A G E N D A

REGULAR MEETING OF THE SUISUN CITY ADVISORY COMMITTEE ON PUBLIC SAFETY AND EMERGENCY MANAGEMENT

THURSDAY, FEBRUARY 16, 2023

6:00 PM VIA ZOOM

Suisun City Council Chambers - 701 Civic Center Boulevard - Suisun City, California

NOTICE

The following Public Safety and Emergency Management Committee Meeting may include teleconference participation by: Committee Members Terrance West, Cameron Williams, Michael Kucsera, Brian Kermoade, Eric Vera, Steve Olry, Katrina Garcia, and Patrick Perkins, in accordance with subdivisions (b), (e), or (f) of Section 54953 of the Government Code, as applicable.

FACE MASKS ARE RECOMMENDED FOR MEMBERS OF THE PUBLIC WHILE IN CITY FACILITIES IF NOT FULLY VACCINATED. IF YOU DO NOT HAVE A FACE MASK, ONE WILL BE PROVIDED FOR YOU.

THE CITY COUNCIL HAS RESUMED IN-PERSON MEETINGS IN ADDITION TO ZOOM. A LIMITED NUMBER OF SEATS ARE AVAILABLE, TO RESERVE A SEAT PLEASE CONTACT THE CITY CLERK AT clerk@suisun.com OR 707 421-7302.

ZOOM MEETING INFORMATION:
WEBSITE: https://zoom.us/join
MEETING ID:
CALL IN PHONE NUMBER: (707) 438-1720

REMOTE PUBLIC COMMENT IS AVAILABLE FOR THE CITY COUNCIL MEETING BY EMAILING CLERK@SUISUN.COM (PRIOR TO 6 PM), VIA WEBSITE, OR ZOOM CALL IN PHONE NUMBER (707) 438-1720.

*(If attending the meeting via phone press *9 to raise your hand and *6 to unmute/mute for public comment.)*

ROLL CALL

Committee Members

REPORTS: (Informational items only)

1 City Manager Update - (Folsom: gfolsom@suisun.com).
2 Recent Fire Department Activity - (Lopez: bllopez@suisun.com)
3 Recent Police Department Activity - (Roth: aroth@suisun.com).

PUBLIC COMMENTS

(Oral participation from the audience is limited to 3 minutes to each speaker).

GENERAL BUSINESS

4 Review of Safety Element

5 Items for Future Public Safety Committee Consideration as Requested by Members of the Committee.

6 Date and Time of Next Public Safety Committee Meeting

ADJOURNMENT

Public Access To Agenda Documents

A complete packet of information containing staff reports and exhibits related to each item for the open session of this meeting, and provided to the City Council, are available for public review at least 72 hours prior to a Council /Agency/Authority Meeting at Suisun City Hall 701 Civic Center Blvd., Suisun City. Agenda related writings or documents provided to a majority of the Council/Board/Commissioners less than 72 hours prior to a Council/Agency/Authority meeting related to an agenda item for the open session of this meeting will be made available for public inspection during normal business hours. An agenda packet is also located at the entrance to the Council Chambers during the meeting for public review. The city may charge photocopying charges for requested copies of such documents. To the extent feasible, the agenda packet is available for online public viewing on the City's website: www.suisun.com/government/city-council/city-council

The City Council/Agency/Authority hopes to conclude its public business by 10:00 p.m. No new items will be taken up after 10:00 p.m., unless so moved by a majority of the City Council, and any items remaining will be agendized for the next meeting. The agendas have been prepared with the hope that all items scheduled will be discussed within the time allowed.

Accommodations

If you require an accommodation to participate in this meeting, please contact the City Clerk at (707) 421-7302 or clerk@suisun.com. The City's reasonable accommodation policy is available for review on the City's website at www.suisun.com/government/city-council/, you may request an electronic copy or have a copy mailed to you. Please note that for accommodations that are not readily available, you must make your request as soon as you can prior to the time of the meeting.

Decorum

All participants are expected to conduct themselves with mutual respect. Conduct that disrupts meetings will be addressed in accordance with Section 54957.95 of the Government Code.

Ordinances

Ordinances are city laws contained in the Suisun City Municipal Code. Enacting a new city law or changing an existing one is a two-step process. Government Code 36934 provides, except when, after reading the title, further reading is waived by regular motion adopted by majority vote all ordinances shall be read in full either at the time of introduction or passage; provided, however, that a reading of the title or ordinance shall not be required if the title is included on the published agenda and a copy of the full ordinance is made available to the public online and in print at the meeting prior to the introduction or passage.

Certification Of Posting

Agendas are posted at least 72 hours in advance of regular meetings at Suisun City Hall, 701 Civic Center Boulevard, Suisun City, CA. Agendas may be posted at other Suisun City locations including:

- Suisun City Fire Station, 621 Pintail Drive, Suisun City, CA;
- Suisun City Senior Center, 318 Merganser Drive, Suisun City, CA;

- Joe Nelson Center, 611 Village Drive, Suisun City, CA;
- Harbor Master Office, 800 Kellogg Street, Suisun City, CA.

I, Michelle Zunino, Administrative Assistant for the City of Suisun City, declare under penalty of perjury that the above agenda was posted and available for review, in compliance with the Brown Act.

2023 Public Health and Safety Element

Public Safety and Emergency Management Committee

February 16, 2023

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Agenda

- Safety Element Update Process
- Vulnerability Assessment Overview and Key Findings
- Public Health and Safety Element Updates
- Schedule

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Safety Element Process

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What is a Safety Element?

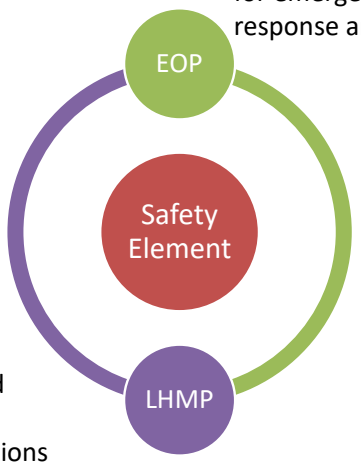
- **Mandatory part of a General Plan.**
- **Identifies hazards of concern and risks to the community.**
- **Helps protect the city against natural disasters and other hazards.**
  - Earthquakes
  - Emergency evacuations
  - Fire and smoke
  - Flooding
  - Sea level rise
  - Other related topics.

4

Why Update the Public Health and Safety Element?

- **Updated background information, hazards, and policies.**
- **Required with Update of the Housing Element.**
- **Incorporation of the LHMP.**
- **Consistency with other documents.**
- **Eligibility for grant funding.**

Details City's approach for emergency response and recovery



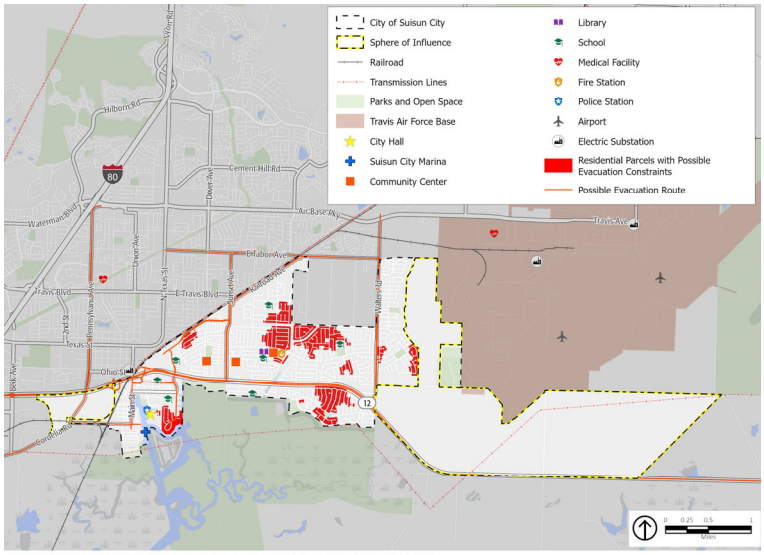
Short-term, focused plan with detailed implementation actions

Safety Element Update per State Law

- **SB 1241: Increased requirements for flood and wildfire sections.**
  - Identify responsible agencies for protecting against these hazards and ensure continued coordination.
  - Refine current policies to minimize the risk for new buildings and essential facilities.
- **SB 379: Requires a Safety Element to address climate change adaptation and resilience.**
  - Prepare vulnerability assessment to identify the risks from climate change hazards.
  - Develop adaptation and resilience goals, policies, and implementation actions to increase community adaptation and build resilience.

Safety Element Update per State Law

- **SB 2140: Incorporation of the LHMP.**
- **SB 99: Show and assess evacuation-constrained areas.**



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

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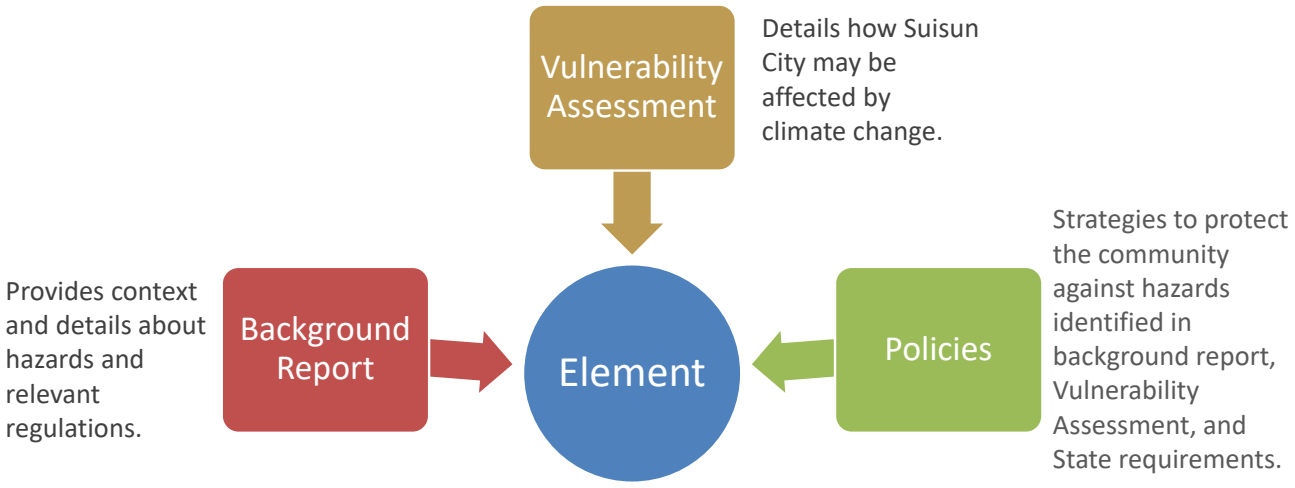
Sections of the Public Health and Safety Element update



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Climate Change Vulnerability Assessment

- **Required by state law (SB 379).**
- **Identifies climate hazards and the potential impacts of those hazards to the community.**
- **Evaluates how people and key community assets may be affected by projected climate hazards.**
- **Assesses availability of existing policies or programs to help people avoid or recover from impacts.**

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Background Report

- Includes regulatory framework and evaluation of public safety issues:
  - Healthy Communities
  - Hazardous Materials
  - Flooding
  - Fire Risk
  - Geologic, Soils, and Seismic Hazards
  - Emergency Response
  - Climate change hazards
- Provides updated mapping.
- Discusses hazards, at-risk areas, relevant agencies, past events, and future risk.

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Policies

- **Programmatic**: Strategies to expand or create new programs, activities, and initiatives.
- **Plans, regulations, and policy development**: Strategies to revise policies, plans, regulations, and guidelines.
- **Capital improvement projects**: Strategies to address physical and functional needs in the built and natural environment, or to secure funding for these projects.
- **Education, outreach, and coordination**: Strategies to begin or expand partnerships and relationships, communication, and expanding awareness.
- **Evaluation**: Strategies to improve feedback, input, and data and information to conduct further or new analyses.

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Vulnerability Assessment Overview & Key Findings

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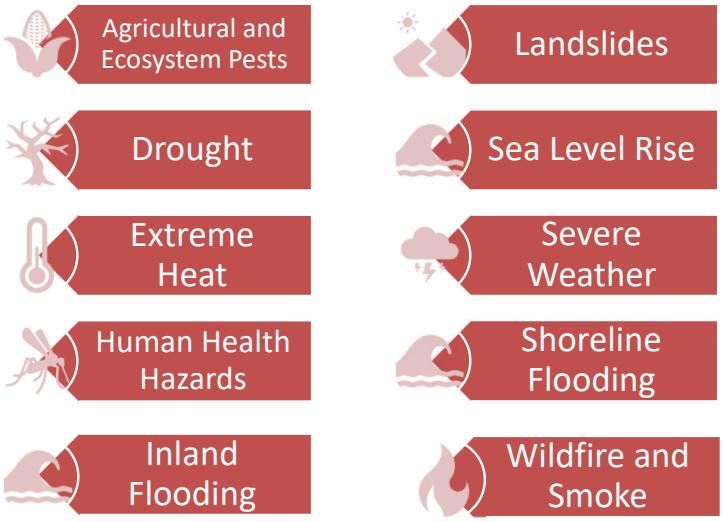
Hazards in Suisun City

- The hazards in the city and the populations and assets they impact, were determined through the Vulnerability Assessment process, including:



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Populations Included in the Vulnerability Assessment

- **Children**
- **Cost-burdened households**
- **Households in poverty**
- **Immigrant communities**
- **Linguistically isolated persons**
- **Low-income households**
- **Low-resourced people of color**
- **Outdoor workers**
- **Overcrowded households**
- **Persons experiencing homelessness**
- **Persons living in mobile homes and houseboats**
- **Persons living on single access roads**
- **Persons with chronic illnesses or disabilities**
- **Persons without a high school degree**
- **Persons without access to lifelines**
- **Pollution-burdened populations**
- **Renters**
- **Seniors**
- **Seniors living alone**
- **Unemployed persons**

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Community Assets Included in the Vulnerability Assessment

- **Infrastructure and Services:**
  - Transportation
  - Energy
  - Parks and recreation
  - Flood control
  - Water and wastewater
  - Solid waste
  - Education
  - Government administration
  - Medical care
  - Emergency response
- **Buildings**
  - Homes
  - Public buildings
  - Commercial buildings
- **Economic Drivers**
  - Accommodation and tourism
  - Education
  - Healthcare
  - Retail
  - Travis Air Force Base
- **Ecosystems**

Key Vulnerability Assessment Findings

- **Expected local impacts of climate change:**
  - Sea level rise and increased coastal flooding.
  - More frequent and intense regional wildfires.
  - Increases in intense rainfall and drought conditions.
  - More frequent extreme heat events.

Key Vulnerability Assessment Findings

- Households in poverty, low-resourced people of color, seniors living alone, outdoor workers are among the most vulnerable.
- The railway and bridges are among the most vulnerable infrastructure systems, especially to flooding, sea level rise, severe weather, and extreme heat.
- Residential structures, historic buildings, and government buildings are especially vulnerable to flooding, sea level rise, and severe weather.
- Accommodation and tourism is the most vulnerable economic driver.
- Wetland and marsh ecosystems are highly vulnerable to sea level rise and shoreline flooding.
- Public transit access, energy delivery, solid waste removal, and water and wastewater services are most vulnerable key services.

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Public Health and Safety Element Update

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New Appendix to the General Plan

» **Public Health and Safety Background Report**
- Evaluation of public safety issues
  - Healthy Communities
  - Hazardous Materials
  - Flooding
  - Fire Risk
  - Geologic, Soils, and Seismic Hazards
  - Emergency Response
  - Climate change hazards
- Updated mapping
- Regulatory framework/agencies
- Past events and future risks

» **Climate Change Vulnerability Assessment**
- Required by State law
- Identify most vulnerable populations and community assets
- Results integrated into Background Report

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Public Health and Safety Element

» **Public Health**
- Noise (minor changes)
- Air Quality and GHGs (minor changes)
- Water Quality (minor changes)
- Healthy Communities (minor changes)

» **Safety**
- Hazardous Materials (updated)
- Flooding (updated and expanded)
  - Sea Level Rise and Shoreline Flooding (new section)
- Fire Risk (updated)
- Geologic and Seismic Hazards (updated and expanded)
- Climate Change Hazards (new section)
  - Drought
  - Extreme Heat
  - Severe Weather
  - Agriculture and Ecosystem Pests
- Emergency Response (updated and expanded)
  - Evacuation (new section)

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Public Health and Safety Element Goals/Policies

» **New Goals/Policies**

- Goal PHS-15: Climate Change Hazards
  - Drought
  - Extreme Heat
  - Severe Weather

» **Updated Goals/Policies**

- Goal PHS-3: Air Pollutants
- Goal PHS-4: Greenhouse Gas Emissions
- Goal PHS-5: Water Quality
- Goal PHS-7: Healthy Lifestyles
- Goal PHS-9: Economic Health and Opportunity
- Goal PHS-10: Hazardous Materials
- Goal PHS-11: Flooding
- Goal PHS-12: Fire
- Goal PHS-14: Geologic Hazards
- Goal PHS-16: Emergency Response and Evacuation

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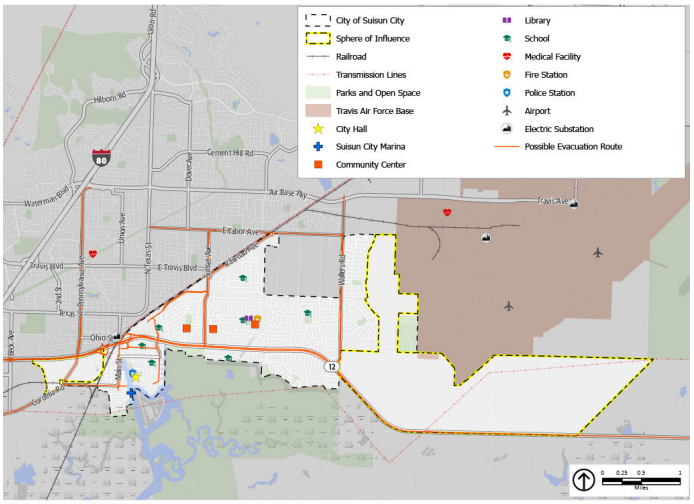
Emergency Response and Evacuation

» **New maps**

- Evacuation routes
- Evacuation-constrained residential parcels

» **New policies and actions to improve evacuation planning and facilitate evacuation and emergency response**



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

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Schedule

Activity	Date
Public Review of Public Health and Safety Element	February - March
Public Safety and Emergency Management Committee Meeting	**February 16**
Planning Commission Public Hearing – Recommendation to City Council*	February 28
City Council Public Hearing – Final Action/Adoption*	March 21

We are here

**An update of the Housing Element is occurring concurrently with the Public Health and Safety Element Update, as is required by legislation.*

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Chapter 9

Public Health and Safety

Introduction

The goals, objectives, policies, and programs in this Public Health and Safety Element ensure that the City of Suisun City (City) appropriately considers public health and safety in decisions related to land development, the provision of services, and public investments.

This Element combines two of the mandatory subject matters under state law:

1) Noise and its impact on people, and
2) Safety hazards that could threaten people and property.

The noise and safety elements have been combined since noise is commonly cited as a health and safety issue. In addition to topics that are mandatory for general plans under state law, this Element also addresses "optional" issues that are priorities for Suisun City.[1]

Following are the City's goals, objectives, policies, and programs addressing:

- Public health
  - Noise and vibration;
  - Air quality, greenhouse gas emissions, and climate change;

[1] Please refer to Government Code Section 65302 (g) (1) for more details.

  - Water quality; and
  - Healthy communities.
- Safety
  - Hazards and hazardous materials;
  - Flooding and sea level rise;
  - Fire risk;
  - Geologic, soils, and seismic hazards;
  - Climate change hazards;
  - Emergency response; and
  - Travis Air Force Base.

Relationship to Other Elements, Plans, and Studies

Public health is intrinsically linked with policies in the Land Use, Transportation, Community Character and Design, Open Space and Conservation, Community Facilities, and Housing Elements.

Transportation-related air pollution, including ground-level ozone and particulate matter, contributes to respiratory illnesses and cardiovascular diseases. The public health costs of pollution from cars and heavy-duty vehicles alone have been estimated at between $40 billion and $64 billion per year in the United States. The number of walking trips by U.S. adults dropped by 42 percent between 1975 and 1995, while vehicle miles traveled has increased four times faster than the population. Obesity has been correlated with automobile-dependent development patterns. Traffic-related fatalities are also a serious public health concern.[2]

The City can set the stage for healthy community design through its land use and transportation planning policies. Mixing homes and destinations in proximity and providing opportunities for public transit, walking, and bicycling can reduce air pollution and decrease rates of traffic injuries, cancer, lung and heart disease, obesity, diabetes, and other chronic health conditions. People that live in mixed-use, walkable communities have a 35 percent lower risk of obesity. According to data from 33 California cities in 2006, the obesity rate among adults who drove the most was about three times higher than the group that drove the least. An American who switches to transit (which includes walking between destinations) for the daily commute can reduce lifetime medical expenses by $5,500.[3,4,5]

Reduced driving and congestion can improve air quality and reduce the incidence of air pollution-related illnesses (e.g., asthma, cancer, respiratory distress) and reduce the rate of obesity, along with related health risks. The City can help make walking and bicycling

[2] Fredrich Kahrl and David Roland-Holst, California Climate Risk and Response. Department of Agricultural and Resource Economics, University of California, Berkeley. November 2008

[3] American Lung Association, Land Use, Climate Change & Public Health Issue Brief. Spring 2000.

[4] Michael R. Bloomberg, Rohit T. Aggarwalam, Think Locally, Act Globally: How Curbing Global Warming Emissions Can Improve Local Public Health. 2008.

[5] Jacqueline Kerr and the Robert Wood Johnson Foundation's Active Living Research Program, Designing for Active Living Among Adults. Spring 2008.

more desirable by improving transportation facilities and ensuring housing and destinations are within proximity to one another.[6, 7]

Just as with public health, safety issues are also linked to the Land Use, Transportation, Community Character and Design, Open Space and Conservation, and Community Facilities Elements. For example, the design of a community and distribution of land uses should reflect the location of hazards and hazardous conditions. Most communities avoid adverse effects related to hazardous conditions through land use planning, when possible. For example, if a particular area tends to be subject to the threat of fires or flooding, development of inhabited buildings would normally be limited or prohibited. Geologic or soils constraints could make certain land uses inappropriate or infeasible. An inefficient transportation network could adversely affect emergency response efforts.

The presence of Travis Air Force Base is of particular importance for Suisun City. Some operations at the Base create compatibility issues for certain land uses. It is necessary to limit land use and development around the Base to protect sensitive land uses and prevent interference with the Travis Air Force Base mission as it exists today and may evolve in the future.

Local Hazard Mitigation Plan

The City, in partnership with Solano County and participating partners, prepared the Solano County Multi-Jurisdiction Hazard Mitigation Plan (MJHMP) and the Suisun City Annex for the Suisun City planning area in accordance with the Disaster Mitigation Act of 2000 (DMA 2000) and the Federal Emergency Management Agency's (FEMA) 2011 Local Hazard Mitigation Plan guidance. The MJHMP incorporates a process where hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions are developed to reduce or eliminate hazard risk. Of particular importance in Suisun City are the potential risks associated with seismic activity, flooding, sea level rise, and hazardous materials. The implementation of these mitigation actions, which include both short-term and long-term strategies, involve planning, policy changes, programs, projects, and other activities. The Solano County MJHMP and jurisdictional annex specific to hazards in Suisun City, is hereby incorporated into the Public Health and Safety Element by reference. The Local Hazard Mitigation Plan can be found at this location (insert web link, or the actual full-text LHMP, or guidance to where the LHMP can be located).

Vulnerability Assessment

Under California law, the Public Health and Safety Element is required to include a vulnerability assessment that looks at how people, buildings, infrastructure, and other key community assets may be affected by climate change and the degree to which they are vulnerable. The City conducted a Climate Change Vulnerability Assessment in the fall of 2022 to analyze Suisun City's susceptibility to climate-related hazards. Suisun City's vulnerability assessment assesses how 10 climate-related hazards (agricultural and forestry pests, drought, extreme heat and warm nights, human health hazards, inland

[6] Center for Clean Air Policy, Cost-Effective GHG Reductions through Smart Growth & Improved Transportation Choices. 2009.

[7] Surface Transportation Policy Project, Clearing the Air: Public Health Threats from Cars and Heavy Duty Vehicles – Why We Need to Protect Federal Clean Air Laws. 2003.

flooding, landslides, sea level rise, severe weather, shoreline flooding, and wildfire and smoke) may affect 59 different population groups and community assets. Each population or asset received a score of V1 (minimal vulnerability) to V5 (severe vulnerability) for each relevant climate-related hazard.

The Public Health and Safety Element includes goals, policies, and implementation actions to increase community resilience and help lower vulnerabilities, particularly for the populations and assets that received a score of V4 or V5 in the Vulnerability Assessment. A full list of the Vulnerability Assessment methods and results is included in the Public Health and Safety Element Background Report, which is attached as Appendix A.

Related General Plan Guiding Principles

The City Council directed staff to incorporate a set of Guiding Principles into the General Plan Update, several of which are relevant to this Element, including the following.

Public Safety and Community Preparedness

Suisun City will strive to protect the community and minimize vulnerability to disasters.

- Foster neighborhood resilience through community planning practices, fire safety measures, building codes/seismic requirements, and effective code enforcement.
- Protect life and property through reliable public safety services, as well as active, sensitive service to members of the community in need.
- Minimize the City's vulnerability to natural and human-caused disasters and strengthen the City's emergency response systems.

Sustainability

Suisun City will practice economically, fiscally, and environmentally responsible municipal decision making to avoid shifting today's costs to future generations.

- Encourage a healthy living environment.
- Preserve and enhance natural resources and minimize negative environmental impacts.

Goals, Objectives, Policies, and Programs

Following are Suisun City's goals, objectives, policies, and programs related to public health and safety. Public health and safety are inherently connected issues. The City's

public health policies address potential effects of General Plan buildout and regional development on human health. The City's safety policies protect citizens from natural disasters, human-caused disasters, and other incidents that could have a negative impact on public and environmental health, as well as property.

Public Health

Public health policies focus on improving the health of the community and quality of life of residents. The General Plan is intended to prevent adverse health conditions and accommodate healthy lifestyles.

Noise and Vibration

Unregulated noise can cause stress and otherwise affect the well-being of City residents. However, with proper planning, unwanted noise can be managed in a way that reduces the negative impact of noise on City residents and visitors. Noise and vibration policies in this Element provide the basis for noise control and abatement and the protection of people in Suisun City from excessive noise exposure.

Noise is commonly defined as unwanted sound. Excessive noise can pose a health problem. The health effects of noise arise from the interference with human activities, such as sleep, conversation, and tasks that demand concentration or coordination.

Sound is the audible expression of vibration through solid, liquid, or gas. To measure sound directly as changes in air pressure and determine whether such sound is excessive or unwanted (i.e., noise), would require a very large and awkward range of numbers. To avoid this complexity, the decibel (dB) scale was devised. The decibel scale presents noise levels in multiples of 10 (a logarithmic scale). The decibel scale uses the threshold of human hearing as a point of reference with human sensitivity.

It is common to describe community noise in terms of the "ambient" or "background": noise level, defined as the all-encompassing sound level associated with a given noise environment. A statistical tool to measure the ambient noise level is the equivalent energy noise level (L_{eq}), a constant noise level that would result in the same total sound energy being produced over a given period (usually one hour). The L_{eq} is the foundation of other methods by which noise is measured and described, and it shows a very strong correlation with human perception of, and response to noise.

The two most common methods to describe noise are the day-night average level (L_{dn}) and the Community Noise Equivalent Level (CNEL). L_{dn} is the average hourly ambient noise (L_{eq}) over a 24-hour day, with a 10-decibel penalty applied to the nighttime L_{eq} (10:00 pm to 7:00 am). The nighttime penalty is based on the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. CNEL is the same as the L_{dn}, except that an additional penalty of 5 decibels is applied to the evening L_{eq} (7:00 pm to 10:00 pm).

Please refer to the Volume II of the General Plan, Chapter 9, to review Noise Background Report, under separate cover and available on the City's website, for more fundamental noise information.

Noise-Sensitive Land Use and Noise Sources

Noise-sensitive land uses include parks, schools, residences, places of worship, and medical and other health care facilities. These land uses are distributed throughout the

city. As addressed in the Noise Background Report, the primary sources of noise in the city include roadways (State Route [SR] 12), railroad operations (Union Pacific Railroad), and aircraft operations (Travis Air Force Base).

- **Roadways**. Transportation noise is a significant issue in areas along highways and other high-volume roadways. In affected areas, these noise impacts must be considered in the determination of appropriate land uses. Exhibit NOI-2 of the Background Report illustrates the existing 60 dBA and 65 dBA L_{dn} noise contours associated with vehicular traffic and Table 9-2 of the Background Report shows existing traffic volumes for the major roadways in Suisun City and estimated distances to the 65 and 60 dBA Ldn traffic noise contours.
- **Railroads**. There are two railroad lines that operate in Suisun City. The California Northern Railroad (CFNR) operates 24 miles of the Schellville Sub line from Suisun City to Schellville. The Schellville Sub line enters Suisun City from the west and parallels Cordelia Street then traverses Suisun City in an east-west direction from the Union Pacific Railroad (UPRR) line to the westernmost city boundary. The CFNR Schellville Sub line operates approximately six daily train trips through Suisun City. UPRR operates the Overland Route in the city. The UPRR Overland Route traverses the northern boundary of the city and the western edge of the downtown area, carrying both freight and Amtrak passenger trains. The 60 dBA L_{dn} contour extends out approximately 361 feet from the center of the tracks, while the 65 dBA L_{dn} contour is at approximately 168 feet. Table 9-2 of the Background Report illustrates the distances to the 65 and 60 dBA L_{dn} noise contour from the railroad lines.
- **Travis Air Force Base**. Travis Air Force Base (Travis AFB) is in the central portion of Solano County and borders the northeastern boundary of the city. Travis AFB operates two runways designed to handle heavy transport aircraft (e.g., C-5s). Scheduled missions, practice takeoffs, landings, instrument approaches, and run-up activities generally occur during daytime hours. Exhibit NOI-3 of the Background Report illustrates the noise contours associated with Travis AFB operations.[8] Areas in the eastern portion of the city's sphere of influence (SOI) are substantially affected by Travis AFB operations. Developed portions of the city are within the 60-65 CNEL noise contours of Travis AFB.
- **Stationary Sources.** With the exception of City parks, most of the City's stationary noise-producing land uses are adjacent to railroad tracks and/or major roadways in the Planning Area (e.g., SR 12). The noise levels generated by these sources vary substantially and the ambient noise environment in the immediate vicinity of these facilities includes noise generated by other industrial facilities, local vehicle traffic, and railroad activities. In addition, Suisun City does not include large areas of industrial land uses and activities associated with these land uses primarily occur indoors and thus do not create any discernable noise outside of buildings.

Existing noise levels from roadway and railroad traffic in Suisun City are shown in Exhibit 9-1. Noise levels from operations at Travis AFB are shown in Exhibit 9-2.

Vibration

Vibration is the periodic oscillation of a medium (solid object, liquid, or gas). The rumbling sound caused by the vibration of room surfaces is called groundborne noise. Sources of groundborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions,

[8] Solano County ALUC, 2015. Travis Air Force Base Land Use Compatibility Plan. https://www.solanocounty.com/civicax/filebank/blobdload.aspx?BlobID=34765.

machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or intermittent, such as explosions.

Noise and vibration policies will be used to guide decisions concerning land use and the location of roads, industrial developments, and other common sources of noise. Noise-sensitive land uses will be planned with existing and future estimated noise levels in mind. For the purposes of this Element, noise- and vibration-sensitive uses include residences, schools, hospitals, rest homes, long-term medical or mental care facilities, and similar uses.

Goal PHS-1 Ensure that Noise Does Not Substantially Reduce the Quality of Urban Life.

Objective PHS-1 Require review and conditioning of new developments to mitigate noise impacts.

Policy PHS-1.1 *Large-scale commercial land uses that could require frequent large truck deliveries – 50 or more trips per day - shall not be developed within new or existing neighborhoods.*

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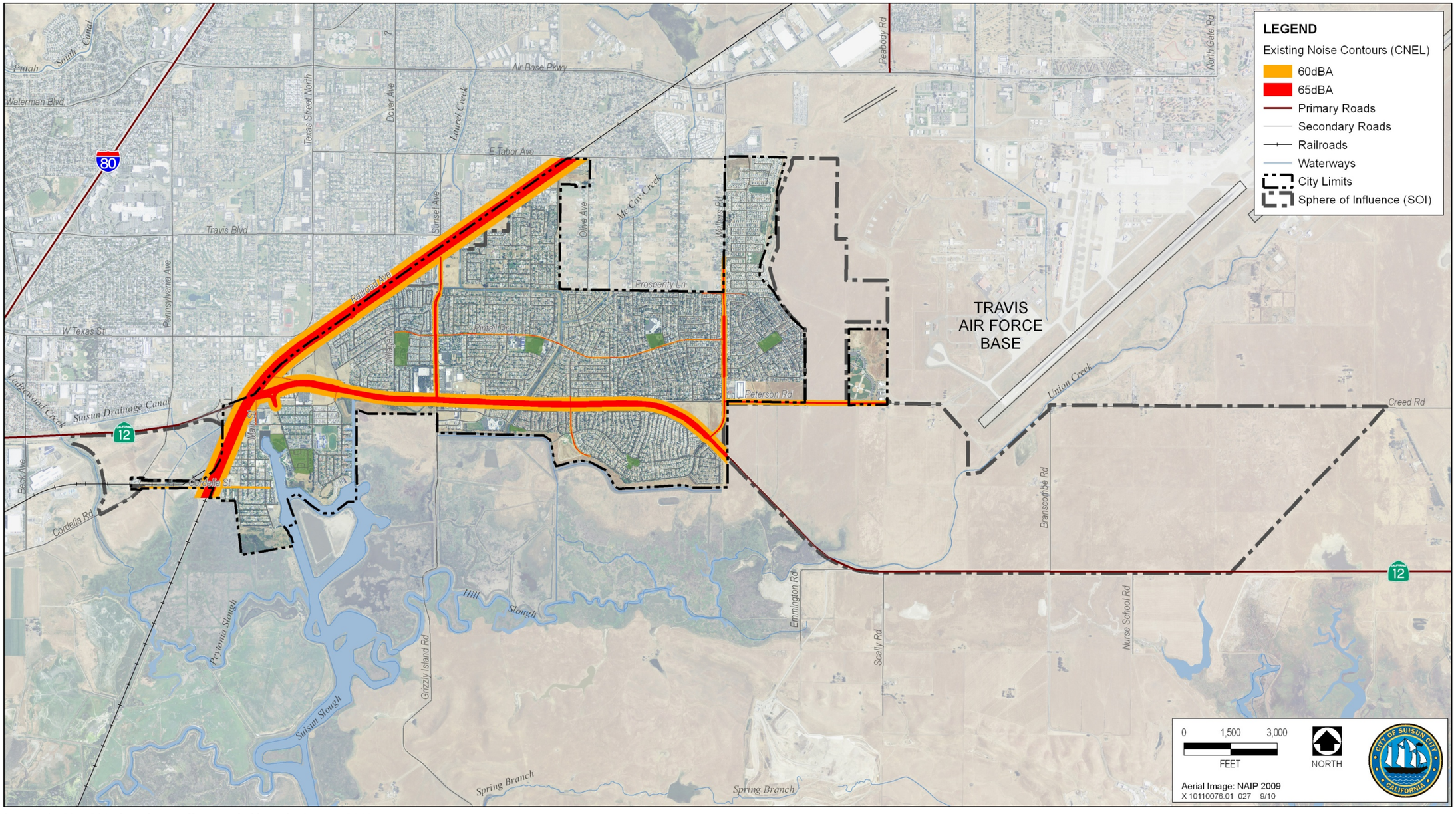
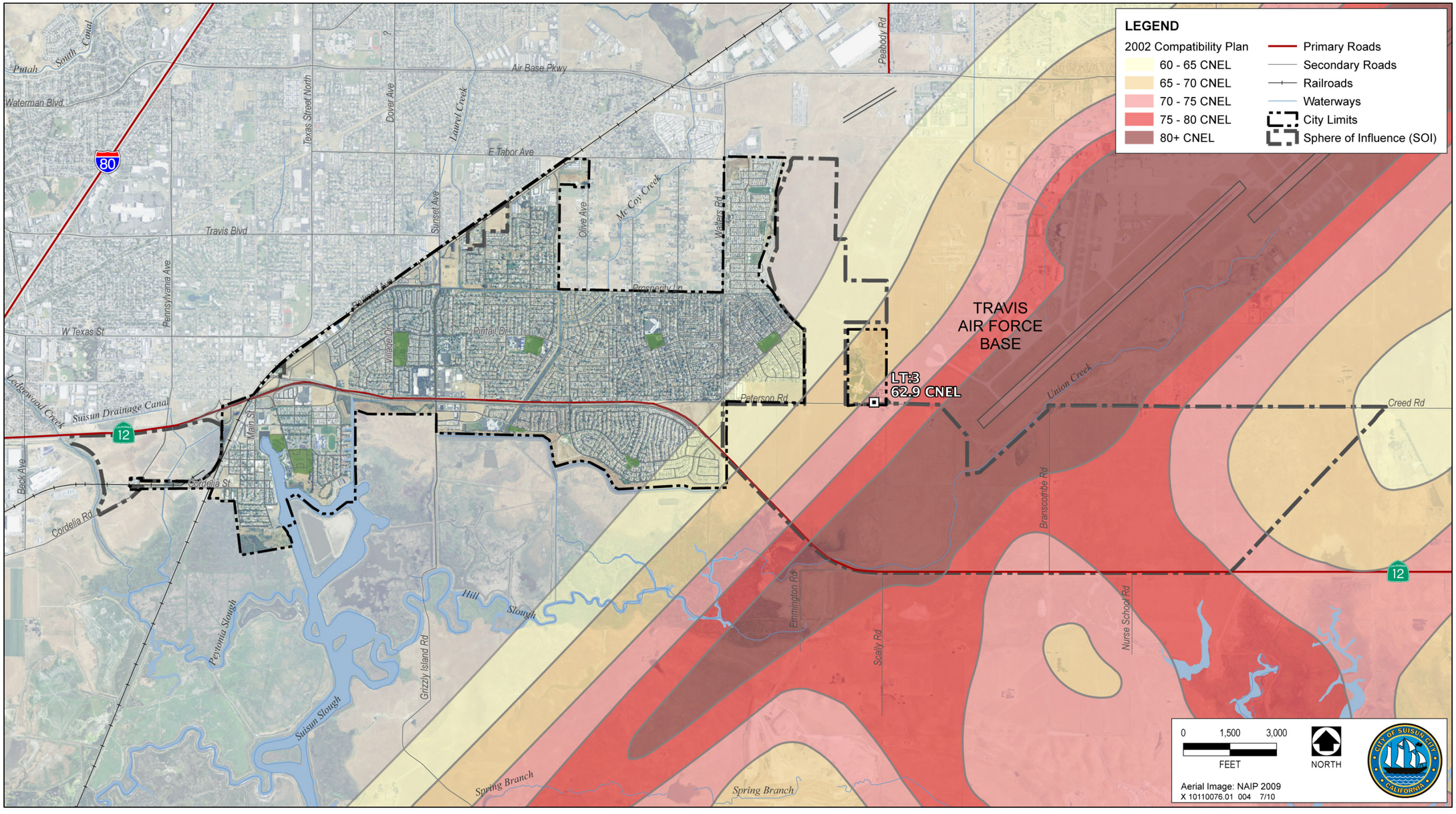


Source: AECOM 2014 based on traffic provided by Fehr & Peers 2010

Exhibit 9-1 **Existing Noise Contours**



Source: Travis Air Force Base Land Use Compatibility Plan 2002

Exhibit 9-2 **Travis Air Force Base Noise Contours**

Policy PHS-1.2 *New development shall be designed to disperse vehicular traffic onto a network of fully connected smaller roadways.*

Policy PHS-1.3 *Industrial and other noise-generating land uses be located away from noise-sensitive land uses[9] or should use noise attenuation methods, such as enclosing substantial noise sources within buildings or structures, using muffling devices, or incorporating other technologies designed to reduce noise levels.*

Policy PHS-1.4 *The City will use all feasible means to reduce the exposure of sensitive land uses to excessive noise levels and mitigate where noise levels exceed those specified in Table 9-1.*

Table 9-1
Maximum Allowable Noise Exposure from Transportation Noise Sources at Noise-Sensitive Land Uses

Land Use	Outdoor Activity Area ($dBA L_{dn}$)	Interior Spaces	
		$dBA L_{dn}$	$dBA L_{eq}$
Residential	60	45	--
Residential (Downtown Waterfront and Residential in Mixed-Use Designations)	70	45	--
Transient Lodging	60	45	--
Hospitals, Nursing Homes	60	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60	--	40
Office Buildings	--	--	45
School, Libraries, Museums	60	--	45
Playgrounds, Neighborhoods	70	--	--

Notes: Noise-sensitive land uses include schools, hospitals, rest homes, long-term care, mental care facilities, residences, and other similar land uses. Outdoor activity areas are considered to be the portion of a noise-sensitive property where outdoor activities would normally be expected (i.e., patios of residences and outdoor instructional areas of schools). Outdoor activity areas for the purposes of this element do not include gathering spaces alongside transportation corridors or associated public rights-of-way. Where development projects or roadway improvement projects could potentially create noise impacts, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. Such analysis shall be the financial responsibility of the applicant and be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics. Mitigation strategies shall include site planning and design over other types of mitigation.

Policy PHS-1.5 *It is the City's policy to allow outdoor noise levels in residential land uses located in commercial and mixed-use areas, including the Downtown Waterfront Specific Plan Area up to 70 dBA L_{dn}.*

Policy PHS-1.6 *Lands within the 65 CNEL noise contour of Travis AFB shall be maintained in agricultural, open space, commercial, industrial, or other uses permitted by Travis AFB Land Use Compatibility Plan (LUCP) and consistent with the recommendations of the Travis AFB Protection Element, including noise contours associated with future air base operations, as appropriate.*

[9] For the purposes of this Public Health and Safety Element, noise-sensitive land uses include schools, hospitals, rest homes, long-term care, mental care facilities, and residences. Outdoor activity areas are considered to be the portion of a noise-sensitive property where outdoor activities would normally be expected (i.e., patios of residences and outdoor instructional areas of schools). Outdoor activity areas for the purposes of this element do not include gathering spaces alongside transportation corridors or associated public rights-of-way.

Policy PHS-1.7 *The City should coordinate with Union Pacific and the Public Utilities Commission to replace at-grade railroad crossings with Federal Railroad Administration-approved quiet zone rated crossing systems designed to reduce or eliminate the use of rail horn blasts within the City, as funding is available.*

Policy PHS-1.8 *Soundwalls are prohibited as a method for reducing noise exposure that could be addressed through other means, such as, site design, setbacks, earthen berms, or a combination of these techniques.*

Policy PHS-1.9 *The City shall require all feasible noise mitigation to reduce construction and other short-term noise impacts as a condition of approval.*

Policy PHS-1.10 *Public events, such as school sporting events, festivals, and other similar community and temporary events are exempt from the noise standards outlined in this Element.*

Program PHS-1.1 Reduce Noise Exposure for Noise-Sensitive Land Uses

Development of noise-sensitive land uses in areas with existing noise from mobile, stationary, or agricultural sources will be reviewed and conditioned according to the City's noise policies. Projects that could expose noise-sensitive uses will be required to incorporate feasible mitigation to address potentially significant noise effects.

Methods may include, but are not limited to: traffic calming, site planning that orients noise-sensitive outdoor gathering areas away from sources, buffering, sound insulation, and other methods deemed effective by the City.

Development projects that are affected by, non-transportation related noise shall be mitigated to achieve acceptable levels specified in Table 9-2, as measured at outdoor activity areas of existing and planned noise-sensitive land uses.

If existing noise levels exceed acceptable levels in Table 9-2 as measured at outdoor activity areas of noise sensitive land uses, then:

- Where existing exterior noise levels are between 60 and 65 dBA at outdoor activity areas of noise-sensitive uses, an increase of 3 dBA or greater is considered significant and requires mitigation to achieve acceptable levels.
- Where existing exterior noise levels are greater than 65 dBA at outdoor activity areas of noise-sensitive uses, an increase of 1.5 dBA or greater is considered significant and requires mitigation to achieve acceptable levels.
- Where it is not possible to reduce noise in outdoor activity areas to 60 dBA or less using practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dBA may be allowed, provided that available exterior noise level reduction measures have been implemented.

The City will identify regional, state, and federal sources of funding to make improvements that would attenuate noise as experienced by existing noise-sensitive land uses, where feasible.

Table 9-2
Noise Level Performance Standards for New Projects Affected By, or Including, Non-Transportation Noise Sources

Noise Level Descriptor	Daytime (7 am – 10 pm)	Nighttime (10 pm – 7 am)
Hourly L_{eq}	60 dBA	45 dBA
L_{max}	75 dBA	65 dBA

Notes: Each of the noise levels specified shall be lowered by five dBA for simple tone noises, noises consisting primarily of speech, or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

Program PHS-1.2: Review and Conditioning of Noise-Generating New Uses

New developments that generate noise will also be reviewed and feasible mitigation required to reduce effects on existing noise-sensitive land uses.

Methods may include, but are not limited to: operating at less noise-sensitive parts of the day, better distribution of vehicle traffic to avoid large volumes on any one street, traffic calming, buffering, sound insulation, and other methods deemed effective by the City.

The maximum noise level resulting from new sources and ambient noise shall not exceed the standards in Table 9-3, as measured at outdoor activity areas of any affected noise sensitive land use except:

- If the ambient noise level exceeds the standard in Table 9-3, the standard becomes the ambient level plus 5 dBA.
- Reduce the applicable standards in Table 9-3 by 5 decibels if they exceed the ambient level by 10 or more decibels.
- The City shall exempt all school related events and City sponsored events from noise standards outlined in this chapter.

Table 9-3
Noise Level Performance Standards for Non-Transportation Noise Sources

Cumulative Duration of a Noise Event[1] (Minutes)	Maximum Exterior Noise Level Standards[2]	
	Daytime[3,5]	Nighttime[4,5]
30-60	50	45
15-30	55	50
5-15	60	55
1-5	65	60
0-1	65	60

Notes:
1 Cumulative duration refers to time within any one-hour period.
2 Noise level standards measured in dBA.
3 Daytime = Hours between 7:00 a.m. and 10:00 p.m.
4 Nighttime = Hours between 10:00 p.m. and 7:00 a.m.
5 Each of the noise level standards specified may be reduced by 5 dBA for tonal noise (i.e., a signal which has a particular and unusual pitch) or for noises consisting primarily of speech of for recurring impulsive noises (i.e., sounds of short duration, usually less than one second, with an abrupt onset and rapid decay such as the discharge of firearms).

Program PHS-1.3 Train Quiet Zone

The City will coordinate with Union Pacific Railroad, the Federal Railroad Administration, and the City of Fairfield to establish a Quiet Zone. As funding is available, the City will collaborate with other agencies improve crossings with appropriate technologies to implement the Quiet Zone. The City will coordinate with Union Pacific to reduce or eliminate the use of horns in noise-sensitive areas of the community with the installation of alternative crossing devices.

Program PHS-1.4 Travis AFB Land Use Compatibility Review

The City will require new developments within areas addressed by the Travis AFB Land Use Compatibility Plan to submit plans for review and conditioning, as appropriate, by Travis AFB.

Program PHS-1.5 Construction Noise Reduction Measures

The City will require new developments proposing construction adjacent to existing noise-sensitive uses or close enough to noise-sensitive uses that relevant performance standards could be exceeded to incorporate feasible mitigation to reduce construction noise exposure. This may include additional limits on the days and times of day when construction can occur, re-routing construction equipment away from adjacent noise-sensitive uses, locating noisy construction equipment away from noise-sensitive uses, shrouding or shielding impact tools, use of intake and exhaust mufflers and engine shrouds, construction of acoustic barriers (e.g., plywood, sound attenuation blankets), pre-drilling holes for placement of piles or non-impact pile driving where piles would be needed, and other feasible technologies or reduction measures necessary to achieve the City's relevant performance standards.

Goal PHS-2 Minimize Vibration Impacts Associated with Development Projects and Nearby Land Uses

Objective PHS-2 Achieve City and other relevant agency vibration performance standards.

Policy PHS-2.1 *New developments that propose vibration-sensitive uses within 100 feet of a railroad or heavy industrial facility shall analyze and mitigate potential vibration impact, as feasible.*

Policy PHS-2.2 *New developments that would generate substantial long-term vibration shall provide analysis and mitigation, as feasible, to achieve velocity levels, as experienced at habitable structures of vibration-sensitive land uses, of less than 78 vibration decibels.*

Air Quality, Greenhouse Gas Emissions, and Climate Change

Air Quality

Air pollution affects human health, harms the natural and the built environment, damages crops, and changes the climate of the earth. Air pollution can have local, regional, and global sources and effects.

Air quality is directly related to land use and development patterns and their relationship to transportation systems that enable or inhibit multiple means of travel. The location of highways, railroads, industries, and other sources of air emissions in relation to houses, schools, and other sensitive land uses is an important consideration in land use planning. Air quality is also affected by building energy use—the amount, sources, and efficiency of use of energy.

Toxic air contaminants (TACs) are airborne substances that can cause acute (short-term) and chronic (long-term) health problems, including cancer. TACs include a variety of substances from many different sources, such as gasoline stations, highways and railroads, dry cleaners, industrial operations, power plants, and painting operations. The effects of TACs are mostly experienced locally (close to the source).

Stationary sources of TACs include gasoline stations, dry cleaners, and diesel backup generators, which are subject to Bay Area Air Quality Management District (BAAQMD) permit requirements. On-road motor vehicles and off-road sources, such as construction equipment, ships, and trains are also common sources of TACs.

Particulate matter (dust) and ozone can also have adverse human health effects. Reactive organic gases (ROGs) and oxides of nitrogen (NO_X), which combine to form ozone, have decreased in the Bay Area over the past several years as a result of more stringent motor vehicle standards and cleaner-burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the San Francisco Bay Area Air Basin (SFBAAB) have declined overall by about 18 percent respectively during the last 20 years.

According to BAAQMD, particulate matter less than 2.5 microns in diameter (PM2.5) is the most harmful air pollutant in the Bay Area relative to the overall impact on public health. Direct emissions of both PM10 and PM2.5 increased slightly in the Bay Area between 1975 and 2005 and are projected to increase through 2020. These increases are due to growth in emissions from area-wide sources, primarily fugitive dust sources.

Criteria air pollutant emission sources in Suisun City include stationary, area, and mobile sources. According to the 2008 emissions inventory for Solano County, the majority of ROG and NO_X emissions are attributable to mobile sources, while area-wide sources are the greatest contributor of particulate matter emissions.

Major stationary sources of air pollutant emissions within Solano County include fuel combustion from electric utilities and other processes, waste disposal, and petroleum production. As discussed previously, the local districts issue permits to various types of stationary sources, which must demonstrate implementation of Best Available Control Technology (BACT).

Area-wide sources of emissions include consumer products, application of architectural coatings, residential fuel combustion, farming operations, construction and demolition, road dust, fugitive dust, landscaping, fires, and other miscellaneous sources. Paved road dust is the largest contributor to particulate matter emissions.

On-road and other mobile sources are the largest contributors of ozone precursor emissions within the county. On-road sources consist of passenger vehicles, trucks, buses, and motorcycles, while off-road vehicles and other mobile sources comprise heavy-duty equipment, boats, aircraft, trains, recreational vehicles, and farm equipment. The major roadway serving the Suisun City area is SR 12.

Greenhouse Gases and Climate Change

Greenhouse gases (GHGs) play a critical role in determining the earth's surface temperature. Infrared radiation is absorbed by GHGs, resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on earth. However, human activities have increased atmospheric GHG levels in excess of natural ambient concentrations. This has led to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate.[10]

Based on the serious threat that climate change poses to the economic well-being, public health, natural resources, and the environment of California, the State of California enacted legislation intended to reduce GHG emissions. The Global Warming Solutions Act of 2006, also known as Assembly Bill 32 (AB 32) establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires reduction of statewide GHG emissions to 1990 levels by 2020. The California Air Resources Board (CARB) adopted its Climate Change Scoping Plan to identify the main strategies California will implement to achieve GHG emissions reductions from each emissions sector of the state's GHG inventory, consistent with the provisions of AB 32. Passed in September 2022, AB 1279 sets a GHG reduction target of achieving carbon neutrality by 2045 (meaning that any GHG emissions not reduced must be offset, removed, or otherwise balanced out). Achievement of this target must include a minimum reduction of GHG emissions 85% below 1990 levels by 2045. In November 2022, CARB updated the Scoping Plan to reflect the requirements of AB 1279.

Various local governments throughout California have enacted plans, programs, policies, and standards intended to reduce GHG emissions and take advantage of the various co-benefits of GHG efficient planning, such as lowering business operating costs, reducing household transportation costs, improving air quality and the public health, creating more efficient transportation options, among other benefits.[11]

Oftentimes, the most effective way to reduce emissions is through broad-scale planning efforts. General plans, community plans, specific plans, and GHG reduction plans are often the most appropriate place for many communities to establish community GHG goals, objectives, policies, and standards for existing and new development. A long-term, comprehensive, integrated plan for reducing overall GHG emissions to a less-than-significant level can be preferable to a project-by-project analysis and mitigation of impacts. A programmatic approach can help to provide more predictable and consistent

[10] Intergovernmental Panel on Climate Change. 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Geneva, Switzerland. Available: http://www.ipcc.ch/ipccreports/ar4-wg1.htm.

[11] Some of the co-benefits at the statewide level were outlined in Governor Schwarzenegger's Executive Order S-3-05.

mitigation requirements based on an overall plan and emissions reduction target. Cities, counties, and other agencies can collaborate to design and fund a more complete and connected transportation network that encourages walking, bicycling, and public transit to provide a more GHG-efficient context for new developments.

Goal PHS-3 Minimize Exposure to Air Pollutants

Objective PHS-3 Reduce emissions that produce harmful air pollutants.

Policy PHS-3.1 *The City will ensure that new industrial, manufacturing, and processing facilities that may produce toxic or hazardous air pollutants are at an adequate distance from residential areas and other sensitive receptors, considering weather patterns, the quantity and toxicity of pollutants emitted, and other relevant parameters.*

Policy PHS-3.2 *The City will communicate with the Bay Area Air Quality Management District to identify sources of toxic air contaminants and determine the need for health risk assessments prior to approval of new developments.*

Policy PHS-3.3 *The City will require projects to reduce operational emissions from vehicles, heating and cooling, lighting, equipment use, and other proposed new sources.*

Policy PHS-3.4 *The City will require implementation of applicable emission control measures recommended by the Bay Area Air Quality Management District for construction, grading, excavation, and demolition.*

Policy PHS-3.5 *The City's vehicle fleet will be updated over time with more fuel-efficient, low-emission vehicles.*

Policy PHS-3.6 *The City will work the Solano County Department of Health and Social Services to help community members access clean air spaces and personal protective equipment during poor air quality days.*

Program PHS-3.1 Health Risk Analyses

When development involving sensitive receptors, such as residential development, is proposed in areas within 134 feet of SR 12 or when uses are proposed that may produce hazardous air contaminants, the City will require screening level analysis, and if necessary, more detailed health risk analysis to analyze and mitigate potential impacts.

For projects proposing sensitive uses within 134 feet of SR 12, the City will require either ventilation that demonstrates the ability to remove more than 80 percent of ambient $PM_{2.5}$ prepared by a licensed design professional or site-specific analysis to determine whether health risks would exceed the applicable BAAQMD-recommended threshold and alternative mitigation demonstrated to achieve the BAAQMD threshold. Site-specific analysis may include dispersion modeling, a health risk assessment, or screening analysis.

For proposed sources of toxic air contaminants, the City will consult with the BAAQMD on analytical methods, mitigation strategies, and significance criteria to use within the context of California Environmental Quality Act (CEQA) documents, with the objective of avoiding or mitigating significant impacts.

Program PHS-3.2 Standard Construction Mitigation

The City will require new developments to incorporate applicable Basic Construction Mitigation Measures, which are maintained by the BAAQMD. This includes standard mitigation measures designed to minimize fugitive PM dust and exhaust emissions from construction activities.

In addition to these Basic Construction Mitigation Measures, in some cases when construction emissions would be significant, involve a substantial amount of earthmoving activities, and/or be located in proximity of sensitive receptors, the City will require new developments to incorporate BAAQMD Additional Construction Mitigation Measures.

Program PHS-3.3 Construction Mitigation for Health Risk

Construction equipment over 50 brake horsepower (bhp) used in locations within 300 feet of an existing sensitive receptor shall meet Tier 4 engine emission standards. Alternatively, a project applicant may prepare a site-specific estimate of diesel PM emissions associated with total construction activities and evaluate for health risk impact on existing sensitive receptors to demonstrate that applicable BAAQMD-recommended thresholds for toxic air contaminants would not be exceeded or that applicable thresholds would not be exceeded with the application of alternative mitigation techniques approved by BAAQMD.

Goal PHS-4 Reduce Local Greenhouse Gas Emissions and Reduce the Local Effects of Global Climate Change

Objective PHS-4 Reduce the City's contribution to global climate change.

Policy PHS-4.1 *The City will coordinate with the Association of Bay Area Governments, Solano County, the Bay Area Air Quality Management District, and California Air Resources Board, and other relevant agencies, to attempt to orient its plans, policies, and regulations to take best advantage of regional and statewide AB 32-related infrastructure investment and other programs.*

Policy PHS-4.2 *The City will guide land use change, direct investments, and apply its fees and programs to encourage more energy-efficient development patterns and construction standards, as feasible.*

Policy PHS-4.3 *The City will actively pursue funding for transportation systems that promote public transit, bicycling, and pedestrian travel and other needed infrastructure, building, and public realm energy-efficiency upgrades, renewable energy production, land use-transportation modeling, ecosystem restoration, and other projects to reduce local greenhouse gas emissions.*

Policy PHS-4.4 *The City will collaborate with the Association of Bay Area Governments, Solano County, the Bay Area Air Quality Management District, and California Air Resources Board, and other relevant agencies, where feasible, to fund transportation and other infrastructure and service improvements that decrease local GHG emissions.*

Policy PHS-4.5 *The City will, as feasible, conduct regionally coordinated land use, transportation, and public facility planning to support energy-efficient local development.*

Program PHS-4.1 Greenhouse Gas Reduction Program

The City will seek funding to develop a greenhouse gas (GHG) reduction program. The reduction program will address sources attributable to land uses operating within Suisun City at General Plan buildout.

The City will address the following in its GHG reduction plan:

- Quantified estimates of GHG emissions attributable to development within Suisun City, along with population and employment estimates;
- Emissions reduction target or GHG efficiency target that is consistent with, and supportive of the legislative mandate embodied in AB 32 and applicable efficiency-based targets for years after 2020;
- Reduction measures, performance standards, incentives, and/or verifiable offsets that would collectively achieve the specified emissions reduction target or GHG efficiency target and could apply to both existing and new development; and
- A monitoring mechanism to consider changes to the GHG reduction plan, as necessary, to ensure progress toward the specified target.

The City will participate in and support relevant regional GHG reduction programming to the extent that these efforts are consistent with the 2035 General Plan and to the extent that funding is available.

Water Quality

Good water quality is essential to the health of a community. In Suisun City, water supplies for drinking are provided by the Solano County Water Agency, which delivers water supplies from other water sources outside of the city. Suisun City's proximity to Suisun Marsh, however, makes it imperative that water quality in stormwater runoff, upstream of the marsh, and in wastewater discharges are maintained at a high level of quality.

Suisun City is required to comply with the San Francisco Bay Regional Water Quality Control Board (RWQCB) Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit Order R2-2022-0018, NPDES Permit No. CAS612008, issued May 11, 2022. This permit replaces the formerly separate municipal stormwater permits within the San Francisco Bay RWQCB area with a regional permit for 76 Bay Area municipalities, including Suisun City and the Fairfield-Suisun Urban Runoff Management Program, formed by Suisun City and Fairfield. Water quality in the Planning Area is also protected by treatment and disposal of wastewater through the

Fairfield-Suisun Wastewater Treatment Plant (WWTP), which is operated by the Fairfield Suisun Sewer District (FSSD).

Section 303(d) of the Clean Water Act requires states to develop lists of water bodies (or segments of water bodies) that will not attain water quality standards after implementation of minimum required levels of treatment by point source dischargers (e.g., municipalities and industries) and requires states to develop a total maximum daily load (TMDL) for each of the listed pollutants and water bodies. A TMDL is the amount of loading that the water body can receive and still meet water quality standards.

This list, called the Clean Water Act Section 303(d) list, identifies one water body within the Planning Area that does not meet the TMDL standard. Ledgewood Creek, which is in the extreme western portion of the City's SOI, is listed for the pesticide diazinon, which likely entered the creek through urban runoff and storm sewers. In addition to Ledgewood Creek, Suisun's City's other receiving waterways, Suisun Bay, Suisun Marsh wetlands, and other various Delta waterways, are included on the Clean Water Act Section 303(d) list for various constituents, including, but not limited to, mercury, nickel, selenium, chlordane, DDT, PCBs, chlorpyrifos, and exotic species.

Goal PHS-5 Maintain and Improve Water Quality

Objective PHS-5 Maintain and improve water quality in a way that provides public and environmental health benefits.

Policy PHS-5.1 *New development shall incorporate site design, source control, and treatment measures to keep pollutants out of stormwater during construction and operational phases, consistent with City and Fairfield-Suisun Urban Runoff Management Program standards.*

Policy PHS-5.2 *The City will encourage the phasing out of commercial and industrial building materials that leach metals into stormwater runoff.*

Policy PHS-5.3 *New developments shall incorporate low-impact development (LID) strategies, such as rain gardens, filter strips, swales, and other natural drainage strategies, to the greatest extent feasible, to reduce stormwater runoff levels, improve infiltration to replenish groundwater sources, reduce localized flooding, and reduce pollutants close to their source.*

Policy PHS-5.4 *Impervious surfaces such as driveways, streets, and parking lots shall be interspersed with vegetated areas that allow for infiltration of stormwater.*

Policy PHS-5.5 *New developments shall minimize the land area covered with driveways, loading areas, and parking lots to reduce stormwater flows, reduce pollutants in urban runoff, recharge groundwater, and reduce flooding.*

Policy PHS-5.6 *New developments shall use permeable surfaces for hardscape, where feasible.*

Policy PHS-5.7 *Industrial land uses with high wastewater generation rates or effluent pollutant concentrations may be required by the Fairfield Suisun Sewer District to install equipment for pre-treatment of wastewater.*

Policy PHS-5.8 *The City will consult with appropriate regional, state, and federal agencies to monitor water quality and address local sources of groundwater and soil*

contamination, including possible contamination from activities at Travis Air Force Base, underground storage tanks, septic tanks, and industrial uses, as necessary, to achieve state and federal water quality standards.

Policy PHS-5.9: *Septic systems are not allowed in new developments, which must connect to the regional sewer system for treatment of wastewater.*

Program PHS-5.1 Stormwater Development Requirements

The City will review new developments for applicable requirements of the National Pollutant Discharge Elimination System (NPDES) permit. New developments must use best management practices (BMPs) during construction to mitigate impacts from construction work and during post construction to mitigate post-construction impacts to water quality. Long-term water quality impacts must be reduced using site design and source control measures to help keep pollutants out of stormwater. The City will encourage proactive measures that are a part of site planning and design that would reduce stormwater pollution as a priority over mitigation measures applied to projects after they are designed. Some of the many ways to reduce water quality impacts through site design include reduce impervious surfaces, drain rooftop downspouts to lawns or other landscaping, and use landscaping as a storm drainage and treatment feature for paved surfaces.

Healthy Communities

Public safety and quality of life play a large role in the overall health of a community. Although there are goals and policies throughout the different elements of this General Plan that support community health and quality of life, the policies listed here provide additional guidance toward reaching this goal.

Healthy community principles can address a wide range of factors, including access to health care, healthy food, recreation, education, economic opportunity, disease management, and other factors. The City is committed to pursuing healthy community objectives in the context of its decision making and programs, in collaboration with many local and regional partners. It is anticipated that future collaboration would occur between City departments and health care providers, school districts, nonprofit foundations, and other public and private groups.

Increases in average temperature and changes in precipitation patterns due to climate change favor larger precipitation events that may facilitate the growth and activity of disease-carrying vectors. These can include ticks and mosquitoes carrying vector-borne diseases such as Lyme Disease and West Nile Virus, which have been recorded in the county in the past. Some of these diseases may cause only mild inconvenience, but others are potentially life threatening. Populations most vulnerable to human health hazards are those who spend a disproportionate amount of time outdoors, those with fragile immune systems or existing illnesses, those who may live in sub-standard housing or not have access to health insurance and medical care, and those without access to vehicles or internet. These persons may be living in conditions that increase their chances of catching vector-borne illnesses, lack the ability to fight off infections that may occur, or lack the financial resources to seek timely medical care. Increases in average temperature and changes in precipitation patterns due to climate change may facilitate the growth and activity of disease-carrying vectors. Overall, the risk of human health hazards is expected to increase.

Goal PHS-6. Provide for improved health of Suisun City residents through healthy community design

Objective PHS-6 Manage land use change, community design standards, and public facilities in a way that maintains or improves public health outcomes.

Policy PHS-6.1 *The City will promote healthy lifestyles by encouraging a land use pattern and community design that includes public spaces to facilitate social interaction and for social gatherings and interaction.*

Policy PHS-6.2 *The City will ensure that the land use pattern and community design support walking and biking to promote physical activity by providing safe infrastructure, such as sidewalks, bike lanes, and trails, and by providing access to parks, recreation services, and open space.*

Policy PHS-6.3 *The City will allow for convenient transportation options that accommodate people of all ages and physical abilities, including complete and safe sidewalks, public transit, and bicycle lanes.*

Policy PHS-6.4 *The City will increase access to parks and recreation facilities and encourage the development of new parks in areas lacking sufficient facilities.*

Policy PHS-6.5 *As feasible, the City will increase access to health care and social services for residents of all ages.*

Policy PHS-6.6 *The City will promote the idea of complete neighborhoods, which provide a range of services and recreational opportunities that are supportive of healthy lifestyles within walking or biking distance of most homes.*

Goal PHS-7 Encourage programs that promote healthy lifestyles

Objective PHS-7 Engage in proactive City health programs that maintain or improve Suisun City residents' health outcomes.

Policy PHS-7.1 *The City should collaborate with area health providers and other stakeholders to provide targeted education regarding the importance of nutrition and exercise in a healthy lifestyle.*

Policy PHS-7.2 *The City should work closely with the Solano County Department of Health and Social Services to monitor health statistics for the City and county and develop action items and programs to address health deficiencies.*

Policy PHS-7.3 *The City should work closely with the Solano County Department of Health and Social Services to monitor emerging disease conditions for the City and county.*

Policy PHS-7.4 *Flood-management facilities shall be designed to reduce mosquito propagation by limiting the time period of standing water after a storm, by promoting circulation in water or fluctuating water levels, or through mosquito control methods, in communication with the Solano County Mosquito Abatement District.*

Policy PHS-7.5 *The City will work with the Agricultural Commissioner's Office to monitor pest conditions within the Sphere of Influence.*

Policy PHS-7.6 *The City will establish and maintain healthy community programs for residents, with a particular focus on seniors, children, and teens.*

Policy PHS-7.7 *The City will help low-income and other vulnerable community members connect with local affordable health services.*

Policy PHS-7.8 *The City will identify opportunities to ensure that workers in outdoor industries have the training and resources to be adequately protected from environmental hazards, including extreme heat, poor air quality, pests, and diseases.*

Goal PHS-8 Promote access to healthy food and nutrition

Objective PHS-8 Improve access to healthy and nutritious food.

Policy PHS-8.1 *The City will encourage access to grocery stores for all residents by allowing the development of such uses within walking or biking distance of all homes.*

Policy PHS-8.2 *The City will encourage the location of grocery stores, retailers that offer healthy food choices, and healthy restaurants in areas currently lacking access to such facilities.*

Policy PHS-8.3 *The City should coordinate with the school district and other local agencies to incorporate local agricultural products into government food programs.*

Policy PHS-8.4 *The City will support the establishment of community gardens, farm stands, and farmer's markets, as shown in Exhibit 9-3.*

Exhibit 9-3 **Community Garden**

Goal PHS-9 Promote economic health and opportunity to contribute to public health and happiness

Objective PHS-9 Increase local opportunities that both improve public health and the local economy.

Policy PHS-9.1 *The City will implement the goals and policies of the Economic Development Element to increase the economic health of the City, recognizing that economic health and opportunity provide jobs and contribute to the overall happiness of the community.*

Policy PHS-9.2 *The City will encourage the development of a highly skilled local employment base by promoting local job training programs to provide vocational education to the local workforce.*

Policy PHS-9.3 *The City will support local businesses, as they contribute to the local economy and civic pride, and provide income for City residents.*

Program PHS-9.1 Vector Control

The City will coordinate with the County's vector control program and Mosquito Abatement District to monitor and respond to hazards presented by pests and disease vectors.

Program PHS-9.2 Health Education Programs Outreach

Work with the Solano County Department of Health and Social Services and healthcare providers to provide outreach and education programs about human health hazards to Suisun City residents and workers.

Program PHS-9.3 Transportation Coordination Program

Coordinate with local transit providers to establish programming and services to help those without vehicle access or with limited mobility reach medical centers.

Safety

The safety goals and policies of this Element are focused on preventing and responding to potentially hazardous conditions and situations. These goals and policies differ from public health goals and policies in that they describe the potential for hazards and protecting people and infrastructure from these hazards.

Hazards and Hazardous Materials

Hazardous materials are substances that can be dangerous to the public's health and safety if they are improperly used, stored, transported, or disposed.

The most significant concerns regarding possible hazardous materials releases in Suisun City are the presence of truck traffic on SR 12, rail traffic on the UPRR main line, and four

major pipelines that cross the City and are in bordering areas. A wide range of hazardous cargoes are regularly transported along these routes.

Types of hazardous materials regularly transported by highway and railroad include flammable liquids, corrosive materials, compressed and/or poisonous gases, explosives, flammable solids, and irritating materials. Underground pipelines transporting hazardous materials include two Pacific Gas and Electric Company (PG&E) high-pressure natural gas lines along SR 12, Kinder-Morgan pipelines along the right-of-way of the UPRR carrying refined petroleum products, and Department of Defense jet fuel lines going to Travis AFB along SR 12.

There are also hazardous material sites that are scheduled for investigation, remediation, are under remediation, or that have completed remediation throughout the City.

Major releases of hazardous materials from pipelines have occurred in Solano County, making this a particular concern in Suisun City. A fuel pipeline failed near Peabody and Vanden Roads in Fairfield in 1994, a pipeline failed and released diesel fuel in Suisun Marsh in 2004, another leak occurred from a pipeline parallel to the UPRR just northeast of the City limits in 2009, and in 2021 a diesel fuel leak affected the backwater area of Suisun City.

Travis AFB is directly adjacent to the City's SOI and is listed as a United States Environmental Protection Agency (EPA) Superfund site. Travis AFB is also a permitted hazardous waste facility that handles PCB-contaminated waste and PCB-containing equipment, such as electrical transformers.

Climate change is unlikely to substantially affect hazardous materials transportation incidents. However, increased frequency and intensity of hazards, such as floods and severe weather, may create a greater risk of hazardous materials releases during and after these events.

Goal PHS-10 Reduce Potential Human Injury or Property Damage During the Manufacture, Storage, or Transportation of Hazardous Substances.

Objective PHS-10 Avoid and minimize health risk associated with hazardous materials.

Policy PHS-10.1 *The City will assess risks associated with public investments and other City-initiated actions, and new private developments shall assess and mitigate hazardous materials risks and ensure safe handling, storage, and movement in compliance with local, state, and federal safety standards.*

Policy PHS-10.2 *The City will require that sites containing hazardous materials or waste be remediated in conformance with applicable federal and state standards prior to new development or adaptive reuse projects that could be substantially and adversely affected by the presence of such contamination.*

Policy PHS-10.3 *The City will prohibit the transportation of hazardous materials in quantities greater than those used in routine household maintenance through residential areas.*

Policy PHS-10.4 *The City will require that large quantities of hazardous materials be securely contained in a manner that minimizes risk until they can be transported offsite and neutralized to a nonhazardous state in a proper manner.*

Policy PHS-10.5 *The City will require that all hazardous waste transfer stations, disposal facilities, and residual repositories be sited at least 2,000 feet away from Travis Air Force Base accident potential zones.*

Policy PHS-10.6 *The City will prohibit the development of hazardous waste storage facilities south of SR 12 to prevent the possibility of upset in close proximity to the Suisun Marsh. Policy PHS-10.7 The City will prohibit the development of hazardous materials and waste facilities within areas identified at risk of sea level rise and flooding as shown in Exhibit 9-6.*

Policy PHS-10.8 *The City will prohibit new hazardous materials facilities within one-quarter mile of schools or residential areas.*

Policy PHS-10.9 *The City will require all businesses to comply with state requirements for Hazardous Materials Business Plans (HMBP) under the California Environmental Protection Agency HMBP Program.*

Policy PHS-10.10 *The City will require that dedicated pipeline rights-of-way be permanently protected from construction encroachment, particularly in areas where high-pressure pipelines adjoin developable properties.*

Policy PHS-10.11 *The City will provide educational materials to local businesses and the general public about methods for safe handling and disposal of hazardous materials and techniques for reducing their own hazardous materials use.*

Policy PHS-10.12 *The City will continue to participate in the Solano County Hazardous Materials Response Team and provide initial and ongoing training for first responders, such as training in hazardous materials incident response and management.*

Program PHS-10.1 Hazardous Materials Business Plans

Businesses shall submit their Hazardous Materials Business Plans (HMBPs) to the City and the Solano County Environmental Health Services Division for approval prior to issuance of a building permit, occupancy permit, or business license within Suisun City, unless the business obtains an exemption from the Health Services Division.

Program PHS-10.2 Hazardous Building Materials Analysis

For projects involving demolition that could disturb asbestos or lead-based paint, the City will require a hazardous building analysis. Prior to the issuance of building or demolition permits, the City will require project applicant(s) to hire a Certified Asbestos Consultant (CAC) to investigate whether any of the existing structures or infrastructure contain lead or asbestos-containing materials (ACMs) that could become friable or mobile during demolition, renovation, or other construction-related activities. If ACMs or lead-containing materials are found, the project applicant(s) shall ensure that such materials are properly removed by an accredited contractor in accordance with EPA and the California Occupational Safety and Health Administration (Cal-OSHA) standards and Yolo-Solano Air Quality Management District

asbestos rules. In addition, all activities (construction or demolition) in the vicinity of these materials shall comply with Cal-OSHA standards related to exposure of workers to asbestos and lead. The lead-containing materials and ACMs shall be handled properly and transported to an appropriate disposal facility.

Flooding

Flooding is the rising and overflowing of a body of water onto normally dry land. Areas at an elevated risk of flooding are generally divided into 100- and 500-year flood zones. A 100-year flood zone has a 1-percent chance of experiencing a major flood in any given year and a 500-year flood zone has a 0.2-percent chance of flooding in any given year.

The potential for flooding is a major hazard in Suisun City, as portions of the City and its SOI are within the Federal Emergency Management Agency (FEMA) designated 500-year and 100-year flood zones, as depicted in Exhibit 9-4. As shown, this includes most of the Downtown Waterfront Area and several developed areas south of SR 12, particularly in the vicinity of Sunset Avenue adjacent to Suisun Marsh. Flooding can also occur along the City's waterways. Areas of shallow flooding frequently occur along Sunset Avenue and SR 12 due to sheet-flow and ponding from Laurel Creek, between SR 12 and the UPRR from Laurel Creek, and at Cordelia Road due to ponding from Pennsylvania Avenue Creek flooding. Flooding along Pennsylvania Avenue Creek, within Suisun City, is caused by backwater from Suisun Slough. These major flooding events in the City occurred in 1940, 1950, 1955, 1963, 1966, 1967, 1969, 1970, and 1973.

Several populations and assets face high risks from flooding events. These populations may face outsize risk of flood exposure, may be especially vulnerable to the health effects and financial repercussions of flood damage, or may encounter barriers to evacuating during flood events. These include those living in flood-prone areas who lack the financial resources to protect their homes or are ineligible for grant funding to recover from flood damage to their homes; persons with limited mobility; outdoor workers; pollution-burdened populations that may be exposed to pollutant mobilization due to flooding; and persons living on single-access roads.

Significant pieces of critical infrastructure in Suisun City could be blocked, damaged, or rendered inoperable by floodwaters. Flooding can damage or interrupt the operation of transportation infrastructure, including major roads, the UPRR, and electrical vehicle charging stations. Floodwaters can inundate water and wastewater infrastructure, potentially resulting in the release of wastewater and contamination of drinking water and overwhelm existing flood control infrastructure. Parks and recreation facilities, homes, government and public safety buildings, and the Downtown Waterfront Area all fall within flood hazard areas and could be damaged by floodwaters; operations at government buildings may be interrupted and homes could be rendered uninhabitable. Flooding damage to any of these community assets could have profound effects on utilities, essential services, economic activity, and public health and safety.

Climate change is expected to make flood events worse, as scientists expect that climate change will cause more frequent and intense precipitation events, which could lead to more severe flooding. Because of this, floods are expected to occur more often in Suisun City and climate change may expand the parts of the City that are considered prone to flooding.

Sea Level Rise and Shoreline Flooding

Sea level rise is an increase in the ocean's surface height relative to the land in a particular location. Sea level rise is a gradual process, taking place over years or decades. Sea level rise, a direct result of climate change, affects shoreline communities as well as those along the San Francisco Bay and into the Sacramento-San Joaquin Delta region. It has the potential to inundate homes, businesses, and infrastructure near the shorelines, as well as cause erosion of shoreline lands over time. Sea levels rose an average of 2.0 millimeters (mm) per year since the late nineteenth century, and projections suggest that it will rise at a higher rate during the twenty-first century. Rising seas increase the risk of shoreline flooding, storm surge inundation, shoreline erosion, and wetland loss. The cities and infrastructure that line many shorelines are already vulnerable to damage from storms, which will likely increase as the sea level continues to rise and inundate areas further inland. While not widely reported historically, sea level rise may increase the risk of saltwater intrusion from the Sacramento-San Joaquin River Delta into the Suisun Marsh Solano Subbasin, which would have negative impacts on water quality. However, the Department of Water Resources maintains three salinity control gate facilities that help reduce saltwater intrusion into the Suisun Marsh.

Along the Suisun City shoreline, sea levels are projected to rise approximately 24 inches by 2050 and 84 inches by 2100. However, it is possible that sea levels could rise faster than these projections. Sea level rise projections for the years 2050 and 2100 in Suisun City are shown in Exhibits 9-5 and 9-6, respectively. Parts of the City immediately adjacent to McCoy Creek are projected to experience sea level rise of up to approximately two to four feet by 2050. By 2100, the area immediately adjacent to McCoy Creek may experience sea level rise of up to 12 feet, the southern edges of the City may experience sea level rise of up to four feet. Most shoreline damage from flooding would occur as a result of storm activity in combination with higher sea levels.

Suisun City is also vulnerable to shoreline flooding due to its proximity to the Sacramento-San Joaquin Delta. Shoreline flooding is caused by processes such as waves, tides, storm surge, or heavy rainfall from storms and can be exacerbated by sea level rise. The severity and exact location of shoreline flooding depends on several factors and can be exacerbated by inland flooding. However, Exhibit 9-7 illustrates the parts of the City that would be impacted by shoreline flooding by 2050, with 24 inches of sea level rise and a five-year storm, and Exhibit 9-8 shows shoreline flooding by 2100, with 84 inches of sea level rise and a five-year storm. By 2100, much of the southern half of the City would be inundated by floodwaters of up to two feet.

Dam Failure

A dam failure is an uncontrolled release of water from a reservoir through a dam because of structural failures or deficiencies in the dam, usually associated with intense rainfall or prolonged flooding. Dam failures can range from minor to catastrophic and can potentially harm human life and property downstream from the failure. Although dam failures are very rare, these events are not unprecedented. There are several jurisdictional dams in Solano County and Napa County near Suisun City. The inundation zone of Lake Curry in Napa County can reach Suisun City, as shown in Exhibit 9-9.

Flood Protection

Suisun City relies on local levee systems for flood protection. The levee systems in some Solano County marshlands were originally constructed by hand labor and later by dredging to hold back river floods and daily tides, to create additional land for grazing and growing crops. Today, these levees remain as embankments of five to six feet in

height, with foundation widths of roughly 20 to 30 feet. Levees run both north to south and east to west across the marshland immediately south of the City and following the path of Suisun Slough.

Constant maintenance is required to hold these levees against the high tides and river floods. Some of these levees are not maintained to specific standards, leaving them vulnerable to failure and inundation. Levee instability is the cause of many floods. There are 27 Delta islands that have been partially or completely flooded since 1980, and 150 failures occurred over the course of the twentieth century. In mid-January 1980, severe rainstorms over central California caused high river outflow through the Sacramento-San Joaquin Delta, which, coinciding with gale force and high tides, resulted in levee failure and flooding to approximately 9,600 acres. Even inspected levees are prone to failure under certain conditions, such as the Jones Tract (approximately nine miles of Stockton), which failed in 2004 after inspection.

The Delta-Suisun Marsh Office, part of the California Department of Water Resources, is responsible for improving flood protection within the Sacramento-San Joaquin Delta and portions of the Suisun Marsh. This is a grant-funded program that works with more than 60 reclamation districts in the Sacramento-San Joaquin Delta and Suisun Marsh to maintain and improve the flood-control system and provide protection to public and private investments in the Sacramento-San Joaquin Delta. Through its two major components (Delta Levees Maintenance Subventions Program and Delta Levees Special Flood Control Projects), the grant program works with the local agencies to maintain, plan, and complete levee rehabilitation projects.

Goal PHS-11 Minimize the loss of life and damage to property caused by flood events.

Objective PHS-11 Manage land use change and plan for flood protection in a way that is consistent with applicable federal and state guidelines.

Policy PHS-11.1 *The City will coordinate with Solano County Water Agency; the California Department of Water Resources; the San Francisco Bay Conservation and Development Commission; and others to plan, construct, repair, and maintain flood-control facilities protecting Suisun City capable of protecting existing and proposed structures from flooding, in accordance with state law.*

Policy PHS-11.2 *The City will coordinate with federal, state, and local agencies to maintain and improve the capacity of local and regional flood-control systems, promoting a regional approach to addressing flood and sea level rise hazards.*

Policy PHS-11.3 *The City will regularly reinforce and expand the City's stormwater drain systems to enhance the survivability of the system during heavy flood events.*

Policy PHS-11.4 *The City will use the most current flood hazard and floodplain information from state and federal agencies (such as the State Department of Water Resources, the Federal Emergency Management Agency, and the Army Corps of Engineers) as well as sea level rise and shoreline flooding projections, as a basis for project review and to guide development in accordance with federal and state regulations.*

Policy PHS-11.5 *The City will regulate development within floodplains according to state and federal requirements to minimize human and environmental risks and maintain the City's eligibility under the National Flood Insurance Program.*

Policy PHS-11.6 *The City will require evaluation of potential flood hazards before approving development projects.*

Policy PHS-11.7 *The City will require new development to demonstrate that such development will not result in an increase to downstream flooding.*

Policy PHS-11.8 *The City will prohibit development of new critical infrastructure in areas subject to inland flooding or 2100 shoreline flooding (as shown in Exhibits 9-4 through 9-9 unless no feasible alternative exists.*

Policy PHS-11.9 *The City will require that existing and new critical facilities and structures intended for human occupancy within the 100-year floodplain are appropriately elevated and flood proofed for the profile of a 100-year flood event. Flood proofing may include a combination of structural and nonstructural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents and may include:*

- *Anchoring to prevent flotation, collapse, or lateral movement.*
- *Using flood-resistant construction materials.*
- *Employing construction methods and practices that minimize flood damage.*
- *Elevating building pads, habitable building floors, and key building systems (e.g., HVAC machinery, power systems, etc.) above the base flood elevation plus required freeboard.*
- *Providing adequate venting to allow for equalization of hydrostatic flood forces.*

Policy PHS-11.10 *The City will regularly reinforce local ramps, bridges, and roads against flooding through protection activities, including elevating road(s) and installing culverts beneath roads or building a higher bridge across areas that experiences regular flooding.*

Policy PHS-11.11 *The City will require critical facilities, including those providing emergency response and public health services, to expand operations and contingency plans to ensure they are protected from both inland and shoreline flooding and have water, power, food, and other supplies necessary to maintain key functions during a flood event.*

Policy PHS-11.12 *The City will use the City of Suisun City Annex of the Solano County Multi-jurisdiction Hazard Mitigation Plan and will coordinate with the Solano County Water Agency and Solano County Reclamation and Levee Districts to develop adaptation strategies associated with the impacts of sea level rise.*

Policy PHS-11.13 *The City will foster, facilitate, and coordinate partnerships with Solano County, agencies, utilities, property owners, and neighborhood groups/organizations on planning for and implementing inland flooding mitigation and sea level rise adaptation projects.*

Policy PHS-11.14 *The City will work collaboratively with surrounding jurisdictions to seek funding, design, and implement sea level rise resiliency projects.*

Policy PHS-11.15 *The City will support Solano County's Sea Level Rise Strategic Program, as feasible.*

Policy PHS-11.16 *The City will ensure that regional shoreline park planning and project development activities consider sea level rise projections (as shown in Exhibits 9-5 and 9-6) and factor impacts into tidal wetland restoration, habitat enhancement or creation, and park and recreation management activities.*

Policy PHS-11.17 *The City will support the implementation of the Suisun Marsh Habitat Management, Preservation, and Restoration Plan to improve and restore wetland habitats and ensure that these habitats protect the built environment.*

Policy PHS-11.18 *The City will prioritize funding to improve vulnerable public transportation assets in shoreline flooding areas that serve transit-dependent populations and prioritize development of alternative transit options to serve these populations.*

Policy PHS-11.19 *The City will establish educational programs to raise public awareness about inland and shoreline flooding, sea level rise, and flood risks.*

Policy PHS-11.20 *The City will expand communication campaigns to increase public awareness and capacity to participate in local and regional sea level rise decision-making, with a focus on basic understanding of concepts, consequences, relationship to other critical issues such as jobs and housing, and how to get involved with local, regional, and state governance.*

Program PHS-11.1 Flood Protection Plan

The City will collaborate with the Solano County Water Agency to implement and regularly update the Flood Control Master Plan.

Program PHS-11.2 Floodplain Review

The City will regularly review all areas subject to flooding, as identified by the Federal Emergency Management Agency or Department of Water Resources 100-year floodplains, will make any changes identified through this review available to the public, and will consult the most recently available flood mapping data during the development review process.

Program PHS-11.3 Development Review Checklist

The City will develop a checklist to consult during development review to aid potential applicants in determining flood risk. This checklist will provide the following information:

- A site's location within the inland flood hazard, sea level rise, and shoreline flooding projection zones.
- Information about local ratio of pervious to impervious surfaces.
- Confirmation of stormwater drainage capacity.

- Elevation of key building systems and habitable areas.

Program PHS-11.4 Building Codes and Design Guidelines

The City will update building codes and design guidelines to support improvements to existing structures that consider sea level rise and shoreline flooding. Updates could consider floodproofing, flood-resistant building materials, floodable designs, and freeboard/elevation requirements.

Program PHS-11.5 Floodplain Management Ordinance

The City will review and assess the feasibility of an update to the local Floodplain Management Ordinance that goes beyond existing National Flood Insurance Program (NFIP) regulations. Consider adding additional elevation to the current base flood elevation (BFE) requirement and lowering Suisun City's Community Rating System (CRS) designation.

Program PHS-11.6 Sea Level Rise Overlay Zone

The City will adopt a Sea Level Rise overlay zone in the City's Zoning Code incorporating the sea level rise and shoreline flooding projections for 2050 and 2100. The "overlay zone" shall include land use regulations for site planning and a minimum construction elevation that reflects flooding and sea level rise data.

Program PHS-11.7 Conservation Easements

The City will establish conservation easements that preserve certain high hazard areas as nondevelopment areas that can be maintained as open space or habitat, and/or low-density development areas to discourage and prohibit new development or densification in high hazard areas.

Program PHS-11.8 Flood Insurance

The City will explore the benefits of participating in the Community Rating System (CRS) to maintain and reduce flood insurance rates under the National Flood Insurance Program.

Program PHS-11.9 Storm Drain Maintenance

The City will regularly clean and maintain storm drains and will address potential ponding and improvement needs along key roadways in communities and neighborhoods subject to flooding due to poor drainage, especially in advance of the rainy season.

Program PHS-11.10 Levee Maintenance

The City will explore opportunities to support levee owners and managers with obtaining funding to improve the resilience of levees and ensure they can withstand rising sea levels and 100-year storm events.

Program PHS-11.11 Marina Facilities

The City will improve City-owned and operated marina and shoreline facilities to withstand king tide events and sea level rise.

Program PHS-11.12 Countywide Adaptation Planning

The City will work with Solano County to facilitate the formation of a centralized countywide agency or joint powers authority to facilitate adaptation planning, adaptation project development and financing, and implementation.

Program PHS-11.13 Regional Sea Level Rise Adaptation Plan

The City will collaborate with all Solano County jurisdictions, including the participating agencies in the Solano Bayshore Resiliency Project, to develop a countywide Sea Level Rise Adaptation Plan. The adaptation plan shall include the following components:

- Sea Level Rise Projection Map, to be used as the basis for adaptation planning.
- Coordination with local, regional, state, and federal agencies with Delta and Bay shoreline oversight, major property owners, and owners of critical infrastructure and facilities in the preparation of the adaptation plan.
- An equitable, community-driven outreach and engagement plan for all community stakeholders with focused engagement of residents, business owners, and property owners within the vulnerable areas.
- An inventory of potential areas and sites suitable for mid- to large-scale adaptation projects.
- A menu of adaptation measures and approaches that could include, but not be limited to:
    - Re-purposing of land for wetland and habitat migration, especially on low-lying, undeveloped, and underdeveloped sites; in areas that are permanent open space; and in areas that are environmentally constrained. Transfer of development rights from such areas should be encouraged.

- Innovative shoreline protection and nature-based adaptation measures such as wetlands and habitat restoration, and horizontal levees where most practical and feasible.
- Channel realignment and widening.
- Hard line armoring measures (sea walls, levees, breakwater, locks, etc.) in densely developed areas to minimize the potential for displacement of permanent residents and businesses.
- Elevating areas, structures, and infrastructure to reduce risks.

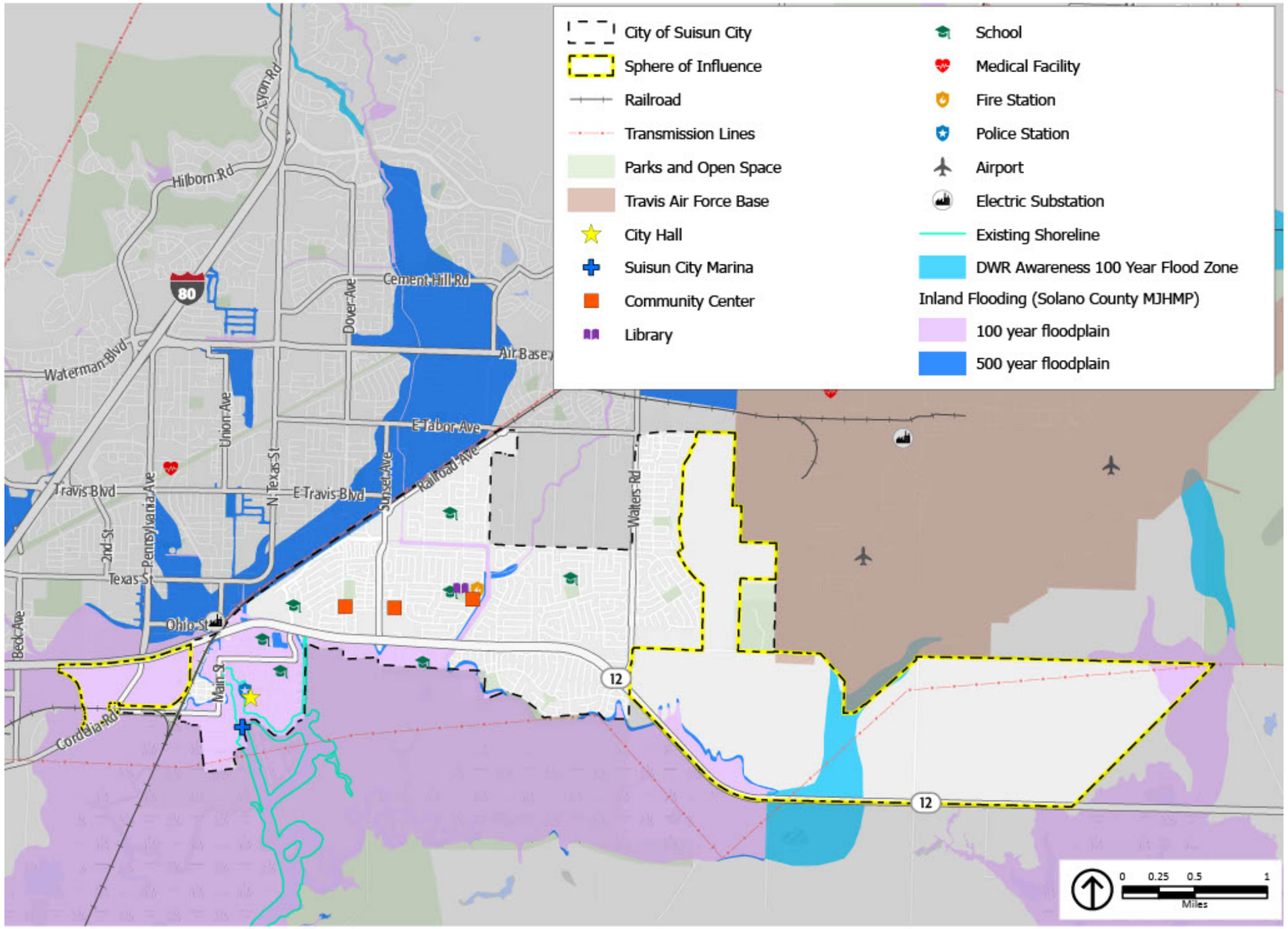
- The appropriate timing and "phasing" of adaptation planning and implementation, in accordance with the Adaptation Pathways Model.
- Potential financing tools and opportunities.
- Coordination or incorporation into the Solano County Multi-Jurisdictional Hazard Mitigation Plan.

Program PHS-11.14 Collaboration with Neighboring Jurisdictions

The City will participate in groups supporting regional sea level rise coordination, including Bay Conservation and Development Commission (BCDC) Regional Working Groups, Bay Area Climate Adaptation Network, and San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group.

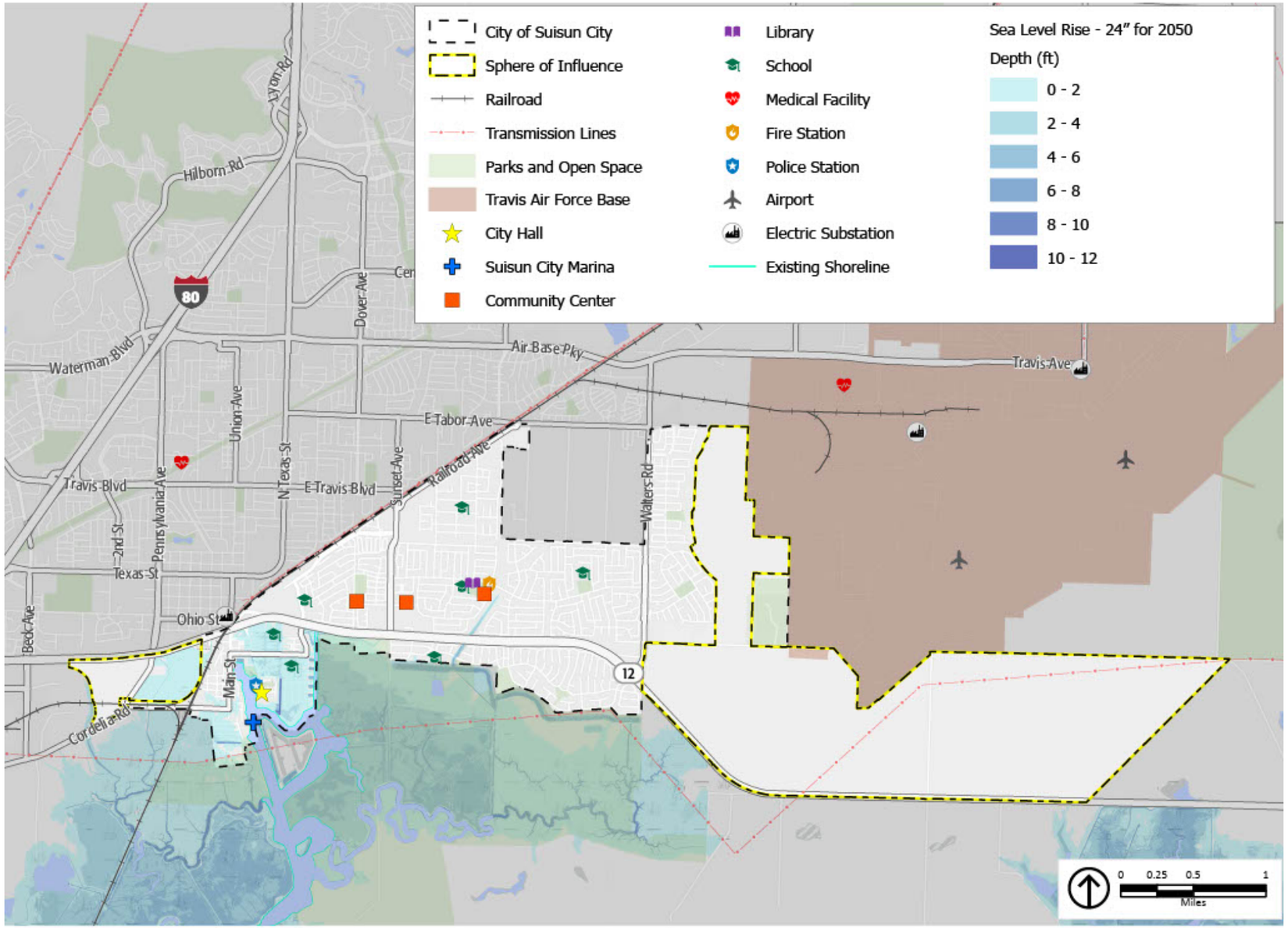
Program PHS-11.15 Protection Priorities for Vulnerable Communities

The City will establish city-wide protection priorities for vulnerable communities and populations identified to be at high risk of displacement from future flooding and sea level rise in the Vulnerability Assessment and use regional funding mechanisms to plan and implement protection measures in these locations.



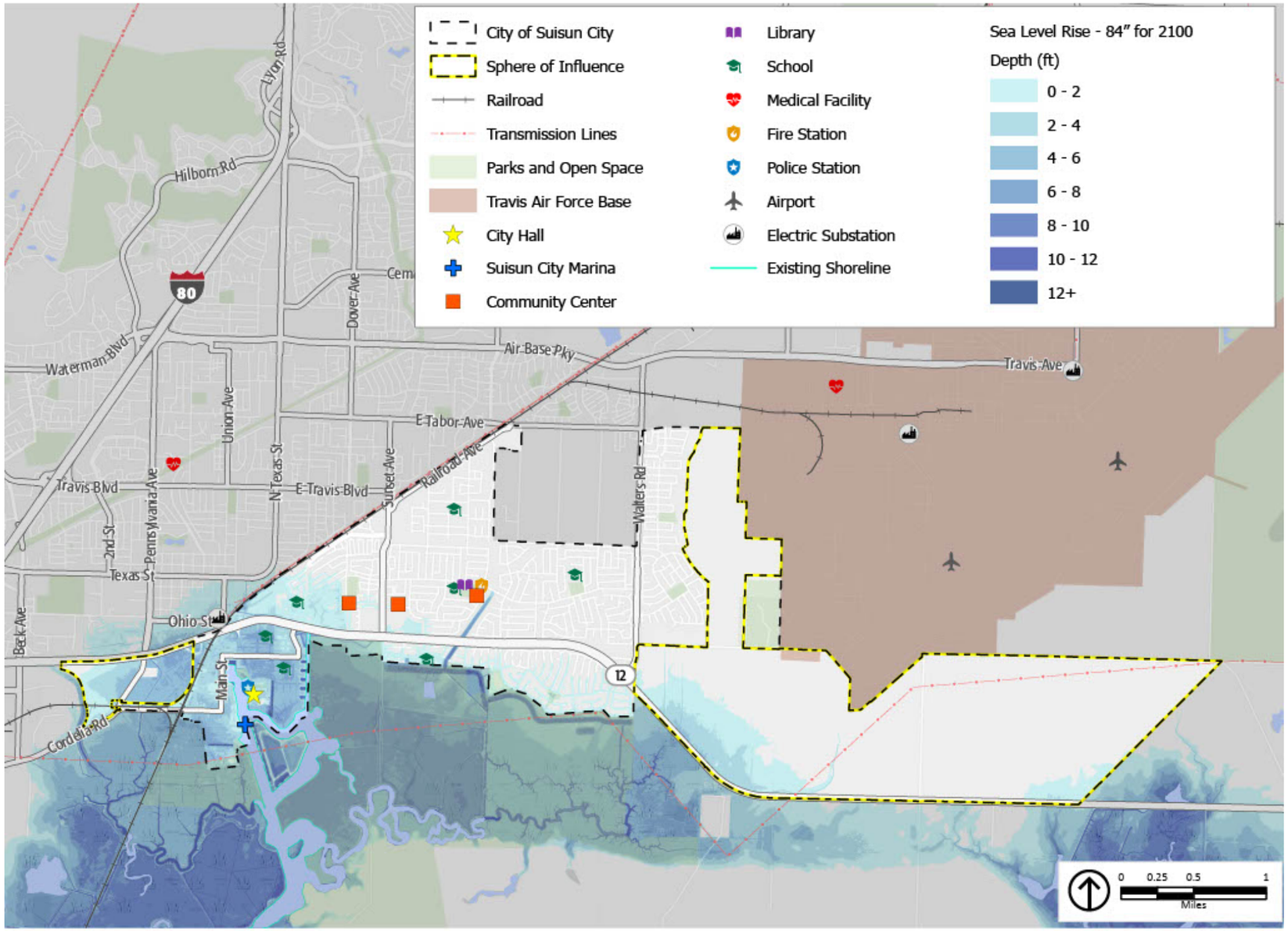
Source: DWR 2021, Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Exhibit 9-4 **Flood Hazard Areas**



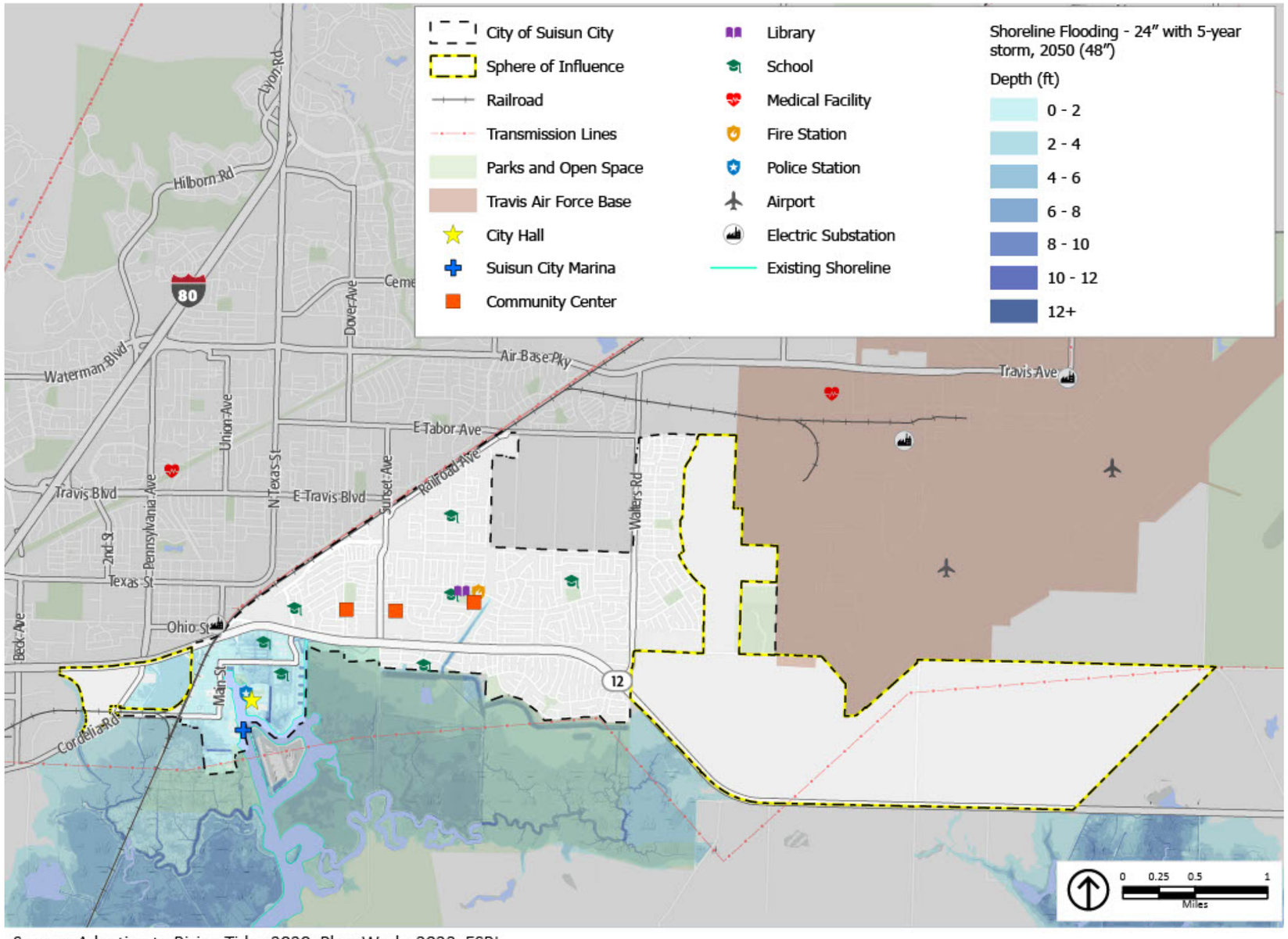
Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Exhibit 9-5 **Sea Level Rise Hazard Areas, 2050**



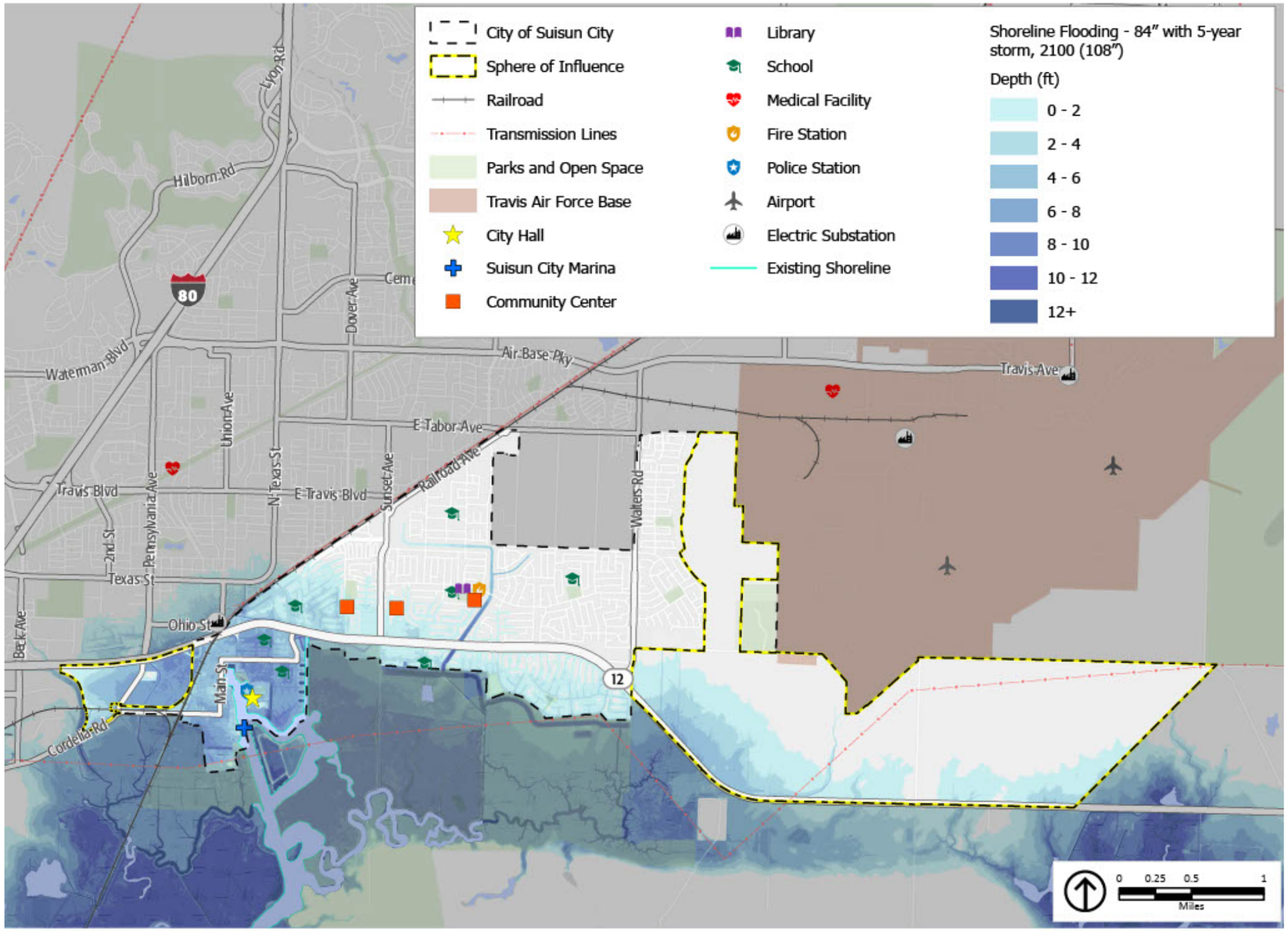
Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Exhibit 9-6 **Sea Level Rise Hazard Areas, 2100**



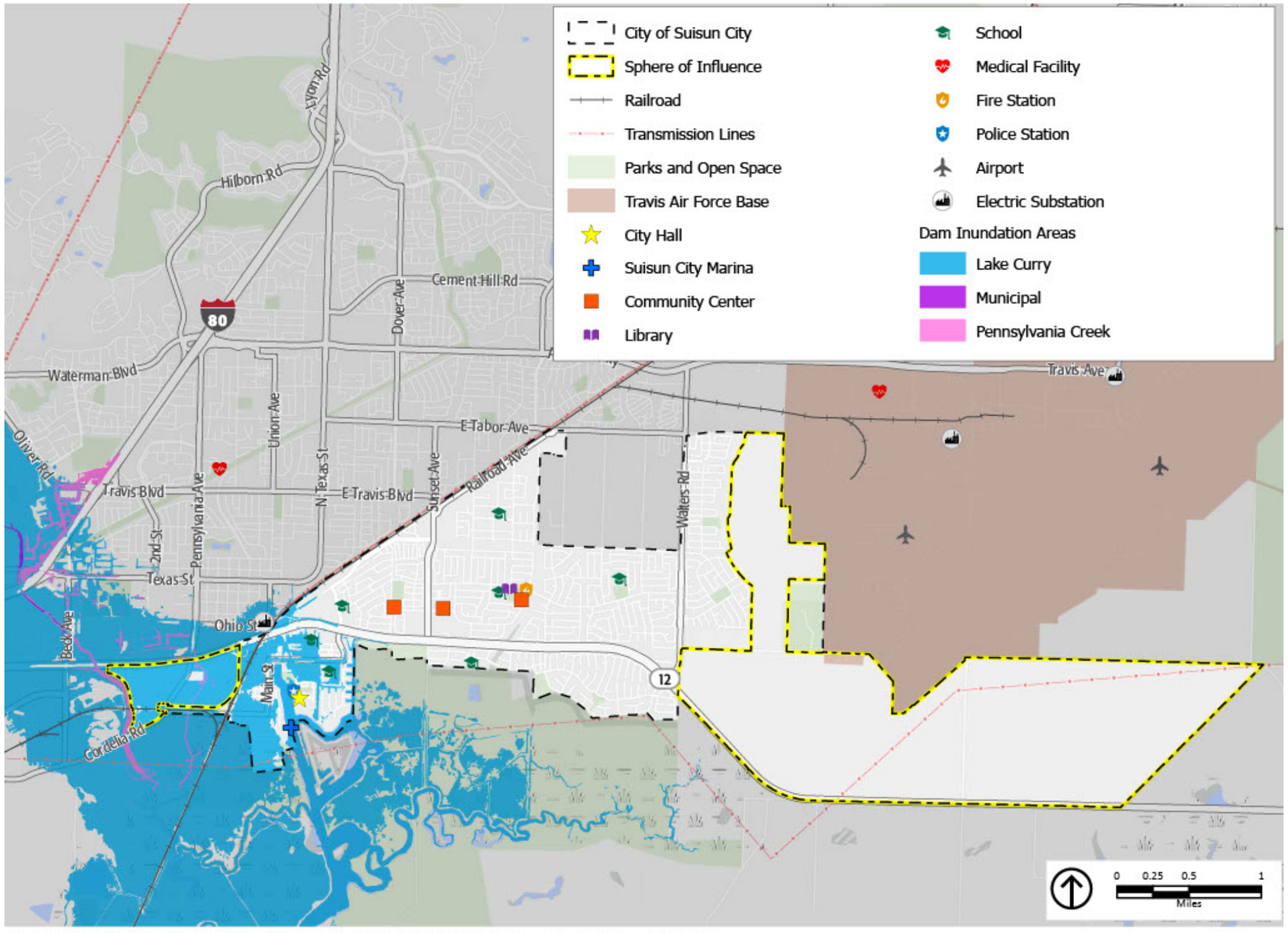
Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Exhibit 9-7 **Flood Hazard Areas, Sea level Rise with a 5-Year Storm, 2050**



Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Exhibit 9-8 **Flood Hazard Areas, Sea level Rise with a 5-Year Storm, 2100**



Source: DWR DSOD 2021, USDOT BTS 2021, Solano LAFCO 2020, PlaceWorks 2022, ESRI

Exhibit 9-9 **Dam Inundation Areas**

Fire Risk

Vegetation, wind, temperature, humidity, and slope are all factors that affect how wildfires spread. The worst wildfire hazards occur where easily ignitable grass is growing with brush. Open space areas and grasslands, particularly those adjacent to urban development, can pose major risks for wildfires. Areas within the City's SOI are characterized as low to moderate fire risk. However, according to draft fire risk maps from the California Department of Forestry and Fire Protection (CALFIRE), there are areas of moderate fire risk in the western part of the SOI and just east of Sunset Avenue and south of SR 12 (see Exhibit 9-10).

The wildland-urban interface (WUI) is an area where buildings and infrastructure (e.g., cell towers, schools, water supply facilities) mix with areas of flammable wildland vegetation. The WUI is made up of three distinct zones. The intermix zone contains housing development or improved parcels interspersed in an area dominated by wildland vegetation subject to wildfire. The interface zone contains dense housing next to vegetation, but not dominated by wildland vegetation, that can burn in a wildfire. The influence zone contains wildfire-susceptible vegetation within 1.5 miles from the WUI or wildland-urban intermix zones. WUI areas in and around Suisun City are shown in Exhibit 9-11. These areas occur predominately along the eastern border of the City in close proximity to existing residential land uses. In the WUI, efforts to prevent ignitions and limit wildfire loss hinge on hardening structures and creating defensible space through a multi-faceted approach, which includes engineering, enforcement, education, emergency response, and economic incentive. Different strategies in the defense and threat zones of the WUI help to limit the spread of fire and reduce the risk to people and property.

Fire risks are not solely contained to wildfires. Older structures oftentimes are not constructed to meet current fire codes, so may pose an additional risk. Many of these structures may have inadequate electrical and heating systems. Approximately 30 percent of Suisun City's housing stock was constructed prior to 1980 and may therefore be particularly vulnerable to structural fires.

Several moderate and large-scale fires have affected Suisun City in recent years. The more severe of these fires were generally fueled or exacerbated by strong winds and high temperatures and resulted in damage to homes and commercial buildings, evacuations, and road closures, including closure of portions of SR 12.

The Suisun City Fire Department provides fire protection for Suisun City. The Fire Department provides 24/7 fire protection and emergency services, including fire suppression, medical response, and natural and human-caused disaster preparedness. The Fire Department also responds to public assistance calls, provides public education programs for schools within the City, and manages the nuisance weed abatement program.

Over half of the populations evaluated in the Vulnerability Assessment are highly or severely vulnerable to wildfire and wildfire smoke. Those who are most vulnerable include persons who may be unable to reduce their exposure to wildfire smoke and those who may be unable to seek timely medical care in the event of wildfire smoke exposure. These populations include those with limited mobility or who lack access to reliable transportation, those living in less resilient housing, those who spend a disproportionate amount of time outdoors, and pollution-burdened populations.

Given the complex relationships between climate, vegetation, hydrology, and human behavior that contribute to fire risk, fire severity can fluctuate from year to year. However, changing climate conditions are expected to increase the fire risk in and around Solano County. Warmer temperatures brought on by climate change can exacerbate drought conditions. Droughts can kill or dry out plants, creating more fuel for wildfires. Increased winds may result in more erratic fire behavior, making fires harder to contain. Warmer temperatures are also expected to occur later in the year, extending the wildfire season, which is likely to begin earlier in the year and extend later than it has historically. Therefore, even in years in which wildfire does not occur within Suisun City, the city may still be affected by the public health impacts of wildfire smoke from wildfires occurring throughout the region.

Goal PHS-12 Reduce Potential Human Injury or Property Damage from Fires.

Objective PHS-12 Manage land use change, building design, and site planning in a way that minimizes fire risk.

Policy PHS-12.1 *The City will implement California Building Standards Code requirements for fire safety, as modified for historic structures and the rehabilitation of existing buildings.*

Policy PHS-12.2 *The City will require that new development and redevelopment projects ensure adequate water flow for fire suppression as required by the Building Department.*

Policy PHS-12.3 *The City will prohibit the construction of critical public facilities within mapped fire hazard or wildland-urban interface areas (as shown in Exhibits 9-10 and 9-11) to the greatest extent feasible.*

Policy PHS-12.4 *The City will work with existing property owners within mapped wildland-urban interface areas to establish and maintain fire defensible space, vegetation clearance, emergency access roads, and firefighting infrastructure.*

Policy PHS-12.5 *For older structures in Old Town constructed prior to 1980, limitations from inadequate fire wall construction and clearance around structures is to be considered during the revitalization and historic preservation of these structures.*

Policy PHS-12.6 *The City will provide public education to encourage owners of older buildings to retrofit structures to current safety standards, as specified in state building code requirements.*

Policy PHS-12.7 *Suisun City will continue to be signatory to the Solano County Fire and Rescue Mutual Aid Agreement and the agreement for Local Government Fire and Emergency Assistance (California Fire Assistance Agreement).*

Policy PHS-12.8 *The City will require setbacks of new development adjacent to Suisun Marsh to provide defensible space and reduce potential for exposure to wildfires.*

Program PHS-12.1 Inventory of Potential High Fire Hazards

The City will prepare and maintain a list of buildings and specific areas that could represent additional fire hazards, including vacant lots and those buildings that were constructed prior to requirements for fire-resistant construction materials, sprinklers, and other fire safety systems. The City will explore opportunities to collaborate with property owners to retrofit such buildings, as feasible, to reduce fire risk.

Program PHS-12.2 Wildfire Mitigation Plan

The City will develop a wildfire mitigation plan to identify specific projections the City may wish to undertake related to wildfire.

Program PHS-12.3 Air Quality Response

The City will coordinate with Solano County Public Health to provide health resources to help residents respond to poor air quality events.

Program PHS-12.4 Improve Fire Resilience

The City will develop an incentive program for property owners to retrofit their buildings to improve fire resilience.

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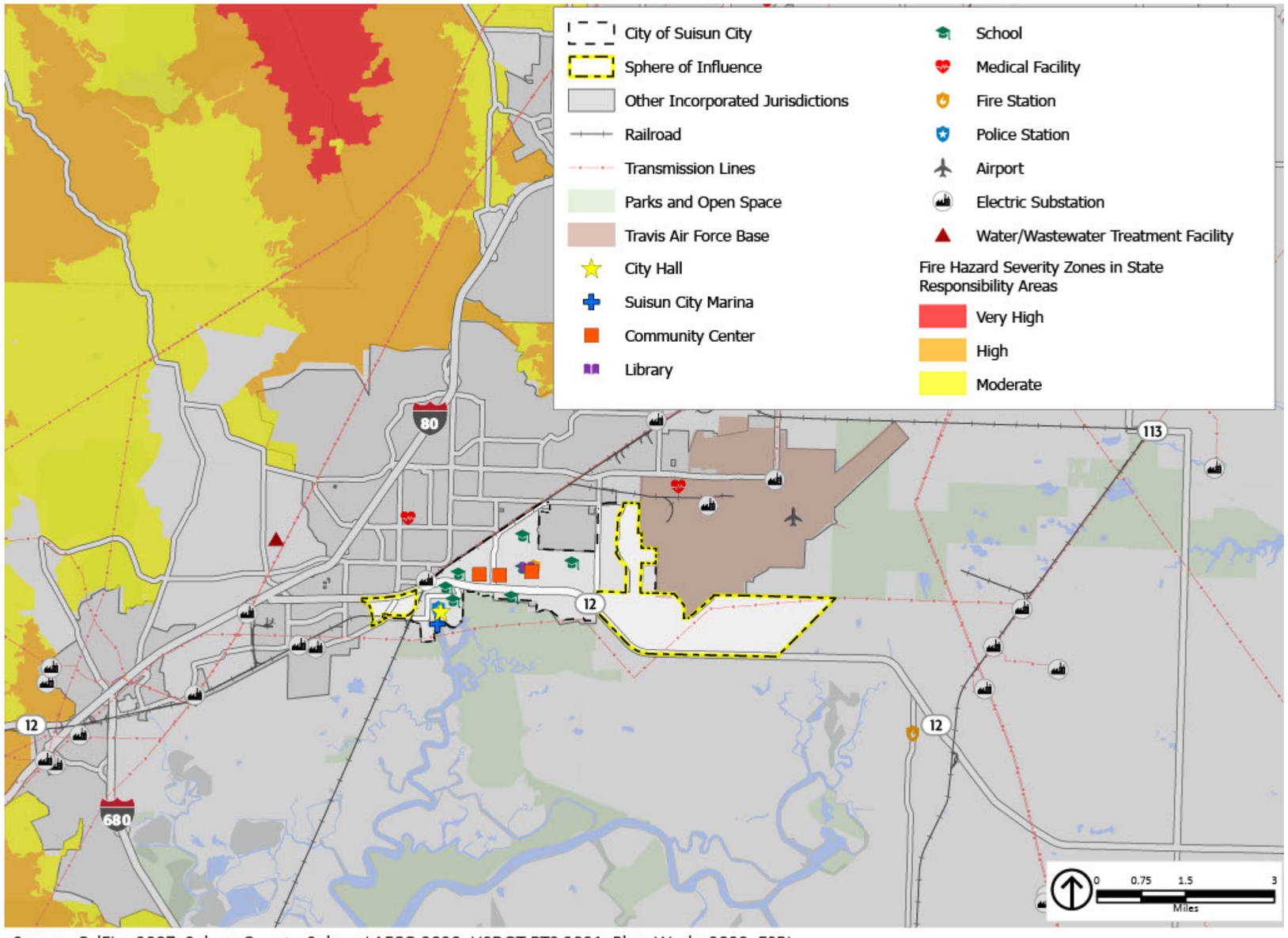
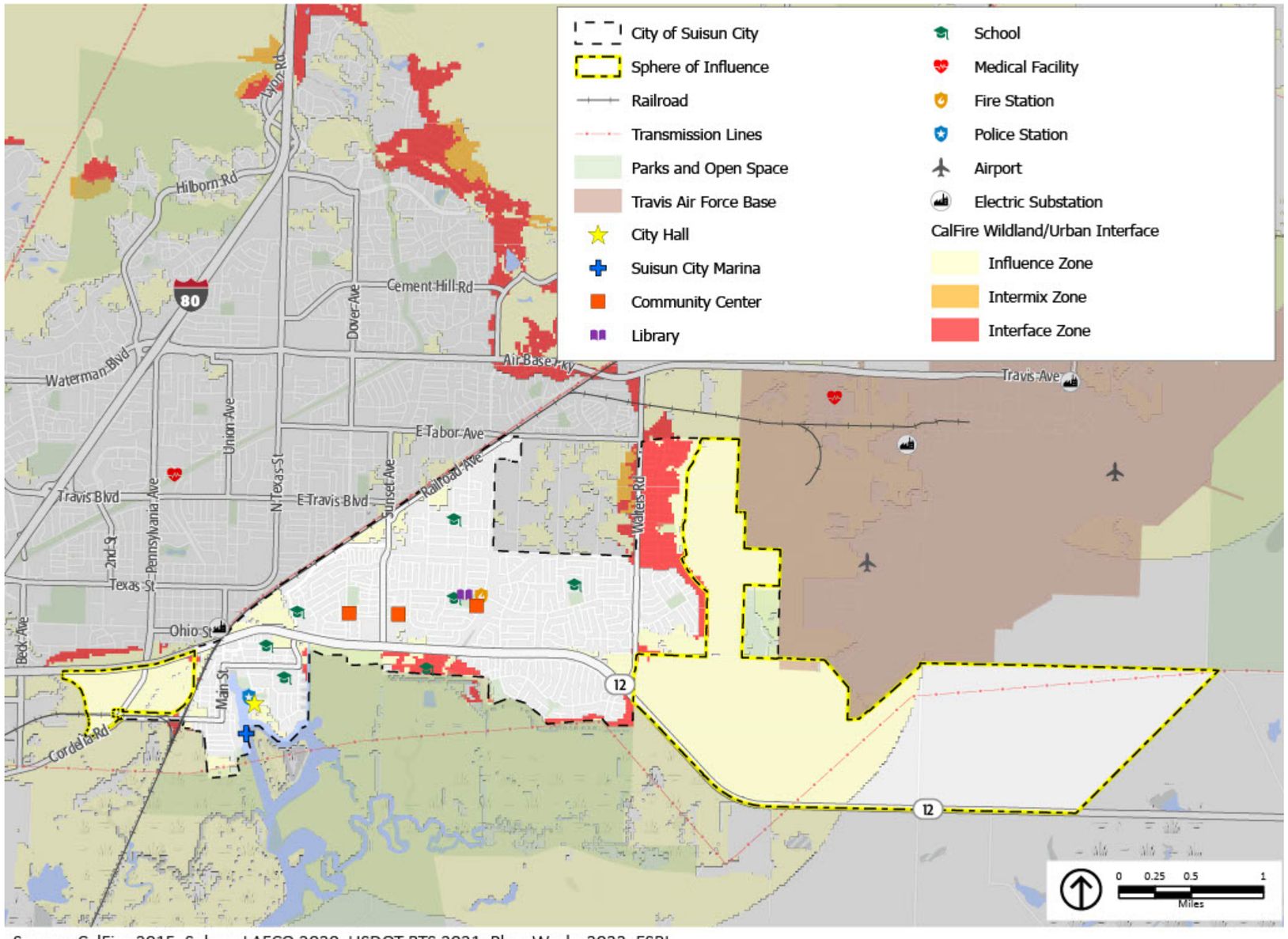


Source: CalFire 2007, Solano County, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Exhibit 9-10 Fire Hazard Severity Zones



Source: CalFire 2015, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Exhibit 9-11 **Wildland-Urban Interface**

Geologic and Seismic Hazards

Suisun City is susceptible to geologic, soil, and seismic hazards. The major geologic hazards are linked to seismic activity.

Seismic Hazards

Solano County contains a number of faults within and outside the County that could potentially affect Suisun City. One fault, the Vaca-Kirby Hills Fault, runs though the City's SOI, trending north-south in the extreme eastern portion of the SOI. Recent geologic studies indicate that this is an active fault and therefore may pose a risk for surface rupture in the City.

Segments of the Green Valley Fault and the Cordelia Fault, approximately 3.5 and 3 miles west, respectively, are known to be active. Both faults have been zoned under the Alquist-Priolo Earthquake Fault Zone Act, meaning that development in the immediate vicinity of the fault trace must be preceded by detailed fault investigations. Because surface fault rupture is generally limited to a linear zone that is less than 50 feet wide, neither of these faults present any hazard from surface fault rupture in the City's SOI. However, strong ground shaking from a seismic event on these two faults, the Vaca-Kirby Hills Fault, or other active faults in the region could result in seismic hazards. There are no records of substantial earthquakes along the Rio Vista Fault system, and the Lagoon Valley Fault is considered inactive. The location of faults in the region are depicted in Exhibit 9-12.

Much of the City's SOI is an area of relatively high seismicity and will likely be subject to earthquake shaking in the future. Ground failure in the form of liquefaction, lurching, and settlement could result from earth shaking. Flood damage from earthquake-induced dam failure, as well as canal and levee damage could occur. Depending on the magnitude, proximity to epicenter, type of construction, and subsurface conditions (e.g., bedrock stability and the type and thickness of underlying soils), ground shaking damage could vary from slight to catastrophic. For example, the wet, unconsolidated soils of Suisun Marsh would have a high ground response and liquefaction potential, while surrounding areas of hard rock generally would experience lower intensities of shaking.

Soil Hazards and Ground Failure

Shrink-swell potential is the relative change in volume to be expected with changes in moisture content. This is the extent to which the soil shrinks as it dries out or swells when it gets wet. Shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes damage to building foundations, roads, and other structures. These clays tend to swell despite the heavy loads imposed by large structures. Damage, such as cracking of foundations, results from differential movement and from the repetition of the shrink-swell cycle. In some cases, this problem may be avoided by removing the topsoil layer before placing a foundation.

A high shrink/swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating. As shown on Exhibit 9-7, most of the City's SOI is in areas with high shrink-swell potential. The area of Made Land just south of SR 12 and east of Suisun Slough have not yet been rated.

Ground failure includes liquefaction and the liquefaction-induced phenomena of lateral spreading and lurching. Liquefaction is a process by which sediments below the water table temporarily lose strength during an earthquake and behave as a viscous liquid

rather than a solid. Liquefaction can cause the soil beneath a structure to lose strength, which may result in the loss of foundation-bearing capacity. This loss of strength commonly causes the structure to settle or tip. Loss of bearing strength can also cause light buildings with basements, buried tanks, and foundation piles to rise buoyantly through the liquefied soil. Areas in Suisun City and the surrounding area with a high liquefaction potential are mapped in Exhibit 9-17.

Lateral spreading is lateral ground movement, with some vertical component, as a result of liquefaction. In effect, the soil rides on top of the liquefied layer outward from under buildings, roads, pipelines, transmission towers, railroad tracks, and other structures such as bridges. Damage is usually greatest to large or heavy structures on shallow foundations, and takes the form of cracking, tilting, and differential settlement.

Landslides

Landslides and slope instability are characterized by the movement of soil and bedrock down slopes. This movement results from wet weather, seismic shaking, and/or improper construction, grading, and drainage. Areas of medium landslide risk are scattered throughout the City. The most prominent of these areas occur in the middle of the City, generally coinciding with McCoy Creek, and along the northern half of the eastern border of the City. Landslide hazard areas are shown in Exhibit 9-14.

Climate change may result in precipitation extremes (i.e., wetter rainfall periods and drier dry periods). While total average annual rainfall may not change significantly, rainfall may be concentrated in more intense precipitation events. Heavy rainfall could cause an increase in the number of landslides or make landslides larger than normal.

Goal PHS-14 Reduce risks to people and property from geologic hazards and soils conditions.

Objective PHS-14 Avoid risks to property and life through the implementation of City policies, programs, and standards related to geologic and soils hazards.

Policy PHS-14.1 *The City will implement state and local building code requirements, including those related to structural requirements and seismic safety criteria to reduce risks associated with seismic events and unstable and expansive soils.*

Policy PHS-14.2 *The City will require the preparation of a geotechnical site investigation for new development projects. The project will be required to implement any recommendations made in the investigation to reduce the potential for ground failure due to geologic or soil conditions.*

Policy PHS-14.3 *The City will require new developments within seismic or geological hazard areas, as shown in Exhibits 9-12, 9-13, and 9-14, to include project features that minimize these risks.*

Policy PHS-14.4 *The City will discourage the development of critical infrastructure within 50 feet of the Vaca-Kirby Hills Fault trace, Rio Vista Fault trace, or areas susceptible to landslide hazards.*

Policy PHS-14.5 *Critical facilities and buildings intended for human habitation shall be set back a minimum distance of 50 feet from the Vaca-Kirby Hills Fault trace, Rio Vista Fault trace, and landslide hazard areas.*

Policy PHS-14.6 *Require existing unreinforced masonry buildings to be seismically retrofitted, based on an engineering evaluation, if deemed unsafe by a building official.*

Policy PHS-14.7 *Assess critical and lifeline facilities for seismic safety and earthquake performance to ensure they remain operational after a seismic event.*

Program PHS-14.1 Geotechnical Investigations

The City will require geotechnical evaluation and recommendations before development or redevelopment activities. Such evaluations will be required to focus on potential hazards related to liquefaction, erosion, subsidence, seismic activity, and other relevant geologic hazards and soil conditions for development. New development would be required to incorporate project features that avoid or minimize the identified hazards to the satisfaction of the City.

Program PHS-14.2 Adopt an Unreinforced Masonry Ordinance

The City will adopt and implement an Unreinforced Masonry Ordinance that requires all public facilities built with unreinforced masonry be retrofitted and brought up to code.

Program PHS-14.3 Fire Station Retrofit

The City will retrofit or replace the un-reinforced masonry Fire Station.

Program PHS-14.4 Safe Placement of Potentially Hazardous Infrastructure

Except where preempted by State or federal law, no new public or private power, water, sewer, or gas lines will be permitted to cross identified ground failure areas, including the Vaca-Kirby Hills Fault trace, Rio Vista Fault trace, or landslide areas, unless reasonable alternative routes are not available or the facility is designed to ensure rapid shut-off, minimum disruption of service, and minimum adverse impact on adjacent and surrounding areas in the event of seismic-induced ground failure. Lines will also be made accessible for routine maintenance and emergency repairs to minimize the potential for extended service interruption.

Program PHS-14.5 Ensure Soil Stability

The City will engage in soil erosion and slope stabilization activities in areas that have been subject to erosion or landslides.

Program PHS-14.6 Seismic and Geologic Hazards Education

The City will provide education and training to Suisun City residents on earthquake preparation and safety.

Climate Change Hazards

Climate change is projected to disrupt climate processes that influence global temperature, precipitation patterns, and sea levels. In addition to increasing the frequency and severity of fires, floods, and landslides, climate change is expected to lead to increases in the frequency and severity of droughts, extreme heat, and severe weather, as well as to influence the spread and behavior of plant pests and vector-borne diseases.

Drought

A drought is an extended period when precipitation levels are well below normal. Although drought is a normal part of the climate cycle, it may cause losses to agriculture, affect domestic water supply, energy production, public health, and wildlife; and contribute to wildfire conditions. Like most of California and the western United States, Suisun City chronically experiences drought cycles. Major droughts affecting Solano County occurred in 1896 to 1900, 1975 to 1977, 1991, 2004, 2006 to 2009, 2011 to 2016, and 2022. Drought impacts the City's water supply, which may in severe instances make less water available for people, businesses, and natural systems.

Drought conditions create high vulnerabilities for populations within the City, as water quality may be degraded, supplies may become more expensive, and be less available for economic drivers that depend on this resource, such as water recreation and agriculture. Populations especially vulnerable include those who may struggle to afford higher water bills, those whose employment may be jeopardized by water restrictions, and those who already have limited access to clean drinking water. These populations include households in poverty, low-resourced people of color, outdoor workers, and pollution-burdened populations. Natural systems in the City, including wetland, marsh, and riparian areas in McCoy Creek and along the Suisun Slough are highly vulnerable, as droughts can reduce the amount of freshwater flowing into and through both of these ecosystems, leading to algal blooms, low streamflow, higher temperatures, and increased erosion.[12]

Scientists expect that climate change will lead to more frequent and intense droughts statewide, with more years of extreme levels of precipitation, both high and low. This is expected to cause more frequent and intense droughts compared to historical occurrences. The state Cal-Adapt database indicates that snow water equivalent (i.e., the amount of water contained in snowpack) for the Westside (Yolo, Solano, Napa, Lake Colusa) Integrated Regional Water Management Region (IRWMR) will decrease from a historical annual average baseline of 10.5 inches to an annual average of 1.2 inches in an early-century drought (2023 to 2042), and to an annual average of 0.2 inches under a late-century drought scenario (2051 to 2070). Baseflows within the IRWMR may decline from a historical annual average of 6.1 to 3.4 inches under an early-century drought scenario (2023 to 2042) to 3.1 inches in a late-century drought scenario (2051 to 2070).[13] [1]

Extreme Heat

While there is no universal definition of extreme heat, California guidance documents define extreme heat as temperatures that are hotter than 98 percent of the historical high temperatures for the area, as measured between April and October of 1961 to 1990. Days that reach this level are called extreme heat days. In Suisun City, the extreme heat

[12] US Dept. of Interior, Bureau of Reclamation. 2017. *Bay Area Regional Reliability Drought Contingency Plan*.
[13] Cal-Adapt. 2018. "Annual Averages," https://cal-adapt.org/tools/annual-averages.

threshold is 101.9 degrees Fahrenheit (°F). An event with five extreme heat days in a row is considered a heat wave.

Extreme heat can be fatal, cause heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke, in addition to worsening respiratory and cardiovascular conditions. The most vulnerable populations are those that spend a disproportionately high amount of time outside since these populations may be unable to seek direct relief from high temperatures. Additionally, persons with chronic illnesses, populations with existing pollution burdens, and senior citizens, including seniors living alone, may have existing health conditions that make them highly vulnerable to extreme heat. Persons with financial instability, low-resourced, or those living in mobile homes, are also highly vulnerable due to a lack of financial resources to prepare for or respond to extreme heat conditions. Rolling blackouts may also prevent residents from keeping indoor air temperatures and medications cool or cause food loss due to lack of refrigeration when the power is turned off, which could harm persons with financial instability or limited income.

Energy delivery services and associated infrastructure are highly vulnerable to extreme heat, as high temperatures can stress and overload the regional grid, causing power outages and damage to the transmission lines. Railway infrastructure is also highly vulnerable to extreme heat days and prolonged periods of high temperatures, as these events can cause thermal expansion and warping of the tracks.

Extreme heat events have historically occurred in the region. In June 2000, high temperatures persisted across interior northern California for three days, resulting in 16 hospitalizations and the death of one individual, as well as road closures and widespread power outages. In June 2013, a high heat event in Solano County sickened at least 15 people.

The warmer temperatures brought on by climate change are likely to cause an increase in the frequency of extreme heat events. The state Cal-Adapt database indicates the number of extreme heat days is expected to rise from a historical annual average of 4 days per year, to 22 days per year by the middle of the century (2035 to 2064), and an annual average of 38 days per year by the end of the century (2070 to 2099).

Severe Weather

Severe weather is generally any destructive weather event, but usually occurs in Solano County as localized storms that bring heavy rain, hail, thunderstorms, and strong winds. Severe weather is usually caused by intense storm systems, although types of strong winds can occur without a storm. The types of dangers posed by severe weather vary widely and may include injuries or deaths, damage to buildings and structures, fallen trees, roads and railways blocked by debris, and fires sparked by lightning. Severe weather often produces high winds and lightning that can damage structures and cause power outages. Lightning from these storms can ignite wildfires and structure fires that can cause damage to buildings and endanger people.

Since 1950, 11 federally declared major severe weather events have occurred in Solano County. These events include one coastal storm, one snow event, and five severe storm events. In January 2021, an atmospheric river event caused heavy rain and high winds across northern California. Thousands of Solano County residents lost power, with rockslides, flooding, road closures, and downed trees occurring across the region. Heavy rains also occurred in October 2021, triggering road closures, downed trees, and flooding across Solano County.

Electricity utilities throughout California, including PG&E, have begun to occasionally "de-energize," or turn off the electricity for power lines that run through areas where

there is an elevated fire risk. This is intended to reduce the risk of power lines sparking or being damaged and starting a wildfire. These activities, called public safety power shutoff (PSPS) events, result in a loss of power for customers served by the affected power lines. A PSPS event may occur at any time of the year, usually during high wind events and dry conditions. PSPS events may be limited to specific communities or affect broad swaths of the state. Four PSPS events occurred in Solano County in 2019, affecting more than 25,000 customers. Three PSPS events affected Solano County in 2021, the largest of which resulted in approximately 4,700 Solano County customers losing power.

The people most vulnerable to severe weather are those who may be directly exposed to the hazard, those who may live in less structurally resilient buildings, and those who may have difficulty preparing for or responding to severe weather due to mobility or lack of access to transportation or communication. Individuals with chronic illnesses and/or disabilities who depend on electricity for life-sustaining equipment but lack backup power supply, such as a generator or battery system, are highly vulnerable to PSPS events. Persons living on single-access roads are also highly vulnerable to severe weather, as high winds and heavy rain can cause downed trees and powerlines, isolating these persons from the rest of the community if roadways are blocked. Buildings and infrastructure, such as bridges, communication facilities, electrical infrastructure, railways, hazardous materials sites, historic buildings, and homes, are highly vulnerable to severe weather, and they can be damaged by high winds, heavy rainfall, and debris carried by severe storms.

Climate change is expected to cause an increase in intense rainfall and severe weather. This means that Suisun City could see more severe and frequent weather events resulting from these storms. While average annual rainfall may increase only slightly, climate change is expected to cause an increase in the number of years with intense levels of precipitation. Heavy rainfall can increase the frequency and severity of other hazards, including flooding.

Agricultural and Ecosystem Pests

Agricultural pests and diseases can affect crop plants, orchards, and nurseries throughout and surrounding the City of Suisun City. Pests and diseases can slow the growth of plants, inflict damage, or lead to fatalities. Major pests of concern in Solano County include Asian Citrus Psyllid, European Grapevine Moth, Glassy-Winged Sharpshooter, Gypsy Moth, Japanese Beetle, Light Brown Apple, Mediterranean Fruit Fly, Melon Fly, Oriental Fruit Fly, Asian Gypsy Moth, Rosy Moth, Nun Moth, and Siberian Silk Moth. Pesticides and herbicides can help crops resist pests and diseases and new crop varietals may be pest-resistant; however, quickly evolving pests may make it difficult for some plant species to survive; changing crop varietals can also be expensive for farm owners.

Solano County has been subject to agricultural and ecosystems in the past. False yellowhead (*Dittrichia viscosa)* was detected in the county in 2014. In 2017, a quarantine was initiated in response to the Mediterranean Fruit Fly (or Medflies). This quarantine encompassed 108 square miles of Solano County and was declared eradicated in August 2018. Pest activity is likely to increase as higher temperatures caused by global warming allow insects to reproduce more rapidly and increase the activity window for pests and diseases.

Persons working in landscaping or agricultural industries may be indirectly affected by agricultural and ecosystem pests and diseases that damage crops. Damage to crops and other plants can reduce work opportunities, create economic hardships for some workers, and cause employees to be let go from their jobs. The County implements a number of pest-control programs, including inspections of shipping terminals,

placement of insect traps, and the Pierce's Disease Control, Sudden Oak Death, and Phytosanitary Certification Programs.

Goal PHS-15 Reduce risks to people and property from hazards related to climate change.

Objective PHS-15 Minimize the effects of drought, extreme heat, severe weather, and agricultural and ecosystem pests.

Policy PHS-15.1 *The City will encourage the installation of water-efficient landscaping on all public and private property.*

Policy PHS-15.2 *The City will increase the use of low-maintenance, climate-appropriate landscaping and low-emissions landscape maintenance equipment in parks and other City-maintained landscaped areas and open space.*

Policy PHS-15.3 *The City will support the installation of greywater systems in existing development.*

Policy PHS-15.4 *The City will collaborate with the Solano County Water Agency and Solano Resource Conservation District to share best practices regarding drought management and distribute resources to the community.*

Policy PHS-15.5 *The City will educate the general public about the importance of water conservation.*

Policy PHS-15.6 *The City will coordinate with public agencies, utilities, and community-based organizations to establish a network of equitably located resilience hubs throughout Suisun City and ensure that resilience hubs are situated outside of areas at risk from hazard impacts to the extent possible, offer refuge from extreme heat and other hazardous events, and are equipped with renewable energy generation and backup power supplies. Such facilities should be in easily accessible locations and available to all community members.*

Policy PHS-15.7 *The City will work with Pacific Gas and Electric Company (PG&E) to promote programs encouraging reduced energy use during extreme heat events.*

Policy PHS-15.8 *The City will encourage the use of heat-reflective building and paving materials in private development.*

Policy PHS-15.9 *The City will require the use of heat-reflective building and paving materials in Capital Improvement Projects and public development.*

Policy PHS-15.10 *The City will use shade structures, installation of green space, and heat-resilient building techniques, as feasible, to ensure that key public facilities, such as schools and bus stops, are adequately protected from extreme heat.*

Policy PHS-15.11 *The City will install shade cover, equitably throughout the City, prioritizing natural solutions such as trees when feasible.*

Policy PHS-15.12 *Where feasible, encourage the use of existing natural features and ecosystem processes, or the restoration of, when considering alternatives for the conservation, preservation, or sustainable management of open space. This*

may include, but is not limited to, aquatic or terrestrial vegetated open space, systems and practices that use or mimic natural processes, and other engineered systems, to provide clean water, conserve ecosystem values and functions, and provide a wide array of benefits to people and wildlife.

Policy PHS-15.13 *The City will work with local community organizations and the Solano County Department of Health and Social Services to provide the community with information about the health effects of extreme heat and measures to minimize heat exposure and health effects and that vulnerable members of the community are reachable during high heat events.*

Policy PHS-15.14 *The City will support the undergrounding of infrastructure, particularly electrical utilities.*

Policy PHS-15.15 *The City will provide critical facilities, including water and wastewater systems, emergency and medical services, and heating and cooling centers, with adequate backup power supplies to support operations during a severe weather event that disrupts power service.*

Policy PHS-15.16 *The City will encourage building owners to install backup battery systems and will help building owners and installers connect with funding mechanisms for these systems.*

Program PHS-15.1 Municipal Code Update and Water Conservation

The City will update the Municipal Code to streamline the installation of greywater systems and require new development to use of heat-reflective building and surfacing materials in new development to the extent feasible.

Program PHS-15.2 Greywater Systems

The City will install greywater systems in existing municipal buildings, as feasible, and will collaborate with local water providers to encourage the installation of greywater systems in private development.

Program PHS-15.3 Extreme Heat Response Plan

The City will collaborate with community and regional community services and health providers to develop and implement an Extreme Heat Response Plan.

Program PHS-15.4 Multi-Benefit Resilience Features

The City will implement features that address multiple hazards, such as extreme heat and air quality, or that include sustainability benefits, such as on-site renewable energy generation and backup battery systems.

Program PHS-15.5 Community Outreach

The City will work with local community groups and volunteers to help establish a task force to conduct outreach and house calls to vulnerable members of the community during hazardous events.

Program PHS-15.6 Tree Planting

The City will prepare a tree master plan for the City that emphasizes planting of low-maintenance native tree species and includes quantified goals and tracking methods, including mapping the tree canopy, and prioritizes planting in vulnerable communities and along safe routes to schools. The City will allocate funding for regular tree maintenance.

Program PHS-15.7 Building Retrofits

The City will help connect residents and business owners with home and business weatherization, energy and water efficiency, and floodproofing programs, including helping them find rebates and contractors for these programs. The City will conduct targeted outreach among vulnerable communities.

Program PHS-15.8 Utility Undergrounding

The City will partner with PG&E to develop a plan to secure funding for the undergrounding of electrical utilities.

Program PHS-15.9 Coordinate with Regional Adaptation Strategy

The City will seek funding to collaborate with other local, regional, and state agencies to develop strategies to adapt to the effects of climate change and promote the other objectives of the General Plan.

Development of an adaptation strategy would generally be anticipated to include a prioritization of adaptive needs based on the City's Public Health and Safety Element Vulnerability Assessment; identification of strategies for priority adaptation needs; consider potential strategies relative to costs, benefits, co-benefits, feasibility, and other relevant local factors; and phasing and funding approach for the strategies. The City anticipates that adaptation strategies – particularly those that are designed to protect existing structures, facilities, and infrastructure – would require regional cooperation and funding.

The City will prioritize those areas in the City with properties that contain development of special value and that merit special protection and identify areas where hazardous substances could be released into the environment as a result of sea level rise. Investigate and recommend sea level rise management actions, such as the construction of levees or sea walls to protect areas that merit special protection or plans to relocate buildings and infrastructure that could become inundated. The City will update land use designations and development regulations, as appropriate, to protect public safety, welfare, and health. The City will adopt construction standards that account for flood hazards for public roads and bridges used as evacuation routes.

Emergency Response

All communities face the possibility of disasters and emergency situations, whether they are of natural or human-related causes. Citizens and first responders must be prepared to react to such an emergency. The Fire Department and Police Department are

equipped to provide a first line of emergency response in the unlikely event of a major disaster. The Police Department operates a variety of emergency response and public safety programs.

Suisun City participates in an emergency response mutual-aid agreement with other Solano County jurisdictions and fire protection districts. Mutual-aid response is coordinated by the Solano County Dispatch Center.

Emergency Evacuation

With advanced warning, evacuations can be effective in reducing injury and loss of life during a catastrophic event. Exhibit 9-15 shows evacuation routes serving Suisun City, including SR 12, Walters Road, Sunset Avenue, Marina Boulevard, Main Street, Pennsylvania Avenue, Cordelia Street, Cordelia Road, Railroad Avenue, East Tabor Avenue, Peterson Road, and Lotz Way. Exhibit 9-16 shows residential parcels with evacuation constraints. Evacuation-constrained parcels south of SR 12 are in shoreline flood hazard areas and parcels along McCoy Creek are in flood hazard areas. These evacuation-constrained areas may have only one emergency evacuation route. The lack of multiple emergency access points limits roadway access for these properties, which may create difficulties if there is a need to evacuate.

Climate change-related shifts in wildfire, inland and shoreline flooding, extreme heat, and severe weather patterns will likely make hazardous conditions both more frequent and intense. Given the ability of wildfires, floods, extreme heat, and severe weather to damage structures and infrastructure and harm human health, increased frequency of these natural hazards will likely increase demand for disaster preparation and recovery assistance. These hazards may also block evacuation routes, isolating residents and preventing them from evacuating during emergencies.

Goal PHS-16 Minimize loss of life and damage to property resulting from natural and human-caused hazards by ensuring adequate emergency response and evacuation.

Objective PHS-16 Improve emergency response and access throughout the City.

Policy PHS-16.1 *The City will use the Local Hazard Mitigation Plan and Emergency Operations Plan to prepare for immediate response, adaptation, long-term recovery, and planning for future community resiliency in the event of a disaster.*

Policy PHS-16.2 *The City incorporates the most recent version of the Solano County Multi-Jurisdictional Hazard Mitigation Plan, Suisun City Annex, most recently certified by FEMA, into this Safety Element by reference, as permitted by California Government Code Section 65302.6.*

Policy PHS-16.3 *The City will review development and redevelopment projects, plans, and public investment decisions to ensure consistency with the Multi-Jurisdictional Hazard Mitigation Plan.*

Policy PHS-16.4 *The City will develop an assessment plan to determine railway points of vulnerability to more accurately predict areas of which would be impacted most during railway damage events. This plan can include preparedness plans to quickly initiate detours to maintain a secondary access point to the interstate and operations to activate.*

Policy PHS-16.5 *The City's development and improvement standards will require a circulation system with multiple access points, adequate provision for emergency equipment access, and evacuation egress. New and redevelopment projects will be checked by the City to ensure proper emergency access is provided.*

Policy PHS-16.6 *The City shall designate evacuation routes in the event of a fire or other citywide emergency requiring the evacuation of a substantial portion of the City's residents.*

Policy PHS-16.7 *Require new development in the WUI, 100-year floodplain, or shoreline flooding area to have access to at least two emergency evacuation routes.*

Policy PHS-16.8 *Encourage existing development that is in a WUI or 100-year floodplain or shoreline flooding area to have access to at least two emergency evacuation routes.*

Policy PHS-16.9 *The City will work with local transit and social service providers to develop evacuation strategies for residents who may face mobility constraints or lack access to a private vehicle.*

Policy PHS-16.10 *The City will provide public access to emergency response procedures in such locations as City Hall, Suisun City Library, and public schools and will otherwise promote awareness of emergency response and evacuation plans.*

Policy PHS-16.11 *The City will encourage the public to prepare for disasters through community forums, presentations, and media by developing personal emergency*

response plans and by maintaining a three-day preparedness kit for home and work.

Policy PHS-16.12 *Educate residents and businesses regarding appropriate actions to safeguard life and property during and immediately after emergencies.*

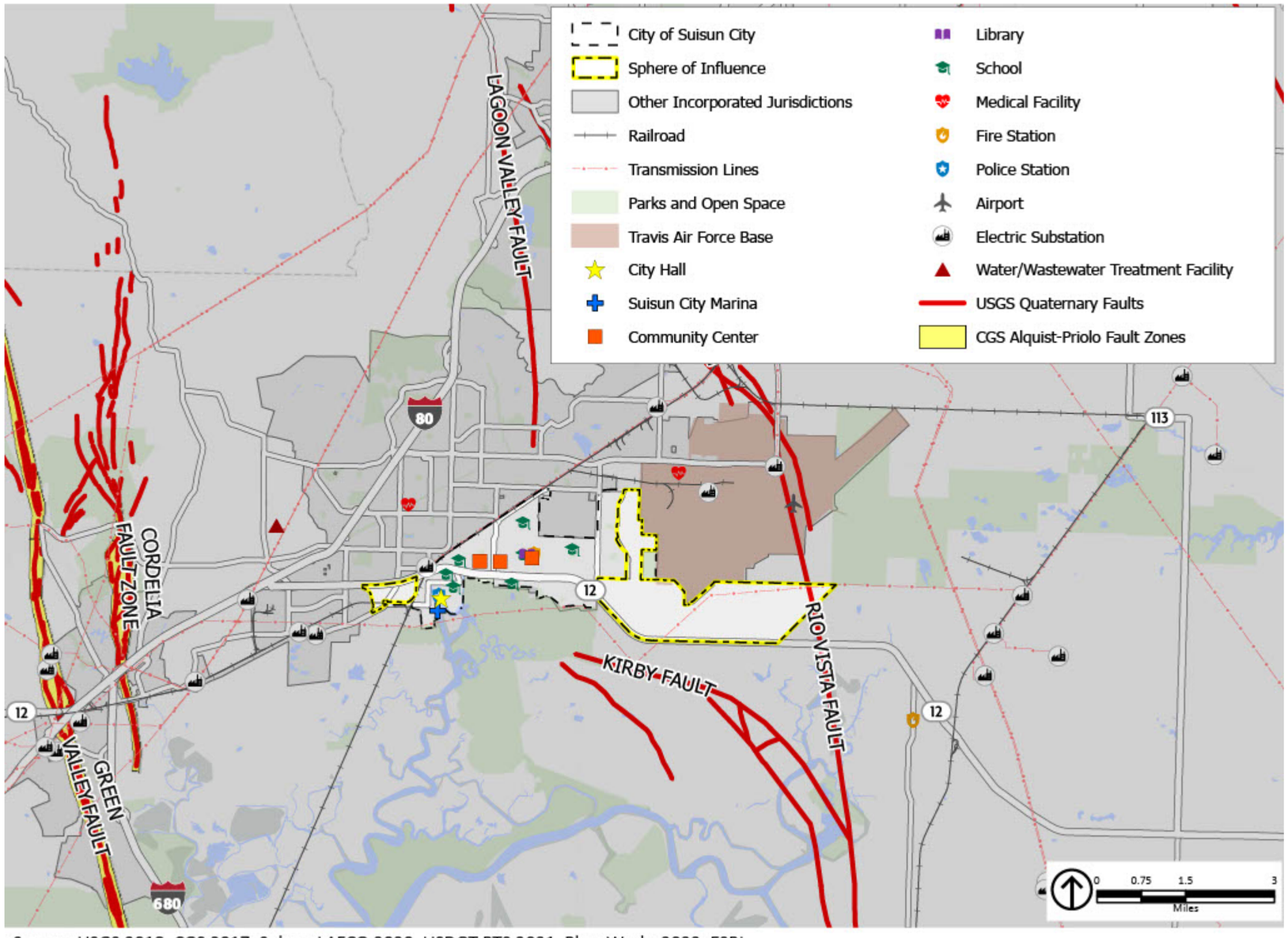
Policy PHS-16.13 *Expand the capabilities of the Community Emergency Response Team to provide more community members the tools to respond to disasters.*

Policy PHS-16.14 *Increase resident enrollment in Alert Solano and Nixle.*

Policy PHS-16.15 *Identify additional emergency warning mechanisms that can increase access to emergency warnings and ensure that emergency notifications are provided in formats and languages appropriate for the demographics of Suisun City.*

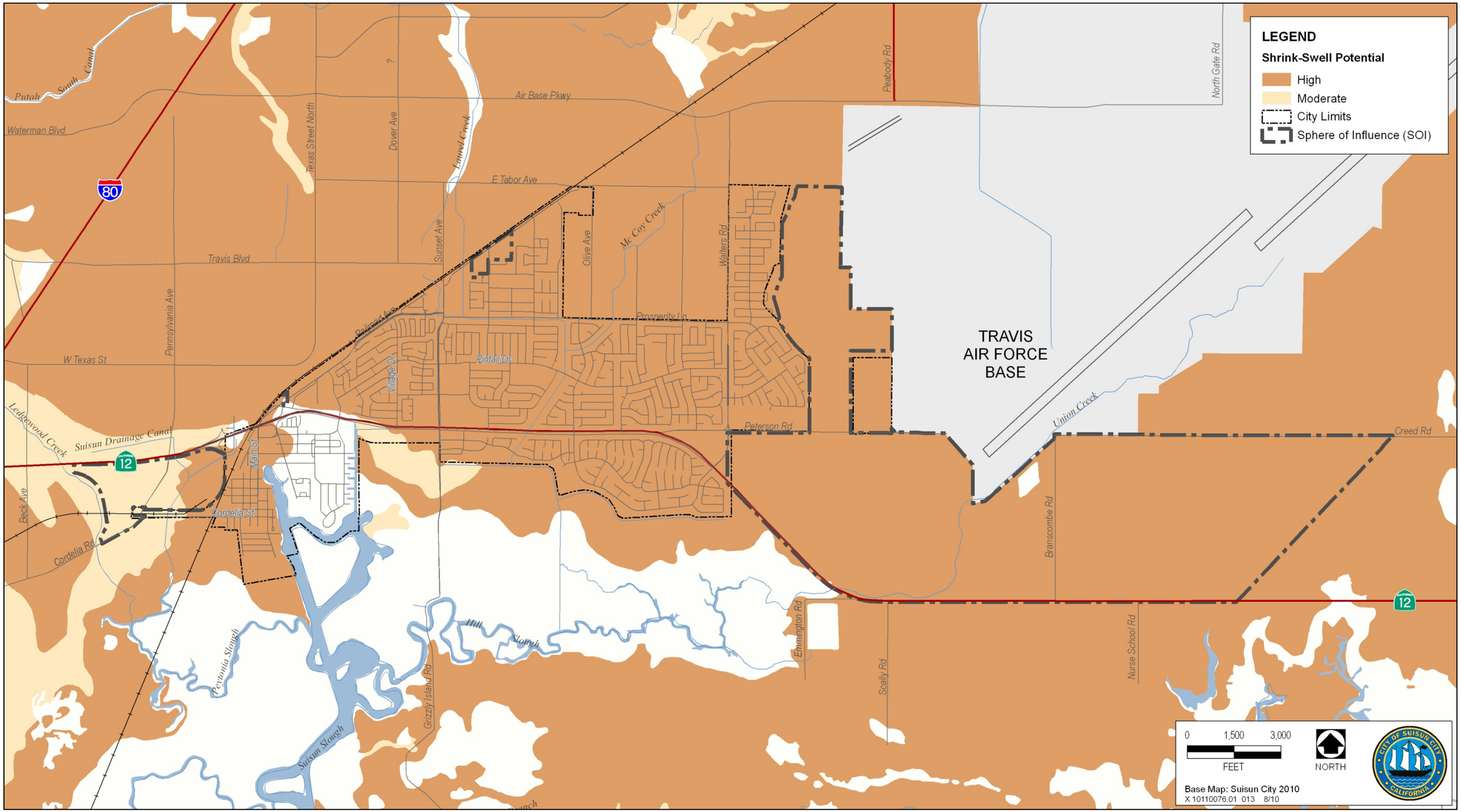
Program PHS-16.1 Implement and Update the Local Hazard Mitigation Plan

The City will collaborate with interested service providers and the County to update the Multi-Jurisdictional Hazard Mitigation Plan every five years and ensure that it is certified by FEMA. Regular updates will account for changes in environmental conditions, new emergency response methods, new technologies, and new laws and regulations. The City will seek funding to implement action items listed in the Multi-Jurisdictional Hazard Mitigation Plan, Suisun City Annex, and to update the plan regularly.



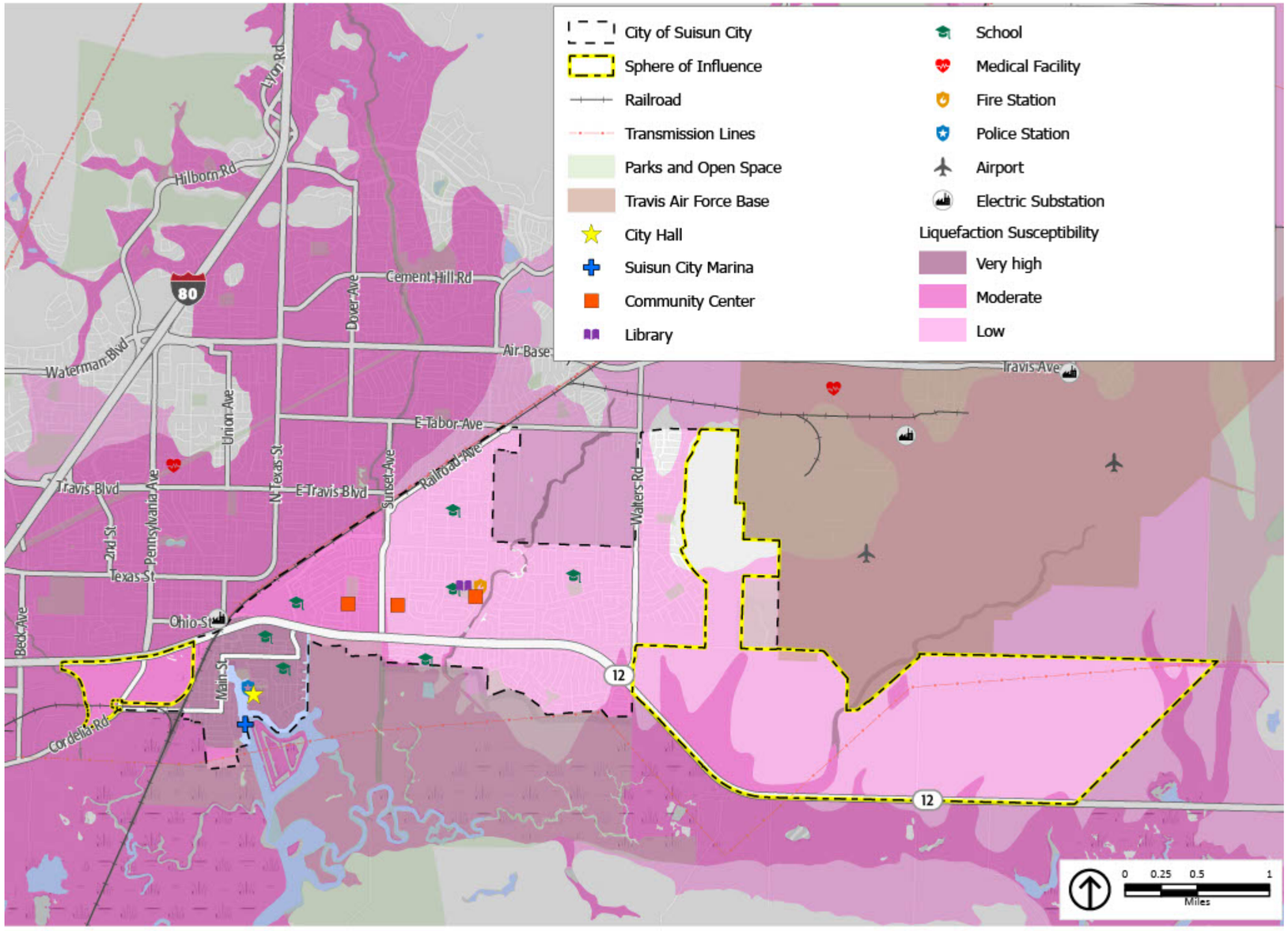
Source: USGS 2010, CGS 2010

Exhibit 9-12 **Regional Seismicity**



Source: NRCS

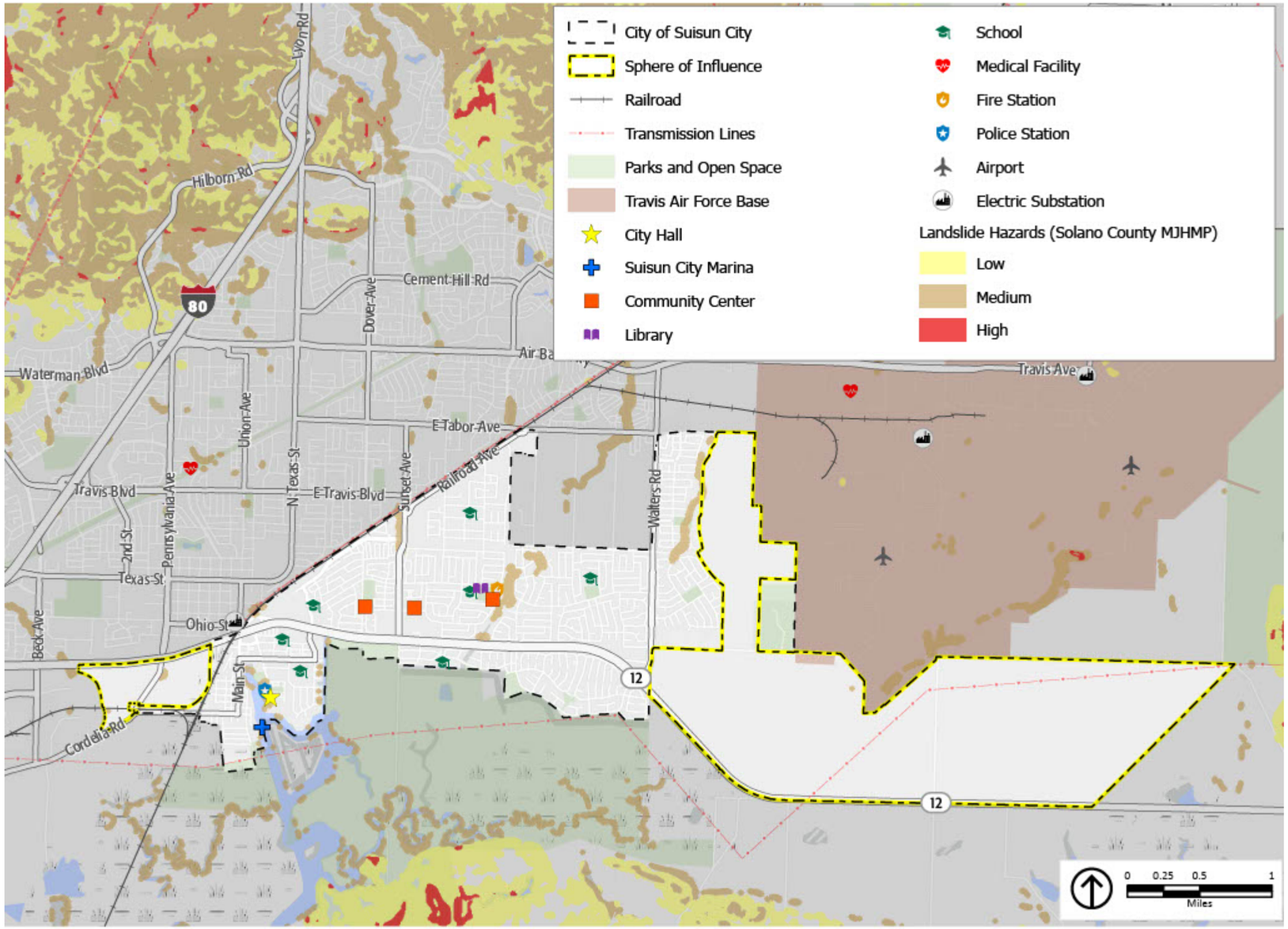
Exhibit 9-13 **Shrink-Swell Potential**



Source: USGS 2006, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

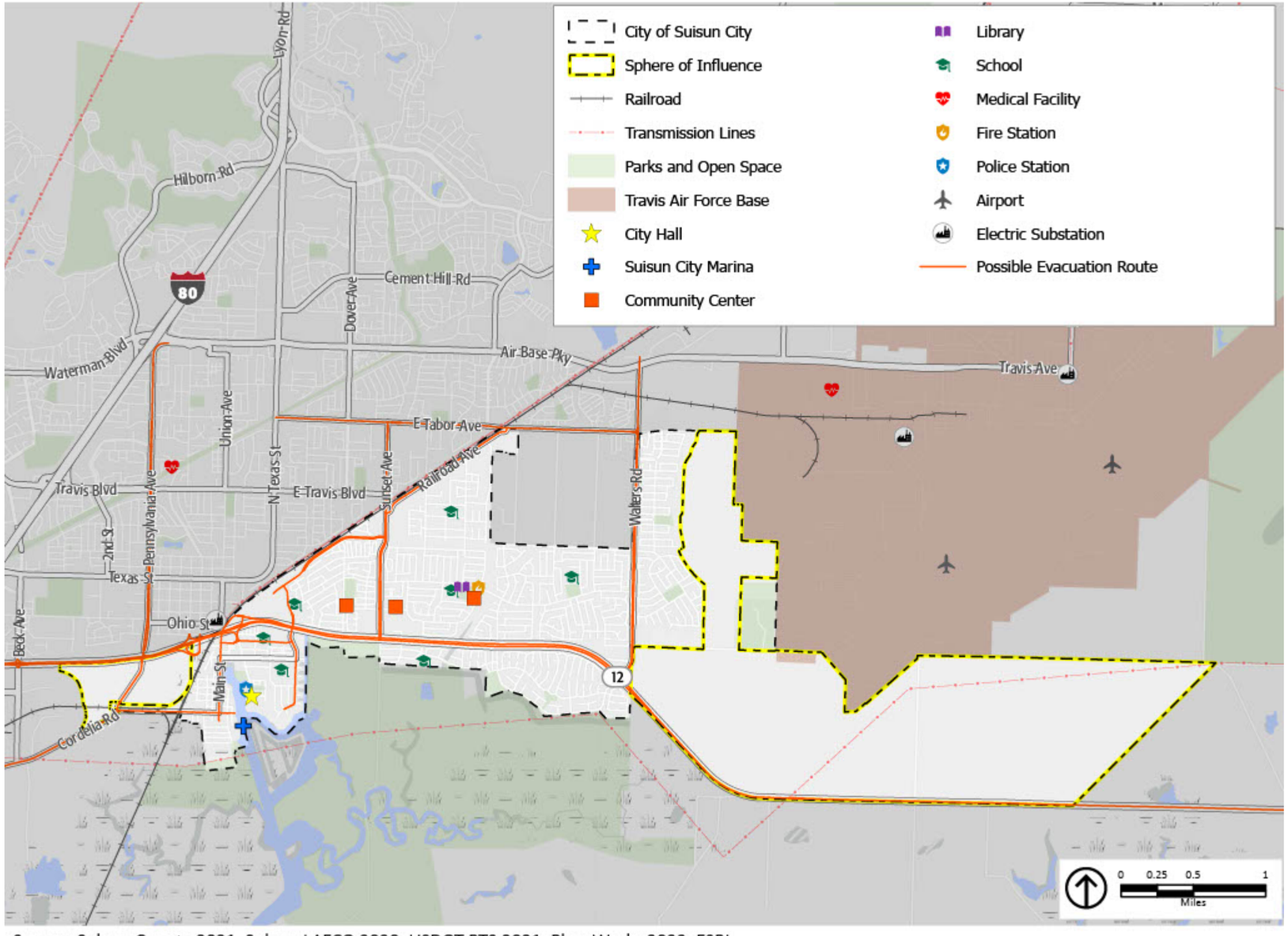
Source: ABAG 2011

Exhibit 9-14 **Liquefaction Susceptibility**



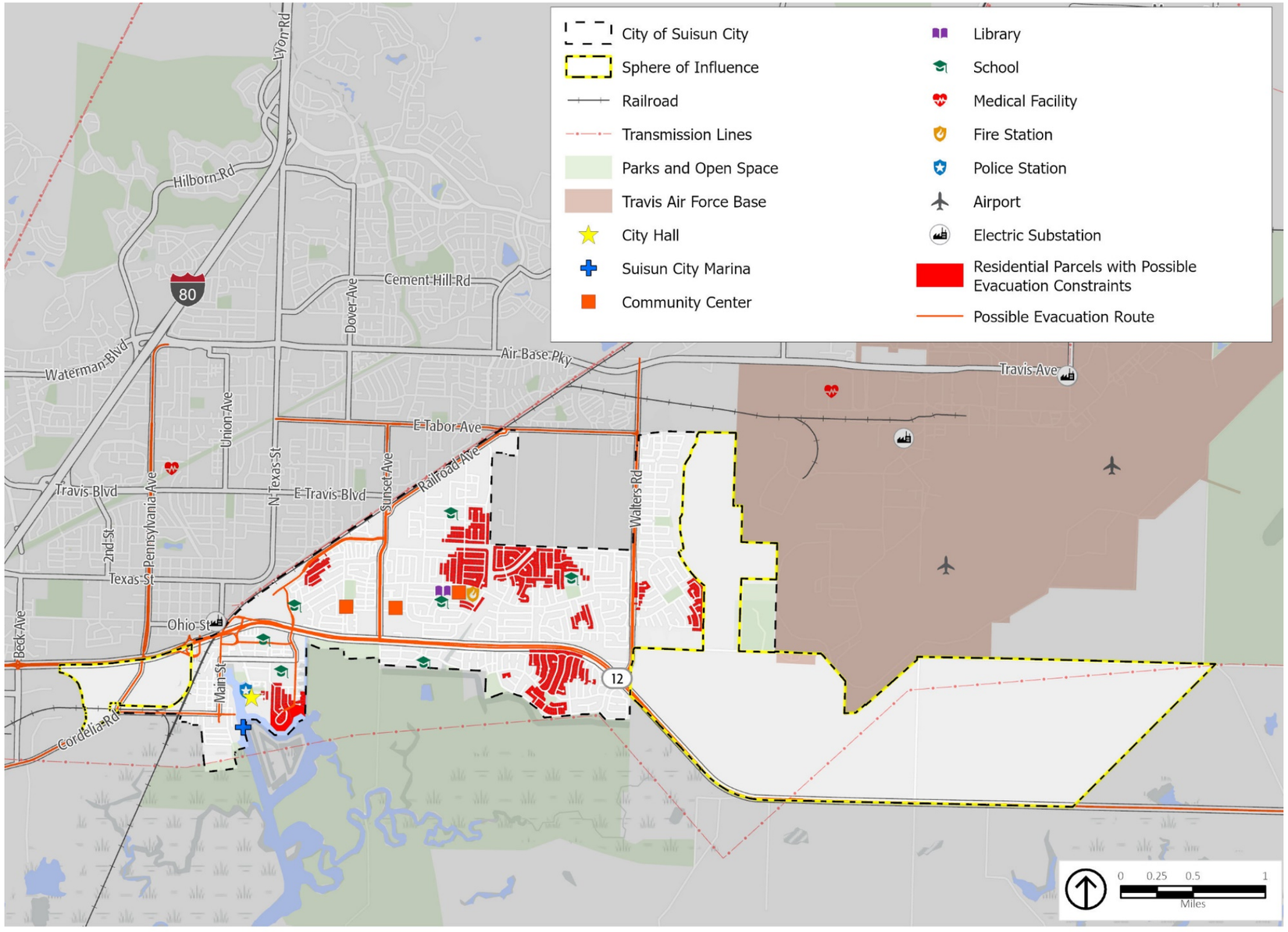
Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Exhibit 9-15 **Landslide Hazard Zones**



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Exhibit 9-16 **Evacuation Routes**



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Exhibit 9-17 **Evacuation-Constrained Residential Parcels**

Program PHS-16.2 Emergency Access and Evacuation Routes

In the event of serious emergency, the following major routes are designated for evacuation of the population:

- Cordelia Road
- Main Street to SR 12
- Driftwood Drive - Marina Boulevard to SR 12
- SR 12
- Sunset Avenue
- Railroad Avenue
- Tolenas Avenue
- Walters Road
- Bella Vista Drive
- Pennsylvania Avenue
- East Tabor Avenue
- Lotz Way

These streets provide for alternate major routes east, west, and north out of the community, depending on the nature of the emergency.

Program PHS-16.3 Roadway Standards

In coordination with local fire districts, develop and maintain minimum roadway, ingress, and egress standards for evacuation of residential areas in the wildland-urban interface or flood-hazard area.

Program PHS-16.4 Evacuation Planning

Cooperate with neighboring jurisdictions and public protection agencies to delineate evacuation routes, identifying their capacity, safety, and viability under different hazard scenarios, as well as emergency vehicle routes for disaster response, and where possible, alternate routes where congestion or road failure could occur. Update as new information and technologies become available.

Program PHS-16.5 Evacuation Program

Develop an evacuation assistance program in coordination with local transit providers to help those with limited mobility or lacking vehicle access.

Program PHS-16.6 Emergency Alerts

Continue to provide alerts about potential, developing, and ongoing emergency situations in languages and formats appropriate to City residents.

Program PHS-16.7 Community Emergency Response

Coordinate with Solano Voluntary Organizations Active in Disaster to continue providing CERT training programs for community members.

Program PHS-16.8 Emergency Response Education

Work with community groups and Solano Voluntary Organizations Active in Disaster to develop and implement community emergency response education programs.

Program PHS-16.9 Multi-Jurisdictional Hazard Planning

Continue to participate in the Multi-Jurisdictional Hazard Mitigation Plan update and development process.

Travis Air Force Base

Travis AFB is a major source of economic stability in Suisun City, and while the base provides many benefits for the City, its proximity can create additional hazard mitigation planning challenges. As mentioned previously, the proximity of the base to the City contributes to changes in the noise environment and operations at the base have resulted in some contamination, making the base a Superfund site. The primary environmental contaminants found at Travis AFB include solvents, metals, and fuels. Additionally, the storage of explosives within the base could have some effects on land uses in Suisun City in the event of major upset.

Off-base migration of contaminants appears to be very limited, with minimal potential for harmful exposure. Institutional controls limit access to on-base source areas, operable units and abandoned structures, and have eliminated possible exposures to other sites of contamination and physical hazards within Travis AFB. However, if land uses change on the base, the likelihood of human exposure should be re-evaluated by the Air Force, the EPA, the State of California, or Agency for Toxic Substances and Disease Registry (ATSDR).

Additionally, the Planning and Zoning Law (California Government Code, Sections 65352, 65940, and 65944) requires consultation with U.S. Armed Forces Personnel during general plan updates that could affect ongoing military operations.

Under Senate Bill No. 1462, the City must notify the U.S. Air Force of proposed land uses immediately adjacent to Travis AFB. The *Travis Air Force Base Land Use Compatibility Plan* encourages lands immediately adjacent to Travis AFB to be used for housing Base personnel, equipment, and buildings so that airport crash hazards are minimized and military security is enforced. Also, a buffer zone around these immediately adjacent areas is established to restrict sensitive land uses, such as schools, day care centers, senior centers, and other facilities where occupants have reduced effective mobility and are unable to respond to emergency situations from the buffer zone.

Goal PHS-17 Reduce the Potential for Human Injury or Property Damage Resulting from Activities at Travis Air Force Base

Objective PHS-17 Promote the ongoing mission of Travis AFB, while avoiding local risks related to ongoing operations.

Policy PHS-17.1 *The City will regularly coordinate closely with Travis Air Force Base to ensure that existing and future land uses do not interfere with existing or planned operations at the base.*

Policy PHS-17.2 *The City will restrict land uses and the height of development according to the requirements of the Travis Air Force Base Airport Land Use Plan.*

Policy PHS-17.3 *The City shall prohibit the future development of sensitive land uses, including residential uses and schools, critical facilities, or uses that could result in large gatherings of people, within the base's Accident Potential Zone 1 boundary, or in any other areas that the base determines to be at a greater risk of upset.*

Policy PHS-17.4 *The City will coordinate with the Army Corps of Engineers and Travis Air Force Base to perform site investigations for the presence of potential hazards, including soil and groundwater contamination and unexploded ordnance that could potentially be located outside of the base but within the City's Sphere of Influence. If hazards are discovered, the City will continue to work with the other parties to clean up hazards to ensure safety to Suisun City residents.*

Policy PHS-17.5 *New developments and public investments involving earth disturbance in the eastern area of the City's Sphere of Influence shall incorporate permit requirements in coordination with the State Department of Toxic Substances Control to reduce risk associated with munitions or explosives.*

Program PHS-17.1 Travis Air Force Base Consultation

The City will consult with representatives from Travis AFB to discuss land use issues. Discussion will include potential land use conflicts, new development under consideration by the City, hazardous conditions, and possible changes in Base operations that could potentially have an effect on City operations. Discussions will also include efforts to provide biological resources mitigation in areas near Travis AFB that do not conflict with ongoing operations. The Community Development Department, along with the Fire Department representatives and other relevant department representatives will be involved.

City of Suisun City
Public Health and Safety Element
Background Report

February 2023

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PUBLIC HEALTH AND SAFETY ELEMENT BACKGROUND REPORT

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1 INTRODUCTION

1.1 PURPOSE AND CONTENT

The Public Health and Safety Element is a state-mandated General Plan element that must identify potential natural and human-created hazards that could affect the City of Suisun City's (City's) residents, businesses, and services. The purpose of the Public Health and Safety Element is to establish a framework that anticipates these hazards and prepares the community to minimize exposure to these risks.

The Public Health and Safety Element conveys the City's goals, policies, and actions to minimize the hazards to safety in and around Suisun City. It identifies the natural and human-caused hazards that affect existing and future development, describes present and expected future conditions, and sets policies and standards for improved public safety. This includes efforts to minimize physical harm to the buildings and infrastructure in and around Suisun City to reduce damage to local economic systems, community services, and ecosystems. Some degree of risk is inevitable because the potential for many disasters cannot be eliminated completely, and the ability to predict such disasters is limited.

The Public Health and Safety Element serves the following functions:

- Develops a framework by which safety considerations are introduced into the land use planning process.
- Facilitates the identification and mitigation of hazards for new development, and thus strengthens existing codes, project review, and permitting processes.
- Presents policies directed at identifying and reducing hazards in existing development.
- Strengthens earthquake, flood, dam inundation, and wildland fire preparedness planning and post-disaster reconstruction policies.
- Identifies how natural and climate change hazards are likely to increase in frequency and intensity in the future and provides policies to increase community resilience through preparedness and adaptation.

PUBLIC HEALTH AND SAFETY ELEMENT BACKGROUND REPORT

The Public Health and Safety Element follows state requirements, as presented in Section 65302(g) of the California Government Code. State law requires that the Public Health and Safety Element contains background information and policies to address multiple natural hazards, analyze the vulnerabilities from climate change and contain policies to improve climate change resilience, and assess residential areas with evacuation constraints. The public health and safety issues in Suisun City include healthy communities, air quality, water quality, hazardous materials, flooding, wildfire, geologic and seismic hazards, emergency response, and other climate change hazards, such as agricultural and ecosystem pests, drought, extreme heat, human health hazards, severe weather, and sea level rise. This background report focuses on safety issues in the city and hazards covered in the vulnerability assessment.

1.2 REGULATORY FRAMEWORK

In 2015, the state adopted Senate Bill (SB) 379, amending Section 65302(g) of the California Government Code to require the Safety Element of the General Plan to include more information about wildfire hazards, flooding risks, and climate change adaptation and resilience. SB 379 requires local governments to conduct vulnerability assessments as part of their long-range planning efforts and to prepare resilience and adaptation policies that will protect against harm caused by climate change. A vulnerability assessment evaluates the impacts that climate change hazards will have on people and community assets, as well as the current resources and programs available to help people and community assets prepare, respond, and recover from those impacts. This analysis creates a prioritized list of vulnerable populations and assets that will be used to develop policies and actions in the Public Health and Safety Element to increase resilience citywide.

Other important updates to the California Government Code related to safety elements, climate change, and resiliency and addressed in the City's Public Health and Safety Element Update include SB 1241, SB 1035, SB 99, Assembly Bill (AB) 2140, and AB 747/1409.

- **SB 1241** added Section 65302(g)(3) to the California Government Code, requiring jurisdictions in a state responsibility area or very high fire hazard severity zone to provide background; historical context; and goals, policies, and implementation measures to address wildfire risks in a community. The City of Suisun City does not have lands within the state responsibility area or very high fire hazard severity zones, and therefore this requirement does not apply; however, historical context and other wildfire content will be included in the Public Health and Safety Element Update.

- **SB 1035**, which established Section 65302(g)(6) of the California Government Code, builds on previous legislation and requires local governments to review and update their Safety Element during an update to their Housing Element or Local Hazard Mitigation Plan (LHMP), or no less than every eight years. Any revisions should include updated information related to flood hazards, fire hazards, and climate adaptation and resilience.
- **AB 2140** added Sections 8685.9 and 65302.6 of the California Government Code, enabling cities and counties to adopt an LHMP into the Safety Element.
- **SB 99** established Section 65302(g)(5) of the California Government Code and requires jurisdictions to review and update the Safety Element to include information identifying residential developments in hazard areas that do not have at least two emergency evacuation routes.
- **AB 747** added Section 65302.15 to the California Government Code (amended by AB 1409), requiring local governments to identify the capacity, safety, and viability of evacuation routes and locations in the Safety Element or LHMP. This requirement is triggered by future updates to the LHMP.

1.3 COMMUNITY PROFILE

Suisun City was established in the 1850s around the time of the California Gold Rush. In 1869, the Transcontinental Railroad connected to Suisun City, creating an ideal location for commerce and transportation between the Bay Area, Sacramento, and Sierra Nevada foothills. In the 1960s and 1970s, Suisun City experienced rapid growth as the San Francisco Bay Area's suburban ring expanded to formerly rural Solano County. Most of that growth was east of the historic Downtown Waterfront Area in suburban-style single-family neighborhoods. In the 1960s, Interstate 80 (I-80) was constructed two miles outside the city. By the 1980s, the City was spending about 70 percent of its police budget on the Crescent neighborhood, and the historic waterfront was an industrial backwater with little to no public access. The City designated a redevelopment zone to promote revitalization, investing $65 million in blight elimination and infrastructure improvements, including construction of the Marina and Promenade. The City replaced dilapidated housing and built new affordable units, the Civic Center, the Nelson Community Center, the Lambrecht Sports Complex, and Suisun City Library. Crime dropped by 60 percent and new businesses, restaurants, and houses brought people to downtown Suisun City.

Today, Suisun City is rich in water-oriented natural and recreational resources, as well as historic architecture and other heritage resources. Natural watercourses traverse the community, providing numerous opportunities for outdoor recreation. The Suisun Marsh, the largest contiguous brackish water marsh remaining on the west coast of North America, surrounds the city on the south, and abounds with recreational and open space benefits. Formed by the confluence of the Sacramento and San Joaquin Rivers, the marsh is home to many species of birds and other wildlife. The marsh is immediately west of the legally defined Sacramento-San Joaquin Delta, as well as part of the San Francisco Bay estuary.

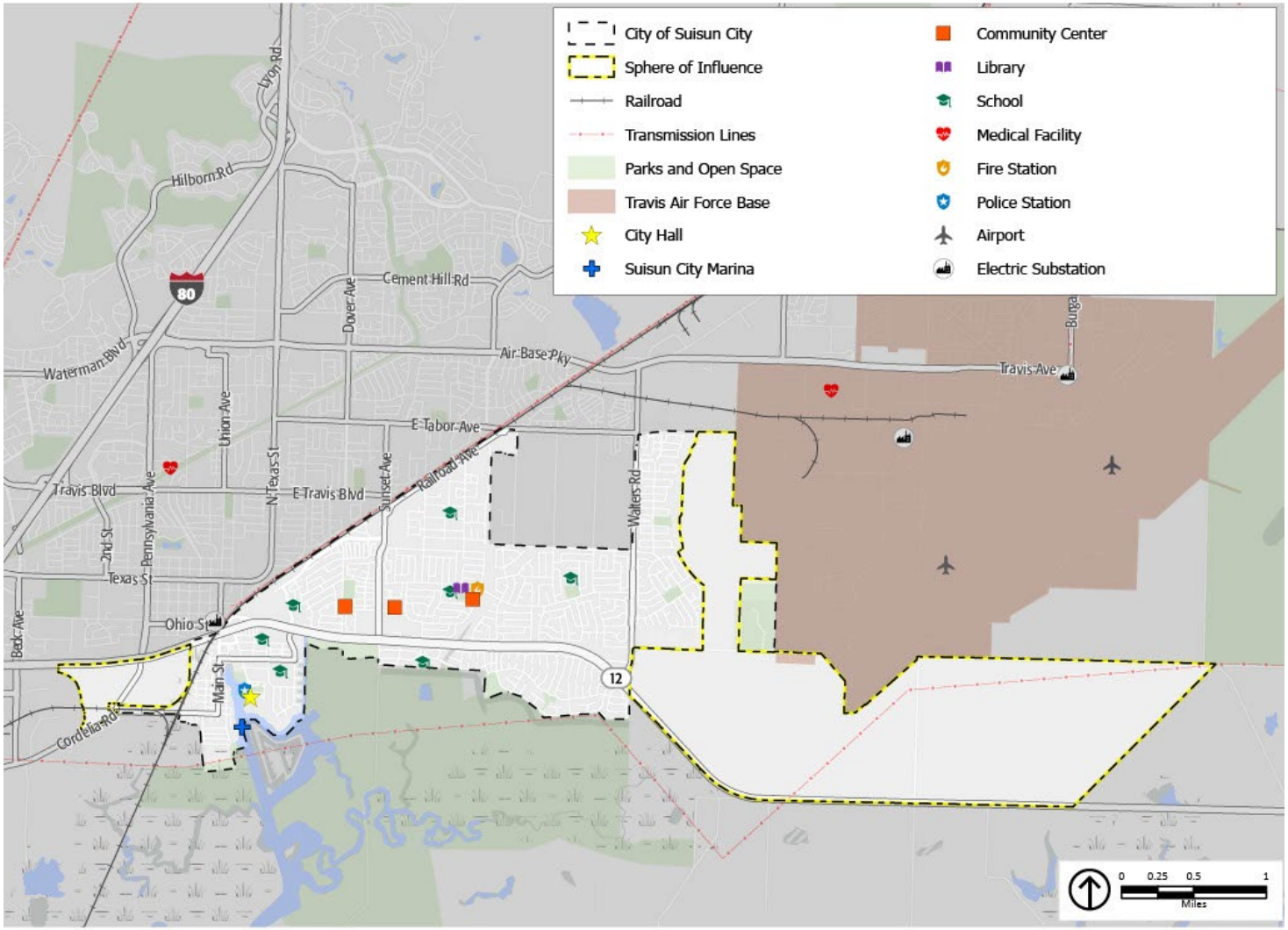
Elevations in Suisun City range from approximately 5 to 15 feet. Suisun City is drained by Laurel Creek, McCoy Creek, Pennsylvania Avenue Creek, and Union Avenue Creek that discharge into tidal channel tributaries to Suisun Slough. The climate in Suisun City is characterized by the two well-defined seasons of winter and summer. Winters are mild with frequent rain and summers are warm to hot with little precipitation. Historic annual average precipitation is approximately 19.3 inches. Temperature varies from an average low of 47 degrees Fahrenheit (°F) to an average high of 73°F and are moderated by cool, moist winds from the ocean. Native vegetation has been largely eliminated by agricultural operations, urbanization, and reclamation; however, grassland, riparian, and marshland habitats still exist within the city.

Approximately 28,882 people live in Suisun City, an approximately 6 percent increase since 2010 and 11 percent increase since 2000. Suisun City contains 9,310 households. The racial makeup of the city is approximately 27 percent Hispanic or Latinx, 26 percent White, 21 percent Black or African American, 20 percent Asian, and 6 percent mixed or other races.

Approximately 14,487 of Suisun City residents are active in the labor force and citywide median income is $82,320. By employment, the largest industries are education and healthcare (31 percent of civilian labor force); manufacturing, wholesale, and transportation (19 percent); retail trade (16 percent); professional, scientific, and management, and administrative and waste management services (15 percent); and construction (6 percent). Major economic drivers include tourism, education and healthcare services, and retail. Major employers include Fairfield-Suisun Unified School District, Wal-Mart Stores, City of Suisun City, Raley's Superstores, Salvation Army, and Travis Air Force Base.[1]

Figure 1 shows key community features, including medical facilities, schools, police stations, fire stations, electrical substations/transmission lines, community centers, libraries, the railway, and major economic centers in Suisun City.

Figure 1: Community Facilities



Source: CalOES 2021, USDOT BTS 2021, Solano County 2021, Solano LAFCO 2020, PlaceWorks 2022, ESRI

1.4 RELATIONSHIP TO OTHER PLANS

California Government Code Section 65302(g) requires all local jurisdictions to review and update their Safety Element as necessary upon each revision of the Housing Element or LHMP, or once every eight years. The State of California specifies types of information that must be updated, notably, climate change resiliency and adaptation mitigation. Other topics relating to natural hazards, which are already addressed in the Public Health and Safety Element but may be updated as necessary to reflect new information, include fire risk, seismic risk, flood risk, hazards and hazardous materials, and the City's ability to respond to natural and human-made disasters.

1.4.1 OTHER GENERAL PLAN ELEMENTS

The Public Health and Safety Element is one of several elements of the Suisun City General Plan. Other social, economic, political, and aesthetic factors must be considered and balanced with safety needs. Rather than compete with the policies of related elements, the Public Health and Safety Element provides policy direction that complements the intent and policies of other General Plan elements. Crucial relationships exist between the Public Health and Safety Element and the other General Plan elements. For example, public health is intrinsically linked with policies in the Land Use, Transportation, Community Character and Design, Open Space and Conservation, Community Facilities, and Housing Elements. The design of a community and distribution of land uses should reflect the location of hazards and hazardous conditions. Most communities avoid adverse effects related to hazardous conditions through land use planning, when possible. For example, if a particular area is prone to elevated fire or flood risk, development of inhabited buildings would normally be limited or prohibited. Geologic or soils constraints could make certain land uses inappropriate or infeasible. An inefficient transportation network could adversely affect emergency response efforts. The presence of Travis Air Force Base is of particular importance for Suisun City. Some operations at the Air Force Base create compatibility issues for certain land uses. It is necessary to limit land use and development around the Air Force Base to protect sensitive land uses and prevent interference with current and future operations of Travis Air Force Base. Policies and information in the updated Public Health and Safety Element should not conflict with those in other elements.

1.4.2 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The update to the Public Health and Safety Element will draw from information appearing in the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for Solano County. The MJHMP for Solano County was developed in accordance with the Disaster Mitigation Act of 2000 and followed the Federal Emergency Management Agency's (FEMA) Local Hazard Mitigation Plan guidance. Solano County's MJHMP is a plan to identify and profile hazard conditions, analyze risk to people and facilities, and develop mitigation actions to reduce or eliminate hazard risks in the incorporated and unincorporated areas of Solano County. Volume II of Solano County's MJHMP contains an annex discussing hazards risks and mitigation actions specific to Suisun City. The City adopted the MJHMP in March 2022 and FEMA approved it in April 2022.

The MJHMP and the Public Health and Safety Element address similar issues, but the Public Health and Safety Element provides a higher-level framework and set of policies, while the MJHMP focuses on more specific mitigation actions. The implementation of these mitigation actions, which include both short- and long-term strategies, involve planning, policy changes, programs, projects, and other activities.

1.5 CLIMATE CHANGE VULNERABILITY ASSESSMENT

As part of the 2022 update of the Public Health and Safety Element, the City prepared a Climate Change Vulnerability Assessment. The Vulnerability Assessment follows the recommended process in the *California Adaptation Planning Guide* (APG), published in 2020 by the California Governor's Office of Emergency Services. This includes a four-step process: (1) characterizing the city's exposure to current and projected climate hazards; (2) identifying potential sensitivities and potential impacts to city populations and assets; (3) evaluating the current ability of the populations and assets to cope with climate impacts, also referred to as its adaptive capacity; and (4) identifying priority vulnerabilities based on systematic scoring. A more detailed description of the method, hazards, and results can be found in **Appendix A**, and each of the hazard sections of this report provides a summary of vulnerabilities created by each climate change-related hazard.

Step 1. Identify Exposure. The goal of this step is to characterize the community's exposure to current and projected climate change hazards. The climate change hazards included in the Vulnerability Assessment are **agricultural and ecosystem pests, drought, extreme heat and warm nights, human health hazards, inland flooding, human health hazards, landslides, sea level rise, severe weather, shoreline flooding,** and **wildfire and wildfire smoke**.

Step 2. Identify Sensitivities and Potential Impacts. This step involved evaluating potential future climate change impacts to community populations and assets.[1] City staff first identified a comprehensive list of populations and assets to understand how susceptible the people, places, ecosystem services, and services within the community are to climate change hazards. After this applicability review, City staff first evaluated which hazards are likely to affect which populations and assets, and then the potential impacts to the applicable populations and community assets. Based on the results of the impact assessment, each population and asset was identified as experiencing low, medium, or high impacts for each relevant hazard. The list of populations and assets included in the vulnerability assessment is shown in **Table 1**.

Table 1: Populations and Assets

Populations			
Children under 10	Cost-burdened households	Households in poverty	Immigrant communities
Linguistically isolated persons	Low-income households	Low-resourced people of color	Outdoor workers
Overcrowded households	Persons experiencing homelessness	Persons living in mobile homes	Persons living on single access roads
Persons with chronic illness and/or disability	Persons without a high school degree	Persons without access to lifelines	Pollution burdened populations
Renters	Seniors (65+)	Seniors living alone	Unemployed persons
Infrastructure			
Bicycle and pedestrian trails	Bridges	Communication facilities	Electrical transmission infrastructure
Electrical vehicle charging stations	Hazardous materials sites	Major roads and highways	Natural gas pipelines
Parks and recreation facilities	Railway	Solid waste facilities	Transit facilities
Water, wastewater, and flood control infrastructure			

[1] Community populations are groups of people that may be uniquely vulnerable to climate change hazards due to existing stressors such as financial instability, health conditions, mobility challenges, and housing conditions.

Buildings			
Community centers and libraries	Commercial businesses	Government buildings	Historic buildings and museums
Homes and residential structures	Medical and care facilities	Public safety buildings	Public schools
Economic Drivers			
Accommodation and tourism	Education services	Healthcare services	Major employers
Retail	Travis Air Force Base		
Ecosystems and Natural Resources			
Grassland	Wetland and marsh	Riparian and riverine habitats	
Key Services			
Communication services	Emergency medical response	Energy delivery	Government administration
Public safety response	Public transit access	Solid waste removal	Water and wastewater treatment, delivery, and collection

Step 3. Assess Adaptive Capacity. Adaptive capacity is the ability of populations and community assets to prepare for, respond to, and recover from the impacts of climate change using existing resources and programs. Based on the results of the adaptive capacity assessment, the City ranked the adaptive capacity of each population or asset as low, medium, or high for each relevant hazard.

Step 4. Conduct Vulnerability Scoring. The City used the impact and adaptive capacity scores for each population and asset for each relevant hazard to determine the vulnerability score. The vulnerability score reflects how susceptible a population or asset is to harm from a particular hazard. Vulnerability is assessed on a scale from V1 to V5, with V1 meaning minimal vulnerability and V5 meaning severe vulnerability. The matrix in **Figure 2** shows how impact and adaptive capacity scores combine and translate into a vulnerability score.

Figure 2: Vulnerability Scoring Matrix

	Low Impact	Medium Impact	High Impact
Low Adaptive Capacity	V3	V4	V5
Medium Adaptive Capacity	V2	V3	V4
High Adaptive Capacity	V1	V2	V3

2 PUBLIC SAFETY ISSUES

This section outlines the existing and likely future hazardous conditions and other public safety issues in Suisun City and policy responses to these issues. The public safety issues in Suisun City include:

- Healthy communities
- Hazardous materials
- Flooding and sea level rise
- Fire risk
- Geologic, soils, and seismic hazards
- Emergency response
- Additional climate change hazards (drought, extreme heat, severe weather, and agricultural and ecosystem pests)

This section provides details pertaining to probable locations each hazard or issue is likely to occur (per availability of data), past notable events in and around Suisun City, agencies responsible for providing protection from these public safety issues, and other background information required by the State of California Government Code Section 65302(g)(4). The results of the Vulnerability Assessment are integrated into the hazards and other public safety issues previously mentioned. The results and implications of the Vulnerability Assessment are integrated into each of the hazard and public safety topics.

2.1 HEALTHY COMMUNITIES

Public safety and quality of life play a large role in the overall health of a community. Healthy community principles can address a wide range of factors, including access to health care, healthy food, recreation, education, economic opportunity, and other factors. The City is committed to pursuing healthy community objectives in the context of its decision making and programs, in collaboration with many local and regional partners. It is anticipated that future collaboration would occur between City departments and healthcare providers, school districts, nonprofit foundations, and other public and private groups.

Human health hazards are bacteria, viruses, parasites, and other organisms that can cause diseases and illness in people. Some of these diseases may cause only mild inconvenience, but others are potentially life threatening. These diseases can be and often are carried by animals such as mice and rats, ticks, and mosquitos. Warmer temperatures and high levels of precipitation can lead to increased populations of disease-carrying animals, creating a greater risk of disease and increased rates of infection.

Populations most vulnerable to human health hazards are those who spend a disproportionate amount of time outdoors (such as outdoor workers or persons experiencing homelessness), those with fragile immune systems or existing illnesses (which may include persons with chronic illnesses, seniors and seniors living alone, and pollution-burdened populations), those who may live in sub-standard housing or not have access to health insurance and medical care (households in poverty, low-resourced people of color, immigrant communities, and overcrowded households), and those without access to vehicles or internet. These persons may be living in conditions that increase their chances of catching vector-borne illnesses, lack the ability to fight off infections that may occur, or lack the financial resources to seek timely medical care. Emergency medical response services may be unable to meet the needs of the community if human health hazards affect a majority of the population, as there may be shortages of healthcare facilities, equipment, pharmaceuticals, and personnel if healthcare workers become sick or if supply chains are disrupted.

2.1.1 PAST OCCURRENCES

Isolated incidents of West Nile Virus and Lyme Disease have been a perennial concern within Solano County. However, there are no records of recent widespread disease incidents.

2.1.2 POTENTIAL CHANGES TO HEALTHY COMMUNITIES IN FUTURE YEARS

Likelihood of Future Occurrence

Human health hazards of various scales and levels of severity are likely to occur in the future.

Climate Change and Healthy Communities

Increases in average temperature and changes in precipitation patterns favoring larger precipitation events may facilitate the growth and activity of disease-carrying vectors. The overall risk of human health hazards is thus expected to increase.

2.1.3 IMPLICATIONS FOR THE PUBLIC HEALTH AND SAFETY ELEMENT UPDATE

The Public Health and Safety Element Update can help the Suisun City community prepare for and respond to human health hazards by introducing policies to work with local public health agencies to monitor and report on emerging disease conditions and connecting low-income residents and residents who may lack access to health insurance with local healthcare organizations.

2.2 HAZARDOUS MATERIALS

Hazardous materials are substances that may be dangerous to the public's health and safety if they are improperly used, stored, transported, or disposed. The most significant concerns regarding possible hazardous materials releases in Suisun City are the presence of truck traffic on SR-12, rail traffic on the Union Pacific Railroad main line, and three pipelines that pass through the city.

Travis Air Force Base is directly adjacent to the city's Sphere of Influence and is listed as a United States Environmental Protection Agency (EPA) Superfund site. Travis Air Force Base is also a permitted hazardous waste facility that handles PCB-contaminated waste and PCB-containing equipment, such as electrical transformers.

Additional hazardous materials sites occur throughout Suisun City, with the highest concentration along the western border of the city. The State Water Resources Control Board GeoTracker database identifies 24 hazardous materials sites within Suisun City. Of these, 4 are Cleanup Program Sites and 18 are leaking underground storage tank Cleanup Sites. Cleanup has been completed at 20 of the sites. The Department of Toxic Substances Control (DTSC) EnviroStor database shows two school hazardous materials sites within Suisun City, both of which are closed and require no further action.

2.2.1 TRANSPORT OF HAZARDOUS MATERIALS

Hazardous materials regularly transported by highway and railroad include flammable liquids, corrosive materials, compressed and/or poisonous gases, explosives, flammable solids, and irritating materials. The railroad and highway travel network traversing the city carries a relatively high percentage of industrial traffic, and an industrial traffic accident may result in the release of hazardous materials. SR-12, which is a major connector between Interstate (I-) 80 and I-5, carries a high volume of commercial truck traffic. I-80 is in close proximity to the city and a major hazardous materials release there could pose a risk.

The main rail connection from the San Francisco area to all points east runs through the heart of Suisun City. Several freight trains and passenger trains (including the Capitol Corridor commuter system) use the connection each day. The freight trains using this transportation route carry a variety of materials that could pose health risks to Suisun residents in the event of an accident.

2.2.2 PIPELINE HAZARDS

Underground pipelines transporting hazardous materials include two PG&E high-pressure natural gas lines along SR-12, Kinder-Morgan pipelines along the Union Pacific railroad line carrying refined petroleum products, and Department of Defense jet fuel lines going to Travis Air Force Base along SR-12.

Pipelines can be damaged by corrosion. Pipeline operators must monitor and avoid buildup of corrosive acid fluids or chemicals that may damage pipe materials and must protect pipes from external rusting and other soil corrosive conditions caused by stresses such as over-pressurization, subsidence, or earthquakes. Pipelines are constructed of "high carbon" steel primarily for strength. High carbon steel is not stainless steel and is subject to chemical alteration by both conveyed fluids and external environments. PG&E conducts surveys on both its pipelines annually.

2.2.3 HAZAROUS MATERIALS RESPONSE

The California Health and Safety Code regulates Underground Storage Tanks (USTs) containing hazardous substances. The regulations contain requirements for UST permitting, construction, installation, leak detection monitoring, repairs, and corrective actions and closures.

The California DTSC has primary regulatory responsibility, with the delegation of enforcement to local jurisdictions that enter into agreements with the state agency, for the management of hazardous materials and the generation, transport, and disposal of hazardous waste under the authority of the Hazardous Waste Control Law. The DTSC is responsible for compiling a list of hazardous materials sites pursuant to Government Code Section 65962.5, which includes five categories:

1. Hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code.
2. Land designated as "hazardous waste property" or "border zone property."

3. Properties with hazardous waste disposals on public lands.
4. Hazardous substance release sites selected for (and subject to) a response action.
5. Sites included in the Abandoned Site Assessment Program.

The California Environmental Protection Agency (Cal EPA) plays a major role in overseeing the management of hazardous materials and waste within California. In 1993, SB 1082 gave Cal EPA the authority and responsibility to establish a unified hazardous waste and hazardous materials management and regulatory program, commonly referred to as the Unified Program. The purpose of this program is to consolidate and coordinate six different hazardous materials and hazardous waste programs, and to ensure that they are consistently implemented throughout the state. State law requires county and local agencies to implement the Unified Program. The agency in charge of implementing the program is called the Certified Unified Program Agency (CUPA). The Solano County Department of Resource Management is the designated CUPA for the county. As the CUPA, the Department of Resource Management administers the following Unified Programs:

- Hazardous Materials Release Response Plans and Inventory (Business Plan) Program
- California Accidental Release Prevention Program
- Underground Storage Tank Program
- Hazardous Waste Generator and Hazardous Waste On-Site Treatment Program
- Aboveground Storage Tank Program (Spill Prevention, Control, and Countermeasure Plans)

In Suisun City, the majority of hazardous material incidents are handled prior to becoming a major disaster. Suisun City is a voting member and subscriber to the Solano Hazardous Materials Response Team, a county-wide joint powers agreement between cities. The team is a type-two team certified by the California Governor's Office of Emergency Services.

The Solano County Department of Resource Management is the designated administering agency for Solano County's Area Hazardous Material Monitoring Program. In the event of a spill or release, this agency should be notified immediately to obtain the most up-to-date hazmat storage locations information. Major incidents are coordinated through the Governor's Office of Emergency Services.

2.2.4 PAST OCCURRENCES

Major releases of hazardous materials from pipelines have occurred in Solano County. A fuel pipeline failed near Peabody and Vanden Roads in Fairfield in 1994, a pipeline failed and released diesel fuel in Suisun Marsh in 2004, and another leak occurred from a pipeline parallel to the Union Pacific Railroad just northeast of the city limits in 2009. In 2021, a diesel fuel leak affected the backwater area of Suisun City.[2]

The Governor's Office of Emergency Services reports 116 hazardous materials spills occurring in Suisun City between 2007 and 2022. Of these, 77 were petroleum spills, 5 were sewage spills, 3 were chemical spills, and 31 were various other types of spills. There were 32 spills that affected waterways, 23 that affected railways, 12 that affected roads, 11 that affected residences, 10 that affected harbors or ports, and 9 that affected other locations such as businesses, schools, service stations, and substations.[3]

2.2.5 POTENTIAL CHANGES TO HAZARDOUS MATERIALS IN FUTURE YEARS

Likelihood of Future Occurrence

The history of pipeline-related hazards within and immediately surrounding Suisun City suggests that pipeline operations and maintenance will continue to pose a hazard to Suisun City and its environs for the foreseeable future. Likewise, the presence of major roadways, rail lines, and proximity to Travis Air Force Base will likely result in a certain degree of continued exposure to hazardous materials.

Climate Change and Hazardous Materials

Climate change is unlikely to substantially affect hazardous materials transportation incidents. However, increases in the frequency and intensity of hazards, such as floods and severe weather, may create a greater risk of hazardous materials releases during these events.

2.2.6 IMPLICATIONS FOR THE PUBLIC HEALTH AND SAFETY ELEMENT UPDATE

The existing Public Health and Safety Element contains comprehensive policies for addressing material-related hazards. The Public Health and Safety Element Update can improve Suisun City's response to and management of hazardous materials by introducing policies to:

- Encourage business owners and residents to reduce their own use of hazardous materials.
- Encourage phasing out of commercial and industrial building materials that leach metals into stormwater runoff.
- Continue participation in the Solano County Hazardous Materials Response Team and provide initial and ongoing training for first responders, such as training in hazardous materials incident response and management.
- Prohibit the development of hazardous waste storage facilities or land uses that use hazardous materials from being located in the 2100 sea level rise and shoreline flooding area.
- Provide protective equipment and educational resources to residents who may be at elevated risk of chemical exposure at work or at home.

2.3 FLOODING

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

Floods are usually caused by large amounts of precipitation, either from a period of very intense precipitation or a long period of steady precipitation. In Solano County, the flood season generally lasts from November through April. Historically, over 90 percent of annual precipitation falls during these months and January is the wettest month of the year.

Land use, development patterns, and the presence of obstructions affect the movement of floodwaters. Natural obstructions to flood flows include trees, brush, and other vegetation growing along stream banks in flood-prone areas. Bridges, culverts, and building pads can create more extensive flooding than would otherwise occur. During floods, debris may be washed and carried downstream to collect on bridges and other obstructions. Bridges may be damaged or destroyed.

Culverts may be plugged, or debris may pile up, causing increased flood height due to backwater. As the flood increases, masses of debris may break loose, and the accumulation of water and debris can surge downstream until another obstruction is encountered. Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself.

In the Fairfield-Suisun City area, restrictive outlets into slough areas cause flood flows to pond in low-lying areas, and high tides may delay drainage for several days. In urbanized areas, flood problems are intensified because new homes and other structures, new streets, driveways, parking lots, and other paved areas all decrease the amount of open land available to absorb rainfall and runoff, and thus increase the volume of water that must be carried away by waterways. Flood conditions in the Sacramento-San Joaquin Delta are influenced by Pacific Ocean tides, high flood outflow from tributary streams, and strong onshore winds.

Several populations and assets face high risks from flooding events.

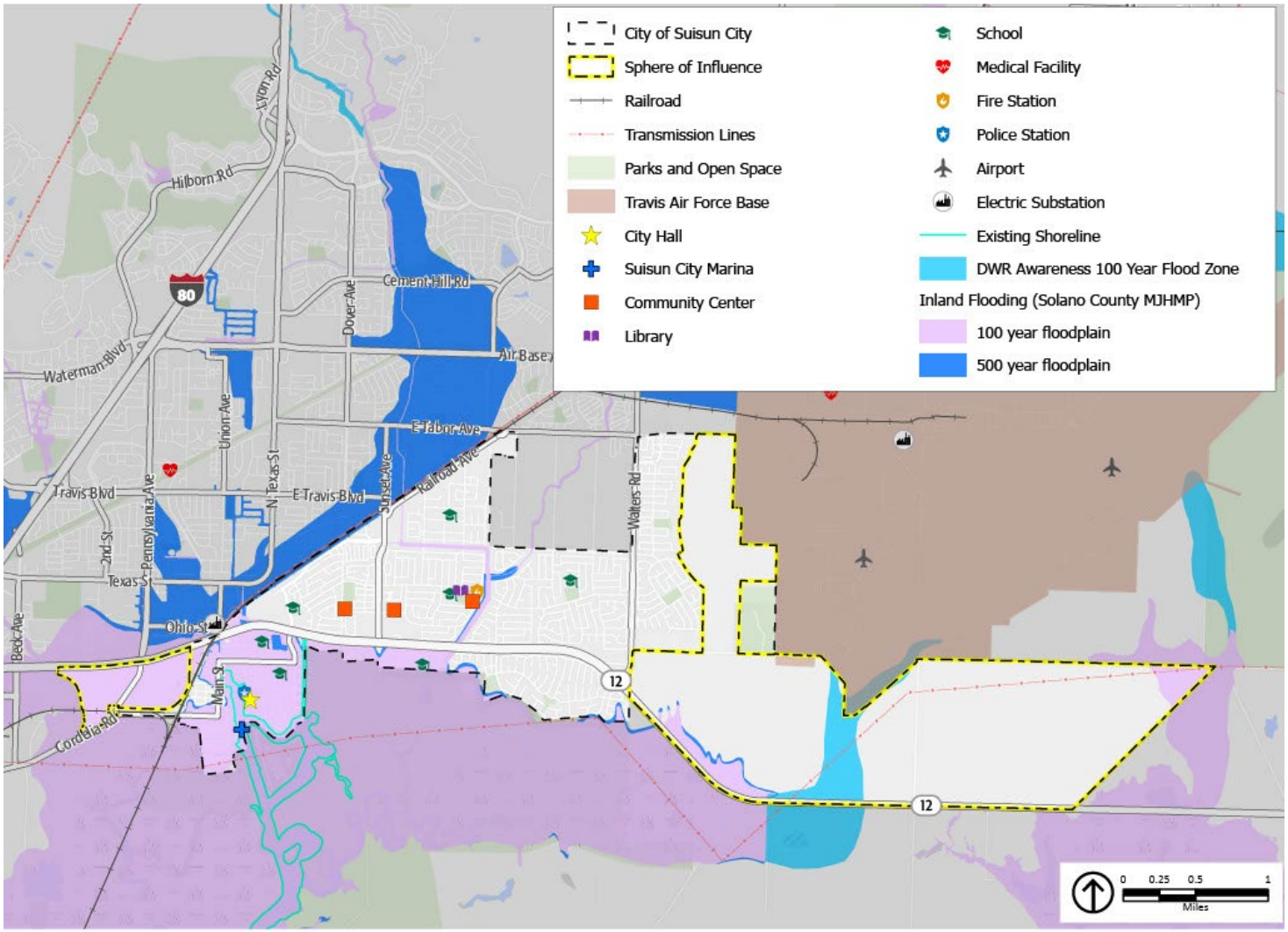
- Persons experiencing homelessness, persons living in mobile homes and houseboats, households in poverty, low-income households, immigrant communities, and low-resourced people of color are severely vulnerable to flooding if they live in a flood-prone area, as they may lack financial resources to protect their homes or be ineligible for grant funding to recover from flood damage to their homes.
- Persons with limited mobility and those without access to lifelines (i.e., a car, transit, or communication systems) may have difficulty evacuating prior to a flooding event, and therefore are also highly vulnerable.
- Outdoor workers may face disruptions in employment if agriculture, construction, or water recreation is harmed by inland flooding, causing economic hardships.
- Pollution-burdened populations are highly vulnerable to flooding that causes toxic chemicals and contaminants to spread into the water and soil, affecting the health of this population.[4]
- Persons living on single-access roads are highly vulnerable to inland flooding, which can cause them to become isolated if flooding inundates roadways that connect these neighborhoods to other areas of the city.

- Transportation infrastructure, including seven bridges, SR-12, Pintail Drive, Railroad Avenue, the Union Pacific Railroad, and the electric vehicle charging station can be inundated, blocked, and damaged by floodwaters, preventing the movement of people, goods, and services. This can disrupt services that depend on this infrastructure, such as public transit access and solid waste removal.
- Flood-control infrastructure could fail if floodwater exceeds the capacity of levees and other infrastructure.
- Parks and recreation facilities, such as park structures, facilities, and fields could be damaged chronically by inland flooding, specifically at Day Park, Todd Park, McCoy Creek Park, and Lawler Ranch Park.
- Homes, residential structures, City Hall facilities, and the Police Department building, can be damaged, destroyed, or have mold and mildew growth from standing water after flooding. Damage to City Hall facilities could disrupt government administration services.
- The Downtown Waterfront Area is at a high risk of inland flooding, creating high vulnerability for accommodation, tourism, and retail economic drivers in that portion of the city.
- Heavy rainfall and subsequent flooding could disrupt water and wastewater services, causing the Fairfield Suisun Wastewater Treatment Plant to not function properly and damaging infrastructure.
- Inland flooding can cause sediment and other nutrients to wash into wetland and marshland habitats in southern Suisun City, reducing water quality and harming fish and plant species that may already be weakened from extreme heat and drought conditions.

2.3.1 FLOOD HAZARD ZONES

Areas at an elevated risk of flooding are generally divided into 100- and 500-year flood zones. A 100-year flood zone has a 1-percent chance of experiencing a major flood in any given year and a 500-year flood zone has a 0.2-percent chance of flooding in any given year. Portions of Suisun City are within the Federal Emergency Management Agency (FEMA)-designated 500- and 100-year flood zones, as depicted in **Figure 3**. As shown, this includes most of the Downtown Waterfront Area and several developed areas south of SR-12, particularly in the vicinity of Sunset Avenue adjacent to Suisun Marsh.

Figure 3: Flood Hazard Zones



Source: DWR 2021, Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Flooding can also occur along the city's waterways. Areas of shallow flooding occur along Sunset Avenue and SR-12 due to sheet-flow and ponding from Laurel Creek, between SR-12 and the Union Pacific Railroad from Laurel Creek, and at Cordelia Road due to ponding from Pennsylvania Avenue Creek flooding. Flooding along Pennsylvania Avenue Creek, within Suisun City, is caused by backwater from Suisun Slough.

2.3.2 SEA LEVEL RISE AND SHORELINE FLOODING

Sea Level Rise

Sea level rise is an increase in the ocean's surface height relative to the land in a particular location. The two major causes of sea level rise are thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting of land-based ice, such as glaciers and ice sheets. Sea level rise is a gradual process, taking place over years or decades. Sea level rise, a direct result of climate change, affects coastal communities as well as those along the San Francisco Bay and into the Sacramento-San Joaquin Delta region. Sea level rise has the potential to inundate homes, businesses, and infrastructure near the shorelines, as well as to cause erosion of coastal lands over time. Sea levels rose an average of 2.0 millimeters (mm) per year since the late nineteenth century, and observations and projections suggest that it will rise at a higher rate during the twenty-first century. This is comparable to a global average during the twentieth century of 1.4 mm per year – a pace that has not been exceeded in any century since at least 2,800 years ago. Rising seas increase the risk of coastal flooding, storm surge inundation, coastal erosion and shoreline retreat, and wetland loss. The cities and infrastructure that line many coasts are already vulnerable to damage from storms, which will likely increase as the sea level continues to rise and inundate areas further inland.

Along the Suisun City shoreline, sea levels are projected to rise approximately 24 inches by 2050 and 84 inches by 2100. However, it is possible that sea levels could rise faster than these projections. Sea level rise projections for the years 2050 and 2100 in Suisun City are shown in **Figures 4** and **5**, respectively. Parts of the city immediately adjacent to McCoy Creek are projected to experience sea level rise of up to approximately 2 to 4 feet by 2050. By 2100, the area immediately adjacent to McCoy Creek may experience sea level rise of up to 12 feet, the southern edges of the city may experience sea level rise of up to 4 feet. Most shoreline damage from flooding would occur as a result of storm activity in combination with higher sea levels. The San Francisco Bay Conservation and Development Commissions (BCDC) requires that shoreline protection projects, such as levees and seawalls, be designed to withstand the effects of projected sea level rise and be integrated with adjacent shoreline protection. Whenever feasible, projects must integrate hard shoreline protection structures with

natural features, such as marsh or upland vegetation, that enhance the San Francisco Bay ecosystem. BCDC also requires risk assessments for projects within 100 feet of the shoreline; however, as a matter of best practice, development within areas susceptible to sea rise should be designed for resilience.

Shoreline Flooding

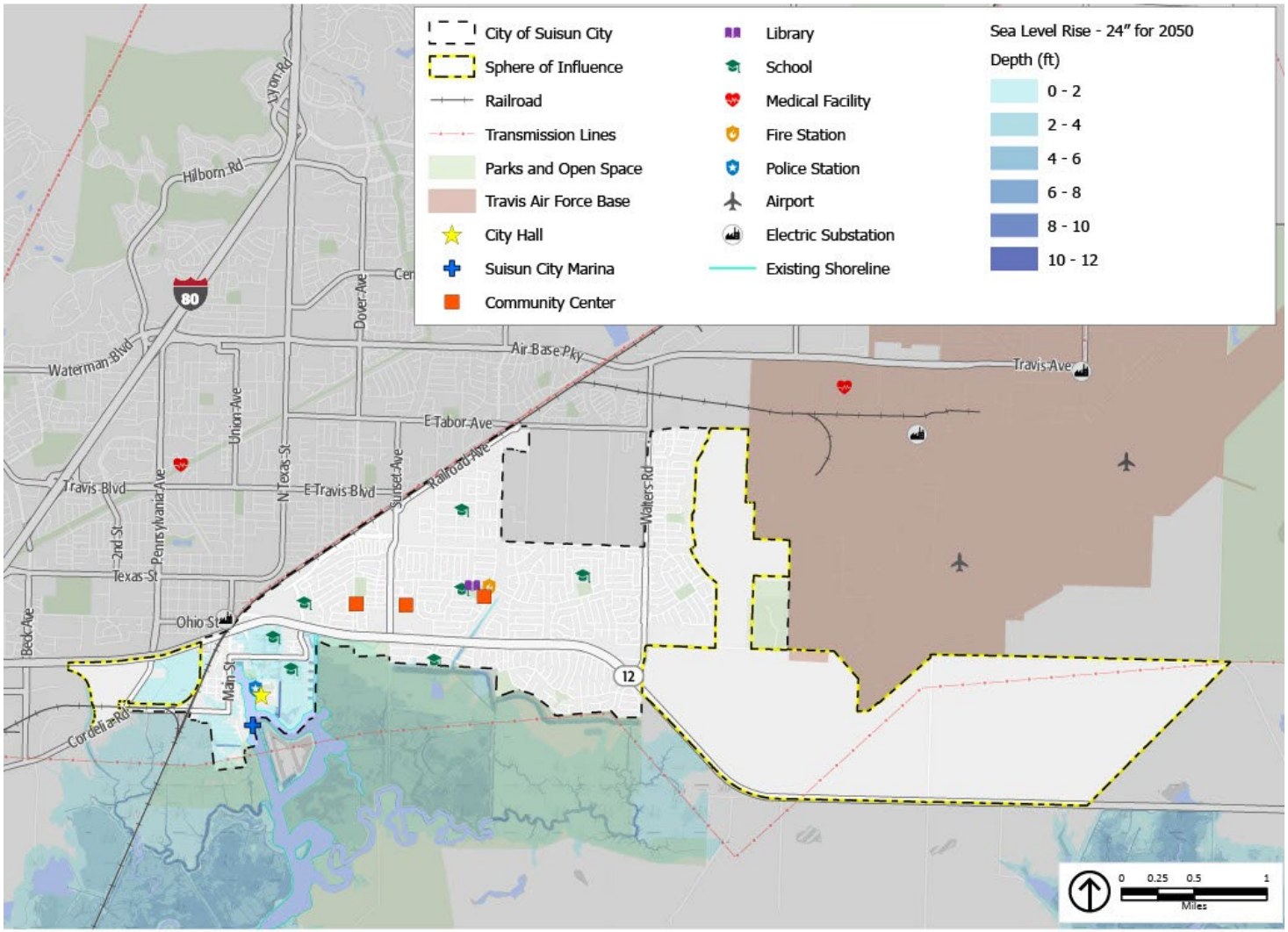
Suisun City is also vulnerable to shoreline flooding due to its proximity to the Sacramento-San Joaquin Delta. Shoreline flooding is caused by coastal processes, such as waves, tides, storm surge, or heavy rainfall from storms and can be exacerbated by sea level rise. The severity and exact location of shoreline flooding depends on several factors. However, **Figure 6** illustrates the parts of the city that would be impacted by shoreline flooding by 2050, with 24 inches of sea level rise and a 5-year storm and **Figure 7** shows shoreline flooding by 2100, with 84 inches of sea level rise and a 5-year storm. By 2100, much of the southern half of the city would be inundated by floodwaters of up to two feet.

Sea Level Rise and Shoreline Flooding Vulnerability

As shown in **Figure 4** and **Figure 5**, sea levels may increase enough by 2100 to permanently flood low-lying areas in the Downtown Waterfront Area and most areas south of SR-12, including the Suisun City Marina, City Hall, the Suisun City Police Department, and Crystal Middle School. Sea level rise threatens essential buildings and infrastructure that support economic drivers and key services in Suisun City, including those listed above and others such as bridges along Cordelia Road and Anderson Drive, SR-12 and other major roadways, the Union Pacific Railroad, and historic buildings. Homes and structures built above the increased sea level can still be harmed if the higher levels of water erode the rock or soil supporting the structures, potentially making them unsafe and at risk of collapse. Sea level rise can also cause roadways to become impassable, flood-control infrastructure to be overtopped and not work effectively, hazardous material facilities to increase the risk of accidentally releasing harmful substances, and roadways to the Potrero landfill and composting facilities to be blocked.

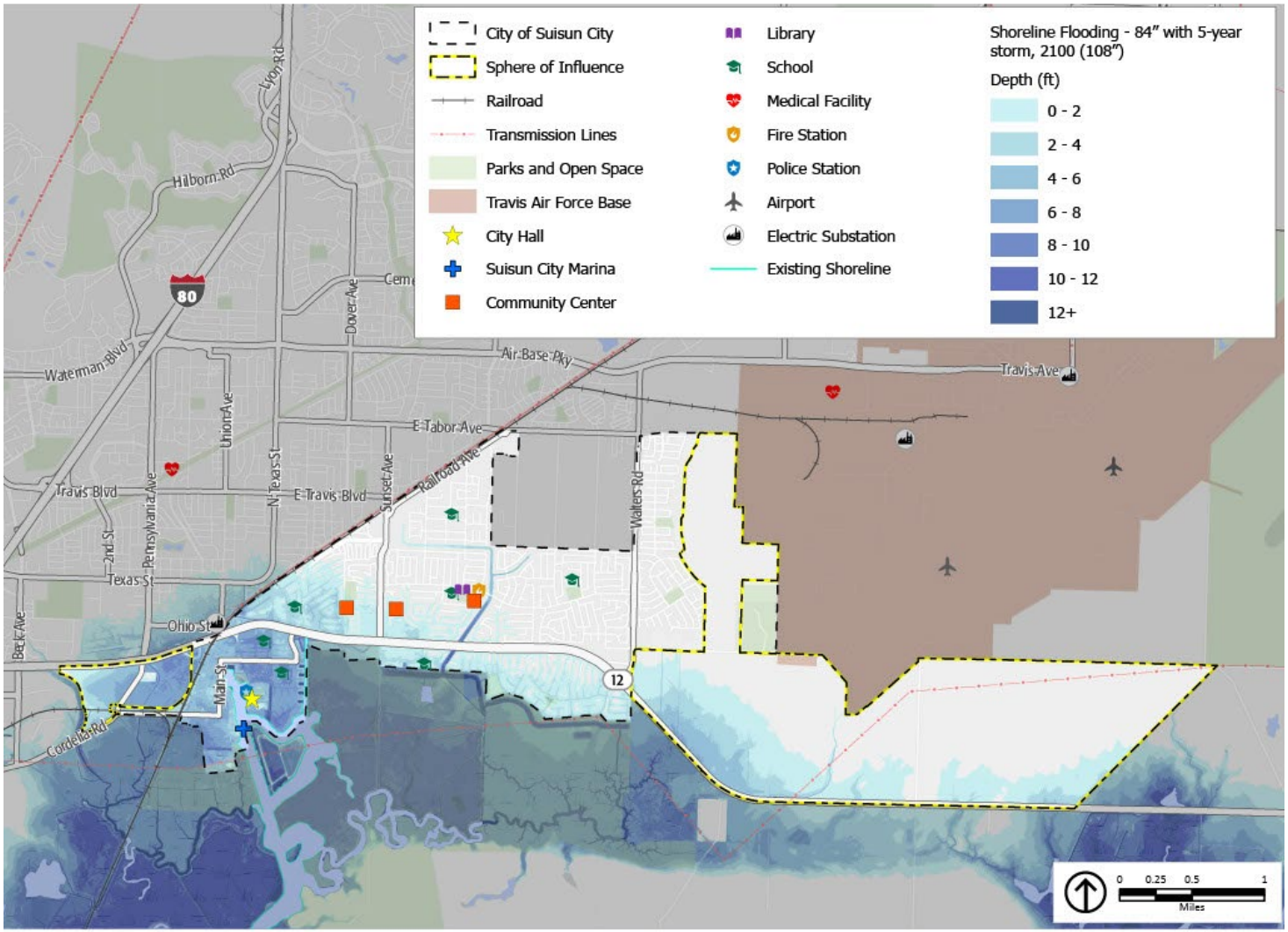
In the natural environment, higher tide levels lead to conversion of wetland and marsh habitat to another habitat type that accommodates different plant and animal species, resulting in the alteration or loss of some ecosystem features.[5] Riparian areas may see an increase in salt water, causing special composition shift as the waters become more saline.

Figure 4: Sea Level Rise 2050



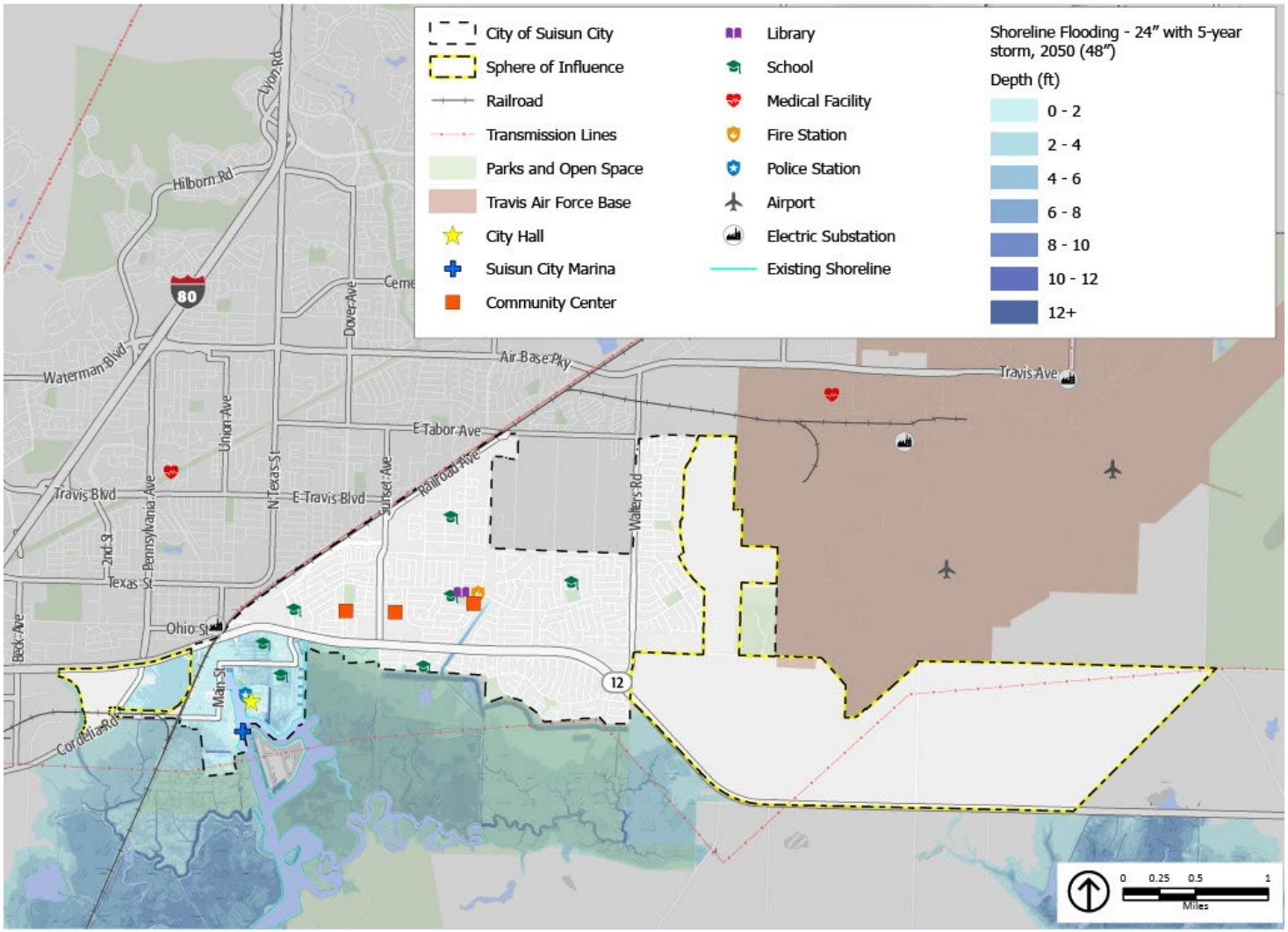
Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Figure 5: Sea Level Rise 2100



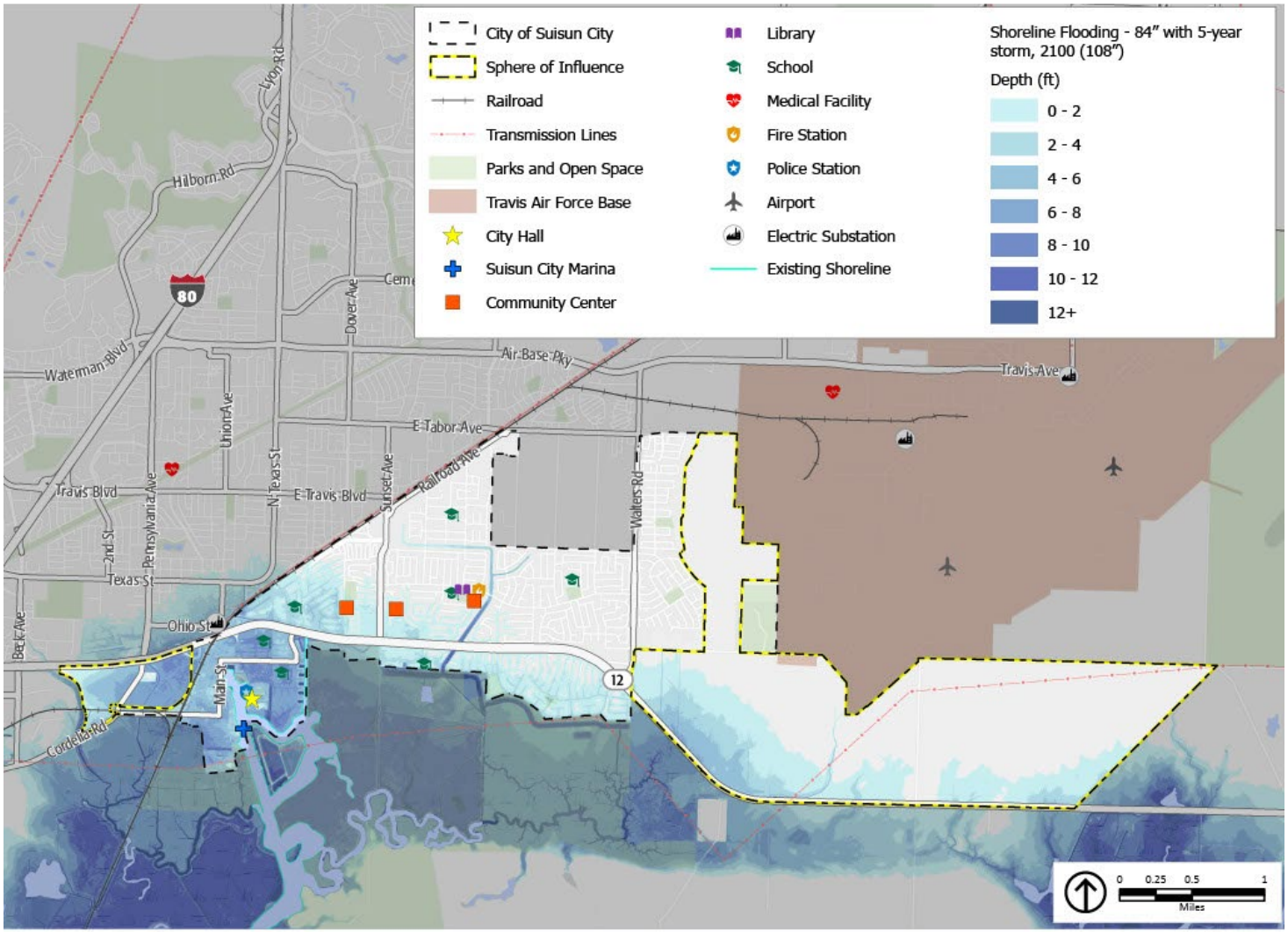
Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Figure 6: Shoreline Flooding 2050



Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

Figure 7: Shoreline Flooding 2100



Source: Adapting to Rising Tides 2020, PlaceWorks 2022, ESRI

During strong storms and king tides, shoreline flooding may damage or destroy homes, commercial businesses, government buildings, and historic buildings in the Downtown Waterfront Area and low-lying areas along the Suisun Slough; disrupt transportation routes such as SR-12, Sunset Avenue, and the southern portion of Railroad Avenue; and harm economic drivers, such as accommodation, tourism, and retail. Essential infrastructure, such as flood-control infrastructure; bridges along SR-12, Anderson Drive, Cordelia Road, Blossom Avenue, and Worley Road; hazardous materials sites; the Union Pacific Railroad; parks and recreation facilities at Day Park, Todd Park, Lawler Ranch Park, Lawler Falls Park, and Heritage Park; and transit facilities may be frequently and temporarily inundated, causing them and the economic drivers or services they support to not function as needed.[6]

Those living along the shoreline, especially those in low-lying areas, are especially vulnerable to shoreline flooding. This includes many populations in Suisun City, but those most vulnerable include persons living in mobile homes and houseboats, low-resourced people of color, persons without access to lifelines, persons experiencing homelessness, and pollution-burdened populations. Persons with limited income may live in less-resilient structures or not have control over the housing units they live in, increasing the risk of damage from shoreline flooding and reducing the ability to recover from these events. Those with limited mobility, such as persons with disabilities and seniors, and those living on single-access roads may not be able to prepare their homes for shoreline flooding and may not be able to effectively evacuate if needed.

2.3.3 LEVEE HAZARDS

The levee systems in some Solano County marshlands were constructed initially by hand labor and later by dredging to hold back river floods and daily tides, to create additional land for grazing and growing crops. Today, these levees remain as embankments of 5 to 6 feet in height, with foundation widths of roughly 20 to 30 feet. Levees run both north to south and east to west across the marshland immediately south of the city and following the path of Suisun Slough.

Constant maintenance is necessary to hold these levees against the high tides and river floods. Some of these levees are not maintained to any specific standard, leaving them vulnerable to failure and inundation. In particular, the City will need to ensure maintenance and suitability of the levee that borders West Street, Crystal Street, School Street, and Maple Street in the southwestern portion of the city. Potential failure of levees from liquefaction or seismic hazards constitutes a potential hazard in much of the southern half of Solano County, including areas around Suisun City.

The Delta-Suisun Marsh Office, part of the California Department of Water Resources, is responsible for improving flood protection within the Sacramento-San Joaquin Delta and portions of the Suisun Marsh. The office is deeply involved in implementation of the California Bay-Delta Program Levee System Integrity Program in addition to a portion of the Water Quality Program. The Bay-Delta Levees Branch, also part of the California Department of Water Resources, administers the Delta Levees Flood Protection Program as authorized by the Water Code Sections 12300 through 12318 and 12980 through 12995. This is a grant program that works with more than 60 reclamation districts in the Sacramento-San Joaquin Delta and Suisun Marsh to maintain and improve the flood-control system and provide protection to public and private investments in the Sacramento-San Joaquin Delta, including water supply, habitat, and wildlife. Through its two major components (Delta Levees Maintenance Subventions Program and Delta Levees Special Flood Control Projects), the grant program works with the local agencies to maintain, plan, and complete levee rehabilitation projects.

2.3.4 DAM FAILURE

A dam failure is an uncontrolled release of water from a reservoir through a dam because of structural failures or deficiencies in the dam, usually associated with intense rainfall or prolonged flooding. Dam failures can range from minor to catastrophic and can potentially harm human life and property downstream from the failure. In addition, ecosystems and habitats are destroyed because of waters flooding them. Although dam failures are very rare, these events are not unprecedented. There are four major causes of dam failures:

- **Overtopping:** These failures occur when a reservoir fills too high with water, especially in times of heavy rainfall, leaving water to rush over the top of the dam. Other causes of this type of failure include settling of the crest of the dam or spillway blockage.
- **Foundation defects:** These failures occur as a result of settling in the foundation of the dam, instability of slopes surrounding the dam, uplift pressures, and seepage around the foundation. All of these failures result in structural instability and potential dam failure.
- **Piping and seepage failures**: These failures occur as a result of internal erosion caused by seepage and erosion along hydraulic structures, such as the spillways. Erosion may also be caused by animal burrows and cracks in the dam structure.
- **Conduit and valve failure**: These failures occur as a result of problems with valves and conduits.

Many dam failures are also the secondary result of other natural disasters, such as earthquakes, landslides, extreme storms, or heavy snow-melt. Other causes include equipment malfunction, structural damage, and sabotage. Dams are constructed with safety features known as "spillways" that allow water to overtop the dam if the reservoir fills too quickly. Spillway overflow events, often referred to as "design failures," result in increased discharges downstream and increased flooding potential. In a dam failure scenario, the greatest threat to life and property typically occurs in those areas immediately below the dam since flood depths and discharges generally decrease as the flood wave moves downstream. The primary danger associated with dam failure is the high-velocity flooding downstream of the dam and limited warning times for evacuation.

The Federal Energy Regulatory Commission (FERC), as required by federal law, has reviewed and approved comprehensive emergency action plans (EAPs) for all dams. EAPs minimize the threat to public safety and the response time to an impending or actual sudden release of water from project dams. EAPs are also designed to provide emergency notification when floodwater releases may present the potential for major flooding.

As mandated by the National Dam Inspection Act, the U.S. Army Corp of Engineers has the authority and responsibility for conducting inspections of all dams. The purpose of these inspections is to check the structural integrity of the dam and associated appurtenant structures, ensuring protection of human life and property. Periodic inspections disclose conditions that might disrupt operation or dam safety.

The State of California regulates dams to prevent failure, safeguard life, and protect property. The California Water Code entrusts dam safety regulatory power to the Department of Water Resources (DWR) Division of Safety of Dams (DSOD), which provides oversight to the design, construction, and maintenance of over 1,200 jurisdictional-sized dams in California. The DSOD ensures dam safety by:

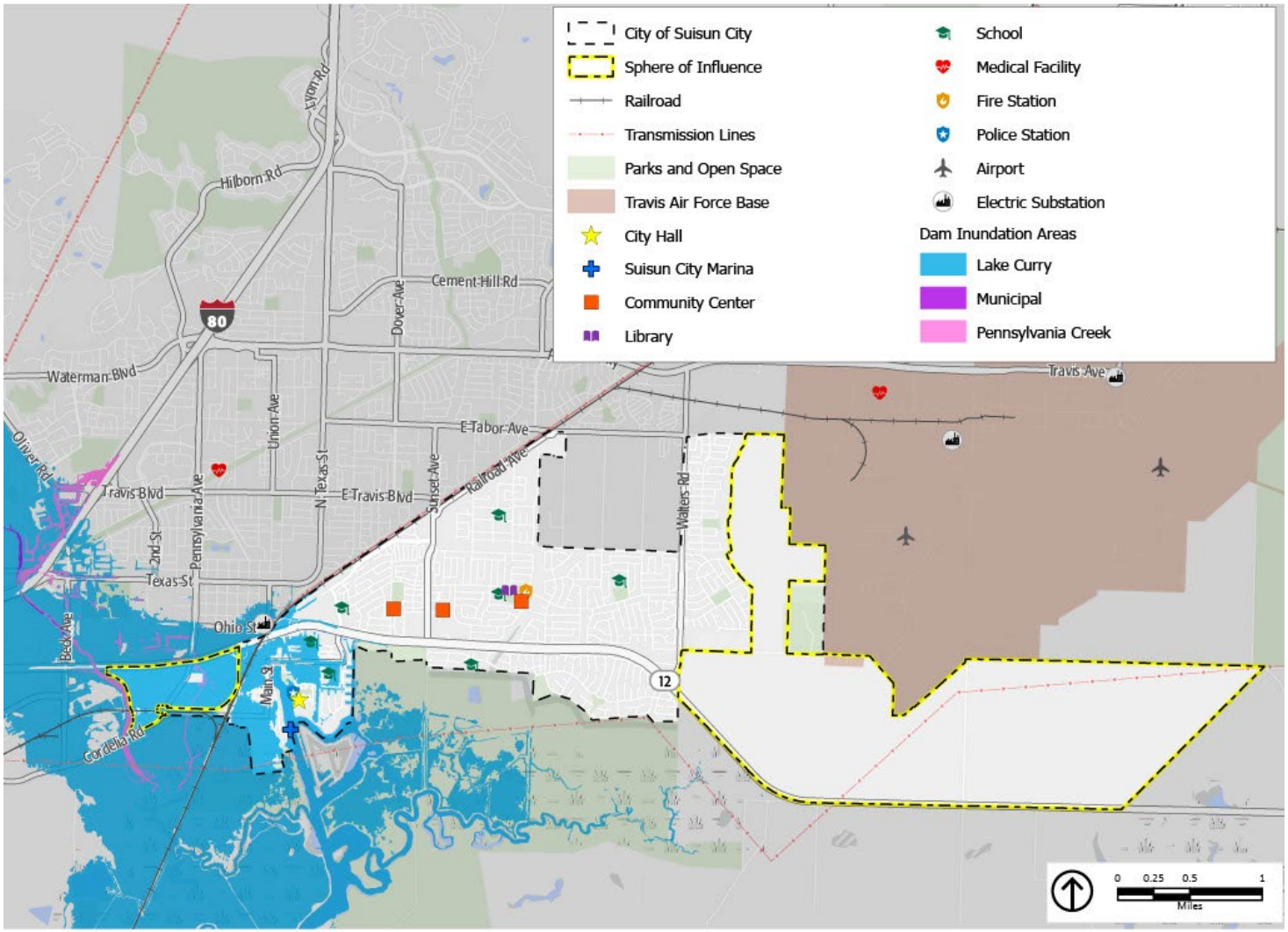
- Reviewing and approving dam enlargements, repairs, alterations, and removals to ensure that the dam appurtenant structures are designed to meet minimum requirements.
- Performing independent analyses to understand dam and appurtenant structures performance. These analyses can include structural, hydrologic, hydraulic, and geotechnical evaluations.
- Overseeing construction to ensure work is being done in accordance with the approved plans and specifications.

- Inspecting each dam on an annual basis to ensure it is safe, performing as intended, and is not developing issues. Roughly one-third of these inspections include in-depth instrumentation reviews of the dam surveillance network data.

- Periodically reviewing the stability of dams and their major appurtenances in light of improved design approaches and requirements, as well as new findings regarding earthquake hazards and hydrologic estimates in California.

There are several jurisdictional dams in Solano County and Napa County near Suisun City. The inundation zone of Lake Curry in Napa County is capable of reaching Suisun City, as shown in **Figure 8**.

Figure 8: Dam Inundation Areas



Source: DWR DSOD 2021, USDOT BTS 2021, Solano LAFCO 2020, PlaceWorks 2022, ESRI

2.3.5 PAST OCCURRENCES

Historically, Suisun City is at risk of flooding during the winter months when river systems swell with heavy rainfall. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood-control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage.

Solano County has a long history of flooding, but little definitive data are available for specific floods. Stream flow records are limited for the streams relevant to Suisun City, and the rural nature of past flooding precluded detailed news coverage. Information on past floods is based primarily on historical accounts, brief newspaper descriptions, and various published and unpublished reports.

Major flooding occurred in Suisun City in 1940, 1950, 1955, 1963, 1966, 1967, 1969, 1970, and 1973.

- In December 1955, extensive flooding occurred along SR-12. Floodwaters rose to waist depth in a residential development when high tides slowed drainage.
- In January 1967, floodwaters covered one-third of the streets of Suisun City and was approximately two feet deep in the southern part of town.
- In January 1970, a high tide and overflow from Laurel Creek and Union Avenue Creek caused flooding.
- The 1986 northern California and western Nevada floods caused unprecedented amounts of rain and extensive flooding of the Napa and Russian Rivers. The nine-day storm brought half of the average annual rainfall for the year. Sacramento, Yuba, and Feather River levee breaks in Olivehurst and Linda forced thousands of residents to evacuate. On the San Joaquin River and in the Sacramento-San Joaquin Delta, levee breaks along the Mokelumne River caused flooding in Thornton and flooded four Sacramento-San Joaquin Delta islands. The event resulted in 13 deaths, 50,000 people evacuated, and over $400 million in property damage.
- The 1996 to 1997 New Year's Day northern California flood caused extensive flooding along the Klamath River. Dozens of levees failed and produced widespread flooding throughout the San Joaquin River Basin, including along the Cosumnes River and near Olivehurst, Arboga, Wilton, Manteca, and Modesto. Massive landslides occurred in El Dorado National Forest east of Sacramento, closing Hwy 50. Forty-eight counties in California were declared disaster areas. Over 23,000 homes and businesses, agricultural lands, bridges, roads, and flood-management infrastructures—valued at about $2 billion—were damaged. Nine people were

killed and 120,000 people were evacuated from their homes. Overall, the storms led to flooding across 300 square miles.

Levee instability is also the cause of many floods. In mid-January 1980, severe rainstorms over central California precipitated high river outflow through the Sacramento-San Joaquin Delta, which, coinciding with gale force winds over the Sacramento-San Joaquin Delta and high tides, resulted in levee failure and flooding to approximately 9,600 acres. Continued high inflow to the Sacramento-San Joaquin Delta and wind-generated waves increased erosion on all Sacramento-San Joaquin Delta levees, necessitated intensive flood fighting, and the temporary disruption of boat traffic. In late February 1980, three islands at the lower end of the Yolo Bypass were inundated. Even inspected levees are prone to failure under certain conditions, such as the Jones Tract, which failed in 2004 after inspection.

2.3.6 POTENTIAL CHANGES TO FLOOD RISK IN FUTURE YEARS

Likelihood of Future Occurrence

Suisun City's proximity to the shoreline, reliance on levees, and vulnerability to precipitation-related flooding indicates that flooding is likely to occur in Suisun City in the future. Suisun Slough, the lower reaches of stream tributary to Suisun Bay, and the lower reaches of Sacramento River are under the influence of tides. The most severe flooding along these waterways would result when very high tides and a large volume of stream outflow occur at the same time, along with strong onshore winds generated wave actions.

Sea levels have risen in the San Francisco Bay and are expected to continue to rise at an accelerated rate over the coming century. Sea level rise will occur slowly over time and increase impacts of other shoreline hazards, such as shoreline erosion and flooding.

Climate Change and Flooding

Climate change is expected to make flood events worse, as scientists expect that climate change will cause more years with extreme precipitation events. This means that more years are likely to see particularly intense storm systems that drop enough precipitation over a short enough period to cause flooding. Because of this, floods are expected to occur more often in Suisun City and climate change may expand the parts of the city that are considered prone to flooding. There are some indirect effects of climate change that may also increase flooding in the city. Climate change is expected to increase

the frequency and severity of droughts that cause soil to dry out and become hard. When precipitation does return, more water runs off the surface than is absorbed into the ground, which can lead to floods. Rising seas increase the risk of shoreline flooding and storm surge inundation.

While the risk and associated short- and long-term impacts of climate change are uncertain, experts in this field tend to agree that among the most significant impacts include those resulting from increased heat and precipitation events that cause increased frequency and magnitude of flooding. Increases in damaging flood events will cause greater property damage, public health and safety concerns, displacement, and loss of life. Displacement of residents can include both temporary and long-term displacement, increase in insurance rates, or restriction of insurance coverage in vulnerable areas.

The science associated with sea level rise is regularly updated, revised, and strengthened. Although there is no doubt that sea levels have risen and are projected to continue to rise at an accelerated rate over the coming century, it is difficult to predict with certainty what amount of sea level rise will occur within a given time frame. The uncertainties increase over time (i.e., the uncertainties associated with 2100 projections are greater than those associated with 2050 projections) because of uncertainties in future GHG emissions, the sensitivity of climate conditions to GHG concentrations, and the overall capabilities of climate models. Nonetheless, rising seas increase the risk of flooding, storm surge inundation, coastal erosion and shoreline retreat, and wetland loss. Community assets and infrastructure that border the shoreline are vulnerable to damage from storms, which will likely increase as the sea level continues to rise and inundate areas further inland. As sea levels rise, the area and the number of people at risk because of flooding will also increase.

2.3.7 IMPLICATIONS FOR THE PUBLIC HEALTH AND SAFETY ELEMENT UPDATE

The Public Health and Safety Element Update can continue to reduce Suisun City's vulnerability to flood risk by incorporating policies to:

- Assess sea level rise projections on a project site when reviewing new development.
- Maintain the structural and operational integrity of essential public facilities during flooding.
- Locate, when feasible, new essential public facilities outside of flood hazard zones, including hospitals and healthcare facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities or identify construction methods or other methods to minimize damage if these facilities are located in flood-hazard zones.

- Ensure that flood warnings and flood evacuation services are accessible to all members of the Suisun City community.
- Assist low-resourced and physically challenged residents in installing flood-control measures.
- Explore opportunities for installing green infrastructure and permeable paving materials to reduce flood risk; provide support services and incentives for property owners installing such measures.
- Improve marina facilities to withstand king tide events, shoreline flooding, and sea level rise.
- Coordinate with Solano County Water Agency and Solano County Reclamation and Levee Districts to monitor and respond to changes in sea level.
- Engage in marsh ecosystem restoration activities to slow the advance of sea level rise.
- Inform the public about risks pertaining to sea level rise and flooding.

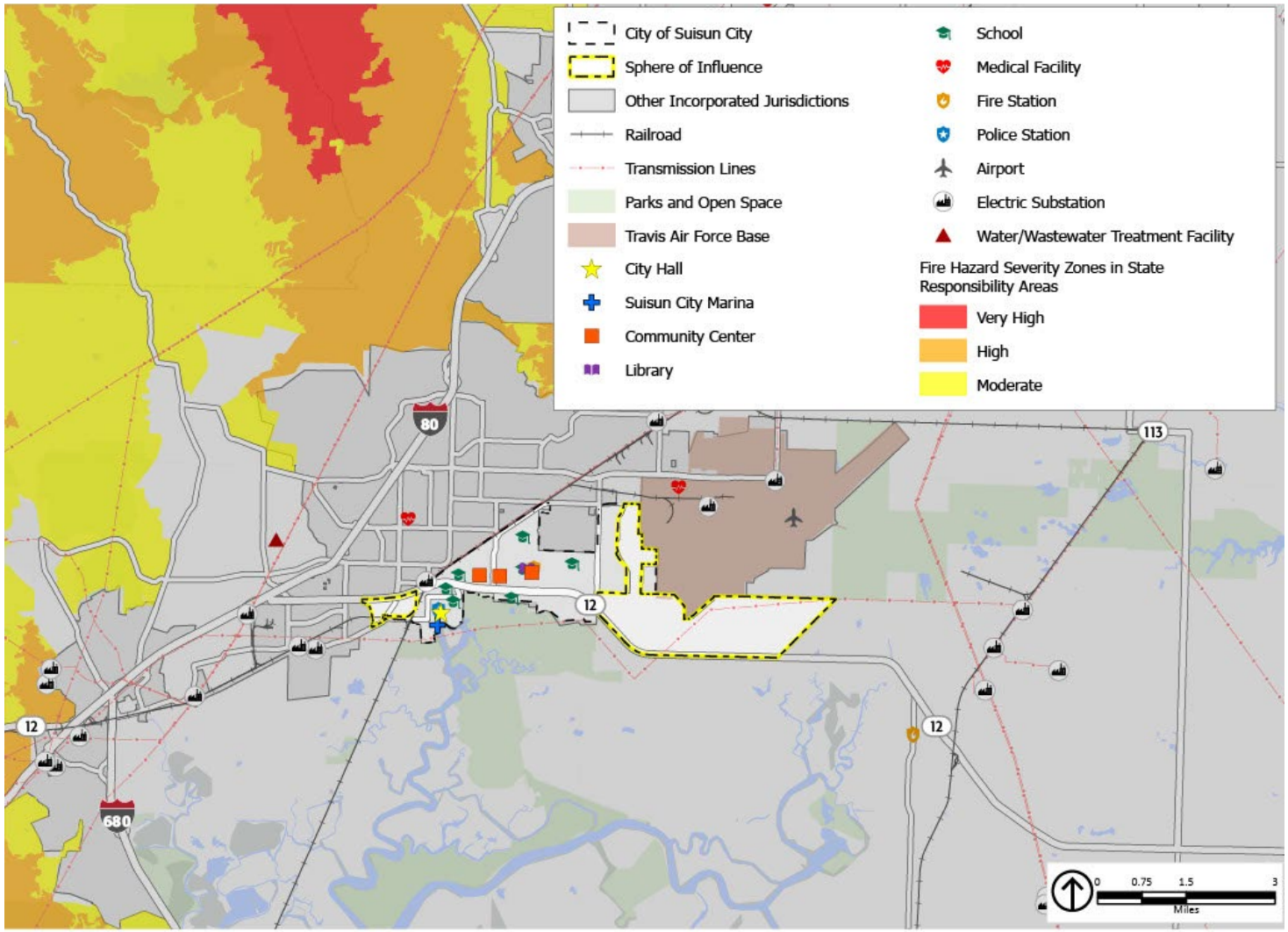
2.4 FIRE RISK

Suisun City is threatened by both urban and rural fires with the potential to cause property damage, injury, and loss of life. Fire risks are not solely contained to wildfires. Older structures often are not constructed to meet current fire codes, so may pose an additional risk.

2.4.1 WILDFIRES

Vegetation, wind, temperature, humidity, and slope are all factors that affect how wildfires spread. The worst wildfire hazards occur where easily ignitable grass is growing with brush, which in turn serves as an extremely effective fuel link to the dense woodland canopy. Open space areas and grasslands, particularly those adjacent to urban development, can pose major risks for wildfires. Most areas within the city boundaries, sphere of influence, and surrounding areas are characterized as moderate to low fire risk.[7] However, according to the California Department of Forestry and Fire Protection (CAL FIRE), there are areas of moderate fire risk in the western part of the city and just east of Sunset Avenue and south of SR-12. These areas occur in close proximity to existing residential land uses. **Figure 9** shows the Fire Hazard Severity Zones surrounding Suisun City.

Figure 9: Fire Hazard Severity Zones



Source: CalFire 2007, Solano County, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

The wildland-urban interface (WUI) is an area where buildings and infrastructure (e.g., cell towers, schools, water supply facilities) mix with areas of flammable wildland vegetation. The WUI is made up of three distinct zones. The intermix zone contains housing development or improved parcels interspersed in an area dominated by wildland vegetation subject to wildfire. The interface zone contains dense housing next to vegetation, but not dominated by wildland vegetation, that can burn in a wildfire. The influence zone contains wildfire-susceptible vegetation within 1.5 miles from the WUI or wildland-urban intermix zones. In the WUI, efforts to prevent ignitions and limit wildfire loss hinge on hardening structures and creating defensible space through a multi-faceted approach, which includes engineering, enforcement, education, emergency response, and economic incentive. Different strategies in the defense and threat zones of the WUI help to limit the spread of fire and reduce the risk to people and property. WUI areas in and around Suisun City are shown in **Figure 10**. These areas occur predominately along the eastern border of the city in close proximity to existing residential land uses.

Over half of the populations evaluated in the Vulnerability Assessment are highly or severely vulnerable to wildfire and wildfire smoke. Some populations can stay indoors or travel to the Nelson Community Center or Macedonia Church of God in Christ to protect themselves from smoke conditions. However, those who lack medical insurance or have other financial hardships may not be able to seek medical attention for wildfire smoke-related illnesses and may be unable to afford retrofits to keep their indoor air quality clean. When wildfire smoke conditions and extreme heat events coincide, many community members are faced with either opening their windows to cool off their house, letting smoke in, or keeping windows closed, which keeps indoor air temperatures high. The following lists the populations most vulnerable to wildfire and wildfire smoke.

- Those with mobility issues or lack of access to transportation (seniors, children, persons with chronic illnesses and/or disabilities) may be unable to effectively evacuate during a wildfire emergency or seek medical attention on their own.

- Households in poverty, immigrant communities, low-income households, and low-resourced people of color may live in less-resilient structures that are more likely to burn down in the event of a wildfire. These persons may be ineligible for or lack the time and resources to rebuild and recover from wildfires and may not have medical insurance to seek help from smoke-related illnesses.[8]

- Those who spend a disproportionate amount of time outdoors (outdoor workers and persons experiencing homelessness) may be directly exposed to smoke and ash from wildfires, causing asthma or respiratory conditions.

- Pollution-burdened populations may have existing health conditions due to pollutants in the land, water, or air where they live or work, which can be exacerbated by wildfire smoke.[9]

Wildfire smoke can also make it difficult for residents to use public transit, as people may not be able to wait outside in smoke conditions for a bus or train. The accommodation and tourism industry can be harmed if visitors are deterred from traveling to Suisun City due to smoke conditions. Wildfires outside of Suisun City can destroy energy delivery infrastructure, disrupting services, as well as degrade water supplies due to ash or fire retardants that make their way into surface water supplies.

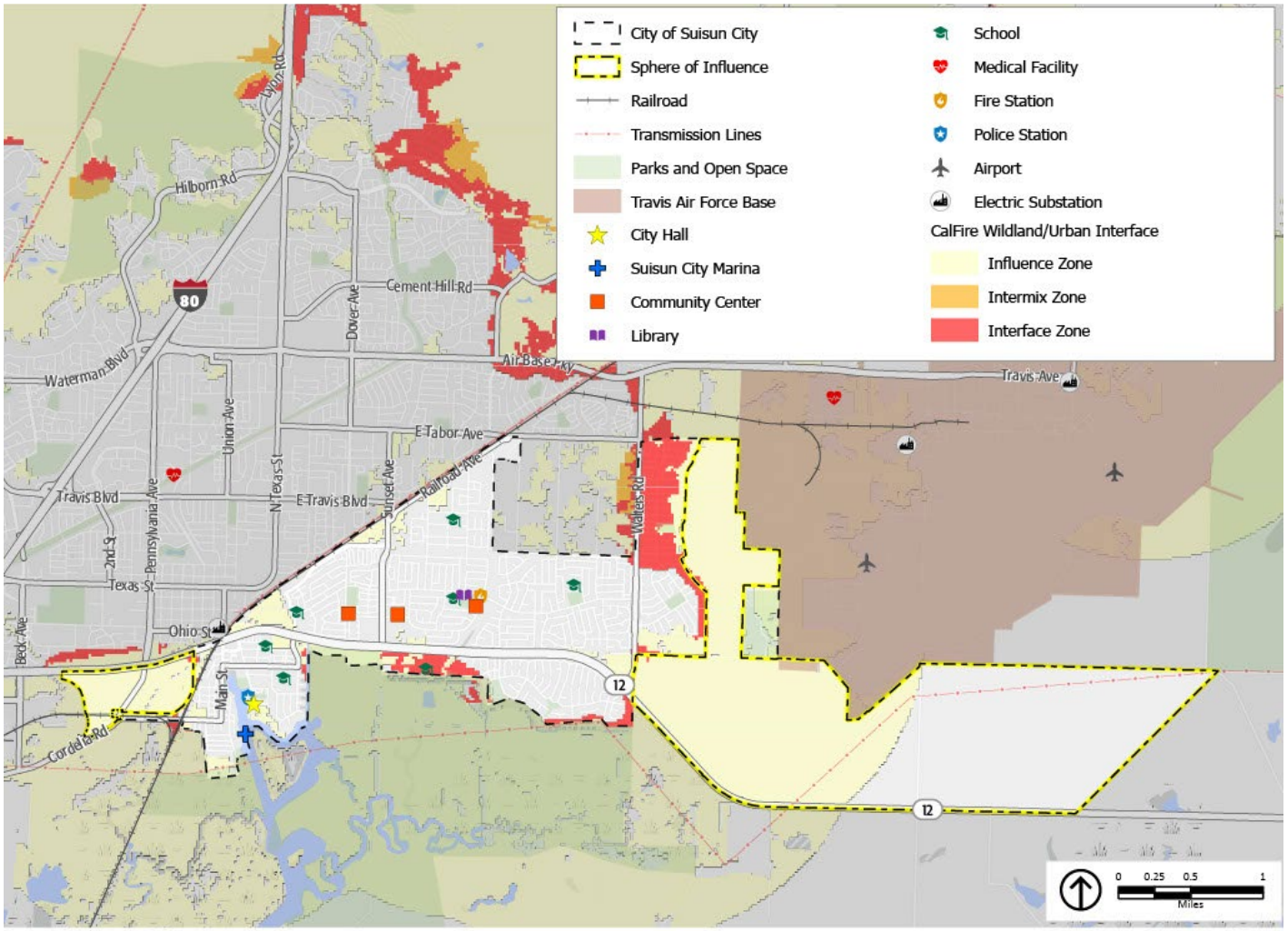
2.4.2 STRUCTURAL FIRES

Fire risks are not solely contained to wildfires. Older structures oftentimes are not constructed to meet current fire codes, so may pose an additional risk. Many of these structures may have inadequate electrical and heating systems. Approximately 30 percent of Suisun City's housing stock was constructed prior to 1980.

2.4.3 WILDFIRE SMOKE

Proximity to fire-prone areas increases the potential for smoke from wildfires to increase air pollution levels, creating a significant health risk to community members. Increasing local and regional fire frequency can create recurring air quality degradation events, leading to respiratory health effects. Wildfire smoke consists of a mix of gases and fine particulate matter from burning vegetation and materials. The pollutant of most concern from wildfire smoke is fine particulate matter ($PM_{2.5}$). $PM_{2.5}$ from wildfire smoke is damaging to human health because of its ability to deeply penetrate lung tissue and affect the heart and circulatory system. Although wildfire smoke presents a health risk to everyone, sensitive groups may experience more severe acute and chronic symptoms from exposure to wildfire smoke, such as children, older adults, people with chronic respiratory or cardiovascular disease, or people with few resources.

Figure 10: Wildland-Urban Interface Areas



Source: CalFire 2015, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

2.4.4 FIRE PROTECTION

The Suisun City Fire Department provides fire protection for Suisun City. The Fire Department provides 24/7 fire protection and emergency services, including fire suppression, medical response, and natural and human-caused disaster preparedness. The Fire Department also responds to public assistance calls, provides public education programs for schools within the city, and manages the nuisance weed abatement program.

The Suisun City Fire Department is an all-hazards and all-risk Fire Department that covers the 4.5 square miles that make up the boundaries of the city. The department operates out of one fire station, located at 621 Pintail Drive. The Fire Department is a combination agency staffed with both full-time and volunteer fire personnel. Daily staffing currently consists of four firefighters staffing two engine companies 24/7. The department currently operates a fleet of two Type 1 fire engines, one Type 3 fire engine, one ladder truck, three command vehicles, one Type 5 fire engine, and two Zodiac Rescue Boats. In 2021, the department ran 2,382 medical aids and 995 fire related calls totaling 3,377 calls for service. The Suisun City Fire Department has experienced a 41.9% increase of calls for service over the past five years, which is consistent with a growing community. Growth of residential, commercial, industrial projects and annexation will continue to challenge the fire department in its ability to meet response time standards as adopted in the City of Suisun General Plan policy CFS-2.1 of Five Minutes or less.

Currently, average response times to both the east and west side city limits are well over five minutes. Extended response times impact our ability to mitigate fires of small to moderate-size, and quickly escalate to large fires. Climate changes, local weather influences including excessive heat and drought conditions compounded by extended response time contribute to fires growth and destruction. Past Occurrences

Several moderate and large-scale sized fires have affected Suisun City in recent years, including the following:

- In June 2020, a wildfire erupted near the Suisun City Wildlife Center. Heavy winds and high temperatures accompanied the fire, which spread from the wildlife center to homes in Suisun City.[10] Several homes were destroyed and evacuations took place on Elmwood and Maple Streets.[11] The fire burned more than 300 acres.[12]

- In October 2020, the Petersen Fire began on Petersen Road near Suisun City, fueled in part by high winds in the Sacramento Valley. Highway 12 between Scally Road and Walters Road was closed to help control the blaze.[13]
- A two-alarm house fire occurred in February 2021.[14]
- In May 2021, a vegetation fire resulted in the closure of southbound Sunset Avenue. Several businesses were affected by the road closure and smoke.[15]
- A January 2022 fire destroyed a roofing company building within Suisun City.[16]
- In April 2022, a structural fire destroyed two homes and threatened a third. The fire was fueled by high winds.[17]
- In June 2022, a backyard fire damaged a nearby home.[18]

Several large regional fires have also occurred within the greater Solano County and northern California area within recent years, generating smoke that affected Suisun City. These include the following:

- One of the largest and most destructive wildfires in California history, the Camp Fire originated in Butte County in November 2018. The fire was ignited by a faulty electric transmission line and its spread was exacerbated by strong winds and regional drought conditions. The fire forced the evacuation of several Butte County communities. While Suisun City was not directly impacted by the blaze itself, smoke from the air caused significant reductions in air quality across the Bay Area and Central Valley. Due to the large number of structures burned in the Camp Fire, the smoke contained elevated levels of lead, zinc, calcium, iron, and manganese.[19]

- The LNU Lightning Complex was a large complex of wildfires that burned during the 2020 California wildfire season across much of the wine country area of northern California—Lake, Napa, Sonoma, Solano, and Yolo Counties—from August 17 to October 2, 2020. The complex consisted of numerous lightning-sparked fires, most of which were small. The Hennessey Fire eventually grew to merge with the Gamble, Green, Markley, Spanish, and Morgan fires, scorching 192,000 acres by itself, for a total burn area of 363,220 acres in the complex. The fire, which burned in the hills surrounding Vacaville, Fairfield, and Napa, destroyed 1,491 structures and damaged a further 232. Six people were killed and another five injured. As of spring 2022, the LNU Lightning Complex was the sixth-largest, eleventh-most destructive, and sixteenth-deadliest fire in California's recorded history.

2.4.5 POTENTIAL CHANGES TO FIRE RISK IN FUTURE YEARS

Likelihood of Future Occurrence

Given the complex relationships between climate, vegetation, hydrology, and human behavior that contribute to fire risk, fire severity can fluctuate from year to year. Historically, wildfires have burned an annual average of 96 acres per year in Suisun City. By mid-century (2035- to 2064), wildfires are projected to increase to an annual average of 123 acres per year. By the end of the century (2070 to 2099), wildfires may burn an annual average of 114 acres per year in Suisun City. Even if Suisun City is not directly subject to wildfire itself, it will experience poor air quality events due to wildfire smoke. Structural, vehicle, trash, and other types of urban and structural fire within built-up areas will likely continue to occur periodically within Suisun City. The spread of these fires can be exacerbated by high temperatures, high winds, and low humidity.

Climate Change and Wildfire

Changing climate conditions are expected to increase the fire risk in and around Solano County. Warmer temperatures brought on by climate change can exacerbate drought conditions. Droughts can kill or dry out plants, creating more fuel for wildfires. Increased winds may result in more erratic fire behavior, making fires harder to contain. Warmer temperatures are also expected to occur later in the year, extending the wildfire season, which is likely to begin earlier in the year and extend later than it has historically. Therefore, even in years in which wildfire does not occur within Suisun City, the city may still be affected by the public health and safety impacts of wildfire smoke from wildfires occurring throughout the region.

2.4.6 IMPLICATIONS FOR THE PUBLIC HEALTH AND SAFETY ELEMENT UPDATE

The Public Health and Safety Element Update can help the Suisun City community prepare for and respond to fire hazards by introducing policies to do the following:

- Consider exposure to fire hazards when approving new development.
- Offer educational materials, rebates, and incentives for property owners looking to retrofit their buildings and properties to improve fire safety.

- Ensure that fire warnings and evacuation services are accessible to all members of the Suisun City community.
- Develop a wildfire mitigation plan to identify specific projects the City may wish to undertake related to wildfire.
- Provide resources to assist elderly and physically disabled residents in maintaining defensible space around their homes.
- Provide resources to help residents respond to poor air quality events.

2.5 GEOLOGIC, SOILS, AND SEISMIC HAZARDS

The Suisun City area is situated in the Great Valley Geomorphic Province of California. This province is characterized as a relatively un-deformed sedimentary basin bounded by highly deformed rock units of the Coastal Ranges to the west and by the gently sloping western foothills of the Sierra Nevada to the east. The Sacramento Valley, which forms the northern portion of the Great Valley Province, is composed of unconsolidated and recent-age alluvial sediments. The underlying bedrock is thought to be composed of early tertiary marine deposits. Suisun City is susceptible to geologic, soil, and seismic hazards. The major geologic hazards are linked to seismic activity.

2.5.1 SEISMIC HAZARDS

Geologic evidence indicates that Suisun City is within an area of northern California known to be seismically active. Seismic activity may result in geologic and seismic hazards, including seismically induced fault displacement and rupture, ground shaking, liquefaction, lateral spreading, landslides, and structural hazards. Fault rupture is a seismic hazard that affects structures sited above an active fault. The hazard from fault rupture is the movement of the ground surface along a fault during an earthquake. Typically, this movement takes place during the short time of an earthquake, but it can also occur slowly over many years in a process known as creep. Most structures and underground utilities cannot accommodate the surface displacements of several inches to several feet commonly associated with fault rupture or creep.

Solano County contains a number of faults and faults both within and outside the county could potentially affect Suisun City. However, only two faults run close to the city, both of which are part of the Vaca-Kirby Hills fault, which trends north-south to the south and east of the city's sphere of

influence, as shown in **Figure 11**. Geologic studies indicate that this is an active fault that may pose a risk for surface rupture.

Segments of two of Solano County's faults – the Green Valley Fault and the Cordelia Fault, both part of the greater Concord/Green Valley Fault system – are known to be active. Both faults have been zoned under the Alquist-Priolo Act, meaning that development in the immediate vicinity of the fault trace must be preceded by detailed fault investigations. The Concord/Green Valley Fault system, including the Concord and Green Valley Faults and some active secondary traces such as the Cordelia Fault, consist of a highly complex zone with potential for either major or smaller events to the northwest and southeast of Suisun Bay. The Green Valley Fault trends northwest along the eastern front of the Benicia Hills and appears to have right lateral offset, which means that the western side has moved northward relative to the eastern side, or vice versa. The fault shows many features associated with recent activity, including offset fences and power lines, location of micro-earthquake epicenters along the fault trace, and disrupted drainage patterns. In 2002, the U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities (WGCEP) determined that the Concord/Green Valley Fault has a 4 percent chance of experiencing an earthquake of magnitude 6.7 or greater.[20] The Green Valley and Cordelia Faults are in western Solano County, and do not present any risk of surface fault rupture in the city's sphere of influence. However, strong ground shaking from a seismic event on these two faults, the Vaca-Kirby Hills Fault, or other active faults in the region could result in seismic hazards.

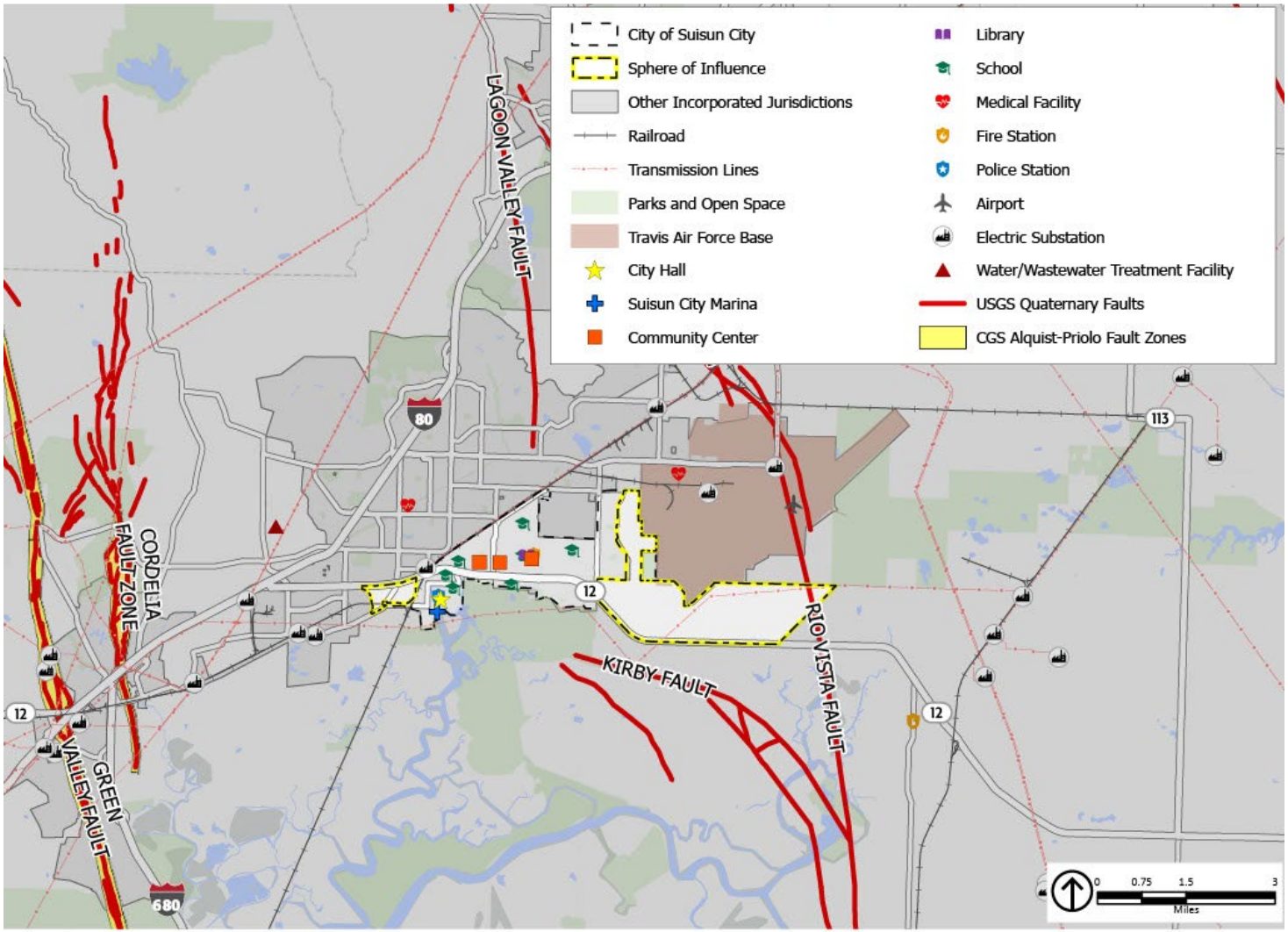
Ground failure, in the form of liquefaction, lurching, and settlement, could result from earth shaking. Flood damage in the western portion of the city from earthquake-induced dam failure, as well as canal and levee damage could occur. Depending on the magnitude, proximity to epicenter, type of construction, and subsurface conditions (e.g., bedrock stability and the type and thickness of underlying soils), ground-shaking damage could vary from slight to intense. For example, the wet unconsolidated soils of the Suisun Marsh would have a high ground response, while surrounding areas of hard rock generally would experience lower intensities of shaking. In Suisun City, the greatest risk to life stems from existing structures that were inadequately constructed or have been improperly maintained. In unreinforced masonry structures, the greatest hazard is not from the building's collapse, but from falling objects, ornaments, brick veneers, chimneys, or glass.

2.5.2 SOIL HAZARDS AND GROUND FAILURE

Shrink-Swell Potential

Shrink-swell potential is the relative change in volume of soil to be expected with changes in moisture content. This is the extent to which the soil shrinks as it dries out or swells when it gets wet. Shrinking and swelling is influenced by the amount and kind of clay in the soil, as clays tend to swell despite the loads imposed by large structures. Shrinking and swelling of soils causes damage to building foundations, roads, and other structures. Most of the city's sphere of influence is in areas with high shrink-swell potential.[21]

Figure 11: Regional Fault Lines



Source: USGS 2018, CGS 2017, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Liquefaction

Ground failure can occur through liquefaction and the liquefaction-induced phenomena of lateral spreading and lurching. Liquefaction is a process by which sediments below the water table temporarily lose strength during an earthquake and behave as a viscous liquid rather than a solid. Liquefaction can cause the soil beneath a structure to lose strength, which may result in the loss of foundation-bearing capacity. This loss of strength commonly causes the structure to settle or tip. Loss of bearing strength can also cause light buildings with basements, buried tanks, and foundation piles to rise buoyantly through the liquefied soil.

Liquefaction is restricted to certain geologic and hydrologic environments, primarily recently deposited clean, uniformly graded, loose, saturated, fine-grained sand and silt in areas with high groundwater levels. Where gentle slopes exist such as on stream or slough banks, liquefaction may cause lateral spreading landslides. Whole buildings can be moved downslope by this type of ground failure. Where the condition is known to exist, structural and foundation design can usually minimize or eliminate liquefaction hazard to new construction. Soil layers with high and very high liquefaction potential are present in the existing and former marsh areas in the western part of the city's sphere of influence. Areas in Suisun City and the surrounding area with a high liquefaction potential are mapped in **Figure 12**.

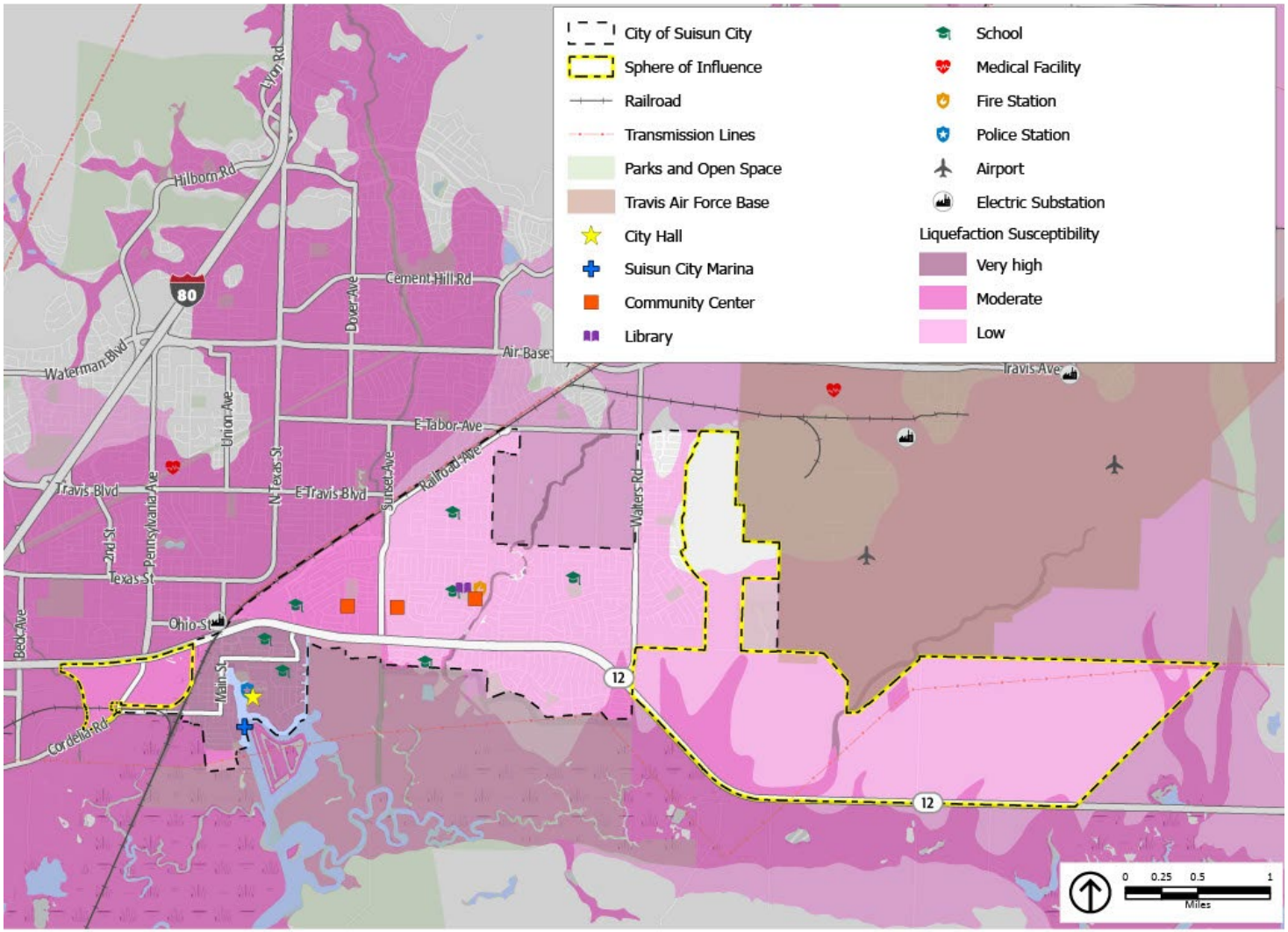
Landslides

Landslides and slope instability are characterized by the movement of soils and bedrock down steep slopes. This movement results from wet weather, seismic shaking, and/or improper construction, grading, and drainage. Areas of medium landslide risk are scattered throughout the city. The most prominent of these areas occur in the middle of the city, generally coinciding with McCoy Creek, and along the northern half of the eastern border of the city. Landslide hazard areas are shown in **Figure 13**.

Lateral Spreading

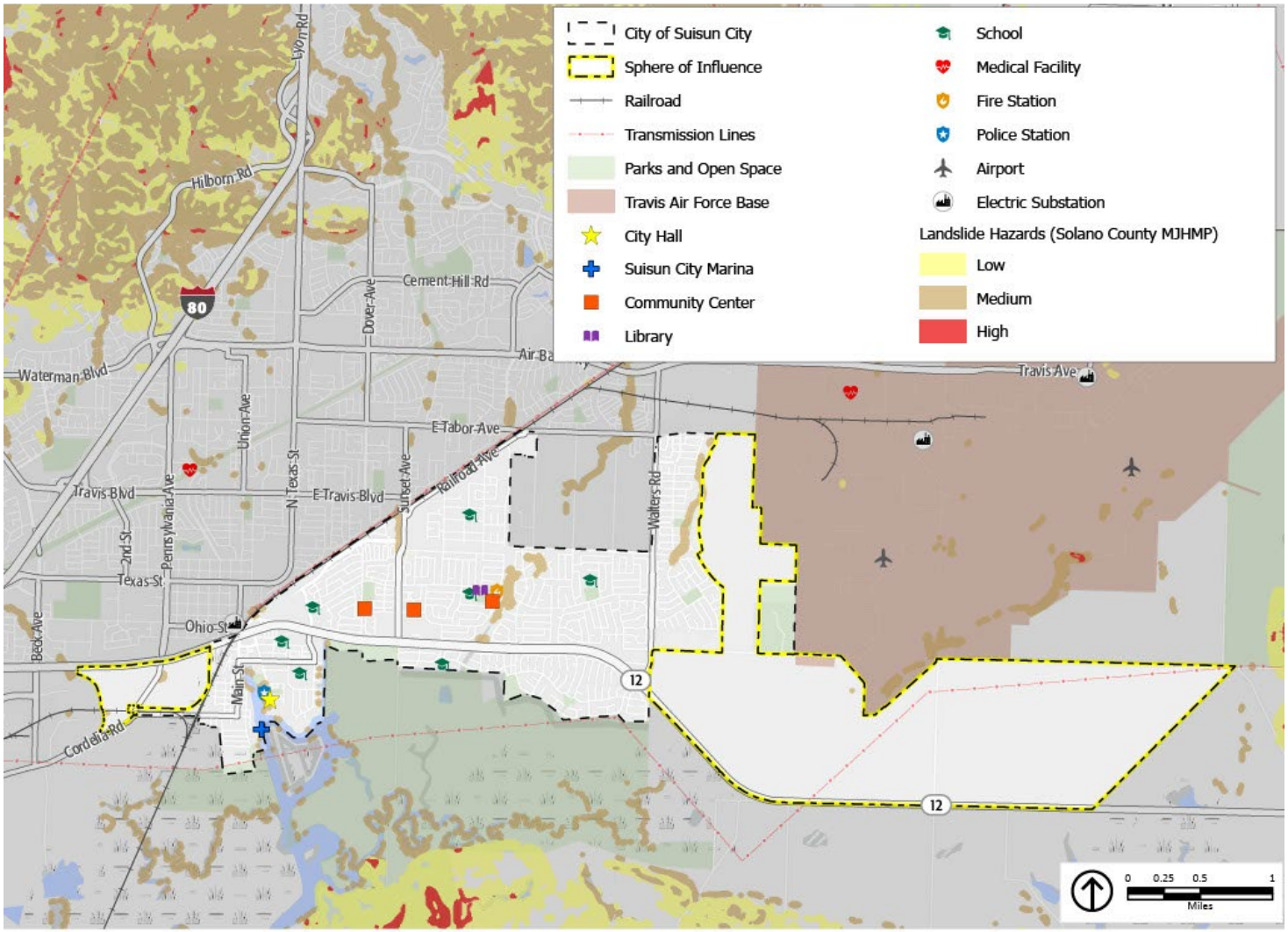
Lateral spreading is lateral ground movement, with some vertical component, as a result of liquefaction. Laterally spreading soil rides on top of the liquefied layer outward from under buildings, roads, pipelines, transmission towers, railroad tracks, and other structures such as bridges. Lateral spreading can occur on relatively flat sites with slopes less than 2 percent, under certain circumstances, and can cause ground cracking and settlement. Damage is usually greatest to large or heavy structures on shallow foundations, and takes the form of cracking, tilting, and differential settlement.

Figure 12: Liquefaction Susceptibility



Source: USGS 2006, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Figure 13: Landslide Susceptibility



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

2.5.3 GEOLOGIC, SOILS, AND SEISMIC HAZARD REDUCTION

Chapter 15 of the Suisun City Code of Ordinances adopts the California Building Code (CBC) in its entirety, excepting additions, revisions, and omissions as listed in Section 15.04.200. The CBC regulates seismic design, the excavation of foundations and retaining walls, analysis of slope instability, requirements for drainage and grading, and other aspects of building design and construction that relate to geology, soils, and seismicity. Section 15.12 of the City's Code of Ordinances issues regulations pertaining to grading, erosion control, and creek side development.

2.5.4 PAST OCCURRENCES

USGS data for historic earthquakes indicates that several earthquakes have occurred between 1889 and the present within the area of Solano County. However, none had epicenters within the city's sphere of influence. Noteworthy earthquakes occurred in 1906 San Francisco Earthquake (magnitude 7.9, 56.1 miles away from the city center), 1989 Loma Prieta Earthquake (magnitude 7.1, 79.7 miles away from Suisun City center), 1922 Parkfield Earthquake (magnitude 7.6, 253.9 miles away from the city center), 1952 Kern County Earthquake (magnitude 7.7, 280.0 miles away from the city center), 1927 Lompoc Earthquake (magnitude 7.5, 236.7 miles away from Suisun City center), and 1992 Landers Earthquake (magnitude 7.2, 182.3 miles away from the city center).

2.5.5 POTENTIAL CHANGES TO GEOLOGIC AND SEISMIC RISK IN FUTURE YEARS

Likelihood of Future Occurrence

Seismic Risk

Suisun City, like most of California, is in a seismically active area. The probability of a major earthquake occurring in the near future is likely. Given the seismic conditions as presented, the major seismic hazards in Suisun City are damages from ground shaking and liquefaction. The existence of unreinforced masonry structures within the city limit will most likely cause a catastrophic loss of property and lives. A major earthquake is likely to trigger other geologic hazards, including liquefaction, levee damage, flooding, fire, and hazardous materials incidents. It is likely that catastrophic interruptions and/or failure in communications electrical power, water supply, wastewater treatment, natural gas, and petroleum fuels will occur.

Geologic Risk

Suisun City is vulnerable to geologic hazards, such as landslides, erosion, and expansive soils. However, hazard areas are confined to relatively small areas of the city. Heavy rainfall may exacerbate risks pertaining to erosion and landslides.

Climate Change and Geologic and Seismic Hazards

While climate change is unlikely to increase earthquake frequency or strength, the threats from seismic and geologic hazards are expected to continue. Climate change may result in precipitation extremes (i.e., wetter rainfall periods and drier dry periods). While total average annual rainfall may not change significantly, rainfall may be concentrated in more intense precipitation events. Heavy rainfall could cause an increase in the number of landslides or make landslides larger than normal. The combination of a generally drier climate in the future, which will increase the chance of drought and wildfires, and the occasional extreme downpour, is likely to increase landslide potential.

2.5.6 IMPLICATIONS FOR THE PUBLIC HEALTH AND SAFETY ELEMENT UPDATE

The Public Health and Safety Element Update can address Suisun City's ability to prepare for and respond to seismic and geologic hazards through the following strategies:

- Increasing public awareness regarding seismic and geologic risks.
- Ensuring that critical facilities will remain operational in the event of an earthquake or landslide.
- Engaging in soil erosion response and slope stabilization activities in areas that have been subject to erosion or landslides.

2.6 EMERGENCY RESPONSE

All communities may experience disasters and emergency situations, whether they are of natural or human-related causes. Citizens and first responders must be prepared to react to such an emergency. The Suisun City Fire Department and Police Department are equipped to provide a first line of emergency response in the unlikely event of a major disaster.

The Police Department operates a patrol beat and neighborhood watch. The Operations Division provides patrol, traffic enforcement, and problem-oriented policing. The Support Division includes Investigations, School Safety Traffic Officer, and Citizen Volunteers. Specialty Units include the Boating Safety unit and partnership with the County's SWAT Team. The Police Department has an authorized staff of 26 police officers and one community service officer who would be field-ready in the event of an emergency.

The Police Department uses Nixle, a citizen notification service, that delivers important and timely emergency and general information to the city's residents using the web, text messaging, and email. Nixle alerts residents to emergency weather events, road closings, public safety advisories, natural and human-made disasters, and general city information.

2.6.1 EMERGENCY EVACUATION

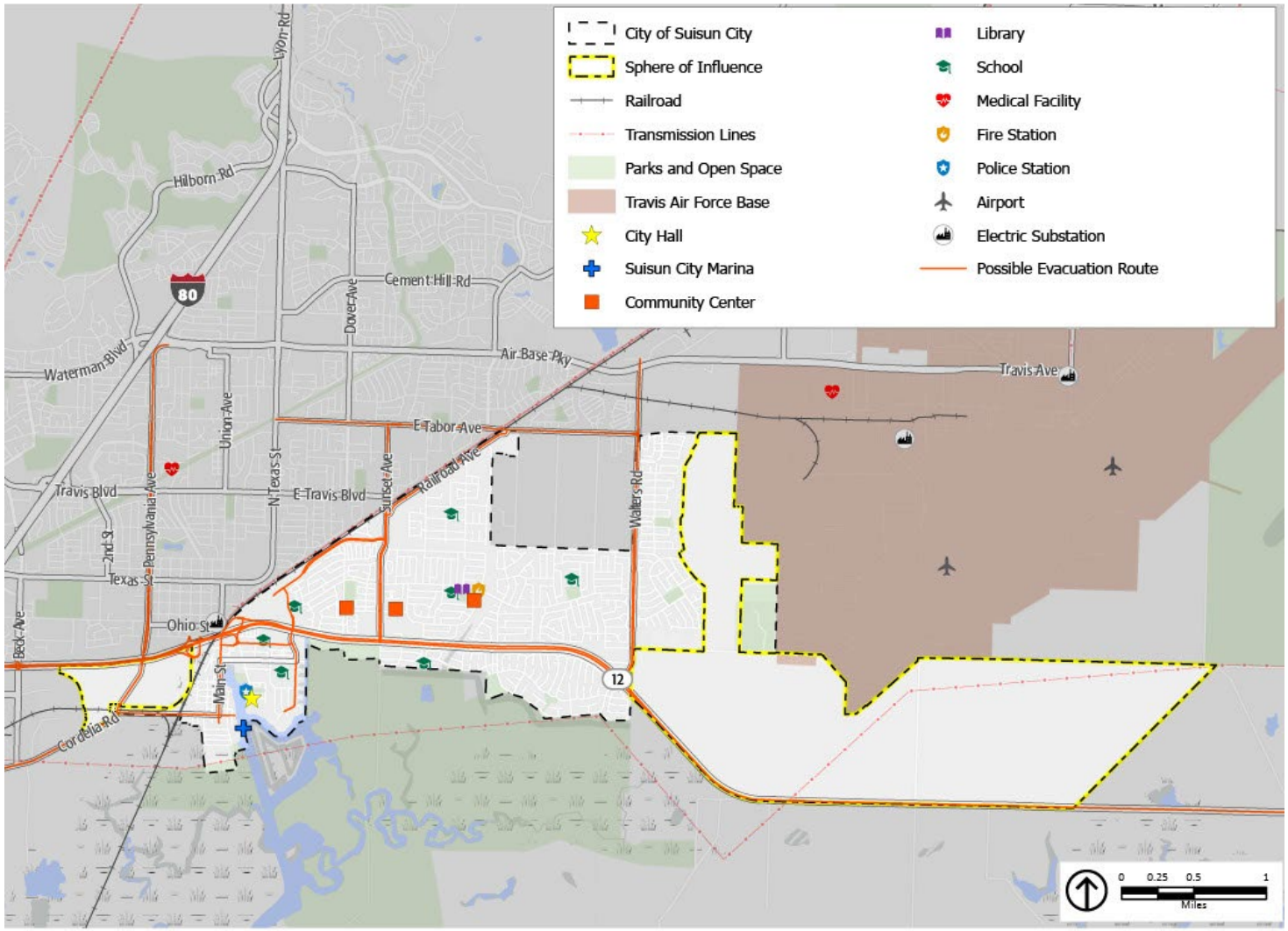
With advanced warning, evacuations can be effective in reducing injury and loss of life during a catastrophic event. **Figure 14** shows evacuation routes serving Suisun City, including SR-12, Walters Road, Sunset Avenue, Marina Boulevard, Main Street, Pennsylvania Avenue, Cordelia Street, Cordelia Road, Railroad Avenue, East Tabor Avenue, Peterson Road, and Lotz Way. **Figure 15** shows residential parcels with evacuation constraints. Evacuation-constrained parcels south of SR-12 are in shoreline flood hazard areas and parcels along McCoy Creek are located in flood hazard areas. Evacuation-constrained parcels east of Walters Road are within the WUI-identified parcels in the center of Suisun City and are located in medium landslide susceptibility areas. These evacuation-constrained areas may have only one emergency evacuation route. The lack of multiple emergency access points limits roadway access for these properties, which may create difficulties if there is a need to evacuate.

2.6.2 POTENTIAL CHANGES TO EMERGENCY RESPONSE IN FUTURE YEARS

Climate Change and Emergency Response

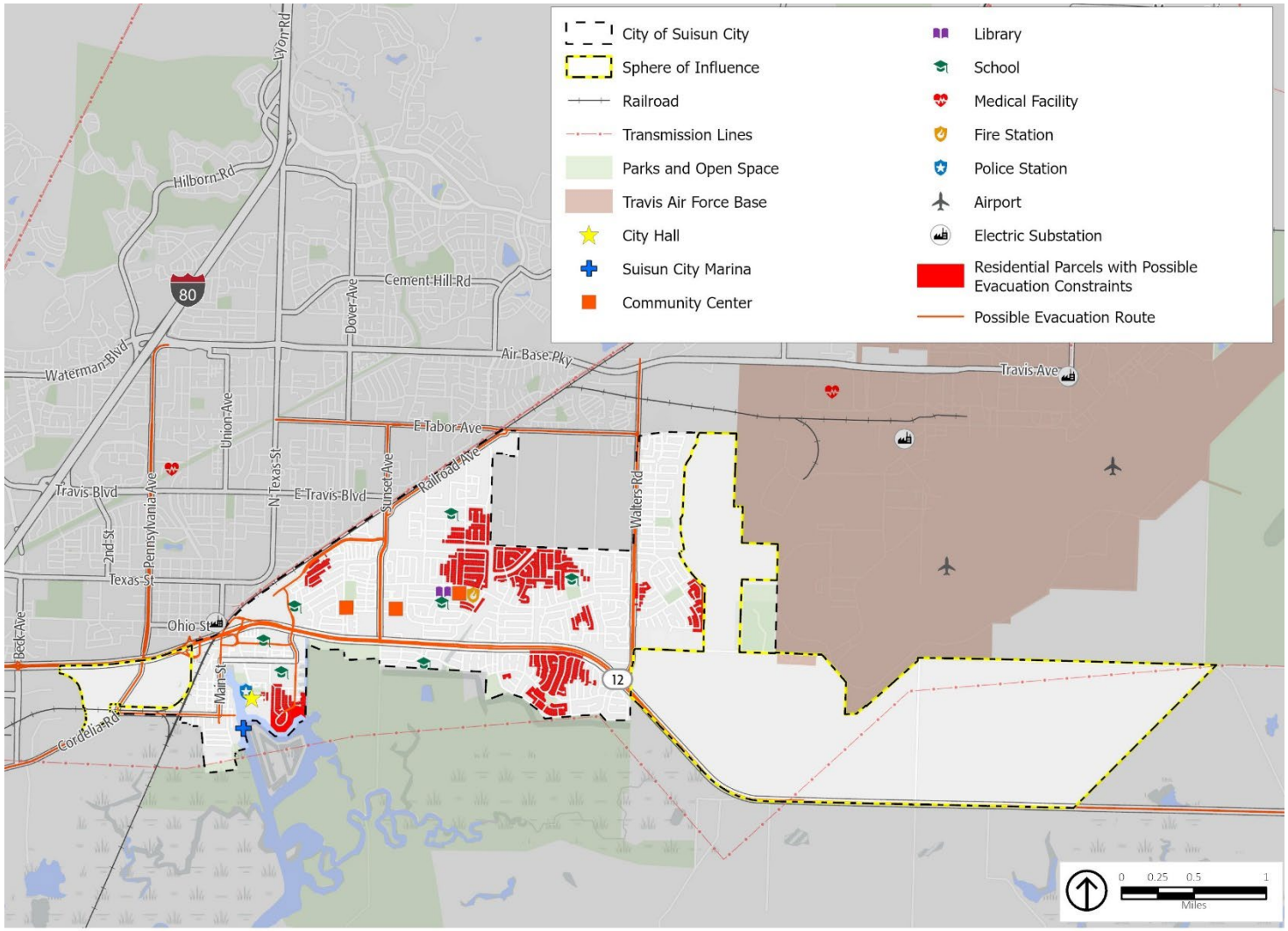
Climate change-related shifts in wildfire, flooding, extreme heat, and severe weather patterns will likely make natural hazards-related emergencies both more frequent and more intense. Given the ability of wildfires, floods, extreme heat, and severe weather to damage structures and infrastructure and harm human health, increased frequency of these natural hazards will likely increase demand for disaster preparation and recovery assistance. These hazards may also block evacuation routes, isolating residents and preventing them from evacuating during emergencies.

Figure 14: Evacuation Routes



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

Figure 15: Residential Parcels with Evacuation Constraints



Source: Solano County 2021, Solano LAFCO 2020, USDOT BTS 2021, PlaceWorks 2022, ESRI

2.6.3 IMPLICATIONS FOR THE PUBLIC HEALTH AND SAFETY ELEMENT UPDATE

Policies within the Public Health and Safety Element should address adequacy of citywide evacuation facilities and emergency response services. Examples of specific policies could include addressing the needs of evacuation-constrained parcels via road construction, operating evacuation assistance programs in conjunction with local transit providers to help those with limited mobility or who lack access to a vehicle to safely evacuate and ensuring that evacuation routes remain operational in the event of an emergency. Emergency warning policies could include working with the Fire and Police Departments to increase enrollment in AlertSolano, as well as identifying additional emergency warning mechanisms that can increase access to emergency warnings among isolated or socially vulnerable members of the community. Creation of equitably located resilience hubs designed to serve the emergency response needs of Suisun City's most vulnerable populations, including the elderly, disabled, financially stressed, and those who face high levels of exposure to climate change hazards due to unstable or unsound housing or outdoor work conditions would help residents prepare for emergencies and evacuations.

2.7 ADDITIONAL CLIMATE CHANGE HAZARDS

2.7.1 DROUGHT

A drought is an extended period when precipitation levels are well below normal. Drought is a normal part of the climate cycle. Drought may cause losses to agriculture; affect domestic water supply, energy production, public health, and wildlife; or contribute to wildfire. Like most of California and the western United States, Suisun City chronically experiences drought cycles. Drought impacts the city's water supply, which may in severe instances, ultimately make less water available for people, businesses, and natural systems.

Suisun City obtains its water from the Suisun-Solano Water Authority (SSWA), a joint-powers authority between the City of Suisun City and the Solano Irrigation District. SSWA currently has two sources of water, the United States Bureau of Reclamation Federal Solano Project and the California Department of Water Resources State Water Project (SWP). The main water supply to SSWA is from Lake Berryessa via the Solano Project. The primary water source for the SWP is the Feather River, a tributary of the Sacramento River. Storage released from Oroville Dam on the Feather River flows down natural river channels to the Sacramento-San Joaquin River Delta. The majority of SWP supplies are pumped from the southern Sacramento-San Joaquin Delta into the California Aqueduct. The

California Aqueduct conveys water along the west side of the San Joaquin Valley to the Edmonston Pumping Plant, where water is pumped over the Tehachapi Mountains.

Drought conditions create high vulnerabilities for populations within the city, as water quality may be degraded, become more expensive, and be less available for industries that depend on this resource, such as water recreation and agriculture. Populations especially vulnerable include households in poverty, low-resourced people of color, outdoor workers, and pollution-burdened populations.

Natural systems in the city, including wetland and marsh, and riparian areas in McCoy Creek and along the Suisun Slough are highly vulnerable to drought conditions. Droughts can reduce the amount of freshwater flowing into and through both of these ecosystems, leading to algal blooms, low streamflow, higher temperatures, and increased erosion.[22] Marshes may be able to recover in non-drought years; however, rising sea levels may cause higher concentrations of salinity in the water with the reduction in freshwater, harming both plants and wildlife. Drought conditions can also dry out vegetation in scrub, grassland, and woodland habitats, increasing wildfire conditions and potentially putting a strain on firefighting equipment and personnel.

Past Occurrences

Major droughts have occurred periodically in the Solano County region. Recent major droughts include:

- **1896 to 1900:** A four-year drought occurred in the Vaca Valley area of Solano County. Within two years, fruit production in this area dropped by more than 50 percent.
- **1975 to 1977:** The two driest years (1976 and 1977) in the State of California's history resulted in severe drought conditions in Solano County. The drought was declared an emergency (FEMA-EM-3023) on January 20, 1977, and a State of California disaster in Solano County in February 1976. Total crop damage statewide totaled $2.67 billion dollars for both years ($888.5 million in 1976 and $1.8 billion in 1977).
- **1991:** A drought emergency was declared for Solano County. The US Department of Agriculture (USDA) provided $995 million for crop losses from 1990 to 1991 nationwide, and an additional $775 million in emergency funds for 1990 to 1992 crop losses.
- **2004:** The Small Business Administration (SBA) declared an Economic Injury Disaster in Solano County (Declaration #10073) for drought conditions, which occurred March 1 through September 23, 2004. Small, non-farm businesses in Solano County were able to apply for Economic Injury Disaster Loans to cover working capital needs. The declaration covered

the impact of reduced revenue caused by the drought. These loans were available to offset the economic losses caused by reduced revenue from farmers and ranchers whose crop production suffered.

- **2006 to 2009:** A California State-declared three-year drought of below-average rainfall, low snowmelt runoff, and the largest court-ordered water restriction in the state's history. The dry conditions damaged crops, deteriorated water quality, and caused extreme wildfire danger. Approximately $300 million in agricultural revenue loss, and a potential $3 billion in economic losses over time.
- **2012 to 2016:** The years 2012 to 2016 were particularly dry for much of the state. The USDA included all of California's counties in its drought disaster designations at various times over the course of the drought. An emergency proclamation was issued in January 2014 that ordered state agencies to take specified actions and called on Californians to voluntarily reduce their water usage by 20 percent. In April 2014, the Governor issued an Executive Order to redouble state drought actions that ordered the State Water Resources Control Board to adopt emergency regulations as necessary to direct urban water suppliers to limit wasteful outdoor water use practices and ordered DWR to conduct intensive outreach to local agencies to increase their groundwater monitoring in areas of significant impacts.[23]

The U.S. Drought Monitor recognizes a five-point scale for drought events: D0 (abnormally dry), D1 (moderate drought), D2 (severe drought), D3 (extreme drought), and D4 (exceptional drought). During severe drought conditions, water shortages are common and water restrictions may be imposed so as to meet essential community needs. In 2021, from April through the end of the year, the county was classified as having an "extreme" drought. As of May 2022, western Solano County was classified as being in "severe" drought and eastern Solano County was classified as being in "extreme" drought.

Potential Changes to Drought in Future Years

Likelihood of Future Occurrence

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically, affecting different sectors in different ways and with varying intensities. Adequate water is the most critical issue for commercial and domestic use.

Based on the historic occurrences of drought in California, these events are cyclical, driven by climate patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on comparing observed precipitation with what is normal (climatologic), comparing soil moisture and crop conditions with what is normal (agricultural), or by looking at how much water is contained in snow, the level or flow rate of moving water, water in reservoirs, or groundwater levels (hydrologic). However, how individuals recognize drought depends on the ways in which it affects them. The impacts from drought include reduction in water supply and an increase in dry fuels.

As reported in the SSWA 2015 Urban Water Management Plan, a long drought could result in a major drawdown of Lake Berryessa. However, the SSWA concludes that in a multiple dry-year scenario, the City should still receive 89 percent of its allotment from the Solano Project. The SSWA projects that under a multiple dry-year scenario, the City will receive 24 percent of its typical allotment from the SWP.

Climate Change and Drought

Although droughts are a regular feature of California's climate, scientists expect that climate change will lead to more frequent and intense droughts statewide. Overall, precipitation levels are expected to increase only slightly; however, there will likely be more years with extreme levels of precipitation, both high and low, as a result of climate change. This is expected to cause more frequent and intense droughts compared to historical occurrences that cause soil to dry out and become hard. When precipitation does return, more water runs off the surface than is absorbed into the ground, which can lead to floods. Higher air temperatures are expected to increase evaporation, causing more water loss from lakes and reservoirs, exacerbating drought conditions.

The state Cal-Adapt database indicates that snow water equivalent (i.e., the amount of water contained in snowpack) for the Westside (Yolo, Solano, Napa, Lake Colusa) Integrated Regional Water Management Region (IRWMR) will decrease from a historical annual average baseline of 10.5 inches to an annual average of 1.2 inches in an early-century drought (2023 to 2042), and to an annual average of 0.2 inches under a late-century drought scenario (2051 to 2070). Baseflows within the IRWMR may decline from a historical annual average of 6.1 to 3.4 inches under an early-century drought scenario (2023 to 2042), and to 3.1 inches in a late-century drought scenario (2051 to 2070). [24]

Implications for the Public Health and Safety Element Update

The Public Health and Safety Element can address drought risk by incorporating policies to:

- Promote the use of water-efficient landscaping on existing private property.
- Encourage the use of greywater systems throughout the community.
- Collaborate with the Solano County Water Agency and Solano Resource Conservation District to share best practices regarding drought management and distribute resources to the community.
- Provide public education and outreach about water-use efficiency.
- Provide support to Suisun City residents whose employment may be adversely affected by drought.

2.7.2 EXTREME HEAT

While there is no universal definition of extreme heat, California guidance documents define extreme heat as temperatures that are hotter than 98 percent of the historical high temperatures for the area, as measured between April and October of 1961 to 1990. Days that reach this level are called extreme heat days. In Suisun City, the extreme heat threshold is 101.9°F. An event with five extreme heat days in a row is considered a heat wave.

Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The Center for Disease Control and Prevention (CDC) recognizes extreme heat as a substantial public health concern. Historically, National Oceanic and Atmospheric Administration (NOAA) data indicates that about 175 Americans succumb to the demands of summer heat, although this number has increased in recent years. From 2004 to 2018, studies by the U.S. Department of Health and Human Services indicate that there is an average of 702 deaths annually that are directly or indirectly linked to extreme heat.[25]

Extreme heat can be fatal, cause heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke, in addition to worsening respiratory and cardiovascular conditions. The most vulnerable populations are those that spend a disproportionately high amount of time outside, such as children, outdoor workers, immigrant communities, and persons experiencing homelessness, since these populations may be unable to seek direct relief from high temperatures. Additionally, persons with

chronic illnesses, populations with existing pollution burdens, and senior citizens, including seniors living alone, may have existing health conditions that make them highly vulnerable to extreme heat.

Persons with financial instability, low-resourced, or living in mobile homes are also highly vulnerable due to a lack of financial resources to prepare for or respond to extreme heat conditions. There are two cooling centers in Suisun City, at Nelson Community Center and Macedonia Church of God in Christ. However, these facilities may be subject to rolling blackouts associated with extreme heat events and generators may not be available.[26] Rolling blackouts may also prevent residents from keeping indoor air temperatures or medications cool or cause food loss due to lack of refrigeration when the power is turned off, which could harm persons with financial instability or limited income.

Energy delivery services and associated infrastructure are highly vulnerable to extreme heat, as high temperatures can stress and overload the regional grid, causing power outages and damage to the transmission lines. Railway infrastructure is also highly vulnerable to extreme heat days and prolonged periods of high temperatures, as these events can cause thermal expansion and warping of the tracks.[27] Damaged railways can slow freight services and cause train accidents.

Additional extreme heat vulnerabilities include the following:

- Parks and recreation facilities, which will likely experience additional wear and tear due to extreme heat days and heat waves.
- Wetland and marsh habitat, which can experience warmer water temperatures that cause harmful algal blooms.
- Public transit access, as extreme heat reduces ridership of bus and train systems since it may be more difficult to wait outside for the bus.

Past Occurrences

In June 2000, very hot weather persisted across interior northern California for three days. Sixteen people were treated for heat stroke in Sacramento and Solano Counties and one, a 16-year-old male in West Sacramento, died. A heavily used portion of I-80 between Sacramento and San Francisco was closed for several hours to repair three lanes in which the asphalt had buckled due to the sustained heat. Power outages were suffered by more than 100,000 customers during the event.

In June 2013, strong high pressure built across the Solano County region, which resulted in very hot temperatures on June 7 and June 8, accompanied by warm overnight temperatures. The heat sickened at least 15 people, 2 critically. Many of those stricken suffered heat exhaustion and heat stroke and ranged in age from 15 to 80 years of age and older.

Potential Changes to Extreme Heat in Future Years

Likelihood of Future Occurrence

Extreme heat tends to occur on an annual basis and is likely to continue occurring annually.

Climate Change and Extreme Heat

The warmer temperatures brought on by climate change are likely to cause an increase in extreme heat events. The state Cal-Adapt database indicates the number of extreme heat days is expected to rise from a historical annual average of 4 to 22 days per year by the middle of the century (2035 to 2064), and an annual average of 38 days per year by the end of the century (2070 to 2099).

Overall, Suisun City is expected to see an increase in the average daily high temperatures. The state Cal-Adapt database indicates the annual average maximum temperature is expected to increase from a historical annual average of 73.4°F to an average of 78.7°F by the middle of the century (2035 to 2064), and an average of 80°F by the end of the century (2070 to 2099). These increases make it more likely that an above-average high temperature will cross the extreme heat threshold. As temperatures increase, Suisun City will face increased risk of death from dehydration, heat stroke, heat exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Implications for the Public Health and Safety Element

The Public Health and Safety Element Update can help protect the community from the effects of heat by:

- Providing for the continued support and maintenance of cooling centers.
- Providing public education about the health impacts of high heat.
- Providing support for property owners looking to make weatherization and energy-efficiency improvements to their buildings.
- Promoting the use of heat-reflective building and paving materials.
- Ensuring that green infrastructure, such as trees, are equitably distributed throughout the city.

- Ensuring that public facilities, such as schools and bus stops, are adequately protected from heat.
- Providing house calls to residents such as seniors living alone who are particularly vulnerable to heat.

2.7.3 SEVERE WEATHER

Severe weather is generally any destructive weather event, but usually occurs in Solano County as localized storms that bring heavy rain, hail, thunderstorms, and strong winds. Severe weather is usually caused by intense storm systems, although types of strong winds can occur without a storm. The types of dangers posed by severe weather vary widely and may include injuries or deaths, damage to buildings and structures, fallen trees, roads and railways blocked by debris, and fires sparked by lightning. Severe weather often produces high winds and lightning that can damage structures and cause power outages. Lightning from these storms can ignite wildfires and structure fires that can cause damage to buildings and endanger people. Objects such as vehicles, unprotected structures (e.g., bus stops, car ports), fences, telephone poles, or trees can also be struck directly by lightning, which may result in an explosion or fire.

Solano County experiences what climatologists classify as a Mediterranean type of climate. This climate regime is typified by nearly 90 percent of the annual precipitation occurring a relatively narrow window of about 16 weeks from late fall to early spring. The climate pattern, coupled with the onshore flow of warm, moist Pacific air during the winter, can generate severe and prolonged periods of heavy rain. Solano County experiences periods of heavy rains on an annual recurring basis. Some of these severe winter storms may also contain thunderstorms. Thunderstorms are typically few in number and are more likely to appear in the spring or late fall.

The people most vulnerable to severe weather are those who may be directly exposed to the hazard, such as outdoor workers and persons experiencing homelessness; those who may live in less structurally resilient buildings, such as households in poverty, immigrant communities, persons living in mobile homes and houseboats, and low-resourced people of color; and those who may have difficulty preparing or responding to severe weather due to mobility or lack of access to transportation or communication. Individuals with chronic illnesses and/or disabilities who depend on electricity for life-sustaining equipment but lack backup power supply, such as a generator or battery system, are highly vulnerable due to the Public Safety Power Shutoff (PSPS) events that can occur during Diablo wind events. Persons living on single-access roads are also highly vulnerable to severe weather, as high

winds and heavy rain can cause downed trees and powerlines, isolating these persons from the rest of the community if roadways are blocked.

Buildings and infrastructure, such as bridges, communication facilities, railways, hazardous materials sites, historic buildings, and homes, are highly vulnerable to severe weather, and they can be damaged by high winds, heavy rainfall, and debris carried by severe storms. Diablo wind events can damage electrical transmission and distribution infrastructure, potentially causing PSPS events, disrupting both energy delivery services and communication services. Travis Air Force Base may experience disruptions as an economic driver, as severe wind and heavy rainfall may make it difficult to fly aircraft, which could delay aircraft from taking off or landing on the base, disrupting base operations.

Extreme winds and heavy rainfall can also harm ecosystems by causing large volumes of sediment to flow into riparian and riverine ecosystems. Extreme heat and drought conditions may weaken natural ecosystems and prevent them from recovering from these severe weather events.

Past Occurrences

Since 1950, 11 federally declared major severe weather events have occurred in Solano County. These events include one coastal storm, one snow event, and five severe storm events. According to The Governor's Office of Emergency Services Emergency and Disaster Proclamations Executive Orders (November 2003 to present), one severe storm event occurred in Solano County in 2006. The 2010 Solano County LHMP Update lists one heavy rain and two severe storm events occurring in Solano County between 1957 and 1982.

The greater Solano County area is subject to periodic extreme weather events, most frequently in the form of heavy rain, high wind, thunderstorms, and fog. In December 1997, dense fog contributed to a chain reaction collision on I-5 near Lambert, 17 miles south of downtown Sacramento, where 5 people were killed and 26 were injured. In December 1998, 1 person was killed and 10 were injured during a dense fog event that resulted in a vehicle pileup 10 miles northwest of downtown Sacramento on I-5.

In June 2000, one person was killed during a high wind event. Sustained winds of 30 to 40 miles per hour blew through Carquinez Strait, pushing a motorcyclist on I-680 off the highway near Marshview Road.

In January 2021, an atmospheric river event caused heavy rain and high winds across northern California. Thousands of Solano County residents lost power, and rockslides, flooding, road closures, and downed trees occurred across the region.[28] Heavy rains also occurred in October 2021, triggering road closures, downed trees, and flooding across Solano County.[29]

Public Safety Power Shutoff Events

Electricity utilities throughout California, including Pacific Gas and Electric Company (PG&E), have begun to occasionally "de-energize," or turn off the electricity for power lines that run through areas where there is an elevated fire risk. This is intended to reduce the risk of power lines sparking or being damaged and starting a wildfire. As previously described, these activities, called PSPS events, result in a loss of power for customers served by the affected power lines. A PSPS event may occur at any time of the year, usually during high wind events and dry conditions. PSPS events may be limited to specific communities or they may affect broad swaths of the state.

Four PSPS events affected Solano County in 2019, affecting more than 25,000 customers. Three PSPS events affected Solano County in 2021, the largest of which resulted in approximately 4,700 Solano County customers losing power.[30]

PSPS events can impact emergency management activities. A loss of power can make it more difficult for homes or businesses to receive emergency notifications if needed. PSPS events can also create vulnerabilities for community members that lack backup power supplies and depend on electricity for heating or cooling homes and buildings, lighting, and internet. PSPS events may also be harmful to people who depend on electrically powered medical devices. Additionally, community members may be faced with economic hardships and be deprived of important services, such as grocery stores, gas stations, and banks/ATMs. Traffic lights and other traffic-control systems may not work, which can complicate any evacuation needs and may hinder emergency response. Although critical public health and safety facilities often have backup generators, the loss of power may also disable other key infrastructure systems.

Potential Changes to Severe Weather in Future Years

Likelihood of Future Occurrence

Severe weather is an annual or near-annual occurrence in Solano County. Heavy rain, high wind, and thunderstorms are the most frequent type of severe weather occurrences in and around Suisun City. Wind and lightning often accompany these storms and have caused damage in the past. However,

actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by severe weather, such as floods and fire, that have had the greatest impact on the city. In general, any severe storm that affects Solano County has local effects in Suisun City as well. Thunderstorms, high winds, and lightning can each have localized impacts on infrastructure, properties, and public safety. Transportation, including freight shipping, faces increased congestion when severe storms occur.

Climate Change and Severe Weather

Climate change is expected to cause an increase in intense rainfall and severe weather, which is usually associated with strong storm systems. This means that Suisun City could see more intense weather resulting from these storms in the coming years and decades, although such an increase may not affect all forms of severe weather. While average annual rainfall may increase only slightly, climate change is expected to cause an increase in the number of years with intense levels of precipitation. Heavy rainfall can increase the frequency and severity of other hazards, including flooding.

Implications for the Public Health and Safety Element Update

The Public Health and Safety Element Update can help Suisun City prepare for the impacts of severe weather by:

- Supporting resiliency of the local power grid and weatherization of older homes.
- Promoting the undergrounding of power lines.
- Reinforcing the city's storm water drain systems to enhance the operation of the system during a heavy rain event, which are compounded by high wind events creating debris, and other flooding incidents.
- Installing backup power generators to support operation of critical facilities, including water and wastewater systems, emergency services, and cooling and heating centers.
- Providing support to workers whose employment may be jeopardized by severe weather.
- Providing public education about how to prepare for and respond to severe weather.

2.7.4 AGRICULTURAL AND ECOSYSTEM PESTS

According to the Solano County Crop and Livestock Report, agriculture and livestock production had a value of $357 million in 2020.[31] In 2020, top agricultural commodities were almonds, tomatoes, nursery products, cattle and calves, and walnuts. Agricultural pests and diseases can affect crop plants, orchards, and nurseries throughout and surrounding the City of Suisun City. Pests and diseases can slow the growth of plants, inflict damage, or lead to fatalities. Major pests of concern in Solano County include Asian Citrus Psyllid, European Grapevine Moth, Glassy-Winged Sharpshooter, Gypsy Moth, Japanese Beetle, Light Brown Apple, Mediterranean Fruit Fly, Melon Fly, Oriental Fruit Fly, Asian Gypsy Moth, Rosy Moth, Nun Moth, and Siberian Silk Moth.[32] Pesticides and herbicides can help crops resist pests and diseases and new crop varietals may be pest-resistant; however, quickly evolving pests may make it difficult for some plant species to survive; changing crop varietals can also be expensive for farm owners.

Due to the severe vulnerability of agriculture to pests and diseases, outdoor workers and immigrant communities are also highly vulnerable, as many people from these populations work in agriculture. Persons working in these industries may be indirectly affected by agricultural and ecosystem pests and diseases that damage crops. Damage to agricultural assets can reduce work opportunities, create economic hardships for some workers, and cause employees to be let go from their jobs when farms experience economic hardships.

Agricultural and Ecosystem Pest Reduction and Response

Pest exclusion is the first line of defense to prevent detrimental, non-native pests from entering the county. In 2020, a total of 457 premise visits occurred at shipping terminals, nurseries, and residences in the county. During these visits, 2,002 shipments of plant material, seed, and household goods were inspected. A total of 17 shipments were rejected for live pests, material not properly certified, or improper container markings. County staff inspected 11 production nurseries, encompassing 1,572 acres, for pests and diseases.

Pest detection is Solano County's second line of defense against the introduction and spread of insect pests of concern. Insect traps are placed throughout the county and monitored for early detection of pests. In 2020, 22,320 inspections were conducted on a total of 2,712 traps.

The County also implements the following programs to address agricultural and ecosystem pests and diseases:

- The Pierce's Disease Control Program works to prevent the spread of the glassy-winged sharpshooter into Solano County, which is the main insect vector of Pierce's Disease. In 2020, Department personnel inspected 533 shipments of nursery stock arriving from infested counties in California.
- The Sudden Oak Death program prevents the spread of the disease caused by the pathogen *Phytophthora ramorum*. Department personnel conducted 46 inspections at 9 production shipping nurseries.
- The Phytosanitary Certification Program ensures that plants and plant communities shipped to other states or foreign countries are free from injurious pests. Solano County personnel performed 812 phytosanitary field inspection on 7,137 acres of seed crops.[33]

Past Occurrences

False yellowhead (*Dittrichia viscosa)* is a State-listed noxious weed originating from the south Mediterranean, first found in western Solano County in 2014. This was the first documented sighting in California. *D. viscosa* is a world-wide weed of concern that proliferates in disturbed landscapes such as roadsides and burn sites. It is a threat to Solano County's unique biodiversity and is toxic to livestock. The Solano County Agricultural Department, in cooperation with Caltrans, has established an eradication project area between Vallejo and Fairfield.[34]

In 2017, a quarantine was initiated in response to the Mediterranean Fruit Fly (or Medflies). This quarantine encompassed 108 square miles of Solano County and was declared eradicated in August 2018 by the California Department of Food and Agriculture and the Solano County Agricultural Commissioner's Office. Eradication efforts included fruit removal from trees in hot spot areas, organic insecticidal bait treatments, and the release of over 100 million sterile Medflies to disrupt the reproduction cycle of the pest.[35]

Potential Changes to Agricultural and Ecosystem Pests in Future Years

Likelihood of Future Occurrence

Agricultural and ecosystem pests will likely maintain an ongoing presence in Solano County and Suisun City, though their activity can be at least partially managed via the County's pest control initiatives.

Climate Change and Agricultural and Ecosystem Pests

Pest activity is likely to increase as higher temperatures caused by global warming allow insects to reproduce more rapidly and increase the activity window for pests and diseases. Row crops can be affected by fungal pathogens and invasive disease vectors as temperatures continue to rise, affecting the quality and viability of crops.

Implications for the Public Health and Safety Element Update

The Public Health and Safety Element Update can help the community prepare for and respond to agricultural and ecosystem pests by including policies to:

- Support local and regional collaboratives addressing pest management and monitoring.
- Help members of the agricultural community identify and implement best management practices for pest management.
- Support members of the Suisun City community who may find their employment jeopardized by agricultural pests.

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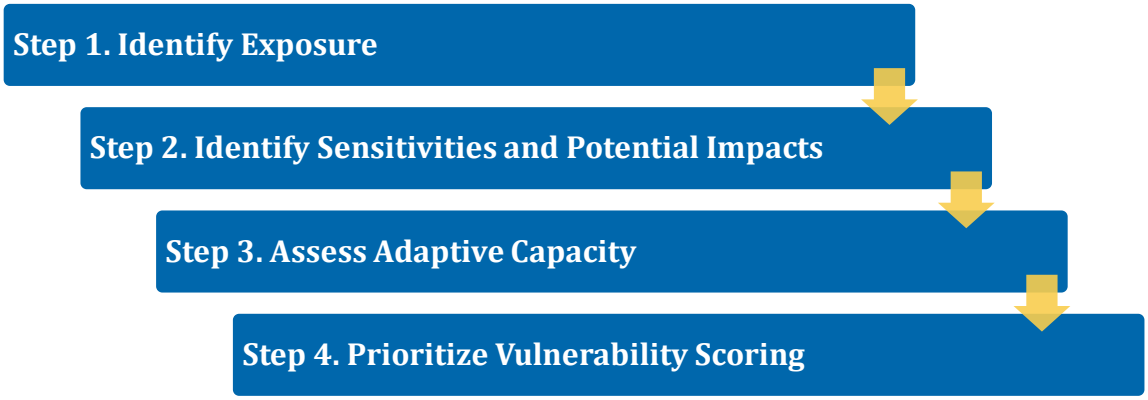
APPENDIX A: VULNERABILITY ASSESSMENT METHODS AND RESULTS

A.1 VULNERABILITY ASSESSMENT METHODS

The Vulnerability Assessment follows the recommended process in the *California Adaptation Planning Guide* (APG), published in 2020 by the California Governor's Office of Emergency Services. This includes a four-step process: (1) characterizing the city's exposure to current and projected climate hazards; (2) identifying potential sensitivities and potential impacts to city populations and assets; (3) evaluating the current ability of the populations and assets to cope with climate impacts, also referred to as its adaptive capacity; and (4) identifying priority vulnerabilities based on systematic scoring. **Figure A-1** presents these steps.

Figure A-1: California Adaptation Planning Guide Recommended Model



Step 1. Identify Exposure. The goal of this step is to characterize the community's exposure to current and projected climate change hazards. The climate change hazards included in the Vulnerability Assessment are **agricultural and ecosystem pests, drought, extreme heat and warm nights, human health hazards, inland flooding, human health hazards, landslides, sea level rise, severe weather, shoreline flooding,** and **wildfire and wildfire smoke**.

Projections of climate change hazards rely on multiple scenarios that reflect different levels of greenhouse gas (GHG) emissions and concentrations over time. The Cal-Adapt database, which provides California-specific climate change hazard projections, uses Representative Concentration

Pathway (RCP) 4.5 for a low-emissions scenario and RCP 8.5 for a high-emissions scenario.[2] RCPs are scenarios that include time series of emissions and concentrations of the full suite of GHGs, aerosols, chemically active gases, and land use/land cover. RCP 4.5 is considered an intermediate stabilizing pathway; RCP 8.5 is considered a high-emissions pathway. The Governor's Office of Planning and Research *Planning and Investing for a Resilient California* document and the *California Adaptation Planning Guide* recommend using RCP 8.5 for analyses considering impacts through 2050 and 2100, as there are minimal differences between emission scenarios for the first half of the century and for late-century projections, this is a more conservative and risk-averse approach. The RCP 8.5 scenario was used as input for global climate models on the Cal-Adapt database, BayAdapt, *Plan Bay Area*, the *California 4th Climate Change Assessment*, *Adapting to Rising Tides*, and other resources.

Step 2. Identify Sensitivities and Potential Impacts. This step involved evaluating potential future climate change impacts to community populations and assets.[3] City staff first identified a comprehensive list of populations and assets to understand how susceptible the people, places, ecosystem services, and services within the community are to climate change hazards. After confirming this list, City staff looked at which hazards are likely to affect which populations and assets. For example, human health hazards are likely to impact most populations, but would not physically affect buildings, as shown in **Table A-1**.

Table A-1: Populations and Assets

Populations			
Children under 10	Cost-burdened households	Households in poverty	Immigrant communities
Linguistically isolated persons	Low-income households	Low-resourced people of color	Outdoor workers
Overcrowded households	Persons experiencing homelessness	Persons living in mobile homes	Persons living on single access roads
Persons with chronic illness and/or disability	Persons without a high school degree	Persons without access to lifelines	Pollution burdened populations
Renters	Seniors (65+)	Seniors living alone	Unemployed persons

[2] RCPs are scenarios that include time series of emissions and concentrations of the full suite of greenhouse gases, aerosols, chemically active gases, and land use/land cover. RCP 4.5 is considered an intermediate stabilizing pathway; RCP 8.5 is considered a high-emissions pathway.

[3] Community populations are groups of people that may be uniquely vulnerable to climate change hazards due to existing stressors such as financial instability, health conditions, mobility challenges, and housing conditions.

Infrastructure			
Bicycle and pedestrian trails	Bridges	Communication facilities	Electrical transmission infrastructure
Electrical vehicle charging stations	Hazardous materials sites	Major roads and highways	Natural gas pipelines
Parks and recreation facilities	Railway	Solid waste facilities	Transit facilities
Water, wastewater, and flood control infrastructure			
Buildings			
Community centers and libraries	Commercial businesses	Government buildings	Historic buildings and museums
Homes and residential structures	Medical and care facilities	Public safety buildings	Public schools
Economic Drivers			
Accommodation and tourism	Education services	Healthcare services	Major employers
Retail	Travis Air Force Base		
Ecosystems and Natural Resources			
Grassland	Wetland and marsh	Riparian and riverine habitats	
Key Services			
Communication services	Emergency medical response	Energy delivery	Government administration
Public safety response	Public transit access	Solid waste removal	Water and wastewater treatment, delivery, and collection

After this applicability review, City staff evaluated potential impacts to the applicable populations and community assets. Based on the results of the impact assessment, each population and asset was identified as experiencing low, medium, or high impacts for each relevant hazard. Impact is considered a negative quality, and therefore, a higher impact score means that there is a higher potential for harm

to a population or asset. A lower impact score means that there is a lower potential for harm to a population or asset.

Step 3. Assess Adaptive Capacity. Adaptive capacity is the ability of populations and community assets to prepare for, respond to, and recover from the impacts of climate change using existing resources and programs. Based on the results of the adaptive capacity assessment, the City ranked the adaptive capacity of each population or asset as low, medium, or high for each relevant hazard. Adaptive capacity is considered a positive attribute, so a higher adaptive capacity score means that a population or asset may be more adaptable to the hazard. A lower adaptive capacity score means that a population or asset may have a harder time adjusting to the changing conditions given available resources.

Suisun City, Solano County, and community-based organizations already provide some of these tools and resources to both populations and community asset owners or managers. The following list describes the plans, projects, programs, and initiatives that increase adaptive capacity throughout the city.

Non-Climate Stressors

Non-climate stressors are trends unrelated to climate hazards that can exacerbate impacts or impede adaptive capacity, making populations or assets more vulnerable. They are also known as pre-existing conditions that make populations or assets more susceptible to harm from hazards because the stressors may impair their ability to prepare for, respond to, or recover from hazards. Addressing non-climate stressors can improve the adaptive capacity of populations and community assets.

Source: United State Global Change Research Program. 2016. "U.S. Climate Resilience Toolkit." https://toolkit.climate.gov/.

- **Plans**
  - 2021 Solano County Multi-Jurisdictional Hazard Mitigation Plan, Suisun City Annex
- **Mitigation Action Plan**
  - 2020 Solano County Active Transportation Plan
  - Suisun-Solano Water Authority Urban Water Management Plan, including water shortage contingency plan and demand-management measures.
- **Municipal Code Requirements**
  - Public Nuisances (Code of Ordinances, Chapter 8.12)
  - Stormwater Management and Discharge Control (Code of Ordinances, Chapter 13.10)
  - Underground Installation of Utilities (Code of Ordinances, Chapter 13.12)

- Floodplains and Flood Damage Prevention (Code of Ordinances, Chapter 15.08)
- Grading, Erosion Control, and Creekside Development (Code of Ordinances, Chapter 15.12)
- Fire Prevention (Code of Ordinances, Chapter 15.80)
- Water-Efficient Landscaping (Code of Ordinances, Chapter 20.04)

- **Capital Improvement Projects**
  - Annual Sewer Line Repairs Program
  - Pacific Gas and Electric Company (PG&E) Tree Mitigation Project

- **Programs and Initiatives**
  - Emergency manager on staff.
  - Environment and Climate Committee.
  - Public Safety Committee.
  - Sandbags are available from the City of Suisun City at 701 Civic Center Boulevard.
  - Solano Resource Conservation District operates urban greening, flood protection, water conservation, watershed planning programs.
  - Suisun City's Public Works Department maintains stormwater and flood-control infrastructure.
  - Solano County Water Agency programs: rebates for water-conserving products, Solano High-Efficiency Washer Rebate, Smart Irrigation Controller Rebates, Water-Efficient Landscape Rebate for both residential and commercial properties, Commercial Water Savings Incentive Program.
  - Cooling centers (Nelson Community Center, Macedonia Church of God in Christ).
  - Energy-efficiency and renewable energy incentive and rebate programs offered by PG&E and BayREN.
  - Solano County Green Business program initiatives.
  - Solano County Mosquito Abatement District.
  - DART Paratransit, FAST, SolTrans, Solano County Mobility Program, Pace Solano, and Solano County In-Home Support Services to help individuals travel to cooling centers and medical facilities, as well as evacuate during emergencies.
  - Suisun City Housing Authority aims to serve the residents of Suisun City by providing federal Housing Choice Voucher rental assistance to families, seniors, and individuals that apply for and are eligible for Section 8 rental assistance.
  - Alert Solano through Solano County to inform residents of hazardous events or evacuation notices.

- Independent Living Resources of Solano County provides those with access and functional needs support with emergency preparedness, response, and recovery.
- Solano Community College and Solano Workforce Development Board assist with career development services.
- Solano Napa Small Business Development Center (SBDC) supports the stability of Solano County's small and local businesses.

Step 4. Conduct Vulnerability Scoring. The City used the impact and adaptive capacity scores for each population and asset for each relevant hazard to determine the vulnerability score. The vulnerability score reflects how susceptible a population or asset is to harm from a particular hazard. Vulnerability is assessed on a scale from V1 to V5, with V1 meaning minimal vulnerability and V5 meaning severe vulnerability. The following list describes the level of vulnerability:

- V1: Minimal vulnerability
- V2: Low vulnerability
- V3: Moderate vulnerability
- V4: High vulnerability
- V5: Severe vulnerability

Having a low vulnerability score does not mean that the population or asset will be unaffected by climate change, but that the effects are likely to be less substantial. The matrix in **Figure A-2** shows how impact and adaptive capacity scores combine and translate into a vulnerability score. For example, extreme heat would create a high impact on energy delivery services as mechanical failures, heat damage, and high demand for electricity from cooling equipment can disrupt this service. Adaptive capacity is low because many community members need to use more electricity on extreme heat days to keep cool and retrofitting electrical equipment can be expensive. Therefore, energy delivery services have a high vulnerability to extreme heat.

Figure A-2: Vulnerability Scoring Matrix

	Low Impact	Medium Impact	High Impact
Low Adaptive Capacity	V3	V4	V5
Medium Adaptive Capacity	V2	V3	V4
High Adaptive Capacity	V1	V2	V3

A.2 CLIMATE CHANGE HAZARDS

Changes to the global climate system are expected to affect future occurrences of natural hazards in and around Suisun City. Many hazards are projected to become more frequent and intense in coming years and decades, and in some cases, these trends have already begun. Key climate change considerations that affect Suisun City include increasing temperatures and changes in precipitation patterns. Overall, precipitation levels are expected to increase only slightly, with more years of extreme precipitation events and droughts that last longer and are more intense. According to California's *Fourth Climate Change Assessment,*[36] Suisun City can expect to experience various changes to climate change hazard events.

What is vulnerability?

Vulnerability is the degree to which natural, built, and human systems are susceptible to harm from exposure to stresses associated with environmental and social change and from the absence of a capacity to adapt.

Source: California Governor's Office of Emergency Services. 20202. California Adaptation Planning Guide. https://www.caloes.ca.gov/climate.

- Both droughts and floods are expected to become more frequent as rainfall is expected to occur in fewer, more intense storms due to climate change. Although Suisun City is likely to experience only a minimal increase in overall annual precipitation levels from climate change, the region is also expected to see an increase in the number of extreme precipitation events. As a result, floods are expected to occur more often in Suisun City, and climate change may expand the parts of the city that are considered prone to flood. Climate change is expected to also increase the frequency and severity of droughts that cause soil to dry out and condense. When precipitation does return, dry ground means that more water runs off the surface rather than being absorbed into the ground, which can lead to floods. Flooding events can also lead to more erosion in waterways and creeks, increasing the risk of landslides.
- Sea level rise is a gradual process, taking place over years to decades. Along the Suisun City shoreline, sea levels are projected to rise approximately 24 inches by 2050 and 84 inches by 2100.[37] However, it is possible that sea levels could rise faster than these projections.[38] Rising sea levels can also cause the shoreline to flood more frequently and severely during storms or king tide events. Because ocean levels are higher during normal conditions due to sea level rise, shoreline flooding can reach further onto land. For example, a storm that has a 1 in 5 chance of occurring in a given year (known as a 5-year storm) can create a temporary increase in sea levels of approximately 24 inches. This means that if sea levels rise by 24 inches during

normal conditions, a 5-year storm event would create a temporary sea level rise of around 48 inches.

- Severe weather events, such as strong storms and high winds, may become more frequent and intense due to climate change. Climate change is expected to cause an increase in intense rainfall, which is usually associated with strong storm systems. Heavy rainfall may also contribute to an increased risk of landslides in and around Suisun City. In Suisun City, most severe weather consists of intense winds, lightning, hail, and related events. The types of dangers posed by severe weather vary widely and include injuries or deaths, damage to buildings and structures, fallen trees, roads blocked by debris, and fires sparked by lightning.
- Warmer temperatures are projected to cause an increase in extreme heat events. The number of extreme heat days, defined in Suisun City as a day when the high temperature is at least 101.9°F, is expected to rise from a historical annual average of 4 extreme heat days per year to an annual average of 22 extreme heat days per year by the middle of the century (2035 to 2064), and to an annual average of 38 extreme days per year by the end of the century (2070 to 2099). In addition to the increases in extreme heat events, Suisun City is expected to see an increase in the average daily high temperatures. The number of warm nights, defined in Suisun City as a day in April through October when the minimum temperature is above 62.5°F, is expected to rise from a historical annual average of 5 warm nights per year to an annual average of 40 warm nights per year by the middle of the century (2035 to 2064), and to an annual average of 93 warm nights per year by the end of the century (2070 to 2099).
- Hotter, drier weather due to climate change is expected to increase wildfires and an extension of the wildfire season surrounding Suisun City. While large wildfires are unlikely to break out within Suisun City itself, an increase in frequency and intensity of wildfire across the region will expose Suisun City to adverse air quality impacts. This can cause respiratory and cardiovascular illnesses for residents in Suisun City.
- Climate change can increase the rates of infection for various diseases because many of the animals that carry diseases are more active during warmer weather. There are a number of diseases that are linked to climate change and can be harmful to the health of Suisun City community members, such as hantavirus pulmonary syndrome, Lyme disease, and West Nile fever. Many of these diseases are carried by animals, such as mice and rats, ticks, and mosquitos, which are usually seen as pests even if they do not cause infections. Warmer temperatures earlier in the spring and later in the winter can cause these animals to be active for longer periods, increasing the time that these diseases can be transmitted.

- According to the *Solano County Crop and Livestock Report*, agriculture and livestock production had a value of $357 million in 2020.[39] In 2020, top agricultural commodities were almonds, tomatoes, nursery products, cattle and calves, and walnuts. Agricultural pests and diseases can affect crop plants, orchards, and nurseries surrounding Suisun City. The severity of this hazard is measured in terms of pests and disease incidents, which are likely to increase as higher temperatures allow insects to reproduce more rapidly and increase the activity window for pests and diseases. Pests and diseases can slow the growth of plants, inflict damage, or lead to fatalities.

A.3 VULNERABILITY ASSESSMENT RESULTS

Under California law, the Safety Element is required to include a vulnerability assessment that looks at how people, buildings, infrastructure, and other key community assets may be affected by climate change. The City conducted a Vulnerability Assessment in the summer of 2022 to analyze Suisun City's susceptibility to climate change hazards. Suisun City's vulnerability assessment, prepared in accordance with the most recent available guidance in the *California Adaptation Planning Guide*, assesses how 10 different climate change hazards (agriculture and ecosystem pests, drought, extreme heat and warm nights, human health hazards, inland flooding, landslides, sea level rise, severe weather, shoreline flooding, and wildfire and smoke) may affect 59 different population groups and community assets. Each population or asset received a score of V1 (minimal vulnerability) to V5 (severe vulnerability) for each climate change hazard. The Vulnerability Assessment indicates that Suisun City's populations and assets are most vulnerable to shoreline and inland flooding, severe weather, sea level rise, and extreme heat. Overall, populations in Suisun City tend to be most vulnerable to shoreline flooding, inland flooding, and extreme heat, which directly affect health outcomes. The most vulnerable communities include households in poverty, low-resourced people of color, outdoor workers, pollution-burdened populations, and seniors living alone.

The transportation and transit network throughout the city is highly vulnerable to several hazards, especially hazards that increase or expand flood-prone areas. These transportation assets include major roads and highways, bridges, and railways, which can be damaged during hazardous events, disrupting economic activity and key services within and surrounding Suisun City. This can affect travel behavior, goods movement, and supply chain business continuity. When parts of the transportation infrastructure network fail, typical travel routes for both passenger travel and goods movement may be affected, including State Route (SR-) 12, the Unions Pacific Railroad, and other major roadways. Disruption of these local transportation roadways due to hazards such as flooding or extreme heat

could significantly impact the transportation of goods and services provided in the city, the economic vitality of the community, and the livelihood of many businesses. Similarly, residents that rely on Amtrak as a means of transportation for work could be greatly impacted by disruptions in the operation of the railway.

In Suisun City, climate change is expected in the parts of the city that are considered prone to flooding from both inland and shoreline areas. As a result, homes, historic building, government buildings, hazardous materials facilities, and parks and recreation facilities within and adjacent to the 100-year floodplain or Suisun Slough will likely experience an increase in the frequency and magnitude of flood events in future years. Sea level rise will likely increase the severity of flood events, especially in the Downtown Waterfront Area of the city, affecting accommodation and tourism economic drivers in the city. Increases in damaging flood events in the city are expected to cause greater property damage, public health and safety concerns, displacement, and loss of life. Increased flooding in the city may also impact the operation of the Bay Area Rapid Transit (BART) railway, roads, and bridges, as well as electrical substations and transmission lines. Key services, such as public transit access, solid waste removal, and water and wastewater delivery become more vulnerable when the infrastructure that supports these services is damaged by inland and shoreline flooding. Wetlands and marshes, which may be degraded due to drought and extreme heat, will also face harm from more frequent and severe flooding, changing the characteristics of the ecosystem.

Citywide, energy delivery is vulnerable to multiple hazards, including severe storms, such as high winds that can trigger public safety power shutoff (PSPS) events and extreme heat that reduces the capacity and strains the system, ultimately disrupting energy service. Furthermore, energy delivery services, specifically electricity delivery, are subject to harm during extreme heat events. Extreme heat can lead to power outages by causing mechanical failure of grid equipment, heat damage to power lines, and by creating a high demand for electricity to power air conditioners, all of which place stress on the network. This is likely to lead to greater service disruptions. These conditions can damage communication infrastructure, decreasing network capacity. There may be a higher demand for communication services during severe storms, potentially putting stress on the network and increasing the risk of service interruptions.

The Public Health and Safety Element will include goals, policies, and implementation actions to increase community resilience and help lower vulnerability scores, particularly for the populations and assets that received a score of V4 or V5 in the Vulnerability Assessment. A full list of the Vulnerability Assessment results can be found in **Table A-2**.

Table A-2: Vulnerability Assessment Results Matrix

The Vulnerability Assessment evaluates the impact and adaptive capacity of 59 populations and assets for each of the relevant 10 hazards. Vulnerability scores of V1 to V5 were assigned to reflect how susceptible the population or asset is to the harm posed by the hazard. The following list describes what each score means:

- V1: Minimal Vulnerability
- V2: Low Vulnerability
- V3: Moderate Vulnerability
- V4: High Vulnerability
- V5: Severe Vulnerability

The City assessed 444 different pairings for vulnerability, 159 of which scored as highly or severely vulnerable. The following matrix provides the scores for each population and assets to each relevant hazard. Gray cells with a dash (-) indicate that a specific hazard is not applicable to a specific population or asset, and therefore was not scored.

PUBLIC HEALTH AND SAFETY ELEMENT BACKGROUND REPORT

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Populations										
Children under 10	-	V2	V5	V3	V3	-	-	V3	V3	V4
Cost-burdened households	-	V3	V3	V3	V3	V2	V3	V3	V4	V3
Households in poverty	-	V4	V5	V5	V5	V3	V5	V5	V5	V5
Immigrant communities	V5	V3	V5	V4	V5	V3	V3	V4	V4	V5
Linguistically isolated persons	-	V2	V3	V3	V3	V2	V2	V3	V3	V3
Low-income households	-	V3	V4	V3	V4	V2	V3	V3	V4	V4
Low-resourced people of color	-	V4	V5	V5	V5	V3	V5	V4	V5	V5
Outdoor workers	V4	V4	V5	V5	V5	V3	V4	V5	V3	V5
Overcrowded households	-	V1	V3	V4	V3	V2	V2	V2	V3	V3

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Persons experiencing homelessness	-	V3	V5	V5	V5	V3	V3	V5	V5	V5
Persons living in mobile homes and houseboats	-	V2	V4	V3	V5	-	V5	V5	V5	V2
Persons living on single access roads	-	V1	V2	V2	V4	V3	V4	V4	V5	V3
Persons with chronic illness and/or disabilities	-	V3	V4	V5	V4	V2	V3	V4	V4	V5
Persons without a high school degree	-	V2	V2	V2	V3	-	V2	V2	V2	V2
Persons without access to lifelines	-	V2	V4	V4	V5	V3	V3	V4	V4	V3
Pollution burdened populations	-	V3	V4	V5	V5	V2	V5	V3	V5	V5
Renters	-	V1	V3	V3	V3	V2	V3	V3	V4	V3
Seniors (65+)	-	V1	V4	V4	V4	V2	V3	V3	V4	V4

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Seniors living alone	-	V2	V5	V5	V5	V3	V5	V4	V5	V5
Unemployed persons	-	V2	V3	V3	V3	-	V2	V3	V3	V3
Infrastructure										
Bicycling and pedestrian trails	V2	V2	V3	-	V3	V2	V3	V3	V3	V2
Bridges	-	-	V2	-	V5	V3	V4	V4	V5	-
Communication facilities	-	-	V3	-	V2	V2	V1	V4	V2	V1
Electrical transmission infrastructure	-	-	V5	-	V3	-	V3	V5	V2	V2
Electric vehicle charging stations	-	-	V3	-	V3	-	V2	V2	V2	-
Flood control infrastructure	-	-	-	-	V4	V3	V5	V3	V5	V3
Hazardous materials sites	-	-	V3	-	V3	V1	V4	V4	V4	-

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Major roads and highways	-	-	V3	-	V4	V3	V5	V3	V5	V2
Natural gas pipelines	-	-	-	-	V2	-	V2	-	V3	V2
Parks and recreation facilities	V3	V3	V4	-	V5	V1	V3	V3	V4	V3
Railway	-	-	V5	-	V5	V3	V4	V4	V5	-
Solid waste facilities	-	-	V2	-	V3	-	V1	V3	V3	-
Transit facilities	-	-	V1	-	V3	-	V3	V3	V4	V1
Water and wastewater infrastructure	-	V3	V2	-	V5	V2	V3	V2	V3	V2
Buildings										
Community centers and libraries	-	-	V2	-	-	-	V3	V3	V3	-
Commercial businesses	-	-	V3	-	V3	-	V5	V3	V4	V1
Government buildings	-	-	V1	-	V4	V3	V4	V2	V5	-

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Historic buildings and museums	-	-	V2	-	V3	-	V5	V4	V5	-
Homes and residential structures	-	-	V3	-	V5	V3	V5	V5	V5	V3
Medical and care facilities	-	-	V2	-	-	-	-	V3	-	-
Public safety buildings	-	-	V1	-	V4	V2	V3	V2	V3	-
Public schools	-	-	V3	-	V3	-	V3	V3	V3	V1
Economic Drivers										
Accommodation and tourism	-	V3	V3	V3	V5	-	V3	V3	V5	V4
Education services	-	V2	V3	V3	V3	-	V2	V2	V3	V3
Healthcare services	-	-	V2	V2	V2	-	V1	V3	V1	V2
Major employers	-	-	V3	V3	V3	V2	V3	V3	V3	V3
Retail	-	V1	V2	V3	V4	V2	V3	V2	V4	V2

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Travis Air Force Base	-	V1	V2	V2	V1	V1	-	V4	-	V2
Ecosystems and Natural Resources										
Grassland	V2	V3	V2	-	V3	-	V2	V1	V2	V3
Wetland and marsh	V3	V4	V4	-	V4	-	V5	V2	V5	V3
Riparian and Riverine habitats	V3	V4	V3	-	V3	-	V4	V4	V3	V3
Key Services										
Communications services	V2	-	V3	-	V2	V2	V1	V4	V2	V3
Emergency medical response	-	-	V2	V4	V3	-	V2	V3	V3	V2
Energy delivery	-	V2	V5	-	V2	V3	V3	V5	V3	V5
Government administration	-	-	V2	V1	V4	V2	V3	V3	V4	V1
Public safety response	-	-	V2	V3	V3	V1	V3	V3	V3	V2

Populations and Assets	Agriculture and Ecosystem Pests	Drought	Extreme Heat and Warm Nights	Human Health Hazards	Inland Flooding	Landslides	Sea Level Rise	Severe Weather	Shoreline Flooding	Wildfire and Smoke
Public transit access	-	-	V4	V2	V4	V3	V3	V3	V5	V4
Solid waste removal	-	-	V3	V3	V4	V2	V4	V2	V4	V3
Water and wastewater treatment, delivery, and collection	-	V5	V3	-	V5	V3	V3	V3	V3	V4

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