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

CITY OF TUMWATER

November 2023

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Adopting Resolution

[Will be inserted when adopted]

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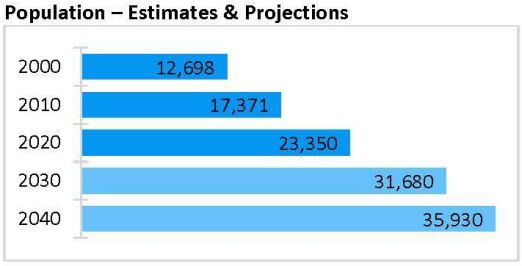
Demographics

Population – Estimates & Projections



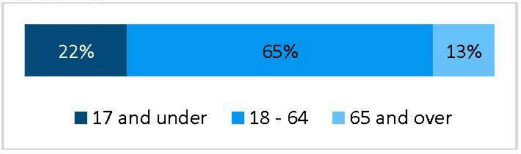
Average Annual Population Growth

2000-2010:	3.2% per year
2010-2020:	3.0% per year

Language Spoken at Home (2016-2020)*

English Only	93.8%
Spanish	3.0%
Korean	0.2%
Chinese	0.2%
Vietnamese	0.8%
Tagalog	0.0%
Other Language	1.9%
TOTAL	**100.0%**

Age (2010)



Median Age: 37

Race & Ethnicity (2020)

Race

White	76%
Black & African American	3%
American Indian & Alaska Native	1%
Asian	5%
Native Hawaiian & Other Pacific Islander	1%
Other Race	2%
Two or More Races	12%
TOTAL	**100%**

Ethnicity

Hispanic or Latino	9%
Not Hispanic or Latino	91%
TOTAL	**100%**

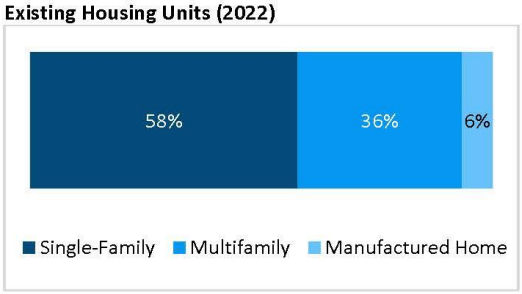
Households & Housing

Households (2020)

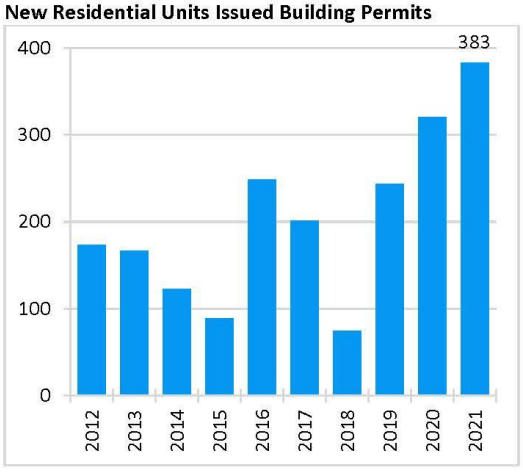
Total Households:	11,488
Average Household Size:	2.39

Median Home Sale Price (2021): $460,000

Existing Housing Units (2022)



New Residential Units Issued Building Permits

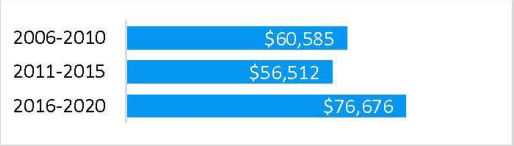


**Estimates based on survey data and may have a large margin of error.* *Updated Nov. 2022*

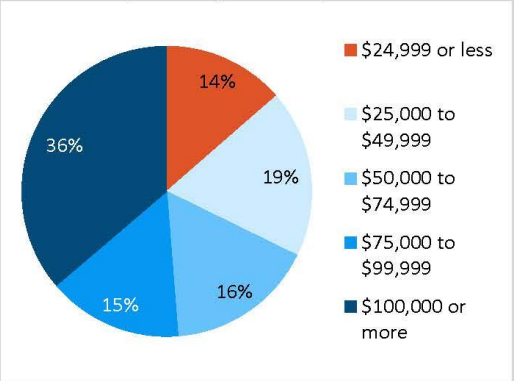
Tumwater — 2022 Statistical Profile

Employment & Income

Median Household Income*



Households by Income (2016-2020)*

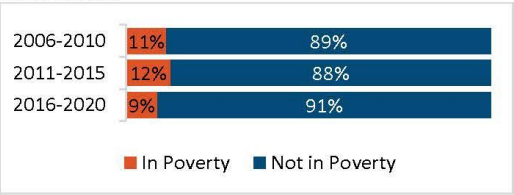


Cost Burdened Households (2016-2020)*

Cost Burdened	2,948
*Severely Cost Burdened***	*1,318*
Not Cost Burdened	6,324
TOTAL Households	**9,272**

***Severely cost burdened households are a subset of cost burdened households.*

Poverty Rate*

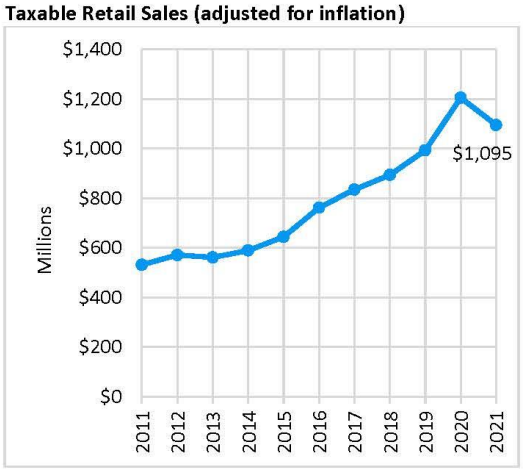


Jobs (2017 Estimate)

Resource, Construction, Utilities	1,890
Manufacturing, Wholesale Trade	2,970
Retail, Accommodation, Food	3,660
Transportation, Warehousing	680
Services	5,630
Finance, Insurance, Real Estate	1,250
Government	10,960
Total Jobs**	**27,030**

***Numbers may not add due to rounding.*

Taxable Retail Sales (adjusted for inflation)



LEARN MORE about statistics, trends, analyses and comparisons for Thurston County and its jurisdictions at The Profile: www.trpc.org/theprofile.

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**Estimates based on survey data and may have a large margin of error.* *Updated Nov. 2022*

Summary and Adoption

The fourth edition of the Natural Hazards Mitigation Plan for the Thurston Region, referred to here as the Regional Plan, is the result of a multi-jurisdictional process to develop a mitigation strategy to reduce the risks of the most destructive hazards that threaten the region. This plan specifically addresses communities and special districts within Thurston County. This regional cooperative approach, led by the Thurston Regional Planning Council, has provided a comprehensive document at minimal cost to the participating regional partners. Thurston County jurisdictions, including special purpose districts, have the option of developing their own more jurisdiction-specific hazards mitigation plans, referred to as an "Annex." The City has elected to update the City Annex as part of the Regional Plan update process.

The Board of County Commissioners will adopt the Regional Plan and the Thurston County specific Annex. Other jurisdictions will review the document and adopt the Regional Plan and their specific Annex. In adopting the City Annex, the City also adopts the Regional Plan which describes the overarching regional approach to hazards mitigation.

The City Annex describes the City's planning process and expands upon the Regional Plan by identifying unique characteristics of the City, detailing the City's hazard risk rating for all appropriate hazards, cataloging the City's past, current, and proposed mitigation initiatives, and documenting the City's participation in the National Flood Insurance Program. The City Annex identifies potential City specific projects, designed to mitigate the impacts of those hazards that could be undertaken in the future depending on funding, direction, and need. The projects, known as mitigation initiatives, are developed based on input from each City department.

The Community Development Department has reviewed the City Annex to ensure that it does not conflict with the Comprehensive Plan or create potential conflicts with other City initiatives. The public has also been given opportunities to comment on the Regional Plan and the City Annex.

In order to apply for certain types of state and federal grants the City must have current Hazards Mitigation and Comprehensive Emergency Management plans in place.

City Annex Development Process

Hazards Mitigation Planning Team

The following individuals served as the City's hazards mitigation planning team.

City Department and Title	Representative
Community Development, Housing and Land Use Planner	Erika Smith-Erickson
Community Development, Planning Manager	Brad Medrud
Community Development, Director	Mike Matlock

Hazards Mitigation Planning Team Development Activities

The following activities supported the development of the City hazards mitigation planning process.

Actions and Activities	Date
Thurston Regional Planning Council Community Survey	June 1 – July 31, 2022
City Council Briefing	June 21, 2022
Thurston Hazards Mitigation Workgroup	September 26, 2022
Thurston Hazards Mitigation Workgroup	October 24, 2022
Thurston Hazards Mitigation Workgroup	November 28, 2022
Thurston Hazards Mitigation Workgroup	January 23, 2023
Long Range Planning Meeting – Staff introduction	March 3, 2023
Thurston Hazards Mitigation Workgroup	March 8, 2023
Review 2017 initiatives and draft new and revised initiatives	March 10, 2023
Email to City Department Directors for status on 2017 initiatives	March 15, 2023
Review of the of status of initiative responses from the 2017 Hazards Mitigation Plan	March 20, 2023
Started benefit cost review worksheet	April 19, 2023
Thurston Hazards Mitigation Workgroup	March 27, 2023
Collaboration with internal staff reviewing the draft initiatives and cost benefit worksheet	May 12, 2023
Email to internal workgroup to go over new proposed initiatives for 2023	May 23, 2023
Meeting with Planning Manager and Community Development Director to review initiatives	May 26, 2023
Discussion with Planning Manager with draft initiatives, prioritization criteria worksheet, and meeting schedules	June 2, 2023
Email to internal workgroup regarding FEMA requirements and capability assessment	June 5, 2023
Meeting with Thurston Regional Planning Council to review two new policy changes to FEMA requirements: capability assessment and review of hazards and actions required for the City	June 8, 2023

Actions and Activities	Date
Internal City Annex workgroup meeting to review 2023 initiatives, capability assessments, benefit cost review worksheet, and timeline for City Annex and Regional Plan Update	June 29, 2023
Planning Commission Briefing	July 25, 2023
Staffing Thurston County Fair – Thurston County Emergency Management Booth	July 26, 2023
Risk assessment criteria discussion with Thurston Regional Planning Council	August 3, 2023
General Government Committee Briefing	August 9, 2023
Final draft of 2023 initiatives sent to Department leads for comment	August 16, 2023

City Stakeholder Involvement

The City stakeholder group worked together to provide an update on the status of the 2017 initiatives, proposed revisions, and helped implement new initiatives. The stakeholder group helped implement other work plans and plan documents relative to hazards mitigation for the capability assessment.

The hazards mitigation planning team briefed the City Council on June 21, 2023, the Planning Commission on July 25, 2023 and General Government Committee on August 9, 2023. They provided comments and asked questions relating to the City Annex and Regional Plan update.

Organization	Representatives
Mayor	Debbie Sullivan
City Council	Councilmembers Angela Jefferson, Charlie Schneider, Eileen Swarthout, Joan Cathey, Leatta Dahlhoff, Michael Althauser, and Peter Agabi
General Government Committee	Councilmembers Michael Althauser, chair, and Joan Cathey and Leatta Dahlhoff
Public Health and Safety Committee	Councilmembers Leatta Dahlhoff, chair, and Angela Jefferson and Peter Agabi
Planning Commission	Elizabeth Robbins (Chair), Meghan Sullivan (Vice Chair), Anthony Varela, Brian Schumacher, Kelly Von Holtz, Terry Kirkpatrick, Grace Anne Edwards, Michael Tobias
Staff Stakeholder Group	Fire, Water Resources & Sustainability, Parks & Recreation, Executive, Transportation &

Organization	Representatives
	Engineering, and Community Development Departments and the GIS Team

Opportunities for Public Participation in the Plan Development

To engage the public and get feedback on the City Annex and Regional Plan update, the City participated in multiple public meetings, open houses and surveys, volunteer events, and the Emergency Preparedness Expo. During the Planning Commission briefing held on July 25, 2023 the Jolt News organization attended and authored an article.

Public comment on the Jolt News article expressed concern with earthquake hazards. Comments from the Planning Commission and General Government Committee were addressed and noted by staff as part of the update. The City posted the open house and survey on Facebook and put up flyers at local businesses and at City Hall at the Community Development Department counter.

The following public outreach activities supported the development of the City's hazards mitigation planning process.

Public Outreach Activities	Date
Thurston Regional Planning Council Community Survey	June 1- July 31, 2022
Article in *The Olympian* regarding the Community Survey	July 11, 2022
City Council Briefing	June 21, 2022
Draft Action Plan Open House and Survey	July 24-August 25, 2023
Planning Commission Briefing	July 25, 2023
Volunteering at Thurston County Fair – Thurston County Emergency Management Booth	July 26, 2023
Planning Commission Briefing	July 25, 2023
General Government Committee Briefing	August 9, 2023
Emergency Preparedness Expo	September 23, 2023
Final Draft Plan Public Comment Period	November 3- November 17, 2023
Final City Annex and Core Regional Plan to Washington Emergency Management Division	November 2023
FEMA Review	November 2023
Planning Commission Work Session	January 9, 2024

Public Outreach Activities	Date
Planning Commission Hearing	January 23, 2024
GGC Briefing	February 14, 2023
City Council Work Session	February 27, 2024
City Council Consideration	March 5, 2024

Review and Incorporation of Existing Plans, Studies, and Technical Information into the City Annex and Regional Plan Update

Plan	Type
2017 Natural Hazards Mitigation Plan	Initiatives and Historical Events
Thurston County Climate Adaptation and Mitigation Plans	2023 Initiatives
Capital Facilities Plan	2023 Initiatives
2020 Water System Plan	2023 Initiatives
Long Range Planning 2022 and 2023 Work Programs	2023 Initiatives
Comprehensive Plan	City Annex and Regional Plan Update and 2023 Initiatives
Stantec Consulting Ltd. 2023, Deschutes River Flood Reduction Study: Hydraulic and Erosion Analysis and Alternative Report. Retrieved from Water Resources & Sustainability Department's Deschutes Flood Reduction Study.pdf - City of Tumwater.	City Annex and Regional Plan Update and 2023 Initiatives

Technical Reports and Citations Bibliography

Report	Type
Julie Baxter and Karen Helbrecht from FEMA and Stacy Franklin Robinson, Sara Reynolds, Adam Reeder, and Hilary Kendro from the Strategic Alliance for Risk Reduction (STARR). *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards. E-Book, FEMA, 2013.*	2023 Initiatives
Department of Homeland Security. National Risk Index, National Risk Index | FEMA.gov. Accessed 2023.	Hazard Profiles and Risk Ratings

Report	Type
Zuzak, C., E. Goodenough, C. Stanton, M. Mowrer, A. Sheehan, B. Roberts, P. McGuire, and J. Rozelle. 2023. National Risk Index Technical Documentation. Federal Emergency Management Agency, Washington, DC.	Hazard Profiles and Risk Assessments
Mauger, G.S., J.H. Casola H. A. Morgan, R. L. Strauch, B. Jones, B. Curry, T.M. Busch Isaksen, L. Whitely Binder, M. B. Krosby, and A.K. Snover, 2015. *State of Knowledge: Climate Change in Puget Sound*. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. https://doi:10.7915/CIG93777D	Hazard Profiles and Risk Assessments
Climate Mapping for a Resilient Washington. Climate Impacts Group. Climate Mapping for a Resilient Washington, University of Washington, Washington County Climate Projections (uidaho.edu).	Hazard Profiles and Risk Assessments
Halofsky, J. E., Peterson, D. L. & Harvey, B.J. Changing wildfire, changing forests: the effects of climate change on fire regimes and vegetation in the Pacific Northwest, USA. *fire ecol 16, 4* (2020). https://doi.org/10.1186/s42408-019-0062-8	Hazard Profiles and Risk Assessments
Weather closures: rain, flooding - Updated Fri., 1:35 p.m. | The JOLT News Organization (The Jolt News, 2022), A 501(c)(3) Nonprofit Organization	Risk Assessments
Fox 13 Seattle News. (2022, January 6). Retrieved from Fox 13 Seattle: https://www.fox13seattle.com/news/major-flooding-expected-along-south-thurston-county-rivers	Risk Assessments

Integration of City Annex and Regional Plan into other Planning Mechanisms

The City's Capital Facilities Plan and the biennial budget are both used to implement mitigation initiatives specified by the City Annex. After adoption of the City Annex and Regional Plan, the first step is to seek funding for a project or action that supports a mitigation initiative in the biennial budget. The drafting and adoption of the biennial budget is an open public process available to the public. Community members are encouraged to participate in the shaping of the City's biennial budget. Also, getting an action or project into the Capital Facilities Plan is a way to get it in line for funding and a way to plan for when it will be implemented. The Capital Facilities Plan is updated every other year in a process which encourages public participation.

The Land Use Element is being updated and a new Climate Element will be created through the 2025 Comprehensive Plan periodic update process. Both Elements will include integration of the City Annex and Regional Plan into policies and action items. For example, Policy LU-6.5 of the Comprehensive Plan Land Use Element strongly encourages implementation of the City Annex and Regional Plan to reduce or eliminate the human and economic costs of natural disasters for the overall good and welfare of the

community. The Climate Element will have a resiliency subelement that will incorporate the City Annex and Regional Plan to meet state requirements.

Plan Monitoring and Maintenance

The Planning Division of the Community Development Department is responsible for monitoring and maintaining the plan. The Planning Division has a Planning Manager and a Land Use and Housing Planner, who are leads for the planning team. The City Council, or appropriate Council committee, will be briefed annually on the status of the plan. Annual briefings will keep the plan in the forefront and place the decision makers in a more ready position to update the plan if needed. The agendas and notices for these meetings are posted on the City's website. These meetings are open to the public so there are additional chances for the public to participate in suggesting ideas for ongoing maintenance and updates to the City Annex.

The City also plans to work with Thurston County and Thurston Regional Planning Council in four years to meet the required five year update to the City Annex. The City has participated in updates in this manner on a regular basis since the plan was first adopted in the early 2000s. The planning team will continue to work with the Thurston Regional Planning Council, Thurston County Emergency Management Division, internal and external stakeholders, and follow state legislature to ensure all documented vulnerabilities are still accurate for the City.

The City Annex has incorporated many City updates into its initiatives. Staff will frequently review and track the status of the initiatives throughout the Capital Facilities Plan update, Tree and Vegetation Code update, 2025 Development Code periodic update, Washington Wildland-Urban Interface Code adoption, the 2025 Comprehensive Plan periodic update, Comprehensive Plan amendments, and more. The City Annex and Regional Plan is a climate resiliency sub-element requirement for the City's Comprehensive Plan that will need to be tracked and monitored.

At a minimum, the planning team and hazards mitigation planning team will meet yearly. The leads identified in the initiatives will be responsible for tracking and providing updates on the initiatives. The planning team has created a spreadsheet to track and monitor past and current initiatives. Additional monitoring and updates will be required through the Comprehensive Plan periodic update.

Continued Public Involvement

The City will continue promoting public participation. The Planning Commission will be briefed on the City Annex and Regional Plan update at a public meeting and hold a public hearing. The City Annex and Regional Plan will also be presented at a public meeting of the General Government Committee, a subcommittee of the City Council. The City Council will hold a public work session and a public meeting on the City Annex and Regional Plan as well. Events like this will be used in the future to allow for ongoing public participation.

Specific examples of continuous public involvement include:

1. Community members, businesses, and organizations will have opportunities to provide feedback on hazards mitigation planning between update cycles through Planning Commission meetings, City Council meetings, and the Comprehensive Plan periodic update.
2. Outreach efforts to engage socially vulnerable populations that are most impacted by hazards will be done through methods outlined in the Comprehensive Plan Update Public Engagement Plan.
3. Methods will include:
    - Presentations on the plan's progress at City Sponsored Meetings.
    - Stakeholder meetings for the Comprehensive Plan periodic update including neighborhood associations, chambers of commerce, School Districts, or other community organizations.
    - Periodic online polls or questionnaires.
    - Hosting a booth at public events like a farmer's market, community event, or music festival when applicable.
    - Creating door flyers.
    - Public meetings.
    - Social media posts.
    - Interactive websites, online open house, GIS story map.
4. Public Involvement will be documented with the initiative status worksheet that is maintained by Community Development Department staff.

City Risk Assessments

Flood Risk Assessment

Area of Impact

Same as described in the Regional Plan. The City is mapped with areas of high groundwater south of Tumwater Boulevard and the 100-year floodplain along the Deschutes River and lakes throughout the City and its Urban Growth Area.

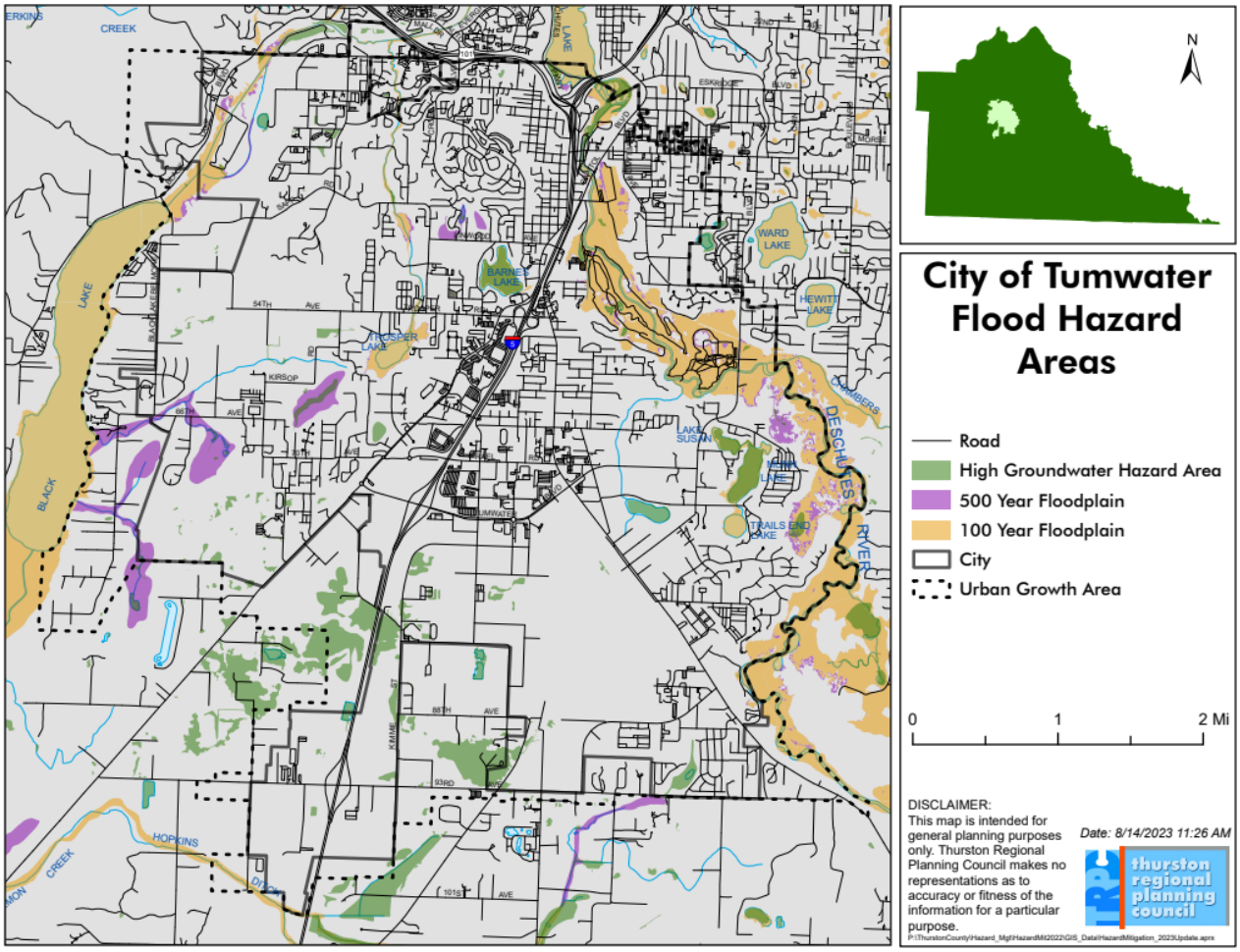


Figure 1. City Flood Hazard Areas.

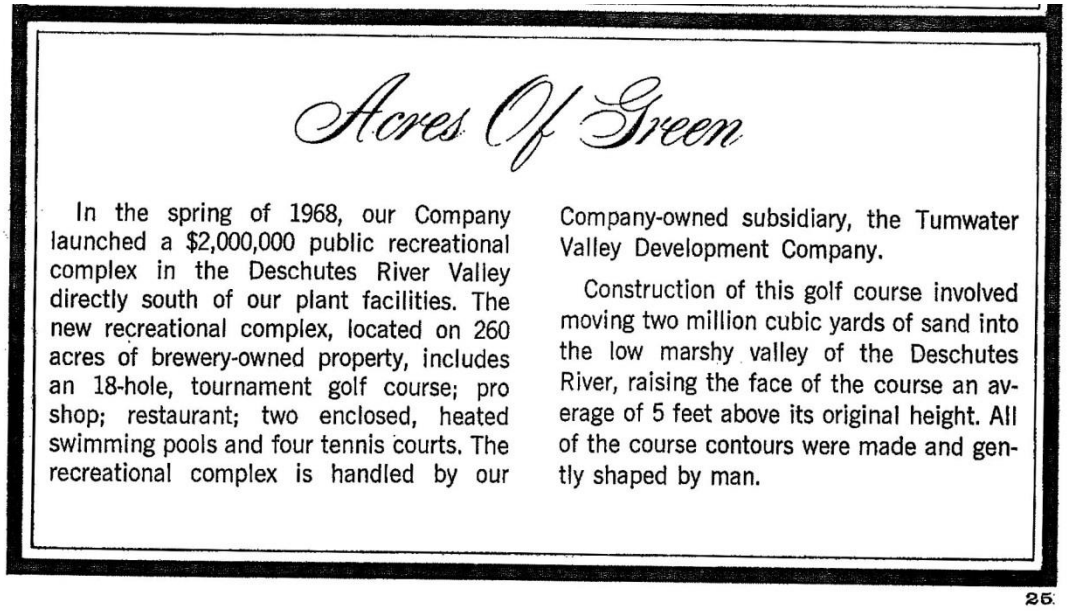
Extent

The Deschutes River is the fastest rising and falling river in the county, responding quickly to local rainfall and runoff. The river's watershed encompasses a large part of the City. As the Deschutes River enters the urban growth area and the City, the riverbank and surrounding land use becomes more developed, with several residences in the Tumwater Valley around the periphery of the Tumwater Valley Municipal Golf Course. A riprap bank and additional hard banking channels the river through the Tumwater Valley Municipal Golf Course and parts of Tumwater Historical Park before it discharges into Capitol Lake near the Historic Olympia Brewery in the City, just south of Interstate 5. The City has areas of high ground water concern, especially within the Salmon Creek Basin and areas of Kirsop Road.

Previous Incidents

The vast majority of flooding events within the City occur within the Deschutes Valley. According to the National Weather Service records for the Rainier Flood gauge on the Deschutes River, between 1949 and October 2023 there were forty-six events above Flood Stage.

The expansion and development of the former Olympia Brewery properties within the valley led to a significant transformation of the area. Starting in 1953, several acres of riparian floodplain were filled with 133,000 cubic yards of material on which the bottling warehouses were built.[1] The river was partially re-channeled then as well. In 1963 an additional 114,000 cubic yards of material was moved from the adjacent hillside to fill a portion of the valley for a bottling warehouse expansion.[2] Later, in 1968 a much larger project began which moved two million cubic yards of fill material from the hillside on Cleveland Avenue into the valley. This project raised the level of the valley an average of five feet to make development of the Tumwater Valley Municipal Golf Course and Valley Athletic Club possible.[3] A significant watercourse change to the river was also done at this time.



Acres Of Green

In the spring of 1968, our Company launched a $2,000,000 public recreational complex in the Deschutes River Valley directly south of our plant facilities. The new recreational complex, located on 260 acres of brewery-owned property, includes an 18-hole, tournament golf course; pro shop; restaurant; two enclosed, heated swimming pools and four tennis courts. The recreational complex is handled by our Company-owned subsidiary, the Tumwater Valley Development Company.

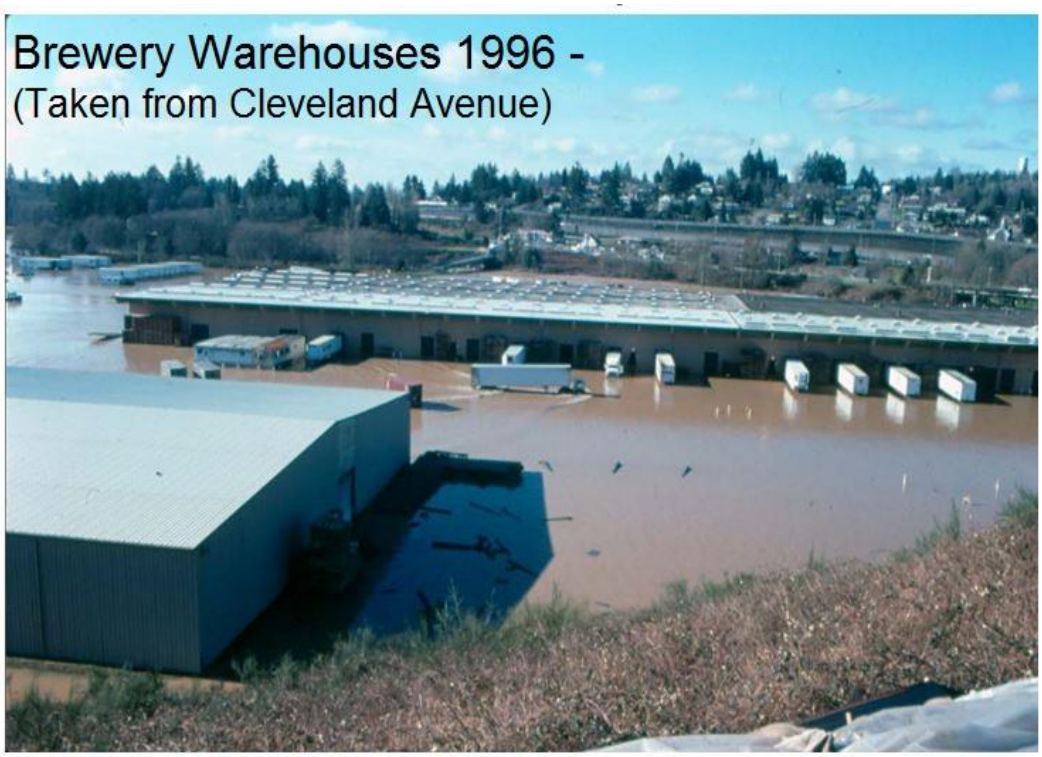
Construction of this golf course involved moving two million cubic yards of sand into the low marshy valley of the Deschutes River, raising the face of the course an average of 5 feet above its original height. All of the course contours were made and gently shaped by man.

25

Figure 2. Source: 75th Anniversary Brewery "It's the water" newsletter. p.25 Circa 1971.

The most obvious and visually dramatic examples of flooding in the City generally occur within the Deschutes Valley. City owned properties and facilities such as Pioneer Park, Tumwater Historical Park, the Tumwater Valley Municipal Golf Course, the Palermo well field and water treatment facility, the "M" Street sewer lift station, and other water and sewer infrastructure are located within this flood prone area. Private properties within this area include the bottling plant for the former Olympia Brewery, a few homes in the Palermo neighborhood off of "M" Street, The Valley athletic club, Tumwater Historical Park, which is a private park open to the public, the fish hatchery and associated fish ladder at Tumwater Falls, and the historic Old Brewhouse across from Tumwater Historical Park.

[1] "It's the Water" Brewery newsletter. "A Hill Becomes A Fill." June-July 1953.
[2] "It's the Water" Brewery newsletter. Aesthetic Excavation Planned. July 1963.
[3] 75th Anniversary Brewery "It's the water" newsletter. p.25, circa 1971.



1996 Tim Walsh, WA DNR

Several residential structures on 58th Avenue across from Pioneer Park were annexed to the City in January 2016. Since 1999, staff have observed and photographed these homes and properties being flooded on a regular basis.

Pioneer Park is one of several areas that are frequently inundated by floodwater. Water typically flows through the entire parking lot area and some of the sports fields.[4] Fortunately, the building, which houses the restrooms, has yet to be flooded.[5] This building is also used as a storage shed for mowers, tractors, and other equipment used for park maintenance.[6] A sewer lift station is located here as well.[7] 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.[8]

The generator for this sewer lift station is on a concrete pad behind the restrooms. If the power supply is interrupted this generator is to take over so the sewer lines do not backup and overflow. The generator is not elevated except for the mounting brackets and the concrete pad upon which it sits. Consideration should be given to elevating portions of the infrastructure such as the generator when they are located within floodplains.

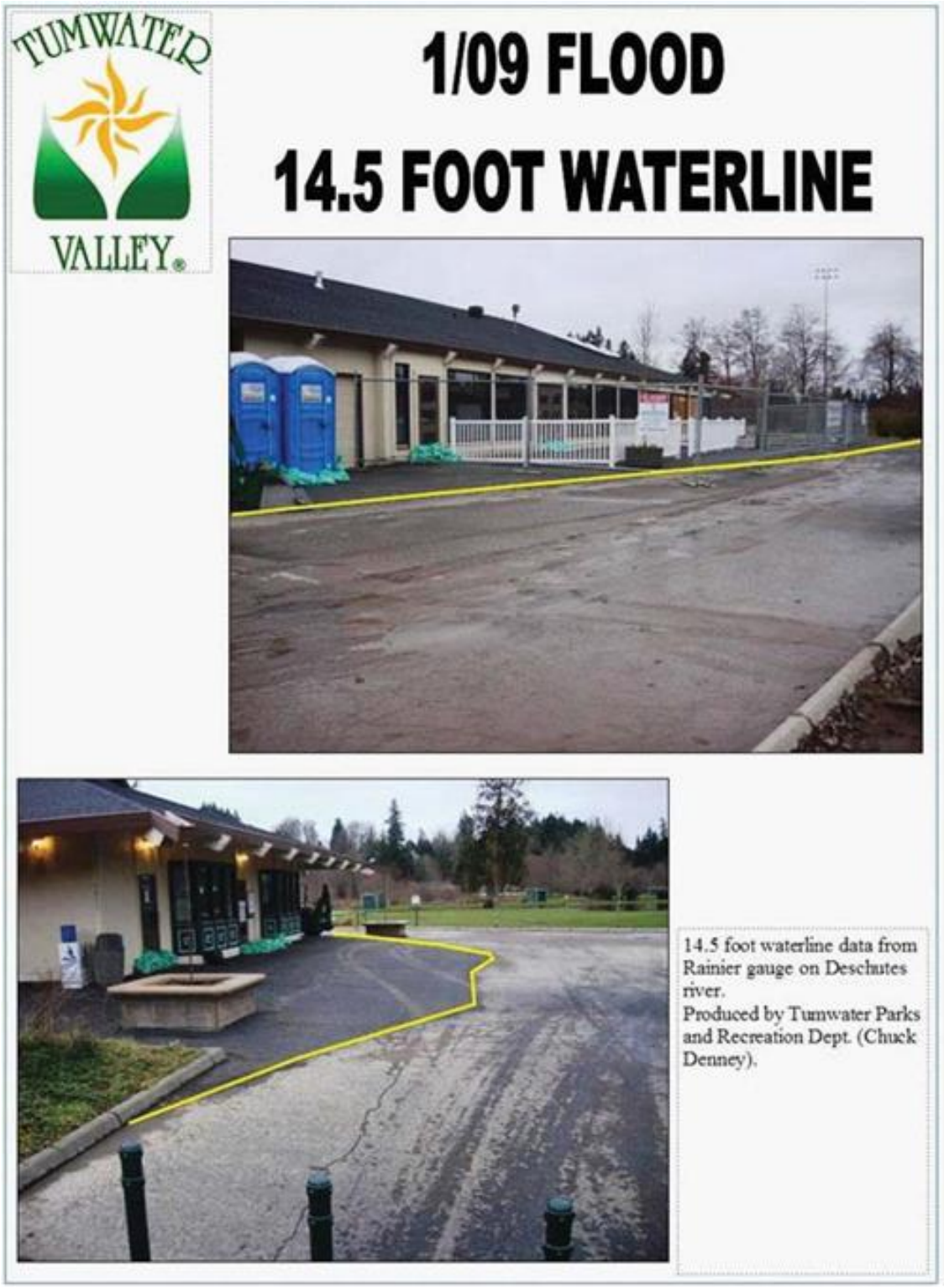
[4] Picture of flooding in parking lot and access road at Pioneer Park, January 8, 2009.
[5] Picture of flooding near restrooms at Pioneer Park, December 4, 2007.
[6] Phone conversation with Jeff Vrabel, Tumwater Facilities Manager, June 10, 2009.
[7] Phone conversation with Steve Craig, Tumwater Public Works Operations Manager, June 15, 2009.
[8] Phone conversation with Steve Craig, Tumwater Public Works Operations Manager, June 15, 2009.

The Palermo neighborhood off "M" Street has several homes within the 1% (100-year) floodplain. The area also contains the Palermo wellfield and water treatment facility and the "M" Street sewer lift station. Floodwaters have not yet flooded the drinking water treatment and wellhead facility but have come close in the past several 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 floodwater into the wetwell. In addition, 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.[9]

The Tumwater Valley Municipal Golf Course is within the 1% (100-year) floodplain and is flooded almost yearly. Floodwater routinely covers the golf course and gets to within a couple of feet of the door of the clubhouse, which is only inches below the level needed to flood the interior. Chuck Denney, the Parks & Recreation Director, produced a one-page demonstration of the water level at the Tumwater Valley Municipal 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 flood gauge at Rainier on the Deschutes River (14.5 feet).

[9] Phone conversation with Steve Craig, Tumwater Public Works Operations Manager-June 15, 2009.



With most storms that involve precipitation there are localized areas of flooding on streets. The Transportation & Engineering Department 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 and 2012

snowstorms 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.[10]

In various areas along both Trosper and Kirsop Roads, localized flooding is a regular occurrence with large storms. The area has little in the way of frontage improvements. There are a series of deep ditches, many disconnected from upstream and downstream conveyance due to impacted or undersized culverts. In a few instances, beaver dams have obstructed conveyance, which is now managed by the City under a permit from the State Department of Fish & Wildlife. In addition, the City's Public Works Department completed a drainage study for the Trosper and Kirsop area in 2011, identifying a number of projects for retrofit to improve both conveyance and water quality. These projects have been added to the City's Capital Facilities Plan, with one project underway in 2015 for Kirsop Road, and others scheduled for 2023.[11]

Heavy rains, snow melting, and warmer temperatures caused flooding of major streets on January 7, 2022. Tyee Drive between Trosper Road and Kingswood Drive SW was closed due to water over the roadways. Tumwater Valley Drive was closed; a flood watch was in effect for the Deschutes River. The Tumwater Valley Municipal Golf Course and parks near the river experienced minor flooding during this event.

High groundwater flooding is an issue in several areas but mostly concentrated in the southwest portion of the City and its urban growth area. In order to deal with future groundwater flooding impacts the City and Thurston County adopted the Salmon Creek Drainage Basin Plan and its implementing regulations in 2005. The regulations control development within areas impacted by high groundwater flooding. Currently, sixteen properties in the City have flood insurance and only two claims have been paid since 1978 for a total of approximately $12,514.40. None of the City owned facilities or buildings, including the

[10] Phone conversation with Steve Craig-Tumwater Public Works Operations Manager-June 15, 2009.
Photos of Capitol Boulevard taken by Senior Planner David Ginther during 2012 snowstorm.
[11] Conversation with Tumwater Public Works Water Resource Division Manager in 2009, December 2015, and review of the June 15, 2009, Request for Statement of Qualifications for drainage studies in the City.

recently remodeled Tumwater Valley Municipal Golf Course clubhouse, which are located in the floodplain, have FEMA flood insurance.

Probability of Occurrence

Same as described in the Regional Risk Assessment. The probability of a flood event in the one hundred year flood plain is high, meaning a flood event is likely in the next 25 years. Flooding in a high groundwater area has a medium probability, an event is likely to occur within one hundred years.

Changes in Development

Development is restricted in the 100-year flood zone, there is no new development in flood hazard areas.

One site that may be redeveloped is the former Olympia Brewery and an "E" street expansion. The Brewery redevelopment and "E" street expansion proposals will require extensive Environmental Impact Studies. The redevelopment areas are in the one hundred year flood plain, shoreline regulatory environment for the Deschutes River which extends to the edge of the one hundred year flood plain.

Review of available studies and regulatory references identify some potential limitations to redevelopment of this area, largely due to the site's proximity to shoreline, function as a flood plain, and the impact of stormwater. The majority of the site area that is affected by these limitations lies within the Valley and Knoll parcels. The Valley parcel lies within the one hundred-year flood plain of the Deschutes River and within the shoreline buffer areas. Due to periodic flooding and the current Tumwater Municipal Code, grading and construction of new structures will not be allowed. Future uses of the Valley Parcel will need to be tolerant of periodic flooding.

Effects of Climate Change

Both the extent and the frequency of flooding is projected to increase. Heavy rain events are projected to intensify increasing flood risk in all Puget Sound watersheds, including the Deschutes River watershed. Multiple factors combine to drive large increases in flood risk: declining snowpack, intensifying heavy rain events, and rising seas.

Flooding, especially in the Deschutes Valley and areas near the airport have a very high risk index. Flooding will impact existing homes, recreation facilities such as the Valley Athletic Club and parks, and critical infrastructure such as wells and lift stations, and critical facilities such as City Hall, the Headquarters and North End Fire Stations, and the Olympia Regional Airport. Roads and transportation will be impacted as well. Emergency services may not be able to access those in need in cases of extreme water way flooding which is common in the Trosper and Kirsop Road area, and other roads in high ground water areas.

Vulnerability

Impacts to People

If unprepared, people can be caught in fast moving waters and die. Those who have health concerns or do not have transportation are at risk if they are not able to leave in case of an evacuation. Though flooding is rarely related to mortality in Washington State, Flood waters present direct, short-term physical threats to health. In addition, floods can indirectly affect health by conveying biological and chemical agents to drinking, storm, and recreational waters; and by establishing favorable conditions for mold growth. The risk of illness increases as individuals and communities are exposed to pathogens through contact with contaminated waters or mold-filled dwellings.

People living near the Deschutes River by Pioneer Park and residents living near Kirsop and Trosper Road are at risk of flood hazard. There is a high risk of emotional, physical, and psychological stress. Damage to property could be costly and take time, this would impact people's livelihoods. The recovery period is stressful and disruptive for flood victims.

Impacts to Structures

The loss matrix identifies nine buildings exposed to high ground water hazard areas and sixteen buildings in the 100-year flood zone. It is estimated there would be twelve buildings impacted by flood, with a value of $123,879 worth of damage to the structures and contents. The City owns the parcels in the Tumwater Valley, including the Tumwater Valley Gold Course clubhouse. There are warehouses and maintenance facilities in the Deschutes Valley area, flooding could impact City functions and cause damage to structures.

The following critical infrastructures are located within the one hundred year flood zone or near:

- Pump station off Sapp Road
- Palermo Lift Station
- Pioneer Park

Impacts to Systems

Floodwater can damage or destroy buildings, homes, and their contents. Electric, gas, water, and communication utilities are also at risk of damage and disruption. Swift moving floodwaters can cause erosion and damage or destroy infrastructure including electric, gas, water, and communications utilities. Bridges, roads, and railroads are also vulnerable.

Impacts to Natural, Cultural, and Historic Resources

Unique to the historic brewery site along the Deschutes River are several rich layers of culture and history. The site presents challenges for historic preservation, cultural endowment, environmental sensitivity and mitigation, riparian restoration, recreation, and economic development in the event of a flood. Some of the highlights of natural, cultural, and historic resources include:

- Native American historical and cultural site
- Location where settlers from the Columbia River first settled in Washington State
- Southernmost location of Puget Sound
- Brewery History

Risk

Estimated Exposure to Flood

The Regional Plan used a Flood Modeling and GIS exposure analysis to estimate the number of people who live in areas that are prone to flooding. The City's number of population exposed is low as noted in the table below, but that does not negate the risk or danger.

Table 1. Estimated Population Exposure to Flood.

Number or Population Exposed			
50 year	**100 year**	**500 year**	**High Groundwater**
16	28	34	19

Types of Structures Exposed in Flood

The Regional Plan identifies estimates of buildings exposed to flood and the cost of losses and damages using Hazus Modeling. In the event of a flood there will also be tons of debris created from the hazard event. People, businesses, and more would be disrupted for potentially long periods of time. This will have effects on the economy, people, transportation, and more.

Table 2. Estimated Structural Exposure to Flood.

Number of Structures Exposed to Flood			
50 year	**100 year**	**500 year**	**High Groundwater**
5	16	23	9

Hazard Risk Rating

The City's 50-, 100-, and 500-year flood hazard risk ratings are low, medium, and low, respectively. The high groundwater hazard risk rating is low.

Earthquake Risk Assessment

Area of Impact

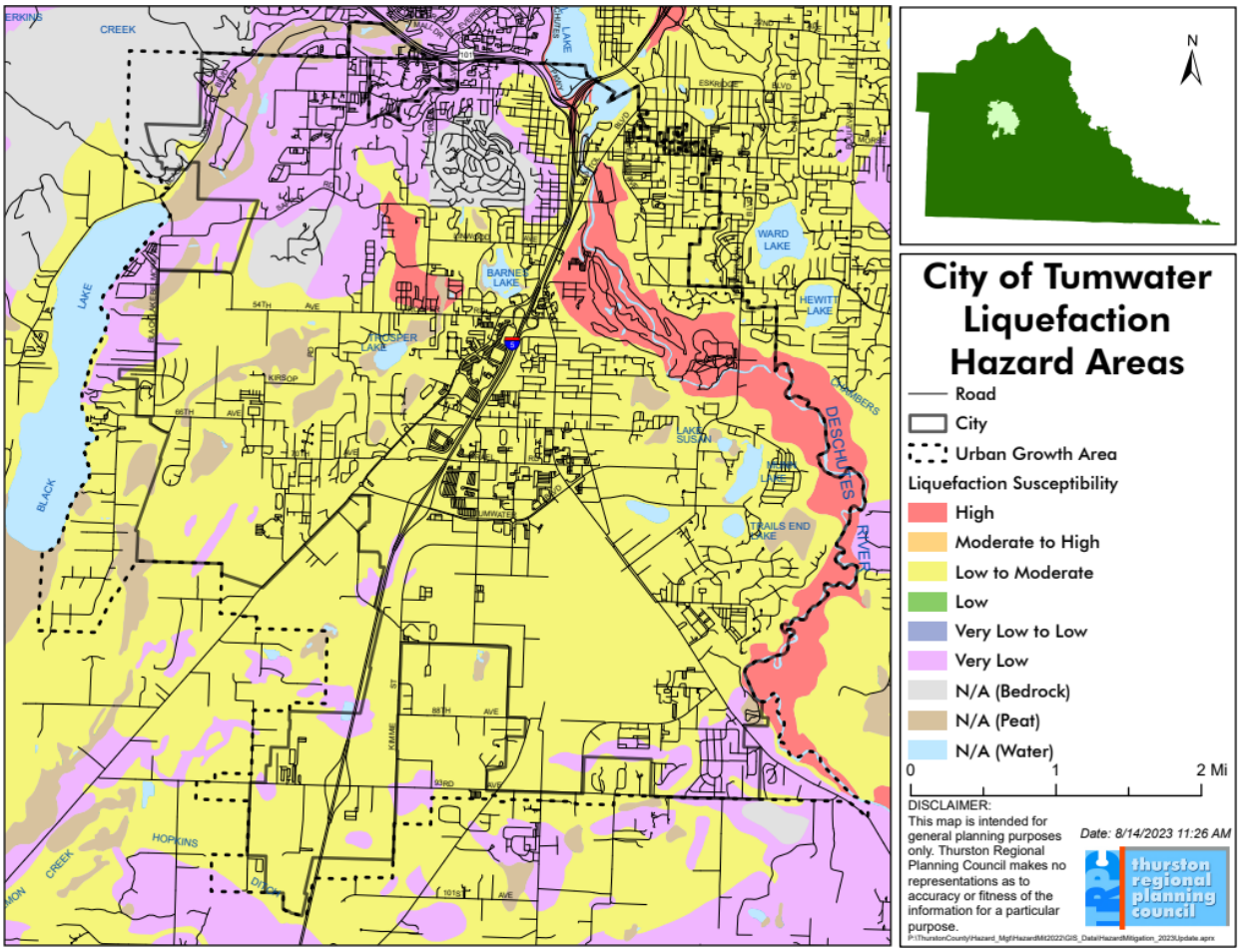


Figure 3. City Liquefaction Hazard Areas.

Generally, the same as described in Chapter 4.2 of Regional Risk Assessment, all areas of the Pacific Northwest are seismically active.

For the risk assessment, three earthquake scenarios were modeled using the natural hazards GIS modeling tool Hazus to assess vulnerabilities, estimate losses, and characterize earthquake hazard risks for Thurston County:

- A Cascadia Subduction Zone Magnitude 9.3 (megathrust earthquake)
- A Nisqually 7.2 (deep intraplate earthquake)
- A Seattle Fault 7.2 (shallow or crustal faulting earthquake)

The entire Deschutes Valley from Henderson Boulevard SE to the former Olympia Brewery has high liquefaction susceptibility. Percival Creek vicinity from Trosper Road SW to Sapp Road SW have areas of moderate to high liquefaction. Liquefaction is a phenomenon that occurs when ground shaking causes loose soil to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength. Lateral spreads develop on gentle slopes and involve the sidelong

movement of large masses of soil as an underlying layer liquefies. Loss of bearing strength results when the soil supporting a structure liquefies. This can cause structures to tip and topple. Liquefaction typically occurs in artificial fills and in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys.

City critical facilities and infrastructure such as water systems and pump stations are located in Earthquake hazard areas. Disruptions in service could have significant impacts on the community and extend recovery times after an event. Damages to infrastructure would be costly and have significant economic losses and burden to vulnerable communities.

There are many socially vulnerable communities located in areas at high risk for earthquakes and liquefaction near Trosper Road and the Deschutes Valley.

Extent

The Pacific Northwest is one of the most geologically active regions in North America, as described i in Chapter 4.2 of the Regional Risk Assessment. There are three different source zones to categorize Northwest earthquakes: Cascadia Megathrust, Deep Intraplate, and Crustal Faulting zones.

Previous Incidents

Four of the seven large manufactured and mobile home parks within the City are in areas of high liquefaction hazards or on peat.[12] These include Eagles Landing, Tumwater Mobile Estates, and Western Plaza, which are all located on Trosper Road, and Thunderbird Villa on Dennis Street. The latter three sustained damage during the 2001 Nisqually earthquake.[13]

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 fifty residences in the mobile home park.[14] Evidence of liquefaction in the form of sand boils appeared in several areas of the park.[15]

The Western Plaza mobile home park experienced settling due to liquefaction, although it was to a lesser degree than that seen at Tumwater Mobile Estates.[16] Thunderbird Villa on Dennis Street had damage as well. The Fire Department observed at least one home in Thunderbird Villa that had the backyard settle several feet abruptly off the back of the home.[17]

[12] Map-Tumwater Mobile & Manufactured Home Parks Liquefaction Soil Hazards.
[13] Former Tumwater Fire Chief John Carpenter-phone conversations June 3, 9, and 10, 2009.
[14] Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.
[15] USGS report on 2001 Nisqually Earthquake: http://pubs.usgs.gov/of/2003/ofr-03-211/NisquallyFinal.html#sunset 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.
[16] Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.
[17] Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.
Picture by Fire Department of earthquake damage at Thunderbird Villa mobile home park.

Photo by Tumwater staff

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.[18] John Carpenter, the former Fire Chief, was inside the building at the time and witnessed the formation of a 10" step in the middle of a formerly flat hallway.[19] It is of particular concern that these types of facilities and mobile and manufactured home parks, which tend to be populated by some of the more vulnerable residents, 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 Headquarters 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 Headquarters Fire Station even though the two were structurally joined together.[20]

Most City buildings had at least some minor damage. Both the Headquarters Fire Station and North End Fire Station, City Hall, the Tumwater Timberland Library, Old Town Center, the historic Crosby House, the

[18] Map-Tumwater Mobile & Manufactured Home Parks Liquefaction Soil Hazards.
Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.
[19] Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.
[20] Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.

Henderson House Museum, and portions of the Tumwater Valley Municipal Golf Course all were damaged in the earthquake.[21] There were approximately 173 reports of damage to private property in the City.[22]

Figure 1: The Best Western hotel located on the bluff above the Palermo well field had a portion of the rear parking lot settle and start to slide down the hill. (Former Tumwater Fire Chief John Carpenter-phone conversation 6-3/9/10-2009)

Figure 2: The Extended Stay America facility near the Highway 101/Crosby Boulevard interchange had a large retaining wall give way, which broke a water line (Former Tumwater Fire Chief John Carpenter-phone conversation 6-3/9/10-2009)

[21] Former Fire Chief John Carpenter-phone conversation June 3, 9, and 10, 2009.
Jeff Vrabel, Facilities Manager, phone conversation June 10, 2009.
City Preliminary Damage Assessment Worksheet March 5, 2001.
[22] City-wide damage spreadsheet (Excel) sourced from the Fire Department.

Figure 8-10. Hillside slid away from beneath this four-hundred-foot section of a Union Pacific Railway branch line at Tumwater, near Olympia, Washington, during the Puget Sound Earthquake of 1965. A large landslide during the heavy-rainfall winter of 1996-97 also damaged the rail line. Photo by G.W. Thorsen, Washington Division of Geology and Earth Resources.

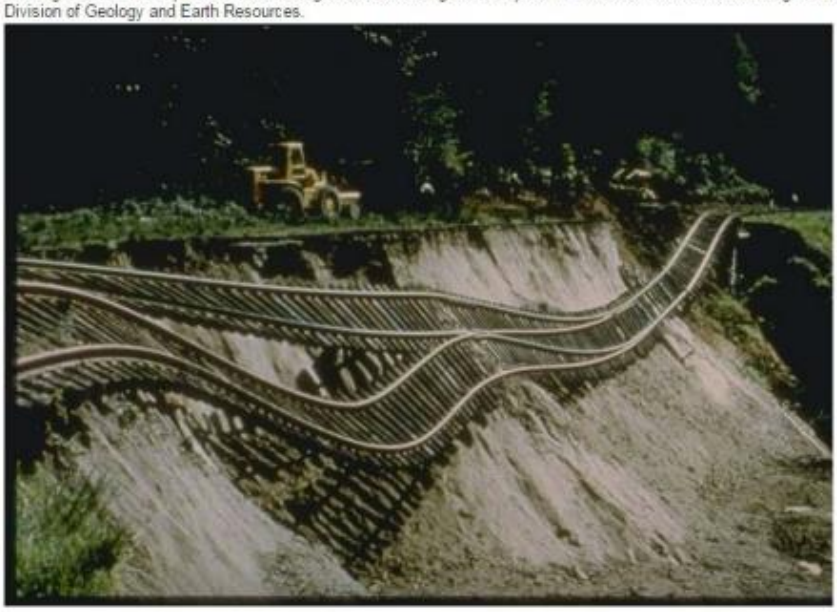


Figure 3: During the 1965 Puget Sound Earthquake, a large portion of the railroad lines north of the old brewhouse were significantly damaged in an earthquake induced landslide.

After the 2001 Nisqually earthquake, the State Department of Natural Resources mapped liquefaction hazard areas in the City. The entire Deschutes Valley southeast of Capitol Boulevard has been identified as an area of high liquefaction hazard. Aerial photos from the 1930s and the early 1950s[23] show that the area where the brewery warehouses are now located was once part of the Deschutes River channel. The river was relocated, 7.5 acres were filled with 130,000 cubic yards of material from the adjacent hillside along Cleveland Avenue, and the warehouses were built on top of the fill.[24]

Probability of Occurrence

An earthquake or liquefaction event for the City is medium, meaning it is likely a hazard event will occur within the next one hundred years. There is a 40 to 80 percent chance of a large earthquake occurring in Washington State in the next 50 years.

Changes in Development

There have been no changes or development in high liquefaction areas. The City is trying to work with the existing manufactured home parks to keep housing costs affordable and to ensure homes are connected to utilities which are to be built to current standards.

[23] Henderson House Museum Collection No. 78 and No. 80
[24] "It's the Water" Brewery newsletter. "A Hill Becomes A Fill." June-July 1953.

Effects of Climate Change

Earthquakes are not influenced by climate change.

Vulnerability

Impacts to People

In the event of an earthquake, everyone within the City would be exposed. There are immediate life safety impacts from collapsing buildings, liquefaction areas, and roads. There are other near-term impacts such as: disruption to utilities, water contamination, risks to people with disabilities, mental health incidents, and shelter demand for displaced individuals. In the event of an M9.3 scenario, 811 households will be displaced, half of those households will need temporary shelter. All buildings and businesses will be exposed to the earthquake, resulting in damage to structures and contents totaling an estimated $996,891,653. The City is at High risk for exposure to earthquakes, and the damages could be substantial. The economy would be impacted, and functionality of critical facilities are services, such as City Departments and infrastructure, would have long recovery times.

As identified in previous incidents above, there are communities that are socially vulnerable located in earthquake hazard areas. The FEMA National Risk Index identifies the City as Relatively Low for Social Vulnerability, but there are historic occurrences of earthquakes impacting emergency service facilities, which could impact the health and safety of people. There are also electric substations, and health and medical facilities that would be impacted. Socially vulnerable people living in long term care and special care facilities would be impacted, especially in the Trosper area, where liquefaction has occurred.

Table 3. Earthquake Displacement and Shelter Needs in the City.

Earthquake Household Displacement & Sheltering Needs			
	Cascadia M9.3	**Nisqually M7.2**	**Seattle M7.2**
Households Displaced	811	68	15
Individuals Needing Shelter	406	35	8

Impacts to Structures

Earthquakes can cause damage to homes and other buildings. Furniture, appliances, electronics, and other items could be moved and damaged in the event. There is a risk of secondary hazards such as fire or water damage.

Critical facilities such as fire departments, hospitals, police, and other providers could sustain damage to the buildings and equipment. Operations would be disrupted and inoperable until buildings, equipment, and power are restored to a functioning status.

In the event of an earthquake, mass amounts of structural debris will be generated. The table below represents structural debris multiplied by one thousand tons within the City.

Table 4. Structural Rubble Created by Earthquake in the City.

	Cascadia M9.3	Nisqually M7.2	Seattle M7.2
Total Debris (tons)	198.35	24.70	6.59

Impacts to Systems

City facilities and infrastructure are susceptible to damage, as identified in the previous incidents section, above. City Hall and surrounding facilities were built in 1987. The Headquarters Fire Station was built in 2000. Routine inspections and maintenance, as well as upgrades to infrastructure outlined in the mitigation initiatives will help reduce damage and keep critical operations working in the event of earthquake. Updates to infrastructure are needed to ensure they can withstand earthquakes and other hazards; the Capital Facilities Plan addresses the specific systems that need to be updated. Upgrades, such as installing solar power in City Hall and backup generators for water systems are needed to reduce the risks of vital utilities being out of commission for long periods of time.

The City has water systems in the Deschutes Valley. This area is mapped with high risk for earthquakes and liquefaction zone. Below is a table outlining the probability of damage and functionality after an event based on LOTT water systems at T Street and a Wastewater Line on Deschutes Valley Drive in the City. These systems are located near the Palermo Well, a critical facility to the City.

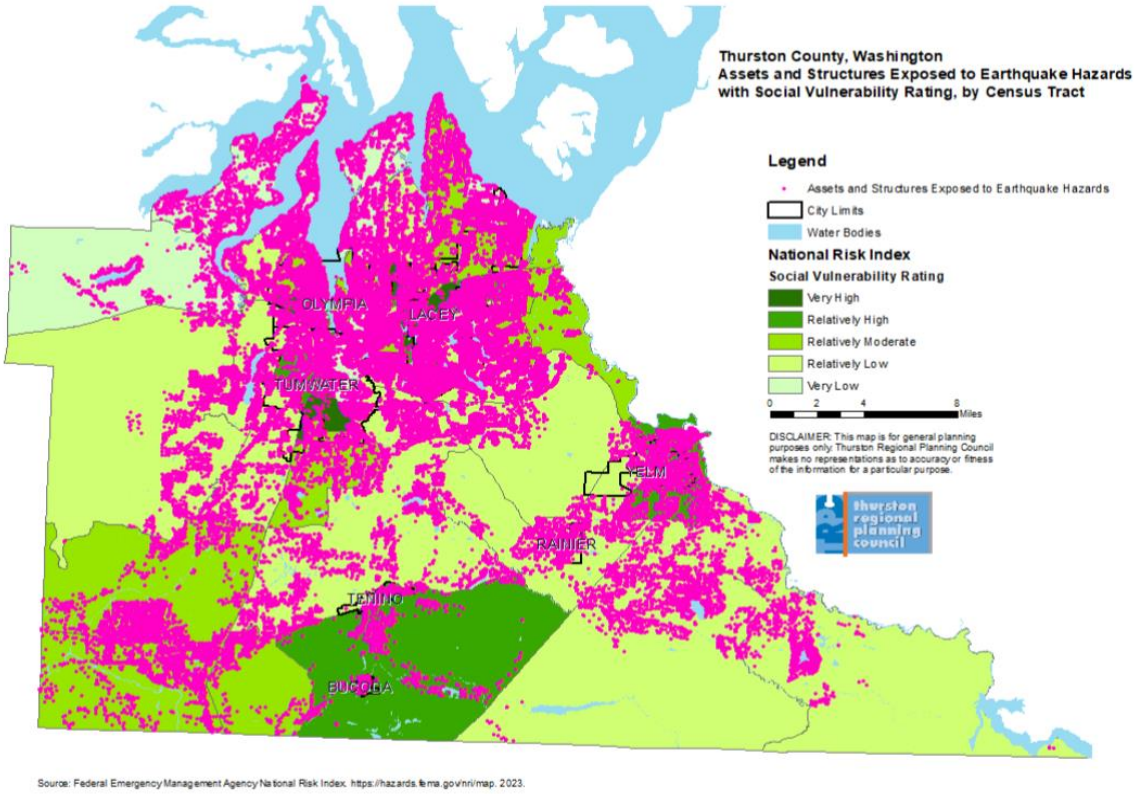
According to the Water Resources & Sustainability Department, more than one third of the City's drinking water comes from the Palermo well field in the Deschutes Valley, which is identified as an area of high liquefaction susceptibility by data provided by the State Department of Natural Resources. Damage to the Palermo wells or related infrastructure could cause a significant disruption in the supply of potable water for the City residents and emergency responses such as firefighting.

Table 5. Damage to Water Systems in the Event of a Cascadia M9.3 Earthquake.

Site	Probability of Complete Damage	Probability of At Least Slight Damage	Probability of at Least Moderate Damage	Functionality (%) at Day1	Functionality (%) at Day 7	Functionality (%) at Day 14
600 T Street-Water reservoir	90.93%	99.98%	98.7%	10.4%	13.5%	16.6%
110 Deschutes Parkway-Wastewater Pipeline	82.04%	99.93%	95.18%	1.3%	6%	8.1%

**Data from CriticalFacilitiesAnalysis_EQ_CascadiaM93.xlsx- Cascadia Fault Earthquake Scenarios*

Risk

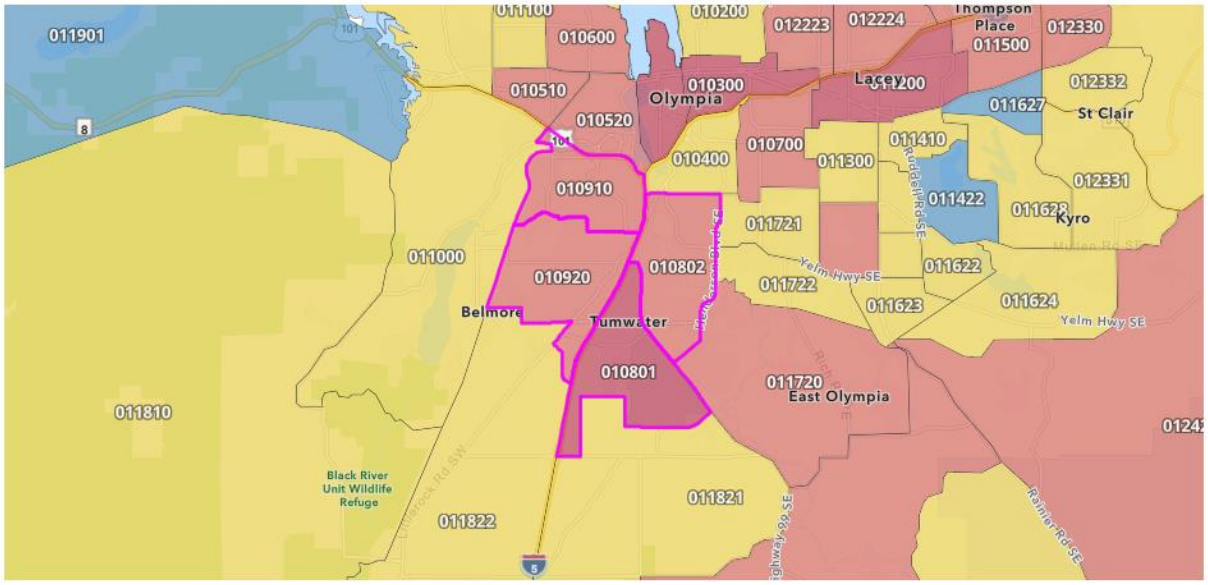


Hazard Risk Rating

Social vulnerability and the hazard risk rating index are summarized in Chapter 4.2 of the Regional Plan. The City's rating for a Cascadia M9.3, Nisqually M7.2, and Seattle M7.2 hazard risk ratings are high, medium, and medium, respectively.

Nationally, the City ranks relatively high/high for risk and social vulnerability in the event of an earthquake.

Risk Index



Risk Index Legend

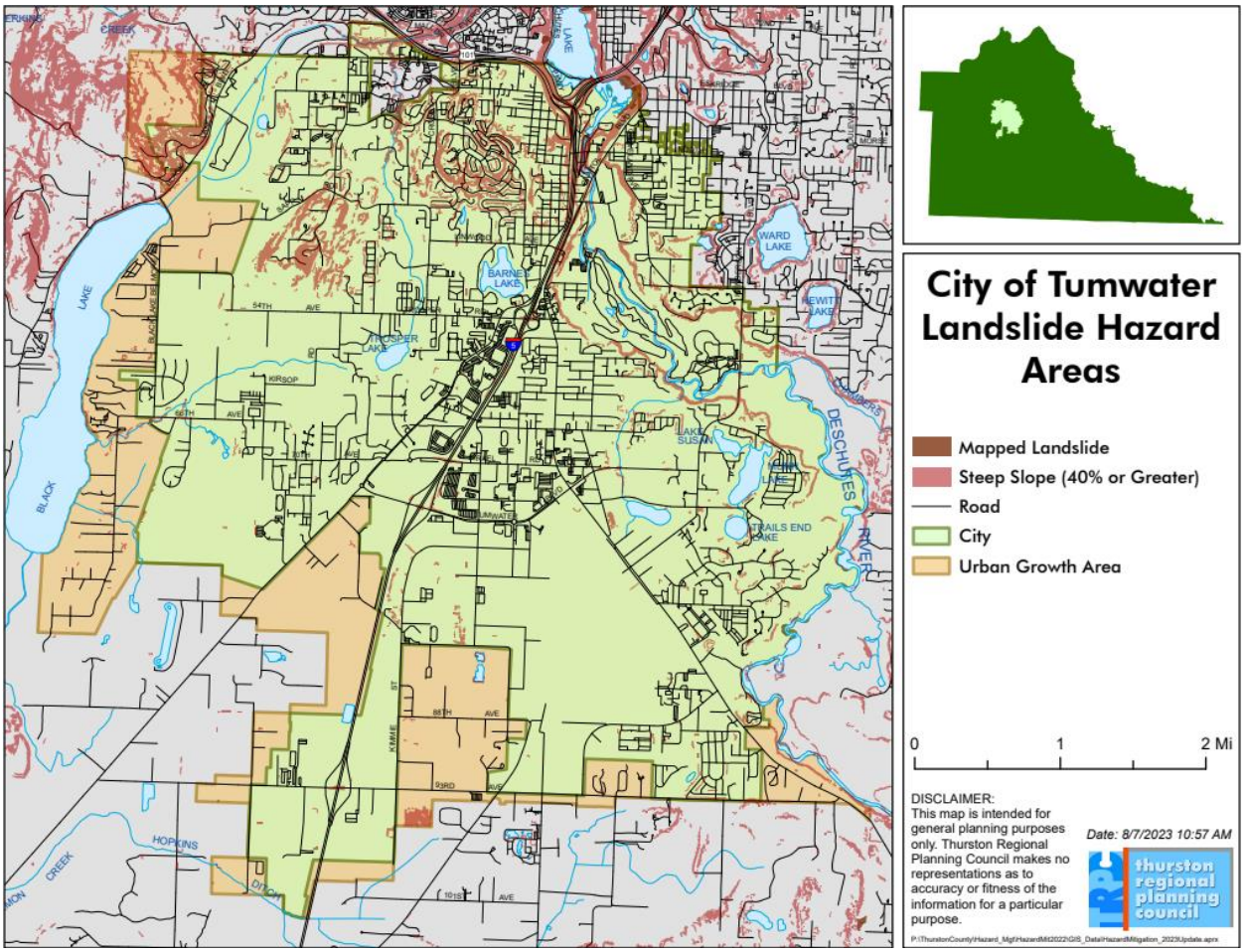
Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Rating | Not Applicable | Insufficient Data

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Census tract 53067010801	WA	Very High	97.5	0 100
2	Census tract 53067010910	WA	Relatively High	95.93	0 100
3	Census tract 53067010920	WA	Relatively High	95.81	0 100
4	Census tract 53067010802	WA	Relatively High	94.88	0 100

Landslide Risk Assessment

Area of Impact



For the purposes of the hazard risk assessment, landslide hazard area is defined as a combination of the following areas:

1. Areas with slopes that are 40 percent or greater (slope was calculated using light detection and ranging or LIDAR using GIS); and
2. State Department of Natural Resources mapped known and historic landslides database

Tumwater Municipal Code 16.20.045(B) defines landslide hazard areas as:

> *Landslide Hazard Areas. Landslide hazard areas are areas potentially susceptible to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible to landslides because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Examples of these may include, but are not limited to, the following:*
>
> *1. Areas of historic failures such as:*
>
> *a. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having "severe" limitation for building site development.*

b. Those areas mapped by the Department of Ecology (Coastal Zone Atlas) or the Department of Natural Resources (slope stability mapping) as unstable ("U" or class 3), unstable old slides ("UOS" or class 4), or unstable recent slides ("URS" or class 5).

c. Areas designated as quaternary slump, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Department of Natural Resources.

2. Areas with all three of the following characteristics:

a. Slopes steeper than fifteen percent; and

b. Hillsides that have intersecting geologic contact with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

c. Springs or ground water seepage.

3. Areas that have shown movement during the Holocene epoch (from ten thousand years ago to present) or that are underlain or covered by mass wastage debris of that epoch.

4. Slopes that are parallel or sub parallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials.

5. Slopes having gradients steeper than eighty percent are subject to rock fall during seismic shaking.

6. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action.

7. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding.

8. Any area with a slope of forty percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief.

Landslide Hazard areas are mapped near Sapp Road, Tumwater Hill, Black Lake Boulevard, and along the Deschutes River.

Extent

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

Previous Incidents

The areas within the City that are most susceptible to landslides are shown on the City Steep Slopes map. Most of the steep slopes are in the northern portion of the City and include the bluffs along the Deschutes 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.[25] 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.

However, the majority of landslides have occurred at the southeast end of Capitol Lake near the historic Old Brewhouse. This area is across the water from Tumwater Historical Park and behind the row of historic homes on Capitol Boulevard.

The following is an excerpt from the Brewery Neighborhood Appendix of the Tumwater Land Use Element:

> *There have been a number of landslides within this neighborhood. A slide in 1902 demolished several of the brewery buildings that were located east of the Old Brewhouse.[26] Slides in this same area have also occurred in 1965, 1996, 2001, and 2008 and have caused significant damage, mainly to infrastructure such as sewer lines.[27] The slides in 1965 and 1996 both ruptured main sewer lines resulting in untreated wastewater flowing directly into the Deschutes River and Capitol Lake.*

[25] Desoto Street landslide (1999)-Picture sourced from City's Public Works Water Resource Division.
[26] Source: 75th Anniversary Olympia Brewing Company Booklet ~1971.
[27] Source: *Natural Hazards Mitigation Plan for the Thurston Region-2009.*

The 1965 earthquake triggered a landslide in this area that took out the railroad tracks and the sewer line that transported wastewater from the City to the LOTT treatment facility in the City of Olympia.[28]

Figure 8-10. Hillside slid away from beneath this four-hundred-foot section of a Union Pacific Railway branch line at Tumwater, near Olympia, Washington, during the Puget Sound Earthquake of 1965. A large landslide during the heavy-rainfall winter of 1996-97 also damaged the rail line. Photo by G.W. Thorsen, Washington Division of Geology and Earth Resources.

Another landslide in 1996 in the same area again took out the railroad tracks and the two main sewer lines.[29] The 1996 landslide was not triggered by an earthquake but occurred during a prolonged and intense period of precipitation. The wastewater has since been redirected to a new pipe that is located on the other side of the valley along Deschutes Parkway.[30]

Another landslide in this general vicinity was observed to have occurred during the 2001 Nisqually earthquake.[31] This 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.

There have not been any recent landslides since the 2017 City Annex update.

[28] 1965 landslide: Washington Emergency Management Division 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.
[29] 1996 landslide: "Sewer line plan upended by quake." Tuesday, March 20, 2001. John Dodge. *The Olympian*. 1996 landslide: Washington Emergency Management Division Washington State Hazard Mitigation Plan. November 2007. Hazard Profile-Landslide. p.9 http://www.emd.wa.gov/plans/documents/LandslideNov2007Tab5.6.pdf
[30] 1996 landslide: "Sewer line plan upended by quake." Tuesday, March 20, 2001. John Dodge. The Olympian.
[31] 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

The most recent 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 temporary failure. This minor lift station only serves about twenty residences on and near Capitol Boulevard.[32]

In February 2019, an oil spill from the Brewery spilled gallons of toxic sludge into the soil of Tumwater Historical Park's eastern trail. Clean up efforts by the State Department of Ecology repaired the soil, but after heavy rain the repairs were not enough. The soil was eroded, and rain caused segments of the trail to collapse into the Deschutes River. Continued rains only made things worse when the waterfall underneath the Boston Street bridge deteriorated, sending massive volumes of water down onto the east trail. The rush of water broke a fence and caused a rock buttress that holds up the trail to topple down onto the banks of the river.

Probability of Occurrence

The probability of a landslide in the City is high, meaning an event is likely to occur in the next 25 years.

Changes in Development

Tumwater Municipal Code addresses new and redeveloped areas that may be in areas mapped with geologic hazard areas. There are standard setbacks from hazard areas and special technical reports required as part of the development proposal. A geotechnical engineer or geologist must prepare

[32] Phone conversation with Steve Craig-Tumwater Public Works Operations Manager-June 15, 2009.

reports. The Development Code will be checked to ensure current state regulations are adopted through the periodic update in 2025.

Effects of Climate Change

With climate change, more frequent and intense rain, decreased summer precipitation, wildfires, and flooding, landslides and erosion frequencies and processes are altered. Warmer air will break down soils, allowing more water to be penetrated, wildfires and loss of vegetation and root systems that stabilize slopes, can affect rates of erosion and increase the chances of landslides.

Vulnerability

Impacts to People

An estimated 223 people within the City live within areas that are at risk of landslides. Landslides could catch people unaware and cause serious injury or death. People could be stranded if roads are blocked and transportation unavailable. People can lose their homes and experience displacement. If serious injury occurs, help and assistance could be extended or not able to reach those in need.

Impacts to Structures

Landslides can damage and destroy homes, property, critical facility structures, and infrastructure. There are seventy-four structures identified in potential landslide hazard areas according to the Regional Plan Table 4.4.3. Tumwater Hill is a highly populated area with residences, duplexes, apartments, a school, and businesses. A landslide could carry structural debris and cause damage to anything in its flow path.

Impacts to Systems

Water, sewers, and other critical infrastructure could be damaged in the case of a landslide. Tumwater Hill and the Deschutes Valley have water systems and transport lines that could be impacted or broken in a landslide. There is also the potential for contamination of water and to the environment. Landslides could block off transportation systems, damage roads and infrastructure needed for emergency services and evacuation, and isolate or strand people.

Impacts to Natural, Cultural, and Historic Resources

There are multiple historical structures and natural resources that could be affected by a landslide. Landslides in the Deschutes Valley could transmit contamination from the Historic Brewery site into the Deschutes River and damage the Tumwater Historical Park.

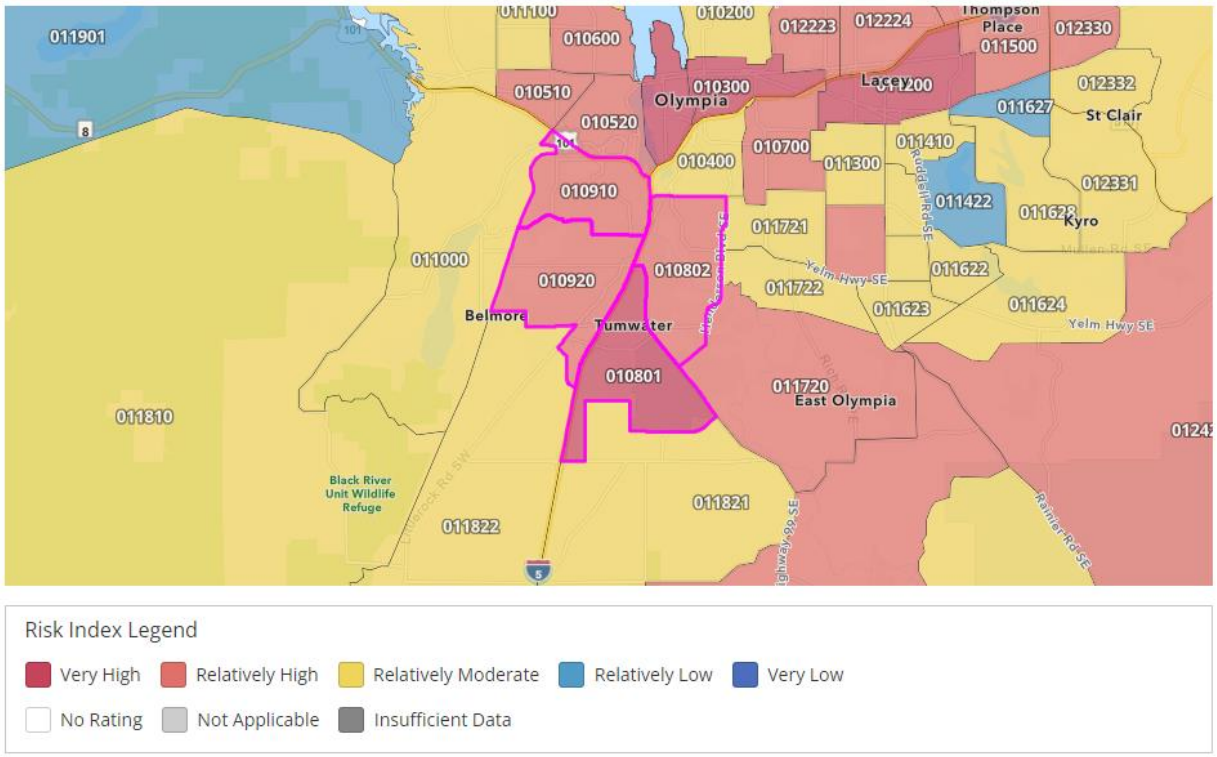
Risk

Hazard Risk Rating

Chapter 4.4 of the Regional Plan describes social vulnerability rating and the risk index for Landslide Hazard Areas. The City's risk index is relatively high to high according to the FEMA National Risk Index report. The overall hazard risk rating for the City is 18.

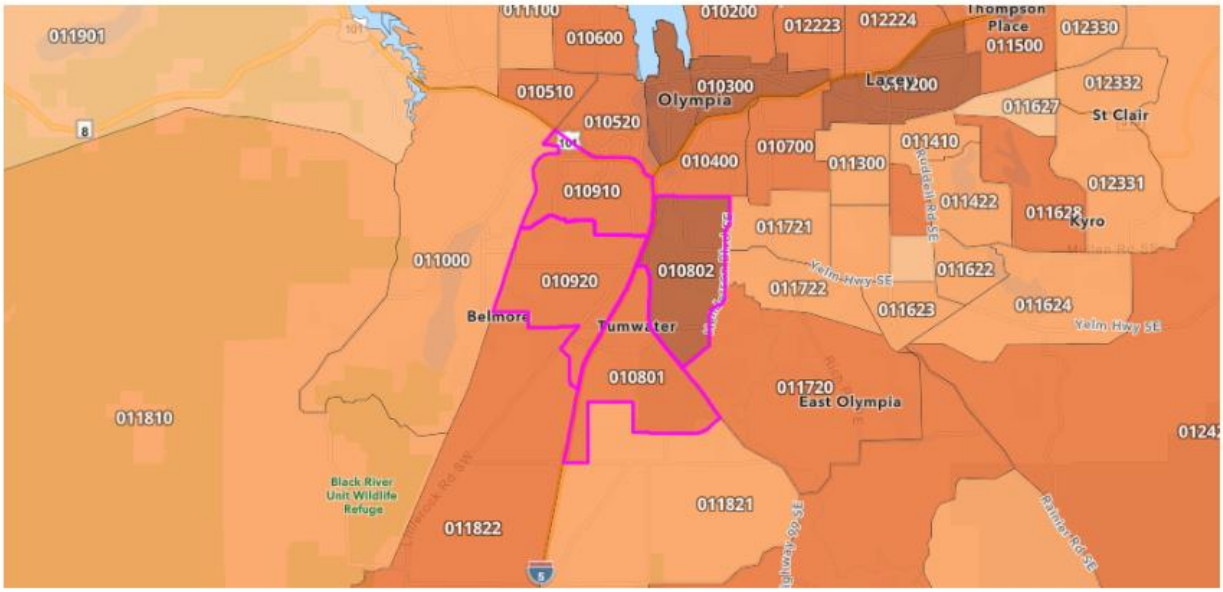
The maps below show the risk index and expected annual loss from landslides.

Risk Index



Expected Annual Loss

Expected Annual Loss measures the expected loss each year due to natural hazards.



Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Expected Annual Losses | Not Applicable | Insufficient Data

Rank	Community	State	EAL Value	Score
1	Census tract 53067010802	WA	$3,944,128	97.13
2	Census tract 53067010910	WA	$3,772,236	96.86
3	Census tract 53067010801	WA	$3,377,825	96.04
4	Census tract 53067010920	WA	$2,951,985	94.83

Severe Weather Risk Assessment

Area of Impact

In general, all Thurston County communities are affected by extreme heat events, extreme cold events, and other storm activities (winds, rains, and snow). See Chapter 4.6 of the Regional Plan for definitions and statistics.

Extent

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

Previous Incidents

Lightning has caused damage to the infrastructure in the City several times over the last couple of decades.

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.

During the December 2008 snowstorm, several apartment complexes in the City had carports collapse. These included the Breckenridge Heights apartments, Indian Creek condominiums (pictured below), and Capitol Heights apartments.[33] The Olympics West Retirement facility on Trosper Road was evacuated due to the threat of roof collapse from heavy snow.[34] Other relatively minor damage occurred to the Headquarters Fire Station when the weight of the snow tore the gutters off of the building. No injuries were reported due to the collapses.

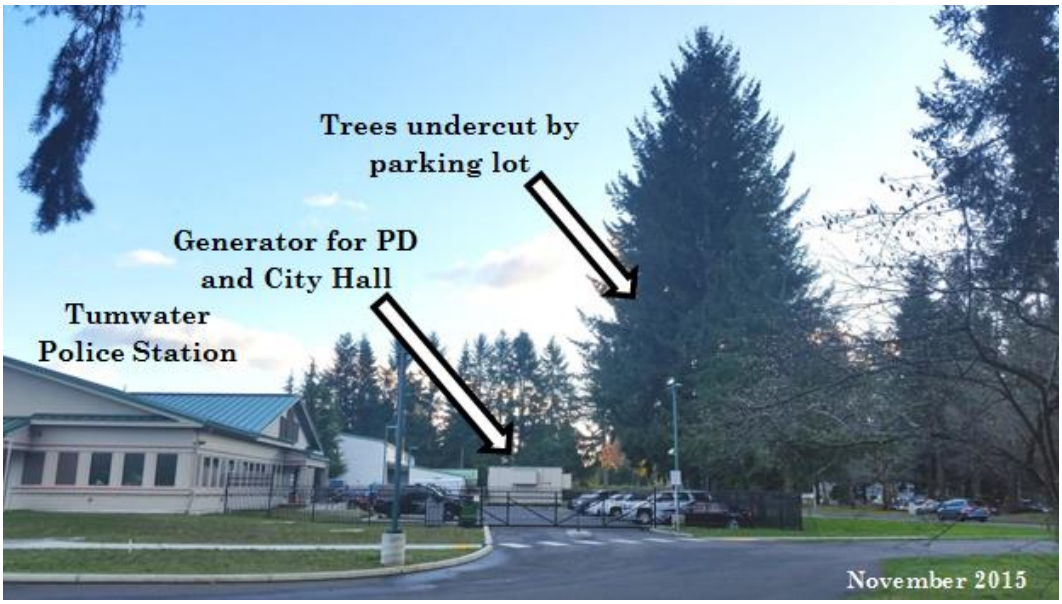
Due to the number of trees in the City, power outages are expected during storms. The most recent severe and long lasting power outages were during the December 2006, 2008, and 2012 winter storms. The 2006 windstorm resulted in City facilities without power for several days. A half million-dollar generator was installed at City Hall in 2009 to provide uninterrupted power for both City Hall and the Police Station. In addition, there are generators for most of the City facilities including, but not limited to,

[33] Picture from the Fire Department of collapsed carport at Indian Creek Condos 220 Israel Road in Tumwater on December 25, 2008 and conversation with Fire Department front counter staff.
[34] The Olympian newspaper article 12-28-2008 (online). "Riding arenas roof collapses." by Rolf Boone.

the Emergency Operations Center, which is inside the Headquarters Fire Station, the North End Fire Station, the Operations & Maintenance Facility, and several critical components of the water and sewer systems. Most City facilities are now able to function due to the generators.

Besides power outages, the other significant issue from storms is the damage to structures, utilities, and the transportation system from falling trees, as well as the cost of cleanup afterwards. The 2012 storm was a combination of heavy snow and ice, which severely damaged many trees throughout the City. The damage and cleanup costs for removal of tree debris from City streets and properties were approximately $317,796.56.[35] Some of the structure and infrastructure damage included a partially collapsed Headquarters Fire Station wash rack roof (~$42,000) and part of the computer system for the SCADA sewer and water management system had to be replaced (~$16,000).[36]

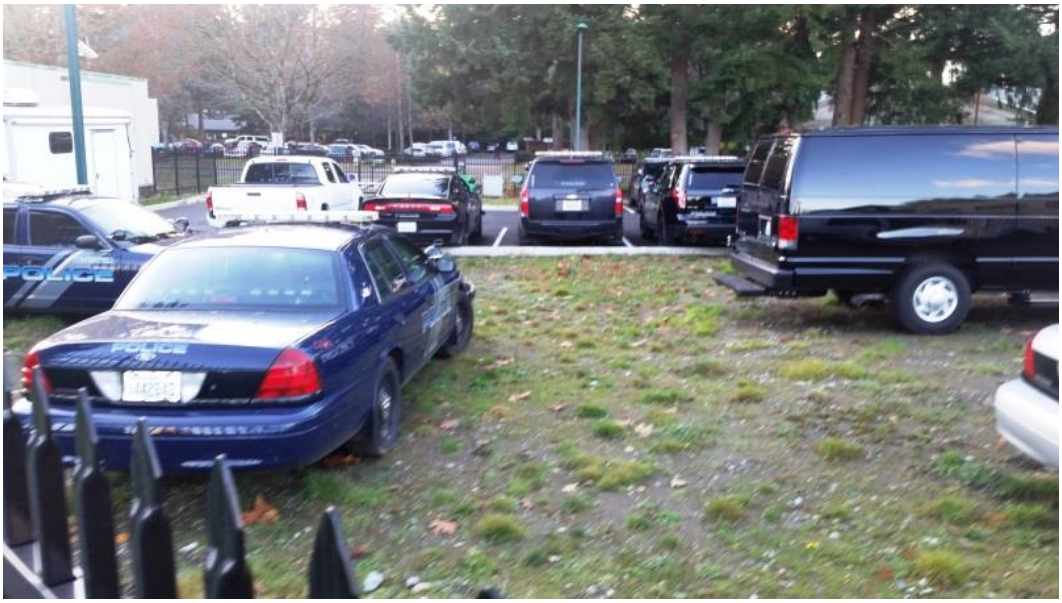
During the Police Department expansion at City Hall in 2014, the row of ten large fir trees on the west side of the building had their root zones significantly disturbed during construction. These trees are within falling distance of the newly expanded Police Station, which is a critical facility attached to City Hall, as well as the half million-dollar generator, which supplies power to the Police Station and City Hall. This generator also includes a special device to remove power fluctuations. For this reason, all power for City Hall, the Police Station, and the Operations & Maintenance Facility are routed from the Puget Sound Energy lines and through this device first before being distributed on-site. If a tree fell on the generator, it would also damage this special controller and completely interrupt power service on-site.



On May 4, 2017, a wet microburst touched down in parts of the City and the Cities of Olympia and Lacey causing substantial damage in a relatively small area. Many trees and utility poles were broken or blown down in the short but severe storm. Localized urban flooding occurred as well due to the large amount of precipitation that occurred within a short time period. Microbursts happen when air cools quickly inside a thunderstorm, moves to the surface, hits the ground and then spreads horizontally on the ground. Microbursts tend to affect small areas, usually no larger than a few square miles. This weather

[35] Project reimbursement worksheet for submittal to FEMA prepared by Fire Department staff 2012.
[36] Project reimbursement worksheet for submittal to FEMA prepared by Fire Department staff 2012.

phenomenon produces damage in a starburst pattern. The damaging winds radiate away from the point of impact in straight lines.



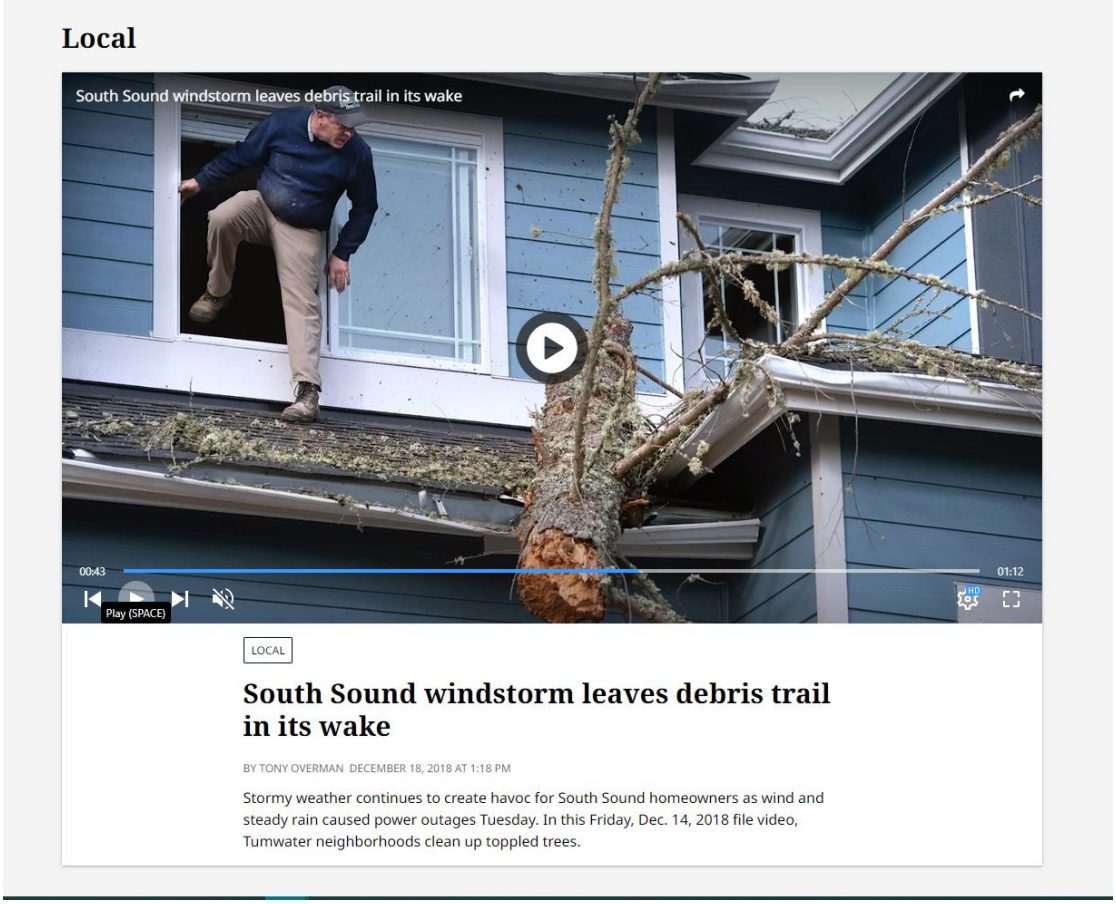
Other issues associated with these fir trees in this location are the clogging of the porous asphalt parking lot, fir needles and debris falling into and on cars, and tree sap dripping on to cars. Both of the latter issues can cause visibility issues with windshields on emergency vehicles. Police officers have taken to avoiding utilizing half of the parking lot for this reason and are parking on the grass at the back of the facility at times.


Trees undercut by police station parking lot – November 2015

Special care should be taken to have a tree professional inspect these trees on a regular basis. An alternative and more initiative-taking approach would be to remove them before a strong storm occurs and they topple onto a critical facility, the generator that powers the critical facility, or police vehicles or personnel. A first step may be to trim the lower branches to lighten the wind load on the trees.

In a somewhat similar situation, very tall fir trees also surround the Headquarters Fire Station, which contains the Emergency Operations Center. These trees have not been disturbed since the construction of the Headquarters Fire Station in 2000 and have weathered several significant storms in the last decade and a half. However, one tree was hit by lightning in summer 2015 and much of its bark was blown off. The groves of trees on both sides of this critical facility should be assessed every few years as to their health and their ability to weather a severe storm. Monitoring the health of trees within falling distance of critical facilities should be done on a regular basis.

On December 11, 2018 heavy rains and windstorms swept through Puget Sound and caused power outages to about 2,000 Puget Sound Energy customers, mostly in the City. Trees fell, taking down power lines and poles. This left homeowners, businesses, and even students at school without power. Students at Tumwater High School were released early due to the school not having power and lights. Busy intersections were turned into four way stops. This storm was one of many projected throughout that week. The pictures below show City residents trying to clear debris from the windstorm days later on December 14, 2018.



At the end of June 2021, the City experienced a historic heat wave. The heat was caused by a dome of high pressure over the northwest and worsened by climate change. One man in the City died due to the extreme heat, he was found deceased in his apartment. Temperatures were as high as 105 degrees. Many homes in the City are not equipped with air conditioning, the chances of hyperthermia are high, and most of the population is at risk.

Probability of Occurrence

The City matches the regional risk assessment for storms in regard to probability of "high." A high rating means a hazard event is likely to occur within 25 years.

Changes in Development

Any development within the City is subject to storm hazards, especially heat. The City's Building Codes are up to state standards and Washington State Energy Code standards are met. This helps in times of severe cold or heat storm events. The City is working to promote infill to reduce urban sprawl and heat islands caused by hard surfaces, such as concrete. The retention of trees will help keep areas cooler, the City is updating its tree and vegetation code.

Effects of Climate Change

It is projected that over the next thirty years summer temperatures will rise 3.4 degrees, this will impact economic development, agriculture, ecosystems, and human health. Warmer summers are expected to increase concentrations of air pollutants, such as ozone and some vector-borne illnesses, such as West Nile virus. Warmer summer temperatures could decrease opportunities for warm season recreation activities. Warmer summers are expected to reduce summer soil moisture and increase physiological stress for some plants and animals. The elderly, very young, and people with preexisting health conditions are more likely to be affected by warmer summers.

Warmer temperatures set the stage for algal blooms, in 2015, the waters off the west coast from California up to Washington experienced one of the largest observed toxic algal blooms in recent decades when the neurotoxin domoic acid formed and spread. Droughts can concentrate harmful substances in streams or wells. Extended or intense droughts can impact smaller surface water and shallow groundwater systems by significantly reducing the quantity of water available for use. While impacts on individual water supply systems will vary, the projected increase in both flooding and drought could increase risks to drinking water quality and quantity.

Heavy precipitation is expected to increase by ten percent. Floods can introduce hazardous and toxic substances to water ways and threaten public water supplies. Neighborhoods and developments that are low-lying or have problems with drainage will be more vulnerable to flooding. Transportation routes and infrastructure located in low-lying areas, within or near current floodplains or regulatory flood zones, or adjacent to unstable slopes are expected to be more exposed to an increase in heavy precipitation.

Vulnerability

As stated above, the City is vulnerable to the effects of severe weather and storm hazard events. Infrastructure, water systems, waste management, ecosystems, development, economic development, human health, and more can be impacted.

Impacts to People

The elderly, young, and people with existing medical conditions are the most vulnerable to extreme weather events and storms. As temperatures rise, more stress is placed on the body, which increases the risk of heat exhaustion and heat stroke. Prolonged summers can increase pollen and allergens, affecting those with asthma or allergies. During heat waves, there is an increase in the number of emergency calls, hospitalizations, and heat-related deaths. People with pre-existing health conditions, such as diabetes or a suppressed immune system, are also at a higher risk of experiencing health complications. Outdoor laborers are more exposed, placing them at a relatively higher risk as well.

Residents who do not have access to housing, housing with air conditioning or fans, heaters, access or transportation to medical or emergency weather centers, families without medical care, are all at risk. Households that are damaged by storm events are financially burdened, while public safety is at risk. Storm events can leave households displaced due to structural damage. Without power, transportation, heat, access to clean water, cooling centers, and medical care people are burdened emotionally, physically, and financially.

Impacts to Structures

There have been historic incidents where the Headquarters Fire Station, City Hall, and structures have been impacted by severe weather and storm events. It is vital that trees are inspected around critical facilities to reduce damage from trees and limbs falling during a severe storm, so damage to City property such as roofs, vehicles, and buildings are minimized. During winter storm events, water mains can freeze or weight from snow and falling debris can cause physical damage.

Impacts to Systems

During power outages, it is critical the Emergency Operations Center at the Headquarters Fire Station and Police Department at City Hall are still functioning. City staff are looking at resources and funding to secure solar panels in case the main generator at City Hall fails. Power lines and utility lines are susceptible to damage from tree limbs and trees falling. If utilities and communication systems are installed underground, there is less impact on critical communication systems. Homes can remain with power and heat during winter storms and have the ability to communicate with emergency services in case of an emergency.

Impacts to Activities

Outdoor recreation and economic development will be impacted. In a heat event, sports and games may have to be cancelled, people who work outside may not be able to work in extreme heat, dust and allergens will affect air quality and people will have to stay indoors. Parks and outdoor areas will be exposed to drought, waterbodies and areas to swim will have water level decreases and prone to more water quality issues.

Risk

Hazard Risk Rating

Hazard risk ratings are based on social vulnerability ratings and the national risk index as explained in Chapter 4.6 of the Regional Plan. The City has a relatively high to high risk index and broad range of socially vulnerable areas. Those who live in homes without heat and air conditioning or are elderly and have medical conditions are most at risk.

Wildfire Risk Assessment

Area of Impact

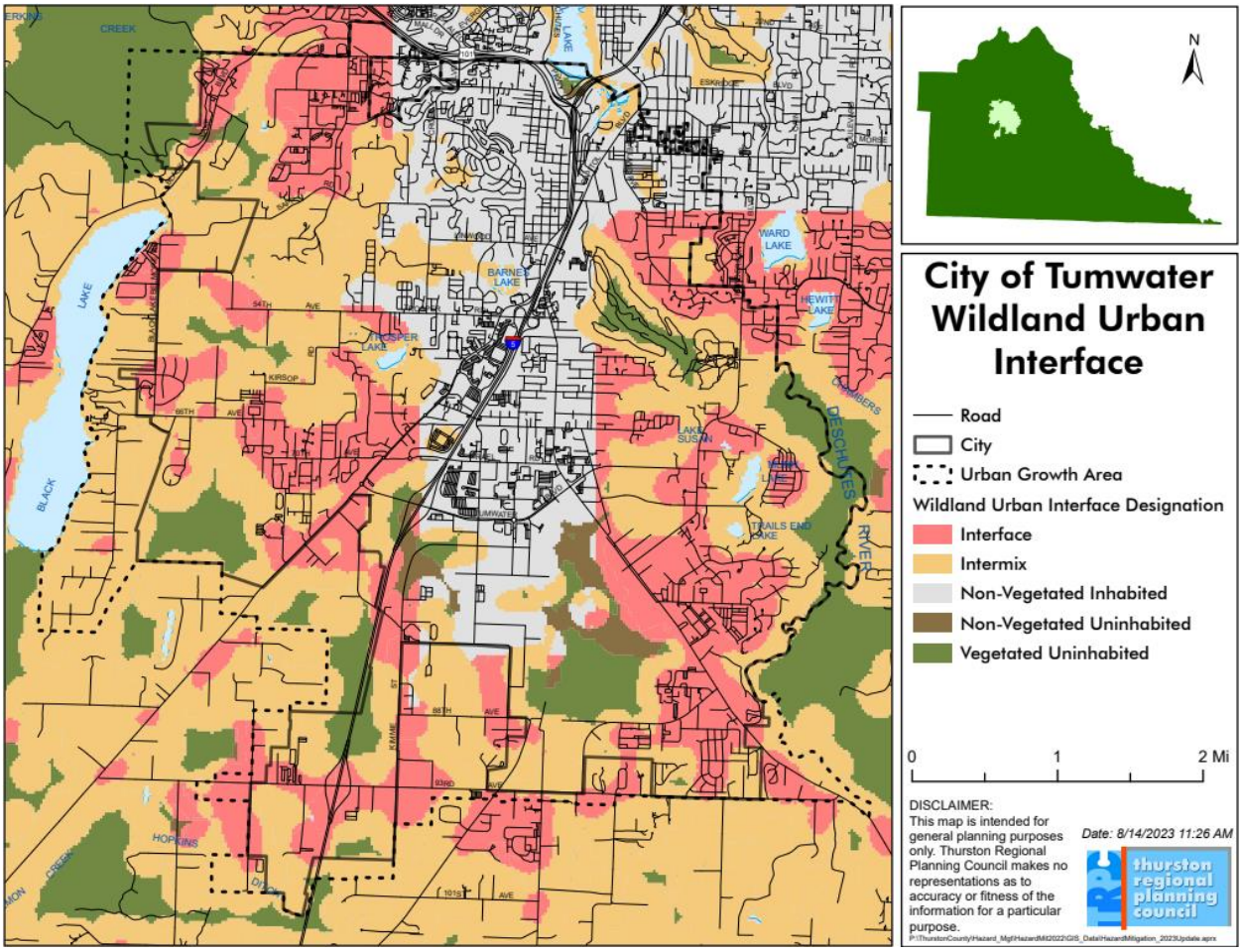


Figure 4. City Wildland Urban Interface

In 2019, the State Department of Natural Resources completed statewide mapping for wildlands and wildland-urban interface areas. For the purposes of the wildfire hazard risk analysis, the hazard assessment area is defined as wildland-urban interface and intermix mapped areas. Approximately two thirds of the City are mapped in the wildland urban interface and intermix areas according to the state mapping.

In general, wildlands are areas covered with 50 percent or higher burnable vegetative cover (Map 4.9.1). There are two major land use characterizations for areas that are prone for wildfires:

1. Wildland-Urban Interface – located on the periphery of urbanized areas where homes, businesses, and other structures meet wildlands. Areas mapped as a wildland-urban interface and intermix include development that is bordered by wildlands on at least one side. Approximately 32 percent of Thurston County's population is located in areas mapped as a wildland-urban interface.
2. Wildland-Urban Intermix – located between both the urban interface and wildlands. Most wildland-urban intermix areas in Thurston County are near lower density areas further away from

urbanized areas. The urban intermix is where homes and structures intermingle with wildlands. Areas characterized as intermix consists of development or structures that are surrounded on two or more sides by wildlands. Approximately 33 percent of the county's population is located in areas mapped as wildland-urban intermix.

WDNR's Wildland-Urban Intermix map is not a wildfire risk map, but it is a useful planning tool to inform the region's wildland fire risk assessment. Wildland-urban interface and intermix areas are prone to wildfires because they contain people and structures adjacent to wildland vegetation. People are attracted to natural and less developed rural landscapes. Over time, wildlands can convert to intermix as development spreads in unincorporated areas of Thurston County. The wildland-urban interface and intermix communities and the adjacent wildlands are at risk for wildland fire hazards because a fire may originate in the wildland area and spread to structures and dwellings and vice versa.

Extent

Human behavior, weather, fuel, terrain, and road access influence wildland fire behavior and suppression response activity. Chapter 4.9 of the Regional Plan goes into further detail of each factor.

Previous Incidents

According to Table 4.9.1 in the Regional Plan, the City has had nineteen wildfire starts from 2008-2022. A total of 5.9 acres have burned in the incidents.

Table 4.9.1 Total Wildfire Starts and Acres Burned by Fire District, Thurston County, 2008-2022[ii]

Agency[1]	Total Starts[2]	Sum of Acres Burned	Average Acres Burned	Max Acre Burn Event
Bald Hills Fire Department FD 17	17	11.5	0.7	4.5
Bucoda	2	0.5	0.2	0.3
East Olmpia FD 6	28	8.1	0.3	2.0
Griffin Fire Department FD 13	17	3.3	0.2	1.0
Lacey FD 3	87	54.2	0.6	4.6
McLane Black Lake FD 9	63	43.2	0.7	8.5
Olympia	14	3.7	0.3	1.4
Outside Taxing Boundaries	37	24.4	0.7	9.7
South Bay FD 8	15	2.3	0.2	0.8
South East Thurston Fire Authority FD 2&4	117	144.2	1.2	29.0
South Thurston Fire and EMS FD 12	42	55.9	1.3	13.0
Tumwater	19	5.9	0.3	1.3
West Thurston Regional Fire Authority FD 1&11	179	859.0	4.8	384.0
Grand Total	**637**	**1216.1**	**1.9**	**384.0**

Between 2018 and August 2023, the Fire Department responded to eighty-eight natural brush or vegetation fires.[37]

[37] Data provided by the Fire Department, Chief Hurley.

Probability of Occurrence

The probability of a wildfire in the City is low according to the hazard risk rating index. This means a hazard event is not likely to occur within one hundred years.

Changes in Development

With two thirds of the City mapped within a fire hazard area (wildland-urban interface and intermix) most existing development is within a wildfire hazard area. Starting in October 2023 all new and existing developments will have to be reviewed for proximity to vegetation and trees, also known as "defensible space". There will need to be a protective buffer from residential structures and development, even if they were established prior to the Washington Wildland Urban Interface Code requirements. All development within the wildland hazard areas is at risk as shown on the map.

Effects of Climate Change

Large and severe fires are associated with warm and dry conditions, which are likely to intensify with climate change. Climate related factors such as increased temperatures and drought, hotter and drier summers, drier soils and vegetation, earlier spring melting and reduced snowpack, and decreased summer water availability all contribute to conditions that fuel wildfires. Interactions between fire and other disturbances, such as drought and insect outbreaks, are likely to be the primary drivers of ecosystem change in a warming climate. Reburns are also likely to occur more frequently with warming and drought, with potential effects on tree regeneration and species composition. Hotter, drier sites may be particularly at risk for reburns, or regeneration failure. A reburn occurs when the perimeter of a recent past fire is breached by a subsequent fire.

Vulnerability

The City has many parks, residential communities, and vulnerable populations mapped in the wildland fire hazard area. Approximately 75% of the City is within a wildfire hazard area, the majority of residents, infrastructure, and businesses are at risk and exposed. A wildfire could be devastating to the economy and the health of people and vulnerable populations.

The most vulnerable populations are mapped between East of Interstate 5 and west of Capital Boulevard, from Trosper Road to 88th Avenue according to FEMA national Risk Index Mapping.

Many schools, businesses, and City facilities are located in wildfire hazard areas.

Impacts to People

Approximately 3,499 people are exposed to the Wildland Urban Intermix area, and 11,431 people are exposed to the Wildland Urban Intermix area.[38]

Wildfires create air pollution and affect air quality. The effects of smoke from wildfires can range from eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma and heart failure, and premature death. Children, pregnant women, and the elderly are especially vulnerable to smoke exposure. Emissions from wildfires are known to cause increased visits to hospitals and clinics by those exposed to smoke.[39]

There are many homes in Washington State that are not equipped with Air Conditioning, and during peak wildfire season in the summer, many people rely on opening windows to cool homes in the summer.

Impacts to Structures and Systems

Structures that lack adequate defensible spaces from fire-prone vegetative fuels are at risk of ignition during a fast-moving fire. Wildfires can destroy or cause damage to homes, businesses, schools, vehicles, electric utilities, and critical infrastructure. Wildfires can delay transportation in and around affected areas. Loss of power disrupts communications which in turn can impact a wide range of public and private sector lines of service and business operations.

Risk

Hazard Risk Rating

Hazard risk ratings are determined by social vulnerability and ratings and the national risk index as explained in Chapter 4.9 of the Regional Plan. The City's risk ranking for wildland urban interface was medium and low for wildland urban intermix.

[38] Data from the Loss Matrix provided by Tetra Tec.
[39] Wildland Fire Research: Health Effects Research | US EPA.

Table 6. Estimated Exposure to Wildland Fire for the City.

Estimated Population[40]	Total Number of Buildings[41]	Total Number of Residential Buildings[2]	Total Building Value (Structure & contents)[2]	Washington DNR Wildland Urban Interface[42]						
				Estimated Exposure						
				Estimated Buildings Exposed[43]	Population Exposed	%Population Exposed	Exposed Value Structure[2]	Exposed Value Contents [2]	Total Value Exposed [2]	% Total Value
26,360	9,513	8,408	$9,362,171,728	4,142	11,431	43.4%	$1,930,103,308	$1,495,341,610	$3,425,444,918	36.6%

Table 7. Types of Structures Exposed in Wildland Urban Interface in the City.

Number of Structures in Wildland Urban Interface (2)							
Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
3,646	433	48	1	1	6	7	4,142

[40] 2022 population from the State Office of Financial Management, Forecasting and Research Division.
[41] Values based on 2022 tax assessor data provided by Thurston County.
[42] Wildland Urban Interface and Intermix data provided by the State Department of Natural Resources.
[43] Percent of residential buildings exposed multiplied by the estimated population.

Mitigation Strategy

City Mitigation Initiatives

Central to the City Annex and Regional Plan are its recommended projects, programs, and activities the planning partners will implement to provide long-term and sustained benefits that will reduce losses from the impacts of the hazards that are identified in this plan's risk assessment. Each initiative was screened and ranked using a benefit-cost review criteria worksheet. Each initiative will require significant investments in planning, design, and construction or coordination, and may take years to complete. The desired outcomes of this plan's mitigation strategy are that communities:

- Build the necessary capacities to improve their knowledge of hazards and their risks
- Identify actions that will effectively reduce their vulnerabilities from hazards; and
- Implement their mitigation strategies to fulfill the Plan Goals and Objectives

The City Annex contains City specific initiatives. The City Annex identifies actions that are specific to the vulnerabilities of its community. The City is responsible for implementing the actions.

Mitigation Initiative Prioritization Process

During all City Annex and Regional Plan updates, the previous mitigation initiatives were reviewed for current status and relevance. After this was completed, new mitigation initiatives were considered. This process included a review of emerging hazards and initiatives from the other jurisdictions' earlier plans to see if there were items that would also benefit the City.

For the 2023 City Annex and Regional Plan update, several new ideas were selected and crafted into new mitigation initiatives for the City. The hazards mitigation planning team discussed the benefits and costs of each initiative recommended for inclusion in the 2023 City Annex and Regional Plan update. Members of the team provided input based on their experience with an understanding of past disaster events and the ability of the mitigation initiatives to protect public and private property.

The hazards mitigation planning team weighed the significance of the initiatives using the criteria established for the regional planning process. The final scoring of the initiatives against the regional criteria shown below occurred through an iterative, consensus-based process.

- **Hazard Risk Rating**: Does the mitigation initiative address a high, medium, or low-risk hazard?
- **Project Cost**: Is the implementation of the mitigation initiative expected to cost less than $100K, between $100K to $500K, or more than $500K?
- **Natural Hazards Mitigation Plan Goals and Objectives**: Does the mitigation initiative strongly support at least four policies, at least two policies, or one policy?

- **Social Vulnerability:** Will the action produce a significant and direct benefit for socially vulnerable or underserved communities, or will the action produce a benefit for socially vulnerable or underserved communities, or will the action have minimal benefit?
- **Changes in Development:** Does the action include measures that strongly account for changes in development, or does the action include some measures that account for changes in development, or does the action include minimal measures?
- **Climate Change:** Does the action strongly account for the effects of climate change, or does the action account for the effect of climate change, or does the action minimally account for the effects of climate change?
- **Geographic Impact:** Does the action address hazard risks for the entire affected area of the community, across at least half of the affected area or a very limited portion of the affected area?

The results of the scoring exercise completed by the hazards mitigation planning team appear below.

Mitigation Initiative Format

To support organization, every initiative in the plan follows a consistent format that includes a title, a background and needs description, a brief scope, priority, hazard addressed, project category, related Goals and Objectives, department or project lead, estimated cost, estimated timeline for implementation, potential funding sources, relationship to other community planning documents – if applicable – and implementation status. Refer to the Sample Mitigation Initiative to view the layout of the mitigation initiative content.

Sample Mitigation Initiative

Initiative identification, benefit cost review score, and title

New, existing, modified, ongoing, or removed during the plan update process

Benefit-cost review score. Higher score is a higher priority

Hazard addressed and action category

Background and Need description

Relationship to plan goals

Implementation details

Source for the initiative

Progress toward the initiative's implementation

CW-WH-2: Countywide Multijurisdictional Community Wildfire Protection Plan

Benefit-Cost Review Score: 36 **Status:** New
Hazard Addressed: Wildland Fire
Category: Plan Coordination and Implementation

Background and Need: Thurston County wildfire frequency and size have trended upward over the last 15 years. On September 8, 2020, a 268-acre fire in southwest Thurston County, intensified by sustained high speed winds, destroyed two homes and two outbuildings near Mima and Bordeaux Roads SW. The fire forced area residents to evacuate. The incident resulted in Thurston County receiving immediate federal fire management assistance, an uncommon wildfire declaration for communities in Western Washington lowlands.
The effects of climate change will make summers warmer, drier, and longer. Climate change combined with the region's growing population will increase the likelihood for more frequent, larger, and perhaps more severe wildfires. Planning is necessary to understand the wildfire risks for current and future households and businesses located in wildland urban interface and intermix areas. In addition, wildfire smoke will adversely impact people who suffer from chronic respiratory diseases or people who are exposed and unable to seek indoor refuge.
Building on the momentum of the 2023 Wildfire Ready Neighbors Program partnership and the 2023 Assessing Structural Ignition Potential courses hosted by Thurston County Emergency Management, the region will pursue the development of a multijurisdictional countywide Community Wildfire Protection Plan. The planning process will involve a whole community approach to engage a variety of stakeholders to identify areas of the community, especially underserved communities, that are at greatest risk for wildfire losses and establish a collaborative framework for communities to identify strategies for wildfire response, hazard mitigation, and community education and preparedness.

Relates to Plan Goal(s) and Objectives: 3C, 5C, 6A, 6B, 7B, 7D, 7E, 9A, 9B
Lead: The Association of Thurston County Fire Chiefs in partnership with the tribes, county, cities, special purpose districts, Wash. Dept. of Natural Resources, the US Forest Service, TRPC, the public, and other stakeholders.
Estimated Cost: Medium, $100,000 to $300,000
Time Period: 2024-2028
Funding Source: Wash. Dept. of Natural Resources Community Wildfire Defense Grant
Source and Date: 2023 Natural Hazards Mitigation Plan

Initiative and Implementation Status: This is a new initiative. Information about this initiative's status will be reported during the next plan update.

City Mitigation Initiatives

The City Annex Mitigation Strategy consists of twenty initiatives that, if implemented, will improve the City's ability to perform hazards mitigation planning, respond to natural hazards, and strengthen community resiliency. Seven initiatives were carried over from the previous plan. Five new initiatives were added through the City Annex and Regional Plan update process.

The priority of implementation could vary from the order shown below due to changing hazard conditions, emerging priorities, or the condition of grant funding opportunities.

Table 8. City Annex Mitigation Strategy Initiatives.

Initiative	Status	Benefit-Cost Review Score
Public Outreach and Information		
TUM-MH-22 Mail flood insurance information to owners of properties located within a floodplain and to residents who live in a floodplain	Ongoing	22
Plan Coordination and Implementation		
TUM-FH-36 Continue to be actively involved in inter-jurisdictional flood hazard reduction efforts where the City and other jurisdictions are located within the same basin	Ongoing	36
Data Collection and Mapping		
TUM-WH-33 Update GIS (City Map) maps to show wildland-urban interface and intermix	New	33
Development Regulations		
TUM-WH-42 Update Building Code to wildland-urban interface and intermix requirements	New	42
TUM-WH-38 Develop a wildland-urban interface and intermix Vegetation Management Plan and Planting Species Plan	New	38
TUM-SH-36 Reduce heat islands through street tree, tree preservation, and landscape code updates	New	36
TUM-LH-31 Update Critical Area Code and Development Code and Regulations during the Comprehensive Plan periodic update	New	31

TUM-SH-30 Reduce damage to utilities by updating City Development Code	New	30
Hazard Preparedness		
TUM-WH-23 Routinely inspecting the functionality of fire hydrants	New	28
TUM-MH-34 Encourage the public to be ”Two Weeks Ready” prior to a disaster	Modified	34
TUM-LH-28 Keep a supply of air filters on hand for critical equipment, generators, wells, and vehicles in case of ash fall from a volcanic eruption, fires, or wildfires	Ongoing	28
Hazard Damage Reduction		
TUM-EH-36 Conduct a voluntary non-structural earthquake readiness inspection for all critical facilities on an annual basis	Ongoing	36
TUM-EH-31 Include retrofitting and replacement of critical system elements in Capital Facilities Plan	Modified	31
TUM-WH-27 Maintain vegetation on City Property on heavily wooded hills in the City	Modified	27
TUM-FH-23 Draft a prioritized list of residences the City would acquire (buyout) if state or federal monies are available	Existing	23
TUM-FH-23 Work with stakeholders to reforest corridors along river and stream shorelines.	Existing	23
Critical Facilities Replacement and Retrofit		
TUM-SH-29 Periodically Inspect all trees within falling distance of City-owned critical facilities	Existing	29
TUM-FH-33 Investigate funding sources for projects that will reduce or eliminate damage from flooding	Existing	33
TUM-MH-31 Install auxiliary backup power to power the City main Well and water supply	New	31
TUM-MH-30 Install auxiliary power and battery storage at City Hall and Tumwater Timberland Library (secondary Emergency Operations Center)	New	30

TUM-FH-22: Mail flood insurance information to owners of properties located within a floodplain and to residents who live in a floodplain

Benefit-Cost Review Score: 36 **Status:** Ongoing
Hazard Addressed: Multi Hazard
Category: Public Information

Background and Need: Knowledge of flood insurance opportunities and other related information will be helpful for residents and property owners who may not be aware of the options. Preliminary work has been completed to map hazard areas, develop mailing list, and notification. Mailing postponed due to COVID staffing shortage.

Relates to Plan Goal(s) and Objectives: 7f, 8a, 9a, 9b
Lead: Community Development and Executive Departments
Estimated Cost: Low on an annual basis.
Time Period: Fall 2023
Funding Source: General funds, City
Source and Date: 2023 City Annex and Regional Plan

Initiative and Implementation Status: In 2023, this existing initiative was revised to become an ongoing action. Originally this initiative was ranked 12 of 18 in 2003 and removed in 2008. Removal from the plan was because the City had no repetitive loss or severe loss properties (Source: FEMA National Flood Insurance Program Report, Washington, May 4, 2009). In addition, since 1978 the City had only two claims paid for a total of $12,515 (same source as above). This information was not readily available during the initial drafting of the plan in 2003. However, the City annexed an area on 58th Avenue off Henderson Boulevard in the Deschutes Valley with several homes that are frequently flooded. A subcommittee of the City Council decided it would be appropriate to put this mitigation initiative back into the plan due to the aforementioned change of circumstances. Preliminary work has been completed to map hazard areas, develop a mailing list, and create a notification. The mailing was postponed due to COVID-19 staffing shortage.

TUM-FH-36: Continue to be actively involved in inter-jurisdictional flood hazard reduction efforts where the City and other jurisdictions are located within the same basin

Benefit-Cost Review Score: 36 **Status:** Existing
Hazard Addressed: Flood
Category: Plan Coordination and Implementation

Background and Need: The City, being located at the mouth of the Deschutes River, is directly affected by activities occurring upstream and "downstream". The City should work closely with upstream jurisdictions as well as the City of Olympia which is “downstream” to ensure that any activities in these other jurisdictions do not adversely affect the City. The City of Olympia is referred to as "downstream" because it controls the lake at the mouth of the Deschutes River with a dam. The lake has been filling in with silt and debris over the past several decades and now has very little storage capacity. Tumwater Historical Park and the historic Old Brewhouse are located at the base of the falls, effectively the mouth of the Deschutes River, which would be significantly impacted by lake level rise during a flooding event. A study was conducted in 2023 to consider flood impacts and mitigation needs for properties in the Deschutes Valley, known as the “Deschutes River Flood Reduction Study 2023.”

Relates to Plan Goal(s) and Objectives: 4d, 5c, 6a, 6c, 7b, 7c, 7f
Lead: Community Development, Water Resources & Sustainability, and Parks & Recreation Departments
Estimated Cost: Unknown, this initiative would require staff time and inter-jurisdictional collaboration
Time Period: 2023-2028
Funding Source: City
Source and Date: 2023 City Annex and Regional Plan

Initiative and Implementation Status: The City continues to be involved with other jurisdictions in regard to the Deschutes River. The Water Resources & Sustainability and Parks & Recreation Departments both represent the City 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. In addition, the City’s Stream Team often works in conjunction with the Thurston Conservation District for riparian habitat restoration projects that involve agricultural uses and lands.

TUM-WH-33: Update GIS (City Map) maps to show Wildland-Urban Interface and Intermix

Benefit-Cost Review Score: 42 **Status:** New
Hazard Addressed: Wildland Fire
Category: Data Collection and Mapping

Background and Need: The majority of the City is within the wildland-urban interface and intermix regulatory area. Developers, homeowners, and City staff will need a mapping system to help determine which wildland-urban interface and intermix regulations will apply. Offering GIS hazard mapping online for residents and design professionals creates an opportunity for the City to develop an app map to transfer data to the City's City Annex website and link to state and federal websites.

Relates to Plan Goal(s) and Objectives: 7b, 7e, 7f, 9a, 9b
Lead: Transportation & Engineering (GIS Team) Department
Estimated Cost: Low
Time Period: 2023-2024
Funding Source: City
Source and Date: 2023 City Annex and Regional Plan

Initiative and Implementation Status: This is a new initiative. The GIS Team is assisting by adding the wildland-urban interface and intermix areas to the internal staff maps. The GIS Team is creating a vegetation layer and trying to find a solution to allow for staff to select any point on the map and have the app automatically create a 40 acre square buffer around the point, show the buffer, and automatically calculate the percentage of land covered by vegetation and the number of buildings within the buffer.

TUM-WH-42: Update Building Code to Wildland-Urban Interface and Intermix requirements

Benefit-Cost Review Score: 42 **Status:** New
Hazard Addressed: Wildland Fire
Category: Development Regulations

Background and Need: Approximately two-thirds of the City is within the wildland-urban interface and intermix area, and at risk for wildfires. To reduce the loss of life and property due to wildfires, the Washington Wildland-Urban Interface Code establishes minimum state requirements for land use and built environment in designated wildland-urban interface and intermix areas. These requirements include specific fire resistant materials for structures and limiting the amount and type of trees and vegetation in "defensible space" within 30 to 100 feet of structures. The Washington Wildland-Urban Interface Code would apply to the wildland-urban interface and intermix area as mapped by the State Department of Natural Resources. The intent is to reduce the amount of fuel for wildfires in areas where there are people and structures.

Relates to Plan Goal(s) and Objectives: 1b, 7d, 8b
Lead: Community Development Department
Estimated Cost: Low
Time Period: 2024 Building Code Update
Funding Source: City
Source and Date: Regional Plan, City Work Plan

Initiative and Implementation Status: This is a new initiative.

TUM-WH 38: Develop a Wildland-Urban Interface and Intermix Vegetation Management Plan and Planting Species Plan

Benefit-Cost Review Score: 38 **Status:** New
Hazard Addressed: Wildland Fire
Category: Development Regulations

Background and Need: Critical fire weather frequency occurs between 2 to 7 days a year in Thurston County. A vegetation management plan may reduce the fire hazard severity. By establishing a drought tolerant tree and plant species list and required setbacks and locations for landscaping, there will be a decrease in the chances of landscaping vegetation becoming wildfire fuel. As part of the adoption of the Washington Wildland Urban Interface Code, there are established "fuel models." The fuel models will evaluate the types of vegetation and size of trees and their proximity to structures, slopes, and defensible space.

Relates to Plan Goal(s) and Objectives: 4a, 4b, 7d, 8b
Lead: Community Development and Water Resources & Sustainability Departments
Estimated Cost: Low
Time Period: 2023-2028
Funding Source: City
Source and Date: Regional Plan, City Work Plan

Initiative and Implementation Status: This is a new initiative.

TUM-SH-36: Reduce heat islands through street tree, tree preservation, and landscape code updates

Benefit-Cost Review Score: 36 **Status:** New
Hazard Addressed: Storm/Weather
Category: Development Regulations

Background and Need: As urban areas develop and buildings and roads replace open land and vegetation, urban regions become warmer than their rural surroundings, forming an "island" of heat. By implementing updates to the City's tree and vegetation, landscape, and street tree codes, proper tree and vegetation planting and maintenance will help reduce the effects of increased ambient and surface temperatures. Increasing tree and vegetation cover lowers surface and air temperatures by providing shade and cooling and reducing the amount of energy needed to cool buildings, resulting in improved reliability of the electric system, particularly during extreme weather events.

Relates to Plan Goal(s) and Objectives: 4a, 4b, 7d, 8b
Lead: Community Development and Water Resources & Sustainability Departments
Estimated Cost: Low to Medium; $100,000 to $500,000
Time Period: 2024-2028
Funding Source: Grants and City Funds
Source and Date: City Annex and Regional Plan

Initiative and Implementation Status: Since 2021 staff have been working with consultants, the public, The Tree Board, internal staff, Planning Commission, and City Council to move forward with updates to the Urban Forest Management Plan. In June 2023, staff were informed about updates to the Washington Wildland-Urban Interface Code and Development Code. Staff will need to reassess the updated plan and take into consideration Washington Wildland-Urban Interface Code requirements relating to trees and vegetation.

TUM-LH-31: Update Critical Areas Regulations and Development Regulations during the 2025 Comprehensive Plan periodic update

Benefit-Cost Review Score: 31 **Status:** New
Hazard Addressed: Flood
Category: Development Regulations

Background and Need: During the 2025 Comprehensive Plan periodic update, staff will review the Critical Area Checklist and Tumwater Municipal Code to ensure flood and geological and landslide hazards are minimized using the most current development regulations. This will ensure any future development or redevelopment of these areas mitigate and avoid risks for landslide hazards. During a Community Assistance Visit, it was determined the City's floodplain ordinance (TMC 18.38 *FP Floodplain Overlay*) is overall in fair standing, with minor updates needed to bring the ordinance into compliance with National Flood Insurance Program and state standards. The City will complete all needed updates and adopt a compliant ordinance in order to close out the Community Assistance Visit.

Relates to Plan Goal(s) and Objectives: 3a, 4c, 8b
Lead: Community Development Department
Estimated Cost: Low
Time Period: 2025
Funding Source: City
Source and Date: City Annex and Regional Plan, 2025 Comprehensive Plan periodic update

Initiative and Implementation Status: This initiative is new; the Critical Areas Code and Development Code will be reviewed in the 2025 periodic update.

TUM-SH-30: Reduce damage to utilities by updating City Development Code

Benefit-Cost Review Score: 30 **Status:** Modified
Hazard Addressed: Storm/Weather
Category: Development Regulations

Background and Need: By updating land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors, the risk of having critical infrastructure damaged during a storm is reduced. The landscape code and other ordinances will be modified to encourage appropriate plantings near overhead power, cable, and phone lines. Furthermore, as part of the 2023 Development Code housekeeping amendments, staff are proposing a change to the Development Code requiring utilities to be installed underground, unless going through a deviation process. This will help improve reliability of services in the event of a storm or other natural hazard occurrence.

Relates to Plan Goal(s) and Objectives: 1a, 2b, 8b
Lead: Community Development Department
Estimated Cost: Low
Time Period: 2025
Funding Source: City
Source and Date: City Annex and Regional Plan

Initiative and Implementation Status: This initiative is new. Revisions to the Development Code will be processed through the 2023 Development Code housekeeping amendments in the Long Range Planning Work Program.

TUM-MH-34: Encourage the public to be "Two Weeks Ready" prior to a disaster.

Benefit-Cost Review Score: 34 **Status:** Modified
Hazard Addressed: Multi Hazard
Category: Hazard Preparedness

Background and Need: Being self-sufficient allows individuals and communities to bounce back more quickly after a disaster. When people can take care of themselves and their immediate needs, it frees up resources for larger-scale recovery efforts, such as restoring infrastructure and providing long-term aid to those who require it. Natural disasters often occur with little to no warning, leaving little time for evacuation or preparation. Having a basic understanding of self-sufficiency ensures that individuals are better equipped to handle unexpected situations when they arise. Learning how to be self-sufficient after a disaster often extends to broader preparedness efforts, such as having emergency kits, communication plans, and evacuation routes in place. This long-term preparedness mindset can contribute to safer communities overall. Regular messaging and outreach activities should provide useful information for social service providers, households, businesses, and major employers to improve their understanding of natural hazards and the effects of climate change to help people and organizations minimize losses and how to prepare in case of disaster. At a minimum, the City will be convening an annual fall season in-person Emergency Preparedness Expo, post information on City social media and websites, distribute the Thurston County Flood Bulletin and other local agency e-newsletters, and cross-promotion partnerships with other area agencies and Thurston County Emergency Management.

Relates to Plan Goal(s) and Objectives: 6b, 9a, 9b
Lead: Community Development, Executive, and Fire Departments
Estimated Cost: Low
Time Period: 2023-2028
Funding Source: City
Source and Date: City Annex and Regional Plan

Initiative and Implementation Status: This initiative is new. Emergency Preparedness Expos were held in 2018 and 2019 but paused in 2020-2022 as a safety precaution during the COVID Pandemic. The expo will resume in-person in Fall 2023. In 2022 and 2023 staff attended community events to perform outreach on hazards mitigation.

TUM-MH-31: Install auxiliary backup power for the City main well and water supply

Benefit-Cost Review Score: 31 **Status:** New
Hazard Addressed: Earthquake
Category: Critical Facilities Replacement / Retrofit

Background and Need: In the case of a natural disaster event, ensuring water supplies to emergency services and the community is critical. Having emergency power backups to the City wells (City well number 15) will ensure that even if the power grid goes out, emergency responders and residents can still have access to water. The 2024-2029 Capital Facilities Plan identifies seismic planning to Well 15 work which includes auxiliary power and review of pipeline network for seismic resiliency.

Relates to Plan Goal(s) and Objectives: 1b, 2b, 2d, 8a, 8b,
Lead: Water Resources & Sustainability Department
Estimated Cost: Medium
Time Period: 2023-2028
Funding Source: City, Grants
Source and Date: City Annex and Regional Plan and 2020 Water Plan

Initiative and Implementation Status: This initiative is new.

TUM-MH-30: Install auxiliary power and battery storage at City Hall (secondary Emergency Operations Center) and Tumwater Timberland Library.

Benefit-Cost Review Score: 30 **Status:** Modified
Hazard Addressed: Storm/Weather
Category: Critical Facilities Replacement / Retrofit

Background and Need: City Hall and Tumwater Timberland Library are critical facilities. In the event of a storm, solar power will keep City Hall and the police station functioning during an emergency. The Water Resources & Sustainability Department staff has submitted grant proposals to fund combined solar and storage feasibility assessments at (1) City Hall and (2) the Tumwater Timberland Library. The Tumwater Timberland Library is the City's only cooling center and City Hall is the secondary Emergency Operations Center for the City.

Relates to Plan Goal(s) and Objectives: 1b, 2c, 2d, 3c, 8a, 8c, 9a
Lead: Water Resources & Sustainability Department
Estimated Cost: Medium
Time Period: 2023-2028
Funding Source: City
Source and Date: City Annex and Regional Plan, Capital Facilities Plan, Thurston Climate Mitigation Plan

Initiative and Implementation Status: This initiative is New.

TUM-WH-28: Routinely inspecting the functionality of fire hydrants

Benefit-Cost Review Score: 28 **Status:** New
Hazard Addressed: Wildland Fire
Category: Hazard Preparedness

Background and Need: Water is a key factor in suppressing fire. Ensuring fire hydrants are functioning correctly is critical in reducing the spread of wildfires and increasing public safety. There are 1,905 fire hydrants currently mapped within the City. As development occurs, there are more hydrants being installed. Fire hydrants are currently inspected on a semiannual basis.

Relates to Plan Goal(s) and Objectives: 2D, 6C, 7B, 8A
Lead: Fire and Water Resources & Sustainability Departments

Estimated Cost: Low
Time Period: Every year
Funding Source: Capital Facilities Plan
Source and Date: City Annex and Regional Plan, 2022 edition of NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants

Initiative and Implementation Status: This action is new. Hydrant inspections will be completed every year to include cleaning and operating of each hydrant and documenting each inspection in City's Lucity database. Any deficiencies are reported and scheduled to be fixed. An update will be provided in the 2028 City Annex and Regional Plan update.

TUM-VH-28: Keep a supply of air filters on hand for critical equipment, generators, and vehicles in case of ash fall from a volcanic eruption, fires, or wildfires

Benefit-Cost Review Score: 28 **Status:** Ongoing
Hazard Addressed: Volcanic
Category: Hazard Preparedness

Background and Need: In order to keep critical facilities operating during a volcanic ash fall situation, emergency operations equipment such as police vehicles, fire trucks, medic one units, the HVAC system for the Emergency Operations Center, and generators supporting critical facilities such as water treatment sites, should have extra filters 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 regard to stocking up on filters beforehand. Continued operation of emergency response equipment and critical facilities during a disaster is very important to the health, safety, and welfare of the residents of the City. Water Resources & Sustainability Department may consider needs for lift stations and other facilities.

Relates to Plan Goal(s) and Objectives: 1d, 2b, 2d, 3b, 5e
Lead: Fire, Water Resources & Sustainability, and Parks & Recreation Departments
Estimated Cost: $100,000
Time Period: 2024-2028
Funding Source: City
Source and Date: 2017 Hazards Mitigation Plan

Initiative and Implementation Status: This initiative was implemented in the 2008 Hazards Mitigation Plan.

TUM-FH-33: Investigate funding sources for projects that will reduce or eliminate damage from flooding, including damage to street, structure, utilities, etc. in flood areas.

Benefit-Cost Review Score: 33 **Status:** Modified
Hazard Addressed: Flood
Category: Hazard Damage Reduction

Background and Need: Elevating and other means of flood proofing will reduce damages, reduce or eliminate disruption to provision of services (utilities), and allow travel of emergency vehicles as well as daily traffic during periods of flooding.

Relates to Plan Goal(s) and Objectives: 6b, 9a, 9b
Lead: Water Resources & Sustainability Department
Estimated Cost: Unknown
Time Period: 2023-2028
Funding Source: City
Source and Date: City Annex and Regional Plan and Capital Facilities Plan

Initiative and Implementation Status: This initiative is ongoing.

TUM-EH-31: Include retrofitting and replacement of critical system elements in the Capital Facilities Plan

Benefit-Cost Review Score: 31 **Status:** New
Hazard Addressed: Earthquake
Category: Hazard Damage Reduction

Background and Need: Repair, replacement, and improvements to existing critical systems and critical infrastructure with seismic retrofits are included as part of the City 2020 Water System Plan. A seismic backbone map was drafted to identify critical structures and the distribution systems that would be used to serve the public after a seismic event. Inspections and assessments of key infrastructure, such as bridges, water towers and pump stations, sewer lift stations, and water and sewer main lines, should be completed in regard to their ability to withstand earthquakes will help to prioritize projects and upgrades. The Water Resources & Sustainability Department noted that formal physical assessments have not yet been completed; however, the City can plan for this in the upcoming biennial budget and Capital Facilities Plan processes. High level recommendations have been incorporated into Comprehensive Plan documents. Bridge inspections are performed for the condition of the bridge, and it is performed every two years. If the condition warrants further analysis, like load ratings or seismic analysis, they are performed separately to address the concern. The current condition of City bridges has not warranted the deeper seismic analysis. A recent load rating was performed on Capitol Street bridge per new federal requirements. This is the only structure in City that meet the specific requirements warranting the load rating.

Relates to Plan Goal(s) and Objectives: 2a, 2b, 2c, 2d, 8b
Lead: Water Resources & Sustainability Department
Estimated Cost: Medium
Time Period: 2025
Funding Source: Grants and City
Source and Date: Hazards Mitigation Catalog, Capital Facilities Plan, Comprehensive Plan periodic update

Initiative and Implementation Status: Some critical assets are inventoried in WebEOC. Implementing this project has been challenged by budget constraints, personnel changes, and COVID 19 response.

TUM-WH-27: Maintain vegetation on heavily wooded hills in the City

Benefit-Cost Review Score: 27 **Status:** Modified
Hazard Addressed: Wildland Fire
Category: Hazard Damage Reduction

Background and Need: Tumwater Hill is at high risk for wildfire due to slopes, vegetation and tree cover, and development. Maintaining vegetation next to the new houses in this area and then periodically cutting the remainder brush would help to minimize damage in the event of a localized wildfire. This work is scheduled to be done annually.

Relates to Plan Goal(s) and Objectives: 2c, 5b
Lead: Parks & Recreation Department
Estimated Cost: Low
Time Period: Annually
Funding Source: City
Source and Date: 2017 Hazards Mitigation Plan, City Work Plan,

Initiative and Implementation Status: This initiative was modified from 2017 to remove the term “fire break”. City staff do not formally maintain a fire break, but ensure vegetation is cleared from private property and fence lines.

TUM-FH-23: Work with stakeholders to reforest corridors along river and stream shorelines.

Benefit-Cost Review Score: 23 **Status:** Ongoing
Hazard Addressed: Flood
Category: Hazard Damage Reduction

Background and Need: Reestablishing a forested edges along river and stream shorelines are 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 riverbanks. Planting trees and other vegetation also helps to reduce erosion and contributes to long term bank stabilization. Restoration plans are in various stages of formal completion, with work plans ranging from Tumwater Falls to the Henderson Boulevard Bridge. City stakeholders will need to collaborate on efforts to implement the restorative measures.

Relates to Plan Goal(s) and Objectives: 4a, 4b, 9a
Lead: Parks & Recreation and Water Resources & Sustainability Departments
Estimated Cost: Medium to High
Time Period: 2024-2028
Funding Source: City
Source and Date: 2017 Hazards Mitigation Plan

Initiative and Implementation Status: Staff is in conversation with LOTT regarding acquisition of the property west of the railroad tracks. The Parks & Recreation Department plans to purchase the property as part of the Capital Facilities Plan. The former brewery property is the last section within the City without full tree cover along the Deschutes River.

TUM-FH-23: Draft a prioritized list of residences the City would acquire (buyout) if state or federal monies are available

Benefit-Cost Review Score: 23 **Status:** Ongoing
Hazard Addressed: Flood
Category: Hazard Damage Reduction

Background and Need: Repetitive loss properties negatively impact the property owner as well as the surrounding community. Frequently flooded properties and structures can also become a health and life safety issue for both residents, emergency responders, and the community in general. The City should work with regional, state and federal agencies in determining which residences should be purchased and how the funding for such actions will be acquired.

Relates to Plan Goal(s) and Objectives: 1b, 3a, 7e, 8c
Lead: Community Development, Water Resources & Sustainability, and Executive Departments
Estimated Cost: High
Time Period: Unknown
Funding Source: City
Source and Date: 2017 Hazards Mitigation Plan

Initiative and Implementation Status: Ranked 13 of 18 in 2003 and removed in 2008. Removal was because the City had no repetitive loss or severe loss properties (Source: FEMA National Flood Insurance Program Report, Washington, May 4, 2009). In addition, since 1978 the City had only two claims paid for a total of $12,515 (same source as above). This information was not readily available during the initial drafting of the plan in 2003. However, City has annexed an area on B 74 58th Avenue off Henderson Boulevard in the Deschutes Valley with several homes that are frequently flooded. A committee of the City Council decided it would be appropriate to put this mitigation initiative back into the plan due to the aforementioned change of circumstances.

TUM-EH-34: Conduct a voluntary non-structural earthquake readiness inspection for all critical facilities on an annual basis

Benefit-Cost Review Score: 34 **Status:** Ongoing
Hazard Addressed: Earthquake
Category: Critical Facilities Replacement / Retrofit

Background and Need: It is in the best interest of the City 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 and 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. Furthermore, the Water Resources & Sustainability Department is planning for a water and wastewater assessment in the 2024-2025 Capital Facilities Plan.

Relates to Plan Goal(s) and Objectives: 2c, 3b
Lead: Fire and Parks & Recreation Departments
Estimated Cost: Low
Time Period: 2023, annually.
Funding Source: City General Funds
Source and Date: 2017 Hazards Mitigation Plan

Initiative and Implementation Status: Ranked 1 of 18 in the 2003 City Annex and Regional Plan and 1 of 8 in the 2008 City Annex and Regional Plan update. This initiative has never been implemented yet. In 2008 it was changed to B 55 specifying that an annual inspection should be done. Minor change in 2017 to mention supplies could be part of the estimated cost.

TUM-SH-29: Periodically inspect all trees within falling distance of City-owned critical facilities

Benefit-Cost Review Score: 29 **Status:** Modified
Hazard Addressed: Storm/Weather
Category: Critical Facilities Replacement / Retrofit

Background and Need: The Water Resources & Sustainability Department has been awarded a grant to have a formal inspection and evaluation of trees on City property. A consultant will identify maintenance needs and potential hazardous trees. Periodically Inspect all trees within falling distance of the four City-owned critical facilities (Headquarters and North End Fire Stations, the Operations & Maintenance Facility, and City Hall), 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. Tree roots were partially covered with pervious asphalt during the 2014 Police Department expansion. Trees have been evaluated by City arborist and are currently healthy.

Relates to Plan Goal(s) and Objectives: 1B, 2A, 2B, 2D, 5B, 6A, 6B, 7D, 8A, 9A, 9B
Lead: Water Resources & Sustainability and Parks & Recreation Departments
Estimated Cost: Low
Time Period: 2023 – 2024
Funding Source: City and Grant Funding
Source and Date: City Work Plan

Initiative and Implementation Status: This initiative has been modified. Staff are in the process of writing contracts with a private consultant to perform the formal evaluation. The evaluation is slated to be completed by April 20, 2024.

Mitigation Initiatives Removed from the City Annex Mitigation Strategy

The City Annex and Regional Plan update process removed three initiatives from the City Annex Mitigation Strategy because they are no longer relevant

Additional details about why an initiative was removed are shown in each initiative's implementation status in the pages that follow.

Table 9. Former Mitigation Initiatives Removed from the City Annex Mitigation Strategy.

Initiative	Status	Former Ranking
Hazard Damage Reduction		
TUM-FH-15 Consider and investigate methods and options of construction of a short floodwall around the Tumwater Valley Municipal Golf Course clubhouse or floodproofing the structure to FEMA standards to stop the infiltration of floodwaters during a flood event.	Removed	3 of 13
TUM-FH-10 Draft a prioritized list of residences the City would elevate above the base flood elevation, if state or federal monies are available.	Removed	10 of 13
Data Collection and Mapping		
TUM-FH-14 Install or upgrade flood elevation gauges on the Deschutes River.	Removed	6 of 13

TUM-FH-15: Consider and investigate methods and options of construction of a short floodwall around the Tumwater Valley Municipal Golf Course clubhouse or floodproofing the structure to FEMA standards to stop the infiltration of floodwaters during a flood event

Hazard Addressed: Flood **Status:** Removed

Category: Hazard Damage Reduction

Background and Need: The Tumwater Valley Municipal Golf Course clubhouse is located within the 1% (100-year) floodplain according to the most recent Flood Insurance Study and Flood Insurance Rate Map. The building has not yet been flooded but the floodwaters came within a few inches of the door in the January 2009 flood event when the Deschutes River crested at 14.5 feet at the Rainier gauge. A several million-dollar remodel of the building was completed in early 2009. Due to the significant dollar investment in the building, a flood wall surrounding the building that could prevent flood damage or upgrading the structure to include floodproofing should be seriously considered. Evaluation of these options 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: Regional Plan Goals 2, 3. Regional Plan Objectives 2C, 3B

Lead: Parks & Recreation Department

Estimated Cost: Unknown

Time Period: 2017-2021

Funding Source: City

Source and Date: 2008 City Annex and Regional Plan

Initiative and Implementation Status: This initiative was the third ranked priority in the previous plan. The clubhouse is not considered a critical facility or infrastructure. There is no mitigation benefit for the structure.

TUM-FH-10: Draft a prioritized list of residences the City would elevate above the base flood elevation, if state or federal monies are available.

Hazard Addressed: Flood **Status:** Removed

Category: Hazard Damage Reduction

Background and Need: Repetitive loss properties negatively impact the property owner as well as the surrounding community. Frequently flooded properties and structures can also become a health and life safety issue for both residents, emergency responders, and the community in general. The City should work with regional, 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: Goal 3. Objective 3A.

Lead: Community Development, Transportation & Engineering, and Executive Departments.

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: 2017-2022

Funding Source: City

Source and Date: 2023 City Annex and Regional Plan

Initiative and Implementation Status: This initiative was the 10th ranked priority in the previous plan. This initiative was removed because there are no City Work plans prioritizing elevating residences. Information on flood insurance and emergency preparedness will be shared with properties within the flood zone through other initiatives outlined in the 2023 City Annex and Regional Plan.

TUM-FH-14: Install or upgrade flood elevation gauges on the Deschutes River.

Hazard Addressed: Flood **Status:** Removed

Category: Data Collection and Mapping

Background and Need: Previously the flood gauge at the "E" Street bridge was an older type which had to be read manually. It has since been updated to provide data every 15 minutes. However, flood state information based on this gauge is not readily provided by USGS or NOAA, unlike the gauge at Rainier. This initiative was created because readings at the Rainier gauge do not always accurately reflect what is occurring twenty miles downstream in the City's 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 the City showed the water levels were higher in the 2009 flood than in the 2007 flood. A gauge at the "E" Street bridge that linked data immediately to a public website such as USFS or NOAA would help in obtaining accurate records of flood levels in the City which would be important for making decisions regarding future land use and zoning, infrastructure locations and designs, future critical facilities, etc.

Relates to Plan Goal(s) and Objectives: Regional Plan Goal 7. Regional Plan Objective 7A

Lead: Water Resources & Sustainability Department

Estimated Cost: $20,000 per gauge and $4,000 per year for operating costs

Time Period: 2017-2022

Funding Source: Department of General Administration, City of Olympia, and the City. In regard 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 the City for a new gauge. The 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 B 63 dam, as necessary. Also, the City of Olympia has a vested interest in making sure that Capitol Lake does not flood a portion of downtown Olympia.

Source and Date: 2017 City Annex and Regional Plan

Initiative and Implementation Status: This was the sixth ranked initiative in the previous plan. This initiative has not been implemented. The gauge at the E Street Bridge was slightly upgraded so the data does not have to be read manually, Staff state the gauge is working and functioning, no additional upgrades are needed at this time. The gauge at E street is up to USGS standards.

Benefit Cost Review Results

Purpose

The City must perform a benefit-cost review for each hazard mitigation action or project that it is considering for inclusion in a new or updated mitigation strategy. The City's hazards mitigation planning team must consider the benefits that would result from a mitigation action versus the cost to implement it. This is intended as a planning-level assessment of whether the costs are reasonable compared to the probable benefits, unlike a more comprehensive Benefit-Cost Analysis.[44] Cost estimates do not have to be exact but can be based on a range of values or the City's experience or judgement. Benefits include losses avoided, such as the number and value of structures and infrastructure protected by the action and the population protected from injury and loss of life. Qualitative benefits such as quality of life can also be estimated as part of the review process.

Evaluation Criteria

The City's hazards mitigation planning team must evaluate each proposed mitigation project or action as providing a high, medium, or low benefit using the benefit-cost review and prioritization criteria. There are eight required criteria that the planning partners must use to evaluate actions. There are four additional optional criteria that the City's hazards mitigation planning team may find useful to refine the process. The City's hazards mitigation planning team needs to agree upon the other criteria that will be used to analyze the mitigation actions. Other criteria used should be annotated in the worksheet. Descriptions of the required and optional criteria follow.

Required Benefit-Cost Review and Prioritization Criteria

1. **Hazard Risk Rating:** The City must have at least one mitigation strategy per high-risk hazard. It is acceptable to identify actions or projects for medium and low risk hazards. However, actions that address high risk hazards should be a community priority.

2. **Project Cost**: Actions or projects should produce benefits that exceed the cost to implement the project over its life cycle.

3. **Natural Hazards Mitigation Plan Goals and Policies:** how strongly does the action support the City Annex and Regional Plan's goals and policies?

4. **Life/Safety –** What type of benefits will an action or project have on the safety of residents, businesses, and properties within the community?

5. **Social Vulnerability[45]:** The City has a responsibility to ensure that the Plan's mitigation strategy complies with all applicable legal requirements related to civil rights, to ensure nondiscrimination.

[44] An in-depth Benefit-Cost Analysis using FEMA's BCA module criteria is not required for the plan but is required when applying for Hazard Mitigation Assistance grant funding.

[45] "Social vulnerability" is understood as the potential for loss within an individual or social group, recognizing that some characteristics influence an individual's or group's ability to prepare, respond, cope or recover from an event. These

Compliance can help achieve equitable outcomes through the mitigation planning process for all communities, including underserved communities and socially vulnerable populations. The City can use the CDC/ATSDR Social Vulnerability Index (SVI) interactive mapping tool to assess affected populations within communities:

https://www.atsdr.cdc.gov/placeandhealth/svi/interactive_map.html

The City can refer to other sources of data or tools such as the Washington Tracking Network to assess social vulnerability and health disparities:

https://fortress.wa.gov/doh/wtn/WTNIBL/

6. **Changes in Development:** Does any of the following affect the City's projects or actions: 1) Construction completed since the last plan was approved; 2) Planned development or changes under consideration; or 3) Conditions that may affect the risks and vulnerabilities of the City (declining populations or projected increases in population, or foreclosures)? This could also include changes in local policies, standards, codes, regulations, land use regulations and other conditions that influence development patterns in a community.

7. **Climate Change**: Climate change is expected to increase the frequency, duration, and intensity of natural hazards, such as wildfires, extreme heat, drought, storms, heavy precipitation, and sea level rise. Impacts are expected to be felt more frequently by the mid-21st Century. These variations create new risks to local governments and challenge pre-existing mitigation plans. Impacts will threaten communities with most at-risk populations by exacerbating the impacts of disasters on underserved and socially vulnerable populations who already experience the greatest losses from natural hazards.

8. **Geographic Impact**: The area that will benefit from the proposed action. The location of a hazard is defined as the unique geographic boundaries within the planning area, or assets outside of geographic boundaries that may be affected by the identified hazard. The City should mitigate risks wherever they occur within a community.

Optional Benefit-Cost Review and Prioritization Criteria

9. **Capacity Building**: Will the action expand the City's capacity or expertise to plan for, implement, and evaluate the near- and long-term effectiveness of the proposed action or project? If outside expertise is necessary, how much will this increase the cost and complexity of implementing and operating the action or project? For example, grant writing, grant award administration and reporting, design and engineering, etc.

characteristics can overlap within populations to create heightened vulnerability, which may be compounded by infrastructure deficiencies within communities and historic or existing discriminatory government policies.
"Underserved communities" refers to populations sharing a particular characteristic, as well as geographic communities that have been systematically denied a full opportunity to participate in aspects of economic, social and civic life.

10. **Other Strategic Plan Goals**: Does the action support other strategic planning goals? For example, comprehensive plans, school, fire, and utility strategic plans, transit development plan, etc.

11. **Co-Benefits**: In addition to an action's primary purpose to reduce losses from a hazard, an action can also produce environmental, economic, or social benefits to a community. For example, removing structures from a flood plain can mitigate impacts to residential property, but also can restore the natural function of a flood plain, improve fish and wildlife habitat, and create passive recreational open space opportunities for community members. Some mitigation actions could incorporate features that support art, education, and historic preservation co-benefits.

12. **Grant Eligibility**: Is the action eligible for FEMA's Hazard Mitigation Assistance grant programs or other federal or state grant programs? Does the hazards mitigation planning team believe the project will be competitive for grant funding? Will the project's need to be funded using local revenues and decrease its likelihood of being implemented?

Required Mitigation Action Benefit-Cost Mitigation Review with Prioritization Criteria Ratings and Scores

REQUIRED CRITERIA	HIGH BENEFIT		MEDIUM BENEFIT		LOW BENEFIT		NO BENEFIT	
	Description	Pts	Description	Pts	Description	Pts	Description	Pts
1. Hazard Risk Rating	Action addresses a High-Risk Hazard	5	Action addresses a Medium-Risk Hazard	3	Action addresses a Low-Risk Hazard	1	Action Addresses a no-risk hazard	0
2. Project Cost	Low cost, less than $100K	5	Medium cost, $100K - $500K	3	High cost, more than $500K	1	Cost far exceeds the anticipated benefits	0
3. Natural Hazards Mitigation Plan Goals and Policies	Action strongly supports at least four policies	5	Action supports at least two policies	3	Action supports one policy	1	Action does not support plan policies	0
4. Life and Safety	Action will produce significant and lasting public safety benefits for residents, businesses, and property	5	Action will produce public safety benefits	3	Action will produce minimal public safety benefit	1	Action has no public safety benefits	0
5. Social Vulnerability	Action will produce a significant and direct benefit for socially vulnerable or underserved communities	5	Action will produce a benefit	3	Action will have minimal benefit	1	Action does not benefit socially vulnerable or underserved communities	0
6. Changes in Development	Action includes measures that strongly account for changes in development	5	Action includes measures that account for changes in development	3	Action includes minimal measures that account for changes in development	1	Action does not account for changes in development	0

REQUIRED CRITERIA	HIGH BENEFIT		MEDIUM BENEFIT		LOW BENEFIT		NO BENEFIT	
	Description	Pts	Description	Pts	Description	Pts	Description	Pts
7. Climate Change	Action strongly accounts for the effects of climate change on the hazard it addresses	5	Action accounts for the effects of climate change…	3	Action minimally accounts for the effects of climate change…	1	Action does not account for the effects of climate change…	0
8. Geographic Impact	Action addresses hazard risks for the entire affected area of the community	5	Action address risks across at least half of the affected area	3	Action address risk for a very limited portion of the affected area	1	Action does not address risks within the affected area	0

Optional Mitigation Action Benefit-Cost Mitigation Review with Prioritization Criteria Ratings and Scores

9. Capacity Building	Action will strengthen the City's capacity and expertise to implement the initiative and future initiatives	5	Action will assist the City's internal capacity and expertise	3	Action will have minimal effect on the City's capacity and expertise	1	Action will require outside technical expertise	0
10. Other Strategic Plan Goals	Action strongly supports the City's other strategic plan goals	5	Action supports the City's other strategic plan goals	3	Action minimally supports the City's other strategic plan goals	1	No support for the City's other strategic plan goals	0
11. Co-Benefits	Action will produce at least two co-benefits	5	Action will produce at least one co-benefit	3	Action minimally produces some co-benefit	1	Action is unlikely to produce any co-benefits	0

12. Grant Eligibility	The entire project is eligible for FEMA Hazard Mitigation Assistance grants or other federal or state grant programs	5	Most of the project is eligible for grant programs	3	Some of the project may be eligible for grant programs	1	The project is not eligible for grant programs	0

Cost-Benefit Review and Prioritization Worksheet

Jurisdiction Name:	**City of Tumwater**												
	Required Criteria							**Optional**					
Mitigation Project	**1. Hazard Risk Rating**	**2. Project Cost**	**3. HMP Goals and Policies**	**4. Life and Safety**	**5. Social Vulnerability**	**6. Changes in Development**	**7. Climate Change**	**8. Geographic Impact**	**9. Capacity Building**	**10. Other Strategic Plan Goals**	**11. Co-Benefits**	**12. Grant Eligibility**	**Total Score**
Public Outreach and Information													
Mail flood insurance information to owners of properties located within a floodplain and to residents who live in a floodplain	1	5	3	1	1	0	3	5	1	1	1	0	22

Jurisdiction Name:	**City of Tumwater**												
	Required Criteria								**Optional**				
Mitigation Project	**1. Hazard Risk Rating**	**2. Project Cost**	**3. HMP Goals and Policies**	**4. Life and Safety**	**5. Social Vulnerability**	**6. Changes in Development**	**7. Climate Change**	**8. Geographic Impact**	**9. Capacity Building**	**10. Other Strategic Plan Goals**	**11. Co-Benefits**	**12. Grant Eligibility**	**Total Score**
Plan Coordination and Implementation													
Continue to be actively involved in inter-jurisdictional flood hazard reduction efforts where the City and other jurisdictions are located within the same basin	1	5	5	5	3	3	5	5	1	1	1	1	36
Data collection and Mapping													
Install or upgrade flood elevation gauges on the Deschutes River	1	5	3	5	3	1	3	5	1	1	1	0	29
Update GIS (City Map) maps to show wildland-urban interface and intermix	3	5	5	3	3	3	3	5	1	1	1	0	33
Development Regulations													
Update Building Code to wildland-urban interface and intermix requirements	3	5	5	5	3	5	3	5	1	3	3	1	42

Jurisdiction Name:	**City of Tumwater**												
	Required Criteria								**Optional**				
Mitigation Project	**1. Hazard Risk Rating**	**2. Project Cost**	**3. HMP Goals and Policies**	**4. Life and Safety**	**5. Social Vulnerability**	**6. Changes in Development**	**7. Climate Change**	**8. Geographic Impact**	**9. Capacity Building**	**10. Other Strategic Plan Goals**	**11. Co-Benefits**	**12. Grant Eligibility**	**Total Score**
Develop a wildland-urban interface and intermix Vegetation Management Plan and Planting Species Plan	3	5	5	3	3	5	5	5	1	1	1	1	38
Reduce heat islands through street tree, tree preservation, and landscape code updates	3	3	5	3	3	5	5	5	1	1	1	1	36
Minimize vegetation removal in steep slopes and critical areas	3	5	3	3	3	3	3	5	1	1	1	0	31
Modify Street Tree, Tree Preservation, and Landscape codes to require appropriate planting near overhead power, cable, and phone lines	3	3	5	5	3	3	0	5	1	1	1	0	30
Hazard Preparedness													
Inspect Fire Hydrants	5	5	1	5	3	1	0	5	1	1	1	0	28
Encourage the public to be prepared to be self-sufficient for the first 72 hours after a disaster.	5	5	5	3	3	1	3	5	1	1	1	1	34

Jurisdiction Name:	City of Tumwater												
	Required Criteria								Optional				
Mitigation Project	**1. Hazard Risk Rating**	**2. Project Cost**	**3. HMP Goals and Policies**	**4. Life and Safety**	**5. Social Vulnerability**	**6. Changes in Development**	**7. Climate Change**	**8. Geographic Impact**	**9. Capacity Building**	**10. Other Strategic Plan Goals**	**11. Co-Benefits**	**12. Grant Eligibility**	**Total Score**
Keep a supply of air filters on hand for critical equipment, generators, and vehicles in case of ash fall from a volcanic eruption, fires, or wildfires	3	5	5	3	3	0	1	5	1	1	1	0	28
Install auxiliary generator to power City main well and water supply	5	3	5	3	3	3	1	5	1	1	1	0	31
Install solar power and battery storage at City Hall and Tumwater Timberland Library (secondary Emergency Operations Center)	5	3	5	3	3	3	1	5	1	1	1	0	30
Hazard Damage Reduction													
Include retrofitting and replacement of critical system elements in Capital Facilities Plan	5	1	5	5	3	3	1	5	1	1	1	0	31
Establish fire breaks next to residences on heavily wooded hills in the City	3	1	3	3	3	3	3	5	1	1	1	0	27
Work with landowners to reforest corridors along river and stream shorelines.	1	5	3	1	1	1	3	5	1	1	1	0	23

Jurisdiction Name:	City of Tumwater												
	Required Criteria								Optional				
Mitigation Project	**1. Hazard Risk Rating**	**2. Project Cost**	**3. HMP Goals and Policies**	**4. Life and Safety**	**5. Social Vulnerability**	**6. Changes in Development**	**7. Climate Change**	**8. Geographic Impact**	**9. Capacity Building**	**10. Other Strategic Plan Goals**	**11. Co-Benefits**	**12. Grant Eligibility**	**Total Score**
Draft a list of residences the City would elevate above the base flood elevation, if state or federal monies are available	1	5	3	1	1	1	3	5	1	1	1	0	23
Draft a prioritized list of residences the City would acquire (buyout) if state or federal monies are available	1	5	3	1	1	1	3	5	1	1	1	0	23
Have a professional assess infrastructure for earthquake vulnerability	5	3	5	5	3	3	3	5	1	1	1	1	36
Investigate funding for projects that will reduce damage to streets, structures, utilities, etc. in flood areas prone to flooding	1	5	5	5	3	3	3	5	1	1	1	0	33
Critical Facilities Replacement and Retrofit													
Conduct a voluntary non-structural earthquake readiness inspection for all critical facilities on an annual basis	5	5	5	3	3	1	3	5	1	1	1	1	34
Periodically Inspect all trees within falling distance of the four City-owned critical facilities	3	5	5	3	1	1	3	5	1	1	1	0	29

Benefit points: High=5; Medium=3; Low=1; No benefit=0

Public Comment Summary

The City received one comment from the community during the Final Draft Plan Public Comment period of November 3 to 17, 2023.

The public comment was an email received by Paul Brewster (Senior Planner, Thurston Regional Planning Commission) November 11, 2023 on the City of Tumwater Annex. The comment expressed concern with existing development in liquefaction areas, and whether or not residents living within the liquefaction areas were notified. The comment read as follows:

> *"I have serious concerns about **notification and potential actions to consider addressing existing development**. I live in Tumwater and am a homeowner in a 55+ manufactured home park, and am low income. In June 2017 the City of Tumwater produced document 'Resolution No. R2017-013 (copy attached below) which honestly shocked me. I had never seen it. It was an excellent report with maps and photos. It identified **4 mobile home parks in a high liquefaction hazardous zone, and identified all our homes here in Eagle's Landing of one of those 4 parks and further identifies a significant water issue for us.** Was the City's report after the 4 parks were identified given to the **owners** of these four parks? Were they notified in 2017? None of our leases or sign-in documents ever disclosed this information to us and I have not found one homeowner here who realizes we are in a high liquefaction hazardous zone. Or has ever seen the document.*
>
> *You now are producing a 2023 update. Will the final report be buried in a file cabinet or will any of us **affected** by your excellent information be notified at all? Or property owners notified of the most hazardous areas? We need this information more public."*

Appendix A – Community Capability Assessment

Capability Assessment Worksheets

Types of Capabilities

There are four mitigation worksheets. The worksheets are intended for notes about relevant capabilities within the City. Each type of capability may include laws, regulations, policies, programs, staff, or funding and may go beyond traditional mitigation. The City's hazards mitigation planning team may find other capabilities that help make the City more resilient.

1. Planning and regulatory
2. Administrative and technical
3. Financial
4. Education and outreach

Observations and Discussion Form

Each worksheet includes an 'Observations and Discussion' form. It includes a series of questions to help the City document which authorities, policies, programs, funding, and resources the City has to accomplish hazards mitigation. The discussion must account for building codes, land use and development codes, ordinances and regulations that are key to reducing risk. It must also describe ways the City and expands and improves its capabilities.

Evaluating Equity in the Capability Assessment

Consider low-income, communities of color, people with disabilities, people who lack English proficiency, people with insecure housing, and others who may be disenfranchised from economic, social, and civic life. Are there barriers to accessing resources in the community? By reducing barriers to socially vulnerable and underserved populations, the City can support a whole-community approach to hazards mitigation. Use the following questions to bring equity into the City's capability assessment.

- Which communities and populations lack resources to improve their resilience?
- What gaps might exist that decrease an underserved community's ability to access resources and plan for risk reduction?
- Do any capabilities disproportionately benefit wealthy areas or neighborhoods?
- Do any capabilities actively increase the vulnerability of underserved and socially vulnerable populations and communities?
- How can the City think differently about leveraging non-monetary and non-traditional resources and partners to support underserved communities?

Capability Assessment Worksheets

1. Planning and Regulatory

Evaluation for Planning and Regulatory Capabilities

- What is the legal framework for land use planning in the City?
- What kinds of plans does the City have? Which are used most often?
- Are there any specific laws or ordinances that mitigate hazards?
- How does the City regulate growth and development?
- How does the City protect community lifelines such as well heads, wastewater treatment facilities, and other critical facilities, including dams and levees?

Plans	In Place? Y or N	Notes - Does the plan address hazards? Can the plan be used to implement mitigation actions? When was it last updated? *Cite specific sections or language that supports hazards mitigation. Note if there are gaps.*
Comprehensive Plan	Yes	Plan identifies and addresses avoiding critical areas in Conservation Element. The Plan was last completely updated in 2016. Planning started for 2025 update. The update is expected to address the relationship with City Annex and Regional Plan as required by 2023 state law as a subelement of the new Climate Element. The Plan is amended on an annual basis. The last Plan amendment was in 2022.
Capital Facilities Plan	Yes	Plan identifies specific City projects for funding in six-year cycle, includes projects that address hazards and can include specific mitigation actions. The Plan was last updated in 2021 as part of the Comprehensive Plan annual amendment process. The Plan is amended on a biennial basis. Next update will be in 2023 as part of the Comprehensive Plan annual amendment process.
Climate Adaptation and Mitigation Plans	Yes	Plans address how the City will address climate change through actions for adaptation and mitigation. The Thurston Climate Adaption Plan was adopted in 2018 and the Thurston Climate Mitigation Plan was adopted in 2021. A new state required Climate Element will be added to the Comprehensive Plan as part of the 2025 periodic update.
Community Wildfire Protection Plan	No	Currently planning in conjunction with Thurston County and the Thurston Regional Planning Council.
Comprehensive Emergency Management Plans	Yes	Plan last updated 2017. Planning has started for 2023 update. The Plan identifies hazards mitigation as an area for further plan development (p. 8), but specific actions not outlined.

Plans	In Place? Y or N	Notes - Does the plan address hazards? Can the plan be used to implement mitigation actions? When was it last updated? *Cite specific sections or language that supports hazards mitigation. Note if there are gaps.*
Comprehensive Flood Management Plan	Yes	Thurston County Flood Hazard Mitigation Plan was completed in 2013. The Plan identifies specific hazard mitigation measures and assigns a priority to implement.
Continuity of Operations Plan	No	It is currently unclear whether the City has a city wide Continuity of Operations Plan or if individual departments have them.
Economic Development and Resiliency Plan	Yes	Plan last completely updated in 2019. Planning started for 2025 update. Update is expected to address resiliency.
Habitat Conservation Plan	No	Bush Prairie Habitat Conservation Plan is being prepared. There is no specific date for completion. The Plan does not address hazards.
Stormwater Management Plan	Yes	Plan was completed in 2022. Plan does not address hazards.
Transportation Plan	Yes	The Transportation Plan was last completely updated in 2016 as part of the Comprehensive Plan periodic update. Planning started for 2025 periodic update. Update is expected to address relationship with City Annex and Regional Plan as required by state law.

Land Use Planning and Ordinances	Y or N	Notes - Is the ordinance an effective measure for reducing hazard impacts? Is it adequately administered and enforced? *Cite specific language or sections of ordinances or codes that support hazards mitigation, if applicable. Note if there are gaps.*
Acquisition of land for open space, public recreation, or conservation	Yes	The City purchases property for open space and public recreation and will be purchasing property for habitat protection under the Bush Prairie Habitat Conservation Plan.
Building Codes	Yes	Building Codes were last updated in 2021. Includes building, fire, residential, mechanical, plumbing, property maintenance, and energy conservation codes, all of which address life, health, and safety. Planning has started for 2024 update. Update is expected to include adoption of the 2021 Washington Wildland-Urban Interface Code.
Flood Insurance Rate Maps	Yes	The floodplain in the City is regulated through the floodplain overlay chapter of the zoning code (TMC 18.38), the Building Code, as well as portions of critical areas and shoreline regulations. The existing floodplain maps can be seen on the Official FEMA Flood Insurance Rate Maps for the City as well as on the City's zoning map. FEMA is currently nearing the end of the process for updating the floodplain map for portions of the City including the

Land Use Planning and Ordinances	Y or N	Notes - Is the ordinance an effective measure for reducing hazard impacts? Is it adequately administered and enforced? *Cite specific language or sections of ordinances or codes that support hazards mitigation, if applicable. Note if there are gaps.*
		Deschutes Valley. The City will be required to adopt the new floodplain maps and study in the next few months.
Floodplain ordinance	Yes	The floodplain in the City is regulated through the floodplain overlay chapter of the zoning code (TMC 18.38). The State Department of Ecology completed a Community Assistance Visit with the City in 2023, which identified specific updates to the floodplain overlay chapter of the zoning code (TMC 18.38) which will be completed as part of the Development Code periodic update in 2025.
Natural hazard specific or Critical Areas Ordinance	Yes	Critical areas are regulated by TMC Title 16 *Environment*, which were last updated in 2019 and will be updated as part of the Development Code periodic update in 2025.
Subdivision ordinance	Yes	Land divisions are regulated by TMC Title 17 Land Divisions, which were last updated in 2022.
Zoning ordinance	Yes	Zoning is regulated by TMC Title 18 Zoning, which includes the City floodplain overpay regulations (TMC 18.38), aquifer protection regulations (TMC 18.39), and environmental performance standards (TMC 18.40). Regulations will be updated as part of the state required Development Code periodic update in 2025.

Plans and Regulations Capabilities Observations and Discussion

a. *What specific sections of the City's plans, land use regulations, building codes, and ordinances support the City's ability to reduce risks and implement the City's mitigation actions?*

   See chart for specific information.

b. *Are there any gaps in the City's plans, regulations, or ordinances that may prevent the City from supporting the City's mitigation actions?*

   See chart for specific information.

c. *How can the City's plans and regulations be expanded or modified to improve the City's understanding of hazards and vulnerabilities? How can they be improved to reduce risks?*

   The City is currently updating its Comprehensive Plan which must include a resiliency subelement as part of the new state required Climate Element. The Hazards Mitigation Plan for the Thurston Region can serve the purpose of the resiliency subelement.

d. *What type of development regulation mitigation initiatives, if any, could support the integration of hazards mitigation planning policies and programs?*

   As the City updates its Comprehensive Plan, the City will further its work in this area. If work on the Comprehensive Plan periodic update results in policy recommendations to update the City's development regulations related to hazards mitigation, such code updates will be considered for incorporation into the City's Annex.

2. Administrative and Technical

Evaluation for Administrative and Technical

- Who will be responsible for implementing mitigation actions?
- Have available staff been trained to support mitigation?
- Are outside technical expertise or resources needed?
- Do government agencies and departments regularly coordinate and problem-solve?
- Are agreements in place between participants or between participants and other organizations that provide regular administrative or technical assistance?
- Does the City work with nongovernmental organizations who also work in mitigation?
- Which staff and abilities are available to help carry out the City's mitigation plan?
- If the City does not have staff, consider how county, regional, and state partners can assist the City.

Administrative	In Place Y or N	Notes - Is staffing adequate to enforce regulations? Are staff trained in hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Y	The City has a City-wide Emergency Management Committee. The Building Official or designee participates in the Emergency Management Committee, which coordinates training. The Building official issues Flood Certificates. In the event someone builds in the flood zone, they will need to meet the applicable code and receive a flood certificate.
Civil Engineer	Y	The City has engineers in the Transportation & Engineering and Water Resources & Sustainability Departments. Engineering staff participate in the City-wide Emergency Management Committee. Engineering staff assist with designing and constructing city capital projects which may include projects that address mitigating for natural hazards.
Community Development Director	Y	The Community Development Director oversees the Community Development Department staff, including the Planning staff. They help enforce regulations in the Development Code such as floods and other critical areas. They also help create and implement City plans such as the City Annex and Regional Plan and the Comprehensive Plan.
Emergency Manager	N	The City has a City-wide Emergency Management Committee.

Floodplain Administrator	Y	The Planning Manager acts as the Floodplain Administrator for the City.
GIS Manager	Y	The GIS Team helps map critical facilities, infrastructure, critical areas, and more. This helps staff implement and enforce regulations.
Planning Commission		The Planning Commission are briefed in the City Annex and Regional Plan update process.
Technical	**In Place Y or N**	**Notes – Has capability been used to assess or mitigate risk in the past? Will the City use it to implement the City's current action plan?**
Grant Writing	Y	Staff have applied for many grants to help with assessments, retrofitting of critical facilities and infrastructure, purchasing of resources, and more. The current plan will be used to help facilitate funds and grant opportunities further.
Hazard data and information	Y	Hazard data and information was used in previous plans and in the current plan. Furthermore, it is used to help identify priorities for the Capital Facilities Plan update cycle.
GIS Analysis	Y	GIS mapping helps assist staff in recognizing areas that are prone to flooding, landslides, high ground water, and soon to be wildfire hazard areas.
Mutual Aid Agreements		The City's Comprehensive Emergency Management Plan contains a listing of mutual aid agreements available to the City. The City has mutual aid agreements associated with fire, emergency medical services, and police services, water interties, emergency management, including the Thurston County Emergency Management Committee. The Homeland Security Region 3 Omnibus agreement covers emergency management planning, mitigation and response for Thurston, Mason, Lewis, Pacific and Grays Harbor Counties.

Administrative and Technical Capabilities Observations and Discussion

a. *What specific administrative and technical strengths does the City have to support hazards mitigation?*

   Staff are proficient in writing and applying for grant opportunities. Staff ensure the City code and regulations are up to date- meeting state and federal standards.

b. *Are there any gaps in administrative or technical capabilities to support the City's understanding of hazards and vulnerabilities?*

   An emergency manager could potentially be established.

c. *How can the City expand or improve its administrative and technical capabilities to reduce risks or the City's mitigation actions?*

   Potentially by establishing more frequent meetings with each department to talk about funding, public outreach, and initiative updates.

d. *What type of plan coordination and implementation mitigation initiatives, if any, could enhance the City's technical and administrative capabilities?*

   As the City completes its Comprehensive Plan periodic update with the Climate Element, there may be additional items to include in the City Annex and Regional Plan.

3. Financial

Evaluation for Financial

- What financial resources can the City program for mitigation activities?
- What resources have the City used in the past?
- What grant programs can the City pursue to fund the City's mitigation actions?
- Can the City cover the 25 percent match for a federally grant funded mitigation project?
- How do the City's mitigation projects get programmed into the City's Capital Facilities Plan?
- Are there any financial policies to direct available funds to mitigation projects?

Funding Resources	In Place Y or N	Notes - Has the funding resource been used in the past and for what type of activities? Could it be used to fund future mitigation actions?
Capital Improvements Project Funding	Yes	The Capital Facilities Plan used to implement mitigation initiatives specified by the Annex.
Community Development Block Grant	Yes	No.
Non-FEMA Federal Funding Programs	Yes	No.
Impact Fees	Yes	The City has parks and transportation impact fees which fund projects related to growth.
State Funding Programs	Yes	The City received funding to update the City's Shoreline Master Program and has able for state grant funding to develop a Climate Element, which will include a resiliency subelement.
Utility Fees	Yes	Utility fees are utilized for upgrades and retrofitting projects.

Financial Capabilities Observations and Discussion

a. *What specific financial strengths does the City have to support hazards mitigation?*

   The City has some staff availability to apply for grants and low interest loans.

b. *Are there any gaps in financial capabilities to support the City's understanding of hazards and vulnerabilities?*

   Other than general financial limitations all local governments face and share, the City does not have any specific gaps.

c. *How can the City expand or improve its financial capabilities to implement the City's mitigation actions?*

   Not known.

d. *What type of actions can the City take, if any, to secure funding to make the community more resilient?*

   Apply for more opportunities and form partnerships with others.

4. Education and Outreach

Evaluation for Education and Outreach

- What outreach programs does the City use to share important information?
- What venues does the City use for outreach activities? Could they be used to promote risk reduction?
- What new or additional outreach efforts could get the most public participation and support for risk reduction?

Programs or Activities	In Place Y or N	Notes – How widespread and effective are these programs in the City's community?
Hazard awareness campaigns such as Firewise, Storm Ready, Flood Awareness Month, School Programs, or Public Events	Yes	Much of this work occurs at the regional level through Thurston County staff. The Water Resources & Sustainability Department staff do general outreach to the community about flooding.
Local News Media	Yes	The local news media is present at most Planning Commission, General Government Committee, and City Council meetings. Communication Department staff is skilled at using local and social media.
Organizations that represent or advocate for socially vulnerable and underserved populations	Yes	The City is undertaking great efforts in working with socially vulnerable and underserved populations through the Housing Action Plan, Regional Plan and City Annex, 2025 Comprehensive Plan periodic update, 2023 Capital Facilities Plan, the 2020 Water System Plan, and more. Equity is a primary focus when any plans or updates are being proposed. The City has hired consultants to establish an "Equity Toolbox."
Social Media	Yes	The City utilizes many platforms of social media. The Countywide survey and Thurston County Fair event were shared to the City Facebook page. Staff will be utilizing social media more during the Comprehensive Plan periodic update, especially the Climate Element and Resiliency Subelement, which is correlated to the Regional Plan and City Annex.

Public Outreach and Education Capabilities Observations and Discussion

a. *What specific public outreach and education capabilities and strengths do the City have to support hazards mitigation?*

   Staff involvement with the hazards mitigation planning team, the Fire Department works with emergency management and the public, and the City's Communications Department helps with public outreach, sharing of information and upcoming events, and mailing of critical information and upcoming public events. The City also has the ability to utilize Planning Commission, General Government Committee, and City Council meetings to share information and updates with the public.

b. *Are there any gaps in the City's capabilities to engage the public about natural hazards and the City's vulnerabilities?*

   Yes, a formal internal hazards mitigation planning team could be established. It will be easier to get involved with other departments to identify public engagement opportunities and the ability to share implementation statuses of the initiatives.

c. *How can the City expand or improve its public education and outreach activities?*

   Potentially by identifying a City staff member to lead or organize an internal workgroup, who will also be responsible for sharing updates on the City's Natural Hazards Mitigation Plan webpage and posting to social media. The City could develop a general communication plan around hazards mitigation to identify vulnerable populations and develop targeted outreach.

d. *What type of mitigation actions can the City take, if any, to engage the City's constituents and stakeholders about the natural hazard risks or mitigation actions?*

   The City could have a mitigation action around identifying vulnerable populations.

Appendix B – National Flood Insurance Program Assessment

National Flood Insurance Program Assessment Worksheet

Evaluation for National Flood Insurance Program Participation

- Who is the floodplain manager? Is this their primary or a secondary role? Does this person have adequate training and capacity for their role?
- Is the FIRM and FIS report in an accessible location? Does the community (or state) promote public access to floodplain information?
- How does the community support map change requests? These could be requests during the Risk MAP process or through Letters of Map Amendment or Revision.
- Does the community collect updated floodplain data or modeling? Is this shared with partners and with FEMA?
- How does the community issue development permits in the special flood hazard area? Who is responsible for permitting?
- How are floodplains regulated in new subdivisions?
- Does the community maintain elevation records? Does it track the number of buildings in the special flood hazard area?
- How does the community enforce its floodplain rules? Does enforcement include monitoring compliance and acting to correct violations?
- How does the community educate the public on floodplain management and the availability of flood insurance, in and out of the floodplain?

National Flood Insurance Program Topic	Response	Source of Information	Notes – *If the City were unsure or answered "no" to any of these questions, consider short- and long-term action items to address them.*
Staff Resources			
Who is responsible for floodplain management in the City? Do they serve any roles other than Community Floodplain Administrator?	The City's Planning Manager also serves in the role of the City's Floodplain Administrator.	City Floodplain Administrator	
Is the Community Floodplain Administrator or National Flood Insurance Program Coordinator a Certified Floodplain Manager?	No.	City Floodplain Administrator	
Is floodplain management an auxiliary function?	Yes.	City Floodplain Administrator	
Explain National Flood Insurance Program administration services (e.g., permit review, GIS, inspections, engineering capability).	The floodplain review process is handled by the Community Development Department. All major permits go through a preliminary development review before vesting and permit application. Many of these permits go in front of the Development Review Committee for review. The City's flood permit is a part of the building permit. The City currently utilizes a digital permitting and record keeping system. Upon formal application of permit, development engineering,	City Floodplain Administrator	

National Flood Insurance Program Topic	Response	Source of Information	Notes – *If the City were unsure or answered "no" to any of these questions, consider short- and long-term action items to address them.*
	permitting, and building staff review the submittal, while the Building Official reviews permits for floodplain considerations. The City's Building Official oversees the Elevation Certificate process.		
Insurance Summary			
How many National Flood Insurance Program policies are in the community? What is the total premium and coverage?	Sixteen policies are in place with a total coverage of $3,717,000 and $6,885 in total written premium and Federal Policy Fee	Community Assistance Visit summary and State Mitigation Strategist through Paul Brewster at Thurston Regional Planning Council	
How many claims have been paid out in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	There have been two paid losses worth $12,514.40 and zero substantial damage claim to date.	Community Assistance Visit summary	
How many structures (residential and non-residential) are exposed to flood risk within the community?	Twenty-two non-residential, forty-six residential, and eighteen are unknown. Total: eighty-six	GIS Team	
Are there any repetitive or severe repetitive loss structures in the community?	None.	GIS Team	

National Flood Insurance Program Topic	Response	Source of Information	Notes – *If the City were unsure or answered "no" to any of these questions, consider short- and long-term action items to address them.*
Describe any areas of flood risk with limited NFIP policy coverage.	None.	Floodplain Administrator	
How does the community teach property owners or other stakeholders about the importance flood insurance?	The City mailed all property owners with Special Flood Hazard Areas on their property information about Thurston Lakes Map updates.	Floodplain Administrator	
What digital sources (like the FEMA Map Service Center, National Flood Hazard Layer) or non-regulatory tools does the community use?	The City maintains digital copies of DFIRM maps and Flood Insurance Study Reports at City Hall, and they are available to the public. The DFIRM map coverage has also been integrated into the City's official zoning map which is available online and at City Hall.	Floodplain Administrator	
Compliance History			
Is the community currently suspended from the National Flood Insurance Program?	No.	Floodplain Administrator	
Are there any outstanding compliance issues? (i.e., current violations)?	No.	Floodplain Administrator and Community Assistance Visit summary	
How does the community identify substantially damaged or improved structures? What is the process to make sure these	At the time of a Development Permit Application submittal, City staff are notified that a property is in a Special Flood Hazard Areas via the City's GIS System. During	Floodplain Administrator	

National Flood Insurance Program Topic	Response	Source of Information	Notes – *If the City were unsure or answered "no" to any of these questions, consider short- and long-term action items to address them.*
structures are brought into compliance?	plan review is the time for determination of mitigating flood damage.		
When was the most recent Community Assistance Visit or Community Assistance Contact?	The City completed its Community Assistance Visit in the spring 2023.	City Floodplain Administrator	
Is a Community Assistance Visit or Community Assistance Contact scheduled or needed?	Not at this time.	City Floodplain Administrator	A Community Assistance Visit was conducted May 1, 2023. The last Community Assistance Contacts were completed by FEMA in 2020.
Regulation			
When did the community enter the National Flood Insurance Program?	1978	Community Status Book	
Are the FIRMs digital or paper?	Digital	City Floodplain Administrator	
How does the community enforce local floodplain regulations and monitor compliance?	Tumwater Municipal Code Chapter 18.38 *FP Floodplain Overlay* applies to the special flood hazard area within the City as well as the City's Shoreline Master Program in the case of shorelands of the state, such as the Deschutes River. If there are any conflicts between the Shoreline Master Program and the Floodplain Overlay Regulations that apply in	City Floodplain Administrator and Tumwater Municipal Code, and Shoreline Master Program	The City's Flood Damage Prevention Ordinance found in Tumwater Municipal Code Chapter 18.38 *FP Floodplain Overlay was* reviewed during the Community Assistance Visit. The City's ordinance was overall in fair standing, with minor updates needed to bring the ordinance into compliance with NFIP and State of Washington standards. It was discussed during the

National Flood Insurance Program Topic	Response	Source of Information	Notes – *If the City were unsure or answered "no" to any of these questions, consider short- and long-term action items to address them.*
	shoreline jurisdiction, the requirements of Shoreline Master Program apply.		Community Assistance Visit that the City will complete all needed updates as part of the 2025 Development Code periodic update process and adopt a compliant ordinance in order to close out the CAV.