City of Happy Valley

Natural Hazards Mitigation Plan Addendum

Prepared for
City of Happy Valley
16000 SE Misty Drive
Happy Valley, OR 97086

In cooperation with

Clackamas County Emergency Management
2200 Kaen Road
Oregon City, OR 97045

Adopted by City Council on March 2, 2010

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

April 8, 2010

Honorable Lynn Peterson,
Chair, Board of County Commissioners
2051 Kaen Road
Oregon City, Oregon 97045

Dear Chair Peterson:

On October 19, 2007, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) approved the *Clackamas County Natural Hazards Mitigation Plan Update 2007* as a multi-jurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through October 19, 2012:

Clackamas County	**City of Canby**	**City of Damascus**
City of Estacada	**City of Gladstone**	***City of Happy Valley***
City of Johnson City	***City of Lake Oswego***	**City of Milwaukie**
City of Oregon City	**City of Sandy**	**City of West Linn**
City of Wilsonville		

The list of approved jurisdictions has been updated to include the cities of Happy Valley and Lake Oswego, which have recently adopted the *Clackamas County Natural Hazards Mitigation Plan Update 2007*. To continue eligibility the plan must be reviewed, revised as appropriate, and resubmitted within five years of the original approval date.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our State counterpart, Oregon Emergency Management, which coordinates and administers these efforts for local entities.

Sincerely,

Mark Carey, Director
Mitigation Division

cc: Dennis Sigrist, Oregon Emergency Management

KM:bb

RESOLUTION NO. 10-03

A RESOLUTION ADOPTING THE CITY OF HAPPY VALLEY'S REPRESENTATION IN THE CLACKAMAS COUNTY MULTI-JURISDICTION HAZARD MITIGATION PLAN

WHEREAS, the City of Happy Valley is vulnerable to the human and economic costs of natural, technological and societal disasters, and

WHEREAS, the City Council of the City of Happy Valley recognizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community, and

WHEREAS, the City of Happy Valley has participated in the development of the Clackamas County Multi-Jurisdiction Natural Hazard Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities, and

WHEREAS, the City of Happy Valley's representatives and staff have identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the City of Happy Valley to the impacts of future disasters, and

WHEREAS, these proposed projects and programs have been incorporated into the Clackamas County Multi-Jurisdiction Natural Hazard Mitigation Plan that has been prepared and promulgated for consideration and implementation by the cities of Clackamas County; NOW THEREFORE

THE COMMON COUNCIL OF THE CITY OF HAPPY VALLEY RESOLVES AS FOLLOWS:

Section 1. The Common Council of the City of Happy Valley hereby accepts and approves of its section of the Clackamas County Multi-Jurisdiction Hazard Mitigation Plan as a reasonable process to identify and plan for potential hazards in the City of Happy Valley and Clackamas County,

Section 2. The agency personnel of the City of Happy Valley are requested and instructed to pursue available funding opportunities for implementation of the actions and proposals designated therein,

Section 3. The City of Happy Valley will, upon receipt of such funding or other necessary resources, seek to implement the mitigation proposals identified by the Jurisdiction's Hazard Mitigation Planning Committee, and

Section 4. The City of Happy Valley will continue to participate in the updating and expansion of the Clackamas County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead, and

Section 5. The City of Happy Valley will further seek to encourage the businesses, industries and community groups operating within and/or for the benefit of the City of Happy Valley to also participate in the updating and expansion of the Clackamas County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead.

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR, this Tuesday, March 2nd 2010.

Hon. Robert Wheeler, Mayor

ATTEST:

Marylee Walden, City Recorder

City of Happy Valley
Natural Hazards Mitigation Plan Addendum

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Overview

What is Natural Hazard Mitigation?

Natural hazard mitigation is defined as permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; education and outreach to targeted audiences, such as Spanish speaking residents, or the elderly. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.

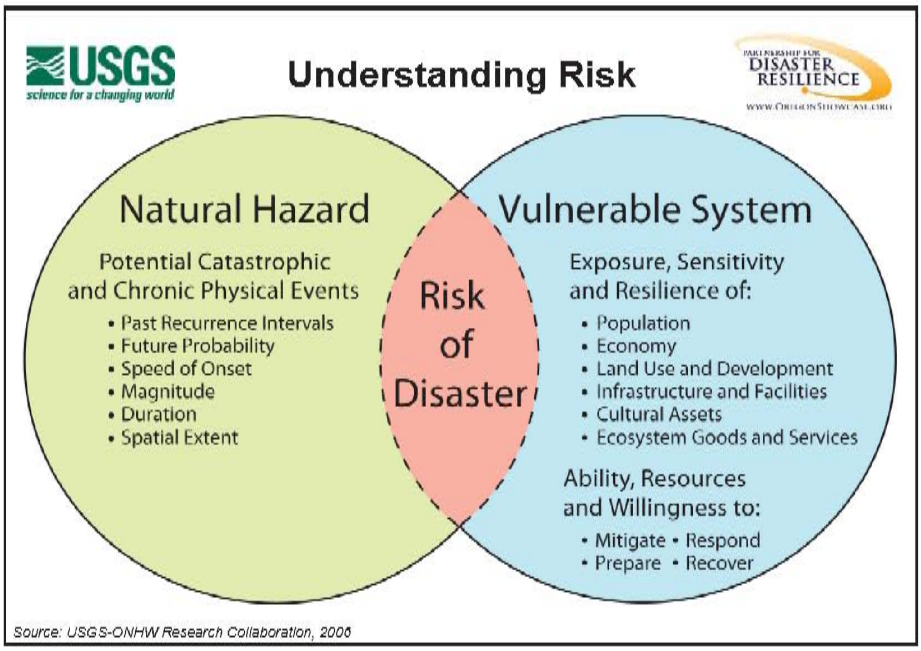
Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why Develop a Mitigation Plan?

Happy Valley developed this addendum to the Clackamas County multi-jurisdictional Natural Hazards Mitigation Plan in an effort to reduce future loss of life and damage to property resulting from natural hazards. It is impossible to predict exactly when disasters will occur, or the extent to which they will affect the city. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

The figure below is utilized throughout the plan to illustrate the concepts of risk reduction.

Figure 1 Understanding Risk[i]



A natural hazard mitigation plan can assist the community in understanding what puts the community at risk. By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capabilities, Happy Valley can become better equipped to identify and implement actions aimed at reducing the overall risk of hazards.

This plan focuses on the primary natural hazards that could *affect* Happy Valley, Oregon, which include flood, landslide, wildfire, severe storms, earthquake and volcano. The dramatic increase in the costs associated with natural disasters over the past decades has fostered interest in identifying and implementing effective means of reducing vulnerability. A report submitted to Congress by the National Institute of Building Science's Multi-hazard Mitigation Council (MMC) highlights that for every dollar spent on mitigation, society can expect an average savings of $4.[ii] This addendum to the Clackamas County multi-jurisdictional Natural Hazards Mitigation Plan is intended to assist Happy Valley in reducing its risk from natural hazards by identifying resources, information, and strategies for risk reduction.

The plan is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the city; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other city plans and programs including the city's Comprehensive Plan, Development Code, Transportation system Plan, and Parks Master Plan, as well as the State of Oregon Natural Hazards Mitigation Plan.

The plan provides a set of actions to prepare for and reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and

the implementation of preventative activities. The actions described in the plan are intended to be implemented through existing plans and programs within the city.

Policy Framework for Natural Hazards in Oregon

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the jurisdiction's Comprehensive Plan, and helps each jurisdiction meet the requirements of statewide land use planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Oregon Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

The Disaster Mitigation Act of 2000 (DMA 2000) is the current federal legislation addressing mitigation planning. It reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels, and CFR 201 provides information on the policies and procedures for mitigation planning. Local jurisdictions must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Additionally, mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

Section 1:
Planning Process

1.1 How was the Addendum Developed?

In the fall of 2007, the Oregon Partnership for Disaster Resilience (OPDR / the Partnership) at the University of Oregon's Community Service Center partnered with Oregon Emergency Management, Resource Assistance for Rural Environments (RARE), Clackamas County, and cities within Clackamas County to develop a Hazard Mitigation Grant Program (HMGP) planning grant proposal. The City of Happy Valley joined the Partnership by signing a memorandum of understanding for this project. FEMA awarded the Partnership with a grant to support the development and update of city addenda in Clackamas County, and Happy Valley's local planning efforts began in April, 2009. RARE provided a staff person ('RARE Participant') to facilitate and document the city's addendum development process.

Participants in Planning Process

Representatives from the city's Hazard Mitigation Team (HMT) served as steering committee members for the City of Happy Valley's natural hazards mitigation planning process. Committee members included:

- Erin Brisben, Police Sergeant
- Ed Cameron, Building Official
- Steve Campbell, Director of Community Services/Public Safety
- Rich Feucht, Engineering Associate
- Ryan Kersey, Code Enforcement
- Sarah Mizejewski, Associate Planner
- Barbara Muller, Finance Officer
- Chris Randall, Public Works Director

Planning Process

The RARE Participant and Clackamas County Emergency Management developed and facilitated three plan development meetings with the Hazard Mitigation Team on April 30th, May 20th, and June 3rd, 2009. Please see Appendix A for meeting agendas and minutes.

Introduction – April 30, 2009: the RARE Participant facilitated an introductory meeting to present a brief overview of the natural hazards mitigation planning process. The HMT discussed a planning timeline, and additionally decided to serve as the steering committee for Happy Valley's planning processes.

Risk Assessment – May 20, 2009: Between April and May 2009, the RARE Participant developed the plan's Community Profile (see Section 2 below), and researched the causes and characteristics of natural hazards in Happy Valley, as well as past events. On May

20th, 2009 the RARE Participant facilitated the first of two plan development meetings with the HMT. Group members identified and discussed past hazard events, vulnerable systems within the community, and existing emergency management capabilities. Additionally, the group identified various public involvement activities to implement during the planning process, as well as continued public involvement strategies that could occur after the plan's completion. The HMT also identified a future coordinating body for Happy Valley's Natural Hazards Mitigation Plan Addendum, as well as a plan convener.

Action Items – June 3, 2009: Between April and June, 2009 the RARE Participant drafted the community's Risk Assessment (see Section 3 below), and developed a list of potential mitigation actions based on vulnerabilities identified at the May 20th plan development meeting. On June 3rd, 2009 the RARE Participant facilitated the second of two plan development meetings with the HMT. Group members discussed the RARE Participant's proposed mitigation actions, and developed a final list of actions. Additionally, the HMT developed a future meeting schedule (see 1.3 Plan Implementation and Maintenance below).

Public Involvement

Following completion of the final draft, the city requested that citizens provide input and/or comment on the plan's content. Clackamas County's project webpage located on the Partnership's website (www.oregonshowcase.org/plans/clackamas) hosted plan drafts during the plan development process, and the city's website provided a link to the Partnership's website. Upon completion of a final draft, the city placed an article in the city's December newsletter, "Happy Valley Today". Additionally, outreach language was posted on the city's website. Please see Appendix A for a copy of the December Newsletter. The article informed residents about the planning process, and provided a link to the Partnership's website. Residents were told that they could read the plan, and provide comments within City Hall if desired. The city allowed one month for public comment, and no comments were received.

Adoption

The City of Happy Valley adopted the Natural Hazards Mitigation Plan Addendum via resolution on March 2, 2010.

1.2 Addendum Mission and Goals

Because this is an addendum to the Clackamas County Natural Hazards Mitigation Plan, the City of Happy Valley has chosen to adopt Clackamas County's Plan mission and goals. The city's Hazard Mitigation Team believes that Clackamas County's plan mission and goals accurately reflect those of Johnson City as well. Likewise, adopting the county's mission and goals promotes cohesion between the two plans.

Mission

The mission of the Clackamas County Natural Hazards Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards. This can be achieved by increasing

public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

Goals

Protect Life and Property

- Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventative measures for existing development in areas vulnerable to natural hazards.

Promote Public Awareness

- Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
- Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.

Enhance Natural Systems

- Balance watershed planning, natural resource management, and land use planning with natural hazard mitigation to protect life, property, and the environment.
- Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

Encourage Partnerships and Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation.
- Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

Augment Emergency Services

- Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.
- Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.
- Coordinate and integrate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

1.3 Plan Implementation and Maintenance

This section details the formal process that will ensure that the Happy Valley Addendum to the Clackamas County Natural Hazards Mitigation Plan remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan annually, as well as producing an updated plan every

five years. Finally, this section describes how the city will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

After the plan is locally reviewed and deemed complete, the Director of Community Services and Public Safety will submit the plan to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management submits the plan to the Federal Emergency Management Agency (FEMA--Region X) for review. This review addresses the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the Happy Valley City Council will adopt the plan via resolution. At that point the city will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance program.

Coordinating Body

The Hazard Mitigation Team will serve as the coordinating body for Happy Valley's Natural Hazards Mitigation Plan Addendum. Roles and responsibilities of the coordinating body include:

- Serving as the local evaluation committee for funding programs such as the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and Flood Mitigation Assistance program;
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Encouraging stakeholders, and relevant hazard mitigation organizations and agencies to implement and/or report on implementation of the plan's identified action items;
- Evaluating and updating the Natural Hazards Mitigation Plan Addendum following a disaster;
- Evaluating and updating the Natural Hazards Mitigation Plan Addendum in accordance with the prescribed plan maintenance schedule; and
- Developing and coordinating ad hoc and/or standing subcommittees. The committee will engage relevant organizations, agencies, and/or neighboring communities as technical advisers in hazard mitigation as needed.

Convener

The Director of Community Services/Public Safety will serve as the plan's convener. The convener's roles and responsibilities include:

- Assigning additional stakeholders and representatives to the coordinating body as needed;
- Coordinating HMT meeting dates, times, locations, agendas, and member notification;
- Documenting the outcomes of HMT meetings;
- Serving as a communication conduit between the HMT and the public and/or key plan stakeholders;

- Identifying emergency management-related funding sources for natural hazard mitigation projects;
- Facilitating the incorporation, maintenance, and update of the city's natural hazard risk GIS data elements;
- Utilizing the risk assessments as a tool for prioritizing proposed natural hazard risk reduction projects; and
- Facilitating and documenting the plan's five-year update.

Implementation through Existing Programs

This plan is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the city; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other city plans and programs including the Comprehensive Land Use Plan, Capital Improvements Plan, Building Codes, as well as the Clackamas County Natural Hazards Mitigation Plan, and the State of Oregon Natural Hazards Mitigation Plan. The mitigation actions described in Section 4 below are intended to be implemented through existing plans and programs within the city. Implementation opportunities are further defined in action items (see action item worksheets in Appendix B) when applicable.

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan addendum. Proper maintenance of the plan ensures that this plan will maximize the city's efforts to reduce the risks posed by natural hazards. This section includes a process to ensure that regular review and update of the plan occurs.

Semi-Annual Meetings

The HMT will meet on a semi-annual basis to complete the following tasks. Meetings will be held in the spring and fall to discuss the previous hazard season and prepare for upcoming hazard seasons. During the first meeting of each year, the committee will:

- Discuss funding opportunities for the implementation of mitigation strategies.
- Review existing action items to determine appropriateness for funding;
- Educate and train new members on the plan and mitigation in general; and
- Identify issues that may not have been identified when the plan was developed.

During the second meeting of each year, the committee will:

- Review existing and new risk assessment data, and incorporate this information into the plan;
- Document success in implementing mitigation actions and/or applying for funding;
- Discuss the addition and/or subtraction of mitigation actions from the plan;
- Discuss methods for continued public involvement;
- Document successes and lessons learned during the year; and
- Generate a list of members that should be included in future meetings.

The convener will be responsible for documenting the outcome of the semi-annual meetings. The process the HMT will use to prioritize mitigation projects is detailed in Section 4 below. The plan's format allows the city to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a natural hazards mitigation plan that remains both current and relevant.

Five-Year Plan Update

Local mitigation plans must be updated and resubmitted to the Federal Emergency Management Agency (FEMA) for approval every five years in order to maintain eligibility for federal hazard mitigation assistance programs.[1] Plan updates must demonstrate that progress has been made in the past five years for local mitigation plans to fulfill commitments outlined in the previously approved plan.

Happy Valley's Natural Hazards Mitigation Plan Addendum will be updated every five years in accordance with the Disaster Mitigation Act of 2000. Because this is an addendum to the Clackamas County Natural Hazards Mitigation Plan, the addendum must be updated in conjunction with the county's five-year plan update schedule. As such, Happy Valley must update this addendum by September 2012 (and then again five years thereafter). Sufficient time should be allotted for plan update activities and FEMA review, meaning the city should begin the plan update process by September 2011. Additional time will be needed if the city intends to pursue application for mitigation planning grants, and/or contracting for technical or professional services.

During the five-year plan update, the city must review and revise its plan to reflect changes in development, progress in mitigation efforts, and changes in priorities. The following questions will be asked to determine what actions are necessary in updating the addendum:

- Have public involvement activities taken place since the plan was adopted?
- Are the plan goals still relevant?
- Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?
- Are there new hazards that should be addressed?
- Have there been hazard events in the community since the plan was adopted?
- Have new studies or previous events identified changes in any hazard's location or extent?
- Has vulnerability to any hazard changed?
- Have development patterns changed? Is there more development in hazard prone areas?
- Do future annexations include hazard prone areas?
- Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?

[1] 44 CFR 201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

- Are there new high risk populations?
- Did the plan document and/or address National Flood Insurance Program repetitive loss properties?
- Is there an action dealing with continued compliance with the National Flood Insurance Program?
- Did the plan identify data limitations?
- Did the plan identify potential dollar losses for vulnerable structures?
- What is the status of each mitigation action?
- Are there completed mitigation actions that have decreased overall vulnerability?
- Are there new actions that should be added?
- Are changes to the action item prioritization, implementation, and/or administration processes needed?
- Do changes need to be made within the five year update schedule?

The convener will be responsible for (1) organizing the HMT to address plan update needs; (2) updating any deficiencies found in the plan, and (3) ensuring the plan meets the Disaster Mitigation Act of 2000's plan update requirements. If needed, FEMA provides plan update guidance, tools, and training to assist communities in the plan development/update process.

Continued Public Involvement & Participation

The City of Happy Valley is dedicated to involving the public directly in the continual reshaping and updating of the Natural Hazards Mitigation Plan Addendum. Although members of the HMT represent key community constituencies, the general public will have the opportunity to provide feedback on future plan amendments and updates.

During the plan development process, public participation was incorporated into every stage of the plan development process. To ensure that these opportunities will continue, copies of the plan will be available online at the city's website, and hard copies will be available in offices around the city. The city newsletter, Happy Valley Today, will be utilized and if funding becomes available brochures will be created and distributed to the public. The addendum will additionally be available for viewing during the city's open house events, Traffic and Public Safety Forum, Happy Valley Business Alliance meetings, and to dozens of homeowner's association meetings. Public meetings regarding plan content will be scheduled when deemed necessary, such as after a natural hazard event.

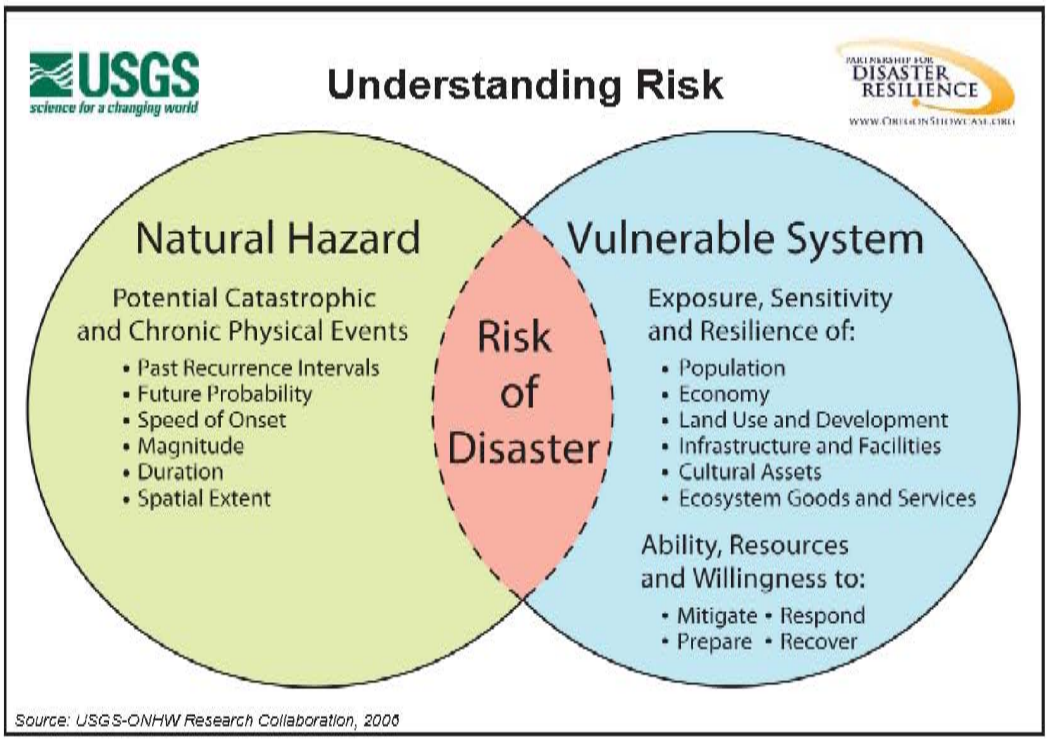
In addition to the involvement activities listed above, the city's Natural Hazards Mitigation Plan Addendum has been archived and posted on the University of Oregon Libraries' Scholar's Bank Digital Archive.[2] Contact information is posted on all plan copies.

[2] University of Oregon Scholars Bank, Natural Hazards Mitigation Plans: https://scholarsbank.uoregon.edu/xmlui/handle/1794/1930

Section 2: Community Profile

The following section describes the City of Happy Valley from a number of perspectives in order to help define and understand the city's sensitivity and resilience to natural hazards. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). The information in this section represents a snapshot in time of the current sensitivity and resilience factors in Happy Valley when the addendum was developed. The information documented here, along with the risk assessments located in Section 3 below, should be used as the local level rationale for the risk reduction actions identified at the end of this addendum. The identification of actions that reduce the city's sensitivity and increase its resilience assist in reducing overall risk, or the area of overlap in Figure 1 below.

Figure 1: Understanding Risk



Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

2.1 Geography and the Environment

The City of Happy Valley is located in Clackamas County, 6 miles southeast of the City of Portland. Happy Valley is located in Oregon's Willamette Valley which experiences a moderate climate. The city encounters about 142 sunny days per year. In August the average high temperature is 82°F, while in January the average low temperature is 35°F. Happy Valley receives 60 inches of rainfall and 4 inches of snowfall a year.[iii]

Happy Valley is located in the Willamette Valley of Northwest Oregon. The Willamette Valley is nestled between the Coast and Cascade Mountain Ranges and varies from 20 to 40 miles wide and 130 miles long. The Willamette Valley extends from Eugene-Springfield in the south to Portland in the north. Happy Valley is bound by Mt. Scott on the west, and Scouter's Mountain on the east. The area is characterized by gently to steeply sloping uplands and a nearly flat valley floor. The ridges extending northeastward and southeastward from these mountains form the hollow that is often referred to as the "bowl". Mount Scott, an extinct volcano of the Boring Lava field, remains the highest point in the city at 950 feet.[iv]

Rock Creek is a major basin that flows southwest to the Clackamas River. The basin drains to Kellogg Creek and the Willamette River. The Kelley Creek watershed borders a headwater drainage of the Rock Creek watershed. Ground and surface water flows north into Johnson Creek or south into Rock Creek. Subbasins of the Johnson Creek watershed include Veterans Creek, Mitchell Creek, and Kelley Creek.[v]

2.2 Population & Demographics

The City of Happy Valley is one of the fastest growing cities in the state of Oregon. Happy Valley's population has increased dramatically, growing from 1,650 in 1992 to a 2008 estimated population of 11,455.[vi] Since 2000, the population in Happy Valley has grown 146.34%. Based on this growth, it is anticipated that the next census will show a population of 12,000 or more.

Table 2.1 Population Change from 2000 to 2008

Year	Happy Valley	Percent Change	Clackamas County	Percent Change	Oregon	Percent Change
2000	4,650		340,000		3,436,750	
2001	4,930	6.0%	345,150	1.5%	3,471,700	1.0%
2002	5,810	17.8%	350,850	1.7%	3,504,700	1.0%
2003	6,370	9.6%	353,450	0.7%	3,541,500	1.1%
2004	6,640	4.2%	356,250	0.8%	3,582,600	1.2%
2005	7,275	9.6%	361,300	1.4%	3,631,440	1.4%
2006	9,210	26.6%	367,040	1.6%	3,690,505	1.6%
2007	10,380	12.7%	372,270	1.4%	3,745,455	1.5%
2008	11,455	10.4%	376,660	1.2%	3,791,060	1.2%

Source: Portland State University Research Center[vii]

Disaster impacts in terms of loss and the ability to recover vary among population groups following a disaster. Historically, 80% of the disaster burden falls on the public. Of this number, a disproportionate burden is placed upon special needs groups, particularly children, the elderly, the disabled, minorities, and low income persons. Portions of Happy Valley's residents fall into these special needs categories. According to the 2000 Census, approximately 1.2% of Happy Valley's population had an income below the poverty level. More information on the city's special needs populations is shown below in Tables 2.2 and 2.3.

Table 2.2 Population by Race in 2000

Race	Number	Percent
White	3,949	87.4%
Asian	400	8.9%
Two or more races	95	2.1%
Hispanic or Latino	85	1.9%
Black or African American	35	0.8%
American Indian or Alaska Native	13	0.3%
Native Hawaiian and other Pacific Islander	7	0.2%

Source: US Census, 2000[viii]

Table 2.3 Disabled Population 2000

Age	Number of People
5 to 15	28
16 to 64	447
65 and older	107
Total	582
Percent of Population	12.9%

Source: US Census, 2000[ix]

2.3 Land Use & Development

In June 2001, Happy Valley nearly doubled in physical size with the annexation of Rock Creek, which will provide commercial development as well as high-density housing. The Rock Creek Comprehensive Plan guides the transition of the rural Rock Creek area to an addition of the City of Happy Valley. As a result, Happy Valley has seen a dramatic increase in construction of new single family residences, with the building department issuing an average of 15 new single family building permits per month. The Damascus/Boring Concept Plan includes strategies for development of the East Happy Valley area outside the urban growth boundary. The land use development strategies encourage a combination of densities and uses to support local and regional needs.

In 2002, Metro expanded its Urban Growth Boundary (UGB) to include 12,200 acres in the Damascus/Boring area east of Happy Valley, and south of Gresham. In the summer

of 2004, the City of Happy Valley annexed 10% of the 12,200 acres. The remaining acreage formed the City of Damascus, and about 10% is left for annexation of nearby communities. As the Damascus and east Happy Valley communities develop, the population is expected to increase from about 9,000 to over 68,000. As a result, the cities of Happy Valley, Gresham, and Damascus developed a 'first step' concept plan that served to guide the transition of this area from rural to urban uses.[x] In addition to identifying general patterns of future development, the concept plan identifies transportation and other systems that will be shared by Damascus, Happy Valley, Gresham, Clackamas County, and other nearby communities.

The Damascus / Boring Concept Plan served as a starting point for Happy Valley's development and implementation of an East Happy Valley Comprehensive Plan, a Transportation System Plan Update, Comprehensive Plan Text Amendments, and a revised and Updated Development Code.

Happy Valley's most current zoning map (2009) is shown below on page 14. The Happy Valley City Council believes a mix of land uses – residential, commercial and industrial – establishes a stable tax base which in turn helps pay for needed services for existing and future residents. The city believes that the next five years will see both commercial and industrial development east of 162nd avenue and south of Sunnyside road. In the 2004 general election, voters approved a ballot measure that gave the City Council authority to annex properties into Happy Valley without voter approval. The area to the east of the city extending north to the Multnomah County line and east to approximately SE 182nd has the potential for annexation within the next five years.

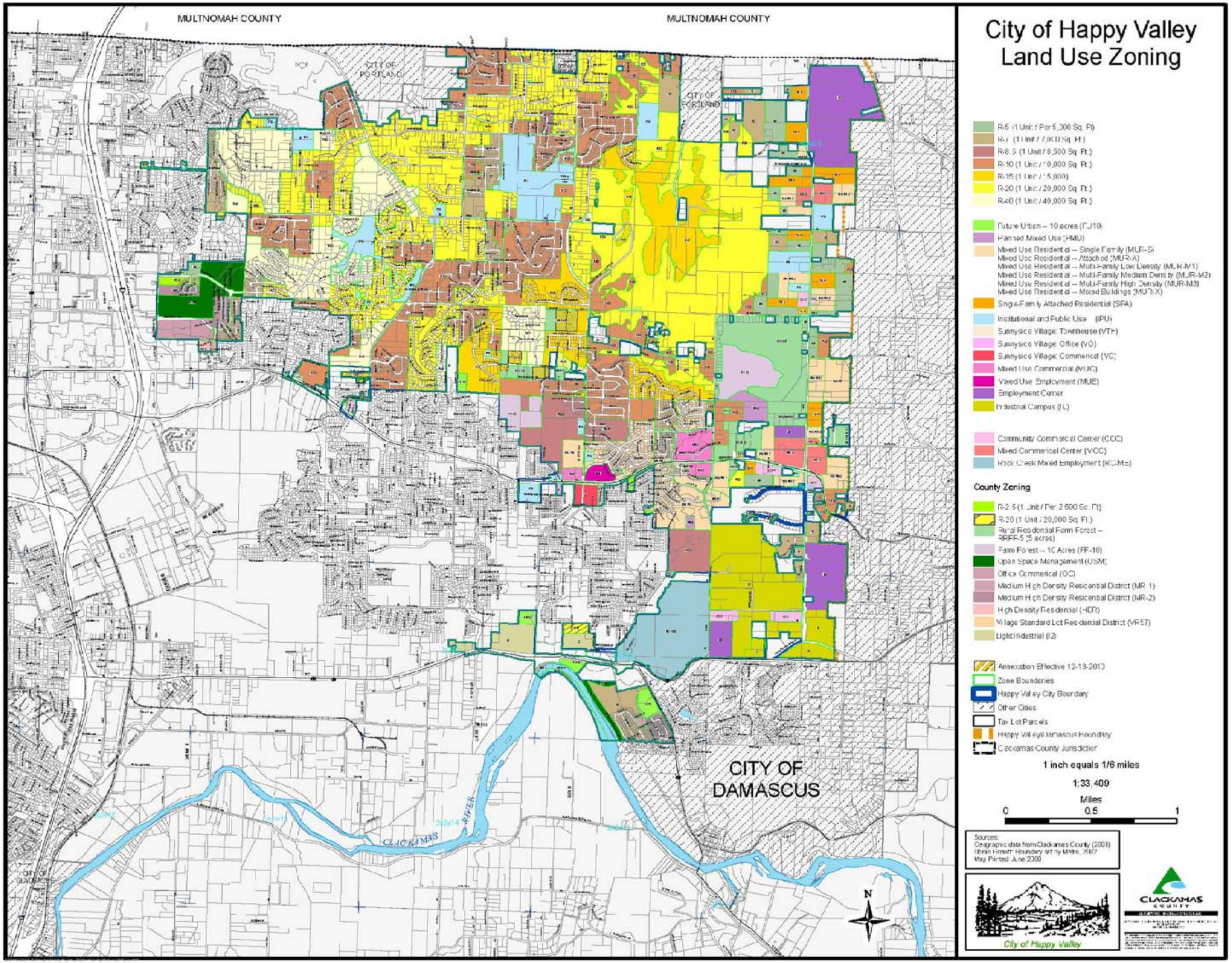

MULTNOMAH COUNTY
MULTNOMAH COUNTY
CITY OF PORTLAND
CITY OF PORTLAND
CITY OF DAMASCUS
CLACKAMAS RIVER
CITY OF GLADSTONE
N
City of Happy Valley Land Use Zoning
R-5 (1 Unit / Per 5,000 Sq. Ft)
R-7 (1 Unit / 7,000 Sq. Ft.)
R-8.5 (1 Unit / 8,500 Sq. Ft.)
R-10 (1 Unit / 10,000 Sq. Ft.)
R-15 (1 Unit / 15,000)
R-20 (1 Unit / 20,000 Sq. Ft.)
R-40 (1 Unit / 40,000 Sq. Ft.)
Future Urban – 10 acres (FU10)
Planned Mixed Use (PMU)
Mixed Use Residential – Single Family (MUR-S)
Mixed Use Residential – Attached (MUR-A)
Mixed Use Residential – Multi-Family Low Density (MUR-M1)
Mixed Use Residential – Multi-Family Medium Density (MUR-M2)
Mixed Use Residential – Multi-Family High Density (MUR-M3)
Mixed Use Residential – Mixed Buildings (MUR-X)
Single-Family Attached Residential (SFA)
Institutional and Public Use (IPU)
Sunnyside Village: Townhouse (VTH)
Sunnyside Village: Office (VO)
Sunnyside Village: Commerical (VC)
Mixed Use Commercial (MUC)
Mixed Use Employment (MUE)
Employment Center
Industrial Campus (IC)
Community Commercial Center (CCC)
Mixed Commerical Center (VCC)
Rock Creek Mixed Employment (RCME)
County Zoning
R-2.5 (1 Unit / Per 2,500 Sq. Ft)
R-20 (1 Unit / 20,000 Sq. Ft.)
Rural Residential Farm Forest – 5RFF-5 (5 acres)
Farm Forest – 10 Acres (FF-10)
Open Space Management (OSM)
Office Commerical (OC)
Medium High Density Residential District (MR-1)
Medium High Density Residential District (MR-2)
High Density Residential (HDR)
Village Standard Lot Residential District (VR5/7)
Light Industrial (I2)
Annexation Effective 12-13-2013
Zone Boundaries
Happy Valley City Boundary
Other Cities
Tax Lot Parcels
Happy Valley Damascus Boundary
Clackamas County Jurisdiction
1 inch equals 1/6 miles
1:33,409
Miles
0
0.5
1
Sources:
Geographic data from Clackamas County (2009)
Urban Growth Boundary set by Metro, 2002
Map Printed June 2009
City of Happy Valley
CLACKAMAS COUNTY

Table 2.4 below summarizes future land use needs within Happy Valley. The 2025 land use projections demonstrate growth in housing and employment. Specifically, moderate growth will occur in the area bordered by Clatsop Street to the north, 145th Avenue to the east, Mountain Gate Road and Alta Vista Drive to the south and the west city limits. Areas expected to have major growth are located south of Sunnyside Road and the Scouters Mountain area.xi

Table 2.4 Happy Valley Land Use Summary

Landuse	2005	2025	Increase	Percent Increase
Households	5,610	21,150	15,540	277%
Retail Employees	1,088	1,970	882	1
Other Employees	3,171	8,384	5,213	164%

Happy Valley Transportation Plan[xii]

2.4 Housing

Housing type and age are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1960s in the Northwest use earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that required homes in the floodplain to be elevated to one foot above Base Flood Elevation.

As of 2000, Happy Valley had 1,500 housing units of which 1,431 were occupied and 69 were vacant. Of these housing units, 2.7% are owner-occupied and 2.2% are renter occupied. The median year housing structures were built is 1995 and 26% were built before 1980, meaning a good portion of the city's housing stock was built before stricter seismic and floodplain building codes were put in place. The median value of an owner-occupied home in 2000 was $306,600. The cost of living in Happy Valley is 2.77% lower than the average cost of living in the United States.[xiii] Please see Tables 2.5 and 2.6 below for more information regarding Happy Valley's housing characteristics.

Table 2.5 Housing by Type, 2000

Housing Type	Total Structures	% of Structures
Single-Family Unit	1,582	100
Duplex	0	0
Multi-Family 3 to 4 units	0	0
Mobile home	0	0
Boat, RV, van, etc.	0	0
Total	1,582	100

Source: US Census, 2000[xiv]

Table 2.6 Age of Housing Structures

Year structure built	Number of Structures	% of Structures
1990 to March 2000	1,053	70.2%
1980 to 1989	49	3.3%
1970 to 1979	80	5.3%
1960 to 1969	200	13.3%
1950 to 1959	68	4.5%
1940 to 1949	24	1.6%
1939 and earlier	25	1.7%
Median	**1995**	

Source: US Census 2000[xv]

2.5 Employment and Industry

Oregon's largest healthcare industry and related businesses are located in Happy Valley. Located in close proximity to one another are the Kaiser Sunnyside Medical Center, Providence Clackamas Medical Plaza and Providence Medical Office Building and two dozen medical related businesses.[xvi]

Happy Valley's residents work in a variety of industries, with 'professional and related occupations' being the largest employment industry. 'Sales' and 'management' constitute the second and third largest employment industries (see Table 2.7 below).

Table 2.7 City of Employment by Major Industry, 2000

Industry	Total Persons Employed	% of Population
Professional and related occupations	1,206	51.9%
Sales and related occupations	633	27.2%
Management, business, and financial operations and occupations	554	23.8%
Office and administrative support occupations	245	10.5%
Production occupations	165	7.1%
Construction and extraction occupations	160	6.9%
Transportation and material moving occupations	73	3.1%
Personal care and service occupations	54	2.3%
Installation, maintenance, and repair occupations	41	1.8%
Healthcare support occupations	26	1.1%
Protective service occupations	26	1.1%
Building and grounds cleaning and maintenance occupations	25	1.1%
Food preparation and serving related occupations	18	0.8%
Farming, fishing, and forestry occupations	10	0.4%

Source: US Census, 2000[xvii]

Median income can be used as an indicator of the strength of the region's stability. According to the 2000 census, the median household income in Happy Valley was $93,131, nearly $51,137 more than the national median household income and $41,051 more than Clackamas County's median household income. Given the high median incomes in Happy Valley the city is relatively economically stable, but the average may not be reflective of all residents.

2.6 Transportation and Commuting Patterns

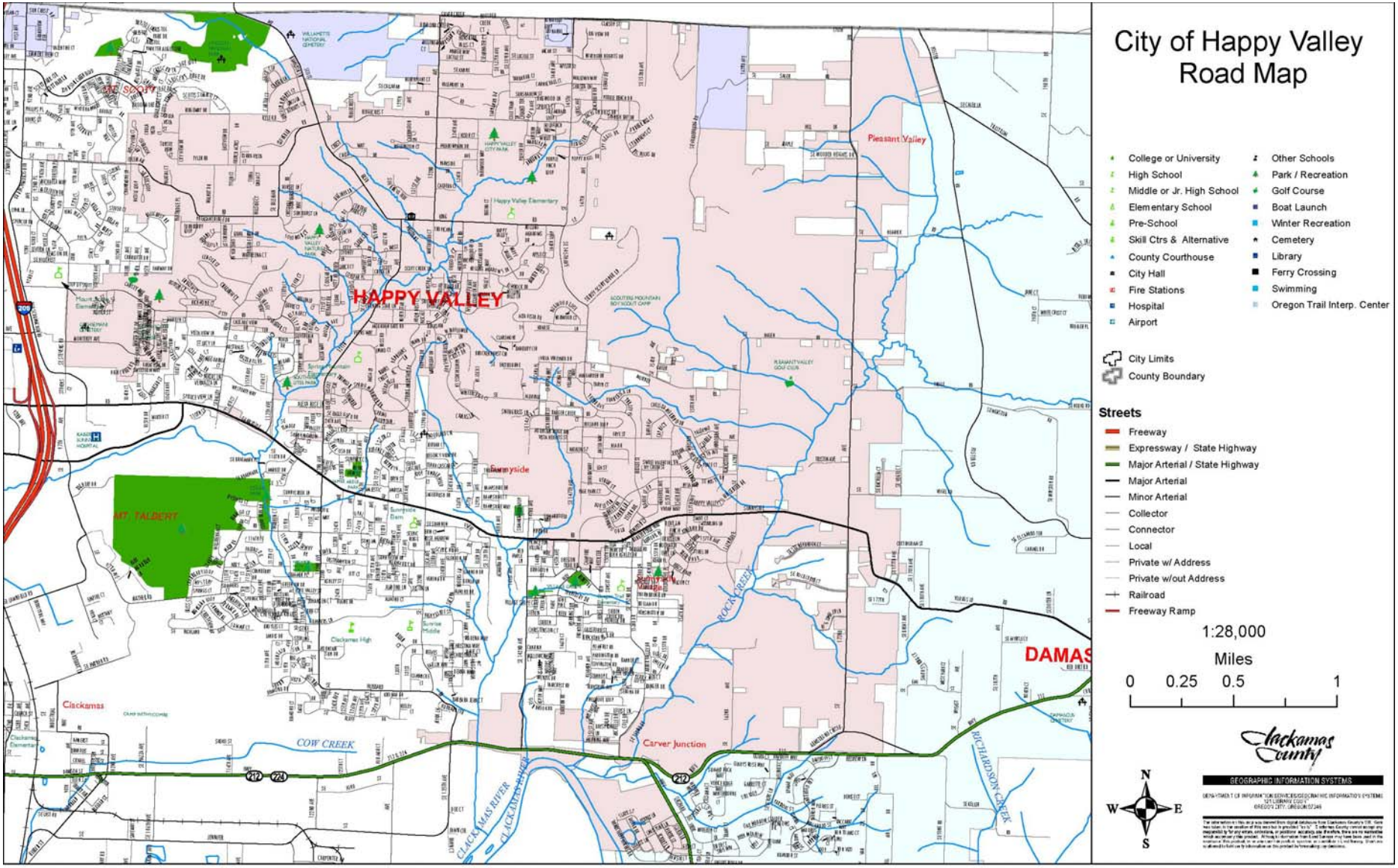
Transportation is an important consideration when planning for emergency service provisions. Growth within the city will put pressure on both major and minor roads, especially if the main mode of travel is by single occupancy vehicles. How people travel to work is indicative of the prevalence of single occupancy vehicle travel, and can help predict the amount of traffic congestion and the potential for accidents. Table 2.8 below shows the different methods city residents use to travel to work.

Table 2.8 Transportation Mode Used to Commute to Work, 2000

Mode of Commute	Number of Commuters	% of Commuters
Car, truck, or van -- drove alone	1,991	87%
Car, truck, or van -- carpooled	161	7%
Worked at home	91	4%
Public transportation (including taxicab)	36	2%
Walked	23	1%
Other means	0	0%
Motorcycle	0	0%
Bicycle	0	0%
Total	**2,302**	100%

Source: US Census, 2000[xviii]

The City of Happy Valley is made accessible by Interstate 205, Highway 212/224 and SE Foster Road. Auto, transit, bicycle and pedestrian transportation modes are the primary means of travel in Happy Valley. According to the 2003 census data, transit routes provided by Tri-Met have low ridership. There are no rail facilities within the city nor are there expected to be any in the future. Established truck routes throughout Happy Valley have contributed to efficient movement of raw materials and finished products. The mean travel time to work is 26.7 minutes.[xix] The City of Happy Valley Road Map, below on page 19, provides an overview of Happy Valley's road system.


City of Happy Valley
Road Map
HAPPY VALLEY
Pleasant Valley
Sunnyside
MT. TALBERT
Clackamas
COW CREEK
Carver Junction
ROCK CREEK
CLACKAMAS RIVER
RICHARDSON CREEK
DAMAS
College or University
High School
Middle or Jr. High School
Elementary School
Pre-School
Skill Ctrs & Alternative
County Courthouse
City Hall
Fire Stations
Hospital
Airport
Other Schools
Park / Recreation
Golf Course
Boat Launch
Winter Recreation
Cemetery
Library
Ferry Crossing
Swimming
Oregon Trail Interp. Center
City Limits
County Boundary
Streets
Freeway
Expressway / State Highway
Major Arterial / State Highway
Major Arterial
Minor Arterial
Collector
Connector
Local
Private w/ Address
Private w/out Address
Railroad
Freeway Ramp
1:28,000
Miles
0 0.25 0.5 1
N
W E
S
Clackamas County
GEOGRAPHIC INFORMATION SYSTEMS

2.7 Community Assets

This section outlines the resources, facilities and infrastructure that if damaged could significantly impact public safety, economic conditions, and/or the environmental integrity of Happy Valley. A map of these assets can be found on page 22.

Critical Facilities: Those facilities and infrastructure necessary for emergency response efforts.

- City Hall – Emergency Operations Center
- Community Policing Center
- Fire Station #6
- Fire Station #7
- Public Works Complex
- Shelters – Church of Jesus Christ of Latter Day Saints
- Happy Valley Park
- Sunrise Water Authority
- 162nd Park
- Providence Medical Facility

Critical Infrastructure: Infrastructure that provides services for the city

- Sunnyside Road
- SE 122nd Ave/129th
- SE Mount Scott Blvd
- Carver Road/Hwy 212
- 172nd
- Ridge Crest
- 152nd/147th/145th
- King Road
- 132nd
- Clatsop
- Idleman Road
- 162nd
- Hwy 224
- City Reservoirs
- Pump stations
- Telephone lines
- Gas lines
- Power lines
- Bridges (152nd and Sunnyside Road, Hwy 212)
- Water treatment, storage, and distribution lines
- Water treatment plant
- Radio/cell phone towers (many on Ridge Way, one in Happy Valley Park, one on Idleman Road)

Essential Facilities: Those facilities and infrastructure that supplement response efforts.

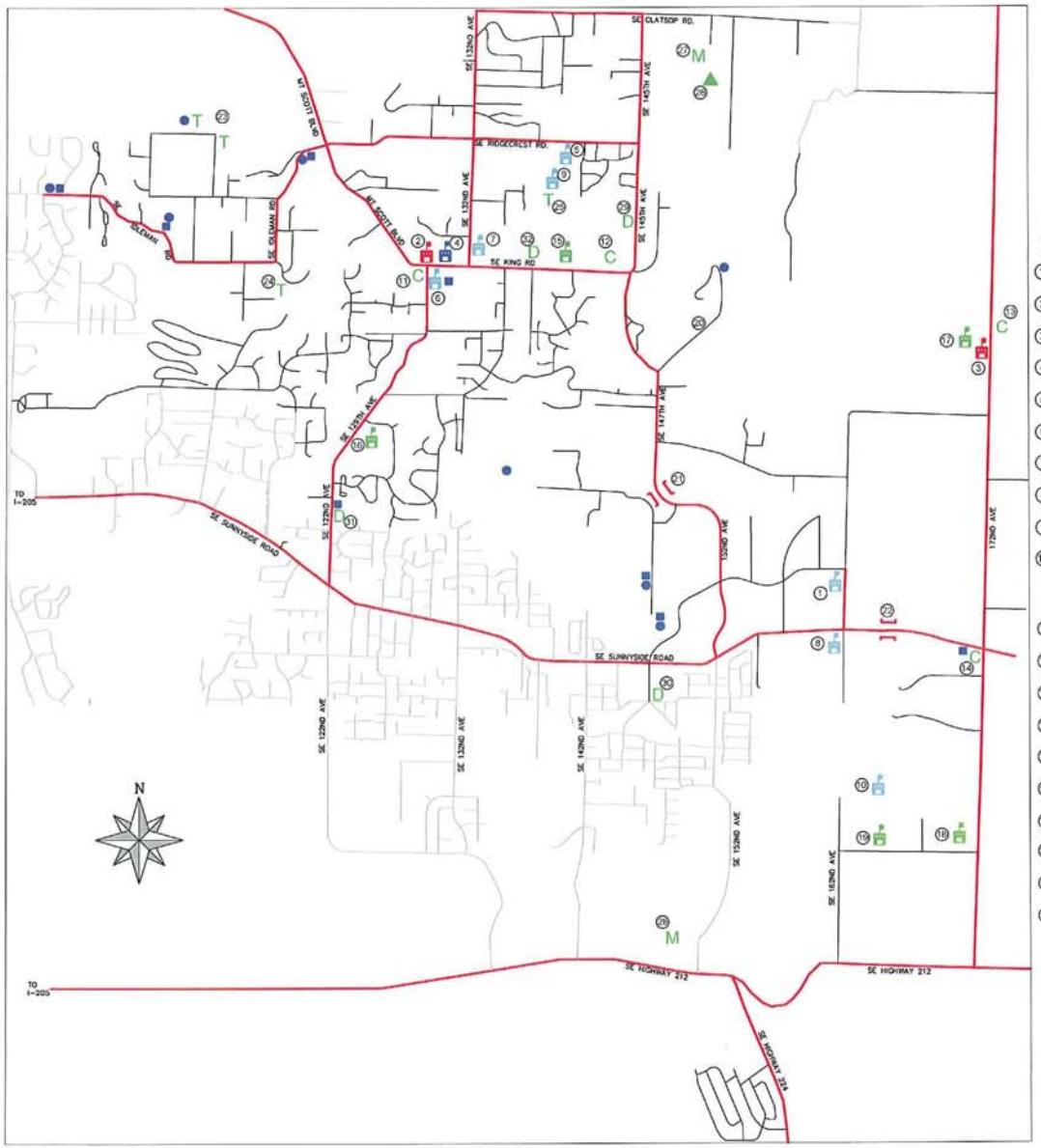
- Happy Valley Middle School/Happy Valley Elementary
- Rock Creek Middle School
- Verne A. Duncan Elementary
- Scouters Mountain Elementary
- Spring Mountain Elementary
- Scouters' Mountain
- Abundant Life Church
- New Hope Community Church
- Emmanuel Community Church
- Happy Valley Baptist Church
- Happy Valley Evangelical Church

Vulnerable Populations: Locations serving populations that have special needs or require special consideration.

- Happy Valley Schools
- Happy Valley Mobile Home Park
- Day Spring Mobile Home Park
- Adult Care Facilities
- Day Care Centers

Environmental Assets: Environmental assets are those parks, green spaces, wetlands, and rivers that provide an aesthetic and functional service for the community

- Happy Valley Park
- Eagle Landing Golf Course
- Happy Valley Wetland Park
- Associated Trails Systems
- Future home of 162nd Park
- Rebstock Park
- Mount Scott Park
- Rock Creek
- Mitchell Creek
- Scouters Mountain and adjacent Metro green space



City of Happy Valley

Critical & Essential Facilities and Infrastructure Map - June 2009

Critical Facilities

1. Happy Valley City Hall
2. Happy Valley Fire Station
3. Pleasant Valley Fire Station
4. Community Policing Center
5. Happy Valley Public Works
6. Sunrise Water Authority
7. Church of Jesus Christ of LDS (Community Shelter)
8. Providence Medical Facility
9. Happy Valley Park
10. 162nd Ave Park (under construction)

Essential Facilities

11. Happy Valley Evangelical Church
12. Happy Valley Baptist Church
13. Abundant Life Church
14. Emmanuel Community Church*
15. Happy Valley Elementary School*
16. Spring Mountain Elementary School*
17. Scouters Mt. Elementary School*
18. Verne A. Duncan Elementary School*
19. Rock Creek Middle School*
20. Scouters Mountain Scout Camp

Critical Infrastructure

21. 152nd Ave Bridge
22. Sunnyside Road Bridge
23. Communication Towers - SE Eastview Drive
24. Communication Towers - SE Idleman Road
25. Communication Towers - Happy Valley Park
26. Sanitary Pump Station

Also all Water Pumps, Reservoirs and Red Highlighted Roads marked on map

Vunerable Populations

27. Happy Valley Mobile Home Park
28. Day Spring Mobile Home Park
29. Happy Valley Preschool and Childcare Center
30. Academy For Kids
31. Sunnyside Montessori Preschool
32. Happy Valley ChildWorks

* Schools also included as vunerable populatio

Legend

- Fire Station
- Community Policing Center
- Other Critical Facility
- School
- C Church Facility
- Water Reservoir
- Water Pump Station
- Road - Critical Infrastructure
- Bridge
- T Communication Tower
- M Mobile Home Park
- D Day Care Center

2.8 Historic & Cultural Resources

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Protecting these resources from the impact of disasters is important. The following historic resources can be found in the City of Happy Valley:

- Strickrott Home
- Rebstock Home
- Deardorff Cemetery
- Christian and Dara Meng House
- Florian D. and Helen L. Meng House
- John Donaldson House
- Hazelfern Dairy
- The Ulrich Home

As one of the fastest growing cities in Oregon, residents enjoy an abundance of cultural activities that Happy Valley has to offer. The Harvest Fest takes place in October, and celebrates autumn with tractor rides, pumpkin painting, farm animals and treasure hunts among other activities. A summer concert series in the park is an opportunity to enjoy live music from local bands. Additionally, the North Clackamas Parks and Recreation District's RecMobile is a mobile activity center that brings children to two parks a day.

2.9 Government Structure

The City of Happy Valley operates under the direction of the City Council. The City Council is comprised of four councilors and a mayor nominated and elected by the city. The Mayor presides over and facilitates council meetings and enforces council procedures. With the consent of the council, the mayor appoints members of commissions and committees and serves as the political head of the city government. The city manager serves as the chief administrative officer of the city government.

The city's departments provide a variety of services for residents, and include the following:

- **Public Works Department**: Responsible for maintenance of city streets and parking lots and city parks, trails and open spaces.
- **Building:** Manages permit requests and applications, fees and inspections for development.
- **Finance:** Manages the budget for city investments.
- **Economic and Community Development:** Consists of the Engineering and Planning divisions which are overseen by one director.
    - *Engineering:* Responsible for review and approval of preliminary and final plans for private development related to the public infrastructure.
    - *Planning:* Responsible for careful and responsible planning for the city's future through current and long range planning.

2.10 Public Services

The City of Happy Valley provides a variety of services to promote the safety and welfare of its residents. Public services that support the demands of a growing community include potable water services, wastewater services and fire protection services.

Potable Water Services

The Sunrise Water Authority water distribution system services a geographic region of approximately 22 square miles in Happy Valley and Damascus, as well as unincorporated county areas. In 2008 the Authority delivered 1.80 million gallons of water to a population of approximately 40,000 through 12,500 service connections.[xx] Due to expansion of the urban growth boundary, Sunrise's demands are expected to serve a population of 125,000 by 2030.

The Sunrise Water Authority distribution system consists of 200 miles of pipe, countless fire hydrants, valves, back-flow prevention devices, and pressure reducing valves. Water is consistently delivered to the system from the Clackamas River Water and North Clackamas County Water Commission treatment plants on the Clackamas River. Water is extracted from wells located in the Damascus area during periods of peak water use. The water is pumped to thirteen different reservoirs scattered throughout the service territory at varying elevations. The system is a gravity fed system, with water pressure generated by the drop in elevation from the reservoirs to the point of use.[xxi]

Wastewater Services

Water Environment Services (WES) provides Wastewater Collection and Treatment and Biosolids Reuse for seven cities and several unincorporated areas in Clackamas County, including the City of Happy Valley. Storm Water Management, On Site Sewage Disposal and Water Quality and Stream Enhancement projects are also coordinated by WES.[xxii]

Fire Protection Services

Clackamas County Fire District #1 provides fire protection for the City of Happy Valley. The Fire Marshal, Deputy Fire Marshals, and emergency response crews perform a wide array of fire prevention tasks, including:[xxiii]

- Performing business inspections
- Investigating causes of fires
- Issuing burning permits
- Investigating complaints of illegal burning or other hazardous conditions
- Reviewing building plans and inspecting new construction
- Tracking incidents and reporting to fire district administration and state agencies
- Analyzing and developing fire codes
- Monitoring and promoting fire and safety related legislation
- Counseling juvenile fire-setters
- Teaching fire prevention in schools
- Conducting CPR classes

- Teaching proper use of fire extinguishers
- Coordinating educational programs with other agencies, hospitals, and schools
- Answering citizens' questions

2.11 Existing Plans & Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can easily adapt to changing conditions and needs.[xxiv]

Happy Valley's Addendum to the Clackamas County Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the city's vulnerability to natural hazards (see Section 4 below). Many of these recommendations are consistent with the goals and objectives of the city's existing plans and policies. To the extent possible, Happy Valley will work to incorporate the recommended mitigation action items into existing plans, programs and policies. Linking existing plans and policies to the mitigation plan helps identify existing city resources that can be used to implement the plan's action items. Likewise implementing the mitigation plan's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the city's resources.

The following are Happy Valley's existing plans and policies (specifically, those that directly relate to natural hazards mitigation):

Plan: City of Happy Valley Comprehensive Plan
Date of Last Revision: April 2009
Author/Owner: City of Happy Valley
Description: The purpose of the Comprehensive Plan is to preserve the character of Happy Valley, improve the quality of existing and future development areas, and to provide a coordinated direction to the conservation and development of Happy Valley
Relation to Natural Hazards Mitigation:

- Policy 9: Recognize the potential liability of the city if land with known hazards which endangers life or property is allowed to be developed
- Policy 10: Limit development in identified natural drainage-ways, floodplains, wetlands, steep slopes and landslide hazard areas, Housing development, and any other development intended for human occupancy, shall occur, to the greatest extent possible, on lands designated for development that are free from flood hazard, slope limitations, or other hazards.
- Policy 11: Dedication of lands to the city within natural drainage channels and floodplains may be required as a condition for development near the channel, or to meet the needs of community recreation and open space.

- Policy 12: Modifications to the natural drainage channels including clearing, filling, diking or the construction of dams of levees shall be done in accordance with the city's Land Development Code.
- Policy 13: Development which increases runoff and erosion, or which has the potential for undermining development through significant increases in runoff will be restricted.
- Policy 14: The allowed intensity of development will be correlated with the degree of natural hazard. When slopes are over 15% gradient, the intensity of development shall be regulated in compliance with the city's Land Development Code.
- Policy 15: Require engineering studies by private developers for sites proposed for development within areas of suspected or known hazards.
- Policy 16: Manage wooded areas within the city through the annexation and land division process and through the city's tree removal requirements.
- Policy 20: Inventory the location, quality and quantity of open space, scenic areas and historic sites to be managed in the development process.
- Policy 21: Maintain relationship of open space to permitted development in order to preserve the character of the natural setting and to provide for recreation and visual relief from development.
- Policy 28: Conserve the area's unique natural resources through their inclusion in the Comprehensive Plan, and development approvals, in a manner which considers uses and provides a continuity of open space character and natural features.
- Policy 35: Maintain riparian vegetation and avoid degradation of natural features adjacent to drainage channels and conservation easements to minimize runoff and erosion affecting water quality.

Plan: City of Happy Valley Municipal Code
Date of Last Revision: April 2009
Author/Owner: City of Happy Valley
Description: The purpose of the Municipal Code is to set rules and regulations on construction and activities within the city.
Relation to Natural Hazards Mitigation:

- Title 9 Public Peace and Welfare – includes the Emergency Operations Plan
- Title 15 Building and Construction – establishes uniform performance standards providing reasonable safeguards for the health, safety, welfare, comfort and security of the residents of this jurisdiction who are occupants or users of buildings. Title provides information on dangerous buildings, infill and grading, erosion control, and flood damage prevention.

Plan: Happy Valley Development Code
Date of Last Revision: February 24, 2009
Author/Owner: City of Happy Valley
Description: Development codes are ordinances implementing a local government's comprehensive plan. They include two components: a zoning ordinance and a subdivision ordinance, which may be adopted and published as separate documents under their own

titles. In some cases the sections pertaining to subdivision of land may be included in the zoning ordinance.
Relation to Natural Hazards Mitigation:

- Chapter 16.32 Steep Slopes Development Overlay Zone (SSDO) – The purpose of the SSDO is to contribute to compliance with Statewide Planning Goal 7 specifically by minimizing seismic and landslide hazards and soil erosion associated with development on steep or unstable slopes; regulate development and provide special protection on lands within "conservation slope areas" and "transition slope areas"; and limit the potential residential density and facilitate transfer of development away from slope constrained lands
- Chapter 16.34 Natural Resources Overlay Zone – the purpose of the NROZ is to implement the goals and policies of the Comprehensive Plan relating to natural resources, open space and the environment. It is intended to protect and improve natural resource functions and values.
- Chapter 16.35 Flood Management Overlay Zone - The purpose of these standards is to reduce the risk of flooding, prevent or reduce risk to human life and property, and maintain the functions and values of floodplains, such as allowing for the storage and conveyance of stream flows through existing and natural flood conveyance systems.
- Chapter 16.51 Surface Water Management – the purpose is to minimize water quality degradation by preventing siltation of any creek, stream, lake of other body of water, and to protect property and property owners not only adjacent to any body of water but at any location within the city

Plan: Happy Valley Transportation System Plan
Date of Last Revision: June 2009
Author/Owner: City of Happy Valley
Description: The plan aims to guide future transportation investment in the city and determine how land use and transportation decisions can be brought together to meet transportation demands. In accordance with the Transportation Planning Rule (TPR), OAR 660 Division 12, a comprehensive analysis of the transportation system within the City of Happy Valley has been prepared. Included is an analysis of existing conditions, identification of short-term and long-term transportation system improvements, a transportation system plan, a transportation finance plan, and a description of the transportation system plan's compliance with the Transportation Planning rule.
Relation to Natural Hazard Mitigation: Mitigation actions relating to improving transportation facilities should be linked with goals and policies found in the transportation system plan.

Plan: Happy Valley Parks Master Plan
Date of Last Revision: January 21, 2003
Author/Owner: City of Happy Valley
Description: This report discusses the findings and recommendations to provide park, open space, trails and other recreation facilities in Happy Valley.... the Plan will provide policies for acquiring and managing recreation and facilities. The plan also provides a

short-term financing strategy (six-year) for meeting the immediate park and recreation needs in Happy Valley.
Relation to Natural Hazard Mitigation: Mitigation actions that relate to Happy Valley parks should be consistent with goals and policies stated in the Parks Master Plan.

Plan: Rock Creek Comprehensive Plan
Date of Last Revision: 2001
Author/Owner: City of Happy Valley
Description: The majority of Rock Creek's 10-12 acres is within Happy Valley city limits. This plan serves to guide the transition of the area from its rural character to a livable addition to the city.
Relation to Natural Hazard Mitigation:

- Requirements for stream corridors and protecting steep slopes
- Guidelines to preserve and enhance additional natural areas for both environmental benefits
- Recommendations for a coordinated sub-basin approach to detention and water quality facilities.

Plan: Damascus Boring Concept Plan
Date of Last Revision: 2006
Author/Owner: Clackamas County, Metro, City of Damascus, City of Happy Valley, ODOT, OTAK
Description: In 2002, Metro expanded the UGB for the Portland metropolitan area, including 12,200 acres in the Damascus/Boring and east Happy Valley areas. The Damascus/Boring Concept Plan provides guidance for local governments to create plans to guide the transition of this area from rural to urban uses.
Relation to Natural Hazard Mitigation:

- Guidelines for the level of development that should be planned for the buttes
- Policies for slopes, natural resource protection and restoration areas

Section 3:
Risk Assessment

The following hazards have been addressed in the Clackamas County Natural Hazards Mitigation Plan. The City of Happy Valley reviewed the county's plan on May 20, 2009 and assessed how Happy Valley's risks vary from the risks facing the entire planning area.

3.1 Flood

The Clackamas County Plan adequately describes the causes and characteristics of flooding in Happy Valley, as well as the history of events through September 2007. General impacts and vulnerabilities are also described within the county's plan. Descriptions of the flood hazard can be found on pages 6-1 to 6-22 of the 2002 Clackamas County Natural Hazards Mitigation Plan and pages 25 to 29 of the 2007 update.

Major sources of riverine flooding in Happy Valley include Mt. Scott Creek and Rock Creek. The Clackamas River borders a small portion of the south end of the city, but flooding along this river occurs on its southern side and Happy Valley is not affected. The city also experiences urban flooding during severe storms when rainwater comes down into the city from its many hillsides. Additionally, numerous culverts in the city are undersized, causing back-ups and occasional flooding to occur. A good example of this occurred January 1-2, 2009 when a winter storm event led to urban flooding in many parts of the city. The storm drain system reached capacity, causing a few storm drains to overflow and a number of roads to flood. One residential bridge washed out near 122nd and Scott Creek Lane.

Happy Valley is a regular participant in the National Flood Insurance Program with four policies in force totaling $1,400,000. The city's most current effective Flood Insurance Rate Map (FIRM) is dated June 17th, 2008 (Initial FIRM 12/04/1979). The city has not had a Community Assistance Visit. To date there have been zero losses paid, and zero repetitive loss properties. The location of Happy Valley's flooding hazard is best described in the city's FIRM. Figures 2-7 are excerpts of the overall FIRM and detail the flooding hazards along Mt. Scott Creek and Rock Creek. The figures below show the areas along Mt. Scott Creek in zone A, meaning no depths or base flood elevations are shown because detailed analyses have not been performed. Portions of SE 129th Ave. and four homes appear to be in the Mt. Scott Creek floodplain, while King Road passes over Mt. Scott Creek. The Rock Creek floodplain is zone AE, meaning base flood elevations are shown on the maps. No homes or infrastructure appear to be in the Rock Creek floodplain.

Figure 2: Mount Scott Creek Floodplain 1

Figure 3: Mount Scott Creek Floodplain 2

Figure 4: Mount Scott Creek Floodplain 3

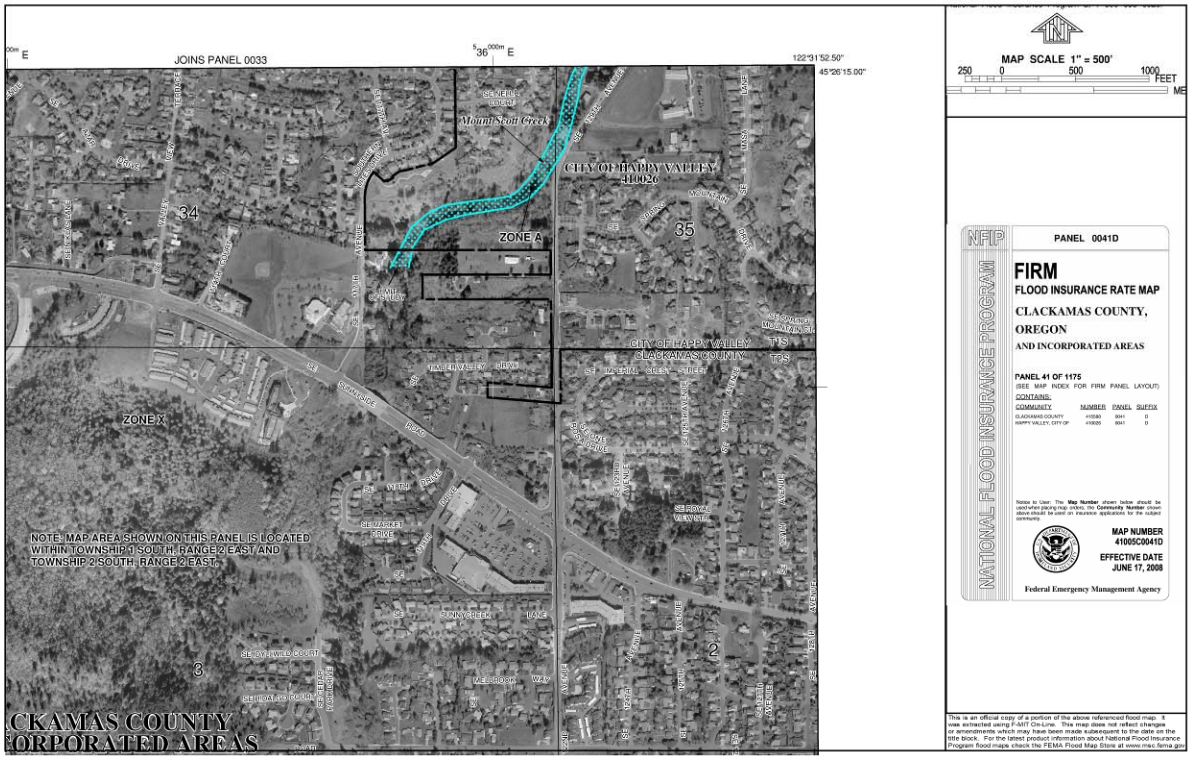


Figure 5: Rock Creek Floodplain 1

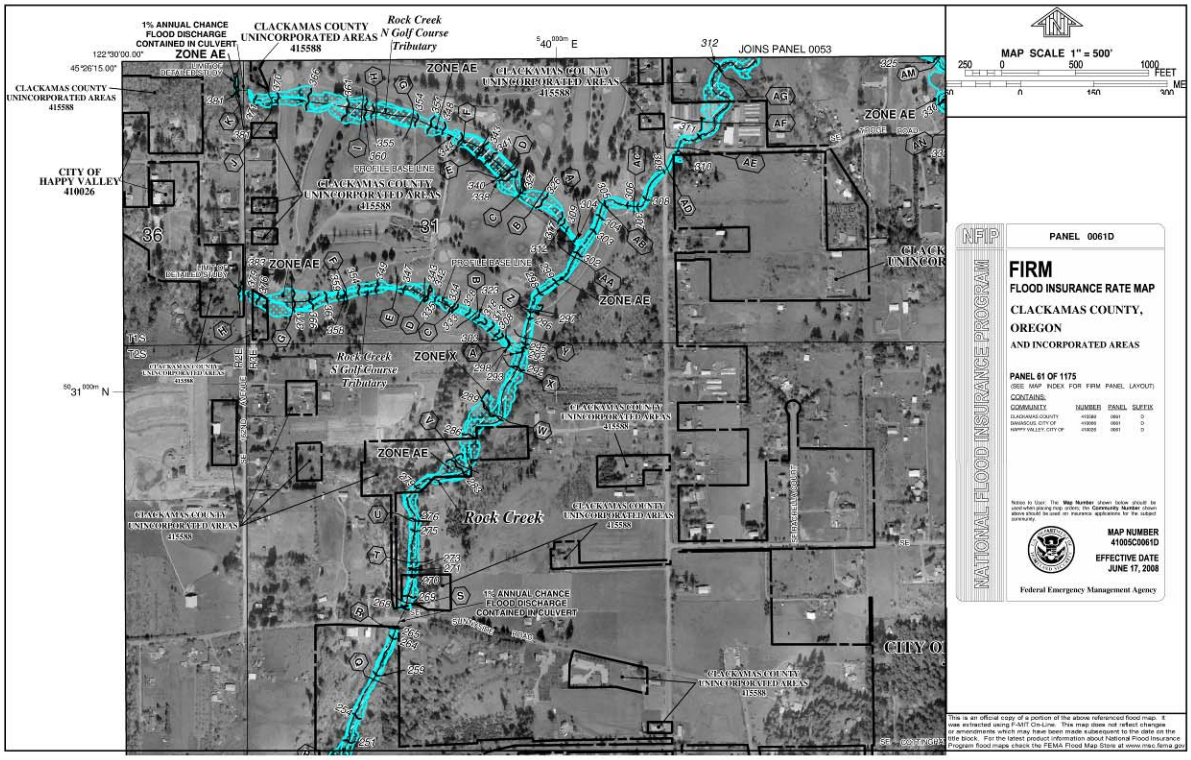


Figure 6: Rock Creek Floodplain 2

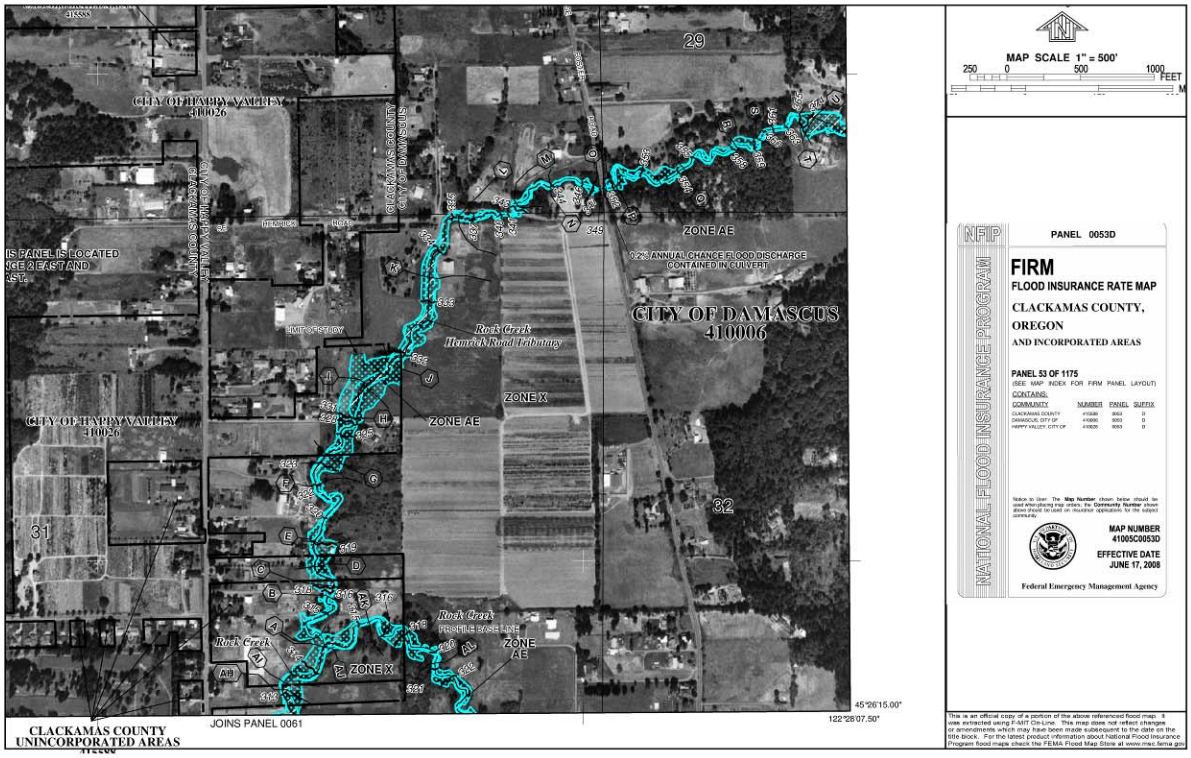
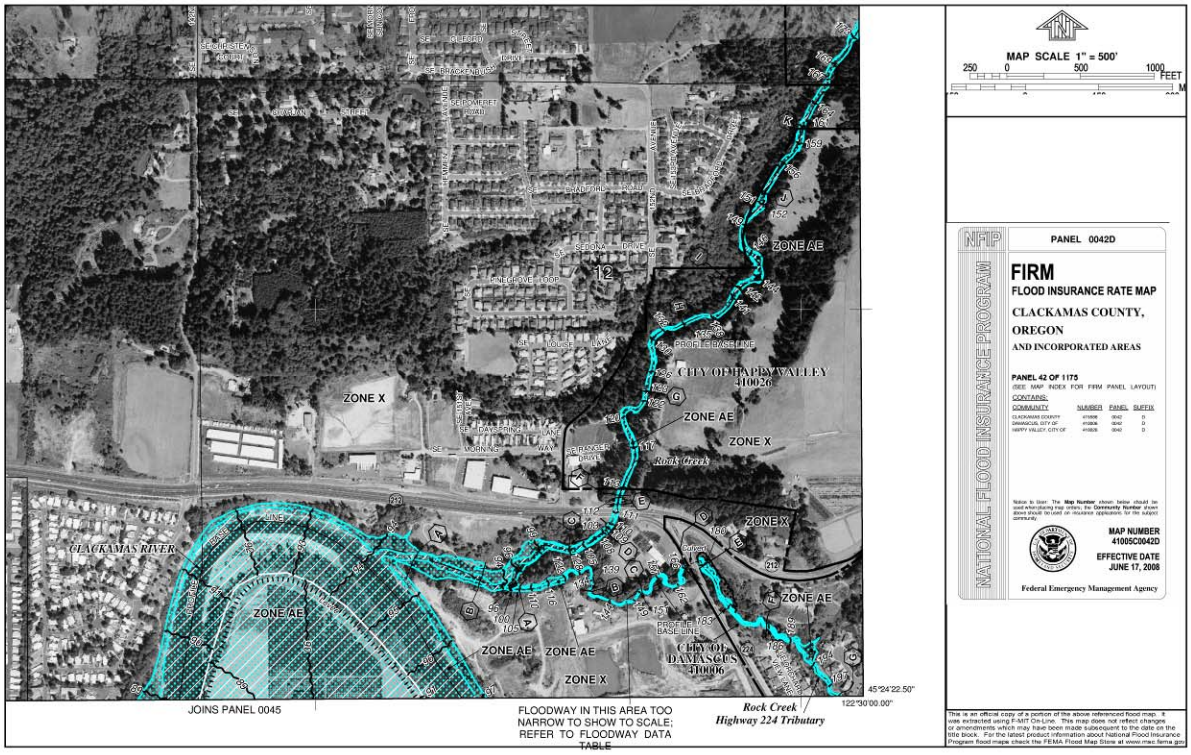


Figure 7: Rock Creek Floodplain 3



The extent of the flooding hazard primarily depends on climate and precipitation levels, but due to the prevalence of urban flooding, the extent of the flood hazard can include much of the city. The Happy Valley Heights neighborhood is the most common location for urban flooding. Precipitation from the top of the hills drains towards the homes at the bottom of hills, resulting in frequent crawlspace and basement flooding. Homeowners associations own and maintain a number of private infrastructure systems such as pipes and drainage ditches. During heavy rains water flushes downhill and can wash out pipes or fill drainage ditches with debris, which can clog culverts.

The City of Happy Valley employs a number of mitigation strategies to reduce the city's risk to flood events. The city has a flood management overlay zone and a number of city policies intended to reduce the city's risk to flooding (see 2.10 Existing Plans and Policies above). Public works crews clean drainage ways weekly from October through April, and before a big storm is forecasted. The city website and newsletter, Happy Valley Today, regularly advise citizens to properly discard yard debris to avoid clogged culverts and drainage ditches.

The HMT estimates that the probability of future flooding events in Happy Valley is 'high,' meaning one event is likely to occur within a 10 to 35 year period. The HMT additionally estimates that the city's vulnerability to flooding events is 'moderate' meaning 1-10% of the city's population and/or assets could be affected in a major flood event. Both ratings are in agreement with the county's probability and vulnerability estimates.

3.2 Landslide

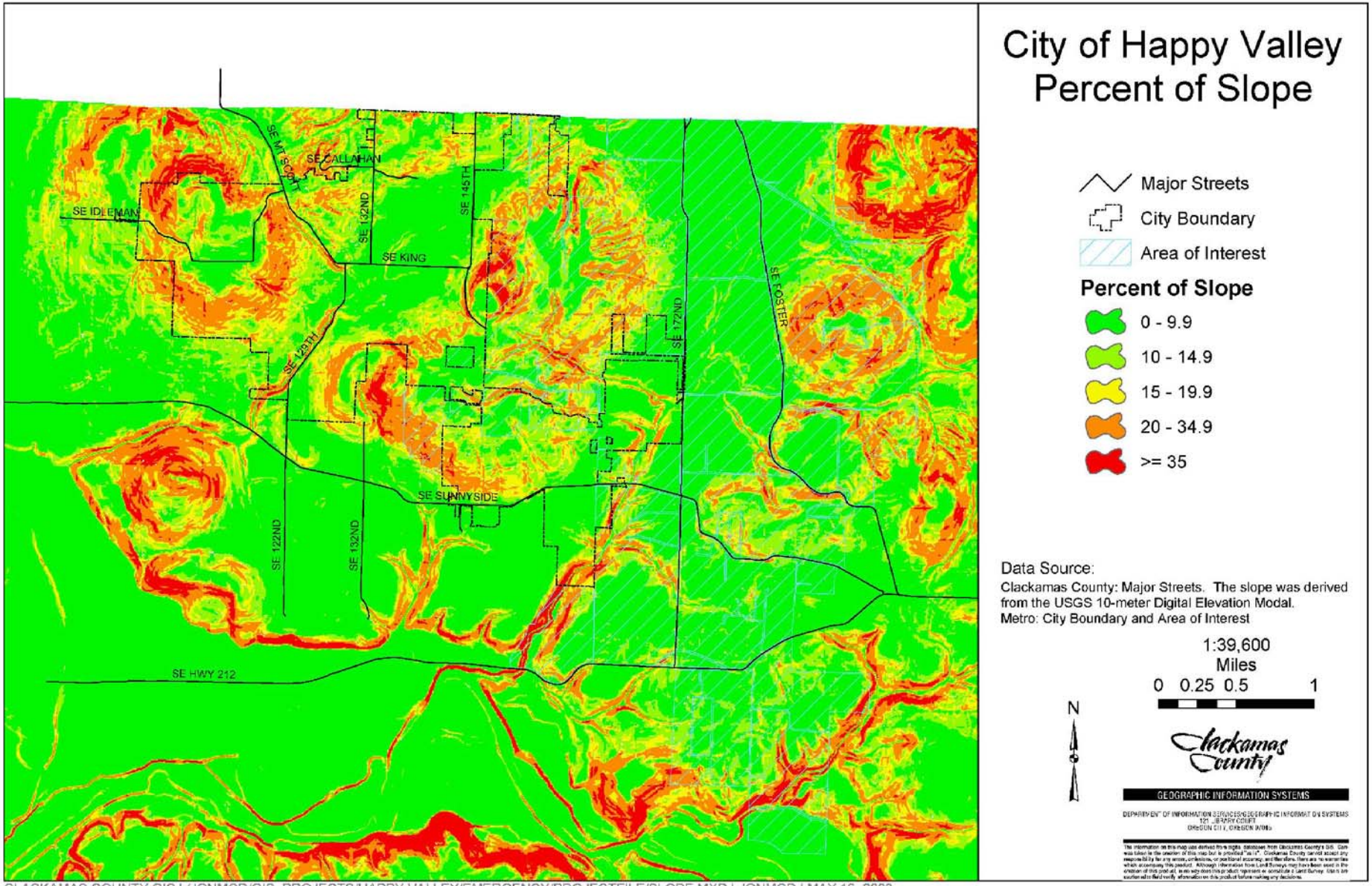
The Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan adequately describes the causes and characteristics, history, location, extent and impacts of landslides in the region. Descriptions of the landslide hazard can be found on pages 7-1 to 7-13 of the 2002 Clackamas County Natural Hazards Mitigation Plan and pages 33 to 39 of the 2007 update.

As shown in the Percent of Slope map on page 35, Happy Valley has a hilly topography. Areas with steep slopes include Scouters Mountain, The Reserve, Rock Creek, Mt. Scott, Mt. Talbert, and the area east of SW 145th Ave. Despite the hilly terrain few landslides have occurred. In 1996 a hillside in the Mt. Scott area on City View Drive slid into a homeowner's yard and continued past the home towards Foster Road. Traffic on Johnson Creek Road was impacted by the slide but no injuries or severe damage was sustained.

The Landslide Hazard map on page 36 shows a few areas with potentially rapidly moving landslides. These areas include portions of Mt. Scott, Mt. Talbert, areas east of SE 145th Ave., an area northeast of SE 132nd Ave. and portions of Mt. Scott Creek near Highway 212.

The HMT estimates that the probability of future landslide events is 'high,' meaning one event is likely to occur within a 10 to 35 year period. This estimate is in agreement with the county's 'high' probability estimate. The HMT additionally estimates that Happy Valley has a 'moderate' vulnerability to landslide hazards. A 'moderate' ranking means that between 1-10% of the population and/or community assets could be affected by a landslide event, which is higher than the county's 'low' vulnerability rating. A number of Happy Valley homes are located on or near hillsides. A large landslide could create transportation-related issues and greatly impact these citizens' abilities to commute.

Happy Valley has taken steps to reduce the landslide risk. Happy Valley's Comprehensive Plan and Development Code have a number of policies guiding developments on slopes over 15% gradient and developments which increase runoff and erosion. The city also has a Steep Slopes Development Overlay Zone which regulates development on slopes.



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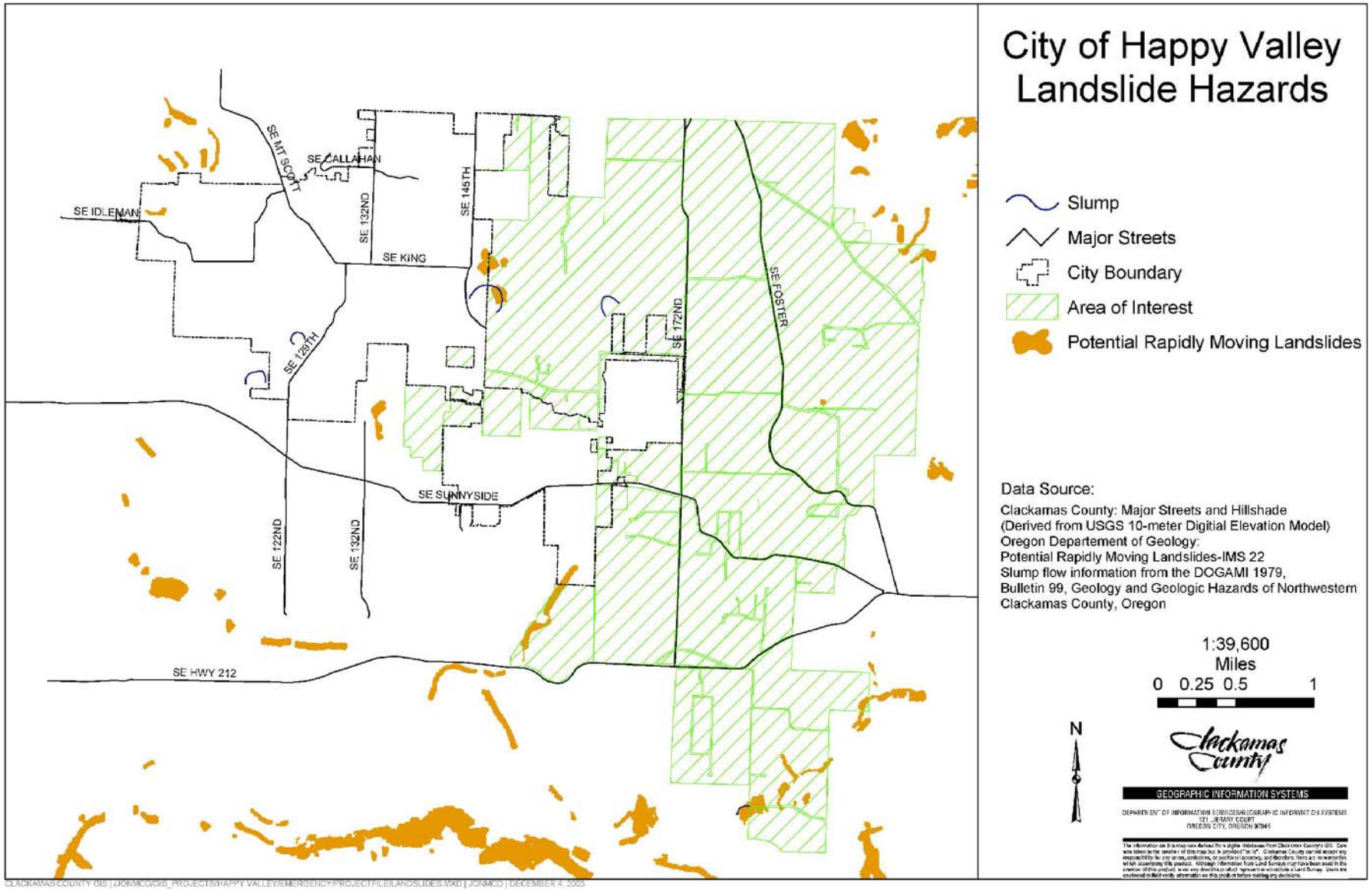

City of Happy Valley
Landslide Hazards
Slump
Major Streets
City Boundary
Area of Interest
Potential Rapidly Moving Landslides
SE MT SCOTT
SE CALLAHAN
SE IDLEMAN
SE 132ND
SE 145TH
SE KING
SE 129TH
SE 172ND
SE FOSTER
SE SUNNYSIDE
SE 122ND
SE 132ND
SE HWY 212
Data Source:
Clackamas County: Major Streets and Hillshade
(Derived from USGS 10-meter Digitial Elevation Model)
Oregon Departement of Geology:
Potential Rapidly Moving Landslides-IMS 22
Slump flow information from the DOGAMI 1979,
Bulletin 99, Geology and Geologic Hazards of Northwestern
Clackamas County, Oregon
1:39,600
Miles
0 0.25 0.5 1
N
Clackamas County
GEOGRAPHIC INFORMATION SYSTEMS
CLACKAMAS COUNTY GIS | J:\GIS\MXD\GIS_PROJECTS\HAPPY VALLEY\EMERGENCY\PROJECTFILE\LANDSLIDES.MXD | JONMCD | DECEMBER 4, 2003

3.3 Wildfire

The Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan's descriptions of the causes and characteristics, location, extent and impacts of the wildfire hazard apply to the City of Happy Valley. Descriptions of the wildfire hazard can be found on pages 8-1 to 8-16 of the 2002 Clackamas County plan. The Clackamas County Community Wildfire Protection Plan details a limited history of wildfire in the county. In 1951 approximately 2,000 acres burned in Clackamas and Multnomah Counties. In 2001 lightning strikes started eight fires in eastern Clackamas County on US Forestry Service lands, burning about 80 acres. In 2002 the Bowl Fire burned over 300 acres just east of Estacada (14 miles southeast of Happy Valley). No history of wildfires is reported for Happy Valley.[xxv]

Clackamas County has two major physiographic regions: the Willamette River Valley in western Clackamas County and the Cascade Range Mountains in eastern and southern Clackamas County. The Willamette River Valley, which includes Happy Valley, is the most heavily populated portion of the county and is characterized by flat or gently hilly topography. The Cascade Range has a relatively small population and is characterized by heavily forested slopes. Eastern Clackamas County is at higher risk to wildfire than western portions of the county because of its dense forested land. Human caused fires are responsible for the majority of fires in Clackamas County.

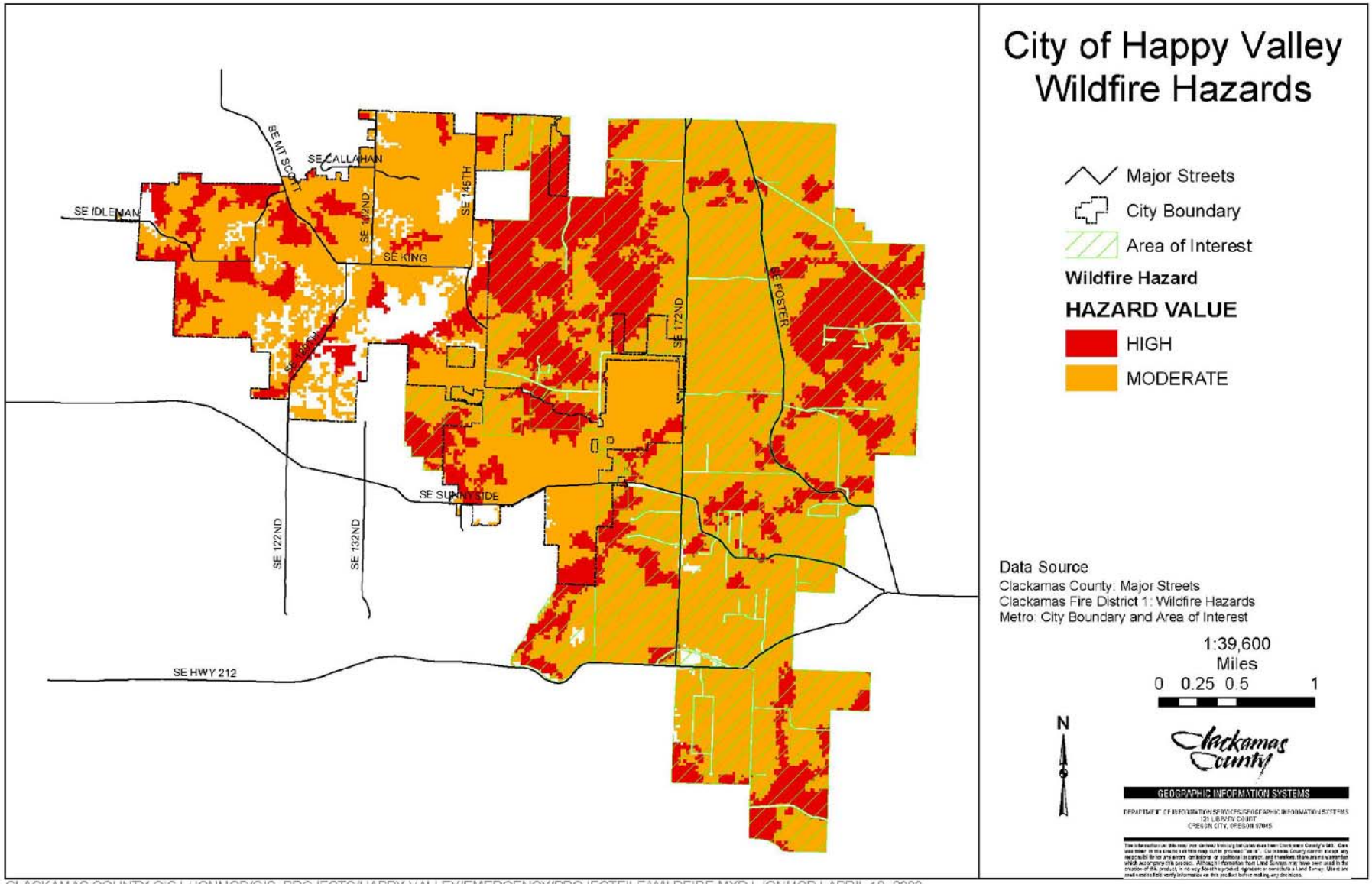
The Relative Wildfire Hazards map (see page 39 below) was modeled using fuels, slope, and weather data. The wildland/urban interface includes Scouters Mountain, Mt. Scott, Metro green space, the Happy Valley Trail System, and the area east of Foster Road. These areas have a buildup of ladder fuels which can facilitate the spread of fire into the tree crown. Scouters Mountain is the biggest wildfire threat because homes, an elementary school, fire station #7, the public works facility, and water facility are located near Scouters Mountain.

The HMT estimates the probability of future wildfire events is 'moderate,' meaning one event is likely within a 35 to 75 year period. Vulnerability is 'moderate', meaning between 1% and 10% of the population or community assets would be affected by a major wildfire event. Both rankings are in agreement with the county's 'moderate' ratings.

Happy Valley uses a number of mitigation tools to reduce the city's risk to wildfires. The city recently adopted a no smoking ordinance in all parks and public property. The city has a strict fireworks ordinance and task force to collect illegal fireworks. Clackamas Fire District #1 notifies residents of the burn season and strictly enforces burning regulations. The fire district stays current on issues by participating in the Clackamas County Fire Prevention Cooperative, a group consisting of the fire districts within the county. The district also contributed in creating the Clackamas County Community Wildfire Protection Plan.

Public outreach is a primary mitigation tool used by Clackamas Fire District #1. The fire district has a fire prevention division dedicated to protecting and preserving life and

property through education, engineering, and enforcement. The Fire Prevention Division offers numerous education opportunities including school programs, public presentations, media events, and safety fairs. They review pre-construction plans and develop fire codes. Additionally this division inspects buildings for fire code compliance and offers juvenile fire setter counseling and follow-up.



CLACKAMAS COUNTY GIS | /JONMCD/GIS_PROJECTS/HAPPY VALLEY/EMERGENCY/PROJECTFILE/WILDFIRE.MXD | JONMCD | APRIL 10, 2003

3.4 Severe Storms: Wind and Winter

The Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan adequately describes the causes and characteristics, location, extent and impacts of the severe storm hazard in the City of Happy Valley. Additionally, the county's plan adequately describes the history of wind and winter storm events up to September, 2007. From December 26, 2008 to January 2, 2009 Clackamas County was hit with the worst winter storm event in over 40 years. The storm saturated soils and led to sewer overflows, downed trees, and car accidents due to hazardous driving conditions. Happy Valley's equipment was inadequate to handle the storm and a full size dump trunk with a snow plow was leased to assist in snow removal efforts. A retired equipment operator was contracted to operate the leased equipment for three days, as only one city staff member had a Commercial Drivers License. Some staff members spent the night at City Hall, and staff overtime amounted to $9,000.

In general, Happy Valley is more susceptible to windstorms than other communities in Clackamas County because the city is situated at a higher elevation and closer to the Columbia Gorge. Trees and tree branches are regularly blown over during wind storm events. Additional severe storm information can be found on pages 9-1 to 10-7 of the 2002 Clackamas County Natural Hazards Mitigation Plan, and pages 46 to 50 in the 2007 plan update.

Mitigating severe storms can be difficult because storms affect all areas of the city, but Happy Valley has made progress in reducing the negative effects of storms. The city has a tree ordinance that provides standards and conditions for tree maintenance and removal. Each year trees are assessed for overhangs or low lying branches. Based on yearly assessments, the city removes trees and branches that appear potentially damaging or dangerous. A tree survey is required for all new developments, and if a developer wishes to remove plants or trees, he or she must first receive a permit from the city. All new construction is required to have underground utilities, therefore reducing the chance of utility interruption during severe storm events. The Happy Valley Community Emergency Response Team (CERT) can be utilized for response and public outreach efforts. Finally, Happy Valley has a designated sand and snow plow route to help expedite snow remediation efforts.

The HMT estimates that the probability of severe wind and winter storm events is 'high,' meaning one event is likely within a 10 to 35 year period. This estimate is the same as the county's 'high' winter storm probability estimate, but higher than the county's 'moderate' wind storm estimate. Happy Valley is situated at a higher elevation and closer to the Columbia Gorge than most cities in Clackamas County, making them more prone to wind storms. The history of wind storms in Happy Valley indicates that they occur frequently enough to warrant the 'high' probability rating.

The HMT estimates a 'high' vulnerability to winter storms, meaning more than 10% of the population and/or assets could be affected by a severe winter storm, and a 'moderate' vulnerability to wind storms, meaning 1-10% of the population and/or community assets could be affected by a severe wind storm event. Both ratings are higher than the county's

‘moderate’ winter storm vulnerability rating and ‘low’ wind storm vulnerability rating. Happy Valley’s winter storm vulnerability is greater than the county’s rating because much of the city has steep slopes and density on hillsides. This makes transportation in winter storm events very difficult for many Happy Valley residents. Wind storm vulnerability is greater than the county’s rating because of the city’s density near heavily wooded areas such as Scouters Mountain, Metro green space, and the Happy Valley Trail System. These areas require a good deal of debris clean up after wind storm events.

3.5 Earthquake

The Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan adequately describes the causes and characteristics, history, location, extent and impacts of the earthquake hazard affecting Happy Valley. Descriptions of the earthquake hazard can be found on pages 11-1 to 11-20 in the 2002 Clackamas County Natural Hazards Mitigation Plan, and pages 53 to 58 in the 2007 plan update.

Within the Northern Willamette Valley/Portland Metro Region, three potential faults and/or zones are capable of generating high-magnitude earthquakes. These include the Portland Hills Fault Zone, Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone.

- Portland Hills Fault Zone
  The Portland Hills Fault Zone is a series of NW-trending faults that vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years ago) sediment.[xxvi] The fault zone extends along the eastern margin of the Portland Hills for a distance of 25 miles, and lies about 3 miles southwest of Happy Valley.

- Gales Creek-Newberg-Mount Angel Structural Zone
  The Gales Creek-Newberg-Mount Angel Structural Zone is a 50-mile-long zone of discontinuous, NW trending faults that lies about 22 miles southwest of Happy Valley. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment.[xxvii]

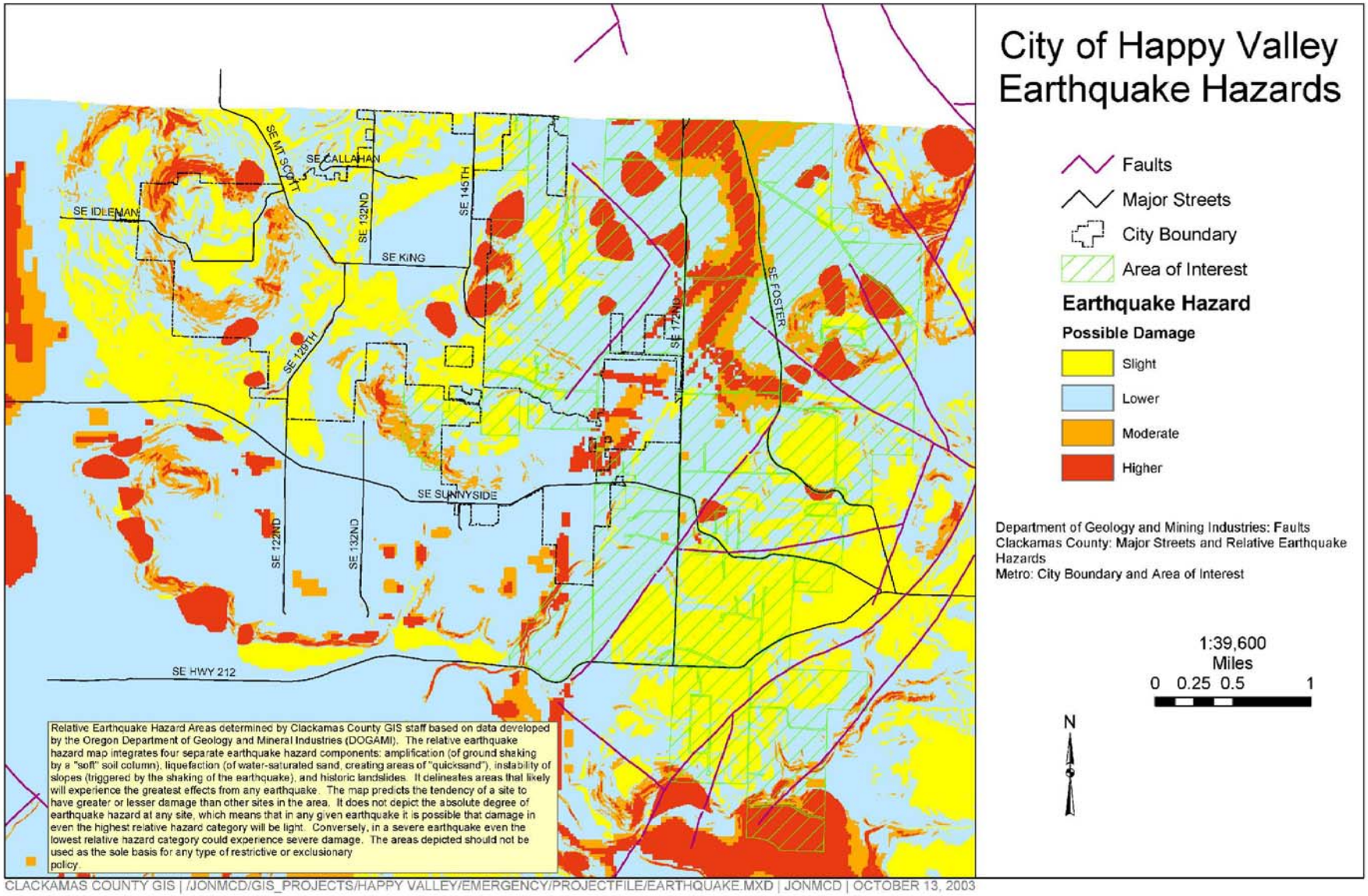
- Cascadia Subduction Zone
  The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year.[xxviii] Paleoseismic studies along the Oregon coast indicate that the state has experienced seven Cascadia Subduction Zone (CSZ) events possibly as large as M9 in the last 3,500 years. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1000 years. Scientists estimate that the chance in the next 50 years of a great subduction zone earthquake is between 10 and 20 percent assuming that the recurrence is on the order of 400±200 years.[xxix]

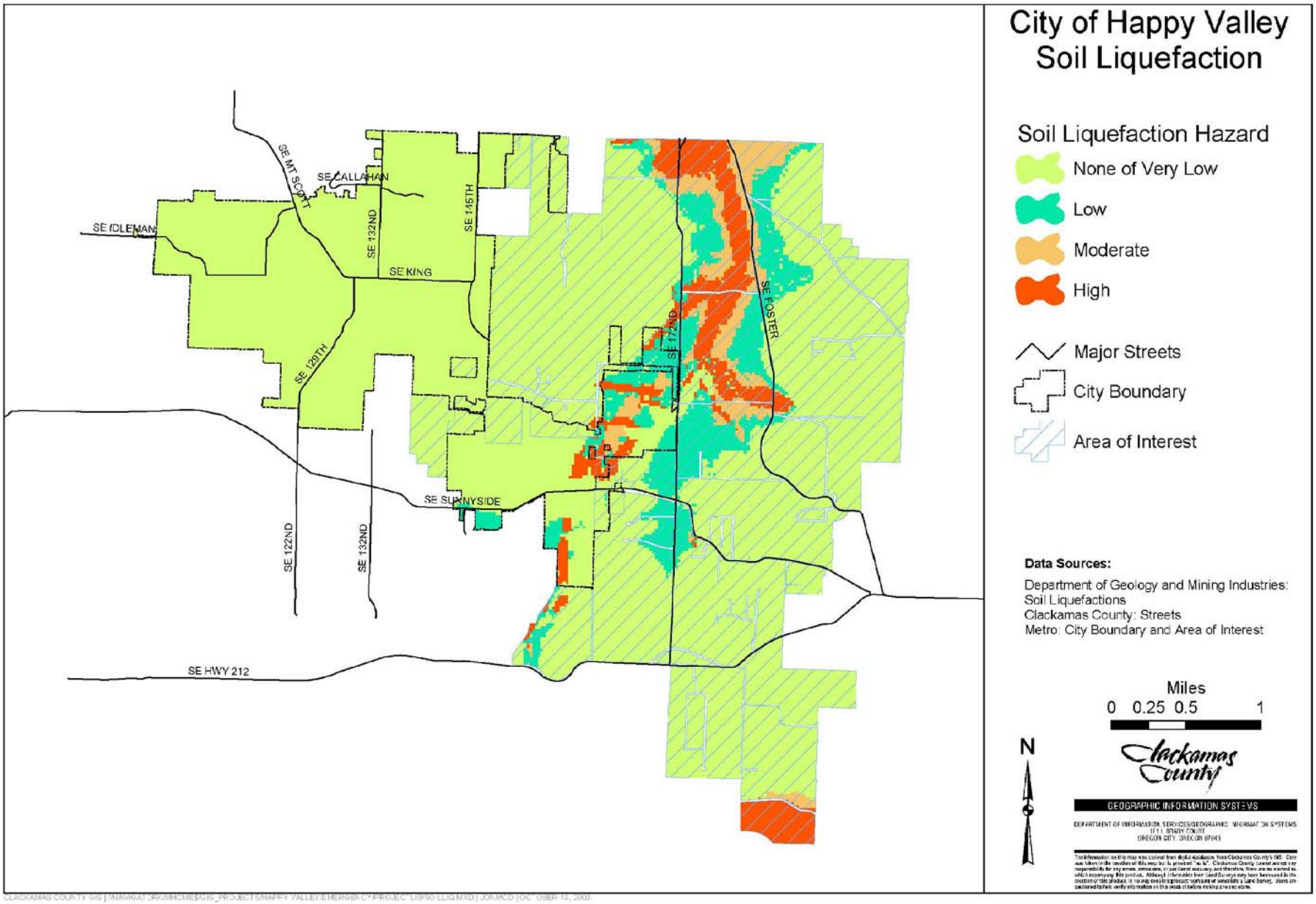
Earthquake fault lines can be seen on Earthquake Hazards Map, located below on page 44. A number of faults run along the eastern side of the city, and a fault runs between SE Vrandenberg Road and SE 172nd Ave. Pockets of high earthquake hazard exist throughout the city, the largest being the area between SE 172nd and SE Foster Road. Other high earthquake hazards are near Mt. Scott, Scouters Mountain, and Mt. Talbert. Additional information can be viewed on the Soil Liquefaction and Soil Amplification maps (pages 45 and 46). Soil liquefaction mirrors the highest earthquake hazard zone between SE 172nd and SE Foster Road. The Soil Amplification Map shows only a few

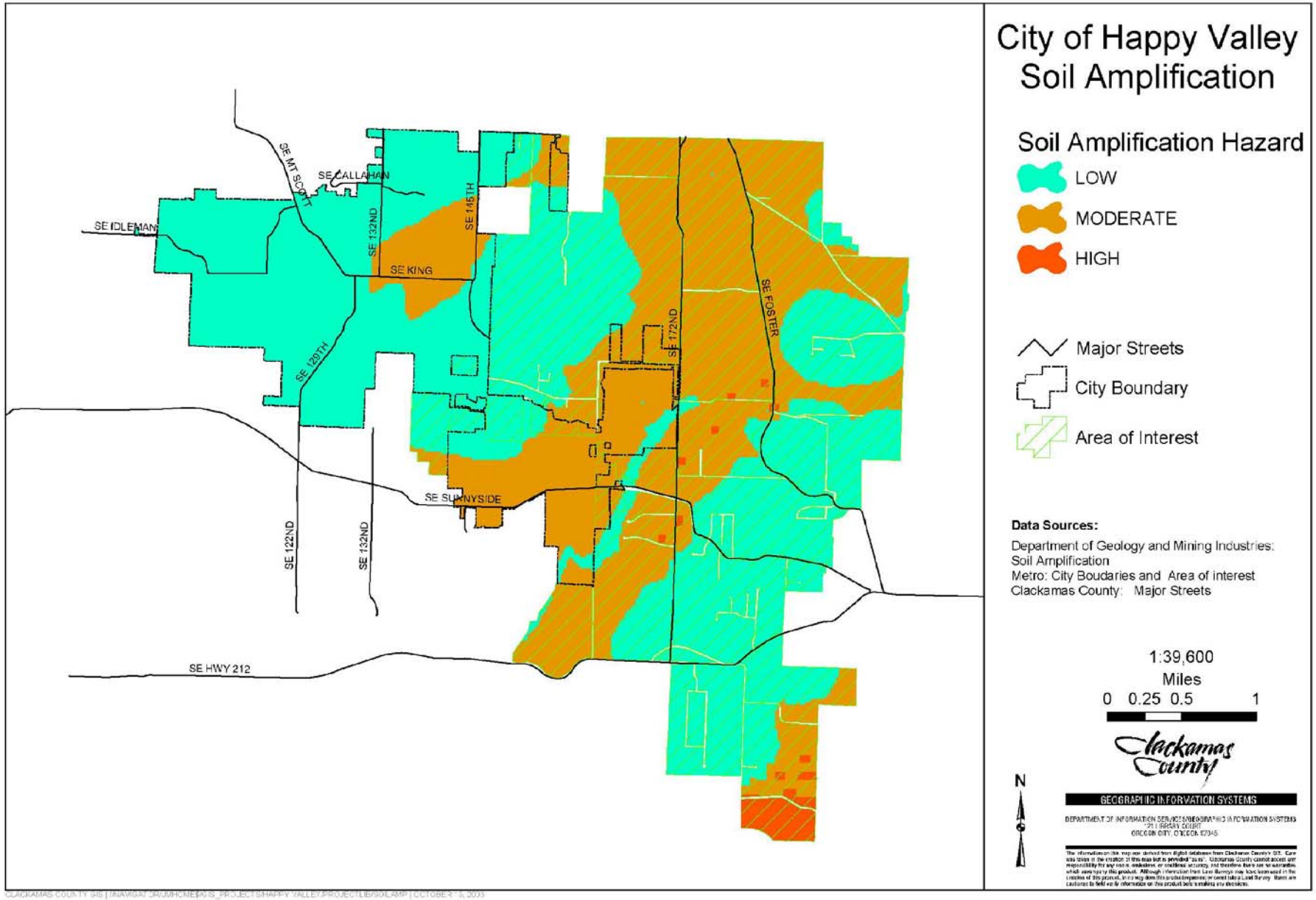
small areas in 'high' amplification zones. The 'moderate' amplification zone is primarily west of SE Foster Road, and between SE 132nd Ave, SE King, and SE 145th Ave.

A high magnitude earthquake could have significant impacts in Happy Valley. While the majority of buildings have been constructed after stricter seismic building codes were implemented, approximately 15% of the city is built on fill. Areas built on fill are subject to liquefaction in an earthquake event. The Community Policing Center and Public Works Complex are not up to seismic standards. Please see Clackamas County's Natural Hazards Mitigation Plan for additional information regarding potential earthquake-related impacts.

Clackamas County estimates a high probability that earthquakes will occur in the future (event is likely within a 10 to 35 year period), and a high vulnerability to earthquake events (more than 10% of the population and assets would likely be affected in a major event). Both ratings are true for the city of Happy Valley as well.


City of Happy Valley
Earthquake Hazards
Faults
Major Streets
City Boundary
Area of Interest
Earthquake Hazard
Possible Damage
Slight
Lower
Moderate
Higher
Department of Geology and Mining Industries: Faults
Clackamas County: Major Streets and Relative Earthquake Hazards
Metro: City Boundary and Area of Interest
1:39,600
Miles
0 0.25 0.5 1
N
SE MT SCOTT
SE CALLAHAN
SE IDLEMAN
SE 132ND
SE 145TH
SE KING
SE 129TH
SE 172ND
SE FOSTER
SE SUNNYSIDE
SE 122ND
SE 132ND
SE HWY 212
Relative Earthquake Hazard Areas determined by Clackamas County GIS staff based on data developed by the Oregon Department of Geology and Mineral Industries (DOGAMI). The relative earthquake hazard map integrates four separate earthquake hazard components: amplification (of ground shaking by a "soft" soil column), liquefaction (of water-saturated sand, creating areas of "quicksand"), instability of slopes (triggered by the shaking of the earthquake), and historic landslides. It delineates areas that likely will experience the greatest effects from any earthquake. The map predicts the tendency of a site to have greater or lesser damage than other sites in the area. It does not depict the absolute degree of earthquake hazard at any site, which means that in any given earthquake it is possible that damage in even the highest relative hazard category will be light. Conversely, in a severe earthquake even the lowest relative hazard category could experience severe damage. The areas depicted should not be used as the sole basis for any type of restrictive or exclusionary policy.
CLACKAMAS COUNTY GIS | /JONMCD/GIS_PROJECTS/HAPPY VALLEY/EMERGENCY/PROJECTFILE/EARTHQUAKE.MXD | JONMCD | OCTOBER 13, 2003


City of Happy Valley
Soil Liquefaction
Soil Liquefaction Hazard
None of Very Low
Low
Moderate
High
Major Streets
City Boundary
Area of Interest
Data Sources:
Department of Geology and Mining Industries: Soil Liquefactions
Clackamas County: Streets
Metro: City Boundary and Area of Interest
Miles
0 0.25 0.5 1
N
Clackamas County
GEOGRAPHIC INFORMATION SYSTEMS
SE MT SCOTT
SE CALLAHAN
SE IDLEMAN
SE 132ND
SE 145TH
SE KING
SE 129TH
SE 172ND
SE FOSTER
SE SUNNYSIDE
SE 122ND
SE 132ND
SE HWY 212


City of Happy Valley
Soil Amplification
Soil Amplification Hazard
LOW
MODERATE
HIGH
Major Streets
City Boundary
Area of Interest
Data Sources:
Department of Geology and Mining Industries:
Soil Amplification
Metro: City Boudaries and Area of interest
Clackamas County: Major Streets
1:39,600
Miles
0 0.25 0.5 1
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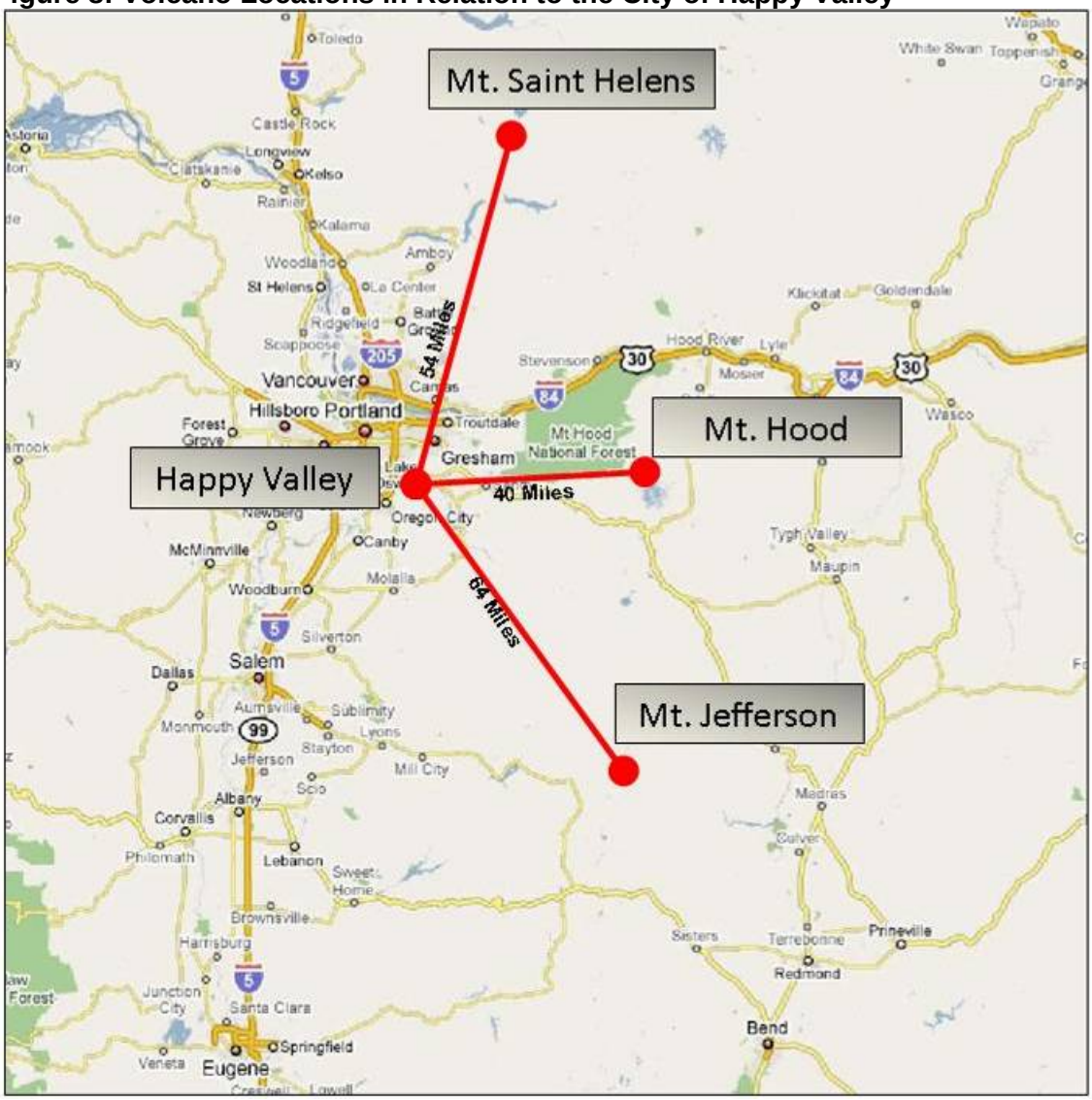
SE MT SCOTT
SE CALLAHAN
SE IDLEMAN
SE 132ND
SE 145TH
SE KING
SE 120TH
SE 172ND
SE FOSTER
SE SUNNYSIDE
SE 122ND
SE 132ND
SE HWY 212
GEOGRAPHIC INFORMATION SYSTEMS

3.6 Volcano

Immediate danger areas for volcanic eruptions lie within a 20-mile radius of the blast site, and ashfall is likely to affect communities downwind of the eruption. Several volcanoes are located near Happy Valley, the closest of which are shown in Figure 8 below. Additionally, Mount Adams is located north of Mount Hood; Mount Rainier is located north of Mount Saint Helens; and the Three Sisters lie to the south of Mount Jefferson.

Figure 8: Volcano Locations in Relation to the City of Happy Valley



Due to Happy Valley's relative distance from volcanoes, the city is unlikely to experience the immediate effects that eruptions have on surrounding areas (i.e., mud and debris flows, or lahars). Depending on wind patterns and which volcano erupts, however, the city may experience ashfall. The eruption of Mount St. Helens in 1980, for example, coated the Willamette Valley with a fine layer of ash. If Mount Hood erupts the city is likely to be fully coated in ash.

Clackamas County's Natural Hazards Mitigation Plan adequately documents the causes and characteristics and historic volcanic events for Mount Hood, Mount Saint Helens, Mount Rainier, Mount Adams, and Mount Saint Helens. Please refer to pages 12-1 to 12-13 of the 2002 Clackamas County Natural Hazards Mitigation Plan and pages 61 to 64 of the 2007 plan update for more information regarding volcanic events.

Clackamas County estimates a low probability that volcanic eruptions will occur in the future, meaning one event is likely within a 75 to 100 year period, and a high vulnerability to volcanic events, meaning more than 10% of the population or assets would be affected. Both ratings are true for the city of Happy Valley as well. Hazards related to volcanic eruptions (i.e., potential community impacts) are adequately described in the Clackamas County Natural Hazards Mitigation Plan. Although the City of Happy Valley is unlikely to experience lahars or lava flows, tephra (sand-sized or finer particles of volcanic rock that is ejected rapidly into the air from volcanic vents) drifts downwind from the explosions and can form a blanket-like deposit of ash. Tephra is a public health threat, and can damage agriculture and transportation systems (i.e., aircraft and on-the-ground vehicles). Tephra can also clog drainage systems and create major debris management problems. Within Happy Valley, public health would be a primary concern, and keeping transportation routes open/accessible would be important as well.

Section 4:
Action Items

4.1 Action Items

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. Each action item has a corresponding action item worksheet describing the activity, the project's rationale, potential ideas for implementation, and coordinating / partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. Full action item worksheets are located in Appendix B of this addendum.

- MH #1: Develop public education programs to inform the public about methods of mitigating the impacts of natural hazards.
- MH #2: Integrate the goals and action items from the Natural Hazards Mitigation Plan into existing regulatory documents and programs, where appropriate.
- MH #3: Identify and pursue funding opportunities to develop and implement hazard mitigation activities.
- MH #4: Continue to update and improve hazard assessments in the Natural Hazards Mitigation Plan as new information becomes available.
- MH #5: Encourage greenspace management throughout the city.
- FL #1: Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances.
- FL #2: Increase capacity of culverts throughout the city.
- FL #3: Develop a stormwater management plan.
- WF #1: Promote fire-resistant strategies for new and existing developments.
- WF #2: Conduct community based fuel reduction demonstration projects in the wildland-urban interface.
- SS #1: Reduce negative effects from severe windstorm and severe winter storm events.
- EQ #1: Conduct seismic evaluations on the Community Policing Center, Public Works Complex, and identified shelters for implementing appropriate structural and non-structural mitigation strategies.

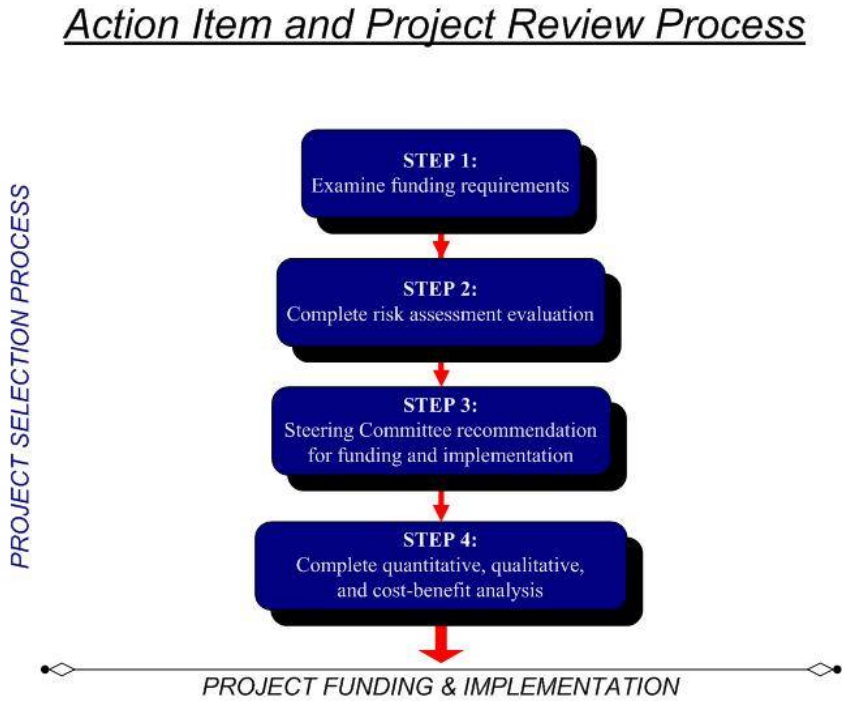
Note: the City of Happy Valley does not believe that implementing landslide or volcano-related mitigation activities will be cost-effective at this time. As such, the city has not

identified landslide or volcanic-eruption mitigation action items. Happy Valley will partner with Clackamas County, however, on the implementation of mitigation strategies that benefit both jurisdictions.

4.2 Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that jurisdictions identify a process for prioritizing potential actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by committee members, local government staff, other planning documents, or the risk assessment. Figure 9 illustrates the project prioritization process.

Figure 9: Project Prioritization Process



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2008.

Step 1: Examine funding requirements

The first step in prioritizing the plan's action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the city's proposed mitigation projects. Examples of mitigation funding sources include but are not limited to: FEMA's Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds, and private foundations, among others.

Because grant programs open and close on differing schedules, the Hazard Mitigation Team (HMT) will examine upcoming funding streams' requirements to determine which mitigation activities would be eligible. The HMT may consult with the funding entity,

Oregon Emergency Management, or other appropriate state or regional organizations about project eligibility requirements. This examination of funding sources and requirements will happen during the HMT's semi-annual plan maintenance meetings.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The HMT will determine whether or not the plan's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas, and whether community assets are at risk. The HMT will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future, or are likely to result in severe / catastrophic damages.

Step 3: Committee Recommendation

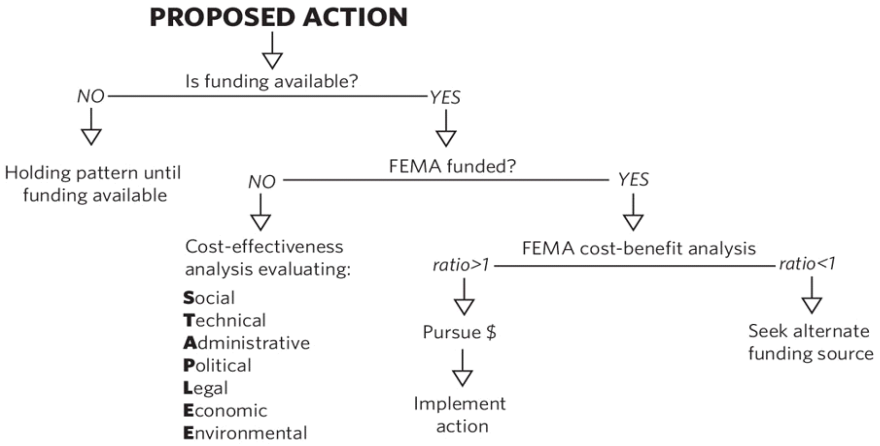
Based on the steps above, the HMT will recommend which mitigation activities should be moved forward. If the HMT decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The HMT will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

The HMT and the community's leadership have the option to implement any of the action items at any time, (regardless of the prioritized order). This allows the HMT to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of the highest priority. This methodology is used by the HMT to prioritize the addendum's action items during the annual review and update process.

Step 4: Complete quantitative and qualitative assessment, and economic analysis

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 10 shows decision criteria for selecting the appropriate method of analysis.

Figure 10: Benefit Cost Decision Criteria



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2006.

If the activity requires federal funding for a structural project, the committee will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project's cost effectiveness. The committee will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness. Please see Appendix C for a description of STAPLE/E.

[i] USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

[ii] National Institute of Building Science's Multi-hazard Mitigation Council. "Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities" 2005.

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[xi] Happy Valley Transportation System Plan Update, "Chapter 4: Future Needs and Improvements," http://www.ci.happy-valley.or.us/pdf/community/tsp/ch4_future_demand.pdf

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[xviii] US Census, "Journey to Work: 2000," Fact Sheet, Happy Valley, OR, www.census.gov.

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[xxi] Sunrise Water Authority, "2005 Water Quality Report" http://www.sunrisewater.com/pdf/misc/2005SWA%20Water%20Quality%20Report.pdf

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Appendix A: Planning and Public Process

The following appendix documents Happy Valley's natural hazards mitigation planning and public involvement processes.

Work Sessions

Public Outreach

AGENDA

Meeting: Happy Valley Natural Hazards Mitigation Plan Intro Meeting
Date: April 30, 2009
Time: 2:00 to 3:00pm
Location: Happy Valley City Hall

1. Meeting Attendees
    a. Chris Randall, Public Works Director
    b. Sarah Mizejewski, Associate Planner
    c. Ryan Kersey, Code Enforcement
    d. Erin Brisben, Happy Valley Police Sergeant
    e. Steve Campbell, Director of Community Services/Public Safety
    f. Ed Cameron, Building Official
    g. Barbara Muller, Finance Officer
    h. Rich Feucht, Engineering Associate

2. Natural Hazards Mitigation Plan Overview
    a. The group reviewed the handouts that explain natural hazards mitigation plans, the disaster cycle, and the "understanding risk" Venn diagram
        (See handouts below)

3. Planning Process

First Planning Meeting:

During this meeting we will:

- Adopt Plan Mission Statement, Goals, and Objectives
    - We will adopt the Clackamas County Goals and Mission Statement unless the group wants to add to it.
- Determine who will be the Coordinating Body
    - This is the group who will implement the action items in the plan.
- Determine who will be the Convener
    - This is the person who will call the coordinating body together, facilitate meetings, create agendas, etc or designate someone to do these tasks
- Review hazard data and history and get feedback
    - Laurel will research hazard history and email to the group before the next meeting. Between now and the next meeting everyone should be thinking about past natural hazards events.
- Discuss community issues related to each hazard
    - What happened when the hazard hit? Where did the hazard hit? Who was affected? By answering these questions the group will identify vulnerabilities in the community.
- Review next steps – action item updates
    - The action items will be created based on the vulnerabilities identified. The goal of creating a mitigation plan is to reduce the vulnerabilities within a community, and action items are specific projects/programs/etc that a community can do to build resiliency. Laurel will create a list of potential action items, but the group should also be thinking of specific projects to put in the plan.

Second Planning Meeting:

During this meeting we will discuss the following:

- Create mitigation action items

    - The reason we make natural hazards mitigation plans is to create action items that address each of the vulnerabilities. Laurel will create a list of suggested action items and the group will review and add action items as needed.
- Discuss the formal review process and plan maintenance
    - We will come up with a schedule of meetings and tasks so the action items can be implemented.
- Discuss public involvement
    - The public needs to be made aware of the plan's existence both during and after the planning process. Once we have a final draft of the plan we will need to advertise it to the public and allow time for comments.
- Review timeline for city review, OPDR review, FEMA review
    - Once Laurel finishes her draft she will email it to the committee for editing. The Oregon Partnership for Disaster Resilience will also review the plan and then send it off to FEMA for preliminary review.
- Review process for adoption
    - The City Council will need to adopt the plan after FEMA gives preliminary approval.

4. Needs from you
    - Maps – GIS department participation
        - Any new data should be reflected in the maps, but the 2003 maps could still be applicable for the new plan.
    - Access to existing plans/policies
        - Laurel can find plans linked on the city website. She has found the Draft Transportation System Plan, East Happy Valley Comprehensive Plan, Parks Plan, Development Code, Municipal Code, and Rock Creek Comprehensive Plan. Other helpful plans would be a Stormwater master plan, or other public works plans.
    - List of critical facilities, infrastructures, populations
        - These are your community assets, and the destruction or damage of one or more of these facilities would have an impact on the community.
    - Hazard history facts/statistics
        - The group should be thinking of the impacts of past natural disasters on the city to prepare for the next meeting. Any numbers you have (# of damaged homes, costs to repair, etc) would be very beneficial.
    - Most recent employment and economics data
        - Laurel will use the 2000 Census data unless the city has more up-to-date information
    - Land use and development information
        - Future development should be discussed in the NHMP
    - Existing mitigation projects, education, etc

5. Next meeting: Wednesday, May 20th from 1:00 to 5:00pm

HANDOUT

What is 'natural hazards mitigation'?

Natural hazards mitigation is defined as permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies.

Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why develop a natural hazards mitigation plan?

A natural hazards mitigation plan provides a community with a set of goals, action items, and resources designed to reduce risk from future natural disaster events. The process of developing a mitigation plan can also forge new partnerships among community organizations, businesses, and local citizens. These partnerships can lead to the development and implementation of risk reduction strategies that assist the community in reducing losses from any future natural disaster events.

In 2000, Congress approved the Disaster Mitigation Act of 2000 (DMA2K). DMA2K set forth requirements for communities to develop and adopt local natural hazard mitigation plans to become eligible for mitigation grant funding, including FEMA's Hazard Mitigation Grant Program (HMGP), and Pre-Disaster Mitigation (PDM) Grant Program.

What does a mitigation plan do?

Natural hazards mitigation plans document knowledge about the problems associated with natural hazards in a community. A mitigation plan articulates goals that will guide the community in implementing short- and long-term risk reduction activities, recommending appropriate mitigation action items, and identifying resources to implement activities. Preparing a mitigation plan for your community can reduce public and private costs resulting from natural disaster events. Successes in risk reduction and loss prevention are achieved by implementing programs that address and mitigate the potential impacts natural disasters may have on society, the economy, and the environment.

How will the county help with this process?

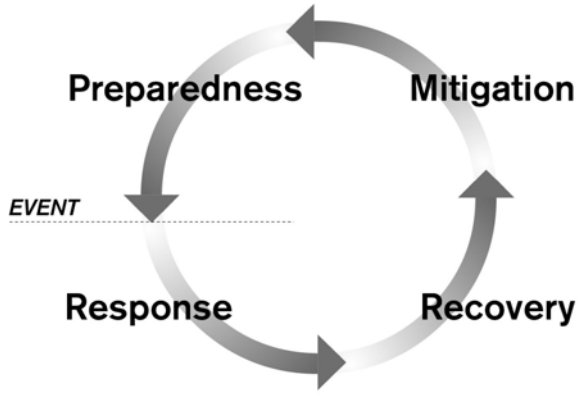
In an effort to assist each city in their addendum development process, Clackamas County partnered with the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon to hire a Resource Assistance for Rural Environments Participant (RARE Participant). The RARE Participant was hired using funds made available through the Hazard Mitigation Grant Program, and she will work with each participating city in developing an addendum to Clackamas County's Natural Hazards Mitigation Plan. The planning processes will occur between February and August 2009.

The RARE Participant will be responsible for developing and facilitating all natural hazards mitigation plan meetings within each city. Likewise, the RARE Participant will be responsible for documenting the results of each meeting, and preparing a draft addendum for all cities involved.

The Disaster Cycle

The emergency management profession and FEMA have used the concept of the disaster cycle (Figure 1-1) to describe the phases of a disaster. Although described as separate phases, each phase is tied to the others. It is helpful to think of the disaster cycle as a simple equation. Every risk or vulnerability we mitigate today reduces our overall exposure whereby decreasing the pressure on the response side of the disaster cycle and lowering our recovery costs from future events. This section defines the four phases and describes plans and activities associated with them. The four phases, Response, Recovery, Preparedness, and Mitigation can be described as follows:

Figure 1-1: The Disaster Cycle



Response

Response begins as soon as a disaster event occurs. Response is the provision of search and rescue, medical services, and access control as well as repairing and restoring communication and data systems during a crisis. A coordinated response plan can help reduce casualties, damage, and decrease recovery time. Examples include emergency operations plans and business continuity plans and established networks of first responders.

Recovery

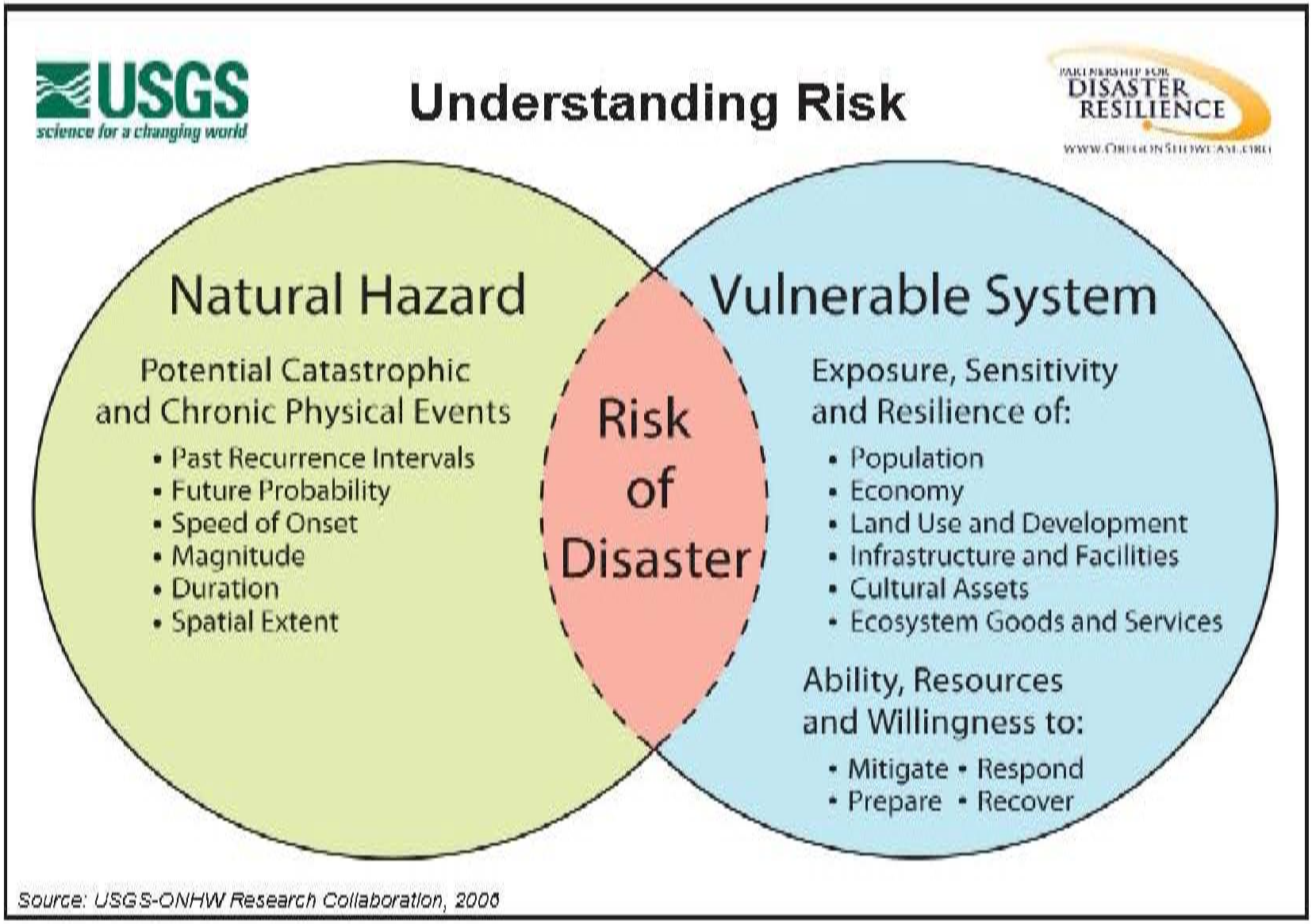
Recovery operations provide for basic needs and restore the community. There are two components in the recovery phase. During the first phase, infrastructure is examined, and repairs are conducted to restore water, power, communication and other utilities. The second phase includes returning to normal functions and addressing future disasters. The process of recovery can take months or possibility years to accomplish depending upon the event. An example would be the development of a post-disaster recovery plan.

Preparedness

Preparedness refers to activities, programs, and systems developed in advance of a disaster designed to build and enhance capabilities at an individual, business, community, state and federal level to support the response to and recovery from disasters. Example strategies might include developing awareness and outreach campaigns and training targeted to individuals and businesses on personal and professional responsibility to be self sufficient for at least 72 hours post-disaster.

Mitigation or Risk Reduction

Mitigation is the act of reducing or eliminating future loss of life and/or property, and/or injuries resulting from hazards through short and long-term activities. Mitigation strategies may range in scope and size; however, no matter the size, effective mitigation activities have the potential to reduce the vulnerability and/or exposure to risk and impact of disasters. Example mitigation activities for flooding include acquiring, elevating, or relocating structures; for seismic include building code, retrofitting buildings or infrastructure and non-structurally retrofitting labs and offices; and for wind or winter storms include under grounding power lines and tree replacement programs.


USGS
science for a changing world
Understanding Risk
DISASTER RESILIENCE
Natural Hazard
Potential Catastrophic and Chronic Physical Events
• Past Recurrence Intervals
• Future Probability
• Speed of Onset
• Magnitude
• Duration
• Spatial Extent
Risk of Disaster
Vulnerable System
Exposure, Sensitivity and Resilience of:
• Population
• Economy
• Land Use and Development
• Infrastructure and Facilities
• Cultural Assets
• Ecosystem Goods and Services
Ability, Resources and Willingness to:
• Mitigate • Respond
• Prepare • Recover
Source: USGS-ONHW Research Collaboration, 2006

Natural Hazard Mitigation Plan Introductory Meeting

City of Happy Valley
April 30, 2009
2:00 to 3:00pm

First	Last	Agency	Job Title	Email	Roundtrip Mileage
Chris	Randall	City of Happy Valley	Public Works Director	chrisr@ci.happy-valley.or.us	
SARAH	MIZEJEWSKI	CITY OF HAPPY VALLEY	ASSOCIATE PLANNER	SARAHM@CI.HAPPY-VALLEY.OR.US	
RYAN	KEASEY	CITY OF HAPPY VALLEY	CODE ENFORCEMENT	RYANK@CI.HAPPY-VALLEY.OR.US	
ERIN	BRISBEN	HAPPY VALLEY P.D.	SERGEANT	erinbri@co.clackamas.or.us	
STEVE	CAMPBELL	Happy Valley	Dir. Com Serv & Public	stevec@ci-happy-valley.or.us	
ED	CAMERON	Happy Valley	Building Official	edc@CI.HAPPY-VALLEY.OR.US	
Barbara	Muller	Happy Valley	Finance Officer	barbaram@ci.happy-valley.or.us	
RICH	FEUCHT	CITY OF HAPPY VALLEY	Engineering Associate	richf@ci.happy-valley.or.us	

Meeting: Happy Valley Natural Hazard Mitigation Plan Meeting 1
Date: May 20, 2009
Time: 1:00 to 5:00pm
Location: Happy Valley City Hall

MINUTES

1. Meeting Attendees
    a. Ed Cameron, Building Official
    b. Steve Campbell, Director of Community Services/Public Safety
    c. Rich Feucht, Engineering Associate
    d. Ryan Kersey, Code Enforcement
    e. Sarah Mizejewski, Associate Planner
    f. Barbara Muller, Finance Officer
    g. Chris Randall, Public Works Director

2. Planning Process Discussion
    a. Plan Participants
        i. The group present is called the Hazard Mitigation Team
    b. Mission and Goals
        i. The group agrees with the mission and goals of the Clackamas County Natural Hazards Mitigation Plan
    c. Plan Adoption
        i. The City Council will be responsible for adopting the plan
    d. Coordinating Body
        i. The Hazard Mitigation Team will serve as coordinating body
    e. Convener
        i. The Director of Community Services/Public Safety (Steve Campbell) will serve as convener.
    f. Public Involvement
        i. The plan will be available for viewing online and in offices around the city
        ii. The plan will be advertised at city open house events, on the city website, brochures, and in local publications (Happy Valley Today)
        iii. The plan can be brought to the Traffic and Public Safety Forum, Business Alliance meetings, and to dozens of homeowner's association meetings.
        iv. The Hazard Mitigation Team can schedule a public meeting when deemed necessary, such as after a hazard event

3. Critical/Essential Facilities & Infrastructure
        i. Critical Facilities: those facilities and infrastructure necessary for emergency response efforts:
            1. City Hall – EOC

2. Community Policing Center (CPC)
3. Fire Station #6
4. Fire Station #7
5. Public works Complex
6. Shelters – Church of Jesus Christ of Latter Day Saints
7. Happy Valley Park
8. Sunrise Water Authority
9. 162nd Park
10. Providence Medical Facility

ii. Essential Facilities: those facilities and infrastructure that supplement response efforts.
    1. Happy Valley Middle School/Happy Valley Elementary
    2. Rock Creek Middle School
    3. Verne A. Duncan Elementary
    4. Scouters Mountain Elementary
    5. Spring Mountain Elementary
    6. Scouters Mountain
    7. Abundant Life Church
    8. New Hope Community Church
    9. Emmanuel Community Church
    10. Happy Valley Baptist Church
    11. Happy Valley Evangelical Church

iii. Critical Infrastructure: infrastructure that provides services for the City of Happy Valley
    1. Sunnyside Road
    2. SE 122nd Ave/129th
    3. SE Mount Scott Blvd
    4. Carver Road/Hwy 212
    5. 172nd
    6. Ridge Crest
    7. 152nd/147th/145th
    8. King Road
    9. 132nd
    10. Clatsop
    11. Idleman Road
    12. 172nd
    13. 162nd
    14. Hwy 224
    15. City Reservoirs
    16. Pump stations
    17. Telephone lines
    18. Gas lines
    19. Power lines
    20. Bridges (152nd and Sunnyside Road, Hwy 212)

21. Water treatment, storage, and distribution lines (Chris working to get this information from the county)
22. Water treatment plant
23. Radio/cell phone towers (many on Ridge Way, one in Happy Valley Park, one on Idleman Road)

iv. Vulnerable Populations: locations serving populations that have special needs or require special consideration
    1. Happy Valley schools
    2. Happy Valley Mobile Home Park
    3. Day Spring Mobile Home Park
    4. Adult Care Facilities (will do a public records request to the county to find this information)
    5. Day Care Centers – 142nd and Oregon Trail, 145th, King Road

v. Cultural or Historical Assets: these assets include those facilities that augment or help define community character, and if lost would represent a significant loss for the community
    1. Strickrott Home
    2. Rebstock Home
    3. Deardorff Cemetery
    4. Christian and Dara Meng House
    5. Florian D. and Helen L. Meng House
    6. John Donaldson House
    7. Hazelfern Dairy
    8. The Ulrich Home

vi. Environmental Assets: Environmental assets are those parks, green spaces, wetlands, and rivers that provide an aesthetic and functional service for the community
    1. Happy Valley Park
    2. Eagle Landing Golf Course
    3. Happy Valley Wetland Park
    4. Associated Trails Systems
    5. Future home of 162nd Park
    6. Rebstock Park
    7. Mount Scott Park
    8. Rock Creek
    9. Mitchell Creek
    10. Scouters Mountain and adjacent METRO green space

4. Mitigation Planning Priority System Discussion
    a. The group reviewed the planning priority system used in the county plan and the system recommended by OPDR. The group went with OPDR's priority system.

5. Hazard Identification
    a. Laurel created a handout detailing each of the following hazards: flood, landslide, wildfire, earthquake, severe storm, and volcano. The group went over each hazard and added information on impacts, history, mitigation efforts, and compared Happy Valley's probability/vulnerability to the county's ratings. The following is information added to the handout.
    b. Flood
        i. History
            1. The December 2008/January 2009 flooding took out a residential bridge. A number of roads and storm drains washed out. The storm drain system was at capacity and could not hold more water.
            2. Flooding occurred on 162nd because of construction. The city shut down the bridge and some of the adjacent hill eroded (what was the date of this?)
        ii. Impacts
            1. Happy Valley Heights is the most common place for infrastructure failure because houses on top of the hill drain water towards the homes at the bottom of the hill. Residents call the city saying their crawspace or basements are flooding so the city will go out and help the residents sandbag.
            2. A number of private infrastructure systems are owned by homeowner's associations
            3. Infrastructure such as pipes and ditches at the bottom of hills can be washed out because of heavy rains. The water will flush up debris in the ditches and clog culverts.
            4. For the most part flooding occurs on the south side of the Clackamas River, so river flooding isn't as common as urban flooding.
        iii. Mitigation steps taken
            1. Public works cleans out all known problem areas weekly from October through April, and before any big storm is forecasted
            2. The city website and newsletter, Happy Valley Today, advises citizens to properly discard yard debris rather than blowing it into the street to avoid clogging up culverts
        iv. Probability: High (same as county)
        v. Vulnerability: Moderate (same as county)

    c. Landslide
        i. History

1. In 1996 a hillside on City View Drive slid into a homeowners yard and continued past the home towards Foster Road. Traffic on Johnson Creek Road was impacted by the slide.
2. Happy Valley has a hilly topography but few landslides have occurred

ii. Impacts
1. A fault runs above 145th Avenue and could be vulnerable to landslides
2. Scouters Mountain, the reserve, and Rock Creek are potential landslide areas
3. East of 145th has potentially rapidly moving slopes
4. The 2003 map shows that Happy Valley has a number of steep slopes, but potential rapidly moving landslides (using slump flow information from DOGAMI) is very minimal

iii. Mitigation Steps
1. Happy Valley has written a code to prohibit building on slopes steeper than 20% (still in appeal phase)

iv. Probability: High (same as county)
v. Vulnerability: Moderate (higher than county)

d. Wildfire
i. History – The Clackamas County Plan is sufficient
ii. Impacts
1. All of Scouters Mountain, Mt. Scott, METRO green space and the Happy Valley trail systems are wildland/urban interface. These areas have a buildup of ladder fuels. Scouters Mountain is the biggest hazard because homes, a new elementary school, fire station #7, the public works facility, and water facility are near Scouters Mountain
2. Moderate wildfire hazard areas are spread throughout the city

iii. Mitigation Steps Taken
1. The city adopted a no smoking ordinance in all parks and public property
2. The city has a strict fireworks ordinance and a task force collects illegal fireworks. A big public education push is made in the weeks leading up to July 4th to discourage purchase and use of illegal fireworks.

iv. Probability: Moderate (same as county)
v. Vulnerability: Moderate (same as county)

e. Earthquake
    i. History – County plan is sufficient
    ii. Impacts
        1. The Community Policing Center (CPC) and Public Works Complex are not up to seismic standards
        2. Approximately 15% of the city is built on engineered fill. Areas built on fill are subject to liquefaction in an earthquake event.
    iii. Mitigation Steps Taken
        1. The city has an active CERT team that meets monthly
    iv. Probability: High (same as county plan)
    v. Vulnerability: High (same as county plan)

f. Severe Storm: Wind and Winter
    i. History
        1. FEMA reimbursed the city for cleanup of a large snow storm in January 2006
    ii. Impacts
        1. Happy Valley has more windstorms than other communities in the county. This is because the city is a higher elevation and closer to the Columbia Gorge than most cities in Clackamas County. Trees and tree branches are regularly blown over.
    iii. Mitigation Steps taken
        1. Once a year trees are assessed for overhangs and low lying branches. The city will remove trees or branches that appear potentially dangerous.
        2. A tree survey is required with all new developments. If the developer wants trees or plants removed they must receive a permit through the city.
        3. The city has a tree ordinance that provides mitigation standards and conditions
        4. The city has designated sand and snow plow routes
    iv. Probability: High for both wind and winter storms. This is higher than the county's 'moderate' wind storm rating because Happy Valley is at a higher elevation and closer to the Gorge
    v. Vulnerability: Moderate for both wind and winter storms. This is higher than the county's 'low' wind storm rating.

g. Volcano
    i. History – County plan is sufficient
    ii. Impacts – County plan is sufficient
    iii. Mitigation Steps Taken

1. The city had a plan in place in 2006 when St. Helens was active again (what was the name of this plan?)

iv. Probability: Low (same as county plan)
v. Vulnerability: High (same as county plan)

6. Next Time: Action Items
    a. At the next meeting we will discuss action items and the formal review process.
    b. The next meeting was scheduled for Wednesday, June 3rd at City Hall at 1:00.

Natural Hazard Mitigation Plan First Planning Meeting

City of Happy Valley
520/2009
1:00 to 5:00pm

First	Last	Agency	Job Title	Email	Roundtrip Mileage
SARAH	MIZEJEWSKI	CITY OF HAPPY VALLEY	ASSOCIATE PLANNER	SARAHM@CI.HAPPY-VALLEY.OR.US	-
RICH	FEUCHT	CITY OF HAPPY VALLEY	ENGINEERING ASSOCIATE	richf@ci.happy-valley.or.us	-
STEVE	Campbell	" "	Community Services	steveC@ci.happy-valley.or.us	
Chris	Randall	" "	Public Works	chrisr@ci.happy-valley.or.us	
ED	CAMERON	" "	Building official	ed@ci.happy-valley.or.us	
RYAN	KERSEY	CITY OF HAPPY VALLEY	COMMUNITY SERVICES	ryank@ci.happy-valley.or.us	
Barbara	Muller	City of Happy Valley	Finance	barbaram@ci.happy-valley.or.us	

Meeting: Happy Valley Natural Hazard Mitigation Plan Meeting 2
Date: June 3, 2009
Time: 1:00pm to 4:00pm
Location: Happy Valley City Hall

MINUTES

1. Meeting Attendees
    a. Ed Cameron, Happy Valley Building Official
    b. Steve Campbell, Happy Valley Director of Community Services/Public Safety
    c. Kevin Donegan, Clackamas Fire District #1 Emergency Manager
    d. Rich Feucht, Happy Valley Engineering Associate
    e. Ryan Kersey, Happy Valley Code Enforcement
    f. Chris Randal, Happy Valley Public Works Directors

2. Formal Review Process and Plan Maintenance
    a. The convener will be responsible for assigning representatives to the committee
    b. The committee will meet twice a year. The first meeting will be held in the spring to discuss the previous hazard season (severe storm, flood, etc) and prepare for upcoming hazard seasons (wildfire, earthquake awareness month, etc). The second meeting will be held in the fall.
    c. During the first meeting, the committee will:
        - Discuss funding opportunities for the implementation of mitigation strategies.
        - Review existing action items to determine appropriateness for funding;
        - Educate and train new members on the plan and mitigation in general; and
        - Identify issues that may not have been identified when the plan was developed.

    During the second meeting of the year, the committee will:
        - Review existing and new risk assessment data, and incorporate this information into the plan;
        - Document success in implementing mitigation actions and/or applying for funding;
        - Discuss the addition and/or subtraction of mitigation actions from the plan;
        - Discuss methods for continued public involvement;
        - Document successes and lessons learned during the year; and
        - Generate a list of members that should be included in future meetings.
    d. Timeline for plan updates

i. The plan will be updated every five years follow the follow county's update cycle. This means the first update will be due in September 2012.
ii. The update process will begin in September 2011 to allow sufficient time for update activities and FEMA review.

e. The convener will be responsible for developing and facilitating plan update meetings. The committee will assist the convener throughout the update process.
f. During the plan evaluation the committee will ask:
    - Have public involvement activities taken place since the plan was adopted?
    - Are there new hazards that should be addressed?
    - Have there been hazard events in the community since the plan was adopted?
    - Have new studies or previous events identified changes in any hazard's location or extend?
    - Has vulnerability to any hazard changed?
    - Have development patterns changed? Is there more development in hazard prone areas?
    - Do future annexations include hazard prone areas?
    - Are there new high risk populations?
    - Are there completed mitigation actions that have decreased overall vulnerability?
    - Did the plan document and/or address National Flood Insurance Program repetitive loss properties?
    - Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?
    - Did the plan identify data limitations?
    - Did the plan identify potential dollar losses for vulnerable structures?
    - Are the plan goals still relevant?
    - What is the status of each mitigation action?
    - Are there new actions that should be added?
    - Is there an action dealing with continued compliance with the National Flood Insurance Program?
    - Are changes to the action item prioritization, implementation, and/or administration processes needed?
    - Do changes need to be made within the five year update schedule?
    - Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?

3. Review Anatomy of an Action Item
    a. Laurel reviewed the elements to be included in an action item before the group began discussions.

4. Update and Brainstorm Action Items
    a. Laurel provided the group with a list of potential action items based on the vulnerabilities they identified in the previous meeting. The group reviewed and updated the action items and added new ones as they saw fit.
    b. See the attached action item sheet for final list

5. Next Steps
    a. Laurel will compile the plan and email it out to the committee for review
    b. Once a final draft is completed it will need to be presented to the public for their comments. This can mean posting the plan online, writing a press release, presenting it at a community meeting/event, etc.
    c. Once public comment is completed the plan will be sent into FEMA for preliminary review. Preliminary review takes between 40 and 60 days.
    d. FEMA will either pre-approve the plan or return the plan with edits. Laurel will make any necessary edits and then resubmit the plan.
    e. After we've gained pre-approval the plan will need to be adopted by City Council and then resent to FEMA for official approval.

Natural Hazard Mitigation Plan [redacted] Meeting 2

City of Happy Valley
June 3, 2009
1:00 to 4:00pm

First	Last	Agency	Job Title	Email	Roundtrip Mileage
Rich	Feucht	City of Happy Valley	Engineering Associate	richf@ci.happy-valley.or.us	∅
Ed	Cameron	CoHV	Bldg. Official	edc@ci.happy-valley.or.us	∅
Chris	Randall	COHV	PWD	chrisr@ci.happy-valley.or.us	"
Steve C	Campbell	COHV	Public Safety	steveC@ci.happy-valley.or.us	
Kevin	Donegan	Clackamas Fire Dist. #1	Emergency Mgn	Kevindon@ccfd1.com	?
Ryan	Kersey	City of Happy Valley	Code Enforcement	RyanK@ci.happy-valley.or.us	—

City of Happy Valley

Happy Valley TODAY

VOLUME I ISSUE 13 DECEMBER 2009

CITY COUNCIL MEMBERS

MAYOR

Rob Wheeler 503.367.6821
robw@ci.happy-valley.or.us

COUNCIL PRESIDENT

Lori DeRemer 971.235.1999
lorid@ci.happy-valley.or.us

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Tom Andrusko 503. 783.3800
toma@ci.happy-valley.or.us

Michael Morrow 503.347.2020
michaelm@ci.happy-valley.or.us

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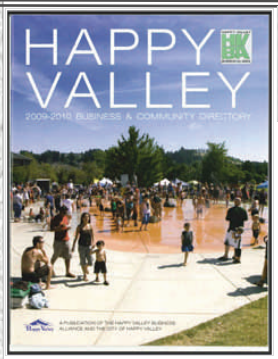


HV BUSINESS & COMMUNITY DIRECTORY
City's First Publication Debuts

A strong partnership between a city and its business community is the foundation of its financial well-being. In Happy Valley, we are fortunate that our local businesses take a collective interest in the city's successful business climate through the Happy Valley Business Alliance.

The Alliance joined forces with the City and Pamplin Media Group to produce a useful community directory that would remind local residents that their business needs are well served locally, and serve as a reference tool for other community information.

The listings included all those businesses registered with the City as a Happy Valley business. Neighboring businesses outside of Happy Valley also took the opportunity to advertise in this inaugural issue.

Members of the Pamplin Media Group and the HVBA attended the November 3rd Council meeting to formally unveil the publication to council members. Bob Brands, Director of Sales & Operations for the Community

Continued next column

Newspaper Group noted that they were extremely pleased with the quality of the finished product and also commended the level of input and assistance from city staff, which was much higher than they were accustomed to receiving. Also applauded were John Higgins and Dylan Drake of local business *Higgins Signs* for their outstanding city photography.

A mailing of 11,000 went out to the HV zip code area in late October, and the response has been very favorable. The directory has already been credited with increased business activity as reported by numerous HVBA members.

The annual publication is anticipated to be much bigger next year as interest grows, and even more businesses expand their advertising to be included in this invaluable community listing. The directory is also accessible via the city's website.

What is natural hazard mitigation? In simplest terms, it is a planning strategy to alleviate the loss of life, property and injuries resulting from natural disasters.

Local and regional governments responded to the FEMA directive of 2002 requiring all states and local governments to develop natural hazard mitigation plans in order to be eligible for disaster assistance.

You are invited to review the Happy Valley Natural Hazard Mitigation Plan by using the following web link: www.oregonshowcase.org/projects/clackamascities. If you do not have internet access, you may also review a hard copy at City Hall.

Face Painting was just one reason to smile at the 2nd Annual Harvest Fest. See Event Recap inside!

Happy Valley
BUSINESS ALLIANCE PARTNER
of the Month

the blue butterfly
Reinventing the Art of Gift Giving

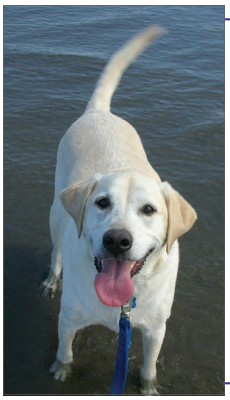
(Above) ***Angie Marvin*** *addresses the October monthly meeting of the HV Business Alliance at New Seasons. (Below) Visitors enjoy the variety of*

We've all received that perfect keepsake gift– a wonderful reflection on the thoughtfulness of the giver, and the special recipient it's intended to please. If you're wondering where to find that special token of affection, or even to simply treat yourself, look no further than the Blue Butterfly at 15916 SE Happy Valley Town Center Drive in HV Town Center!

Angie Marvin describes her store's mission as providing for the celebration of life itself, as displayed through the boutique's distinctive offerings. Store hours are Mon-Sat from 10 to 7, and on Sundays from 11 to 5. Gift cards, as well as complimentary gift wrap services, are available.

www.shopthebluebutterfly.com

The Happy Valley Business Alliance strongly encourages businesses from around the City to connect with each other to share ideas, resources and experiences. Monthly meetings are held on the 4th Wednesday of each month at 7:30 am at New Seasons Market. For more information go to http://www.hvba.biz.



REMEMBER - Your pet is required to have a Happy Valley-issued dog license within 30 days of the dog turning 6 months of age; or if you became its owner or keeper; or if you have moved into the city. License fees vary for a 1, 2 or 3 year duration, and also based on the dog's spay/non-spay status. Seniors 62+ yrs of age receive discounts. Pick up an application at City Hall, or print one from the city's website: www.ci.happy-valley.or.us.

Ice and Snow - How Will It Go?
City is Prepared– Make Sure You Are, Too!

Record snowfall kept the Public Works crew busy last winter

While the weather experts debate whether we'll see another winter like last year's, in Happy Valley the motto is ***Plan, Prepare, Take Care***!

When winter storms hit, many of our steep streets are unsafe for even 4WD vehicles and traction devices. The City's snow and ice policy for street clearing is designed to first and foremost provide passage for all emergency responders, and to then clear the established snow routes of arterial and collector streets within the City.

Our Public Works department is ready with snow plows equipped with sanders. If you live on an established snow route street (contact City Hall if you're not sure) please assist our snow plow crews by ***not*** parking your vehicle in the roadway!

Prepare your home and family by having safe & alternate heating sources in the event of power outages. Insulate your pipes and allow faucets to drip a little during cold weather to avoid freezing. Know where your water valve is and how to shut it off. Do you have fire extinguishers in your home, and does your family know how to use them? Have a supply of sand or rock salt and snow shovels to clear your walkways and driveways. Keep your pantry stocked with the basics to avoid driving to stores on unsafe roads.

The city's website will post updated storm and road information at www.ci.happy-valley.or.us. Follow the "Services" heading to Inclement Weather. There will also be a hot line at (503) 783-3834 to update residents on winter storms and city road and road closure information.

HARVEST FEST at Happy Valley Park

2nd annual event transforms HV Park into a busy pumpkin patch for the day

(Above) Pumpkins received colorful makeovers from young artists. (Right) A wait in line for the hay wagon was rewarded with a smile-filled hayride! Hundreds attended the October 24th event.

A warm day and sunny blue skies made Harvest Fest a day to enjoy for the many families who attended the 2nd annual event. A full schedule of events included a pumpkin patch for picking and painting activities. Hayrides scored smiles from all ages, and a "Treasure-in-the-Hay" Hunt sent the kids running for hidden prizes. A new winner claimed 1st place in the "Best Use of Pumpkin" recipe contest, as Pat O'Donnell took home a gift basket donated by ***Friends Salon***, while Susan Hartley & Cindy Crivellone claimed 2nd & 3rd place awards. ***New Seasons*** offered tastings to sample the best of the apple harvest. ***Hand & Stone*** extracted soothing sighs with free back massages.

Another group benefiting from the great weather was the Volkswalkers, who took to the trails for another successful "Hills & Hallows" 5k & 10k hike event, with many opting for the new Scouters Mountain 5k Adventure.

(Below Left) Community Services employee Rich Chavez hands out pears, compliments of the NW Pear Bureau. (Below Right) Short and squat or tall and skinny, there was a 'perfect' pumpkin out there to please even the pickiest pumpkin picker.

We sincerely thank our Business Sponsors. Their financial support makes this and all of our Community Events possible for the families in our community.

HV LIBRARY FEASIBILITY STUDY
Town Hall Meeting Outlines Proposed Service

Last November, Clackamas County voters approved a Clackamas County library district that will serve most of the residents of the county. Happy Valley is included in the district. According to the district plan for serving County residents, the County has proposed that Happy Valley have a public library that will serve residents of Happy Valley and the surrounding area.

On October 28, 2009, twelve community members participated in a town hall meeting about a future Happy Valley public library. Eight City staff and elected officials attended as well, to hear comments and answer questions from the public. The meeting was facilitated by library consultants Ruth Metz and Kathryn Page. The City hired Ms. Metz and Ms. Page to establish the space requirements and budget of a public library that would serve the growing population in the proposed service area. The proposed service area includes Happy Valley and the surrounding unincorporated area. The estimated current population is about 43,000, about a quarter of which live in the city of Happy Valley. It is expected to grow by about 1.37% to 1.70% per year through 2030.

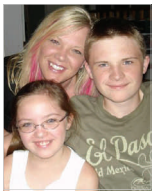
Library consultants Metz and Page will prepare a report for the City Council to include a proposed plan of service and a building program for a future Happy Valley area public library. The findings from the town hall meeting, as well as other community input and the consultants' fact-finding, will factor into the report. The City Council's main interest is in establishing the square footage needs, operating costs and the feasibility of providing library service with the projected revenue from the library district. The report is expected to be completed by the end of December, 2009 and presented to the City Council in January, 2010.

CHRISTMAS TREE SAFETY REMINDERS

Don't let a dry Christmas tree, or frayed or overloaded tree lights turn a happy holiday into a potential disaster. Dried tree needles combined with tree sap puts a virtual torch in your house, ready to ignite with the slightest source of ignition.

Remember to water-- a fresh-cut tree can drink up to 4 liters of water per day. Keep your tree away from fireplaces, heaters or other sources of heat, and far away from candles. Turn off tree lights at night. We have a great fire department, but they don't want to meet you under these circumstances! And remember to please recycle your tree after the holidays.

"To Emme Ek With Love"
Benefit Organized by Clackamas High Student



Emme & Family

Clackamas HS sophomore Jasmin Johnson is asking for a special gift for her 16th birthday. She'd love to see you at the "To Emma Ek With Love" Benefit on December 3rd at 6 PM at the Hawthorne Theater in SE Portland.

Emme, a 4th grader from Lake Oswego was diagnosed in September with *medullablastoma*- a rapidly growing, rare & highly malignant brain tumor. Since the diagnosis, Emme's had 8 procedures/surgeries along with chemo and radiation therapies. Emme, her single mom and brother are struggling through therapy with courage and determination, but unfortunately without insurance.

Jasmin Johnson

Benefit organizer Jasmin Johnson is a musician who has participated in other benefits, but notes that this one is very special to her. The December event has a $10 cover and an auction, and will feature 5 bands. For band line-up and theatre information go online to the theatre's website: www.hawthornetheater.com.

You can also contact Jasmin at angellady1@q.com.

PLANNING COMMISSION SEAT OPEN
Citizen Volunteers Encouraged to Apply

The City of Happy Valley is currently seeking a citizen volunteer to fill one available position on the City's Planning Commission. Planning Commission members are asked to review certain types of land use applications submitted to the City by private parties, and to make recommendations to the City Council on plans and text crafted by the city staff.

The Planning Commission meets once a month in the evenings at 7:00 pm, currently on the second Tuesday of the month at City Hall. Appointments to the Planning Commission are made by the City Council.

Planning Commission members are involved in a wide variety of land use decisions and recommendations (training programs are available at regular intervals throughout the year), including the review of subdivisions, PUD's, comprehensive plan map/zoning map amendments, variances, conditional use permits, etc.

If you are interested in land use planning , local decision-making and future development patterns within the current and future city limits, please contact Cheryl Whitehead, Planning Assistant at 503-783-3812 or e-mail to cherylw@ci.happy-valley.or.us to request an application. If you should have additional questions about the role or responsibilities of a Planning Commissioner, contact Interim Economic/Community Development Director Michael D. Walter at 503-783-3839, or e-mail to michaelw@ci.happy-valley.or.us.

Car Prowler Gets Jail Time

Thief Sentenced to 95 Months in Jail

Recovered Backpack

In February, 2008, a young Happy Valley girl learned a hard lesson. As her mother later stated in an interview, "We're trying to teach our kids that bad things happen to good people and you move forward."

As the young girl underwent treatment for cancer, she found strength and determination in her prized possessions: team-signed memorabilia from her soccer heroes, the Portland Timbers. The backpack was stolen from the family vehicle by a pair of car prowlers suspected of at least 10 car break-ins in the Happy Valley area.

Initial investigative work by HV Detective Gil Millett led to the recovery of the backpack and the arrest of Phillip Burton Merriman, who was sentenced to 13 months, but released in early 2009. The convicted thief's next mistake was to return to our area for more car prowl break-ins. Happy Valley Officer *(pictured)* Lon Steinhauer, Detective Millett and Sheriff's deputies Scott King and Tony Edwards quickly responded to theft reports and suspect vehicle information, and within hours successfully arrested Merriman with the assistance of Portland police.

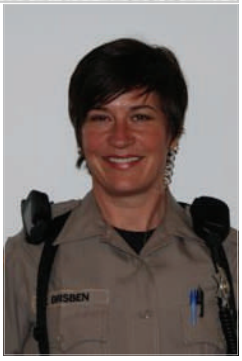
Deputy Steinhauer

Clackamas Deputy District Attorney Bryan Brock, who did an outstanding job on this case, is pleased to report that Merriman has been sentenced to 95 months for 3 counts of ID theft and one count of Theft 1.

We applaud the excellent teamwork of our officers, and publicly commend them for another job well done!

Safety Reminders

T'is the Season for Extra Precautions



Sgt. Erin Brisben

The men and women of the Happy Valley Police Department wish you and yours the happiest of holidays! Unfortunately, there are 'Grinch-y' opportunists who see this time of year as an easy way to make their lives prosper...and yours miserable. They prey upon the vehicle you've left in your driveway or the shopping center lot. They love it when you leave your doors unlocked for them as they easily steal your I-pods, GPS systems, expensive sunglasses, laptop computers and those present-filled shopping bags.

Thieves are not just night-time operators. They can follow delivery trucks through your neighborhood with a van or truck of their own, and steal deliveries off your front porch. They may impersonate utility workers or someone seemingly legitimate to see if they can burglarize your home.

Fortunately, these stories are relatively rare in Happy Valley. Please help us keep it that way. Lock your car and house doors at night. Don't leave valuables in your vehicles. Look after your neighbor's property, too. Call us if you see any suspicious activity; if a crime was committed ***please make a report!***

We spend a lot of time tracking every reported crime in our community, but can't track those that aren't reported. With specific and accurate crime reporting, we can best allocate our resources to keep you safe and secure, now and throughout the year.

The Mission of the Happy Valley Police Department, in partnership with the Clackamas County Sheriff's Office, is to be a progressive and innovative organization that promotes, delivers and preserves an assurance of security, safety and quality law enforcement services to all people of the City of Happy Valley.

Have you ever made a 9-1-1 Emergency call, or worried about placing such a call? There's good information available on the city's website on this subject, and also what happens when you place a 9-1-1 call from cell phones.

For this and other helpful information (Accident Reporting information, links to the DMV, Sheriff's Office & more) visit us at www.ci.happy-valley.or.us.

City of Happy Valley

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Happy Valley, OR 97086
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FAX: 503.658-5174
E-Mail: beckym@ci.happy-valley.or.us
Website: www.ci.happy-valley.or.us

A monthly publication provided to the Community

Preserving and enhancing the safety, livability and character of our community

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December, 2009

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Don't Miss the Tree Lighting Ceremony at City Hall
Sunday, December 6th from 4:00 to 6:00 PM

Tuesday, Dec. 1	City Council	7:00 pm	City Hall
Sunday, Dec. 6	Tree Lighting Ceremony	4 to 6 pm	City Hall
Tuesday, Dec. 8	Planning Commission	cancelled	City Hall
Wednesday, Dec. 9	Juvenile Diversion Panel	6:00 pm	City Hall
Thursday, Dec. 10	Traffic/Pub Safety Comm	7:00 pm	City Hall
Tuesday, Dec. 15	City Council	7:00 pm	City Hall
Wednesday, Dec. 23	HV BUSINESS ALLIANCE	7:30 am	at New Seasons
Thursday, Dec. 24	CHRISTMAS HOLIDAY - City Hall Closed		
Friday, Dec. 25	CHRISTMAS HOLIDAY - City Hall Closed		

For any Non-Emergency Police Assistance, Call 503.655.8211

Appendix B:
Action Item Worksheets

Multi-Hazard #1

Proposed Action Item:	**Alignment with Plan Goals:**
Develop public education programs to inform the public about methods of mitigating the impacts of natural hazards.	***Protect Life and Property, Promote Public Awareness, Encourage Partnerships and Implementation***

Rationale for Proposed Action Item:

- Conducting public outreach campaigns raises awareness about natural hazards and helps illustrate what residents and businesses can do to reduce the impact of a natural disaster on their properties, thereby significantly reducing the impact of natural hazards on the City of Happy Valley.
- The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public informed of, and involved in, the county's actions to mitigate hazards.

Ideas for Implementation:

- Conduct public education as hazard seasons approach. These include earthquake awareness month in April, wildfire prevention in summer, and flood and severe storm information in winter;
- Identify property owners in flood, landslide, and wildfire hazard zones, and conduct a target mailing to disseminate information on all hazards;
- Target neighborhood associations to sponsor CERT teams;
- Partner with Clackamas County and other jurisdictions to develop public education flyers for all hazards;
- Include insurance information in public outreach and education materials and promote purchase of appropriate insurance coverage;
- Include hazard information on the city website and link to the Clackamas Fire District #1 website; and
- Utilize the city newsletter, Happy Valley Today, to disseminate hazard information

Coordinating Organization:	Hazard Mitigation Team

Internal Partners:	**External Partners:**
Public Safety, Community Development, Public Works, Engineering, Planning, Building, and Finance Departments	Clackamas Fire District #1, Clackamas County Sheriff's Office, Oregon Partnership for Disaster Resilience

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
Ongoing		

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Multi Hazard #2

Proposed Action Item:	**Alignment with Plan Goals:**
Integrate the goals and action items from the Natural Hazards Mitigation Plan into existing regulatory documents and programs, where appropriate.	***Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Incorporating natural hazards plans into comprehensive plans, local ordinances, and land-use regulations will ensure that communities implement the proper mitigation measures for their community.

Ideas for Implementation:

- Use the mitigation plan to help the City's Comprehensive Land Use Plan meet State Land Use Planning Goal 7, designed to protect life and property from natural disasters and hazards through planning strategies that restrict development in areas of known hazards;
- Use zoning codes to regulate development in hazard-prone areas;
- Integrate the city's mitigation actions into the current emergency operations plan and capital improvement plans (where appropriate);
- Incorporate the Natural Hazards Mitigation Plan into deed restrictions and conditions of approval where appropriate;
- Use citizen input for the creation of appropriate ordinances; and
- Use the natural hazard mitigation planning resources provided by the Oregon Partnership for Disaster Resilience to learn how to better integrate the NHMP into existing documents and programs.

Coordinating Organization:	Planning Department

Internal Partners:	**External Partners:**
Engineering, Building, City Attorney	Oregon Partnership for Disaster Resilience

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Multi Hazard #3

Proposed Action Item:	**Alignment with Plan Goals:**
Identify and pursue funding opportunities to develop and implement hazard mitigation activities.	***Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- Implementation cannot occur without proper funding. The switch from planning to implementation is the step that begins the reduction of risk.
- The Pre-Disaster Mitigation Grant Program provides funds for hazard mitigation planning and project implementation prior to a disaster event. PDM grants are nationally competitive.
- The Hazard Mitigation Grant Program provides funds to implement long-term hazard mitigation measures and projects after a major disaster declaration. HMGP funds are available to communities within states that have recently received Presidential Disaster Declarations. HMGP funds are prioritized for communities that are directly affected by a disaster, but communities outside of the disaster declaration are typically eligible as well.
- Flood Mitigation Assistance helps communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program.

Ideas for Implementation:

- Meetings will be held semi-annually to discuss, update, and implement actions in the NHMP. Funding opportunities should also be discussed at the semi-annual meetings;
- Develop incentives for special service districts, citizens, and businesses to pursue hazard mitigation projects;
- Review mitigation projects during each city budget review cycle;
- Allocate city resources and assistance to mitigation projects when possible;
- Partner with other organizations and agencies to identify grant programs and foundations that may support mitigation activities; and
- Pursue funding opportunities for the five-year update (2012).

Coordinating Organization:	Building Department, Code Enforcement, Community Development Department, Engineering Department, Hazard Mitigation Team, Planning Department, Public Works Department

Internal Partners:	**External Partners:**
Finance Department	Clackamas County Emergency Management, Clackamas Fire District #1, Clackamas County Sheriff, Oregon Emergency Management, FEMA Region X

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New action in 2009

Multi Hazard #4

Proposed Action Item:	**Alignment with Plan Goals:**
Continue to update and improve hazard assessments in the Natural Hazards Mitigation Plan as new information becomes available.	***Promote Public Awareness, Augment Emergency Services***

Rationale for Proposed Action Item:

- At this time the city does not have in-house GIS capabilities.
- The city was unable to conduct a quantitative risk analysis for most hazards.
- Oregon updates the state risk assessment once every three years. Communities are informed of new risk information if it affects areas in their jurisdiction.
- New demographic data will become available after the 2010 census.

Ideas for Implementation:

- Continue to update vulnerability assessment as date becomes available and new development occurs;
- Cooperate with participating agencies or secure funding needed to obtain data to perform a risk analysis;
- Update hazards maps when the city has in-house GIS capabilities;
- Use new data to guide public outreach programs and update educational outreach pieces as new data becomes available; and
- Update codes and city policies when new data and information becomes available as required by state planning goal 7.

Coordinating Organization:	Hazard Mitigation Group

Internal Partners:	**External Partners:**
Planning, Engineering and Building Departments	Clackamas County Emergency Management, Clackamas County Water Environment Services, DOGAMI, FEMA

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Multi Hazard #5

Proposed Action Item:	**Alignment with Plan Goals:**
Encourage greenspace management throughout the city.	***Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation***

Rationale for Proposed Action Item:

- Landscaping and vegetation make a difference in mitigating the impacts of natural hazards. Trees break the force of the wind and stabilize the soil. Wetlands absorb much of the overflow from stream channels. Fire-resistant vegetation can retard the spread of wildfires toward vulnerable buildings. Limiting or regulating the amount of vegetation cleared off a hillside lot reduces the risk of increasing the number of landslide-prone areas in a community. Planting vegetation or maintaining slope terraces can also reduce slope-runoff. Planners can use landscaping requirements to preserve or enhance he protection such natural features afford. These requirements may be part of site plan reviews or a separate set of zoning regulations and environmental performance standards.

Ideas for Implementation:

- Encourage homeowners associations to take responsibility for removing invasive species and maintaining healthy bush and tree coverage;
- Identify appropriate practices for eliminating invasive species such as blackberry and English Ivy;
- Maintain healthy urban canopy and remove excess understory;
- Maintain vegetation coverage for slope stability;
- Identify hazardous trees for remediation or removal;
- Coordinate with the Clackamas River Watershed Council and others;
- Provide education to the public about justifications for, and benefits of vegetation mitigation practices; and
- Encourage fuels reduction on private property by providing education for pruning and remove trees and using native vegetation.

Coordinating Organization:	Public Works Department

Internal Partners:	**External Partners:**
Hazard Mitigation Team, Planning Department, Code Enforcement	Clackamas Fire District #1, Clackamas Soil and Water Conservation District, Fire Co-op, Oregon Department of Forestry, US Forestry Service, Clackamas County

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Flood #1

Proposed Action Item:	**Alignment with Plan Goals:**
Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances.	***Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- The National Flood Insurance Program provides communities with federally backed flood insurance to homeowners, renters, and business owners, provided that communities develop and enforce adequate floodplain management ordinances. The benefits of adopting NFIP standards for communities are a reduced level of flood damage in the community and stronger buildings that can withstand floods. According to the NFIP, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.
- The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continued participation in the NFIP will help reduce the level of flood damage to new and existing buildings in communities while providing homeowners, renters and business owners additional flood insurance protection.

Ideas for Implementation:

- Community Assistance Visits (CAV) are scheduled visits to communities participating in the NFIP for the purpose of: 1) conducting a comprehensive assessment of the community's floodplain management program; 2) assisting the community and its staff in understanding the NFIP and its requirements; and 3) assisting the community in implementing effective flood loss reduction measures when program deficiencies or violations are discovered. Actively participate with DLCD and FEMA during Community Assistance Visits;
- Conduct an assessment of the floodplain ordinances to ensure they reflect current flood hazards and situations, and meet NFIP requirements;
- Coordinate with the county to ensure that floodplain ordinances and NFIP regulations are maintained and enforced; and
- Mitigate areas that are prone to flooding and/or have the potential to flood. This area includes Happy Valley Heights.

Coordinating Organization:	Risk Management and Human Resources

Internal Partners:	**External Partners:**
Hazard Mitigation Team, Engineering	FEMA, DLCD, Clackamas County Planning Department

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
Ongoing		

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Flood #2

Proposed Action Item:	**Alignment with Plan Goals:**
Increase capacity of culverts throughout the city.	***Protect Life and Property, Enhance Natural Systems, Augment Emergency Services***

Rationale for Proposed Action Item:

- The rapid growth of Happy Valley over the past decade has resulted in an undersized culvert system. Much of the flooding experienced is a result of water overflowing culverts at the top of hills and rushing into property lower on the hill.

Ideas for Implementation:

- Identify undersized culverts, primarily in the Happy Valley Heights neighborhood;
- Prioritize construction projects based on criticality of need;
- Include culvert enhancement in the Capital Improvements Plan;
- Contact neighborhood associations to coordinate efforts on privately owned systems; and
- Coordinate with the Oregon Department of Transportation for access to culverts along roadways.

Coordinating Organization:	Public Works Department

Internal Partners:	**External Partners:**
Engineering and Planning Departments	ODOT, Neighborhood Associations, Clackamas County Water Environment Services

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Flood #3

Proposed Action Item:	**Alignment with Plan Goals:**
Develop a stormwater management plan.	***Protect Life and Property, Enhance Natural Systems***

Rationale for Proposed Action Item:

- Happy Valley does not currently have a comprehensive Stormwater Management Plan.
- Stormwater management is a key element in maintaining and enhancing a community's livability. There is a direct link between stormwater and a community's surface and ground waters. As a community develops, the impervious surfaces that are created increase the amount of runoff during rainfall events, disrupting the natural hydrologic cycle. Without control, these conditions erode stream channels and prevent groundwater recharge. Parking lots, roadways, and rooftops increase the pollution levels and temperature of stormwater runoff that is transported to streams, rivers, and groundwater resources. Protecting these waters is vital for a great number of uses, including fish and wildlife habitat, recreation, and drinking water.

Ideas for Implementation:

- Identify appropriate staff members to work on developing a stormwater management plan;
- Research consulting firms that specialize in stormwater management plans;
- Identify funding to create the plan; and
- Identify mitigation action items that reduce the city's vulnerability to flood and landslide related hazards.

Coordinating Organization:	Public Works and Engineering Departments

Internal Partners:	**External Partners:**
Planning Department	Clackamas County Water Environment Services

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Wildfire #1

Proposed Action Item:	**Alignment with Plan Goals:**
Promote fire-resistant strategies for new and existing developments.	***Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on existing and new buildings and infrastructure [201.6(c)(3)(ii)]. Developing and implementing programs to improve fire-resiliency will reduce the potential for wildfires to cause damage and can assist a community in mitigating its overall risk to wildfire events.

Ideas for Implementation:

- Require fuel breaks in site plans, describe the procedures for ongoing maintenance, and place information on the city website for public view;
- Review roofing standards and develop recommendations for promoting non-combustible roofing;
- Encourage installation of double pane windows;
- Promote use of sprinkler systems in residential construction;
- Maintain awareness of potential city growth into the wildland-urban interface; and
- Encourage defensible space creation and use of fire resistant landscaping.

Coordinating Organization:	Engineering and Planning Departments

Internal Partners:	**External Partners:**
Building Department	Clackamas Fire District #1 Fire Prevention Office

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
Ongoing		

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Wildfire #2

Proposed Action Item:	**Alignment with Plan Goals:**
Conduct community based fuel reduction demonstration projects in the wildland-urban interface.	***Protect Life and Property, Promote Public Awareness, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Developing and implementing programs to mitigate life-loss will reduce the potential for wildfires to harm citizens and can assist a community in mitigating its overall risk to wildfire events.
- The forest lands in and around Happy Valley have accumulated an unnatural buildup of fuel as a result of decades of timber harvest and aggressive fire suppression. Additionally, residential development near the wildland urban interface has increased exposure to wildfire hazards.

Ideas for Implementation:

- Partner with Clackamas Fire District #1; and
- Focus on the developments surrounding Scouters Mountain.

Coordinating Organization:	Clackamas Fire District #1

Internal Partners:		**External Partners:**
Community Services, Parks and Recreation		Clackamas County Fire Prevention Co-op
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
Ongoing		

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Severe Storm #1

Proposed Action Item:	**Alignment with Plan Goals:**
Reduce negative effects from severe windstorm and severe winter storm events.	***Protect Life and Property, Promote Public Awareness, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- The Disaster Mitigation Act of 2000 requires communities to identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure[201.6(c)(3)(ii)]. Developing and implementing programs to reduce the potential for wind and winter storms to cause power outages can assist a community in mitigating its overall risk to wind and winter storms.

Ideas for Implementation:

- Reduce power outages by partnering with PGE to obtain funding to bury power lines subject to frequent failures;
- Encourage burial of power lines for existing development;
- Ensure that there are back up underground lines to major businesses & employers;
- Develop partnerships to implement programs to keep trees from threatening lives, property, and public infrastructure;
- Continue regular tree trimming practices;
- Partner with PGE to continue hazardous tree inventory and mitigation programs;
- Create sheltering programs; and
- Promote safe installation and use of generators.

Coordinating Organization:	Public Works Department

Internal Partners:	**External Partners:**
Engineering, Building, and Community Services Departments	PGE

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
Ongoing		

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Earthquake #1

Proposed Action Item:	**Alignment with Plan Goals:**
Conduct seismic evaluations on the Community Policing Center, Public Works Complex, and identified shelters for implementing appropriate structural and non-structural mitigation strategies.	***Protect Life and Property, Encourage Partnerships and Implementation, Augment Emergency Services***

Rationale for Proposed Action Item:

- The Community Policing Center and Public Works Complex are not up to seismic standards.
- The structural integrity of shelter facilities is not known.
- Pre-disaster mitigation strategies will reduce post-disaster response needs by lessening life loss, injury, damage, and disruption.
- Refer to risk assessment, and DOGAMI's rapid visual assessment scores

Ideas for Implementation:

- Obtain funding to perform seismic evaluations;
- Conduct seismic evaluations on identified community assets (including shelters) for implementing appropriate structural and non-structural mitigation strategies;
- Prioritize seismic upgrades based on criticality of need and population served; and
- Seismically retrofit critical government facilities to guarantee continuous operation during and after a natural disaster.

Coordinating Organization:	Building and Engineering Departments

Internal Partners:	**External Partners:**
Public Works Department	Shelters, Happy Valley Police, DOGAMI

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Hazard Mitigation Team
Status	New Action, 2009.

Appendix C
Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan,* (Oregon State Police – Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigatio*n. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to provide the details of economic analysis methods that can be used to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the

community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are Some Economic Analysis Approaches for Evaluating Mitigation Strategies?

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the there methods is outlined below:

Benefit/cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in public sector mitigation activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still

affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in private sector mitigation activities

Private sector mitigation projects may occur on the basis of one of two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchasers. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Conducting detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practicable. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of these methods is the STAPLE/E Approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a systematic fashion. This set of criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E Approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process".

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or county planning commission, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?

- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
- How will this action affect the fiscal capability of the community?
- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

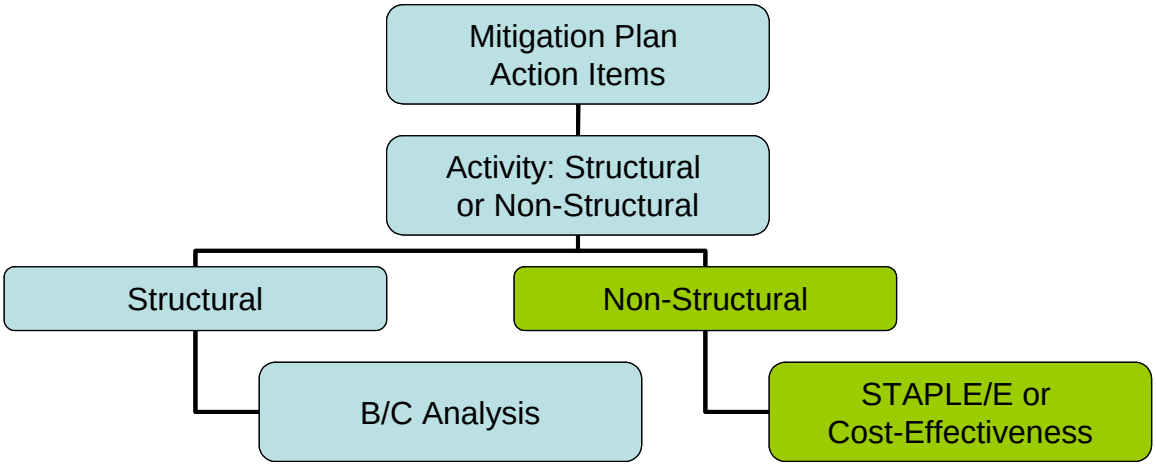
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed Benefit/Cost Analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure A.1: Economic Analysis Flowchart



Source: Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon, 2005

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation project can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- ***Determine the project cost.*** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ***Estimate the benefits.*** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult

to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.

- ***Consider costs and benefits to society and the environment.*** These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ***Determine the correct discount rate.*** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the best activities given varying costs and benefits include net present value and internal rate of return.

- ***Net present value***. Net present value is the value of the expected future returns of an investment minus the value of expected future cost expressed in today's dollars. If the net present value is greater than the project costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ***Internal Rate of Return***. Using the *internal rate of return* method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to

understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. Many communities are looking towards developing multi-objective projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

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