

**Thurston County Fire Protection District 8
Annex to the Natural Hazards Mitigation Plan
for the Thurston Region**

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**SOUTH BAY FIRE DEPARTMENT
THURSTON COUNTY FIRE PROTECTION
DISTRICT 8**

3506 SHINCKE RD. NE OLYMPIA, WA 98506
TELEPHONE: 360-491-5320 • FAX: 360-438-0523

RESOLUTION NO. 09-11

**A RESOLUTION ADOPTING THE 2009 THURSTON COUNTY NATURAL HAZARDS MITIGATION PLAN
FOR THURSTON COUNTY FIRE PROTECTION DISTRICT 8**

WHEREAS the Thurston County Natural Hazards Mitigation Plan (“Plan”) was originally adopted by the County and certain other jurisdictions in 2003 as a multi-jurisdictional plan in accordance with the Natural Disaster Mitigation Act of 2000 (44CFR 201.6); and

WHEREAS the Natural Disaster Mitigation Act of 2000 requires that applicants for Pre-Disaster Mitigation Grant Program project funding after November 1, 2004 have an approved Plan in effect; and

WHEREAS the Plan represents the commitment of Thurston County Fire Protection District 8 (“District”) along with other surrounding jurisdictions to reduce the risks from natural hazards, serving as a guide for decision-makers as they commit resources to reducing the affects of natural hazards in the general community; and

WHEREAS the Plan has been updated as required every five (5) years by FEMA and the Plan has been reviewed through a public involvement process; and

WHEREAS the District participated directly in the update process and has established an annex in the Plan covering its own community risk assessment and proposed mitigation measures; and

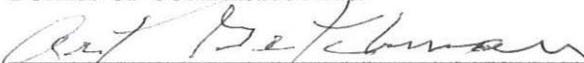
WHEREAS the Plan continues to provide a current framework for natural hazard impact reduction in the community and the District desires to continue to remain an active participant in the review and updating process; and

WHEREAS the District recognizes that minor changes and corrections may need to be made to portions of the updated Plan pertaining to other jurisdictions, but that expedient adoption of the updated Plan is necessary and in the public interest.

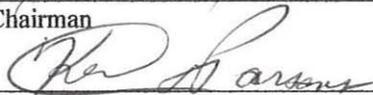
THEREFORE BE IT RESOLVED that Thurston County Fire Protection District 8 Board of Fire Commissioners hereby adopt the updated 2009 Plan as the official natural hazards mitigation plan for the District.

ADOPTED at the regular meeting of the District’s Board on the 20th day of November, 2009 the following Commissioners being present and voting:

BOARD OF COMMISSIONERS



By: Chairman



By: Commissioner

By: Commissioner

ATTEST 

District Secretary

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Community Profile Thurston County Fire Protection District 8

(360)491-5320
www.southbayfire.com

Background

The District, commonly known as the South Bay Volunteer Fire Department, was incorporated in 1953 with a handful of local citizens responding the sound of the firestation siren. From an initial call annual volume of 15 fire calls to a current annual average of over 600 fire, medical, rescue and hazardous situation incidents, the District has expanded to three firestations, with nearly 60 volunteer and career members on duty around the clock.

Governance: The district is governed by a board of three fire commissioners. Commissioners must reside in the district and they are elected by district voters to serve six year terms.

Mission

We are committed to serve our community with prompt, consistent and professional fire suppression, basic life support and rescue services.

Vision

Our priority is to provide a consistent & professional emergency response throughout the District.

-We are committed to deploy our resources to ensure a response that meets our Target Levels of Service regardless of the incident location within our District.

-We are a volunteer fire department and we commit to recruit and retain our volunteers through programs that are convenient, make effective use of their time, prepare them for their assigned duties, create synergy between organizational health & community service and build an environment that is safe, stimulating and fun.

-We will provide a consistent level of leadership and support for our volunteers. Our commitment is to maintain and provide round-the-clock direction and mentorship.

-We will provide management and other resources as necessary to ensure the success of our strategic choices. We will manage risk to life and property for our community. In addition to our commitment to incident readiness & response, we will also identify, evaluate and offer appropriate proactive risk management programs to mitigate anticipated community hazards.

Demographics

Service Area Limits (sq mi.)¹:	20.5
Service Area Population	7,165
Dwelling Units	2,885

Thurston County Population by Race (2000)²:	
White Alone	86%
Black/African American	2%
American Indian & Alaska Native	2%
Asian	4%
Hispanic or Latino	5%
Other	2%

Service / Operations

Service Summary

Stations	Duty Positions
Station # 8-1 South Bay	4
Station # 8-2 Johnson Point	2
Station # 8-3 Puget Beach	(Call)

Apperatures	Quantity
Type 1 Fire Engine	3
BLS Response Unit	2
Type 2 Water Tender	2
Type 6 Fire Engine	1

Staff	Number
Career/Full-Time	8
Part-Time	1
Volunteer	50

Major Lands Within the District

Woodard Bay (portion of DNR preserved lands)
Tolmie State Park

Financial

Assets (2009)³:	
Valuation of Infrastructure	\$3,030,505
Valuation of Apperatures and Contents	\$2,481,482
Total Assets	\$5,511,987

Budget Summary (2009)³

Property Tax	\$1,651,490
Other Tax	\$1,500
Non-Tax Revenues	\$49,000
Total Revenue	\$1,701,990

Expenses

Salaries & Benefits	\$637,300
Overhead & Support	\$102,570
Volunteer Stipends & Benefits	\$258,130
Operations	\$239,450
Capital, Repairs & Replacement Fund	\$239,400
Total Expenses	\$1,476,850

Sources:

¹Thurston Regional Planning Council

²U.S. Bureau of the Census; data is for the entire County

³Thurston County Fire Protection District 8

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Thurston County Fire Protection District 8 Plan Development Process

Hazard Mitigation Plan Workgroup

The following individuals served as the District's hazards mitigation planning development workgroup (District Executive Team):

Department/Title	Representative(s)
Fire Chief	Brian VanCamp
Assistant Chief, Facilities & Equipment	Greg Kessel
Assistant Chief, Operations	Greg Thompson
Assistant Chief, Training & Safety	Brent McBride
District Secretary	Heidi Prince

Hazard Mitigation Plan Development

The following activities supported the development of the District's local hazard mitigation planning process:

Date	Location	Activity	Subject
July 2003- March 2004	District	Project	Community Risk Assessment & Evaluation (disaster, fire and EMS)
March 26, 2004	District	Plan Adoption	Adoption of Community Risk Assessment and District Deployment Strategic Plan; Public & Board of Fire Commissioners
February 2005- February 2009 (Annually)	District	Annual Plan Review & Update	Annual review & update of Community Risk Assessment & Deployment Strategy Plan; development of District Budget
April-May 2009	Station 8-1	Review of Requirements	Review of Federal, State and County hazard mitigation documentation
June 10 & 17, 2009	Station 8-1	Prioritization	Prioritizing ongoing and planned projects for target hazard mitigation
September 2009- January 2010	Station 8-1	Plan Review	In conjunction with review & update of Community Risk Assessment, Deployment Strategy Plan and 2010 District Budget
TBA		Plan Adoption	

Mitigation Initiative Prioritization Process

During the initial District Community Risk Assessment project, all forms of hazard (including disasters as related to natural hazards, man-made hazards) and “routine” emergency incidents (non-conflagratory fires, all emergency medical incidents, rescue events) were evaluated based upon historical, current and predictive data to form an overall statement of risk faced within the District. Based upon the results of that project, a District Deployment Strategy Plan was developed to address those identified risks. This set the stage for a multi-year operational and capital plan and project to modify staffing, training, infrastructure, apparatus, equipment, risk management, and incident practices & tactics, implemented through each annual operating and capital budget. Currently identified natural hazards and their mitigation are complementary to this effort, and will be included in the fiscal year 2010 processes.

Thurston County Fire Protection District 8 Risk Assessment

Introduction

The risk assessment provides information about the hazards that threaten Thurston County Fire Protection District 8 (“South Bay FD8”). This information provides the factual basis to identify and support a strategy that can effectively mitigate the effects of the hazards that threaten this jurisdiction’s safety and challenge its ability to perform essential functions.

The content and structure of this plan’s risk assessment was developed using the Federal Emergency Management Agency’s (FEMA) 2008 “Local Multi-Hazard Mitigation Planning Guidance.” Table 1 shows the Disaster Mitigation Act (DMA) Risk Assessment Planning Requirements that must be met in order for this plan to receive a “satisfactory” score. Each of these planning requirements is met through the information contained in both the regional risk assessment and in this local annex.

Table 1: Disaster Mitigation Act Risk Assessment Planning Requirements

DMA Section	Requirement
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction ...
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii):	[The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
§201.6(c)(2)(ii):	[The risk assessment in all] plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.
§201.6(c)(2)(ii)(A):	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas ...
§201.6(c)(2)(ii)(B):	[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate ...
§201.6(c)(2)(ii)(C):	[The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii):	For multi-jurisdictional plans, the risk assessment must assess each jurisdiction’s risks where they vary from the risks facing the entire planning area.

In general the Federal DMA planning requirements with the words “**shall**” and “**must**” indicate that the item is mandatory and must be included in the plan, otherwise it will not be approved by FEMA. Regulations with the word “**should**” indicate that the item is strongly recommended to be included in the plan, but its absence will not cause FEMA to disapprove the plan.

Hazard Analysis Definitions

The adjective descriptors (High, Moderate, and Low) for each hazard's probability of occurrence, vulnerability, and risk rating are consistent with the terms used in the regional assessment.

The following terms are used in this plan to analyze and summarize the risk of the hazards that threaten this jurisdiction:

Risk Rating:

- An adjective description (High, Moderate, or Low) of the overall threat posed by a hazard is assessed for the next 25 years. Risk is the subjective estimate of the combination of any given hazard's probability of occurrence and vulnerability. High: There is strong potential for a disaster of major proportions during the next 25 years; or History suggests the occurrence of multiple disasters of moderate proportions during the next 25 years.
- Moderate: There is medium potential for a disaster of less than major proportions during the next 25 years.
- Low: There is little potential for a disaster during the next 25 years.

Probability of Occurrence:

An adjective description (High, Medium, or Low) of the probability of a hazard impacting the jurisdiction within the next 25 years.

- High: There is great likelihood that a hazardous event will occur within the next 25 years.
- Moderate: There is medium likelihood that a hazardous event will occur within the next 25 years.
- Low: There is little likelihood that a hazardous event will occur within the next 25 years.

Vulnerability:

Vulnerability can be expressed as combination of the severity of a natural hazard's effect and its consequential impacts to the community. An adjective description (High, Medium, or Low) of the potential impact a hazard could have on the community. It considers the population, property, commerce, infrastructure and services at risk relative to the entire jurisdiction.

- High: The total population, property, commerce, infrastructure and services of the community are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worse case scenario, there could be a disaster of major to catastrophic proportions.
- Moderate: The total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence; or The total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence, but not all to the same degree; or An important segment of population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard. In a worse case scenario there could be a disaster of

moderate to major, though not catastrophic, proportions.

- **Low:** A limited area or segment of population, property, commerce, infrastructure, or service is exposed to the effects of a hazard. In a worse case scenario, there could be a disaster of minor to moderate proportions.

Summary Risk Assessment

Based on the regional risk assessment and the local risk assessment in the subsequent section, the following hazards pose the greatest threat to South Bay FD8:

Hazard	Probability of Occurrence	Vulnerability	Risk
Earthquake	High	High	High
Storm	High	High	High
Flood	Moderate	Low	Low
Landslide	Moderate	Low	Low
Wildland Fire	High	Moderate	Low
Volcanic Event	Low	Moderate	Low

Local Risk Assessment

A comprehensive risk assessment of the major natural hazards that threaten South Bay FD8 was developed for this plan through the regional risk assessment process described in Chapter 4.0. The regional risk assessment and its hazard profiles serve as the foundation for this jurisdiction's risk assessment. A list of all of the potential natural hazards that could impact this jurisdiction is located in Chapter 4. Chapter 4 includes six natural hazard profiles for earthquake, storm, flood, landslide, wildland fire, and volcanic events. Each profile defines the hazard and describes its effects, severity, impacts, probability of occurrence, and historical occurrences. The regional profiles describe this jurisdiction's local vulnerabilities in terms of the portion of the jurisdiction's land base or service area, population, employment, dwelling units, jurisdiction-owned assets, and critical facilities that are within each hazard zone.

This section of the plan provides additional details or explains differences where this jurisdiction's risks for each hazard vary from the risks facing the entire planning area. Maps of the hazards that affect South Bay FD8 are scaled to local boundaries and are included in this section.

Earthquake

Severity

Current accepted measurement of earthquake intensity is the Richter Magnitude Scale, which expresses peak ground acceleration as a measure of ground movement. Severity is dependent upon the source of the quake, of three major types: 1) crustal (shallow) in faults along the North American plate; 2) subduction zone along the Juan de Fuca and North American plates, and 3) deep in the Juan de Fuca plate. The most current (and proximate) earthquake, that in 2001 centered near the Nisqually River Delta, was of the deep type. It was measured at 6.8 on the Richter Scale.

Impacts

Based upon the independent assessment of natural hazards by South Bay FD8 in 2003, the relative risk for earthquakes in the district indicates an area impact exceeding 75%, few fatalities but many injuries, many properties destroyed & damaged, environmental resources damaged with long-term recovery and high direct and low indirect economic disruption. Based on TRPC surveys of steep slopes and liquefaction hazards in the district's 13,113 acres, 27% of the land mass and 30% of the population is in hazard areas (primarily along the shorelines and Woodland Creek basin. The same survey estimates that 31% of the residential dwellings are located in hazard zones. The district's three current stations (and proposed new north-end firestation location) are all located in specific "low" to "very low" liquefaction zones and no-slope sites.

Probability of Occurrence

Past events suggest that a destructive event reoccurs about every 26 years. Therefore, the overall probability of occurrence of a damaging earthquake is "high".

Historical Occurrences and Impacts Specific to this Jurisdiction

At 10:54 am on February 28, 2001 a magnitude 6.8 earthquake produced strong ground shaking across Washington State. The epicenter was located near Anderson Island north of the Nisqually River Delta. The focus was located nearly 33 miles underground. While Thurston County was among the hardest hit counties in the State, with most damages reported in the Olympia and Tumwater areas. The district firestations did not incur any reportable damage, however, the old firestation (serving as a training site for both South Bay FD8 and the Thurston County Sheriff's Office) did incur damage in its non-reinforced concrete masonry structure. South Bay FD8 operated under disaster conditions for two days, providing assessment & response services throughout the district; no related injuries or significant damage was reported within the district. Historical records of district impacts, if any, of the 1965 Seattle-Tacoma earthquake cannot be found.

Summary Assessment

History suggests a high probability of occurrence of another damaging earthquake sometime in the next 25 years. It is important to note that the 2001 Nisqually earthquake was not the largest

event possible in the Puget Sound region. It is conceivable that a similar magnitude earthquake could emanate from a shallow crustal fault which would result in much greater damage, producing catastrophic impacts upon the Thurston County area.

Summary Risk Assessment for Earthquake in South Bay FD8

Probability of Occurrence	Vulnerability	Risk
High	High	High

Storm

Severity

Severe weather events are the most frequent source of natural disasters for South Bay FD 8 and the rest of the Thurston County. Between 1962 and 2009, 19 of the 23 Presidential Disaster Declarations for Thurston County were attributed to damage resulting from the effects of winter storms. While the most damaging historical weather events were as a result of flooding, this type of hazard is almost non-existent with the district.

High winds, heavy rain, heavy snow, freezing rain, tornados, hail and lightning all impact Thurston County. Each element poses a threat at varying degrees throughout the county. The severity of each is summarized below:

- 1) High Winds/Windstorms: 59 windstorms have buffeted the district since 1953; nine produced peak gusts over 58 mph, the most powerful being the Columbus Day storm in 1962. The 13 point Beaufort Scale measuring windspeed is used to measure impacts to land conditions.
- 2) Heavy Rain: the overall region is moderately vulnerable to flooding as a result of heavy rains between November and February.
- 3) Freezing Rain: the overall region is susceptible to the effects of an ice storm. The 1996 event resulted in ice accumulations of $\frac{1}{4}$ to $\frac{3}{4}$ inch thick on surfaces.
- 4) Heavy Snow: while the average annual snowfall for the county is 18 inches between mid-November and mid-March, since 1948 six major heavy snow events have occurred in the county. Record accumulated snowfall was during December 1968-January 1969 with a total of 81.5 inches.
- 5) Tornado: No deaths or injuries have resulted from tornados in Thurston County. Four small tornados have been reported in the county (generally southern area) since 1950, none producing any significant damage or life hazard. The wind speed of tornados is classified by the Fujita Scale (F0-F5); all county tornados were F0 on the scale.
- 6) Hail: Most hail storms in the county produce mall non-destructive hail.
- 7) Lightning: Records indicate that lightning storms are most likely to occur in the county from April through September, and are of a short-lived localized nature.

Impacts

High winds, heavy rain, heavy snow, freezing rain, tornados, hail and lightning all impact Thurston County. Each element poses a threat at varying degrees throughout the county. The impact of each is summarized below:

- 1) High Winds/Windstorms: The region is vulnerable to high winds due to climatic conditions and trees resulting in the most damage caused by falling trees & limbs. Widespread power outages and debris damage are the most significant impacts. Based upon the independent

assessment of natural hazards by South Bay FD8 in 2003, the relative risk for high winds in the district indicates an area impact exceeding 75%, few fatalities but many injuries, limited properties destroyed & damaged, environmental resources damaged with short-term recovery and high direct and low indirect economic disruption.

- 2) Heavy Rain: Most common impacts from heavy rainfall are flooding & erosion. Based upon the independent assessment of natural hazards by South Bay FD8 in 2003, the relative risk for heavy rains/erosion & landslide in the district indicates an area impact exceeding 25%, few injuries, few properties destroyed & damaged, environmental resources damaged with short-term recovery and low direct and/or indirect economic disruption.
- 3) Freezing Rain: As was discovered by South Bay FD8 in 1996, freezing rain can produce debilitating effects: response efforts were literally shut-down for an extended period of time due to slick roads blocked by number limbs & debris, no land-line communications and no electrical power.
- 4) Heavy Snow: Blizzard conditions can cause powerline, tree limbs and structures to fail due to the weight of snowload; safe transportation can grind to a halt (reducing or eliminating response capabilities) and create widespread power outages. These resulting conditions can also produce consumer shortages due to the inability of freight carriers to deliver goods.
- 5) Tornado: The effects of a tornado can be extremely destructive during a short period of time in a very localized setting.
- 6) Hail: The effects of hail can be destructive during a short period of time in a very localized setting.
- 7) Lightning: While there are no documented lightning fatalities in Thurston County, the district has documented two cases of lightning related injuries since 1989, both of a serious nature. Lightning can also cause fires, however, none are documented to have caused any fires in the district.

Probability of Occurrence

High winds, heavy rain, heavy snow, freezing rain, tornados, hail and lightning all impact Thurston County. Each element poses a threat at varying degrees throughout the county. The probability of occurrence of each is summarized below:

- 1) High Winds/Windstorms: Thurston County has a high wind reoccurrence rate of 175% (high) with at least 18 notable Pacific Northwest cyclones impacting the area in the last 25 years, thus, the probability of occurrence is “high”.
- 2) Heavy Rain: The annual probability of occurrence is “high”.
- 3) Freezing Rain: The annual probability of occurrence is “low”, with only one major event in the county in the past 50 years.

- 4) Heavy Snow: Between the period of 1948-1994, 23 heavy snow events experienced in Thurston County indicate “high” probability of snow exceeding 12 inches within the next 25 years.
- 5) Tornado: The annual probability of occurrence is “low”.
- 6) Hail: The annual probability of occurrence is “low”.
- 7) Lightning: The annual probability of occurrence is “moderate”.

Historical Occurrences and Impacts Specific to this Jurisdiction

Local effects (within the district) of storm events has generally been somewhat less than other parts of the county; the most recent and most damaging events have been as a result of flooding (December 2008, December 2007, November-December 2006, December 1996, etc) along major river plains. The most debilitating events have resulted from windstorms, the ice storm and heavy snow. The primary impacts are safe transportation of responding units, accessibility for members to district facilities & services and the loss of electrical power. South Bay FD8’s implementation of emergency power supply to its facilities, purchasing & use of 4-wheel drive vehicles, pre-event (if known) staffing of members and member/family emergency pre-planning & preparation have helped mitigate the impacts of storms.

Summary Assessment

The high reoccurrence rate of Pacific Northwest storms, the record of historical damage and the repetitive response & recovery costs (regionally and countywide) associated with these destructive events make the county and district highly vulnerable to storm events. Thus the overall risk rating for severe storms is “high”.

Summary Risk Assessment for Storm in South Bay FD8

Probability of Occurrence	Vulnerability	Risk
High	High	High

Flood

Severity

A flood is a temporary condition in which a normally dry area of land or infrastructure is inundated by excess standing or flowing water. Floods occur during any season and at any time. Four types of flooding occur in Thurston County: “riverine” (excess flow & volume exceeding a river’s normal channel), “groundwater” (caused by high water table & excessive rain), “tidal” (high tide combined with low atmospheric pressure, excessive run-off and/or strong northerly winds), and “urban” (when stormwater runoff exceeds the capacity of natural or infrastructural drainage systems). In the district, the primary risk of flooding is due to either groundwater or tidal conditions. Riverine flooding has not historically been a significant problem in the district.

Groundwater flooding events are classified by Thurston County as “type 1” (characterized by a wet winter weather phenomenon known as “Pineapple Express”) and “type 2” (less common by characterized by weeks of low intensity rainfall). Less than 3% of the district’s 13,113 acres are subject to recorded groundwater flooding.

Tidal flooding events have not historically produced any reportable flooding hazards within the district. The effects of Climate Change could potentially produce new hazards in the second half of the current century if sea level rise projections occur.

Impacts

Based upon the independent assessment of natural hazards by South Bay FD8 in 2003, the relative risk for floods in the district indicates an area impact exceeding 25%, little or no health safety impact, few properties destroyed & damaged, environmental resources damaged with long-term recovery and low direct and high indirect economic disruption. Based on TRPC surveys of flooding hazards in the district’s 13,113 acres, 12% of the land mass and 9% of the population is in a flooding hazard area. The same survey estimates that 10% of the residential dwellings are located in hazard zones. The district’s three current stations (and proposed new north-end firestation location) are located outside of historical or potential flooding hazard zones. Historically, the known impacts of groundwater flooding have been seen at homes with basements flooded, inundated septic-drainfield systems and flooded underground utility vaults. Dwelling flooding events have become more rare over time with eventual correction, relocation and prevention with new construction or remodeling.

Probability of Occurrence

Over the past decade, the increasing frequency of incidence of large rainfall events leading to groundwater flooding is believed to be due to the effects of Climate Change.

Historical Occurrences and Impacts Specific to this Jurisdiction

Flooding events have not presented a significant impact to the district or the delivery of its services to the community. Most flooding event related services are of a non-emergency nature, providing assistance in pumping out flooded basements.

Summary Assessment

While the history of Thurston County clearly demonstrates a high probability of future occurrence, the severity and impact on the district is “low”.

Summary Risk Assessment for Flood in South Bay FD8

Probability of Occurrence	Vulnerability	Risk
Moderate	Low	Low

Landslide

Severity

Landslides are the movement of rock, soil or other debris down a slope. Factors that contribute to landslides include erosion, earthquakes, volcanic eruptions, increased land bearing loads, hydrologic (water) factors, human modifications to land structures, removal of lateral & underlying support, increased lateral pressures and regional tilting. In South Bay FD8, the slopes of a significant portion of the Puget Sound coastline has been identified as slope exceeding 40%, however, this consists of less than 1% of the district's total landmass.

Impacts

Based upon the independent assessment of natural hazards by South Bay FD8 in 2003, the relative risk for landslides in the district indicates an area impact exceeding 25%, few injuries or illnesses, few properties destroyed & damaged, environmental resources damaged with short-term recovery and low direct / indirect economic disruption. Based on TRPC surveys of landslide hazards in the district, 14% of the population is in a landslide hazard area. The same survey estimates that 14% of the residential dwellings are located in hazard zones. The district's three current stations (and proposed new north-end firestation location) are located outside of historical or potential landslide hazard zones. Historically, the known impacts of landslides in the district have been minimal.

Probability of Occurrence

Based on historical precedent, the incidence of landslides are concurrent with winter storms, flooding and earthquakes. The majority of landslides in the region are triggered by heavy precipitation. While significant landslides have occurred in nearby areas (Carlyon Beach, Hunter Point), there have been no recent notable landslides causing injuries or damage to personal property in the district. Based on geologic information, the probability for occurrence is "moderate".

Historical Occurrences and Impacts Specific to this Jurisdiction

Landslide events have not presented a significant impact to the district or the delivery of its services to the community.

Summary Assessment

In the district, landslides tend to occur in isolated, sparsely developed areas with minimal impact on individual structures, transportation networks and power/communications infrastructures; this would indicate a "low" risk rating.

Summary Risk Assessment for Landslide in South Bay FD8

Probability of Occurrence	Vulnerability	Risk
Moderate	Low	Low

Wildland Fire

Severity

The wildland fire, or “wildfire”, hazard is unique from other hazards in Thurston County in that a) it is the most frequently occurring hazard with approximately 71 wildland fires start per year, b) it can be prevented (over 99% of the fires started are due to poor human judgement or accidental ignition), and c) it is the only hazard that can be actively contained or suppressed in real time. While ecological science views wildfires as a natural process necessary to sustain the health of forests and grasslands, when interfaced with humans and human structural improvements (generally homes), risk to the community dictates aggressive prevention & suppression practices.

Sources and factors in wildland fires include fuel loading & types, weather conditions and terrain. In turn, the severity of a fire is influenced by soil conditions present, slope of the land, the type & moisture content of vegetation present, accessibility of fire suppression resources to the fire and the size when discovered/reported and subsequently attacked by the initial responders.

Based upon Washington State Department of Natural Resources (“DNR”) records from 1972-2007, the DNR and South Bay FD8 responded to 147 wildfire calls of a mean size of 0.3 acres, for a total loss of 41.6 acres in that 35 year period. The largest fire in the district was approximately 3 acres in size. This number does not include wildfires responded to by the district without the DNR. In 2008, the district responded to 9 wildfires consuming a total of 1.0 acres, 5 wildfires in 2007 consuming a total of 4.9 acres and 18 wildfires in 2006 consuming 2.4 acres. The district also responded mutual aid to several fires outside the district.

The number, size and severity of wildfires in the district in the past several years have been affected by the growing residential community (less wildlands, quicker reporting of fires, home-owner intervention), implementation & enforcement of open burning regulations and upgraded training & equipping of emergency responders.

Impacts

Based upon the independent assessment of natural hazards by South Bay FD8 in 2003, the relative risk for wildland fires in the district indicates an area impact exceeding 25%, few injuries or illnesses, few properties destroyed but many damaged, environmental resources damaged with long-term recovery and high direct / indirect economic disruption. Based on TRPC surveys of wildland fire hazards in the district, 66% of the district’s 13,113 acres and 59% of the population is in a wildfire hazard area. The same survey estimates that 59% of the residential dwellings are located in hazard zones. The information used by the TRPC for this evaluation was provided by the DNR based upon statistical formulae rather than empirical data.

While one of the district’s three current stations and the proposed new north-end firestation location are located within the historical or potential wildfire hazard zone, the structures are not directly impacted by factors as described in the above “Severity” section.

The impacts of a wildland fire varies upon the size & location of the fire. Only 18% of the homes in the district existed prior to 1960; many small farms and other agricultural lands have been

converted to low or mid-sized density housing, with 53% of the total of the district's residences being built since 1980. This means that relatively little of the "wildland areas" within the district exist any longer, most with adequate to good public or private access. Interface problems (forestry and housing intermingled) do exist, but often is mitigated with vegetation control, adequate access and relatively quick notification. When fires do occur, they tend to require a significant staffing level (often requiring mutual aid with other fire departments and the DNR), require strenuous work on the part of responders and may disrupt normal transportation networks. Long term effects on land may include increased erosion and biological damage, diminished esthetics and loss of property value.

Probability of Occurrence

The documented record of wildland fires in Thurston County suggest that approximately 97% of future wildfires will be 5 acres or less; the region can expect at least one fire exceeding 100 acres over the next 25 years. A warmer and drier future climate may create more suitable conditions for more frequent or larger wildfires. There is a "high" probability of reoccurrence in both the county and the district for wildland fires.

Historical Occurrences and Impacts Specific to this Jurisdiction

Since 1972, most of the largest wildfires South Bay FD8 responded to were located in the Hawks Prairie and Marvin Road area; most of this area has been developed with mid-level and high density housing, and no longer feature the wildland attributes present during those fire periods. While wildfires still present a hazard to the district, in relative context to other community risks addressed by South Bay FD8, it is of a lower but manageable priority.

Summary Assessment

In the district, wildland fires tend to occur in the remaining isolated, sparsely developed areas or are of a nature where they are quickly reported/suppressed with minimal impact on life safety, individual structures, transportation networks and power/communications infrastructures; this would indicate a "low" risk rating.

Summary Risk Assessment for Wildland Fire in South Bay FD8

Probability of Occurrence	Vulnerability	Risk
High	Moderate	Low

Volcanic Hazards

Severity

There are 5 major Cascade volcanoes in Washington State: Mount Baker, Glacier Peak, Mount Rainier, Mount St. Helens and Mount Adams. In the last 4,000 years, 11 Cascade volcanoes have erupted an estimated 100 times. The last major eruption was of Mount St. Helens on May 18, 1980. An explosive eruption could create an ash plume that could conceivably deposit ash all across Thurston County and could trigger large debris and mudflows, known as “lahars”, down glacial river valleys like the Nisqually. The two most likely hazards to affect Thurston County are tephra (volcanic dust & rock fragments as a result of an explosion) and lahar.

In the district, landslides tend to occur in isolated, sparsely developed areas with minimal impact on individual structures, transportation networks and power/communications infrastructures; this would indicate a “low” risk rating. While the location & geography of South Bay FD8 do not indicate any hazard for lahars (in Thurston County it lies mainly in the Nisqually River plain), it could potentially be quickly exposed to tephra during a volcanic event.

Impacts

Based upon the independent assessment of natural hazards by South Bay FD8 in 2003, the relative risk for volcanic events in the district indicates an area impact exceeding 75%, few injuries or illnesses, few properties destroyed but many damaged, environmental resources damaged with long-term recovery and high direct / indirect economic disruption.

Ash fall of a ¼ inch or more would reduce motorist visibility and disrupt nearly every mode of transportation due to both reduction of visibility and contamination for air-breathing engines. The ash would also effect persons with respiratory problems. Large accumulations or wet ash could cause load bearing problems for structures, trees and utility lines, causing collapses and power/communications outages. The ability of the district to respond to emergency incidents could correspondingly be complicated or reduced. Clean-up and recovery would likely be the greatest cost to both the public and private sector.

Probability of Occurrence

The US Geological Survey reports that Mount Rainier has only produced moderate quantities of ash in past eruptions; Mount St. Helens 1980 eruption deposited only a scant layer of ash in Thurston County. Because the prevailing winds blow from the south & west, it is likely most ash from a Cascade Range eruption be blown east away from Thurston County, with little (less than .02%) chance of winds blowing it into the county. Therefore, there is a “low” probability of occurrence in the county and district.

Historical Occurrences and Impacts Specific to this Jurisdiction

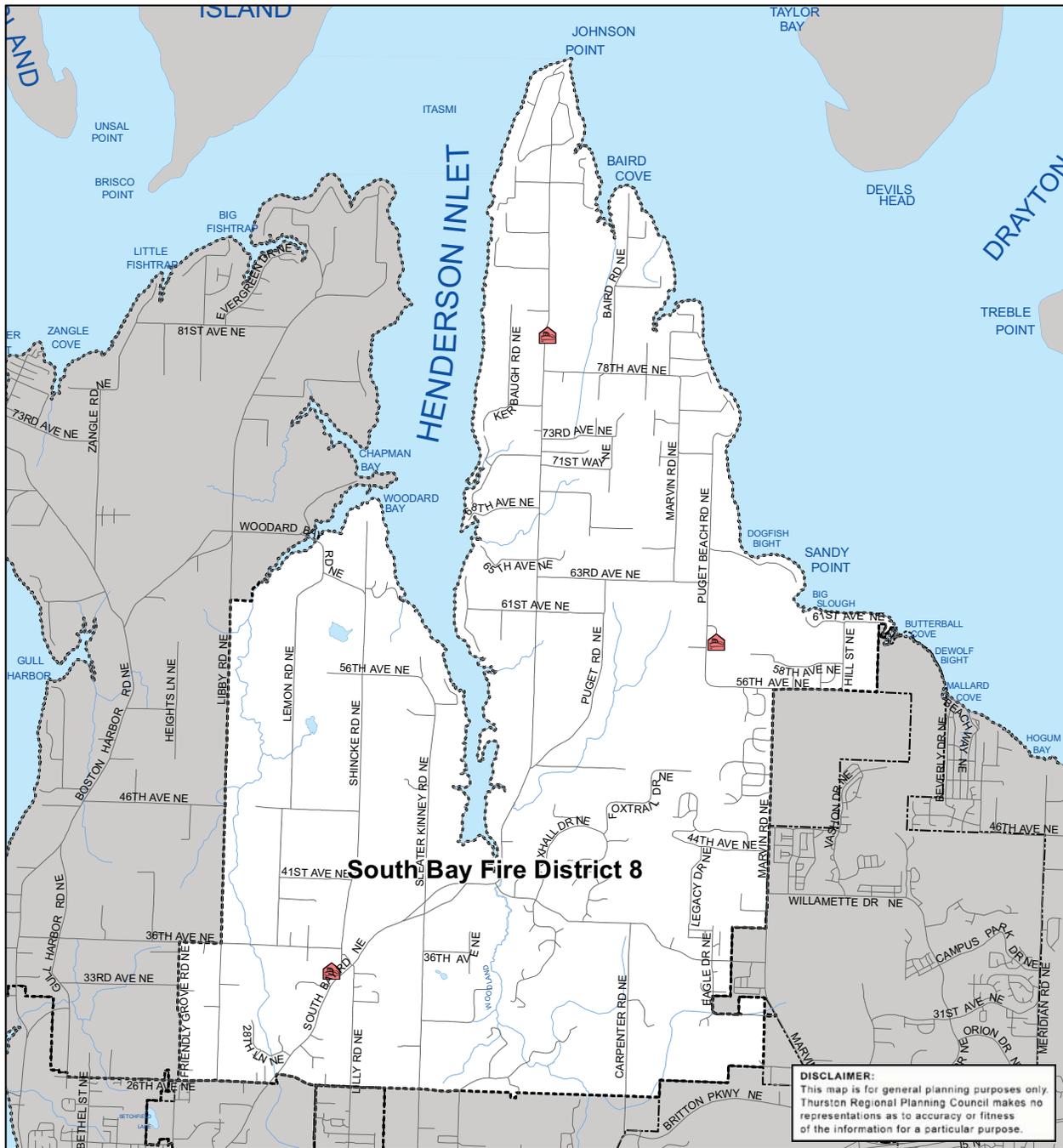
No known historical precedence in South Bay FD8.

Summary Assessment

Under certain conditions, tephra could fall within the district; the effects would not pose immediate life threatening conditions, but the clean-up and recovery costs could be significant. Therefore, the district is “moderately” vulnerable to volcanic activity.

Summary Risk Assessment for Volcanic Events in South Bay FD8

Probability of Occurrence	Vulnerability	Risk
Low	Moderate	Low





TRPC
Thurston Regional Planning Council

Fire District 8

Thurston County, WA



	Fire District 8		City Limits
	Fire District Response Areas		Fire Station Locations

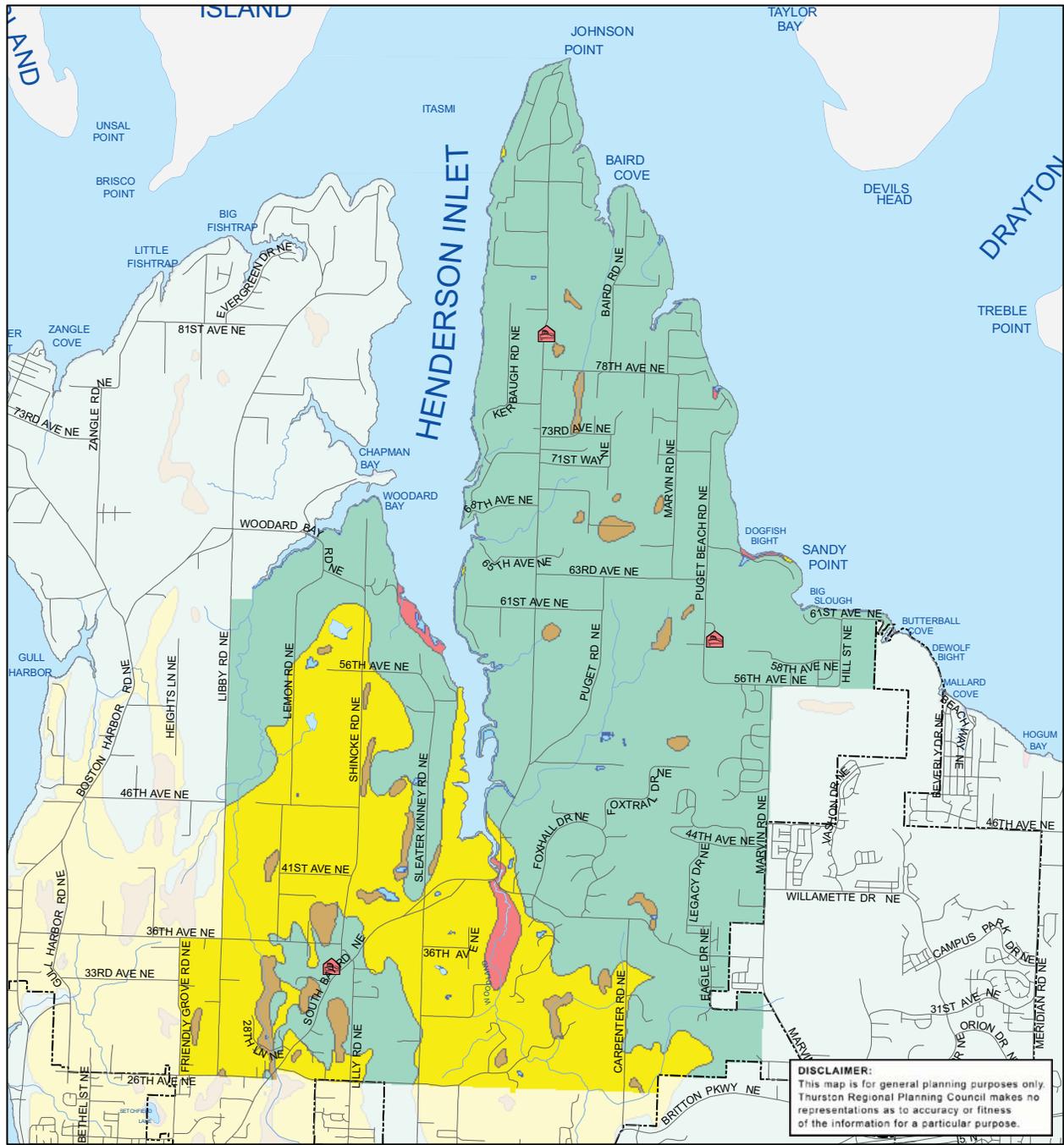
0.5 0.25 0 0.5 Miles





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Fire District 8 Liquefaction Hazards

City Limits

Fire Station Locations

high

moderate to high

low to moderate

low

very low to low

very low

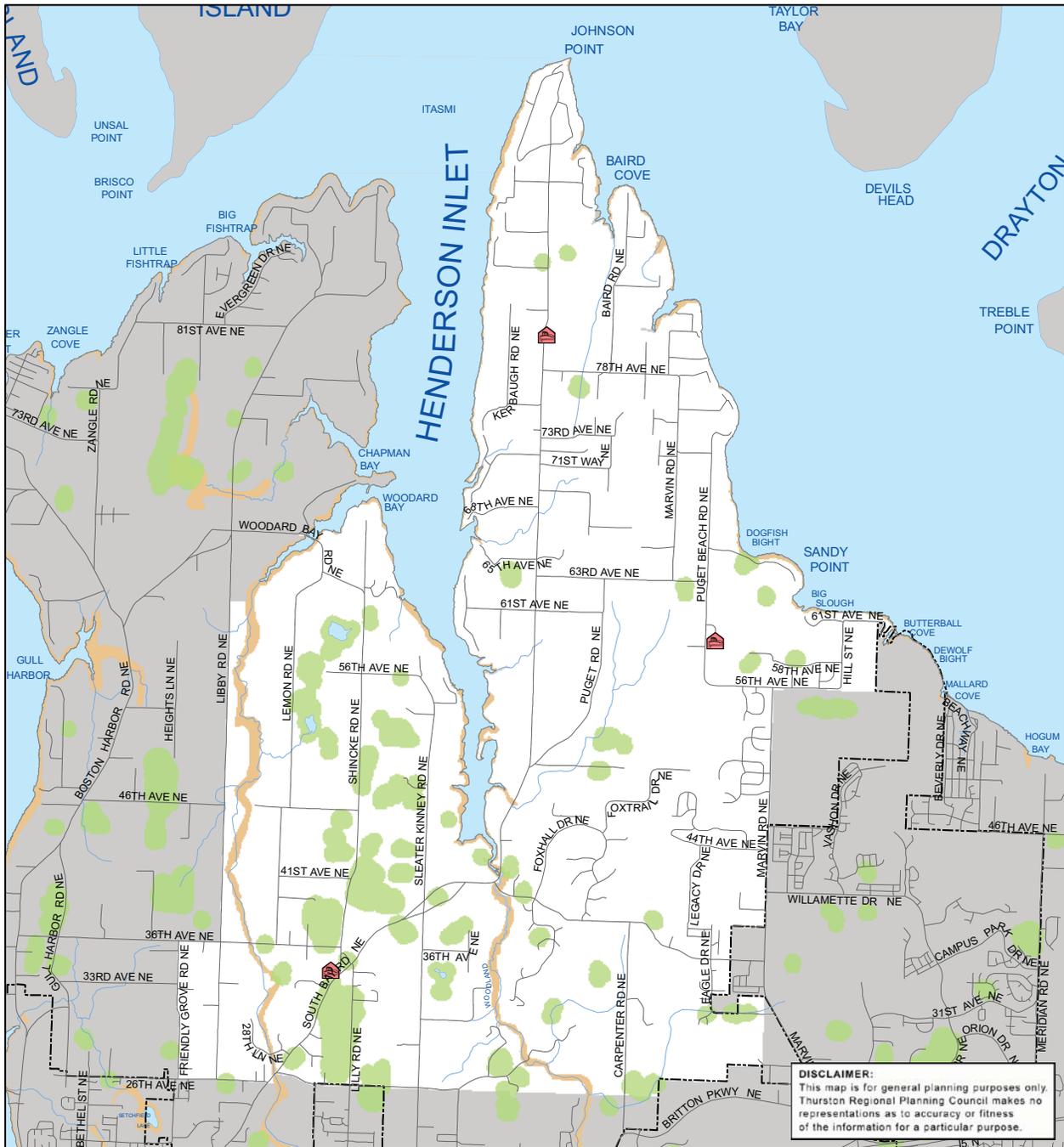
bedrock

peat

water

0.5 0.25 0 0.5 Miles

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Fire District 8 Flood Hazards



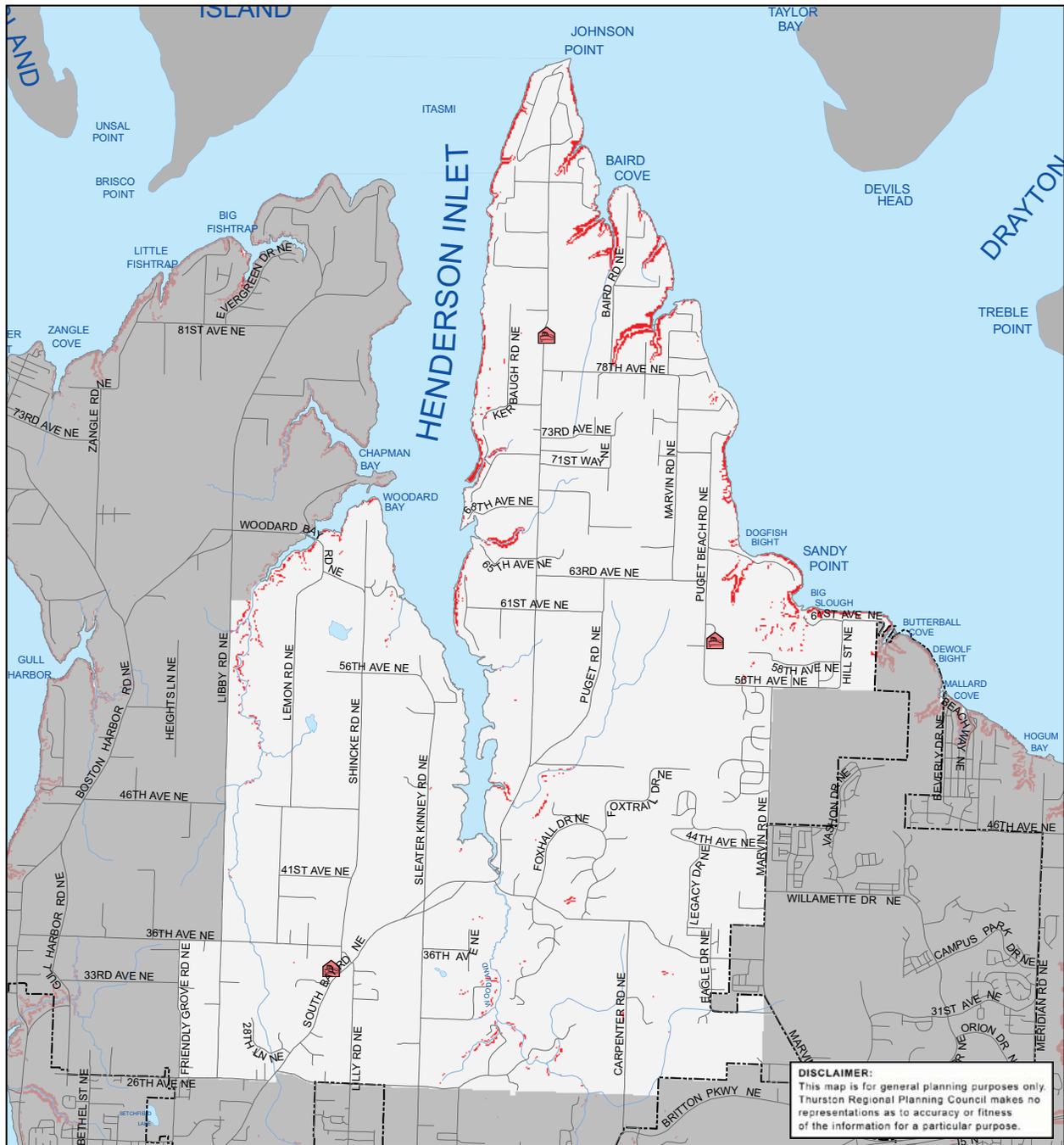
- High Groundwater Flooding
- 100 Year Floodplain
- 500 Year Floodplain
- Fire District Boundary
- City Limits
- Fire Station Locations



0.5 0.25 0 0.5 Miles



Printing Date: February 19, 2009
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Fire District 8 Steep Slopes



Slopes Over 40%



City Limits



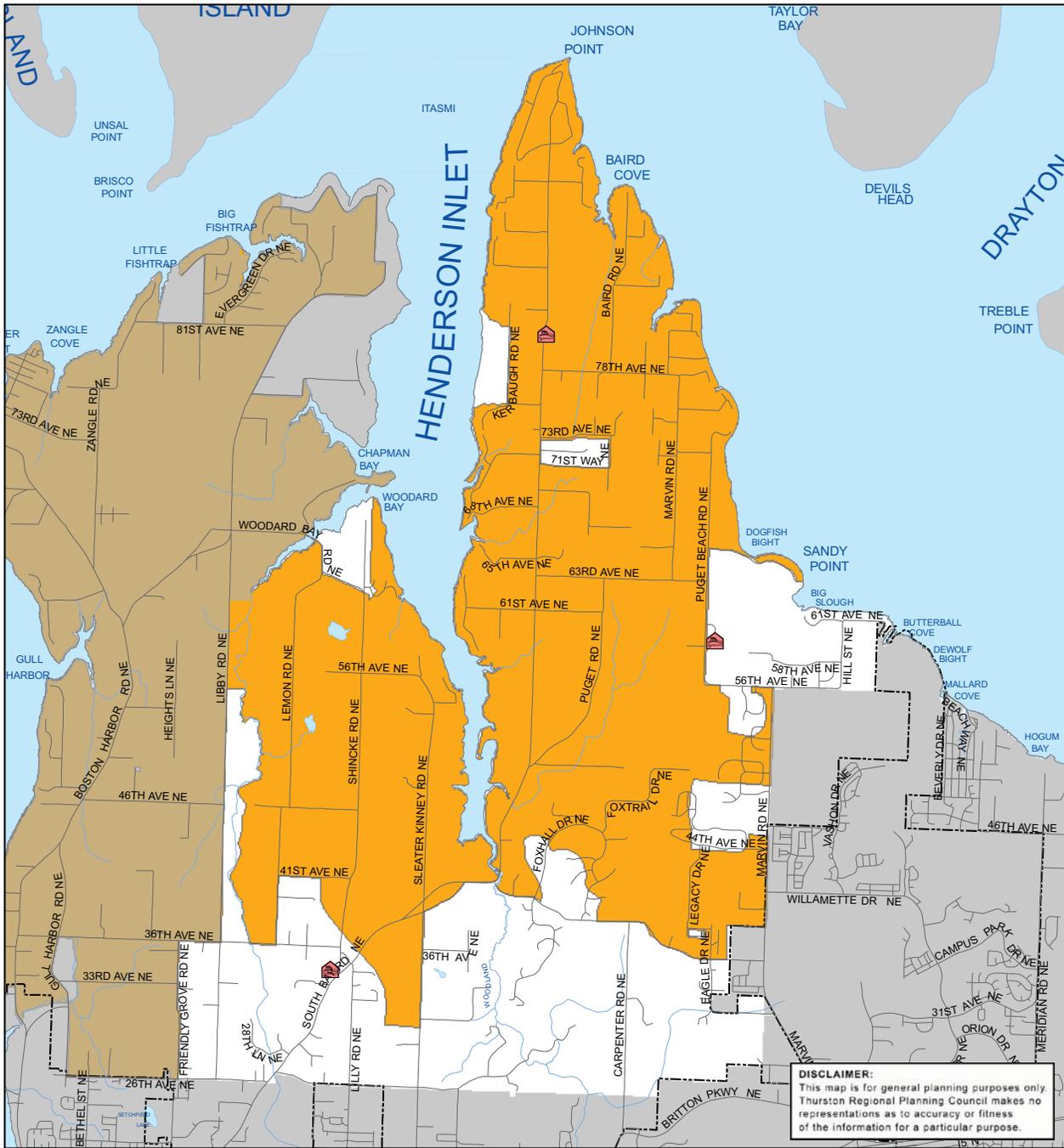
Fire Station Locations



0.5 0.25 0 0.5 Miles



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Fire District 8 Wildfire Hazard Areas



- Wildfire Hazard Areas
- Fire Station Locations
- City Limits



0.5 0.25 0 0.5 Miles

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Thurston County Fire Protection District 8 Current Adopted Mitigation Initiatives

Current Adopted Mitigation Initiatives

Thurston County Fire Protect District 8 identified its mitigation initiatives as a new planning partner during the regional plan update process.

Priority	I.D. Number	Category	Action	Status
1 of 2	TCFD8-EH 1	Hazard Preparedness	Establish a designated Emergency Coordination Center (ECC) at Station 8-2	New
2 of 2	TCFD8-SH 1	Public Information	Develop and deliver public outreach program for storm preparedness	New

Hazard Category Codes are as follows: EH=Earthquake Hazard; FH=Flood Hazard; LH=Landslide Hazard; MH=Multi Hazard; SH=Storm Hazard; WH=Wildland Fire Hazard; and VH=Volcanic Hazard.

Priority: 1 of 2**Status: New****TCFD8-EH 01: Establish a designated Emergency Coordination Center (ECC) at Station 8-2.****Hazard Addressed: Multi Hazard**
Category: Hazard Preparedness

Rationale: In a regional disaster, it is imperative that limited resources be mobilized to perform the “greatest good for most of the needy”. For this to occur, an ECC is critical for the efficient command and control of District resources. The District currently has established an ECC at its headquarters station (Station 8-1, 3506 Shincke Rd NE). The District is in the process of building a new firestation (new Station 8-2 at 7804 Hendershot St. NE) based on the goals & objectives of the District Strategic Plan and the Community Risk Assessment process. The probability of the results of a severe storm or other natural hazard isolating the Johnson Point area from the rest of the District is high, so, a separate north end ECC (at the new firestation) is indicated. The Station 8-2 ECC would generally mirror the capabilities of the Station 8-1 ECC (necessary VHF radio, amateur band radio, wireless data interchange, mapping, etc.).

Relates to Plan Goal(s) and Objectives: 3C, 4E.**Implementer:** Thurston County Fire Protection District 8.**Estimated Cost:** Estimated initial installation cost at \$15,000; ongoing maintenance estimated at \$1,000 plus District staff time, annually.**Time Period:** 2009-on.**Funding Source:** Unknown; anticipated grant funding to supplement District funding for equipment and staff time.

Source and Date: District Strategic Plan (revision 2009): Vision 1: “Our priority is to provide a consistent & professional emergency response throughout the District. We are committed to deploy our resources to ensure a response that meets our Target Levels of Service regardless of the incident location within our District.” Vision 4: “We will manage risk to life and property for our community. In addition to our commitment to incident readiness & response, we will also identify, evaluate and offer appropriate proactive risk management programs to mitigate anticipated community hazards.” Goal/Objective 1.1: “Ensure we meet Target Levels of Service 90% of the time.” Goal/Objective 7.2: “Use Community Risk Assessment and identify the number one Disaster issue and implement a community preparedness program with at least 50 people participating.”

Adopted Plan Number: Unknown.**Reference Page:** Unknown.**Initiative and Implementation Status:** New.

Priority: 2 of 2**Status: New****TCFD8-SH 01: Develop and deliver public outreach program for storm preparedness.****Hazard Addressed: Severe Storm Hazard****Category: Public Information**

Rationale: When reoccurring winter storms cause power/utility outages and obstruct safe transport, many of the District's residents are isolated for some period of time where they must become self-reliant. While the county has planned to provide a public outreach program (ref. County Natural Hazards Mitigation TC-SH-01), this program would complement these efforts with a more local approach. In addition to the preparation and distribution of public education materials regarding protecting life, property and the environment, the District would obtain key occupancy information to assist in response & recovery efforts if necessary, provide contact information with its local Emergency Coordination Centers (ref. District Natural Hazards Mitigation TCFD8-EH-01) and expand opportunities for the District to share important information in a day-to-day fashion as well as in disaster situations.

Relates to Plan Goal(s) and Objectives: 8A**Implementer:** Thurston County Fire Protection District 8.**Estimated Cost:** Estimated at \$5,000 plus District staff time, annually.**Time Period:** 2009-on.**Funding Source:** Unknown; anticipated grant funding to supplement District funding for staff time.

Source and Date: District Strategic Plan (revision 2009): Vision 4: "We will manage risk to life and property for our community. In addition to our commitment to incident readiness & response, we will also identify, evaluate and offer appropriate proactive risk management programs to mitigate anticipated community hazards." Goal/Objective 7.2: "Use Community Risk Assessment and identify the number one Disaster issue and implement a community preparedness program with at least 50 people participating."

Adopted Plan Number: Unknown.**Reference Page:** Unknown.**Initiative and Implementation Status:** New.

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