Hazard Addressed: Storm Hazard****Category: Critical Facilities Replacement/Retrofit**

**TUM-SH 1: Inspect all trees within falling distance of critical facilities, related equipment such as generators, and utilities such as power and communication lines within the immediate vicinity to determine if they pose a hazard to the facility or operation of the facility during a storm.**

**Rationale:** The removal of hazard trees that could damage, destroy, or even hinder the operation of, critical facilities will help to keep critical facilities functioning properly when they are needed the most.

**Relates to Plan Goal(s) and Objectives:** 3B, 3C, 3F, 4C, 5A.

**Implementer:** Tumwater Planning Department.

**Estimated Cost:** \$2500 for an inspection by a professional arborist

**Time Period:** 2009-2015

**Funding Source:** City of Tumwater.

**Source and Date:** 2003 Natural Hazards Mitigation Plan

**Adopted Plan Number:** TUM-SH1

**Reference Page:** V-263 (NHMP)

**Initiative and Implementation Status:** Ranked 2 of 18 in 2003. Not yet implemented. Modified to add related equipment such as generators and nearby infrastructure such as communication and electrical lines. Tumwater City Hall recently added a large costly generator that is within falling distance of several large fir trees. The generator will power City Hall, which houses the Police station, if a power outage occurs. There are numerous other generators at City facilities including those located at the Public Works shop and the Fire Department facilities; these should be included in the hazard tree evaluation.

**Priority: 3 of 8****Status: New****Hazard Addressed: Flood Hazard****Category: Hazard Damage Reduction****TUM-FH 15: Consider the construction of a short floodwall around the Tumwater Valley golf course clubhouse to stop the infiltration of floodwaters during a flood event.**

**Rationale:** The Tumwater Valley golf course clubhouse is located within the 100-year floodplain. The building has not yet been flooded but came close in the January 2009 flood event (14.5 feet at the Rainier gauge on the Deschutes River). A significant remodel of the building was completed in early 2009. Due to the large investment in the building, a floodwall surrounding the building that could prevent flood damage should be seriously considered. Consideration of this option should include costs, benefits, impacts to nearby properties including the Tumwater Valley Athletic club, as well as impacts to the floodplain as a whole.

**Relates to Plan Goal(s) and Objectives:** 6F, 6G**Implementer:** Tumwater Parks and Recreation Department, Tumwater Planning and Facilities Department, Tumwater Development Services Department.**Estimated Cost:** \$500 for a brief summary assessment of the floodwall utilizing existing City staff. The total cost of the floodwall is currently unknown.**Time Period:** 2009-2015**Funding Source:** City of Tumwater.**Source and Date:** N/A**Adopted Plan Number:** N/A**Reference Page:** N/A**Initiative and Implementation Status:** This is a new mitigation initiative.

**Priority: 4 of 8****Status: Modified****Hazard Addressed: Flood Hazard****Category: Data Collection and Mapping****TUM-FH 14: Install flood elevation gauges on the Deschutes River.**

**Rationale:** There is currently no way to easily and quickly measure flood levels in Tumwater. The flood gauge at the “E” Street bridge is an older type which has manual data readings. It is not electronically monitored and the information is usually only available several months after a flooding event from the United States Geological Service (USGS). The nearest electronically controlled and easily accessed measuring device is approximately 20 miles upstream near the town of Rainier. However, readings at that gauge do not always accurately reflect what is occurring (or what is to occur) downstream in the Tumwater portion of the Deschutes River. For example, the January 2009, flood was one foot lower than the December 2007 flood at the Rainier gauge, however, photographs at Henderson Boulevard in Tumwater showed the water levels were higher in the 2009 flood than in the 2007 flood.

A gauge at the “E” Street bridge would help in obtaining accurate records of flood levels in Tumwater which would be important for making decisions regarding future land use and zoning, infrastructure locations and designs, future critical facilities, etc. It could also help in future map updates of the floodplain.

A gauge at Rich Road bridge (slightly upstream and southeast of the Tumwater Urban Growth Boundary) would help to provide a short notice of imminent flooding downstream in Tumwater. This would help with last minute preparations or evacuations.

**Relates to Plan Goal(s) and Objectives: 2A****Implementer:** Tumwater Public Works Department.**Estimated Cost:** \$15,000 per gauge and \$2500 per year for operating costs.**Time Period:** 2009-2015**Funding Source:** Washington State Department of General Administration, City of Olympia, City of Tumwater.

In regards to the funding for an upgraded electronically monitored gauge at the “E” Street bridge, reportedly the USGS would be interested in installing an upgraded gauge provided the local governments pay for the installation and operation of the gauge. It appears there is some interest by the Washington State Department of General Administration, and the City of Olympia to possibly partner with Tumwater for a new gauge. General Administration would be interested due to their need to control the water level in Capitol Lake with the dam. A gauge would be able to be integrated into a telemetry system to automatically open and close the dam as necessary. Also, the City of Olympia has a vested interest in making sure that Capitol Lake doesn’t flood a portion of downtown Olympia.

However, it is quite unlikely that there would be as many willing partners for a gauge upstream of Tumwater near the Rich Road bridge. A gauge at this location would work better for a short term notice of flooding in Tumwater and Capitol Lake in Olympia. The only other gauge on the Deschutes River is approximately 20 miles upstream near the town of Rainier. Readings at the Rainier gauge do not always accurately translate to what happens in Tumwater/Olympia. Funding for a gauge at Rich Road (which is outside Tumwater’s jurisdiction, and outside the urban growth boundary) will need to be further explored in the future.

**Source and Date:** 2003 Natural Hazards Mitigation Plan

**Adopted Plan Number:** TUM-FH14.

**Reference Page:** V-257 (NHMP)

**Initiative and Implementation Status:** Ranked 5 of 18 in 2003. Changed from “Public Information” to “Data Collection and Mapping”. Also changed from flood elevation poles to flood gauges and further clarified the rationale.

**Priority: 5 of 8****Status: New****Hazard Addressed: Volcanic Hazard****Category: Hazard Preparedness****TUM-VH 1: Keep a supply of air filters on hand for critical equipment, generators and vehicles in case of ashfall from a volcanic eruption.**

**Rationale:** In order to keep critical facilities operating during a volcanic ashfall situation, emergency operations equipment such as police vehicles, fire trucks, medic one units, HVAC systems for the Emergency Operations Center and other critical facilities, and generators supporting critical facilities, etc, should have extra airfilters on hand. Even though volcanic eruptions usually give indications several months in advance, the addition of this mitigation initiative will help to reduce the likelihood of forgetfulness in regards to stocking up on airfilters beforehand. Continued operation of emergency response equipment and critical facilities during a disaster is very important to the health, safety, and welfare of the citizens of Tumwater.

**Relates to Plan Goal(s) and Objectives:** 3B,3C,3F,4D.**Implementer:** Tumwater Public Works Department, Tumwater Planning and Facilities Department, Tumwater Fire Department.**Estimated Cost:** \$1000**Time Period:** 2009-2015**Funding Source:** City of Tumwater.**Source and Date:** N/A**Adopted Plan Number:** N/A**Reference Page:** N/A**Initiative and Implementation Status:** This is a new mitigation initiative.

**Priority: 6 of 8****Status: Modified****Hazard Addressed: Flood Hazard****Category: Hazard Damage Reduction****TUM-FH 6: Work with landowners to reforest corridors along river and stream shorelines.**

**Rationale:** Re-establishing a forested edge along river and stream shorelines is one way to help reduce the impacts of flooding. The placement of large woody debris in rivers helps to dissipate the hydraulic energy along the river banks. Planting of trees and other vegetation also helps to reduce erosion and contributes to long term bank stabilization.

**Relates to Plan Goal(s) and Objectives: 5A****Implementer:** Tumwater Public Works Department

**Estimated Cost:** Unknown. Stream restoration projects are part of an ongoing program with the Tumwater Stream Team (a division of the Tumwater Public Works-Water Resource Division). This initiative is not a single specific project but rather an ongoing effort to re-establish a forested edge along rivers and streams in Tumwater.

**Time Period:** 2010-2015**Funding Source:** City of Tumwater**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-FH6**Reference Page:** V-241

**Initiative and Implementation Status:** Ranked 9 of 18 in 2003. This initiative has been partially completed. Work continues on portions of the Deschutes River and Percival Creek where the natural riparian habitat has been disturbed or removed. The Tumwater Stream Team (in the Water Resources Division of the Tumwater Public Works Department) plans, organizes, and manages riparian restoration projects in Tumwater. Work has been done on several portions of the Deschutes River along the Tumwater Valley Golf Course and Pioneer Park as well as along Percival Creek. However, more work remains to be done.

This initiative was partially modified under the Rationale section by integrating the some of the rationale from mitigation initiative FH8 regarding large woody debris and its calming effects on hydraulic energy along river banks.

**Priority: 7 of 8****Status: Existing****Hazard Addressed: Flood Hazard**  
**Category: Development Regulations****TUM-FH 3: Reevaluate land uses and zoning based upon new floodplain maps.**

**Rationale:** After new floodplain maps become available, the very next step will be to incorporate this new data into the development permit review process. It is likely to assume that the areas covered under these maps will increase, and that those new coverages will extend into already built up areas or developing areas. Therefore, the adoption process for each new floodplain map will need to include a detailed analysis of impacts and options not unlike a sub-area plan.

**Relates to Plan Goal(s) and Objectives: 6A,6B,6D****Implementer:** Tumwater Planning Department**Estimated Cost:** \$500 (2003)  
\$10,000 of in-house staff time for evaluation of land uses and zoning (2015)**Time Period:** 2009-2015**Funding Source:** City of Tumwater**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-FH3**Reference Page:** V-235

**Initiative and Implementation Status:** Ranked 16 of 18 in 2003. This initiative has not been implemented. The 1984 FIRM maps for Tumwater have not yet been updated by FEMA. However, a new floodplain analysis is currently being done by Thurston County. This should lay the groundwork for future projects which could be used to update the official FEMA floodplain maps.

**Priority: 8 of 8****Status: Existing****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TUM-FH 12: Continue to be actively involved in inter-jurisdictional flood hazard reduction efforts where Tumwater and other jurisdictions are located within the same basin.**

**Rationale:** Tumwater, being located at the mouth of the Deschutes River, is directly affected by activities occurring upstream. Tumwater should work closely with “upstream” jurisdictions to ensure that any activities in these other jurisdictions do not adversely affect Tumwater.

**Relates to Plan Goal(s) and Objectives: 2A****Implementer:** Tumwater Planning Department, Tumwater Public Works Department.

**Estimated Cost:** Unknown. This is not a specific project. It involves continued participation in intergovernmental work and planning that are related to flood hazards.

**Time Period:** 2009-2015**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan.**Adopted Plan Number:** TUM-FH12.**Reference Page:** V-253 (NHMP)

**Initiative and Implementation Status:** Ranked 18 of 18 in 2003. Tumwater continues to be involved with other jurisdictions in regards to the Deschutes River. The Tumwater Public Works Water Resource Division and the Tumwater Parks and Recreation Department both represent Tumwater on the Deschutes River, Capitol Lake, and Budd Inlet TMDL Technical Advisory Group. The scientific research on the river has been completed and the advisory group is working on an action plan to deal with the activities and land uses currently impacting the river. Currently logging and agricultural practices, as well as riparian habitat issues, are impacting the river. Although the focus of the research, the committee, and the eventual action plan is on water quality, it will also result in better quality riparian habitat, more naturally regulated flows in the river, and some positive impacts on the effects of downstream flooding episodes. Also, the Tumwater Stream Team often works in conjunction with the Thurston Conservation District for riparian habitat restoration projects that involve agricultural uses and lands.

**Priority: N/A****Status: Completed****Hazard Addressed: Flood Hazard**  
**Category: Development Regulations****TUM-FH 4: Adopt development regulations for high groundwater areas.**

**Rationale:** The importance of this recommendation is being reinforced by high groundwater flooding in early 1999 that exceeded levels in 1997. Work on this project began in 1998 and a multi-departmental work group has been established. They are using new topography maps, remote sensing data, aerial photographs and on-site observations and monitoring wells. Development standards are also being prepared.

**Relates to Plan Goal(s) and Objectives: 6B****Implementer:** Tumwater Planning Department and Tumwater Public Works Department**Estimated Cost:** \$7,500

**Time Period:** On May 4, 2004, the Salmon Creek Comprehensive Drainage Basin Plan was adopted by Tumwater Resolution R2004-012. On October 4, 2005, development regulations for the Salmon Creek Basin and other high groundwater areas were adopted by Tumwater Ordinance O2005-003.

**Funding Source:** City of Tumwater**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-FH4**Reference Page:** V-237

**Initiative and Implementation Status:** Ranked 15 of 18 in 2003. This initiative has been completed.

**Priority: N/A****Status: Completed****Hazard Addressed: Flood Hazard****Category: Data Collection and Mapping****TUM-FH 5: Determine the width and conditions of buffers along river and stream shorelines.**

**Rationale:** This recognizes the importance of forests along shorelines. As documented in the Budd Inlet-Deschutes River Watershed Action Plan (1995), issues of bank erosion, water quality and salmon habitat are all directly related to the presence or absence of a forested canopy along the river.

**Relates to Plan Goal(s) and Objectives: 6B, 6D**

**Implementer:** Tumwater Planning Department, Tumwater Public Works Department, and Tumwater Development Services Department

**Estimated Cost:** Unknown

**Time Period:** Analysis of the buffers along the Deschutes River were completed by Parts 1, 2, and 3 of the June 2008 Draft Shoreline Inventory and Analysis for the Cities of Lacey, Olympia, and Tumwater and their Urban Growth Areas produced by Thurston Regional Planning Council (updated in December 2008). The northern portion of Percival Creek that is under Shoreline Act jurisdiction was also included in this study. The rest of the shorelines have been analyzed through a number of studies including the Percival Creek Comprehensive Drainage Basin Plan (May 1993) and the Water Quality Assessment/Basin Characterization Percival Creek Basin Plan (March 20, 1991). More recent analyses of portions of Percival Creek have occurred through the development application process as properties along the creek are proposed for development.

**Funding Source:** City of Tumwater**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-FH5**Reference Page:** V-239

**Initiative and Implementation Status:** Ranked 8 of 18 in 2003. This initiative has been completed for both the Deschutes River and Percival Creek. The analyses of the Deschutes River was the main intent of the original mitigation initiative due to the obvious flooding issues on this river. To a certain extent an analysis of the conditions of buffers on Percival Creek was possibly intended even though no reports of flooding have occurred on the creek in the last decade. A complete analysis of Percival Creek has been completed as well. Analyses of other shorelines in Tumwater were not within the intended scope of the original mitigation initiative.

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TUM-FH 1: Apply to FEMA to be included into the Community Rating System (CRS) Program as a part of the National Flood Insurance Program.**

**Rationale:** The Community Rating System (CRS) is a voluntary program within the National Flood Insurance Program. The City will need to apply to this program before residents within floodplains could have their flood insurance rates reduced by up to 45 percent.

**Relates to Plan Goal(s) and Objectives: 6E****Implementer:** Tumwater Planning Department.**Estimated Cost:** N/A**Time Period:** N/A**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan.**Adopted Plan Number:** TUM-FH1.**Reference Page:** V-231

**Initiative and Implementation Status:** Ranked 11 of 18 in 2003. This initiative has not been implemented. This initiative is being removed due to the fact that there are only six properties in Tumwater with FEMA flood insurance and damage claims paid out for these properties has totaled only \$12,515 since 1978. Also, none of these six properties are listed by FEMA as repetitive or severe loss properties. (Source: FEMA NFIP Insurance Report, Washington, May 4, 2009)

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard****Category: Public Information****TUM-FH 2: Mail flood insurance information to residents and property owners who live in a floodplain, and to real estate offices.****Rationale:** This activity would provide a special mailing to parties most affected by flooding.**Relates to Plan Goal(s) and Objectives:** 8A**Implementer:** Tumwater Planning Department.**Estimated Cost:** \$500**Time Period:** 2004-2006**Funding Source:** Unknown**Source and Date:** 2003 Natural Hazards Mitigation Plan.**Adopted Plan Number:** TUM-FH2.**Reference Page:** V-233

**Initiative and Implementation Status:** Ranked 12 of 18 in 2003. This initiative has not been implemented and is being removed. Properties within the floodplain are already paying for FEMA flood insurance and distributing flood insurance information to property owners who already have the flood insurance would be redundant. Floodplain data is easily available to realtors (and the general public) on the Thurston County website (Geodata.org).

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard**  
**Category: Hazard Damage Reduction**

**TUM-FH 7: Encourage research into bioengineering and other techniques which provide streambank protection and support local demonstration projects which could provide such research.**

**Rationale:** Local knowledge is often gained through local examples. The State has funded several bioengineering pilot projects on the Deschutes River. Not only did these projects solve existing problems, but they added to the local cumulative knowledge and were successful projects in their own right.

**Relates to Plan Goal(s) and Objectives:** 2A, 5A

**Implementer:** Tumwater Public Works Department

**Estimated Cost:** Unknown

**Time Period:** 2004-2010

**Funding Source:** City of Tumwater

**Source and Date:** 2003 Natural Hazards Mitigation Plan

**Adopted Plan Number:** TUM-FH7

**Reference Page:** V-243

**Initiative and Implementation Status:** Ranked 10 of 18 in 2003. This mitigation initiative is being removed because it very similar to and overlaps with other mitigation initiatives (FH6 and FH8).

**Priority: N/A**

**Status: Removed**

**Hazard Addressed: Flood Hazard**

**Category: Hazard Damage Reduction**

**TUM-FH 8: Plant trees and other native vegetation and install large woody debris to prevent erosion and stream scour which occurs as a result of excessive runoff.**

**Rationale:** The placement of large woody debris in rivers helps to dissipate the hydraulic energy along the river banks. Planting of trees and other vegetation also helps to reduce erosion and contributes to long term bank stabilization.

**Relates to Plan Goal(s) and Objectives: 5A**

**Implementer:** Tumwater Public Works Department.

**Estimated Cost:** N/A

**Time Period:** N/A

**Funding Source:** City of Tumwater

**Source and Date:** 2003 Natural Hazards Mitigation Plan

**Adopted Plan Number:** TUM-FH8

**Reference Page:** V-245

**Initiative and Implementation Status:** Ranked 7 of 18 in 2003. This mitigation initiative is being removed and partially integrated with mitigation initiative FH6 due to the similarities between the two.

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard****Category: Hazard Damage Reduction****TUM-FH 9: Draft a prioritized list of which floodplain residences Tumwater would acquire (buyout) if state and federal monies are available.**

**Rationale:** Repetitive loss properties negatively impact the property owner as well as the surrounding community. The City of Tumwater should work with State and federal agencies in determining which properties should be bought out and how the funding for such actions will be acquired.

**Relates to Plan Goal(s) and Objectives: 5C****Implementer:** Tumwater Planning Department.**Estimated Cost:** N/A**Time Period:** N/A**Funding Source:** City of Tumwater**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-FH9**Reference Page:** V-247

**Initiative and Implementation Status:** Ranked 13 of 18 in 2003. This mitigation initiative is being removed due to the fact Tumwater has no repetitive loss or severe loss properties (Source: FEMA NFIP Insurance Report, Washington, May 4, 2009). Also, since 1978 Tumwater has had only two claims paid for a total of \$12,515 (Source: FEMA NFIP Insurance Report, Washington, May 4, 2009). This information was not readily available when this initiative was originally drafted. If new floodplain maps become available in the future and show a significant amount of new residences within the floodplain then this mitigation initiative should be re-evaluated for possible inclusion back into the plan.

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard****Category: Hazard Damage Reduction****TUM-FH 10: Draft a prioritized list of residences Tumwater would elevate above the 100-year floodplain, if state and federal monies are available.**

**Rationale:** Repetitive loss properties negatively impact the property owner as well as the surrounding community. The City of Tumwater should work with State and federal agencies in determining which residences should be elevated and how the funding for such actions will be acquired.

**Relates to Plan Goal(s) and Objectives: 5D****Implementer:** Tumwater Planning Department.**Estimated Cost:** N/A**Time Period:** N/A**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan.**Adopted Plan Number:** TUM-FH10**Reference Page:** V-249

**Initiative and Implementation Status:** Ranked 14 of 18 in 2003. This mitigation initiative is being removed due to the fact Tumwater has no repetitive loss or severe loss properties (Source: FEMA NFIP Insurance Report, Washington, May 4, 2009). Also, since 1978 Tumwater has had only two claims paid for a total of \$12,515 (Source: FEMA NFIP Insurance Report, Washington, May 4, 2009). This information was not readily available when this initiative was originally drafted. If new floodplain maps become available in the future and show a significant amount of new residences within the floodplain then this mitigation initiative should be re-evaluated for possible inclusion back into the plan.

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard****Category: Hazard Damage Reduction****TUM-FH 11: Construct a stormwater detention and treatment facility for Tumwater's municipal stormwater that is not currently contained or treated.**

**Rationale:** A stormwater detention and treatment pond for Tumwater's currently untreated stormwater would help to decrease stream scour and would help to minimize the impacts of sudden storms and other flooding occurrences.

**Relates to Plan Goal(s) and Objectives: 6A****Implementer:** Tumwater Public Works Department.**Estimated Cost:** \$832,000**Time Period:** 2004-2010**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan. Tumwater Capital Facilities Plan (2002)**Adopted Plan Number:** TUM-FH11.**Reference Page:** V-251 (NHMP)  
SD1-SD10 (2002 CFP)

**Initiative and Implementation Status:** Ranked 4 of 18 in 2003. This mitigation initiative is being removed in order to clarify which stormwater projects will result in flood hazard damage reduction. This will also help in their cost/benefit analysis. Individual stormwater projects in the Capitol Facilities Plan for Tumwater will be evaluated separately and added as new mitigation initiatives if appropriate.

**Priority: N/A****Status: Removed****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TUM-FH 13: Secure funding for the stormwater related projects within Tumwater's 6-year Capital Facilities Plan.****Rationale:** Funding for goals, programs, and other mitigation initiatives is vital if they are to be carried out.**Relates to Plan Goal(s) and Objectives:** 6A**Implementer:** Tumwater Public Works Department.**Estimated Cost:** Unknown**Time Period:** 2004-2010**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan  
Tumwater Capital Facilities Plan (2002)**Adopted Plan Number:** TUM-FH13.  
SD1-SD10 (2002)**Reference Page:** V-255 (NHMP)

**Initiative and Implementation Status:** Ranked 3 of 18 in 2003. This mitigation initiative is being removed partially because it is too broad of a goal to analyze the benefits, costs, or effectiveness. Also, the Capital Facilities Plan is reviewed and updated each year by the Tumwater City Council. Funding for stormwater projects is re-evaluated and re-prioritized each year as projects come and go, it is an on-going process.

**Priority: N/A****Status: Removed****Hazard Addressed: Landslide Hazard**  
**Category: Hazard Damage Reduction****TUM-LH 1: Replant native vegetation along the rivers to stabilize banks and to prevent landslides.****Rationale:** The planting of trees and other native vegetation will help to stabilize the banks of the river and prevent landslides. This will also help to protect and enhance water quality through erosion prevention.**Relates to Plan Goal(s) and Objectives: 5A****Implementer:** Tumwater Public Works Department.**Estimated Cost:** unknown**Time Period:** 2004-2006**Funding Source:** City of Tumwater.**Source and Date:** 2003 Natural Hazards Mitigation Plan**Adopted Plan Number:** TUM-LH1**Reference Page:** V-259 (NHMP)**Initiative and Implementation Status:** Ranked 6 of 18 in 2003. This mitigation initiative is being removed for the following reasons: the action specified is very similar to another mitigation initiative dealing with flooding (FH6); no specific areas of landslides in Tumwater were originally identified with this mitigation initiative, so cost/benefit analysis would not be possible; and lastly, the area described in the 2008 update to this plan (the Tumwater Risk Assessment Section) that is prone to landslides has had the critical infrastructure moved out of harms way.

**Priority: N/A**

**Status: Removed**

**Hazard Addressed: Landslide Hazard**

**Category: Development Regulation**

**TUM-LH 2: Reevaluate development regulations in regards to steep slopes.**

**Rationale:** Using the list of repetitive loss properties from federal and state agencies Tumwater should evaluate the effectiveness of its development regulations for steep slope areas.

**Relates to Plan Goal(s) and Objectives:** 6B.

**Implementer:** Tumwater Planning Department.

**Estimated Cost:** unknown

**Time Period:** 2004-2010

**Funding Source:** City of Tumwater.

**Source and Date:** 2003 Natural Hazards Mitigation Plan

**Adopted Plan Number:** TUM-LH2

**Reference Page:** V-261 (NHMP)

**Initiative and Implementation Status:** Ranked 17 of 18 in 2003. This mitigation initiative is being removed because there are no known repetitive loss properties on steep slopes within Tumwater and the only area known in Tumwater to be prone to landslides has had the critical infrastructure (main sewer lines) moved out of the area.

This page left intentionally blank.

# City of Tumwater 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.

Tumwater has participated in the NFIP since August of 1980 and since that time there have been only two claims paid for a total of \$12,515. There are only six properties in Tumwater that have flood insurance policies. There are no repetitive loss properties and no severe loss properties within Tumwater.

## Future Land Use Plans, Zoning, and Development Regulations

The Conservation Plan, an element of the Tumwater Comprehensive Plan, contains a chapter devoted to frequently flood areas (Chapter 6). The goals listed in the chapter (and the techniques to implement the goals) are to protect life and property in frequently flooded areas. The plan lists the adoption of a floodplain overlay zone and floodproofing regulations as two of the techniques to limit or prohibit, as appropriate, encroachment in floodplains that could endanger life and property during periods of flooding. Implementation of a floodplain overlay zone and floodproofing regulations also are mentioned as techniques that will help to preserve the natural functions of floodplains to store, carry, and control flood waters.

The Land Use Plan (also an element of the Tumwater Comprehensive Plan) acknowledges the problems of development in floodplains. The following is an excerpt from p.116 of the Land Use Plan:

*“Nearly all of the Tumwater valley is a floodplain for the Deschutes River, and consequently is very unsuitable for any but the lowest intensity of development. It is subject to frequent flooding and seasonal high water tables. It’s rich, alluvial soils, although excellent for agricultural purposes, present severe limitations for roads, buildings, and septic tanks. Moreover, the underlying geology contributes to severe settling problems.”*

Goal #6 of the Land Use Plan is to reduce impacts from flooding. Consistent with this goal, future land use designations, including “Shoreline Environment” and “Parks/Open Space”, have been applied to areas within the floodplain. These land use designations help to preclude and minimize development within the special flood hazard areas and to reduce the impacts of flooding.

To reach the goals listed in both the Conservation Plan and the Land Use Plan a floodplain overlay zone (Tumwater Municipal Code Chapter 18.38--*Floodplain Overlay*) was adopted in 1984 and is used to limit or prohibit, as appropriate, encroachment in floodplains that could endanger life and property during periods of flooding. This overlay zone district also helps to preserve the natural functions of floodplains to store, carry, and control flood waters. A chapter establishing federal floodproofing requirements was adopted in 1981. Chapters 15.28-*Floodproofing Regulations Adopted* and 18.38-*Floodplain Overlay* of the Tumwater Municipal Code are in place and serve to designate frequently flooded areas and to specify federal floodproofing regulations. If allowed at all, any structures permitted in the designated flood areas are subject to strict development regulations. The existing regulations were put in place after careful study and evaluation to ensure consistency with all state and federal requirements regarding floodplain regulations.

### *Tumwater Municipal Code-Floodplain Overlay Chapter 18.38.050 Floodway*

This section regulates uses within the floodway. Open space uses such as agriculture, forestry, picnic areas, biking and horseback trails are allowed provided the storage of materials or equipment or other development or substantial improvement, including structures, fill and support facilities are prohibited within the designated floodway.

Utility support facilities and fish hatchery appurtenances are only allowed if it can be adequately

demonstrated that there are no other practicable alternatives. If they are allowed then they must meet strict criteria regarding their placement. They must not cause any measurable rise in base flood elevation, be anchored to prevent movement, be floodproofed, be located so as to not obstruct the flow of floodwaters, and be minimized in both mass and height.

*18.38.055 One hundred-year floodplain subdistrict--Permitted uses.*

Uses in the one hundred-year floodplain include agricultural type uses, forestry, and fish hatcheries and related appurtenances and interpretive centers. Also allowed are recreational uses such as parks, trails, and open space areas. Support facilities are allowed but must meet the same requirements for utility support facilities required in the floodway. An exception for the protection, rehabilitation, restoration and reconstruction of existing sites, buildings, structures and objects significant in American and Washington pre-history, history, architecture, archaeology or culture is included. Also, in accordance with 44CFR60.3, recreational vehicles placed on sites within the one hundred-year floodplain shall be on the site for fewer than 180 consecutive days or be ready for highway use.

*18.38.060 Five hundred-year floodplain subdistrict.*

Although it is relatively uncommon, Tumwater does have requirements for uses in the five hundred year floodplain (in addition to those in the underlying zoning district). For example, residential structures must be elevated at least two feet above the base flood elevation, non-residential structures can be either elevated two feet above the base flood elevation or floodproofed. Base flood elevation data is required as part of the approval process for developments of five acres or larger. Also, the standards that apply to fill and materials, structures, utilities, and storage within the one hundred year-floodplain also apply within the five hundred-year floodplain.

*18.38.020 Areas of special flood hazard.*

This section of the Tumwater Municipal Code identifies the areas of special flood hazard as specified by the Federal Emergency Management, Federal Insurance Administration, in a scientific and engineering report dated April 3, 1984, and entitled, "The Flood Insurance Study for the City of Tumwater." The Flood Insurance Study and the Flood Insurance Rate Map are on file at Tumwater City Hall, 555 Israel Rd SW, Tumwater, WA 98501 and are available for the public viewing. Also, the floodplain layers are available on the Thurston County mapping website (Geodata.org).

*18.38.030 Districts established.*

This section states that the floodplain overlay zone shall be indicated on the Official Tumwater Zoning Map. It also explains that this zoning district is further divided into three subdistricts called the floodway, the one hundred-year floodplain, and the five hundred-year floodplain.

Although not reflected on the 1984 FIRM maps, high groundwater flooding occurred in early 1999 in Tumwater and Thurston County. The 1999 groundwater flooding exceeded groundwater flooding that had previously occurred in 1997. On May 4, 2004, the Salmon Creek Comprehensive Drainage Basin Plan was adopted by Tumwater Resolution R2004-012. On October 4, 2005, development regulations for the Salmon Creek Basin and other high groundwater areas were adopted by Tumwater Ordinance O2005-003. These regulations limit development in, and near, areas prone to flooding due to high groundwater.

**Additional Activities**

The following activities carried out by Tumwater help to further reduce the effects of flooding:

1. Elevation Certificates: Tumwater maintains elevation certificates for new and substantially improved buildings within the floodway and one hundred-year floodplain. Copies of elevation certificates are made available upon request and may be viewed at Tumwater City Hall.
2. Open Space Preservation: Most of the special flood hazard areas on Tumwater are designated as open space, shoreline environment, or greenbelt.
3. Higher Regulatory Standards: Tumwater's floodplain regulations meet and in several instances exceed the minimum state and federal requirements. Tumwater also has regulations for development within the five hundred year floodplain.
4. Flood Data Maintenance: Tumwater maintains copies of F.I.R.M. maps and Flood Insurance Study Reports at Tumwater City Hall and they are available to the public.
5. Stormwater Management: The City of Tumwater is in the process of adopting an updated stormwater manual, consistent with Thurston County.
6. Public Drainage System Maintenance: Tumwater's public drainage system is inspected regularly throughout the year and maintenance is performed as needed by the Tumwater Public Works Department. Records are maintained for both inspections and required maintenance. The Tumwater Capital Facilities Plan (an element of the Tumwater Comprehensive Plan) is a financial planning and budgeting tool that includes capital drainage improvement projects.
7. Private Drainage Systems: Tumwater's Water Resource Division staff is in the process of mapping and inspecting private stormwater systems within Tumwater. The outreach is to make sure the systems are functioning properly and to continue the public education about the importance of such facilities and their role in controlling runoff, treating stormwater, and helping to reduce flooding impacts.