5.2 City of Gresham

5.2.1 Mitigation Actions

<table>
<tr><th>Hazard</th><th>Action ID</th><th colspan="8">Mitigation Actions – City of Gresham</th></tr>
<tr><td rowspan="8">Multi-Hazard</td><td rowspan="8">1</td><td colspan="8">Develop a Disaster Debris Management Plan to support community recovery and maximize FEMA reimbursement.</td></tr>
<tr><td colspan="4">Plan Goals – 2,3,5</td><td colspan="4">Hazards Addressed – All Hazards</td></tr>
<tr><td colspan="4">Lifelines – Debris Management</td><td colspan="4">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Solid Waste, Recycling and Sustainability (SWR&S)</td><td>Environmental Services, Transportation Operations</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>15</td></tr>
<tr><td colspan="8">Potential Funding – Solid Waste operating budget, Environmental Services budget</td></tr>
<tr><td colspan="8">Potential Implementation Methods – Gresham Debris Management Plan</td></tr>
<tr><td colspan="8">Notes –</td></tr>
</table>

Hazard	Action ID	Mitigation Actions – City of Gresham								
Multi-Hazard	2	**Engage with community-based organizations (CBO's) to ensure touchpoints with frontline communities vulnerable in disasters.**								
		Plan Goals – 1,2,4,5		Hazards Addressed – All Hazards						
		Lifelines – Community Resilience		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Community Engagement	Emergency Management	**3**	**2**	**3**	**3**	**3**	**14**	
		Potential Funding –								
		Potential Implementation Methods –								
		Notes –								
Multi-Hazard	3	**Support the City's adopted Climate Action Plan actions that relate to climate change resiliency and preparedness.**								
		Plan Goals – 1,2,3,4,5		Hazards Addressed – Flood, Landslide, Severe Weather, Wildfire & Wildfire Smoke						
		Lifelines – Climate Resilience		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Solid Waste, Recycling and Sustainability (SWR&S)		**3**	**2**	**3**	**3**	**2**	**13**	
		Potential Funding – Solid Waste operating budget, Grants								
		Potential Implementation Methods – Climate Action Plan, Green Business Program, Needs amendments to Comprehensive Plan								
		Notes -								

Hazard	Action ID	Mitigation Actions – City of Gresham								
Multi-Hazard	4	**Support local businesses in preparing for disasters and promote local business continuity planning.**								
		Plan Goals – 1,2		Hazards Addressed – All Hazards						
		Lifelines – Local Economy		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Solid Waste, Recycling and Sustainability (SWR&S)	Economic Development, Emergency Management	**2**	**2**	**3**	**1**	**3**	**11**	
		Potential Funding –								
		Potential Implementation Methods –								
		Notes –								
Earthquake	5	**Implement improvements to the wastewater treatment plant to resist seismic events, including earthquake caused landslides**								
		Plan Goals – 3,5		Hazards Addressed – Earthquake						
		Lifelines – Wastewater Infrastructure		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Wastewater Division		**3**	**3**	**3**	**3**	**3**	**15**	
		Potential Funding – CIP, Grants								
		Potential Implementation Methods – Master Plan, Seismic Plan								
		Notes –								

Hazard	Action ID	Mitigation Actions – City of Gresham								
Earthquake	6	**Harden the city's sewer backbone system to resist seismic events, including earthquake caused landslides.**								
		Plan Goals – 3,5		Hazards Addressed – Earthquake						
		Lifelines – Wastewater Infrastructure		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Wastewater Division		**3**	**3**	**3**	**3**	**3**	**15**	
		Potential Funding – CIP, Grants								
		Potential Implementation Methods – Master Plan/Seismic Plan								
		Notes –								
Earthquake	7	**Continue to implement seismic structural retrofits at water reservoirs and pump stations.**								
		Plan Goals – 3,5		Hazards Addressed – Earthquake						
		Lifelines – Wastewater Infrastructure		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Water Division		**3**	**3**	**3**	**3**	**3**	**15**	
		Potential Funding – CIP, Grants								
		Potential Implementation Methods – Master Plan, Seismic Plan. AWIA Requirements								
		Notes –								

<table>
<tr><th>Hazard</th><th>Action ID</th><th colspan="8">Mitigation Actions – City of Gresham</th></tr>
<tr><td rowspan="6">Earthquake</td><td rowspan="6">8</td><td colspan="8">Improve seismic resilience of water pipeline infrastructure.</td></tr>
<tr><td colspan="3">Plan Goals – 3,5</td><td colspan="5">Hazards Addressed – Earthquake</td></tr>
<tr><td colspan="3">Lifelines – Water Infrastructure</td><td colspan="5">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Water Division</td><td></td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>15</td></tr>
<tr><td colspan="8">Potential Funding – CIP, Grants
Potential Implementation Methods – Master Plan, Seismic Plan, AWIA Requirements
Notes –</td></tr>
<tr><td rowspan="6">Earthquake</td><td rowspan="6">9</td><td colspan="8">Seismically retrofit existing public wastewater facilities and infrastructure to withstand and continue service after a catastrophic earthquake, allowing the city to meet the Oregon Resilience Plan Target States of Recovery.</td></tr>
<tr><td colspan="3">Plan Goals – 3,5</td><td colspan="5">Hazards Addressed – Earthquake</td></tr>
<tr><td colspan="3">Lifelines – Wastewater Infrastructure</td><td colspan="5">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Wastewater Division</td><td></td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>15</td></tr>
<tr><td colspan="8">Potential Funding – CIP, Grants
Potential Implementation Methods – Master Plan, Seismic Plan
Notes –</td></tr>
</table>

Hazard	Action ID	Mitigation Actions – City of Gresham							
Earthquake	10	**Build resiliency and mitigation education into public events. Partner with NGOs to ensure culturally appropriate and engaging material.**							
		Plan Goals – 1,2,4		Hazards Addressed – Earthquake					
		Lifelines – Community Resilience		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Community Engagement	Emergency Management	**3**	**2**	**3**	**1**	**3**	**12**
		Potential Funding –							
		Potential Implementation Methods –							
		Notes -							
Earthquake	11	**Develop a seismic overlay.**							
		Plan Goals -		Hazards Addressed – Earthquake					
		Lifelines – Land Use, Zoning, Building		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Urban Design and Planning		**2**	**2**	**2**	**3**	**2**	**11**
		Potential Funding – General Fund							
		Potential Implementation Methods – Needs amendments to Comp Plan Volumes 1-3, could be stand-alone or combined with Wildfire Overlay Project.							
		Notes –							

<table>
<tr><th>Hazard</th><th>Action ID</th><th colspan="8">Mitigation Actions – City of Gresham</th></tr>
<tr><td rowspan="7">Flood</td><td rowspan="7">12</td><td colspan="8">Develop and implement strategies to restore and enhance the natural functions of floodplains.</td></tr>
<tr><td colspan="4">Plan Goals – 3,5</td><td colspan="4">Hazards Addressed – Flood</td></tr>
<tr><td colspan="4">Lifelines – Floodplain Management</td><td colspan="4">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Watershed Division</td><td></td><td>3</td><td>3</td><td>2</td><td>2</td><td>3</td><td>13</td></tr>
<tr><td colspan="8">Potential Funding – Watershed CIP</td></tr>
<tr><td colspan="8">Potential Implementation Methods – Natural Resources Master Plan</td></tr>
<tr><td colspan="8">Notes - These projects are found within the Natural Resources Master Plan, Stormwater Master Plan, and are associated with Transportation projects involving major stream crossings. Projects should be reviewed for potential to provide additional flood attenuation to reduce flooding</td></tr>
<tr><td rowspan="7">Flood</td><td rowspan="7">13</td><td colspan="8">Implement flood attenuation strategies as identified and prioritized in the Stormwater Master Plan.</td></tr>
<tr><td colspan="4">Plan Goals – 3,5</td><td colspan="4">Hazards Addressed – Flood</td></tr>
<tr><td colspan="4">Lifelines – Stormwater Infrastructure</td><td colspan="4">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Wastewater Division</td><td></td><td>3</td><td>3</td><td>2</td><td>2</td><td>3</td><td>13</td></tr>
<tr><td colspan="8">Potential Funding – Watershed CIP</td></tr>
<tr><td colspan="8">Potential Implementation Methods – Stormwater Master Plan</td></tr>
<tr><td colspan="8">Notes -</td></tr>
</table>

<table>
<tr><th>Hazard</th><th>Action ID</th><th colspan="8">Mitigation Actions – City of Gresham</th></tr>
<tr><td rowspan="7">Flood</td><td rowspan="7">14</td><td colspan="8">Maintain eligibility in the National Flood Insurance Program (NFIP) and initiate participation in the Community Rating System (CRS).</td></tr>
<tr><td colspan="3">Plan Goals – 1,2,3</td><td colspan="5">Hazards Addressed – Flood</td></tr>
<tr><td colspan="3">Lifelines – Floodplain Management</td><td colspan="5">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Urban Design and Planning</td><td>Watershed Division</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td><td>11</td></tr>
<tr><td colspan="8">Potential Funding – Existing Resources/General Fund</td></tr>
<tr><td colspan="8">Potential Implementation Methods – Endangered Species Act BiOp Compliance</td></tr>
<tr><td colspan="8">Notes –</td></tr>
<tr><td rowspan="7">Landslide</td><td rowspan="7">15</td><td colspan="8">Protect slopes and associated infrastructure by identifying and prioritizing at-risk slopes with high consequences of failure.</td></tr>
<tr><td colspan="3">Plan Goals – 3,5</td><td colspan="5">Hazards Addressed – All Hazards</td></tr>
<tr><td colspan="3">Lifelines – All Infrastructure</td><td colspan="5">Prioritization Criteria</td></tr>
<tr><td>Implementation Lead</td><td>Coordinating Partnerships</td><td>Equity</td><td>Benefit</td><td>Cost</td><td>Risk</td><td>Capacity</td><td>Priority Score</td></tr>
<tr><td>Natural Resources</td><td>Wastewater, Environmental Services</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td><td>11</td></tr>
<tr><td colspan="8">Potential Funding – Watershed and other Environmental Services CIPs</td></tr>
<tr><td colspan="8">Potential Implementation Methods – Natural Resources Master Plan</td></tr>
<tr><td colspan="8">Notes - Weight loading of dead vegetation and debris; Alteration of vegetation to more stabilizing species; identify City program staff and budget for landslide risk mitigation and landslide response; Programmatic retrofits needed for developments prior to 1994; Modeling of highest risk areas with infrastructure conflicts.</td></tr>
</table>

Hazard	Action ID	Mitigation Actions – City of Gresham							
Landslide	16	**Integrate landslide prevention into outreach/enforcement programs to find and resolve encroachments at the public/private interface where dumping contributes to landslide risk.**							
		Plan Goals – 1,3,5		Hazards Addressed – Landslide					
		Lifelines – Community Resilience		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Natural Resources	Code Compliance, City Attorney's Office	**2**	**2**	**1**	**2**	**2**	**9**
		Potential Funding – Watershed CIP, Settlement Agreements							
		Potential Implementation Methods –							
		Notes -							
Severe Weather	17	**Revisit where and what kind of generators need to be available for water and wastewater infrastructure due to significant power outages.**							
		Plan Goals – 3,4,5		Hazards Addressed – Severe Weather					
		Lifelines – Water and Wastewater Infrastructure		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Water/Wastewater Divisions		**3**	**3**	**3**	**3**	**3**	**15**
		Potential Funding – CIP, Grants							
		Potential Implementation Methods – Master Plan, AWIA Requirements							
		Notes -							

Hazard	Action ID	Mitigation Actions – City of Gresham							
Severe Weather	18	**Coordinate with Multnomah County to mitigate the effects of severe weather on vulnerable populations.**							
		Plan Goals – 1,2,4,5		Hazards Addressed – Severe Weather					
		Lifelines – Community Resilience, Medical Systems		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Emergency Manager	Multnomah County Health Department, Multnomah County Human Services, Multnomah County Emergency Management	**3**	**3**	**3**	**3**	**3**	**15**
		Potential Funding –							
		Potential Implementation Methods –							
		Notes -							
Severe Weather	19	**Conduct a shade audit in all city parks.**							
		Plan Goals – 3,4,5		Hazards Addressed – Severe Weather					
		Lifelines – Community Resilience, Parks		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Parks and Recreation Division		**2**	**2**	**3**	**2**	**3**	**12**
		Potential Funding – Parks and Recreation General Fund							
		Potential Implementation Methods – Parks and Recreation Trails and Natural Areas Master Plan Update (2024)							
		Notes -							

Hazard	Action ID	Mitigation Actions – City of Gresham							
Severe Weather	20	**Install trees in tree-deficient neighborhoods that experience urban heat island effect impacts to enhance shade equity in underserved areas.**							
		Plan Goals – 1,2,4,5		Hazards Addressed – Severe Weather					
		Lifelines – Community Resilience, Parks		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Parks and Recreation Division	Watershed Division	**2**	**2**	**3**	**2**	**3**	**12**
		Potential Funding – Special Designated Tree Fund/EMSWCD PIC Grant through 2023, General Fund (Parks & Recreation and UDP), Stormwater CIP or Operating Funds							
		Potential Implementation Methods – Urban Forestry Management Plan, Tree Code, Stormwater Retrofit Strategy							
		Notes - Potential grant funding from FEMA/EPA and USDA inflation reduction act 2023 - 2026							
Severe Weather	21	**Develop an emergency service plan for solid waste removal in multifamily properties after a disaster event.**							
		Plan Goals – 2,4,5		Hazards Addressed – Severe Weather					
		Lifelines – Solid Waste Removal		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Solid Waste, Recycling and Sustainability (SWR&S)		**2**	**2**	**2**	**2**	**2**	**10**
		Potential Funding –							
		Potential Implementation Methods –							
		Notes -							

Hazard	Action ID	Mitigation Actions – City of Gresham							
Wildfire & Wildfire Smoke	22	**Expand permanent backyard burning ban.**							
		Plan Goals – 1,5		Hazards Addressed – Wildfire & Wildfire Smoke					
		Lifelines – Fire Prevention		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Fire	Urban Design and Planning, Watershed Division	**3**	**2**	**3**	**2**	**3**	**13**
		Potential Funding – None needed							
		Potential Implementation Methods – Post-levy vote							
		Notes -							
Wildfire & Wildfire Smoke	23	**Include content on wildfire defensible space in outreach to properties within or adjacent to protected resource areas.**							
		Plan Goals – 1,2		Hazards Addressed – Wildfire & Wildfire Smoke					
		Lifelines – Fire Prevention		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Natural Resources	Fire, Urban Design and Planning	**2**	**3**	**2**	**2**	**3**	**12**
		Potential Funding – Natural Resources Operating Funds							
		Potential Implementation Methods – Distribution to begin with completion of EOP Phase 2 (est. FY 24-25)							
		Notes -							

Hazard	Action ID	Mitigation Actions – City of Gresham								
Wildfire & Wildfire Smoke	24	**Develop emergency ingress/egress mapping tool for older developments and assess options for alternative access where no secondary ingress/egress exists.**								
		Plan Goals – 1,2,5		Hazards Addressed – Wildfire & Wildfire Smoke						
		Lifelines – Fire Operations, Evacuation Planning		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Fire	GIS, Transportation, Natural Resources	**2**	**2**	**3**	**2**	**2**	**11**	
		Potential Funding – Existing resources								
		Potential Implementation Methods – Existing plans and workloads								
		Notes -								
Wildfire & Wildfire Smoke	25	**Strengthen code language to ensure secondary access for future subdivisions.**								
		Plan Goals – 2,5		Hazards Addressed – Wildfire & Wildfire Smoke						
		Lifelines – Fire Operations, Evacuation Planning, Land Use		**Prioritization Criteria**						
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**	
		Urban Design and Planning	Transportation	**2**	**2**	**3**	**2**	**2**	**11**	
		Potential Funding – General Fund								
		Potential Implementation Methods – Combined with other transportation or housing updates to Comp Plan Volume 3								
		Notes -								

Hazard	Action ID	Mitigation Actions – City of Gresham							
Wildfire & Wildfire Smoke	26	**Address riparian forest die off and implement measures to transition to more drought tolerant/climate resilient plant communities.**							
		Plan Goals – 1,2,5		Hazards Addressed – Wildfire & Wildfire Smoke					
		Lifelines – Parks, Fire Prevention		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Natural Resources		**3**	**2**	**1**	**2**	**2**	**10**
		Potential Funding – Natural Resources Operating Funds							
		Potential Implementation Methods – Implemented by means of City's Temperature TMDL regulatory response							
		Notes -							
Wildfire & Wildfire Smoke	27	**Develop a wildfire overlay.**							
		Plan Goals – 1,2,5		Hazards Addressed – Wildfire & Wildfire Smoke					
		Lifelines – Parks, Fire Prevention		**Prioritization Criteria**					
		Implementation Lead	**Coordinating Partnerships**	**Equity**	**Benefit**	**Cost**	**Risk**	**Capacity**	**Priority Score**
		Urban Design and Planning		**2**	**1**	**2**	**2**	**2**	**9**
		Potential Funding – General Fund							
		Potential Implementation Methods – Needs amendments to Comp Plan Volumes 1-3, could be stand-alone or combined with Seismic Overlay Project							
		Notes -							

5.2.2 City Overview

The City of Gresham was incorporated in 1905 and occupies about 23.4 square miles of land on the eastern side of Multnomah County. Gresham spans from the northern boundary of the

county at the Columbia River all the way to the southern boundary with Clackamas County. Gresham is primarily bordered by the City of Portland to the West. Fairview and Wood Village are north of Gresham and Troutdale borders Gresham to the northeast. The city is otherwise bounded by unincorporated Multnomah County.

Gresham is the second largest city in Multnomah County and the fourth largest city in the State of Oregon by population. Only Portland and Vancouver, Washington are larger cities within the Portland Metropolitan Area.

Figure 124- Public art at the Rockwood light rail station in Gresham. Photo - Metro

Gresham spans across a number of landscapes, from the flat floodplains of the Columbia Slough watershed, the deep, well-drained rocky soils of the Rockwood area, the Downtown area with its high surface water, and the mostly forested southern butte complex.

Gresham has grown out from its early urban core with three urban centers; Historic Downtown, Rockwood and the Civic Neighborhood, each with commercial corridors. Low-density residential development and slowly urbanizing farmland characterize the southern areas (bordering Clackamas County) of the urban services boundary and the eastern edges of the city. Johnson Creek, Fairview Creek and Kelly Creek and their tributaries form vegetated corridors through the city. The Rockwood area in northwest Gresham, was first developed in the 1970s when it was unincorporated and became denser in the late 80s and early 90s due to significant multifamily development. Mount Hood dominates the viewsheds and Mount St. Helens is visible on clear days.

Because of its diversity of landscapes and development patterns, Gresham has significant vulnerability to specific natural hazards. There are numerous hazard risks that overlay against the large population and resultant critical infrastructure located across the City.

Gresham remains the fastest growing city included in this plan, based on total population increase. Although geographic and population growth has slowed compared to the rapid city expansion of the 1980s and 1990s, Gresham continues to annex areas of unincorporated Multnomah County and has also added residents through residential infill and redevelopment.

Table 41 – Gresham Population by Census Year (For population details, see Community Profile chapter)

Census or Estimate Year	Total Population – City of Gresham	Percentage Change
2000	90,205	32.2% (1990)
2010	105,594	17.1% (2000)
2015 (est)	107,065	
2020	114,247	8.3% (2010)
2021 (est)[87]	114,361	

Gresham is notably racially, linguistically and socio-economically diverse, compared to Oregon and Multnomah County as a whole. Gresham's demographics add another layer of risk to residents, requiring multi-faceted approaches to maintain risk communication and understand the complex needs of diverse populations in developing hazard resilience as well as hazard preparation, response and recovery.

Gresham's population is younger than the county average, with 23% of residents being children under the age of 18, compared to about 18% countywide. However, the city has grown significantly faster with those over 65 compared to children over the last five years. Because of its large size, Gresham has, by far, the largest total number of children (26,359) and those over the age of 65 (15,572) of cities included in this plan.

Gresham has the highest number of those identifying as having a disability (16,778) and the highest proportion of residents with a disability (14.7%) of communities participating in this plan.

Gresham also has the highest poverty rate of any community in Multnomah County, with about 16% of the population (17,568) being below federally-designated poverty levels. While poverty has historically been concentrated in the Rockwood area, development patterns, intraregional migration, and the ongoing housing crisis has led to growing dispersal of this population.

Though the other cities in this plan are characterized as "East County" for the purposes of the Point in Time counts of homeless residents, Gresham is enumerated separately. In the 2019 PIT count, 103 residents of Gresham were identified as unsheltered – a sharp increase from the 2017 count, even as the total countywide population remained flat. The number of people identified as chronically homeless also grew at a more rapid rate for Gresham. A new 2022 count is currently being finalized.

[87] 2021 population estimates from the Portland State University Population Center. All other totals or estimates come from the US Census Bureau.

Gresham has ten manufactured home parks within city limits. Within these parks, there are a total of 636 spaces making up approximately 1.5% of the city's housing units.

Gresham is second only to Wood Village in its proportion of residents who speak a language other than English at home and speak English less than 'very well'. Again, because of the city's large size, it serves by far the most people in this plan with limited English proficiency (11,445).

Transportation

Gresham is bisected by Interstate 84 in the north and by United States Route 26 (Powell Boulevard) in the south. Other key primary transportation routes are:

- 181st/182nd Avenue
- Division Street
- Burnside Street
- Hogan Road
- Kane Road (257th Avenue)
- Eastman Parkway (223rd Avenue)
- Stark Street
- Glisan Street
- Halsey Street
- Pleasant View Drive (190th Avenue)

Public transportation is provided by TriMet, with extensive light rail and bus service, including a transit center at NE Kelly and 8th Streets. North-south transit is weak with relative underserved populations south of Powell and east of Hogan.

Utilities

The City of Gresham and the Rockwood Water People's Utility District provide water to city residents. Water has primarily come from the City of Portland's sources (mostly the Bull Run Reservoir) and has been supplemented in dry periods and emergencies by the Columbia South Shore Well Field. Gresham and Rockwood Water PUD have also maintained their own wells in the Sand and Gravel Aquifer to supplement Portland supply. In 2021 they formed the Cascade Groundwater Alliance to develop more wells which will be the primary source of Gresham's drinking water by 2026.

The City of Gresham also provides wastewater and stormwater services to its citizens.

Electricity is provided by Portland General Electric (PGE) and natural gas by NW Natural.

Critical Facilities

A full list of critical facilities can be found in the Human-Caused and Technological Hazard Identification and Risk Assessment, included as an annex to this plan. Communities define critical facilities through their own definition.

Critical facilities in Gresham include:

- Bridges
- Childcare Facilities

- City Hall
- Community Center
- County Assets
- Fire Stations
- Hospital
- Law Enforcement Facilities
- Libraries
- Licensed Medical Facilities
- Residential Care Facilities
- Schools
- Urgent Care Centers

5.2.3 Five-Year Update, 2017-2022

Hazard Events

Natural impacts over the past five years were most prominently climate events, as Gresham residents suffered from extreme heat and cold and from wildfire smoke.
One death from hyperthermia in the 2021 Heat Dome event was recorded in a Gresham zip code. Residents living in neighborhoods with severe urban heat island effects and without the ability to access cooling spaces were most at risk.

Unsheltered residents were especially impacted by a long cold period in the winter of 2017, and by shorter events in following years. Transportation routes and other infrastructure were repeatedly impacted by snow and ice over this timespan.

The September 2020 Wildfire Smoke event impacted all city residents, with those closest to Clackamas County experiencing the heaviest smoke, and those in neighborhoods with limited tree canopies dealing with high heat and less filtered air. Long term health impacts from the smoke have not yet been quantified.

Periods of heavy rain caused localized ponding and small landslides, but no significant damage.

Mitigation Activities

Seismic Resilience

- Gresham's 2016 Water System Seismic Resilience Plan identified key resources that would be at risk from the effects of a large earthquake. The Grant Butte Reservoir and associated pipes were determined to be a priority vulnerability to earthquake impacts, including co-seismic landslide. Gresham received a $2.2 million hazard mitigation grant from FEMA to improve underground pipes and structurally improve the reservoir structure as well as operational equipment. Final repaving work was completed in the summer of 2022.

Figure 125 - The Grant Butte Reservoir in Gresham. Photo - City of Gresham

- Gresham received a FEMA Hazard Mitigation grant to strengthen a sewer/water conveyance flyover at Johnson Creek near Cedarville Park. The project will replace the span, strengthen the base with piles and harden manholes. This type of project was specifically noted as a prioritized mitigation strategy in Gresham's 2017 NHMP. Construction is planned for Summer 2023.

Tree Planting

- As part of Gresham's efforts to cool elevated stream temperatures and to improve stream bank stability, Gresham's Natural Resources Program continues to plant over 15,000 riparian trees and shrubs annually.

- Urban heat islands have been identified with Rockwood (the area with the highest concentration of poverty and limited English proficiency) showing extreme heat. Tree planting is being prioritized in Gresham for these areas given the extreme heat risk and poor air quality in neighborhoods with high proportions of impervious surfaces and populations with less ability to avoid these risks. Increasing the tree canopy also assists in infiltrating stormwater in these highly urbanized areas.

- To support the goal of increasing tree canopy, the City of Gresham partnered with the Multnomah County Office of Sustainability, Friends of Trees and the East Multnomah Soil and Water Conservation District (EMSWCD) in 2018 to create the Green Gresham, Healthy Gresham program to plant additional street trees in the Rockwood, Wilkes East and North Gresham neighborhoods. Since the initiation of this program, hundreds of trees have been planted and Gresham is also seeking funding for a larger-scale project in Rockwood to add trees to a highly urbanized commercial area that would include permanent pavement replacement.

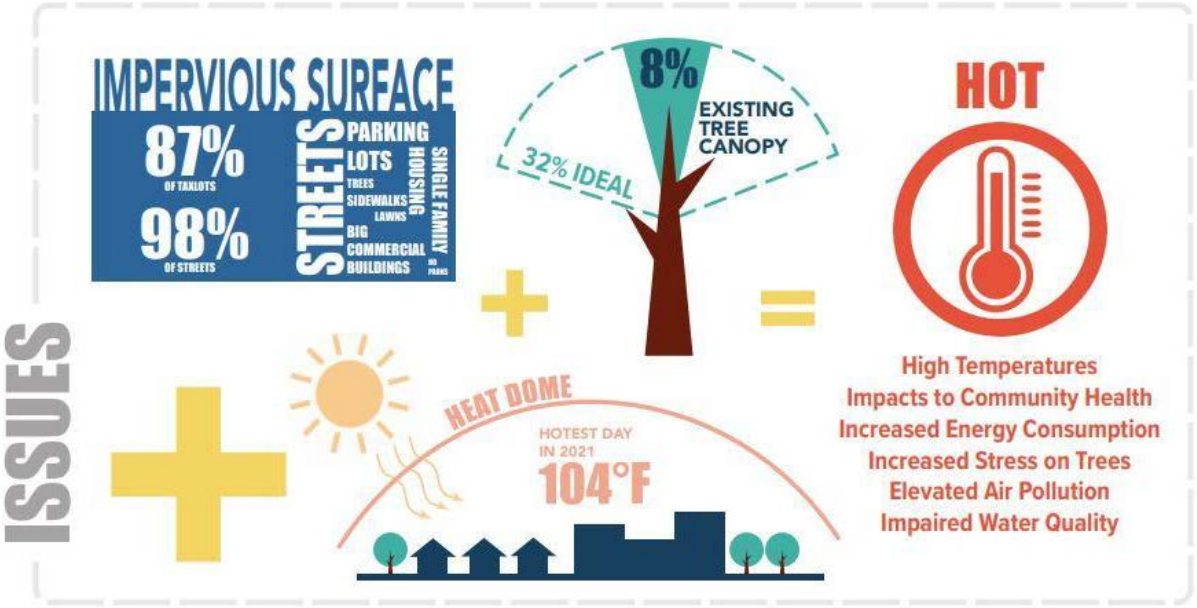

Figure 126– Graphic from Juncus Studio landscape analysis for City of Gresham, 2021

Flood Resilience

- In 2019 Gresham updated its floodplain code to bring the city into compliance with updated FEMA standards and adopted new FIRM maps within the Lower Columbia-Sandy Watershed. Riparian code updates went into effect in 2021 were targeted to maintain current levels of code protection but increase understanding and enforceability.

- The culvert under Palmquist Road was upsized to prevent historic backups and flooding of the area including Palmquist Estates, an 86-space manufactured home park.

Landslide Resilience

- In 2020 updated code and overlay maps regarding development in areas with steep slopes and landslide risk. Hillside mapping was updated to utilize LIDAR and DOGAMI landslide risk data. The code was updated to require a geotechnical professional review development in these areas and to further protect trees from removal.

Sustainable Infrastructure

- The City of Gresham partnered with the University of Oregon's Institute for Policy Research and Engagement (IPRE) and the Center for Sustainable Infrastructure to review the city's natural hazard policies and consider how critical infrastructure is impacted. The collaboration focused on the development of a more resilient water supply and how that project could be reimagined in ways that strengthen the resilience of critical infrastructure systems and the interconnection of systems—with an eye to maximizing economic, public health and environmental value, and reducing risks posed by natural and human-induced disasters. A report and workshop series were created to evaluate the project on those terms.

- The resilient water supply project was undertaken by Gresham's two water providers because of rising costs of buying water from Portland and to increase redundancy in the system. In 2021, a new well was completed in Gresham, a new reservoir is under construction at Rockwood Water People's Utility District facilities, and Gresham is planning for new earthquake-resilient transmission mains.

5.2.4 Local Hazard Analysis

Earthquake – Risk Rating High

See Earthquake Section for more detailed risk and vulnerability information.

Gresham faces considerable risk from a Cascadia Subduction Zone event or local crustal fault event. In the two earthquake events modeled by DOGAMI in the countywide Multnomah County Earthquake Impact Study (Cascadia Subduction Zone earthquake and Portland Hills crustal earthquake), Gresham faces primarily very strong shaking fairly evenly across the city. Severe shaking effects are predicted in floodplains in the farthest north of the city along the Columbia River and Columbia Slough and along creeks in the south of the city, especially Johnson Creek. These areas with heightened earthquake impacts make up about 20% of the city.

An interactive version of this map can be found here (Earthquake Hazard – Earthquake Liquefaction (Soft Soil) Hazard)

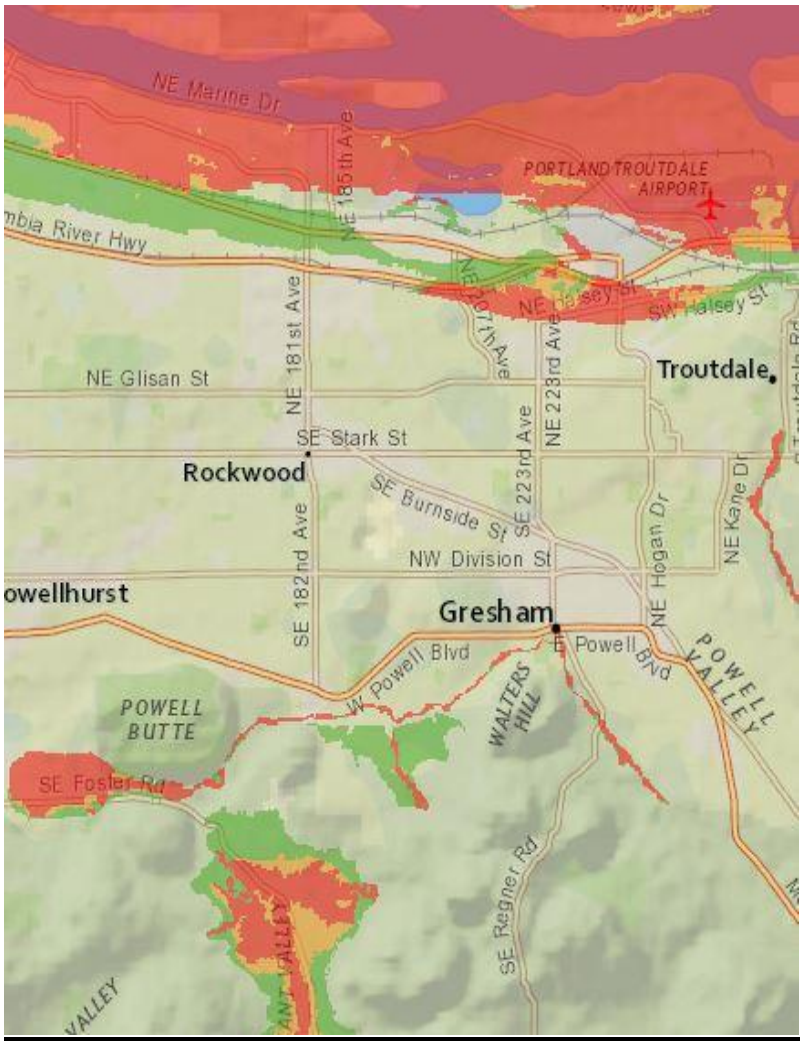

Figure 127- Map showing liquefaction risk zones in Gresham. High risk is shown in red, medium risk in yellow and lower risk in green. All areas of Gresham would be subject to ground shaking. Map from DOGAMI HazVu website.

Gresham has highly urbanized areas including older multifamily residential buildings which would be more susceptible to shake damage. Much of the population in these areas are at increased risk and have significant barriers to resilience/mitigation planning. There is significant infrastructure in the Columbia Slough watershed and along Johnson Creek. These factors lead to a high relative risk for Gresham.

Gresham is also the only city in this plan which has identified crustal faults within its jurisdiction. These faults are the Grant Butte Fault Zone and Damascus-Tickle Creek Fault Zone located around Gresham Butte and in Powell Valley respectively. While these faults are a concern, they have not been evaluated for vulnerability to earthquake scenarios and there is little record of past seismic activity.

An interactive version of this map can be found here (Earthquake Hazard – Active Faults)

Figure 128 - Map showing location of crustal faults in Gresham. Map from DOGAMI HazVu..

The buttes in the south of the city are also at high risk from earthquake-induced landslides. Those areas are expected to be the same as the mapped risk areas for any landslide, but a large earthquake would be expected to trigger a large number at once and complicate response and evacuation efforts and put infrastructure at risk.

Flood – Risk Rating Moderate

***See Flood Section for more detailed risk and vulnerability information*.**

While much of Gresham's industrial land lies in the Columbia River floodplain, the area is largely protected by the Multnomah County Drainage District levee system and upstream dams. In other portions of the City, mapped flood hazard area is limited closely to stream channels. These extents, most prominently along the Columbia Slough, Johnson Creek, Fairview Creek, and Kelly Creek are sufficient to consider the relative risk of flood in Gresham to be moderate. There is also documented risk of flooding along Burlingame Creek which is not reflected on FEMA floodplain maps, and protections have been implemented with the recent floodplain updates.

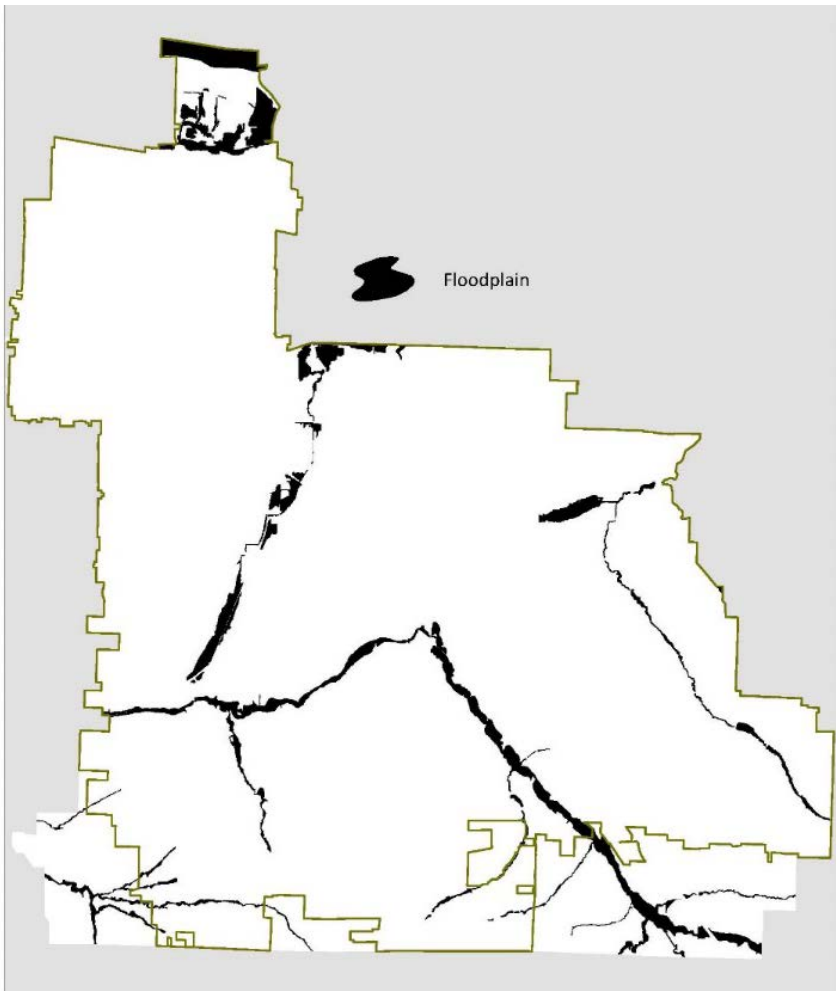

Figure 129 - Floodplain overlay for the City of Gresham indicated in black. Map from the Gresham Community Development Plan, Volume 2, Section 10.232

Gresham has participated in the National Flood Insurance Program (NFIP) since 1979, and adopted its Floodplain Overlay Zone to its Development Code in 1988. NFIP Program participation allows city residents to purchase federal flood insurance and requires the city to maintain a flood protection ordinance to make new and rebuilt construction more resilient to flood. As of 2016, there were 83 active policies with over $23 million in insurance coverage. Since Gresham residents became eligible for Federal flood insurance, two claims had been paid as of 2016, totaling about $8,000 in payments. Gresham has no structures considered repetitive loss or severe repetitive loss.

Gresham's floodplain management program is overseen by the Urban Design and Planning Department, which that implements the Floodplain Overlay Zone. The city updated its Floodplain Overlay in 2019 to adopt revised Flood Insurance Rate Maps developed for the Lower Columbia-Sandy watershed.

Gresham seeks to reduce flooding impacts of existing and new development by constructing regional stormwater detention facilities, requiring new development to provide on-site stormwater detention, protecting undeveloped riparian and floodplain areas and, where possible, utilizing green practices. Areas identified as of risk for urban stormwater flooding are:

- Areas along Burlingame Creek, particularly those near Hogan Road where Burlingame enters the Gresham Golf Course
- Properties along Johnson Creek off Park Avenue

Landslide – Risk Rating Moderate

See Landslide Section for more detailed risk and vulnerability information.

Gresham's risk of landslide is primarily in the butte areas in the south of the city, while the northern portion shares the flatter topography of the other cities in this plan. Apart from unincorporated Multnomah County, Gresham has the highest proportion of its area with high-risk shallow and deep landslide areas of entities in this plan. Gresham has been fairly successful in reducing development on the buttes in recent years, but legacy development exists at toes of slope of all the buttes and along the eastern slope of Gresham Butte and Hogan Butte. Increased die off of forest canopy throughout the buttes is associated with the increase in warmer, drier summers, resulting in a decline in tree cover as well as a decline in the slope stabilization provided by healthy tree roots. Because of these factors, the risk level for landslides was determined as moderate.

DOGAMI landslide inventories show a small number of recorded landslides around Gresham Butte. Deep landslide deposits were identified in several areas around the city buttes, with the largest found on a steep slope near Kelly Creek and SW Rodlun Road at the boundary between Gresham and Unincorporated Multnomah County.

Notable landslide risk areas identified by the City of Gresham are the Springwater and Pleasant Valley communities, the north and east face of Gresham Butte and at Walter's Road, the east face of Hogan Butte, and along Miller Avenue, Lovar Street and 14th Street.

An interactive version of this map can be found here (Landslide Susceptibility – Susceptability to Deep Landslides)

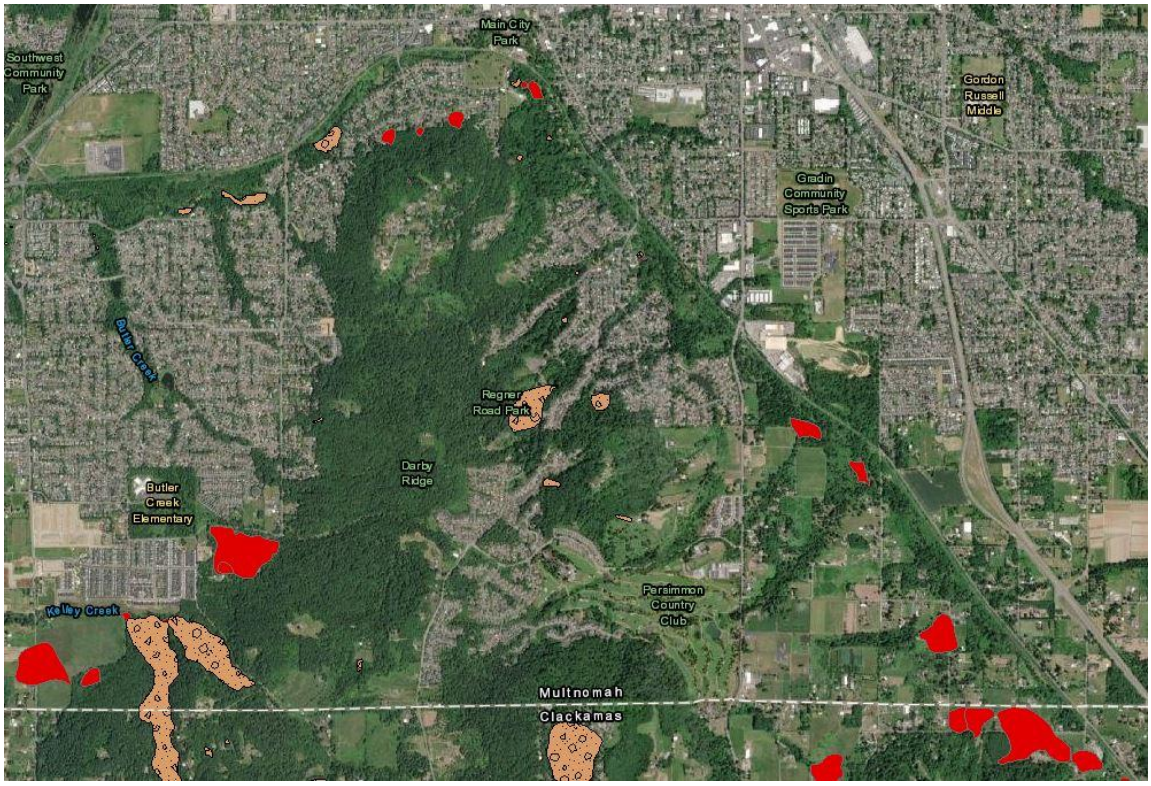

Figure 130- Map showing historic landslide deposits in the Gresham Buttes area. Areas indicated in orange are historic slide deposits and red areas are historic alluvial fans. Map from DOGAMI SLIDO site.

The southern buttes are also highly susceptible to shallow landslides because of their steep slopes and soil makeups.

[An interactive version of this map can be found here (Landslide Susceptibility – Susceptability to Shallow Landslides)]

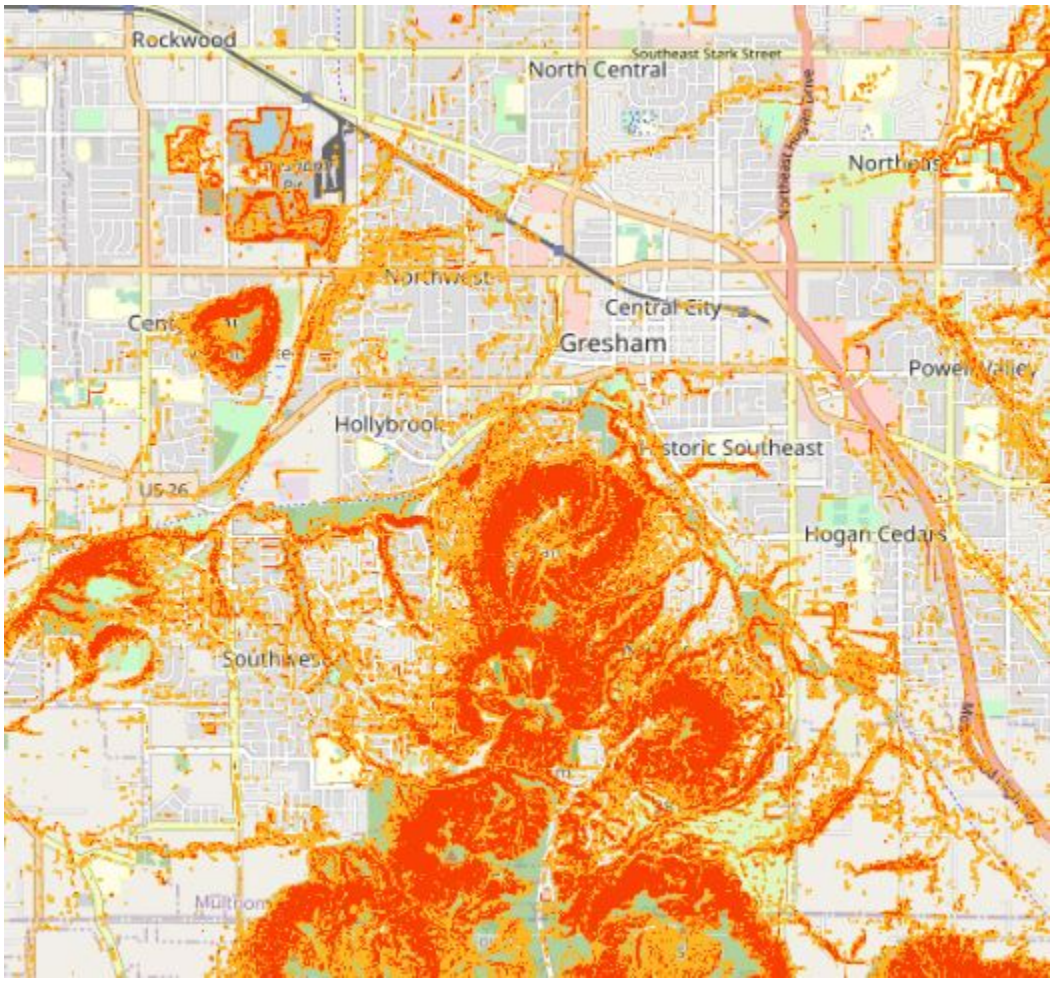

Figure 131 - Map showing shallow landslide susceptibility in South Gresham. Red are the highest risk areas, orange are medium risk, and yellow are lower risk. Map from DOGAMI SLIDO site.

Gresham referenced SLIDO and DOGAMI's landslide and hazard risk study to identify areas of landslide risk and used that and community risk assessments to create a Hillside and Geologic Risk Overlay which regulates work, including tree removal, on hillsides and steeply sloped areas. Ground disturbance is limited in such mapped areas and on slopes greater than 35% development is severely limited. Almost all development in these areas requires a geotechnical engineer to have reviewed plans. Trees are protected and replacement is required if dangerous trees are removed to mitigate the loss of slope stability.

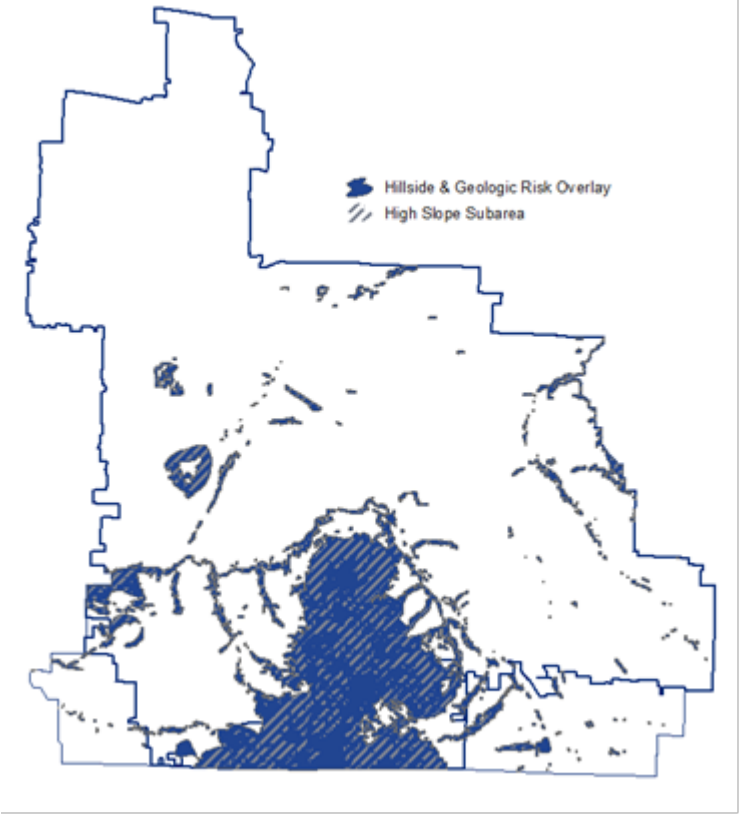

Figure 132 - Map showing City of Gresham Hillside & Geologic Risk Overlays, from the Gresham Community Development Plan, Volume 2, Section 10.211

Severe Weather – Risk Rating High

See Severe Weather Section for more detailed risk and vulnerability information.

Due to the density of Gresham's urban centers the impacts of extreme weather events may be particularly severe in Gresham. Due to the limited tree canopy in these areas (particularly Rockwood) the impacts of heat in particular is likely to be much greater while the aging multifamily housing stock in those same areas may create more susceptibility to extreme cold. Due to this intersection of risk and elevated harm, Gresham provided a single risk rating of high for severe weather as a whole.

Extreme Heat

Extreme heat is a high priority risk for Gresham. One hyperthermia death in the 2021 Heat Dome Event was identified in the city, while other deaths occurred in directly neighboring zip codes in East Portland. Measurements of urban heat islands in East Portland during that event showed ambient temperatures as much as 50 degrees hotter than green spaces, an effect likely repeated in Gresham neighborhoods like Rockwood and East Gresham with similarly developed streetscapes. Increasing tree canopy in the most affected neighborhoods is a key mitigation strategy.

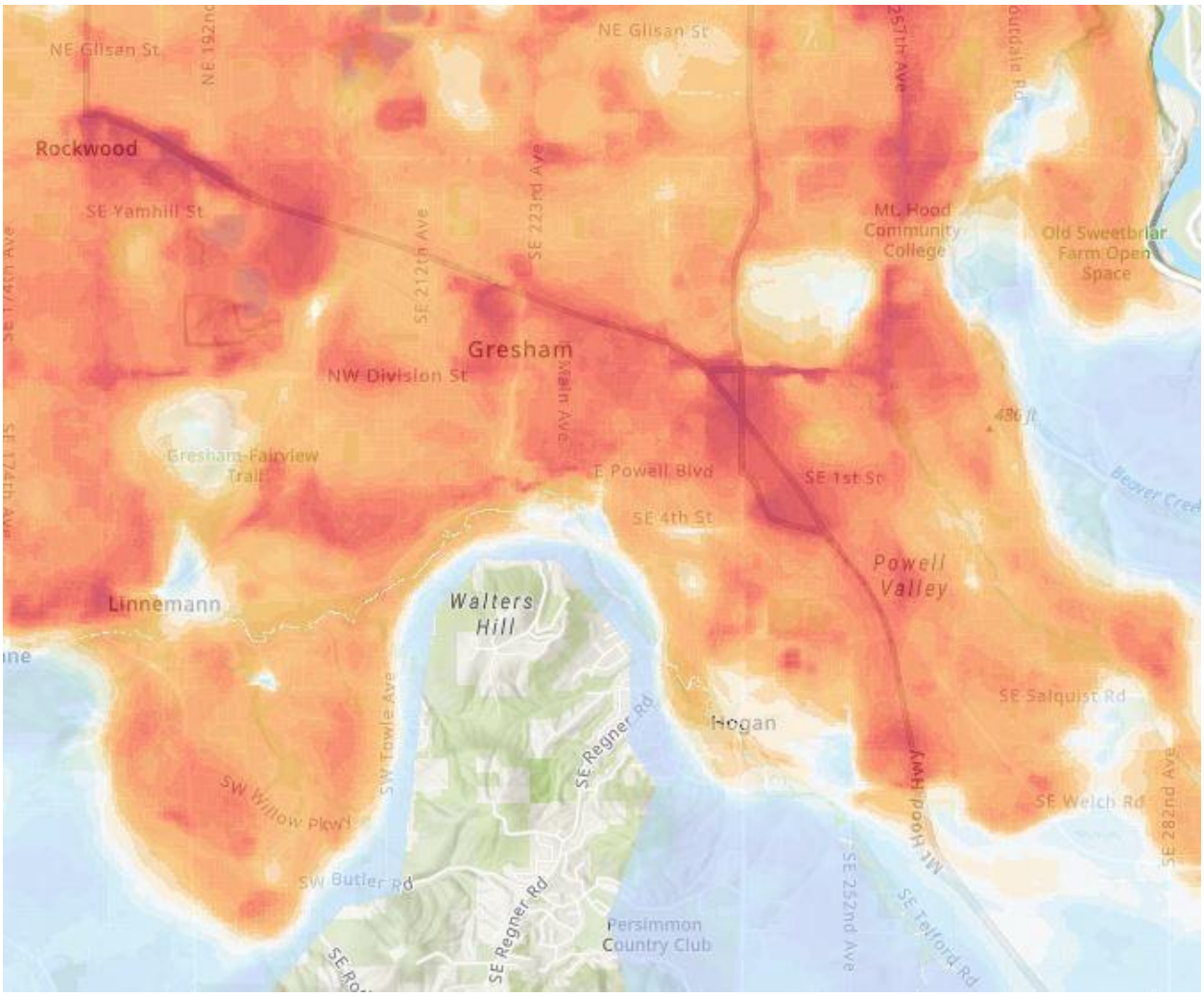

Figure 133 - Figure 134 - Map showing heat risk during severe heat events, with areas in the darkest red having the most significant urban heat island effects. Map from CAPA Strategies East Multnomah County Heat Watch Report.

Winter Storms

Winter storms are particularly dangerous to Gresham's unsheltered population. Snow and ice have also caused disruptions to transportation, utilities, and other infrastructure. Long-term power loss creates risks for Gresham's disabled and medically fragile population that use powered medical devices or need refrigerated medications. Transportation and power disruptions may also prevent caregivers from being able to reach those who need daily support.

Windstorms

Gresham's risk of windstorm is similar to other east county cities. Vulnerabilities include mobile homes, transportation corridors and power lines that can be impacted by the wind and or from downed trees.

Drought

As with other communities, the risk to Gresham's drinking water from drought is lessened by Gresham's water supply resources. The Bull Run Reservoir and aquifer wells used by local

water providers are recharged through year-round rainfall and are not reliant on surface waters fed by snowpack during hot summer months. The implementation of the Cascade Groundwater Alliance and increasing use of groundwater will not impact this resilience to weather. Gresham's forest resources are at high risk from drought, and an increase in forest die off contributes to increased risks for wildfire and landslides.

Volcano – Risk Rating Low

See Volcano Section for more detailed risk and vulnerability information.

Portions of Gresham along the Columbia River could be impacted by a volcanic lahar, a massive debris flow caused by an eruption of Mount Hood. The area of Gresham at risk is an industrial area between the railroad tracks and NE Marine Drive, but this risk would likely only be realized in a rare, 'worst-case' event. A full vulnerability analysis of potential lahar damage in Gresham has not yet been performed.

An interactive version of this map can be found here (Volcano Hazard – Moderate Hazard Zone)

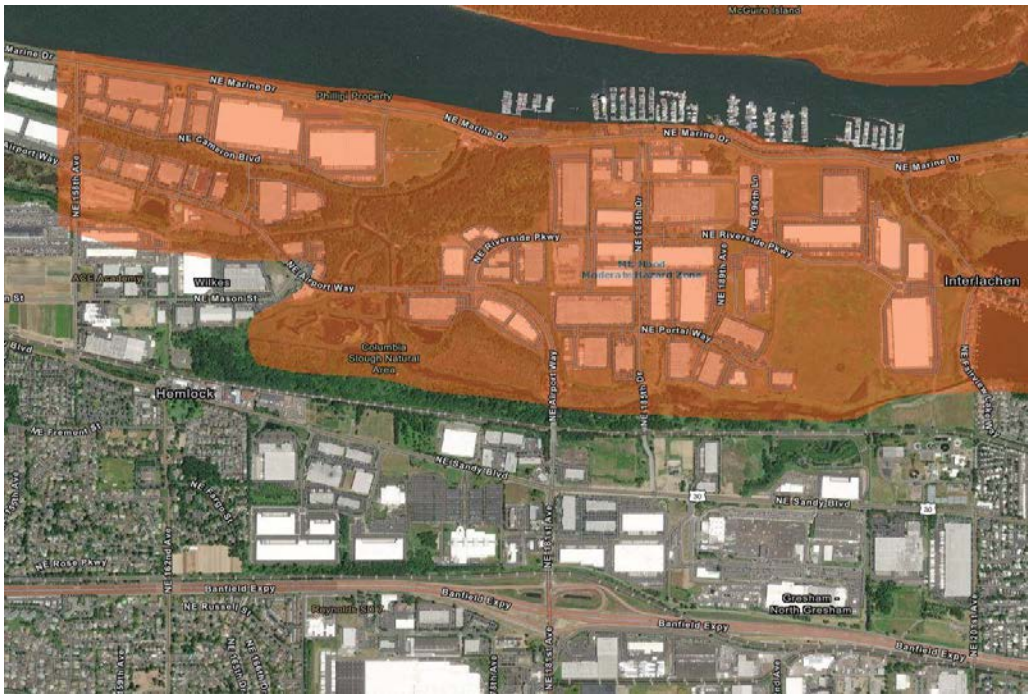

Figure 135- Map showing potential lahar impacts in Gresham from an extra-large Mount Hood eruption (10,000-100,000 year event). Map from DOGAMI HazVu site.

Falling ash from eruptions of Mount Hood would be expected to impact Gresham, though weather conditions would determine how severely. Falling ash could have severe impacts to the health of vulnerable community members, and damage buildings and infrastructure. But these events are of extremely low probability and therefore Gresham has rated volcanic risk overall as low.

Wildfire and Wildfire Smoke – Risk Rating Moderate

See Wildfire and Wildfire Smoke Section for more detailed risk and vulnerability information.

Wildfire and wildfire smoke is considered to be of moderate risk for the City of Gresham. As with all other cities in this plan, all of Gresham's population, especially those with existing health risk factors and/or unable to move to clean air spaces, face the greatest impacts from wildfire smoke events. Tree canopies can also help filter particulates, so areas subject to impacts from heat island effects may also suffer additional impacts during smoke events.

Wildfire risk is most prominent in the city's southern buttes. There is a large connected area of forest from Gresham Butte to the Clackamas County line where a wildfire of over 250 acres could originate and threaten a fairly large population in local neighborhoods at the foots of buttes, as well as important infrastructure.

Other risk areas are scattered across the city, in locations where smaller vegetated areas could become fire transmission locations to urban development in extreme fire weather conditions. Significant risk areas have also been identified just outside of the city limits to Gresham's southeast, creating risk to Wildland Urban Interface areas within the urban boundary.

An interactive version of this map can be found here (Wildfire Potenial Impacts – Overall Potential Impacts)

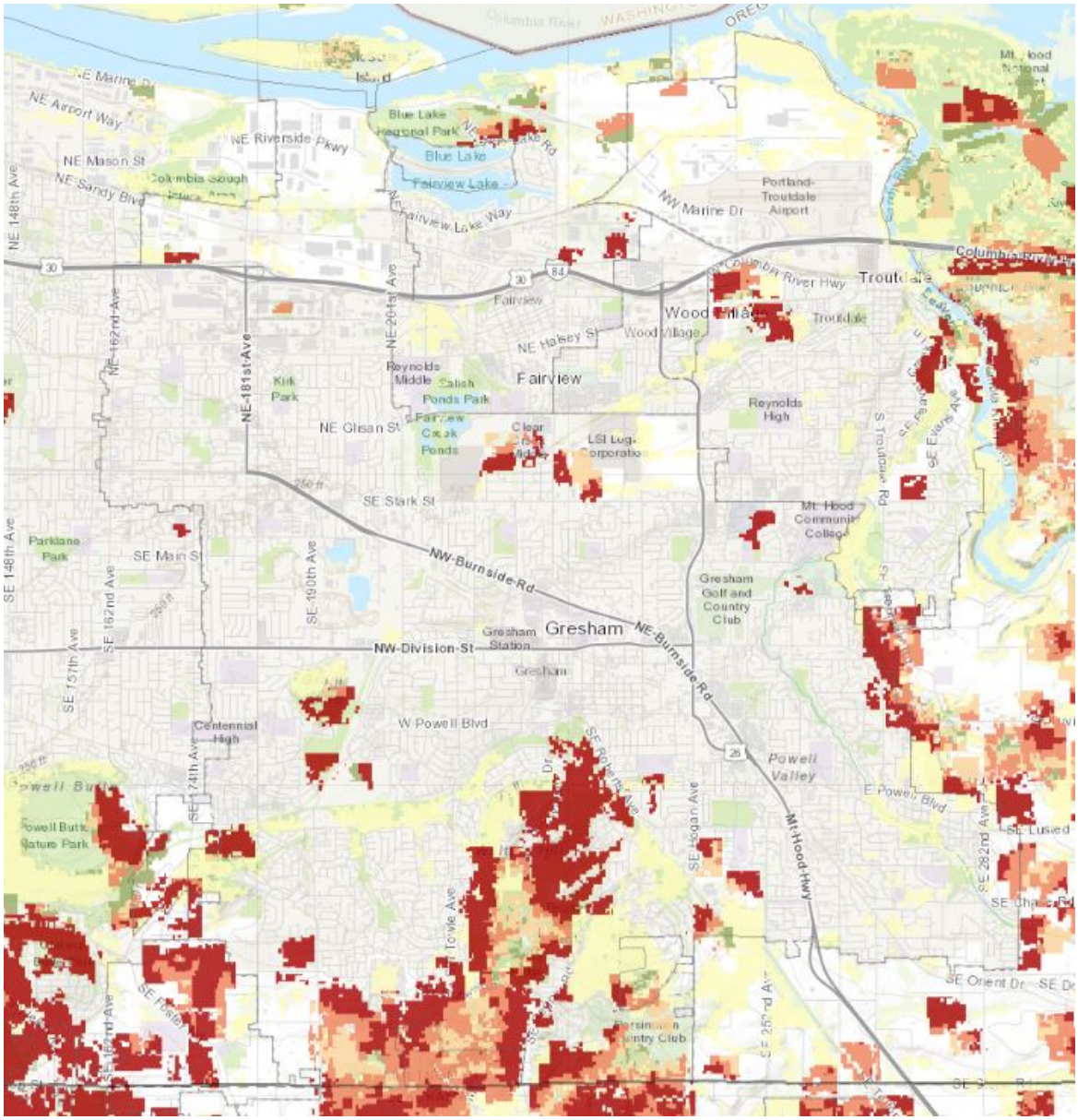

Figure 136 – Map showing overall impact of wildfire to locations in Gresham. Impact includes risk to structures, infrastructure and natural resources. Since catastrophic fire is linked to extreme wildfire risk conditions, this serves as a measure of where fire ignition would be the most dangerous. Map from Oregon Wildfire Risk Explorer with data from PNW-QWRA.

5.2.5 Hazard Risk Scoring

The identified levels of risk from each hazard were determined by the City of Gresham, using a scoring methodology designed by Oregon Emergency Management, and applied across the state to contextualize local risk perception.

Gresham Hazard Risk Analysis										
Hazard	History (Weight Factor = 2)		Vulnerability				Probability (Weight Factor = 7)		Risk Score	Initial Risk Ranking
			Average (WF = 5)		Max (WF = 10)					
Earthquake	2 x	**10**	5 x	**10**	10 x	**10**	7 x	**8**	**226**	**High**
Flood	2 x	**7**	5 x	**4**	10 x	**7**	7 x	**8**	**160**	**Moderate**
Landslide	2 x	**3**	5 x	**7**	10 x	**7**	7 x	**10**	**181**	**Moderate**
Severe Weather – Extreme Heat, Winter Storm, Wind Storm, Drought	2 x	**10**	5 x	**10**	10 x	**10**	7 x	**10**	**240**	**High**
Volcano	2 x	**1**	5 x	**8**	10 x	**8**	7 x	**2**	**136**	**Low**
Wildfire and Wildfire Smoke	2 x	**8**	5 x	**8**	10 x	**8**	7 x	**10**	**206**	**Moderate**

5.2.6 Aligned Plans and Other Implementation Processes

Overview

Gresham has similar plans and processes to other cities in this plan, under the State Building Code and Land Use Program. Because Gresham is larger than the other cities, it has some resilience-focused staff, which has helped the city take advantage of grant opportunities, build out development codes with additional hazard overlays, drive natural resource programs, and begin work on a Climate Resilience Plan. Integration of hazard mitigation resilience into infrastructure system planning and general plan alignment has been ongoing and effective, as Gresham manages all of its own local lifeline systems. Coordination with partners in water delivery, wastewater treatment, and fire service has built multi-jurisdictional resilience in east Multnomah County. Gresham does not have the resources of larger cities like Portland, so still must make targeted priority decisions when implementing mitigation, and ongoing and increasing coordination with Multnomah County government around climate risk remediation is an important strategy noted in this update.

- Capital Improvement Program (CIP)
  - A five-year estimate, most recently adopted in June 2022
  - The CIP funds major infrastructure projects in the city that can reduce risk by being lifelines in disaster. The CIP can work in concert with the NHMP by aligning infrastructure priorities with new risk and vulnerability hazards data.

- City Budget
  - Adopted each new fiscal year, beginning on July 1.
  - The annual budget can provide funding used for natural hazard mitigation. Action items from the NHMP that require local funding should be aligned with the budget process for funding.
- City of Gresham Emergency Operations Plan (EOP)
  - Most recently updated in 2015
  - The mission and goals of the NHMP support the mission of the EOP to coordinate disaster response. When the EOP is updated next it should include updated risk assessment information and mapping to prioritize response priorities.
- City Strategic Plan
  - Developed in 2021-22 to provide a shared vision for the city from 2022-25
  - The Strategic Plan is the result of a community effort called Imagine Gresham that occurred in 2021-2022. The mission of the plan is to foster a safe, thriving and welcoming community over the three-year planning horizon. The Community Safety goal has the objective of strengthening the city's ability to withstand natural disasters and deal with climate change. The strategic plan offers another vehicle to prioritize natural hazards mitigation planning and implement identified actions from the NHMP update.
- City-wide Stormwater Master Plan (SWMP)
  - Adopted June 2022
  - The set of stormwater management codes and plans reduce risk to people and property from flooding. Updated risk assessment information in the NHMP can be used to inform updates to the SWMP, and stormwater management gaps identified in the SWMP have informed NHMP action priorities.
- Climate Action Plan (In Progress)
  - When adopted, the Climate Action Plan will be a community-driven roadmap for addressing causes of and outcomes from climate change. The climate preparedness goal will address strategies for reducing risk from climate hazards – fire and smoke, extreme heat and cold, winter weather, and precipitation – and align and continue to inform NHMP action strategies for these hazards.
- Comprehensive Plan
  - Includes housing capacity analysis and community plans for downtown, Civic neighborhood, Central Rockwood, Gresham Butte, Pleasant Valley, and Springwater
  - The plan addresses the extent of natural hazards to meet statewide Land Use Goal 7. References in the plan to the NHMP should be updated, and the risk assessment and mapping used should be aligned with new information in the NHMP update.
- Debris Management Plan (In Draft)
  - The plan, when adopted, will identify opportunities to managing post-disaster debris and can identify risk-reduction processes that may be suitable to become future NHMP actions.
- Development Code
  - Revised in 2009, and amended more recently.
  - The Development Code provides regulation for development and land use in the city. Gresham's code includes overlay districts for Flood Plans and Hillside and Geologic Risk, with specific code requirements for those locations. Alignment with NHMP updates is needed, and the city may consider additional overlay districts in the future for other natural hazards of concern.

- Gresham Water Infrastructure Resilience Planning
  - The outcome of a planning workshop to look at long-term resilience in Gresham's water system. The planning effort included a link to the NHMP update process and noted the overlap between the plans in identifying priorities.
- Gresham Redevelopment Commission Community Investment Framework
  - 2029 Community Investment Framework in process
  - This framework has an opportunity to center climate resilience and other natural hazard risk in their investment priorities – building off work already occurring in Gresham.
- Parks Master Plan
  - Last adopted in 2009, with a 20-year planning horizon
  - Parks are a part of a natural hazard mitigation strategy and also can be an element of risk. Updates to the parks plan could include updated risk assessment and mapping from the NHMP, and could determine design and amenities of new or redeveloped parks or open space.
- Rockwood-West Gresham Renewal Plan
  - Approved November 2003
  - The Rockwood-West Gresham area is subject to natural hazards and the renewal plan is a tool that guides development and can be used to increase the resilience of the community to natural hazards. Because the plan was approved in 2003, it does not have discussion of the significant urban heat islands in this part of Gresham and any future update of the plan would likely consider the climate impacts to less resourced and historically underserved residents.
- Wastewater Collection System Master Plan (WCSMP)
  - Adopted June 2020
  - The Wastewater System Master Plan provides a long-term framework for wastewater system requirements, of which resilience is an important element. The plan includes a section on system-wide seismic resilience. The plan should be aligned with the NHMP update, and a priority action in this plan is to implement projects identified in the WCSMP.
- Wastewater Plant Master Plan
  - Adopted October 2017
  - The Wastewater Plant Master Plan details system needs for this critical infrastructure lifeline. Seismic risk is described in the plan, and revised earthquake and flood risk assessments should continue to be integrated into future updates.
- Water Master Plan (WSMP)
  - Most recently updated in March 2022
  - The Water System Master Plan provides a long-term framework for water system requirements, of which resilience is an important element. The recently updated plan includes a section on seismic resilience, and this plan and the NHMP have been used in tandem to identify retrofits to water system infrastructure. The plan should be aligned with the NHMP update, and continue to inform resilience project needs to be listed in future iterations of this NHMP.
- Transportation System Plan (TSP)
  - Being updated with policies and projects identified in the 2018 Active Transportation Plan.

- The hazard resilience of transportation systems is essential to meeting the goals of the plan. The TSP should reflect the revised risk assessment in this plan to help prioritize transportation system improvements that will increase resilience.