



# SAFETY ELEMENT BACKGROUND DOCUMENT & DEFINITIONS

## BACKGROUND

The Safety Element Background Document and Definitions Report was prepared for the City of Menifee General Plan Safety Element and was adopted in 2013 with the General Plan. This technical background report has been updated to address the relative sections of the Safety Element that have been updated in compliance with Government Code Sections 65302(g)(2) through (7). Specifically, flood hazards, fire hazards, climate adaptation and resiliency and police services have been addressed in the Safety Element and updated in the technical background document. Minor technical edits were made to this document that didn't impact the conclusions of the analysis. A Climate Vulnerability Assessment was prepared and is an attachment to the Safety Element.

## SEISMIC AND GEOLOGIC ISSUES

The City of Menifee is highly diverse geologically, the result of both the youthful seismic setting of the surrounding region and the effects of climate. Geomorphically, Menifee lies in the Perris block, a fault-bounded, **internally undeformed** and **tectonically stable** region in the northern part of the Peninsular Ranges province. Although the Perris block is tectonically stable, the San Jacinto Mountains to the northeast and the Santa Ana Mountains to the southwest are rising due to movement along the San Jacinto and Elsinore faults, respectively.

### FAULTS

No **active faults** have been mapped in the City of Menifee; therefore, the hazard of **primary surface fault** rupture is considered low to none. However, Menifee is located near several regional active faults — such as the San Jacinto and Elsinore fault zones— that have the potential to cause strong ground shaking in the area (see Exhibit S-1, Fault Map). The closest **segment** of the Elsinore fault is thought capable of generating a **maximum magnitude** 6.8 earthquake. Similarly, the San Jacinto Valley segment of the San Jacinto fault can generate a maximum magnitude 6.9 earthquake. If several segments of these faults rupture together in an earthquake, a larger earthquake is possible. The San Andreas fault, while farther away, also has the potential to generate moderate shaking in Menifee.

Although the shaking from an earthquake can be upsetting or terrifying on its own, it is the effect of this shaking on the built environment that can make an earthquake deadly. The interaction between earthquake-induced ground motion and human-made structures is complex; some of the governing factors include the structure's height,

construction quality, stiffness, architectural design, condition, and age. Great advances in earthquake engineering have been made in the last about 15-20 years, in part as a result of the lessons learned from the 1994 Northridge, California; 1995 Kobe, Japan; 1999 Izmit, Turkey; and 1999 Chi-Chi, Taiwan, earthquakes. These advances are reflected in the most recent building codes, and thus, newer structures built to these codes are theoretically stronger and more likely to survive an earthquake. However, the main purpose of building codes is to prevent structures from collapsing, although significant damage that may make a structure uninhabitable following a large earthquake is possible and permissible. Furthermore, building codes are not retroactive, and several older building types are now known to not perform well when shaken.

This is reflected in the **HazUS** loss estimation analyses conducted for this study: the models indicate that over 22 percent of the buildings in the Menifee area, including more than 60 percent of the manufactured homes, could be at least **moderately damaged** by an earthquake on the San Jacinto fault. The models also indicate that more than 59 percent of the residential structures other than single-family homes (that is, multifamily residential buildings, including duplexes, condominiums, and apartments) will suffer at least moderate damage as a result of an earthquake on the San Jacinto fault, and 20 percent to 30 percent of the steel, unreinforced masonry, precast, and concrete buildings in Menifee are also expected to be at least moderately damaged. Similar levels of damage are expected if an earthquake occurs on the Elsinore fault. Therefore, comprehensive hazard mitigation programs that include the structural review and retrofitting and rehabilitation where needed of older and weak structures and of manufactured (mobile) homes, are important to significantly reduce the potential impact of an earthquake on a fault near Menifee.

The HazUS analyses estimate that the number of injured people in Menifee requiring hospitalization after an earthquake would be fairly low—about 17 maximum, if the earthquake occurs at night (see the Safety Element Technical Report). The HazUS analyses also suggest that although the local hospital will be less than 50 percent functional the day of an earthquake on the San Jacinto or Elsinore faults, it is expected to be able to meet the demand for medical care, unless other nearby communities closer to the fault experience a large number of injuries and these victims are brought to the Menifee Valley Medical Center. The models indicate that the potable water, wastewater, and natural gas systems in Menifee will experience moderate damage if an earthquake occurs on the San Jacinto fault. The pipelines are anticipated to experience hundreds of leaks and dozens of breaks. Eastern Municipal Water District (EMWD) serves more than 850,000 people within a 555 square mile service area in western Riverside County. In an earthquake event, people within the service area may be without potable water for up to two days after the earthquake. The local transportation system, alternatively, is expected to perform well.

## **SLOPE INSTABILITY**

Topographically, the Menifee area encompasses numerous rugged and moderately steep hills and mountains surrounded by a series of broad, nearly flat-bottomed valleys. Most development in the area occurs in the valleys and low hillside areas, with the prominent hills and ridgelines largely undeveloped (Exhibit S-2; Slope Distribution). As a result, slope instability is a potential hazard only where development has encroached onto the hills or is at the

base of the hills. Most slope damage in the region is likely to occur as a result of earthquake-induced shaking, or during periods of exceptional and/or prolonged rainfall. Slope damage in the area typically consists of shallow failures involving the surficial soils and the uppermost weathered bedrock, **rockfalls**, and mud or **debris flows**. Seismically induced slope failures (see Exhibit S-2; Liquefaction and Landslides) can occur in the moderately steep hills and low mountains of the Menifee area, especially where the granitic bedrock has weathered into large boulders. Boulders that perch precariously on slopes pose a rockfall hazard to structures and roads below. **Ridgetop shattering** may occur locally in the Lakeview Mountains, Double Butte, and the hills between Quail Valley and Sun City. Given that there is little to no development on these ridgelines, the damage to structures as a result of this hazard is anticipated to be low to none. If the seismic energy is amplified along these ridgelines, however, some of the above-ground storage water tanks in the area could experience stronger than anticipated ground shaking and could be at risk of small-scale inundation, releasing the stored water.

Weather induced landslides occur when a hillside becomes unstable, caused by severe or persistent rain events, causing soil and rocks to slide downslope. In some cases, the hillsides can become so saturated that slope failures result in a mudslide, a mixture of soil and water moving downslope. Unstable hillsides, such as those denuded of vegetation by wildfires, drought, or pests, are at greater risk of land- and mudslides. The climate change induced increase in rainfall, especially severe rain events, may result in an increase in landslides and mudslides. As discussed in the Local Hazard Mitigation Plan (LHMP), “[a] significant portion of the Menifee area that encompasses hillside terrain.” At present, the hills and mountains have limited rural to semi-rural type development, and scattered development is present along the base of steep slopes.

## **LIQUEFACTION/SLOPE FAILURE**

Seismic shaking can also cause various types of ground deformation; liquefaction and slope failure are the most destructive of these (see Exhibit S-3; Liquefaction and Landslides). Soils that liquefy lose the ability to support structures; buildings may sink or tilt, with the potential for extensive structural damage. For liquefaction to occur, three conditions must exist 1) loose, recently deposited sediments typically sandy in composition; 2) shallow groundwater, typically within 50 feet of the ground surface; and 3) seismic shaking with ground accelerations more than 20 percent the **acceleration of gravity (g)**. Three areas in Menifee are thought to have soils that could liquefy during an earthquake: the Salt Creek floodplain, the Warm Springs Creek floodplain, and portions of the Paloma Wash Valley.

Seismic shaking can cause loose, geologically young deposits to become more tightly packed, resulting in a reduction of the soil column and differential settlement at the ground surface. Areas at or near the contact between **alluvium** and bedrock, or at the contact between **artificial fill** and natural soils, can be susceptible to seismically induced **differential settlement**. Several areas in Menifee are underlain by unconsolidated, young alluvial deposits and artificial fill that may be susceptible to earthquake-induced settlement. (Very young to young alluvial deposits shown in Exhibit S-b1, Engineering Characteristics of Geologic Units.) Deformation may occur on **sidehill fills** in the hillsides surrounding Quail Valley and possibly in the Juniper Flats area, although for the most

part, the losses associated with this kind of failure are anticipated to be small. The unconsolidated sediments are also potentially compressible and/or collapsible. Geotechnical studies prior to development should address these potential hazards on a site-specific basis.

## **SEICHES**

**Seiches** can occur in bodies of water both near and far from the earthquake epicenter. Given that there are several residential community lakes, ponds, and pools in Menifee, seiches as a result of ground shaking can be expected to occur in the region. The amplitude of these waves cannot be predicted, but these are typically less than about 0.5 m (1.6 feet). Property owners down-gradient from these bodies of water should be aware of the potential hazard to their property. Given its distance from the ocean, Menifee does not have a **tsunami** hazard.

## **SEDIMENTARY UNITS**

Sedimentary units in the Menifee area consist mainly of water-transported (alluvial) sand, silt, clay, and gravel derived from erosion of the adjacent hills and mountains (see Exhibit S-4, Geologic Map). Very young **unconsolidated** alluvial sediments line the drainage courses. Although not prevalent, fine-grained soils in the Menifee area are moderately to highly **expansive**. The sediments in the valley areas are commonly corrosive to metallic objects, such as pipelines, if these come in direct contact with the soils.

## **GROUND SUBSIDENCE**

Regional **subsidence** has not been documented to date in the Menifee area, but it has been reported nearby, in the San Jacinto Valley, from Hemet to Moreno Valley, and in Temecula and Murrieta. In the San Jacinto Valley and Murrieta, the subsidence and associated ground fissuring have been attributed to groundwater withdrawal. In Murrieta, the subsidence and ground fissuring were caused by large-scale application of landscape water to arid alluvial soils that collapsed in response. The EMWD does not have a program for periodic monitoring of land subsidence, but they have done baseline ground-level surveys for future reference. According to the EMWD, the potential for ground subsidence is considered in their overall management programs—water level monitoring programs and their broad network of wells allow them to balance extraction so that no areas are overpumped.

## **EROSION**

**Erosion** is a significant geologic hazard in Menifee because much of the runoff travels through the area in natural washes and gullies and by sheet flow. Natural erosion processes are often accelerated through human activities, including the removal of protective vegetation, modification of natural drainage patterns, and construction of slopes that may be more susceptible to erosion than the natural slope conditions. Development also increases nonpermeable surfaces, which reduces the surface area available for infiltration, leading to increased flooding, erosion, and downstream sedimentation.

## **BIOSOLIDS**

According to the Environmental Protection Agency (EPA), **biosolids** are the nutrient-rich organic materials resulting from the treatment of sewage sludge (the name for the solid, semisolid, or liquid untreated residue generated during the treatment of domestic sewage in a treatment facility). When treated and processed according to strict federal and state standards (as monitored by the EPA), sewage sludge becomes biosolids that can be safely recycled and applied as fertilizer to sustainably improve and maintain productive soils and stimulate plant growth. There are different rules for different classes of biosolids, as defined by the EPA. Class A treated sewage sludge contains no detectible levels of pathogens. Class A treated sewage sludge that meets strict vector attraction reduction requirements and low levels metals contents only have to apply for permits to ensure that these very tough standards have been met. Class A EQ (Exceptional Quality) is similar to Class A but with the additional treatment and testing to prove they meet a lower metal content standard. Class B sewage sludge are treated but still contain detectible levels of pathogens. There are buffer requirements, public access, and crop harvesting restrictions for virtually all forms of Class B.

Biosolids were commonly applied to agricultural areas as a soil amendment throughout Riverside County, including in and around the City of Menifee. In 1991, County of Riverside Ordinance 696 was enacted that set standards and protocols for the application of Class B sewage sludge to agricultural land in Riverside County. Class A and Class A EQ were not addressed in this ordinance. Companies that were applying the material were required to provide testing information on each load and details about when and where Class B applications would occur.

In 2000, the Environmental Protection Agency fined an Orange County waste treatment facility for failing to properly treat sludge that was dumped on about 400 acres of farmland throughout the county—some of it near Menifee. In 2001, the Riverside County Board of Supervisors assembled a committee of individuals representing affected homeowners, farmers, regulators (Department of Environmental Health, County Agricultural Commissioner, Santa Ana Regional Water Quality Control Board), scientific community (UC Riverside), medical (County Health Officer), and water treatment agencies. Upon the committee's recommendation, County of Riverside Ordinance 812 was enacted to prohibit the land application of Class B sewage sludge beginning November 2001.

Between 2001 and 2004 the committee reviewed available literature, had multiple discussions, and determined that no scientifically verified correlation between sewage sludge and illness could be found. The County Health Officer, a physician, created a report assessing the health impact. The discussions focused on "quality of life" issues related to odor and nuisance aspects of land application sewage sludge near residences, businesses, and schools. The committee determined an additional ordinance was needed to address these quality of life concerns.

In 2004, County of Riverside Ordinance 830 was passed to regulate the application of Class A treated sewage sludge beginning November 26th 2004. The ordinance defines permitting, testing, notification, application, and location requirements for Class A treated sewage sludge.

The past use of biosolids in the area and current-day treatment and application of the material in and around Menifee continues to be a point of discussion. Residents and City staff continue to look for ways to work together to address the public's questions and concerns and are committed to maintaining a healthy and safe environment in the City.

## FLOOD HAZARDS

Floods are natural and recurrent events that generally do not pose a hazard when they occur in an undeveloped area; it is only when floods interact with the built environment, typically in the form of structures built on the floodplain, where they obstruct floodwaters, that they become hazardous. Unfortunately, as development in floodplains has increased, the average annual losses due to flooding have steadily increased.

Southern California typically has mild winters and warm, dry summers as a result of a high-pressure area over the eastern Pacific Ocean that deflects storms to the north. However, during the winter months, this high-pressure area can break down, allowing the jet stream to move storms along a more southerly track. If the northern jet stream taps into the subtropical jet stream and then veers into southern California, rainfall totals in the region can increase dramatically. **El Niño** events can also result in increased rainfall in the area, and summer monsoons occasionally cause severe weather in July and August. Thus, although Menifee receives on average about 12 inches of rain a year, actual numbers can vary substantially. Several storms have impacted the San Jacinto River **floodplain** since 1862. The largest flood on record for this river occurred in 1927, when a peak discharge of 45,000 cubic feet per second was estimated on February 16. This is more than double the next highest recorded discharge in February 1980.

Runoff totals in the area are also controlled by topography. Menifee is in the lower part of the San Jacinto River basin, a regional **watershed** more than 700 square miles in area. The San Jacinto and San Bernardino Mountains capture a significant portion of the precipitation from strong Pacific storms that pass through, so that average rainfall in the San Jacinto Mountains is more than twice that in the valleys (25 inches instead of the average 12 inches in Menifee). The steep hillsides and relatively impermeable bedrock means that most of this precipitation becomes runoff that eventually makes its way to the San Jacinto River and tributaries. Consequently, these drainages can convey substantial discharges even if little rain falls on the valleys floors. Most flooding in Menifee is the result of flows along the San Jacinto River, Salt Creek, and several smaller drainages along the City's boundaries (including Ethanac Wash and the creek through Quail Valley).

Salt Creek bisects the Menifee area and has a large impact on zoning, development, and flood hazard management. Channelization and land use restrictions have helped reduce the flood hazard along Salt Creek, but adequate bridges and culverts are lacking where many of the roads cross the natural drainage channels. Because the road crossings are not designed to convey major storm flows, road closures are common during intense rainstorms. Given that Salt Creek extends westerly across the City, critical north-south intersections, when closed, lead to the

isolation of neighborhoods and severe disruption of traffic and emergency response. Some of the streets crossing Salt Creek that often flood include Normandy, Bradley, and Murrieta Roads. In the past, road closures due to flooding include Menifee Road at the railroad crossing near Case Road, Encanto Road at McLaughlin Road, Ethanac Road from Case to Murrieta Roads, Ethanac Road at Trumble Road, Palomar Road at Matthews Road, and Menifee Road at Highway 74. However, the Riverside County Flood Control and Water Conservation District (RCFCD)'s construction of Romoland MDP Line A flood control facility and the ongoing extension of Line A have significantly reduced the risks of flooding in these areas.

The new facility improvements have improved conditions in Romoland and the Homeland areas, however, the northern boundary continues to be designated a Special Flood Hazard Area Zone (SFHA) and is therefore subject to federal floodplain management regulations. SFHAs are areas subject to a high risk of inundation by a "base flood," also referred to as the 100-year flood (a flood having a 1 percent chance of occurring annually). SFHAs are regulated zones, requiring the mandatory purchase of flood insurance. They are also subject to special standards and regulations that apply to new construction, and in some cases, existing buildings. The City of Menifee encourages the efforts of the Homeland/Romoland Area Drainage Plan participants' efforts to fund the flood control facilities necessary to remove the area from the 100-year flood zone. There are additional mapped flood areas outside of the 100-year flood zone, generally based on the 500-year flood limits (a flood having a 0.2 percent chance of occurring annually). The zone between the limits of the 100-year and 500-year floods is subject to moderate flood risks, and areas outside the 500-year flood limits are subject to low risk. Flood insurance is available for properties in these zones, but is not mandated by the National Flood Insurance Program (NFIP). Exhibit S-5, Flood Hazards, shows the Federal Emergency Management Agency (FEMA) inundation limits for the 100-year and 500-year floods; however, it should be noted that the study areas are limited and the flood zones are incomplete. Consequently, there are areas outside of the mapped flood zones that are likely to be subject to flood hazards. Riverside County has also published flood hazard zones, most of which coincide with the FEMA zones. Additional county flood zones that are outside of the FEMA mapping are shown on Exhibit S-5. These areas include Paloma Wash and Warm Springs Creek.

## **FLOOD INSURANCE RATE MAPS**

Portions of the City of Menifee have been analyzed through the Flood Insurance Study for Riverside County. The most recent **Flood Insurance Rate Maps (FIRMs)** that include the Menifee area date from 2008, with sections of these maps modified since then via Letters of Map Revision. The inundation limits for the **100-year** and **500-year floods** are shown on these FIRMs; however, not all of the area was evaluated and that the flood zones are incomplete. Riverside County has mapped other flood hazard zones in the area not shown on the FIRMs, including Paloma Wash (south of Holland Road and east of I-215) and Warm Springs Creek. Warm Springs Creek, which eventually flows into the Santa Margarita River, begins in the Harvest Valley/Winchester area and traverses the southeast corner of the City. The Salt Creek 100-year flood scenario is estimated to displace 645 households, with more than 1,500 people requiring shelter in public facilities. The San Jacinto River 100-year flood scenario has the potential to displace 970 households, with nearly 2,300 people requiring shelter.

Prior to incorporation, the Menifee area participated in the NFIP as part of Riverside County, who has been a NFIP partner since 1980. Because the County of Riverside is a participating member of the NFIP, flood insurance is available to any property owner in the unincorporated area of the Menifee General Plan. Property owners are required to purchase flood insurance as a condition of securing financing to buy, build, or improve structures in a Special Hazard Flood Zone. The City of Menifee is a member of the NFIP, and as a result, Menifee residents will be able to renew their policies.

## **SEISMICALLY INDUCED INUNDATION**

Seismically induced inundation refers to flooding that occurs when water retention structures, such as dams, fail due to an earthquake. There are several dams upstream of Menifee that could inundate portions of the City if they fail catastrophically. These are the West, East, and Saddle Dams of Diamond Valley Lake, the Forebay Dam (also associated with Diamond Valley Lake), Lake Perris Dam, Lake Hemet Dam, and Pigeon Pass Dam (which impounds Poorman Reservoir). See Exhibits S-b2.1 through S-b2.7 for dam inundation and failure illustrations.

The West, East and Saddle Dams form Diamond Valley Lake, the largest reservoir in southern California. The earth-core rockfill dams were built in 1999, and filling of the reservoir was completed in 2002. The lake stores water supplies for periods of drought, peak summer usage, and emergencies. Water released by failure of any one of these dams would inundate a significant portion of the developed area in Menifee, causing substantial property losses and the potential loss of human life. Because of their high-risk impact, these dams are considered a high hazard potential by the National Inventory of Dams. The Forebay reservoir temporarily holds water delivered from the Colorado River Aqueduct via the San Diego Canal to the Diamond Valley Lake. The water is pumped from the Forebay reservoir to the lake with the help of 12 pumps, each with a 5,000-horsepower engine. Failure of this dam while the Forebay reservoir is full would result in flooding along the Warm Springs Creek floodplain.

Lake Perris is an artificial lake that stores water imported from northern California. The dam is undergoing seismic strengthening, with completion of the repair work scheduled for 2014. Catastrophic failure of this dam would result in inundation of the lowlands in the northwestern quarter of Menifee. Given its potential impact on property and human life, this dam is also classified a high-hazard facility by the National Inventory of Dams database.

Lake Hemet Dam is an arched masonry structure completed in 1895 in the San Jacinto Mountains. The dam impounds water in the upper reaches of the San Jacinto River that is now fed, via pipes, to customers in the cities of San Jacinto and Hemet. Failure of this reservoir would impact only the northwestern corner of the City of Menifee.

Pigeon Pass Dam is an earthen structure in the northern part of the City of Moreno Valley designed to protect downstream properties from flooding by temporarily retaining runoff during storms. Most of the year the reservoir is empty, containing water only during and immediately after storms. If this reservoir failed while full of water, the inundation area would extend southward to just north of Menifee, impacting only the northwestern-most portion of the City.

Inundation on a smaller scale can also occur if an above-ground water storage tank suffers damage as a result of ground shaking, releasing the stored water. Flexible joints at the inlet/outlet connections, in addition to bracing and baffling, can help mitigate the damage resulting from water sloshing inside the tank. There are 17 above-ground water reservoirs in and nearby the City of Menifee (16 of those are being used), with a total combined capacity of about 29 million gallons. Although some of the tanks are older, all have been fitted with flexible connections to prevent the inlet-outlet piping from breaking in case of an earthquake, and some are equipped with a seismic shut-off valve. Each tank also has an altitude valve tied to an alarm system to prevent the tank from overflowing. Maintaining the structural integrity of these water tanks during an earthquake is important not only to provide water to residents, but also to fight any fires that may occur as a result of the earthquake.

## FIRE HAZARDS

Wildfires are a necessary part of the natural ecosystem in southern California, but they become a hazard when they extend out of control into developed areas, with a resultant loss of property, and sometimes, unfortunately, injuries or loss of life. The wildfire risk in the United States has increased in the last few decades with the increasing encroachment of residences and other structures into the wildland environment, and the increasingly larger number of people living and playing in wildland areas.

Menifee is located in the Valleys Section of the South Coast **Bioregion**. The bioregion extends southward from the Transverse Ranges on the north to Mexico, and from the Pacific Ocean eastward to and including the San Jacinto and Santa Rosa Mountains. The predominant vegetation assemblage in the lower elevation areas of the South Coast Bioregion is semideciduous sage scrub. Other important vegetation types include oak woodlands and grassland, and on north-facing slopes, evergreen chaparral. These vegetation assemblages provide fuel for wildfires in the autumn, when the plants have dried up and the area is intermittently impacted by Santa Ana winds. The Santa Ana winds further increase the growth of fires and threat to urban areas. CalFire estimates the length of fire season had increased by 75 days in 2020. Lightning strikes associated with summer thunderstorms are common in the area in July and August and are responsible for a significant percentage of the acreage burned, although human-caused fires are more common. Intense dry seasons and periods of prolonged drought increase wildfire events when vegetation is more susceptible, and water is scarce to for firefighting. Riverside County Fire Department data indicate that between about 30 and 40 wildland fires, typically less than 10 acres in size, occur in the Menifee area every year. Exhibit S-b3 illustrates the historic wildfires in the Menifee area since 1911.

The California Department of Forestry and Fire Protection (Cal Fire) has recommended that the urban, low-lying areas in Menifee be classified as having a Moderate Fire Hazard, whereas the hillside areas are generally classified as having a Very High Fire Hazard. The areas between the flatlands and the hillsides are classified as High Fire Hazard. Most of the low-lying areas within the City are within **local responsibility areas** (LRA); the hillsides are within either state or federal responsibility areas. Fire suppression responsibility for these areas is divided among local, state, and federal agencies, respectively (see Exhibit S-6, High Fire Hazard Areas). Also, California state law requires that fire

hazard areas be disclosed in real estate transactions. The California Fire Alliance has identified the communities of Sun City, Quail Valley, Romoland, Homeland, and Juniper Flats as fire-threatened communities, or communities at risk. The California Fire Alliance list predates the incorporation of Menifee, and as a result, Menifee is not included, although the hillside areas of the City have a very high to extreme fire threat and, as a result, Menifee should be included in the list of communities at risk.

Experience and research have shown that vegetation management or fuel modification is an effective means of reducing the wildland fire hazard. In the 1990s and early 2000s, property owners were encouraged to follow maintenance guidelines aimed at reducing the amount and continuity of vegetation fuel available. Since 2006, however, many of the recommendations addressing fire spread, accessibility, defensible space, and water supply for buildings constructed near woodland areas were codified into the California Building Standards Code Chapter 7A and the California Fire Code Chapter 49. The code contains standards for building design, water supply and brush clearance. Furthermore, effective January 1, 2005, properties in California within a wildland fire hazard area are required to maintain a **defensible space** clearance around buildings and structures of 100 feet, or to the property line, whichever is less. If uncontrolled or high dry weeds, grass, brush, plant material, dead trees, or other hazardous vegetation are present in an unimproved real property in Riverside County, the fire chief or designated representative has the authority to give the property owner of record a notice of violation and order to abate the hazard. If the owner does not comply within the time period specified in the notice, typically 30 days, the City has authority to abate the hazard and charge the property owner for the cost.

Building construction standards also help reduce the fire hazard. Fire-resistant and noncombustible roofing materials, finely screened attic ventilation openings, noncombustible exterior siding materials, multiple-pane windows, and tempered glass windows all can help a structure perform better in the event of a fire. Every proposed construction project in Menifee is reviewed by the City's Building Department and the Riverside County Fire Department for compliance with the most recent version of the California Building Standards Code and the California Fire Code adopted by Menifee, including any City amendments to the code.

As mentioned above, California state law requires that the fact a property is located in a fire hazard area be disclosed in real estate transactions. This is important because the relatively rapid turnover of residential ownership can create an information gap; as a result, uninformed homeowners in fire hazard areas may attempt landscaping or structural modifications to their houses that could be a detriment to the fire-resistant qualities of the original structure, with potentially negative consequences. Fire hazard education of homeowners is critical.

Structure fires amount to less than 1 percent of the incident responses by the Riverside County Fire Department's Battalion 13, the group that covers the Menifee area. Still, the statistics show that several dozen structure fires occur on a yearly basis in the area, with most of these occurring in residential structures, which results in significant economic and social losses. Fire Code items that help reduce the hazard of structural fire include fire-extinguishing systems, such as automatic fire sprinklers, in addition to fire-resistant construction materials. Fire sprinklers can

help contain a fire that starts inside a structure from spreading to other nearby structures, and also help prevent total destruction of a building. Since 2011, the California Fire Code requires fire sprinklers in all new residential structures and minor changes to smoke alarm requirements. Since most deaths and injuries associated with structure fires are the result of smoke or toxic fumes inhalation, smoke detectors, fire alarms, and windows and doors that allow the occupants to evacuate safely from any part of a building are very important in managing the impact of structure fires.

Fire prevention, suppression, inspection, fire safety, and emergency response services in Menifee are provided by the Riverside County Fire Department. The Riverside County Fire Department also monitors the fire hazard in Menifee and has ongoing programs for public education, and the investigation and mitigation of hazardous situations. Firefighting resources in and near Menifee are provided by five fire stations. Rapid growth and development have created traffic challenges that impact the fire department's response to emergencies. Physical limiting factors include roundabouts, narrow roadways, single points of access, and railroad crossings. Traffic congestion is a significant issue in Menifee, with heavy traffic along most major arterial roads, the interstate, the freeway on/off ramps, the area around Mt. San Jacinto College, and near commercial/retail centers. Traffic is especially heavy weekdays, from 5:30 AM to 9:00 AM, and again in the afternoons, from 3:30 PM to 6:30 PM. Based on data provided by the fire department, average response time in the Menifee area in 2020 was approximately 4.8 minutes.<sup>1</sup> Using a cumulative point system that weighs a community's fire-suppression delivery system, including fire dispatch, fire department representation (in the form of equipment, personnel, training, distribution of fire stations), and water supply adequacy and condition, the Insurance Services Office (ISO) ranks a community's fire protection needs and services. Rating varies from Class 1 (exemplary fire protection) to Class X (worst). Since 2018, Menifee has a Class 3 ISO rating in the urban areas of the City and an ISO rating of Class 3X in the outlying areas.

The Riverside County Fire Department has an Automatic Aid Agreement with the City of Murrieta. If needed, fire stations from these communities may respond to emergency calls in Menifee. Numerous other local, state, and federal agencies are available to assist the Riverside County Fire Department as needed, depending on the type of incident. Emergency response in every jurisdiction in the State of California is handled in accordance with the Standardized Emergency Management System. Since 2004, and in response to the 2001 terrorist attacks and the 2004–05 hurricane season, federal, state, tribal and local governments, in addition to nongovernmental organizations and the private sector, are required to work together to “prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity.” This is referred to as the National Incident Management System. Cities are required to adopt NIMS as a condition of receiving federal preparedness assistance.

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<sup>1</sup> Per the Riverside County Fire Department, this number only represents enroute to onscene time and does not account for dispatch time or turnout time.

Effective fire response and suppression relies on the ability to meet peak load water supply. The City requires all new development to install adequate water conveyance facilities to meet this requirement to ensure adequate water supplies. The City is served by the Eastern Municipal Water District (EMWD) who is able to provide proposed development and existing customers in the City water service.

Earthquakes can cause multiple ignitions distributed over a broad geographic area. Fires can be ignited by a variety of sources, including arcing downed electrical lines, sparks near ruptured gas pipelines, overturned electrical appliances, such as water heaters, and spills of reactive chemicals. If the earthquake has also impaired the water distribution system, limiting the water available to fight these fires, and fire department personnel are busy conducting search and rescue operations, earthquake-induced fires have the potential to be the worst-case fire-suppression scenarios for a community.

### **Wildland Urban Interface**

According to the U.S. Fire Administration, the zone of transition between unoccupied land and human development is referred to as the Wildland Urban Interface (WUI). The WUI zone is highly susceptible to wildfires because it is where built environment meets with undeveloped wildland or vegetative fuels. The State of California has seen increased wildfire activity and greater burn areas with each passing year and experts anticipate the trend to continue if climate change is not immediately addressed. Menifee contains multiple areas noted as Very High Fire Hazard Severity Zones (VHFHSZ) which puts it in greater danger of experiencing potentially devastating wildfires. As structures are built within the VHFHSZ adjacent the wildland urban interface (WUI) areas, fires will become an increasing problem for fire departments, per the U.S. Fire Administration. Secondary impacts can include erosion, loss of vegetation leading to landslides, poor air quality, and public health issues.

## **CLIMATE ADAPTATION AND RESILIENCY**

Climate change generally occurs at a global scale. However, the climate change that is currently occurring at an unprecedented rate is the direct result of intensive human-generated greenhouse gas (GHG) emissions. Human-generated GHG emissions significantly contribute to the changes in the global climate, which have a number of physical and environmental effects. These effects include sea level rise, an increase in the frequency and intensity of droughts, and increased temperatures. Increased GHG emissions are largely the result of increasing energy consumption, particularly through the combustion of fossil fuels. These effects may also affect communities differently based on their geography, weather, environmental resources, urbanization, and populations.

The City prepared a Climate Vulnerability Assessment, which identifies the exposure risks; sensitive structures, functions, and populations; potential impacts and risks; and the City's adaptive capabilities. Prior to the Climate Vulnerability Assessment, the City of Menifee adopted a variety of plans, policies and reduction strategies to address climate change. Furthermore, the City follows recommended GHG emission reduction strategies from the 2014 CAPtivate Adaptation and Resilience Strategy, developed by WRCOG.

## Severe Weather

Menifee, like the Western Riverside subregion, is a combination of Mediterranean and semi-arid climates, characterized by hot, dry summers and mild, wet winters. The City is predicted to experience slowly increasing temperatures and slightly decreasing rates of precipitation by the end of the century, both of which could pose a threat to the ability of the region to meet and maintain the NAAQSs for ozone and PM. Air pollution is considered a risk factor for serious and sometime fatal public health outcomes, such as heart attacks, asthma, and cardiovascular and lung disease. The City is accustomed to hot, dry temperatures, and the integrity of the built environment, including structures and roadways, is not expected to be compromised by these rising temperatures. However, parks and recreational amenities may be negatively impacted. Energy delivery is most threatened as the demand for power to cool buildings increases when people seek shelter indoors from the heat. Hot temperatures can threaten water supply also. Agricultural productivity could decrease, and pest populations increase, increasing food insecurity.

## Utility Systems

The City of Menifee is served by water, wastewater, energy, and communication services which may be overwhelmed or damaged during a climate change event. The Menifee Open Space and Conservation Element of the General Plan identifies energy resources available to the City, which include natural gas supplied by Southern California Gas Company and electricity supplied by Southern California Edison (SCE) and Inland Empire Energy Center (IEEC). Extreme heat days or wildfire risks may result in temporary energy blackouts which may prevent the community from accessing air conditioning and cooling services.

# HAZARDOUS MATERIALS

**Hazardous materials** are used every day in industrial, commercial, medical, and residential applications. The primary concern associated with a hazardous materials release is the short- and/or long-term effect to the public from exposure to these substances. Compared to other cities in southern California, Menifee has a relatively low number of sites that generate, use, or store hazardous materials (see Exhibit S-b4, Hazardous Materials, for the hazardous material sites in Menifee). According to the EPA, there are no Superfund sites in the City of Menifee; the closest sites include one in Perris, one in Hemet, and March Air Reserve Base. There are no sites in Menifee listed in the most recent Toxics Release Inventory, although there is one nearby site outside City limits. This site is the Matthews International Corporation on Highway 74, in Romoland. In 2005, this facility reportedly released five pounds of copper and one pound of lead to the environment via an air stack. There is also one Toxic Release Inventory facility in Nuevo. There are five EPA-registered large quantity and 23 small quantity generators of hazardous waste in Menifee. There are also four registered transporters of hazardous waste.

The only major route in the Menifee area prescribed or permitted to carry hazardous materials is Interstate 215, from Interstate 15 to Interstate 10. All types of hazardous materials are permitted on this road, and it is recommended for the transport of Class I explosives. Vehicles transporting hazardous materials are required to

have placards that indicate at a glance the chemicals being carried and whether they are corrosive, flammable, and/or explosive. The conductors are required to carry detailed "material data sheets" for each of the substances on board. These documents are designed to help emergency response personnel assess the situation immediately upon arrival at the scene of an accident, and take the appropriate precautionary and mitigation measures. The California Highway Patrol is in charge of spills that occur in or along freeways, with Caltrans and local sheriffs and fire departments responsible for providing additional enforcement and routing assistance.

Several gas transmission pipelines extend across and near the City. Pipeline operators are responsible for the continuous maintenance and monitoring of their pipelines. All excavations or drilling to be conducted near pipelines should be conducted only after proper clearance by the appropriate utility agencies or companies. This is done locally by the Underground Services Alert of Southern California, or DigAlert ([www.call811.com](http://www.call811.com); or dial 811).

All businesses that handle more than a specified amount of hazardous or extremely hazardous materials are required to submit a Hazardous Materials Business Plan to the local Certified Unified Program Agency (CUPA). In Menifee the local CUPA is the Riverside County Department of Environmental Health, Hazardous Materials Division. These businesses are also required to prepare risk management plans, detailed engineering analyses that identify the potential accident factors present and the mitigation measures that can be implemented to reduce this accident potential. The County of Riverside Department of Environmental Health, Hazardous Materials Division, is designated as the administering agency for hazardous materials in the City of Menifee.

Leaking underground storage tanks (LUSTs) are the primary cause of groundwater contamination by gasoline compounds and solvents. There are several federal and state programs aimed at leak reporting, investigation regulations, and standards for cleanup and remediation. California now requires all fuel tanks to be double-walled and prohibits the delivery of gasoline or diesel to noncompliant tanks. The State Water Resources Control Board (SWRCB) is the lead regulatory agency in the development of regulations and policy for underground storage tanks. The SWRCB, in cooperation with the Office of Emergency Services, maintains an inventory of LUSTs in a statewide database called GeoTracker. As of June 2021, there were two reported LUST cases in Menifee. All other previously identified sites have been remediated and closed, leaving only two cases still open. Because of the relatively shallow groundwater table in several parts of the Menifee area, twelve of the reported leaks reportedly impacted groundwater in aquifers used for drinking purposes. The GeoTracker list should be reviewed on a regular basis for new leaks, especially since there are at least 23 permitted underground storage tanks in the City.

The EMWD provides drinking water to most residents of the Menifee area. The EMWD provides water to an estimated population of 687,000 in its current service area of 555 square miles that also includes the cities of Perris, Hemet, Moreno Valley, Murrieta, San Jacinto and Temecula, in addition to several school districts and water agencies. Approximately 25 to 30 percent of the water distributed by the EMWD comes from groundwater wells. The rest of the water is imported by the Metropolitan Water District of Southern California from the Colorado River and northern California. Several residents have their own water wells on their property and are not tied to the main

water system. The Water District has had no health-based violations or monitoring-and-reporting violations for their facilities in at least the last 10 years.

Perchlorates, are persistent in the environment and can pose a health hazard, especially to infants and women. Perchlorates have been detected at concentrations between 1.7 and 13.0 parts per billion (ppb, equivalent to µg/L) in water from 12 wells in the EMWD system, although only in four of the wells have the concentrations of perchlorate exceeding the maximum contaminant level (MCL) of 6 µg/L established by California. Furthermore, only three of these wells are used for water supply; the fourth well is a **desalter well**. According to the EMWD, the water from these three wells represents less than 1.7 percent of the total water served by the District. The EMWD blends the water from these three wells with water from other wells and with water from the Colorado River to achieve levels of perchlorate less than 4 µg/L.

Given that hazardous materials are often used at home, and any surplus of these materials cannot be disposed in the regular trash, Riverside County and the City of Menifee have adopted a Household Hazardous Waste and Oil-Recycling Program free to residents. There are several regional household hazardous waste collection centers. For a complete list of acceptable and nonacceptable materials, tips on how to transport these materials, and information regarding where these collections centers are located, refer to <https://www.rcwaste.org/hhw> or call the Household Hazardous Waste Information Hotline at (800) 304-2226. Several other businesses in and around the City of Menifee, such as the Home Depot, UPS Mailing Centers, Office Depot, and similar stores may receive and recycle certain kinds of materials such as used batteries, spent light bulbs, and old electronics. Waste Management, the company that provides waste collection and recycling services in Menifee, also has a series of programs designed to reduce the amount of waste that is taken to the landfill. There is one open land disposal site in the City of Menifee—BP John Recycling Greenwaste located at Matthews and Menifee Roads. Double Butte Landfill, another open land disposal site, is located nearby in Winchester.

There are no oil fields in Menifee, so the development of oil-impacted properties is not an issue.

The most serious concern regarding the significant hazardous materials sites in Menifee is the potential for leaks and reactive chemical interactions to occur as a result of an earthquake compromising their storage containers. Past earthquakes have shown that hazardous materials spills can occur even when the building does not suffer significant damage.

## **DISASTER PREPAREDNESS, RESPONSE, AND RECOVERY**

A disaster is a sudden and dramatic emergency. When a disaster occurs, the threatened community strives to: 1) protect its residents to the extent possible, 2) care for victims, and 3) restore basic services as soon as possible. To do this, a community needs to respond quickly and dynamically, and as effectively as possible. This requires preparation at all levels, from the federal government (for large-scale disasters) down to individual neighborhoods,

families, and businesses. However, emergency managers note that it is difficult to sustain interest in disaster preparedness at the local level because most of us are too preoccupied with the day-to-day details of work, school, and family to worry about a potential disaster that may or may not occur in our lifetime. Having said this, history shows that people impacted by a disaster generally respond actively to the situation, seeking safety for themselves, their families and others, and improvising if necessary to respond to changing conditions. Some basic level of preparedness, however, can be very useful.

To that end, emergency managers realize the need to regularly educate and/or remind the public about these potential hazards, and encourage individuals, families, and businesses to be prepared. Agencies responsible for emergency response need to review and update their preparedness plans and emergency operations plan as new conditions and requirements develop — this is a continuous process. Emergency response personnel need to be familiar with the preparedness plans by reviewing these documents regularly and practicing their assigned roles during drills held frequently. Since January 1, 2008, jurisdictions have been required to adopt their Local Hazard Mitigation Plan (or Disaster Mitigation Plan) as part of their Safety Element. Menifee adopted a single-jurisdiction Local Hazard Mitigation Plan (LHMP) in 2015 and will be updating the plan in 2021. The LHMP relies on data provided in the “Technical Background Report to the Safety Element.” Planning issues pertaining to emergency response, disaster preparedness, and disaster recovery require an assessment of the hazards, identification of functions and resources to handle short-term and long-term response, and development of recovery procedures. Planning can help speed the response to an emergency while ensuring that the response is appropriate to the situation. Coordination between all levels of responders is critical. Direct, clear updates on the situation, provided in a timely manner by public officials engender cooperation from the public. Emergency preparedness includes having an alerting system that can be used immediately to warn the community of impending danger and to transfer information after a disaster. It is also essential to have provisions in place to deal with handicapped individuals and people who do not speak English and need to be notified of the disaster preparedness, response and recovery efforts in their native language. Recognizing and being sensitive to cultural differences are important for effective emergency preparedness and response in multiethnic communities.

## **POLICE SERVICES**

In November 2018, the Menifee City Council voted to create their own police department. Being a young city, which incorporated in 2008, this was a bold step on the City Council’s part. Menifee is one of the fastest growing and vibrant cities in America and it only made sense to have local control of their own police department. On July 1, 2020, the Menifee Police Department officially entered service with over 60 officers and 17 professional staff. The Chief of Police is responsible for administering and managing the Menifee Police Department. There are three divisions in the Police Department; Office of the Chief of Police; Operations Division; and Investigations and Support Services Division.

## **COMMUNITY EMERGENCY RESPONSE TEAM**

The city of Menifee Community Emergency Response Team (CERT) program provides disaster preparedness education and training for volunteers in our community. When requested by the City of Menifee, volunteers help with disaster response, disaster preparedness community presentations, and education outreach events. An important component within the CERT program includes CERT basic training, which provides 20 hours of free hands-on instruction in fire suppression, search and rescue, cribbing, and medical aid. Each CERT basic trained volunteer receives a certificate of completion and a comprehensive CERT kit. Further information on the City of Menifee's cert program is available on the City's CERT page at <https://cityofmenifee.us/631/cert>.

## **CRITICAL FACILITIES**

HazUS breaks critical facilities into two groups: (1) essential facilities, and (2) high potential loss (HPL) facilities. Essential facilities are parts of a community's infrastructure that must remain operational after an earthquake. Buildings that house essential services include hospitals, emergency operation centers, fire and police stations, schools, and communication centers. HPL or high-risk facilities are those that, if severely damaged, may result in a disaster far beyond the facilities themselves. Examples include power plants, dams and flood control structures, and industrial plants that use or store explosives, extremely hazardous materials, or petroleum products in large quantities (see Exhibit S-7: Critical Facilities).

Other critical facilities not considered in the HazUS analysis but that should be considered in both emergency preparedness and emergency response operations given their potential impact on the community include: (1) high-occupancy facilities, such as high-rise buildings, large assembly facilities, and large multifamily residential complexes because of the potential for a large number of casualties or crowd-control problems; (2) dependent care facilities, such as preschools, schools, rehabilitation centers, prisons, group care homes, nursing homes, and other facilities that house populations with special evacuation considerations; and (3) economic facilities, such as banks; archiving and vital record-keeping facilities; and large industrial or commercial centers that should remain operational to avoid severe economic impacts.

In the census tracts used for the HazUS analysis, there is one hospital listed, the Menifee Valley Medical Center, at 28400 McCall Boulevard, in Sun City. The Menifee Valley Medical Center is an acute care, full-service hospital with an 84-bed capacity that was founded in 1989. There are two other medical facilities nearby, but outside the City: Hemet Valley Medical Center, a 327-bed hospital founded in 1943, and the Loma Linda University Medical Center–Murrieta, a 256,000-square-foot acute care hospital with 106 inpatient beds, and a 160,000-square-foot Professional Office Building. Only the Menifee Valley Medical Center was considered in the HazUS analysis.

Other critical facilities in the HazUS database for Menifee include 404 school buildings, 6 fire stations (note that the area used in the HazUS analysis includes 11 census tracts which extend beyond the City's boundaries), City Hall (29844 Haun Rd.), one police station, and an emergency operations center both located at 29714 Haun Road. High potential loss facilities in the area include two dams, one hazardous materials site, no military installations, and no

nuclear power plants. The Inland Empire gas turbine combined-cycle power plant in Menifee started operation in 2008 and is not included in the HazUS database of high-loss potential facilities. One of the two dams (Diamond Valley Lake-Eastside Reservoir) is classified “high hazard.” According to the earthquake scenario results, the San Andreas fault would not cause significant damage to any of the hospitals, school buildings, fire stations, or the emergency operations center (EOC) in the area. All of these facilities are expected to be more than 50 percent functional one day after an earthquake on this fault.

The San Jacinto or Elsinore fault earthquake scenario is anticipated to impact some of the school buildings, with three buildings (out of a total of 404 in the area) experiencing more than 50 percent moderate damage. Further, only 324 school buildings are expected to be more than 50 percent functional the day after the earthquake. This loss of functionality may be in great part related to nonstructural damage, such as toppled bookshelves and computers, and loss of water and communications. All of the fire stations and the City’s EOC are expected to be more than 50 percent functional on the day after the earthquake, but the local hospital would not be functioning at more than 50 percent capacity the day after.

**RISK ANALYSIS**

Earthquakes typically pose the greatest challenge, but other natural and man-made hazards can also cause damage to the community. The risk that the various hazards discussed in the Safety Element and its Technical Background Report pose to essential facilities, schools, and other facilities in Menifee are summarized in Table SE-1. All of the City can experience ground shaking as a result of a regional earthquake, but the eastern portion of the region has the potential to experience moderate to strong ground shaking as a result of an earthquake on the San Jacinto fault, while the western portion would experience moderate to strong shaking as a result of earthquakes on the Elsinore fault. Sites in the eastern and western portions of the analysis area were assigned a moderate to strong (M-S) rating for ground shaking, whereas sites in the central portions of the City were assigned a moderate (M) rating for ground shaking.

**Table S-1: Risk Analysis of the Essential Facilities, Schools, and Other Facilities in and near Menifee (based on their location and relative to the hazards described in the Technical Report only)**

<i>Essential / Critical Facility</i>	<i>Ground Shaking</i>	<i>Surface Fault Rupture</i>	<i>Liquefaction</i>	<i>Slope Instability</i>	<i>Wildfire Susceptibility</i>	<i>Flooding, Inundation</i>	<i>Near Hazmat Site or Pipeline</i>
<b>Essential Facilities</b>							
City Hall and Primary EOC	M		Y			F, I	
Police Station	M					F, I	
Alternate EOC	M						Y
Fire Station 76 – Menifee Lakes	M		N			NF, I	
Fire Station 5 – Quail Valley	M-S				H		

**Table S-1: Risk Analysis of the Essential Facilities, Schools, and Other Facilities in and near Menifee  
(based on their location and relative to the hazards described in the Technical Report only)**

<i>Essential / Critical Facility</i>	<i>Ground Shaking</i>	<i>Surface Fault Rupture</i>	<i>Liquefaction</i>	<i>Slope Instability</i>	<i>Wildfire Susceptibility</i>	<i>Flooding, Inundation</i>	<i>Near Hazmat Site or Pipeline</i>
Fire Station 7 – Sun City	M						Y
Fire Station 34 – Winchester	M-S		Y			F, I	
Fire Station 68 – Menifee	S-M				VH		
Fire Station 54 – Homeland	M-S				H-VH		Y
Menifee Valley Hospital	M			N	H		
Sun City Convalescent Center	M						Y
Loma Linda University Medical Center	M				M-H		
BrightStar Health Care	M		Y			F, I	
Rancho Family Medical Group	M				N	I	
So. California Primary Care Medical	S-M			Y	H-VH		
Power Plant	M					NF	Y
<b>Schools</b>							
Romoland Elementary School	M					F	Y
Harvest Valley Elementary School	M				M		Y
Heritage High School	M				M	F	Y
Mesa View Elementary School	M					I	Y
Boulder Ridge Middle School	M			L	VH	I	Y
Hans Christensen Middle School	M				M		Y
Freedom Crest Elementary School	M		Y		H	F, I	Y
Callie Kirkpatrick Elementary School	M					I	
Southshore Elementary School	M			L	H-VH	I	
Bell Mountain Middle School	M					I	
Mt San Jacinto College						I	
Menifee Valley Middle School	S-M				H		
Paloma Valley High School	M				H-VH		
Chester W. Morrison Elementary School	M				M-H	I	
Good Shepherd Lutheran School	M				H	I	
Ridgemoor Elementary School	M				M-H	I	
Quail Valley Elementary School	M-S			M	H		
Revival Christian Academy	M				M		
Oak Meadows Elementary School	S-M				NH		
Taawila Elementary School							

**Table S-1: Risk Analysis of the Essential Facilities, Schools, and Other Facilities in and near Menifee  
(based on their location and relative to the hazards described in the Technical Report only)**

<i>Essential / Critical Facility</i>	<i>Ground Shaking</i>	<i>Surface Fault Rupture</i>	<i>Liquefaction</i>	<i>Slope Instability</i>	<i>Wildfire Susceptibility</i>	<i>Flooding, Inundation</i>	<i>Near Hazmat Site or Pipeline</i>
Winchester Elementary School	M-S		Y			F, I	
<b>Parks</b>							
La Ladera Park	M				M-H	I	
E.L. Pete Petersen Park	M		N		M	F, I	
Lazy Creek Park	M					I	
Sunrise Park	M				H	I	Y
Aldergate Park	M			M	VH	I	Y
La Paloma Park	M				H	F, I	
Wheatfield Park	M				M	I	
Winchester Park	M-S		Y			F, I	
<b>Churches</b>							
St. Stephen's Episcopal Church	M				H	I	
Center for Spiritual Living	M				H	N	
Menifee Bible Church	M				H	N	
First Church-Christ Scientist	M					I	Y
United Church of Christ	M					I	Y
Generations Church	M				M	N	Y
St. Vincent Ferrer Church	M				M-H	N	Y
Faith Lutheran Church	M				H-VH		Y
First Baptist Church-Sun City	M		Y			F, I	
Church of Christ of the Valley	M		Y			F, I	
Temple Beth Sholom	M		Y			F, I	
Sun City United Methodist	M				H-VH	I	
Church of Jesus Christ of LDS	M		Y			F, I	
Sun City Seventh-Day Adventist	M				M-H	I	
Church of Jesus Christ of LDS	M					I	
Eagle Ridge Church	M				M		
Canyon Lake Community Church	S-M			N	VH	I	
New Life Fellowship	M-S				H-VH	NF	Y
Community First Church of God	M-S				H-VH	NF	Y
Winchester United Methodist	M-S				M	I	
Southland Baptist Church	M-S		N			F, I	

## EMERGENCY SHELTERS

Earthquakes, flooding, wildland fires, and other disasters can cause loss of function or habitability of buildings that provide housing. Displaced households may need alternative short-term shelter provided by family, friends, temporary rentals, or public shelters established by relief organizations such as the Red Cross or Salvation Army in facilities around the City.

Potential shelter locations in Menifee include parks, schools, churches, and the Kay Cenicerros Senior Center. These locations are generally ideal as shelters because they have: 1) open space where people can set up tents, 2) restroom facilities and possibly kitchens, and 3) fairly large parking lots where displaced families can park their cars and recreational vehicles, which can be used for housing. Given that not all of these facilities may be available or fully functional after a disaster, having several options is ideal. Table SE-2 includes several potential shelter locations distributed throughout the northern and central sections of the City. Some of these facilities could be impacted by natural disasters, particularly wildfire and flooding. Thus, the selection of which sites to open during an emergency should be made after consideration of the hazard involved and the potential for that hazard to progress into the area where a shelter has been established. The parks included here have restroom facilities; parks without restrooms were not considered. These are short-term shelter facilities to be used for a few hours to a few days. Long-term alternative housing may require import of manufactured homes, occupancy of vacant units, net emigration from the impacted area, or, eventually, the repair or reconstruction of new private and public housing.

**Table S-2: Potential Emergency Shelters in Menifee**

<b>Parks and Community Centers</b>		
<b><i>Name and Approximate Size (acres)</i></b>	<b><i>Address</i></b>	<b><i>Amenities</i></b>
La Ladera Park (8 ac)	29629 La Ladera Road	Covered picnic tables with BBQ grills; restrooms; baseball field; soccer field; basketball court; tennis court; playground facilities; jogging path, fitness facilities; and parking lot.
E. L. Pete Petersen Park (7 ac)	29621 Park City Ave.	Covered picnic tables with BBQ grills; restrooms; soccer field; basketball courts; playground facilities; jogging path; drinking fountain; parking lot; and off-leash dog park.
Lazy Creek Park (6 ac)	26480 Lazy Creek Road	Picnic tables with BBQ grills; restrooms; drinking fountain; basketball court; playground facilities; recreation Center; and parking lot.
Sunrise Park (11 ac)	Heritage Park Dr & Lindenberger Rd	Shaded picnic tables with BBQ grills; restrooms; playground facilities; baseball diamond; basketball courts; drinking fountain; parking.
Aldergate Park (7 ac)	28688 Aldergate	Restrooms; drinking fountain; playground facilities; baseball diamond; off leash dog park; parking.
La Paloma Park (5 ac)	3000 Menifee Road	Picnic benches with BBQ grills; restrooms; playground facilities; parking lot; access to Menifee Lake.
Wheatfield Park (25 ac)	30627 Menifee Road	5, 000 sq. ft. community building; picnic benches; restrooms; drinking fountains; playground facilities; six ball diamonds, two lighted ball diamonds; two lighted tennis courts; maintenance garage; snack bar.

**Table S-2: Potential Emergency Shelters in Menifee**

Rancho Ramona Park (2 ac)	28050 Encanto Drive	Playground facilities; basketball court; horseshoe pits; sand volley ball court; covered picnic tables; drinking fountains; BBQ grills.
Kay Cenicerros Senior Center	29995 Evans Road	Two large multi-purpose rooms and two smaller classrooms.

**Schools**

<b>Name</b>	<b>Address</b>
Romoland Elementary School	25890 Antelope Road
Harvest Valley Elementary School	29955 Watson Road
Heritage High School	26001 Briggs Road
Mesa View Elementary School	27227 Heritage Lake Drive
Boulder Ridge Middle School	27327 Junipero Road
Hans Christensen Middle School	27625 Sherman Road
Freedom Crest Elementary School	29282 Menifee Road
Callie Kirkpatrick Elementary School	28800 Reviere Drive
Southshore Elementary School	30975 Southshore Drive
Bell Mountain Middle School	28525 La Piedra Drive
Mt San Jacinto College	28237 La Piedra Road
Menifee Valley Middle School	26255 Garbani Road
Paloma Valley High School	31375 Bradley Road
Chester W. Morrison Elementary School	30250 Bradley Road
Good Shepherd Lutheran School	26800 Newport Road
Ridgemoor Elementary School	25455 Ridgemoor Road
Quail Valley Elementary School	23757 Canyon Heights Drive
Revival Christian Academy	29220 Scott Road
Oak Meadows Elementary School	28600 Poinsettia Street
Winchester Elementary School	28751 Winchester Road

**Churches**

<b>Church Name</b>	<b>Address</b>	<b>Amenities, Opportunities</b>
St. Stephen's Episcopal Church	26704 Murrieta Road	Large parking lot, 1 large building, open space to the north and east of the property.
Center for Spiritual Living	26805 Murrieta Road	Large parking lot, 1 medium building, open space to the west of parking lot, next to Menifee Bible Church.
Menifee Bible Church	26815 Murrieta Road	Large parking lot, 1 large building, open space to the south of the building.
First Church-Christ Scientist	27755 Bradley Road	Large parking lot, 1 large building, open space to the northwest of the property, may not belong to church.
United Church of Christ	26701 Mccall Boulevard	Large parking lot, 2 large buildings.
Generations Church	28250 Bradley Road #B	Suite in large building, large shared parking lot, open space south of property probably doesn't belong to church.
St. Vincent Ferrer Church	27931 Murrieta Road	Large parking lot, 2 buildings, parking lot probably shared.
Faith Lutheran Church	28200 Portsmouth Drive	Large parking lot, 2 large buildings, open space to the east may belong to church.
First Baptist Church-Sun City	29029 Murrieta Road	Large parking lot, 3 large buildings.

**Table S-2: Potential Emergency Shelters in Menifee**

Church of Christ of the Valley	29035 Del Monte Drive	Large parking lot, large building, open space to the west of the building probably belongs to church.
Temple Beth Sholom	29101 Del Monte Drive	Large parking lot, large building, separated from Church of Christ of the Valley by open space that may not belong to either.
Sun City United Methodist	30220 Carmel Road	Large parking lot, large building, 2 ball fields west of building may belong to church.
Church of Jesus Christ of LDS	29725 Bradley Road	Large parking lot, large building, open field north of building probably doesn't belong to church.
Sun City Seventh-Day Adventist	29885 Bradley Road	Large parking lot, large building, open space south and east of building probably belongs to church.
Church of Jesus Christ of LDS	28150 La Piedra Road	Large parking lot, large building.
Eagle Ridge Church	25891 Holland Road	Medium sized parking lot, large building, open space south of building probably belongs to church.
Canyon Lake Community Church	30515 Railroad Canyon Road	Large parking lot, 2 large buildings, open space to the south of buildings
New Life Fellowship	31336 US Highway 74	Large parking lot, 1 large building, open space west of the building.
Community First Church of God	31371 US Highway 74	Medium parking lot, 3 buildings, open space to the east of buildings.
Winchester United Methodist	33005 Taylor	Building, medium parking lot, open space to the north and south of building

## EVACUATION ROUTES

Evacuation is the movement of people who are at risk of being impacted by a disaster to a safer location, using routes that do not pose a significant danger to the evacuees. Thus, both the destination and the route need to be scrutinized, preferably before the evacuation orders are issued. This involves making a decision as to which of the potential temporary shelters identified in the previous section will be opened, based on the shelters' locations relative to the approaching disaster and their ease of accessibility from the routes identified as safest.

The Police Department serves as the lead organization in carrying out evacuations, supported by the County Fire Department as appropriate. The Public Works Department typically assists in the identification of the best evacuation routes and in barricading the evacuated areas.

Which routes should be used depends on the specific disaster:

1. Earthquakes occur suddenly and for the most part without warning. Evacuation may be necessary post-disaster if the ground shaking causes a secondary disaster, such as the failure of a dam or water reservoir, or the release of a toxic cloud from ruptured containers of hazardous materials. Post-earthquake fires may also require the evacuation of certain areas, but these are generally localized areas with a limited number of affected individuals. Which evacuation routes to use will depend on which area is at risk from any of these secondary hazards.

2. Fires in the Menifee area typically start in the mountains or foothills. If the prevailing winds fan a fire so that it moves into the urban-wildland fire interface, then evacuation of the potentially affected communities may be required. In general, evacuees would take roads leading toward the more developed areas of the City.
3. Storm flooding in Menifee will impact the northern and central portions of the City most significantly. Localized flooding due to storm events can occur throughout the City, typically along road crossings without adequate culverts to convey the flows, or without bridges extending over the flooded areas. Flooding also occurs where the railroad berm obstructs the flow of floodwaters. The appropriate evacuation routes to use will therefore depend on where localized flooding is more severe and on the destination (i.e., shelter location). In general, flooding along the Salt Creek floodplain divides the City in half. Appropriate shelters on both sides of Salt Creek should be operational in the event of a severe storm event, to shelter residents caught on the opposite side of the Creek from their residence. Evacuation may involve merely getting out of the floodplain and onto higher ground for the duration of the storm.
4. Inundation as a result of catastrophic dam failure is a low probability but high risk hazard in Menifee. Depending on which dam fails, large sections of the City could be impacted.
5. Release of hazardous materials, either as a result of a leak in one of the facilities that handle these substances in the area, a leak from a high-pressure gas line, or an accident-caused spill on the freeway, will generally require the evacuation of a relatively small area, possibly within a 1- to 2-mile radius of the release. The evacuation routes to follow would be designated by the sheriff's department based on an assessment of prevailing wind directions, traffic flow, and location of the emergency shelter opened for that event.

The Western Riverside County of Governments (WRCOG) and San Bernardino County Transportation Authority (SBCTA) prepared a Community Vulnerability Profiles Western Riverside County report and the Regional Climate Adaptation Toolkit for Transportation Infrastructure, "Resilient IE Toolkit" to support member agencies prepare climate adaptation and resilience strategies to reduce risks. The assessment identified the City's evacuation network and provided potential conflicts or hazard prone areas along the identified evacuation route. Exhibit S-9: Evacuation Routes, identifies the City's evacuation route network and potential hazard impacts, bridges, and water crossings.

## **RECOVERY**

Many communities do well in preparing for a disaster but are ill-prepared for the recovery phase, possibly in part, because they hope that if their pre-disaster planning is effective, their long-term damages will be relatively small. This is certainly what an emergency planning organization aims for. However, some post-disaster recovery efforts may be necessary to restore community life. This includes the re-establishment of essential services and the

rebuilding and repair of impacted properties. Recovery is an opportunity to improve the community so that it becomes more sustainable and less likely to be impacted by a future, similar disaster. Examples include avoiding reconstruction projects in areas likely to flood again, unless an area-wide flood control structure is built to mitigate the hazard. Having a recovery plan in place can help with the decision-making process of reconstruction, improves communication with other levels of government that were involved in the disaster response phase and now have a vested interest in the recovery process, and possibly most importantly, engenders support for mitigation efforts. If plans for a major mitigation effort exist prior to a disaster, public and government support (at the state and federal levels) for such a project, including the appropriation of money to fund such a project, may become available.

FEMA encourages the development and regular update of emergency preparedness documents by providing grant money to communities that have approved and adopted Local Hazard Mitigation Plans. Similarly, the State of California, through the California Disaster Assistance Act, limits the state share for an eligible project that is in response to a fire disaster to no more than 75 percent of total state eligible costs, except if the local agency has adopted a Local Hazard Mitigation Plan as part of their Safety Element and complies with several requirements imposed by the State Fire Marshal (Senate Bill 1764, 2008). If the community complies with all requirements, the state share may be up to 100 percent of the cost.

## SAFETY DEFINITIONS

**Active fault.** For implementation of Alquist-Priolo Earthquake Fault Zoning Act (APEFZA) requirements, an active fault is one that shows evidence of having experienced surface displacement within the last 11,000 years. APEFZA classification is designed for land use management of surface rupture hazards. A more general definition by the National Academy of Sciences (1988) is "a fault that on the basis of historical, seismological, or geological evidence has the finite probability of producing an earthquake." The American Geological Institute defines an active fault as one along which there is recurrent movement, usually indicated by small, periodic displacements or seismic activity.

**Alluvium.** Surficial sediments of poorly consolidated gravels, sand, silts, and clays deposited by flowing water.

**Artificial Fill.** Soil used for construction purposes, typically placed in layers to develop a final elevation and shape (for example, embankments for roads and airfields, dams, dikes and levees, are all typically made of soils moved for that purpose). Soils are also used to fill in low elevation areas. When used for structural support, each soil layer is compacted before being covered with a subsequent layer. Properly compacted, the resulting mass of fill has strength and support capabilities that are as good or better than that of natural soil formations. Artificial fills placed without compaction, on the other hand, generally perform poorly as foundation support, which can lead to structural damage.

**Automatic Aid Agreement.** An agreement between two or more agencies whereby such agencies are automatically dispatched simultaneously to predetermined types of emergencies in predetermined areas.

**Base flood.** Flood that has as 1 percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.

**Biosolid.** Nutrient-rich organic materials resulting from the treatment of domestic sewage in a treatment facility. When treated and processed, these residuals can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth.

**Bioregion.** A major, regional ecological community characterized by distinctive life forms and distinctive plant and animal species.

**Debris flow.** A saturated, rapidly moving earth flow with 50 percent rock fragments coarser than 2 mm in size; can occur on natural and graded slopes.

**Defensible space.** An area, either natural or man-made, where material capable of causing a fire to spread has been treated, cleared, reduced, or changed in order to provide a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, defensible space is defined as an area with a minimum of 100 feet around a structure that is cleared of flammable brush or vegetation. Distance from the structure and the degree of fuels treatment vary with vegetation type, slope, density, and other factors.

**Desalter Well.** A well used by the EMWD to slow the northward migration of groundwater rich in total dissolved solids into the Lakeview area, where groundwater of better quality occurs naturally.

**Differential settlement.** Nonuniform settlement; the uneven lowering of different parts of an engineered structure, often resulting in damage to the structure. Sometimes included with liquefaction as ground failure phenomenon.

**El Niño.** Phenomenon that originates, every few years, typically in December or early January, in the southern Pacific Ocean, off of the western coast of South America, characterized by warmer than usual water. This warmer water is statistically linked with increased rainfall in both the southeastern and southwestern United States, droughts in Australia, western Africa, and Indonesia, and increased number of hurricanes in the Eastern Pacific.

**Erosion.** Under the National Flood Insurance Program, the process of the gradual wearing away landmass. In general, erosion involves the detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.

**Expansive soil.** A soil that contains clay minerals that take in water and expand. If a soil contains sufficient amount of these clay minerals, the volume of the soil can change significantly with changes in moisture, with resultant structural damage to structures founded on these materials.

**Fault segment.** A continuous portion of a fault zone that is likely to rupture along its entire length during an earthquake.

**Five-hundred (500)-year flood.** Flood that has as 0.2 percent probability of being equaled or exceeded in any given year.

**Flood.** A rising body of water, as in a stream or lake, that overtops its natural and artificial confines and covers land not normally underwater. Under the National Flood Insurance Program, either:

(a) a general and temporary condition or partial or complete inundation of normally dry land areas from:

- (1) the overflow of inland or tidal waters,
- (2) the unusual and rapid accumulation or runoff of surface waters from any source, or
- (3) mudslides (i.e., mudflows) which are proximately caused by flooding as defined in (2) and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when the earth is carried by a current of water and deposited along the path of the current, or

(b) the collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in (1), above.

**Floodplain.** Under the National Flood Insurance Program, any land area susceptible to being inundated by water from any source. See Flood.

**Flood Insurance Rate Map (FIRM).** Under the National Flood Insurance Program, an official map of a community, on which the Federal Emergency Management Agency has delineated both the special hazard areas and the risk premium zones applicable to the community. (Note: The latest FIRM issued for a community is referred to as the effective FIRM for that community.)

**Hazardous material (HAZMAT).** Substance that has the ability to harm humans, property, or the environment. The United States Environmental Protection Agency defines hazardous waste as substances that:

- 1) may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness;
- 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed; and
- 3) whose characteristics can be measured by a standardized test or reasonably detected by generators of solid waste through their knowledge of their waste.

Hazardous waste is also ignitable, corrosive, or reactive (explosive) (EPA 40 CFR 260.10). A material may also be classified as hazardous if it contains defined amounts of toxic chemicals.

**HazUS (short for Hazards United States).** A methodology developed by the National Institute of Building Sciences with funding from the Federal Emergency Management Agency to make standardized loss estimates at a regional scale resulting from earthquakes, floods, or hurricanes. HazUS addresses nearly all aspects of the built environment and is used in planning for disaster loss mitigation, and emergency preparedness, response, and recovery.

**Internally undeformed.** There are no known active faults extending through the Perris Block proper. Instead, known active faults bound the Perris Block, with the San Jacinto fault to the east, and the Elsinore fault to the west being the most significant of these. The Perris Block is a mass of land consisting of Cretaceous and older rocks that is not split internally by active faults. Also referred to as internally unfaulted.

**Local Responsibility Area (LRA).** Lands in which the financial responsibility of preventing and suppressing fires is primarily the responsibility of the local jurisdiction.

**Maximum Magnitude Earthquake (Mmax).** The highest magnitude earthquake a fault is capable of producing based on physical limitations, such as the length of the fault or fault segment.

**Moderately Damaged.** The definition of moderate damage varies by building type. For mobile homes, moderate damage means that the structure suffered major movement over its supports, resulting in damage to metal siding and stairs, and requiring resetting of the mobile home on its supports. For precast concrete tilt-up buildings, moderate damage means that most wall surfaces exhibit diagonal cracks; larger cracks in walls with doors or window openings; few shear walls exceeded their yield capacities as indicated by larger diagonal cracks and concrete spalling. Some walls may have visibly pulled away from the roof. Some welded panel connections may have been broken, as indicated by spalled concrete around the connections.

**Peak Ground Acceleration (PGA).** The greatest amplitude of acceleration measured for a single frequency on an earthquake accelerogram. The maximum horizontal ground motion generated by an earthquake. The measure of this motion is the acceleration of gravity (equal to 32 feet per second squared, or 980 centimeter per second squared), and generally expressed as a percentage of gravity.

**Primary fault rupture.** Fissuring and displacement of the ground surface along a fault that breaks in an earthquake.

**Ridgetop shattering.** An earthquake-induced type of ground failure that occurs at or along the top of ridges, forming linear, fault-like fissures, and leaving the area looking like it was plowed.

**Rockfall.** Free-falling to tumbling mass of bedrock that has broken off steep canyon walls or cliffs.

**Sidehill fill.** A wedge of artificial fill typically placed on the side of a natural slope to create a roadway or a level building pad.

**Subsidence.** The sudden sinking or gradual downward settling of the Earth's surface with little or no horizontal motion.

**Tectonically stable.** Area or part of the Earth's crust that shows neither uplift or subsidence, or that is not readily deformed.

**Tsunami.** Great sea wave produced by submarine earth movement, volcanic eruption, oceanic meteor impact, or underwater nuclear explosion.

**Unconsolidated sediments.** A deposit that is loosely arranged or unstratified, or whose particles are not cemented together, occurring either at the surface or at depth.

**Watershed.** A topographically defined region draining into a particular river or lake.