

**PART 2—
ANNEXES FOR MUNICIPALITIES**

CHAPTER 2. UNINCORPORATED KITTITAS COUNTY ANNEX

2.1. HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

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2.2. JURISDICTION PROFILE

The following is a summary of key information about Kittitas County and its history:

- **Date of Incorporation**—November 1883.
- **Current Population**—40,915 as of 2010 Census.
- **Population Growth**—Kittitas County was the fifth fastest growing county based on populations in the 2000 and 2010 census, with a growth rate of 22.9 percent.
- **Location and Description**—Kittitas County is located in the center of Washington State. It is bounded to the west by the crest of the Cascade Range, separating Kittitas County from the Seattle/Puget Sound region. It is bounded to the north by the Wenatchee National Forest and Alpine Lakes Wilderness region. The eastern boundary is the Columbia River, separating Kittitas County and the agricultural lands of the Columbia Plateau region. Its southern boundary is the urban and agricultural region of the Yakima Valley. The county has a total area of 2,333 square miles, 36 square miles of which is water.

Kittitas County has a diverse landscape, ranging from forested Alpine Lakes Wilderness and snow-capped Cascade Mountains in the north and west areas of the County to the scabland and cliff-lined canyons of the Columbia River and Yakima River in the east and south areas. In the valleys are rich farmlands that produce the County's largest cash crop-timothy hay. Timothy hay is grown commercially by estimated 200-250 farmers on 25,000 to 30,000 acres of land at an estimated annual value of more than \$30 million.

- **Brief History**—The County was organized in November 1883 by the Washington Territorial Legislature. It was partitioned from what was then the northern part of Yakima County. There are numerous interpretations of the name, which is from the language of the Kittitas American Indians. According to one source, it “has been said to mean everything from ‘white chalk’ to ‘shale rock’ to ‘shoal people’ to ‘land of plenty.’ Most anthropologists and historians concede that each interpretation has some validity depending upon the particular dialect spoken.”
- **Climate**—Kittitas County has a wide range of annual precipitation: from 147 inches in western Kittitas County to 6 inches in eastern Kittitas County. The average seasonal snowfall varies from 434 inches each season at Snoqualmie Pass to less than 30 inches in eastern Kittitas County.

Countywide, the average winter maximum temperature is around 30 degrees F and the average daily minimum temperature is around 20 degrees F. The lowest temperature on record, which occurred at Snoqualmie Pass on February 1, 1922, is -48 degrees F. In summer, the average maximum temperature is around 75 degrees F and the average daily minimum temperature is around 50 degrees F. The highest temperature, which occurred in Ellensburg on July 26, 1928, is 110 degrees.

- **Governing Body Format**—Kittitas County has three elected Commissioners who are empowered to set county policy, adopt laws, implement them, and, except for the responsibilities of other elected officials, carry out day-to-day operations of the County.
- **Development Trends**—With its proximity to the Seattle metropolitan area and vast supply of recreational land, Kittitas County has been called “Seattle’s backyard.” Most development in the Cle Elum area has been for recreation or second homes. Most of the development has occurred in mountainous and forested areas, and many hillsides have been cleared and roads constructed to provide access to these lands. The County has also seen a rise over the past decade of families buying houses in the Cle Elum area and commuting daily to the Seattle area. In the Ellensburg area, growth and development have been steady. Much development has been on the flat lands of the Kittitas Valley on what was previously farmland.

2.3. JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 2-1 lists all past occurrences of natural hazards in the county. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 13
- Number of Repetitive Flood Loss Properties that have been mitigated: 0

2.4. HAZARD RISK RANKING

Table 2-2 presents the ranking of the hazards of concern.

2.5. CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 2-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 2-4. The assessment of the jurisdiction’s fiscal capabilities is presented in Table 2-5. Classifications under various community mitigation programs are presented in Table 2-6.

2.6. HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 2-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 2-8 identifies the priority for each initiative. Table 2-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

2.7. FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

County-wide LIDAR data would significantly enhance the HAZUS model.

The Flood Insurance Study (FIS) and associated Flood Insurance Rate Maps for Kittitas County are in need of update and revision.

2.8. HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps for the Kittitas County area are included in Volume 1 of this hazard mitigation plan. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

Type of Event	Date	Preliminary Damage Assessment
Landslide	06/07/1970	A steep hillside about 7 miles northwest of Ellensburg tumbled down, tore out an irrigation flume, destroyed a half mile of roadway and pushed about 1,000 feet of the highway into the Yakima River.
Landslide	08/28/1971	N/A
Severe Storms And Flooding (DR-492)	12/13/1975	N/A
Drought	3/31/1977	N/A
Severe Storms, Mudslides, & Flooding (DR-545)	12/10/1977	N/A
Volcanic Eruption, Mt. St. Helens (DR-623)	5/21/1980	N/A
Severe Storms & Flooding (DR-883)	11/26/1990	N/A
Landslide	4/24/1995	A slide and debris flow 120 feet wide and 800 feet long took out a large section of Kittitas Reclamation District main canal about 12 miles west of Ellensburg south of the Bristol Flats area, sending debris into the Yakima River.
Severe Storms, High Wind, And Flooding (DR-1079)	1/3/1996	N/A
High Winds, Severe Storms, & Flooding (DR-1100)	2/9/1996	N/A
Severe Winter Storms, Land & Muds Slides, & Flooding (DR-1159)	1/17/1997	N/A
Severe Storm & Landslide	7/3/1998	A severe thunderstorm dropped more than 3 inches of rain in less than 1 hour on the flanks of Manastash Ridge and caused swift-moving debris flows in scoured channels down the slopes of the Yakima River Canyon.
Earthquake (DR-1361)	3/1/2001	N/A
Wind	5/19/2001	\$20,000 ^a
Wind	10/23/2001	\$30,000 ^a
Winter Weather	11/28/2001	\$50,000 ^a
Elk Heights Fire	7/30/2004	N/A
Avalanche	1/7/2009	\$500,000 ^a
Severe Winter Storm, Landslides, Mudslides, & Flooding (DR-1817)	1/30/2009	\$10,000,000 ^a

**TABLE 2-1.
NATURAL HAZARD EVENTS**

Type of Event	Date	Preliminary Damage Assessment
Severe Winter Storm And Record And Near Record Snow (DR-1825)	3/2/2009	
Landslide	10/10/2009	\$12,500,000 ^a
Lightning	09/19/2010	\$60,000 ^a
Wind	11/15/2010	\$33,333 ^a
Severe Winter Storm, Flooding, Landslides, And Mudslides (DR-1963)	2/25/2011	
Severe Storm & Flooding	5/15/2011	

a. Damage estimate from SHELDUS

**TABLE 2-2.
HAZARD RISK RANKING**

Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Wildfire	54
2	Flood	39
3	Earthquake	36
4	Drought	27
4	Severe Weather	27
5	Landslide	18
6	Avalanche	18
7	Dam Failure	13
8	Volcano	9
9	Seiche	6

**TABLE 2-3.
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Yes	No	No	Yes	KCC 14.04 Building Code-adopts the 2009 edition of the IBC
Zoning Code	Yes	No	No	Yes	KCC 17 Zoning, 1983
Subdivisions	Yes	No	No	Yes	KCC 16 Subdivisions, 2005
Post Disaster Recovery	No	No	No	No	
Real Estate Disclosure	No	No	No	Yes	RCW 64.06.020
Growth Management	Yes	No	No	Yes	RCW 36.70A
Site Plan Review	Yes	No	No	No	KCC 14.04 Building Code
Special Purpose (flood management, critical areas)	Yes	Yes	No	Yes	KCC 14.08 Flood Damage Protection, 2003
Critical Areas	Yes	Yes	No	Yes	KCC 17A.05 Critical Areas, 1994
Planning Documents					
General Plan	Yes	No	No	Yes	The Kittitas County Comprehensive Plan is mandated by the Growth Management Act. Updated annually.
Floodplain or Basin Plan	Yes	No	No	No	Kittitas County Comprehensive Flood Hazard Management Plan. December 1996.
Stormwater Plan	No	No	No	No	
Capital Improvement Plan	No	No	No	No	A process to develop a Capital Improvement Plan is currently in process. The plan will be a part of the Capital Facilities Plan, which is part of the Comprehensive Plan.
Habitat Conservation Plan	No	No	No	No	
Economic Development Plan	Yes	No	No	No	The Economic Development Plan is a part of the Comprehensive Plan, and the Economic Development Strategic Plan prepared by the Economic Development Group of Kittitas County in 2009 has been adopted by reference into the Comprehensive Plan.
Emergency Response Plan	Yes	No	No	Yes	Kittitas County Comprehensive Emergency Management Plan
Shoreline Management Plan	Yes	No	No	Yes	Shoreline Master Program. March 5, 1975.
Post Disaster Recovery Plan	No	No	No	No	

**TABLE 2-4.
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Kittitas County Public Works (PW): Director, County Engineer, Planner. Kittitas County Community Development Services (CDS): Planner.
Engineers or professionals trained in building or infrastructure construction practices	Yes	PW: County Engineer, Construction Manager, Director.
Planners or engineers with an understanding of natural hazards	Yes	PW: Director, County Engineer, Planner.
Staff with training in benefit/cost analysis	Yes	PW: Planner.
Floodplain manager	Yes	PW: Planner.
Surveyors	Yes	PW: Survey crew.
Personnel skilled or trained in GIS applications	Yes	PW: Planners. CDS: Planners. Information Services: GIS Analyst. Assessor: Cadastral Technician. Various other county departments have employees with GIS experience.
Scientist familiar with natural hazards in local area	Yes	By contract: CWU, WSDOT, NOAA, WDFW.
Emergency manager	Yes	Sheriff's Office.
Grant writers	Yes	Numerous Kittitas County employees with grant writing experience.

**TABLE 2-5.
FISCAL CAPABILITY**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Public Expenditures in Hazard-Prone Areas	No
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Eligible: Yes Accessible: No

TABLE 2-6. COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
Community Rating System	No	—	—
Building Code Effectiveness Grading Schedule	Yes	4/4	—
Public Protection			
Fire District #1	Yes	6	—
Fire District #2	Yes	8	—
Fire District #3	Yes	7	—
Fire District #4	Yes	8	—
Fire District #6	Yes	7	—
Fire District #7	Yes	8	—
Fire District #8	Yes	8	—
Storm Ready	No	—	—
Firewise	No	—	—

TABLE 2-7. HAZARD MITIGATION ACTION PLAN MATRIX						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #KC-1 —Create a flood control district for Kittitas County						
New and Existing	Flood	1, 2, 3, 4, 6, 7, 8, 9, 10	Public Works	10,000 Medium	General Fund, Road Fund	Short-term
Initiative #KC-2 —Enhance the flood warning system on major rivers and streams within Kittitas County including strengthening the computer interface and upgrading and increasing the number of weather stations.						
New and Existing	Flood	1, 6, 9	Sheriff, Public Works	100,000 Medium	Grants, Road Fund, General Fund, Other agency funds	Short-term
Initiative #KC-3 —Join the Community Rating System.						
New and Existing	Flood	All	Public Works, CDS	10,000 Low	General Fund	Short-term, ongoing
Initiative #KC-4 —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect them from future damage, with priority for properties exposed to repetitive losses.						
Existing	All Hazards	1, 2, 8, 10	Public Works, CDS	5,000,000 High	HMGP	Long-term

**TABLE 2-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #KC-5 —Adopt appropriate regulatory standards that will reduce the risk to natural hazards through updates to existing code affecting critical areas regulations, flood hazard regulations, shoreline regulations, and to the county’s growth management comprehensive plan.						
New and Existing	All Hazards	1, 3, 4, 9, 10	Public Works, CDS	25,000 Low	General Fund, grants	Short-term
Initiative #KC-6 —Annually disseminate a floodplain information brochure to all floodplain area or flood risk households.						
New and Existing	Flood	1, 2, 6, 10	Public Works, CDS	10,000/year	General Fund	Short-term, ongoing
Initiative #KC-7 —Retrofit, rehabilitate or replace vulnerable road facilities, bridges and infrastructure throughout Kittitas County.						
Existing	All except drought and severe weather	1, 8	Public Works	High	HMGP, Roads Fund	Long-term
Initiative #KC-8 —Replace undersized bridges and culverts throughout Kittitas County, including but not limited to Manastash Creek and Dry Creek.						
Existing	Flood	1, 8	Public Works	High	HMGP, Roads Fund	Long-term
Initiative #KC-9 —Continue to maintain compliance and good standing under the National Flood Insurance Program.						
New and Existing	Flood	1, 2, 3, 4, 6, 8, 10	CDS	10,000	General Fund	Short-term, ongoing
Initiative #KC-10 —Update the Kittitas County Comprehensive Flood Management Plan.						
New and Existing	Flood	All	CDS	250,000 Medium	General Fund	Short-term
Initiative #KC-11 —Where feasible, seek to elevate at-risk structures within the floodplain to an adequate freeboard that is commensurate with the flood risk. The measure of feasibility will be willing participation by the property owner and the cost-effectiveness of the project.						
Existing	Flood	1, 8	Public Works	5,000,000 High	HMGP, Road Fund	Short-term
Initiative # KC-12 —Upgrade or install stream gauges on rivers and streams with a flow greater than 20 cubic feet per second.						
New and Existing	Flood, Dam Failure	1, 7	Public Works, CDS	100,000 Medium	HMGP, grants	Short-term, ongoing
Initiative # KC-13 —Conduct a study of all County-owned facilities to determine their vulnerability to natural hazards. Conduct a seismic retrofit or other mitigation to identified vulnerable structures.						
Existing	Earthquake	1, 8	Facilities	Medium	HMGP, General Fund	Long-term

**TABLE 2-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative # KC-14 —Begin a public outreach effort to educate landowners about Firewise, defensible space around structures, non-combustible building materials, fuel reduction and other wildfire prevention tactics. Place information boards in key areas of the County.						
New and Existing	Wildfire	1, 6	County Fire Marshal	20,000 Low	HMGP, grants	Short-term, ongoing
Initiative # KC-15 —Perform fuel reduction projects in Manastash, South Wenas, Exit 78, Hidden Valley, Pine Glen, Sky Meadows, and other areas with an identified need.						
New and Existing	Wildfire	1, 2, 3, 6, 10	County Fire Marshal	\$70,000 Low	HMGP, grants	Short-term, ongoing
Initiative # KC-16 —Enhance the subdivision code and building code to include fire code requirements such as fire flow and the use of fire-resistant building materials.						
New	Wildfire	1, 2, 3, 4, 10	County Fire Marshal	Low	General Fund	Short-term
Initiative # KC-17 —Improve and preserve fire apparatus access throughout the County, including access through private gates.						
New and Existing	All Hazards	1, 2, 8	Fire Marshal, Public Works	Medium	HMGP, Road Fund	Short-term, Long-term, Ongoing
Initiative # KC-18 —Identify seiche hazard areas and adopt higher regulatory standards to protect structures within the identified areas.						
New	Seiche	1, 2, 3, 7, 8, 10	Public Works, CDS	Medium	General Fund	Long-term
Initiative # KC-19 —Adopt land use policies that prohibit the placement of habitable structures in high risk landslide and avalanche areas.						
New	Landslide & Avalanche	1, 2, 3, 4, 10	CDS	25,000	General Fund	Short-term
Initiative # KC-20 —Strengthen/harden critical road facilities from the impacts of all hazards for which they have exposure and vulnerability.						
New and Existing	All Hazards	1, 8	Public Works	High	HMGP, Road Fund	Long-Term depends on funding
Initiative # KC-21 —Proactively manage hazardous tree removal from public areas, and educate private property owners about management of their own trees.						
Existing	Severe Storm	1, 9, 10	Public Works, CDS	Low	General Fund, Road Fund	Short-term, ongoing
Initiative # KC-22 —Use the best available data and science to continually update the County risk assessment as new information becomes available (hydrologic, geologic, topographic, etc.).						
New and Existing	All Hazards	1, 3, 7	Public Works, CDS		HMGP, General Fund, Road Fund	Short-term

**TABLE 2-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative # KC-23 —Integrate the hazard mitigation plan into future updates of the Kittitas County Comprehensive Plan.						
New	All Hazards	All	CDS	250,000	General Fund	Short-term
Initiative # KC-24 —Continue to support the implementation, monitoring, maintenance and updating of this plan.						
New and Existing	All Hazards	All	Public Works	Low	HMGP, General Fund, Road Fund	Short-term, ongoing
Initiative # KC-25 —Integrate goals, objectives and initiatives of the Kittitas County Hazard Mitigation Plan into existing County regulations and programs where appropriate.						
New and Existing	All Hazards	All	All County regulatory agencies	Low	General Fund, Road Fund	Short-term
Initiative #KC-26 —Maintain an active public outreach strategy using available multiple media to inform the public how to personally prepare for and mitigate the hazards of concern.						
New and Existing	All Hazards	1, 6	Public Works, CDS, Sheriff	Low	General Fund	Short-term Ongoing
Initiative #KC-27 —Support detailed ash fall studies.						
New and Existing	Volcano	1, 7, 9	Public Works, CDS	Low	HMGP, General Fund, Road Fund	Long-term
Initiative #KC-28 —Identify and create new impounded water sources.						
New and Existing	Drought	1, 7		Medium	HMGP, Grant, Other	Long-term
Initiative #KC-29 —Educate the public on drought resistance and encourage the use of water saving landscaping, irrigation methods and farming practices.						
New and Existing	Drought	1, 6, 7, 9, 10	CDS, Kittitas County Conservation District	Low	General Fund, Grants	Short-term
Initiative #KC-30 —Improve irrigation conveyance systems to reduce water loss through earthen canals and ditches.						
New and Existing	Drought	1, 8, 9, 10	CDS, Kittitas County Conservation District	High	HMGP, Irrigation Districts and Companies	Long-term
Initiative #KC-31 —Enhance the existing dam failure early warning system.						
New and Existing	Dam Failure	1, 6	CDS, Public Works	Medium	HMGP, Grants	Long-term

TABLE 2-7. HAZARD MITIGATION ACTION PLAN MATRIX						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #KC-32 —Set the course for sustained operations of critical county functions by the development of a continuity of operations plan and/or a post-disaster recovery plan.						
New and Existing	All Hazards	1,6,9	Emergency Management	Medium	General Fund, DHS grant funding	Long term
Initiative #KC-33 —Continue to support through active participation the “county-wide” initiatives identified in Volume 1 of the Kittitas County Hazard Mitigation Plan.						
New and Existing	All Hazards	5,6,9	All County Agencies	Low	General Fund	Short-term Ongoing
Initiative #KC-34 —Consider participation in the National Weather Service “Storm Ready” program.						
New and Existing	Flood, Severe Weather	6,7,9	Emergency Management	Low	General Funding, NWS grant funding	Short-term

TABLE 2-8. MITIGATION STRATEGY PRIORITY SCHEDULE							
Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority ^a
KC-1	10	High	Medium	Yes	No	Yes	High
KC-2	3	High	Medium	Yes	Yes	No	Medium
KC-3	10	Medium	Low	Yes	No	Yes	High
KC-4	4	High	High	Yes	Yes	No	Medium
KC-5	5	High	Low	Yes	Now	Yes	High
KC-6	4	Low	Low	Yes	No	Yes	High
KC-7	2	High	High	Yes	Yes	No	Medium
KC-8	2	High	High	Yes	Yes	No	Medium
KC-9	7	Medium	Low	Yes	No	Yes	High
KC-10	10	Medium	Medium	Yes	Yes	No	Medium
KC-11	2	High	High	Yes	Yes	No	Medium
KC-12	2	High	Medium	Yes	Yes	No	Medium
KC-13	2	Medium	Medium	Yes	Yes	No	Medium
KC-14	5	Low	Low	Yes	No	Yes	High
KC-15	2	High	Low	Yes	Yes	Yes	High
KC-16	5	Medium	Low	Yes	No	Yes	High
KC-17	5	Medium	Medium	Yes	Yes	Yes	High
KC-18	3	Medium	Medium	Yes	Yes	No	Medium
KC-19	3	Medium	Low	Yes	No	Yes	High

**TABLE 2-8.
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority ^a
KC-20	6	High	High	Yes	Yes	No	Medium
KC-21	5	Medium	Low	Yes	Yes	Yes	High
KC-22	2	Medium	Medium	Yes	Yes	Yes	High
KC-23	3	Medium	Low	Yes	No	Yes	High
KC-24	3	Medium	Low	Yes	Yes	Yes	High
KC-25	10	Medium	Low	Yes	No	Yes	High
KC-26	10	Low	Low	Yes	No	Yes	High
KC-27	10	Low	Low	Yes	No	No	Low
KC-28	2	Medium	Medium	Yes	No	No	Medium
KC-29	2	Low	Low	Yes	No	No	Medium
KC-30	5	High	High	Yes	Yes	No	Medium
KC-31	4	High	Medium	Yes	No	Yes	High
KC-32	3	High	Medium	Yes	Yes	No	Medium
KC-33	3	High	Low	Yes	Yes	Yes	High
KC-34	3	High	Low	Yes	Yes	Yes	High

a. See Section 1.3 for definitions of high, medium and low priorities.

**TABLE 2-9.
ANALYSIS OF MITIGATION INITIATIVES**

Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	5, 19, 23, 24, 25, 33	4, 7, 20	22, 24, 26, 33	5	17, 20, 32	
Dam failure	5, 23, 24, 25, 33	4, 7, 11, 20	22, 24, 26, 33	5	12, 20, 31, 32	
Drought	5, 23, 24, 25, 33	4	22, 24, 26, 29, 33	5	32	28, 30
Earthquake	5, 13, 23, 24, 25, 33	4, 7, 13, 20	22, 24, 26, 33	5	17, 20, 32	13
Flood	1, 3, 5, 9, 10, 23, 24, 25, 33	1,3,4, 7, 8, 9, 10, 11, 20	1,3, 6, 9, 10, 22, 24, 26, 33	1,3, 5, 10	1, 2, 3, 9, 10, 12, 17, 20, 31, 32,34	1, 3, 10
Landslide	5, 19, 23, 24, 25, 33	4, 7, 20	22, 24, 26, 33	5	17, 20, 32	
Severe Weather	5, 23, 24, 25, 33	4, 20	22, 24, 26, 33	5, 21	12, 17, 20, 32, 34	
Seiche	5, 18, 23, 24, 25, 33	4, 7, 18, 20	18, 22, 24, 26, 33	5	17, 20, 32	
Volcano	5, 23, 24, 25, 27, 33	4, 20	22, 24, 26, 33	5	17, 20, 32	
Wildfire	5, 15, 16, 23, 24, 25, 33	4, 7, 15, 20	14, 22, 24, 26, 33	5, 15	17, 20, 32	

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

CHAPTER 3. CITY OF CLE ELUM ANNEX

3.1. HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

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3.2. JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation** Cle Elum was officially incorporated on February 12, 1902.
- **Current Population**—1,872 as of 2010 (US Census Est.)
- **Population Growth**—The City of Cle Elum has had a growth rate of approximately 9 percent since 2000 according to City-Data.com.
- **Location and Description**—The City of Cle Elum is located in Upper Kittitas County at Milepost 83 on Interstate 90 east of Snoqualmie Pass (47°11'39"N 120°56'15"W). It is bordered on the north by the Cle Elum Ridge and the south by South Cle Elum Ridge, including Peoh Point. It has a total land area of 3.22 sq. mi. It is a neighbor town to the City of Roslyn. It is at an altitude of 1,913 feet.
- **Brief History**—The founders of Cle Elum were Thomas L. Gamble (later known as Judge Gamble) and Walter J. Reed. Mr. Gamble took up a quarter section of land in Section 26, Township 20 North, and Range 15 East, in April 1883 with the intent of farming the land. Mr. Reed took a claim adjoining Mr. Gamble's on the west. On those two preemptive claims the town was laid out. The date of these filings was three years prior to the discovery of coal. Scattered discoveries of coal ledges had been made in 1883 and 1884, but in 1886 a definite discovery of a large ledge of good coal in paying quantities made it clear that an important stage had come in the history of the region and populations in the region began to increase. Meanwhile, the Northern Pacific Railway was seeking a route over the Cascade Mountains. On October 11, 1886, the first Northern Pacific Railroad train pulled into the new Cle Elum station. Following the arrival of the railway, the small town began to grow rapidly.

In 1913, steps were taken to improve automobile access across the Cascade Mountains via Snoqualmie Pass. A \$1,500,000 levy was approved in 1913 to improve and expand the state's highways. The majority of the levy (\$590,743) went to construction of the Sunset Highway between Spokane and Seattle. This major cross-state highway would pass directly through Cle Elum's business district. As one of the first towns reached after traveling east across the pass, Cle Elum would benefit from the road's construction. That same year, reflecting on the prosperity of the coal mines, the city's second bank was chartered. By 1914, Cle Elum's population had risen to 3,000 from about 100 at the turn of the century.

Cle Elum's greatest disaster occurred on June 25, 1918 when a fire wiped out over 70 acres of the city (29 city blocks), with over \$500,000 dollars in damage. The cause was determined

to be a discarded cigarette butt thrown into a pile of garbage behind a theater. Thirty businesses and 205 houses were destroyed, leaving more than 1,800 people homeless. Following the incident, aid poured in from across the state. The Red Cross brought tents from Camp Lewis to house misplaced citizens while soldiers were sent from Ellensburg to guard businesses. Yakima and Portland, Oregon also sent aid to the city. Fortunately no lives were lost in the incident. High insurance rates on Cle Elum’s many wooden structures inhibited many people from purchasing it. One of the few buildings in downtown Cle Elum to survive the fire was the Cle Elum State Bank Building, built in 1906 and still standing today. The rest of downtown was quickly rebuilt of brick and many of these buildings still stand.

- **Climate**—Cle Elum gets 22 inches of rain per year. Snowfall is 81 inches. The number of days with any measurable precipitation is 117. On average, there are 199 sunny days per year in Cle Elum. The July high is around 81 degrees. The January low is 20. The city’s comfort index, which is based on humidity during the hot months, is a 75 out of 100, where higher is more comfortable. The US average on the comfort index is 44.
- **Governing Body Format**—The City of Cle Elum is governed by a mayor and a six person council.
- **Development Trends**—With its proximity to the Seattle metropolitan area and vast supply of recreational land, Kittitas County has been called “Seattle’s backyard.” The majority of development in the Cle Elum area has been for recreational or second homes. Most of the development has occurred in mountainous and forested areas, and many hillsides have been cleared and roads constructed to provide access to these lands. The County has also seen a rise over the past decade of families buying houses in the Cle Elum area and commuting daily to the Seattle area.

3.3. JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 3-1 lists all past occurrences of natural hazards in the county. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 2
- Number of Repetitive Flood Loss Properties that have been mitigated: 0

3.4. HAZARD RISK RANKING

Table 3-2 presents the ranking of the hazards of concern.

3.5. CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 3-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 3-4. The assessment of the jurisdiction’s fiscal capabilities is presented in Table 3-5. Classifications under various community mitigation programs are presented in Table 3-6.

3.6. HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 3-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 3-8 identifies the priority for each initiative. Table 3-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

3.7. HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps for the City of Cle Elum are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

TABLE 3-1. NATURAL HAZARD EVENTS		
Type of Event	Date	Preliminary Damage Assessment
Flood Event (DR-1817)	1/30/2009	61,688
Earthquake	02-28-2001	N/A
Earthquake	05-03-1996	N/A
Earthquake	01-29-1995	N/A
Earthquake	02-14-1981	N/A
Earthquake	04-29-1965	N/A

TABLE 3-2. HAZARD RISK RANKING		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Flood	27
2	Wildfire	27
3	Earthquake	24
4	Dam Failure	18
5	Severe Weather	18
6	Landslide	10
7	Volcano	6
8	Drought	5
9	Avalanche	1
10	Seiche	0

**TABLE 3-3.
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Yes	Yes	No	Yes	Title 15 CEMC adopts the 2009 IBC, 7/27/2010
Zoning Code	Yes	No	No	No	Title 17, CEMC, 2001
Subdivisions	Yes	No	No	No	Title 16, CEMC, 2005
Post Disaster Recovery	No	No	No	No	
Real Estate Disclosure	No	No	Yes	Yes	RCW 64.06.020
Growth Management	Yes	No	No	Yes	RCW 36.70A
Site Plan Review	Yes	No	No	Yes	Title 15 CEMC, 2010
Special Purpose (flood management, critical areas)	Yes	No	No	No	Flood damage Prevention: Title 15, Chapter 15.24; 2002 Critical Areas: Title 18, CEMC, 2010
Planning Documents					
General Plan	Yes	No	No	Yes	
Floodplain or Basin Plan	Yes	No	No	No	Kittitas County Comprehensive Floodplain Management Plan, 1996
Stormwater Plan	Yes	No	No	No	
Capital Improvement Plan	Yes	No	No	No	5-year CIP, updated annually for streets, water, sewer and drainage
Habitat Conservation Plan	No	No	No	No	
Economic Development Plan	Yes	No	No	No	Economic Development Group of Kittitas County & Chamber
Emergency Response Plan	No	No	No	No	
Shoreline Management Plan	Yes	Yes	No	No	
Post Disaster Recovery Plan	No	No	No	No	

**TABLE 3-4.
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Matt Morton, City Development Director Jeff Louman, City Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	Robert Omans, CBO
Planners or engineers with an understanding of natural hazards	Yes	Matt Morton, City Development Director Jeff Louman, City Engineer
Staff with training in benefit/cost analysis	No	
Floodplain manager	Yes	Rob Omens, CBO
Surveyors	Yes	Encompass Engineering & Surveying
Personnel skilled or trained in GIS applications	Yes	Matt Morton, City Development Director
Scientist familiar with natural hazards in local area	No	
Emergency manager	No	
Grant writers	Yes	Matt Morton, City Development Director

**TABLE 3-5.
FISCAL CAPABILITY**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	No
Other	No

	Participating?	Classification	Date Classified
Community Rating System	No	—	—
Building Code Effectiveness Grading Schedule	Yes	3/3	—
Public Protection	Yes	6/9	—
Storm Ready	No	—	—
Firewise	Yes	Sky Meadows Ranch	2009

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #CE-1 —Consider participation in the Community Rating System						
New and Existing	Flood	All	City Council	Low	General Fund	Short-Term
Initiative #CE-2 —Adopt appropriate regulatory standards that will reduce the risk of natural hazards through updates to existing code affecting critical areas regulations, flood hazard regulations, shoreline regulations, and updates to the county’s comprehensive plan.						
New	All Hazards	1, 3, 4, 9, 10	Community Development	Low	General Fund	Short-Term
Initiative #CE-3 —Continue to maintain compliance and good standing under the National Flood Insurance Program.						
New and Existing	Flood	1, 2, 3, 4, 6, 8, 10	Community Development	Low	General Fund	Short-term, ongoing
Initiative #CE-4 —Consider participation in the National Weather Service “Storm Ready” program.						
New and Existing	Flood, Severe Weather	6, 7, 9	Public Works	Low	General Fund	Short term
Initiative #CE-5 —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect structures from future damage, with properties with exposure to repetitive losses as a priority.						
Existing	All Hazards	1,2,8,10	Community Development	High	HMGP funding, Local contribution	Long-Term depends on funding
Initiative #CE-6 —Continue to support participation in the “Firewise” program by expanding the number of project sites within Cle Elum and promoting Firewise strategies through active community outreach.						
New and Existing	Wildfire	1,3,6,7,9	Community Development	Low	General Fund	Short-term Ongoing

**TABLE 3-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #CE-7 —Set the course for sustained operations of critical city functions by the development of a continuity of operations plan and/or a post-disaster recovery plan.						
New and existing	All Hazards	1,6,9	Emergency Management Staff	Medium	General fund, DHS grant funding	Long-term
Initiative #CE-8 —Educate the public on natural hazards, the risks they pose and way to reduce those risk through existing public information programs with the City.						
New and Existing	All Hazards	6, 7, 9	City Council	Low	General Fund	Short-term Ongoing
Initiative # CE-9 —Continue to support the implementation, monitoring, maintenance and updating of this plan.						
New and Existing	All Hazards	All	City Council, Fire Chief	Low	HMGP, General Fund, Road Fund	Short-term, ongoing
Initiative #CE-10 —Continue to support through active participation the countywide initiatives identified in volume 1 of the Kittitas County Hazard Mitigation Plan.						
New and Existing	All Hazards	5,6,9	All City Agencies	Low	General Fund	Short-term Ongoing

**TABLE 3-8.
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority ^a
CE-1	10	Medium	Low	Yes	No	Yes	Medium
CE-2	5	High	Low	Yes	No	Yes	High
CE-3	7	Medium	Low	Yes	No	Yes	High
CE-4	3	High	Low	Yes	Yes	Yes	High
CE-5	4	High	High	Yes	Yes	No	Medium
CE-6	5	High	Low	Yes	Yes	Yes	High
CE-7	3	High	Medium	Yes	Yes	No	Medium
CE-8	3	Low	Low	Yes	Yes	Yes	High
CE-9	10	High	Low	Yes	Yes	Yes	High
CE-10	3	Medium	Low	Yes	No	Yes	High

a. See Section 1.3 for definitions of high, medium and low priorities.

**TABLE 3-9.
ANALYSIS OF MITIGATION INITIATIVES**

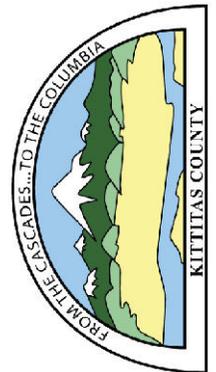
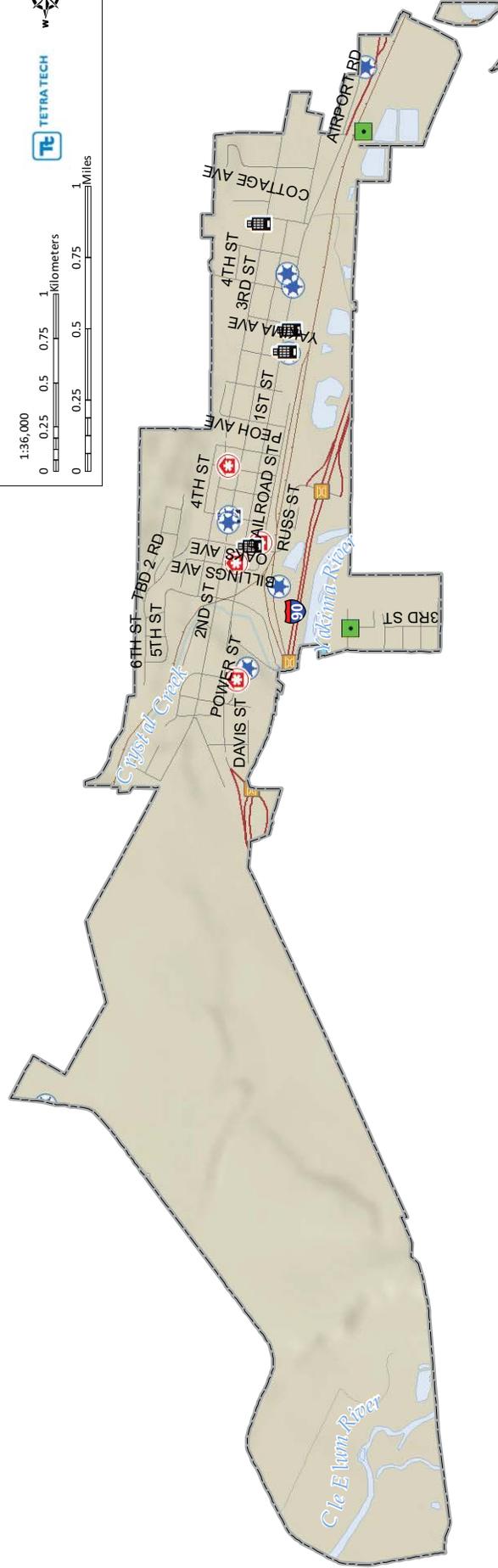
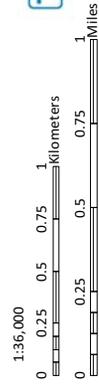
Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	2, 9	5	8, 10		7	
Dam failure	2, 9	5	8, 10		7	
Drought	2, 9		8, 10		7	
Earthquake	2, 9	5	8, 10		7	
Flood	1, 2, 3, 9	1, 3, 5	1, 3, 8, 10	1, 3	1, 3, 4, 7	1
Landslide	2, 9	5	8, 10		7	
Severe Weather	2, 9	5	8, 10		4, 7	
Seiche	2, 9	5	8, 10		7	
Volcano	2, 9	5	8, 10		7	
Wildfire	2, 6, 9	5, 6	6, 8, 10	6	7	

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

CITY OF CLE ELUM

Critical Facilities

- | | | | | | |
|---|---|---|---|---|---|
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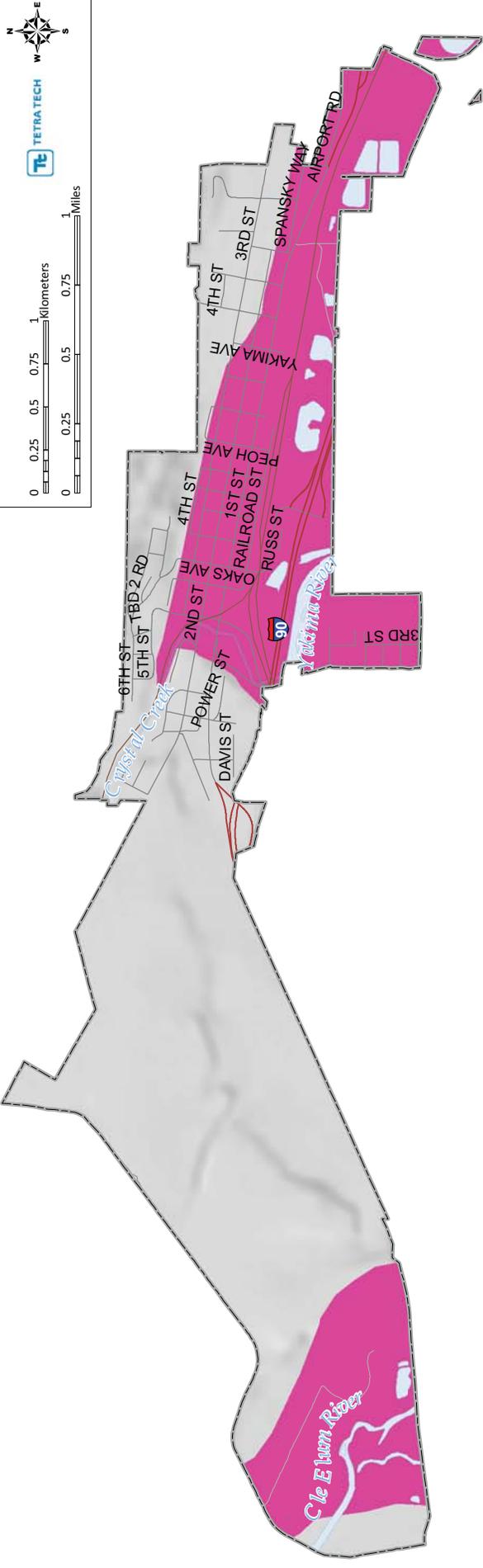
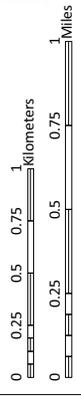


CITY OF CLE ELUM

Cle Elum Dam Inundation Area

 Cle Elum Dam Failure Probable Maximum Flood

1:36,000
Cle Elum Dam Inundation Area data provided by Kittitas County

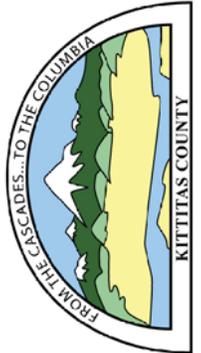
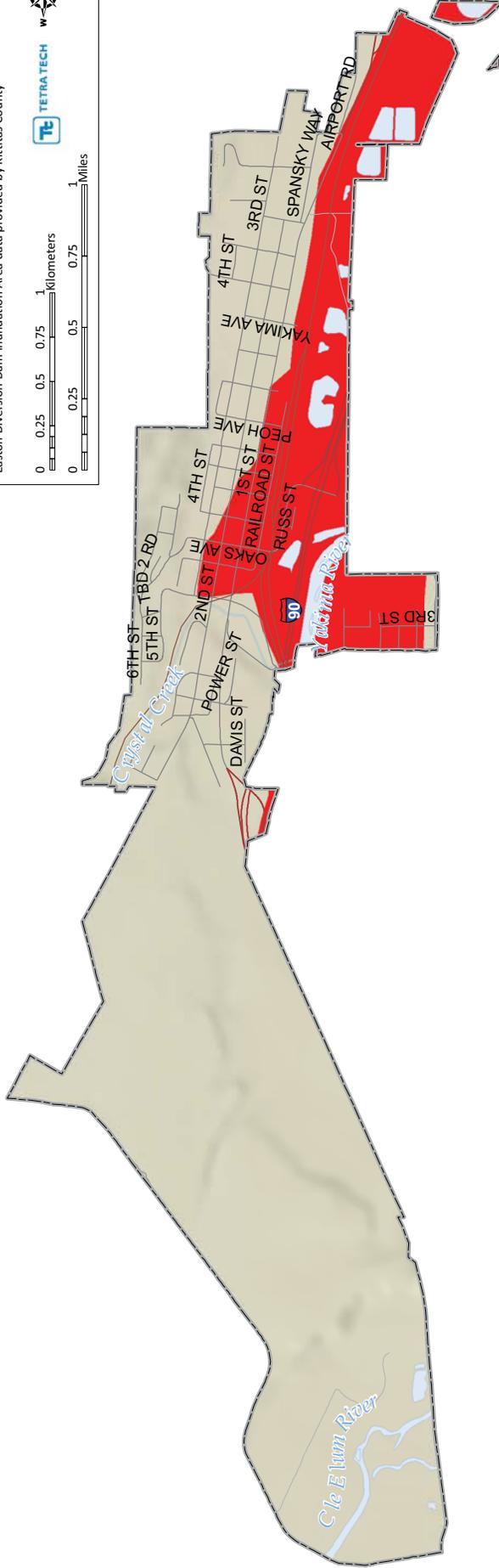


CITY OF CLE ELUM

Easton Diversion Dam Inundation Area

 Easton Diversion Dam Failure
Probable Maximum Flood

1:36,000
Easton Diversion Dam Inundation Area data provided by Kittitas County



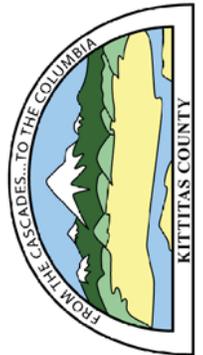
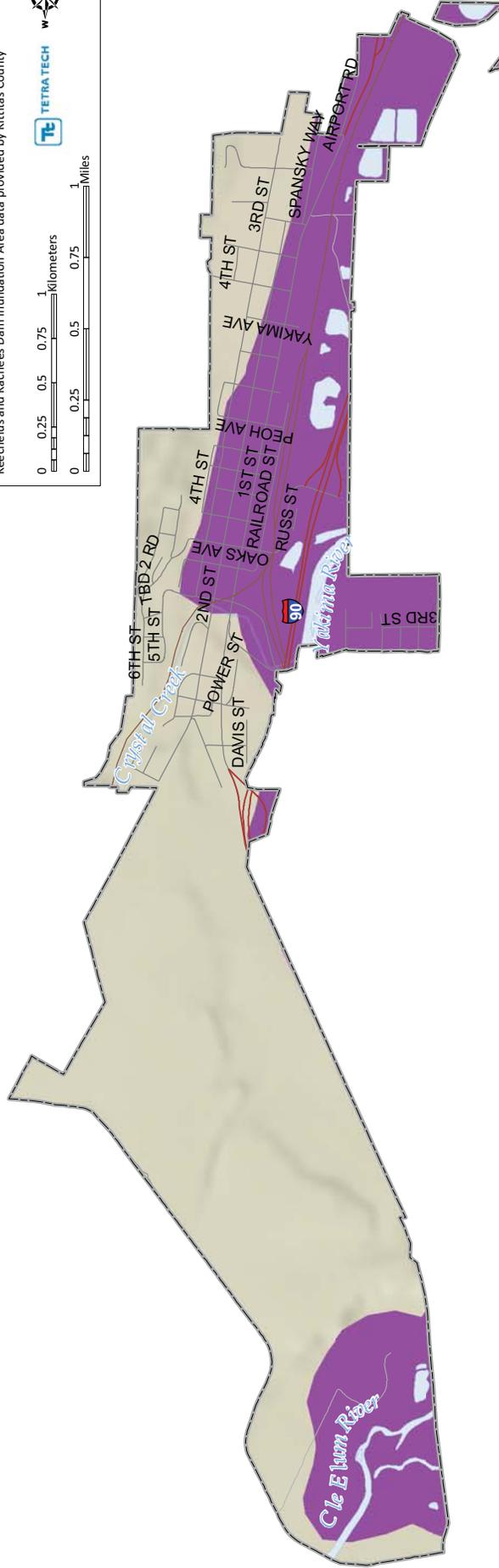
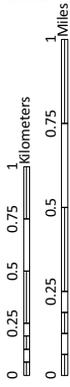
CITY OF CLE ELUM

Keechelus & Kachees Dam Inundation Area Probable Maximum Flood

 Keechelus & Kachees Dam Inundation Area
Probable Maximum Flood

1:36,000

Keechelus and Kachees Dam Inundation Area data provided by Kittitas County



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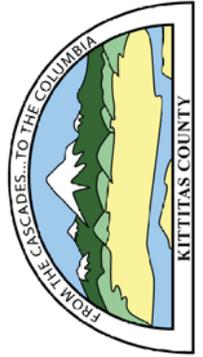
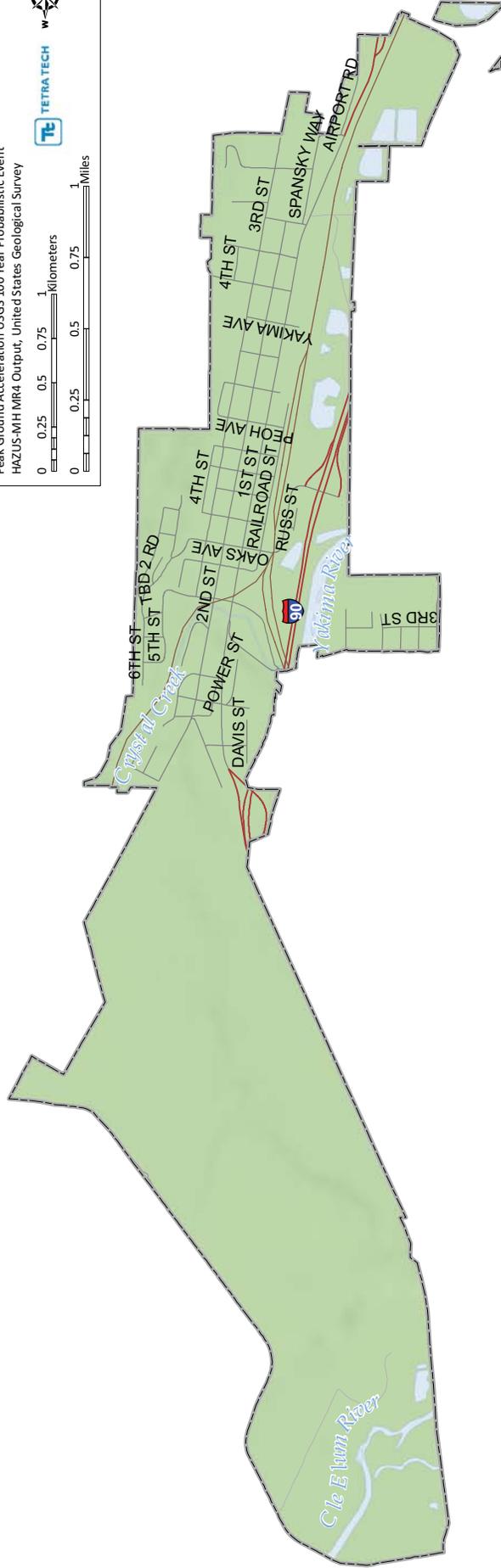
Peak Ground Acceleration
USGS 100 Year
Probabilistic Event

Mercalli Scale, Potential Damage

- V, Very Light
- VI, Light
- VII, Moderate

1:36,000

Peak Ground Acceleration USGS 100 Year Probabilistic Event
HAZUS-MH MR4 Output, United States Geological Survey



CITY OF CLE ELUM

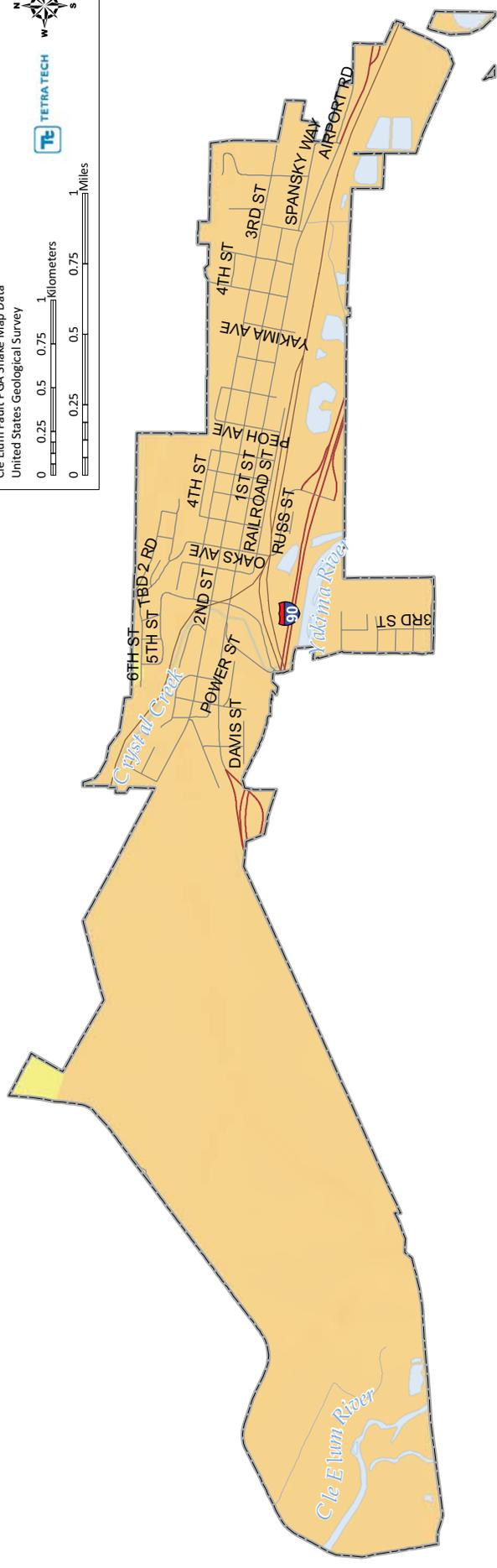
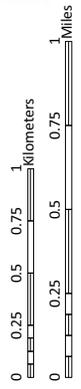
Cle Elum Fault
 Peak Ground Acceleration
 6.8 Magnitude Scenario

Mercalli Scale, Potential Damage

- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy

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Cle Elum Fault PGA Shake Map Data
 United States Geological Survey

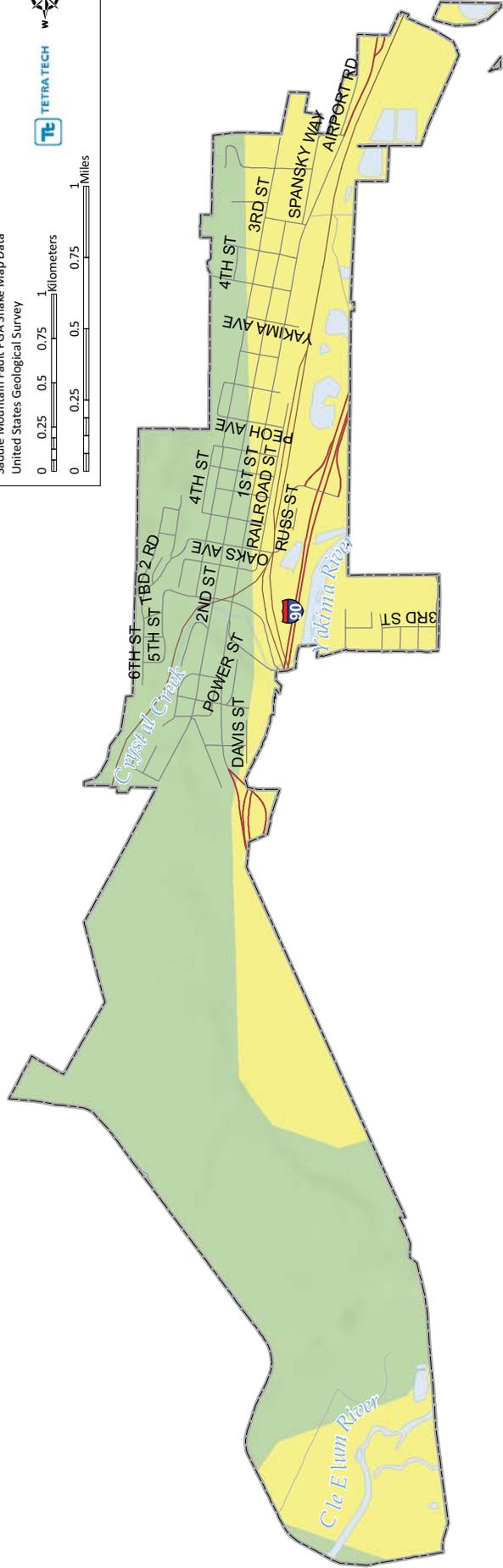
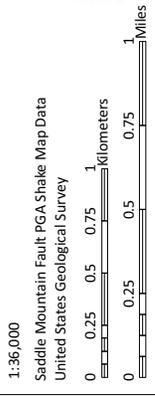


CITY OF CLE ELUM

Saddle Mountain Peak Ground Acceleration 7.3 Magnitude Scenario

Mercalli Scale, Potential Damage

-  V, Very Light
-  VI, Light
-  VII, Moderate
-  VIII, Moderate-Heavy
-  IX, Heavy



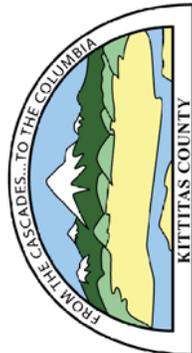
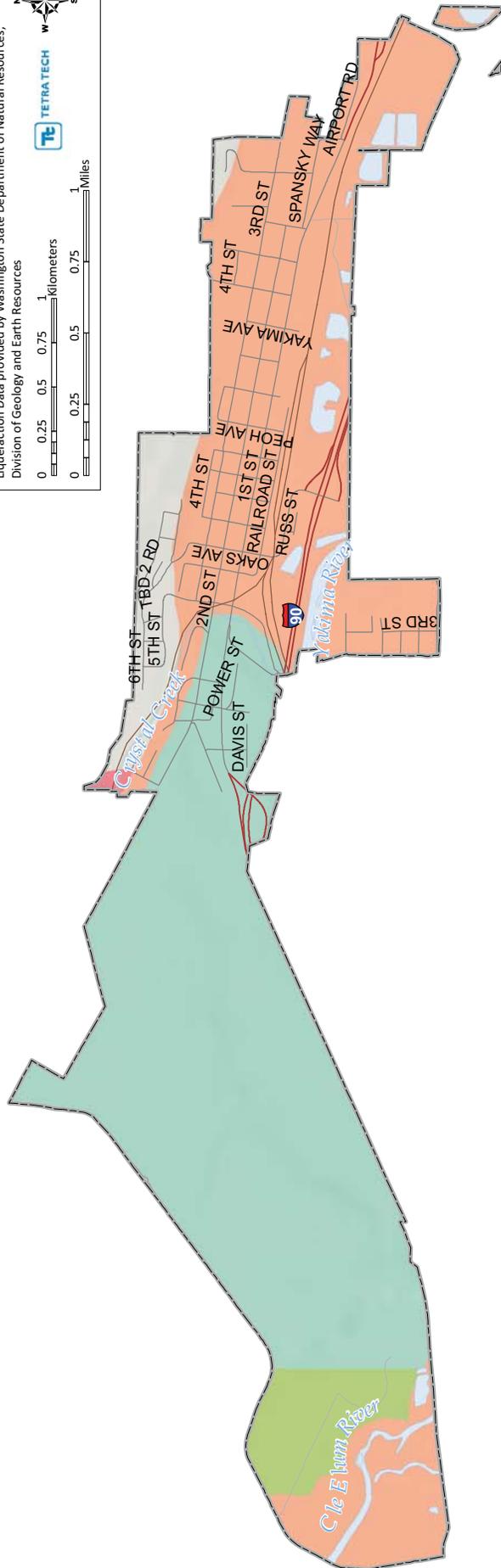
CITY OF CLE ELUM

Liquefaction Susceptibility



1:36,000

Liquefaction Data provided by Washington State Department of Natural Resources,
Division of Geology and Earth Resources



CITY OF CLEELUM

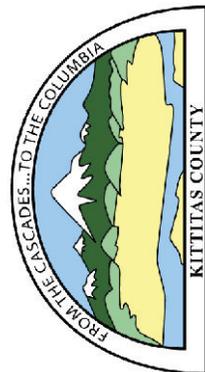
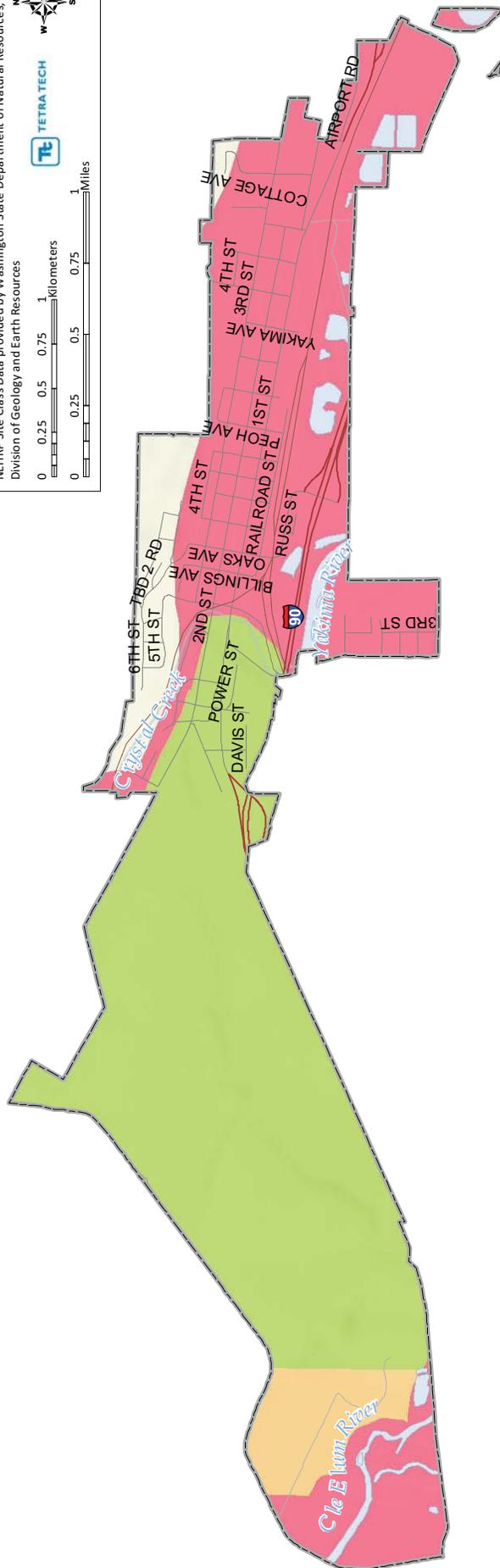
National Earthquake Hazard Reduction Program (NEHRP)

Soil Site Classes

- F - Requires site-specific investigation
- E - Soft Soil
- D - Stiff Soil
- C - Very Dense Soil and Soft Rock
- B - Rock
- Water
- Ice

1:36,000

NEHRP Site Class Data provided by Washington State Department of Natural Resources, Division of Geology and Earth Resources



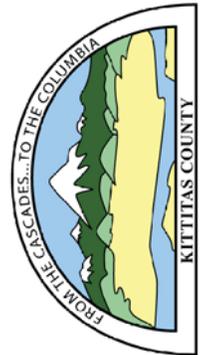
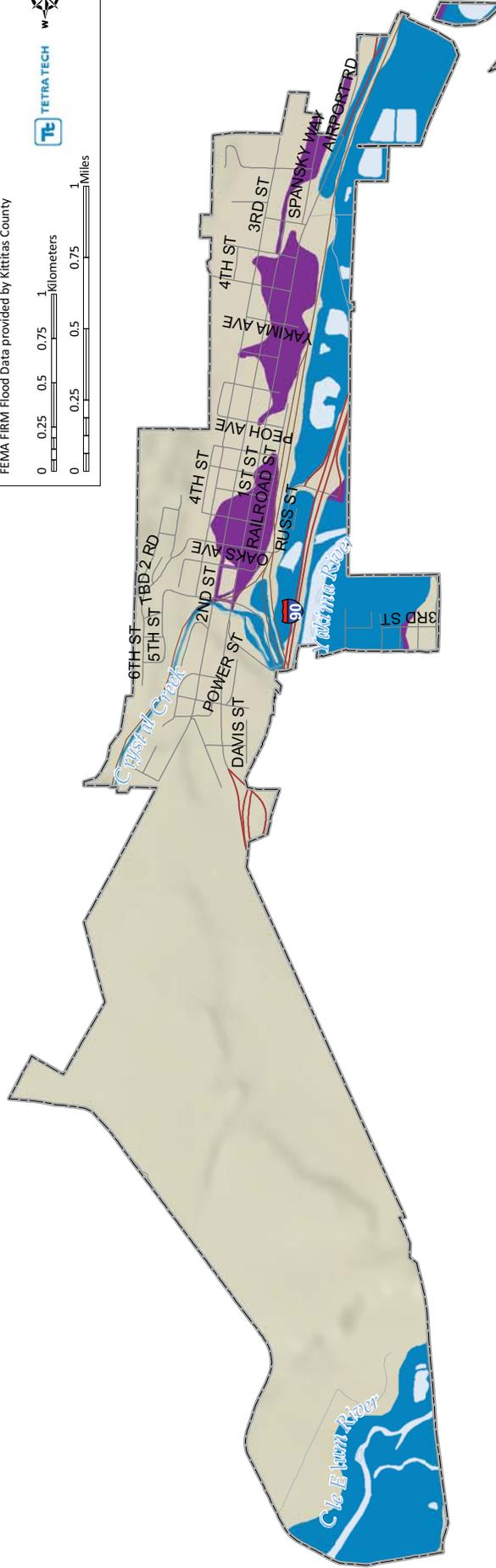
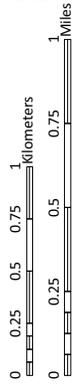
CITY OF CLE ELUM

FEMA FIRM Flood Hazard Areas

-  1-percent annual chance flood (100 Year)
-  0.2-percent annual chance flood (500 Year)

1:36,000

FEMA FIRM Flood Data provided by Kittitas County



CITY OF CLE ELUM

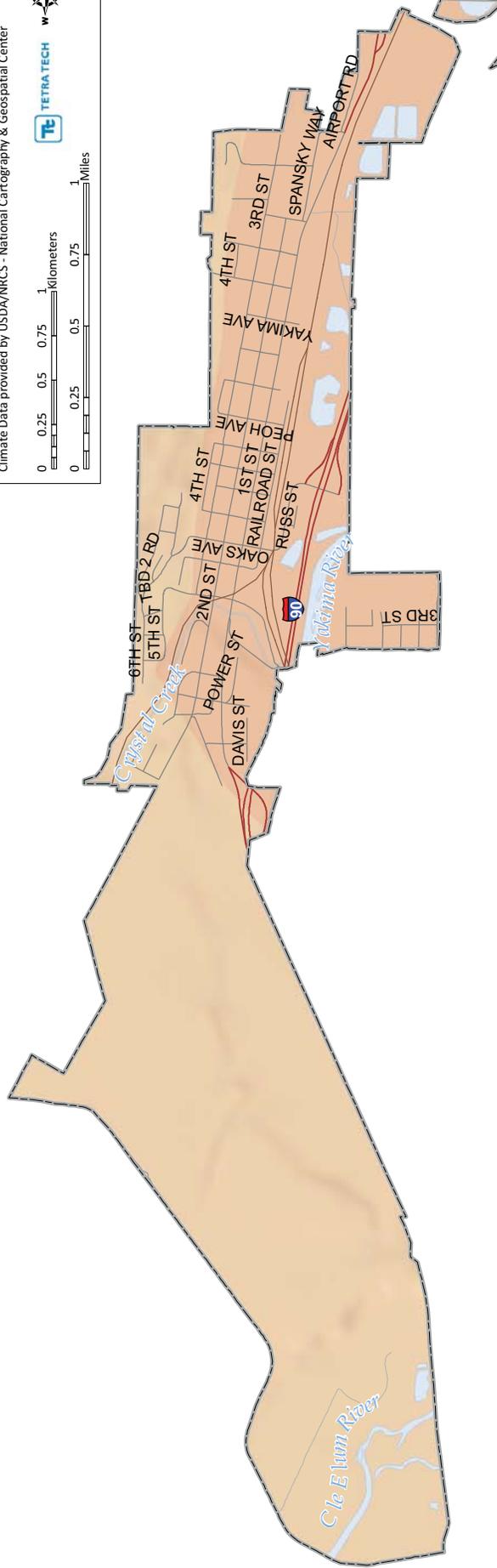
Average Maximum Temperature (F)

High : 91
 Low : 59

Average Maximum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000.
 USDA/NRCS

1:36,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



CITY OF CLE ELUM

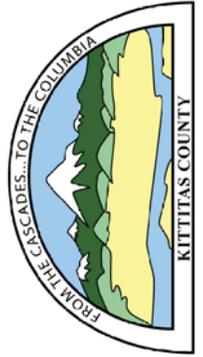
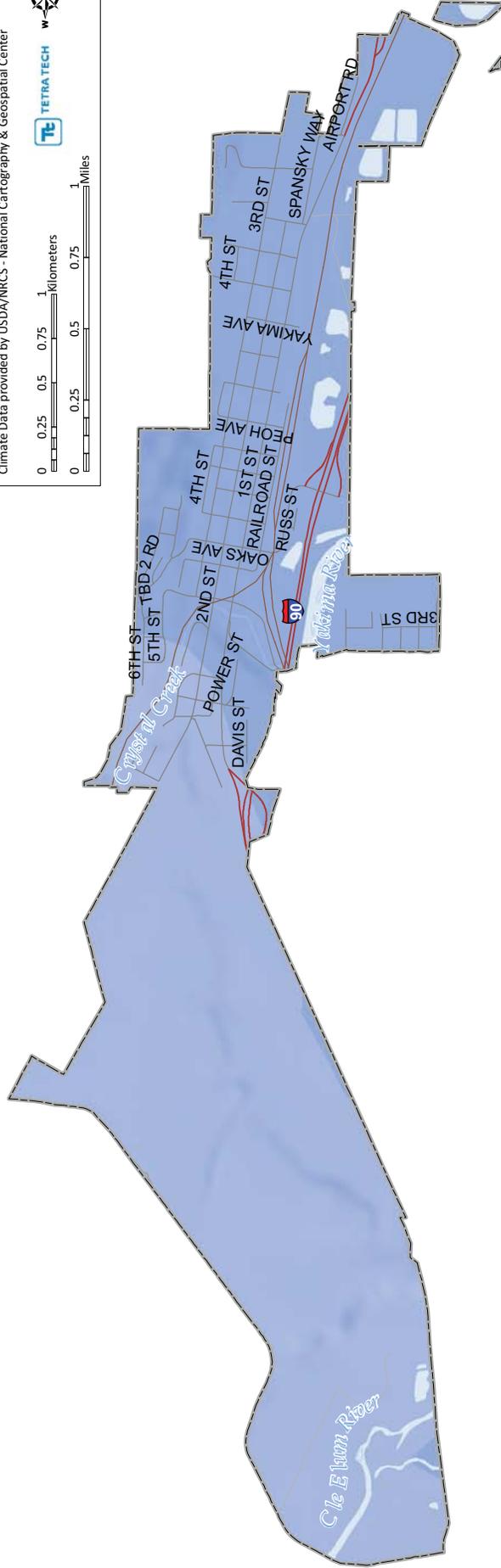
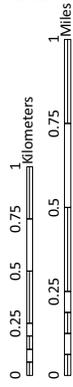
Average Minimum Temperature (F)

Average Annual Minimum Temperature (F)
 High : 25
 Low : 15

Average Minimum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000. USDA/NRCS

1:36,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



CITY OF CLE ELUM

Average Annual Precipitation

Average Annual Precipitation (inches)

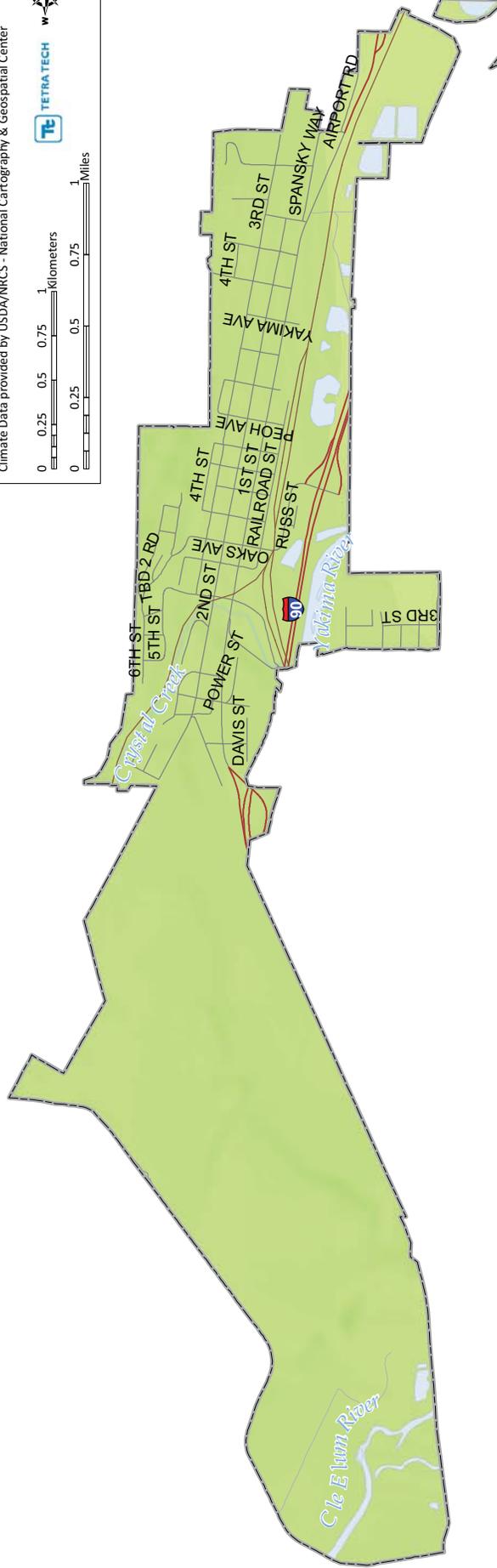
High : 147

Low : 7

Average annual precipitation is according to a model using point precipitation and elevation data for the 30-year period of 1971-2000.
USDA/NRCS

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Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



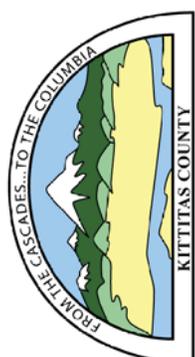
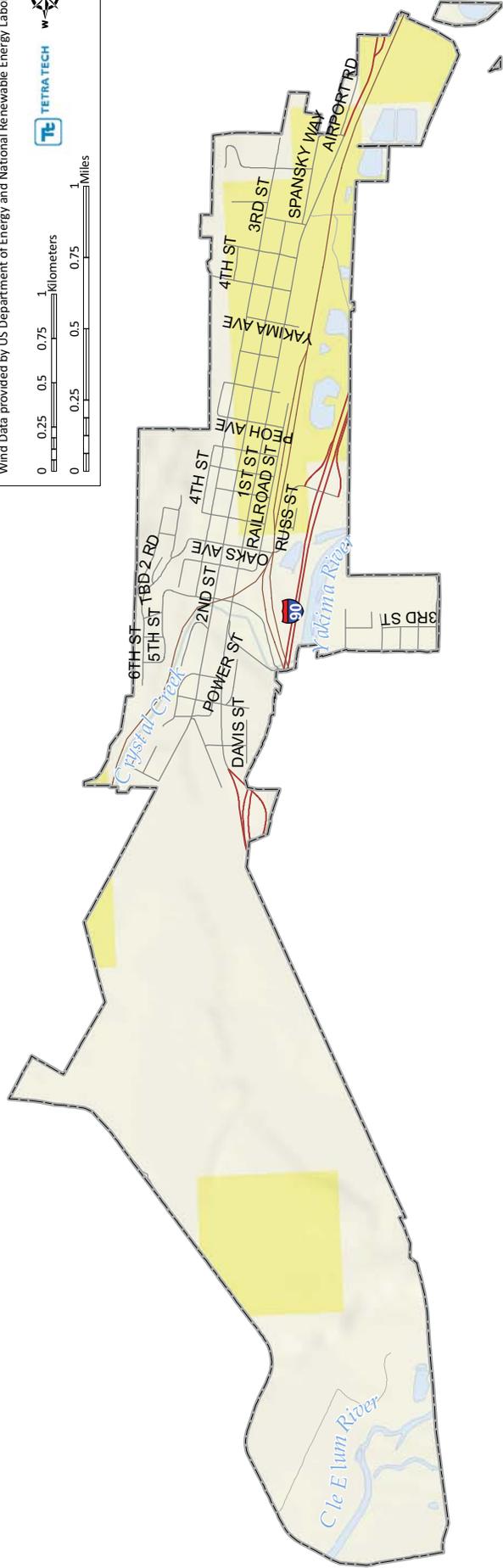
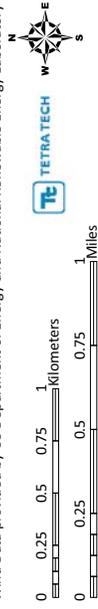
CITY OF CLE ELUM

Potential Wind Power

Wind Power Class	Resource Potential	Wind Power Density at 50m W/m ²	Wind Speed at 50m m/s	Wind Speed at 50m mph
1	None	0	0	0
2	Marginal	200-300	5.6-6.4	12.5-14.3
3	Fair	300-400	6.4-7.0	14.3-15.7
4	Good	400-500	7.0-7.5	15.7-16.8
5	Excellent	500-600	7.5-8.0	16.8-17.9
6	Outstanding	600-800	8.0-8.8	17.9-19.7
7	Superb	>800	>8.8	>19.7

1:36,000

Wind Data provided by US Department of Energy and National Renewable Energy Laboratory



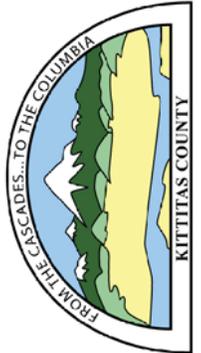
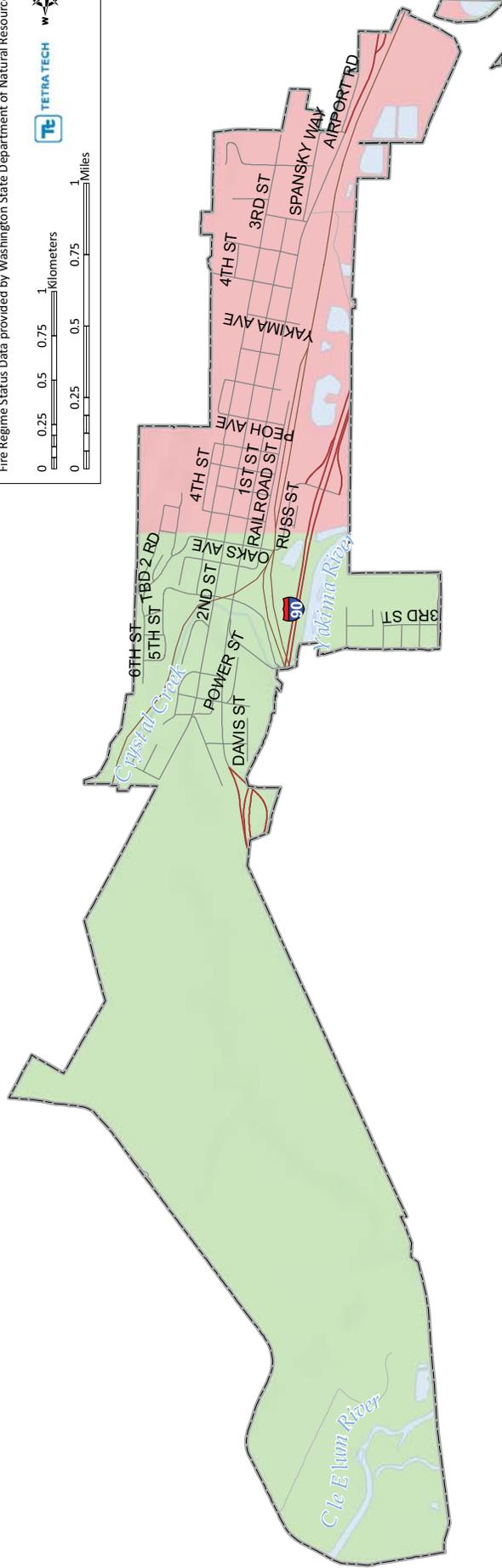
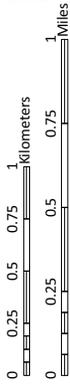
CITY OF CLE ELUM

Fire Regime Status

- 0-35 yrs, Low Severity
- 0-35 yrs, Stand Replacement
- 35-100+ yrs, Mixed Severity
- 35-100+ yrs, Stand Replacement
- 200+ yrs, Stand Replacement

1:36,000

Fire Regime Status Data provided by Washington State Department of Natural Resources



CHAPTER 4. CITY OF ELLENSBURG ANNEX

4.1. HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

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Alternate Point of Contact

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4.2. JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—1883
- **Current Population**— 18,174 as of 2010 Census
- **Population Growth**— The population growth rate for the City of Ellensburg has remained low but consistent throughout the past few decades, with clear correlation to changes in student population at Central Washington University (CWU). Between the 2000 Census and the 2010 Census, the City population increased by 2,760, an 18 percent increase and an average annual growth rate of 1.8 percent.
- **Location and Description** –The City of Ellensburg is in central Kittitas County at the intersection of Interstate 90, Interstate 82, and US Highway 97 and is near the center of Washington State. The elevation is approximately 1,500 feet with topography sloping gradually from northeast to southwest and the Yakima River. The City is located in a fertile plateau valley adjacent to the Yakima River, with ridges and mountains associated with the Cascade mountain range surrounding it. The surrounding area is primarily composed of irrigated agricultural land or semi-arid desert lands that are not irrigated. Six perennial creeks that convey runoff and snow melt water from the mountain range watersheds to the north run through the developed City from the northeast to the southwest where they flow into the Yakima River which then flows into the Columbia River some 130 miles to the south. In addition, three large irrigation canals traverse the City from the northwest to the southeast and provide irrigation water to the surrounding agricultural lands.

Interstate 90, Interstate 82 and US Highway 97, which all intersect at Ellensburg, provide direct access to the Puget Sound area in the west, Canada to the north, and the greater US to the south and east. BNSF Railway has a main line that runs through the City.

Central Washington University is located in Ellensburg and has a student population of approximately 8,000 and associated staff.

The City has two national historic districts—the Downtown National Historic District and the First Railroad Historic District—which consist of commercial and residential structures from the late 1800s and help make the City a regional historic preservation destination.

- **Brief History**—Ellensburg is located on the western slopes of the Columbia Plateau, site of some dramatic geological events that have occurred over time. Basaltic lava flows took place

some 15 million years ago, with a series of giant glacial flood events after the ice age. The largest documented flood in geologic history occurred when a very large water body in the Montana region suddenly breached, causing huge volumes of water to rapidly sweep across the basaltic plateau as it made its way westward to sea level at the Pacific Ocean. More recently, in 1980 Mt. St. Helens, one of a string of active volcanoes in the Cascade Mountain Range, erupted and caused significant property damage and loss of life in the immediate vicinity of the mountain; Ellensburg was impacted with significant ash from that eruption, causing property damage, health issues, and general disruption to the normal activities of the community. Those events have shaped the landscape of central and eastern Washington where Ellensburg is located.

The first inhabitants of the Ellensburg area were the *Psch-wan-wap-pams* (stony ground people) also known as the Kittitas band of the Yakama or Upper Yakama Tribe. The Ellensburg area was one of the few areas in Washington where both camas and kouse (a root used to bread) grew, which made it an important gathering place for regional tribes. Eventually fur trading and missionary activity entered the valley in the 1860s and by the end of that decade a trading post known as “Robber’s Roost” was established.

The late 1800s saw the community prosper as the Northern Pacific Railroad established a rail siding facility in Ellensburg in 1886 that helped create markets for cattle, dairy products, timber, wool and hay. There was speculation that as part of the region’s effort to petition Congress to admit Washington into the union in 1889, Ellensburg would be named the new state capitol due to its central location. A disastrous fire on July 4, 1889, fanned by the winds that regularly flow down from the Cascade Mountain Range to the west, ended that speculation and destroyed most of the downtown business district and many homes. The community rebuilt itself, using brick and stone masonry rather than wood, within a year.

Although Ellensburg lost the state capitol decision to Olympia, the new State Legislature established the Washington State Normal School (a teacher’s college now known as Central Washington University) in Ellensburg. The school opened in 1891 with 86 students and today CWU has an enrollment exceeding 8,000 students, occupies more than 300 acres, is the county’s largest employer with more than 1,300 employees, and is estimated to contribute some \$170 million annually to the local economy.

The timing of the fire and the rapid reconstruction of the destroyed downtown produced a unified and attractive appearance dominated by late Victorian architectural styles that have subsequently been filled in with a few early twentieth-century neoclassic and art deco-styled buildings. That historical style has defined the community and continues to serve as one of its biggest assets. Ellensburg has grown from its re-birth and has established itself as a vital, rooted, and unique community in which the residents consider it as being a quiet, clean, comfortable, safe, and family-oriented city.

- **Climate**—Ellensburg has strong summers and winters. Temperatures vary considerably within the seasons. There are four distinct seasons and a strong and regular breeze from the west throughout much of the year. Average mean temperatures range in the high 50s F with summertime temperatures averaging near 80° F and winter lows often getting below freezing. The mountains to the west and north effectively block much of the rain from the “wet” side of the state, producing a dry climate with less than 10 inches of rain a year. The combination of large snow pack in the mountains, strong westerly winds and occasional unseasonal warm rain events, however, results in regular flood events from February through May for the streams that run from the mountains through the city to the Yakima River.
- **Governing Body Format**—The City of Ellensburg utilizes the council-manager form of government with a city manager hired by the city council. The city council elects a mayor and

mayor pro tem from the council to serve two-year terms. The City also uses an appointed planning commission to provide land use recommendations to City Council and to hear quasi-judicial land use permit application matters. A number of citizen boards and commissions have been established to provide recommendation and guidance to council on a variety of issues, including the downtown, the environment, energy, historic preservation and design review.

- **Development Trends**—Beginning in the late 1990s and continuing up to the economic downturn in the late 2000s, the City experienced greater than usual growth, primarily in residential structures, although the population growth did not match that rate of residential growth. That is primarily due to the housing boom in the early to mid-2000s and the reality that Ellensburg is a college town and it became easier for some families to purchase a second, speculative residence in which to house their child while attending CWU and to utilize the rent payment from roommates to pay the mortgage. The economic downturn of the late 2000s, however, put an end to that growth spurt and it is anticipated that Ellensburg will revert to its more traditional levels of low and slow growth for the foreseeable future.

4.3. JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 4-1 lists all past occurrences of natural hazards in the county. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 0
- Number of Repetitive Flood Loss Properties that have been mitigated: 0

4.4. HAZARD RISK RANKING

Table 4-2 presents the ranking of the hazards of concern.

4.5. CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 4-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 4-4. The assessment of the jurisdiction’s fiscal capabilities is presented in Table 4-5. Classifications under various community mitigation programs are presented in Table 4-6.

4.6. HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 4-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 4-8 identifies the priority for each initiative. Table 4-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

4.7. FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

The biggest future need to better understand risk/vulnerability would be a re-mapping of the floodplain by FEMA. Ellensburg annually experiences sheet-flow floods, and the floods are not uniformly in flood locations identified on the 1981 FIRM maps. People suffer property damage but are not within a FIRM floodplain and are not eligible for federal flood insurance. People want to develop their properties that are not identified in the floodplain but that consistently flood, and it becomes a regulatory issue for which there is no solid documented basis to regulate the property for flooding. FEMA intends to remap the floodplain along the Yakima River, which is immediately southwest of the City of Ellensburg. The City

has requested that some remapping of the tributaries that run through the City into the Yakima be part of that project, but it does not appear that will occur.

4.8. ADDITIONAL COMMENTS

Due to its climate and topography, Ellensburg is prone to unpredictable flood events when there is significant snow pack in the foothills surrounding the City during early and late winter and a heavy rain event occurs combined with warm temperatures and strong winds (strong winds are the norm for this area). The creek that experiences the flood event varies and is dependent on the temperature and the degree of compactness of the snowpack within the creek watersheds. The result is significant overbank flow in the six creeks that run northeast to southwest through the developed city toward the Yakima River, which becomes sheet-flow flooding over large areas of the community. This regular pattern of flooding does not pose major risks to life, but it does cause significant annual damage to public and private property. Although the City's risk rating for the flood hazard is 36, the regularity of annual flooding and associated property damage makes this hazard risk much higher.

In addition, because most of the City's historic downtown structures are masonry buildings constructed in the late 1880s, they are not likely to perform well in earthquake events. The 2001 Nisqually Earthquake, while causing significant damage to the Puget Sound region, in particular the older historic structures, did not cause significant damage in Ellensburg. However, a more local earthquake event, or a much stronger event in the Puget Sound region would likely cause significant property loss and the potential for significant personal injury in the historic downtown area if the two-story brick buildings were to collapse. Retrofitting those historic structures would be an expensive task that is beyond the City's ability to address and beyond the individual property owner's ability to finance.

Large earthquake events in the Puget Sound region also will likely result in significant logistical problems for the Ellensburg community. I-90 is the major east/west interstate that connects the more rural eastern Washington to the more populated western Washington. Large-scale earthquake damage in the Puget Sound region will likely cause serious disruption to food service delivery from the regional warehouses located in Puget Sound, as well as damage to telecommunications. And if the event is serious enough there is likely to be an exodus of displaced Puget Sound residents seeking shelter elsewhere and if the interstate is open Ellensburg is the first larger city over the mountain passes from Puget Sound and is likely to be impacted by displaced Puget Sound people seeking a safe place.

4.9. HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps for the City of Ellensburg are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

TABLE 4-1. NATURAL HAZARD EVENTS		
Type of Event	Date	Preliminary Damage Assessment
Severe Flooding	5/15/11	N/A
Severe Flooding	3/25/11	N/A
Severe Flooding	01/30/09	N/A
Severe Flooding	01/07/09	N/A
Earthquake (Nisqually)	03/01/01	N/A
Severe Winter Storm	01/17/97	N/A
Severe Winter Storm/Flooding	02/09/96	N/A
Storms/High Winds/Floods	01/03/96	N/A
Flooding, Severe Storm	11/26/90	N/A
Severe Flooding	8/21/90	N/A
Severe Winter Weather	01/18/86	N/A
Severe Storm	12/24/80	N/A
Volcanic Eruption, Mt. St. Helens	05/21/80	N/A
Severe Storms, Flooding	12/10/77	N/A
Severe Storms, Flooding	12/13/75	N/A
Heavy Rains & Flooding	12/29/64	N/A

TABLE 4-2. HAZARD RISK RANKING		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Earthquake	36
2	Flood	36
3	Severe Weather	36
4	Dam Failure	30
5	Volcano	24
6	Landslide	6
7	Drought	3
8	Wildfire	3
9	Avalanche	0
10	Seiche	0

**TABLE 4-3.
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Y	N	N	Y	2009 International Building Codes
Zoning Code	Y	N	N	Y	Title 13 ECC
Subdivisions	Y	N	N	N	Title 12 ECC
Post Disaster Recovery	Y	N	N	Y	Stormwater Utility Adopted
Real Estate Disclosure	N	N	N	N	
Growth Management	Y	N	N	N	For Critical Areas Only
Site Plan Review	Y	N	N	N	GMA compliant 1995 to current with 2007 Update
Special Purpose (flood management, critical areas)	Y	N	N	N	Site plans are reviewed for compliance with codes and development regulations
Planning Documents					
General Plan	Y	Y	N	Y	GMA compliant 1995 to current with 2007 Update
Floodplain or Basin Plan	N	N	N	N	
Stormwater Plan	N	N	N	N	Adopted stormwater utility and working on plan
Capital Improvement Plan	Y	N	N	N	Specific 6-Year and more general 12 and 18-year plans included in Comp Plan
Habitat Conservation Plan	N	N	N	N	Regulated through Critical Area Ordinance in ECC Chapter 39
Economic Development Plan	Y	N	N	N	An element in the Comp Plan
Emergency Response Plan	Y	N	N	N	Contracted for through Fire District
Shoreline Management Plan	N	N	N	N	Adopted by reference the Kittitas County SMP. In process of adopting City SMP
Post Disaster Recovery Plan	Y	N	N	N	Contracted for through Fire District

**TABLE 4-4.
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Y	Community Development – Planners Public Works and Energy Services-Engineers
Engineers or professionals trained in building or infrastructure construction practices	Y	Building Department – Building Inspectors Public Works and Energy Services-Engineers
Planners or engineers with an understanding of natural hazards	Y	Public Works – Flood Hazards
Staff with training in benefit/cost analysis	Y	Various departments with basic capability
Floodplain manager	Y	Community Development Director
Surveyors	N	
Personnel skilled or trained in GIS applications	Y	IT Department – GIS division
Scientist familiar with natural hazards in local area	N	
Emergency manager	Y	Contracted with Fire District
Grant writers	Y	On-call contract grant writers

**TABLE 4-5.
FISCAL CAPABILITY**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Y
Capital Improvements Project Funding	Y
Authority to Levy Taxes for Specific Purposes	Y
User Fees for Water, Sewer, Gas or Electric Service	Y
Incur Debt through General Obligation Bonds	Y
Incur Debt through Special Tax Bonds	Y
Incur Debt through Private Activity Bonds	uncertain
Withhold Public Expenditures in Hazard-Prone Areas	N
State Sponsored Grant Programs	Y
Development Impact Fees for Homebuyers or Developers	Y
Other	

	Participating?	Classification	Date Classified
Community Rating System	No	—	—
Building Code Effectiveness Grading Schedule	Yes	4/4	—
Public Protection	Yes	4/9	—
Storm Ready	No	—	—
Firewise	No	—	—

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative E-1—West Ellensburg Flood Mitigation Project – Reecer and Currier Creeks from I-90 to University Way						
Existing/New	Flooding	1, 3, 6, 7, 9, 10	City	\$2,100,000, Medium	Grants, General Fund, Bonds	Included in 6-Year Capital Facility Plan
Initiative E-2—Wilson Creek Flood Control Project						
Existing/New	Flooding	1, 3, 6, 7, 9, 10	City	\$8,900,000, High	General Fund, Bonds, Grants	Included in 12-Year Capital Facility Plan
Initiative E-3—Update FEMA Floodplain Maps						
Existing/New	Flooding	1, 3, 4, 5, 6, 7, 9, 10	City	High	General Fund, FEMA RiskMAP program, Grants	Long Term, depends on funding
Initiative E-4—Clear storm drains and culverts for stormwater management						
Existing	Flooding	1, 6, 7, 10	City	Low	General Fund, Grants Stormwater Utility	Short Term, Ongoing
Initiative E-5—Enhance existing stormwater facilities that lack capacity or functionality and construct new local stormwater facilities where there is identified need.						
Existing/New	Flooding	1, 6, 7, 10	City	High	Stormwater Utility, Bonds, HMGP	Short-term, Ongoing
Initiative E-6—Control land use in flood-prone areas (by zoning setbacks, greenways, and buffers)						
New	Flooding	1, 2, 3, 4, 5, 6, 7, 9, 10	City	Low	HMGP	Long Term

**TABLE 4-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative E-7 —Acquisition of flood-prone structures and conversion of land to open space						
Existing/New	Flooding	1, 2, 3, 4, 5, 6, 7, 8, 10	City	High	HMGP	Long Term, depends on funding
Initiative E-8 —Continue to maintain compliance and good standing under the National Flood Insurance Program.						
Existing/New	Flooding	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	City	low	General fund	Ongoing
Initiative E-9 —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority.						
Existing	All Hazards	1, 2, 8, 10	City	high	HMGP	Long Term
Initiative E-10 —Conduct a seismic retrofit of the Ellensburg Public Safety Building that houses the Ellensburg Police Department and Kittitas Valley Fire And Rescue (Fire District) Headquarters.						
Existing	Earthquake	1, 2, 5, 6, 7, 8, 9, 10	City	medium	HMGP, General Funds, Bonds	Long Term
Initiative E-11 —Collect improved data (hydrologic, geologic, topographic, etc.) to assess risks and vulnerabilities.						
Existing/New	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	City	medium	Grants, General fund	Ongoing
Initiative E-12 —Consider adoption of appropriate regulatory standards, through updates as needed and/or required, affecting critical areas regulations, flood hazard regulations, shoreline regulations, and to the city’s growth management comprehensive plan.						
New	Flooding	1, 2, 3, 4, 5, 6, 7, 9, 10	City	medium	General fund	Ongoing
Initiative E-13 —Inform and educate the public on hazard mitigation and preparedness via the city’s website.						
Existing	All Hazards	1, 2, 5, 6, 10	City	low	General fund	Ongoing
Initiative E-14 —Replace inadequately sized culvert for Reecer Creek at University Way.						
Existing	Flooding	1, 2, 7, 8, 9, 10	City	high	Grants, Road Fund, CIP	Long Term
Initiative E-15 —Relocate City-owned critical facilities out of identified high hazard risk zones						
Existing	All Hazards	1, 2, 5, 7, 8, 9, 10	City	Unknown	HMGP, Bond	Long Term
Initiative E-16 —Install stream gauge stations with communication links for early flood warning on all local tributaries						
Existing/New	Flooding	1, 7, 9	City	\$160,000	Stormwater Utility	Long Term

**TABLE 4-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative E-17 —Consider participation in the Community Rating System						
New and existing	Flood	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	City	low	General fund	Short-term
Initiative E-18 —Continue to support the implementation, monitoring, maintenance and updating of this plan.						
New and Existing	All Hazards	All	City Council, Community Development	Low	HMGP, General Fund, Road Fund	Short-term, ongoing
Initiative E-19 —Continue to support through active participation the countywide initiatives identified in Volume 1 of the Kittitas County Hazard Mitigation Plan.						
New and Existing	All Hazards	5,6,9	All City Agencies	Low	General Fund	Short-term, Ongoing
Initiative E-20 —Consider participation in the National Weather Service “Storm Ready” program.						
New and Existing	Flood, Severe Weather	6, 7, 9	Public Works	Low	General Fund	Short term

**TABLE 4-8.
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority ^a
E-1	6	High	High	Y	Y	N	High
E-2	6	High	High	Y	Y	N	High
E-3	8	High	High	Y	Y	N	High
E-4	4	Medium	Medium	Y	Y	N	Medium
E-5	4	Medium	High	N	Y	N	Low
E-6	9	High	Medium	Y	Y	N	High
E-7	9	Medium	High	N	Y	N	Medium
E-8	10	High	Low	Y	N	Y	High
E-9	4	Medium	High	N	Y	N	Low
E-10	8	Medium	High	N	Y	N	High
E-11	10	High	High	Y	Y	N	High
E-12	9	Medium	Medium	Y	N	N	Medium
E-13	5	Medium	Low	Y	N	Y	Medium
E-14	6	High	High	Y	Y	N	High
E-15	7	Medium	High	N	Y	N	Medium
E-16	3	Medium	Medium	Y	N	Y	High
E-17	10	Medium	Low	Y	N	Y	Medium
E-18	10	High	Low	Y	Y	Y	High
E-19	3	Medium	Low	Y	N	Y	High
E-20	3	High	Low	Y	Y	Y	High

a. See Section 1.3 for definitions of high, medium and low priorities.

**TABLE 4-9.
ANALYSIS OF MITIGATION INITIATIVES**

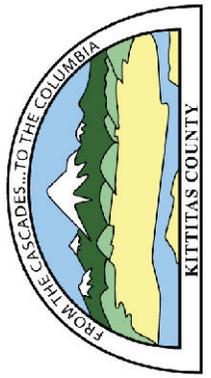
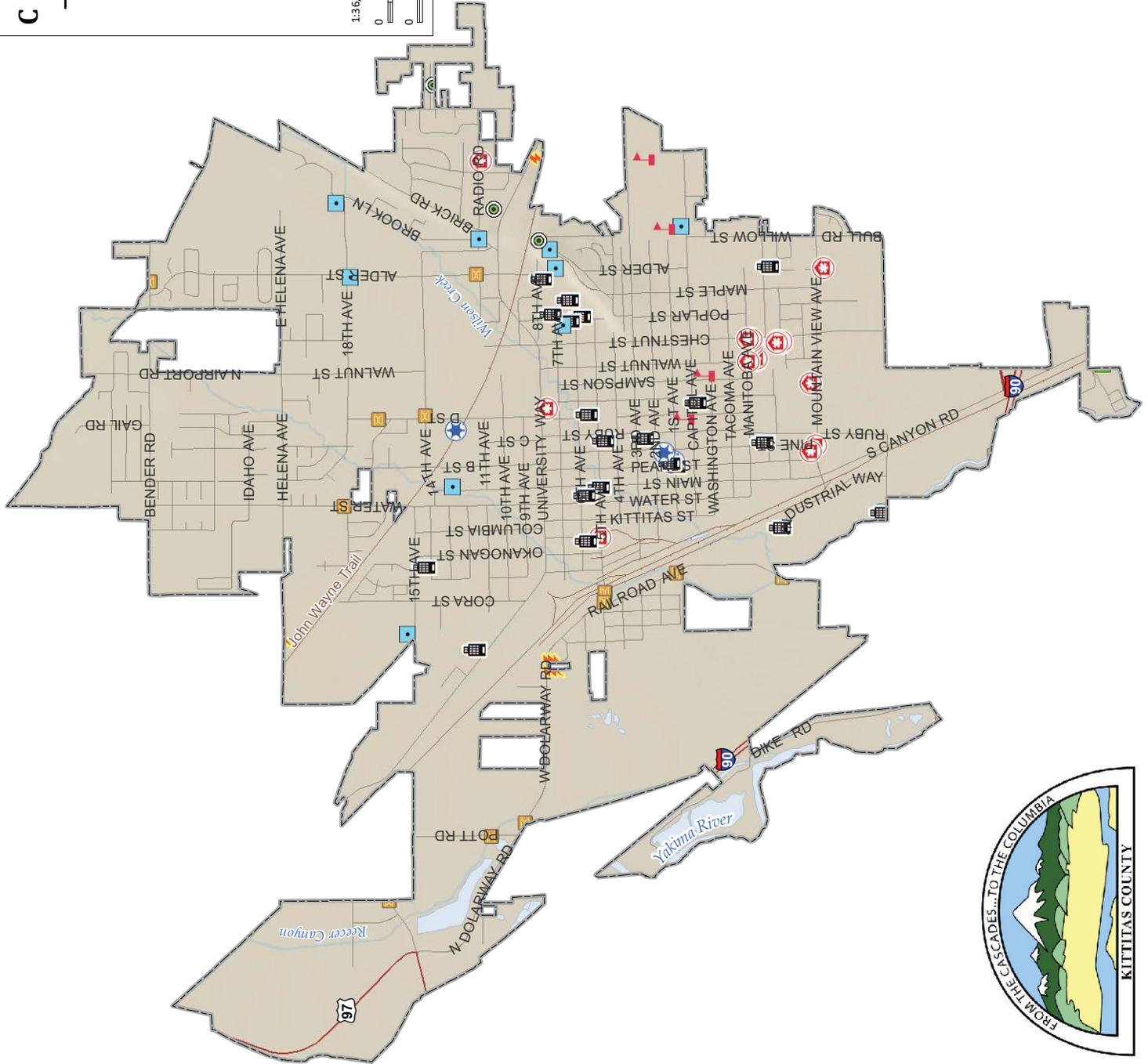
Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	18		18, 19		19	
Dam Failure	18	6, 9, 11, 12, 13, 15	13, 18, 19		19	9, 15
Drought	18		18, 19		19	
Earthquake	18	9, 10, 11, 15	13, 18		10, 19	9, 10, 15
Flood	1, 2, 3, 4, 5, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16, 17	6, 8, 12, 13, 16, 17, 18, 19	3, 11, 12, 17	17, 19, 20	1, 2, 3, 4, 5, 9, 14, 15, 16, 17
Landslide	18		18, 19		19	
Severe Weather	18	1, 2	13, 18, 19	1, 2	19, 20	1, 2
Seiche	18		18, 19		19	
Volcano	18		13, 18, 19		19	
Wildfire	18		18, 19		19	

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

CITY OF ELLENSBURG

Critical Facilities

- | | | | |
|---|---------------|---|------------|
|  | Bridge |  | Power |
|  | Communication |  | Protective |
|  | Dam |  | School |
|  | Government |  | Wastewater |
|  | Hazmat |  | Water |
|  | Medical |  | Other |



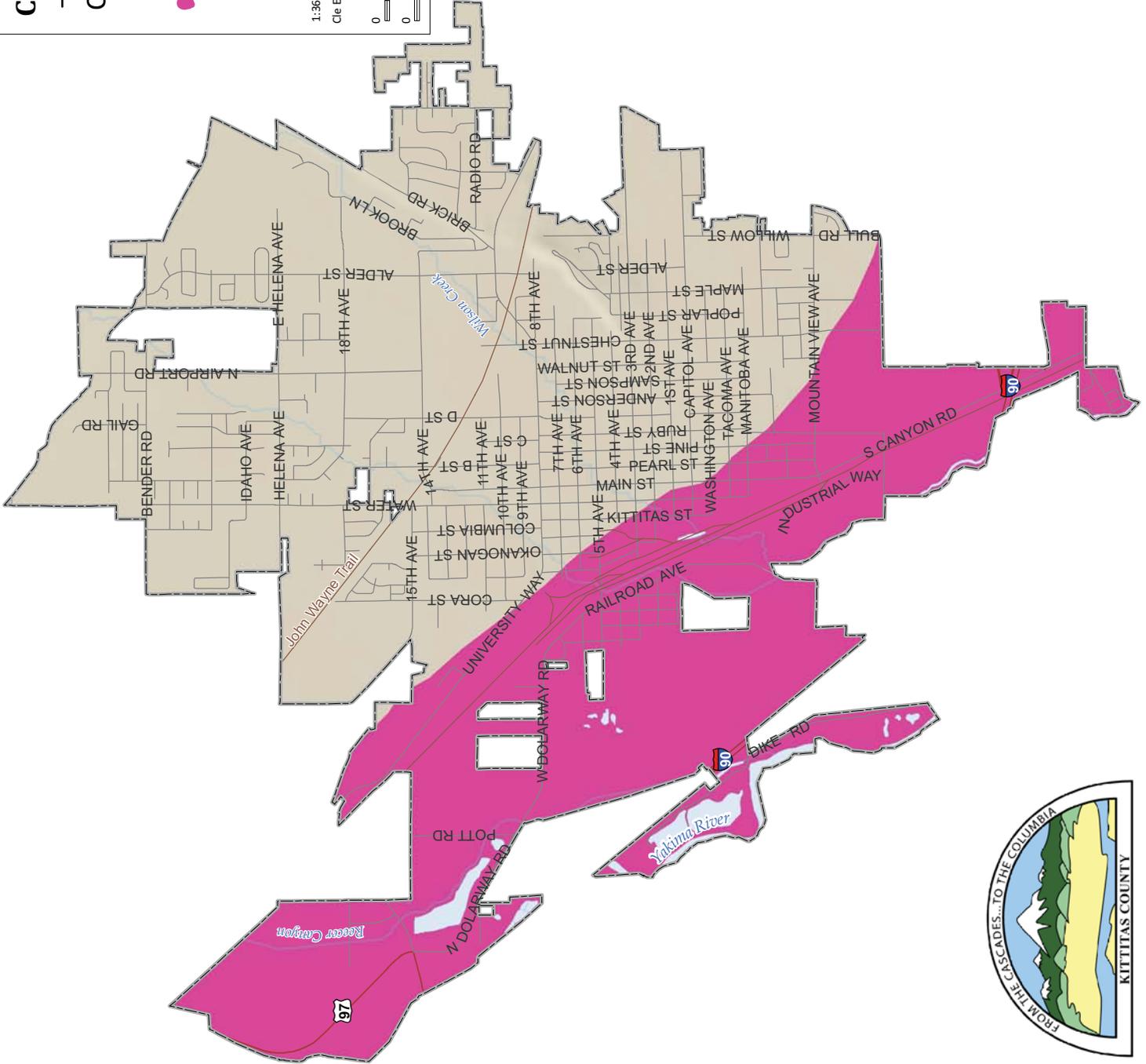
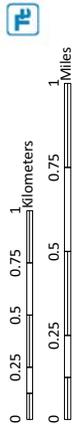
CITY OF ELLENSBURG

Cle Elum Dam Inundation Area

 Cle Elum Dam Failure Probable Maximum Flood

1:36,000

Cle Elum Dam Inundation Area data provided by Kittitas County



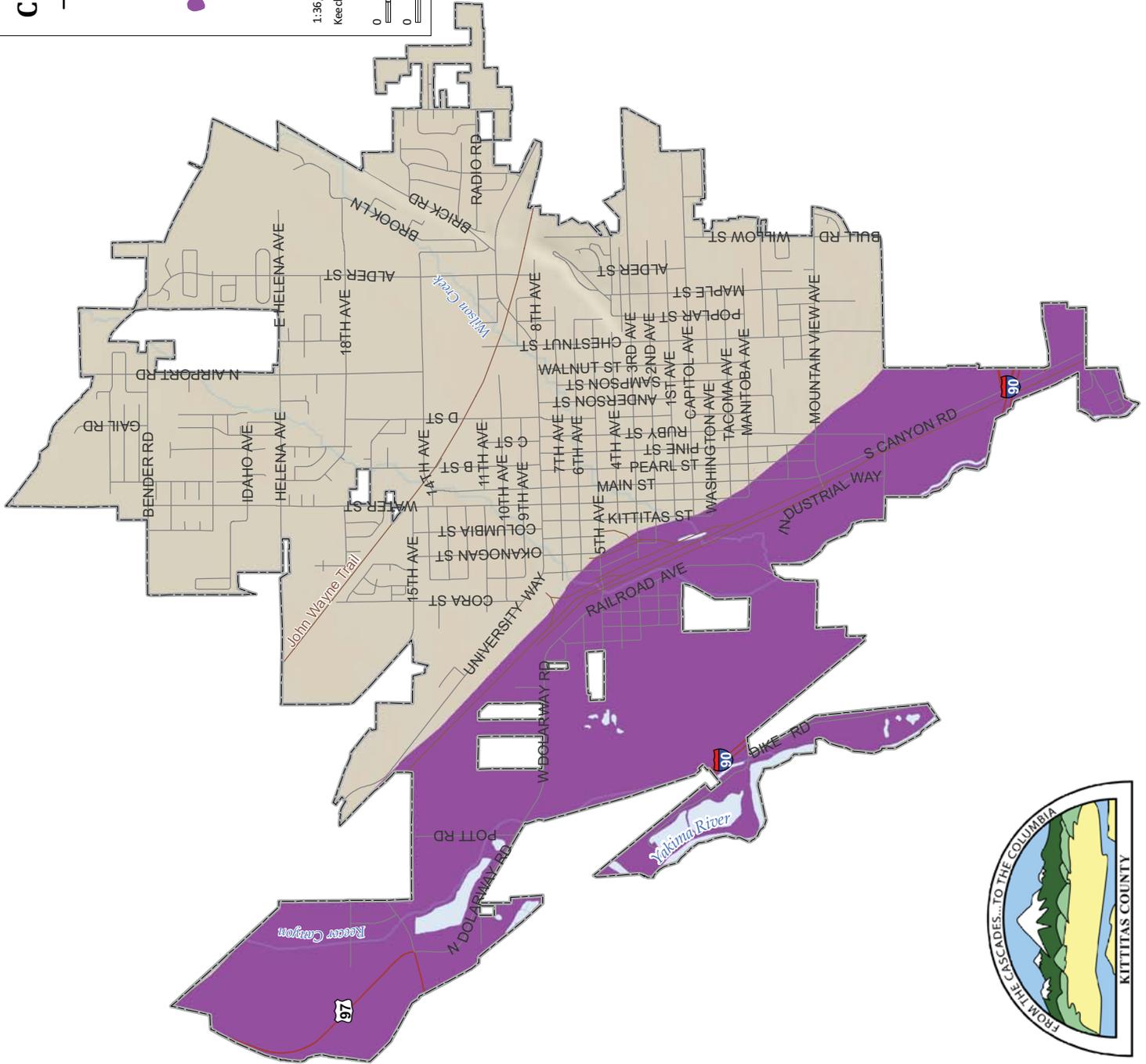
CITY OF ELLENSBURG

Keechelus & Kachees Dam Inundation Area Probable Maximum Flood

 Keechelus & Kachees Dam Inundation Area
Probable Maximum Flood

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Keechelus and Kachees Dam Inundation Area data provided by Kittitas County



CITY OF ELLENSBURG

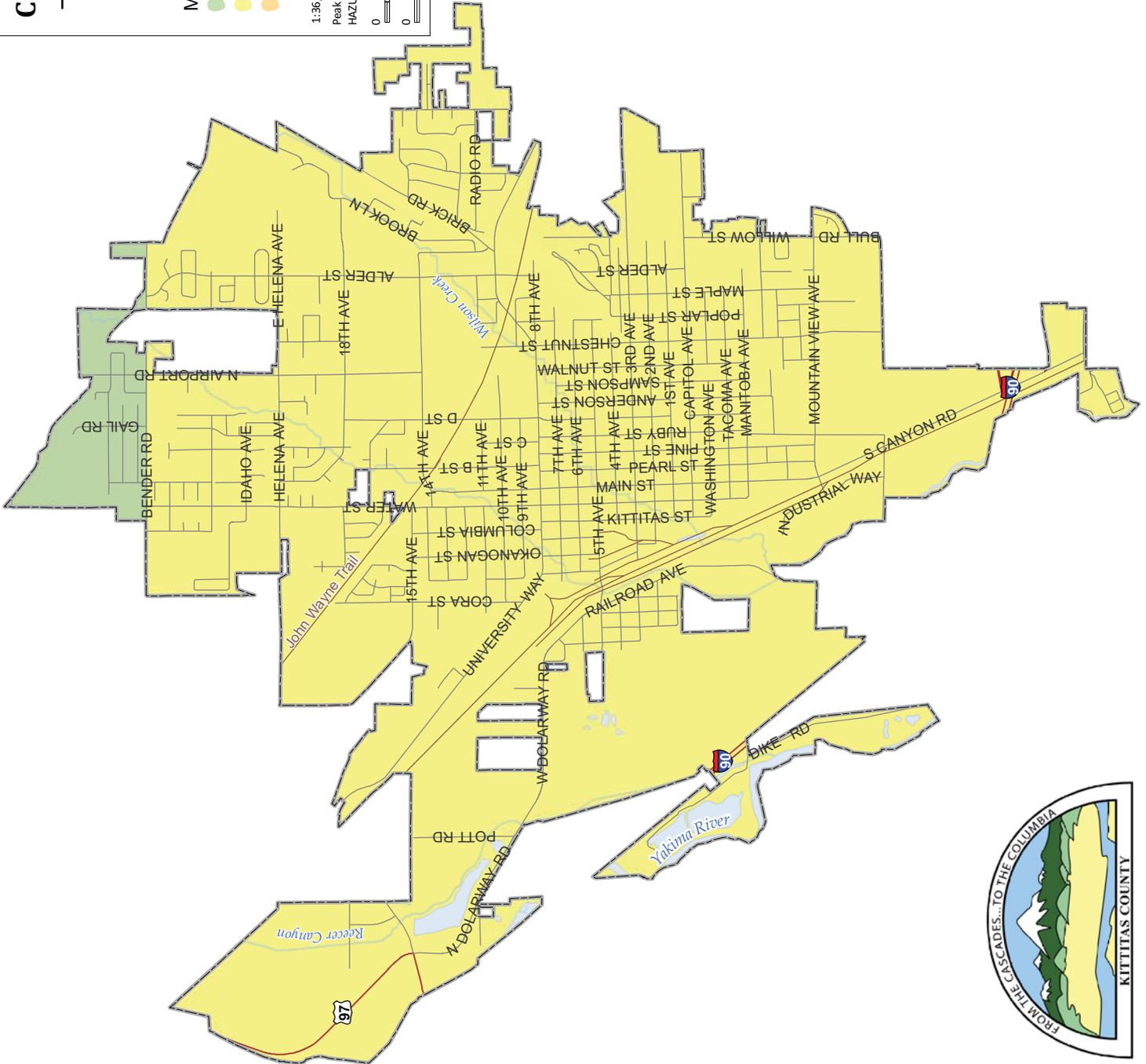
Peak Ground Acceleration
USGS 100 Year
Probabilistic Event

Mercalli Scale, Potential Damage

- V, Very Light
- VI, Light
- VII, Moderate

1:36,000

Peak Ground Acceleration USGS 100 Year Probabilistic Event
HAZUS-MH MR4 Output, United States Geological Survey



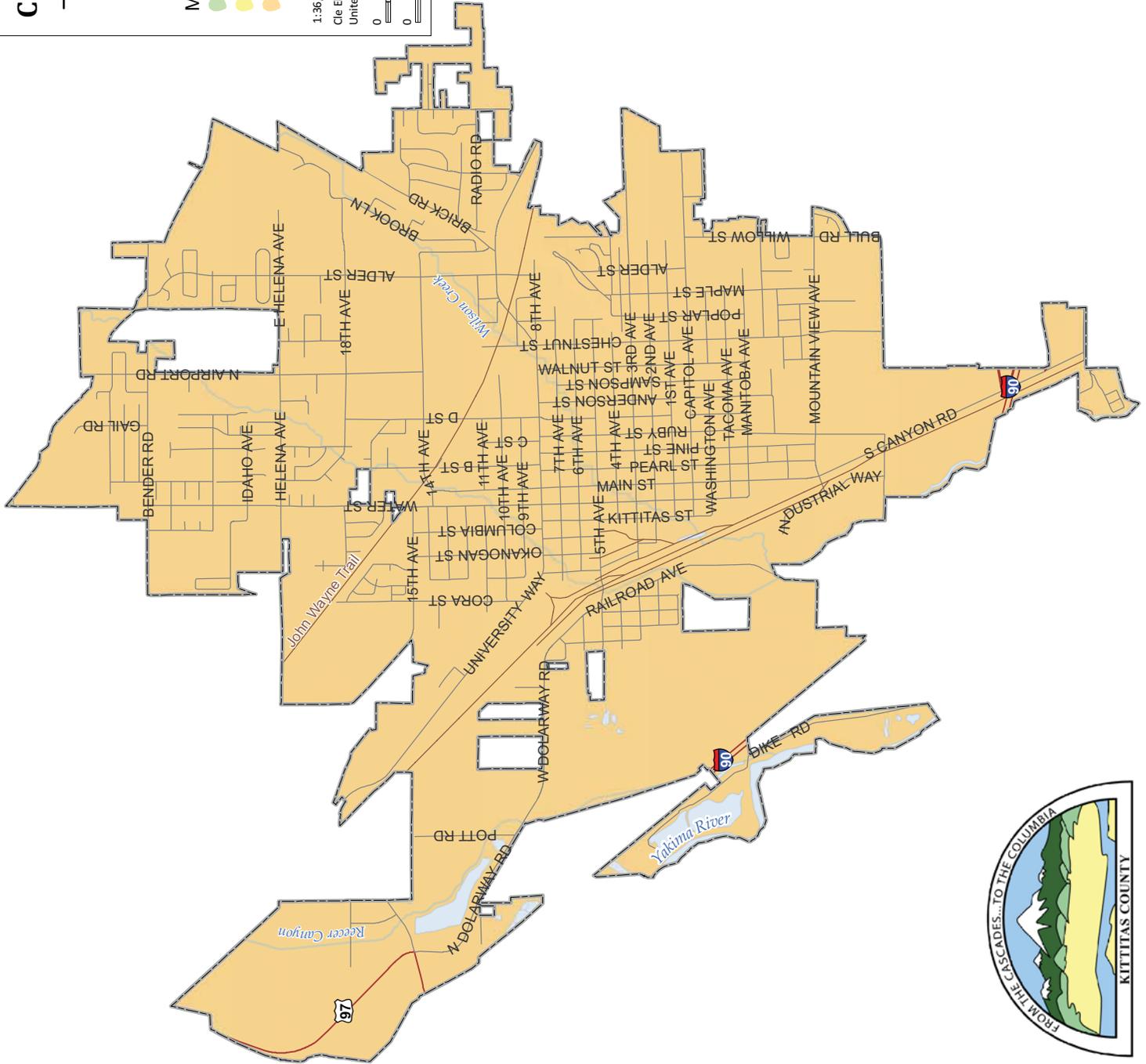
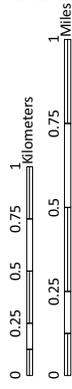
CITY OF ELLENSBURG

Cle Elum Fault Peak Ground Acceleration 6.8 Magnitude Scenario



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Cle Elum Fault PGA Shake Map Data
United States Geological Survey



CITY OF ELLENSBURG

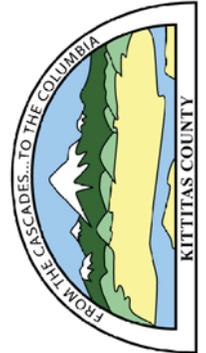
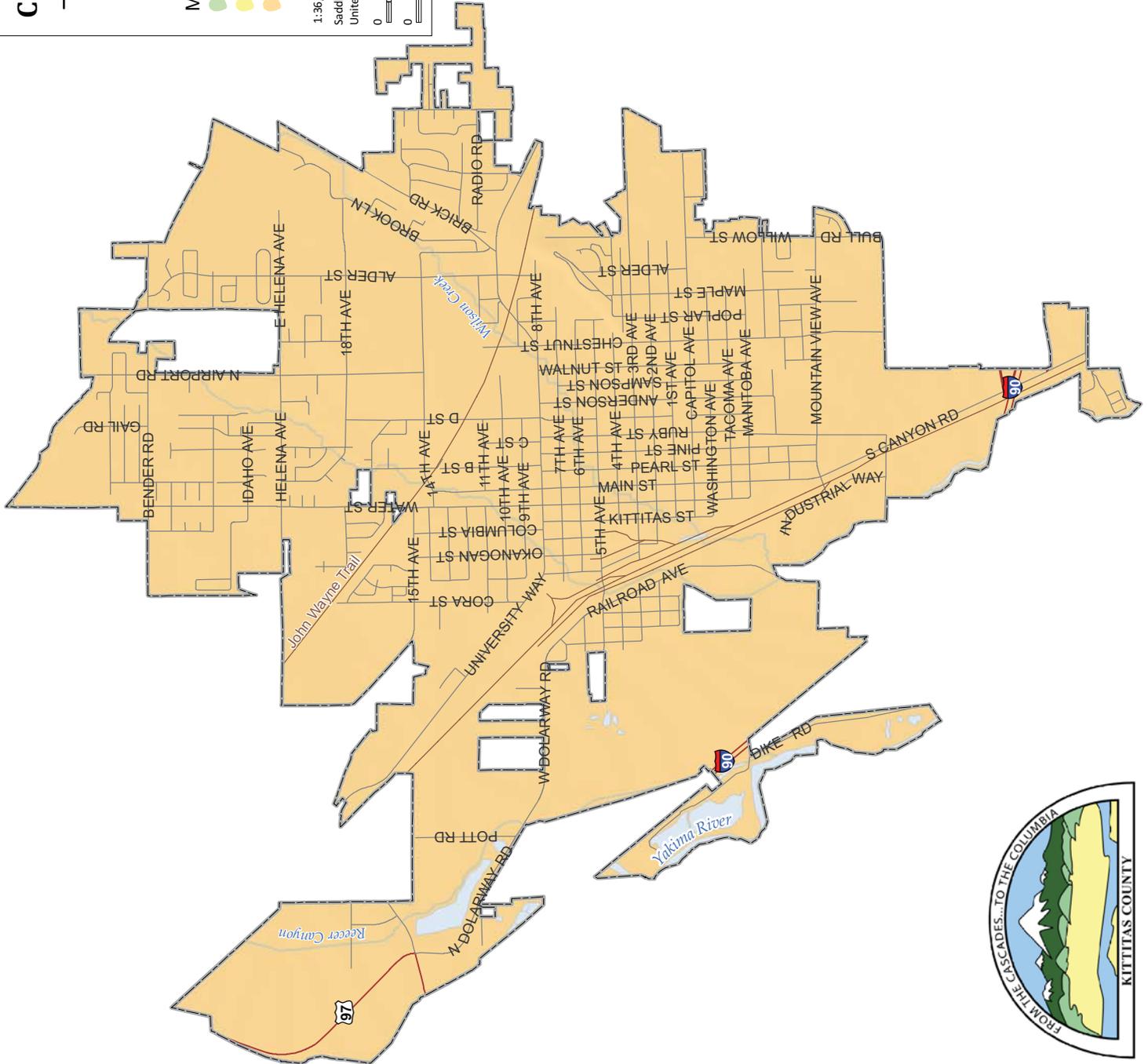
Saddle Mountain Peak Ground Acceleration 7.3 Magnitude Scenario

Mercalli Scale, Potential Damage

- V, Very Light  VIII, Moderate-Heavy 
- VI, Light  IX, Heavy 
- VII, Moderate 

1:36,000

Saddle Mountain Fault PGA Shake Map Data
United States Geological Survey



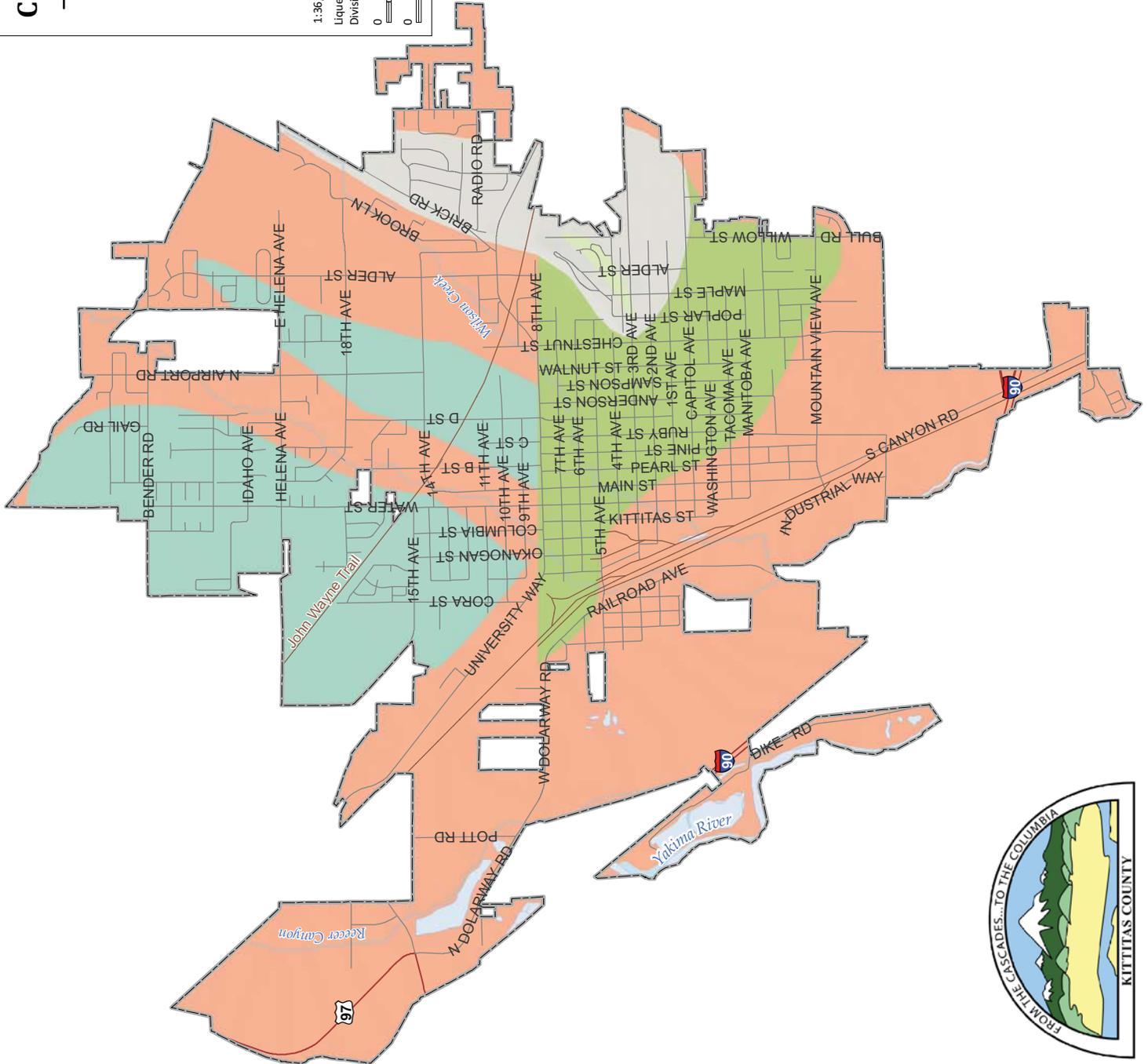
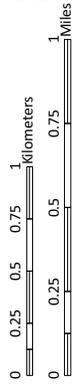
CITY OF ELLENSBURG

Liquefaction Susceptibility



1:36,000

Liquefaction Data provided by Washington State Department of Natural Resources,
Division of Geology and Earth Resources



CITY OF ELLENSBURG

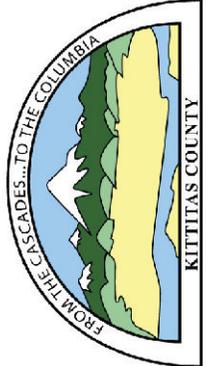
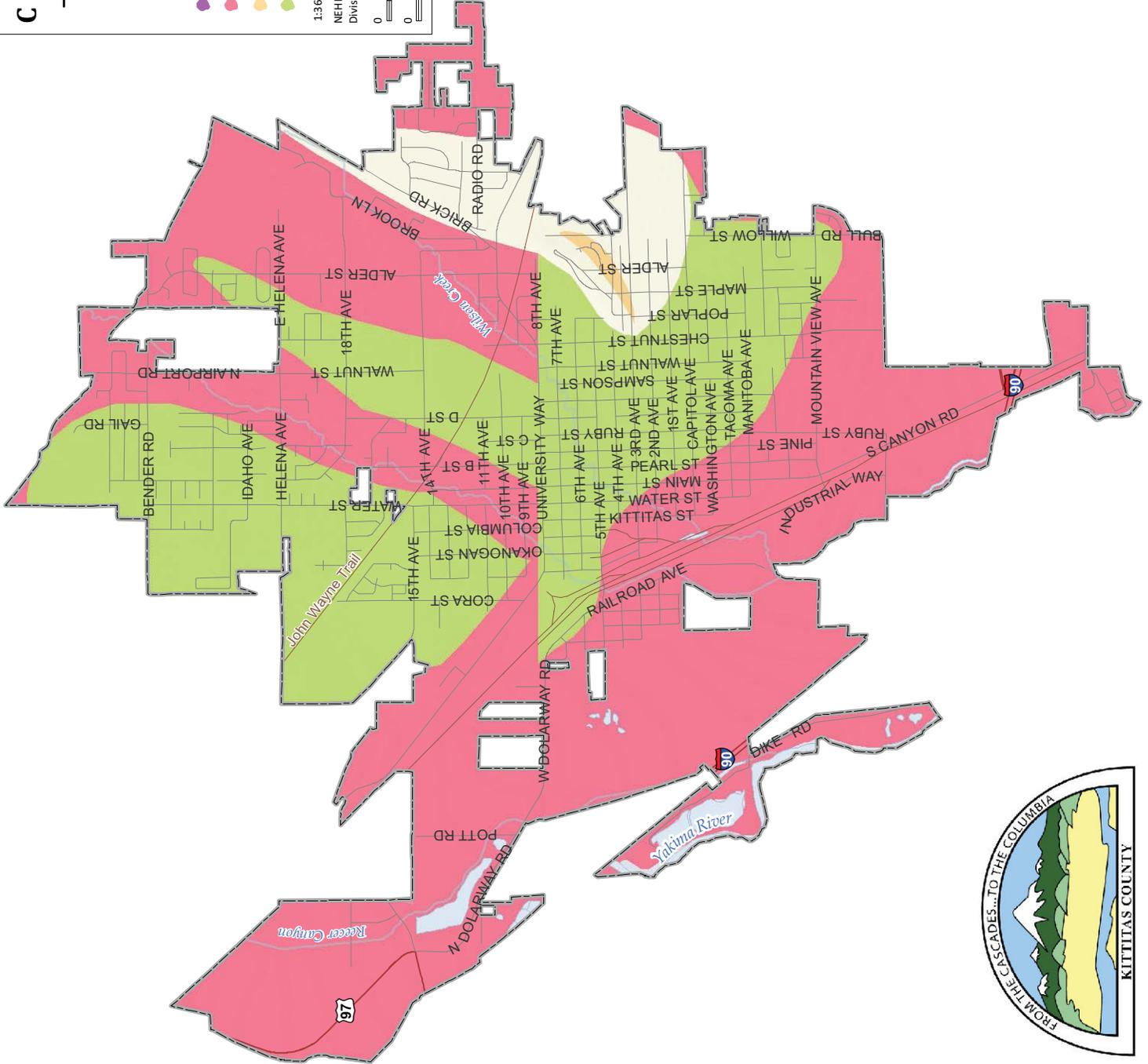
National Earthquake Hazard Reduction Program (NEHRP)

Soil Site Classes

-  F - Requires site-specific investigation
-  E - Soft Soil
-  D - Stiff Soil
-  C - Very Dense Soil and Soft Rock
-  B - Rock
-  Water
-  Ice

1:36,000

NEHRP Site Class Data provided by Washington State Department of Natural Resources, Division of Geology and Earth Resources



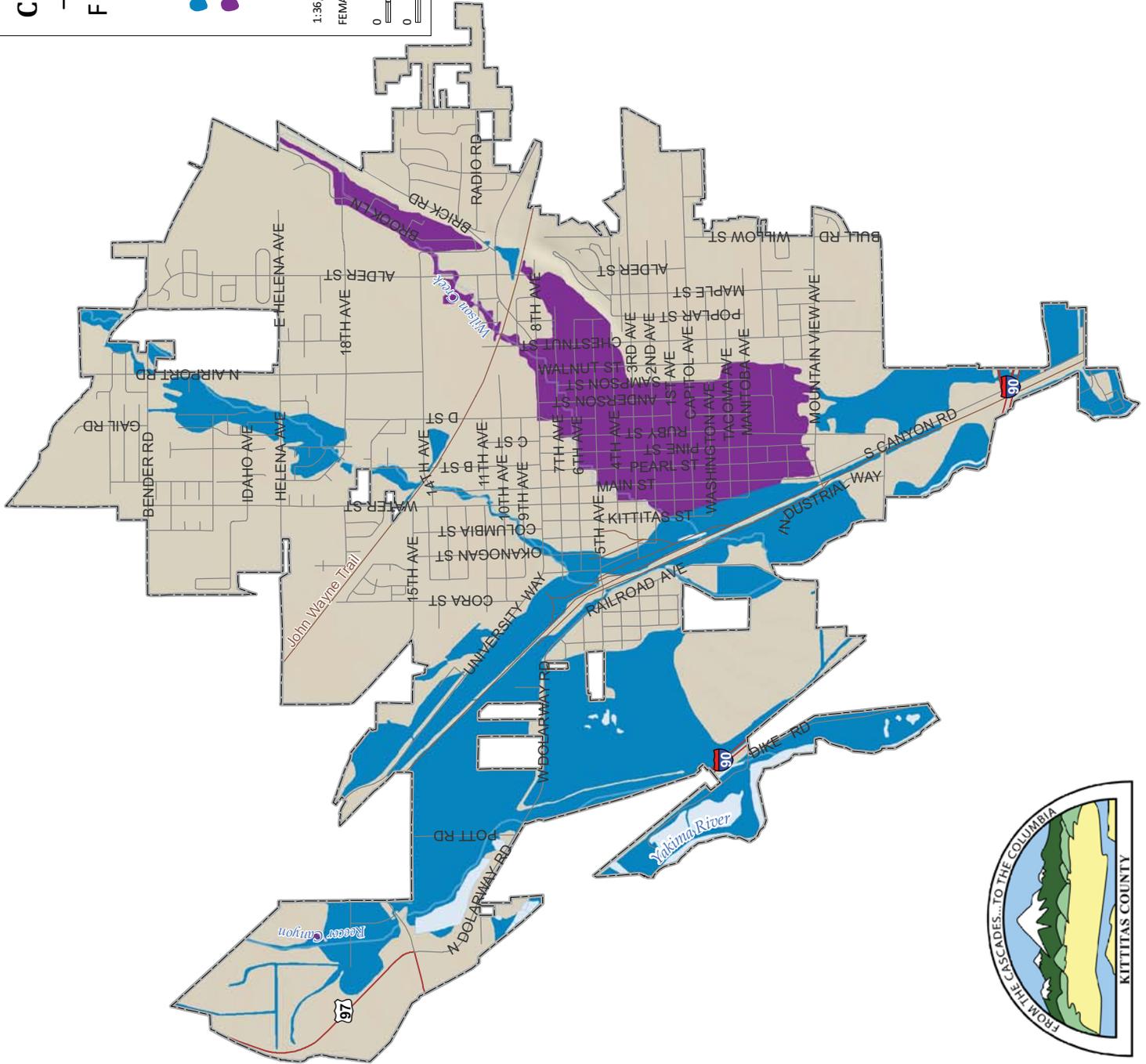
CITY OF ELLENSBURG

FEMA FIRM Flood Hazard Areas

-  1-percent annual chance flood (100 Year)
-  0.2-percent annual chance flood (500 Year)

1:36,000

FEMA FIRM Flood Data provided by Kittitas County



CITY OF ELLENSBURG

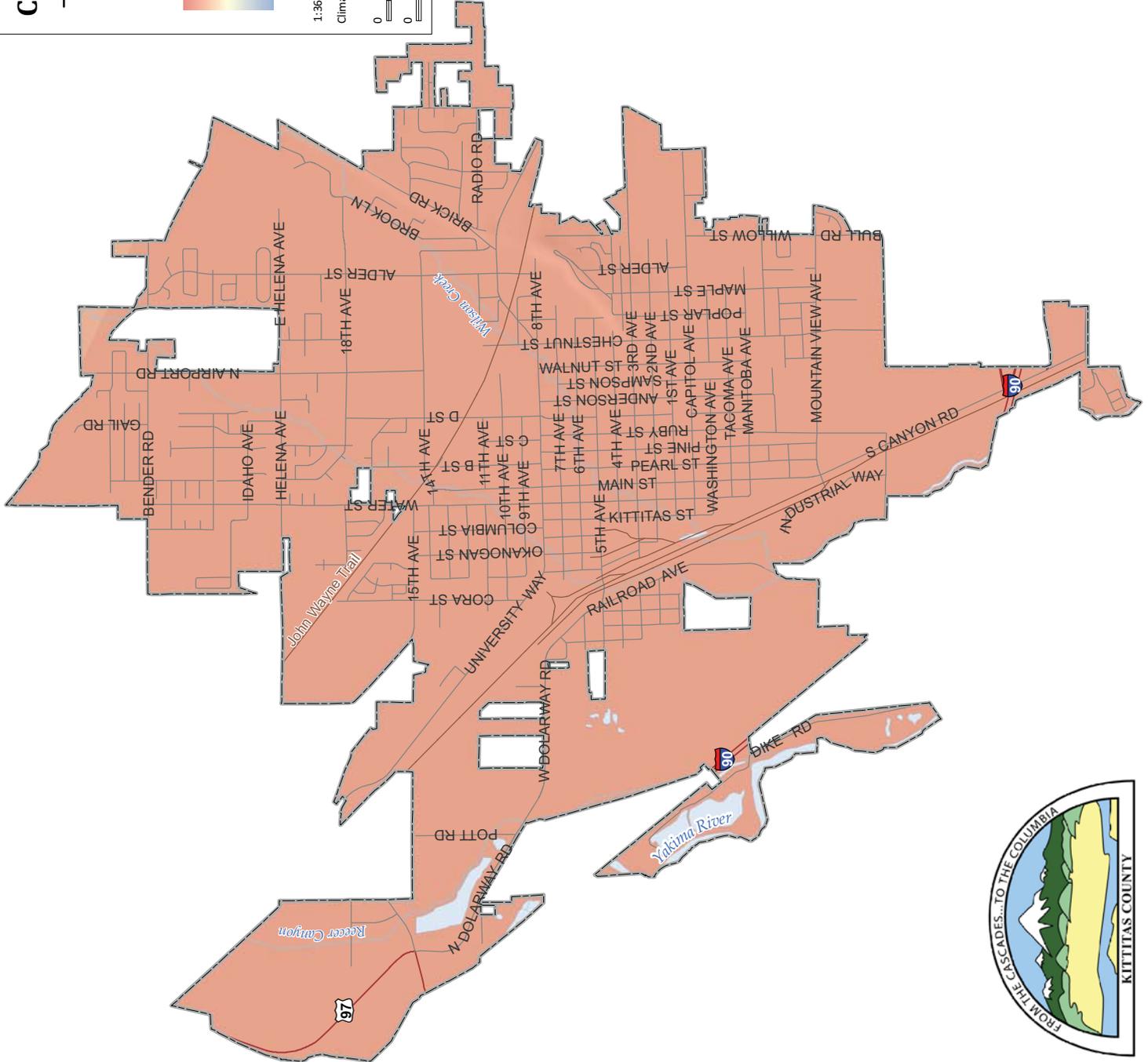
Average Maximum Temperature (F)



Average Maximum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000.
USDA/NRCS

1:36,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



CITY OF ELLENSBURG

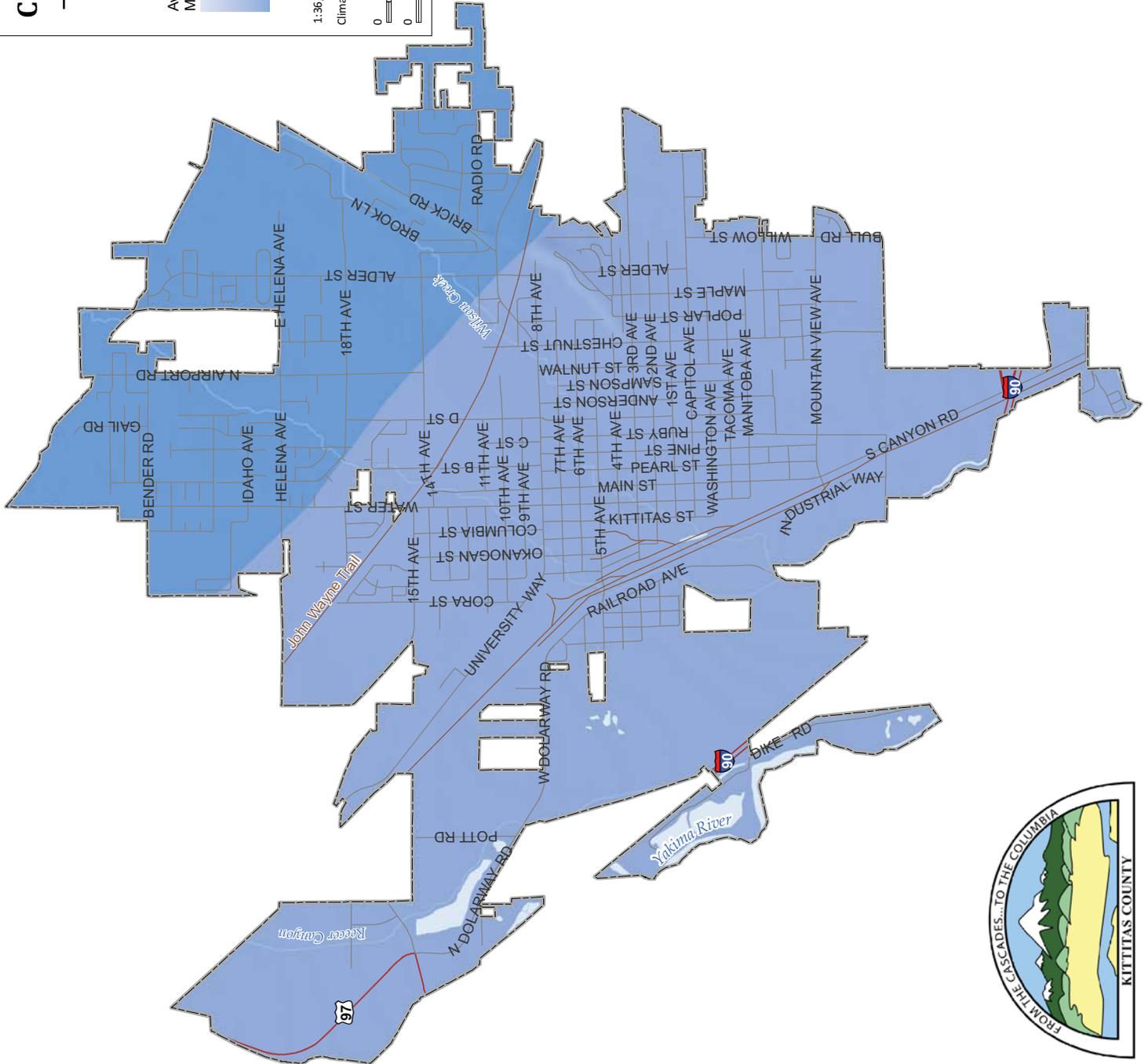
Average Minimum Temperature (F)

Average Annual Minimum Temperature (F)
 High : 25
 Low : 15

Average Minimum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000. USDA/NRCS

1:36,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



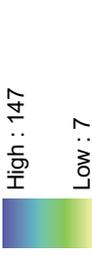
CITY OF ELLENSBURG

Average Annual Precipitation

Average Annual Precipitation (inches)

High : 147

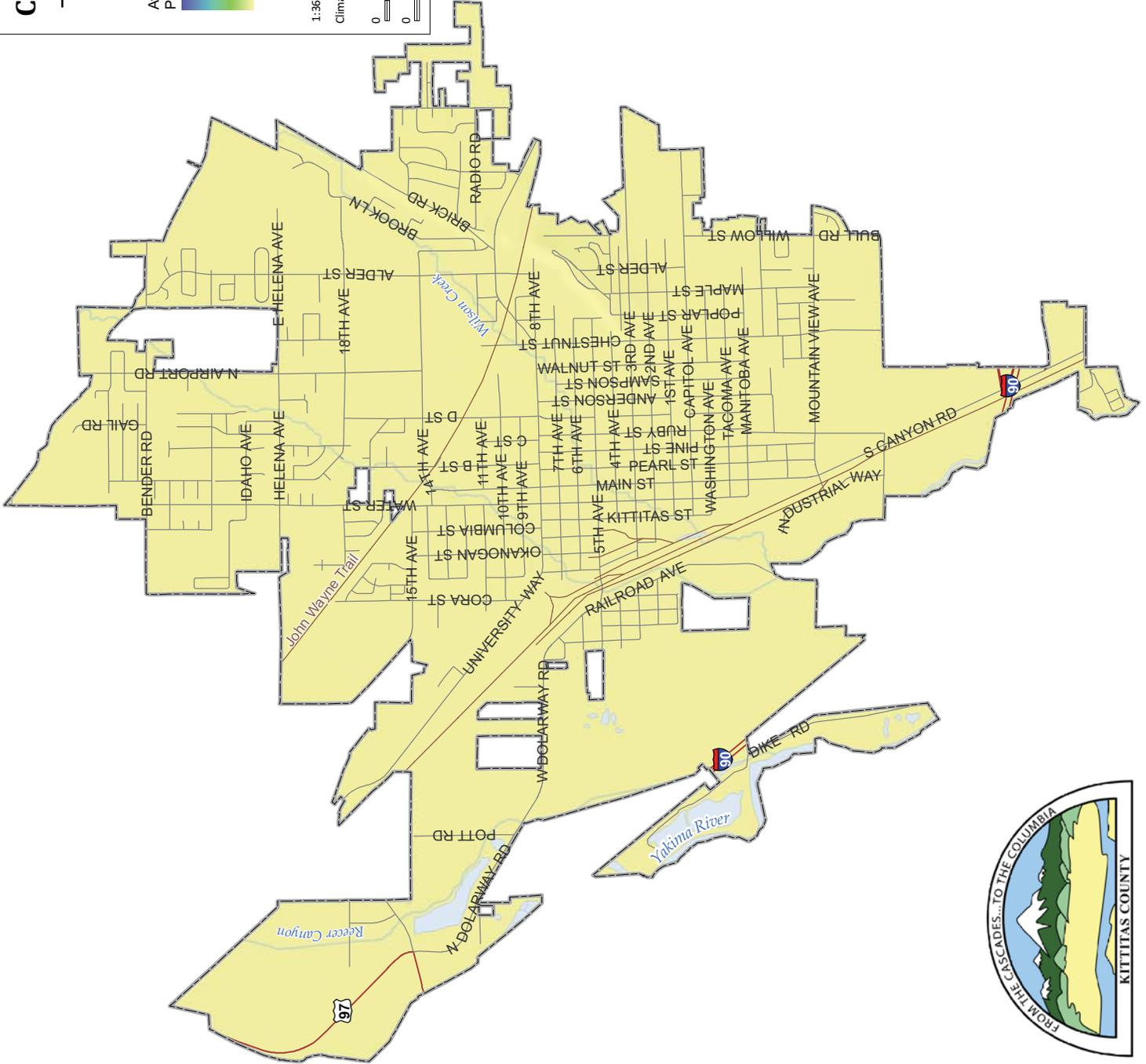
Low : 7



Average annual precipitation is according to a model using point precipitation and elevation data for the 30-year period of 1971-2000.
USDA/NRCS

1:36,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



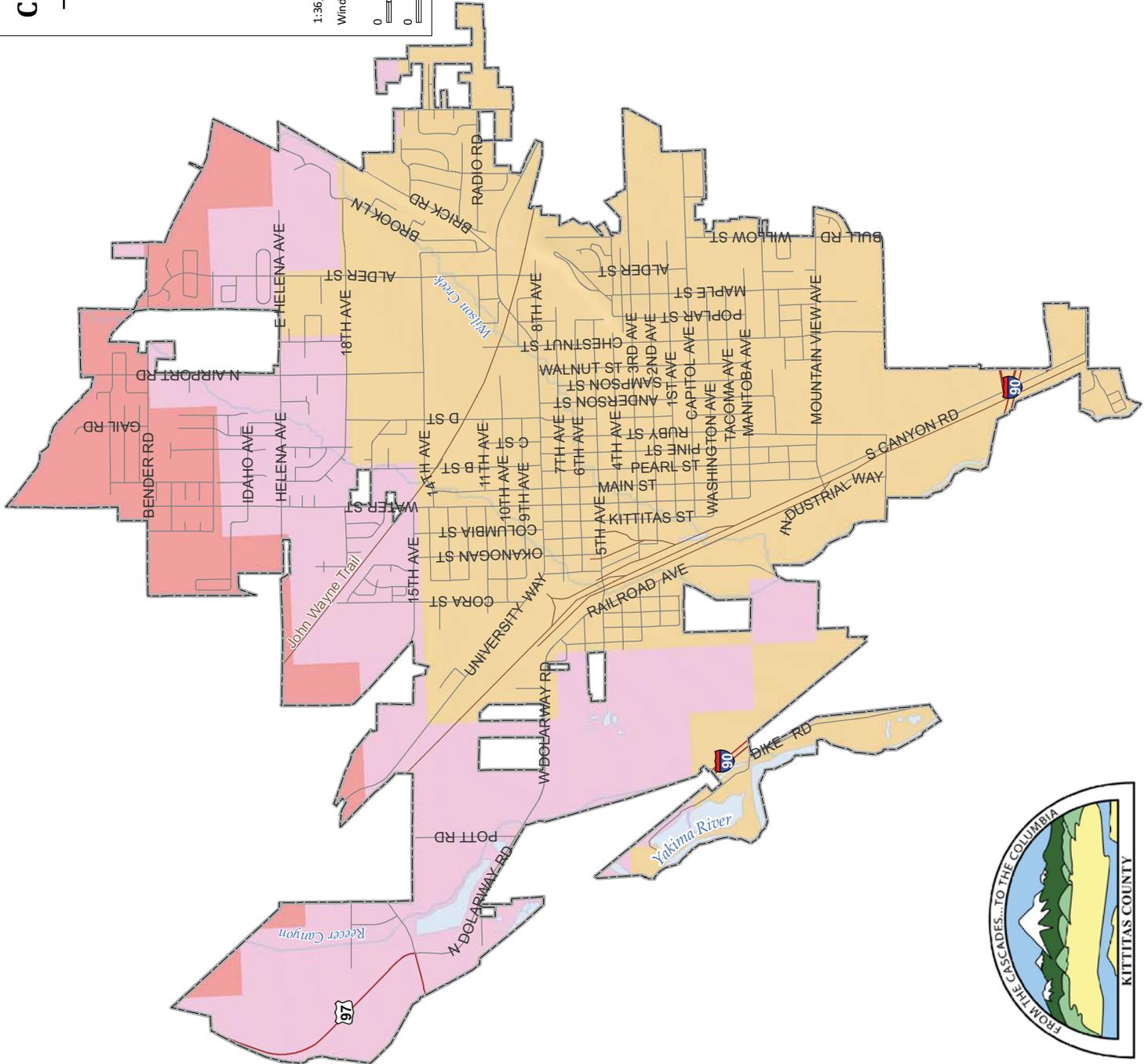
CITY OF ELLENSBURG

Potential Wind Power

Wind Power Class	Resource Potential	Wind Power Density at 50m W/m ²	Wind Speed at 50m m/s	Wind Speed at 50m mph
1	None	0	0	0
2	Marginal	200-300	5.6-6.4	12.5-14.3
3	Fair	300-400	6.4-7.0	14.3-15.7
4	Good	400-500	7.0-7.5	15.7-16.8
5	Excellent	500-600	7.5-8.0	16.8-17.9
6	Outstanding	600-800	8.0-8.8	17.9-19.7
7	Superb	>800	>8.8	>19.7

1:36,000

Wind Data provided by US Department of Energy and National Renewable Energy Laboratory



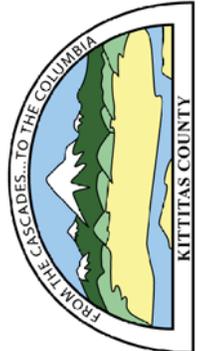
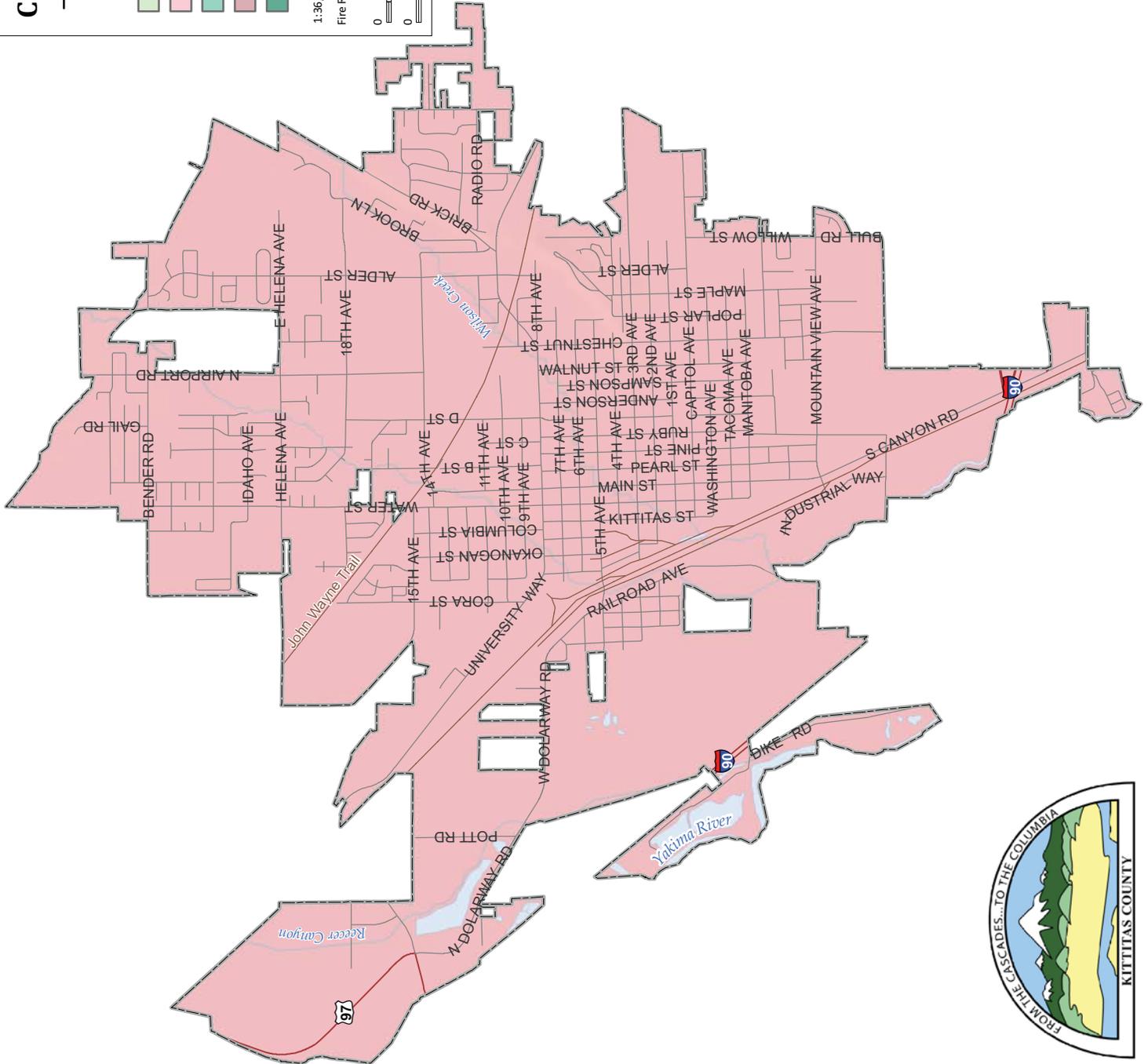
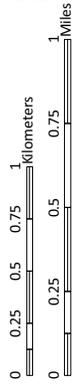
CITY OF ELLENSBURG

Fire Regime Status

- 0-35 yrs, Low Severity
- 0-35 yrs, Stand Replacement
- 35-100+ yrs, Mixed Severity
- 35-100+ yrs, Stand Replacement
- 200+ yrs, Stand Replacement

1:36,000

Fire Regime Status Data provided by Washington State Department of Natural Resources



CHAPTER 5. CITY OF ROSLYN ANNEX

5.1. HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Mitchell Long, Public Works
PO Box 451
Roslyn, WA 98941
Telephone: 509-649-3105
e-mail Address: publicworks@inlandnet.com

Alternate Point of Contact

Stan Georgeson, Public Works Director
PO Box 451
Roslyn, WA 98941
Telephone: 509-649-3105
e-mail Address: publicworks@inlandnet.com

5.2. JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—1886
- **Current Population**—893
- **Population Growth**—While Roslyn has experienced a 12.4 percent decrease in population from 2000 to 2011, the surrounding communities and county have seen a net increase in population.
- **Location and Description**—Roslyn is nestled in the foothills of the east-central Cascades in predominantly Ponderosa pine and Douglas fir forest. The City is a gateway to the Alpine Lakes Wilderness Area and Lake Cle Elum. To the north of Roslyn there is a 300+ acre urban forest that is abutted by 20-acre parcels and Plum Creek Timber holdings to the top of the Cle Elum Ridge. To the west is the township of Ronald, to the east Cle Elum, and south is the Master Planned Resort of Suncadia. SR 903 runs through Roslyn from the southeast to the northwest. Exit 80 (just east of Snoqualmie Pass) is the turn off for Roslyn from Interstate 90, which runs from Seattle to Spokane (and beyond).
- **Brief History**—Incorporated in 1886, the coal-mining town of Roslyn played an important role in Washington State history. Extensive coal fields in the area fueled the Northern Pacific Railroad's trains during construction and early operation of a direct rail line through the Cascade Mountains.

Men from coal mining regions in the United States, Europe and elsewhere came to work in the mines. English, Italian and Slavic immigrants were among the early settlers and a significant proportion of the town's early residents were foreign born. In 1888, responding to a strike, the Northern Pacific Coal Company recruited more than 300 African-American miners from Virginia, North Carolina and Kentucky and brought them, with their families, to work in the mines. At one time, 24 ethnic groups and nationalities were living in Roslyn. Today, many of the original families continue to make Roslyn their home.

- **Climate**—The climate of Roslyn is a mountainous climate that can be quite variable. Summers are generally warm and sunny; the months of July, August and September are usually characteristic of this season. The average temperatures in the high 70s to the mid-80s with a highest recorded temperature of 105°F in 1967. There is little to no rainfall during these months, and the danger of wildfire is extremely high. Winter is typically at its peak

from November through February and typically has temperatures ranging from the mid-teens to mid-30; the lowest recorded temperature was -33°F in 1950. Most of the precipitation falls during these months in the form of snow with heavy accumulations. Average snowfall for the City of Roslyn is 78.5 inches per year. This is also the period when Roslyn experiences flooding events, when there is a rain-on-snow event. This occurs when warm moist air from the Pacific is channeled into the area, often leading to extended periods of rain.

- **Governing Body Format**—Roslyn is governed by an elected mayor/council form of government with seven council seats. The City is run through the administrative office. Current departments include Administrative/Finance, Planning, Public Works, and Volunteer Fire Department. The Police Department is a part of a regional partnership between Roslyn, Cle Elum, and the Town of South Cle Elum.

The City operates a water system managed through the Public Works Department. The City provides water to the City of Roslyn, Kittitas Water District #2 (Ronald), the Roslyn/Cle Elum School District, and other homes and businesses south of the City. The water source is Domerie Creek, located approximately 5-½ miles from Roslyn on the east side of the Cle Elum River. Water is gravity fed from the source to a slow sand filtration treatment plant located outside of Ronald, where it continues to a 1 million gallon reservoir above the Roslyn historic cemeteries.

Sanitary services are provided by the City of Roslyn in its transmission facilities and a Regional Wastewater Treatment plant located in and owned by the City of Cle Elum. The Kittitas Water District #2 (Ronald) is connected to the transmission system at Runje Field. Sewage flows via gravity toward Roslyn’s old sewage lagoons where flow data is captured as it continues towards Cle Elum. One 5-acre lagoon is maintained as a stormwater attenuation facility during times of heavy rain and flood events.

Fire service is provided by the Roslyn Fire Department, which has a 100-percent volunteer staff and one fire station.

- **Development Trends**—There are significant impacts due to increase development pressures outside of the city limits. Little to no regulation of grade and fill through the county and increased impervious surfaces have created increased stormwater runoff that causes the City’s stormwater system to flood on a regular basis. The City of Roslyn is currently working with engineers to complete a stormwater study and create a stormwater utility to help and protect public and private property from such incidences.

5.3. JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 5-1 lists all past occurrences of natural hazards in the county. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 0
- Number of Repetitive Flood Loss Properties that have been mitigated: 0

5.4. HAZARD RISK RANKING

Table 5-2 presents the ranking of the hazards of concern.

5.5. CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 5-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 5-4. The

assessment of the jurisdiction's fiscal capabilities is presented in Table 5-5. Classifications under various community mitigation programs are presented in Table 5-6.

5.6. HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 5-7 lists the initiatives that make up the jurisdiction's hazard mitigation plan. Table 5-8 identifies the priority for each initiative. Table 5-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

5.7. FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

A stormwater study is in the process of being produced by Grey and Osborne.

5.8. HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps for the City of Roslyn are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

**TABLE 5-1.
NATURAL HAZARD EVENTS**

Type of Event	Date	Preliminary Damage Assessment
Flooding	3/31/2011	N/A
Flooding	1/17/2011	N/A
Flooding	1/9/2009	\$51,446.96
Winter Weather	12/2008	\$5,113.04
Winter Weather	12/15/2006	\$150,000 ^a
Drought	5/2005	N/A
Winter Weather	1/17/2005	\$333 ^a
Drought	5/2004	N/A
Drought	7/2001	N/A
Earthquake	2/28/2001	N/A
Winter Weather	1/14/1998	N/A
Winter Weather/Flooding	12/27/1996	N/A
Winter Weather	1/6/1996	\$5,333 ^a
Flooding	02/1995	N/A
Flooding	11/1995	N/A
Winter Weather	2/18/1993	\$2,381 ^a
Winter Weather	12/8/1992	\$714 ^a
Winter Weather	12/29/1990	\$1,282 ^a
Flooding	11/25/1990	N/A
Winter Weather	2/1/1989	\$128,205 ^a
Winter Weather	12/2/1985	N/A
Winter Weather	1/2/1974	\$5,000 ^a
Winter Weather	1/24/1972	\$25,642 ^a
Winter Weather	12/30/1968	N/A

a. Loss data taken from SHEL DUS

TABLE 5-2. HAZARD RISK RANKING		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Flood	54
2	Wildfire	54
3	Severe Weather	51
4	Earthquake	30
5	Drought	18
6	Volcano	16
7	Landslide	6
8	Dam Failure	1
9	Avalanche	0
10	Seiche	0

TABLE 5-3. LEGAL AND REGULATORY CAPABILITY					
	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Y	N	N	Y	RMC, IBC/IRC 2009
Zoning Code	Y	N	N	Y	Title 18 RMC, WA GMA 2007
Subdivisions	Y	N	N	Y	Title 17 & 18 RMC
Post Disaster Recovery	Y	N	Y	Y	Eastern Washington Stormwater Management Plan
Real Estate Disclosure	N	N	Y	Y	RCW 64.06.020
Growth Management	Y	N	N	Y	RCW 36.70A
Site Plan Review	Y	N	Y	Y	WA GMA 2007
Special Purpose (flood management, critical areas)	Y	N	N	N	Title 18 RMC
Planning Documents					
General Plan	Y	N	N	Y	2007 (updated)
Floodplain or Basin Plan	Y	N	Y	Y	RMC Title 15.15
Stormwater Plan	N	N	N	Y	Eastern Washington Stormwater Management Plan
Capital Improvement Plan	Y	N	N	Y	Water and Sewer Comp. Plans
Habitat Conservation Plan	Y	N	Y	Y	Roslyn Urban Forest Land Stewardship Plan
Economic Development Plan	Y	N	N	Y	Roslyn's Comprehensive Plan
Emergency Response Plan	N	N	N	N	
Shoreline Management Plan	N	N	N	Y	
Post Disaster Recovery Plan	N	N	N	N	

**TABLE 5-4.
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Y	Planning Dept./City of Roslyn/Planner, Dohrn and Associates (Planning), Grey and Osborne (Engineer)
Engineers or professionals trained in building or infrastructure construction practices	Y	Grey and Osborne (Engineer), the Building Department Inc. (Building Inspectors)
Planners or engineers with an understanding of natural hazards	Y	Grey and Osborne (Engineer), Dohrn and Associates (Planning)
Staff with training in benefit/cost analysis	Y	
Floodplain manager	N	
Surveyors	Y	Grey and Osborne (Engineer)
Personnel skilled or trained in GIS applications	Y	Grey and Osborne (Engineer)
Scientist familiar with natural hazards in local area	Y	Grey and Osborne (Engineer)
Emergency manager	N	
Grant writers	Y	Staff and Contracted

**TABLE 5-5.
FISCAL CAPABILITY**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Y
Capital Improvements Project Funding	Y
Authority to Levy Taxes for Specific Purposes	Y
User Fees for Water, Sewer, Gas or Electric Service	Y
Incur Debt through General Obligation Bonds	Y
Incur Debt through Special Tax Bonds	Y
Incur Debt through Private Activity Bonds	N
Withhold Public Expenditures in Hazard-Prone Areas	Can, but don't
State Sponsored Grant Programs	Y
Development Impact Fees for Homebuyers or Developers	Y
Other	

	Participating?	Classification	Date Classified
Community Rating System	No	—	—
Building Code Effectiveness Grading Schedule	Yes	3/3	—
Public Protection	Yes	6/9	—
Storm Ready	No	—	—
Firewise	Yes	Mod/High	2001/2011

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #R-1 —Utilize and enhance existing programs to raise public awareness about natural hazards, the risk they pose and ways to reduce those risks.						
New and Existing	All Hazards	1,2,3,4, 5, 6, & 9	City	Low	General Revenue	Short-term, Ongoing
Initiative #R-2 —Maintain political support for hazard mitigation and response planning and programs by annually monitoring the progress of initiatives identified in this plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, & 9	City	Low	General revenue	Short-term, Ongoing
Initiative #R-3 —Leverage mitigation opportunities by establishing and maintaining partnerships between public and private sectors						
Existing	All Hazards	1, 5, & 9	City	Low	General Revenue	Ongoing
Initiative #R-4 —Set the course for sustained operations of critical city functions by the development of a continuity of operations plan and/or a post-disaster recovery plan.						
New and existing	All Hazards	1,6,9	City	Medium	General fund, DHS grant funding	Long-term, depends on funding
Initiative # R-5 —Replace vulnerable bridge crossings with restrained piping where feasible and cost-effective.						
Existing	Flood, Dam Failure, Earthquake	1, 7	City	\$367,744, High	Grants, Loans, Enterprise & Surplus Funds	Short-term, Ongoing
Initiative #R-6 —Replace transmission main (to bridge)						
Existing	Earthquake	1, 7	City	\$2,000,000 , High	Grants, Loans, Enterprise & Surplus Funds	Short-term
Initiative #R-7 —Replace transmission main (bridge to Tx plant)						
Existing	Earthquake	1, 7	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-term, depends on funding

**TABLE 5-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #R-8—Replace transmission main (Tx plant to reservoir)						
Existing	Earthquake	1, 7	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-term, depends on funding
Initiative #R-9—Replace pinch point (storm system) at Penn Place Apartments						
New and Existing	Flooding	1, 7, 8	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-Term, depends on funding
Initiative #R-10—Replace V-ditch catch basins with Type 40 catch basins						
New and Existing	Flooding	1, 7, 8, 10	City	\$350/ Catch basin, Medium	Grants, Loans, Enterprise & Surplus Funds	Short-term, Ongoing
Initiative #R-11—Replace trunk lines and add access points for stormwater transmission system						
New and Existing	Flooding	1, 7, 8	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-Term, depends on funding
Initiative #R-12—Construct adequate intake structures at inlets to stormwater system						
New and Existing	Flooding	1, 7, 8, 9, 10	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-term, depends on funding
Initiative #R-13—Create channel roughness and other water-retaining systems in the Roslyn Urban Forest						
New and Existing	Flooding	1, 9, 10	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-Term, depends on funding
Initiative #R-14—Provide adequate drainage for road beds and trails in the Roslyn Urban Forest						
New and Existing	Flooding, Severe weather	1, 9, 10	City	High	Grants, Loans, Enterprise & Surplus Funds	Long-term, depends on funding
Initiative #R-15—Maintain shaded fuel break at forested perimeter						
New and Existing	Wildfire	1, 2, 4, 10	City	\$300/acre, Low	Grants & General Revenue	Short-term, Ongoing
Initiative #R-16—Implement Land Stewardship Plan and dry site management techniques to increase forest health and Firewise entire forest						
New and Existing	Wildfire	1, 2, 10	City	High	Grants & General Revenue	Long-term, depends on funding

**TABLE 5-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #R-17—Purchase water tender for fire department						
New and Existing	Wildfire	1, 6, 9	City/RFD	High	AFG Grants & General Revenue	Long-term, depends on funding
Initiative #R-18—Provide wildland fire training for fire department						
New and Existing	Wildfire	1,6,9	City/RFD	Low	AFG Grants & General Revenue	Short-term, Ongoing
Initiative #R-19—Maintain road beds in the Roslyn Urban Forest for emergency traffic						
New and existing	Wildfire	1, 9, 10	City	Medium	AFG Grants & General Revenue	Short-term, depends on funding
Initiative #R-20—Retrofit buildings for earthquake protection						
Existing	Earthquake	1, 2, 4, 7, 8	City	High	Grants	Long-term, depends on funding
Initiative #R-21—Purchase land for stormwater retention (Duck Town)						
New and Existing	Flooding, Severe Weather	1, 4, 7, 8, 10	City	High	Grants, Stormwater Funds	Long-term, depends on funding
Initiative #R-22—Clear and maintain creeks that capture flows from storm system (Park & Duck Town)						
New and Existing	Flooding	1, 2, 8, 10	City	Medium	Grants, Stormwater Funds	Short-term
Initiative #R-23—Install adequate storm system in Brookside Neighborhood						
New and Existing	Flooding	1, 2, 10	City	High	Grants, Stormwater Funds	Long-term, depends on funding
Initiative #R-24—Install adequate storm system in Downtown core						
New and Existing	Flooding	1, 2, 10	City	High	Grants, Stormwater Funds	Long-term, depends on funding
Initiative #R-25—Install adequate storm system in Park (neighborhoods N)						
New and Existing	Flooding	1, 2, 10	City	High	Grants, Stormwater Funds	Long-term, depends on funding
Initiative #R-26—Install adequate storm system in 5th Street addition neighborhood						
New and existing	Flooding	1, 2, 10	City	High	Grants, Stormwater Funds	Long-term, depends on funding

**TABLE 5-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative #R-27—Install adequate storm system in 3rd street neighborhood						
New and Existing	Flooding	1, 2, 10	City	High	Grants, Stormwater Funds	Long-term, depends on funding
Initiative #R-28—Manage potential increased runoff from new development by adopting regulations that require new developments to mitigate their impacts.						
New	Flooding, Severe Weather	1, 2, 3, 4, 7, 9, 10	City/County	Low	General revenue	Short-term
Initiative #R-29—Reduce water system losses						
Existing	Drought	1, 2, 4, 5, 6, 7, 9	City	Medium	Water Fund/Grants	Short-term, Ongoing
Initiative #R-30—Adopt development practices that require new developments to bury utility cables in business zones and major transportation routes						
New and Existing	Severe Weather	1, 2, 4, 8, 9	City	Low	Developer	Short-term
Initiative #R-31—Utilize native planting on City-owned facilities						
Existing	Drought	1, 3, 4, 6, & 7	City	Low	General and Enterprise Funds/Grants	Short-term, Ongoing
Initiative # R-32—Integrate Hazard Mitigation Plan into future updates of the Roslyn Comprehensive Plan.						
New	All Hazards	All	City	Low	General Revenue	Short-term
Initiative #-33—Continue to support the implementation, monitoring, maintenance and updating of this plan.						
New and Existing	All Hazards	All	City	Low	HMGP, General Fund, Road Fund	Short-term, ongoing
Initiative #R-34—Continue to support through active participation the countywide initiatives identified in Volume 1 of the Kittitas County Hazard Mitigation Plan.						
New and Existing	All Hazards	5,6,9	All City Agencies	Low	General Fund	Short-term, Ongoing
Initiative #R-35—Consider participation in the National Weather Service “Storm Ready” program.						
New and Existing	Flood, Severe Weather	6, 7, 9	City	Low	General Fund	Short term

**TABLE 5-8.
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority ^a
R-1	7	Medium	Low	Yes	Yes	Yes	High
R-2	7	Medium	Low	Yes	Yes	Yes	High
R-3	3	Medium	Low	Yes	No	Yes	High
R-4	1	High	High	Yes	No	Yes	Med
R-4	2	High	Medium	Yes	Yes	Yes	Med
R-6	2	High	High	Yes	Yes	No	Med
R-7	2	High	High	Yes	Yes	No	Low
R-8	2	Medium	High	No	Yes	No	Low
R-9	3	High	High	Yes	Yes	No	Med
R-10	4	High	Medium	Yes	Yes	Yes	High
R-11	3	High	High	Yes	Yes	No	Med
R-12	5	High	High	Yes	Yes	No	Med
R-13	3	High	High	Yes	Yes	No	Med
R-14	4	Medium	Low	Yes	Yes	Yes	Low
R-15	5	High	Medium	Yes	Yes	No	Low
R-16	3	Medium	Medium	Yes	Yes	No	Low
R-17	3	High	Medium	Yes	Yes	No	Med
R-18	3	High	Low	Yes	No	Yes	High
R-19	3	Medium	Medium	Yes	Yes	Yes	Med
R-20	5	Medium	High	No	Yes	No	Low
R-21	5	High	High	Yes	Yes	No	Med
R-22	4	Medium	Medium	Yes	Yes	No	Med
R-23	3	High	High	Yes	Yes	No	Low
R-24	3	High	High	Yes	Yes	No	Low
R-25	3	High	High	Yes	Yes	No	Low
R-26	3	High	High	Yes	Yes	No	Low
R-27	3	High	High	Yes	Yes	No	Low
R-28	7	High	High	Yes	Yes	Yes	Medium
R-29	7	Medium	Low	Yes	Yes	Yes	Medium
R-30	5	Medium	Medium	Yes	No	Yes	Medium
R-31	5	Medium	Low	Yes	No	Yes	Medium
R-32	10	High	Low	Yes	No	Yes	High
R-33	10	Medium	Low	Yes	Yes	Yes	High
R-34	3	Medium	Low	Yes	Yes	Yes	High
R-35	3	High	Low	Yes	Yes	Yes	High

a. See Section 1.3 for definitions of high, medium and low priorities.

**TABLE 5-9.
ANALYSIS OF MITIGATION INITIATIVES**

Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	—	—	—	—	—	—
Dam Failure	1, 2, 3, 4, 32, 33	1, 2, 3, 4, 5	1, 2, 3, 33, 34	1, 2, 3, 32	1, 2, 3, 34	1, 2
Drought	1, 2, 3, 4, 29, 31, 32, 33	1, 2	1, 2, 29, 31, 33, 34	1, 2, 29, 31, 32	1, 2, 3, 34	1, 2, 6
Earthquake	1, 2, 3, 4, 5, 6, 7, 8, 20, 32, 33	1, 2, 3, 4, 20	1, 2, 3, 33, 34	1, 2, 3, 32	1, 2, 3, 34	1, 2, 5, 6, 7, 8, 20
Flood	1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 21, 22, 23, 24, 25, 26, 27, 28, 32, 33	1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 21, 22, 23, 24, 25, 26, 27, 28	1, 2, 3, 33, 34, 35	1, 2, 3, 28, 32	1, 2, 3, 34, 35	1, 2, 9, 10, 11, 12, 13, 23, 24, 25, 26, 27
Landslide	32, 33		33, 34	32	34	
Severe Weather	1, 2, 3, 4, 32, 33	1, 2, 3, 4, 30	1, 2, 3, 33, 34, 35	1, 2, 3, 32	1, 2, 3, 34, 35	1, 2, 30
Seiche	—	—	—	—	—	—
Volcano	1, 2, 3, 4, 32, 33	1, 2, 3, 4	1, 2, 3, 33, 34	1, 2, 3, 32	1, 2, 3, 34	1, 2
Wildfire	1, 2, 3, 4, 15, 16, 19, 32, 33	1, 2, 3, 15, 16, 17, 18, 19	1, 2, 3, 33, 34	1, 2, 3, 15, 16, 17, 18, 19, 32	1, 2, 3, 17, 18, 34	1, 2

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

CITY OF ROSLYN

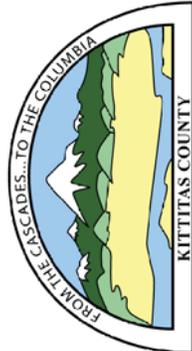
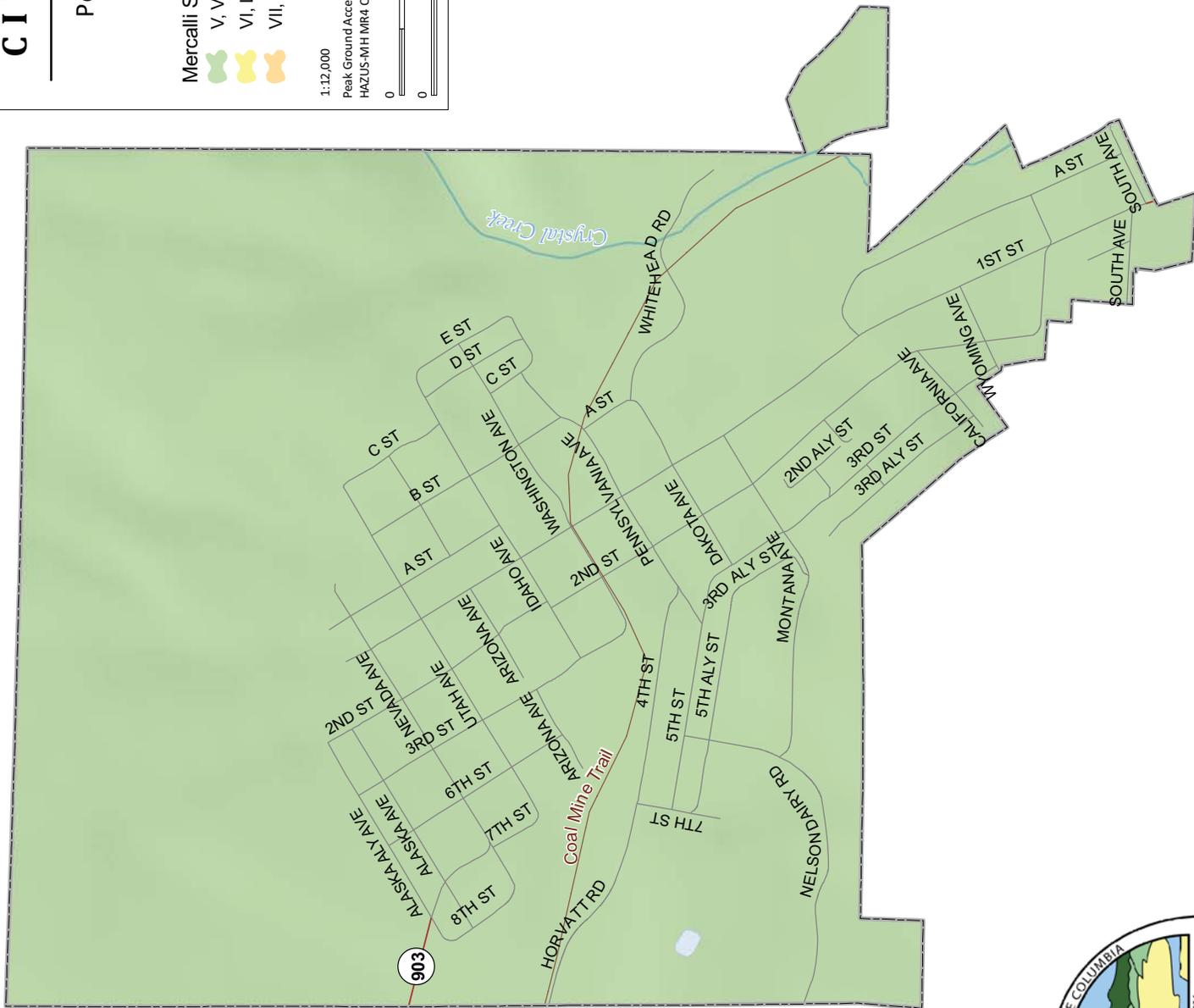
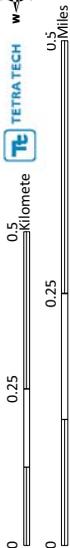
Peak Ground Acceleration
USGS 100 Year
Probabilistic Event

Mercalli Scale, Potential Damage

- V, Very Light
- VI, Light
- VII, Moderate

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Peak Ground Acceleration USGS 100 Year Probabilistic Event
HAZUS-MH MR4 Output, United States Geological Survey



CITY OF ROSLYN

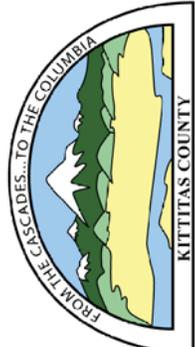
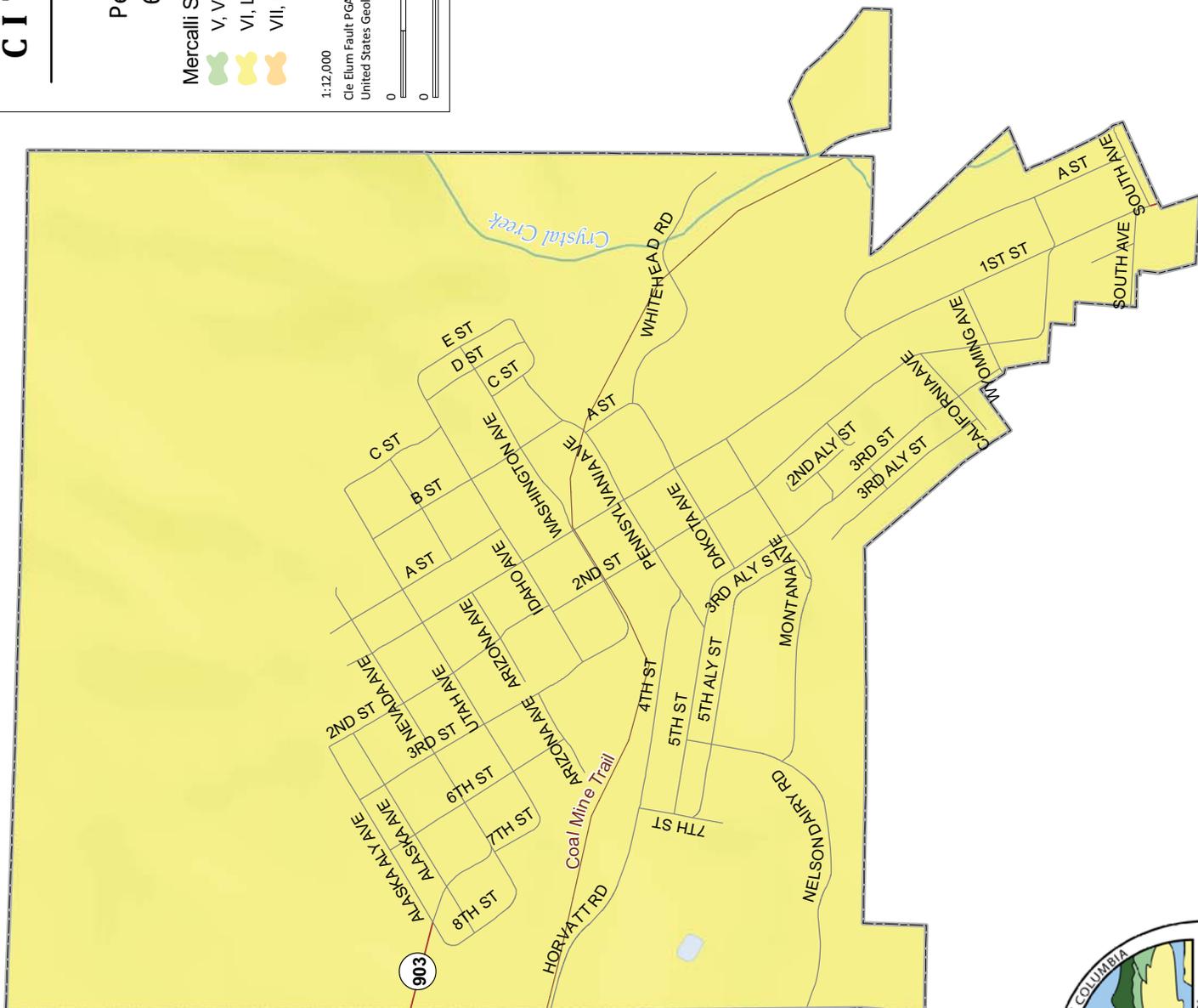
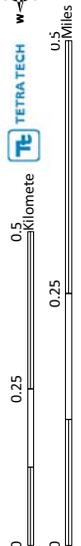
Cle Elum Fault
 Peak Ground Acceleration
 6.8 Magnitude Scenario

Mercalli Scale, Potential Damage

	V, Very Light		VIII, Moderate-Heavy
	VI, Light		IX, Heavy
	VII, Moderate		

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Cle Elum Fault PGA Shake Map Data
 United States Geological Survey



CITY OF ROSLYN

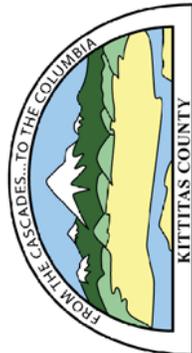
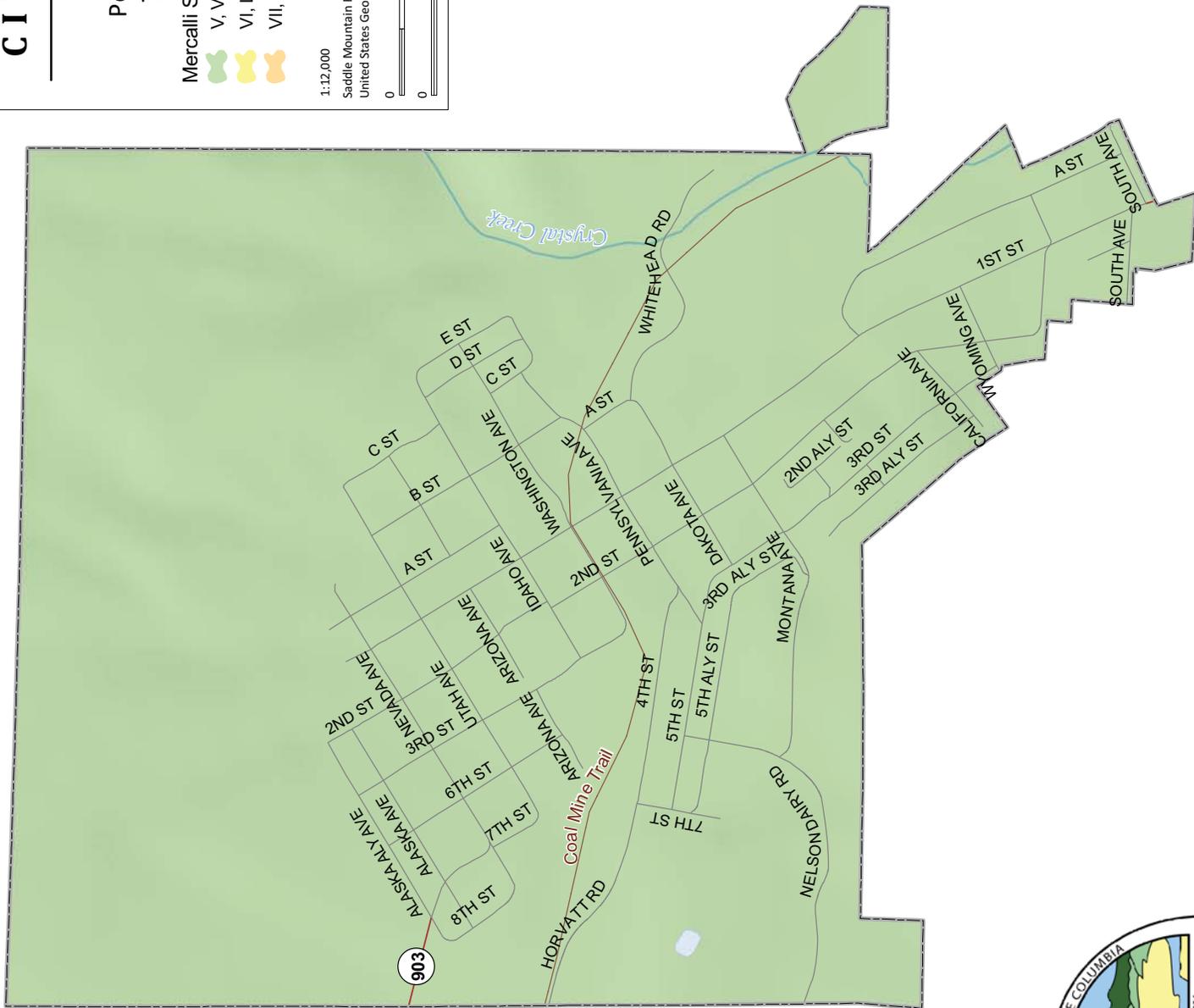
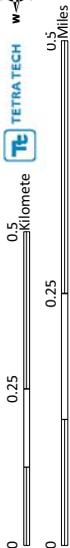
Saddle Mountain Peak Ground Acceleration 7.3 Magnitude Scenario

Mercalli Scale, Potential Damage

-  V, Very Light
-  VI, Light
-  VII, Moderate
-  VIII, Moderate-Heavy
-  IX, Heavy

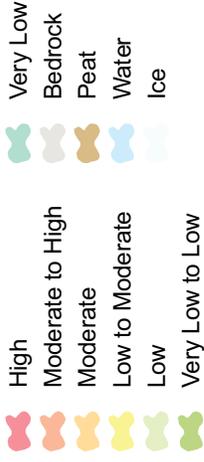
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Saddle Mountain Fault PGA Shake Map Data
United States Geological Survey



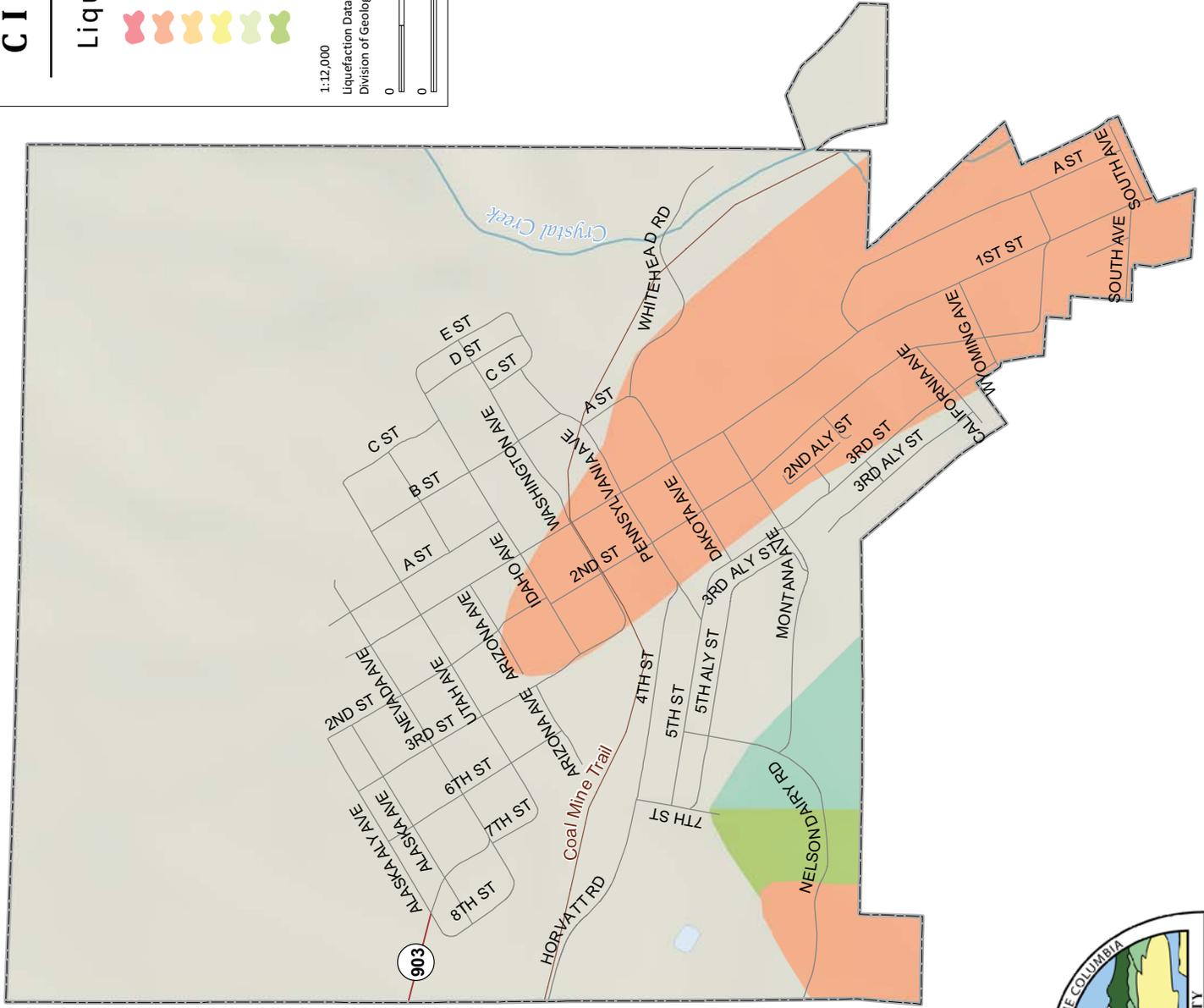
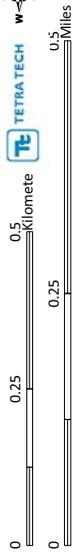
CITY OF ROSLYN

Liquefaction Susceptibility



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Liquefaction Data provided by Washington State Department of Natural Resources,
Division of Geology and Earth Resources



CITY OF ROSLYN

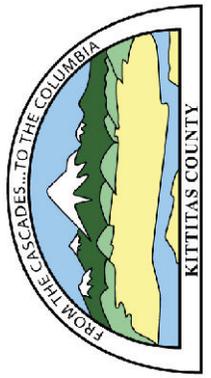
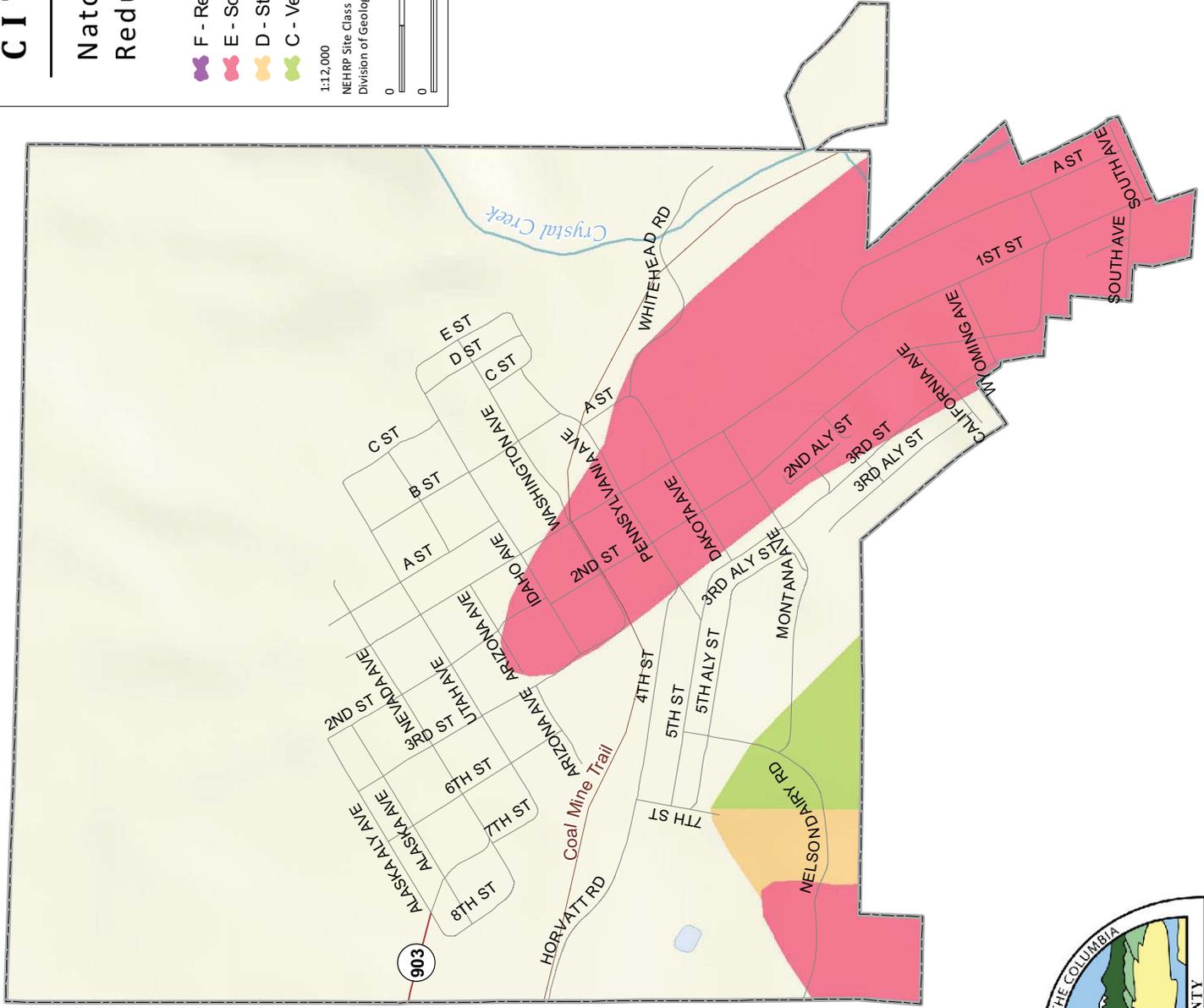
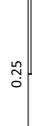
National Earthquake Hazard Reduction Program (NEHRP)

Soil Site Classes

-  F - Requires site-specific investigation
-  E - Soft Soil
-  D - Stiff Soil
-  C - Very Dense Soil and Soft Rock
-  B - Rock
-  Water
-  Ice

1:12,000

NEHRP Site Class Data provided by Washington State Department of Natural Resources, Division of Geology and Earth Resources



CITY OF ROSLYN

FEMA FIRM Flood Hazard Areas

-  1-percent annual chance flood (100 Year)
-  0.2-percent annual chance flood (500 Year)

1:12,000

FEMA FIRM Flood Data provided by Kittitas County

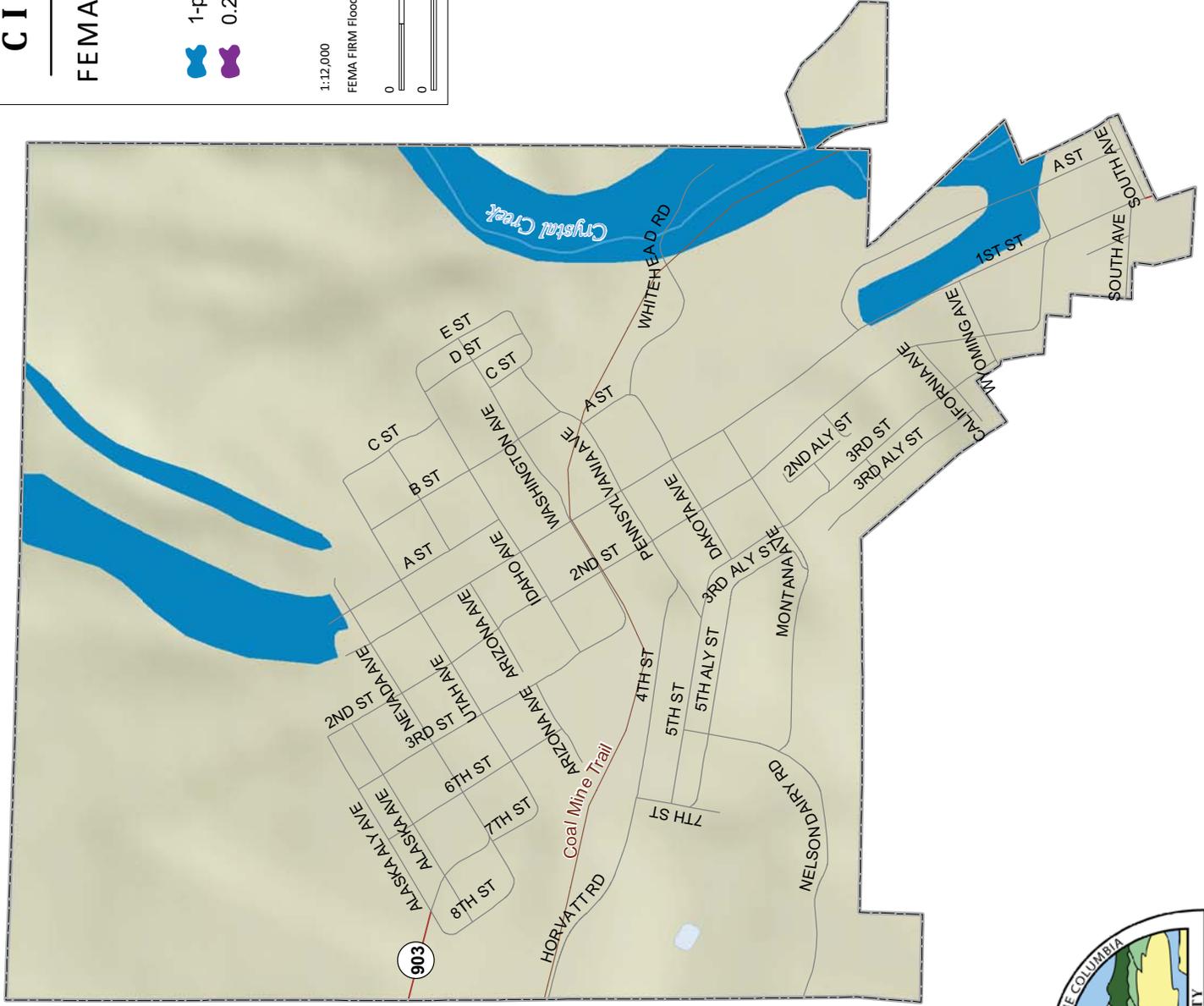
0.25 Kilometre

0.25 Miles

0.5 Kilometre

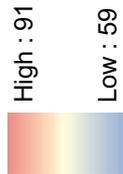
0.5 Miles

TETRA TECH



CITY OF ROSLYN

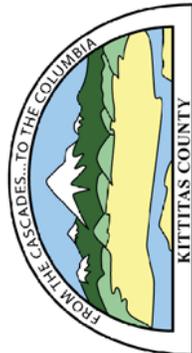
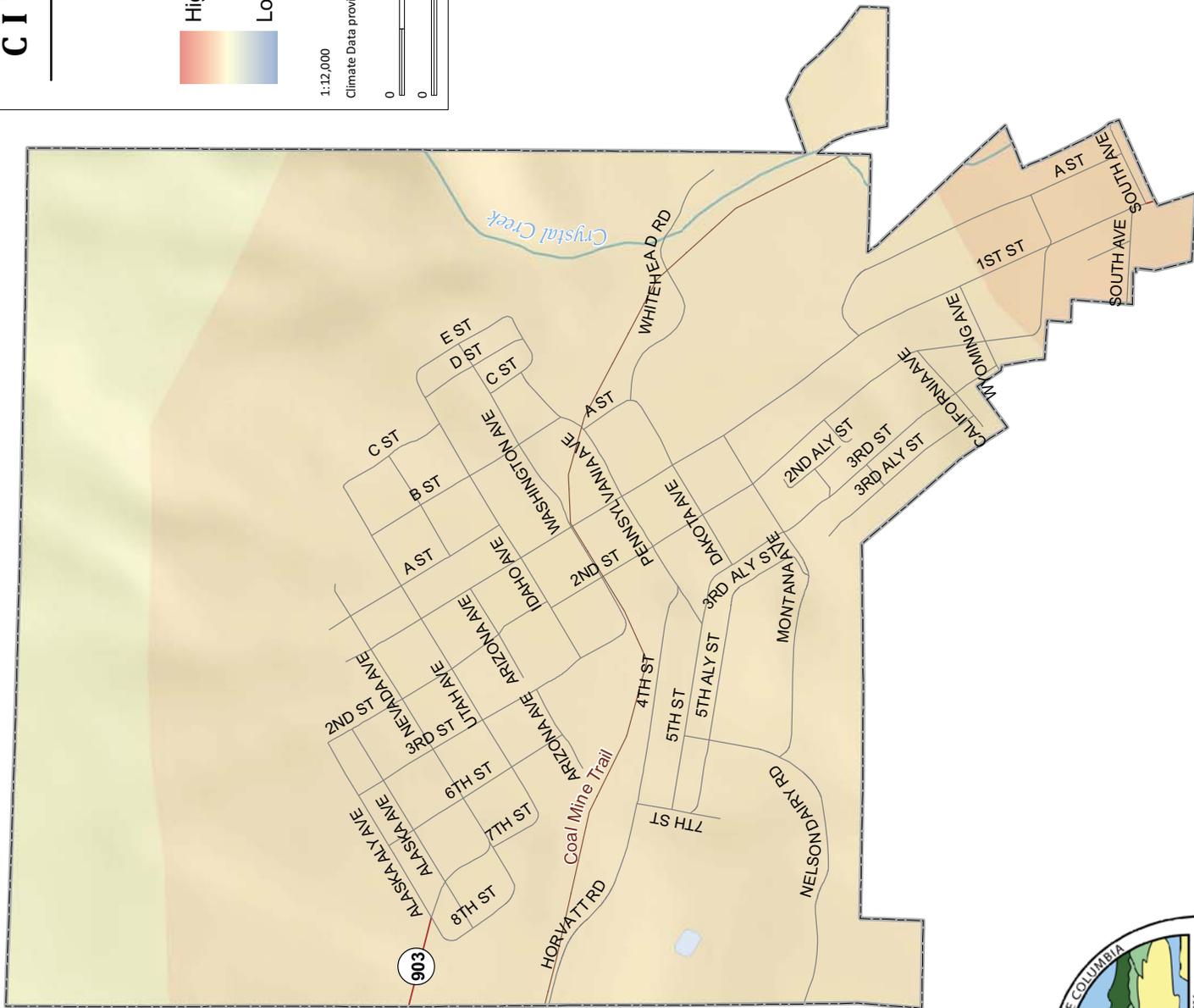
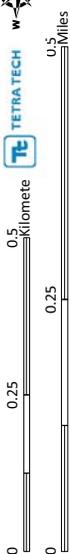
Average Maximum Temperature (F)



Average Maximum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000. USDA/NRCS

1:12,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



CITY OF ROSLYN

Average Minimum Temperature (F)

Average Annual Minimum Temperature (F)

High : 25

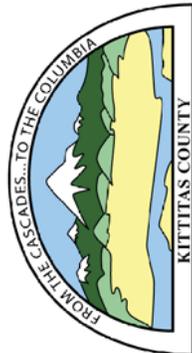
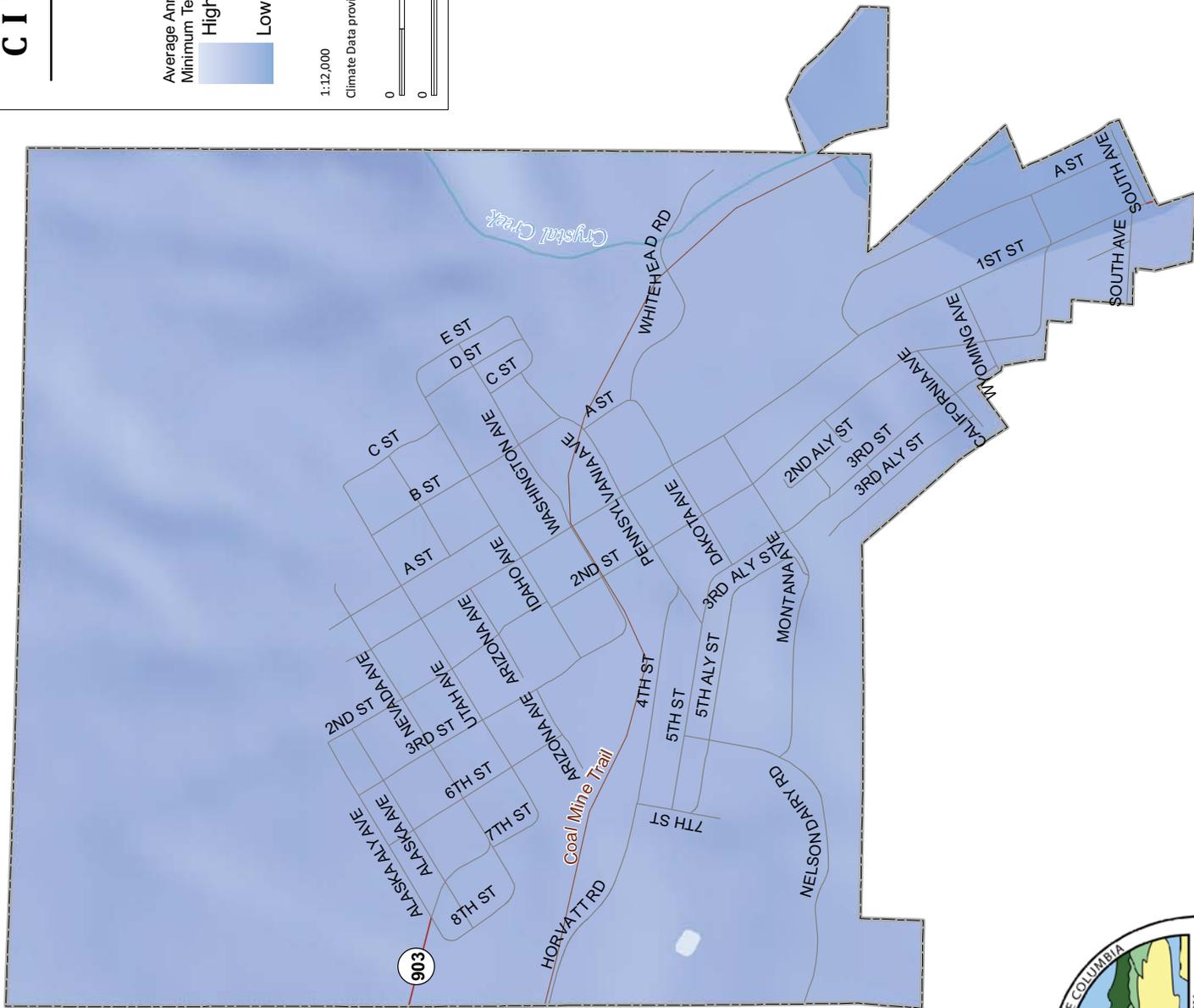
Low : 15

Average Minimum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000.
USDA/NRCS

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Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center

TETRA TECH



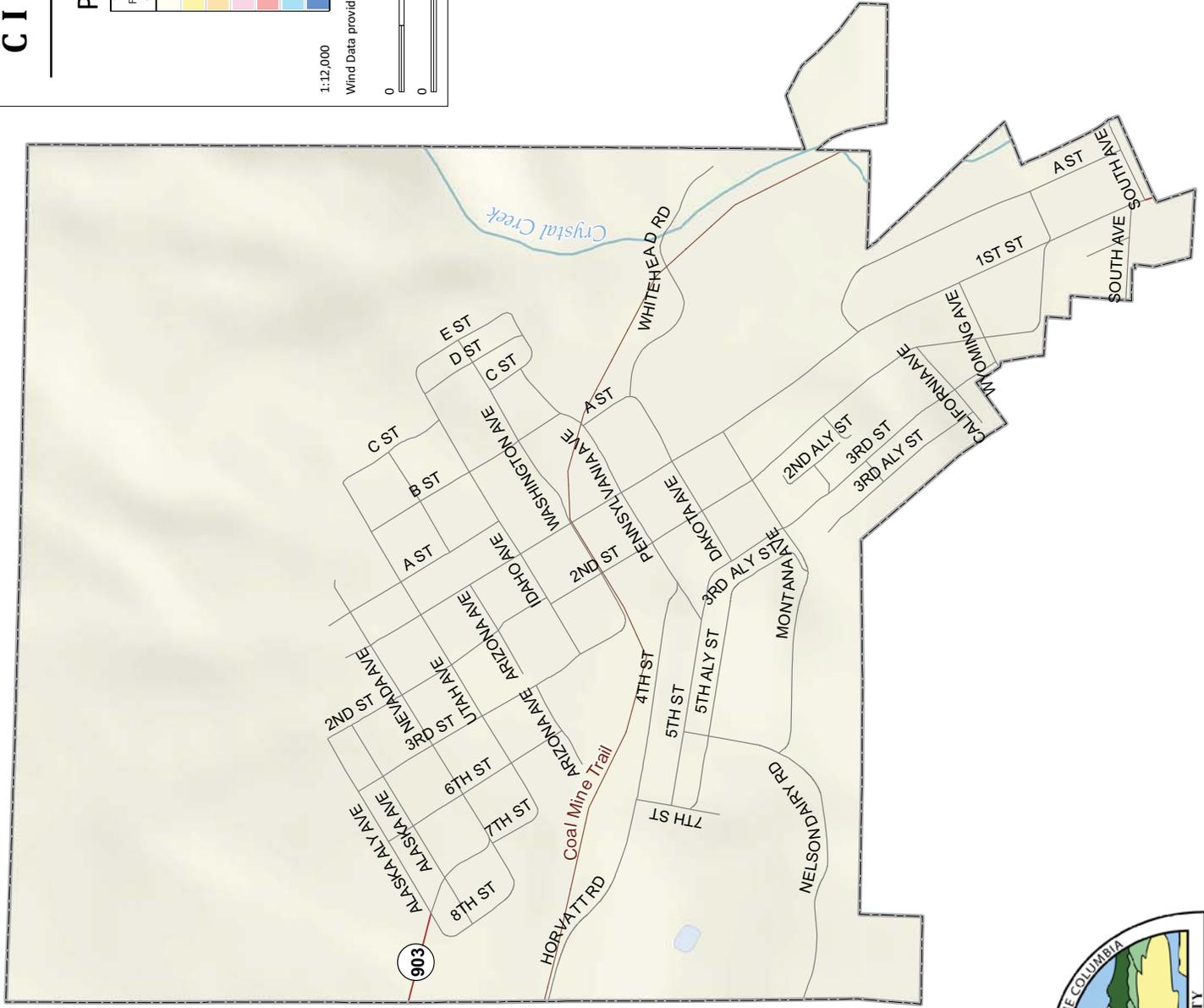
CITY OF ROSLYN

Potential Wind Power

Wind Power Class	Resource Potential	Wind Power Density at 50m W/m ²	Wind Speed at 50m m/s	Wind Speed at 50m mph
1	None	0	0	0
2	Marginal	200-300	5.6-6.4	12.5-14.3
3	Fair	300-400	6.4-7.0	14.3-15.7
4	Good	400-500	7.0-7.5	15.7-16.8
5	Excellent	500-600	7.5-8.0	16.8-17.9
6	Outstanding	600-800	8.0-8.8	17.9-19.7
7	Superb	>800	>8.8	>19.7

1:12,000

Wind Data provided by US Department of Energy and National Renewable Energy Laboratory



CITY OF ROSLYN

Fire Regime Status

- 0-35 yrs, Low Severity
- 0-35 yrs, Stand Replacement
- 35-100+ yrs, Mixed Severity
- 35-100+ yrs, Stand Replacement
- 200+ yrs, Stand Replacement

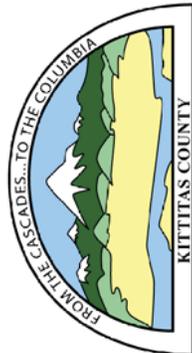
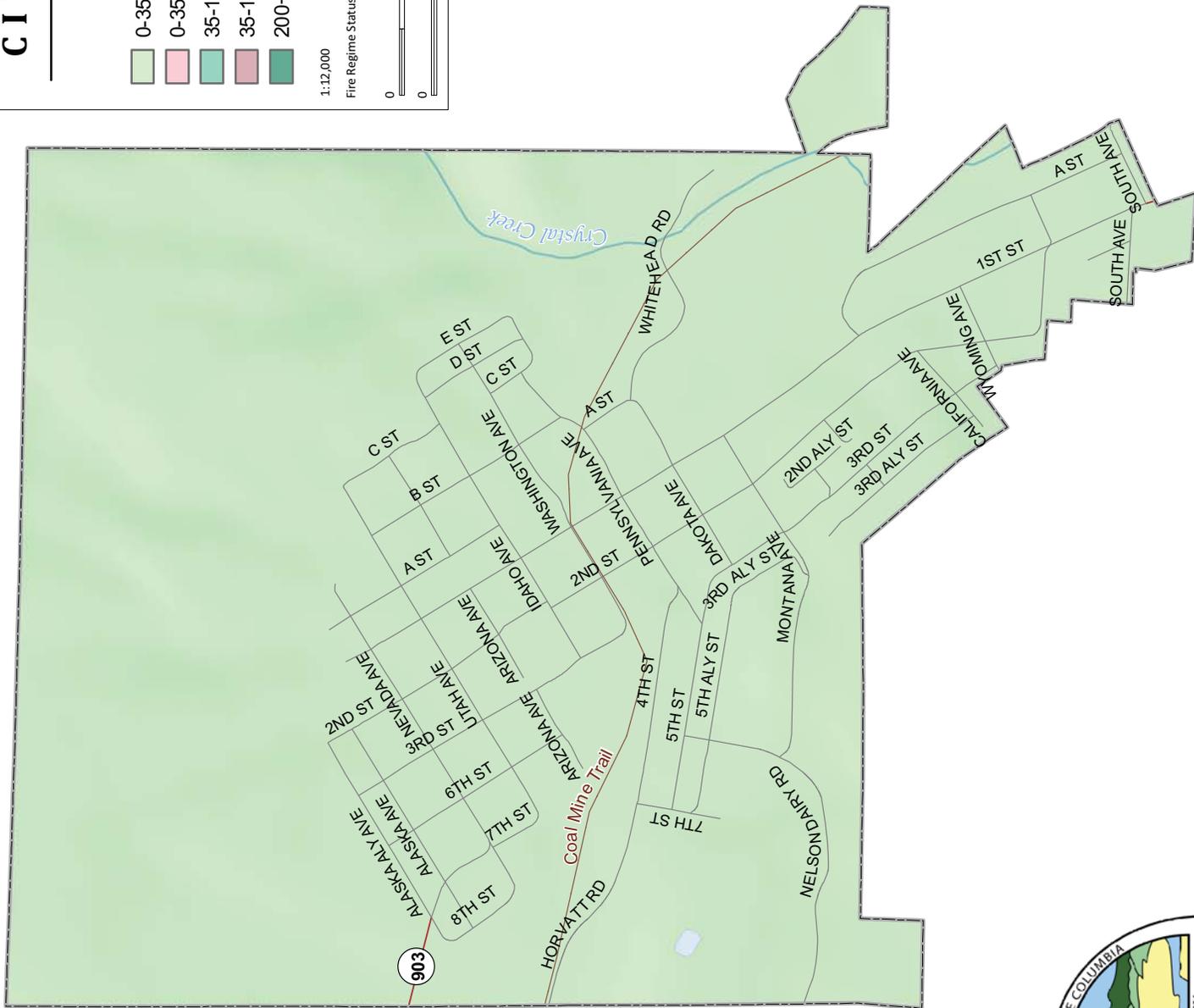
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Fire Regime Status Data provided by Washington State Department of Natural Resources



0 0.25 0.5 Kilometers

0 0.25 0.5 Miles



CHAPTER 6. TOWN OF SOUTH CLE ELUM

6.1. HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Jim DeVere, Mayor
P.O. Box 160
South Cle Elum, WA 98943
Telephone: (509)674-4322
e-mail Address: sce@inlandnet.com

Alternate Point of Contact

Scott McKenzie, Superintendent
P.O. Box 160
South Cle Elum, WA 98943
Telephone: (509) 674-4322
e-mail Address: sce@inlandnet.com

6.2. JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—August 20, 1911
- **Current Population**—575 as of 2011
- **Population Growth**—The population in South Cle Elum increased 21 percent between 2000 and 2010, averaging 2.32 percent per year. Future population growth is limited by remaining available water connections.
- **Location and Description**—South Cle Elum is bordered on the north by the Yakima River and the City of Cle Elum. Interstate 90 is also to the north. Unincorporated Kittitas County surrounds the Town to the east, south and west. Mt. Peoh is to the south, Lookout Mountain is to the east, Mt. Stuart is to the north and the Cascades are to the west. The Iron Horse State Park and the John Wayne Trail run along the Town’s southern border.
- **Brief History**—The Town of Cle Elum was initially developed to serve the Milwaukee Railroad. In mid-1909, the Chicago, Milwaukee & Puget Sound Railway chose Cle Elum as a division point between the Coast and Columbia divisions on its future transcontinental line—first as a water, fuel and crew change location, and later as a full service repair shop, complete with roundhouse. After electrification, a substation was added. The population during this time was split between railroaders, coal miners and loggers. When the Milwaukee Railroad went into receivership in the late 1970s, the State of Washington converted the right-of-way into a state park.
- **Climate**—Being between the Cascade Mountains and the plains of central Washington, the Town of South Cle Elum enjoys four distinct seasons. The seasons are tempered the Town’s elevation at close to 2,000 feet above sea level. Summers are usually dry and warm to hot, with high temperatures between 80°F and 100°F and mostly westerly breezes that make the weather seem somewhat cooler. Cooler temperatures and changing foliage mark the change toward winter weather, which generally arrives between Thanksgiving and Christmas. Winter can bring temperatures from +20°F to –20°F. Colder temperatures usually come in January. In the spring, the snow melts and temperatures warm again.
- **Governing Body Format**—The town of South Cle Elum is governed by a five-member council and a mayor. This governing body is elected to four-year terms. This body will assume responsibility for adoption, implementation and maintenance of this plan.

- **Development Trends**—Development in South Cle Elum trends towards residential uses at this time and into the foreseeable future. The Town does have space for some light industry and commercial development, but selectively so. Urban growth boundaries are going to be static except to the east, where the city hopes to expand in the future.

6.3. JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 6-1 lists all past occurrences of natural hazards within the jurisdiction. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 1
- Number of Repetitive Flood Loss Properties that have been mitigated: 0

6.4. HAZARD RISK RANKING

Table 6-2 presents the ranking of the hazards of concern.

6.5. CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 6-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 6-4. The assessment of the jurisdiction’s fiscal capabilities is presented in Table 6-5. Classifications under various community mitigation programs are presented in Table 6-6.

6.6. HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 6-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 6-8 identifies the priority for each initiative. Table 6-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

**TABLE 6-1.
NATURAL HAZARD EVENTS**

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Flood Event	FEMA 1817 DR	2009	61,688.00
Earthquake		02-28-2001	N/A
Earthquake		05-03-1996	N/A
Earthquake		01-29-1995	N/A
Earthquake		02-14-1981	N/A
Earthquake		04-29-1965	N/A

**TABLE 6-2.
HAZARD RISK RANKING**

Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Flood	27
2	Wildfire	27
3	Earthquake	24
4	Dam Failure	18
5	Severe Weather	18
6	Landslide	10
7	Volcano	6
8	Drought	5
9	Avalanche	1

**TABLE 6-3.
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Yes	Yes	No	Yes	Title 15 SCEMC adopts the 2009 IBC, 7/27/2010
Zonings	Yes	No	No	No	Title 17, SCEMC, 2001
Subdivisions	Yes	No	No	No	Title 16, SCEMC, 2005
Stormwater Management	No	No	No	No	
Post Disaster Recovery	No	No	Yes	Yes	RCW 64.06.020
Real Estate Disclosure	Yes	No	No	Yes	RCW 36.70A
Growth Management	Yes	No	No	Yes	Title 15 SCEMC, 2010
Site Plan Review	Yes	No	No	No	Flood damage Prevention: Title 15, Chapter 15.24; 2002 Critical Areas: Title 18, SCEMC, 2010
Special Purpose (flood management, critical areas)	Yes	Yes	No	Yes	Title 15 SCEMC adopts the 2009 IBC, 7/27/2010
Planning Documents					
General or Comprehensive Plan	Yes	No	No	Yes	
Floodplain or Basin Plan	Yes	No	No	No	Kittitas County Comprehensive Floodplain Management Plan, 1996
Stormwater Plan	Yes	No	No	No	
Capital Improvement Plan	Yes	No	No	No	5-year CIP, updated annually for streets, water, sewer and drainage
Habitat Conservation Plan	No	No	No	No	
Economic Development Plan	Yes	No	No	No	Economic Development Group of Kittitas County & Chamber
Emergency Response Plan	No	No	No	No	
Shoreline Management Plan	Yes	Yes	No	No	
Post Disaster Recovery Plan	No	No	No	No	
Other					
Other					

**TABLE 6-4.
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?
Planners or engineers with knowledge of land development and land management practices	Yes
Engineers or professionals trained in building or infrastructure construction practices	Yes
Planners or engineers with an understanding of natural hazards	Yes
Staff with training in benefit/cost analysis	No
Floodplain manager	Yes
Surveyors	Yes
Personnel skilled or trained in GIS applications	Yes
Scientist familiar with natural hazards in local area	No
Emergency manager	No
Grant writers	Yes

**TABLE 6-5.
FISCAL CAPABILITY**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	No

**TABLE 6-6.
COMMUNITY CLASSIFICATIONS**

	Participating?	Classification	Date Classified
Community Rating System	No	--	--
Building Code Effectiveness Grading Schedule	Yes	3/3	--
Public Protection	No	6/9	--
Storm Ready	No	--	--
Firewise	No	--	--

**TABLE 6-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative SCE #1—Retrofit sewer mains in floodplain.						
Existing	Flood, Earthquake	1,2,3,4,5	Town	High, \$500,000	General Fund, Capital improvements project funding, FEMA Hazard Mitigation Grants	Long-term, depends on funding
Initiative SCE #2—Retrofit water mains within the floodplain.						
New and Existing	Flood, EQ	1,2,3,4,5	Town	High \$750,000	General Fund, Capital improvements project funding, FEMA Hazard Mitigation Grants, CDBG	Long-term, depends on funding
Initiative SCE #3—Maintain and retrofit existing localized flood control structures.						
Existing	Flood	1,2,3,4,5	Town	Low \$24,000	General Fund	Short-term Ongoing
Initiative SCE #4—Retrofit all critical infrastructure to enhance resilience to all hazards.						
Existing	All Hazards	1,2,3,4,5	Town	High	General Fund, Capital improvements project funding, FEMA Hazard Mitigation Grants	Long-term, depends on funding
Initiative SCE #5—Adopt appropriate regulatory standards that will reduce the risk of natural hazards through updates to existing code affecting critical areas regulations, flood hazard regulations, shoreline regulations, and updates to the county’s comprehensive plan.						
New	All Hazards	1, 3, 4, 9, 10	Town	Low	General Fund	Short-Term
Initiative SCE #6—Continue to maintain compliance and good standing under the National Flood Insurance Program.						
New and Existing	Flood	1, 2, 3, 4, 6, 8, 10	Town	Low	General Fund	Short-term, ongoing
Initiative SCE #7—Consider participation in the National Weather Service “Storm Ready” program.						
New and Existing	Flood, Severe Weather	6, 7, 9	Town	Low	General Fund	Short term
Initiative SCE #8—Participate in Firewise and do a study on wildfire prevention and policies.						
New and existing	Wildfire	1,3,6,7,9	Town	Low	General Fund	Short-term

**TABLE 6-7.
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Initiative SCE #9 —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect structures from future damage, with properties with exposure to repetitive losses as a priority.						
Existing	All Hazards	1,2,8,10	Town	High	HMGP funding, Local contribution	Long-Term depends on funding
Initiative SCE #10 —Set the course for sustained operations of critical Town functions by the development of a continuity of operations plan and/or a post-disaster recovery plan.						
New and existing	All Hazards	1,6,9	Emergency Management Staff	Medium	General fund, DHS grant funding	Long-term
Initiative SCE #11 —Educate the public on natural hazards, the risks they pose and way to reduce those risk through existing public information programs with the City.						
New and Existing	All Hazards	6, 7, 9	Town	Low	General Fund	Short-term Ongoing
Initiative SCE #12 —Continue to support implementation, monitoring, maintenance and updating of this plan.						
New and Existing	All Hazards	All	Town	Low	HMGP, General Fund, Road Fund	Short-term, ongoing
Initiative SCE #13 —Continue to support through active participation the countywide initiatives identified in Volume 1 of the Kittitas County Hazard Mitigation Plan.						
New and Existing	All Hazards	5,6,9	Town	Low	General Fund	Short-term Ongoing

**TABLE 6-8.
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Priority ^a
1	5	High	High	Yes	Yes	No	Medium
2	5	High	High	Yes	Yes	No	Medium
3	5	High	Medium	Yes	No	Yes	High
4	5	High	High	Yes	Yes	No	Medium
5	5	Medium	Low	Yes	No	Yes	High
6	7	Medium	Low	Yes	No	Yes	High
7	3	High	Low	Yes	Yes	Yes	High
8	5	High	Medium	Yes	Yes	No	Medium
9	4	High	High	Yes	Yes	No	Medium
10	3	High	Medium	Yes	Yes	No	Medium
11	3	Low	Low	Yes	No	Yes	High
12	10	Medium	Low	Yes	Yes	Yes	High
13	3	Medium	Low	Yes	No	Yes	High

a. Explanation of priorities

- High Priority: Project meets multiple plan objectives, benefits exceed cost, funding is secured under existing programs, or is grant eligible, and project can be completed in 1 to 5 years (i.e., short term project) once funded.
- Medium Priority: Project meets at least 1 plan objective, benefits exceed costs, requires special funding authorization under existing programs, grant eligibility is questionable, and project can be completed in 1 to 5 years once funded.
- Low Priority: Project will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and time line for completion is long term (5 to 10 years).

**TABLE 6-9.
ANALYSIS OF MITIGATION INITIATIVES**

Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	5, 12, 13	4,9	11, 12, 13	--	10, 13	--
Dam failure	5, 12, 13	4, 9	11, 12, 13	--	10, 13	--
Drought	5, 12, 13	4, 9	11, 12, 13	--	10, 13	--
Earthquake	5, 12, 13	1,2, 4, 9	11, 12, 13	--	10, 13	--
Flood	5, 6, 12, 13	1,2,3, 4, 6, 9	6, 11, 12, 13	--	6, 7, 10, 13	--
Landslide	5, 12, 13	4, 9	11, 12, 13	--	10, 13	--
Severe Weather	5, 12, 13	4, 9	11, 12, 13	--	7, 10, 13	--
Volcano	5, 12, 13	4, 9	11, 12, 13	--	10, 13	--
Wildfire	5, 8, 12, 13	4, 8, 9	8, 11, 12, 13	8	8, 10, 13	--

Notes:

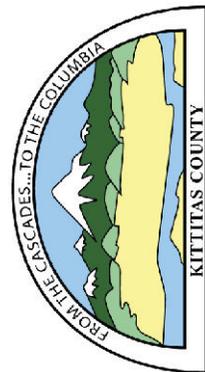
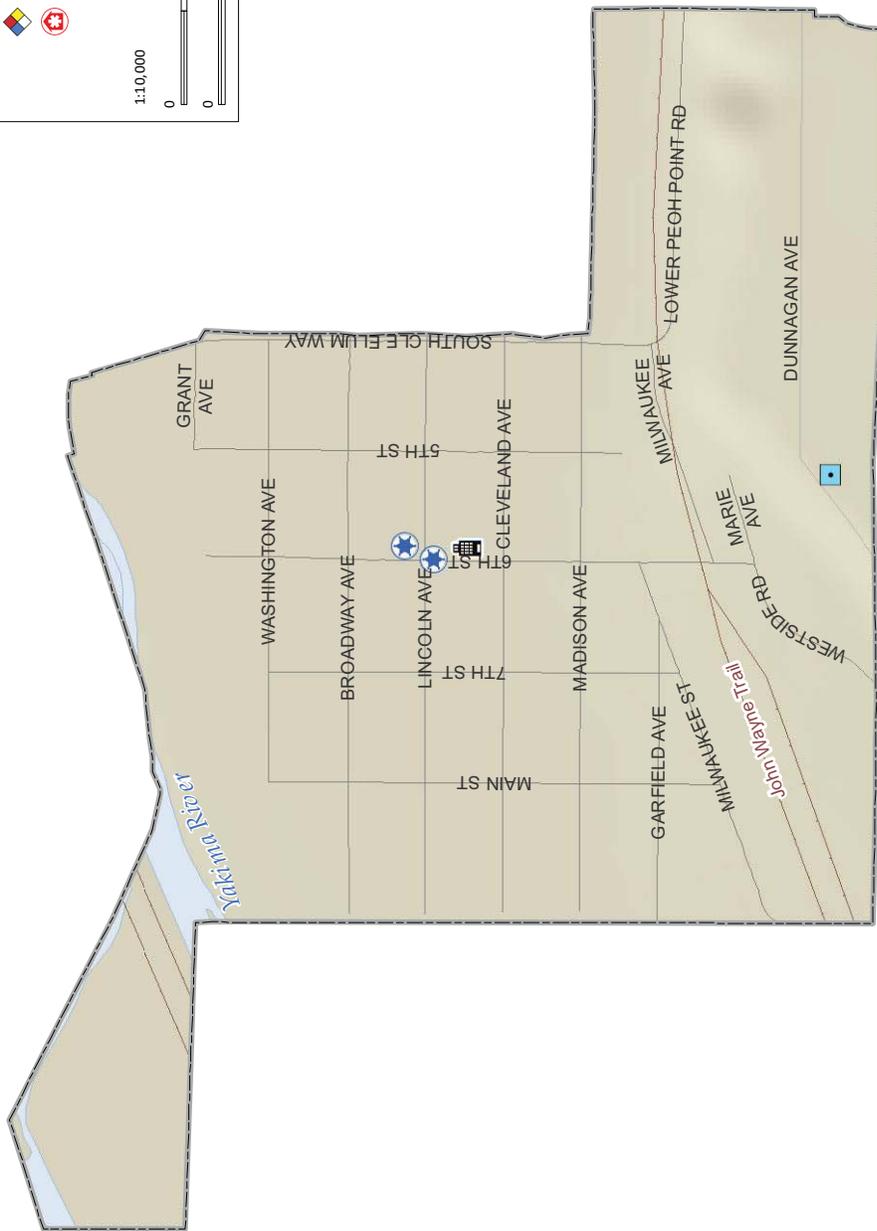
1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

SOUTH CLEELUM

Critical Facilities

- | | | | |
|---|---------------|---|------------|
|  | Bridge |  | Power |
|  | Communication |  | Protective |
|  | Dam |  | School |
|  | Government |  | Wastewater |
|  | Hazmat |  | Water |
|  | Medical |  | Other |

1:10,000

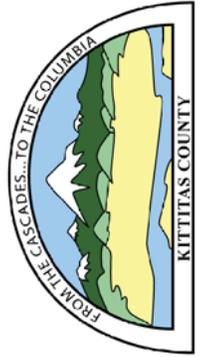
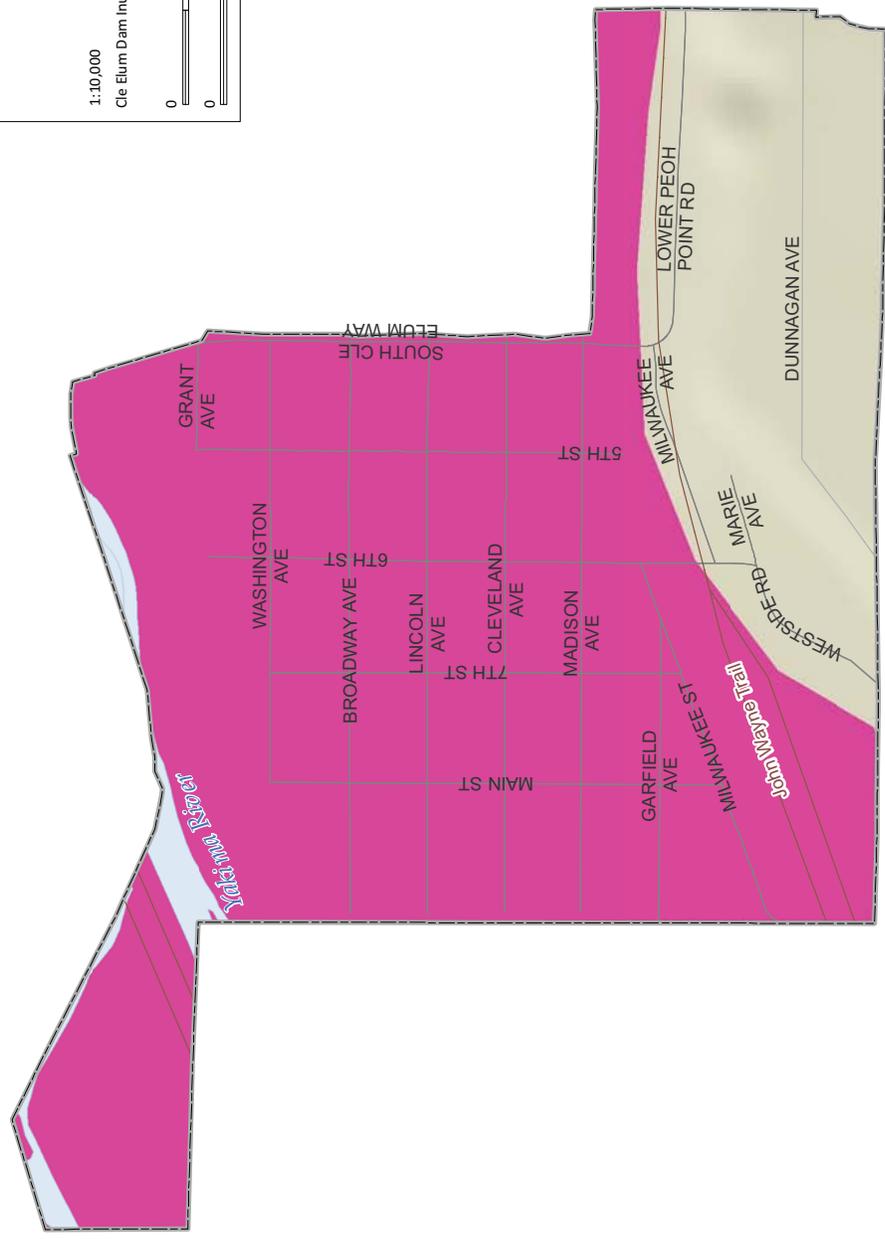
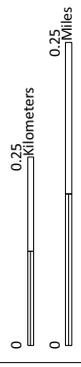


SOUTH CLE ELUM

Cle Elum Dam Inundation Area

 Cle Elum Dam Failure Probable Maximum Flood

1:10,000
Cle Elum Dam Inundation Area data provided by Kittitas County

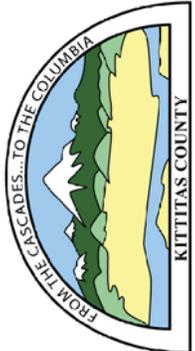
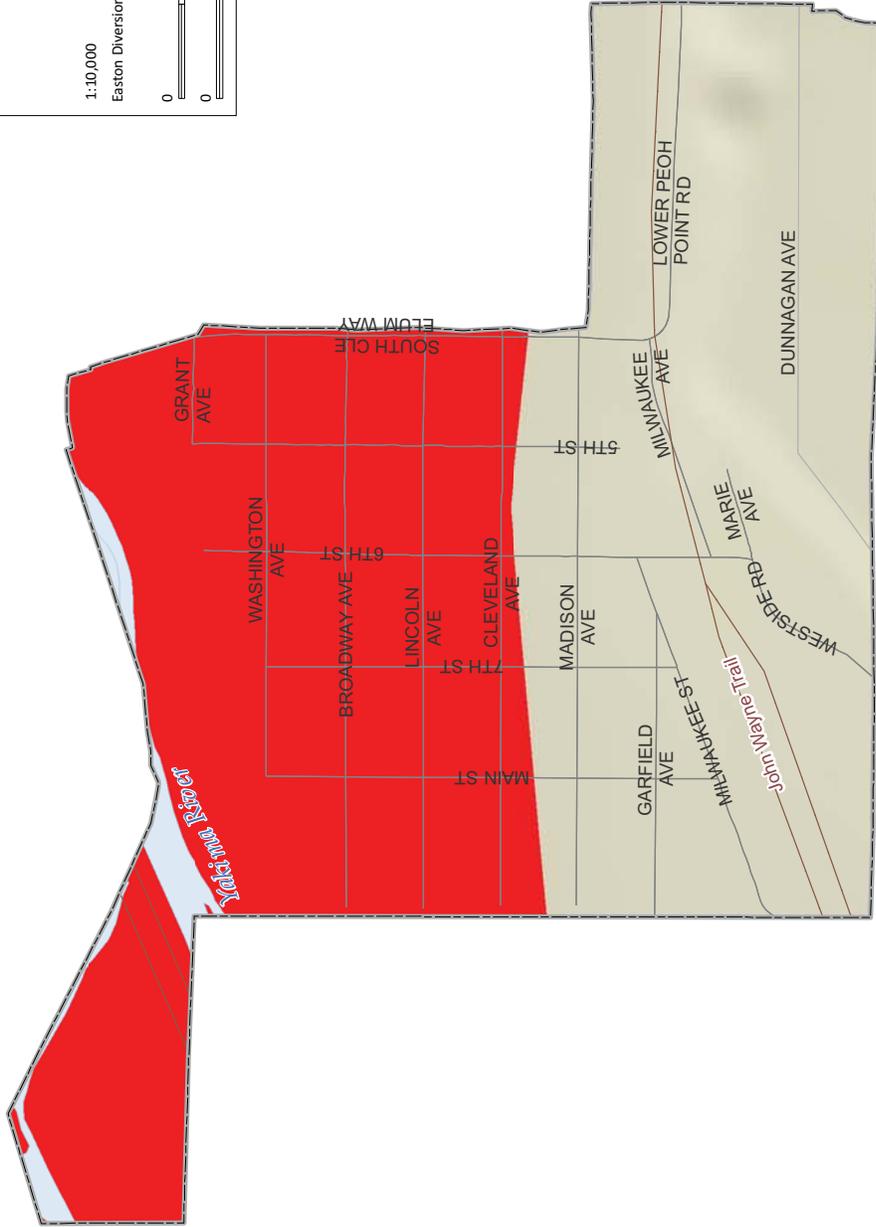
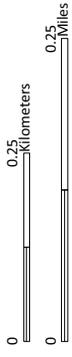


SOUTH CLE ELUM

Easton Diversion Dam Inundation Area

 Easton Diversion Dam Failure
Probable Maximum Flood

1:10,000
Easton Diversion Dam Inundation Area data provided by Kittitas County



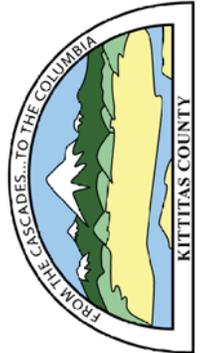
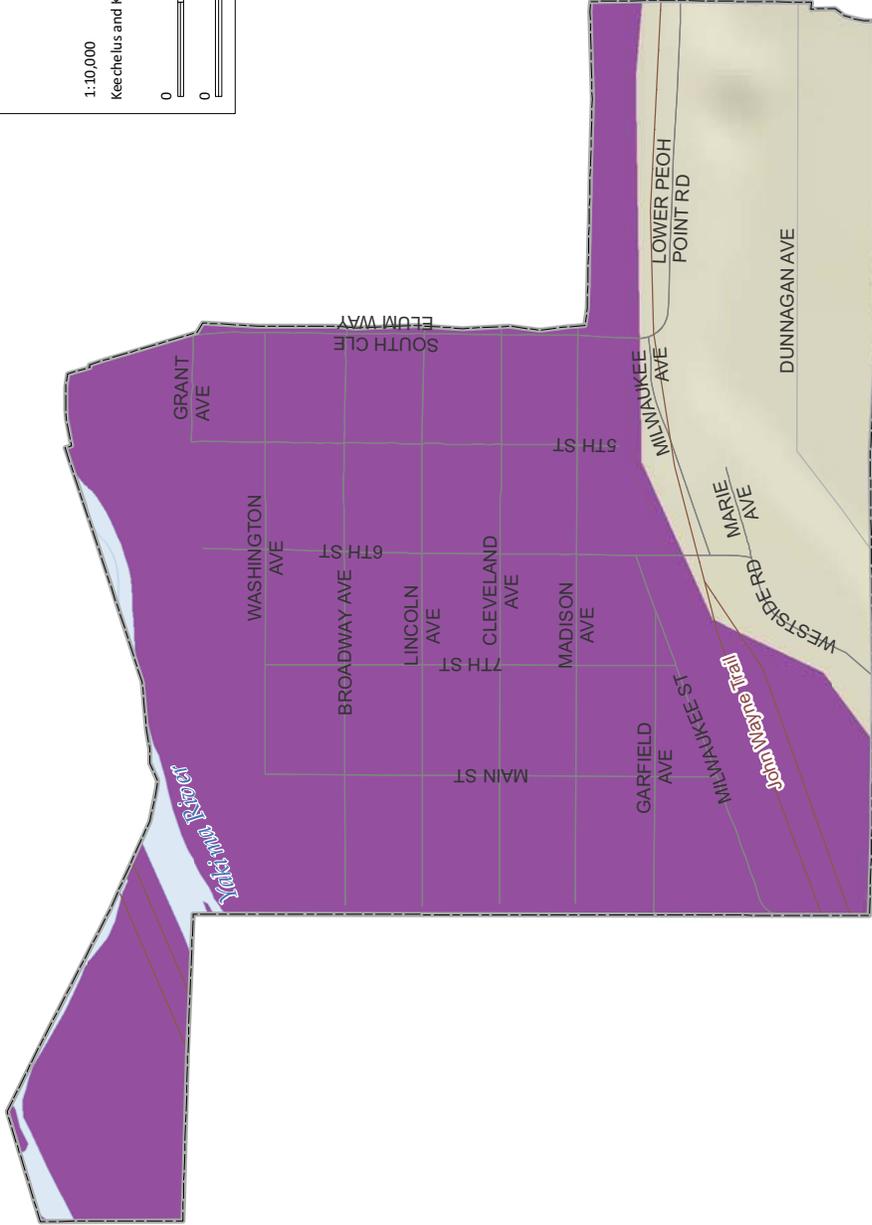
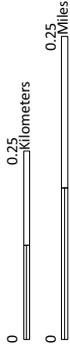
SOUTH CLE ELUM

Keechelus & Kachees Dam Inundation Areas

 Keechelus & Kachees Dam Inundation Area
Probable Maximum Flood

1:10,000

Keechelus and Kachees Dam Inundation Area data provided by Kittitas County



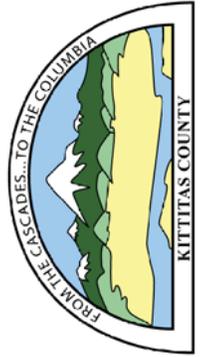
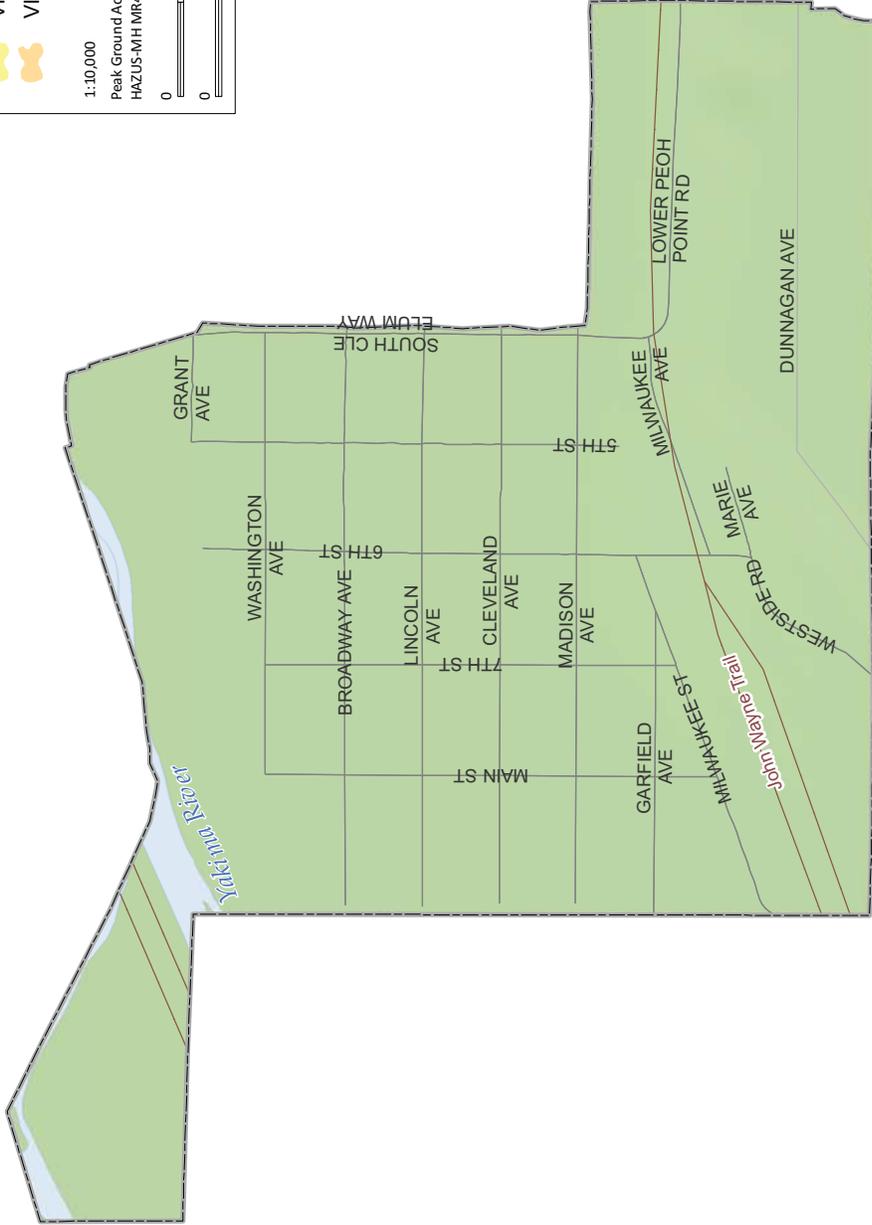
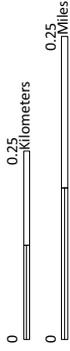
SOUTH CLE E LUM

Peak Ground Acceleration
USGS 100 Year
Probabilistic Event

- Mercalli Scale, Potential Damage
-  V, Very Light
 -  VI, Light
 -  VII, Moderate

1:10,000

Peak Ground Acceleration USGS 100 Year Probabilistic Event
HAZUS-MH MR4 Output, United States Geological Survey



SOUTH CLE ELUM

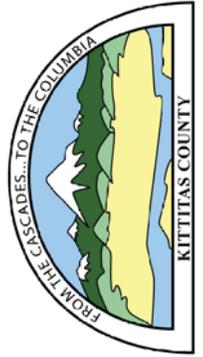
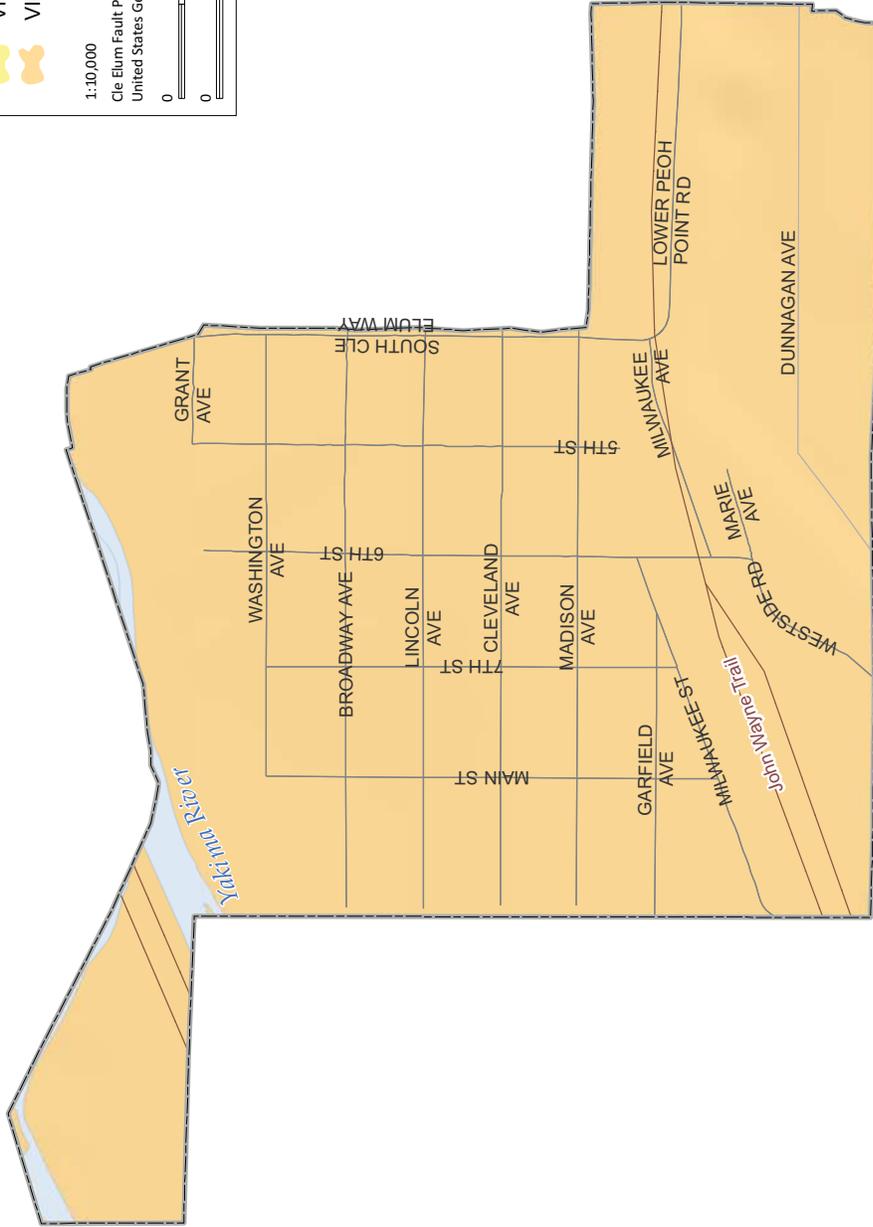
Cle Elum Fault
 Peak Ground Acceleration
 6.8 Magnitude Scenario

Mercalli Scale, Potential Damage

	V, Very Light		VIII, Moderate-Heavy
	VI, Light		IX, Heavy
	VII, Moderate		

1:10,000

Cle Elum Fault PGA Shake Map Data
 United States Geological Survey



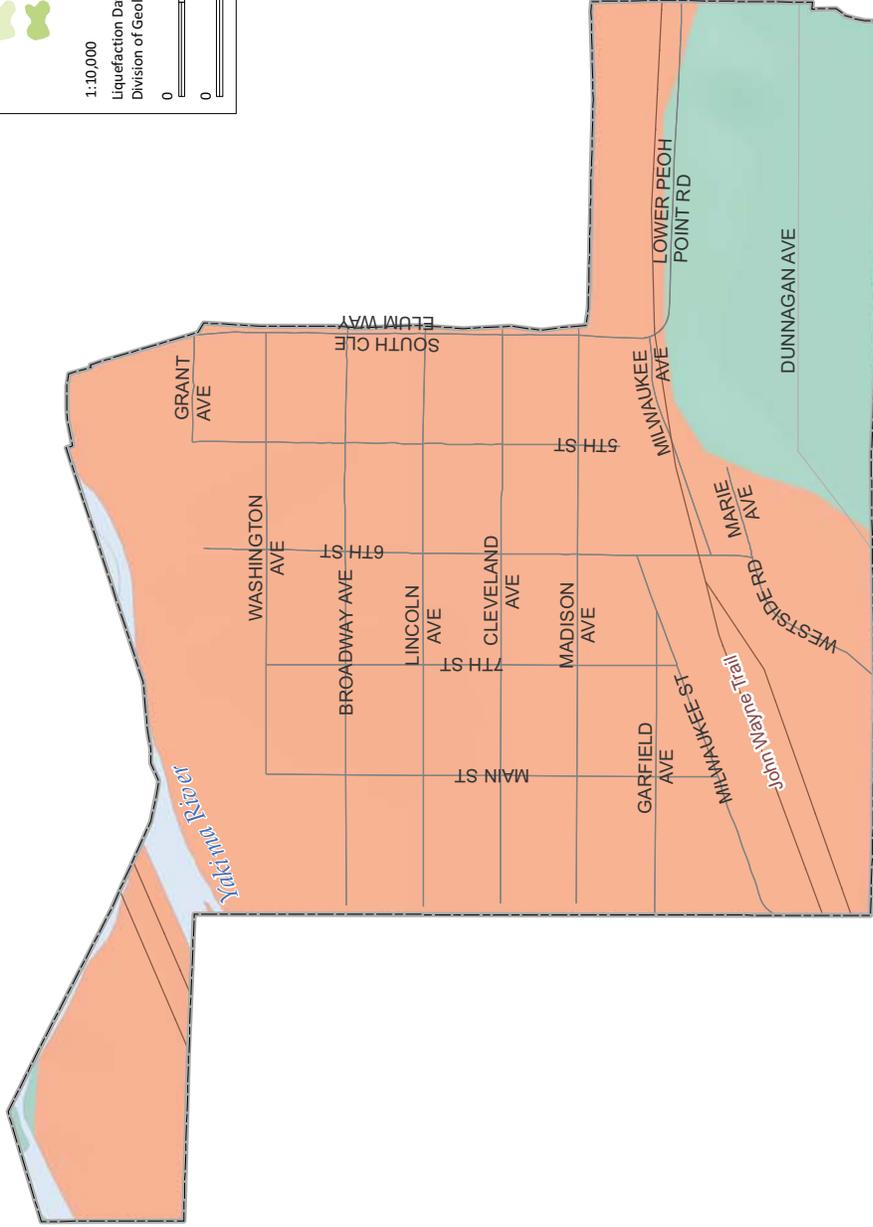
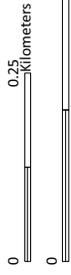
SOUTH CLE ELUM

Liquefaction Susceptibility

-  High
-  Moderate to High
-  Moderate
-  Low to Moderate
-  Low
-  Very Low to Low
-  Very Low
-  Bedrock
-  Peat
-  Water
-  Ice

1:10,000

Liquefaction Data provided by Washington State Department of Natural Resources,
Division of Geology and Earth Resources



SOUTH CLE ELUM

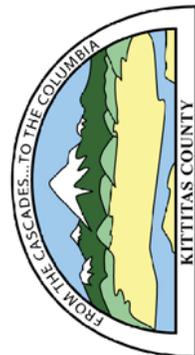
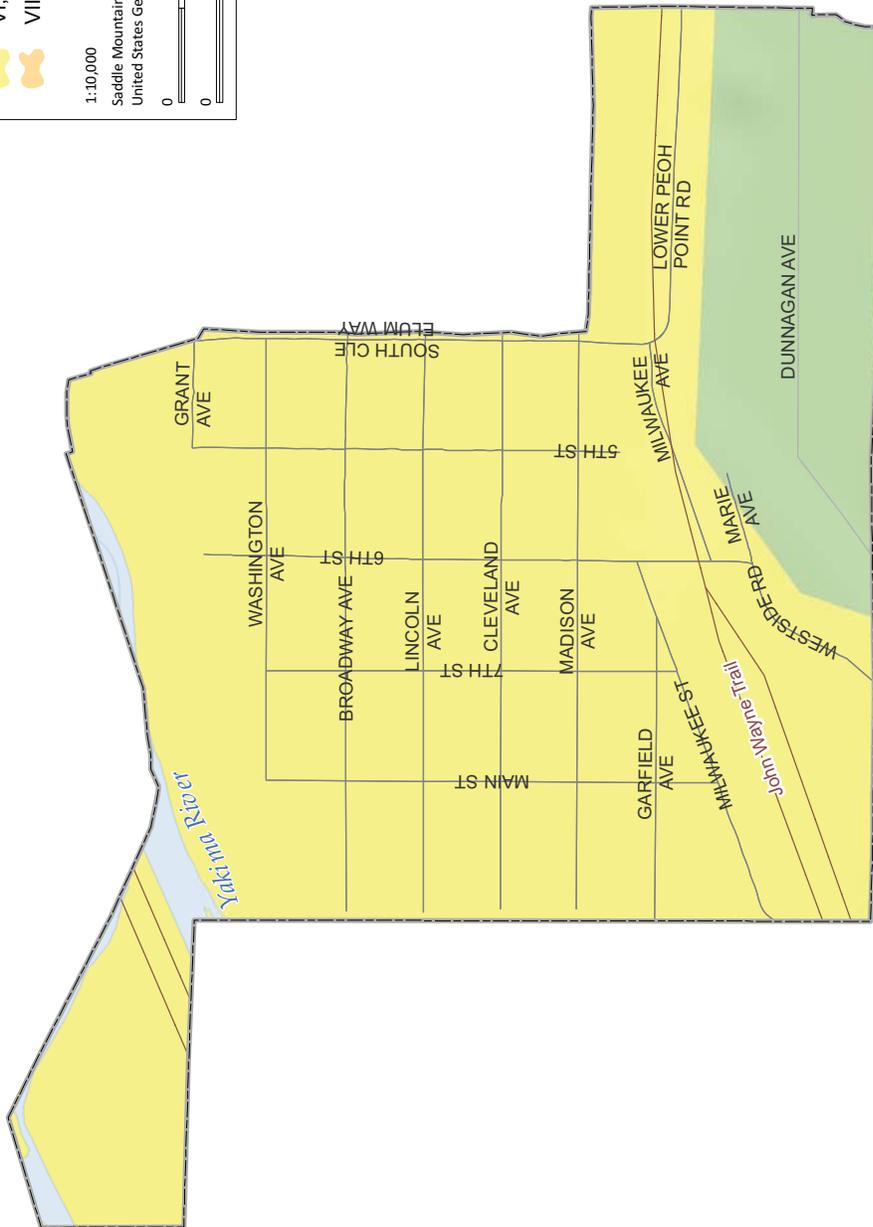
Saddle Mountain Peak Ground Acceleration 7.3 Magnitude Scenario

Mercalli Scale, Potential Damage

-  V, Very Light
-  VI, Light
-  VII, Moderate
-  VIII, Moderate-Heavy
-  IX, Heavy

1:10,000

Saddle Mountain Fault PGA Shake Map Data
United States Geological Survey



SOUTH CLEELUM

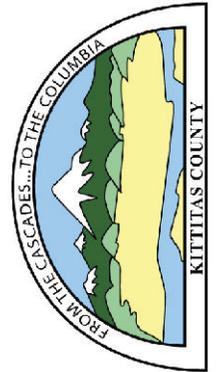
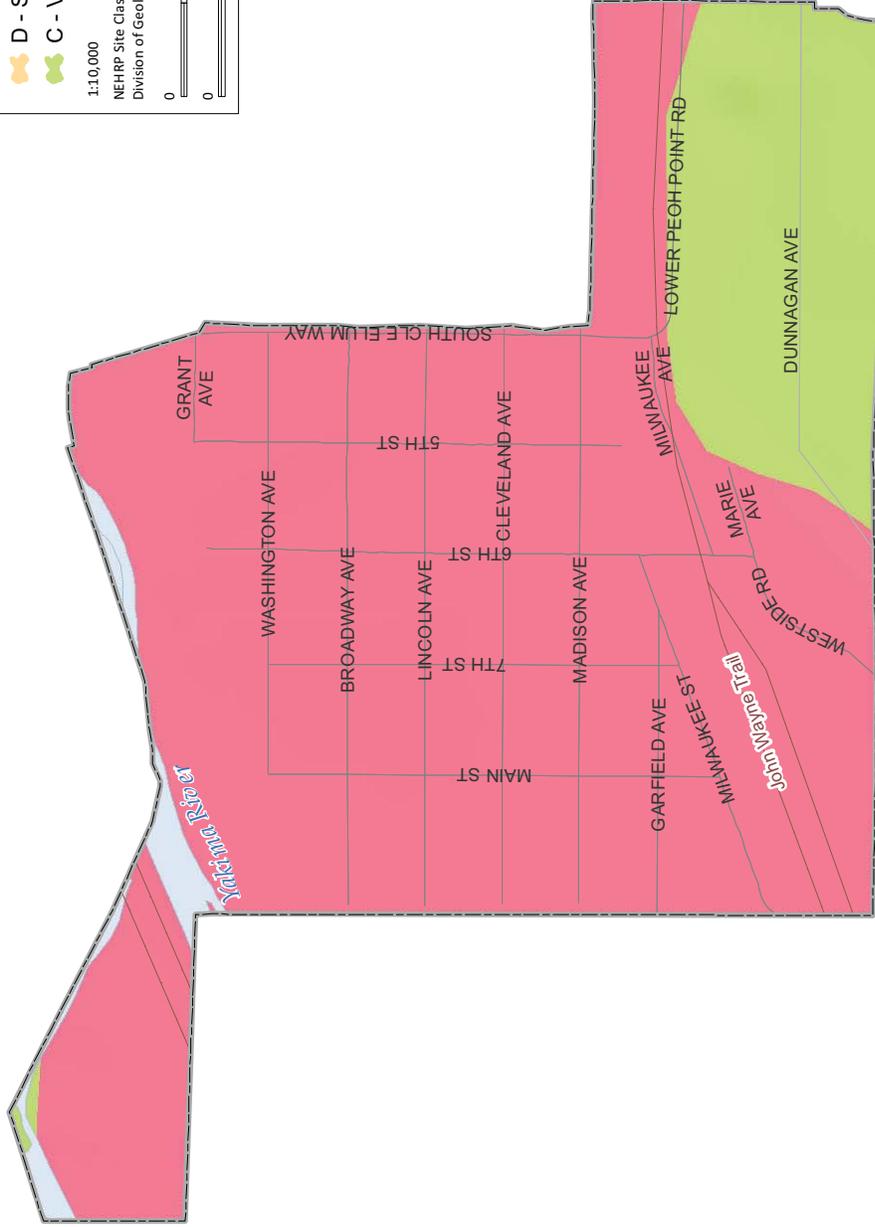
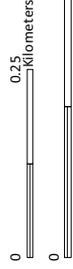
National Earthquake Hazard Reduction Program (NEHRP)

Soil Site Classes

- F - Requires site-specific investigation
- E - Soft Soil
- D - Stiff Soil
- C - Very Dense Soil and Soft Rock
- B - Rock
- Water
- Ice

1:10,000

NEHRP Site Class Data provided by Washington State Department of Natural Resources, Division of Geology and Earth Resources



SOUTH CLE ELUM

FEMA FIRM Flood Hazard Areas

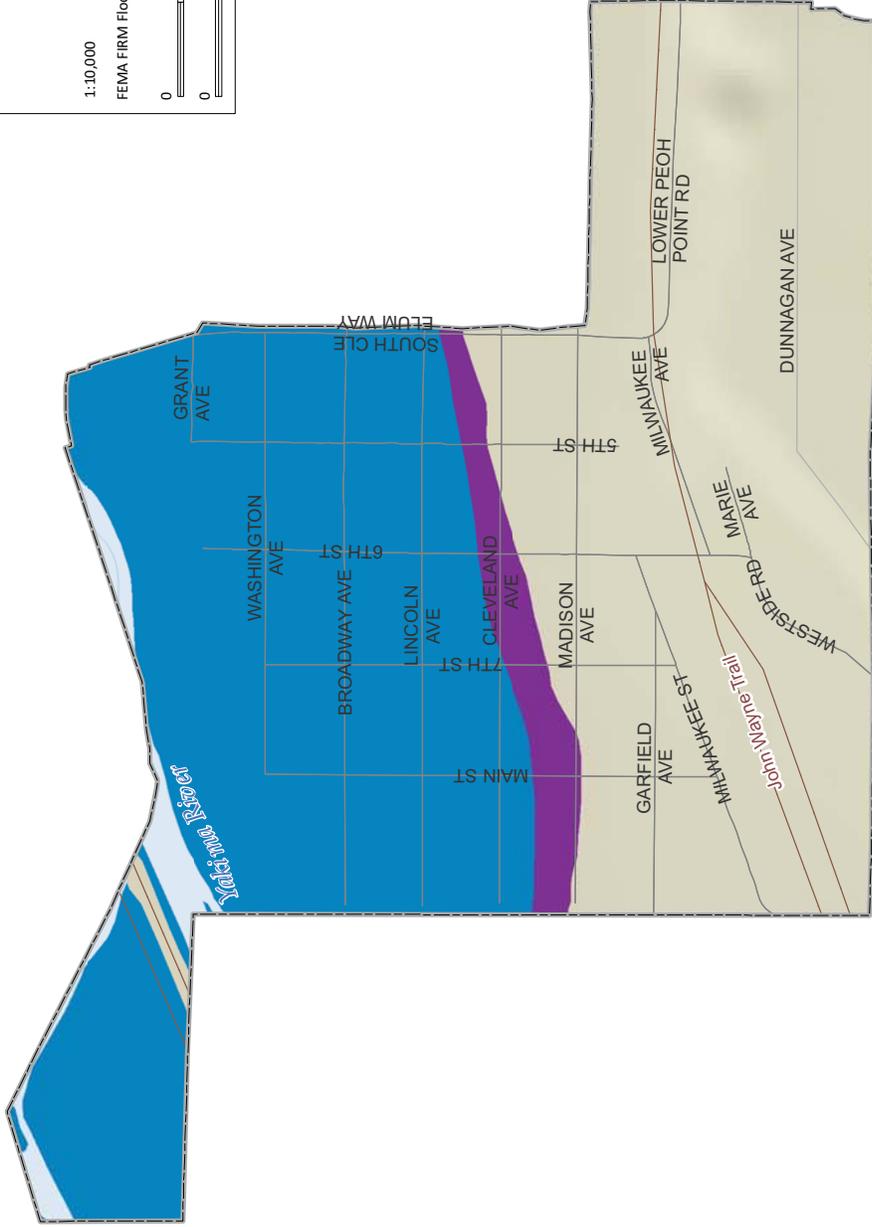
-  1-percent annual chance flood (100 Year)
-  0.2-percent annual chance flood (500 Year)

1:10,000

FEMA FIRM Flood Data provided by Kittitas County

0 0.25 Kilometers

0 0.25 Miles



SOUTH CLE ELUM

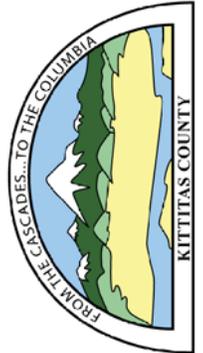
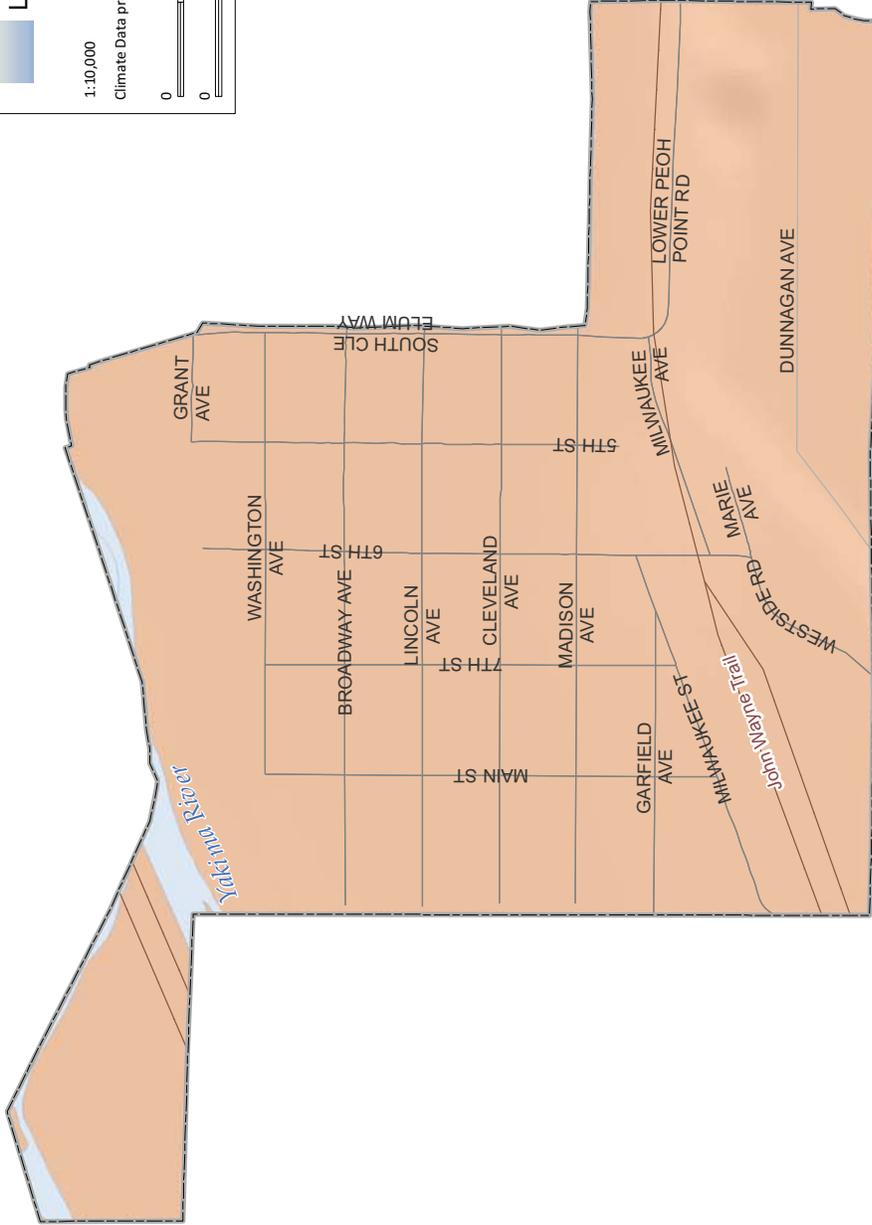
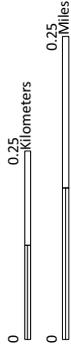
Average Maximum Temperature (F)



Average Maximum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000.
USDA/NRCS

1:10,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center



SOUTH CLE ELUM

Average Minimum Temperature (F)

Average Annual Minimum Temperature (F)
 High : 25
 Low : 15

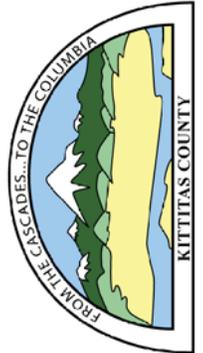
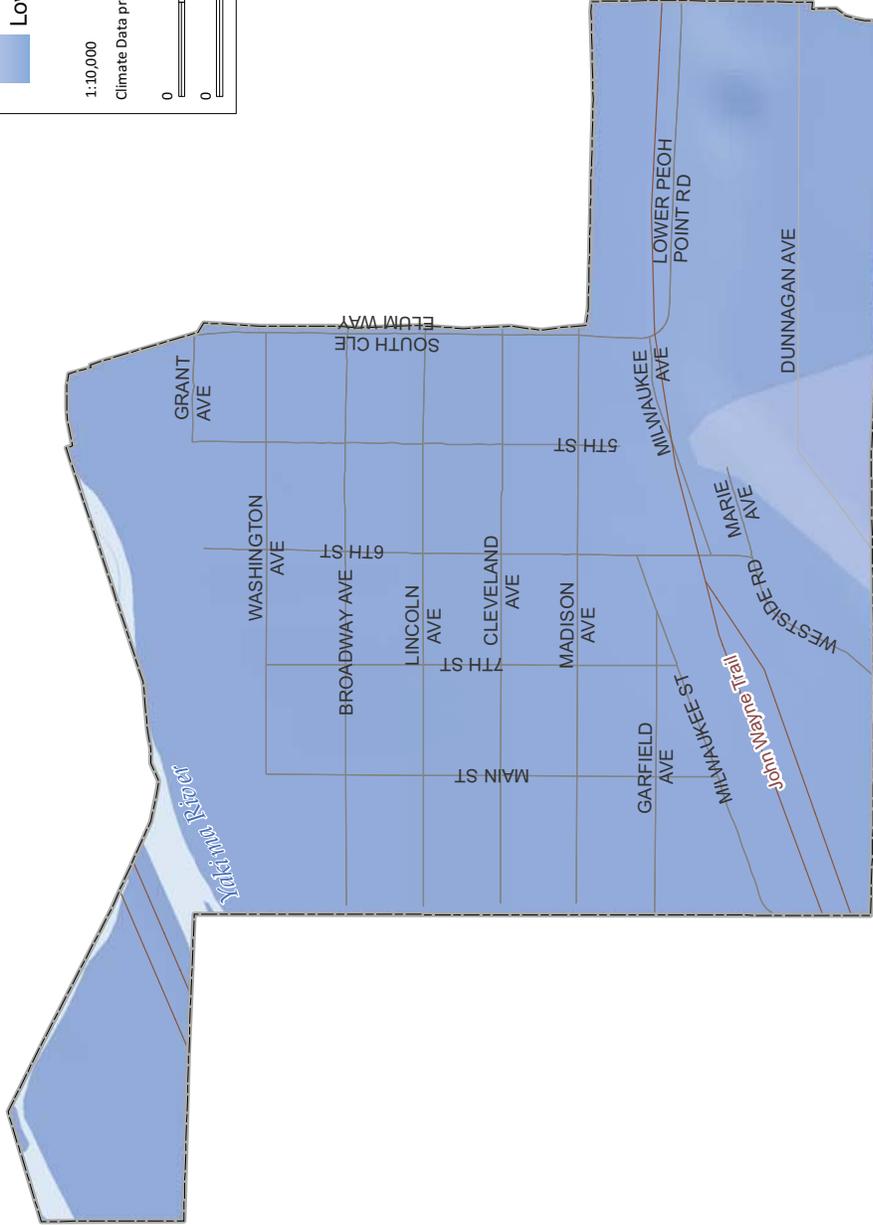
Average Minimum Temperature is according to a model using point temperature data for the 30-year period of 1971-2000. USDA/NRCS

1:10,000

Climate Data provided by USDA/NRCS - National Cartography & Geospatial Center

0 0.25 Kilometers

0 0.25 Miles



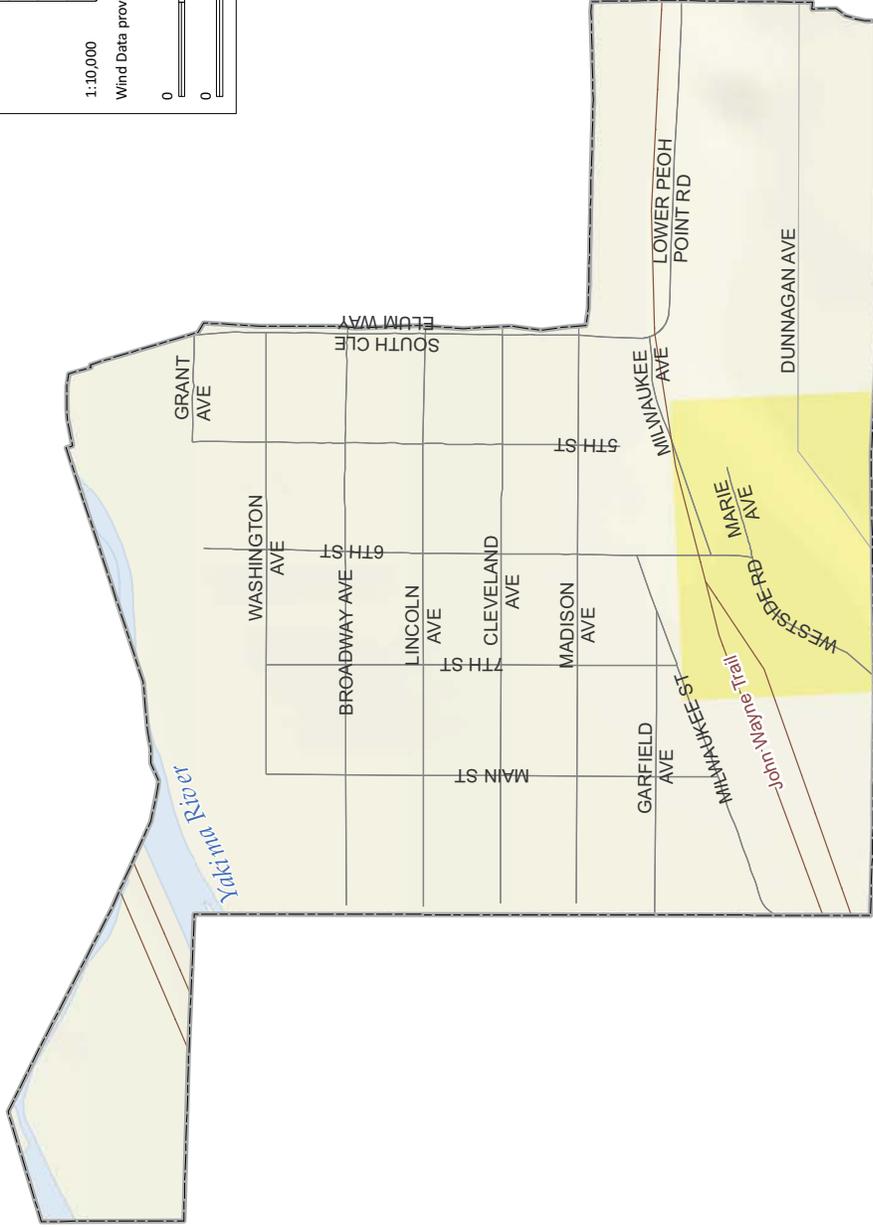
SOUTH CLE ELUM

Potential Wind Power

Wind Power Class	Resource Potential	Wind Power Density at 50m W/m ²	Wind Speed at 50m m/s	Wind Speed at 50m mph
1	None	0	0	0
2	Marginal	200-300	5.6-6.4	12.5-14.3
3	Fair	300-400	6.4-7.0	14.3-15.7
4	Good	400-500	7.0-7.5	15.7-16.8
5	Excellent	500-600	7.5-8.0	16.8-17.9
6	Outstanding	600-800	8.0-8.8	17.9-19.7
7	Superb	>800	>8.8	>19.7

1:10,000

Wind Data provided by US Department of Energy and National Renewable Energy Laboratory



SOUTH CLE ELUM

Fire Regime Status

- 0-35 yrs, Low Severity
- 0-35 yrs, Stand Replacement
- 35-100+ yrs, Mixed Severity
- 35-100+ yrs, Stand Replacement
- 200+ yrs, Stand Replacement

1:10,000

Fire Regime Status Data provided by Washington State Department of Natural Resources

