6. SAFETY ELEMENT

A. Introduction

California Government Code Section 65302(g) specifies that general plans include a safety element for the protection of the community from unreasonable risks associated with the effects of various hazards. The list of possible hazards includes: seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence, liquefaction and other seismic hazards; flooding; and wildland and urban fires. A safety element may also address evacuation routes, military installations, peak load water supply requirements, and minimum road widths and clearances around structures as those items relate to fire and geologic hazards.

The fire safety provisions in the safety element should comply with the minimum statewide fire safety standards pertaining to road standards, signing standards for roads and buildings, private water supply reserves, and fuel breaks and greenbelts.

In addition to the Safety Element, the City of Mt. Shasta also maintains a Local Hazard Mitigation Plan in coordination with Siskiyou County. The Local Hazard Mitigation Plan (LHMP) for the City of Mt. Shasta Planning Area was developed in accordance with the Disaster Mitigation Act of 2000 (DMA 2000) and followed FEMA's 2011 Local Hazard Mitigation Plan guidance. The LHMP incorporates a process where hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions, which include both short and long-term strategies, involve planning, policy changes, programs, projects, and other activities. The City of Mt. Shasta LHMP can be found on the City of Mt. Shasta Planning Website at http://mtshastaca.gov/planning/

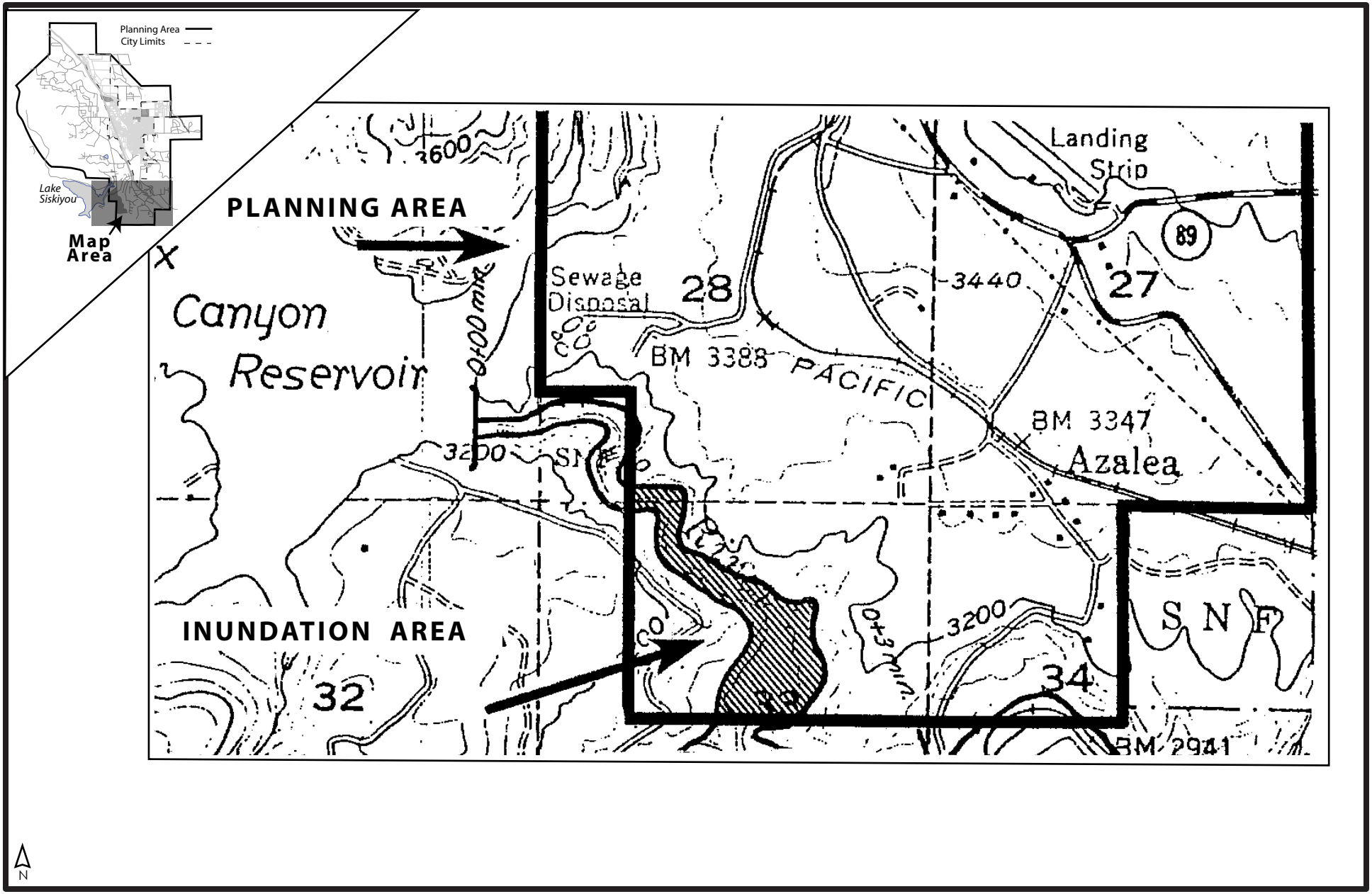
B. Flood Hazards

1. Background

Flood hazard in the planning area is very localized. The hazards are generally limited to riparian areas along streams, the shores of Lake Siskiyou and along the Sacramento River below Box Canyon Dam. The flooding of streams is caused by seasonal flow fluctuations and peak storm events. Flooding that occurs in the planning area generally only affects the immediate vicinity of particular streams.

The Federal Emergency Management Agency has not mapped floodplains in the planning area, with the exception of the shore of Lake Siskiyou and a narrow fringe area along the Sacramento River. **Figure 6-1, Flood Hazards**, shows the areas subject to inundation.

The Box Canyon area below Lake Siskiyou is subject to flood hazards from high precipitation and from potential dam failure. An inundation study prepared for the County indicates that portions of the canyon area below the dam would be inundated in the event of a dam failure. The study was prepared in 1973 by Olson and Associates Engineering and concluded that, in the planning area, inundated areas would be confined in the inner canyon area.



Source: City of Mount Shasta

FIGURE 6-1
FLOOD HAZARD AREAS

PMC

2. General Plan Objectives and Programs: Flood Hazards

Goal SF-1: Protect people and property from flooding.

Policy SF-1.1: Identify areas subject to inundation

Implementation Measures:

SF-1.1(a): Require that the limits of flooding resulting from a one hundred-year storm event be shown on all permit site plans where lands may be subject to inundation.

SF-1.1(b): When subdivisions or discretionary permits are sought for lands adjoining streams that have had a history of overtopping the banks, require that an assessment be prepared by a qualified engineer or hydrologist to delineate areas likely to be subject to inundation from a one hundred-year storm event.

Policy SF-1.2: Develop a program to identify areas subject to flooding.

Implementation Measures:

SF-1.2(a): As studies related to flooding are prepared and submitted for projects, the Department of Public Works shall maintain a file of such reports and maps for public use.

SF-1.2(b): Each year, upon the annual review and update of the General Plan, any boundaries of flood studies prepared during the previous years shall be identified on a City Flood Sensitive Area map.

C. Geologic Hazards

1. Background

Potential geologic hazards in the area include seismicity (with related impacts such as liquefaction), slope instability and subsidence, and volcanism.

Seismicity

The severity of the impact of an earthquake on a community depends on the intensity and duration of ground shaking and on the occurrence of other seismically-induced phenomena. Factors related to severity include the magnitude of the seismic event, the distance between the community and the event fault, and on local geologic and soil conditions. Potential hazards

induced by seismic activity include ground shaking, fault rupture, slope failures and liquefaction.

A fault rupture is an actual crack or breaking of the ground along a fault during an earthquake. Available literature indicates the planning area is subject to low levels of seismicity and low risk of fault surface rupture. The planning area is located in a "moderate" seismicity zone with a possible maximum earthquake intensity of VI or VII on the Modified Mercalli Scale. Earthquakes of this magnitude would be noticeable by the public and could cause minor to moderate structural damage. The planning area has been subject to minor earthquakes.

Historically, there have been only two recorded earthquakes with a Richter magnitude of 4.0 or greater occurring in the immediate Mt. Shasta area. The 1994 *Fault Activity Map*, prepared by the California Division of Mines and Geology, indicates no active or potentially active faults within the Mt. Shasta Planning Area. Two faults classified as "potentially active" by the California Division of Mines and Geology exist near the planning area. One is a north-south trending fault running through the top of Mount Shasta, the other is an east-west trending fault that runs from the top of Mount Shasta to a point north of Black Butte. Because of the active volcanic status of Mount Shasta, these faults are considered potentially active by the California Geological Survey.

Some soils in the planning area may be subject to liquefaction as a result of seismic activity. Liquefaction occurs when earthquakes shake loose, wet, sandy soil. When this occurs, the soils can become almost like quicksand and lose their ability to support structures. Building foundations can sink, break apart or tilt. Gravity-fed pipelines can back up. In the planning area, soils underlain with glacial outwash deposits consisting of sands may be subject to liquefaction.

Pursuant to the Uniform Building Code, the project area is in Seismic Zone 3. Within the provisions of the Uniform Building Code, there are numerous differences between the low seismic risk zones of 0 and 1, the moderate risk zones of 2A and 2B, and the higher risk zones of 3 and 4. These differences include, among others, design force levels, structural connection details, and allowable materials (e.g., whether or not unreinforced masonry is allowed in new construction).

Slope Instability and Subsidence

The terrain of the planning area has primarily low to moderate slopes. During preparation of the Siskiyou County General Plan (1980), reconnaissance mapping was undertaken to identify potential geologic hazards. This mapping revealed no geologic hazards east of Interstate 5 given that slopes are relatively gentle. Mapping of slope instability of areas west of Interstate 5, including lands in the Shasta Trinity National Forest, identified landslide features along Rainbow Ridge and the Box Canyon Gorge. Steep hillsides such as Quail Hill and south

of Old McCloud Road, although unmapped as to geologic hazards, may be subject to slope instability due to similar geology as Rainbow Ridge.

There are no known significant subsidence hazards in the planning area. Geologic or hydrologic conditions associated with subsidence are not known to occur in the area. However, some localized subsidence could result from peat oxidation in wetlands.

Volcanic Hazards

The City of Mt. Shasta lies on the southwestern flank of the Mount Shasta volcano, a large, historically active eruptive center in the southern Cascade Mountains. The Mount Shasta volcano has a long but irregular record of eruption. It has erupted at least once every 600-800 years for the past 10,000 years with its most recent eruption having occurred over two hundred years ago in 1786 (Christianson, 1982). The potential volcanic hazards in the vicinity of Mt. Shasta have been detailed in geologic literature. The most pertinent studies were completed since the 1980 eruption of Mount St. Helens in Washington State (Crandell, 1987).

Fumarolic and hot spring activity persist at the summit area of Mount Shasta, which suggests that there is still a body of molten rock below the surface. The eruptive record suggests that the Mount Shasta volcano will probably erupt again in the future, but at a time and with a magnitude that are not possible to predict.

The figure and discussion below outline the types of volcanic-related hazards that could affect the City of Mt. Shasta and its planning area. Various kinds of volcanic activity can endanger life and property both close to and far away from a volcano. Some hazards are more severe than others, depending on the extent of the event, whether people or property are in the way, and the amount of time in which the community is warned of an impending event.

Although most volcanic hazards are triggered directly by an eruption, some hazards may occur when a volcano is quiet. Volcanic-related mudflows (often addressed as a "lahar"; a term from Indonesia) are a mixture of water and rock fragments that sometimes flow down the slopes of volcanoes and into down-slope valleys and rivers. Eruptions may directly trigger mudflows by quickly melting snow and ice on the volcano. Mudflows can also be triggered by intense rainfall without being related to an eruption. Mudflows vary in size and speed. **Figure 6-2, Potential Mud Flow Channels**, indicates low-lying areas in the planning area that could potentially experience flows as the result of a volcanically triggered mudflow event. The potential mud flow areas indicated on this figure are not precisely defined and have only been presented as advisory information.

Pyroclastic flows are mixtures of hot gases and dry rock fragments that are blasted away from a vent at high speeds. Most pyroclastic flows consist of a

basal flow of gases and coarse fragments that move along the ground, and a turbulent cloud of extremely hot gases and ash that rises above the basal flow. Ash may fall from this cloud over a wide area downwind from the pyroclastic flow.

Landslides may also be triggered on or near a volcano by an eruption or by seismic events related to volcanic forces beneath the surface.

In the case of the Mount Shasta volcano, eruptions during the last 10,000 years produced lava flows around the flanks of the mountain. Pyroclastic flows from summit and flank vents extended as far as 20 kilometers from the summit. Most of these eruptions also produced large mudflows, many of which reached more than several tens of kilometers from the mountain. If a future eruption resembled those of the past, the City of Mt. Shasta and the vicinity, as well as the communities of Weed, McCloud and Dunsmuir, would be endangered. USGS Bulletin 1503 speculated that such eruptions could generate lava and pyroclastic flows that could affect low areas almost anywhere within about 20 kilometers of the summit and mudflows may cover valley floors and other low areas for several tens of kilometers from the volcano [Miller, 1980].

Such a major event could be expected to have significant impacts within the planning area. The City of Mt. Shasta lies in the lower portion of an old, broad pyroclastic and debris fan on the southwest side of the volcano. Cold Creek, Big Springs Creek, and Wagon Creek run along the base of the fan and are likely channels into which any far-traveled flow would empty. The lower portions of the drainages of Cascade Gulch and Avalanche Gulch are likely pathways for flows to travel toward the City.

Development located in these hazard areas may be at risk if a future eruption occurs on the south or west slopes of Mount Shasta. While it is possible to avoid substantial impacts by precluding development in recognized volcanic hazard areas (which amounts to approximately 60 percent of the private land in the planning area), the City has considered a number of factors in adopting its related attitude that the City will not preclude development in lands that may be subject to volcanic hazards. The predicted eruption interval of six to eight hundred years suggests an estimate that Mount Shasta may not erupt until the year 2376, if at all. If the City were to preclude development in potential hazard areas, the City could be required to compensate property owners for condemnation of property. This would be an infeasible fiscal liability in response to a hazard that has such an uncertain potential of occurring.

Hazards due to potential volcanic airfall and volcanic-related earthquakes can be reduced by requiring building foundations, walls and roofs to be properly supported and kept in good repair. Such construction is already required by building codes due to the potential for non-volcanic (i.e., tectonic) seismic hazard potential. Proper geotechnical examinations should assure that foundations are set in well-consolidated deposits or hard rock. Development

should be avoided in poorly consolidated substrata, especially in areas with high water tables such as marshes and meadows, as well as in river and stream flood plains. Steeply gabled roofs designed for snow may also be effective for shedding volcanic ash. Flatter-topped buildings should have easy access to the roof and handy shovels to remove debris that might result in excessive roof loads that could cause structural collapse.

Technological advances in volcano monitoring, new and refined volcano-hazard assessments, and better warning programs have significantly improved the ability to warn of impending eruptions and related volcanic hazards. However, volcano monitoring technology and warning plans, no matter how timely and accurate, will reduce risks only to the extent that warnings are communicated effectively to emergency personnel and to people who live and work in potentially hazardous areas.

Education of the citizenry, including distribution of pamphlets on possible volcanic hazards, can be an important tool as part of the long-term planning goals and emergency contingency plans for the community.

The general conclusion concerning volcanic risks in the Mt. Shasta area is that it is recognized that there is a long-term potential for volcanic hazards to property and infrastructure in the vicinity, but that there is a very low risk to human life since it is expected that an impending eruption would be detected in ample time to notify and evacuate people. Although it is understood that some low-lying areas in the planning area have a higher potential than other areas for destruction of property that could be caused by volcanic mudflows, etc., the expectation that such an event may not occur for hundreds of years, if ever, leads local agencies to conclude that the potential is not regarded as a constraint to planning and approval of development projects in relatively vulnerable areas.

Liquefaction

The California Geological Society has identified soils in the planning area that may be subject to liquefaction as a result of seismic activity. Soils underlain with glacial outwash deposits consisting of loose sands, silty sands and gravelly sands may be subject to this condition. For example, it is reported that the California Geological Society has discovered soils of this type near the Sisson school site.

2. General Plan Objectives and Programs: Geologic Hazards

Goal SF-2: Assure life and property are adequately protected from seismic hazards in the area.

Policy SF-2.1: Avoid development in areas of steep slope and high erosion potential.

Implementation Measures:

SF-2.1(a): Maintain a maximum density of not more than one dwelling per ten acres of gross land area on slopes in excess of thirty percent.

SF-2.1(b): Amend the land development code to establish special review standards for areas with slopes of greater than thirty percent.

SF-2.1(c): Ensure that site development on steep slopes is designed to avoid creating areas that may be subject to slippage or movement from storm events.

SF-2.1(d): Encourage the use of density transfer to avoid new private construction in areas of steep slopes or high erosion potential.

Goal SF-3: Take prudent steps to maintain emergency services in the event of volcanic activity.

Policy SF-3.1: Periodically update the City's emergency service program to minimize destruction from volcanic activity.

Implementation Measures:

SF-3.1(a): Evaluate power, telephone, water, sewer and other utilities; roads, and landing strips for their location and resistance to the effects of various volcanic hazards, and provide the City Council with recommendations for improvements.

SF-3.1(b): Local, state, and Federal governments should develop contingency plans for a possible volcanic eruption at Mt. Shasta, including provisions for emergency communication.

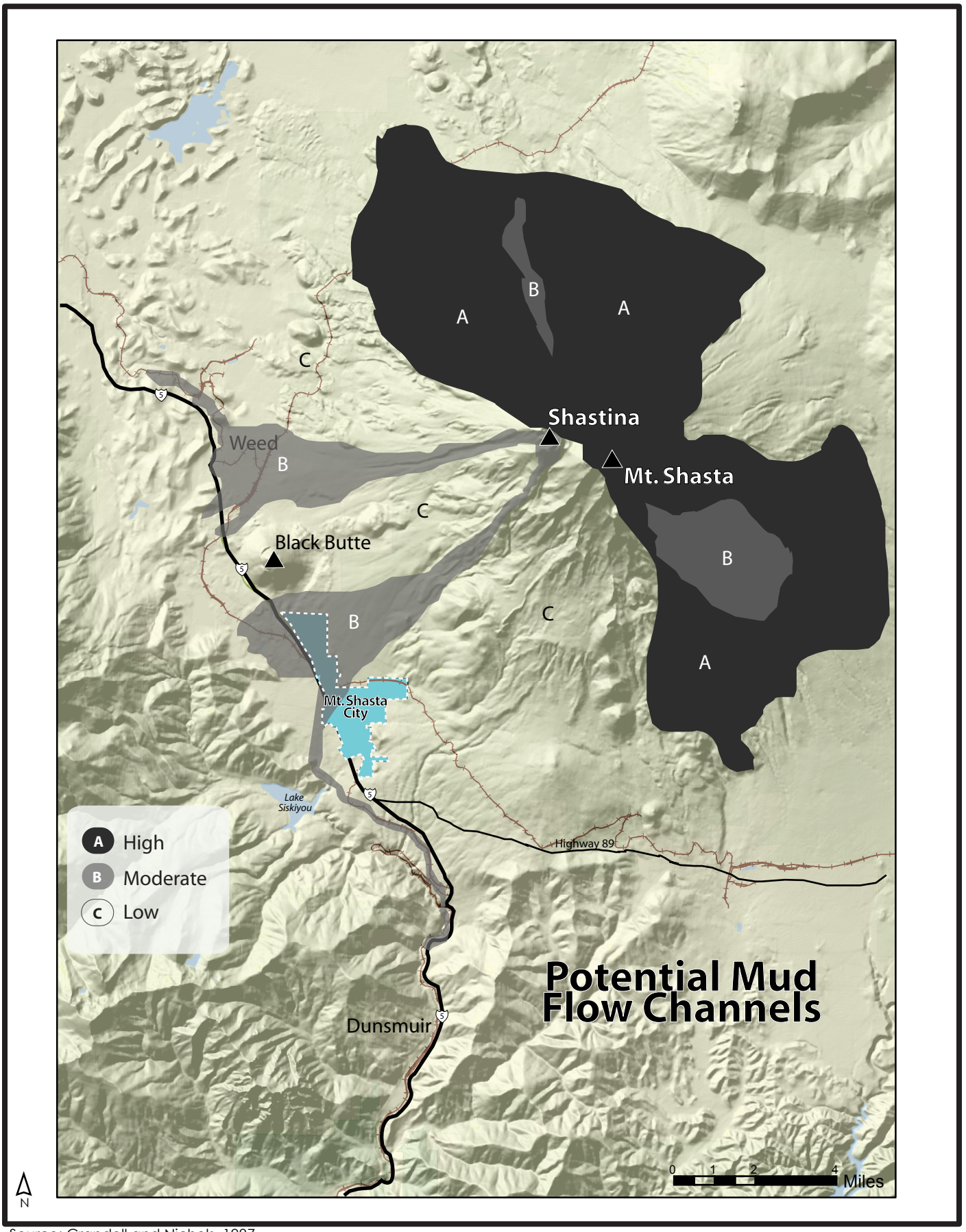
SF-3.1(c): Develop programs to educate residents about preparing for volcanic hazards.

Policy SF-3.2: Take steps to protect public facilities and emergency service providers.

Implementation Measures:

SF-3.2(a): Avoid construction of public or emergency buildings within low-lying areas that may be subject to volcanic flows.

SF-3.2(b): Evaluate and upgrade necessary local codes to accommodate the potential effects of volcanic induced seismic and airfall hazards.



Source: Crandell and Nichols, 1987

FIGURE 6-2
POTENTIAL MUD FLOW CHANNELS

PMC

D. Fire Hazards

1. Background

(*Note: Fire protection services are addressed in the Land Use Element.*)

Due to the abundance of native vegetation, hillside slopes, dry summers, and the extent of development that is located in the wildland interface, fire hazards within the planning area include the potential for wildland fires as well as structural fires.

Wildland fires present considerable risks to development in areas where a wildland-urban interface exists. A wildland-urban interface is simply the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Given that much of the planning area around the City of Mt. Shasta meets the definition of such an interface, a potential threat to both life and property exists for many residents of the planning area. Even without a loss of life or structures, wildland fires often result in substantial suppression costs, a loss of forest resources, considerable disruption to the surrounding community, and visual scars on the landscape.

In order to better address wildland fire hazards in the vicinity of the City of Mt. Shasta and develop measures to minimize these risks, the Mt. Shasta Fire Safe Council obtained funding for, and coordinated preparation of, the *Mt. Shasta Area Community Wildfire Protection Plan* (CWPP), dated June 2006 . The CWPP was prepared with the purpose of identifying areas of high priority for fuels reduction treatment, and to provide guidelines for the implementation of a pro-active program that would reduce the potential for loss of life and property resulting from wildfires. The plan also assessed community fire emergency preparedness.

According to the CWPP, areas dominated by chaparral pose the greatest risk for wildfire due to the intensity of the fuel loading, with areas dominated by grass, brush and timber also posing significant risks. The greatest impact to structures, however, would likely occur along the southern and eastern edges of the City where there are not only ample fuels present, but a substantial amount of development as well.

The CWPP proposes a number of measures to minimize risks to life and property resulting from wildfires. These include: the creation of fuel breaks and shaded fuel breaks surrounding the City; forest thinning to reduce the existing fuel load; enforcement of state defensible space requirements; and implementation of a public education campaign. While implementation of these measures would undoubtedly reduce the impact of a wildfire should one occur, there needs to be resolution concerning how much of the program recommended in the CWPP will be generally supported by the City and the general public. Some residents are concerned about the visual impacts of

planned projects that would significantly thin forests and develop wide fuel breaks around the community.

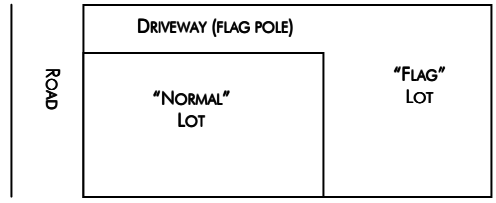
Various provisions of State law address fire safety. The City of Mount Shasta is rated as being in a "Very High Fire Hazard Severity Zone" pursuant to California Government Code Section 51179. Jurisdictions and property owners within such zones are required to comply with the requirements of Section 51182 of the Government Code. One such requirement is the maintenance of at least 100 feet of defensible space around structures, or the clearing of all flammable vegetation (with a few exceptions) to the property line should that distance be shorter. Other requirements of the Code are designed to reduce hazards to residences in the event of a wildfire, but are likewise designed to minimize the likelihood of fires spreading outward from a structural fire.

Successful responses to structural fires involve short response time, good water supply, adequate equipment and trained personnel. In areas served by the City's water system, hydrant availability, flow and pressure are generally adequate for fire fighting purposes. Access to development in the planning area is generally adequate with the exception of some "flag lots." In addition, winter snow conditions and railroad crossings may delay response time to structural fires.

In response to a series of devastating fires in the rural foothills of California and the infamous Oakland Hills fire in October 1991, California law has undergone a number of revisions and updates as the Legislature, the California Department of Forestry and Fire Protection, and local fire-fighting organizations strive to improve the means of protecting property and life from fire danger.

FLAG LOTS

Flag lots are a term that applies to parcels that are designed in tandem with another parcel, where one parcel has "normal" road frontage and the other parcel derives its access from a narrower-than-normal strip as long as the front parcel is deep.



Sometimes relatively simple measures can benefit community fire safety. Such measures include requirements for readily-visible street addresses, maintaining public street signs and ensuring that owners of private roads do the same. The use of firebreaks in strategic locations along the wildland-urban interface is also beneficial. Construction standards such as prohibiting flammable roofing materials, encouraging the use of residential sprinkler systems, and ensuring that new developments have adequate water pressure to serve fire hydrants are among the simpler measures that can be implemented. Other key issues are the lengths of dead-end roads to cul-de-sacs and flag lots, and the standards of

access roads to accommodate fire-fighting vehicles and ensure the safety of fire-fighting personnel. The Uniform Building Code (UBC) provides for such things as firewall standards and sprinkler systems in certain types of new buildings.

Issues concerning evacuation of neighborhoods in the event of wildfire are addressed below.

2. General Plan Objectives and Programs: Fire Hazards

Goal SF-4: Protect property and life from fire hazards.

Policy SF-4.1: Update City codes to provide for fire protection.

Implementation Measures:

SF-4.1(a): Amend the City's building and land development codes to incorporate fire prevention and wildfire protection measures.

SF-4.1(b): Utilize the expertise and experience of the area fire fighting personnel to recommend a workable program that can be used to gain public cooperation in protecting property and lives against fire hazards.

SF-4.1(c): Require street and address signs to be clearly and legibly displayed for all streets and structures in the City.

SF-4.1(d): Amend the land development code to require adequate fire suppression water supplies for all new development, other than the construction of a single-family home on an existing single family parcel.

SF-4.1(e): Require residents to maintain defensible space around their homes and businesses consistent with state standards.

SF-4.1(f): The City shall review the recommendations of the *Mt. Shasta Area Community Wildfire Protection Plan* and, when found to be appropriate and otherwise consistent with City policy, support and/or implement its recommendations.

SF-4.1(g): In evaluating proposed measures for public safety concerning fire hazards, the City will consider, and

will encourage the County to consider, the recommendations and standards set forth in the Fire Hazard Zoning Field Guide.

Policy SF-4.2: Adopt and enforce development standards that provide adequate fire protection.

Implementation Measures:

SF-4.2(a): Avoid individual driveways of more than seventy-five feet in length by requiring as a condition of building permits extra width or mandating a paved, all-weather surface for longer driveways.

SF-4.2(b): Amend the land development code to require that cul-de-sacs serving individual parcels with a length of more than three hundred feet be wide enough to allow for incoming-and outgoing-vehicles during a fire emergency. The minimum paved width shall be twenty feet with two four-foot shoulder areas.

SF-4.2(c): Amend the land development code to require special fire agency approvals for any new cul-de-sac proposed to have a length greater than one-quarter of a mile. The City may deny a road design on the basis of single access point and length of cul-de-sac.

SF-4.2(d): Require all new subdivisions when viewed as complete projects to have at least two points of public ingress and egress unless there are overriding considerations agreed to by the fire chief or California Department of Forestry and Fire Protection for allowing only one public access point.

E. Hazardous Materials

1. Background

Hazardous materials consist of injurious substances that may include flammable liquids and gases, poisons, corrosives, explosives, oxidizers, radioactive materials, bio-waste and medical supplies.

Hazardous materials are transported in large volumes on Interstate 5 and on the Union Pacific Railroad (UPRR). Caltrans indicates that nearly every conceivable type of hazardous material is transported over Interstate 5. The

most common materials are liquefied petroleum gas and gasoline. Some transportation of hazardous materials occurs on local streets within the planning area, but in much smaller quantities compared to the quantities transported on Interstate 5. UPRR transports hazardous materials through the area. The most common types of materials transported by rail are flammable and non-flammable gases, corrosives and flammable liquids.

The "Cantara Spill" of 1991, which is regarded as one of California's largest inland ecological disasters, dramatized the hazards associated with transportation of hazardous materials in the area. On July 14, 1991, railcars of a Southern Pacific Railroad train (before the line was acquired by UPRR) derailed just south of the Mt. Shasta planning area at a hairpin turn along the Sacramento River called Cantara Loop. One railcar was ruptured by the fall and spilled approximately 19,000 gallons of a highly toxic compound (metam sodium) into the river. As the chemical moved downstream toward Shasta Lake, it destroyed aquatic life for approximately 36 miles of the river. The river ecosystem slowly recovered, but the spill had a significant impact on the river as well as on the neighboring community of Dunsmuir.

The California Highway Patrol and UPRR both maintain hazardous material response units. However, these units are not locally based and, therefore, the Mt. Shasta Police and Fire Departments and the Mt. Shasta Fire Protection District are expected to respond first to any incidents in the planning area.

Industrial facilities, depending on the nature of their business, may store, use and generate hazardous materials and hazardous waste. Industries that typically have hazardous material issues include metal plating, painting and machining, and manufacturing and testing.

Hazardous materials storage and handling and hazardous waste generation and disposal are regulated by various federal and state regulations. The Resource Conservation and Recovery Act (RCRA) has mandated a national waste management program since 1976. Under RCRA, hazardous waste must be tracked from the time of generation to the point of disposal. A program must be instituted by every generator and handler to manage hazardous waste in a manner that minimizes the present and future threat to the environment and human health. Each hazardous waste generator must register and obtain an identification number from the Environmental Protection Agency under RCRA regulations.

The State Hazardous Waste Control Law is the basic state law that implements the RCRA waste management system. The Department of Toxic Substances Control is the primary regulatory agency administering the state hazardous waste program. DTSC has delegated local agencies to inspect and regulate small generators.

Any business handling hazardous materials (as defined in Section 25500 of the California Health and Safety Code, Division 20, Chapter 6.95) requires a permit (typically from the local fire department) in order to register the business as a hazardous materials handler. Such businesses are also required to comply with California's Hazardous Material Response Plans and Inventory Law (AB 2185). AB 2185 requires immediate reporting of any release or threatened release of a hazardous material to the local administering agency and the State Office of Emergency Services. In addition, any business handling more than 500 pounds of solid, 55 gallons of liquid, or 200 cubic feet of gaseous hazardous material, at any one time, is required under AB 2185 to file a business plan. The business plan must be submitted to the local administering agency of the program. Emergency response procedures should be included in the business plan.

2. General Plan Objectives and Programs: Hazardous Materials

Goal SF-5: Protect people and the environment from hazardous materials exposure.

Policy SF-5.1: Assure that the use, storage, and transportation of hazardous materials complies with Federal and State regulations.

Implementation Measures:

SF-5.1(a): Working with the State Department of Health and the County Health Department, enforce the applicable provisions of State law related to hazardous material storage.

SF-5.1(b): Ensure that the Fire Department maintains the appropriate "Right-to-Know" records related to storage, use, and disposal of hazardous materials.

Policy SF-5.2: Develop communications with the railroads concerning the transportation of hazardous materials.

Implementation Measures:

SF-5.2(a): Each year during the annual review of the General Plan, send a letter to the appropriate official of the McCloud and Union Pacific Railroad requesting notification of any changes in the status of the railroads' procedures for tracking and transporting hazardous materials in the area.

SF-5.2(b): At least once every three years, coordinate an emergency services exercise with the County

Office of Emergency Services to practice procedures related to a hazardous material spill.

F. Railroad Crossing Safety

1. Background

Collisions at highway-rail crossings are one of the leading causes of death and serious injury associated with railroad operations in the United States.

Two railroad lines are located within the City of Mt. Shasta. The Union Pacific Railroad (UPRR) line through the City (previously operated by Southern Pacific Railroad) is the main north/south railroad through Northern California. Approximately 16 trains per day pass through Mt. Shasta on this interstate line. The McCloud Railway Company (MRC) operates a short-line railroad out of McCloud. The MRC line connects with the UPRR line in Mt. Shasta along North Mt. Shasta Boulevard.

There are a total of seven railroad crossings within the City of Mt. Shasta. Five grade crossings are located along the Union Pacific line. Two crossings are on Nixon Street, and there are crossings of Alma Street, Lake Street and Ream Avenue. All five UPRR crossings are gated. There are two grade crossings for the MRC line; one for Everitt Memorial Highway and one for North Mt. Shasta Boulevard. Both MRC crossings are "passive" and are equipped with flashing lights but no gates.

"Passive" traffic control devices are simply signs and pavement markings that provide warning to vehicles on the street of an upcoming railroad crossing. "Active" traffic control devices are activated by a detection circuit in the railroad track and give warning of an approaching train at the crossing. Typically, the circuit triggers the flashing of lights, the ringing of audible alarms, and the lowering of gates across the street. A warning provided by a train's horn is required as a train approaches both at-grade crossings with active warning devices and crossings with "passive" warning measures.

Locomotive engineers typically sound their horns at least 15 seconds before the train enters a public highway-rail grade crossing. The intent is to sound the horn loud enough and timely for a vehicle on the street approaching the crossing to hear the horn. With the objective of the warning having a sound level of 95 dB(A) at the "motorist decision-making point" 50 feet in advance of the grade crossing, the Federal Railway Administration (FRA) has determined that 108 dB(A) is the optimal sound level for locomotive horns (Federal Railroad Administration, 2005). A horn sound level of 110 dB(A) is the maximum and 96 dB(A) is the minimum sound level. However, such a warning exposes a considerable segment of the local community near the tracks to the blast of the horn as well as the motorists and pedestrians, as intended, who may be approaching the crossing.

The use of train horns as trains approach crossings has raised two particular issues concerning public safety and related noise impacts to neighborhoods around the crossings. These issues are 1) the alternative use of "wayside horns", and 2) the establishment of "quiet zones". These issues are discussed in more detail in the Noise Element of this general plan. However, because the issue is primarily a public safety concern, a related goal and policy statement with an implementation proposal are set forth below in this Safety Element.

2. General Plan Objectives and Programs: Railroad Crossings

Goal SF-6: Maintain public safety at locations where rail and other transportation facilities interface.

Policy SF-6.1: Work with Union Pacific Railroad and the McCloud Railway Company to identify measures to reduce the impact of rail traffic on the City's circulation system.

Implementation Measure:

SF-6.1(a): Evaluate the adequacy of public safety provisions at railroad grade crossings and support improvements where warranted.

Goal SF-7: Maintain adequate levels of public safety at street-rail grade crossings while, when possible, reducing noise impacts involved with warning systems.

Policy SF-7.1: The City will consider the feasibility and means for modifying warning and control systems at selected street-rail grade crossings to reduce related noise impacts, provided that adequate public safety is provided.

Implementation Measure:

SF-7.1(a): The City will consider the feasibility of establishing "quiet zones" and/or the use of wayside horns to reduce train horn noise impacts pursuant to the criteria of the Federal Railroad Administration. A determination to proceed with implementation will be based on the expected adequacy of public safety and cost feasibility.

G. Evacuation and Related Infrastructure

1. Background

Portions of the planning area may need to be evacuated for a number of reasons including wildfire, volcanic activity, or truck or railroad accidents

involving significant quantities of hazardous materials. Response and evacuation procedures have been addressed in the City's Emergency Plan, which is updated periodically. The responsibility for day-to-day initial emergency response is that of the Mt. Shasta Fire and Police Departments, the County Sheriff, and the Mt. Shasta Fire Protection District.

General evacuation of the Mt. Shasta area could be required prior to a volcanic eruption. Such an eruption is expected to be preceded by warning signs detected by seismic and other monitoring devices installed in the Mt. Shasta area. As in the case of Mt. Saint Helens, a warning would be issued in ample time prior to an eruption and an orderly evacuation could take place.

Concerning evacuation issues related to wildfire, the need for and scope of evacuation is dependent on the extent and severity of the fire. Evacuation of only a few homes within a threatened area would not typically create a serious traffic control problem. A large scale evacuation, however, may result in significant traffic problems and would require more extensive traffic control measures.

Principal evacuation routes from Mt. Shasta include Interstate 5 north- and southbound and Highway 89 to the southeast. Evacuation routes should be developed with the intent to direct traffic toward the nearest highway. Due to vehicle carrying capacity, the highways are logical routes by which to move people away from endangered areas. In some locations of the planning area, evacuation could be constrained by the lack of access and egress roads into the area, or by the length of dead-end and cul-de-sac roads.

Although most primary roads (e.g., Mt. Shasta Boulevard, Everitt Memorial Highway, Old Stage Road) in the City of Mt. Shasta and the surrounding community are of sufficient width to allow for passage of emergency vehicles and evacuating residents, many of the secondary roads that serve residential areas (e.g., Davis Place Road, Shasta Ranch Road) are narrow and/or may have few if any ingress/egress options. This would make it exceedingly difficult for engines, tankers, and other firefighting equipment to enter the area while residents are evacuating. Traffic control in these less accessible areas would be crucial in the event of fire.

Evacuation planning needs to be concerned about the capacity of local roads in the event of sizable fires. Many of the roads that service areas of residential development, primarily in older neighborhoods, are inadequate to provide safe passage of residents out of some areas and, at the same time, provide good access to emergency vehicles responding to a fire. These roads are often narrow with dense vegetation growing up to the road shoulder. The steepness of roadway grades can also be an issue.

The lack of multiple access and egress to the unincorporated area east of the City is a recognized concern. The County has permitted a substantial amount of

residential development that relies upon McCloud Avenue as the only paved street for evacuation and emergency access. Rockfellow Drive, which could provide an important optional route, has not been extended and developed to adequately serve this area.

To ensure the provision of adequate evacuation routes, as well as the provision of adequate access roads for emergency equipment, standards for minimum road widths and maximum access road lengths are prescribed. For example, the California Code of Regulations includes basic wildland fire protection standards of the California Board of Forestry. (*California Code of Regulations*, Section 1270, et seq.) Standards include provisions that the maximum length of a dead-end road shall not exceed 800 feet for parcels zoned for less than one acre and 1,320 feet for parcels zoned for 1 acre to 4.99 acres in size. Typically, all two-way roads should be constructed to provide a minimum of two nine-foot traffic lanes. The grade for all roads, streets, private lanes and driveways shall not exceed 16 percent. (Many communities limit the grade of roads and driveways to no more than 12 percent. The *California Code of Regulations* should be consulted for a more-complete discussion of these and other standards.

Evacuation events should be overseen by an "incident commander" and local police and fire departments. Upon initiation of an evacuation, a local law enforcement agency such as the Mt. Shasta Police Department or Siskiyou County Sheriff's Department would be called upon to mange crowds and traffic and will be designated as the Evacuation Coordinator. The Evacuation Coordinator will select the best routes from the endangered area after considering the nature of the incident, the size of the population to be evacuated, and road capacity and characteristics. Specific evacuation routes will be selected as the emergency situation develops. An evacuation location will be identified. A school, park, or church would generally have enough parking and facilities to serve this purpose. During an incident, residents would be briefed on the situation and instructed on how to properly evacuate, which way to drive out of the area, and where the nearest evacuation point has been established.

(See also the related policies and implementation measures in the "Fire Hazards" section above.)

2. General Plan Objectives and Programs: Evacuation

Goal SF-7: Identify and maintain emergency evacuation routes.

Policy SF-7.1: Working with the County, identify routes to evacuate area residents for different types of emergencies.

Implementation Measure:

SF-7.1(a): Work with the County to establish emergency evacuation routes in the event of different categories of emergencies: severe rain or snow storm, flood, fire, volcanic or seismic.

H. Snow Removal

1. Background

The City of Mount Shasta wishes to ensure the safe and orderly flow of traffic within and through the City. During the winter months, snowfall presents an added challenge to achieving this goal. Snow must be properly managed in order to reduce risks to pedestrians and vehicles, ensure that emergency equipment has access to all areas of the City, and to minimize impacts on commerce and community services.

With approximately 50 miles of roadway and other City-owned right-of-ways to be cleared during each storm event, it can take between eight and twelve hours to clear 12 inches of fresh snowfall. The City typically initiates plowing once the snow reaches a depth of four to six inches, with plowing beginning earlier during storms that pose a greater hazard to the community. The City currently (2006) has seven snowplows, one truck for spreading sand and 11 public works employees responsible for snow removal and safety during storms.

During major snowstorms, the City's primary goal is to provide for the safe and orderly movement of emergency equipment and the traveling public. In these situations, the priority order is typically:

1) Support for emergency response vehicles.
2) Clear main arterial roadways and intersections.
3) Clear collectors.
4) Clear secondary residential streets.
5) Clear City-owned parking lots.

During plowing activities, parking along City streets and right-of-ways is prohibited. This helps ensure that snow removal equipment can operate unimpeded and can clear the City's streets in an efficient and timely manner. For those individuals lacking off-street parking, the City provides a number of "snow parking" areas. These areas are: a small dirt parking lot behind the Sportsman's Den off Castle Street; the public parking lot across from the fire station on West Lake Street; Ivy Street between Mt. Shasta Boulevard and Chestnut Street (south side only); the Little League ballpark on Washington Drive behind Sisson School (near snow parking signs); and the parking lot off of Alma Street between North Mt. Shasta Boulevard and the railroad tracks.

It is the City's intent to clear snow from the entire road width prior to allowing on-street parking to continue. This is accomplished by making multiple passes

along each of the City streets. The first pass removes enough snow for the roads to remain open, with subsequent passes widening the traffic lanes. During big storms, this process may continue for several days before on-street parking can resume. So that on-street parking may resume sooner in the downtown area and permit commerce to continue, snow is plowed to the center of the street rather than to the curb. The City subsequently removes the snow berms from the center of the roadways with front end loaders as time and priorities allow.

In order to ensure the safe and orderly flow of traffic through the City during snow events, the City has adopted several ordinances governing snow removal. These ordinances have been codified in Chapter 12.24 of the Mt. Shasta Municipal Code. Two of the more noteworthy sections in this chapter are Section 12.24.030, which prohibits obstructing snow removal equipment with vehicles parked along roadways and in City right-of-ways, and Section 12.24.060, which regulates the dumping of snow from private property onto roadways and City right-of-ways.

Developers should consider snow management at the earliest phase of development planning and incorporate design features to handle snow plowing and storage. Snow storage areas must be designated on site; plowing snow onto public streets is not allowed.

2. General Plan Objectives and Programs: Snow Removal

Goal SF-8: Ensure the safe and orderly flow of traffic through the City during and after winter storm events.

Policy SF-8.1: The City shall enforce rules and regulations that govern the ability of the City to provide roadways unobstructed by snow.

Implementation Measure:

SF-8.1(a): Enforce Chapter 12.24 of the Mt. Shasta Municipal Code.

REFERENCES:

California Code of Regulations, SRA Fire Safe Regulations, Title 14, Section 1270 et seq., 2000.

Christianson, Robert L., *Volcanic Hazard Potential in the California Cascades;* Martin, R. and Davis J. (editors), Status of Volcanic Prediction and Emergency Response Capabilities in Volcanic Hazard Zones of California (Sacramento: California Division of Mines and Geology, Special Publication 63, 1982), pp. 41-59.

City of Mt. Shasta, *General Plan*, 1993.

Crandell, Dwight R. and Nichols, Donald, R., *Volcanic Hazards at Mount Shasta* (Menlo Park, CA: U.S. Geological Survey, 1987), pamphlet, 21 p.

Federal Railroad Administration, *Final Rule on the Use of Locomotive Horns at Highway-Rail Grade Crossings*, Federal Register, Vol. 70, No. 80, April 27, 2005.

Miller, C. Dan, *Potential Hazards from Future Eruptions in the Vicinity of Mount Shasta Volcano* (Northern California: U.S. Geological Survey, Bulletin 1503, 1980), 43 p.

Mt. Shasta Area Fire Safe Council, *Mt. Shasta Area Community Wildfire Protection Plan*, June 2006.

Siskiyou County. *General Plan Land Use Element*, August 1980.