

EMERGENCY OPERATIONS PLAN

Part II: Hazard Annexes

Earthquake

City of Brisbane

November 2018



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1.0 INTRODUCTION

1.1 PURPOSE

This Annex to the City of Brisbane’s Emergency Operations Plan (EOP) is intended to ensure an effective and coordinated response to a significant earthquake event. This Annex provides direction for City departments, community groups and allied stakeholders ensuring interagency coordination in accordance with the City’s EOP, the California Emergency Services Act, the Standardized Emergency Management System (SEMS), and the National Incident Management System (NIMS).

This Annex is designed to accomplish the following:

- Serve as a planning document to support further development of major incident plans by City departments.
- Provide an overview of the threats that earthquakes pose to City and define the potential range of impacts.
- Provide the response management team with contextual information to guide initial response planning.

1.2 SCOPE

This Annex has been developed in accordance with the City EOP. In keeping with the EOP’s “all-hazards” approach for local emergency management, the response policies and protocols for an earthquake will align with those established in the EOP.

The Annex supplements the EOP by providing considerations for a response to a major earthquake in San Mateo County or the San Francisco Bay Area that has a significant effect on the City. This plan does not change policies and direction provided in the EOP, such as policies for activating and managing the EOC. Rather, it provides additional guidance that may be used to complement the EOP.

Many variables govern the specific effects of an earthquake, from the amount of energy it releases and the location of its origin, to the specific qualities of the soil and rock upon which a community is built. Given these variables, the complexity of earthquake effects, and the size and density of the Bay Area, no plan can possibly identify all considerations for a response. Consequently, this Annex is not intended to describe detailed procedures for tactical execution of response tasks. However, the plan does provide considerations that can be used to prepare for and guide the execution of response operations.

This Annex is primarily focused on response and short-term recovery operations. Elements related to preparedness, long-term recovery, and mitigation are addressed in the City’s EOP and the *San Mateo County Hazard Mitigation Plan (July 2016)*, as well as the *California Governor’s Office of Emergency Services (Cal OES) / Federal Emergency Management Agency (FEMA) Bay Area Earthquake Plan (July 2016)*.

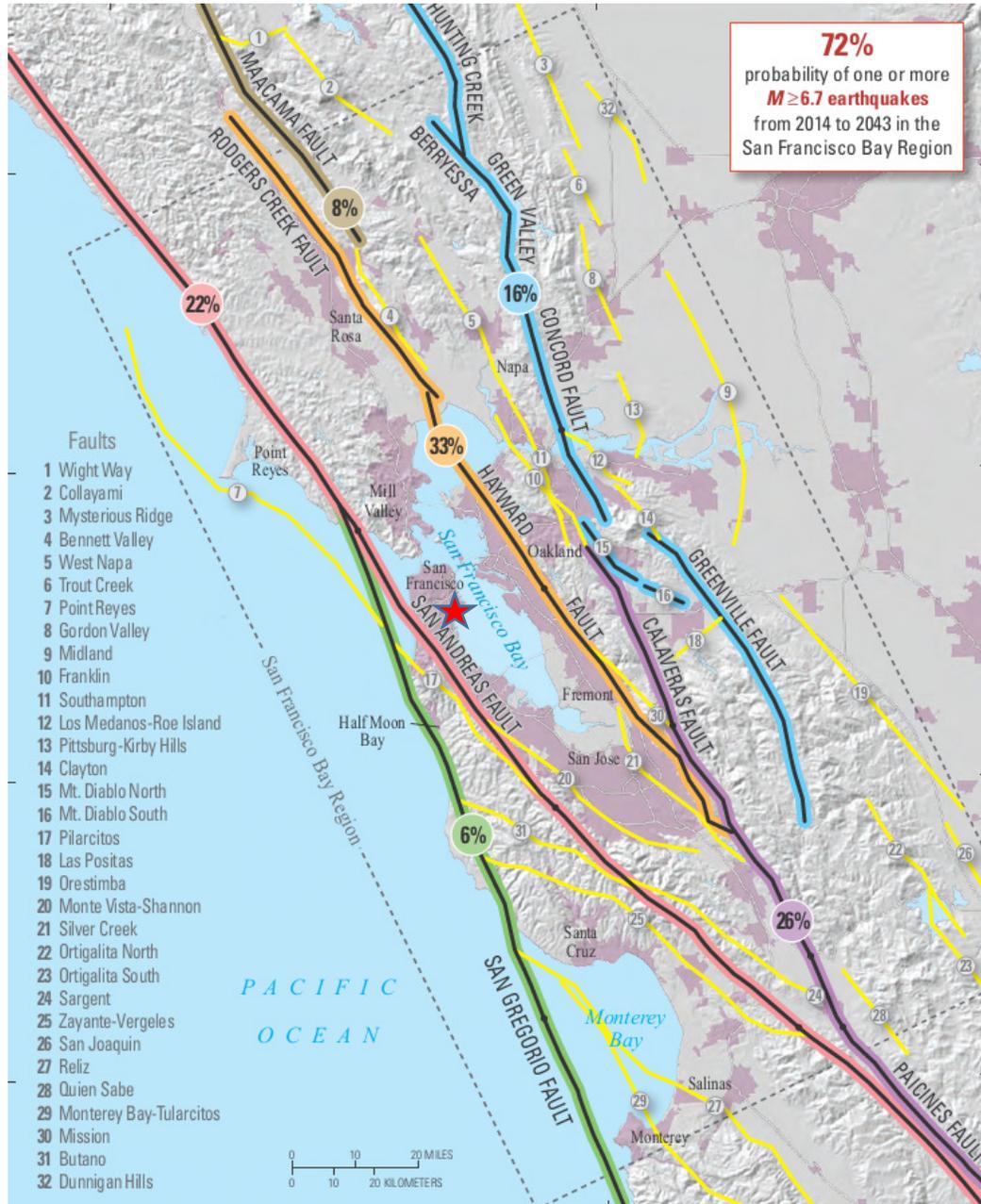
1.3 SITUATION

California is seismically active because it sits on the boundary between two of the earth’s tectonic plates: the North American Plate and the Pacific Plate. All land east of the San Andreas Fault is on the North American Plate. Coastal cities from Monterey to San Diego are on the Pacific Plate. The Pacific Plate is constantly moving northwest past the North American Plate. The relative rate of movement is about 2 inches (50 millimeters) per year (Cal OES 2013). Earthquakes in the San Francisco Bay region result from strain energy constantly accumulating across the region because of the northwestward motion of the Pacific Plate relative to the North American Plate.



In addition to the San Andreas Fault, there is the Hayward Fault across the San Francisco Bay to the east, and the San Gregorio Fault to the west along the Pacific Ocean. The primary seismic hazard for the City is potential ground shaking from these three large faults. See Figure 1.

FIGURE 1: SIGNIFICANT KNOWN FAULTS IN THE BAY AREA



Source: USGS 2016f

1.3.1 San Andreas Fault



The San Andreas Fault is a transform boundary that spans approximately 810 miles from the East Pacific rise in the Gulf of California through the Mendocino Fracture Zone off of the shore of northern California. The fault is estimated to be 28 million years old. The fault forms the tectonic boundary between the Pacific Plate and the North American Plate, and its motion is right-lateral strike-slip.

The San Andreas Fault poses the greatest risk for the City of Brisbane due to the close distance to the fault, posing considerable risk for surface fault rupture within and near the City. According to the Association of Bay Area Governments (ABAG), the San Andreas Fault has a 21 percent chance of generating a magnitude (M) 6.7 or greater earthquake in the next 30 years. The last earthquake with an epicenter in San Mateo County was the 1957 Daly City earthquake with a magnitude of 5.3. A rupture along the peninsula will cause extremely violent ground shaking throughout the City of Brisbane. The bay margins will also be likely to experience liquefaction in a major earthquake (ABAG 2013).

1.3.2 Hayward Fault

The Hayward Fault is a 45-mile-long, right lateral slip fault that runs parallel to the San Andreas Fault through densely populated areas on the East Bay. The Hayward Fault is increasingly becoming a hazard priority in the Bay Area because of its increased chance for activity and its proximity to critical infrastructure and multiple highly populated areas. There is a 33 percent probability of a M-6.7 or greater earthquake along the Hayward Fault within the next 30 years.

1.3.3 Calaveras Fault

The Calaveras Fault is a major branch of the San Andreas Fault in the San Francisco Bay area. It is east of the Hayward Fault and extends 76 miles from the San Andreas Fault near Hollister to Danville at its northern end. The Calaveras Fault is one of the most geologically active and complex faults in the San Francisco Bay Area (U.S. Geological Survey [USGS] 2003). There is a 26 percent probability of a M-6.7 or greater earthquake along the Calaveras Fault within the next 30 years.

The last significant (greater than M-6.0) seismic event in the vicinity of Brisbane was the 2014 M-6.0 earthquake that originated 6 miles southwest of Napa. The previous large event was the 1989 M-7.1 Loma Prieta Earthquake that originated 10 miles northeast of Santa Cruz. No significant seismic events in the Planning Area have been recorded since these two events. Recent earthquakes of M-5.0 or greater within a 100-mile radius of Brisbane are listed in Table 1.

TABLE 1: RECENT EARTHQUAKES MAGNITUDE 5.0 OR LARGER WITHIN 100-MILE RADIUS OF THE CITY OF BRISBANE

Date	Magnitude	Epicenter Location
8/24/2014	6.0	South Napa
10/31/2007	5.6	San Jose
5/14/2002	5.0	Gilroy
9/3/2000	5.0	Napa County
4/18/1990	5.4	Loma Prieta / Santa Cruz
10/18/1989	5.0	Loma Prieta / Santa Cruz
10/17/1989	7.2	Loma Prieta / Santa Cruz
6/13/1988	5.0	San Jose
3/31/1986	5.6	South Bay



The USGS estimates that there is a 72 percent probability of at least one earthquake in the San Francisco Bay region ¹ with a M-6.7 before 2043.

Earthquakes do not only produce damage, they serve as a catalyst for many other hazards. Identifying the extent and location of an earthquake is not as simple as it is for other hazards such as flood, landslide or wildfire. The impact of an earthquake is largely a function of the following components:

- Ground shaking (ground motion accelerations)
- Liquefaction (soil instability)
- Distance from the source (both horizontally and vertically).

For greater detail, see [San Mateo County Hazard Mitigation Plan \(2016\)](#)

1.4 EARTHQUAKE MEASUREMENT

There are two scales that are used to measure the severity and intensity of an earthquake. The Modified Mercalli Intensity (MMI) scale measures the ground shaking intensity in terms of acceleration, velocity, and displacement. The Moment Magnitude (Mw) scale measures the severity of the earthquake by the amount of energy released at the source of the earthquake. The Mw scale, based on the concept of seismic moment, is uniformly applicable to all sizes of earthquakes. The extent of damage from an earthquake is determined by the magnitude of the earthquake, distance from the epicenter, and characteristics of surface geology. An approximate correlation between the Mw and the MMI scale and its effects are shown below in Table 2.

TABLE 2: SEVERITY (Mw) AND INTENSITY (MMI) COMPARISON

Moment Magnitude (Mw) Scale: Severity	Modified Mercalli Intensity (MMI) Scale: Intensity	Abbreviated MMI Scale: Effects	
1.0 – 2.9	I	I. Not felt except by a very few under especially favorable conditions.	
3.0 – 3.9	II – III	II. Felt only by a few persons at rest, especially on upper floors of buildings.	III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck.
4.0 – 4.9	IV – V	IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 – 5.9	VI – VII	VI. Felt by all, many frightened. Some heavy furniture moved; a	VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary

¹ USGS. 2016. Earthquake Outlook for the San Francisco Bay Region. <https://pubs.er.usgs.gov/publication/fs20163020>.



		few instances of fallen plaster. Damage slight.	structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0 – 6.9	VIII – IX	VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.	IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
7.0 and higher	X – XI	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.	XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
	XII	XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.	

Source: USGS: http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

1.4.1 Geologic Hazards

Seismic events are the highest threat and source of loss to the City of Brisbane. The following geologic hazards are associated with earthquakes and may be caused by seismic activity, causing additional damage.

Ground Shaking

Ground shaking caused by a strong earthquake is the most important seismic hazard that can be expected anywhere in the San Francisco Bay Area. The amount of earthquake shaking at a site is associated with the earthquake magnitude; the type of earthquake fault; the distance from the site and the earthquake source; the geology of the site; and how the earthquake waves decrease or increase as they travel from their source to the site in question. Shaking from the earthquake intensifies with a greater magnitude and closer distance to the epicenter. Softer soils and topographic ridges can also amplify seismic ground motions.

The shaking of the ground is caused by the sudden breaking and movement of tectonic plates (large sections of the Earth’s rocky outermost crust). Movements within the Earth’s crust cause stress to build up at points of weakness and can cause deformation of rocks in the Earth’s crust. Stored energy builds up and when the stress finally exceeds the strength of the rock, the rock fractures along a fault, often at a zone of existing weakness within the rock. The stored energy is suddenly released as an earthquake. Intense vibrations, or seismic waves, radiate outward from the initial point of rupture, or focus, where the earthquake begins. These seismic waves are what makes the ground shake and can travel large distances in all directions. Near the focus, the waves can be very large, making them extremely destructive. The epicenter is the point on the Earth’s surface located directly above the focus of an earthquake.

The entire City of Brisbane is subject to a Mercalli VII (Strong) level of peak ground acceleration in an earthquake that is expected to occur at least every 100 years (see Figure 2 below).

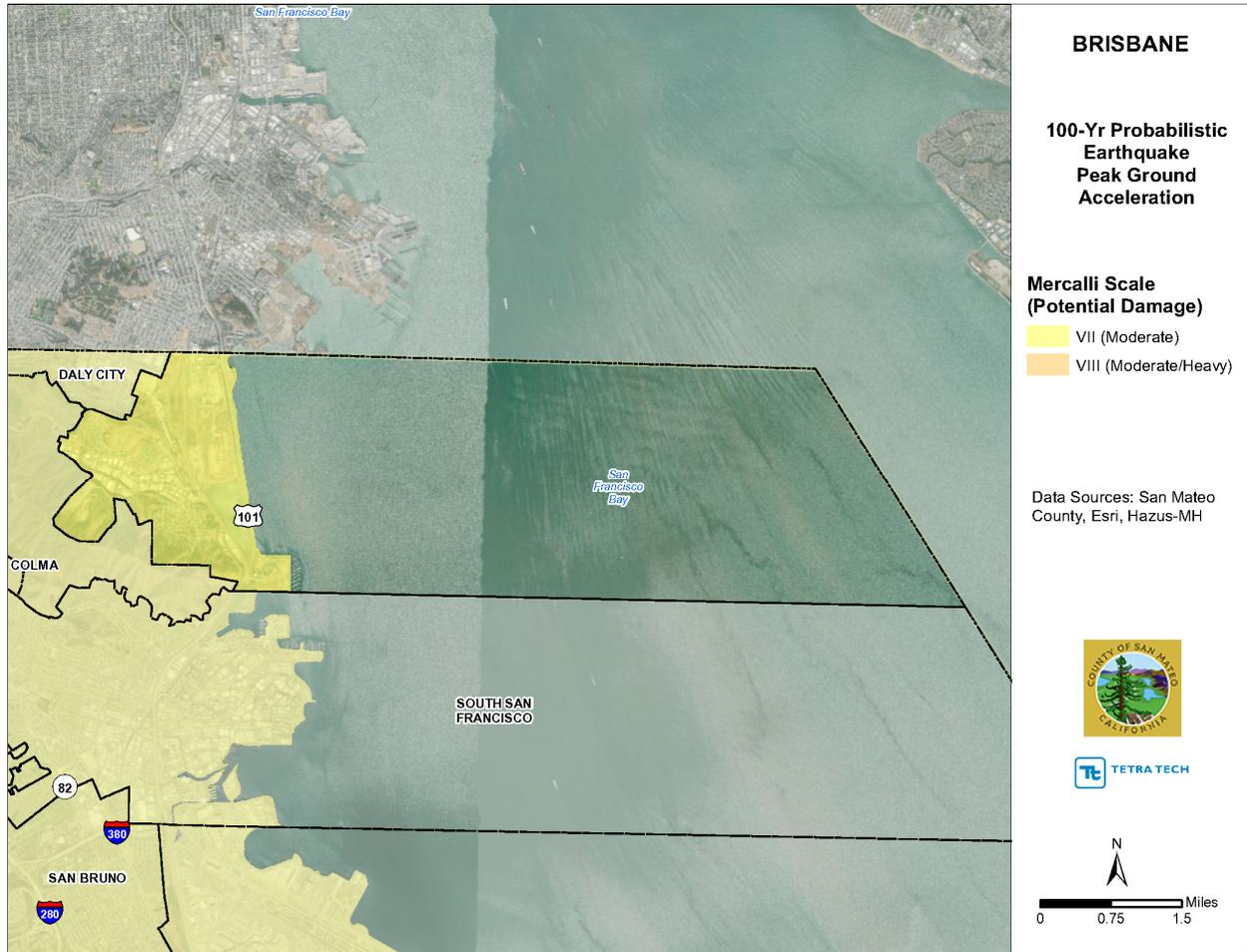
Surface Fault Rupture

Surface fault rupture is displacement along a fault that reaches the Earth’s surface during slip, typically from shallow earthquakes with an epicenter less than 20 kilometers (km) deep. Surface rupture is an offset of the ground surface when fault rupture extends to the Earth’s surface. Fault rupture almost always follows pre-existing faults, which are zones of weakness. Any structure built across the fault is at risk of being torn apart as the two sides of the fault slip past each other. Normal and reverse surface fault ruptures have



vertical motion while strike-slip surface fault ruptures produce lateral offsets. Many earthquake surface ruptures are combinations of both. Structures that span a surface fault are likely to suffer great damage.

FIGURE 2: CITY OF BRISBANE 100-YEAR PROBABILISTIC EARTHQUAKE PEAK GROUND ACCELERATION²



Liquefaction

Soil liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. The vast majority of liquefaction hazards are associated with sandy soils and soils of low plasticity, such as silt. The composition of the soil must be saturated or nearly saturated to be susceptible to liquefaction. Liquefaction can result in the settling and compacting of unconsolidated sediment in the event of a major earthquake. Liquefaction may increase as the ground acceleration and duration of shaking increase. Liquefaction is more likely to occur in sand dune areas, as is quake-triggered ground failure. The probability of liquefaction in the City of Brisbane is very high according to maps of Quaternary (less than 1.8 million years old) deposits and liquefaction susceptibility prepared by the USGS

² Excerpted from the San Mateo County Hazard Mitigation Plan



(USGS 2006b). Various geotechnical investigations have confirmed the presence of potentially liquefiable deposits in subsurface materials (Treadwell & Rollo 2008).

Ground Failure

According to the USGS, ground failure is the term used to describe zones of ground cracking, fissuring, and localized horizontal and vertical permanent ground displacement that can form by a variety of mechanisms on gently sloping valley floors. Ground failure may be caused by surface rupture along faults, secondary movement on shallow faults, shaking-induced compaction of natural deposits in sedimentary basins and river valleys, and liquefaction of loose, sandy sediment.

Subsidence

Land subsidence is defined as the lowering of the land surface. Many different factors can cause the land surface to subside, such as a sinkhole, underground mine collapse, or a major earthquake. Land subsidence can occur in various ways during an earthquake. Movement that occurs along faults can be horizontal or vertical or have a component of both. As a result, a large area of land can subside drastically during an earthquake. Land subsidence can also be caused during liquefaction. Liquefaction can result in the settling and compacting of unconsolidated sediment in an event of a major earthquake. This can result in the lowering of the land surface.

A major earthquake with ground shaking and ground failure can cause significant social disruption and damage to buildings and infrastructure in the City of Brisbane. The extent of damage from an earthquake is determined by the magnitude of the earthquake, distance from the epicenter, and characteristics of surface geology. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. A significant earthquake could occur and exceed the response capabilities of the City of Brisbane. Response and disaster relief support would be required from other counties, private organizations, and from the state and federal governments.

1.4.2 Frequency

California experiences hundreds of earthquakes each year, most with minimal damage and magnitudes below 3.0. Earthquakes that cause moderate damage to structures occur several times a year. According to the USGS, a strong earthquake measuring greater than 5.0 occurs every 2 to 3 years and major earthquakes of more than 7.0 occur once a decade in the State of California. Both the San Andreas and the Hayward Faults have the potential for major to great events. The USGS estimated in 2016 that there is a 72 percent probability of at least one 6.7 or greater magnitude earthquake before 2043 that could cause widespread damage in the San Francisco Bay area (USGS 2015). California’s statewide hazard mitigation plan cites projections that there is more than a 99-percent probability of a M-6.7 earthquake in California in the next 30 years, and a 94-percent probability of a M-7.0 earthquake in California in the next 30 years.

Probabilities for earthquakes on major fault lines in the San Francisco Bay Area were estimated by the USGS in a 2016 report and are summarized in Table 3.

TABLE 3: EARTHQUAKE PROBABILITIES FOR THE SAN FRANCISCO BAY AREA, 2014-2043

Fault	Probability of One or More Earthquake with M-6.7 or Greater 2014-2043	Fault	Probability of One or More Earthquake with M-6.7 or Greater 2014-2043
Hunting Creek	16%	Maacama	8%
Green Valley	16%	Rodgers Creek Fault	33%
Concord	16%	Hayward	33%
Greenville	16%	San Andreas	22%



Fault	Probability of One or More Earthquake with M-6.7 or Greater 2014-2043	Fault	Probability of One or More Earthquake with M-6.7 or Greater 2014-2043
Berryessa	16%	San Gregorio	6%
Calaveras	26%		

Source: USGS 2015

1.5 SEVERITY

Earthquakes can last from a few seconds to over five minutes; they may also occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties generally result from falling objects and debris, because the shocks shake, damage or demolish buildings and other structures. Disruption of communications, electrical power supplies and gas, sewer and water lines should be expected. Earthquakes may trigger fires, dam failures, landslides or releases of hazardous material, compounding their disastrous effects.

1.6 WARNING TIME

There is no current reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that use the low energy waves that precede major earthquakes. These potential warning systems would give approximately 40 seconds notice that a major earthquake is about to occur. The warning time is very short, but it could allow for someone to get under a desk, step away from a hazardous material, or shut down a computer system.

1.7 OTHER SECONDARY HAZARDS

Earthquakes can cause large and sometimes disastrous landslides and mudslides. River valleys are vulnerable to slope failure, often as a result of loss of cohesion in clay-rich soils. Soil liquefaction occurs when water-saturated sands, silts, or gravelly soils are shaken so violently that the individual grains lose contact with one another and float freely in the water, turning the ground into a pudding-like liquid. Building and road foundations lose load-bearing strength and may sink quicksand-like into what was previously solid ground. Unless properly secured, hazardous materials can be released, causing significant damage to the environment and people.

Earthen dams and levees are highly susceptible to seismic events, and the impacts of their eventual failures can be considered secondary hazards of earthquakes. Depending on the location, earthquakes can also trigger tsunamis. Additionally, fires can result from gas lines or power lines that are broken or downed during the earthquake. It may be difficult to control a fire, particularly if the water lines feeding fire hydrants are also broken. After the 1906 earthquake in San Francisco, for example, a fire burned for three days, destroying much of the city and leaving 250,000 people homeless (Michigan Tech University No Date).

1.8 PLANNING ASSUMPTIONS

1.8.1 Impact Assumptions

This Annex is based on a no-notice, significant earthquake--either a localized incident or a larger regional event. The impact and associated effects will be determined by a number of variables including the magnitude, location, shaking intensity, duration and time of the event. General impacts include the following:

- Damage due to shaking may be severe.
 - Structural damage is likely to be worst in areas of soft soils or unconsolidated fill.
 - Some buildings may experience partial or total structural failure.



- Nonstructural damage will be widespread and will cause a number of buildings to be unusable even if the structure is deemed sound.
- Depending on the magnitude of the earthquake, people may be trapped in collapsed structures.
- The earthquake may cause immediate, simultaneous ignitions. Structure fires may ignite throughout the City. Fires will continue to ignite as power is restored.
- Fatalities and hundreds of injuries may occur. If the earthquake occurs during midday, the number of casualties will likely be greater as the working population is affected.
- Most fatalities will occur in the first 48 hours, but recovery of those buried in debris may continue for days.
- Hundreds of residents may require shelter because their dwellings are damaged.
- Water, power, and gas service will be interrupted.
 - Potable water shortages may occur due to pipeline breaks, loss of storage capacity, loss of power, or compromised water treatment. This may be a significant limiting factor for hospitals, medical care providers, 24-hour care facilities, and the business community as well as for the public.
 - Services may gradually decline due to leaks or as generators powering pumps run out of fuel or malfunction.
 - System restoration may take days (for electrical power) or weeks (for water and gas).
- Voice and data communications systems may be damaged, oversubscribed or disrupted due to loss of power and may take several weeks to fully restore.
- Major transportation facilities and systems may be damaged or disrupted including:
 - Major bridges and highways
 - Major airports
 - Mass transit rail and bus systems
 - City streets and roads

Structural damage to these facilities may take weeks or months to repair.

- Breaks in wastewater collection and disruption in treatment may cause disruption of vital services and could result in uncontrolled releases of untreated sewage.
- Critical government facilities (emergency operation centers [EOC], fire and police stations, public works, and transit) may be damaged and require alternate facilities be established.
- Shelter facilities may be damaged, requiring the identification of alternate shelter facilities. The demand for shelters may exceed initial capabilities/capacity.
- Small businesses will likely close due to impacts to their facilities, loss of utilities, and/or lack of staff to continue operations.
- The earthquake may generate millions of tons of debris. Initially, collapsed buildings and other structures may block roads and limit movement for evacuees and response personnel and vehicles.
- Earthquake aftershocks, some almost as large as the main shock, will occur regularly and may cause additional damage. The frequency and magnitude of aftershocks will decrease over time.



- The cumulative impact of large aftershocks will cause additional structural damage and necessitate additional safety assessment inspections (for aftershocks over M-5.0).
- The occurrence of aftershocks will also have a cumulative effect on the feeling of well-being or safety of residents and responders.

1.8.2 Response Assumptions

- Large earthquakes will produce intense regional competition for resources. Local mutual aid fire, EMS, and law enforcement resources will be limited as other jurisdictions face similar circumstances.
- The state and federal governments will immediately begin mobilization of resources. However, it may take time for resources to arrive. For example, FEMA Urban Search and Rescue (USAR) teams may take 24 to 48 hours to arrive in the affected areas.
- Disrupted communications systems, overwhelmed first responders, and the overall magnitude of the situation may slow the initial situation assessment.
- Damage to critical City facilities (ex. EOC, fire stations) may require alternative arrangements for management of response services.
- Damage to water and communications systems may challenge fire-fighting operations.
- The number of people trapped in buildings may initially exceed capacity to respond.
- Damage in high-rise areas may require response to the following incidents:
 - Fires on upper floors
 - People trapped in elevators
 - People with mobility challenges who need to evacuate but cannot use steps
 - Injuries in high-rise areas caused by falling glass and other debris
- Damage and disruption may necessitate deployment of law enforcement resources to maintain public order, augment rescue operations, and secure dangerous sites.
- Local medical facilities may be damaged. Surviving hospital capacity may be inadequate to treat casualties and other medical emergencies, requiring that some severely injured patients be relocated to facilities outside San Mateo County. However, relocation may be limited by impacts to the transportation system.
- The demand for emergency shelter may initially exceed capacity to inspect buildings and provide the resources and staff required to open fully functional shelters.
- The capacity to shelter and care for displaced residents may be exceeded, forcing relocation to other areas outside the City.
- It may be necessary to quickly assess thousands of buildings (public and private) to determine whether they are safe for re-entry and occupancy.
- Resources to remove debris will initially be limited as the City mobilizes its own forces and available contractors.
- The demand for emergency public information will be immediate and sustained. Social and traditional media coverage will be extensive.



- The ability of residents to return to work or provide support will be affected by utility disruptions, infrastructure damage, affected transit systems, interrupted supplies of key commodities including fuel, closed schools, reduced childcare services, as well as other indirect impacts on social infrastructure.
- Assistance in the form of spontaneous volunteers, donated goods, and monetary donations will begin to flow into the City. Although this may provide desperately needed resources, it will create coordination and logistical support challenges.

2.0 CONCEPT OF OPERATIONS

2.1 RESPONSE

The EOP defines the City's general emergency response organization, authorities, policies, priorities, and procedures. In the event of a significant earthquake, this Annex provides potential specific objectives that the emergency response organization may integrate into its operations (see Section 2 – Initial Response Objectives).

If the City is unable to provide sufficient resources, requests will go first to the San Mateo County Operational Area, then the State and then potentially, the federal government. Arriving resources will be rapidly deployed, integrated into the City's operations, and tracked. The City will provide public information efforts as well as mass care and shelter services to impacted residents. Integrated disaster fiscal procedures will ensure any use of public funds is justified and cost-effective. Transitioning from immediate life safety to sustained community response, the City will simultaneously start short-term recovery efforts while developing a long-term recovery plan.

In the first few hours and days following the earthquake (E), the City will conduct a phased response to coordinate these operations:

- First 4 hours (E+4)
Respond to the community's immediate life safety needs of fire suppression, emergency medical services, search & rescue, hazard materials release, and law enforcement.
- First 12 hours (E+12)
Assemble resources for a sustained response and for providing basic mass care, shelter, and information services to the community. Develop initial situational awareness.
- Through 24 hours (E+24)
Consolidate the system and resources for sustaining emergency response operations. Conduct outreach and public information efforts.
- Through 48 hours (E+48)
Stabilize support for affected areas, forecast potential resource requirements, and initiate damage assessment.
- Through 72 hours (E+72)
Begin to transition from immediate emergency response efforts to sustained operations. Develop Initial Damage Estimate (IDE).
- Sustained Operations (E+ 3 to 7 days)
Conduct sustained operations and begin to transition into recovery.



See Section 3 for objectives associated with each of these phases.

2.2 SHORT-TERM RECOVERY

The immediate response to a major earthquake will focus on saving lives, providing resources to sustain City residents, and stabilizing the situation. At some point, however, the City must transition to a phase in which recovery operations take precedence. Given the level of damage to housing, business, and infrastructure; the direct impact on the population; and the effect on the regional economy, full recovery from a major earthquake may take years. Nonetheless, rapid initiation of recovery operations is critical to restoring confidence in the community. Keep in mind that aftershocks may require a temporary transition back into the response phase.

This section describes key issues for initiating short-term recovery operations. The issues described below are among those that must be addressed most urgently. The magnitude of, and resources required to address these issues will require regional approaches with assistance from the state and federal governments.

2.2.1 Utility Restoration

Public and private utility providers, including Pacific Gas & Electric (PG&E), and telecommunications providers such as AT&T, will coordinate with the City EOC Operations Section and the San Mateo County Operational Area to assess damage and restore utility services within the City. Restoration of services will be affected by the following factors:

- Critical emergency response facilities will require backup power to continue operations on a temporary basis while utility service is being restored.
- Water service will be disrupted within the first several hours and could take two to three months to be fully restored. Water transmission and distribution pipes can often break days and weeks following the initial earthquake requiring continual monitoring and repair.
- Electrical power will be interrupted immediately and may take 7 to 15 days or longer to restore.
- Repair sites may be inaccessible temporarily due to debris, aftershocks, and damage to transportation infrastructure.
- Aftershocks may cause additional damage or require re-inspecting facilities and equipment.

The strategy for restoring utilities includes the following:

- Service providers will begin damage assessments immediately. Additionally, damage information will be provided to the City EOC Planning/Intelligence section from first responders, and other sources, which will then work with the Operations Section to provide information to and coordinate operations with service providers.
- Emergency restoration of lifeline utility services will be the top priority for the first 1 to 7 days after the event.
 - Service providers may implement interim repairs and establish temporary delivery systems.
 - Utility providers will restore services in accordance with their pre-established restoration priorities. The Brisbane Water District (BWD) and Guadalupe Valley Municipal Improvement District (GVMID) will convey incident-specific restoration priorities to utility service providers, which will fold these priorities into their restoration plans.



- The BWD and GVMID will identify priorities for restoring services to facilities and services necessary for emergency response operations, hospitals and healthcare facilities, and continuity of government; as well as restoration of service to the greatest number of people.
- The City EOC Water Branch will coordinate with the Brisbane Police Department (BPD), and Brisbane Public Works Department (BPW) to provide utility workers with access to repair sites.
- Utility service providers will assist each other through pre-established mutual assistance agreements (for example, the Water Agency Response Network). The Logistics Section will facilitate the provision of resources from within City and through emergency services mutual aid when requested.
- Permanent restoration of utility infrastructure will occur after critical services are restored on an interim basis, and may continue for months after the earthquake.

2.2.2 Debris Removal

Debris must be removed to allow resumption of services and business and make way for rebuilding.

- Transition to removing material from damaged buildings and demolish unsafe structures.
- Establish procedures to expedite removal of unsafe structures, in accordance with City requirements and FEMA requirements for reimbursement.
- Develop a plan for transporting debris to staging sites; separating, reducing, and recycling debris; and trucking to a disposal site.
- Secure contracted or federal resources, such as the US Army Corps of Engineers (USACE), to support long-term debris removal operations.
- Collaborate with the San Mateo County Operational Area and the region to address movement and disposal of debris in a region with limited landfill space.

2.2.3 Interim Housing

Emergency shelters are a short-term solution to the problem of displaced residents (i.e., no more than 30 days). Residents must quickly be transitioned to interim and, eventually, long-term housing arrangements.

- Establish a plan to determine interim and long-term housing needs, based on the needs of the shelter population.
- Utilize City resources, such as building inspectors, to work with shelter residents to determine whether they can move back into their homes.
- Streamline City processes for home repairs to expedite movement back to permanent residences.
- Establish a housing recovery team to act as the lead for coordinating San Mateo County Operational Area and regional housing planning efforts and immediately begin a working dialogue with FEMA and other federal agencies engaged in the housing issue.
- Collaborate with the San Mateo County Operational Area and regionally to reach consensus regarding what type of housing is needed and where it should be placed.

2.2.4 Disaster Assistance Programs

Disaster assistance is available through a wide array of state and federal programs that can be leveraged in the first 90 days to promote short- and long-term recovery.



- Working with the San Mateo County Operational Area and Cal OES, determine the appropriate number and location of local assistance centers that can be established to provide residents with information regarding recovery actions and assistance that is available.
- Establish a lead department and procedures for ensuring that City residents are fully engaged in state and federal individual assistance programs, including:
 - Disaster SNAP (food stamps) benefits.
 - Disaster unemployment assistance benefits.
 - Assistance to individuals and families, including temporary housing and grants for other uninsured disaster-related necessary expenses and serious needs.
 - State Supplemental Grant Program (SSGP), which provides assistance to families and individuals that still have unmet needs after receiving assistance from the federal government.
 - Crisis counseling.
 - Social Security assistance.
 - Small Business Administration (SBA) Disaster Loan Program, which provides low-interest loans for real estate repairs and costs for businesses.
- Integrate private nonprofit assistance programs into recovery activities. These include:
 - The American Red Cross which offers emergency shelter, food, clothing, physical and mental health support, limited grants for household items, work-related and medical equipment, and minor home repairs following natural disasters. They also provide referrals to other local and national agencies that provide home clean-up, repair, and rebuilding assistance.
 - Habitat for Humanity which assists with repairing and replacing housing for low-income disaster victims.
 - The Salvation Army which provides emergency shelter, food, clothing and household items.
 - The Southern Baptist Convention Disaster Relief Program which provides assistance with food, home clean-up, and repairs.
 - Team Rubicon which may provide volunteer assistance in incident management, damage assessment, mapping, and debris management.
- Establish a lead department (most likely the City Finance Department) to coordinate with Cal OES and FEMA for application of the Public Assistance Program. Under this program, FEMA provides funding to state and local governments for extraordinary costs associated with debris removal, emergency protective measures, and permanent repair or replacement of disaster-damaged facilities. Extensive coordination with City departments will be necessary to track costs, facilitate inspections of damaged sites, and secure reimbursement.
- Establish a lead department (most likely BPW) for obtaining emergency relief funds from the Federal Highway Administration (FHWA). Under this program, FHWA provides funding through the California Department of Transportation (Caltrans) for costs to open and repair federal-aid routes.

2.2.5 Other Emergency Actions

Emergency actions may be taken to address specific short-term recovery conditions such as:

- Suspension of evictions



- Request utilities to provide bill relief
- Waiver of permit fees for damage repairs
- Expedited permitting and inspection processes to support rapid repairs
- Occupancy waivers to support temporary housing and business space
- Change or alter traffic patterns

3.0 OBJECTIVES

3.1 GENERAL OBJECTIVES

Immediately following a major earthquake, and for as long as a state of emergency exists within the City, response to the earthquake will be the first priority of all City departments and agencies. All available City Disaster Service Workers (DSW) will be directed to achieve the following objectives:

- Save lives.
- Reduce immediate threats to life, public health and safety, and public and private property.
- Provide necessary care, shelter, and medical services to City residents and other members of the general public.
- Restore the operations of facilities, whether public or privately owned, that are essential to the health, safety, and welfare of the community, including critical City facilities, utilities, and transportation infrastructure.
- Assess damage to infrastructure, public facilities, and the built environment.
- Expedite the restoration of services, the economy, and the community at large; and begin the process of recovery.
- Keep the public informed.

3.2 RESPONSE OBJECTIVES

In addition to those tasks and objectives outlined in the EOP, the following specific operational objectives should be incorporated into initial response operations and planning. Alerts and notification may be sent via SMC Alert and other communication avenues such as social media.

3.2.1 First 4 hours (E+4)

Respond to the community's immediate life safety needs of fire suppression, EMS, search & rescue, hazardous materials release, and law enforcement.

- Direct and assist immediate life-saving rescue operations.
- Direct fire suppression for existing structure fires and anticipate fire spread based on conditions and historic precedent.
- Deploy law enforcement resources to support response activities and maintain law and order.
- Deploy EMS to major incidents.



- Establish casualty collection points for initial treatment of the injured.
- Deploy hazardous materials (HazMat) response resources as needed.
- Activate the EOC as needed.
- Establish contact with the San Mateo County Operational Area and allied stakeholder agencies.
- Identify potential sites for evacuation centers to accommodate displaced populations while emergency shelters are being opened.
- Identify at-risk populations, notify them, and begin to evacuate if warranted.
- Assess:
 - Situation at critical facilities, including City Hall and utilities.
 - Situation in areas not reporting.
 - Condition of emergency communications systems.
- Implement recall of City staff as needed.
- Begin public information messaging regarding recommended personal protective actions, safe congregation points, and community assistance needed.
- Complete an initial damage assessment of the City, identifying areas affected, major incidents, and operational status of critical services. Begin to develop Essential Elements of Information (EEI)--see Attachment 1.

3.2.2 First 12 hours (E+12)

Assemble resources for a sustained response and for providing basic mass care, shelter, and information services to the community. Develop initial situational awareness.

- Assess critical resource shortfalls and begin requesting support through mutual aid agreements and the San Mateo County Operational Area. Consider resources needed for the next 14 days. Assess condition of transportation system and develop alternatives for moving critical resources into the City.
- Develop a consolidated situation assessment and declare a state of emergency.
- Establish perimeter control around unsafe areas.
- Establish security at critical buildings, incident sites, work locations, infrastructure, and resource centers.
- Initiate safety assessment of critical City facilities.
- Assess conditions at designated emergency shelter sites and begin to supply with beds, water, food, medical support, generators, sanitation, and facility security.
- Begin to open emergency shelters to residents and DSWs.
- Identify people with special support requirements and transfer to appropriate care facilities.
- Designate primary routes and implement debris clearance, route recovery, and traffic control.



- Initiate a regular status reporting and resource requesting process between area commands (if established), major incident commands (if established), and state/federal counterparts offering coordinated assistance.
- Assess the need to activate a Joint Information Center (JIC).
- Determine if a curfew should be established.

3.2.3 Through 24 hours (E+24)

Consolidate the system and resources for sustaining emergency response operations. Conduct outreach and public information efforts.

- Concentrate City emergency management efforts for supporting ongoing on-scene incident management at major incidents, reinforcing the logistical support being requested.
- Coordinate the receipt and deployment of incoming resources to prioritized missions.
- Designate staging areas and begin planning to accommodate support personnel.
- Ensure that an adequate system is in place to fuel and maintain generators providing power to critical facilities as well as fuel for essential vehicles.
- Coordinate with the San Mateo County Operational Area regarding the process of collecting and handling fatalities.
- Conduct outreach for situation status and resource needs for affected facilities needing support from City, including transit sites, schools, commercial buildings, and sites of historic/cultural significance.
- Initiate social and traditional media briefings to inform residents on City operations, steps they can take, services available to them, ongoing rumor control efforts, and ways in which the community can help.

3.2.4 Through 48 hours (E+48)

Stabilize support for affected areas, forecast potential resource requirements, and initiate damage assessment.

- Process ongoing logistical resource requests for emergency services and mutual aid needs to support incident management.
- Evaluate the need for and implement an emergency drinking water plan.
- Establish a distribution network for drinking water and food for persons who are not residing in mass care facilities but are without basic services.
- Initiate damage assessment of City facilities, with priority for facilities critical to response operations. Determine approximate scope and severity of damage for key facilities only.
- Make arrangements for the EOC to assume responsibility for supporting incoming mutual aid and convergent resources, relieving field-level public safety workers to focus on providing sustained rescue, firefighting, paramedic, and law enforcement services.
- Conduct an ongoing review in the EOC of current situation reporting and resource requesting processes and revise as needed.



3.2.5 Through 72 hours (E+72)

Begin to transition from immediate emergency response efforts to sustained operations. Develop IDE.

- Re-evaluate mass care needs considering any ongoing aftershocks and subsequent damage.
- Establish shelter support coordinator teams and evaluate the shelter sites to identify:
 - Site damage
 - Critical support requirements, including shelter management personnel
 - Site security
 - Adequacy of feeding and medical care arrangements
 - Shelter demographics (gender, children, medical needs, language barriers, disability needs)
- Establish plans for how to provide care for people with special support requirements that cannot be met in congregate care shelters.
- Coordinate with the San Mateo County Operational Area and consider establishing a JIC if not already established.
- Coordinate with the San Mateo County Operational Area to facilitate the handling of volunteers and donations.
- Review and enhance security plans to maintain public order.
- Begin deliberate program of safety assessment of homes and businesses.
- Assemble available damage assessment information and submit the Cal OES IDE to the San Mateo County Operational Area.
- Review incident status reports to prioritize incident commands that can begin suspending emergency response operations and transition to long-term response and recovery operations.

3.2.6 Sustained Operations (E + 3 to 7 days)

Conduct sustained operations and begin to transition into short-term recovery. Objectives for Days 3 through 7 are outlined below—these must be prioritized based on overall need and resources available to respond.

- Establish a plan and begin the comprehensive detailed damage assessment of all public infrastructure, such as public rights-of-way (roads and sidewalks), bridges, facilities, utilities, and retaining walls.
- Establish teams to visit shelters to identify people that require special support that need to be relocated into other types of care facilities and to identify site modifications that should be made to better accommodate residents with sight, hearing, mobility or other limitations.
- Reinforce cost tracking guidance for City responders.
- Coordinate with the San Mateo County Operational Area and establish responder and survivor behavioral health support programs.



- Establish portable toilet sanitation stations around the City and related cleaning and pumping program.
- Work with the American Red Cross and other organizations to provide information to support their Disaster Welfare Inquiry Program.
- Establish a debris management plan and begin to gather and transport debris from critical sites or routes.
- Coordinate with the business community regarding business resumption activities.
- Begin widespread damage inspections of homes and businesses.
- Anticipate and support Preliminary Damage Assessment visits by state and federal officials seeking to confirm the scope and severity of damage as well as immediate and long-term recovery needs of the City.
- Produce, regularly update, and distribute a multi-lingual, multi-format, disaster “Fact Sheet” to the media, people in shelters, field-response personnel, residents, and businesses.
- Ensure that air quality, HazMat spills, and other environmental situations are monitored and risks are addressed.
- Evaluate the need to designate specific routes into the City for critical relief supplies. Designating specific lanes for express bus service should also be considered.
- Coordinate with the San Mateo County Operational Area to survey all licensed food establishments, including the emergency shelter/evacuation centers, feeding sites, and disaster kitchens to ensure there are no unsafe food handling or other sanitation or safety concerns.
- Begin planning for the relocation of displaced City staff and departments.
- Implement a process to allow limited entry (where safe) for recovery of personal items.
- Coordinate with the San Mateo County Operational Area to provide prioritized community behavioral health services (for example, for those whose homes have been red-tagged, shelter residents, children, and individuals who have suffered significant loss).

4.0 ROLES AND RESPONSIBILITIES

The following lists summarize the primary and significant roles and responsibilities for each City department and stakeholder organization relative to an earthquake event:

4.1 CITY ADMINISTRATION

- Activate the EOP and EOC as needed
- Establish and communicate policy regarding City staff reporting for assignments
- Lead and manage proclamations of local emergency
- Develop and maintain communication with Mayor and City Councilmembers
- Lead emergency public information
- Assess City operations and provide legal counsel as needed



4.2 FINANCE

- Provide emergency procurement support for life-saving and emergency protective measures
- Provide resource support (facility space, office equipment/supplies, contracting services, etc.)
- Anticipate, obtain, and track resources for City staff, mutual aid resources, and volunteers
- Develop financial mechanisms, procurement vehicles, and contracts to support procurement
- Oversee staff time-keeping
- Provide fiscal oversight and track expenses

4.3 FIRE

- Conduct company-level post-earthquake windshield surveys and report results to dispatch
- Activate emergency personal recall procedures
- Prioritize and conduct firefighting, EMS, search & rescue, and HazMat operations
- Establish field incident command as needed
- Lead fire and rescue mutual aid coordination
- Deploy and manage City and mutual aid resources
- Lead mass casualty/fatality management
- Assess status of critical department facilities
- Lead Emergency Management Mutual Aid (EMMA) coordination
- Provide incident planning and management support as needed
- Activate Auxiliary Emergency Communications Service (AECS) volunteers as needed

4.4 MARINA

- Coordinate and provide emergency assistance
- Support damage assessment efforts
- Support transportation efforts as needed

4.5 HUMAN RESOURCES

- Account for all City staff
- Develop and coordinate human resources including contractors
- Recruit, screen, provide, and track volunteers
- Establish internal City staff communications
- Identify any employee needs (e.g., child care, shelter)



4.6 INFORMATION TECHNOLOGY

- Protect, restore, and sustain City information technology resources
- Oversee communications within the incident management and response structures
- Coordinate with telecommunications service providers
- Restore and repair telecommunications infrastructure

4.7 BUILDING & PLANNING

- Manage and conduct post-earthquake safety assessments for critical City facilities
- Coordinate and direct state-provided Safety Assessment Program (SAP) resources
- Lead damage assessment efforts

4.8 POLICE

- Activate emergency personal recall procedures
- Prioritize and conduct law enforcement, public warning, evacuation, and security operations
- Establish field incident command as needed
- Establish liaison with Coroner Unit of the San Mateo County Sheriff's Office
- Lead Law Enforcement Mutual Aid coordination
- Deploy and manage mutual aid resources
- Impose curfew as directed
- Provide traffic control
- Provide support for access, traffic, and crowd control at mass care facilities

4.9 PARKS & RECREATION

- Assess status of critical department facilities and potential shelter sites
- Coordinate safety assessments of potential shelter sites
- Manage emergency shelter and mass care operations (see Mass Care and Shelter Annex)
- Coordinate with the San Mateo County Operational Area for the care of unaccompanied minors

4.10 PUBLIC WORKS

- Conduct post-earthquake damage surveys and report results to dispatch
- Conduct infrastructure protection and emergency repair
- Support evacuation operations including individuals requiring assistance
- Establish and support movement restrictions
- Conduct debris clearance and manage debris removal



- Coordinate restoration/recovery of energy infrastructure
- Lead Public Works Mutual Aid coordination
- Deploy and manage mutual aid resources
- Provide engineering services and construction management
- Support damage assessment efforts
- Manage City facilities and coordinate use of non-City facilities
- Support public transportation function
- Conduct enhanced maintenance and dispatch operations

4.11 BRISBANE WATER & GUADALUPE VALLEY MUNICIPAL IMPROVEMENT DISTRICT

- Coordinate potable water system resources for prioritized public safety operations
- Monitor potable water quality and perform sampling/testing as needed
- Restore/maintain water and wastewater infrastructure
- Restore/maintain wastewater treatment plant operations
- Provide potable water in support of mass care operations as possible
- Support damage assessment efforts

4.12 CITY COUNCIL / MAYOR

- Support public information efforts as needed
- Lead community engagement
- Review and approve the Proclamation of Local Emergency
- Visit impacted areas, shelters, and other temporary facilities to spot problems and special issues
- Consider short- and long-term recovery staff recommendations

4.13 LOCAL UTILITY PROVIDER

- Mitigate safety threats to responders and residents
- Coordinate prioritization of restoration of electrical and gas utility services



ATTACHMENT 1: ESSENTIAL ELEMENTS OF INFORMATION (EEIs)

Essential information that must be collected during the first 24-hour period:

- Earthquake epicenter, magnitude, shaking intensity and projected impact area.
- Number and locations of deaths and injuries.
- Location and extent of secondary events, including fires, landslides, and HazMat events.
- Location of severely damaged or collapsed structures.
- Location and estimated number of people trapped in collapsed structures.
- Requirements for major evacuations and estimated number of people displaced.
- Status of communication systems, including:
 - City and community voice and data networks
 - City emergency radio systems
 - 911 dispatch systems
- Damage to critical public buildings and other infrastructure, including:
 - Police and fire facilities
 - City Hall
 - Schools
- Significant law enforcement, fire, EMS, search & rescue, and HazMat incidents.
- Critical resource shortfalls impacting public safety.
- Status (open, partial closure, or full closure) of roads, bridges, and major surface streets.
- Status of and damage to major utility systems, including:
 - Water
 - Sewer
 - Power
 - Natural gas
- Results of preliminary safety assessments of critical City facilities and designated emergency shelters.
- Status of City staff.