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City of Sonora

Safety Element

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1 Introduction

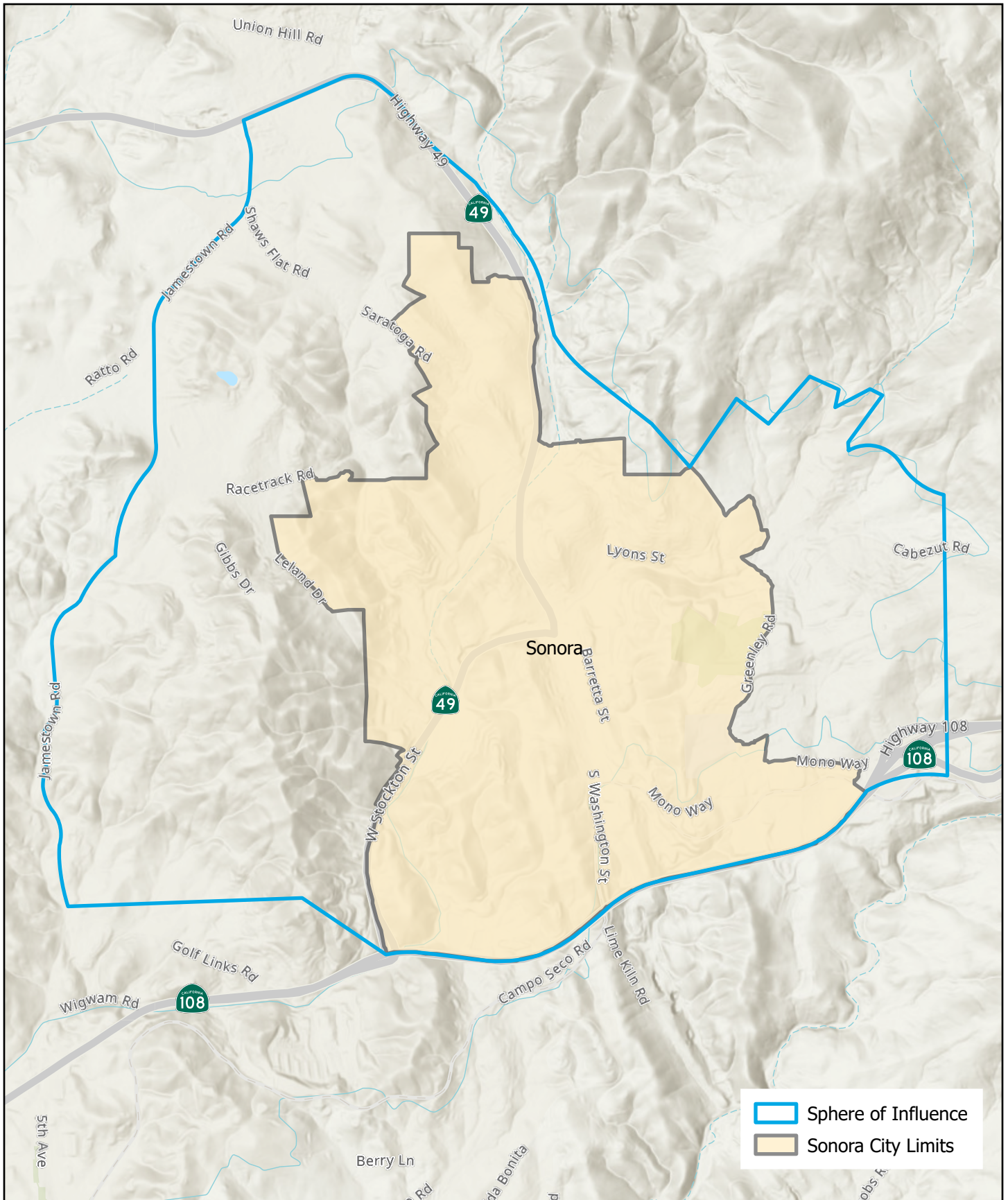


The Safety Element is a plan to minimize the hazards to public health and safety in and around the City of Sonora. It identifies the natural and human-caused hazards that affect, or have the potential to affect, existing and future development and operations, and provides guidance for protecting residents and other community members from injury and death. It describes existing conditions and sets policies and standards for improved public safety. The Safety Element also intends to minimize physical harm to the buildings and infrastructure in and around Sonora as a result of hazard events, and to reduce damage to local economic systems and community services.

The Safety Element reflects the City of Sonora's regard for the health and safety of its residents, and the well-being of other community assets. The Element addresses issues that would require government intervention to effectively achieve public safety. It is the responsibility of the City of Sonora to protect community members from danger and harm. The Safety Element helps to guide new development, as well as community programs and other efforts, with the intent of reducing the potential for harm from natural and human-caused hazards within Sonora and the Planning Area, which includes the land within City limits and the City's sphere of influence; refer to Exhibit 1-1, Project Location.

Some degree of risk is inevitable, as the potential for many disasters cannot be completely eliminated and efforts to predict when such disasters may occur are limited. The goal of the Safety Element is to reduce the risk of injury, death, property loss, or other hardships to acceptable levels. In accordance with California law, the Safety Element serves the following purposes:

- Protect the community from risks associated with a variety of hazards, including seismic activity, landslides, flooding, and wildfire, as required by the California Government Code Section 65302(g)(1).
- Map and assess the risk associated with flood hazards, develop policies to minimize the flood risk to new development and essential public facilities, and establish effective working relationships among agencies with flood protection responsibilities, as required by California Government Code Section 65302(g)(2).
- Map and assess the risk associated with wildfire hazards, develop policies to reduce the wildfire risk to new land uses and essential facilities, ensure there is adequate road and water infrastructure to respond to wildfire emergencies, and establish cooperative relationships between wildfire protection agencies, as required by California Government Code Section 65302(g)(3).
- Assess the risks associated with climate change on local assets, populations, and resources. Note existing and planned development in at-risk areas and identify agencies responsible for providing public health and safety and environmental protection. Develop goals, policies, and objectives to reduce the risks associated with climate change impacts, including locating new public facilities outside of at-risk areas, providing adequate infrastructure in at-risk areas, and supporting natural infrastructure for climate adaptation, as required by California Government Code Section 65302(g)(4).



Sources: City of Sonora, Tuolumne County
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EXHIBIT 1-1 Project Location

2 Relationship to Other Documents

The Sonora Safety Element is one of several plans that address community public safety and related topics, including other Sonora General Plan Elements, the Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), the Tuolumne County Emergency Operations Plan (EOP), and local regulations. The 2024 Sonora Safety Element Update was developed in conjunction with the development of the 2024 City of Sonora Local Hazard Mitigation Plan. The Safety Element should be consistent with other Elements and plans in order to minimize conflicts between documents and ensure that the City has a unified strategy to address public safety issues. The Safety Element incorporates information, technical analyses, and policies from these other documents where appropriate to help support this consistency.

2.1 General Plan Elements

The Sonora General Plan has twelve chapters that cover state-mandated Elements. The Safety Element provides policy direction and identifies safety improvements that complement the intent and policies of other General Plan Elements and City plans. Crucial relationships exist between the Safety Element and the other General Plan Elements. For instance, the Public Facilities and Services Chapter standards correspond with safety concerns related to emergency operations in the Safety Element and must be consistent with the policies to address those hazards.

2.2 City of Sonora Local Hazard Mitigation Plan

The City of Sonora developed a Local Hazard Mitigation Plan (LHMP) in 2024. The City had previously participated in the development of the 2018 Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan, however the LHMP was created to identify specific needs, goals, mitigation actions, capital improvement projects, and local and regional partnerships relevant to the City of Sonora, for the purpose of protecting the community from natural and human-caused hazards.

Further detail regarding these natural disasters, including relevant mitigation actions to reduce vulnerability, are included in the City of Sonora Local Hazard Mitigation Plan (LHMP). The City of Sonora LHMP was developed in accordance with the Disaster Mitigation Act of 2000 (DMA 2000) and followed FEMA's 2023 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 are developed to reduce or eliminate hazard risk. The implementation of these mitigation actions, which include both short-term and long-term strategies, involve planning, policy changes, programs, projects, and other activities. The LHMP is on the City's webpage, linked here: <https://sonoraca.com/local-hazard-mitigation-plan/> (link)

2.2 Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

In collaboration with other local agencies, the County of Tuolumne led preparation of the updated MJHMP in 2024. The MJHMP assesses hazard vulnerabilities from natural and human-caused hazards, including risk to people and facilities, and identifies mitigation actions to reduce or eliminate hazard risks in Tuolumne County, including in unincorporated communities. The current MJHMP was developed in accordance with the Disaster Mitigation Act of 2000 and follows FEMA's 2011 Local Hazard Mitigation Plan guidance. The current MJHMP, as approved by FEMA, is incorporated into this Element by reference, as permitted by California Government Code Section 65302.6, and is available online at: [Multi-Jurisdictional Hazard Mitigation Plan](#) (link)

The MJHMP and Safety Element address similar issues, but the Safety Element provides a higher-level framework and policies that pertain to safety in the City, while the MJHMP focuses on more specific mitigation, often short-term, and actions to enable jurisdictions to better protect lives, property, and natural systems.

Hazard mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage.

2.3 Tuolumne County Emergency Operations Plan

The Tuolumne County Emergency Operations Plan (EOP) describes the County's response to small- and large-scale emergency situations associated with natural disasters and/or human-caused emergencies. The EOP is the principal guide for the County to respond to and mitigate emergencies and disasters within Tuolumne County's geographic boundaries. It outlines the methods for carrying out emergency operations, the process for rendering mutual aid, and the emergency services of governmental departments and agencies. It also describes how resources are to be mobilized, how the public will be informed, and the process to ensure continuity of government during an emergency or disaster. The current Tuolumne County EOP was updated in 2023 and adopted in March 2024.

2.4 City of Sonora Emergency Operations Plan

The City is in the process of developing its Emergency Operations Plan. At the time of publication of this Safety Element, the Emergency Operations Plan was being prepared and was not available. Once completed, the Emergency Operations Plan will describe how the City shall respond to and mitigate emergencies and disasters within the City's Sphere of Influence (SOI) and City limits. The Emergency Operations Plan will address the City's mobilization and processes that shall be implemented following any disaster that may occur as a result of the hazards identified in this Safety Element.

3 Community Profile

The City of Sonora is located in the eastern portion of Tuolumne County, covering approximately 3.18 square miles within the Sierra Nevada Foothills. Sonora is the only incorporated jurisdiction within Tuolumne County and serves as the County seat. The Planning Area, which includes the City's Sphere of Influence and the area within City limits, is surrounded by unincorporated Tuolumne County. The communities of Columbia and Springfield are located to the north, East Sonora to the east, and Jamestown to the west; refer to Exhibit 3-1, Regional Location. Regional access to the City of Sonora is provided by State Route (SR) 49 (north/south) and SR 108 (east/west). State Route 49 begins south of Sonora in Mariposa and passes through the City on its way north through Central California to Sattley/Sierraville. The western terminus of SR 108 is located in Sonora, where the highway turns into SR 49. State Route 49 is the main transportation route in Sonora and passes directly through Downtown; refer to Exhibit 3-2, Local Vicinity. State Route 49 is an important state highway that runs through the foothills of the Sierra Nevada Mountains and is a designated state scenic highway in many areas. Sonora consists of primarily hilly land; Sonora Creek extends through the City in a northeast to southwest direction and provides drainage outside of the Planning Area.

Sonora's Mediterranean climate is typical of the Sierra Nevada foothills, with a cool, rainy winter season and dry, hot summers. On average, annual high temperatures in Sonora range from 54 degrees Fahrenheit (°F) in December and January to 92°F in July. Low temperatures range from 32°F in January to 56°F in July. The City receives an average of 34.71 inches of precipitation annually.¹ Most precipitation falls during the winter months; summer storms are rare.

Land uses in the City primarily consist of commercial, residential, and agricultural uses. According to the 2022 U.S. Census American Community Survey (ACS) 5-year Estimates, the City of Sonora has an estimated population of 4,963 persons.² The median age of City residents is 41.5 years of age. Sonora has four schools/school facilities, one fire station, one police station, and community facilities such as City Hall, a public works facility, a hospital, transportation infrastructure, utilities properties, and several small parks (Cofill, Grigsby, Woods Creek). The Sonora Police Department and Sonora Fire Department provide police services, fire services, and emergency medical response to the community.

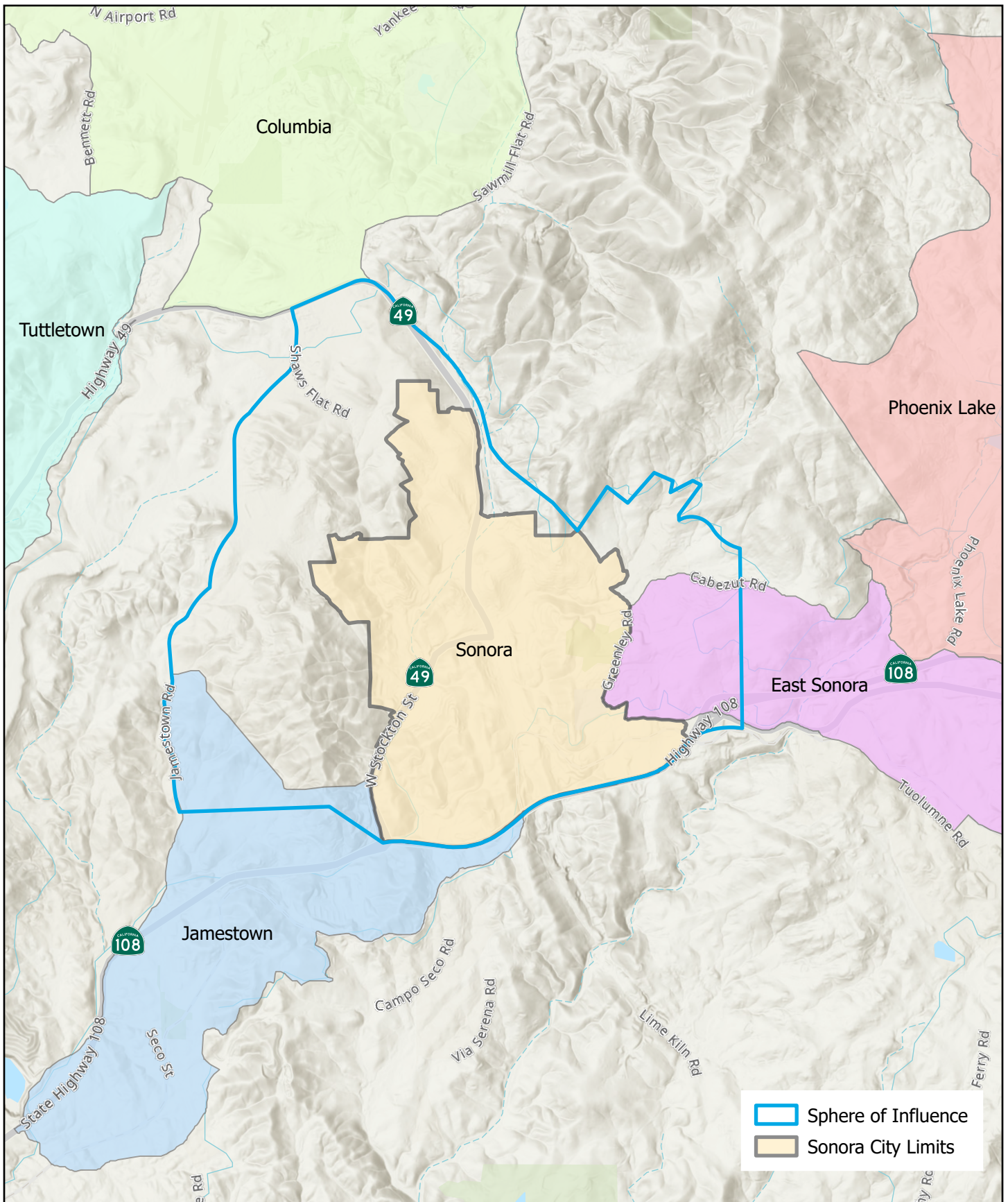
Sonora's primary transportation access is from State Route 49 and State Route 108. State Route 49 connects Sonora to Angels Camp and Calaveras County to the north and Mariposa to the south. State Route 108 connects Sonora to the Sierra Nevada Mountains and Highway 395 to the east. Bus service is the only public transportation service for all of Tuolumne County. Public bus service is provided to the Sonora area by Tuolumne County Transit (TCT). TCT links Sonora with East Sonora, Sierra Village, Columbia, and Groveland.



TCT Bus Stop

¹ U.S. Climate Data, "Climate Sonora – California," n.d., <https://www.usclimatedata.com/climate/sonora/california/united-states/usca1077>. Accessed 05 March 2024.

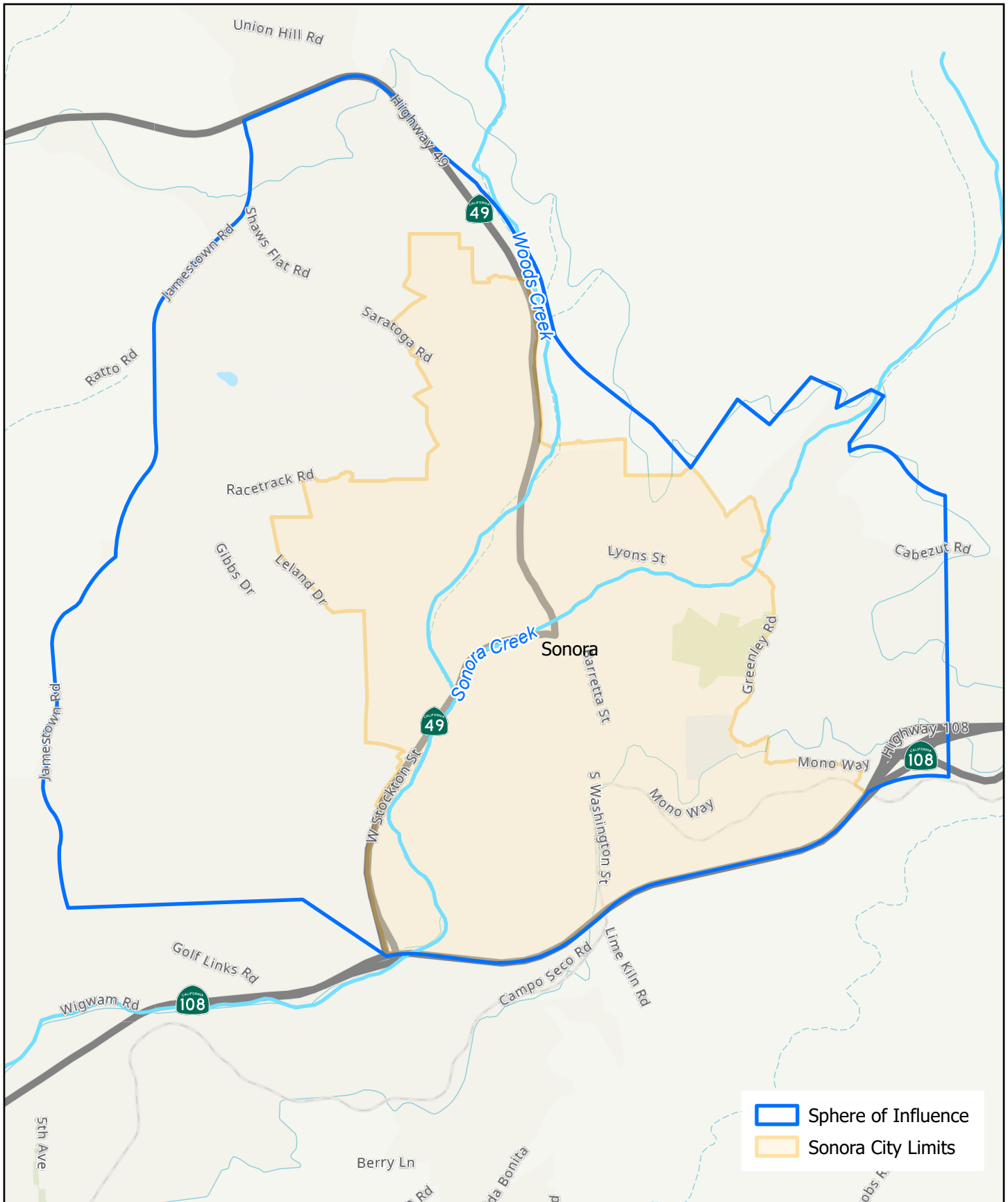
² United States Census Bureau, "American Community Survey, ACS 5-Year Estimates Data, Table DP05, 2022", https://data.census.gov/table?q=2022%20ACS%20DP05&g=050XX00US06109_160XX00US0672674. Accessed 05 March 2024.



Sources: City of Sonora, Tuolumne County
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EXHIBIT 3-1 Regional Location



Sources: City of Sonora, Tuolumne County
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EXHIBIT 3-2 Local Vicinity

4 Existing Conditions

This section outlines the existing hazardous conditions and other public safety issues in Sonora, including fire (urban and wildland), seismic and geologic hazards, flood, hazardous materials/wastes, emergency operations, human-caused hazards, climate change, critical facilities and infrastructure, and evacuation. This section provides details pertaining to probable locations where each hazard or issue is likely to occur (per availability of data), past notable events in and around Sonora, agencies responsible for providing protection from these public safety issues, and other background information as required by the State.

The goals and policies in this report were developed by the City of Sonora in 2024. These goals and policies are presented by topic and sequentially, not by priority.

4.1 Fire

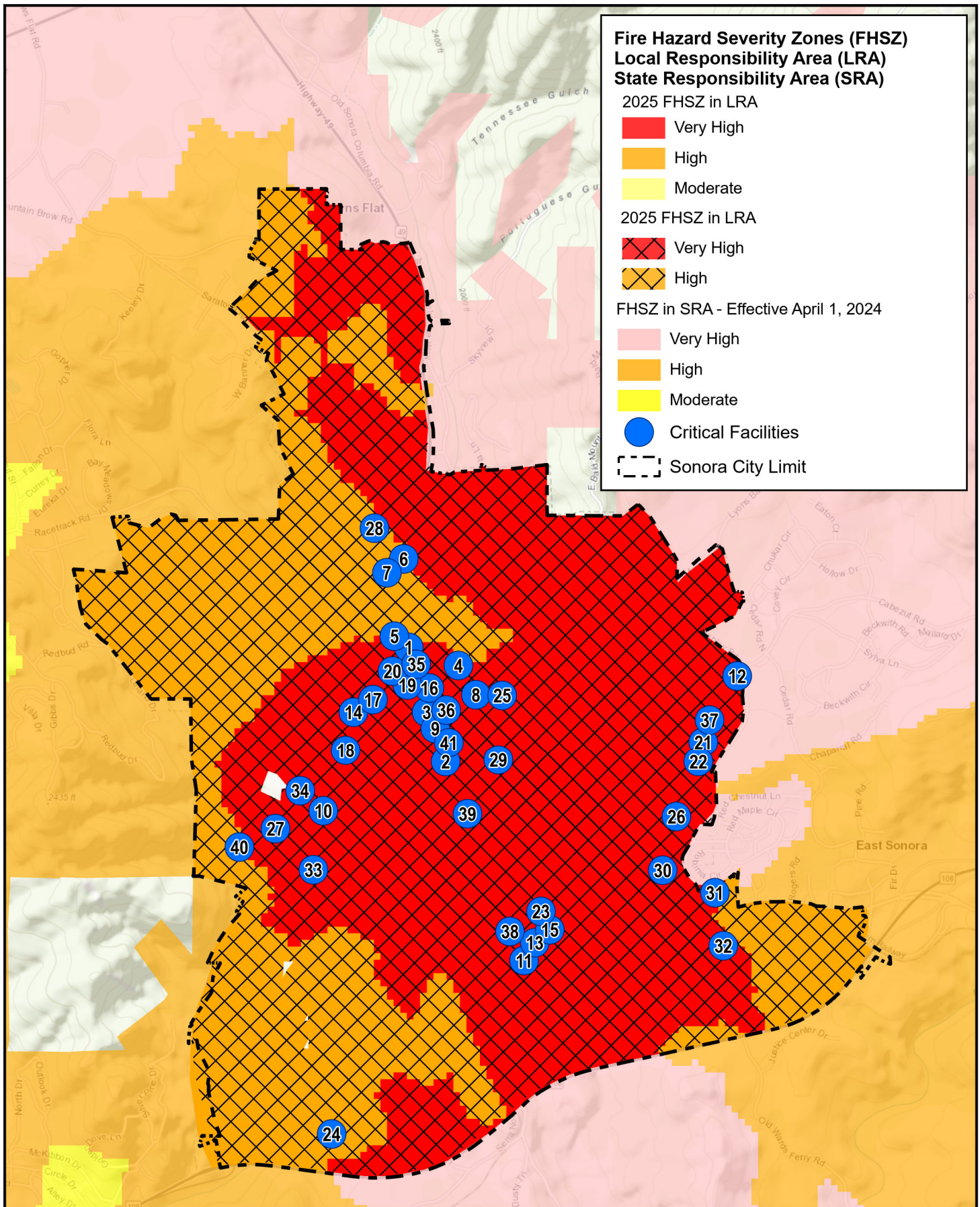
Fire hazards can occur in the form of both wildfires and urban fires. The combination of complex terrain, Mediterranean climate, and productive natural plant communities, along with ample ignition sources, have created conditions for extensive wildfires throughout California. Wildfire is an ongoing concern for communities in Tuolumne County and the Sierra Nevada Foothills. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. Factors which may influence the potential for wildfire include the extent and type of vegetation, temperature, humidity, wind, topography, and fuel moisture content. As mentioned above, the foothills, including Sonora, experience long, dry summers. Even fires that do not threaten the community of Sonora itself can still generate harmful levels of air pollution.

Three types of fires are of concern to the City of Sonora: (1) wildfires, (2) wildland-urban interface fires, and (3) to a lesser extent, structural fires.

4.1.1 Wildfires

Wildfires may occur at any time of the year when conditions are right, although the wildfire potential for Tuolumne County is typically greatest from June to November. This is when dry vegetation coexists with extremely hot average daily temperatures and seasonal drought conditions, all of which exacerbate fire hazards. Vegetation, wind, temperature, humidity, and slope are all factors that affect how wildfires spread. Wildfires typically occur on mountains, hillsides, and grasslands. The City of Sonora and the areas immediately surrounding the City have heavily wooded communities and steep terrain that create substantial wildfire risk to the City. The climate of the Sonora region keeps the grass dry and more readily combustible during the fire season. Steep slopes bring grass and brush within reach of upward flames while impeding access of fire-fighting equipment. Seasonal drought conditions and unregulated camping activities in areas with vegetative fuel exacerbate fire hazards.

Much of the City of Sonora is designated as Very High Fire Hazard Severity Zones (VHFHSZ), the highest risk level designated by the State Fire Marshal. The majority of the VHFHSZs are located in residential areas in the northern, eastern, and western areas of the City. These wildfire zones extend into the City until reaching the developed commercial corridors surrounding Washington Street, Greenly Road, Mono Way, and West Stockton Street. The large undeveloped open space and wooded areas in the southwestern portion of the City are also mapped as a VHFHSZ. The City FHSZ falls under local jurisdiction responsibility (City of Sonora Fire Department) and is classified as a Local Responsibility Area (LRA); refer to Exhibit4-1, Wildfire Hazard Zones.



Data Sources: City of Sonora, Tuolumne County, CAL FIRE 2025
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EXHIBIT 4-1 Wildfire Hazard Zones



Motherlode Fairgrounds

The Planning Area is surrounded by unincorporated areas of Tuolumne County, which include fire hazard severity zones in State Responsibility Areas (SRAs). The majority of these unincorporated areas are very high fire hazard severity zones, with pockets of moderate and high severity areas to the northwest and east of the City. This indicates a significant risk of wildfire in the surrounding areas of Tuolumne County that could spread rapidly and threaten the City of Sonora; refer to Exhibit 4-2, Fire Responsibility Areas.

Due to the location of development within VHFHSZs in the City, there is potential for a wildfire to spread quickly within the City, depending on the conditions and nature of the fire. Further, the mapped areas of high and very high FHSZ that surround the City boundary are indicative of a greater wildfire extent, as wildfires could begin outside of the City and spread toward Sonora.

A substantial portion of the City is located within a VHFHSZ, categorized as an LRA, the majority of which is located in residential areas. A marginal portion of the City along the southwest boundary is within a HFHSZ, categorized as an SRA. A vulnerability analysis was conducted for the 2024 LHMP, which identified critical facilities located in the VHFHSZ (refer to Table 3-6, City of Sonora Critical

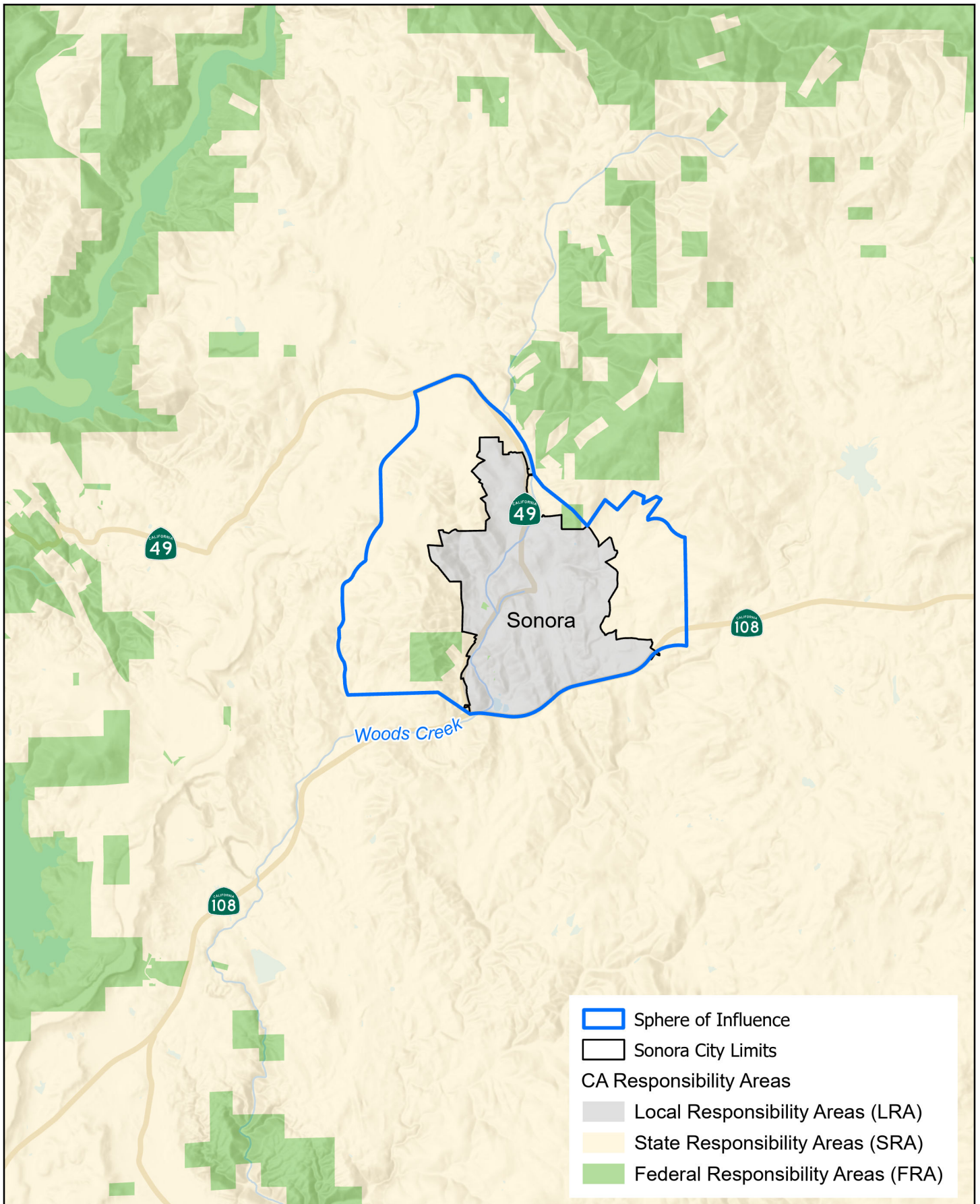
Facilities, and Exhibit 3-1, Critical Facilities, in the LHMP). One fire station, two city bridges, the Tuolumne County IT Department, Adventist Health (Hospital), Tuolumne County Sheriff Department, Tuolumne County Main Library, Tuolumne County Senior Center, Sonora Wastewater Treatment Plant, PG&E Tar Flat Substation, Motherlode Fairgrounds, Heaven for Kids Playground, and AT&T Property were among the facilities identified within the VHFHSZ. Though no areas of the City are identified as lacking service under existing conditions, it is feasible that one or multiple vulnerable critical facilities may be at risk during a wildfire, including facilities critical to the coordination of emergency services, as well as communication services. There are approximately 2,179 residential units and approximately 10,372,072 square feet of non-residential structures located within the VHFHSZ.

Additionally, potential air pollution from wildfires within the region, but outside of the Planning Area, may pose health risks to the City. The pollutant of most concern from wildfire smoke is fine particulate matter (PM_{2.5}). PM_{2.5} from wildfire smoke is damaging to human health due to its ability to deeply penetrate lung tissue and affect the heart and circulatory system. Although wildfire smoke presents a health risk to everyone, sensitive groups may experience more severe acute and chronic symptoms from exposure to wildfire smoke, such as children, older adults, or people with chronic respiratory or cardiovascular disease. Wildfire vulnerability is also closely related to vulnerability with other natural hazards, including drought.

4.1.2 Wildland-Urban Interface Fires

The wildland-urban interface is an area where buildings and infrastructure (e.g., cell towers, schools, water supply facilities) mix with areas of wildland vegetation. This interface is sometimes divided into the defense zone (areas in close proximity to communities, usually about a quarter-mile thick) and threat zones (an approximately one and a quarter-mile buffer around the defense zone.³ In areas where structures and other human development intermingles with wildland or vegetative fuels, wildfires can cause significant property damage and present extreme threats to public health and safety.

³ California Board of Forestry and Fire Protection. "Appendix PD-1 Description of Treatable Landscape Modeling." *Program EIR for the California Vegetation Treatment Program*. PDF.



Data Sources: State of California; ESRI
Map Export: 8/22/2025 1:33 PM.



EXHIBIT 4-2 Fire Responsibility Area

The classic wildland-urban interface exists where well-defined urban and suburban development adjoins open wildland areas. The mixed wildland-urban interface is characterized by isolated homes, subdivisions and small communities situated predominantly in wildland settings. The City of Sonora is characterized by both classic and mixed wildland-urban interfaces, with heavily wooded communities and steep terrain. The City of Sonora is one of many communities in Northern California facing increased wildfire hazards from fuel growth and density. This is causing a strain on existing fire protection systems beyond their original or current design and capability.



Saint James' Episcopal Church and Sonora Fire Museum

The City of Sonora is heavily wooded, and most of the Planning Area is categorized as a VHFHSZ. Much of the VHFHSZ is in residential areas that are located within the wildland-urban interface. Additionally, the City is surrounded by unincorporated, vegetated areas that are categorized as moderate to very high fire hazard severity. Development on the outskirts of the City is located in the wildland-urban interface located in Tuolumne County.

As the number of structures/developments in the wildland-urban interface increases, so does the risk of incidence of fire. Due to the location of development in Sonora, there is potential for wildfire to spread quickly within the City, whether ignition occurs within City limits or in the surrounding area. In the wildland-urban interface, efforts to prevent ignitions and limit wildfire losses hinge on hardening structures and creating defensible space through a multi-faceted approach, which includes engineering, enforcement, education, emergency response, fuel reduction grants, and economic incentive.

The Sonora Fire Department enforces the City's defensible space ordinance through routine inspections in order to implement wildfire prevention and protection practices and minimize the spread of fire to surrounding areas. The defensible space zone is characterized by the establishment and maintenance of a thirty-foot buffer of wildfire prevention measures around a building, structure, or dwelling, and a reduced fuel zone that extends between thirty to one hundred feet away from a building, structure, or dwelling, or to the property line.

4.1.3 Structural Fires

Urban fires occur in built-up environments, destroying buildings and other human-made structures. Sonora is at risk from structural fires, which are often due to faulty wiring or mechanical equipment and combustible construction materials. The absence of fire alarms and fire sprinkler systems are often conditions that exacerbate the damage associated with structural fire. Structural fires occur largely from human accidents, although deliberate fires (arson) may be a cause of some events. Older buildings that lack modern fire safety features may face greater risk of damage from fires. To minimize fire damage and loss, the City's Fire Code, based on the State Fire Code, sets standards for building and construction. It requires the provision of adequate water supply for firefighting and fire-retardant construction, among other provisions.

4.1.4 Past Fire Occurrences

Given the landscape and terrain of Tuolumne County, including forested areas along the western Sierra Nevada Mountains, significant wildfires have historically occurred within proximity to the City. These fires have resulted in varying impacts with the amount of acreage ranging from a few hundred acres to over 250,000 acres. Most wildfire occurrences within the Planning Area have been smaller in nature. Major wildfires have not regularly occurred within the City of Sonora. However, regionally significant wildfires negatively affect the Planning Area by causing smoke and poor air quality in Sonora. Large regional wildfires could also spread toward Sonora, prompting evacuation and shelter in place procedures, or otherwise strain local public safety agencies. Major

wildfires (greater than 10,000 acres burned) in the surrounding area since 1987 and wildfires with specific impacts to the City of Sonora are discussed below.

1987 Stanislaus Complex Fire – The Stanislaus Complex Fire burned approximately 145,950 acres south of Highway 108, across Highway 120, and south toward Mariposa.

1996 Ackerson Fire – The Ackerson Fire burned approximately 61,070 acres in Yosemite National Park and Stanislaus National Forest east of Sonora.

2001 Creek Fire – The Creek Fire burned approximately 11,500 acres south of Sonora near Coulterville, spanning both sides of Highway 49.

2001 Darby Fire – The Darby Fire burned approximately 14,280 acres north of Sonora in Calaveras County.

2013 Rim Fire – The Rim Fire burned approximately 257,314 acres, east of Sonora in Yosemite National Park and the Stanislaus National Forest. The fire began as a result of an illegal campfire, approximately 20 miles east of Sonora. The Rim Fire is the 11th largest wildfire in California history. The fire burned 11 homes, 3 commercial structures, 98 outbuildings, and injured 10 people.

2018 Donnell Fire – The Donnell Fire burned approximately 36,450 acres east of Sonora around Highway 108 in the Stanislaus National Forest.

2021 Washington Fire – The Washington Fire burned 160 acres and destroyed 18 structures. The fire ignited outside the City limits in Tuolumne County, at the intersection of Golf Links Road and SR 108 southwest of Sonora. Tuolumne County and the City of Sonora both proclaimed a Local State of Emergency as a result of the Washington Fire, and the fire resulted in multiple road closures and evacuation orders in the City.

2022 Woods Fire – The Woods Fire occurred near SR 108 and SR 49 near the southwest border of Sonora in Tuolumne County. The fire burned 21 acres; however, it resulted in the closure of Stockton Road between SR 108 and Ponderosa Way in Sonora. Evacuation orders and warnings were issued for residential areas just outside of Sonora. The Tuolumne County Sheriff Posse Grounds served as an evacuation center.

4.1.5 Potential Changes to Fire Risk in Future Years

Possible Future Fire Occurrences

From June to November each year, Tuolumne County has historically faced a serious wildfire threat that is very likely to continue. The threat of wildfire and potential losses are constantly increasing as human development and population increase and the wildland-urban interface areas expand. Due to its fuel load and long, dry summers, most of Tuolumne County continues to be at risk from wildfire. While the City has limited major wildfire occurrences within the Planning Area, there is a high probability of future wildfire occurrence in surrounding areas. The likelihood of structural fires in the City is likely to remain consistent with historic levels.

CALFIRE and the Tuolumne County Fire Department developed a Strategic Plan 2021-2025 to expand funding and outreach, enhance the firefighter volunteer program, and improve fire monitoring and fighting equipment for Tuolumne County Fire and areas surrounding the City of Sonora. The City has taken similar measures to prevent wildfires, including vegetation management, defensible space inspections, staffing increases, and code enforcement actions within the Planning Area.

Climate Change and Wildfire

Changing climate conditions are expected to increase the wildfire risk in and around Sonora. Warmer temperatures brought on by climate change can exacerbate drought conditions. Droughts can kill or dry out plants, creating more fuel for wildfires. It is possible that higher temperatures could cause local native chaparral and scrub ecosystems to become even more flammable grasslands. This would increase dry plant

matter, which could cause wildfires to move faster or spread into developed areas. In recent years, California has witnessed the largest fires in state history, some burning more than or close to 1,000,000 acres. Increasingly, wildfires are being ignited by thunderstorms and lightning strike activity over the summer, which is expected to continue with more extreme weather patterns as a result of climate change.

The annual average area burned in Sonora is expected to remain relatively constant, with an historical average of approximately 135 acres per year, to approximately 128 to 141 acres per year by mid-century. Additionally, climate projections indicate that the number of days per year during which the dryness of the soil in and around Sonora indicates severe drought will increase from an historical average of 106 days to an average of approximately 130 days by mid-century.⁴ The annual average area burned in Tuolumne County is expected to increase from an historical average of approximately 11,850 acres per year, to approximately 17,180 to 20,500 acres per year by mid-century.⁵ Regional wildfires will become an increased threat in Tuolumne County, and are likely to occur near or impact the City of Sonora, in part by releasing smoke, ash, and other particulate matter that degrades air and water quality. Due to warmer temperatures, the fire season is also likely to begin earlier in the year and extend later than it has historically.

4.1.6 Fire Protection

Fire protection in the Planning Area is provided by the City of Sonora. The City of Sonora Fire Department (SFD) has one fire station located at 201 South Shepherd Street. SFD is responsible for all risk/fire/hazard emergency services to the City of Sonora and all fire-related incidents within the Local Responsibility Area. SFD is also part of the 2016 Tuolumne County Fire Service Providers Automatic Aid Agreement, which includes all the fire service providers in the County and establishes a basic tenant of the fire service of the closest resource concept. These agencies include the California Department of Forestry and Fire Protection (CALFIRE), Columbia Fire Protection District, Jamestown Fire Protection District, Chicken Ranch Tribal Fire Department, Tuolumne City Fire Protection District, Tuolumne Rancheria Fire Department, Twain Harte Fire District, Miwuk Sugar Pine Fire District, Groveland Fire District, and the Tuolumne County Fire Department. This agreement allows for decreased response times and increases fire ground staffing while still respecting jurisdictional boundaries.⁶ As a result, the SFD responds to calls in neighboring unincorporated Tuolumne County as well as the communities of Columbia and Jamestown, in addition to servicing the City. The City of Sonora has a Mutual Threat Zone Agreement (MTZA) with CALFIRE to provide services and cooperative efforts in both the SRA and LRA.

SFD provides fire protection and prevention, emergency medical services, public education, non-emergency public services, and disaster preparedness and response to the City and surrounding areas. The department is staffed with two full-time personnel (Fire Captain and Fire Engineer) and two Volunteer Intern Firefighters when positions are filled. At the time of writing of this Safety Element, the SFD had one Fire Chief, one Administrative Assistant, three Fire Captains, three Fire Engineers, three Relief Fire Engineers, 5 Intern Firefighters, and 8 Volunteer Firefighters. SFD relies on the participation of volunteers, off duty full-time personnel, and other fire agency resources during large-scale emergency events.⁷ At any given time, there is a minimum of two paid staff members at the fire station 24 hours per day, 7 days per week. The City Fire Department responds with the following equipment: a 2020 Type 1 Smeal Fire Engine, 2023 Type 6 Rosenbauer Fire Engine, 2024 Type 3 BME Fire Engine, 1996 75' Ariel Quint (Truck), 2005 Reserve Type 3 Fire Engine, and three staff vehicles. The Sonora Fire Department's average response time is approximately 4 minutes within the City limits 90% of the time.

⁴ Cal-Adapt. 2024. "Local Climate Change Snapshot for Sonora." Accessed 07 March 2024. <https://cal-adapt.org/tools/local-climate-change-snapshot>.

⁵ Cal-Adapt. 2024. "Local Climate Change Snapshot for Tuolumne County." Accessed 07 March 2024. <https://cal-adapt.org/tools/local-climate-change-snapshot>.

⁶ Tuolumne County. "CAL FIRE/Tuolumne County Fire Department 2021-2025 Strategic Plan." Accessed 07 March 2024. https://www.tuolumnecounty.ca.gov/DocumentCenter/View/25399/TCFD-2021-2025-STRATEGIC-PLAN-signed_1.

⁷ City of Sonora. "Fire Department." Accessed 07 March 2024. <https://sonoraca.com/city-services/departments/fire-department/>.

4.1.7 Fire Hazards Goals, Policies, and Programs/Implementation

GOAL 1: Minimize risk of injuries, property damage, and economic loss resulting from urban and wildland fires in and around Sonora.

Policy 1.1: Continually identify any areas of likely wildfire or urban fire risks in Sonora.

Program/Implementation 1.1.A: The Sonora Fire Department shall conduct an annual assessment of properties in Sonora pre-fire season to determine potential fire risk and initiate any necessary mitigation.

Policy 1.2: Require all new residential and commercial development in areas identified as very high fire hazard severity zones to comply with State Wildland Urban Interface (WUI) building and fire code regulations.

Policy 1.3: Prevent fuel accumulation around any City-owned infrastructure and other areas where fires may occur.

Program/Implementation 1.3.A.: Establish a comprehensive vegetation management and fuel reduction program applicable to the entirety of the City. Work with the City Fire Department to identify areas with high wildfire hazard risk as top priority for fuel clearance and reduction. Prioritize the removal of hazardous vegetation and trees that are confirmed invasive (non-native species), dead, dying, or infested with bark beetles. Work with a contractor to estimate fuel reduction pricing to apply for CALFIRE or Cal OES/FEMA grant funding.

Program/Implementation 1.3.B.: The City shall draft a vegetation removal program that includes the clearance of vegetation located on roadsides where ownership/property boundaries are unknown. The City shall consider methods by which to engage the public in this process, to encourage vegetation removal on personal property, and to properly notify in advance of City-led removal in roadside areas.

Program/Implementation 1.3.C: Promote a culture of volunteerism and “neighbors-helping-neighbors” regarding vegetation management and fuel reduction on private property. Partner with local nonprofits/community organizations such as the Sonora Sunrise Rotary, Sonora Lions Club or Cub Scouts or CERT to help elderly or disabled community members with vegetation management and fuel reduction on their property.

Program/Implementation 1.3.D: The City and Sonora Fire Department shall support and participate with partner agencies, such as Tuolumne County and CALFIRE, to develop a local program to identify, prioritize, and fund fuel modification projects, including community fire breaks and long-term maintenance to protect new and existing developments in the Local Responsibility Area, and leverage the California Vegetation Treatment Program (CalVTP) for eligible projects in the State Responsibility Area. Fuel modification projects shall include, but are not limited to, a roadside fuel reduction plan, defensible space clearances around structures, subdivisions, and other development in Very High Fire Hazard Severity Zones. The City, in coordination with partner agencies, shall be responsible for maintaining community fire breaks and other fuel modification projects on an annual basis, and shall establish a process for annual review and remediation.

Policy 1.4: Maintain an adequate peak load water supply for fire suppression efforts in Sonora.

Program/Implementation 1.4.A: The City shall require each new large-scale development to submit a water usage plan showing that Sonora’s water system can supply the new

development with minimum water amounts while maintaining optimal water supply for fire suppression work.

Program/Implementation 1.4.B: The City shall conduct a water supply and infrastructure assessment to determine the adequacy of existing water supply infrastructure. The assessment shall include a mapping effort to identify the geographic location of anticipated water supplies. System improvements shall be conducted by Tuolumne Utilities District, in coordination with the City, if any part of the water supply system is found insufficient to meet peak load water supply requirements for fire suppression efforts. The City, in coordination with Tuolumne Utilities District, shall be responsible for maintaining the consistent and long-term integrity of water supplies. The City shall work with Tuolumne Utilities District to set a schedule for re-assessing the water supplies and associated infrastructure.

Policy 1.5: Continue to enforce and, as necessary, adopt new development standards, including relevant sections of the State Building Code, to reduce fire hazard risks for new and existing development in Very High Fire Hazard Severity Zones and utilize home hardening techniques.

Program/Implementation 1.5.A: The City shall continue to enforce requirements to provide defensible space around homes and other buildings in fire-prone areas, and strengthen standards as needed to provide adequate protection.

Program/Implementation 1.5.B: The City shall develop a fire-safe assessment to use prior to issuing a building permit or other formal approval for significant retrofits to buildings in identified very high and high fire hazard severity zones, including installation of sprinklers and fire-safe exterior materials as feasible.

Program/Implementation 1.5.C: Require new developments in very high and high fire hazard severity zones to include fuel reduction plans.

Program/Implementation 1.5.D: Secure grant funding to implement a community wildfire retrofit program for property owners within Very High Fire Hazard Severity Zones. Replicate the California Wildfire Mitigation Program Pilot Home Hardening project, where FEMA grant funding is distributed through the local jurisdiction to eligible private property owners to conduct wildfire retrofits. Wildfire retrofits could include ignition resistant siding, roofs, decks, eaves, attic vents, fencing, windows, and gutters. Retrofits could also be used to establish a defensible space around property, including removal of flammable vegetation, mulch, or tree branches within five feet of the property. Establish a system to prioritize retrofits for residents with social-vulnerability characteristics, such as poverty status, disability status, or aged over 65.

Program/Implementation 1.5.E: Partner with the American Red Cross Sound the Alarm program to help distribute and install free smoke detectors in homes. Prioritize distribution and installation within the Social Vulnerable Population (SVP) (Census Tract 12), or within other small neighborhoods/communities where populations are known to have characteristics associated with social vulnerability. Promote the Sound the Alarm program through existing City communication channels.

Program/Implementation 1.5.F: Develop and update programs as needed that ensure compliance with the most recent version of the California Fire Code, recovery and redevelopment after a large fire, and that reduce future vulnerabilities to fire hazard risks through site preparation, redevelopment layout design, fire-resistant landscape planning, and home hardening building design and materials.

Program/Implementation 1.5.G: Create a planning process to determine what new and significant remodel projects are subject to preparing fire protection plans that incorporate project-specific risk reduction measures, subject to the determination and approval of the City. Require Fire Protection Plans for all new development in Very High Fire Hazard Severity Zones. Fire Protection Plans shall contain the following elements:

- Risk Analysis
- Identification of Areas Lacking Service
- Fire Response Capabilities
- Fire Safety Requirements – Defensible Space, Infrastructure, and Building Ignition Resistance
- Mitigation Measures and Design Considerations for Non-Conforming Fuel Modification
- Wildfire Education Maintenance and Limitations
- Evacuation Plan

Program/Implementation 1.5.H: The City shall require conditional approval of parcel maps and tentative maps in State Responsibility Areas or Very High Fire Hazard Severity Zones based on compliance with the State Responsibility Area Fire Safe Regulations (Title 14, CCR, Division 1.5, Chapter 7, Subchapter 2, Articles 1-5 [commencing with Section 1270]) and the Fire Hazard Reduction Around Buildings and Structures Regulations, including those regarding road standards for ingress, egress, and fire equipment access (Title 14, CCR, Division 1.5, Chapter 7, Subchapter 3, Article 3 [commencing with Section 1299.01]). Require that all new development in Very High Fire Hazard Severity Zones include adequate ingress/egress. Update the approach to reviewing new development and land use entitlements and to the extent feasible, retrofit development, and include the amendments/updates to regulations/requirements. Ensure that new development is located where fire and emergency services have sufficient capacity to meet project needs or require that they be upgraded to provide necessary capacity as part of the proposed development activities to ensure new development has adequate fire protection. The following provisions shall be required:

- Provision of public and private standards for road and driveway design, to ensure the ability of emergency service providers to respond to structural and wildland fires and calls for medical and law enforcement emergency assistance. Designs shall provide for secondary road access necessary for fire safety or emergency access;
- Ensure that each property outside of a developed water system shall maintain water storage to provide wildfire and structure protection on their property;
- Ensure that sign and address standards for new development as well as retrofit, are met, which will provide for easy identification of roads, streets, driveways, and buildings by emergency service providers;
- Create measures/standards for defensible space to reduce hazards associated with structural and wildland intermix, including:
 - Fuel modification and vegetation management procedures adjacent to structures and fuel breaks where appropriate;
 - Vegetation management adjacent to roads and driveways to provide safe travel for residents, and firefighting, medical, and police personnel; and
 - Building setbacks.
- Update buildings to meet or exceed building hardening requirements in Part 7, California Wildland-Urban Interface Code, of the California Building Code or other applicable codes, based on local studies or conditions identified in the LHMP.

- Revise Zoning Code to prohibit land uses that could exacerbate the risk of ignitions, such as outdoor storage of hazardous or highly flammable materials, outdoor welding, or temporary fireworks sales.
- Revise Zoning Code and/or process for simplifying the tree removal process to help reduce fuels on properties.

Policy 1.6: Conserve healthy tree cover in forested areas to protect ecosystem services, including carbon sequestration, soil retention, and water supply, while maintaining responsible fuel-reduction practices.

Policy 1.7: Work with Tuolumne County, State agencies, and federal agencies, as necessary, to support wildfire fuel management activities in areas devastated by bark beetles and other pests.

Policy 1.8: Work with PG&E to reduce wildfire risk and coordinate wildfire prevention and preparation efforts.

Program/Implementation 1.8.A: Advocate for PG&E to continue undergrounding powerlines within the Planning Area, along with supporting enhanced powerline safety settings and other grid strengthening projects to reduce Public Safety Power Shutoff (PSPS) incidents.

Program/Implementation 1.8.B: Promote the PG&E Report It app as a means to report hazardous trees or vegetation conditions, or other non-emergency concerns related to PG&E infrastructure.

Program/Implementation 1.8.C: Partner with PG&E to promote the Generator and Battery Rebate program, to incentivize residents and businesses to purchase back-up generators for use during Public Safety Power Shutoff (PSPS) events.

Policy 1.9: Work with Tuolumne County and State agencies to continuously modernize the City's firefighting techniques and coordinate fire prevention and preparation efforts where applicable.

Program/Implementation 1.9.A: Work with the City Fire Department, Tuolumne County Fire Department, and CALFIRE to evaluate advancements in wildfire fighting, detection, and suppression technology. Where appropriate, partner to fund or purchase technology identified to have benefits across multiple public safety agency jurisdictions.

Program/Implementation 1.9.B: Work with Caltrans to establish sufficient defensible space and vegetation management programs along major evacuation corridors, including State Route 49 and State Route 108. Secure funding to complete roadside brushing on City rights-of-ways.

Program/Implementation 1.9.C: Seek grant funding to prepare a comprehensive wildfire behavior model for the Planning Area to aid in wildfire suppression efforts.

Program/Implementation 1.9.D: Collaborate with CALFIRE, Tuolumne County, local community organizations, and others to regularly study and develop strategies, including through Community Wildfire Protection Plans, that address the change in wildfire risk associated with climate change.

Policy 1.10: Reduce the risk of fire ignition from camping-related activities.

Program/Implementation 1.10.A: Continue to enforce City Ordinance Number 889, added to City Municipal Code Chapter 9.61, prohibiting camping, occupying camp facilities, or using camp paraphernalia within 25-feet of critical infrastructure or areas designated as

a Fire Hazard Severity Zone. The purpose of this ordinance is to mitigate the threat of wildfire and damage to critical infrastructure. Continue to enforce City Ordinance Number 828, added to City Municipal Code Chapter 8.32, prohibiting open burning unless conducted in accordance with the California Fire Code.

Program/Implementation 1.10.B: Continue to enforce City Ordinance Number 888 added to City Municipal Code Chapter 9.62, alleviating hazardous conditions of encampments by authorizing the Public Works Department or other authorized agent to conduct temporary clean and clear operations and permanent encampment closures as necessary to protect the public welfare, health, and safety. The purpose of this ordinance is to mitigate the threat of wildfire and damage to critical infrastructure.

Policy 1.11: Ensure the City has adequate critical facilities for use during emergency wildfire scenarios.

Program/Implementation 1.11.A: Establish two or three critical facilities within the City that are suitable for a designated shelter in place during a wildfire scenario. Facilities for consideration include Sonora High School, Sonora Elementary School, and commercial centers/surface parking lots along Mono Way and Sanguinetti Loop Road. Identify opportunities to make each designated shelter in place location more resistant to wildfire hazards, such as expanding defensible space around the property, upgrading construction materials to be ignition resistant, and proactively staging emergency response equipment/materials. Seek funding for a community resiliency center in the City.

Policy 1.12: Require that all homes have visible street addressing and signage. Support measures that help firefighting crews and emergency response teams respond to fire hazards or work under low-visibility conditions, such as high-visibility signage for streets and building addresses that meet or exceed the standards in the California Fire Safe Regulations (Sections 1273 and 1274 of the California Code of Regulations – Title 24, Division 1.5, Chapter 7, Articles 2 and 3).

4.2 Seismic and Geologic Hazards

Seismic and geologic hazards are risks caused by the movement of different parts of the Earth's crust, or surface. Seismic hazards are the hazards associated with potential earthquakes in a particular area. Geologic hazards are hazards involving land movements such as landslides that are not linked to seismic activity and are capable of inflicting harm to people or property.

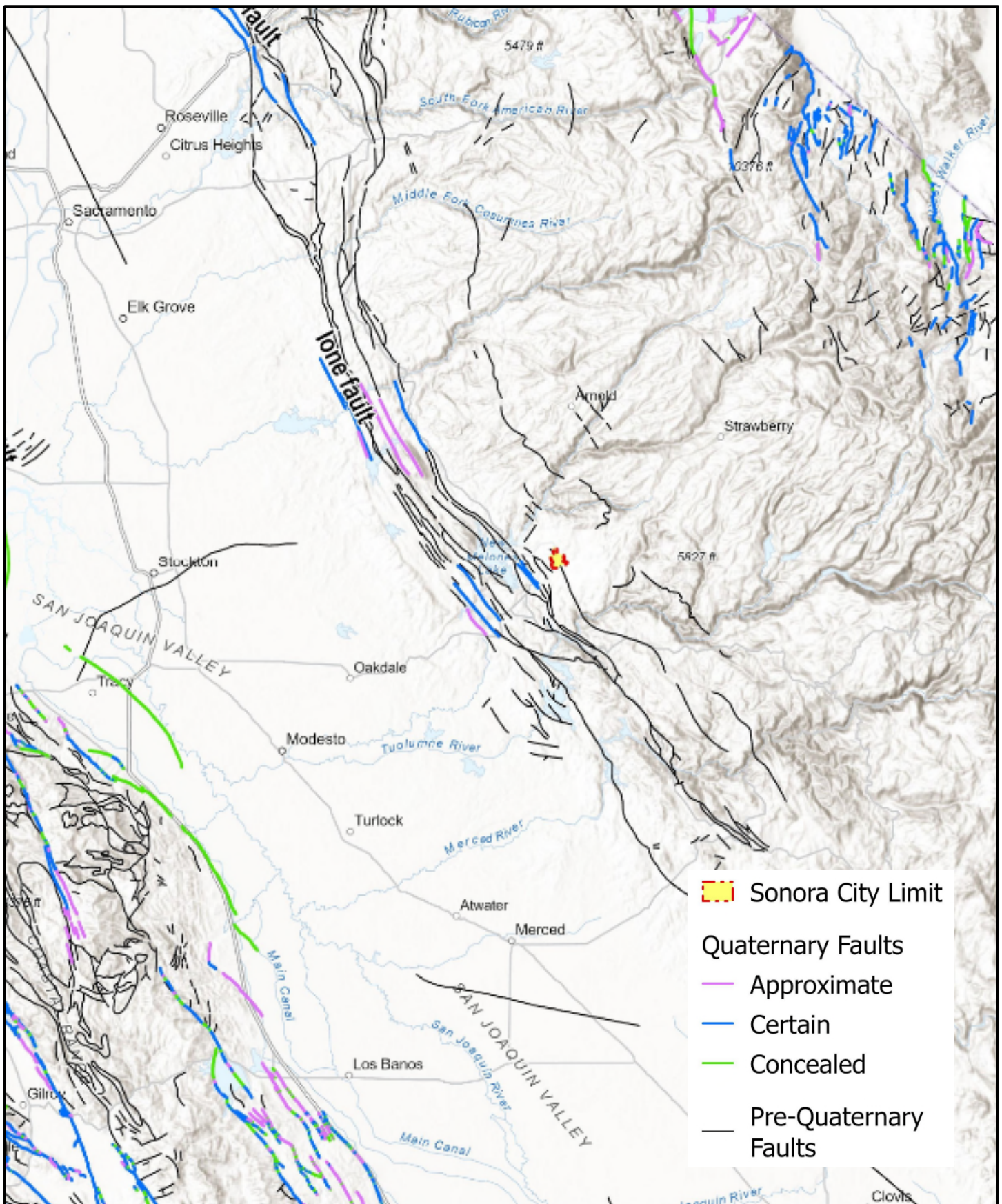
4.2.1 Seismic Hazards

The City of Sonora is located in an area of concern for seismic activity. There is a high potential that the area will be subject to at least moderate earthquakes one or more times over the next century. Seismic activity causes pressure to build up along a fault, and the release of pressure results in ground shaking. This shaking itself is known as an earthquake. Earthquakes can also trigger other hazards, including surface rupture (cracks in the ground surface), liquefaction (causing loose soil to lose its strength), landslides, and subsidence (sinking of the ground surface).

According to the California Geological Survey (CGS), no active earthquake faults are known to exist within or around the City of Sonora. The City is not within an Alquist-Priolo Fault Zone. The City of Sonora is located on a pre-quaternary fault, which is a fault that ruptured over 1.6 million years ago. If fault rupture was to occur within the City of Sonora, the location and extent of damage would be isolated around the mapped fault trace. Fault rupture is unlikely to occur within the Planning Area, as pre-quaternary faults are generally considered inactive.

However, active and potentially active faults pose a risk to the City of Sonora. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected, whereas potentially active faults are those that have shown displacement within the last 1.6 million years and may or may not have a reasonable chance of creating future earthquakes. The Planning Area is susceptible to impacts caused by ground shaking triggered by seismic activity outside of Sonora. Tuolumne County is located east of the Foothills Fault Zone, which includes the Melones Fault Zone along the east side of the system and the Bear Mountain Fault Zone on the west side. The closest known fault of the Melones Fault Zone is located approximately 3.5 miles southwest of the City; refer to Exhibit 4-3, Regional Faults.

The Melones Fault Zone is classified as "active", demonstrating displacement within the last 100,000 years, and the Bear Mountain fault is classified as "indeterminable active", where definitive evidence has not been established locally concerning its activity within the last 100,000 years. Portions of the City of Sonora are underlain by mine workings and could be hazardous to the City if ground shaking were to occur. According to the Sonora General Plan 2020, there are four "capable" faults, faults with tectonic displacement within the last 35,000 years which could produce a quake, located within Tuolumne County. The faults include Negro Jack Point, Bowie Flat, Rawhide Flat West, and Rawhide Flat East. The City could also be susceptible to ground shaking caused by earthquakes originating outside of the region. Major faults in the Bay Area (such as the San Andreas Fault, Hayward Fault) or Mono/Inyo County (including the Long Valley Caldera) could trigger large earthquakes that could generate ground shaking in the City of Sonora.



Sources: City of Sonora, Tuolumne County, Michael Baker Int, CA DOC, CGA 2010
 Map Export: 5/2/2024 12:36 PM.



EXHIBIT 4-3 Regional Faults

Structures that are most likely to be affected are those that are old or constructed of wood or unreinforced masonry construction, and mobile homes. Structures built before 1960 may not have adequate anchorage of framing and foundations. Historic buildings within Downtown Sonora predate modern seismic codes and would be at risk in the event of seismic ground shaking. Soft-story buildings, which have a story that lacks adequate strength or toughness due to too few shear walls, also do not typically perform well during earthquakes. In addition, the City is underlain by various tunnels and historic mines constructed prior to modern seismic codes. Underground mines and tunnels could collapse during strong ground shaking, causing ground failure and subsidence and damaging nearby structures. Ground shaking caused by local or regional earthquake activity has the potential to affect the entire Planning Area, and the extent of likely damage is correlated with the strength of the specific earthquake.

If a major earthquake were to occur in the region, critical damage may occur to public and private buildings, homes, and structures, including those that provide emergency services (hospitals, fire stations, schools, emergency shelters) and essential services, and infrastructure such as roads and utility lines for water, gas, power, telephone, sewer, and storm drainage. Access and continuity of services may be disjointed, and services could be offline for extended periods. Damage to essential and critical structures requires special attention in the public safety programs of the City. Damage to the following infrastructure systems could occur, in addition to the damage to public and private buildings:



Downtown Sonora

- **Telephone communications:** Telephone communications could be adversely affected due to overloading resulting from post-earthquake calls within the area and from outside, and the electronics needed to support communication systems could be damaged. The situation could be further complicated by physical damage to equipment due to ground shaking, loss of services due to loss of electrical power, and subsequent failure of some auxiliary power sources.
- **Water supplies:** Ground shaking could cause existing vulnerable water supply and drainage infrastructure to rupture or become damaged. The existing Main Drain that is located under the City would be susceptible to failure during a large earthquake.
- **Natural gas and propane:** Many buildings in Sonora rely on natural gas for fuel. Earthquake damage could cause natural gas line breaks and disruption of service, and damage to propane tanks by knocking them off their foundations, posing potential fire hazards.

Based on the proximity of the City of Sonora to the San Andreas Fault, the earthquake shaking potential mapped for Tuolumne County, and the history of shaking with no surface rupture, the probability of damaging seismic ground shaking in the City is considered to be occasional.



Saint James' Episcopal Church

Seismic hazards associated with earthquake activity, including liquefaction, are considered unlikely to occur. Liquefaction typically occurs in areas of low-lying, current, or former floodplains; the City is not located within mapped liquefaction hazard zones. The City is located approximately 117 miles from the ocean and is not at risk from tsunamis.

Most of the loss of life and injuries from earthquakes are due to damage and collapse of buildings and structures. Manufactured housing is particularly susceptible to damage from ground shaking because their foundations are not built to withstand seismic movement. Building codes for new construction have generally been made more stringent following damaging earthquakes. The City of Sonora Municipal Code adopts the most recent version of the California Building Code, which contains requirements for all newly constructed buildings to decrease the risk of damage during a seismic event. However, in Sonora, structures built prior to enactment of these improved building codes and that have not been upgraded to current standards are vulnerable to earthquakes.

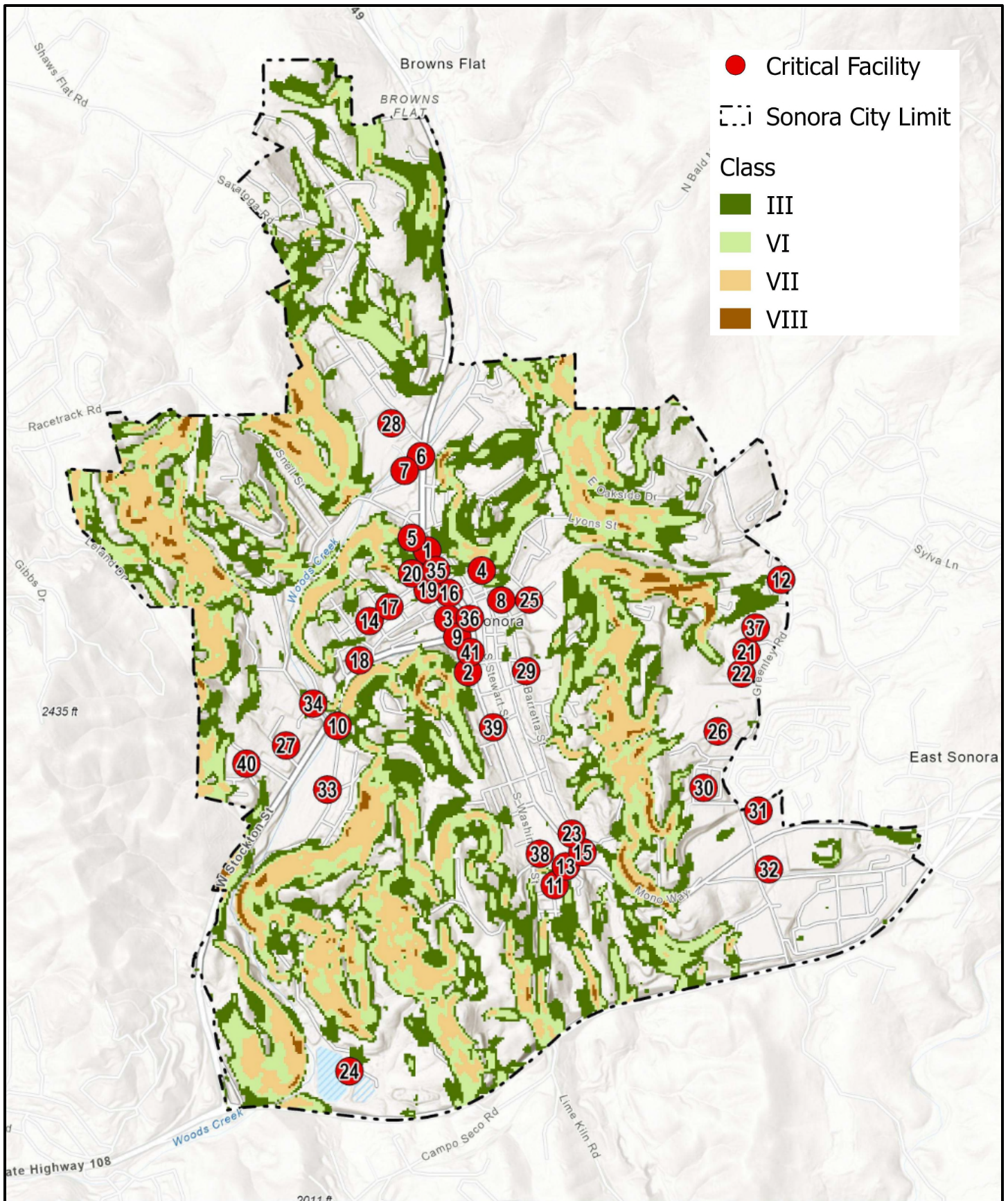
4.2.2 Geologic Hazards

Geologic hazards, such as landslides, depend on the geologic composition of the area. Rock type and composition, slope, pore water pressure, and any natural or human-caused undercutting are among the factors that influence these hazards. Landslides and rock falls occur in sloped areas and are often triggered by other natural hazards such as earthquakes, heavy rain, floods, or wildfires. The City of Sonora consists of sloped terrain, and where slopes are unstable, areas may be subject to erosion and landslides. Increased excavation on these slopes can expose more weaknesses in the underlying rock mass, creating a greater potential for failure. Landslides can damage or destroy structures or roadways as well as underground infrastructure, including pipelines or telecommunication lines, which could lead to infrastructure-induced flooding. Landslides also present a risk of serious injury or death. Mudslides are fast-moving landslides that occur when water rapidly accumulates in the ground and results in a surge of water-saturated rock, earth, and debris. Mudslides often occur following wildfire due to a lack of vegetation and soil stability.

Exhibit 4-4, Landslide Potential Zones, maps the landslide risk areas in the City, which primarily include steep slopes, particularly in the west, north, and east residential areas of the City. Three critical facilities are located within a mapped landslide hazard zone, including the Sonora Fire Station, the bridge on Southgate Drive over Sonora Creek, and a park that could serve a variety of uses during and after an emergency incident. Approximately 1,546 residential units and approximately 11,212,780 square feet of non-residential development are located within a landslide susceptibility zone. Hilly areas in Sonora have varying risk to deep-seated landslides based on regional estimates of rock strength and steepness of slopes. Areas of steep or unstable slopes could be at risk from seismically induced landslides.

Mudslide and sinkhole risk exists outside of the mapped landslide potential zones. Mudslides often occur during heavy rain incidents on wildfire burn scars; no major burn scars currently exist in the Planning Area, however there is the possibility for a future wildfire to occur and create a location with elevated vulnerability for mudslides.

The City of Sonora is also susceptible to subsidence. Sinkholes are a form of subsidence in which depressions in the ground form when the underlying rock and soil has been dissolved, eroded, or saturated by water and



Sources: City of Sonora, Tuolumne County, Michael Baker Int, CA DOC, CGS 2018
 Map Export: 5/2/2024 12:37 PM.



EXHIBIT 4-4 Landslide Potential Zones

collapses. Sinkholes are most often triggered in the Planning Area by heavy rains over known historic mines. Miles of abandoned tunnels and mining shafts exist within the City of Sonora, dating back to the 1850s. Mines and tunnels effectively act as eroded areas of subsurface rock, increasing the risk for sinkhole occurrences within the City.

The location and extent of sinkhole vulnerability in Sonora is not fully known. Historic mine tunnels and shafts are distributed throughout the Planning Area; vulnerability is assumed to be highest around historic tunnels and mining shafts. Mapped historic mine data is documented by the California Department of Conservation and the Tuolumne County History Research Center. Tunnels and retired mines are located throughout the City, including the commercially developed areas in Downtown Sonora. Some historic maps are not digitized, and due to the age of mining infrastructure there is the possibility for unmapped mines to exist.

The City of Sonora is also at risk of a variety of hazards associated with volcanoes, which are located in Mono County, east of the City. Mono County contains the most significant volcanic center in California outside of the Cascade Range, the Long Valley Volcanic Region. Also known as the Long Valley-Mono Basin Region, this area has experienced hundreds of eruptions over the last 4 million years.⁸ Today the region is dominated by two distinct but interrelated systems, the Long Valley Caldera and the Mono-Inyo Craters. The Long Valley Caldera is a 20-mile-by-10-mile, oval-shaped depression which formed during a cataclysmic eruption about 760,000 years ago.⁹ The caldera is located at the base of the eastern slope of the Sierra Nevada range, roughly 80 miles southeast from the City of Sonora. The younger system, the Mono-Inyo Craters, are an 18-mile-long chain of lava domes, lava flows and explosive craters. The chain runs from along the eastern side of the Sierra Nevada range, from Mono Lake to Mammoth Mountain near the rim of the caldera. Eruptions began more than 50,000 years ago and are estimated to have occurred as recently as 300 years ago.¹⁰

Hazards associated with volcanoes include volcanic flood, volcanic ash, lava flow, pyroclastic flow (fast-moving, sudden eruption of lava, ash, and gases), lahar (slow-moving lava eruption), volcanic gas, and ballistics (large fragments of rock with a cannonball-like trajectory typically landing within a few miles of the vent). Hazards resulting from volcanoes are dependent on the type of eruption, and hazard types may vary significantly. The specific hazards to people and property depend on which volcano erupts, the style (effusive or explosive), the volume of lava, the location of the vent, the eruption duration, and local hydrologic (water) conditions. The severity of the hazard generally decreases with distance from the volcano vent. The impact of an eruption in the Long Valley Volcanic Region may impact Tuolumne County and the City of Sonora, however, it would depend on its location, size, type, and wind direction.

Considering the Sierra Nevada Mountain Range is located between the City of Sonora and the Long Valley Volcanic Region, it is unlikely that immediate impacts of lava flows, lahars, volcanic floods, or ballistics would impact the City. These types of hazards associated with volcanoes would not flow over the Sierra Nevada range, and/or do not have an impact area widespread enough to impact the City. However, volcanic ash and volcanic gas may traverse the mountain range and impact the City. An eruption large enough to impact the City of Sonora would likely be



Southgate Drive Bridge Over Sonora Creek

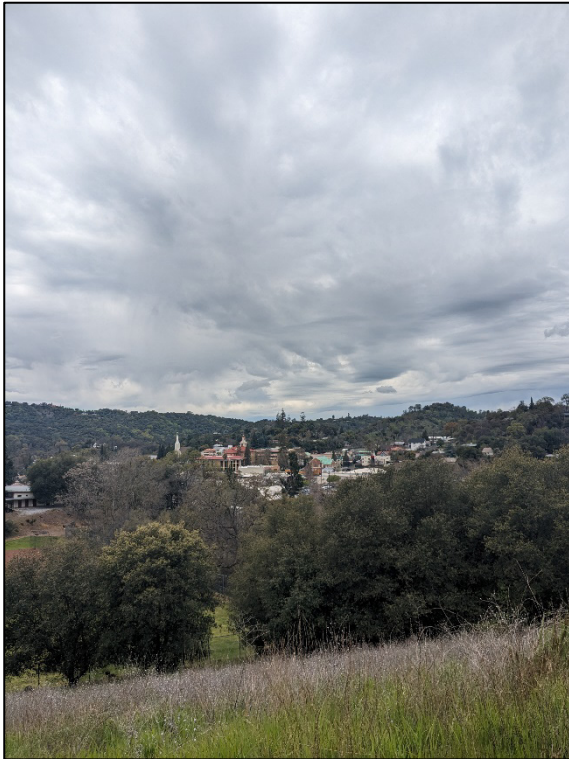
⁸ USGS, *Geologic history of the Long Valley, Mono Basin region*, <https://www.usgs.gov/volcanoes/long-valley-caldera/geologic-history-long-valley-mono-basin-region#:~:text=Sources%2FUsage%3A%20Public%20Domain.,caldera%20and%20the%20Mono%20Basin.>, accessed October 9, 2023.

⁹ USGS, *California's Exposure to Volcanic Hazards*, Version 1.1 December 2019.

¹⁰ USGS, *Mono-Inyo Craters*, <https://www.usgs.gov/volcanoes/mono-inyo-craters>, accessed October 10, 2023.

worse in eastern areas of the City, however, it is feasible that all areas in Sonora would be impacted by volcanic ash. Volcanic ash can pose a threat to buildings, roads, utilities, and communications. Ash particles released from an eruption may also cause respiratory effects, which would have particularly significant impacts on the elderly and people with difficulty breathing or asthma. A large explosive eruption could also potentially contribute to slope instability or seismic activity that would impact the City. Earthquake swarms have been known to occur in the Long Valley Caldera from 1978-1983, 1990-1995, 1996, and 1997-1998.

4.2.3 Past Occurrences



Sonora, California

According to the LHMP, there are no recently recorded fault rupture occurrences in the City of Sonora, however, the City has previously experienced ground shaking from earthquakes originating outside of the Planning Area. The most recent earthquake in Tuolumne County occurred in August 1983 and had a magnitude of 3.5. Earthquakes also occurred in nearby Mono and Mariposa Counties in 1933 and 1965, and 1975, respectively. No ground rupture has been reported in Sonora as a result of these earthquakes. Information regarding associated damages (if any) is unknown. The most recent ground shaking experienced by the City occurred on July 8, 2021, at 3:49 PM when a 5.9 magnitude earthquake in Mono County rattled the City of Sonora's downtown and the greater region. The earthquake epicenter was located in the unincorporated community of Walker, approximately 60 miles northeast of Sonora. There were no reports of damage or injuries.

Landslide occurrences in Sonora have typically been associated with heavy rains and flood events. The most recent landslide and mudslide incidents occurred during the 2022 and 2023 winter storm events. In March 2023, a mudslide on SR 49 resulting from snowy conditions caused traffic impacts in the City. In March 2023, Tuolumne County (including the City of Sonora) was part of a federal emergency disaster declaration due to the extreme winter storms, including

precipitation-induced landslides and mudslides, among other impacts.¹¹

Sinkholes have also occurred due to extreme weather events in the City over the last decade. In 2014, a damaged AT&T duct blocked an old storm drain at 201 South Stewart Street, creating a sinkhole approximately five to seven feet wide and eight feet deep. The City of Sonora Public Works Department worked with AT&T engineers to drain and patch the sinkhole. In 2019, a sinkhole emerged behind the Bank of America building at 180 South Washington Street, due to a heavy rain event. The sinkhole was approximately five to six feet wide and occurred directly on top of the City's Main Drain structure, an historic tunnel that serves as storm water drainage infrastructure. In 2023, heavy rain in January caused a sinkhole to occur behind the parking lot of the St. James' Episcopal Church. The majority of reported sinkholes in recent years have been relatively small, did not cause significant damages or injury, and have been repaired by the City.

Since the Long Valley Caldera's formation 760,000 years ago, clusters of smaller volcanic eruptions have occurred in the Caldera at roughly 200,000-year intervals. About 100,000 years ago, one of these eruptions along the Caldera's ring fault resulted in the formation of the Mammoth Knotts, low hills just north of the Town

¹¹ FEMA, *President Joseph R. Biden, Jr. Approves Emergency Declaration for California*, <https://www.fema.gov/press-release/20230310/president-joseph-r-biden-jr-approves-emergency-declaration-california>, March 10, 2023, accessed October 16, 2023.

of Mammoth Lakes. Repeated eruptions from vents on the southwest rim of the Caldera formed Mammoth Mountain roughly 220,000 to 50,000 years ago.¹²

The Mono-Inyo volcanic system began erupting in the west moat of Long Valley Caldera 400,000 to 60,000 years ago and then in the Mono Basin 40,000 to 13,000 years ago. Over the last 3,000 years, the Mono-Inyo chain has erupted at intervals of 700 to 250 years. The Mono Craters were formed by multiple eruptions 40,000 to 600 years ago, and the Inyo Craters were formed by eruptions 5,000 to 500 years ago. The most recent activity in the chain occurred with the formation of Mono Lake's Paoha Island approximately 350 years ago.¹³

As these historic incidents of volcanic activity pre-date written history within the Planning Area and the region, specific impacts to the City of Sonora from previous eruptions are unknown.

4.2.4 Potential Changes to Geologic and Seismic Risk in Future Years

Likelihood of Future Geologic and Seismic Hazard Occurrence

There is a low probability of fault rupture occurring within the City of Sonora. Fault zones known to be active in the region are located a considerable distance from the City. Earthquakes in the region are likely to continue to occur on an occasional basis and are likely to be small. They may cause no substantive damage and may not even be felt by most people. Major earthquakes are rare, but a possibility in the region. If serious shaking does occur, newer construction is in general more earthquake resistant than older construction because of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are barely braced for earthquake motions.

Mudslides, landslides, and sinkholes are likely to continue to occur with moderate frequency in the Planning Area. Much of the topography in the City is considered susceptible to landslides. Similarly, because the City is considered to be high risk for wildfire, which increases the likelihood of mudslides on wildfire burn scars, the Planning Area may be more susceptible to mudslides in the future. Because most sinkhole occurrences within the City are related to the presence of historic mines located under the Planning Area, the probability for future sinkhole occurrences is expected to remain similar to existing conditions, and moderate.

The Long Valley Volcanic Region has a long history of geologic activity that includes both earthquakes and volcanic eruptions. This pattern of volcanic and seismic activity is likely to continue into the future. The best estimate of the future behavior of a volcanic system is its past behavior. Geological studies of the Long Valley Caldera and the Mono-Inyo Craters volcanic chain provide insight into potential future activity. The pattern of volcanic activity suggests that future eruptions are more likely to occur along the Mono-Inyo volcanic chain than within the Caldera. Generally, the probability of an eruption occurring in any given year is less than 1 percent, comparable to the odds for a great (magnitude 8) earthquake along the San Andreas fault. The odds of a small eruption along the Mono-Inyo volcanic chain having a significant impact in any given year are one in 1,000 (0.1 percent). Future eruptions are likely to be explosive in style but small to moderate in size. Larger eruptions are possible but less likely. An eruption that would cause significant impacts to the City of Sonora would have to be very large. Scientists see no evidence pointing toward the possibility of a massive eruption along the lines of the one that formed the Caldera 760,000 years ago.¹⁴

Future volcanic activity may be linked with seismic activity. Geologic unrest, including series of earthquakes, ground deformation, and gas emissions, can signal a change in the likelihood of an eruption. A period of ongoing geologic unrest in the Long Valley area began in 1978 with a magnitude 5.4 earthquake centered 6 miles southeast of the Caldera. Since then, earthquake activity has increased. The most intense earthquakes

¹² USGS, *Geologic history of the Long Valley, Mono Basin region*, <https://www.usgs.gov/volcanoes/long-valley-caldera/geologic-history-long-valley-mono-basin-region#:~:text=Sources%2FUsage%3A%20Public%20Domain.,caldera%20and%20the%20Mono%20Basin.>, accessed October 9, 2023.

¹³ Ibid.

¹⁴ USGS, *Long-term outlook for volcanic activity in Long Valley caldera*, <https://www.usgs.gov/volcanoes/long-valley-caldera/long-term-outlook-volcanic-activity-long-valley-caldera>, accessed October 10, 2023.

occurred in May 1980 and included four magnitude 6 earthquakes. Between 1979 and 1980, the center of the Caldera rose almost a foot, after decades of stability. The swelling continues, and to date totals more than 2.7 feet, suggesting magmatic activity beneath the caldera. During the early 1990s, trees began dying at several places on Mammoth Mountain at the southwest edge of Long Valley Caldera. Studies showed that the trees were being killed by large volumes of carbon dioxide gas seeping up through the soil from the magma below.¹⁵

As noted, seismic activity is generally an indicator that volcanic activity will occur. Volcanic activity is more likely to occur on a small scale rather than large explosive eruptions with regional impacts. However, even small-scale volcanic activity may introduce hazardous conditions to surrounding areas. Future seismic and volcanic activity in the Long Valley Volcanic Region is expected to continue in the future but will likely be rare in terms of yearly eruptions. Volcanic impacts to Sonora are unlikely.

Climate Change and Geologic and Seismic Hazards

At the time of this writing, there is no significant data to support a direct link between seismic activity and climate change. Thus, climate change is not expected to have any direct influence on the likelihood, size, and/or severity of any future primary seismic hazard.

Although climate change is unlikely to increase earthquake frequency or strength, the threats from seismic and geologic hazards are expected to continue. Climate change will likely result in precipitation extremes (i.e., wetter wet periods and drier dry periods). While total average annual rainfall may decrease only slightly, rainfall is predicted to occur in more frequent, intense precipitation/storm events. Heavy rainfall due to climate change will lead to saturated slopes, erosion, and likely will exacerbate the effects of landslides and mudslides within the Planning Area. Increased rainfall and severe storm events will also likely exacerbate sinkhole events. Heavy rain may lead to more frequent flooding and bedrock erosion which contributes to sinkholes. Storm conditions will also increase stress on the tunnels and mines that underlie the City and are already damaged and eroding, therefore increasing the likelihood of larger and more frequent sinkhole occurrences.

There is no known or suspected connection indicating climate change would impact volcanic activity, however, volcanoes may impact climate change. Major explosive eruptions can introduce huge amounts of volcanic gas, aerosol droplets, and ash into the atmosphere. Volcanic gases like sulfur dioxide can cause global cooling, while volcanic carbon dioxide, a greenhouse gas, has the potential to promote global warming.

4.2.5 Seismic and Geologic Hazards Goals, Policies, and Programs/Implementation

GOAL 2: Minimize risk of injuries, loss of life, property damage, and economic and social disruption resulting from seismic and geologic hazards in Sonora.

Policy 2.1: Continually identify sections of Sonora that would be more susceptible to damage from seismic shaking, landslides/mudslides, sinkholes, volcanoes, or other geologic risks.

Program/Implementation 2.1.A: Identify opportunities to strengthen or relocate existing weak critical structures and lifeline utilities through geotechnical investigation to increase public safety and minimize or avoid potential damage from seismic and geologic hazards.

Program/Implementation 2.1.B: Require mitigation for buildings that change occupancy or use that require a permit for structural alterations, especially un-reinforced masonry buildings, to ensure structural safety.

¹⁵ USGS, *Living With a Restless Caldera - Long Valley, California*, <https://pubs.usgs.gov/dds/dds-81/Intro/facts-sheet/fs108-96.html>, accessed October 10, 2023.

Program/Implementation 2.1.C: Require preparation of a soils report as part of the development review and/or building permit process.

Program/Implementation 2.1.D: The City shall stabilize burned slopes located above developed areas, important infrastructure, or key transportation corridors as soon as possible after a wildfire event. The City will cooperate with the Tuolumne County Department of Public Works and/or the California Department of Transportation when necessary.

Program/Implementation 2.1.E: The City shall conduct structural retrofits of at-risk bridges to protect against flooding and landslides/debris flows. The City shall coordinate with the California Department of Transportation to achieve this implementation program when necessary.

Program/Implementation 2.1.F: Identify historic structures in need of seismic retrofit and prioritize implementation as funding becomes available.

Program/Implementation 2.1.G: Consider using ground penetrating radar to map historic underground tunnels/mines for use in evaluating sinkhole risk/vulnerability. Integrate digital as-built conditions with historic data and mining maps.

Policy 2.2: Require utilities to be designed to withstand probable seismic forces to be encountered in Sonora.

Policy 2.3: Incorporate resilient design features for roads and trails that are on or below steep slopes and have a history of being damaged or blocked by landslide events.

Program/Implementation 2.3.A: The City shall make single-access roads and key trails less vulnerable to landslides and mudflows through the use of retaining walls, slope stabilization techniques, and other strategies.

Policy 2.4: Increase the resiliency of local schools in the context of geologic and seismic hazards.

Program/Implementation 2.4.A: Support Sonora High School in mitigating Dunlavy Stadium landslide concerns by installing a French Drain to direct surface water and groundwater flows away from structures and building foundations.

Program/Implementation 2.4.B: Support Sonora Elementary School in seeking grant funding to conduct seismic retrofits at the historic dome structure.

Policy 2.5: Increase preparedness for and awareness of a potential volcanic threat.

Program/Implementation 2.5.A: Monitor the National Volcano Early Warning System and Eruption Forecasts for the Long Valley Caldera/Mono-Inyo Volcano Chain. If Volcano Eruption Warning or Watch conditions are issued, distribute relevant safety messaging from USGS and regional public safety partners.

4.3 Flood Hazards

4.3.1 Flooding

Flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities, as well as life-safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. Floodwaters can transport large objects downstream, which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits.

Floods are usually caused by large amounts of precipitation, either from a period of very intense precipitation or a long period of steady precipitation. Historically, precipitation in and around Sonora has been moderate to occasionally heavy, but snowfall is light in the Sonora area. Winter is the rainy season, with approximately 87 percent of the annual total precipitation falling in the six months from November to April. In addition to storms, floods can also be caused by very rapid snow melting or from hydrologic infrastructure failure, such as dam collapses or burst water storage tanks. Type and density of vegetation, absorption capacity of the ground, patterns of land use/urbanization, and wildfires also affect flood risk.

Sonora is located within the Upper Tuolumne Watershed and has two major drainages, Sonora Creek and Woods Creek. Areas of flooding concern are generally around Woods Creek, which runs southbound along the west side of the City. Areas at an elevated risk of flooding are generally divided into 100-year flood zones and 500-year flood zones. A 100-year flood zone has a 1 percent chance of experiencing a major flood in any given year; a 500-year flood zone has a 0.2 percent chance of flooding in any given year. The Woods Creek area in the City of Sonora is mapped within the Federal Emergency Management Agency (FEMA) 100-year flood zone; refer to Exhibit 4-5, Flood Hazard Area. This exhibit was generated with the latest FEMA FIRM maps, dated effective April 16, 2009. The City has no areas mapped within a 500-year flood zone. Areas adjacent to Sonora Creek and Woods Creek frequently receive surface flooding during major rain events. Two critical facilities are located within the mapped flood zone, however, flooding has occurred in various areas of the City often impacting roadways, residences, and drainage infrastructure. Flood impacts near mapped flood zones include the residential neighborhood east of the Motherload Fairgrounds which has one point of egress on a small Southgate Drive bridge over Sonora Creek. This bridge frequently overtops during major rain events, hindering access, transportation and evacuation options for the residential neighborhoods accessed via Southgate Drive. In addition, Southgate Drive is the primary access route to the Sonora Wastewater Treatment Plant. Flooding restricts staff access to the Wastewater Treatment Plant.



SR 49/Washington Street in Downtown, Facing North

Outside of areas mapped within the 100-year flood zone, localized flooding is a reoccurring issue in Downtown Sonora, primarily along Washington Street and adjacent streets. In addition to localized surface flooding, water intrusion occurs within the basements of many historic structures on Washington Street. The principal storm drain conveyance in Downtown Sonora is the Main Drain, a system including stone tunnels dating back to the late 1880s and storm drain pipeline connections. Over time, portions of the stone tunnel have been resurfaced

Sources: City of Sonora, Tuolumne County, Michael Baker Int, FEMA 2009
Map Export: 5/2/2024 12:37 PM.



EXHIBIT 4-5
Flood Hazard Area

with concrete/shotcrete or replaced with concrete box culverts. A recent field inspection and condition assessment occurred in October 2023, including recommendations for phased improvements; these improvements are reflected within the City's LHMP.

There are 44 dams in Tuolumne County, however, there are none with mapped inundation zones that will affect the City of Sonora. Therefore, dam failure was not included in this Safety Element.

4.3.2 Past Flood Occurrences

Local flooding incidents have historically occurred during heavy rain events. Impacts have typically occurred in the mapped flood zones and the localized flooding areas discussed above. The most recent flooding occurred over the winter months between 2022 and 2023, when the state of California experienced historically heavy rainfall over an approximately four-month period. The heaviest storms occurred in Sonora during March 2023, with the National Weather Service issuing thunderstorm, tornado, and flash flood warnings for the Planning Area. Caltrans District 10 reported a mudslide on State Route 49 between Fairview Lane and Mill Villa Court in Sonora due to heavy rain.¹⁶ Flooding and standing water caused the Sonora Police Department to close down portions of South Washington Street (Downtown) and Southgate Drive, along with Fairview Lane/Stockton Road south of Southgate Drive.

The City of Sonora may also be impacted by regional flood events. Historically, most regional flood events that have impacted Sonora have occurred as a result of heavy rains between September and March and have impacted the mapped flood zone and/or roadways that have been impacted in recent flood events. According to the National Oceanic and Atmospheric Administration database, the following regional flood events had flood impacts in Sonora; refer to Table 4-1, Historic Flood Events.

Table 4-1
Historic Flood Events

Date	Event Type	Impact
Mar 11, 2023	Flash Flood	Flash flooding was reported in the downtown area of Sonora due to heavy rain from a severe thunderstorm. Tuolumne County OES reported a creek flowing out of banks, and water flowing over Washington Street, impacting approximately 25 to 30 homes, 10 public buildings and 30 businesses.
Mar 13, 2023	Flood	Heavy rain fell bringing widespread roadway flooding, as well as local mudslides, flash flooding, with evacuations ordered in some areas.
Mar 6, 2019	Flood	Heavy rain from training thunderstorms caused flash flooding, particularly in the Sonora area.
Sep 20, 2005	Heavy Rain	Heavy rain caused rock- and mudslides along Highway 49 in Sonora resulting in minor road damage.
Feb 9, 1999	Flash Flood	Woods Creek left its banks and flooded isolated areas of Downtown Sonora.
Nov 22, 1996	Flash Flood	Very heavy rain from a thunderstorm caused Hatch Creek to overflow its banks. One fatality due to an attempt to drive a car through a flooded section of roadway.

Source: NOAA, *Storm Event Database*, <https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=1090201>, accessed November 8, 2023.

¹⁶ NOAA, *Storm Event Database*, <https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=1090201>, accessed November 8, 2023.

4.3.3 Potential Changes to Flood Risk in Future Years

Likelihood of Future Flood Occurrence

Based on the frequency of severe weather events and the capacity of existing infrastructure, there is a high probability of significant flooding occurring in the City of Sonora. Sonora is at risk to both the 100-year flood and localized storm water flooding. The average annual rainfall totals 33 inches, and though the majority of the City is located outside of the designated flood hazard zone, there has been repeated localized flooding in other parts of the City and there are identified structural deficiencies in the Sonora Main Drain. Future floods are likely to occur in similar locations as previous flood events during severe weather incidents. Areas with flood hazards include areas adjacent to Sonora Creek and Woods Creek, Downtown Sonora, the residential neighborhood east of the Motherlode Fairgrounds, and the Southgate Drive bridge over Sonora Creek.

The City of Sonora has been subject to historical flooding. Within the City, much of the flood damage occurs as a result of localized storm water flooding. Most recently, flooding occurred in January and March 2023 as a result of heavy storm water runoff caused by severe winter storms. Damages were considerable, and the storms impacted transit on public roads and several buildings in Downtown. Existing storm water infrastructure has been vulnerable and insufficient during these storm events.



Sonora Creek

Climate Change and Flooding

Climate change is likely to have a direct effect on flooding. According to research conducted by the University of California, Los Angeles, California will experience extremely wet and extremely dry seasons by the end of the century. It is predicted “over the next 40 years, the State will be 300 to 400 percent more likely to have a prolonged storm sequence as severe as the one that caused the legendary California flood more than 150 years ago.”¹⁷ This research team confirmed the recent findings from a New York Times article titled “The Coming California Mega storm,” predicting a future super storm exacerbated by climate change. A warmer climate can carry atmospheric rivers in rapid succession to California, testing the capacity of dams and flood control infrastructure. The risk of a month-long mega storm as modeled and visualized by this article has a one in 50 chance of occurring annually. If global temperatures continue to climb, the likelihood of such a storm could increase to one in 30.¹⁸

Floods are among the most damaging natural hazards in the City of Sonora, and climate change is expected to make flood events worse. Climate change will likely result in more years that see particularly intense storms that drop enough precipitation over a short enough period to cause flooding. Therefore, floods are expected to occur more often in and around Sonora, and climate change may expand the parts of Sonora that are considered flood prone. There are also indirect effects of climate change that may increase flooding in Sonora. Climate change is expected to increase the frequency and severity of droughts which cause soil to dry out and become hard. When precipitation does return, more water runs off the surface rather than being absorbed into the ground, which can lead to floods. Wildfires, which are also expected to become more frequent due to

¹⁷ UCLA Newsroom, *Study forecasts a severe climate future for California*, <https://newsroom.ucla.edu/releases/california-extremeclimate-future-ucla-study>, accessed July 12, 2022.

¹⁸ New York Times, *The Coming California Megastorm*, <https://www.nytimes.com/interactive/2022/08/12/climate/california-rainstorm.html>, published August 12, 2022, accessed October 4, 2022.

climate change, cause a similar effect by baking the surface of the ground into a harder and less penetrable layer. Trees and other vegetation help slow water down, which lets the water absorb into the soil and prevents it from turning into runoff. The loss of trees and other plants from wildfires, pests, diseases, or other climate-related exposures can also increase flood risks.

4.3.4 Flood Hazards Goals, Policies, and Programs/Implementation

GOAL 3: Minimize injury, loss of life, property damage, and economic and social disruption from flooding and inundation hazards in Sonora.

Policy 3.1: Identify and regularly update as needed any areas of likely flood inundation in Sonora using Federal Emergency Management Agency-established floodplain mapping along with any local mapping available.

Policy 3.2: Encourage new development in areas outside of the identified 100-year flood inundation zone and areas repeatedly affected by localized storm water flooding, or ensure developments are according to requirements and regulations in order to withstand flooding.

Policy 3.3: Reinforce and protect any City-owned infrastructure from the threat of flood.

Program/Implementation 3.3.A: The City shall increase resiliency of single-access roads, bridges, and trails to flooding by improving drainage systems, increasing roadbed height, and other protective steps, as feasible and appropriate. The City shall conduct regular cleaning and maintenance of storm drains along key roadways, especially in advance of the rainy season. Improve storm drain capacity in areas where ponding is regularly observed.

Program/Implementation 3.3.B: The City shall ensure that wastewater infrastructure in flood-prone areas is retrofitted and protected to minimize the risk of overflow.

Program/Implementation 3.3.C: Improve the bridge at Southgate Drive over Sonora Creek to remain passable during major flood events. If bridge improvements are determined to be infeasible, then work to establish a secondary access point to allow for ingress/egress to the Sonora WTP and residential community off of Southgate Drive during heavy rains. Options could include another access point between Southgate Drive and Stockton Street (SR 49) or obtaining an easement to connect Gerrymander Avenue with West Sunset Street.

Policy 3.4: Increase the use of permeable surfaces and rainwater catchment systems in developed areas to reduce flooding.

Policy 3.5: Maintain the highest feasible rating under the Community Rating System of the National Flood Insurance Program to reduce flood risks and cost of private property insurance.

4.4 Hazardous Materials/Wastes

Hazardous materials are materials that pose a significant risk to public safety or human or environmental health. These include toxic chemicals, flammable or corrosive materials, petroleum products, and unstable or dangerously reactive materials. Hazardous materials can be released through human error, malfunctioning or broken equipment, or as an indirect consequence of other emergencies (e.g., if a flood or earthquake causes damage to a hazardous material storage tank). Hazardous materials can also be released accidentally during transportation, as a consequence of vehicle accidents or train derailments.

Hazardous materials are generated, used, and stored by facilities throughout the City of Sonora and in surrounding unincorporated communities for a variety of purposes in service industries, agriculture, businesses, schools, and households. Uses known to transport, store, use and/or dispose of hazardous materials within the City involve construction, light manufacturing, dry cleaning, landscaping, automotive maintenance and repair, and common residential/commercial maintenance activities.

Most hazardous materials in the City of Sonora are associated with low-risk, small-scale operations consistent with day-to-day activities. Common hazardous materials include diesel fuel, chlorine, fuel waste, fertilizer, pesticides, propane, paint/paint thinner, and solvents. There are multiple propane facilities located within the City. Additionally, hazardous materials are likely used in households throughout the City. Household hazardous materials are commonly found in paints, lawn and garden products, household cleaners, beauty products, medicine, automotive fluids, and batteries. The City does not contain the types of major industrial uses that typically result in larger amounts of hazardous materials, nor are significant areas of heavy industry located in adjoining areas of unincorporated Tuolumne County.

According to the Department of Toxic Substances Control EnviroStor database, three sites are classified as “Evaluation Needed” in Sonora. The sites are listed as Tanzy Mine (201 Barretta Street) and Manufactured Gas Plant – Sonora (NE Corner of Shepard & Lyon Streets). These sites are listed as inactive, with historic uses related to mining and gas manufacturing. Tanzy Mine is a former “pocket” gold mine, and historic mining operations were small in scale. Potential contaminants of concern include arsenic and elemental mercury. Although information on the historical use of the mine is limited, the mine operated as recently as 1909 to 1928 and was determined unlikely to generate significant quantities of hazardous waste.¹⁹ This mine is currently inactive, and public access to points of entry are closed. Thus, this facility poses a limited risk of hazardous materials release to the community.



Sonora Inn

The historic Manufactured Gas Plant at the intersection of Shepard and Lyon Streets was only in operation for one year and closed in 1859. The contaminant of concern is polynuclear aromatic hydrocarbons (PAHS). The site has been re-developed as a residential property, and no records are found regarding the plant or its status for hazardous materials after 1858. Thus, the Department of Toxic Substances Control has noted this site as

¹⁹ Department of Toxic Substances Control: EnviroStor, *Tanzy Mine (60002452)*, https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=60002452, accessed November 8, 2023.

inactive but in need of evaluation.²⁰ Due to the historic nature of this site, it is also assumed this facility poses a limited risk of hazardous materials release to the community.

Additionally, there is one active State response clean-up site at Sierra Launderers & Cleaners, located at 407 North Washington Street. Hazardous materials spills at dry cleaners are common occurrences, and clean-up activities related to this facility are ongoing.

The Environmental Protection Agency (EPA) biennially collects information regarding the generation, management, and disposal of hazardous materials under the Resource Conservation and Recovery Act (RCRA). The Biennial Report Summary for 2021 reported one hazardous waste generator in the City of Sonora, at Adventist Health Sonora. However, this location is not considered to be a large generator. Hazardous waste types generated at the Sonora Regional Medical Center (including aqueous and alkaline solutions, ignitable waste, inorganic and organic wastes, oxygenated solvents, pharmaceutical waste, photochemicals, oils, sludge waste, corrosive waste, reactive waste, lead, and more) are disposed pursuant to RCRA regulations. This type of hazardous materials waste is considered standard for medical and healthcare facilities.

Hazardous material incidents in Sonora have been relatively infrequent and often minor in nature compared to more urbanized or industrialized areas. The majority of historical incidents have involved leaking underground storage tanks, which have been remediated and do not pose substantial health and safety risks. In recent years the City has experienced increasing incidents of illegal camping, which results in littering, discarded debris, and deserted propane tanks. Illegal camping has the potential to contaminate surface water and to contribute to wildfire risks within the City. The Tuolumne Utilities District relies on a series of surface ditches to convey untreated water to water treatment plants, and illegal camping within the vicinity of these ditches poses a risk to water quality. Historically, illegal camping has caused major wildfire incidents in the region, including the 2013 Rim Fire that substantially impacted Tuolumne and Mono Counties. Most reported hazardous materials incidents that occurred in Tuolumne County were accidental and transportation-caused automobile accidents. Most recently on January 20, 2024, a train carrying empty propane tanks was derailed next to the U.S. Post Office in Downtown Sonora and damaged five parked vehicles. The ultimate cause of this train derailment was determined to be a sinkhole threatening the integrity of the railroad tracks.

Several State agencies monitor hazardous materials/waste facilities. Potential and known contamination sites are monitored and documented by the Department of Health Services (DHS) and the Regional Water Quality Control Board (RWQCB). If an imminent public health threat is posed by an outside factor, the City will support local regulating agencies in notifying the public. The transport of hazardous materials/wastes and explosives through the region is regulated by the California Department of Transportation (DOT). City streets are generally not designated as hazardous materials/waste transportation routes, but a permit may be granted on a case-by-case basis. Transporters of hazardous waste are required to be certified by the DOT and manifests are required to track the hazardous waste during transport. The Sonora Police Department, Sonora Fire Department, Tuolumne County Office of Emergency Services, and the Tuolumne County Environmental Health Division are responsible for hazardous materials accidents at all locations within the City. The Tuolumne County Environmental Health Division is certified by Cal-EPA to administer specific hazardous materials/hazardous waste programs. Tuolumne County also monitors groundwater levels and flow conditions to determine groundwater quality. Tuolumne County requires a Hazardous Materials Business Plan (HMBP) for any facility that stores materials in quantities greater than 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for gases. These programs and protocol serve to mitigate the likelihood and severity of hazardous materials releases.²¹

Accidental hazardous materials releases are usually caused by human error unrelated to climate change. However, hazardous materials releases can be a secondary impact as a result of infrastructure failure during a

²⁰ Department of Toxic Substances Control: Envirostor, *Manufactured Gas Plant – Sonora (55490002)*, https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=55490002, accessed November 8, 2023.

²¹ Tuolumne County, *Hazardous Materials – Environmental Health*, <https://www.tuolumnecounty.ca.gov/1555/Hazardous-Materials>, accessed November 15, 2023.

natural hazard event, such as a wildfire or severe storm. Climate change could cause an increase in destructive natural hazards in the City and surrounding region, and thus increase the risk of future hazardous materials spills. Further, hazardous materials releases during wildfire or severe weather events could spread contamination to large geographic areas and amplify long-term impacts to human and ecological health. Spills or releases in challenging clean-up conditions can result in more severe damage or impacts compared to spills during normal conditions.

4.4.1 Hazardous Materials Hazards Goals, Policies, and Programs/Implementation

GOAL 4: Reduce likelihood of hazardous materials release, exposure, and contamination in Sonora.

Policy 4.1: Maintain a record of all businesses and sites in Sonora with hazardous materials to be filed with the Sonora Fire Department and City Engineer.

Policy 4.2: Encourage commercial or industrial development using hazardous materials in areas away from residential uses and discourage commercial and industrial development using hazardous materials in areas of identified flood or wildfire risk.

Program/Implementation 4.2.A: The City shall discourage new uses of hazardous materials within identified flood and wildland fire risk areas or within a 0.25-mile radius. New hazardous material uses within a 0.25-mile radius of residences shall include a green buffer around the property.

Policy 4.3: Collaborate with other cities/towns, Tuolumne County, and regional hazardous waste management organizations to limit the risk of hazardous materials release.

Program/Implementation 4.3.A: The City shall inform all local governments in Tuolumne County and the County of Tuolumne when a major commercial and/or industrial use has been approved that uses, produces, and/or transports hazardous materials and/or wastes in the area.

Program/Implementation 4.3.B: Identify and establish specific travel routes for the transport of hazardous materials and wastes, with key considerations being capacity to safely accommodate additional truck traffic, avoidance of residential areas, and use of interstate or state-divided highways as preferred routes.

Policy 4.4: Reduce the risk of exposure to hazardous materials in Sonora.

Program/Implementation 4.4.A: The City shall require the proper storage and disposal of hazardous materials to prevent leakage, potential explosions, fire, or the release of harmful fumes. The City shall maintain information channels to the residential and business communities about the illegality of dumping hazardous materials and waste in the storm drain system or in creeks.

Policy 4.5: Require hazardous materials assessments for development projects on sites of concern.

Program/Implementation 4.5.A: Ensure that any proposed new development on identified or suspected hazardous materials sites address hazardous materials through the preparation of Phase I or Phase II hazardous materials studies for each identified site as part of the design phase of each project.

Policy 4.6: Require remediation and cleanup of sites contaminated with hazardous substances.

Policy 4.7: Promote the reduction, recycling, and safe disposal of household hazardous wastes through public education and awareness.

Policy 4.8: Promote and publicize local trash cleanups hosted by community groups such as 1 Pile at a Time and other volunteer organizations.

4.5 Emergency Operations

4.5.1 Communication and Equipment

The City of Sonora does not have a centralized communication system and lacks reliable internet service during emergency scenarios. Emergency operations may be impeded when needed most because emergency responders may not be able to communicate with one another. Response efforts may not be coordinated or effective. City communication is dependent on the service availability of AT&T, which is vulnerable during extreme weather and other hazard events. Reliable communication is necessary for the Sonora Fire Department and Sonora Police Department to respond efficiently and effectively to crises. The lack of dependable communication methods can strain resources that are already limited within the City.



Historic Engine on SR 49

The City also does not have proper emergency response equipment. Basic equipment for emergency operations should include radios, workstations, storage compartments, computers, phones, portable dispatch modules, personal protective equipment, shelter equipment, and generators. The City may be unable to provide adequate emergency response services without necessary supplies during future emergency scenarios. Climate change is likely to increase the severity and occurrence of multiple hazard event types, including wildfires, severe weather, extreme heat, and floods. The City needs proper resources to provide emergency assistance to vulnerable populations and assets in a coordinated and efficient manner in order to be prepared for the expected increase in hazard events.

4.5.2 Pandemic

A pandemic refers to an epidemic that has spread over several countries or continents, usually affecting significant proportions of the population.²² Pandemic agents are spread from person to person through direct or indirect contact, so humans are understood to be the causal element of pandemics. Effects of a pandemic would likely impact the entirety of the City of Sonora depending on the disease and the susceptible population. While the entire City would be at risk, specific subsets of the population may be more susceptible than others, including vulnerable populations, the very young, elderly, and immune-compromised individuals, depending on the disease.

The extent to which a pandemic would impact the City would depend on the disease type and symptoms. Some diseases may be extremely transmissible and would affect a significant portion of the population, however, the symptoms might be mild. Alternatively, a disease might be very deadly but not easily transmitted. The worst-case pandemic scenario is a disease that is both highly transmissible and highly deadly, such as COVID-19. The severity and extent of a pandemic may also depend on the ability to respond by developing and administering vaccinations, or other methods for mitigating the spread of the disease.

²² CDC, *Lesson 1: Introduction to Epidemiology*, Section 11, <https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html#:~:text=Epidemic%20refers%20to%20an%20increase,a%20more%20limited%20geographic%20area.,> accessed April 12, 2023.

The Centers for Disease Control and Prevention have identified two recent pandemics and two major historical pandemics in roughly the past 100 years:²³

- 2019 COVID-19 Pandemic (SARS-CoV-2 virus)
- 2009 H1N1/“Swine Flu” Pandemic (H1N1pdm09 virus)
- 1968 Pandemic (H3N2 virus)
- 1918 Pandemic (H1N1 virus)

The City of Sonora experienced significant impacts from the recent COVID-19 Pandemic. A novel coronavirus disease, SARS-CoV-2, or COVID-19, was identified in Wuhan, China in December 2019. By March 2020, the Governor issued the first statewide stay at home order, closing non-essential businesses. COVID-19 is highly transmissible and can spread by breathing in air or aerosol particles.²⁴ COVID-19 has a wide range of symptoms including fever, chills, cough, shortness of breath, difficulty breathing, and loss of smell or taste. The symptoms of COVID-19 can result in severe complications that require hospitalization. Severe complications often lead to death, particularly in elderly people and people with underlying health conditions or compromised immune systems.²⁵

As of November 2023, 220 confirmed COVID deaths occurred in Tuolumne County.²⁶ The majority of these deaths occurred between 2020 and 2022. The rate of COVID spread and number of COVID infections/deaths in Tuolumne County is generally lower when compared to urbanized areas and major cities across California. However, the community was greatly affected by federal and State policy designed to stop the spread of COVID-19.

As part of the response to slow the spread of the virus, non-essential businesses and schools were closed or transitioned to remote environments, if feasible. The City followed guidelines and safety standards set by the Tuolumne County Public Health Department, particularly regarding the reopening of non-essential businesses and schools. A significant milestone and improvement against the pandemic came in December of 2020 with the release of the COVID-19 vaccine.

Before COVID-19, the most recent pandemic experienced was in 2009, the (H1N1)pdm09, “swine flu” pandemic.²⁷ H1N1pdm09 primarily affected children and young/middle-aged adults, atypical from most influenza pandemics. Between April 2009 and April 2010, the CDC estimates over 60 million cases, nearly 275,000 hospitalizations, and over 12,000 deaths in the United States. The World Health Organization declared an end to the global pandemic in August 2010; however, the virus continues to circulate as a seasonal influenza virus.²⁸

Both the 1968 and 1918 pandemics were caused by avian flu outbreaks. The 1968 pandemic was caused by the influenza H3N2 virus. The estimated number of deaths in the United States was 116,000 and the worldwide total is estimated at 1.1 million.²⁹ Medical advances in the 1960s including antiviral medications and expanded influenza vaccine options significantly helped combat this pandemic. The 1918 pandemic was an outbreak of influenza caused by an H1N1 virus. The virus spread worldwide from 1918-1919. It is estimated that one third of the worldwide population at the time, about 500 million people, became infected with the virus. The pandemic resulted in an estimated 675,000 deaths in the United States alone and over 50 million total world-wide.³⁰

²³ CDC, *Past Pandemics*, <https://www.cdc.gov/flu/pandemic-resources/basics/past-pandemics.html>, accessed November 9, 2023.

²⁴ CDC, *COVID-19 Overview and Infection Prevention and Control Priorities in non-U.S. Healthcare Settings*, <https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html>, accessed November 9, 2023.

²⁵ Ibid.

²⁶ Covid19 California State Dashboard, *Tracking Covid-19 in California*, <https://covid19.ca.gov/state-dashboard/#county-statewide>, accessed November 9, 2023.

²⁷ CDC, *Origin of 2009 H1N1 Flu (Swine Flu): Questions and Answers*, https://www.cdc.gov/h1n1flu/information_h1n1_virus_qa.htm, published November 25, 2009, accessed November 9, 2023.

²⁸ CDC, *Past Pandemics*, <https://www.cdc.gov/flu/pandemic-resources/basics/past-pandemics.html>, accessed November 9, 2023.

²⁹ Ibid.

³⁰ Ibid.

The likelihood of pandemics has increased over the last hundred years due to increased globalization, urbanization, and changes in land use. Another potential key contributor to an increased likelihood of pandemics is factory farming. The shift from small scale animal agriculture to large factory farming operations may be a driving factor in recent pandemic diseases and may cause the next pandemic. For these reasons, the probability of future occurrences is considered medium. Climate change may also contribute to an increase in pandemics and the transmission of pandemics because climate change will cause humans and animals to relocate to more habitable areas over time. This relocation increases the risk of viral transmissions, particularly between species. Additionally, increased urbanization and globalization will allow pandemics to spread faster.

4.5.3 Emergency Operations Goals, Policies, and Programs/Implementation

GOAL 5: Protect the life and property of residents, businesses, and visitors to Sonora from natural and human-made hazards. Ensure emergency operations equipment and infrastructure is sufficient to protect the City of Sonora.

Policy 5.1: Site critical public facilities outside of the identified 100-year flood plain, high fire hazard severity zones, and potential areas of subsidence to the extent possible. Critical public facilities include hospital and healthcare facilities, emergency shelters and resilience hubs, police and fire stations, and emergency communications facilities – if such facilities must be in mapped hazard zones, ensure that such critical facilities are protected from the risks of flood inundation, fire, and subsidence.

Policy 5.2: Continue to regularly update and implement the City of Sonora Local Hazard Mitigation Plan.

Program/Implementation 5.2.A: The City shall review and update as needed the Safety Element at least once every eight years, as required by State law, ideally concurrent with updates to the City's LHMP or the Sonora Housing Element so that the best available hazard data is concurrently incorporated into the Safety Element.

Program/Implementation 5.2.B: The City shall incorporate by reference the LHMP into this Safety Element.

Policy 5.3: Enhance public education and awareness of natural and climate change-induced hazards and public understanding of disasters.

Program/Implementation 5.3.A: The City shall encourage all persons in hazard-prone areas, especially those living in neighborhoods along single-access roads, to prepare and keep an emergency and evacuation kit.

Program/Implementation 5.3.B: The City, in partnership with community-based organizations, shall create a community support network to check on socially vulnerable or isolated persons during dangerous conditions. Similarly, the City shall use said network to provide information and services related to hazard mitigation and emergency preparation to persons with limited access to transportation, communication, and other lifeline resources and services.

Policy 5.4: Identify and, as feasible, retrofit any City-owned buildings, roadways, and facilities in areas prone to storm-induced flooding, subsidence, or structural fire to maximize defensible space and outdoor fireproofing, improve drainage systems, and take other actions to harden the property as needed.

Program/Implementation 5.4.A: The City shall, when identifying projects for inclusion in the Capital Improvements Program list, note any potential vulnerabilities to climate-related hazards and ensure that the project maximizes its resilience potential and minimizes any climate vulnerabilities.

Policy 5.5: Continue to coordinate with nearby jurisdictions and land managers to reduce the risk of hazardous events occurring in surrounding areas that may affect Sonora.

Policy 5.6: Develop mitigation strategies to lessen the impacts of future public health crises, including pandemics.

Program/Implementation 5.6.A: The City shall adopt the California Governor's Office of Emergency Services (Cal OES) policy recommendations to prepare for, prevent, respond to, recover from, and mitigate the effects of all types of public health crises including any future COVID-19 pandemic.

Program/Implementation 5.6.B: Continue to coordinate with the Tuolumne County Public Health Department and follow the most recent guidance to address pandemics, including the recent COVID-19 pandemic.

Policy 5.7: Acquire adequate emergency operations equipment and communications infrastructure and supplies.

Program/Implementation 5.7.A: Evaluate pricing plans for satellite internet providers (such as Starlink, HughesNet, or Viasat) as a backup communication method during emergency scenarios, where power or cable internet service is unavailable for extended periods of time. Seek grant funding and community partners (such as the local school districts) for cost-sharing purposes.

Program/Implementation 5.7.B: Seek grant funding to purchase radio communications systems (such as Public Safety Radios, HAM radios, satellite phones, or Emergency Responder Radio Communication Systems) for use in emergency situations where other forms of communication are not available. Establish internal communication protocols for use of the radio communication systems and identify key points of contact within City Departments. Partner with external agencies such as local school districts and Adventist Health to expand the radio communication network in case of an emergency.

Program/Implementation 5.7.C: Seek grant funding to purchase a mobile command unit or trailer for public safety agencies to stage emergency operations and dispatch in close proximity to the emergency incident. Include communication technology/radio dispatch, workstations, and storage compartments. Consider partnerships with external public safety agencies for cost sharing and maintenance.

Program/Implementation 5.7.D: Purchase a mobile cell site on a rapid-deployment unit for use during Power Safety Shut Offs (PSPS).

Program/Implementation 5.7.E: Purchase equipment for the City Emergency Operations Center in accordance with FEMA's Authorized Equipment List. High priority equipment includes computers, phones, portable dispatch modules, radios, personal protective equipment, office supplies, and tools.

Program/Implementation 5.7.F: Seek grant funding to purchase permanent and emergency generators in coordination with community stakeholders. At a minimum, coordinate to purchase: (1) two generators in partnership with Sonora High School, to allow for extended shelter in place during power outages and (2) back-up power solutions and battery energy storage system (BESS) in partnership with Adventist Health, to maintain standard of healthcare during power outages.

Program/Implementation 5.7.G: Partner with the Red Cross to identify additional shelter locations within the City suitable for use during a variety of natural or human-caused hazard scenarios. Continue to assist the Red Cross with proactively staging required shelter equipment and resources.

Program/Implementation 5.7.H: The City shall, in coordination with utility companies, explore replacing streetlights with new models, or augmenting existing streetlights with additional features, allowing them to act as public Wi-Fi beacons and relay stations for public emergency alerts.

Policy 5.8: Increase community awareness of, and preparedness for, hazard events and emergency protocols.

Program/Implementation 5.8.A: Promote opportunities to volunteer and partner with the American Red Cross – Gold Country Region through existing City communication channels, such as social media, City newsletters and public hearings. Promote Red Cross programming efforts such as Red Cross Month. Connect local community groups with Red Cross programming and resources.

Program/Implementation 5.8.B: Encourage residents and community leaders to participate in Red Cross training programs, including basic shelter training and shelter supervisor training. Partner with local and County Community Emergency Response Teams (CERT) and Search and Rescue Teams to participate in Red Cross training programs, such as first aid and CPR.

Program/Implementation 5.8.C: Participate in regular safety and public awareness campaigns regarding natural and human-caused hazards, and partner with local stakeholders to distribute awareness materials. Include best practices and awareness for emergency evacuations and shelter-in-place orders. Include considerations for “hard to reach groups”, such as senior citizens, disabled persons, or low-income households, who may not consume traditional media or outreach approaches.

Program/Implementation 5.8.D: Promote communication/programming efforts from the Area 12 Agency on Aging organization related to natural hazard preparedness and emergency evacuation for senior citizens.

4.6 Human-Caused Hazards

Human-caused hazards can include a variety of incidents, including active shooter events, terrorist attacks, aircraft crashes, civil disturbance, and cyberterrorism. Most human-caused hazards are unpredictable, and impacts depend on numerous factors specific to the incident.

4.6.1 Active Shooter/Terrorist Attack/Mass Casualty

Active shooter and terrorist attack incidents both have the potential to cause mass casualties and overwhelm emergency response operations in Sonora. These types of events can occur anytime and anywhere, though places where people gather, places of political importance, infrastructure, and destinations are typically most vulnerable. The City of Sonora serves as the commercial, governmental, and cultural center for Tuolumne County. Commercial corridors along Washington Street, West Stockton Street, and the commercial area in the southeast corner of the City are potential targets for terrorism or an active shooter. As the City also serves as the County seat, there is a high concentration of governmental offices and facilities located within the Planning Area. Additionally, schools, churches, and healthcare facilities are also considered vulnerable to terrorism and active shooter threats.

The extent of impacts of terrorism and active shooter events are difficult to predict and would depend on the nature of the attack and target. Impacts may vary in size and severity, but often result in loss of life, psychosocial damage, and service/industry disruptions. The effects of psychosocial damage and service/industry disruptions would likely be experienced by the entire community in the event of an active shooter or terrorist attack.

The City of Sonora has not experienced any active shooter incidents, major terrorism, or mass casualty incidents. In 2015, there was an attempted attack in Tuolumne County outside of the Planning Area, in which four juvenile suspects were arrested for being involved in a shooting plot targeting Summerville High School. The attack was still in the planning stages, and no one was injured at the time of arrest. In April 2023, reports of gunshots near Sonora High School resulted in a four-hour lockdown and prompted a major public safety agency response. The Sonora Police Department was supported by the Sonora Fire Department, Tuolumne County Sheriff's Office, Tuolumne County Probation Department, Stanislaus County Sheriff's Office, Cal FIRE, California State Parks and the Department of Fish and Wildlife in conducting sweeps of the school campus before declaring the reports to be unfounded. No students or faculty at Sonora High School were harmed.³¹ This emergency incident resulted in many discussions through the LHMP planning process about ways the City could enhance emergency response by planning, communication, and training. Many mitigation actions are included in the LHMP and are related to lessons learned during this specific incident.

Active shooter and terrorist attack events have a medium probability of occurring within the Planning Area in the future. Sonora is at an increased risk due to the presence of multiple City/County governmental buildings, as well as schools, churches, special events, and other critical assets. These types of threats are difficult to predict, can occur without warning and in any area within the City. Prolonged climate change impacts may increase incidents of these types because of likely impacts and conflicts regarding natural resources, livelihood insecurity, food



Sonora High School

³¹ The Union Democrat, 'Just panic': Sonora High School students, parents talk about tense lock down scare Thursday, https://www.uniondemocrat.com/news/article_97755f10-d4e2-11ed-a3f9-8f81311e7953.html, accessed December 29, 2023.

insecurity, and water scarcity. Terrorist organizations could operate more easily in fragile and conflict-affected environments. However, climate change is generally unrelated to terrorism and active shooter threats.

4.6.2 Aircraft Crash

Tuolumne County owns and operates three municipal airports in proximity to the City of Sonora. These airports primarily serve private aircraft with some small private businesses and flight schools, which could be susceptible to aircraft crashes. The nearest airports include the following: Columbia Airport (4 miles northwest of Sonora), Columbia Airport Fly-In Campground (5.5 miles northwest of Sonora), and Pine Mountain Lake Airport (14 miles southeast of Sonora). The nearest domestic airports to the City include the Merced Regional Airport (60 miles south of the City) and Stockton Metropolitan Airport (50 miles west of the City). Both airports provide general aviation and commercial service.

Aircraft crashes are more likely to occur with private aircraft in general aviation compared to commercial airlines. Many aircraft crashes typically occur on the runway, however, as flight paths between regional airports are also at risk, it is possible for an aircraft crash to impact any area within the City.

Impacts related to an aircraft crash depend on the circumstances, including the size of the aircraft, location of the incident, and number of persons onboard. Most aircraft crash incidents would likely result in loss of life for those onboard and physical damage to the crash site only, however more significant damage and casualties are possible.

A handful of aircraft crashes have occurred near Columbia Airport within the past few years. All incidents listed below occurred outside of the Planning Area. While no recent incidents have occurred within the City of Sonora, the crash occurrence around Columbia Airport does indicate a heightened risk for the Planning Area.

- In July 2016, four people died in a small plane crash at the Columbia Airport in Tuolumne County. A small private plane veered to the left off of the runway during the landing and crashed, engulfing the plane in flames.³²
- In February 2020, two Sonora men were killed in a plane crash in the 21000 block of Springfield Road, near the Columbia Airport in Tuolumne County. According to the Federal Aviation Administration, the plane was a single-engine Cessna 140A and crashed under unknown circumstances.³³
- On February 22, 2020, a single-engine Aviat Husky A1A plane crashed at the Columbia Airport in Tuolumne County. The pilot was the only person onboard and suffered minor injuries. The plane nearly crashed into a CALFIRE air tanker.³⁴
- On September 5, 2022, an off-duty CALFIRE pilot died in a personal plane crash just behind a home in Tuolumne County. The plane was a single-engine Barnow Barry Vari EZE and was a mile away from the Columbia Airport before the crash.³⁵

Aircraft crashes are moderately likely to occur in the Planning Area, based on previous incidents in the region. Global warming related to climate change will affect wind patterns and events, which could increase aircraft crashes due to increased turbulence. Differences in wind speeds at different altitudes have already become

³² Times Union, *4 die when small plane crashes at airport in Tuolumne County*, <https://www.timesunion.com/bayarea/article/4-die-when-small-plane-crashes-at-airport-in-8481366.php>, accessed September 27, 2023.

³³ KCRA Channel 3 Sacramento, *4 die when small plane crashes at airport in Tuolumne County*, <https://www.kcra.com/article/2-killed-in-tuolumne-county-plane-crash-officials-say/30786807#>, accessed September 27, 2023.

³⁴ KCRA Channel 3 Sacramento, *Plane crashes in Tuolumne County, nearly hits Cal Fire tanker*, <https://www.kcra.com/article/plane-crashes-tuolumne-county-hits-cal-fire-tanker-columbia-airport/31062654>, accessed September 27, 2023.

³⁵ KCRA Channel 3 Sacramento, *Cal Fire pilot killed in small plane crash in Tuolumne County near Columbia Airport*, <https://www.kcra.com/article/small-plane-crashes-in-tuolumne-county-near-columbia-airport-faa-says/41084924>, accessed September 27, 2023.

more pronounced since 1979, and such differences cause turbulence that can affect the safety and vulnerability of aircraft.

4.6.3 Civil Disturbance

The 2014 Emergency Operations Plan for the City of Sonora defines civil disturbance as the spontaneous disruption of normal, orderly conduct and activities in urban areas, or an outbreak of rioting or violence that is of a large nature. Civil disorder is a demonstration of unrest that may manifest in acts of violence and destruction against property or human life. Looting and fires can take place as a result of perceived or actual non-intervention by authorities in the City. Civil disorder can be spurred by specific events, such as large sporting events or criminal trials, or can be the result of long-term disfavor with authority. The threat to law enforcement, safety personnel, and critical facilities can be severe. The City Police Department assumes the primary roles in civil disturbance management.

The specific location of civil disturbance is difficult to predict. Politically motivated civil disturbance may target government facilities like City Hall, County facilities, the public library, schools, and parks. The City of Sonora has many facilities, and public spaces could serve as a starting point for a civil disturbance. Civil disturbance also has the potential to migrate from a specific starting point (including outside of the City of Sonora) and impact multiple public facilities, businesses, and private property throughout the City. For this reason, the entire Planning Area is potentially at risk of civil disturbances.

The extent and severity of damages is dependent on various factors, including the motivation behind the civil disturbance, the number of participants, and the level of law enforcement response. Severe civil disturbance can occur citywide, involve significant numbers of people, result in injuries or deaths, and result in significant property damage from mass rioting, looting, or arson. Financial impacts to residents and business owners who are uninsured or without comprehensive insurance policies would experience the most severe impacts. Most comprehensive insurance policies include coverage for civil disturbance, riots, and other vandalism causes, but payment and repairs may be delayed due to the nature of the unrest incident. Depending on the extent and severity of damage, significant downtime may be required to clean up and/or rebuild after an event.

There have been no recent significant civil disturbance incidents in Sonora. Large-scale occurrences in the City are historic, and any minor incidents have been small in scale and handled quickly by law enforcement.

During June 2020, ongoing civil disturbance across the country resulted in the City of Sonora proclaiming a Local Emergency. Protestors and counter-protesters packed in the City's Courthouse Park and spilled into neighboring sidewalks and side streets. Additional police support from Stanislaus and Calaveras County arrived to maintain peace and lawful protests. Sonora Fire Department filled the first civil unrest preposition strike team through CalOES for additional resources. Later that evening, the City Council implemented a curfew from 8:00 p.m. through 5:00 a.m. to mitigate continued disturbance.³⁶ This incident was largely peaceful and lawful and did not escalate into a large-scale civil disturbance.

Civil disturbance has a medium probability of occurring with the City of Sonora in the future. Due to frequent changes in the political and social climate, it is reasonable to assume that lawful protests, lawful assembly, and civil disturbance will continue to occur. Climate change is not directly related to civil disturbance, however, limited resources and social, political, and cultural stressors affected by climate change may affect the frequency of civil disturbances.

4.6.4 Cyberattacks

Unlike physical attacks, cyberattacks are not location based. Hacking could occur at great distances away from the City but impacts within the City could be severe and widespread. Cyberattacks may have similar motives to

³⁶ My Mother Lode, *Sonora Council Imposes A Curfew And Declares Local State Of Emergency*, <https://www.mymotherlode.com/news/local/1071616/sonora-council-imposes-a-curfew-and-declares-local-state-of-emergency.html>, accessed September 27, 2023.

physical terrorism and likely target similar industries including government, businesses, healthcare or medical facilities, financial institutions, educational institutions, and/or public utilities. Cyberterrorist attacks have the potential to cause violence, service disruptions, physical damages, psychosocial impacts, economic damages, or data breaches. Depending on the target and intended motive, the effects of cyberattacks may impact the entirety of the City or may impact specific businesses. For example, a cyberattack aimed at an energy provider may leave the entire City without power in order to coerce some action from the utility company or the City. On the other hand, cyberattacks may occur on a relatively small scale aimed at individuals to obtain personal or financial information.

The City of Sonora has not experienced a major cyberattack as of April 2024. However, cyberattacks remain a concern for public agencies in the region. On March 18, 2022, a Tuolumne County computer network was impacted by an attempted cybersecurity breach. The County's information was not hacked.

The risk of cyberattacks is likely to increase for the City moving forward. The prevalent use of technology and the internet increases the likelihood of cyberattacks. Likely targets, including governments, businesses, healthcare and medical facilities, financial institutions, educational institutions, and/or public utilities are currently, or will have to consider implementing cybersecurity measures moving forward. Cyberattacks are generally not related to climate change.

4.6.5 Human-Caused Hazards Goals, Policies, and Programs/Implementation

GOAL 6: Improved public safety and reduced human-caused hazards risks in Sonora.

Policy 6.1: Increase City defense against and resilience to cybercrime.

Program/Implementation 6.1.A: Enhance the City server and Virtual Private Network (VPN) capabilities to promote cybersecurity. Establish one computer network for all City Departments (including Police and Fire Departments) to maximize file sharing and communication capabilities, while reducing redundancy.

Policy 6.2: Increase security measures to protect against active shooters and known vulnerable locations and ensure emergency response personnel are trained and prepared for an active shooter situation.

Program/Implementation 6.2.A: Integrate key security measures at Sonora High School, including: electronic key card access system for school buildings and classrooms, strategic fencing around the campus, security lighting, alert/communication systems, and camera systems with remote access for police tie-in. Proactively stage emergency supplies in each classroom, including go buckets with ready to eat foods and pop-up restrooms for prolonged shelter in place scenarios. Replenish/replace emergency supplies as required.

Program/Implementation 6.2.B: Host an inter-agency active shooter training, utilizing Adventist Health facilities as a training exercise location. Partner with external public safety agencies to ensure adequate fire and police coverage within the Planning Area during the active shooter training. Seek grants to support annual training and resourcing.

Policy 6.3: Reduce potential safety hazards and vulnerabilities related to the presence of homeless or transient individuals.

Program/Implementation 6.3.A: Continue conducting mobile outreach to homeless or transient individuals in the Planning Area. Use outreach efforts to connect individuals with shelters and social services offered by the City and Tuolumne County.

Policy 6.4: Enhance preparedness of local law enforcement and emergency response teams for civil disturbance incidents.

Program/Implementation 6.4.A: Coordinate with the Sonora Police and Fire Departments to enhance communication and intelligence for political/social instances that would result in civil disturbance or unrest.

Policy 6.5: Continue to coordinate with Tuolumne County regarding aircraft and flight safety regulations implemented at Columbia Airport. Continue to promote the City of Sonora as a Noise Sensitive Area, and advocate for aircraft traveling to Columbia Airport to avoid low flying over people/property or creating excessive noise.

4.7 Climate Change

Changes to the global climate system are expected to affect future natural hazards in and around Sonora. Many natural hazards are expected to become more frequent and intense in coming years and decades, although some changes are already visible. Sonora can expect the following changes to climate-related hazards:

- Periods of both very high and very low precipitation are likely to become more common, which is expected to increase the frequency of both droughts and floods. More rapid melting of the Sierra snowpack is likely to increase the risk of spring flooding. Prolonged and severe droughts may become more common, particularly in the late summer and autumn.
- Severe weather events, such as intense storms, high winds, and hail are expected to become more frequent and intense. Sonora may experience an increase in hazardous events such as floods and landslides as a result.
- Higher temperatures are expected to cause an increase in extreme heat days. Historically, Sonora experiences an average of two extreme heat days each year, which is any day where temperatures exceed 102.4°F. These extreme heat days are projected to occur 21 to 28 times each year by around 2050, and 30 to 54 times annually by the end of the century.³⁷
- Wildfires are expected to occur more frequently around Sonora due to hotter, drier conditions. While locations higher in the Sierras face the greatest risk, the areas immediately surrounding Sonora are still projected to see an increase in wildfire activity.

With the adoption of Senate Bill (SB) 379 in 2015, the State expanded California Government Code Section 65302(g) to require the Safety Element of the General Plan to include more information about wildfire hazards, flooding risks, and short-term and long-term threats posed by climate change. The City conducted a climate change vulnerability assessment in 2024 to assess the long-term impacts of climate change on community assets and populations throughout the City of Sonora. This vulnerability assessment is included in the LHMP. The priority hazards assessed included drought, extreme heat, flood, hailstorm, landslide/mudflow, lightning, severe winter storm, tornado, wildfire, and windstorm. The LHMP discusses the climate change hazards affecting resiliency in the City of Sonora and provides a summary of the vulnerability assessment results.

4.7.1 Vulnerable Populations and Assets

In 2024, the City of Sonora completed a Climate Change Vulnerability Assessment consistent with Government Code Section 65302(G), which assesses how the populations and assets in Sonora are vulnerable to different emergencies and hazardous conditions that may be created or made worse because of climate change. The primary categories assessed included populations, critical facilities and infrastructure, and important community and economic assets. The assessment follows the recommended process in the updated California Adaptation Planning Guide, which is the State's guidance for how local communities should conduct climate adaptation planning efforts, including vulnerability assessments. As defined by the California Adaptation Planning Guide (2020) (link), climate change vulnerability is considered the degree to which natural, built, and human systems are susceptible to harm from exposure or stresses associated with climate change and from the absence of adaptive capacity.

The LHMP indicates that Sonora's populations and assets are most vulnerable to wildfire, severe weather (including power outages), pandemic, landslide/sinkhole, drought, hazardous materials spill, human-caused hazards, and flood.

Populations in Sonora tend to be more vulnerable to extreme heat and human health hazards (pandemics), and wildfire, which directly affect health outcomes. Due to financial limitations, mobility challenges, and lack of access to medical care, the most sensitive populations include households in poverty, seniors living alone,

³⁷ Cal-Adapt. "Local Climate Change Snapshot for Sonora." California Energy Commission. 2024. Accessed 04 April 2024. <https://cal-adapt.org/tools/local-climate-change-snapshot>.

outdoor workers, and persons experiencing homelessness. The homes that vulnerable populations live in, especially those located on single access roads, are also highly vulnerable to direct damage from hazards such as landslides, floods, severe weather, and fire.

City-wide, the electricity transmission system is vulnerable to multiple hazards including severe weather, such as high winds that can trigger public safety power shutoffs, extreme heat that reduces the capacity and strains the system, and wildfires that damage the system, ultimately disrupting energy service. An increase in droughts, extreme heat, and wildfire create higher vulnerabilities for the local and regional natural resources. This can in turn affect local economic activities in Sonora such as outdoor recreation activities and visitors that travel through Sonora to get to State and national parks and forests.

A full analysis of the anticipated climate change impacts and vulnerability assessment results can be found in the LHMP.

4.7.2 Climate Change Hazards Goals, Policies, and Programs/Implementation

GOAL 7: Community resiliency to climate change hazards, such as drought and extreme heat.

Policy 7.1: Encourage collaboration with regional organizations and agencies to increase resilience.

Program/Implementation 7.1.A: The City shall engage in partnerships and support local and regional interagency efforts to assess climate change impacts and to develop and implement strategies that increase resiliency of vulnerable populations and ecosystems.

Program/Implementation 7.1.B: The City shall coordinate climate resiliency efforts with Tuolumne County, the Sierra Climate Adaptation and Mitigation Partnership, and other regional bodies.

Policy 7.2: Ensure that there are safe places for community members to gather during hazardous events, including extreme temperatures.

Program/Implementation 7.2.A: The City shall promote the County warming and cooling stations that can offer refuge from extreme temperatures and weather events.

Program/Implementation 7.2.B: The City shall establish an online virtual resilience hub to provide residents and businesses with information and resources during an emergency.

Program/Implementation 7.2.C: The City shall purchase an Air Conditioning Unit and install HVAC systems at the Sonora High School gym annex, for use as a community cooling center during extreme heat events.

Policy 7.3: Coordinate with regional water agencies to reduce drought risks and ensure Sonora has a healthy and reliable water supply.

Program/Implementation 7.3.A: Support Tuolumne Utilities District (TUD) public outreach efforts regarding drought and water conservation. Develop communication methods targeted to underserved communities or vulnerable populations who may be uniquely impacted by water surcharges or other drought-related fee increases.

Program/Implementation 7.3.B: The City shall encourage projects that include landscaping to use plants that will continue to be viable in the area under long-term future climate conditions. Explore modifying Sonora's landscape ordinance (Municipal Code Title 12, Chapter 12.20) to support increased use of these species. All proposed landscaping

shall be required to be compliant with the Water Efficient Landscaping Ordinance (WELO) and the City's water efficient landscape standards.

Program/Implementation 7.3.C: The City shall support and cooperate with the Tuolumne Utilities District during updates to its urban water management plan to support ongoing efforts to plan for sustainable, long-term drinking water supply for City residents and businesses.

Program/Implementation 7.3.D: Proactively monitor drought conditions and water conservation warnings issued by State agencies or Tuolumne Utilities District (TUD).

Policy 7.4: Reduce health and economic risks associated with extreme heat, severe weather, and human health hazards.

Program/Implementation 7.4.A: The City shall install water refill stations at parks, community centers, and sport courts/fields with available water supplies to encourage proper hydration and protection against heat-related illnesses.

Program/Implementation 7.4.B: The City shall provide education, partnership, and other local support to local schools to reduce outdoor exposure during extreme heat events.

Program/Implementation 7.4.C: Continue to distribute severe weather alerts, warnings, and advisories from the National Weather Service (NWS). Ensure community members are aware of severe weather risks and have adequate notice to prepare.

Policy 7.5: Coordinate with the County of Tuolumne and existing organizations to distribute information and provide services or shelter to persons experiencing homelessness.

Program/Implementation 7.5.A: The City shall coordinate with the Tuolumne County Department of Social Services to ensure that emergency shelters are available during extreme heat events, severe winter weather events, and other highly hazardous conditions. The City shall ensure that the local homeless population is made aware of these resources.

Program/Implementation 7.5.B: The City shall provide information and resources about staying safe during hazardous conditions as part of outreach and support efforts with the local homeless population.

Program/Implementation 7.5.C: The City shall identify funding opportunities, such as the California Department of Housing and Community Development Emergency Solutions Grant Program, Homeless Emergency Aid Program, and CalWORKS Housing Support Program, to assist homeless individuals and families, as hazards intensify.

4.8 Critical Facilities and Infrastructure



City Hall, Downtown Sonora

Based on the LHMP, the City of Sonora has 41 critical facilities, which include City Hall, a police station, a fire station, a public works facility, a hospital, transportation infrastructure, utilities properties, schools, and several parks that provide important services to the community. Critical infrastructure in the City also includes bridges, roads, utility infrastructure, and pipelines. Damage to or destruction of any of these facilities could impair emergency response efforts, result in a lack of vital resources for residents, or lead to disruption of services. Table 3-6, City of Sonora Critical Facilities, and Exhibit 3-1, Critical Facilities, of the LHMP, identify existing critical facilities and infrastructure in the City.

The principal storm drain conveyance in Downtown Sonora is referred to as the Main Drain, a system including stone tunnels dating back to the late 1880s and storm drain pipeline connections. Portions of the stone tunnel have been resurfaced with concrete/shotcrete or

replaced with concrete box culverts. However, portions of the Main Drain remain vulnerable and insufficient, particularly in the context of hazard events. Structural deficiencies in the Main Drain indicate future floods are likely during severe weather incidents. Such events also put the Drain's infrastructure at further risk. Localized flooding as a result of deficiencies in the Main Drain could impede access to critical facilities, create impassable conditions for first responders, or damage/destroy structures. In 2019, a sinkhole emerged in Downtown as a result of a heavy rain event, creating a five- to six-foot-wide hole directly over the Main Drain. In October 2023 an inspection and condition assessment occurred with regard to the Main Drain and included recommendations for phased improvements to the City's storm water infrastructure; these improvements are included as mitigation actions in the City's LHMP. Additional policies are recommended below to ensure the City has adequate storm water infrastructure in preparation for future extreme hazard events.

4.8.1 Critical Facilities and Infrastructure Goals, Policies, and Programs/Implementation

GOAL 8: Increased resiliency of critical and lifeline facilities and infrastructure to future hazard events in Sonora.

Policy 8.1: Ensure emergency response facilities are adequately funded, staffed, and housed in order to provide sufficient emergency response services.

Program/Implementation 8.1.A: Establish a Social Services Impact Fee (development fees) to fund increased demands on police and fire department services and help public safety agencies maintain adequate personnel and response times during emergency incidents. Develop a fee for service scheduling for assisting other agencies in the County.

Program/Implementation 8.1.B: Build a new or renovated Police Station and Emergency Dispatch that meets both the Department's requirements and community safety needs. Ensure new or renovated construction incorporates current building code requirements and security concerns, and updated technology that would ensure the Police Station would withstand natural disasters. Identify operational and functional deficiencies with the current Police Station to inform key upgrade components in the new or renovated Police Station.

- Program/Implementation 8.1.C:*** Establish an incentive pay structure for police and fire department staff to participate in specialized training, such as the Public Information Officer Program, Standardized Emergency Management System (Disaster Response), or similar.
- Policy 8.2:** Use Mobile LiDAR to create a pavement management database, sign inventory and other asset management uses.
- Policy 8.3:** Establish an online database for code enforcement, violation, and inspection procedures.
- Policy 8.4:** Increase the strength of utilities and assets to increase the resiliency of infrastructure.
- Program/Implementation 8.4.A:*** Support Tuolumne Utilities District (TUD) in ongoing efforts to acquire assets from PG&E, and maintenance improvements on the local water flumes.
- Program/Implementation 8.4.B:*** Support long-term microgrid projects located at critical facilities to avoid extended power outages during Public Safety Power Shutoff (PSPS) incidents. Co-locate and cost-share microgrid projects between multiple critical facilities where feasible, such as Adventist Health and Sonora Elementary School.
- Program/Implementation 8.4.C:*** Extend the life of backup battery power on City traffic signals. Identify streetlights where backup battery power would be most beneficial to facilitate safe ingress/egress in the community.
- Policy 8.5:** Improve the durability and resiliency of the Main Drain and storm water infrastructure.
- Program/Implementation 8.5.A:*** Seek grant funding to implement the Main Drain Improvement Project, as identified in the Main Drain Field Inspection and Condition Assessment Technical Memorandum. Main Drain improvements are anticipated to enhance storm water flows and reduce flooding in Downtown Sonora but may convey storm water flows beyond system capacity downstream in Sonora Creek. In addition to Main Drain improvements, also identify and fund solutions to mitigate flooding at the Main Drain outlet structure on the 100 block of West Stockton Street (SR 49) and other downstream facilities.
- Program/Implementation 8.5.B:*** Identify opportunities to expand the capacity of Woods Creek such as riprap, dredging, or vegetation clearance programs to avoid overtopping or flooding at critical facilities. Coordinate storm water capacity efforts with Main Drain improvements.

4.9 Evacuation

The City of Sonora has several subdivisions and roads that do not meet ingress/egress requirements for evacuation purposes or are currently designed in a manner which inhibits evacuation and emergency response efforts. The Woodscreek subdivision off of Ponderosa Lane and the subdivision located behind the Mother Lode Fairgrounds, off of Southgate Drive, both have only one point of ingress/egress; refer to Exhibit 4-6, Parcels with Inadequate Emergency Access. These subdivisions have been identified as being particularly vulnerable in the case of a fire or need for emergency access.

Additionally, many roads within the Planning Area do not meet minimum width requirements for evacuation purposes and emergency response infrastructure. There are many narrow one-way streets, and many roads have a tight turning radius that prohibits access for emergency vehicles and firefighting infrastructure. Several roads in the Downtown area offer two-way parking that may impede emergency response capabilities. The City of Sonora is increasingly at risk of wildfires and other hazard events, and evacuation planning is necessary to ensure residents and visitors are not made vulnerable.



Southgate Drive and SR 49

4.9.1 Evacuation Hazards Goals, Policies, and Programs/Implementation

GOAL 9: Decreased vulnerability of critical facilities, residents, and visitors to hazard events through proper evacuation planning.

Policy 9.1: Investigate and minimize vulnerabilities due to inadequate road design and evacuation capabilities.

Program/Implementation 9.1.A: Seek grant funding for a City-wide evacuation study to evaluate the local roadway system capacity and limitations during a hazard incident. Identify roadways that do not meet current code width and turning-radius standards, and neighborhoods with limited opportunities for ingress/egress. Identify areas where on-street parking could be reduced or limited to allow for improved emergency access. Use the planning process to identify recommended transportation improvements, implementation, and phasing. Include provisions for bringing emergency ingress and egress requirements of CALFIRE and City road and driveway standards into conformance and provide alternative methods of evacuation, such as transit, carpooling, and shelter in place. Adopt new requirements/regulations reflecting recommendations from the study such as new development mitigation measures, including restricting residential development within high or very high fire hazard severity zones.

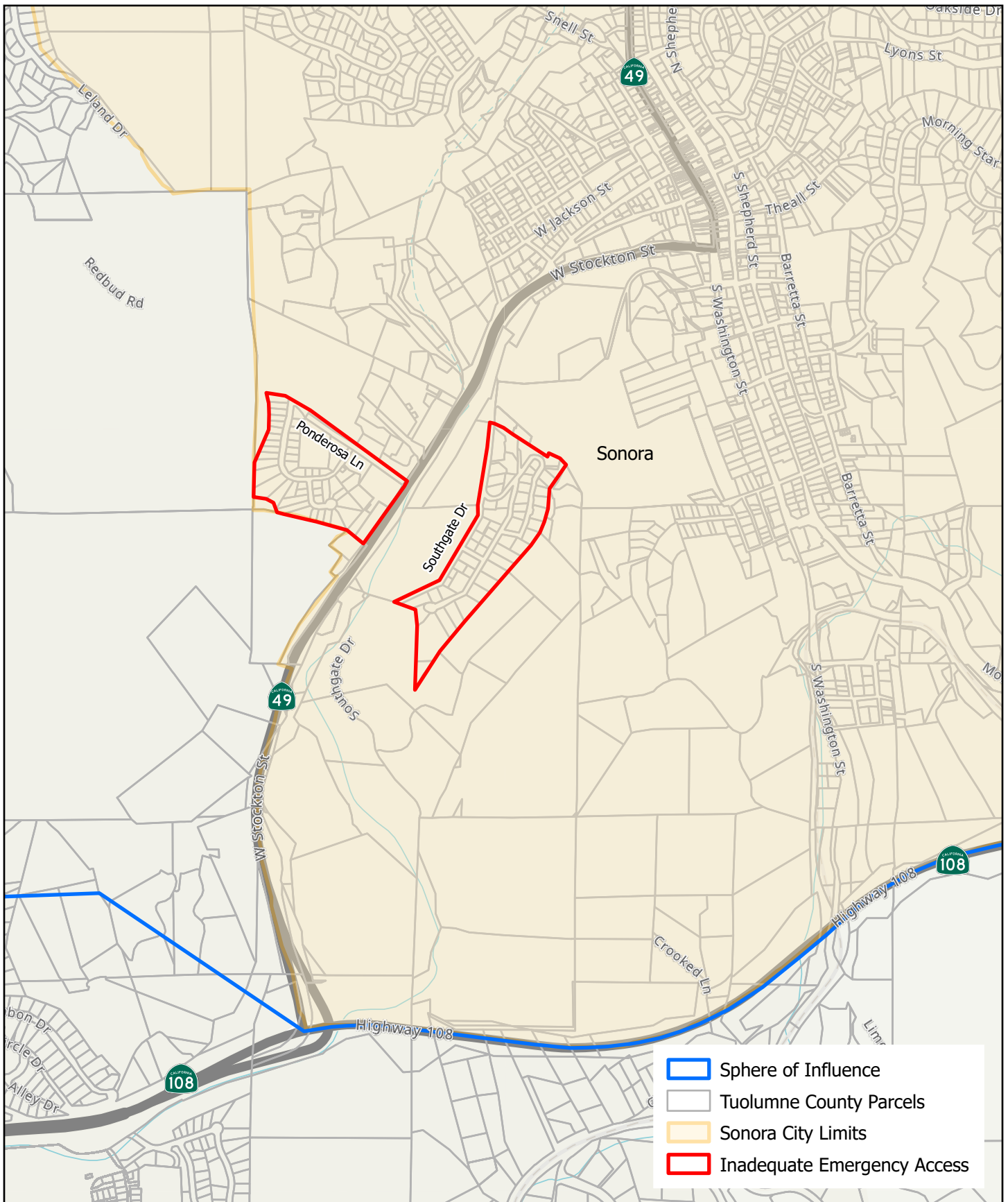
Program/Implementation 9.1.B: Integrate City-wide evacuation considerations and best practices into the City Emergency Operations Plan Update. Identify areas where traffic lanes can accommodate one-way egress out of the Planning Area, or where roadway shoulders could be utilized as emergency evacuation lanes. Include considerations for evacuations during business hours or holiday weekends, when City population can peak at 25,000 individuals. Develop minimum standards for evacuation of residential

areas in Very High Fire Hazard Severity Zones, including, but not limited to, road width, number of ingress/egress points, and capacity thresholds.

Program/Implementation 9.1.C: Identify key locations to construct off-street parking garages to reduce on-street parking and improve emergency ingress/egress. Focus priority within Downtown Sonora and older neighborhoods where residential units do not have garage or off-street parking space.

Program/Implementation 9.1.D: Partner with Sonora High School and conduct a feasibility study with a traffic engineer to re-align ingress/egress, allowing adequate flow of traffic during emergency scenarios. Consider locating a bus turnout along West School Street to allow for two-way traffic during peak pick-up/drop-off times. Consider alternative striping and flow of traffic options for the surface parking lot at the intersection of West School Street/Snell Street.

Program/Implementation 9.1.E: Adopt red flag warning ordinance. Regulate one-side parking in areas of concern for emergency egress/ingress on red flag warning days.



Sources: City of Sonora, Tuolumne County
 Map Export: 5/2/2024 2:39 PM.



EXHIBIT 4-6 Parcels with Inadequate Emergency Access

4.10 Constraints

Constraints to public safety are a result of both natural events and the activities of humans. Natural hazards are caused by excess rainfall, seismic activity, landslides, wildfires, or high winds. Human-made hazards are the result of crime, hazardous materials spills, and accidents. The following are some of the factors that constrain protection of the public:

- **Unpredictability.** Natural disasters are often unpredictable. To reduce the danger of disaster, precautionary measures are required. Avoidance of flood-prone areas and flood-control measures are necessary. Construction to earthquake standards has proven effective to reduce losses in seismic events. Emergency plans that include evacuation, medical aid, and temporary food and shelter are important.
- **Existing land development.** Prior settlement patterns and very dense development often present difficult access problems for emergency vehicles. Undefined evacuation routes and lack of emergency communication lines are also problems for emergency service providers. Exhibit 4-6 shows residential properties that may have only one emergency evacuation route. The lack of multiple emergency evacuation routes provides these parcels limited roadway access, so they may face difficulty evacuating during or in advance of emergency conditions, particularly if residents are given little notice.
- **Priorities.** Public safety may be described as the preservation of human life and the protection of property. These values underlie the concept of human settlement; however, the relative importance of saving lives or saving property is sometimes a subjective decision.
- **Human carelessness.** Carelessness often leads to accidents, which can involve automobiles, airplanes, trains, hazardous materials spills, urban fires, and forest fires. Public education and safety rules and regulations are important to avoid careless attitudes and actions.
- **Individual precaution.** Citizens often are the cause of their own disasters through lack of available or at-hand precautions, i.e., not locking doors at night or when away, swimming alone, drinking and driving, or smoking in bed.
- **Economics.** Economic considerations often play an important role in providing public safety. Budget limitations force difficult decisions related to deciding which safety measures are more important or cost-effective.
- **Boundaries.** Sonora may be threatened or harmed by natural disasters that begin outside of the City limits, such as a wildfire that crosses into Sonora from the Stanislaus National Forest. However, Sonora has no control over development patterns, wildland management strategies, or other factors outside of the community that may reduce the risk of these disasters occurring. Coordination with Tuolumne County and other nearby jurisdictions is critical to Sonora's safety.