

Woodinville

The Woodinville community was established in 1871. The City of Woodinville was incorporated in 1993 and operates under a City Council/City Manager form of government. As of the 2000 US Census, Woodinville's population is numbered at 9,194, with an estimated population of 10,580 in 2008.

Woodinville is approximately 5.6 square miles and is located in north central King County at the north end of the Sammamish River Valley where Little Bear Creek meets the Sammamish River. Immediately to the west is the intersection of State Route (SR) 522 and Interstate 405. The valley is shaped by steep, thickly-wooded slopes.

Most of Woodinville's residential development is located on the hills overlooking the valley. Commercial, industrial and agricultural activities are mostly clustered on the valley floor, although some light industry is situated on the adjacent slopes. The City's commercial and industrial businesses serve an area containing well over 75,000 people residing in both King County and neighboring Snohomish County.

Woodinville is home to over 60 wineries, including, Chateau Ste. Michelle Winery, as well as other world-renowned businesses: Molbak's and Herb Farm. These businesses attract an estimated 1.5 million tourists to Woodinville each year.

The City of Woodinville is served by the Northshore School District, Woodinville Fire & Life Safety District, Woodinville Water District and contracts for police services with the King County Sheriff's Office.

Critical structures are identified in ***Annex I***.

Hazard Identification

Based on past experience, the City of Woodinville rates its risk of natural hazards as follows:

HAZARD	RATING (out of 80 possible)
Drought	13
Earthquake	44
Flood	
100-year	44
Tidal Surge	00
Urban	32
Landslide	21
Severe Storm	65
Tsunami & Seiche	00
Volcano	11
Wildland Urban Interface Fire	11

Drought

Rating: 13

In a drought, the reduction of the amount of available water in reservoirs intensifies the debate over water allocation. Woodinville water is dependent upon the snow pack from the Cascade Mountains. Weather pattern changes and lack of snowfall in the mountain regions may increase the likelihood of future water conservation measures. Woodinville Water District purchases all its water supply from the City of Seattle for distribution to its customers. The majority of the water comes from the Tolt River Reservoir but occasionally the water comes from the Cedar River Reservoir.

Fourteen instances of drought were identified by the State of Washington's HIVA from 1902 to 1977. 2006 was one of the driest years recorded. The City of Woodinville has no known droughts on record to date that significantly impacted residents and businesses.

The City of Woodinville regards drought as a VERY LOW threat.

Earthquake

Rating: 44

As discussed in this document's HIVA, earthquakes occur in Washington State on an almost daily basis. While most quakes are minor, seismologists tell us that we can expect a 7.0 magnitude deep or

intraplate earthquake about every 70 years and an 8.0 or greater subduction quake every 150 to 1,100 years.

Based on this information, when a major earthquake occurs in the region, the City can expect significant damage, injuries, and possibly deaths. This is due in part to the relatively dense concentration of both buildings and people in less than eight square miles.

During the 2001 Nisqually Earthquake, the City of Woodinville experienced relatively minor damage, receiving a total of \$30,000 in Public Assistance.

The lack of significant damage was due to a combination of factors including the distance away from the epicenter, the direction the shockwave traveled, and relatively short length of time the ground actually shook. The fact that most of the City’s buildings are relatively new (less than 40 years old), are mostly woodframe construction, not more than two stories high also played a part in how well the City rode out the earthquake. A different combination of factors could lead to very different levels of damage.

Woodinville rates the risk from earthquake as MODERATE-to-HIGH.

Flood

Rating: 32 - 44

The Federal Emergency Management Agency (FEMA) on June 30, 1997 classified the community as Zone C (minimal flood hazard). Woodinville can experience two or three days of rainfall averaging 2 – 5 inches per day for stream building type of flooding to occur. Actual duration and rainfall amounts needed to cause flooding depend on the initial condition of the stream, groundwater conditions, and runoff conditions. Historically flooding has occurred due to overflow of sub basins, pipeline failure and high flows in Little Bear Creek.

DATE	LOCATION	DAMAGE
November 2006	Eastern end of 19495 – 144th Ave NE	Flooding, damage cost \$43,656
December 2006	15300 block of SR 202	Flooding, damage cost \$4,000, under the trestle. Closed on several locations during the winter. About 2 ft deep. Flooding runs

		down the street. <i>Bottle Neck Relief Project.</i>
December 2006	148 Ave NE North of NE 145	Flooding, damage cost \$500.
December 2006	13460 block of 143rd St Washout	Washout damage cost \$1,000.
December 2006	124 th Ave and 173rd PL	Washout damage cost \$20,000
December 2007	SR 202/131 st Ave NE, underneath the Trestle	Flooding, damage, permanent repair, \$194, 000
December 2007	171 st Ave NE Slide Repair	Washout damage costs, \$344,000
December 2007	134 th Ave NE- Culvert	Flooding Damage, \$44,000
December 2007	Sink Hole at the Skate Park	Washout Damage; costs \$25,000

100-Year

Minimal flood plains are found within or near the city. The greatest potential is with high water content in the soil causing landslides or localized flooding of Little Bear Creek and the Sammamish River. However, the River has been well confined within steep banks in the Woodinville area and, considering that the 100-year floodplain extends only a short distance from the river edge, serious flooding is unlikely. Flooding that does occur along these areas may result both from excess stream flows and from excess storm water volume. The City is also vulnerable to significant water runoff from steep slopes during heavy rainfall.

Tidal Surge

Due to the placement of the City, this does not apply.

Urban

A variety of urban flood situations are possible and occur on a semi-regular basis. This is primarily due to inadequacies associated with the storm water system.

Overall, the risk from flood is rated MODERATE.

Landslide

Rating: 21

Landslides in Woodinville are possible, but not massive in nature due to the minimal number of bluffs or excessively steep hillsides.

The City of Woodinville rates the landslide risk as LOW-to-MODERATE.

Severe Storm

Rating: 65

The City of Woodinville and Puget Sound area is subjected to severe storms on a regular basis. Windstorms and rainstorms occur nearly every winter. On rare occasions, the City has also experienced heavy snows and freezing rains.

Winds and snow or ice regularly cause tree branches to break and/or trees to fall. This may cause power outages or damage buildings.

The Inaugural Day Storm in 1993 had winds of 66 mph. This storm interrupted power to the region for more than three days. Branches and trees were downed and laid across streets, roads, and yards. Roofs were damaged from a combination of branches and the wind itself.

More recently, in the winters of 2006-2007 and 2007-2008, the region experienced colder-than-normal weather associated with ice, snow, and high winds. The combination of these weather phenomenon resulted in power outages, landslides, damage to public and private buildings, and localized transportation disruptions due to downed trees and power lines.

The City of Woodinville rates the hazard from severe storm as MODERATELY HIGH, in part due the regularity of these events.

Tsunami & Seiche

Rating: 00

The City of Woodinville has no risk of damage or destruction from either tsunami or seiche. This is because the City is not located on Puget Sound and does not have any large lakes within its borders.

The risk to the City of Woodinville from tsunami or seiche is considered to be NON-EXISTANT.

Volcano

Rating: 11

The City of Woodinville is unlikely to suffer direct damage from a volcano eruption. However, in the event of a nearby eruption, Woodinville may experience ashfall which could:

- Interfere with the operation of motor vehicles, including emergency vehicles;
- Require expensive clean-up efforts by the City government and the citizenry; and
- Cause respiratory distress to citizens.

The City is highly unlikely to experience any lava flow, lahar activity, or any of the other risks associated with volcanoes.

Secondary effects of a volcano eruption are the influx of refugees into the area and how the affects of the volcano on the region impact the City of Woodinville. This may be an issue to the City of Woodinville, as resources are overwhelmed by numbers of people that the infrastructure is not designed to handle and how the region's resources are affected by the volcano. This includes everything from roads and highways, water and electric utilities, to the regional hospital and shelter facilities, and other essential resources.

The City of Woodinville's risk from a volcanic eruption is LOW-to-MODERATE.

Wildland-Urban Interface Fire

Rating: 11

Wildland-urban interface fire is a concern to the City of Woodinville primarily due to the parks, wetlands, greenbelts, and undeveloped land parcels scattered throughout the City. The threat is in reverse proportion to the amount of rainfall in the region. When rain is scarce, the fire threat increases.

Woodinville considers this risk to be LOW-to-MODERATE.

Mitigation

Existing and Ongoing Mitigation Activities

The City of Woodinville is taking the following actions in ongoing efforts to mitigate for natural hazards and to maintain public safety.

All Hazards

The City of Woodinville is a member of the Emergency Services Coordinating Agency (ESCA). As such, Woodinville receives emergency management planning and response services. The City has maintained relationships with the Woodinville Fire and Life Safety District, as well as Woodinville Water District. These districts will be vital in the ability of the City to respond during emergencies.

As part of the preparation and mitigation services, the Woodinville Fire and Life Safety District provides education in the form of Community Emergency Response Team (CERT) training. This training is provided to the citizens of the member Cities and Towns. The goal is to prepare people to be self-sufficient for as much as three days after a major disaster until safety personnel can get to them.

Codes

Table 1: Woodinville City Codes

Name of Document	Purpose	Review Schedule*	Ordinance, Code, or Plan	Date Adopted
Zoning Code Ordinance	Adoption as a minimum standard the most current publications and standards.	2009-2010	WMC 21.01 Ord. 400 (2005)	2005
Environmental Protection Regulations State Environmental Policy Act – City Environmental Policy (SEPA)	Implement procedures and policies to improve and coordinate plans, functions, programs, and resources consistent with state and county policies for environmental protection.	SEPA was last reviewed in	WMC 14.04, Ord. 204 - (1998) Used in conjunction with WAC 197-11	Jul-98
Shoreline Master Plan	Protect against adverse effects to the public health, the land and its vegetation and wildlife by managing shorelines.		WMC 24.10 Ord. 173 (1997)	2009
Critical Area Regulation	Implement the goals and policies of the Washington State Environmental Policy Act, which is intended to protect the natural environment and the health and safety of the public.		WMC 21.24 Ord. 375 (2004)	2004
Storm Water Master Plan	Minimize adverse effects of alterations in groundwater quantities, locations, and flow patterns.	Currently being studied.		2010 Completion Goal
Surface Water Design Manual	Provide guidance on the estimation and control of Surface Water runoff quantity and quality.		WMC 14.09, Ord. 223 - (1998)	1998

Name of Document	Purpose	Review Schedule*	Ordinance, Code, or Plan	Date Adopted
International Building Code	Ensure construction meets minimum standards.		WMC 15.09.15 Ord. 444 (2007)	2007
International Residential Code	Ensure construction meets minimum standards.		WMC 15.09.20 Ord. 444 (2007)	2007
International Fire Code	Ensure construction meets minimum standards.		WMC 15.15 Ord. 444 (2007)	2007
International Mechanical Code	Ensure construction meets minimum standards.		WMC 15.15.025 Ord. 444 (2007)	2007
Uniform Plumbing Code	Ensure construction meets minimum standards.		WMC 15.15.040 Ord. 444 (2007)	2007
National Electric Code	Ensure construction meets minimum standards.	Inspections are done by the State	N/A	N/A
City of Woodinville Comprehensive Plan	Contains community's vision of the City's future, provides a statement of long-range goals and policies.		WMC 21.01, Ord. 400 (2005)	2005
Flood Hazard Regulations	Monitors Flood Improvement endeavors, and regulating permissible flood plain uses.		WMC 15.21 Ord. 379 (2004)	2004

Name of Document	Purpose	Review Schedule*	Ordinance, Code, or Plan	Date Adopted
Commercial Design Standards	Serves as a guide that promotes development in a manner that is not only functional, but also aesthetically pleasing, promote social and economic vitality, and foster an enhanced sense of safety, comfort, interest and identification between people and their environment.			Dec-05
Industrial Design Guidelines	Used to develop design procedures.			Dec-00
Multifamily Design Guidelines				Nov-04
Woodinville Infrastructure Design Standards and Specifications (WIDSS)				2007
Subdivision Code	Provides criteria, regulations and standards to govern the subdividing of land within the City.		WMC 20.02 Ord. 239 (1999)	2009

* Regulations are updated approximately once every ten years with interim minor updates.

Drought

- Each spring, the City of Woodinville sells rain barrels at spring garden fairs in the area. Rain barrels allow citizens to capture rain for reuse. Citizens who buy the Rain barrels also receive an information brochure.
- Woodinville Water District creates water saving brochures for the public to use.

Earthquake

- Construction within City is permitted to ensure that all buildings are built to earthquake standards.
- Evaluate Old Woodinville School house for possible reuses; considering earthquake codes.
- Adopt critical area regulations

Flood

- Enlarge the outfall at the Sammamish River to accommodate the new 48-inch pipe that was installed in 2008 as part of the improvements at the intersection of 131st Avenue NE and NE 175th Street.
- Conduct Surface Water Master Plan Study-Identify Surface Water system improvements. ‘

Landslide

- 171st Slope Stabilization
- SR 202 Retaining Wall Repair
- Adopt critical area regulations

Severe Storm

- Work with utilities to minimize damage to power and telephone lines from trees.

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Tsunami and Seiche

- None at this time.

Volcano

- None at this time.

Wildland-Urban Interface Fire

- Maintain right-of-way to minimize dry grasses and undergrowth.

Mitigation Action Items

The Mitigation Plan identifies short- and long-term action items developed through data collection, research, and the public participation process. Mitigation Plan activities may be considered for funding through federal and state grant programs and when other funds are made available through the budgeting process or the passage of bonds.

Action items address multi-hazard (MH) or hazard-specific issues. Upon implementation, the coordinating organizations may look to partner organizations for resources and technical assistance.

To help ensure activity implementation, each action item includes several pieces of information in the description. These include:

- *Coordinating Organization*
The coordinating organization is that which is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation. The coordinating organizations may be local or regional agencies. Organizations written in *italics* are not participating in this Plan but have an established relationship with this jurisdiction.
- *Timeline*
Action items include both long- and short-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term* action items (ST) are activities that organizations may implement with existing resources and authorities within one to two years. *Long-term* action items (LT) may require new or additional resources or authorities, and may take between two and five years to implement.
- *Ideas for Implementation*
Each action item includes ideas for implementation. This may be individual steps for one project, or it may be several related projects that address the natural hazard.
- *Plan Goals Addressed*
The plan goals are identified to monitor and evaluate how well the Mitigation Plan is achieving its goals once implementation begins.
- *Benefit-to-Cost Review*
Due to limitations in staff time, and because project priorities may shift based on changes in funding options and local events, a generalized Benefit-to-Cost Review and prioritization process is

used. The steps associated with prioritizing the mitigation projects are as follows:

1. The jurisdiction rates the project cost as “high,” “medium,” or “low” in relation to budget and previous projects, and each rating is assigned a numerical value.
2. The project outcome is then rated as “low,” “medium,” or “high,” and each of these ratings is assigned a numerical value.
3. The two values are added together, and the total provides the cost-benefit and the priority.

Example:

If a project has a *medium approximate cost*, and is considered to be *highly effective*, the boxes would be marked as shown below.

Approx Cost	+	Effectiveness	=	Priority / Benefit-to-Cost Review
<input type="checkbox"/> 1 – High		<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium		<input type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low		<input checked="" type="checkbox"/> 3 – High		<input type="checkbox"/> 4
				<input checked="" type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

The priority/benefit-to-cost review ratings with the highest numbers are considered to be the highest priorities. As always, however, these are subject to financial realities and may not be carried out in the exact order indicated.

MULTI-HAZARD Mitigation Actions (MH)

WV-01-MH-ST: Evaluate Old Woodinville School House for reconstruction and/or replacement. Follow up with appropriate replacement or repair/retrofit activities.

Ideas for implementation:

- Phase I – Conduct study to address legal issues; identify possible users for the building; identify rehabilitation alternatives; identify site reuse alternatives; and identify construction and operating costs associated with each alternative.
- Phase II – identify a funding plan based on the preferred alternative.
- Phase III – Secure funding for the preferred alternative.
- Phase IV – Design and construction, including potential retrofit (if building is rehabilitated instead of rebuilt). In Phase IV, in either case, the building will be built or rebuilt to safety standards.

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Coordinating Organization: Woodinville Public Works
Estimated Price: \$4,000,000
Funding Source: Contingency Fund, other public funds
Timeline: 2009 - 2014
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems; Encourage Partnerships
Benefit-to Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input checked="" type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

WV-02-MH-ST: Install emergency generator at Carol Edwards Center, Building D. (The Carol Edwards Center is designated and used as an emergency shelter as needed and appropriate.)

Ideas for implementation:

- Install emergency back-up generator to provide power in case of power outages.
- Generator to be up to a 100 KW standby emergency generator, with automatic transfer switch, warning system and a mounted fuel tank. The generator is sized to provide power for 72 hours at 75% load, plus 25% reserve to accommodate normal testing.

Coordinating Organization: Woodinville Public Works
Estimated Price: \$200,000
Funding Source: Contingency Fund
Timeline: 2009
Plan Goals Addressed: Protect Life and Property; Provide for Emergency and Critical Services; Facilitate Continuity and Recovery
Benefit-to Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input checked="" type="checkbox"/> 6 – Highest

WV-03-MH-ST: SR 202 Retaining Wall Repair.

Ideas for implementation:

- Permanently repair the retaining wall along the east side of 131st Street / SR 202, just north of Little Creek Parkway by pressure injecting grout into the wall to fill the voids in the wall. (The retaining wall was damaged in the December 2007 Flood of Little Bear Creek.)

Coordinating Organization: Woodinville Public Works
Estimated Price: \$194,000
Funding Source: Street Reserve Fund, FHWA grant
Timeline: 2009
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems; Provide for Emergency and Critical Services
Benefit-to Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input checked="" type="checkbox"/> 6 – Highest

WV-04-MH-ST: 171st Street Slide Repair

Ideas for implementation:

- Construct a “soldier pile” retaining wall to stabilize the toe of the roadway slope. This slope was eroded by Woodin Creek during the December 2007 Flood.

Coordinating Organization: Woodinville Public Works
Estimated Price: \$344,000
Funding Source: Street Reserve Fund, FHWA grant
Timeline: 2009 - 2010
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems; Provide for Emergency and critical Services
Benefit-to Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input checked="" type="checkbox"/> 6 – Highest

WV-05-MH-ST: Enforce code requiring electrical utilities to use underground construction methods where possible to reduce power outages and minimize potential for injuries from downed lines.

Ideas for implementation:

- Continue to require the use of underground utilities for new development.

Coordinating Organization: Woodinville; *Puget Sound Energy*
Estimated Price: (Part of daily operations)
Funding Source: General Fund
Timeline: Ongoing
Plan Goals Addressed: Protect Life & Property; Encourage Partnerships; Provide for Emergency & Critical Services; Facilitate Continuity & Recovery
Benefit-to-Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input checked="" type="checkbox"/> 6 – Highest

WV-06-MH-LT: Sammamish Bridge Replacement. As a primary arterial, this is a key route for emergency vehicles and public safety.

Ideas for implementation:

- Replace .25 miles of primary arterial (Sammamish Bridge).
- Widen existing two-lane road and bridge section.
- Add curb-gutter, sidewalks and bike lanes for travel and queue storage.
- Retrofit to current seismic standards.

Coordinating Organization: Woodinville Public Works
Estimated Price: \$6,500,000
Funding Source: Various Funds, Grants, Utility Fund, REET 1 and/or 2, Street Reserve Fund
Timeline: 5 years
Plan Goals Addressed: Protect Life and Property; Provide for Emergency and Critical Services; Facilitate Continuity and Recovery; Protect Natural Systems
Benefit-to Cost Review: 2

<u>Approx Cost</u>	+	<u>Effectiveness</u>	=	<u>Priority / Benefit-to-Cost Review</u>
<input checked="" type="checkbox"/> 1 – High		<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium		<input checked="" type="checkbox"/> 2 – Medium		<input checked="" type="checkbox"/> 3
<input type="checkbox"/> 3 – Low		<input type="checkbox"/> 3 – High		<input type="checkbox"/> 4
				<input type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

EARTHQUAKE Mitigation Actions (E)

WV-07-ST: Conduct non-structural retrofit activities.

Ideas for implementation:

- Strap down and secure computers and other office equipment and machinery.
- Secure shelves, lockers, and furniture to walls.
- Conduct walk-throughs to ensure that heavy items are not stored overhead. Secure in place or move to safer locations.
- Mount computer servers on seismic isolation platforms, or use other appropriate technology to secure servers.
- Ensure facility water heaters are strapped securely to wall studs in accordance with current requirements.
- Secure ceiling tiles and light fixtures with wires.
- Secure ducts and piping.
- Use plastic sleeves on fluorescent lighting tubes.
- Secure artwork.
- Replace untempered glass with tempered glass, or install polyester shatter-resistant film over existing glass.
- Install child-proof latches on drawers and cabinets in appropriate locations.

Coordinating Organization: Woodinville Maintenance; Woodinville Public Works
Estimated Price: \$500
Funding Source: General funds
Timeline: 3 years, ongoing
Plan Goals Addressed: Protect Life & Property; Provide for Emergency or Critical Services; Facilitate Continuity and Recovery
Benefit-to-Cost Review: 5

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input checked="" type="checkbox"/> 6 – Highest

FLOOD Mitigation Actions (F)

WV-08-F-ST: 171st Storm Drain Installation.

Reduce urban flooding by installing 3,000 linear feet of piped drainage system.

Ideas for implementation:

- Regional conveyance system will collect runoff from NE 171st Street and southern downtown area.
- Untreated runoff will be directed away from Woodin Creek and conveyed to a water quality facility for treatment prior to discharge.
- Updated system will serve as Woodin Creek high flow bypass.

Coordinating Organization: Woodinville Public Works
Estimated Price: \$1,580,000
Funding Source: Surface Water Reserve Fund
Timeline: 2011 - 2013
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems
Benefit-to Cost Review: 4

Approx Cost +	Effectiveness=	Priority / Benefit-to-Cost Review
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

WV-09-F-ST: BNRP Outfall

Ideas for implementation:

- Enlarge the outfall at the Sammamish River to accommodate the new 48-inch pipe that was installed in 2008 as part of the improvements at the intersection of 131st Avenue NE and NE 175th Street.

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Coordinating Organization: Woodinville Public Works
Estimated Price: \$750,000
Funding Source: Surface Water Reserve Fund
Timeline: 2009
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems
Benefit-to Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input checked="" type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

WV-10-F-ST: Surface Water Master Plan

Ideas for implementation:

- Prepare Surface Water Master Plan to identify current surface water system deficiencies and needed improvements to support long-term community development.

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Coordinating Organization: Woodinville Public Works
Estimated Price: \$300,000
Funding Source: Surface Water Reserve Fund
Timeline: 2009 - 2010
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems
Benefit-to Cost Review: 6

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input checked="" type="checkbox"/> 6 – Highest

WV-11-F-LT: Little Bear Creek 134th Culvert. Replace existing culverts.

Ideas for implementation:

- Replace three 48-inch culverts located at the 134th Avenue NE crossing of Little Bear Creek.
- Removes barriers for fish passage.
- Improves water flow and reduces possibility of water back-up resulting in urban flooding.
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Coordinating Organization: Woodinville Public Works
Estimated Price: \$1,815,000
Funding Source: Surface Water Reserve Fund
Timeline: 5+ years
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems
Benefit-to Cost Review: 4

<u>Approx Cost</u>	+	<u>Effectiveness</u>	=	<u>Priority / Benefit-to-Cost Review</u>
<input type="checkbox"/> 1 – High		<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium		<input checked="" type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low		<input type="checkbox"/> 3 – High		<input checked="" type="checkbox"/> 4
				<input type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

WV-12-F-LT: Woodin Creek Surface Water Improvement. Sediment from bank erosion and creek bed scour has accumulated in various areas in the Woodin Creek channel along NE 171st Street, resulting in decreased flow capacity in Woodin Creek and has caused road and private property flooding. This project will also lessen impacts on fish.

Ideas for implementation:

- Evaluate alternatives to provide a sediment collection facility for the main stem of Woodin Creek.
- Construct a settlement basin and landscape the area.
- Remove identified barriers for fish passage.
- Identify and implement components to improve water flow and reduce possibility of water back-up resulting in urban flooding.

Coordinating Organization: Woodinville Public Works
Estimated Price: \$1,800,000
Funding Source: Surface Water Reserve Fund
Timeline: 5+ years
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems
Benefit-to Cost Review: 4

<u>Approx Cost +</u>	<u>Effectiveness=</u>	<u>Priority / Benefit-to-Cost</u>
<u>Review</u>		
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

WV-13-F-LT: 195th Culvert Enhancement.

Ideas for implementation:

- Upgrade current culvert's capacity by building a parallel culvert or replacing culverts with a single bridge span.
- Results in opening up a fish passage and increases water flow capacity. Also reduces the risk of area flooding.

Coordinating Organization: Woodinville Public Works
Estimated Price: \$1,295,000
Funding Source: Surface Water Reserve Fund
Timeline: 5+ years
Plan Goals Addressed: Protect Life and Property; Protect Natural Systems
Benefit-to Cost Review: 4

Approx Cost +	Effectiveness	Priority / Benefit-to-Cost Review
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest
