Section 4

Risk Assessment Requirements

Identifying Hazards--- Requirement §201.6(c)(2)(i):

[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.

- Does the new or updated plan include a **description** of the types of **all natural hazards** that affect the jurisdiction?

Profiling Hazards---Requirement §201.6(c)(2)(i):

[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.

- Does the risk assessment identify (i.e., geographic area affected) of each hazard being addressed in the new or updated plan?
- Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?
- Does the plan provide information on previous occurrences of each hazard addressed in the new or updated plan?
- Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?

Assessing Vulnerability: Overview---Requirement §201.6(c)(2) (ii):

[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.

- Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- Does the new or updated plan address the impacts of each hazard on the jurisdiction?

Assessing Vulnerability: Addressing Repetitive Loss Properties---Requirement §201.6(c)(2) (ii):

[The risk assessment] **must** also address the National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

- Does the new or updated plan describe vulnerability in terms of the types and numbers of repetitive loss properties located in the identified hazard areas?

Assessing Vulnerability: Identifying Structures---Requirement §201.6(c)(2) (ii)(A):

The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas…

- Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
- Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

Assessing Vulnerability: Estimating Potential Losses---Requirement §201.6(c)(2) (ii)(B):

[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate…

- Does the new or updated plan estimate potential dollar losses for vulnerable structures?
- Does the new or updated plan describe the methodology used to prepare the estimate?

Assessing Vulnerability: Analyzing Development Trends---Requirement §201.6(c)(2) (ii)(c):

[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

- Does the new or updated plan describe land uses and development trends?

SECTION 4

REGION 5 ALL HAZARD MITIGATION PLAN
2020-2025 EDITION
MT VIEW-EDGEWOOD WATER COMPANY
RISK ASSESSMENT SECTION

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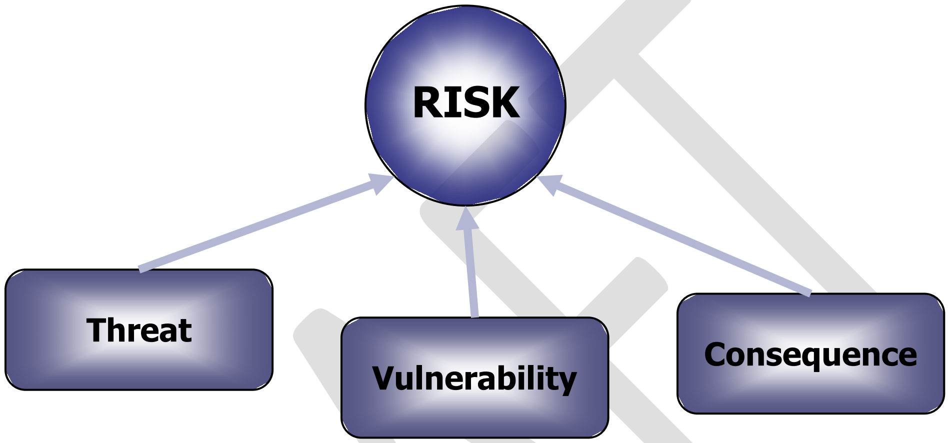
Section Overview

The Risk Assessment portrays the threats of natural hazards, the vulnerabilities of a jurisdiction to the hazards, and the consequences of hazards impacting communities. Each hazard is addressed as a threat and is identified and profiled in the Hazard Identification. The vulnerabilities to and consequences of a given hazard are addressed in the Vulnerability Analysis. Vulnerability is analyzed in terms of exposure of both population and infrastructure to each hazard. Consequences are identified as anticipated, predicted, or documented impacts caused by a given hazard when considering the vulnerability analysis and the characteristics of the hazard as outlined in its identification.



The WA Region 5 **Hazard Identification** was used for this plan. Each jurisdiction's Vulnerability and Consequence Analysis are based on the Region 5 Hazard Identification. The Region 5 Hazard Identification can be found in the Base Plan. Each hazard is identified in subsections. The subsections are grouped by hazard-type (i.e., geological and meteorological hazards) and then alphabetically within each type. A summary table of the WA Region 5 Hazard Identification is included in this section as Table 4-1a and Table 1b.

The **Vulnerability Analysis** is displayed in six tables:

- **Table 4-2 General Exposure**
- **Table 4-3 Population Exposure**
- **Table 4-4 General Infrastructure Exposure**
- **Table 4-5a Consequence Analysis Chart – Geological**
- **Table 4-5b Consequence Analysis Chart – Meteorological**
- **Table 4-5c Consequence Analysis Chart –Technological**

Each jurisdiction has its own Vulnerability Analysis, and it is included in this section.

The **Consequence Identification** is organized by Threat. Each threat page summarizes the hazard, graphically illustrates exposures from the Vulnerability Analysis, and lists corresponding Consequences. Each jurisdiction has its own Consequence Identification and it is included in this section: avalanche, earthquake, landslide, tsunami, volcanic, drought, flood, severe weather, and wildland/urban interface fire.

Specific information and analysis of a jurisdiction’s owned (public) infrastructure is addressed in the Infrastructure Section of its Plan.

Table 4-1a WA Region 5 Hazard Identification Summary – Geological

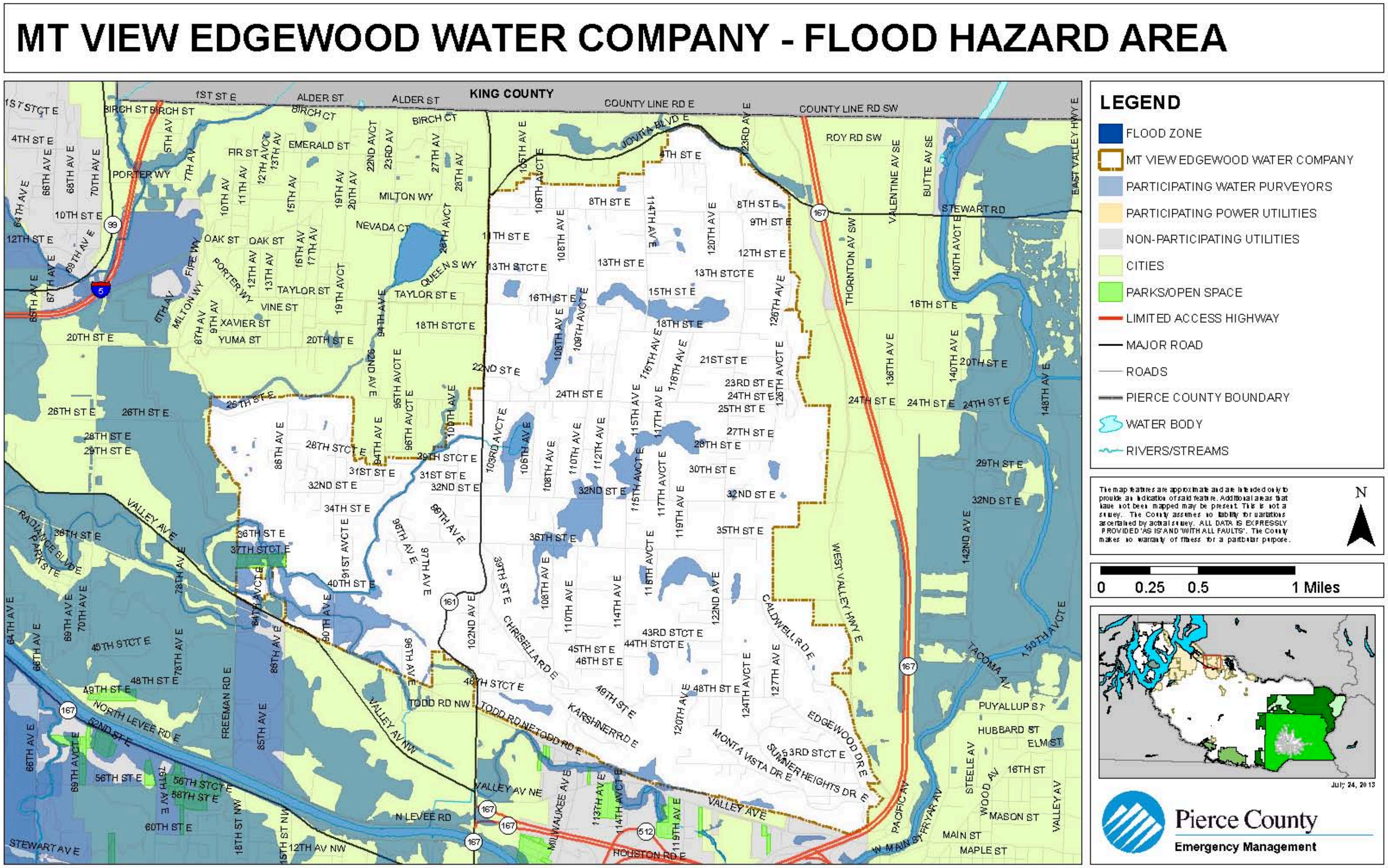
THREAT		DECLARATION # DATE/PLACE	PROBABILITY/ RECURRENCE	MAPS, FIGURES AND TABLES
Geological	**AVALANCHE**	Not Applicable	Yearly in the mountainous areas of the County including Mt. Rainier National Park and the Cascades.	Slab Avalanche Areas Vulnerable to Avalanche Pierce County Avalanches of Record
	EARTHQUAKE	N/A--7/22/2001 Nisqually Delta N/A--6/10/2001 Satsop DR-1361-WA--2/2001 Nisqually N/A--7/2/1999 Satsop DR-196-WA--4/29/1965 Maury Island, South Puget Sound N/A--4/13/1949 South Puget Sound N/A--2/14/1946 Maury Island	Magnitude 4.3 Magnitude 5.0—Intraplate Earthquake Magnitude 6.8—Intraplate Earthquake Magnitude 5.8—Intraplate Earthquake Magnitude 6.5—Intraplate Earthquake Magnitude 7.0—Intraplate Earthquake Magnitude 6.3 40 years or less occurrence Historical Record—About every 23 years for intraplate earthquakes	Types of Earthquakes Major Faults in the Puget Sound Basin Seattle and Tacoma Fault Segments Pierce County Seismic Hazard Major Pacific Northwest Earthquakes Notable Earthquakes Felt in Pierce County Salmon Beach, Tacoma Washington following Feb 2001 Earthquake Liquefaction Niigata Japan-1964 Lateral Spreading – March 2001
	LANDSLIDE	DR-1159-WA--12/96-2/1997 DR-852-WA--1/1990 DR-545-WA--12/1977	Slides with minor impact (damage to 5 or less developed properties or $1,000,000 or less damage) 10 years or less. Slides with significant impact (damage to 6 or more developed properties or $1,000,000 or greater damage) 100 years or less.	Northeast Tacoma Landslide January 2007 Pierce County Landslide and Soil Erosion Hazard Pierce County Shoreline Slope Stability Areas Notable Landslides in Pierce County Ski Park Road – Landslide January 2003 SR-165 Bridge Along Carbon River – Landslide February 1996 Aldercrest Drive - Landslide
	TSUNAMI	N/A--1894 Puyallup River Delta N/A--1943 Puyallup River Delta (did not induce tsunami) N/A--1949 Tacoma Narrows	Due to the limited historic record, until further research can provide a better estimate a recurrence rate of 100 years plus or minus will be used.	Hawaii 1957 – Residents Explore Ocean Floor Before Tsunami Hawaii 1949 – Wave Overtakes a Seawall Puget Sound Fault Zones, Vertical Deformation and Peak Ground Acceleration Seattle and Tacoma Faults Tsunami Inundation and Current Based on Earthquake Scenario Puget Sound Landslide Areas and Corresponding Tsunamis Puget Sound River Deltas, Tsunami Evidence and Peak Ground Acceleration Salmon Beach, Pierce County 1949 – Tsunamigenic Subaerial Landslide Puyallup River Delta – Submarine Landslides Puyallup River Delta – Submarine Landslides and Scarp Damage in Tacoma from 1894 Tsunami
	VOLCANIC	DR-623-WA--5/1980	The recurrence rate for either a major lahar (Case I or Case II) or a major tephra eruption is 500 to 1000 years. The recurrence rate for either a major lahar (Case I or Case II) or a major tephra eruption is 500 to 1000 years.	Volcano Hazards Debris Flow at Tahoma Creek – July 1988 Douglas Fir Stump – Electron Lahar Deposit in Orting Landslide from Little Tahoma Peak Covering Emmons Glacier Tephra Types and Sizes Lahars, Lava Flows and Pyroclastic Hazards of Mt. Rainier Estimated Lahar Travel Times for Lahars 10_7 to 10_8 Cubic Meters in Volume Ashfall Probability from Mt. Rainier Annual Probability of 10 C meters or more of Tephra Accumulation in the Pacific NW Cascade Eruptions Mt. Rainier Identified Tephra, last 10,000 years Pierce County River Valley Debris Flow History

Table 4-1b WA Region 5 Hazard Identification Summary – Meteorological and Technological

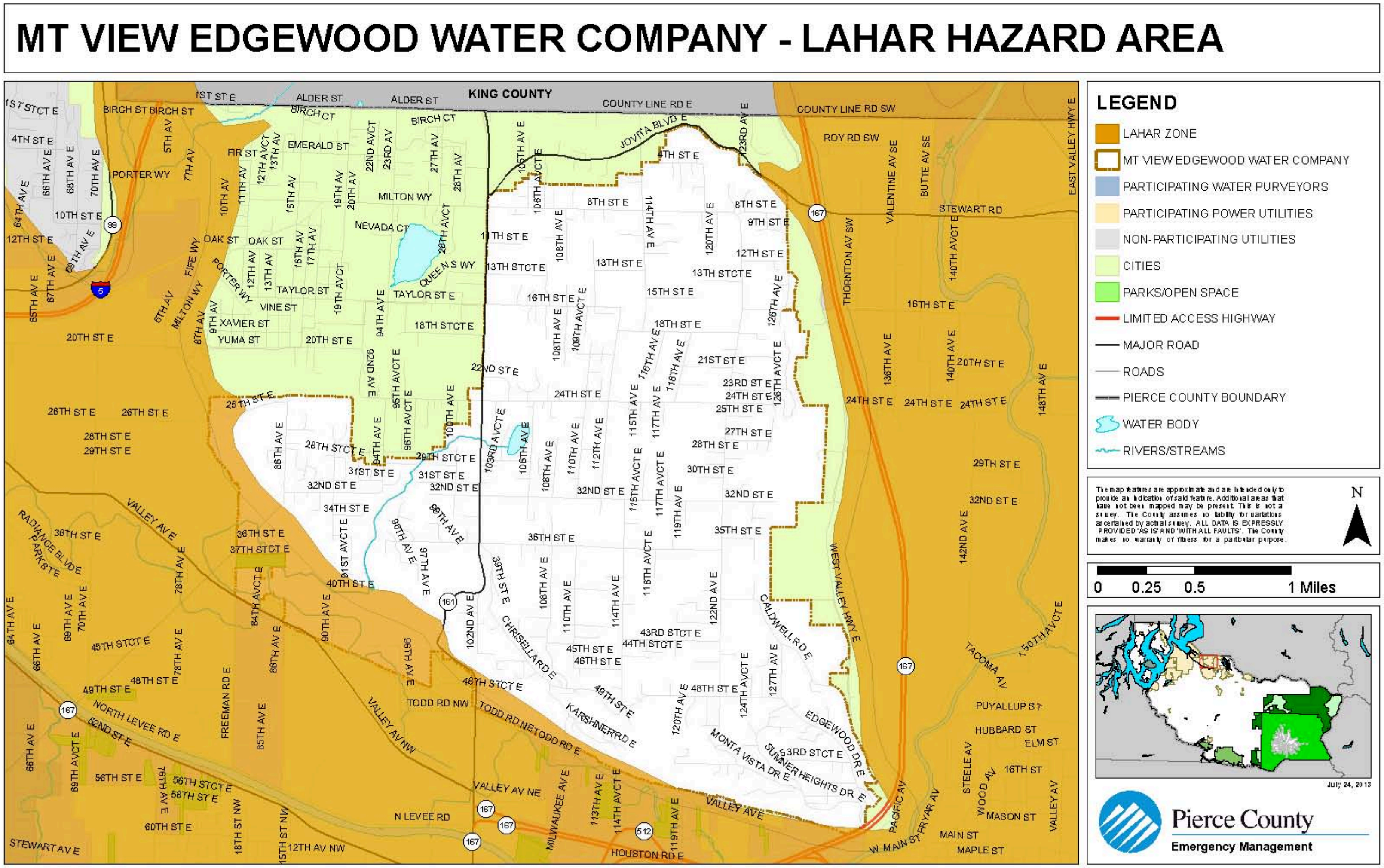
THREAT		DECLARATION # DATE/PLACE	PROBABILITY/ RECURRENCE	MAPS, FIGURES AND TABLES
Geological	**AVALANCHE**	Not Applicable	Yearly in the mountainous areas of the County including Mt. Rainier National Park and the Cascades.	Slab Avalanche Areas Vulnerable to Avalanche Pierce County Avalanches of Record
	EARTHQUAKE	N/A--7/22/2001 Nisqually Delta N/A--6/10/2001 Satsop DR-1361-WA--2/2001 Nisqually N/A--7/2/1999 Satsop DR-196-WA--4/29/1965 Maury Island, South Puget Sound N/A--4/13/1949 South Puget Sound N/A--2/14/1946 Maury Island	Magnitude 4.3 Magnitude 5.0—Intraplate Earthquake Magnitude 6.8—Intraplate Earthquake Magnitude 5.8—Intraplate Earthquake Magnitude 6.5—Intraplate Earthquake Magnitude 7.0—Intraplate Earthquake Magnitude 6.3 40 years or less occurrence Historical Record—About every 23 years for intraplate earthquakes	Types of Earthquakes Major Faults in the Puget Sound Basin Seattle and Tacoma Fault Segments Pierce County Seismic Hazard Major Pacific Northwest Earthquakes Notable Earthquakes Felt in Pierce County Salmon Beach, Tacoma Washington following Feb 2001 Earthquake Liquefaction Niigata Japan-1964 Lateral Spreading – March 2001
	LANDSLIDE	DR-1159-WA--12/96-2/1997 DR-852-WA--1/1990 DR-545-WA--12/1977	Slides with minor impact (damage to 5 or less developed properties or $1,000,000 or less damage) 10 years or less. Slides with significant impact (damage to 6 or more developed properties or $1,000,000 or greater damage) 100 years or less.	Northeast Tacoma Landslide January 2007 Pierce County Landslide and Soil Erosion Hazard Pierce County Shoreline Slope Stability Areas Notable Landslides in Pierce County Ski Park Road – Landslide January 2003 SR-165 Bridge Along Carbon River – Landslide February 1996 Aldercrest Drive - Landslide
	TSUNAMI	N/A--1894 Puyallup River Delta N/A--1943 Puyallup River Delta (did not induce tsunami) N/A--1949 Tacoma Narrows	Due to the limited historic record, until further research can provide a better estimate a recurrence rate of 100 years plus or minus will be used.	Hawaii 1957 – Residents Explore Ocean Floor Before Tsunami Hawaii 1949 – Wave Overtakes a Seawall Puget Sound Fault Zones, Vertical Deformation and Peak Ground Acceleration Seattle and Tacoma Faults Tsunami Inundation and Current Based on Earthquake Scenario Puget Sound Landslide Areas and Corresponding Tsunamis Puget Sound River Deltas, Tsunami Evidence and Peak Ground Acceleration Salmon Beach, Pierce County 1949 – Tsunamigenic Subaerial Landslide Puyallup River Delta – Submarine Landslides Puyallup River Delta – Submarine Landslides and Scarp Damage in Tacoma from 1894 Tsunami
	VOLCANIC	DR-623-WA--5/1980	The recurrence rate for either a major lahar (Case I or Case II) or a major tephra eruption is 500 to 1000 years. The recurrence rate for either a major lahar (Case I or Case II) or a major tephra eruption is 500 to 1000 years.	Volcano Hazards Debris Flow at Tahoma Creek – July 1988 Douglas Fir Stump – Electron Lahar Deposit in Orting Landslide from Little Tahoma Peak Covering Emmons Glacier Tephra Types and Sizes Lahars, Lava Flows and Pyroclastic Hazards of Mt. Rainier Estimated Lahar Travel Times for Lahars 10_7 to 10_8 Cubic Meters in Volume Ashfall Probability from Mt. Rainier Annual Probability of 10 C meters or more of Tephra Accumulation in the Pacific NW Cascade Eruptions Mt. Rainier Identified Tephra, last 10,000 years Pierce County River Valley Debris Flow History

	HAZARD	FEMA DECLARATION # DATE/PLACE	PROBABILITY/ RECURRENCE	MAPS, FIGURES AND TABLES
Technological	**ABANDONED MINES**	Not Applicable	Based on Information from WA DNR The Pierce County Sheriff's Department reports that they have had very few incidents of citizens entering the abandoned mines in east Pierce Co. Isolated issues of minor subsidence have occurred, typically following flood events in 2009/2010	Pierce County – Mine Hazard Areas MapBased on WA DNR Information Schasse, Koler, Eberle, and Christie, The Washington State Coal Mine Map Collection: A Catalog, Index, and User's Guide, Open File Report 94-7, June 1984 Pierce County 2009 HIRA
	CIVIL DISTURBANCE	Not Applicable	Looking at the historical record, major civil unrest is a rare occurrence. Movement of military supplies from Port of Tacoma to Joint Base Lewis McChord	Pierce County Civil Disturbance Map Pierce County 2009 HIRA Hilltop Riots Tacoma 1969, 1991
	DAM FAILURE	Not Applicable	No occurrences in Pierce County 50+ years recurrence	Table D-1 PC Dams that Pose a High or Significant Risk, Pierce County 2009 HIRA Table D-2 Dam Failures in WA State
	ENERGY EMERGENCY	Not Applicable	• January 2009 Loss of electricity to Anderson Island (underground [water] cable) Power Outage is the most frequent energy incident, via natural hazards (storms, ice) Recurrence Rate – 5 years (storms) Recurrence Rate – 50+ years (major)	Pierce County 2009 HIRA Tacoma Power Outage 1929, USS Lexington provide power Anderson Island January 2009 Underwater power cable broke
	EPIDEMIC	Not Applicable	Pandemics • 2009-2010 "Swine Flu Recurrence Rate – 20 years	Pierce County 2009 HIRA Tacoma Pierce County Health District Pan Flu Plan Measles, State of WA, 1990 E Coli, January 1993, September 1998
	HAZARDOUS MATERIALS	Not Applicable	• Dalco Passage oil spill of October 13, 2004 • Chlorine Spill Port of Tacoma February 12, 2007 Large Incidents 5 year recurrence Small Incidents 1 week recurrence	Pierce County 2009 HIRA Table HM-1 Reported Releases (in lbs.)of all chemicals, for Pierce Co. in 2008, all industries Chlorine Spill in the Port of Tacoma (February 12, 2007) Dalco Passage oil spill (October 13, 2004) Illegal methamphetamine sites (A high of 258 sites in 2001-56 sites in 2009
	PIPELINE FAILURE	Not Applicable	• Northwest Pipeline Corporation natural gas incident May 1st 2003, in Sumner 10 years recurrence	Map P-1 Pierce County Pipelines Pierce County 2009 HIRA
	TERRORISM	Not Applicable	Minor PC Incident –Recurrence 1-year Major Incident – Recurrence 100 years	Pierce County 2009 HIRA Tacoma's Model Cities and Human Rights Offices burned 1972 African American church burned 1993 White Supremacy Group Hate Crimes, 1998 Westgate Family Medicine Clinic bombed, 2011
	TRANSPORTATION ACCIDENT	Not Applicable	Minor Incidents occur daily Major Incidents rare Recurrence Rate – 10 years	Pierce County 2009 HIRA Rail: Freight Derailment, Steilacoom 1996 Freight Train Derailment, Chambers Bay, 2011

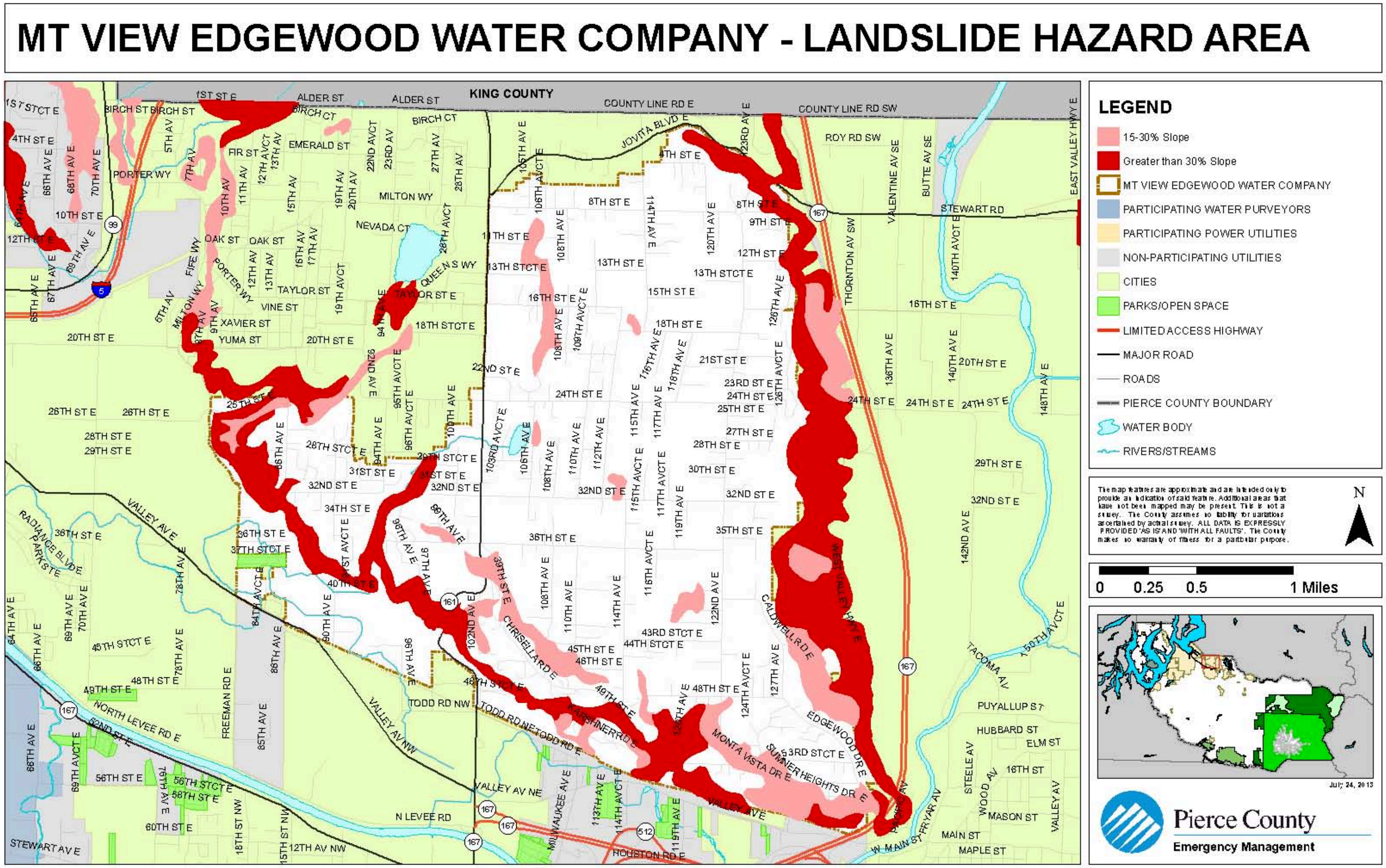
Map 4-1 Mt View-Edgewood Water Company Flood Hazard Map



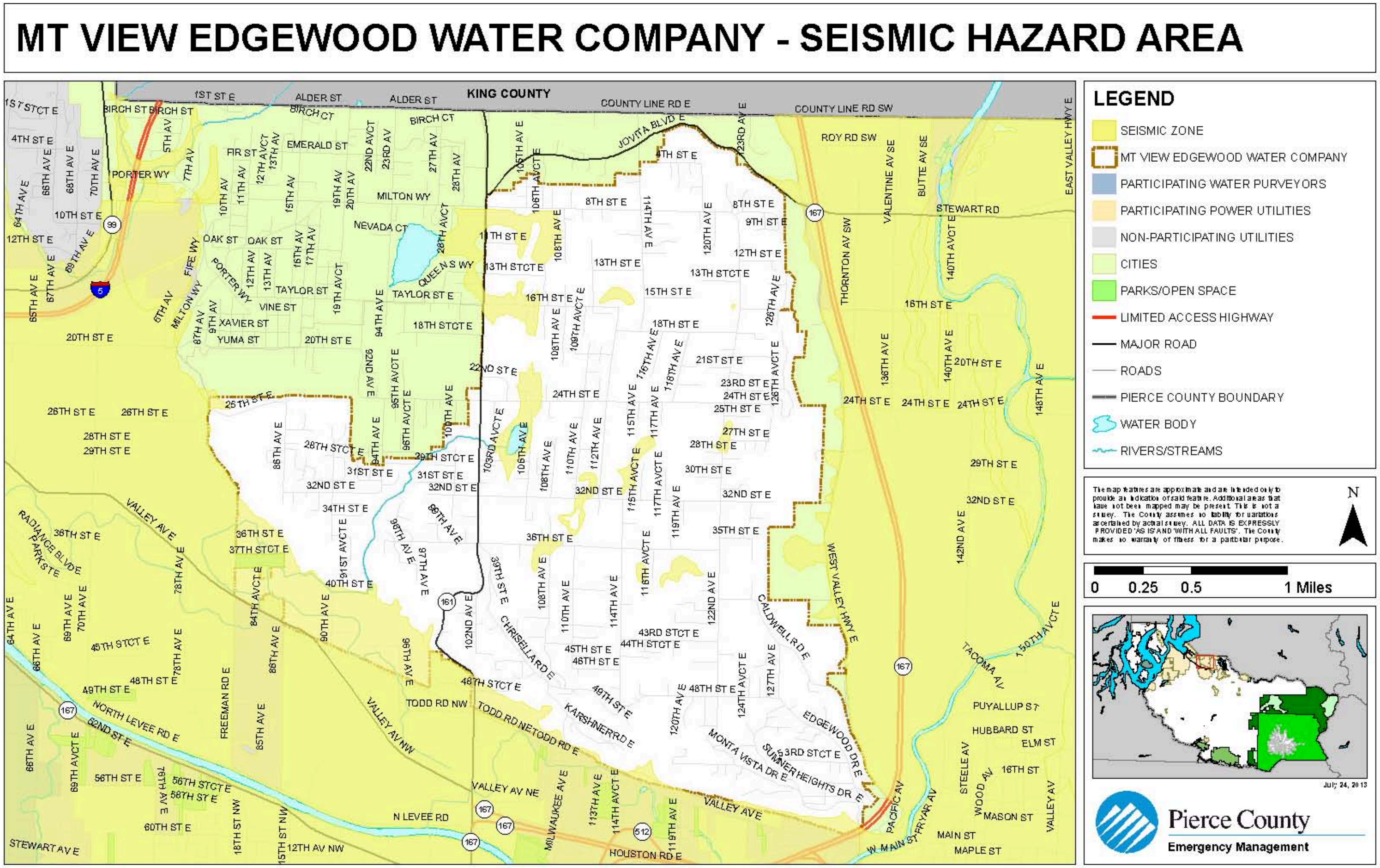
Map 4-2 Mt View-Edgewood Water Company Lahar Hazard Map



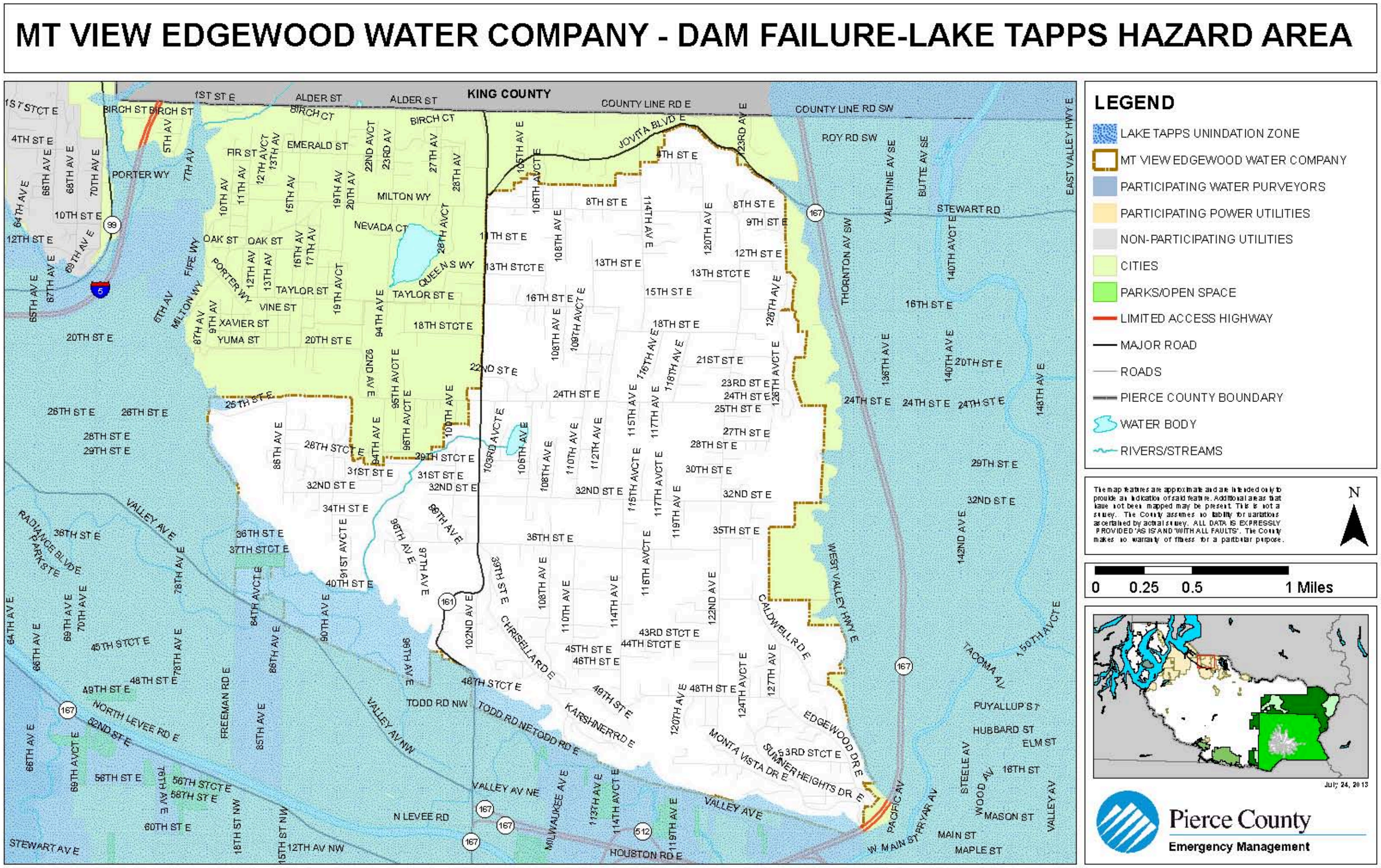
Map 4-3 Mt View-Edgewood Water Company Landslide Hazard Map



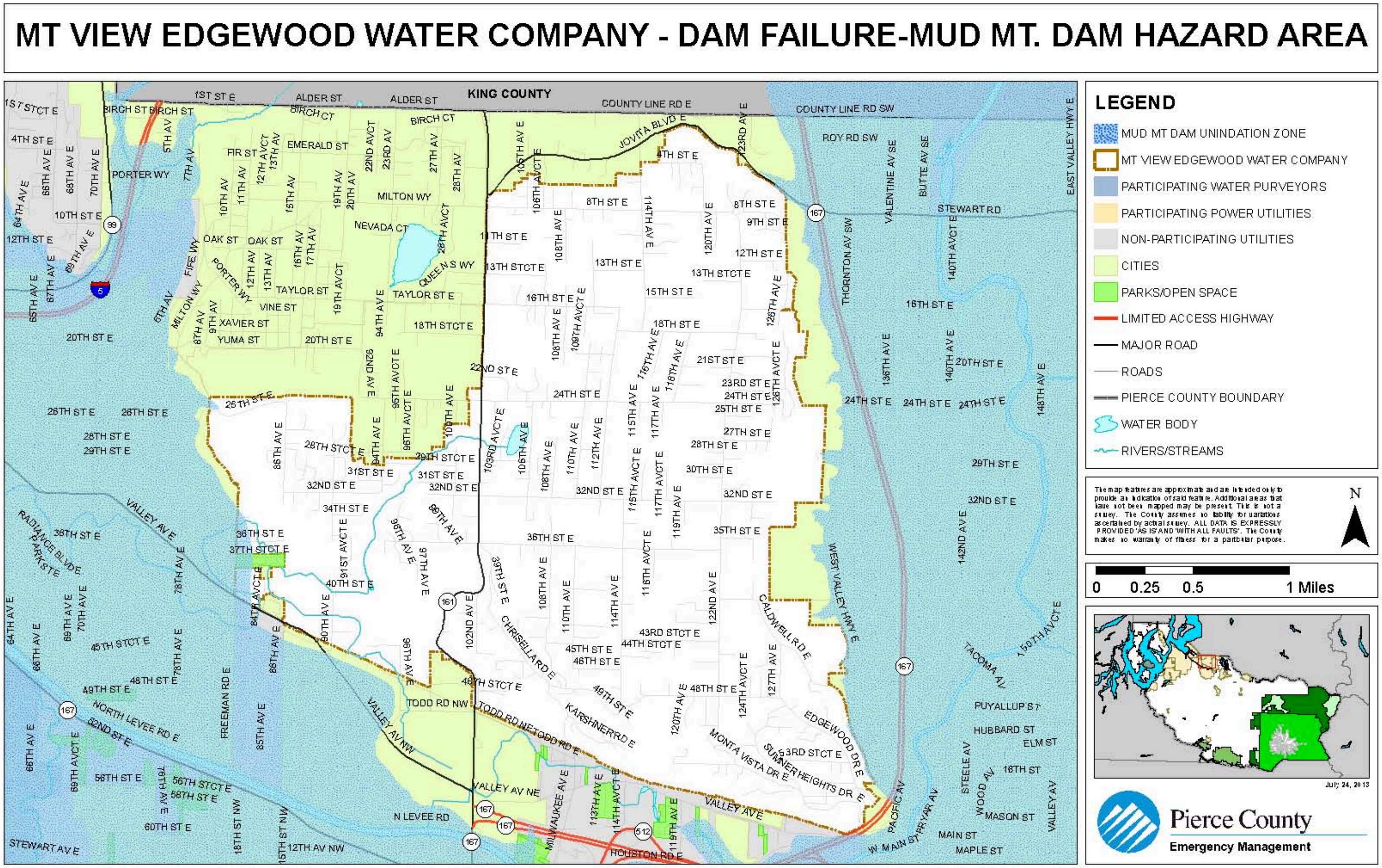
Map 4-4 Mt View-Edgewood Water Company Seismic Hazard Map



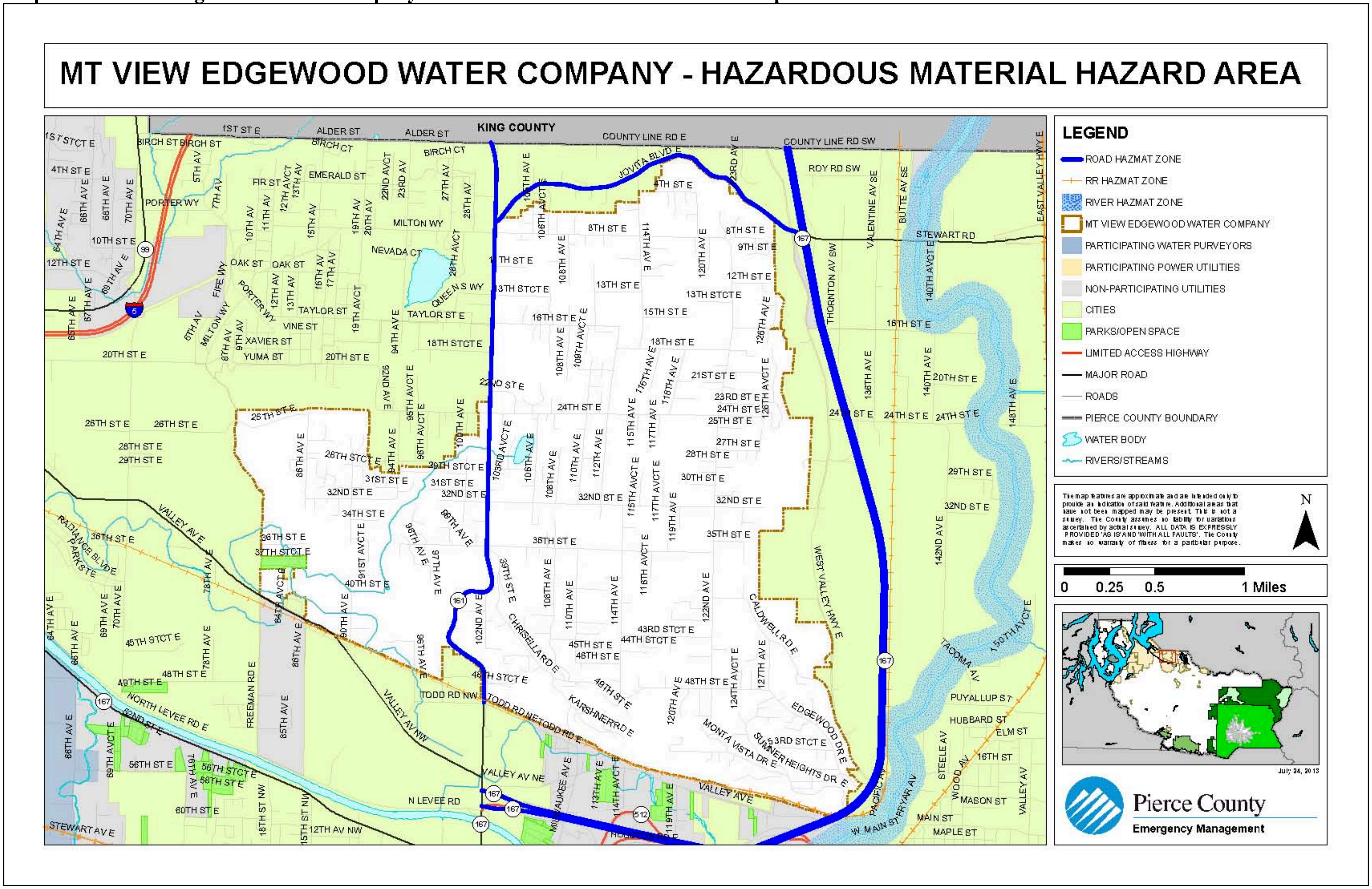
Map 4-5 Mt View-Edgewood Water Company –Dam Failure –Lake Tapps Hazard Area Map



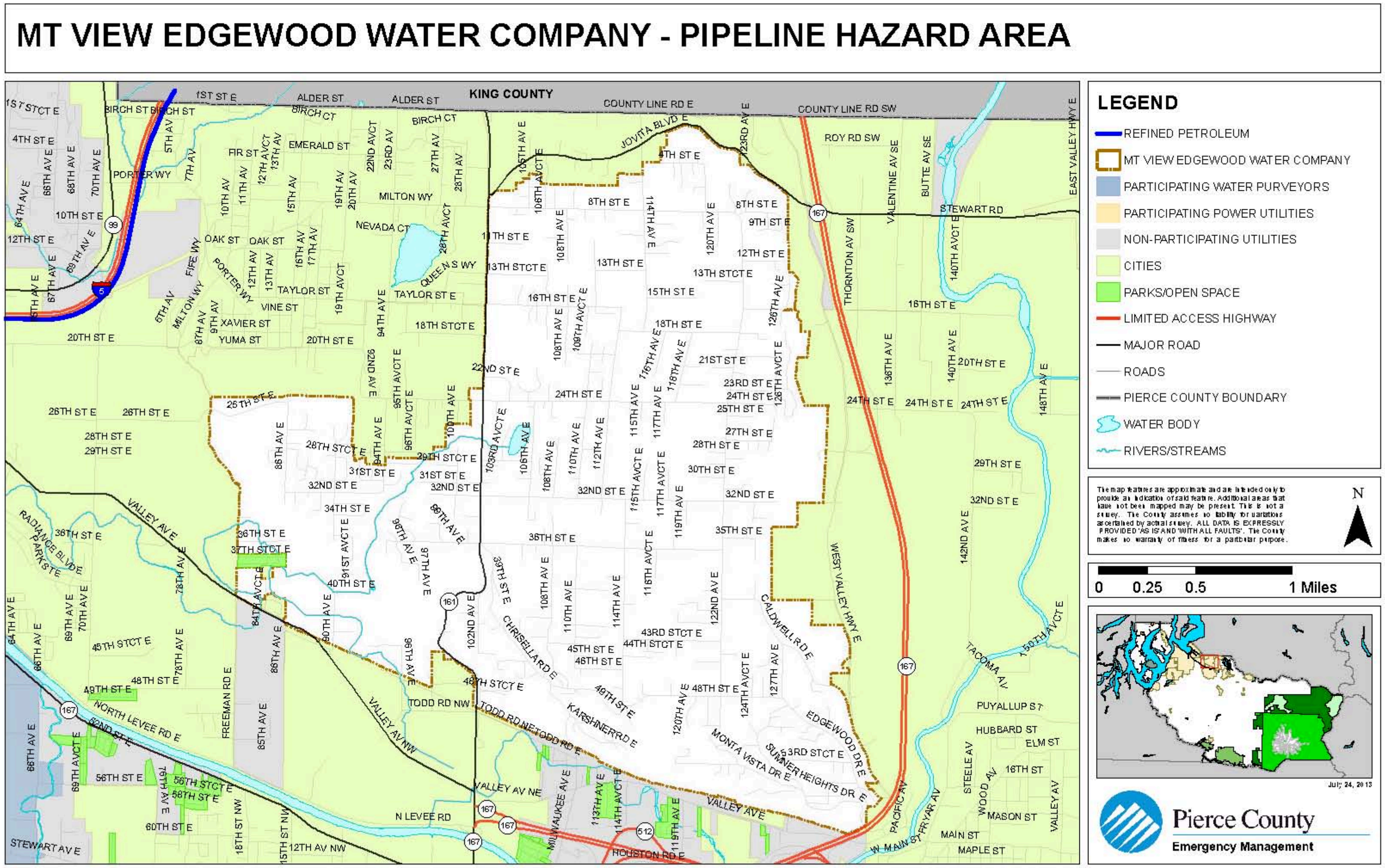
Map 4-6 Mt View-Edgewood Water Company –Dam Failure –Mud Mt. Dam Hazard Area Map



Map 4-7 Mt View-Edgewood Water Company –Hazardous Material Hazard Area Map



Map 4-8 Mt View-Edgewood Water Company –Pipeline Hazard Area Map



Map 4-9 Mt View-Edgewood Water Company –Transportation Emergency Hazard Area Map

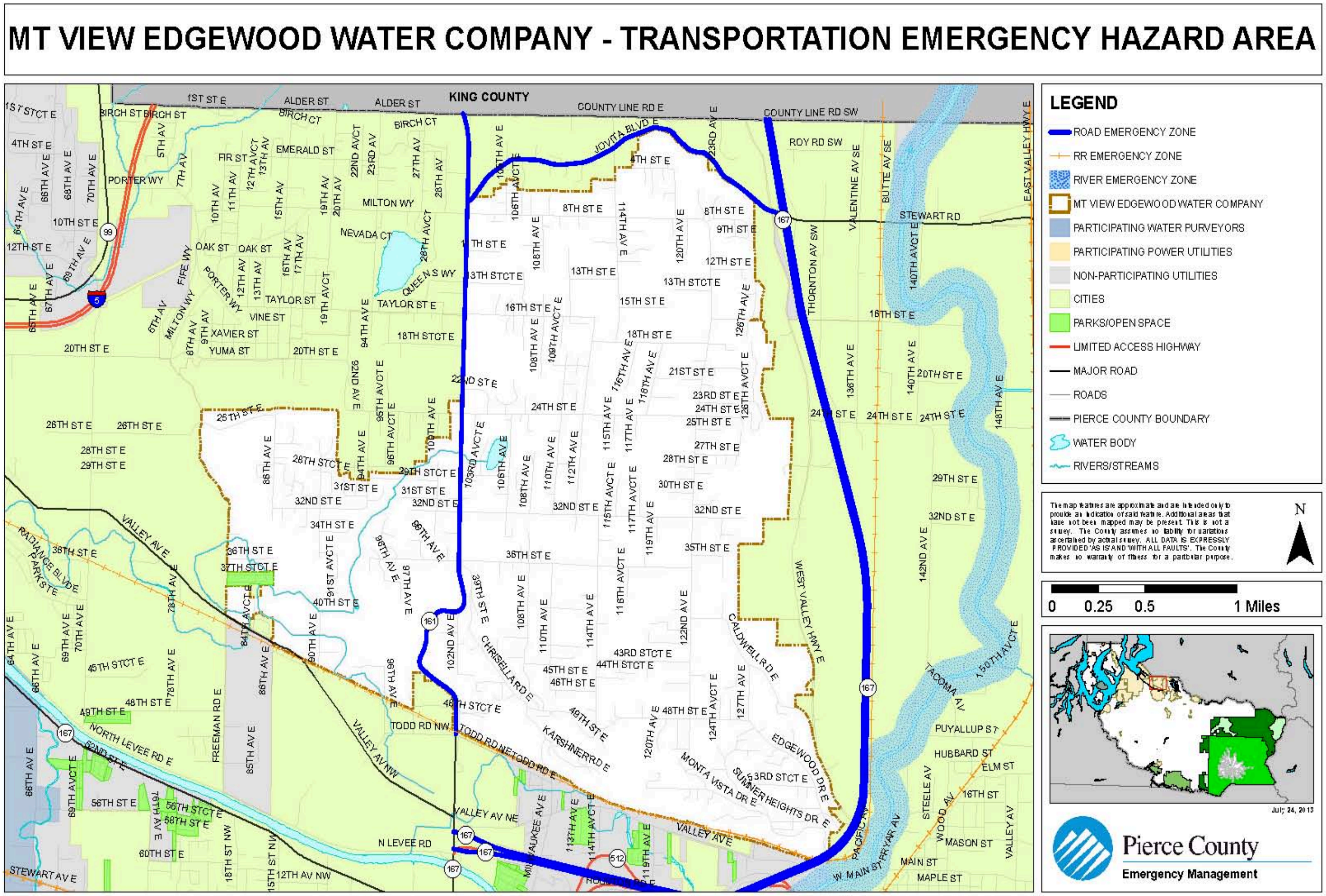


Table 4-2 Vulnerability Analysis: General Exposure[1]

THREAT[2]		AREA (SQ MI)		PARCELS	
		Total	% Base	Total	% Base
BASE		**6.87**	**100%**	**3,665**	**100%**
Geological	**Avalanche[3]**	NA	NA	NA	NA
	Earthquake[4]	1.41	20.5%	372	10.15%
	Landslide	2.16	31.4%	864	23.57%
	Tsunami	NA	NA	NA	NA
	Volcanic[5]	.89	12.9%	144	3.93%
Meteorological	**Drought[6]**	6.87	100%	3,665	100%
	Flood	1.75	25.4%	340	9.28%
	Severe Weather	6.87	100%	3,665	100%
	WUI Fire[7]	NA	NA	NA	NA
Technological	**Abandoned Mines[8]**	NA	NA	NA	NA
	Civil Disturbance[9]	6.87	100%	3,665	100%
	Dam Failure[10]	1	14.5%	139	3.79%
	Energy Emergency[11]	6.87	100%	3,665	100%
	Epidemic[12]	6.87	100%	3,665	100%
	Hazardous Material[13]	3.24	47.1%	1,904	51.95%
	Pipeline Hazard[14]	NA	NA	NA	NA
	Terrorism[15]	6.87	100%	3,665	100%
	Transportation Accidents[16]	3.24	47.1%	1,904	51.95%

Table 4-3 Vulnerability Analysis: Population Exposure

THREAT[2]		POPULATION			SPECIAL POPULATIONS (OF TOTAL EXPOSED POPULATION)			
		Total	% Base	Density (pop/sq mi)	65+ yrs		20 -yrs	
					#	%	#	%
BASE		8,373	100%	1,219	1,184	14%	2,042	24%
Geological	Avalanche	NA	NA	NA	NA	NA	NA	NA
	Earthquake	4,573	55%	3,247.73	601	51%	1,132	55%
	Landslide	6,390	76.32%	2,953	908	76.69%	1,552	76%
	Tsunami	NA	NA	NA	NA	NA	NA	NA
	Volcanic	2,099	25.07%	2,345.82	330	27.87%	457	22.38%
Meteorological	Drought	8,373	100%	1,219	1,184	14%	2,042	24%
	Flood	5,981	71.43%	3,410	797	67.31%	1,483	72.62%
	Severe Weather	8,373	100%	1,219	1,184	14%	2,042	24%
	WUI Fire	NA	NA	NA	NA	NA	NA	NA
Technological	Abandoned Mines	NA	NA	NA	NA	NA	NA	NA
	Civil Disturbance	8,373	100%	1,219	1,184	14%	2,042	24%
	Dam Failure	2,119	25%	2,269	335	28%	465	23%
	Energy Emergency	8,373	100%	1,219	1,184	14%	2,042	24%
	Epidemic	8,373	100%	1,219	1,184	14%	2,042	24%
	Hazardous Material	5,991	71.55%	1,847	837	70.69%	1,456	71.30%
	Pipeline Hazard	NA	NA	NA	NA	NA	NA	NA
	Terrorism	8,373	100%	1,219	1,184	14%	2,042	24%
	Transportation Accidents	5,991	71.55%	1,848	837	70.69%	1,456	71.30%

Table 4-4 Vulnerability Analysis: General Infrastructure Exposure

THREAT[2]		LAND VALUE			IMPROVED VALUE			TOTAL ASSESSED VALUE		
		Total ($)	% Base	Avg. Value ($)	Total ($)	% Base	Avg. Value ($)	Total ($)	% Base	Avg. Value ($)
BASE		**$351,214,600**	**100%**	**$95,829**	**$491,083,700**	**100%**	**$133,993**	**$842,298,300**	**100%**	**$229,822**
Geological	**Avalanche**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Earthquake	$42,812,900	12.19%	$115,088	$35,821,100	7.29%	$96,293	$78,634,000	9.34%	$211,382
	Landslide	$83,880,200	23.88%	$97,084	$107,544,000	21.90%	$124,472	$191,424,200	22.73%	$221,556
	Tsunami	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Volcanic	$19,494,100	5.55%	$135,376	$10,257,500	2.09%	$71,233	$29,751,600	3.53%	$206,608
Meteorological	**Drought**	$351,214,600	100%	$95,829	$491,083,700	100%	$133,993	$842,298,300	100%	$229,822
	Flood	$43,792,800	12.47%	$128,802	$43,561,000	8.87%	$128,121	$87,353,800	10.37%	$256,923
	Severe Weather	$351,214,600	100%	$95,829	$491,083,700	100%	$133,993	$842,298,300	100%	$229,822
	WUI Fire	NA	NA	NA	NA	NA	NA	NA	NA	NA
Technological	**Abandoned Mines**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Civil Disturbance	$351,214,600	100%	$95,829	$491,083,700	100%	$133,993	$842,298,300	100%	$229,822
	Dam Failure	$17,281,100	4.92%	$124,324	$7,741,600	1.58%	$55,695	$25,022,700	2.97%	$180,019
	Energy Emergency	$351,214,600	100%	$95,829	$491,083,700	100%	$133,993	$842,298,300	100%	$229,822
	Epidemic	$351,214,600	100%	$95,829	$491,083,700	100%	$133,993	$842,298,300	100%	$229,822

	Hazardous Material	$189,375,100	53.92%	$99,462	$250,789,900	51.07%	$131,717	$440,165,000	52.26%	$231,179.10
	Pipeline Hazard	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Terrorism	$351,214,600	100%	$95,829	$491,083,700	100%	$133,993	$842,298,300	100%	$229,822
	Transportation Accidents	$189,375,100	53.92%	$99,462	$250,789,900	51.07%	$131,717	$440,165,000	52.26%	$231,179.10

Table 4-5a Consequence Analysis Chart – Geological[17,18]

THREAT		CONSEQUENCE	YES OR NO
Geological	**Avalanche**	Impact to the Public	No
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	No
		Impact to the Jurisdiction Economic Condition	No
		Impact to Reputation or Confidence in Jurisdiction	No
	Earthquake	Impact to the Public	Yes
		Impact to the Responders	Yes
		Impact to COG and/or COOP in the Jurisdiction	Yes
		Impact to Property, Facilities and Infrastructure	Yes
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	Yes
	Landslide	Impact to the Public	Yes
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	Yes
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	Yes
	Tsunami	Impact to the Public	No
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	No
		Impact to the Jurisdiction Economic Condition	No
		Impact to Reputation or Confidence in Jurisdiction	No
	Volcanic[19]	Impact to the Public	Yes
		Impact to the Responders	Yes
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	Yes
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	No
		Impact to Reputation or Confidence in Jurisdiction	No

Table 4-5b Consequence Analysis Chart – Meteorological

THREAT		CONSEQUENCE	YES OR NO
Meteorological	**Drought**	Impact to the Public	Yes
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	Yes
	Flood	Impact to the Public	Yes
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	Yes
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	No
	Severe Weather	Impact to the Public	Yes
		Impact to the Responders	Yes
		Impact to COG and/or COOP in the Jurisdiction	Yes
		Impact to Property, Facilities and Infrastructure	Yes
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	Yes
	WUI Fire	Impact to the Public	Yes
		Impact to the Responders	Yes
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	No

Table 4-6c Consequence Analysis Chart – Technological[20]

THREAT		CONSEQUENCE	YES OR NO
Technological	**Abandoned Mines**	Impact to the Public	No
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	No
		Impact to the Jurisdiction Economic Condition	No
		Impact to Reputation or Confidence in Jurisdiction	No
	Civil Disturbance	Impact to the Public	Yes
		Impact to the Responders	Yes
		Impact to COG and/or COOP in the Jurisdiction	Yes
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	No
		Impact to the Jurisdiction Economic Condition	Yes
		Impact to Reputation or Confidence in Jurisdiction	No
	Dam Failure	Impact to the Public	No
		Impact to the Responders	No
		Impact to COG and/or COOP in the Jurisdiction	No
		Impact to Property, Facilities and Infrastructure	No
		Impact to the Environment	Yes
		Impact to the Jurisdiction Economic Condition	Yes

	Impact to Reputation or Confidence in Jurisdiction	No
Energy Emergency	Impact to the Public	Yes
	Impact to the Responders	Yes
	Impact to COG and/or COOP in the Jurisdiction	Yes
	Impact to Property, Facilities and Infrastructure	Yes
	Impact to the Environment	No
	Impact to the Jurisdiction Economic Condition	Yes
	Impact to Reputation or Confidence in Jurisdiction	No
Epidemic	Impact to the Public	Yes
	Impact to the Responders	Yes
	Impact to COG and/or COOP in the Jurisdiction	Yes
	Impact to Property, Facilities and Infrastructure	No
	Impact to the Environment	No
	Impact to the Jurisdiction Economic Condition	Yes
	Impact to Reputation or Confidence in Jurisdiction	No
Hazardous Materials	Impact to the Public	Yes
	Impact to the Responders	No
	Impact to COG and/or COOP in the Jurisdiction	No
	Impact to Property, Facilities and Infrastructure	No
	Impact to the Environment	Yes
	Impact to the Jurisdiction Economic Condition	No
	Impact to Reputation or Confidence in Jurisdiction	No
Pipeline Hazards	Impact to the Public	No
	Impact to the Responders	No
	Impact to COG and/or COOP in the Jurisdiction	No
	Impact to Property, Facilities and Infrastructure	No
	Impact to the Environment	No
	Impact to the Jurisdiction Economic Condition	No
	Impact to Reputation or Confidence in Jurisdiction	No
Terrorism	Impact to the Public	Yes
	Impact to the Responders	Yes
	Impact to COG and/or COOP in the Jurisdiction	Yes
	Impact to Property, Facilities and Infrastructure	Yes
	Impact to the Environment	Yes
	Impact to the Jurisdiction Economic Condition	Yes
	Impact to Reputation or Confidence in Jurisdiction	Yes
Transportation Accident	Impact to the Public	Yes
	Impact to the Responders	No
	Impact to COG and/or COOP in the Jurisdiction	No
	Impact to Property, Facilities and Infrastructure	No
	Impact to the Environment	No
	Impact to the Jurisdiction Economic Condition	No
	Impact to Reputation or Confidence in Jurisdiction	No

Summary

The Region 5 Utilities are vulnerable to a variety of hazards in which they serve within Pierce County; however they can only mitigate within their specific individual boundary. Acquiring situational awareness of the hazards is a critical component to their safety response efforts with potential closures of essential facilities that support the County's critical functions. The Mountain View Edgewood Water Company is located in the North West portion of Pierce County. The Company is highly susceptible to nine of the eighteen hazards we considered in this plan. The risks are earthquake, landslide, volcanic, drought, severe weather, civil disturbance, energy emergency, epidemic, and terrorism. The risks impact critical infrastructure within the

Utility including State Routes 161 and 167. The majority of the area includes terrain that sporadically rises with a slope greater than 30% and thus increases the risk for landslides. Due to the severe weather events, the area experiences extended power outages. Additionally, the technological impacts of such events present challenges to the operations of the Utilities of Pierce County. The technological threats, though not required as part of a formal mitigation process, are none-the-less important to Utilities which are critical to the Region's functionality.

Endnotes

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[1] Info obtained from Pierce County GIS application, CountyView Pro (12/09).
[2] Currently the expanding body of empirical data on climate change supports its basic premise that the long term average temperature of the earth's atmosphere has been increasing for decades *(1850 to 2008)*. This trend is continuing and will create dramatic changes in the local environment of Pierce County. Today, questions revolve around the overall increase in local temperature and its long term effects. Climate change today refers to variations in either regional or global environments over time. Time can refer to periods ranging in length from a few decades to other periods covering millions of years. A number of circumstances can cause climate change. Included herein are such diverse factors as solar cycles, volcanic eruptions, changing ocean current patterns, or even something as unusual as a methane release from the ocean floor. Over the past 150 years good temperature records have allowed comparisons to be made of global temperatures from year-to-year. This has shown an overall increase of approximately 0.7° C during this period. An increasing body of scientific evidence implies that the primary impetus driving climate change today is an increase in atmospheric green house gases.
[3] Jurisdiction is not vulnerable to this hazard, therefore it is marked NA or non-applicable.
[4] It should be noted here that although all residents, all property and all infrastructure of the Mt View Edgewood Water Company are vulnerable to earthquake shaking, not all are subject to the affects of liquefaction and liquefiable soils which is what is represented here.
[5] The threat of volcanic ashfall affects the entire Region 5 however some jurisdictions are specifically threatened by lahar flows directly from Mt. Rainier; an active volcano.
[6] The entire jurisdiction is vulnerable to drought. There are three things that must be understood about the affect of drought on the jurisdiction: 1) Drought is a Region wide event. When it does affect Pierce County, it will affect every jurisdiction, 2) Drought will gradually develop over time. It is a gradually escalating emergency that may take from months to years to affect the jurisdiction. Initially lack of water may not even be noticed by the citizens. However, as the drought continues, its effects will be noticed by a continually expanding portion of the community until it is felt by all, and 3) Jurisdictions will be affected differently at different times as a drought develops. This will vary depending on the needs of each local jurisdiction. Some examples are: jurisdictions that have industry that requires a continuous supply of a large quantity of water; others have agriculture that requires water, but may only require it at certain times of the year; and, some jurisdictions have a backup source of water while others do not.
[7] According to the most recent information from the Department of Natural Resources, the Mt View Edgewood Water Company while undergoing development does not have large areas of forested land that could develop into a wildland/urban interface fire. Further study is needed to determine the extent of the area that could be affected.
[8] The definition of Abandoned Mines comes from the 2010 Pierce County HIRA: Abandoned mines are any excavation under the surface of the earth, formerly used to extract metallic ores, coal, or other minerals, and that are no longer in production.
[9] The definition of Civil Disturbance comes from the 2010 Pierce County HIRA: Civil Disturbance (unrest) is the result of groups or individuals within the population feeling, rightly or wrongly, that their needs or rights are not being met, either by the society at large, a segment thereof, or the current overriding political system. When this results in community disruption of a nature where intervention is required to maintain public safety it has become a civil disturbance. Additionally, the Region 5 Strategic Plan includes Operational Objectives 3 & 4: Intelligence Gathering, Indicators, Warnings, etc; and Intelligence and Information Sharing.
[10] The definition of Dam Failure comes from the 2010 Pierce County HIRA: A dam is any "barrier built across a watercourse for impounding water.[10]" Dam failures are catastrophic events "characterized by the sudden, rapid, and uncontrolled release of impounded water. The vulnerability analysis was based on the potential dam failure from Mud Mountain Dam and Lake Tapps using Pierce County's GIS data which originated from each of the dams emergency plans inundation maps.
[11] The definition of an Energy Emergency comes from the 2010 Pierce County HIRA: Energy emergency refers to an out-of-the-ordinary disruption, or shortage, of an energy resource for a lengthy period of time. Additionally the Region 5 Strategic Plan addresses Energy Emergencies in its Operational Objective 32, Restoration of Lifelines which addresses the restoration of critical services such as oil, gas, natural gas, electric, etc.
[12] The definition of epidemic comes from the TPCHD Flu Plan of 2005: A Pandemic is an epidemic occurring over a very wide area and usually affecting a large proportion of the population. Pandemics occur when a wholly new

subtype of influenza A virus emerges. A "novel" virus can develop when a virulent flu strain that normally infects birds or animals infects a human who has influenza; the two viruses can exchange genetic material, creating a new, virulent flu virus that can be spread easily from person-to-person. Unlike the flu we see yearly, no one would be immune to this new flu virus, which would spread quickly, resulting in widespread epidemic disease – a pandemic. (DOH Plan & U.S. Dept. of HHS).

[13] The definition of Hazardous Materials comes from the 2010 Pierce County HIRA: Hazardous materials are materials, which because of their chemical, physical or biological properties, pose a potential risk to life, health, the environment, or property when not properly contained. A hazardous materials release then is the release of the material from its container into the local environment. A general rule of thumb for safety from exposure to hazardous material releases is 1000ft; the Emergency Response Guidebook 2008, established by the US Dept of Transportation, contains advice per specific materials. The vulnerability analysis was broken into two sub sections for a better understanding of the hazard using Pierce County's GIS data with a 500 foot buffer on either side of the railroads and major roadways.

[14] The definition of Pipeline Emergency comes from the 2010 Pierce County HIRA: While there are many different substances transported through pipelines including sewage, water and even beer, pipelines, for the purpose of this chapter, are transportation arteries carrying liquid and gaseous fuels. They may be buried or above ground

[15] The definition of Terrorism comes from the 2010 Pierce County HIRA: Terrorism has been defined by the Federal Bureau of Investigation as, "the unlawful use of force or violence against persons or property to intimidate or coerce a Government, the civilian population or any segment thereof, in furtherance of political or social objectives." These acts can vary considerably in their scope, from cross burnings and the spray painting of hate messages to the destruction of civilian targets. In some cases, violence in the schools has also been labeled as a form of terrorism.

[16] The definition of Transportation Accident comes from the 2010 Pierce County HIRA: Transportation accidents as used in this assessment include accidents involving a method of transportation on the road, rail, air, and maritime systems within the confines of Pierce County. The vulnerability analysis was broken into three sub sections for a better understanding of the hazard using Pierce County's GIS data; Commencement Bay to include inland rivers and streams, railroads, and roads. A 200 foot buffer was applied to all the shorelines and a 500 foot buffer on either side of the railroads and roadways.

[17] In the Impact to Property, Facilities and Infrastructure, both Tables 4-5a and 4-5b, look at the impact to all property, facilities and infrastructure existing in the jurisdiction, not just to that owned by the jurisdiction.

[18] The consideration for each of these hazards, in both Tables 4-5a and 4-5b, as to whether an individual hazard's consequences exist, or not, is based on a possible worst case scenario. It must also be understood that a "yes" means that there is a good possibility that the consequence it refers to could happen as a result of the hazard, not that it will. Conversely "No" means that it is highly unlikely that that consequence will have a major impact, not that there will be no impact at all.

[19] While the major volcanic hazard from Mt. Rainier is from a lahar descending the main river valleys surrounding the mountain, it is not the only problem. Most jurisdictions could receive tephra in greater or lesser amounts, sometimes with damaging results. Consequence analyses in this section take into account the possibility of tephra deposition in addition to a lahar.

[20] The Technological Consequences are added herein to acknowledge the role of human-caused hazards in the health and safety of unincorporated Pierce County. The consequences noted are under the same criteria as natural hazards given their impacts to the departmental assets.