

## 16 CITY OF MUKILTEO ANNEX

### 16.1 HAZARD MITIGATION PLAN POINT OF CONTACT

#### Primary Point of Contact

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### 16.2 JURISDICTION PROFILE

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

- **Date of Incorporation**— May 1947
- **Current Population**—20,900 as of April 2015 (Washington State Office of Financial Management 2015 population estimate)
- **Population Growth**— As Mukilteo nears build out its population growth has slowed. Since 2000 the population has grown by 16% (2,881 people). However, since 2010 population growth has slowed even more to 3.2% (646 people). Growth will likely slow down even more in the coming years.
- **Location and Description**— Mukilteo is located on the Puget Sound with views of the Olympic Peninsula and Olympic Mountains to the west, Whidbey Island to the northeast, and the Northern Cascade Mountains to the north and east. It is in the southwestern portion of Snohomish County, 25 miles north of Seattle. Mukilteo encompasses 6.61 square miles of land. Of that, approximately 51% is developable. The city is one leg of the Washington State Ferries Mukilteo-Clinton (Whidbey Island) route. It takes 20 minutes to sail between the two terminals. It is the system's busiest route for vehicle traffic (2.4 million vehicles per year) and has the third highest annual ridership (4.2 million passengers per year).
- **Brief History**— In 1855, the area that is now Mukilteo was the site of the Point Elliot Treaty which was signed by Governor Isaac Stevens and representatives of 22 Native American tribes. Its northern beach was a long-time and well-known Native American gathering place for councils and potlatches (ceremonial feasts and tribal gatherings). A mere three years later, in 1858, the town of Mukilteo was founded. It was the first settlement in Snohomish County and was known for its trading post, lumber mills, cannery, and deep water port. For a while it was the County seat. Mukilteo's iconic lighthouse first went into service in 1906. The City of Mukilteo was incorporated in 1947 with a population of 775 citizens. In 1980, an area to the south of the city boundaries was annexed, followed by the 1991 annexation of Harbour Pointe; a master planned community that included a shopping center and an award-winning public golf course. Each annexation essentially doubled the city's population and area. Mukilteo is located at the north end of the Technology Corridor which extends from Bellevue to Mukilteo. The City is home to many professional, service and light industrial-manufacturing businesses, including the Boeing Company and Electroimpact. Snohomish County Paine Field Airport

borders the east side of the City and provides general aviation and corporate services as well as aircraft testing for the Boeing Company.

- **Climate**— Mukilteo’s climate is typical for the Pacific Northwest. Annual precipitation is 37 inches, mostly as rain with occasional snow. Average temperatures range from a low of 42.8°F to an average high of 59.2°F. The coldest months are January and December (average low of 34°F) and the hottest is August (average high of 74°F).
- **Governing Body Format**— The City is governed by a strong Mayor/Council form of government. The Mayor is elected to a 4-year term as the city’s chief executive. The City Council is comprised of seven members who serve 4-year terms. All positions are non-partisan. The City government has seven departments: Executive, Planning & Community Development, Public Works, Finance, Police, Fire, and Recreation & Cultural Services.
- **Development Trends** – Mukilteo is primarily a single family residential city. It is largely built out with very little vacant land remaining (2.6% of the developable area). As a result, and as identified in the recently adopted Comprehensive Plan, future development activity will be primarily redevelopment.

### 16.3 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 16-1 lists all past occurrences of natural hazards within the jurisdiction. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: None
- Number of Repetitive Flood Loss Properties that have been mitigated: N/A

### 16.4 HAZARD RISK RANKING

Table 16-2 presents the ranking of the hazards of concern.

### 16.5 CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 16-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 16-4. The assessment of the jurisdiction’s fiscal capabilities is presented in Table 16-5. Classifications under various community mitigation programs are presented in Table 16-6.

### 16.6 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 16-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 16-8 identifies the priority for each initiative. Table 16-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

### 16.7 STATUS OF PREVIOUS PLAN INITIATIVES

Table 16-10 summarizes the initiatives that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

## 16.8 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

Hazard area extent and location maps have been generated for the City of Mukilteo and 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.

The City of Mukilteo is an active participant in the Regional Landslide Working Group. Through this partnership the City has also hosted and conducted several public outreach forums to educate residents on landslide risks and mitigation measures. The City will continue its partnership with WSDOT and BNSF and remain an active participant in the Regional Landslide Working Group.

## 16.9 INTERNAL PLANNING PROCESS

The internal planning process kicked off on September 24<sup>th</sup> in a joint meeting with Mukilteo Staff, Snohomish County Department of Emergency Management Staff and a representative of the UW contracting team hired by Snohomish County. In attendance were the City Administrator and representatives from Public Works, Planning and Community Development, Police, Fire, Finance and Recreation and Cultural Services. The HMP process was presented and discussed, along with a general timeline. The template and planning resources were provided to the City. At this meeting, the local risk rating took place and is documented in Table 16-2.

Subsequent meetings within the City occurred on September 24, 2015, October 5, 2016 and February 9, 2016 to refine the draft document.

## 16.10 ADDITIONAL COMMENTS

The following comments are intended to provide additional information about the risk ratings shown in Table 16-2.

### **Earthquake:**

Mukilteo is located in Seismic Zone 3, between several fault lines, and with three parallel fault lines running directly through the City at a diagonal from the northwest to the south east. An earthquake is therefore considered to be a significant risk for the City.

As discussed in this document's HIVA, earthquakes occur in Washington State on an almost daily basis. While most quakes are minor, seismologists tell us that we can expect a 7.0 magnitude deep or intraplate earthquake about every 70 years and an 8.0 or greater subduction quake every 150 to 1,100 years.

Based on this information, when a major earthquake occurs in the region, the City can expect significant damage, injuries, and possibly deaths.

Earthquake is rated as a MODERATE to HIGH RISK.

### **Flooding**

Mukilteo does not have any major rivers flowing in or around its borders. It does, however, have wetlands and several creeks and streams running through it as well as 66 miles of road (impervious surface). While all of these items contribute to intermittent flooding in sections of the City, it is primarily "urban flooding" in nature, as described in the following sections.

In December 2007 over 4 inches of rain fell in the greater Seattle area. However, the usual Snohomish County flooding event where the county's riverbanks are breached did not occur as the rivers were contained within their banks. Instead, the urban areas in the south part of the county took the brunt of the damage and experienced urban flooding. (See the *Urban Flooding* section below for more information and for photos.)

The area around the Mukilteo Lighthouse is the repetitive flood area, with this associated primarily with tidal surge hindering the ability of storm drainage facilities to discharge into Puget Sound.

All but two of the parcels in the lighthouse flood area west of SR525 are owned by the City and are designated for park use, thereby minimizing the potential for flood damages.

About half of the area east of SR525 is used by Washington State Ferries for ferry queuing and the U.S. Government for a National Ocean and Atmospheric Administration laboratory. All of the privately owned parcels are fully developed. Any redevelopment would be required to meet National Flood Insurance Program (NFIP) construction requirements.

The City is in good standing with the NFIP and has no findings. The City was originally flood-mapped in 1976, with the most recent map dated September 16, 2005.

**100-Year Flood:**

The City has multiple creeks and wetlands located within the city limits, and these are vulnerable to regular, seasonal flooding events. While these events are damaging, they are limited in scope and not catastrophic in nature.

Altogether, the City of Mukilteo has 60 acres located in the 100-year floodplain, located on the northern edge of the City, affecting 76 lots. The total value for this property, and the improvements upon it, is \$37,805,900.

While the City has some risk from a major flooding event, it is limited in its impact to the City, and the likelihood of occurrence (1%, by definition) limits the risk still further. Two maps, provided below, show the areas of 100-year flood.

Overall, the risk for a 100-year flood in the City of Mukilteo is LOW.

**Storm Surge / Tidal Surge:**

Storm surge or tidal surge is simply water that is pushed toward the shore by the force of the winds swirling around the storm. This advancing surge combines with the normal tides to create the hurricane-force storm tide, which can increase the mean water level to heights impacting roads, homes and other critical infrastructure. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides.

The storm surge combined with wave action can cause extensive damage, severely erode beaches and coastal highways. While this is most frequently sent in areas that are prone to hurricane, the shoreline areas of Washington State may also be vulnerable to this natural hazard.

Many of the waterfront properties in Mukilteo have an elevation of 11-feet. In October 2003, Mukilteo experienced tidal surges in association with 40 mph windstorms. Employees and diners at Ivar's Restaurant reported water coming under the restaurant door and seeing the floor raise approximately four feet several times due to waves. In addition, the storm broke out windows, buckled the floor and washed away half the deck. While storm surge is a concern, the impact is very localized and occurs infrequently.

As a result, the risk for Mukilteo is considered to be LOW.

**Urban Flooding:**

Generally, Mukilteo experiences very little urban flooding. Even excessive rainfall or snowmelt is handled by the existing storm water system, wetlands, creeks and streams. However, in December 2007, when the greater Seattle area experienced over 4 inches of rain in a 24-hour period, multiple jurisdictions in the central and south Snohomish County area experienced localized flooding, including the City of Mukilteo. Though dramatic, the flooding was due to storm water systems being overwhelmed unable to accommodate that much storm water at once. As a result, the event was short-term in nature and quickly resolved itself.

**Landslide and Soil Displacement:**

Mukilteo has several geologically hazardous areas related to steep slopes and unstable soils. These areas are made more vulnerable by the fact that Mukilteo is in Seismic Zone 3 and is therefore exposed to the possibility of earthquakes from several fault lines in the area. A large earthquake may destabilize and displace soil causing landslides.

Other areas of the city are vulnerable because of creeks and streams. If the waterways flood or have an unusually high water flow, the water may undercut or wash away sections of the creek banks.

Heavy, saturating rains may also cause soil erosion, wash creek banks away, undermine roads and cause sinkholes. Several landslides as a result of the November 1996 and January 1997 storms severely damaged two roads making them impassible for an extended period of time and requiring significant expenditures on capital improvements to stabilize the slopes above and below these roads. The December 2007 storms resulted in Disaster Declarations, resulting in both Public Assistance and Individual Assistance being made available to Snohomish County. The photographs below illustrate some of the damage that resulted from the 2007 storm.

Landslide and soil displacement is of MODERATE risk.

**Severe Storm:**

Mukilteo is subjected to severe storms on a regular basis. Windstorms occur nearly every winter, and rainstorms are not unusual. While rarer, the City has also experienced heavy snows and freezing rains. Winds and snow or ice regularly cause tree branches to break and/or trees to fall. This may cause power outages or damage buildings.

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

During the 2006-2007 winter season, the Puget Sound area experienced multiple severe storms, including the Hanukkah Eve Storm (December 14-16) with wind gusts of 70 mph accompanied by heavy rains and followed by freezing temperatures.

The Puget Sound area, including Mukilteo, experienced power outages that lasted three days on average, with pockets of residences taking up to ten days for power to be restored.

In addition to the power outages, downed trees damaged both public and private property and required road closures in the interests of public safety.

Secondary effects of a severe storm may include the increased risk of landslide or soil displacement.

Severe Storm is a MODERATE risk.

**Tsunami and Seiche:**

There is a low likelihood that Mukilteo could experience a tsunami or seiche. Although Mukilteo has waterfront property on Puget Sound, the City is not located on the oceanfront and is buffered by the land masses in Puget Sound.

The elevation in Mukilteo ranges from 11-feet (right on a portion of the waterfront) to 597-feet. While this causes some steep slopes, it also provides protection from potential tsunami and/or seiche by the rapid increase in elevation in relatively short distances. This hazard is considered a VERY LOW risk.

**Volcano:**

Mukilteo is unlikely to suffer direct damage from a volcano eruption. In the event of an eruption, the City may experience ashfall, and this can interfere with the operation of motor vehicles, require expensive clean-up efforts by the City, and cause respiratory distress to the citizens. The City is highly unlikely to experience any lava flow, lahar activity, or any of the other risks associated with volcanoes.

A secondary effect of a volcano eruption is the influx of refugees into the area. This may be an issue to the City, and the region as a whole, as resources are overwhelmed by numbers of people that the infrastructure is not designed to handle. This includes everything from roads and highways, water and electric utilities, to the regional hospital.

The risk from volcanic activity is VERY LOW.

**Wildland-Urban Interface Fire:**

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

During the summer of 2003, new records were set for number of days without rain. As a result, Mukilteo and the Snohomish County region experienced several fires that were caused by careless smokers or sparks from machinery being operated next to dry grass. These fires were quickly contained and extinguished, but the close proximity of houses to these wildland areas, and the relative density of the housing units, makes wildland-urban interface fires a significant risk during periods of drought or excessive dryness.

It should be noted, however, that the large areas of greenbelt in connection with existing gulches and steep banks may make accessibility difficult. This, in turn, increases the fire danger as fire apparatus may not be able to reach the fire scene.

This is considered to be a VERY LOW risk.

**TABLE 16-1.  
NATURAL HAZARD EVENTS**

| Type of Event   | FEMA Disaster # (if applicable) | Date       | Preliminary Damage Assessment |
|---|---------------------------------|------------|-------------------------------|
| Severe Storms, Straight-line Winds, Flooding, Landslides, and Mudslides | 4249-DR                         | 01/15/2016 | \$107,303                     |
| Severe Windstorm  | 4242-DR                         | 10/15/2015 | No estimates available        |
| Severe Winter Storm, Flooding, Landslides, and Mudslides                | 4056-DR                         | 03/05/2012 | No estimates available        |
| Severe Winter Storm and Record and Near Record Snow                     | 1825-DR                         | 03/02/2009 | No estimates available        |
| Severe Winter Storm, Landslides, Mudslides, and Flooding                | 1817-DR                         | 01/30/2009 | No estimates available        |
| Earthquake  | 1316-DR                         | 02/28/2001 | No estimates available        |
| Severe Winter Storms/Flooding   | 1159-DR                         | 01/17/1997 | No estimates available        |
| Severe Storms/Flooding  | 1100-DR                         | 02/09/1996 | No estimates available        |
| Storms/High Winds/Floods  | 1079-DR                         | 01/03/1996 | No estimates available        |
| High Tides, Severe Storm  | 896-DR                          | 03/08/1991 | No estimates available        |

**TABLE 16-2.  
HAZARD RISK RANKING**

| Rank | Hazard Type             | Risk Rating Score<br>(Probability x Impact) | Description of Risk<br>(Describe the community impacts)  |
|------|-------------------------|---|--|
| 1    | Earthquake              | 54  | An earthquake of large enough magnitude will cause widespread damage to property and infrastructure which will include injuries and death. It is expected the severest damage will occur to homes located on or near steep slopes and structures at the waterfront that are in high liquefaction susceptibility areas.   |
| 2    | Severe Weather          | 48  | Severe Storm will create widespread power outages and downed trees. If power outages are long lasting public health would be impacted. Downed trees create not only inconvenience by blocking streets (which could impact the effectiveness of emergency responses by police and fire) but also cause property damage when they strike buildings and vehicles which in turn can lead to injuries and possibly deaths. Secondary effects of a severe storm often includes increased risk of landslide or soil displacement. |
| 2    | Climate Change          | 48  | Climate Change could be associated with increased storm severity whose impacts are described above. It also will lead to sea level rise which would increase property damage from flooding although the areas in the city that would be affected by this are very limited.   |
| 3    | Landslide/Mass Movement | 24  | Much of Mukilteo is exposed to potential landslide and mass earth movements. When this occurs there will be significant damage to structures, primarily residences which could render many houses uninhabitable thus displacing people. In addition, roadway can be blocked hindering emergency responses by police and fire which decreases their effectiveness in providing emergency medical services.  |
| 4    | Flood                   | 18  | Impacts from flooding would be very limited because flooding would not be widespread nor would it be of long duration. Property damage would be minimal and would affect only non-residential structures.  |

|     |                |    |  |
|-----|----------------|----|--|
| 4   | Tsunami/Seiche | 18 | Impacts from a tsunami would be minimal because of Mukilteo's topography. The City's bluffs and rapid increase in elevation from sea level protects most of the city from the damage a tsunami could cause. The impacts of a tsunami would be similar to those from flooding as described above.   |
| 5   | Volcano/Lahar  | 11 | The impact from volcanic activity would be widespread but not very significant. While Mukilteo will not suffer direct damage from a volcano eruption the ashfall could be widespread causing damage to property and vehicles and negatively impact the health of people with breathing problems.   |
| 6   | Wildland Fire  | 9  | The impacts from wildland fire would likely be minimal if they ever occur, which is not very likely. Mukilteo wildland fires will occur in gulches with steep sides which will help contain the negative impacts. However, residences near the top of gulches could be set afire by flying embers. |
| N/A | Avalanche      | 0  | There is no risk of avalanche in Mukilteo.   |
| N/A | Dam Failure    | 0  | There is no risk to Mukilteo from a dam failure event.   |

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**TABLE 16-3.  
LEGAL AND REGULATORY CAPABILITY**

|  | Local Authority       | State or Federal Prohibitions | Other Jurisdictional Authority | State Mandated | Comments                                      |
|--|-----------------------|-------------------------------|--------------------------------|----------------|---|
| <b>Codes, Ordinances &amp; Requirements</b>        |                       |                               |                                |                |   |
| Building Code                                      | Y                     | N                             | Y                              | N              | Mukilteo Municipal Code (MMC) Chapter 15.04   |
| Zonings  | Y                     | N                             | Y                              | Y              | MMC Title 17                                  |
| Subdivisions                                       | Y                     | N                             | Y                              | Y              | MMC Title 16                                  |
| Stormwater Management                              | Y                     | N                             | Y                              | Y              | Council Resolution 2015-21; Sept. 21, 2015    |
| Post Disaster Recovery                             | N                     | N                             | N                              | N              |   |
| Real Estate Disclosure                             | N                     | N                             | N                              | N              |   |
| Growth Management                                  | Y                     | N                             | Y                              | Y              |   |
| Site Plan Review                                   | Y                     | N                             | Y                              | Y              | MMC 17.13                                     |
| Special Purpose (flood management, critical areas) | Y<br>(critical areas) | N                             | Y                              | N              |   |
| <b>Planning Documents</b>                          |                       |                               |                                |                |   |
| General or Comprehensive Plan                      | Y                     | N                             | Y                              | Y              | Ordinance 1369; Oct. 5, 2015                  |
| Floodplain or Basin Plan                           | N                     | N                             | Y                              | N              |   |
| Stormwater Plan                                    | Y                     | N                             | Y                              | Y              |   |
| Capital Improvement Plan                           | Y                     | N                             | N                              | N              |   |
| Habitat Conservation Plan                          | N                     | N                             | N                              | N              |   |
| Economic Development Plan                          | N                     | N                             | N                              | N              |   |
| Emergency Response Plan                            | N                     | N                             | N                              | N              |   |
| Shoreline Management Plan                          | Y                     | N                             | Y                              | Y              | City County Resolution 2011-06; March 7, 2011 |
| Post Disaster Recovery Plan                        | N                     | N                             | N                              | N              |   |
| <b>Other</b>                                       |                       |                               |                                |                |   |
|  |                       |                               |                                |                |   |

**TABLE 16-4.  
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

| Staff/Personnel Resources   | Available? | Department/Agency/Position  |
|---|------------|---|
| Planners or engineers with knowledge of land development and land management practices  | Y          | 1 - Public Works Director<br>1 – Assistant City Engineer<br>1 – Sr. Engineer Tech<br>1 – Surface Water Program Manager<br>1 – Planning Director<br>1 – Planning Manager<br>3 – Staff City Planner |
| Engineers or professionals trained in building or infrastructure construction practices | Y          | 1 - Public Works Director<br>1 – Assistant City Engineer<br>1 – Sr. Engineer Tech<br>1 – Surface Water Program Manager<br>1 – Building Inspector  |
| Planners or engineers with an understanding of natural hazards                          | Y          | 1 - Public Works Director<br>1 – Assistant City Engineer<br>1 – Sr. Engineer Tech<br>1 – Surface Water Program Manager<br>1 – Planning Director<br>1 – Planning Manager<br>3 – Staff City Planner |
| Staff with training in benefit/cost analysis  | Y          | 1 - Public Works Director<br>1 – Assistant City Engineer  |
| Floodplain manager  | N          |   |
| Surveyors   | N          |   |
| Personnel skilled or trained in GIS applications  | y          | 1 – GIS Coordinator<br>1 – GIS Tech   |
| Scientist familiar with natural hazards in local area                                   | Y          | 1 – Surface Water Program Manager   |
| Emergency manager   | N          |   |

**TABLE 16-4.  
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

| Staff/Personnel Resources | Available? | Department/Agency/Position  |
|---------------------------|------------|---|
| Grant writers             | Y          | 1 - Public Works Director<br>1 – Assistant City Engineer<br>1 – Sr. Engineer Tech<br>1 – Surface Water Program Manager<br>1 – Planning Director |

**TABLE 16-5.  
FISCAL CAPABILITY**

| Financial Resources                                  | Accessible or Eligible to Use? |
|--|--------------------------------|
| Community Development Block Grants                   | No                             |
| Capital Improvements Project Funding                 | Yes – limited                  |
| Authority to Levy Taxes for Specific Purposes        | Yes – limited                  |
| User Fees for Water, Sewer, Gas or Electric Service  | Yes – surface water            |
| Incur Debt through General Obligation Bonds          | Yes – limited                  |
| Incur Debt through Special Tax Bonds                 | Yes – not likely               |
| Incur Debt through Private Activity Bonds            | Yes – not likely               |
| Withhold Public Expenditures in Hazard-Prone Areas   | No                             |
| State Sponsored Grant Programs                       | Yes                            |
| Development Impact Fees for Homebuyers or Developers | No                             |
| Other  |                                |

**TABLE 16-6.  
COMMUNITY CLASSIFICATIONS**

|  | Participating? | Classification | Date Classified |
|--|----------------|----------------|-----------------|
| Community Rating System                      | No             | N/A            | N/A             |
| Building Code Effectiveness Grading Schedule | No             | N/A            | N/A             |
| Public Protection                            | No             | N/A            | N/A             |
| Storm Ready                                  | No             | N/A            | N/A             |
| Firewise                                     | No             | N/A            | N/A             |
| Tsunami Ready                                | No             | N/A            | N/A             |

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**TABLE 16-7.  
HAZARD MITIGATION ACTION PLAN MATRIX**

| Applies to<br>new or<br>existing<br>assets  | Hazards<br>Mitigated | Objectives<br>Met | Lead<br>Department<br>& Position | Estimated<br>Cost | Sources of<br>Funding | Timeline | Included<br>in<br>Previous<br>Plan? |
|---|----------------------|-------------------|----------------------------------|-------------------|-----------------------|----------|-------------------------------------|
| <b>MK1: Continue and enhance hazard education programs.</b>   |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | All                  | All               | Fire Dept                        | 10,000/yr.        | City                  | Ongoing  | Yes                                 |
| <b>MK2: Develop and initiate Forest Management Program.</b>   |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Wildfire             | 3, 5              | Public<br>Works                  | 250,000           | City                  | 5 years  | Yes                                 |
| <b>MK3: Work with Mukilteo Water District and Alderwood Water and Sewer District to educate consumers about drought impacts and ways to minimize water waste.</b> |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Climate Change       | 5                 | Executive                        | Unknown           | City                  | Ongoing  | Yes                                 |
| <b>MK4: Conduct non-structural retrofit activities.</b>   |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Earthquake           | 3, 9              | Public<br>Works                  | 300,000           | City                  | 3 years  | Yes                                 |
| <b>MK5: Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.</b>                         |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Earthquake           | 3, 9              | Planning                         | 1,000             | City                  | Ongoing  | Yes                                 |
| <b>MK6: Identify public buildings and infrastructure that require structural retrofiting.</b>   |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Earthquake           | 3, 9              | Public<br>Works                  | 50,000            | City                  | 5 years  | Yes                                 |
| <b>MK7: Identify surface water drainage obstructions within the City of Mukilteo.</b>   |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Flood                | 5, 9              | Public<br>Works                  | 50,000            | City                  | 3 Years  | Yes                                 |
| <b>MK8: Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.</b>                   |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Landslide            | 3, 9              | Public<br>Works                  | 20,000            | City                  | Ongoing  | Yes                                 |
| <b>MK9: Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe storms.</b>        |                      |                   |                                  |                   |                       |          |                                     |
| Existing  | Severe Weather       | 9                 | Public<br>Works                  | Unknown           | City                  | Ongoing  | Yes                                 |
| <b>MK10: Increase public awareness of severe storm mitigation activities.</b>   |                      |                   |                                  |                   |                       |          |                                     |

|  |                |         |              |            |      |         |     |
|--|----------------|---------|--------------|------------|------|---------|-----|
| Existing   | Severe Weather | 5       | Public Works | Unknown    | City | Ongoing | Yes |
| <b>MK11: Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during severe storm events.</b>  |                |         |              |            |      |         |     |
| Existing   | Severe Weather | 3, 5, 9 | Public Works | 50,000/yr. | City | Ongoing | Yes |
| <b>MK12: Increase communication, coordination, and collaboration between wildland-urban interface property owners, city planners, fire prevention crews, and city officials to address risks, existing mitigation measures, and federal assistance programs.</b> |                |         |              |            |      |         |     |
| Existing   | Wildfire       | 3, 5, 9 | Fire Dept    | 10,000/yr. | City | Ongoing | Yes |

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**TABLE 16-8.  
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 <sup>a</sup> |
|--------------|---------------------|----------|--------|------------------------------------|----------------------------|--|-----------------------|
| MK1          | 9                   | High     | Low    | Yes                                | Yes                        | Yes  | High                  |
| MK2          | 2                   | Medium   | High   | No                                 | Yes                        | No   | Low                   |
| MK3          | 1                   | High     | Low    | Yes                                | Yes                        | Yes  | Medium                |
| MK4          | 2                   | High     | High   | Yes                                | Yes                        | No   | Medium                |
| MK5          | 2                   | Medium   | Low    | Yes                                | Yes                        | No   | Low                   |
| MK6          | 2                   | High     | Medium | Yes                                | Yes                        | No   | Medium                |
| MK7          | 2                   | High     | Medium | Yes                                | Yes                        | Yes  | High                  |
| MK8          | 2                   | Medium   | Medium | Yes                                | Yes                        | Yes  | High                  |
| MK9          | 1                   | Medium   | Medium | Yes                                | Yes                        | No   | Medium                |
| MK10         | 1                   | Medium   | Low    | Yes                                | Yes                        | Yes  | Medium                |
| MK11         | 3                   | High     | High   | Yes                                | Yes                        | No   | High                  |
| MK12         | 3                   | Medium   | Medium | Yes                                | Yes                        | No   | Medium                |

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 timeline for completion is long term (5 to 10 years).

**TABLE 16-9.  
ANALYSIS OF MITIGATION INITIATIVES**

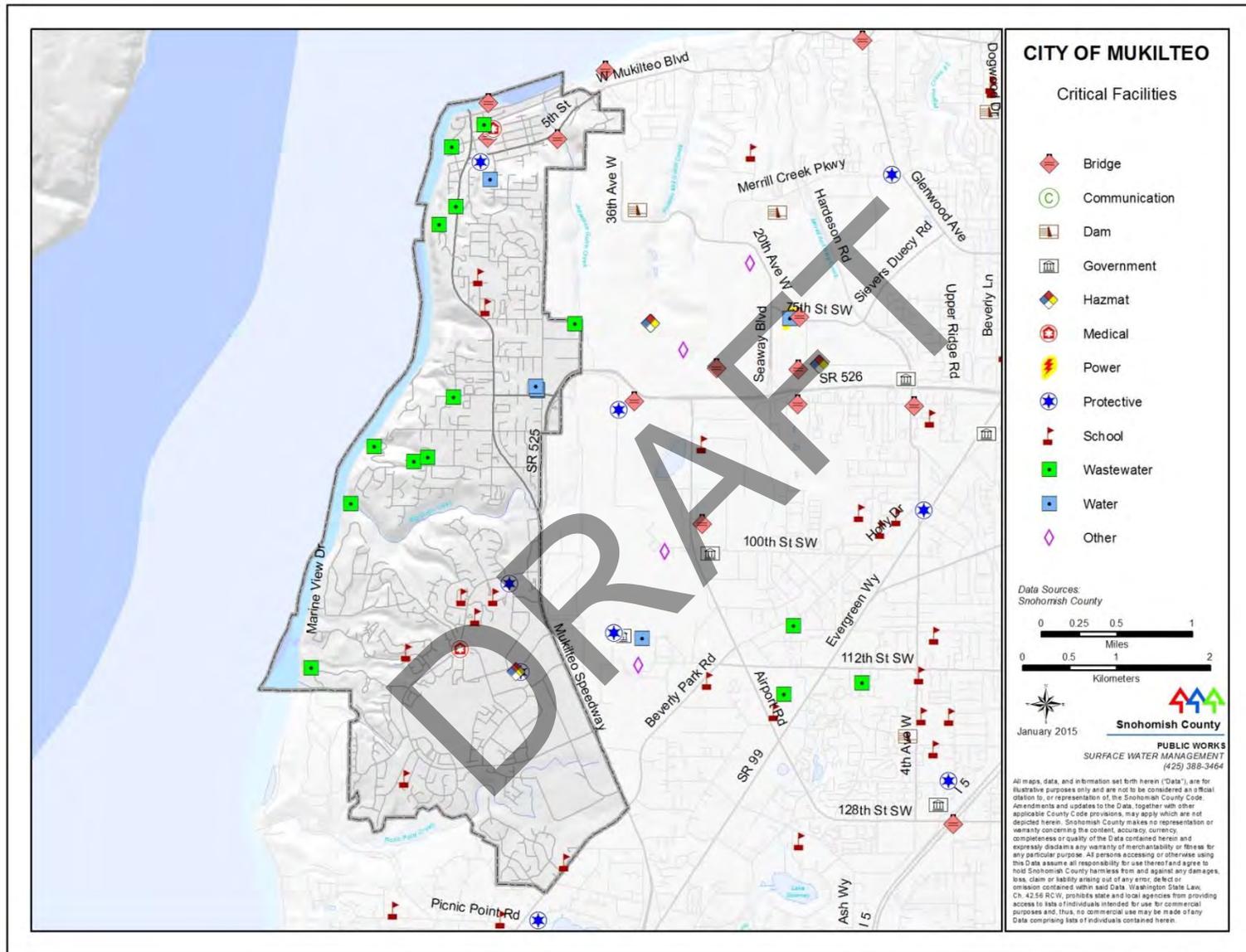
| Hazard Type              | Initiative Addressing Hazard, by Mitigation Type |                        |                                   |                                |                       |                        |
|--------------------------|--|------------------------|-----------------------------------|--------------------------------|-----------------------|------------------------|
|                          | 1. Prevention                                    | 2. Property Protection | 3. Public Education and Awareness | 4. Natural Resource Protection | 5. Emergency Services | 6. Structural Projects |
| Earthquake               |  | MK4<br>MK5<br>MK6      | MK1<br>MK5                        |                                |                       |                        |
| Severe Weather           | MK10   | MK11                   | MK1<br>MK9                        | MK2                            |                       |                        |
| Landslide/ Mass Movement | MK8  |                        | MK8                               |                                |                       |                        |
| Flood                    |  | MK7                    |                                   |                                |                       |                        |
| Tsunami/ Seiche          |  |                        |                                   |                                |                       |                        |
| Volcano/Lahar            |  |                        |                                   |                                |                       |                        |
| Wildland Fire            |  | MK12                   | MK1                               | MK12                           |                       |                        |
| Climate Change           | MK3  |                        |                                   |                                |                       |                        |

Notes:

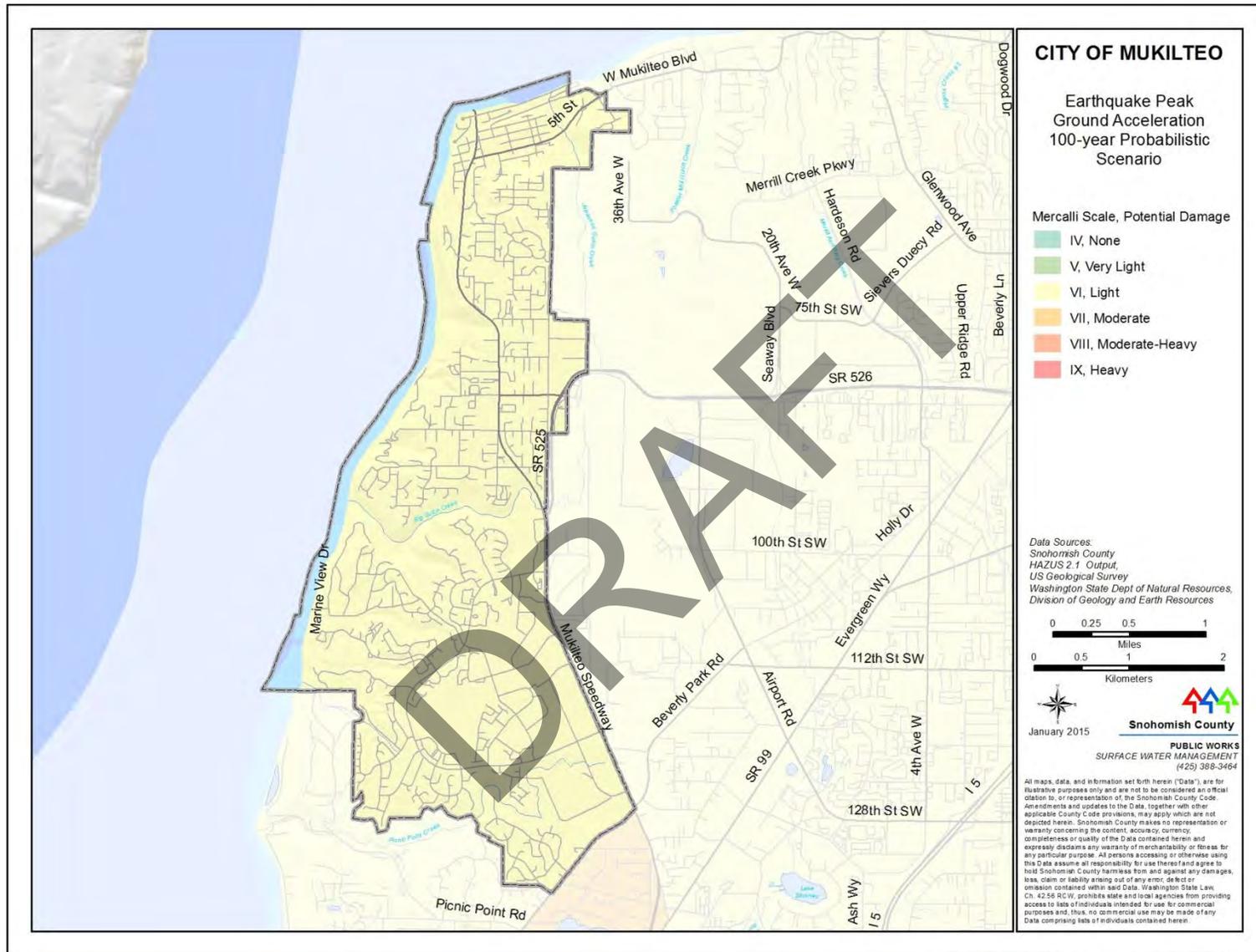
1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: 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.

**TABLE 16-10.  
PREVIOUS ACTION PLAN IMPLEMENTATION STATUS**

| Action #    | Action Status |                                 |                                   | Comments  |
|-------------|---------------|---------------------------------|-----------------------------------|---|
|             | Completed     | Carry Over<br>to Plan<br>Update | Removed;<br>No Longer<br>Feasible |   |
| MK-01-MH-ST | Y             |                                 |                                   | May 31, 2013  |
| MK-02-MH-ST | Y             |                                 |                                   | May 31, 2013  |
| MK-03-MH-ST |               | Y                               |                                   | Ongoing; carried over to 2015 action plan (MK1)   |
| MK-04-MH-ST | Y             |                                 |                                   | May 31, 2013  |
| MK-05-MH-ST |               | Y                               |                                   | Carried over to 2015 action plan (MK2)  |
| MK-06-D-ST  |               | Y                               |                                   | Ongoing as needed; carried over to 2015 action plan (MK3)                               |
| MK-07-E-ST  |               | Y                               |                                   | Ongoing; carried over to 2015 action plan (MK4)   |
| MK-08-E-ST  |               | Y                               |                                   | Carried over to 2015 action plan (MK5)  |
| MK-09-E-ST  |               | Y                               |                                   | Carried over to 2015 action plan (MK6)  |
| MK-10-F-ST  |               |                                 | X                                 | Extremely low risk  |
| MK-11-F-ST  |               | Y                               |                                   | Ongoing; continue to collect and refine data.<br>Carried over to 2015 action plan (MK7) |
| MK-12-F-LT  | Y             |                                 |                                   | May 31, 2013  |
| MK-13-L-ST  |               | Y                               |                                   | Ongoing; carried over to 2015 action plan (MK8)   |
| MK-14-L-ST  | Y             |                                 |                                   | May 31, 2013  |
| MK-15-S-ST  |               | Y                               |                                   | Ongoing; carried over to 2015 action plan (MK9)   |
| MK-16-S-ST  |               | Y                               |                                   | Carried over to 2015 action plan (MK10)   |
| MK-17-S-ST  |               | Y                               |                                   | Carried over to 2015 action plan (MK11)   |
| MK-18-T-ST  |               |                                 | X                                 | Extremely low risk  |
| MK-19-V-ST  |               |                                 | X                                 | Extremely low risk  |
| MK-20-W-LT  |               | Y                               |                                   | Carried over to 2015 action plan (MK12)   |

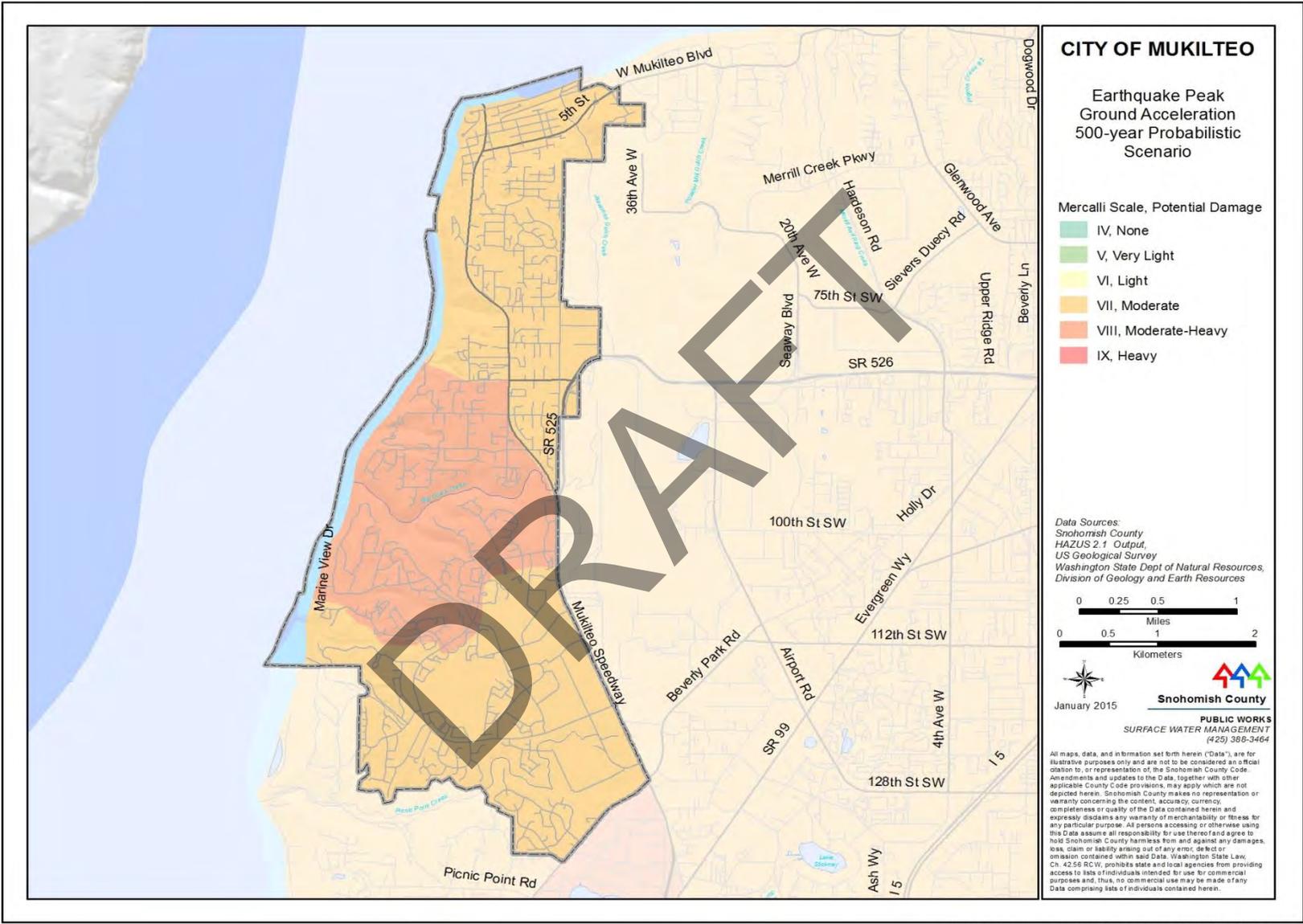


Map 16-1. City of Mukilteo Critical Facilities



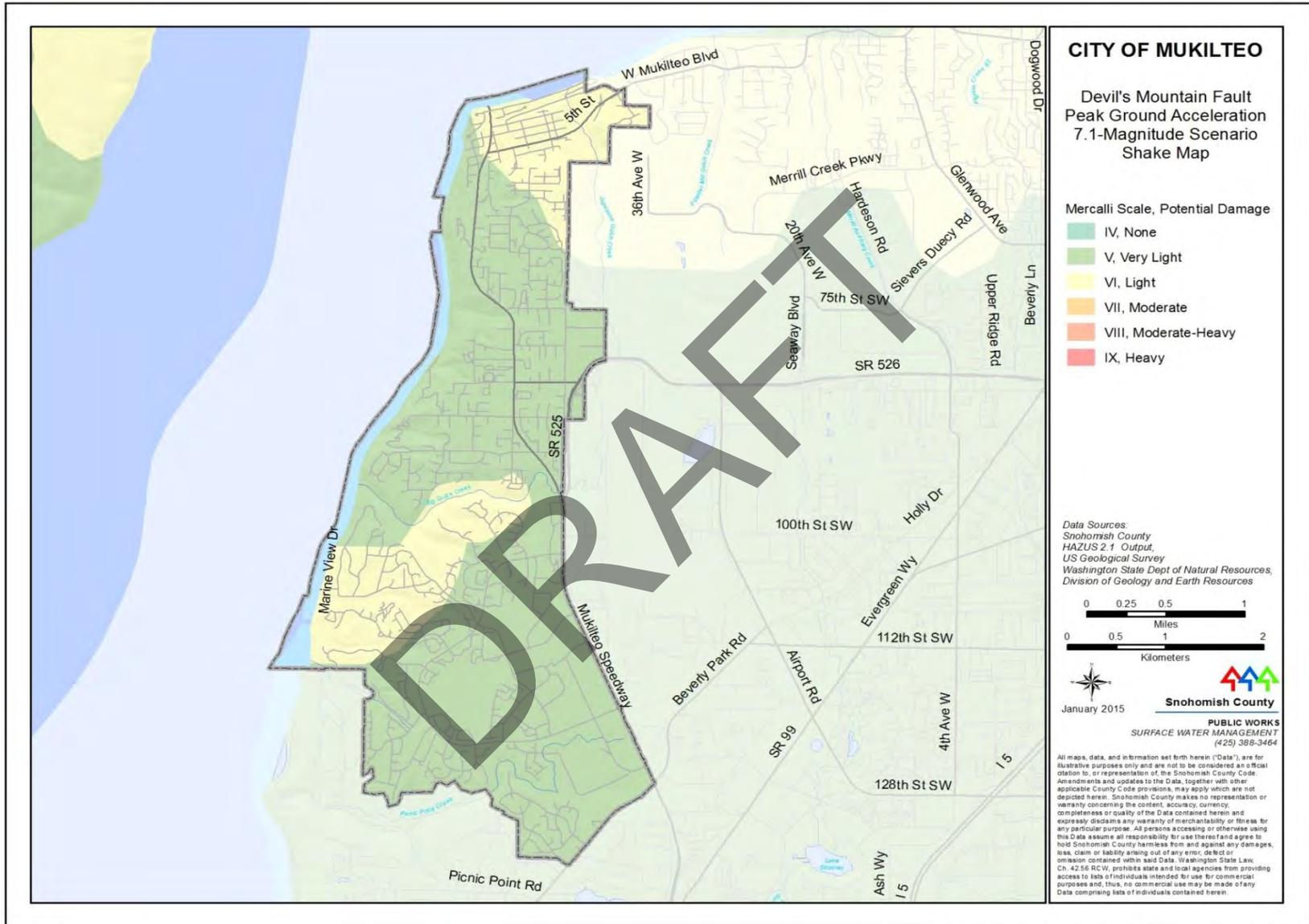
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Map 16-2. City of Mukilteo 100-year Probabilistic Earthquake Scenario



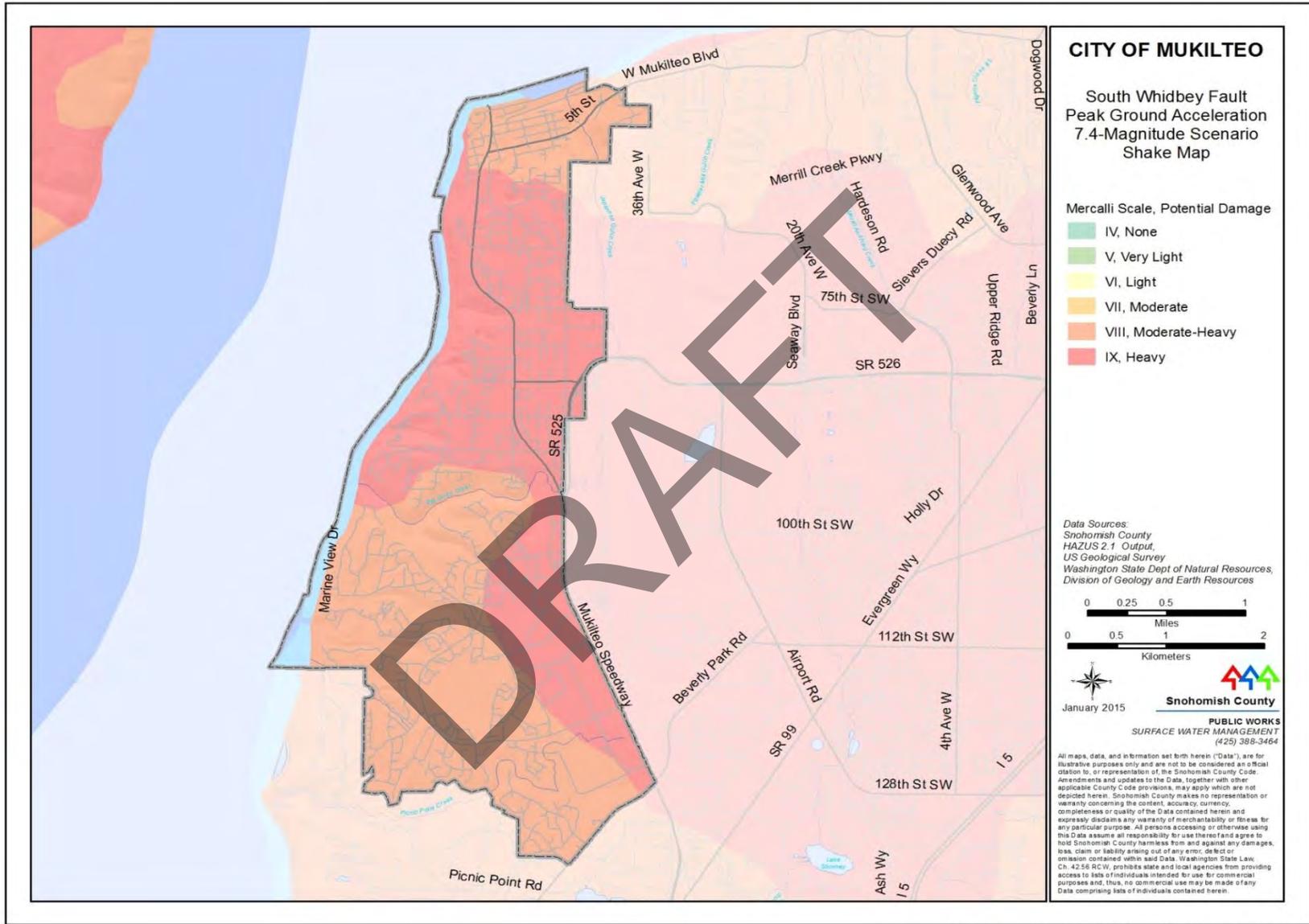
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Map 16-3. City of Mukilteo 500-year Probabilistic Earthquake Scenario



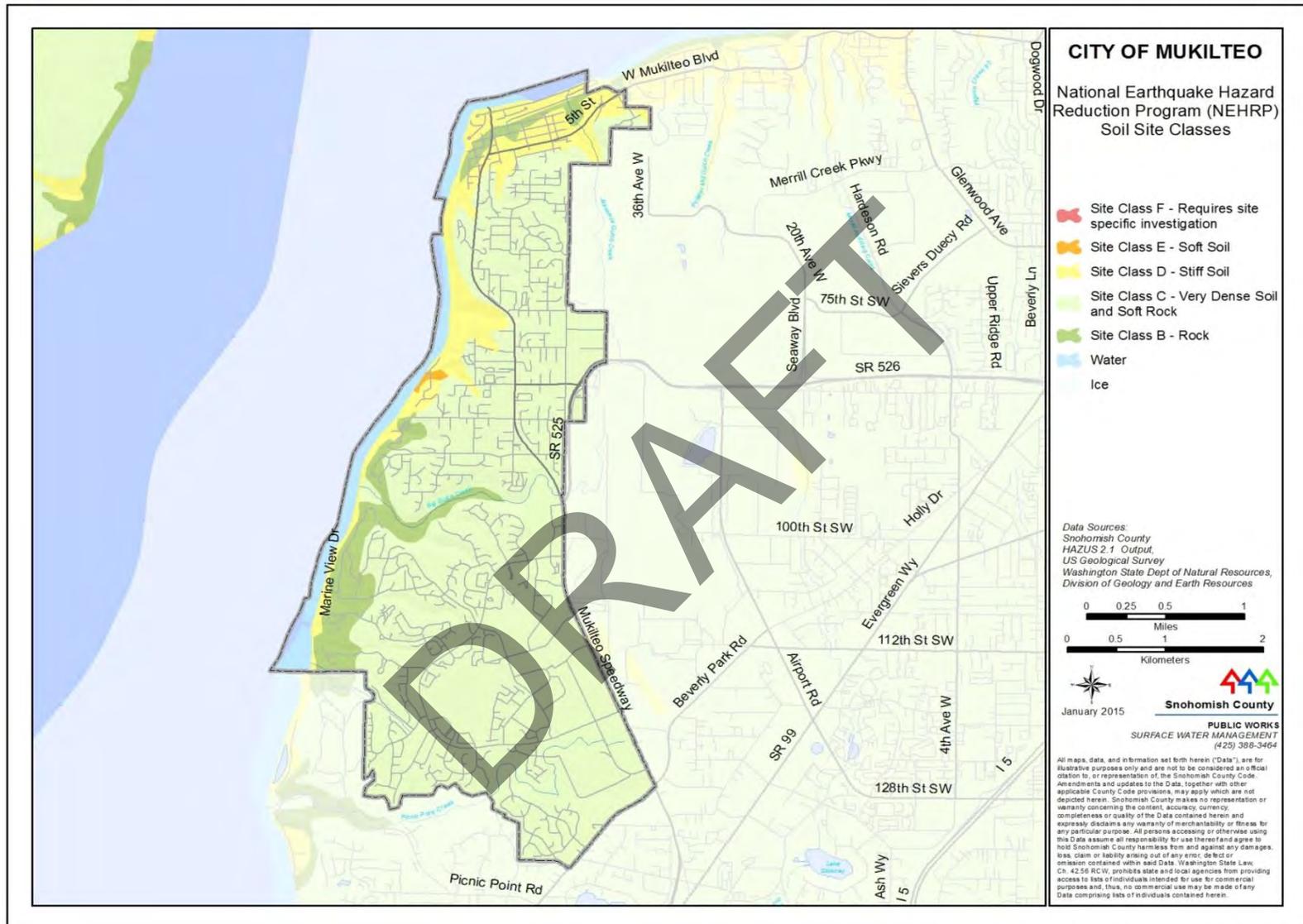
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Map 16-4. Devil's Mountain Fault 7.1 Magnitude Earthquake Scenario



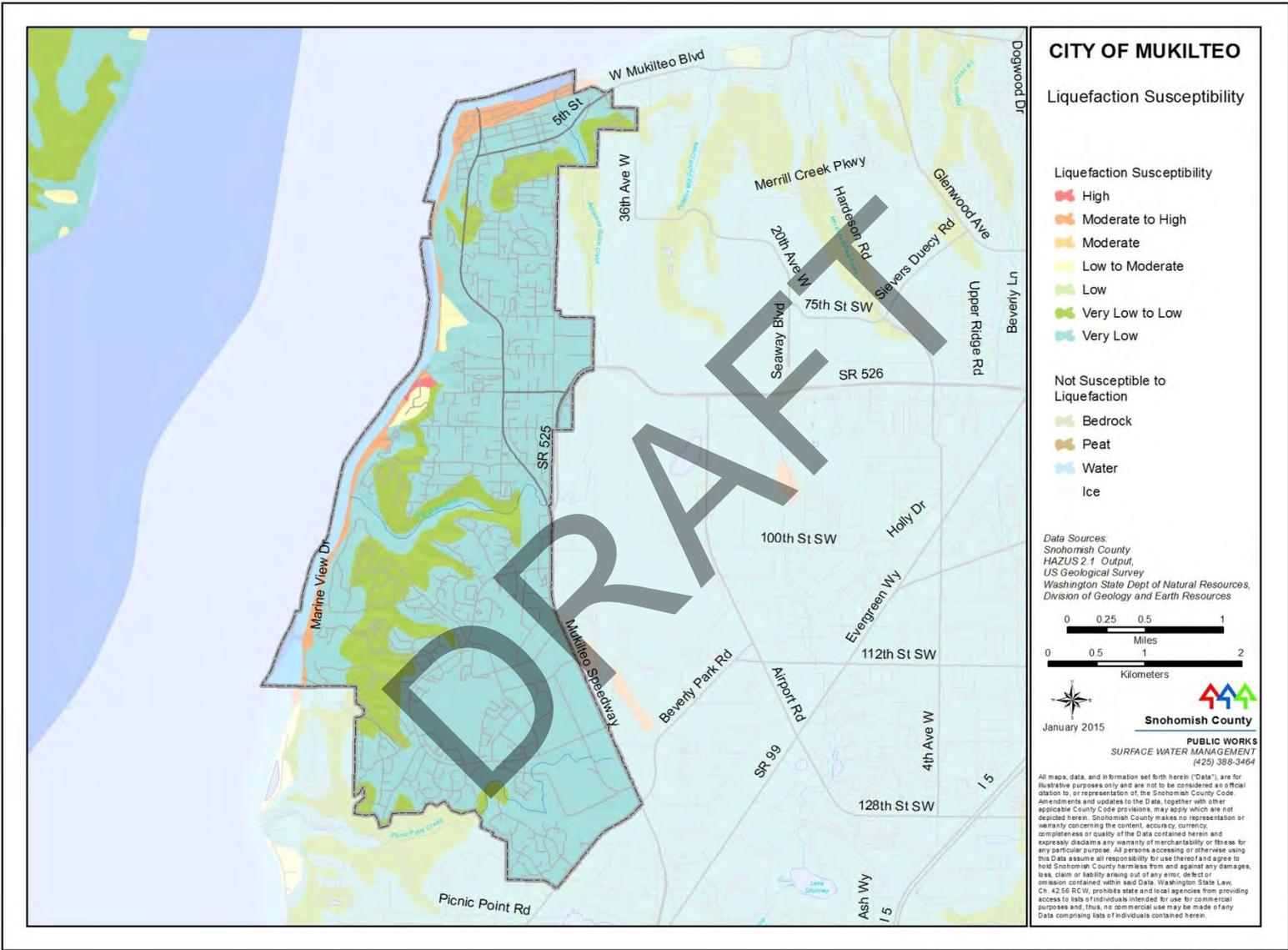
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Map 16-5. South Whidbey Fault 7.4 Magnitude Earthquake Scenario



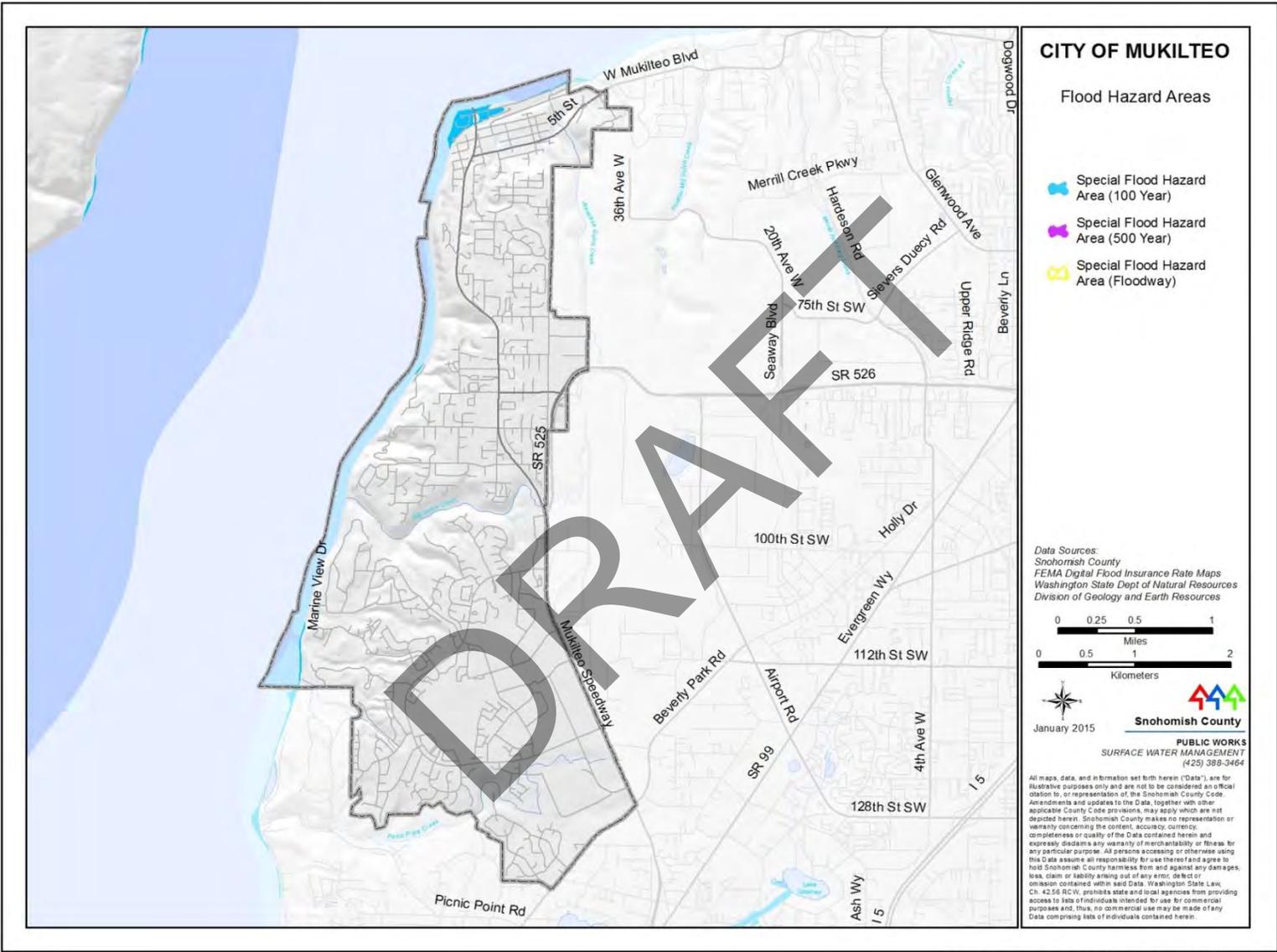
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Map 16-6. City of Mukilteo National Earthquake Hazard Reduction Program Soil Classes



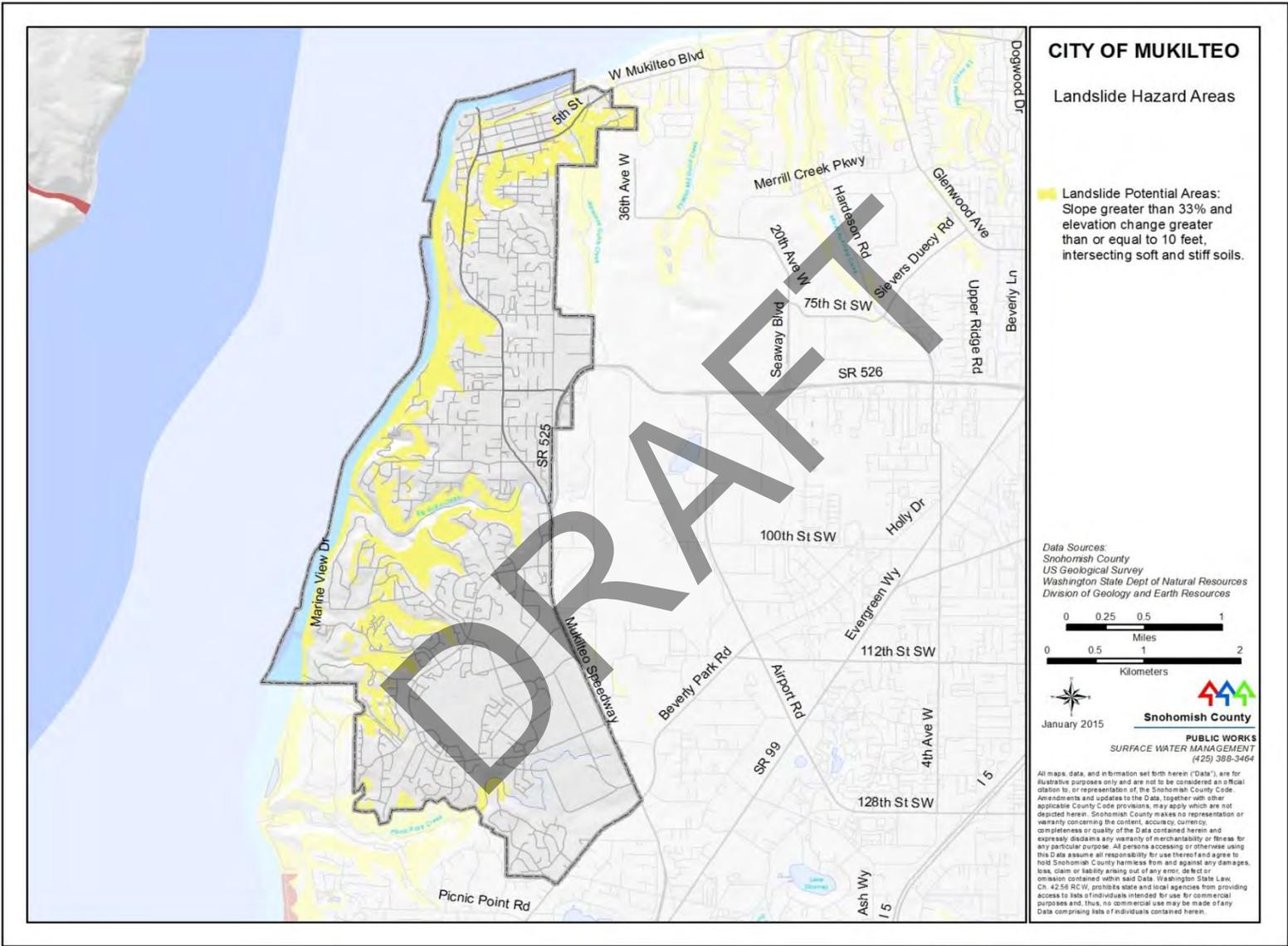
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Map 16-7. City of Mukilteo Liquefaction Susceptibility



Map 16-8. City of Mukilteo Flood Hazard Areas

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Map 16-9. City of Mukilteo Landslide Hazard Areas