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Situation and Planning Assumptions

2.1 Situation

The County is exposed to many hazards, all of which have the potential for disrupting the community, causing damage and creating casualties. Possible natural hazards include droughts, floods, earthquakes, wildfires and winter storms. There is also the threat of a war-related incident such as a nuclear, biochemical or conventional attack. Other disaster situations could develop from hazardous material accidents, health-related incidents, conflagrations, major transportation accidents or acts of terrorism.

Figure 2-1 Map of Clackamas County



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2.1.1 Community Profile

Clackamas County is one of the most rapidly growing counties in the state with an estimated population of 386,143. It is the third most populous county in Oregon, trailing only Multnomah and Washington counties, both of which border the County.

The County encompasses an area of 1,868 square miles, with one-eighth of the land area incorporated and the remainder unincorporated or publicly owned. Elevations range from a low of 55 feet on the shores of the Willamette River in Oregon City to a high of 11,235 feet at the peak of Mt. Hood. Major rivers include the Willamette, Clackamas and Sandy.

Approximately one half of the County's population lives in unincorporated areas, with the other half residing in the sixteen incorporated communities of Barlow, Canby, Damascus, Estacada, Gladstone, Happy Valley, Johnson City, Lake Oswego, Milwaukie, Molalla, Oregon City, Rivergrove, Sandy, Tualatin, West Linn, and Wilsonville (See Appendix C - Maps).

Clackamas County has an extensive transportation network linking the County to the Portland metropolitan area and the greater Pacific Northwest. The County's 1,436-mile road system includes 276 urban road miles, 1160 rural road miles, and 158 bridges. The county is bisected north to south by Interstate 205, while U. S. Highway 26 is the major east-west route. Interstate 5 passes through the western edge of the County, and a railroad line travels north and south, carrying both passengers and freight. Urban Clackamas County is served by a regional transit system (Tri-Met) and various city contracted bus systems.

Clackamas County is governed by the BCC, comprised of five commissioners elected to four year terms. The County Administrator is the chief administrative officer of the County and reports directly to the BCC. Ten departments are headed by appointed officials administratively aligned under the Administrator, with five other departments headed by elected officials (Sheriff, Assessor, Treasurer, Clerk and District Attorney). Most County government offices are located in the Red Soils complex on Beaver Creek Road in the county seat of Oregon City.

The Clackamas County Sheriff's Office is the lead law enforcement agency in the County and provides contract services for the cities of Damascus, Happy Valley, Estacada and Wilsonville. The following cities have their own municipal police departments: Canby, Gladstone, Lake Oswego, Milwaukie, Molalla, Oregon City, Sandy and West Linn.

The Clackamas County Fire Defense Board is comprised of twelve fire districts and two fire departments that serve the County, providing firefighting, emergency medical services (EMS), search and rescue and fire prevention services. The fire districts are: Boring, Canby, Clackamas Fire District #1, Colton, Estacada, Hoodland, Molalla, Monitor, Sandy, Silverton, and Tualatin Valley Fire &

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Rescue; with the cities of Gladstone and Lake Oswego served by city fire departments.

Ambulance transport services for most of the County are provided by American Medical Response (AMR) by contract with the County. Canby Fire District and Molalla Fire District provide ambulance services in the two remaining Ambulance Service Areas (ASA).

Clackamas County Communications (CCOM) serves as the primary Public Safety Answering Point (9-1-1 Center) for the County, and works closely with Lake Oswego Communications (LOCOM) and Washington County Consolidated Communications Agency (WCCCA) to dispatch responders to incidents in Clackamas County.

2.1.2 Hazards and Threats

The following information was taken from the Clackamas County Hazard Analysis.

The County's vulnerability to hazards varies according to hazard type, location, season, weather and other factors. Among the emergencies that may occur:

- Weather events including floods, windstorms, extreme heat, drought, snow, ice, avalanche or tornado.
- Geologic events including earthquake, landslide, volcanic eruption or subsidence.
- Infectious disease outbreaks.
- Fire and explosions including industrial, structural, forest or range incidents.
- Transportation events involving aircraft, rail systems, watercraft, motor vehicles or pipelines.
- Hazardous materials incidents at fixed sites or during transport.
- Terrorism or civil disturbance.
- Utility or infrastructure emergencies involving failure or disruption of electrical, telephone, computer, water, fuel, sewer or sanitation systems.

2.1.2.1 Earthquake

This hazard is created by movement along faults within the Earth's crust. This movement generates regional and localized ground shaking and/or soil liquefaction. After the initial seismic event, tremors or aftershocks can occur for an extended period of time resulting in continuing structural damage. There are

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several known fault lines throughout the County with further geologic analyses ongoing. An earthquake measuring 5.6 occurred in March 1993 and caused damage throughout the County, especially in the Molalla area. Recent evaluation of the earthquake potential in the Pacific Northwest indicates that the earthquake threat has been underestimated, and that our area could experience an earthquake in the offshore Cascadia Subduction Zone measuring in excess of 9.0. An earthquake of this magnitude would cause heavy loss of life and devastation of public and private property and infrastructure.

2.1.2.2 Health Emergency

The potential for pandemic influenza and the possibility of bioterrorism, together generate the threat of a major health emergency in the County. Major threats include flu outbreaks and food/waterborne illness. Detection, surveillance and epidemiology are crucial elements in responding to potential health hazards.

2.1.2.3 Winter Storms

This hazard generally involves severe snow and ice storms that can result in power outages and disrupt transportation. The characteristics of this hazard are determined by a variety of meteorological factors such as the amount of snow or rainfall, air temperature, wind velocity, ground saturation or snow pack conditions. Extended power failures caused by winter storms can create serious difficulty for critical care facilities and people on life support systems. Loss of power could cause failure of water, heating, and sewer systems, posing life safety and health problems should extended outages occur.

Some areas of the County are subject to risk from avalanche; however these areas are primarily in the high country surrounding Mt. Hood and pose minimal risk to population.

NOTE: This hazard does not include flooding.

2.1.2.4 Hazardous Materials (Transportation and Fixed Facilities)

The ever-increasing use of hazardous materials poses a serious threat to life, property and the environment. These products, used in agricultural, industrial and other modern technologies, are becoming increasingly complex with many new products developed and introduced annually. Incidents involving the release of hazardous materials may occur during handling at industrial facilities or during the transportation of such materials by rail or highway. Southern Pacific Railroad's mainline carries thousands of rail cars of hazardous materials through the County each year. Interstate 205 is the designated alternate route to Interstate 5 for through-shipments of hazardous materials. Hazardous materials incidents could include the release of radiological materials in accidents at fixed sites, during transportation or from an accidental weapon detonation.

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2.1.2.5 Residential and Commercial Structure Fires

The County's urban area faces structural fire hazards associated with a mix of residential, business and industrial areas. There are several high-rise buildings in the County that could lead to large numbers of people threatened if trapped. This danger is present in shopping centers, multifamily dwelling units and other structures where people congregate. Increased residential density adds to the risk from fire with increased multi-family construction, narrower streets with single access routes, and more construction on flag lots.

2.1.2.6 Flooding (Rivers and Tributaries)

This hazard generally involves a rise in rivers or creeks caused by heavy rain and/or rapid melting of the annual snow pack, as occurred in 1996. The County has a number of rivers and many streams that could be subject to flooding, potentially threatening life and property.

2.1.2.7 Windstorm (including Tornado)

Other hazards related to weather may include windstorms or tornadoes. Windstorms, such as the one that occurred in December 1995, may occur suddenly and can create damage to homes and property and disrupt vital utilities. Tornadoes touch down in Clackamas County periodically and although we have had no major damage from a tornado, a tornado caused significant damage in nearby Aumsville (Marion County) in December 2010, highlighting the possibility of this hazard regionally. The National Weather Service monitors weather trends and issues special watches and warning when conditions warrant.

2.1.2.8 Wildfire

Over half of the County's land mass is forested and wildfires are a natural part of the forest ecosystem. In fact, wildfires have shaped the forests and rangelands valued by County residents and visitors. However, decades of timber harvest and aggressive fire suppression have significantly altered forest composition and structure. The result is an increase in the wildfire hazard as forest vegetation has accumulated to create an increasingly closed, tighter forest environment that tends to burn more intensely than in the past. The exposure to wildfire hazards is increasing as recent population growth has spurred more residential development close to the forests in what is referred to as the wildland urban interface (WUI). As development encroaches upon forests with altered fire regimes that are more conducive to larger, more intense fires, the risk to life, property and natural resources continues to escalate.

2.1.2.9 Landslide/Debris Flow

This hazard may include the down slope movement of rock, soil, or other debris or the opening of sinkholes. These hazards are often associated with other incidents such as severe weather, floods, earthquake, or volcanic eruptions. Because of the moderate to high relief characteristics of the County's riverbeds, along with hilly and mountainous terrain in rural areas, the chance of landslides

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occurring is high, but not deemed to present a serious threat to large numbers of people.

2.1.2.10 Transportation Accident

This hazard includes major incidents involving motor vehicles, trains, aircraft or vessels. An additional hazard is created by a major natural gas pipeline crossing the County. Hazards increase significantly if incidents include a fire or explosion, a release of hazardous materials, or large numbers of casualties. Railroad tracks carrying both freight and passenger trains travel through the County. Flight paths for Portland International Airport cross parts of the County. Motor vehicle risks may include multi-passenger vehicles such as the many buses that carry skiers over dangerous roads on Mt. Hood. The Willamette River is navigable but poses minimal risk due to limited commercial traffic.

2.1.2.11 Volcano

Mt. Hood, located on Clackamas County's eastern border, is a volcano. The last known eruptions of Mt. Hood occurred in the middle of the 19th century. Such recent eruptions, as well as the thermal activity that continues to be present, suggest that molten rock is still within or beneath Mt. Hood. Risks associated with a volcanic eruption include lava and mud flows, river flooding, destruction of property and woodlands, risk to the Bull Run watershed and volcanic ash fall. Most likely events include a dome collapse and pyroclastic flows. The County is also vulnerable to ash fall during eruptions at nearby Mt. Saint Helens in southwest Washington.

2.1.2.12 Terrorism

This hazard may include bomb threats, arson or other violent acts done to intimidate a population or government. This hazard is most often associated with insurrection, revolution or making a political statement and may include threats to cause mass death or damage to critical infrastructure. Separatist groups such as cults, survivalists, and militias have used terrorism in the past to gain attention to their cause. A terrorist incident may involve the use of weapons of mass destruction (WMD) including chemical, biological, radiological, nuclear or explosive (CBRNE) materials.

2.1.2.13 Extreme Heat

The County is subject to heat extremes when temperatures climb to 100 degrees or more. Many residences lack air conditioning or cooling systems, creating an environment especially hazardous to the elderly and others with certain medical conditions.

2.1.2.14 Dam Failure

There are a number of dams constructed on rivers and streams throughout the County. A failure of dams along the Clackamas and Bull Run Rivers could severely impact downstream populations. If such a breach were to occur without warning (e.g. following an earthquake) the potential loss of life and property

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could be significant. The probability of a catastrophic incident is low, as major dams within the County are federally regulated and inspected.

2.1.2.15 Drought

This hazard involves a period of prolonged dryness resulting from a lack of precipitation or diversion of available water supplies. The County has suffered periods of drought in the past; however impact has been to agriculture, fish and wildlife, and an increased fire risk. A severe drought could require strict conservation measures to assure that an adequate supply of potable water is maintained.

2.1.2.16 Civil Disorder

This hazard may include protests, strikes, demonstrations or riots usually indicating protest over government action or a refusal to obey government orders. Civil disorder can begin non-violently with the revolt of a few, but can quickly escalate to a violent collective action as a means of forcing concessions from the government.

2.1.3 Hazard Analysis

In the Clackamas County Hazard Analysis, each of the hazards and threats described above is scored using a formula that incorporates four independently weighted rating criteria (history, vulnerability, maximum threat, probability) and three levels of severity (low, moderate and high). For each hazard the score for a given rating criterion is determined by multiplying the criterion's severity rating by its weight factor. The four rating criteria scores for the hazard are then summed to provide a total risk score for that hazard. Note that while many hazards may occur together or as a consequence of others (e.g., dam failures cause flooding and earthquakes may cause landslides), this analysis considers each discrete hazard as a singular event.

Hazard	Rating Criteria with Weight Factors				Total Score
	History ¹ (WF=2)	Vulnerability ² (WF=5)	Max Threat ³ (WF=10)	Probability ⁴ (WF=7)	
<i>Score for each rating criteria = Rating Factor (High = 10 points; Moderate = 5 points; Low = 1 point) X Weight Factor (WF)</i>					
Earthquake	4	45	90	49	188
Public Health Emergency	8	45	80	35	168
Winter Storm	10	30	70	49	159
HAZMAT Incident	10	30	60	42	142
Flood	16	20	30	56	122
Wind Storm	14	15	50	42	121
Wildfire	12	25	40	42	119

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Table 2-1 Clackamas County Hazard Analysis Matrix					
Hazard	Rating Criteria with Weight Factors				Total Score
	History¹ (WF=2)	Vulnerability² (WF=5)	Max Threat³ (WF=10)	Probability⁴ (WF=7)	
<i>Score for each rating criteria = Rating Factor (High = 10 points; Moderate = 5 points; Low = 1 point) X Weight Factor (WF)</i>					
Landslide & Debris Flow	14	15	20	63	112
Transportation Accident	4	30	40	28	102
Volcano	2	35	50	14	101
Terrorism	2	30	40	21	93
Extreme Heat	2	20	40	14	76
Dam Failure	2	15	40	7	64
Drought	2	10	20	28	60
Civil Disorder	6	15	20	14	55
Notes:					
1. History addresses the record of previous major emergencies or disasters. Weight Factor is 2. Rating factors: high = 4 or more events in last 100 years; moderate = 3 events in last 100 years; low = 1 or 0 events in last 100 years.					
2. Vulnerability addresses the percentage of population or property likely to be affected by a major emergency or disaster. Weight Factor is 5. Rating factors: high = more than 10% affected; moderate = 1%-10% affected; low = less than 1% affected.					
3. Maximum Threat addresses the percentage of population or property that could be affected in a worst case incident. Weight Factor is 10. Rating factors: high = more than 25% could be affected; moderate = 5%-25% could be affected; low = less than 5% could be affected.					
4. Probability addresses the likelihood of a future major emergency or disaster within a specified period of time. Weight Factor is 7. Rating factors: high = one incident within a 10-year period; moderate = one incident within a 50-year period; low = one incident within a 100-year period.					

2.2 Planning Assumptions

It is necessary in the course of emergency planning to make certain baseline assumptions regarding the nature of the risk to which the County is subject as well as the County’s capabilities and approach to responding to those risks. When an incident occurs, circumstances may necessitate revising such assumptions. The following are the assumptions upon which this EOP is predicated:

- The County will be directly affected by a major disaster in the foreseeable future.
- While most hazards are recognized and foreseeable to varying degrees, a disaster or other major emergency may occur without advance notice. This requires a high state of readiness on the part of emergency response assets.
- Incidents are typically managed at the lowest possible jurisdictional level.
- County government will have sufficient staff, facilities and disaster resources to implement this plan.

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- The continuation and restoration of critical public services and infrastructure will be priorities when the life safety needs have been met.
- Outside assistance will be available in most, but not all, emergencies affecting the County. Outside assistance from the State or Federal governments is likely to take 72-96 hours to arrive. Local jurisdictions and their citizens need to be prepared to be self-sufficient in the interim.
- The County will have adequate communications resources and interoperability to provide a minimum level of communications necessary to respond to the disaster.
- Employees may be assigned emergency duties that are different from those typically performed under non-emergency conditions. Agencies that do not normally respond to emergencies may be assigned roles and responsibilities that differ from their routine duties.
- Should a regional event take place, a regional EOC or other regional entity may be established to coordinate public information, critical resource allocation and policy making.
- Recovery activities will be ongoing for an extended period of time following a disaster or major incident.
- An After-Action Review (AAR) will be conducted following each major incident or disaster and after exercises. AARs focus on identifying where policy, procedures or training can be improved so the County can respond more effectively to the next incident.

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